WARNING:
Improper installation, set-up, modification, operation or maintenance of the heating system can cause personal injury and property damage. Follow these instructions precisely.
If you require assistance or further information, contact a trained and certified installer or the gas supply company.

WARNING:
The operating instructions are part of the technical documents that must be handed over to the owner or operator of the heating system. Explain to the owner or operator how to use the heating system using the operating instructions. Make sure that they are familiar with all required information for the safe and proper operation of the heating system.

These instructions are available in English and French.

Please keep these instructions for future reference.

Residential Gas Condensing Boiler
Greenstar combi 100 p / 151 p
ZWB28-3A... | ZWB42-3A...
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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
minimizing danger are not taken.

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

⚠️ DANGER:

DANGER indicates a hazardous situation which, if not avoided, could
result in death or serious injury.

⚠️ WARNING:

WARNING indicates a hazardous situation which, if not avoided, could
result in death or serious injury.

⚠️ CAUTION:

CAUTION indicates a hazardous situation which, if not avoided, could
result in minor to moderate injury.

⚠️ NOTICE:

NOTICE is used to address practices not related to personal injury.

Table 1

Additional symbols

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>▶</td>
<td>Sequence of steps</td>
</tr>
<tr>
<td>➔</td>
<td>Cross-reference to another part of the document</td>
</tr>
<tr>
<td>•</td>
<td>Listing/list entry</td>
</tr>
<tr>
<td>–</td>
<td>Listing/list entry (2nd level)</td>
</tr>
</tbody>
</table>
1.2 General safety instructions

If you hear gas leaking!
▶ Leave the building immediately.
▶ Prevent others from entering the building.
▶ Notify the police and fire department from outside the building.
▶ From outside the building, call the gas supply company and a trained and certified installer or service company.

⚠️ If you smell gas
▶ Turn off the gas shut-off valve.
▶ Open windows and doors.
▶ Do not touch any electrical switch, telephone, and do not use outlets.
▶ Extinguish all open flames.
▶ Do not smoke!
▶ Do not use lighters!
▶ Warn all occupants of the building, but do not ring any bell.
▶ From outside the building, call the gas supply company and a trained and certified installer or service company.

If you smell flue gas!
▶ Switch off the heating system by shutting off the emergency shut-off switch.
▶ Open windows and doors.
▶ Call a trained and certified installer or service company.

DANGER: Risk of fatal injury from failing to consider your own safety!
▶ Never risk your own life. Your own safety must always take the highest priority.

NOTICE: Risk of appliance damage from improper operation of the boiler!
▶ Only use the boiler for its intended purpose.
▶ Only operate the boiler if it has been installed and maintained per the instructions provided in the Installation Manual.
▶ Do not attempt to operate an appliance if any part of it is not in working order or is damaged.
▶ Use only original spare parts! The use of parts not supplied by the manufacturer may cause damage to the boiler, other property and personal injury. Also, boiler damage caused by the use of unauthorized parts is not covered by the warranty.

DANGER: Risk of fire when soldering and brazing!
▶ Take appropriate protective measures when soldering and brazing around combustible and flammable material.

NOTICE:
▶ The installation must comply with all applicable national, state, and local codes, rules, and regulations.
▶ The operator is responsible for the operational safety and regulatory compliance of the heating system.

DANGER: Risk of personal injury or death from flue gas poisoning!
▶ Do not install a thermostatic flue gas damper downstream of the draft hood.
▶ Do not tamper with, remove, or attempt to repair the blocked vent switch.
▶ When replacing the blocked vent switch, install the new part in the original location.
▶ A blocked vent switch tripping more than once indicates a problem with the venting system or chimney which must be repaired immediately.
▶ Ensure none of the vent pipes and chimneys are damaged or blocked.
▶ Connect only one appliance to each venting system or chimney.
▶ The venting system must not feed into or route through another air extraction duct.
▶ The venting system must be inspected annually. All parts that show any signs of damage or corrosion must be replaced.
▶ Never close off or reduce the size of the combustion air openings.
▶ The boiler must not be operated until any obstructions have been removed.

DANGER: Risk of personal injury or death from explosion!
▶ Work on gas components may only be carried out by a trained and certified installer or service company.
▶ Appliance installation, the connection of gas and vent piping, initial commissioning, electrical connections, and service and maintenance must only be carried out by a trained and certified installer or service company.

DANGER: Risk of personal injury or death from fire!
▶ Do not use flammable or combustible material in the boiler room.
▶ It is recommended not to store any items within 16 inches (415mm) of the appliance.

CAUTION: Appliance damage from contaminated combustion air!
▶ Keep the combustion air free of corrosive substances, e.g. halogenated hydrocarbons from painting operations or beauty salons.
▶ Keep combustion air free from dust and lint, e.g. from laundry or agricultural operations.
▶ If clean room air is not available, fresh outdoor combustion air must be provided.

DANGER: Risk of personal injury or death from electric shock!
▶ Before removing the front panel, disconnect the heating system from the electrical power supply by shutting off the emergency shutoff switch or the heating system circuit breaker.
▶ It is not enough to switch off the control panel. **Power to the panel must be disconnected!** Ensure that the power is not restored unintentionally by following proper lock out/tag out procedures.
▶ Only qualified electricians are permitted to carry out electrical work.

DANGER: Safety devices!
▶ Never shut off safety valves!
▶ Hot water may escape from the safety valve at any time when the appliance is running.

DANGER: Risk of personal injury or death after a flood!
▶ Do not attempt to operate an appliance if any part of it has been under water.
▶ An appliance that was subject to flooding must be replaced.
NOTICE:

- Upon completion of the installation, these instructions should be handed to the owner and operator of the appliance.
- The installer must instruct the owner and operator on the functionality of the components and the proper operation of the boiler and the heating system.
- The boiler must be serviced annually including the main burner, ignition burner, the entire venting system, and the combustion air supply. All parts that show any signs of damage or corrosion must be replaced.

2 Scope of delivery

![Scope of delivery combi boiler ZWB..-3A](image)

- [1] Gas condensing boiler
- [2] Set of documents for appliance
- [3] Mounting bracket with mounting kit
- [4] Hydraulics connection plate with mounting kit
- [5] Gas conversion kit
- [6] Adapter for connection of a LWCO

3 Product Description

ZWB appliances are residential combi boilers for central heating and on demand DHW heating.

The appliances comply with South Coast Air Quality Management District (SCAQMD) 2012 requirements: (Type-1) 14 Ng/J NOx (and/or 20 ppm at 3 % O2).

3.1 Proper use

The Greenstar boiler is not for use in CSD-1 commercial installation.

The appliance may only be installed in closed loop hot water central heating systems.

Any other purpose is considered improper use. Any resulting damage is excluded from the manufacturer’s warranty.

The commercial and industrial use of the appliance for generating process heat is not permitted.

3.2 Overview of boiler types

| ZWB28-3 | A | 23 | Greenstar combi 100 p |
| ZWB42-3 | A | 23 | Greenstar combi 151 p |

| Z | Central heating appliance |
| W | DHW heating |
| B | Condensing technology |
| 28 | Output and DHW output up to 95,500 BTU/hr (28 kW) |
| 42 | Output and DHW output up to 143,300 BTU/hr (42 kW) |
| -3 | Version |
| A | Fan-supported appliance |
| 23 | Natural gas (NG) |

3.3 Rating plate

The rating plate is located at the right side of the appliance.

![Data plate location](image)

The rating plate contains the appliance output, model number, approval data and serial number.
3.4 Appliance description

- Appliance for wall installation, regardless of chimney and room size
- Intelligent boiler pump control
- Heatronic boiler control with 2-wire BUS
- Three-speed boiler circulator
- Automatic air vent
- Display
- Automatic ignition
- Continuously-controlled output
- Full protection via the Heatronic with flame rod and solenoid valves
- No minimum circulating water flow rate required
- Suitable for radiant floor heating
- Flue adapter for flue gas and combustion air with test ports
- Variable speed fan
- Gas premix burner
- Temperature sensor and temperature control for space heating
- Supply temperature sensor
- Temperature limit sensor
- Safety relief valve, pressure gauge
- Flue gas temperature limiter
- DHW priority switching
- Motorized 3-way valve
- Hydraulics connection plate

3.5 Accessories

Here you will find a list of typical accessories for this appliance. Refer to the Product Catalog for a complete overview of all available accessories.

- Adapter for separate pipe routing USA → Chapter 6.7, page 23. This adapter is needed for connection of standard PVC vent pipes.
- Concentric flue gas accessories → Chapter 6.7, page 23. This flue gas accessory is used for concentric flue gas routing.
- Neutralizer NBT-23 · condensing (part number 7 738 005 514)
- Neutralizing agent for neutralizer NBT-23 (part number 7 738 005 515)
- Cleaning blade for WB-5 (accessory number 1061, part number 7 719 002 503)
- Cleaning brush kit for WB-5 (accessory number 1060, part number 7 719 002 502)
- Supply temperature sensor (part number 8 737 700 289 0)
- Bosch remote control CRC 100 (part number 7 738 110 090): The CRC 100 is a comfort-enhancing room thermostat for measuring the room temperature and automatic adjustment to the desired room temperature. Optional combination with CZM 100 and CRC 200.
- Bosch remote control CRC 200 (part number 7 738 111 034): The CRC 200 is a largely programmable room thermostat for measuring the room temperature and automatic adjustment to the desired room temperature. Optional combination with CZM 100 and CRC 100.
- Bosch Zone module CZM 100 (part number 7 738 110 112): The CZM 100 is an expansion module for several heating zones with valves or pumps. Optional combination with CRC 100 and CRC 200.
- Bosch remote control FW 200 USA (part number 8 718 226 215 0): weather-compensated heating controller. Optional combination with ICM 100.
- Cascade module ICM 100 (part number 7 719 003 528): The ICM 100 makes it possible to increase the total output of the system through use of several heat sources. Optional combination with FW 200.
3.6 Product dimensions and minimum clearances

Fig. 3 Dimensions and minimum clearances (front view, rear view, side view)

[1] Outer jacket complete
[2] Front cover
[3] Hydraulics connection plate

(*) Zero clearance from combustibles permitted, but 4" (102 mm) recommended for serviceability

(**) Distance to door, if mounted inside a closet
3.7 ZWB..-3A appliance layout

Fig. 4 ZWB..-3A appliance layout
Key to Fig. 4:
[1] Heatronic
[2] ON/OFF power switch
[3] Burner operation indicator lamp
[4] Service button
[5] Emissions test button
[6] Boiler high limit dial
[8] DHW thermostat
[9] Key pad lock
[10] ECO button
[12] Display
[13] Condensate trap
[14] Test ports for inlet gas pressure
[15] Adjustment screw, minimum gas volume
[16] DHW temperature sensor
[17] Plate-type heat exchanger
[18] Automatic air vent
[19] Maximum gas adjuster
[20] Flue gas temperature limiter
[21] Combustion air intake
[22] Supply pipe
[23] Connection for optional low water cut off (LWCO)
[24] Additional supply temperature limiter
[25] Gas/air premix chamber
[26] Fan
[27] Bracket
[28] Wall hanging bracket
[29] Exhaust pipe
[30] Flame viewing window
[31] Set of electrodes complete
[32] Supply temperature sensor
[33] Boiler block temperature limiter
[34] Inspection and cleanout cover
[35] Condensate collector
[36] Flow meter
[37] 3-way valve
[38] Drain cock
[39] Condensate drain hose
[40] Boiler circulator
[41] Pump speed switch
[42] Pressure relief valve (heating zone)
[43] Safety relief valve discharge hose
[44] Boiler water pressure gauge
3.8 Electrical wiring

Key to Fig. 5:

1. Ignition transformer
2. Boiler high limit dial
3. 120 VAC connection
4. Fuse T 6.3 A (120 VAC)
5. DHW thermostat
6. External safety high limit or low water cut off (LWCO)
7. BUS connection, e.g. heating control
8. Room thermostat – dry contact
9. Outdoor temperature sensor
10. Code plug
11. Diagnostic interface
12. ON/OFF power switch
13. Gas valve
14. Fan
15. Flue gas temperature limiter
16. Supply temperature sensor
17. Flame rod electrode
18. Ignition electrode
19. Boiler block temperature limiter
20. DHW temperature sensor
21. Boiler circulator
22. 3-way valve (Space heating/DHW heating)
23. Flow turbine complete
24. Additional supply temperature limiter
25. External system supply temperature sensor
# 3.9 Technical data

<table>
<thead>
<tr>
<th>Input/Output</th>
<th>Unit</th>
<th>Greenstar combi 100 p, ZWB28-3A... NG</th>
<th>LPG (propane)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max. input rate 180/79 °F (82/26 °C)</td>
<td>BTU/hr (kW)</td>
<td>100,000 (29.3)</td>
<td>98,600 (28.9)</td>
</tr>
<tr>
<td>Max. output rate 104/86 °F (40/30 °C)</td>
<td>BTU/hr (kW)</td>
<td>93,800 (27.5)</td>
<td>93,800 (27.5)</td>
</tr>
<tr>
<td>Output rate domestic hot water (DHW), 113 °F (45 °C)</td>
<td>BTU/hr (kW)</td>
<td>93,600 (27.4)</td>
<td>93,600 (27.4)</td>
</tr>
<tr>
<td>Min. input rate 180/79 °F (82/26 °C)</td>
<td>BTU/hr (kW)</td>
<td>24,600 (7.2)</td>
<td>40,100 (11.7)</td>
</tr>
<tr>
<td>Min. output rate 104/86 °F (40/30 °C)</td>
<td>BTU/hr (kW)</td>
<td>23,900 (7.0)</td>
<td>39,900 (11.7)</td>
</tr>
</tbody>
</table>

## Gas connection value

| Natural Gas – $H_g = 1,010$ BTU/ft³ (37.3MJ/m³) | BTU/ft³ (MJ/m³) | 99 (2.8) | – |
| Liquid Propane Gas – $H_{D,S} = 2,500$ BTU/ft³ (93.1MJ/m³) | BTU/ft³ (MJ/m³) | – | 39 (1.1) |

## Permissible inlet gas pressure

| NG | in. W.C. (mbar) | 3.5-10.5” (8.7-26.1) | – |
| LPG (propane) | in. W.C. (mbar) | – | 8-13” (19.9-32.3) |

## DHW

| Max. DHW flow rate | gpm (l/min) | 2.64 (10) | 2.64 (10) |
| Nominal DHW flow rate (at 140 °F (60 °C) outlet temperature) | gpm (l/min) | 2.03 (7.7) | 2.03 (7.7) |
| Outlet temperature | °F (°C) | 104 - 140 (40 - 60) | 104 - 140 (40 - 60) |
| Max. cold water inlet temperature | °F (°C) | 140 (60) | 140 (60) |
| Max. approved DHW pressure | psi (bar) | 150 (10.3) | 150 (10.3) |
| Minimum water pressure | psi (bar) | 3.45 (0.3) | 3.45 (0.3) |

## Flue gas

| Flue gas mass flow at maximum/minimum nominal output | g/s | 12.0/3.2 | 11.7/4.9 |
| Flue gas temperature 176/140 °F (80/60 °C) at maximum/minimum nominal heat input | °F (°C) | 147/133 (64/56) | 147/133 (64/56) |
| Flue gas temperature 104/86 °F (40/30 °C) at maximum/minimum nominal heat input | °F (°C) | 117/90 (47/32) | 117/90 (47/32) |
| CO₂ at max. nominal output | % | 9.4 | 11.0 |
| CO₂ at minimum nominal output | % | 8.6 | 10.4 |

## Condensate

| Max. condensate quantity (t_R = 86 °F (30 °C)) | gph (l/h) | 0.6 (2.3) | 0.6 (2.3) |
| pH level, approx. | | 4.8 | 4.8 |

## General

| Voltage | VAC | 120 | 120 |
| Frequency | Hz | 60 | 60 |
| Max. power consumption (central heating mode) | W | 205 | 205 |
| Max. power consumption (Stand-by) | W | < 6 | < 6 |
| Sound pressure level | dB(A) | ≤ 39 | ≤ 39 |
| Max. supply temperature | °F (°C) | 187 (86) | 187 (86) |
| Max. permissible operating pressure (P<sub>MS</sub>) heating | psi (bar) | 30 (2.07) | 30 (2.07) |
| Permissible ambient temperature | °F (°C) | 32 - 122 (0 - 50) | 32 - 122 (0 - 50) |
| Nominal water capacity (heating) | gal (l) | 0.925 (3.5) | 0.925 (3.5) |
| Weight (without packaging) | lbs. (kg) | 110.2 (50) | 110.2 (50) |
| Dimensions, W x H x D | inch (mm) | 17-21/64” × 33-15/32” × 13-57/64” (440 × 850 × 353) |

---

Table 3 Technical data ZWB28-3A...
### Input/Output at elevation 0 - 2000 feet (0 - 610 m) above sea level

<table>
<thead>
<tr>
<th>Description</th>
<th>Unit</th>
<th>NG</th>
<th>LPG (propane)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max. input rate 180/79 °F (82/26 °C)</td>
<td>BTU/hr (kW)</td>
<td>151.600 (44.4)</td>
<td>148.300 (43.5)</td>
</tr>
<tr>
<td>Max. output rate 104/86 °F (40/30 °C)</td>
<td>BTU/hr (kW)</td>
<td>137.500 (40.3)</td>
<td>137.500 (40.3)</td>
</tr>
<tr>
<td>Max. output rate 122/86 °F (50/30 °C)</td>
<td>BTU/hr (kW)</td>
<td>137.500 (40.3)</td>
<td>137.500 (40.3)</td>
</tr>
<tr>
<td>Max. output rate 176/140 °F (80/60 °C)</td>
<td>BTU/hr (kW)</td>
<td>134.400 (39.4)</td>
<td>134.400 (39.4)</td>
</tr>
<tr>
<td>Output rate domestic hot water (DHW), 113 °F (45 °C)</td>
<td>BTU/hr (kW)</td>
<td>137.500 (40.3)</td>
<td>137.500 (40.3)</td>
</tr>
<tr>
<td>Output rate domestic hot water (DHW), 140 °F (60 °C)</td>
<td>BTU/hr (kW)</td>
<td>135.800 (39.8)</td>
<td>135.800 (39.8)</td>
</tr>
<tr>
<td>Min. input rate 180/79 °F (82/26 °C)</td>
<td>BTU/hr (kW)</td>
<td>35.500 (10.4)</td>
<td>46.100 (13.6)</td>
</tr>
<tr>
<td>Min. output rate 104/86 °F (40/30 °C)</td>
<td>BTU/hr (kW)</td>
<td>35.500 (10.4)</td>
<td>46.100 (13.6)</td>
</tr>
<tr>
<td>Min. output rate 122/86 °F (50/30 °C)</td>
<td>BTU/hr (kW)</td>
<td>35.100 (10.3)</td>
<td>46.100 (13.5)</td>
</tr>
<tr>
<td>Min. output rate 176/140 °F (80/60 °C)</td>
<td>BTU/hr (kW)</td>
<td>31.700 (9.3)</td>
<td>42.000 (12.3)</td>
</tr>
</tbody>
</table>

### Input/Output at elevation 2000 - 4500 feet (611 - 1372 m) above sea level

<table>
<thead>
<tr>
<th>Description</th>
<th>Unit</th>
<th>NG</th>
<th>LPG (propane)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max. input rate 180/79 °F (82/26 °C)</td>
<td>BTU/hr (kW)</td>
<td>136.440 (40.0)</td>
<td>139.402 (40.9)</td>
</tr>
<tr>
<td>Max. output rate 104/86 °F (40/30 °C)</td>
<td>BTU/hr (kW)</td>
<td>123.750 (36.3)</td>
<td>129.250 (37.9)</td>
</tr>
<tr>
<td>Max. output rate 122/86 °F (50/30 °C)</td>
<td>BTU/hr (kW)</td>
<td>123.750 (36.3)</td>
<td>129.250 (37.9)</td>
</tr>
<tr>
<td>Max. output rate 176/140 °F (80/60 °C)</td>
<td>BTU/hr (kW)</td>
<td>120.960 (35.5)</td>
<td>126.336 (37.0)</td>
</tr>
<tr>
<td>Output rate domestic hot water (DHW), 113 °F (45 °C)</td>
<td>BTU/hr (kW)</td>
<td>123.750 (36.3)</td>
<td>129.250 (37.9)</td>
</tr>
<tr>
<td>Output rate domestic hot water (DHW), 140 °F (60 °C)</td>
<td>BTU/hr (kW)</td>
<td>122.220 (35.8)</td>
<td>127.652 (37.4)</td>
</tr>
</tbody>
</table>

### Input/Output at elevation 4500 - 7000 feet (1373 - 2134 m) above sea level

<table>
<thead>
<tr>
<th>Description</th>
<th>Unit</th>
<th>NG</th>
<th>LPG (propane)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max. input rate 180/79 °F (82/26 °C)</td>
<td>BTU/hr (kW)</td>
<td>125.828 (36.9)</td>
<td>129.021 (37.8)</td>
</tr>
<tr>
<td>Max. output rate 104/86 °F (40/30 °C)</td>
<td>BTU/hr (kW)</td>
<td>114.125 (33.5)</td>
<td>119.252 (35.1)</td>
</tr>
<tr>
<td>Max. output rate 122/86 °F (50/30 °C)</td>
<td>BTU/hr (kW)</td>
<td>114.125 (33.5)</td>
<td>119.252 (35.1)</td>
</tr>
<tr>
<td>Max. output rate 176/140 °F (80/60 °C)</td>
<td>BTU/hr (kW)</td>
<td>111.552 (32.7)</td>
<td>116.928 (34.3)</td>
</tr>
<tr>
<td>Output rate domestic hot water (DHW), 113 °F (45 °C)</td>
<td>BTU/hr (kW)</td>
<td>114.125 (33.5)</td>
<td>119.252 (35.1)</td>
</tr>
<tr>
<td>Output rate domestic hot water (DHW), 140 °F (60 °C)</td>
<td>BTU/hr (kW)</td>
<td>112.714 (33.0)</td>
<td>118.146 (34.6)</td>
</tr>
</tbody>
</table>

### Gas connection value

<table>
<thead>
<tr>
<th>Description</th>
<th>Unit</th>
<th>NG</th>
<th>LPG (propane)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Natural gas – H₄ = 1.010 BTU/ft³ (37.3MJ/m³)</td>
<td>BTU/ft³ (MJ/m³)</td>
<td>149 (4.2)</td>
<td>–</td>
</tr>
<tr>
<td>LPG propane – Hᵔₛ = 2.500 BTU/ft³ (93.1MJ/m³)</td>
<td>BTU/ft³ (MJ/m³)</td>
<td>–</td>
<td>59 (1.7)</td>
</tr>
</tbody>
</table>

### Permissible inlet gas pressure

<table>
<thead>
<tr>
<th>Description</th>
<th>* W.C. (mbar)</th>
<th>NG</th>
<th>LPG (propane)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max. DHW flow rate</td>
<td>3.5-10.5 (8.7-26.1)</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Nominal DHW flow rate (at 140 °F (60 °C) outlet temperature)</td>
<td>140 (60)</td>
<td>140 (60)</td>
<td>–</td>
</tr>
<tr>
<td>Outlet temperature</td>
<td>104 - 140 (40 - 60)</td>
<td>104 - 140 (40 - 60)</td>
<td>–</td>
</tr>
<tr>
<td>Max. cold water inlet temperature</td>
<td>3.61 (11.4)</td>
<td>3.61 (11.4)</td>
<td>–</td>
</tr>
<tr>
<td>Max. approved DHW pressure</td>
<td>150 (10.3)</td>
<td>150 (10.3)</td>
<td>150 (10.3)</td>
</tr>
<tr>
<td>Minimum water pressure</td>
<td>4.35 (0.3)</td>
<td>4.35 (0.3)</td>
<td>4.35 (0.3)</td>
</tr>
</tbody>
</table>

### Flue gas

<table>
<thead>
<tr>
<th>Description</th>
<th>g/s</th>
<th>NG</th>
<th>LPG (propane)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max. cold water inlet temperature</td>
<td>18.0/4.5</td>
<td>17.5/5.6</td>
<td>–</td>
</tr>
<tr>
<td>Flue gas temperature 176/140 °F (80/60 °C) at maximum/minimum nominal heat input</td>
<td>171/135 (77/57)</td>
<td>171/135 (77/57)</td>
<td>–</td>
</tr>
<tr>
<td>CO₂ at max. nominal output</td>
<td>9.4</td>
<td>11.0</td>
<td>10.4</td>
</tr>
<tr>
<td>CO₂ at minimum nominal output</td>
<td>8.6</td>
<td>–</td>
<td>10.4</td>
</tr>
</tbody>
</table>

### Condensate

<table>
<thead>
<tr>
<th>Description</th>
<th>gph (l/h)</th>
<th>NG</th>
<th>LPG (propane)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max. condensate quantity (tᵣ = 86 °F (30 °C))</td>
<td>0.9 (3.5)</td>
<td>0.9 (3.5)</td>
<td>–</td>
</tr>
<tr>
<td>pH level, approx.</td>
<td>4.8</td>
<td>4.8</td>
<td>–</td>
</tr>
</tbody>
</table>
4 Regulations

Observe all rules, regulations, standards and guidelines applicable to the installation and operation of this appliance in your country.

Valves external to the boiler must be fitted with T-handles and condensate piping must be installed in accordance with the State Plumbing Code.

4.1 Compliance with standards and regulations

The installation must conform to the requirements of the authority having jurisdiction or, in the absence of such requirements, to the latest edition of the National Fuel Gas Code, ANSI Z223.1./NFPA 54. In Canada, installation must be in accordance with the requirements of CAN/CSA B149.1, Natural Gas and Propane Installation Code.

This wall-mounted condensing gas boiler complies in its design and mode of operation with the American National Standard ANSI Z21.13/CSA4.9, latest edition for Gas-Fired Low-Pressure Steam and Hot Water Boilers.

Other confirmed approvals and certifications are indicated by labels on the boiler.

If so advised by the responsible agency, the installation must satisfy the requirements of the standard for Controls and Safety Devices for Automatically Fired Boilers, ANSI/ASME CSD-1.

Install CO detectors per local regulations. Wall-mounted gas condensing boilers require yearly maintenance (→ Chapter 14, page 48).
4.2 Operating limits of the boiler
The heat exchanger has been designed and certified in accordance with the ASME Boiler and Pressure Vessel Code, Section IV.

<table>
<thead>
<tr>
<th>Maximum boiler temperature</th>
<th>187 °F (86 °C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum operating pressure</td>
<td>30 psi (2.07 bar)</td>
</tr>
</tbody>
</table>

Table 6  Operating limits

The hot water distribution system must comply with all applicable codes and regulations. When replacing an existing boiler, it is important to check the condition of the entire hot water distribution system to ensure safe operation.

Common practice calls for inspecting an existing system in its entirety and bringing it up to code. All pipework should be properly cleaned and flushed.

4.3 Additional regulations for installations in the Commonwealth of Massachusetts

(a) For all side wall side horizontally vented gas fueled equipment installed in every dwelling, building or structure used in whole or in part for residential purposes, including those owned or operated by the Commonwealth and where the side wall exhaust vent termination is less than seven (7) feet [2150 mm] above finished grade in the area of the venting, including but not limited to decks and porches, the following requirements shall be satisfied:

- INSTALLATION OF CARBON MONOXIDE DETECTORS. At the time of installation of the side wall horizontal vented gas-fueled equipment, the installing plumber or gas fitter shall ensure that a hard-wired carbon monoxide detector with an alarm and uninterruptible power supply is installed on the floor level where the gas equipment is to be installed. In addition, the installing plumber or gas fitter shall ensure that a battery-operated or hard-wired carbon monoxide detector with an alarm is installed on each additional level of the dwelling, building or structure served by the side wall horizontal vented gas-fueled equipment. It shall be the responsibility of the property owner to secure the services of qualified licensed professionals for the installation of hard-wired carbon monoxide detectors.
  - In the event that the side wall horizontally vented gas-fueled equipment is installed in a crawl space or an attic, the hard-wired carbon monoxide detector with alarm and uninterruptible power supply may be installed on the next adjacent floor level.
  - In the event that the requirements of this subsection can not be met at the time of completion of installation, the owner shall have a period of thirty (30) days to comply with the above requirements; provided, however, that during said thirty (30) day period, a battery-operated carbon monoxide detector with an alarm shall be installed.

- APPROVED CARBON MONOXIDE DETECTORS. Each carbon monoxide detector as required in accordance with the above provisions shall comply with NPA 720 and be ANSI/UL 2034 listed and IAS certified.

- SIGNAGE. A metal or plastic identification plate shall be permanently mounted to the exterior of the building at a minimum height of eight (8) feet above grade directly in line with the exhaust vent terminal for the horizontally vented gas-fired heating appliance or equipment. The sign shall read, in print size no less than one-half (½) inch in size, “GAS VENT DIRECTLY BELOW. DO NOT BLOCK.”

- CHECK. The state or local gas inspector of the side wall horizontally vented gas-fueled equipment shall not approve the installation unless, upon inspections, the inspector observes carbon monoxide detectors and signage installed in accordance with the provisions of 248 CRM 5.08(2)(a) 1 through 4.

(b) EXEMPTIONS: The following equipment is exempt from 248 CRM 5.08(2)(a) 1 through 4:

- The equipment listed in Section 10 entitled “Equipment Not Required To Be Vented” in the most current edition of NFPA 54 as adopted by the board; and
- Approved side wall horizontally vented gas-fueled equipment installed in a room or structure separate from the dwelling, building or structure used in whole or in part for residential purposes.

(c) MANUFACTURER’S REQUIREMENTS - GAS EQUIPMENT VENTING SYSTEM REQUIRED. When the manufacturer of Product Approved side wall horizontally mounted gas-fueled equipment provides a venting system design or venting system components with the equipment, the instructions provided by the manufacturer for the installation of the equipment and venting shall include:

  - Detailed instructions for the installation of the venting system or the venting system components; and
  - a comprehensive parts list for the design and the components of the venting system.

(d) MANUFACTURER’S REQUIREMENTS – NO VENTING SYSTEM FOR GAS EQUIPMENT INCLUDED IN THE SCOPE OF DELIVERY. When the manufacturer of Product Approved side wall horizontally vented gas-fueled equipment does not provide the parts for the venting of flue gases, but identifies “special venting systems”, the following requirements shall be satisfied by the manufacturer:

  - The referenced “special venting systems” shall be included with the appliance or equipment installation instructions.
  - The “special venting systems” shall be Product Approved by the Board, and the instructions for that system shall include a parts list and detailed installation instructions.

(e) A copy of all instructions for all Product Approved side wall horizontally vented gas-fueled equipment, all venting instructions, all parts lists for venting instructions, and/or venting design instructions shall remain with the appliance or equipment at the completion of the installation.
5 Examples of Installations

5.1 Multiple zones using zone valves with DHW

Fig. 6 Piping

1. Motorized valve heating zone 3
2. To heating zone 3
3. Bosch room temperature controller heating zone 3 (CRC100)
4. Motorized valve heating zone 2
5. To heating zone 2
6. Bosch room temperature controller heating zone 2 (CRC100)
7. Motorized valve heating zone 1
8. To heating zone 1
9. Bosch controller heating zone 1 and DHW (CRC200)
10. System pump
11. Comfort Zone Module CZM100
12. Gas condensing boiler
13. Boiler primary line - supply pipe 1"
14. DHW
15. External system supply temperature sensor for system supply pipe (to be installed in closest vicinity with boiler supply Tee)
16. Cold water
17. Boiler primary line - return pipe 1"
18. From heating zone 1
19. From heating zone 2
20. From heating zone 3
21. Expansion vessel (accessory)

X ≤ 4 × pipe diameters on boiler primary side (here ≤ 4 × 1")

For all accessories not included in the package please refer to the Bosch Product Catalog.
[1] PCB in wall-mounted gas condensing boiler
[2] 120 V AC mains power (white plug) (→ Chapter 7.3, page 34)
[3] 120 V AC, 60 Hz
[4] System pump
[5] External system supply temperature sensor for system supply pipe
[6] Motorized valve heating zone 1
[7] Motorized valve heating zone 2
[8] Motorized valve heating zone 3
[9] 24 V AC transformer
[10] Outdoor temperature sensor
[12] DHW temperature sensor (inside gas condensing boiler)
[13] Optionally connect external system supply temperature sensor for system supply pipe here (with white plug)

For all accessories not included in the package please refer to the Bosch Product Catalog.
5.2 Multiple zones using circulators with DHW

Fig. 8  Piping

[1] Pump heating zone 3
[2] To heating zone 3
[3] Bosch room temperature controller heating zone 3 (CRC100)
[4] Pump heating zone 2
[5] To heating zone 2
[6] Bosch room temperature controller heating zone 2 (CRC100)
[7] Pump heating zone 1
[8] To heating zone 1
[9] Bosch controller heating zone 1 and DHW (CRC200)
[10] Comfort Zone Module CZM100
[12] Boiler primary line - supply pipe 1"
[13] DHW
[14] External system supply temperature sensor for system supply pipe (to be installed in closest vicinity with boiler supply Tee)
[15] Cold water
[16] Boiler primary line - return pipe 1"
[17] From heating zone 1
[18] From heating zone 2
[19] From heating zone 3
[20] Expansion vessel (accessory)

X  \leq 4 \times \text{pipe diameters on boiler primary side (here } \leq 4 \times 1"

For all accessories not included in the package please refer to the Bosch Product Catalog.
Fig. 9  Wiring

[1] PCB in wall-mounted gas condensing boiler
[2] 120 V AC mains power (white plug) (→ Chapter 7.3, page 34)
[3] 120 V AC, 60 Hz
[4] Pump heating zone 1
[5] Pump heating zone 2
[6] Pump heating zone 3
[7] External system supply temperature sensor for system supply pipe
[8] Outdoor temperature sensor
[9] LWCO (Low Water Cut Off, 24V AC Transformer required)
[10] DHW temperature sensor (inside gas condensing boiler)
[11] Optionally connect external system supply temperature sensor for system supply pipe here (with white plug)

i
For all accessories not included in the package please refer to the Bosch Product Catalog.
6 Notes on installation and operation

DANGER:

Explosion!

▶ Close the gas cock prior to working on the gas train.
▶ Check for gas leaks after carrying out work on the gas train.

Installation, power connection, connection on the gas and flue gas side and commissioning must only be carried out by a contractor certified for such work by the state or local jurisdiction or the local gas or power utility.

6.1 Notes on installation and operation

When installing and operating the heating system observe the following:

• The elevation of the installation location above sea level must be taken into account (Chapter 11.2).
• Follow all local building regulations regarding the installation conditions on site.
• The local building regulations regarding air supply and venting systems and the chimney flue connection.
• Electrical code requirements for connection to the electrical power supply.
• The technical regulations of the gas company regarding the connection of the gas burner to the local gas main.
• The regulations and standards relating to the DHW heating system.

6.1.1 Important notes

Fill and make-up water for the heating system

Unsuitable fill and make-up water can result in the heating system scaling up or failing prematurely.

Recommended steps for commissioning a new or retrofit boiler installation

▶ Flush the system with clean water.
▶ Isolate the boiler, fill the system with fresh water and a boiler cleaner, run for 30 minutes to 1 hour. Under no circumstances may boiler cleaner be pumped through the boiler.
▶ Thoroughly flush the system with fresh water. Ensure all zones and loops are flushed.
▶ Empty out sediment traps.
▶ Systems containing antifreeze not approved by Bosch, must be completely flushed to ensure no old fluid remains.
▶ Fill the system with fresh water and the proper amount of inhibitor.
▶ Verify the pH is within the proper range.
▶ Add additional inhibitor if pH is not within the proper range.
▶ Check pH annually.
▶ If using antifreeze, fill with approved antifreeze and fresh water.
▶ Always follow the cleaner, antifreeze, or additive manufacturer’s instructions.
▶ Do not mix different manufacturer’s products.
▶ Follow manufacturer’s data to determine the anti-freeze ratio for the desired freeze protection temperature.

Recirculation pump/DHW recirculation lines

A recirculation pump can be installed. Control and electrical connection are not possible via the appliance's electronics. Additional accessories are required for this.

▶ Connect the DHW circulation line at the cold water inlet as close as possible to the hydraulics connection plate.

<table>
<thead>
<tr>
<th>Total length DHW/recirculation line</th>
<th>Flow rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤ 33 ft (10 m)</td>
<td>0.66 gpm (2.5 l/min)</td>
</tr>
<tr>
<td>33 - 66 ft (10 - 20 m)</td>
<td>0.92 gpm (3.5 l/min)</td>
</tr>
<tr>
<td>66 - 98 ft (20 - 30 m)</td>
<td>1.32 gpm (5 l/min)</td>
</tr>
</tbody>
</table>

Table 7 Recommended flow rates

You can display the flow rate through the heat exchanger with the service function 6.d current flow through the turbine (page 43).

Open vented heating systems

▶ Convert open vented heating systems into closed systems.

Gravity heating systems

▶ Connect the appliance to the existing piping system via a low-loss header with a sludge separator.

Galvanized radiators or pipes.

To prevent gas formation:

▶ Do not use galvanized radiators or pipes.

Plastic pipework

If using plastic pipework for the heating system (eg. underfloor/radiant heating), the type of pipe that should be used must be oxygen tight.

Use of a room temperature controller

▶ Do not install thermostatic valves on radiators in the primary room.

Primary-secondary piping or a low loss header

In the case of radiant floor heating, panel radiators, systems with several heating zones or 3/4" baseboard heating (≥ 70 ft (21 m), temperature difference ≥ 20 °F (11 °C), flow rate ≥ 4.0 gpm (15.1 L/min) plus the required supply and return pipes), hydraulic separation of the system is required, e.g. by means of a low-loss header.

Anti-freeze

NOTICE:
Insufficient antifreeze can accelerate corrosion.

▶ Follow manufacturer’s instructions on antifreeze concentration.
▶ Frost protection level has to be checked annually during the regular scheduled maintenance of the condensing boiler.

NOTICE:
System damage!

▶ It is the installer’s responsibility to ensure that the heating system is compatible with the boiler type and size installed.
▶ pH-value of the heating water to be kept between 7 and 8.5.
The following anti-freeze fluids and concentrations have been approved:

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>Concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nalco (Varidos) FSK</td>
<td>22 - 55 %</td>
</tr>
<tr>
<td>Fernox Alphi 11</td>
<td>Observe manufacturer's instructions</td>
</tr>
<tr>
<td>Intercool NFP-50 AA</td>
<td>0 - 39 %</td>
</tr>
<tr>
<td>Antifrogen N</td>
<td>Observe manufacturer's instructions</td>
</tr>
<tr>
<td>NoBurst AL</td>
<td>0 - 55 %</td>
</tr>
</tbody>
</table>

Table 8  Anti-freeze

Corrosion inhibitors

The following anti-corrosion agents are approved:

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>Concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fernox F1</td>
<td>Observe manufacturer's instructions</td>
</tr>
<tr>
<td>Nalco 77381</td>
<td>1 - 2 %</td>
</tr>
<tr>
<td>Sentinel X 100</td>
<td>1.1 %</td>
</tr>
</tbody>
</table>

Table 9  Corrosion inhibitors

- System fluid pH must be maintained between 7 and 8.5 to prevent system damage.
- Use only untreated water to fill the system.
- Do not use TSP (tri-sodium phosphate).
- Do not use fill water treated with salt bedding type exchangers (ion exchanger).
- Never introduce non-approved boiler treatment or similar additives.
- Only use fill water with a hardness below 7 grains.
- Filling with chlorinated water is acceptable if chlorine levels are below 100 ppm.
- Do not use inhibitors or other additives unless listed in this document.
- Consult a local water treatment specialist for recommendations if any of the above is outside the stated ranges.
- When using oxygen permeable PEX, the system must be separated from the boiler by a heat exchanger.
- A correctly sized and working expansion vessel must be installed.
- Do not exceed the maximum permissible flow rate through the boiler. Excessive flow can cause erosion damage to the heat exchanger.
- Eliminate leaks in the system
  Continuously topping up the system constantly adds oxygen to the heating water, causing corrosion damage. All system leaks must be repaired.

Boiler sealer

This boiler is not approved for use with boiler sealer.

LPG

To protect the appliance against high pressure (ANSI/Z223.1/NFPA54 (National fuel gas code) or CAN/CSA B 149.1 (Natural Gas and Propane installation code)):
- Install a pressure regulator with a safety valve.

6.1.2  Other important information

- The installation of this boiler must comply with all national and local code and regulations.
- Only operate this boiler with the combined air/flue system specifically designed and approved for it.
- Use only approved venting systems per the manufacturer's instructions.
- Do not dispose of untreated boiler condensate in septic systems.
- Inspect the sewer pipes for suitability before disposing of untreated boiler condensate in them.
- Verify with the local authority that disposing of untreated boiler condensate into public sewer systems is permitted.

6.2  Selecting an external expansion vessel

- Determine the size of the expansion vessel in compliance with local laws and regulations.

6.3  Selecting the installation location

Installation location requirements

Observe the current national and local codes and regulations.
- Observe country-specific requirements.
- Observe installation instructions of the venting system accessories and their clearances.

Combustion air

To avoid corrosion, keep the supply of combustion air free of corrosive substances; contained in solvents, paints, adhesives, propellants and domestic cleaning agents.

<table>
<thead>
<tr>
<th>Industrial sources</th>
<th>Chemical cleaning</th>
<th>Degreasing bath</th>
<th>Printing shops</th>
<th>Hair salons</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemicals</td>
<td>Trichloroethylene, tetrachloroethylene, fluorinated hydrocarbons</td>
<td>Perchloroethylene, trichloroethylene, methylchloroform</td>
<td>Trichloroethylene</td>
<td>Aerosol propellants, hydrocarbons containing fluorine and chlorine (difluorodichloromethane)</td>
</tr>
</tbody>
</table>
### Household sources

| Cleaning and degreasing agents | Perchloroethylene, methylchloroform, trichloroethylene, methylene chloride, carbon tetrachloride, hydrochloric acid |
| Workshops | Various chlorinated hydrocarbons |
| Aerosols | Chlorofluorinated hydrocarbons (difluorodichloromethane) |

### Table 10 Corrosive materials

#### Surface temperature

The max. surface temperature of this appliance is below 185 °F (85 °C). According to ANSI/Z223.1/NFPA54 (National fuel gas code) and CAN/CGA B 149.1 (Natural Gas and Propane installation code), the appliance is approved for zero clearance to combustibles. For servicing a clearance of 4" (102 mm) is recommended.

#### 6.4 Pre-installing pipes

- Secure the installation template supplied with the technical documentation to the wall; when doing so, observe the minimum side clearances of 4 inches (102 mm) (→ page 7).
- Drill holes for the appliance and for the hydraulics connection plate in accordance with the mounting template.

#### NOTICE:

For walls with insufficient load capacity, the appliance and the hydraulics connection plate must be mounted on a sheet of plywood or similar reinforcement.

#### Fig. 11 Mounting template

#### Fig. 12 Installing the hydraulics connection plate

#### Fig. 13 Hydraulics connection plate (front view)

- Remove the mounting template.

#### NOTICE:

The hydraulics connection plate (packed in cardboard) can be found in the air box of the appliance.

- Secure the hydraulics connection plate and the mounting bracket with the mounting kits supplied.

### Household sources

- Cleaning and degreasing agents: Perchloroethylene, methylchloroform, trichloroethylene, methylene chloride, carbon tetrachloride, hydrochloric acid
- Workshops: Various chlorinated hydrocarbons
- Aerosols: Chlorofluorinated hydrocarbons (difluorodichloromethane)

### Table 10 Corrosive materials

- **NOTICE:**
  - For walls with insufficient load capacity, the appliance and the hydraulics connection plate must be mounted on a sheet of plywood or similar reinforcement.

### Notices

- Remove the mounting template.

#### NOTICE:

The hydraulics connection plate (packed in cardboard) can be found in the air box of the appliance.

- Secure the hydraulics connection plate and the mounting bracket with the mounting kits supplied.
6.5 Mounting the appliance

**NOTICE:**
Residue, metal shavings, and contaminants in the piping can damage the appliance.
- Flush the piping thoroughly and completely to remove all residue.
- Follow the instructions with respect to water quality (→ Chapter 6.1.1, page 19).
- Remove packaging, observing all notes and symbols.
- On the type plate, check the identification of the target country and suitability for the gas type supplied by the local gas utility company (→ page 8).

**Removing the cover**

The cover is secured with two screws against unintentional removal (electrical safety).
- Always keep the cover secured with these screws.

- Undo screws (step 1).
- Lift strap (step 2) and remove cover toward the front (step 3).

**Hanging the appliance**

- Check that the gas type matches (→ data plate).
- Remove the transport brackets.
- Place the gaskets on the pipe connections.
- Hang the appliance.
- Check the positioning of the gaskets on the pipe connections.
- Tighten the union nuts on the pipe connections.
6.6 Installing the low water cut off (LWCO)

The boiler is equipped with a dedicated port for installation of a LWCO on the supply pipe inside the boiler cabinet. This location represents the minimum water level for safe operation of the boiler.

The LWCO device must be specified for an ambient temperature of 176 °F (80 °C) and a water temperature of 250 °F (121 °C). It needs a dry contact.

The following LWCO is approved with the boiler:

- Hydrolevel Safgard 1100

The device is available at most Bosch wholesalers. It requires an external 24VAC AC 20VA transformer provided on site.

When a different LWCO is used, it must be installed outside the wall-mounted gas condensing boiler.

The Hydrolevel Safgard 1100 is installed in the supply pipe to the left of the heat exchanger.

- Disconnect the boiler from power by shutting off the emergency shutoff switch or disengaging the heating system circuit breaker.
- Drain the boiler.
- Remove the safety clip from the dummy plug in the supply pipe (step 1).
- Pull off the dummy plug (step 2) and place with the boiler documentation.
- Ensure the O-ring remains in place on the pipe.
- Lubricate the O-ring.

![Fig. 16 Installing a LWCO device - removing dummy plug](image)

- Screw the LWCO as far as possible into LWCO adapter located in the boiler accessory kit. Follow the Hydrolevel Safgard 1100 instructions.

![Fig. 17 Installing a LWCO device - LWCO adapter](image)

- Push the adapter with the LWCO onto the pipe (step 1) and secure with the clip (step 2).

![Fig. 18 Installing a LWCO devicesecuring with a clip](image)

- Connect the wires of the LWCO (→ chapter 35, page 7.4).

The LWCO is positioned upright for technical reasons. Tests have shown that all air will bleed from the pipe during commissioning and full functionality is established.

If fault d3 is displayed when commissioning the boiler, purge the boiler properly and check the boiler water pressure.

6.7 Connecting flue gas accessories

Optional vent systems are:

- Twin pipe PVC / CPVC 2" / 3"
- Twin pipe PP 2" (50 mm) / 3" (80 mm) (M&G Duravent PolyPro and Centrotherm InnoFlue)
- Concentric PP 3" / 5" (80/125 mm) ()

In case of using the twin pipe adaptor:

- The flue gas adapter for separate pipe is available as an accessory for the wall-mounted gas condensing boiler and approved as part of the venting system.
► Install the vent flange and gasket with the screws enclosed.

![Fig. 19  Attaching the vent flange and gasket](image1)

| 1 | Gasket |
| 2 | Vent flange |
| 3 | Screws |

► Insert the flue gas adapter as far as it will go into the vent flange and align it.

![Fig. 20  Flue gas adapter](image2)

| 1 | Vent flange |
| 2 | Flue gas adapter |
| 3 | Combustion air test port |
| 4 | Flue gas test port |

► Tighten the screws.

To avoid premature wear of the gaskets DO NOT use lubricants.

In case of **concentric venting system**:

As an alternative to twin pipe venting, a purposely designed and built telescopic concentric vent kit can be obtained as an accessory from Bosch Thermotechnology for a horizontal direct vent wall termination. This vent system can be used for vent lengths of 2 feet to 3 feet (610 mm to 915 mm).

For more details on connecting the flue system, refer to the installation instructions for the flue kit.

![Fig. 21  Horizontal venting system (telescopic concentric vent kit)](image3)

| 1 | Intake |
| 2 | Exhaust |
| L | 2 feet to 3 feet (610 mm to 915 mm) |

► Install the concentric vent adaptor with the screws enclosed.

![Fig. 22  Installing the concentric vent adaptor](image4)

| 1 | Concentric vent adaptor |
| 2 | Screws |
| 3 | Combustion air test port |
| 4 | Flue gas test port |

For atmospheric combustion, the supply air connection must be provided with a safety mesh.

6.7.1 Installation of the exhaust and air intake system

**NOTICE:**

► Vent connectors serving appliances vented by natural draft shall not be connected to any portion of mechanical draft systems operating under positive pressure.
NOTICE:
Burner damage!
▷ Avoid drawing in combustion air excessively loaded with dust or airborne particles.

DANGER:
▷ Ensure that the flue pipes and seals are not damaged.
▷ Use only sealing compounds (primer and glue) approved with the vent material.
▷ Never install a barometric nor a thermally controlled vent damper with this boiler.
▷ Connect only one boiler to each flue system or chimney flue.
▷ Do not route the flue system piping through or inside another duct that is used for exhausting air or other flue gases.
▷ The condensate trap must be primed at all times. Failure to do so may allow combustion gases to escape into boiler room.
▷ External insulation on plastic vent pipe is prohibited.

Consult local and state codes pertaining to special building code and fire department requirements. Adhere to national code requirements.

Observe the listed maximum lengths of vent system, which are boiler model dependent (⇒ chapter 6.7.3).

DANGER:
Improper venting of the Greenstar boiler can result in excessive levels of carbon monoxide which can result in severe personal injury or death.
▷ The boiler must be vented in accordance with the Venting of Equipment section of the latest edition of ANSI Z 223.1 / NFPA 54 Natural Fuel Gas Code and/or the Venting systems and air supply for appliances section of the latest version of CAN/CGA B149.1 Natural Gas and Propane Installation Code in Canada and in accordance with all applicable local building codes.

NOTICE:
▷ To prevent moisture and frost and ensure the minimum clearances to openings and neighboring buildings, 45° and 90° elbows or T-pieces may be attached to the flue outlet in order to direct flue gas away from neighboring buildings. The total allowable vent length, maximum number of elbows and distance to air intake restrictions must be adhered to.

Optional vent systems are:
• Direct vent installations (sealed combustion)

For direct vent applications all applicable items below must be met.

1. Intake
2. Exhaust
X At least 1 foot (305 mm)

Vent termination must be at least 4 feet (1220 mm) below, 4 feet (1220 mm) horizontally away from or 1 foot (305 mm) above every door, every window or every air opening in any building (⇒ Fig. 24 [2], [X1], [X3], page 27).

If multiple boilers are installed in a row, allow at least 1 foot (305 mm) clearance between the vent termination of one and the combustion air intake of the other.

The combustion air inlet is located at least 1 ft (305 mm) above the upper edge, the expected snow line or roof surface (in Canada, at least 1 1/2 ft (457 mm) (⇒ Fig. 24 [Y], page 27).

Vent termination must be located at least 7 ft (2135 mm) above public traffic routes (⇒ Fig. 24 [X5], page 27). Condensate can exit at the terminal end. Ensure that condensate spilling from the termination does not create a hazard or a nuisance.

Do not allow expose vent pipes outside the building to extend past the recommended distance. Condensate can freeze and block the flue outlet.

Vent termination must be at least 3 ft (915 mm) away from adjoining walls, inside corners and 5 ft (525 mm) below the roof overhang (⇒ Fig. 24 [X3], [X4], page 27).

Do not extend exposed vent pipe outside the building beyond recommended distance. Condensate could freeze and block vent pipe.

Did not use the chimney as a conduit if the flue gases from a wall-mounted gas condensing boiler or other combustion equipment are routed in or through the chimney.

All non-steel PVC/CPVC vent pipes must be glued, except for the flue gas adapter.

The flue pipe must be supported properly and angled downward at least ¼ inch (6.35 mm) per foot from the wall-mounted gas condensing boiler. This allows the condensate to drain away.
NOTICE:

Risk of damage to 2 inch PVC pipe

- For Greenstar combi 151 p, use 2 inch CPVC pipe or 3 inch pipe.

All PP/PVC/CPVC combustion air and vent pipe materials and fittings (except for steel components) must satisfy the following requirements and be UL-approved:

Table 11 Materials for pipe

For installations in Canada, field supplied plastic vent piping must comply with CAN/CGA B149.1 (latest edition) and be certified to the Standard for Type BH Gas Venting systems. ULC S636 components of the listed system may not be combined with other venting systems or pipes/fittings that are not listed here. All plastic components and specified primers and glues of certified vent systems must be from a single system manufacturer and not intermixed with other system manufacturer's vent system parts.

Table 12 Roof terminals

For the supplied vent connector and separate available vent termination are certified as a part of the Greenstar Boiler.
NOTICE:

▶ For Clearances not specified in ANSI Z223.1 / NFPA 54 or CSA B149.1. comply with local installation codes and the requirements of the gas supplier including the Authority Having Jurisdiction.
▶ DO NOT use PVC when using anti-freeze in the primary circuit of the boiler. Use CPVC, PP or stainless steel only!

NOTICE:

▶ Vent terminations must keep the following minimum clearances from electric meters, gas meters and pressure relief equipment: 4 ft (1220 mm) [Canada 6 ft (1830 mm)] horizontally and in no case above or below, unless a horizontal distance of 4 ft (1220 mm) [Canada 6 ft (1830 mm)] is maintained.

Table 14  Additional accessories

<table>
<thead>
<tr>
<th>Accessories</th>
<th>Flue System / Materials</th>
<th>Supplier</th>
<th>Order number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adapter for separate pipe Ø 3&quot; (Ø 76 mm)</td>
<td>Parallel PP</td>
<td>Bosch</td>
<td>8 718 226 289 0</td>
</tr>
<tr>
<td>Pipe Ø 3&quot; / Ø 5&quot; (Ø 80/125 mm), extension 10&quot; (254 mm)</td>
<td>concentric PP</td>
<td>Bosch</td>
<td>7 738 003 238</td>
</tr>
<tr>
<td>Pipe Ø 3&quot; / Ø 5&quot; (Ø 80/125 mm), extension 20&quot; (508 mm)</td>
<td>concentric PP</td>
<td>Bosch</td>
<td>7 738 003 239</td>
</tr>
<tr>
<td>Pipe Ø 3&quot; / Ø 5&quot; (Ø 80/125 mm), extension 40&quot; (1016 mm)</td>
<td>concentric PP</td>
<td>Bosch</td>
<td>7 738 003 240</td>
</tr>
<tr>
<td>Pipe Ø 3&quot; / Ø 5&quot; (Ø 80/125 mm), extension 80&quot; (2032 mm)</td>
<td>concentric PP</td>
<td>Bosch</td>
<td>7 738 003 241</td>
</tr>
<tr>
<td>90° elbow, concentric</td>
<td>concentric PP</td>
<td>Bosch</td>
<td>7 738 003 242</td>
</tr>
<tr>
<td>45° elbow, concentric</td>
<td>concentric PP</td>
<td>Bosch</td>
<td>7 738 003 243</td>
</tr>
</tbody>
</table>

Fig. 24  Vent and combustion air pipe position

[1] Forced Air Inlet
[2] Gravity Air Inlet
[3] Exhaust terminal
X₁ 1 foot (305 mm)
X₂ Clearance in accordance with local installation codes and the requirements¹)
X₃ 1 ft (305 mm)
3 feet (915 mm) in Canada for model Greenstar combi 151 p
X₄ Clearance in accordance with local installation codes and the requirements¹)
X₅ 7 feet (2 135 mm)²)

1) For Clearances not specified in ANSI Z223.1 / NFPA 54 or CSA B149.1. Clearance in accordance with local installation codes and the requirements of the gas supplier including the Authority Having Jurisdiction.
2) A vent shall not terminate directly above a sidewalk or paved driveway that is located between 2 single family dwellings and serves both dwellings.

Ya At least 1 foot (305 mm) above grade or snow line
YB Exhaust terminal must be at least:
3 ft (915 mm) above forced air inlet within
10 ft (3050 mm) horizontally - USA
6 ft (1830 mm) above forced air inlet - Canada
6.7.2 Examples of approved horizontal and vertical venting installation

NOTICE:

▶ Place pipe supports every 5 ft (1.525 mm) of horizontal and vertical run, beginning with support near wall-mounted gas condensing boiler.
▶ Remove condensate in accordance with applicable regulations.
▶ Regularly clean the vent terminal and safety mesh.
▶ Avoid locating vent terminal near equipment or items that could be adversely affected by flue gases.
▶ When installing several appliances in a row, maintain a clearance of at least 1 ft (305 mm) between the vent terminal of one appliance and the combustion air inlet of the next appliance.

Fig. 25 Horizontal venting system (room air only)

Fig. 26 Horizontal venting system (room air only)

Key to Fig. 25 and Fig. 26:

[1] Intake
[2] Exhaust

Fig. 27 Horizontal venting system (sealed combustion)

Key to Fig. 27 and Fig. 28:

[1] Intake, behind exhaust
[2] Exhaust
[3] Wall termination
Key to Fig. 29, Fig. 30 and Fig. 31:

1. Intake
2. Exhaust
X  Greater than 12 inches (305 mm)
Y  Greater than 12 inches (305 mm)
**Notes on installation and operation**

**Fig. 32 Vertical venting system (sealed combustion)**

1. Intake
2. Exhaust

X: Greater than 12 inches (305 mm)
Y: Greater than 12 inches (305 mm)

**Fig. 33 PolyPro Flex chimney cap (PP) flue gas routing (sealed combustion)**

1. Intake
2. Exhaust

**6.7.3 Vent and combustion air pipe lengths**

With Flex Pipe the maximum length is reduced by 50%.

**3" (76 mm) Vent and combustion air pipe**

For all installation situations and for all appliances the maximum vent and combustion air pipe length is 100 feet each, with no more than 8 elbows each.
Notes on installation and operation

2” (50 mm) Vent and combustion air pipe
The maximum total combined equivalent length of vent and combustion air pipe (→ Tab. 15, 16 and 17) depends on the installation, the appliance type and number of elbows be used.

| Installation → Fig. 25, 26, 27, 29, 30 and 32 separate terminal ends | Maximum straight vent pipe length allowed for Ø 2” pipe
<table>
<thead>
<tr>
<th>Number of 90° elbows used</th>
<th>combi 100 p</th>
<th>combi 151 p</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>81 ft (24.6 m)</td>
<td>65 ft (19.8 m)</td>
</tr>
<tr>
<td>2</td>
<td>76 ft (23.1 m)</td>
<td>57 ft (17.3 m)</td>
</tr>
<tr>
<td>3</td>
<td>71 ft (21.6 m)</td>
<td>48 ft (14.6 m)</td>
</tr>
<tr>
<td>4</td>
<td>66 ft (20.1 m)</td>
<td>40 ft (12.2 m)</td>
</tr>
<tr>
<td>5</td>
<td>61 ft (18.6 m)</td>
<td>32 ft (9.8 m)</td>
</tr>
<tr>
<td>6</td>
<td>56 ft (17.1 m)</td>
<td>23 ft (7.0 m)</td>
</tr>
</tbody>
</table>

Table 15 Vent and combustion air pipe lengths with 2” diameter and separate terminations

| Installation → Fig. 28 Stainless steel terminal end, horizontal | Maximum straight vent pipe length allowed for Ø 2” pipe
<table>
<thead>
<tr>
<th>Number of 90° elbows used</th>
<th>combi 100 p</th>
<th>combi 151 p</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>76 ft (23.1 m)</td>
<td>60 ft (18.3 m)</td>
</tr>
<tr>
<td>2</td>
<td>71 ft (21.6 m)</td>
<td>52 ft (15.9 m)</td>
</tr>
<tr>
<td>3</td>
<td>66 ft (20.1 m)</td>
<td>43 ft (13.1 m)</td>
</tr>
<tr>
<td>4</td>
<td>61 ft (18.6 m)</td>
<td>35 ft (10.7 m)</td>
</tr>
<tr>
<td>5</td>
<td>56 ft (17.1 m)</td>
<td>27 ft (8.2 m)</td>
</tr>
<tr>
<td>6</td>
<td>51 ft (15.6 m)</td>
<td>18 ft (5.5 m)</td>
</tr>
</tbody>
</table>

Table 16 Vent and combustion air pipe lengths with 2” diameter and the stainless steel wall termination

3” / 5” (80/125 mm) Concentric venting system
The maximum length of concentric vent or combustion air pipe (→ Tab. 18) depends on the installation, the appliance type and number of elbows used.

| Installation → Fig. 34 Ø 3” / Ø 5” (Ø 80/125 mm) CONCENTRIC PIPE | Maximum straight vent pipe length allowed for Ø 3” / Ø 5” (Ø 80/125 mm) concentric pipe
<table>
<thead>
<tr>
<th>Number of 90° elbows used</th>
<th>combi 100 p</th>
<th>combi 151 p</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>50 ft (15.2 m)</td>
<td>44 ft (13.4 m)</td>
</tr>
<tr>
<td>2</td>
<td>44 ft (13.4 m)</td>
<td>38 ft (11.6 m)</td>
</tr>
<tr>
<td>3</td>
<td>38 ft (11.6 m)</td>
<td>32 ft (9.8 m)</td>
</tr>
<tr>
<td>4</td>
<td>32 ft (9.8 m)</td>
<td>26 ft (7.9 m)</td>
</tr>
<tr>
<td>5</td>
<td>26 ft (7.9 m)</td>
<td>20 ft (6.1 m)</td>
</tr>
<tr>
<td>6</td>
<td>20 ft (6.1 m)</td>
<td>14 ft (4.3 m)</td>
</tr>
</tbody>
</table>

Table 18 Pipe lengths with 3” / 5” (80/125 mm) diameter and termination

<table>
<thead>
<tr>
<th>Fitting</th>
<th>Equivalent</th>
</tr>
</thead>
<tbody>
<tr>
<td>45° elbow</td>
<td>3</td>
</tr>
<tr>
<td>90° elbow</td>
<td>6</td>
</tr>
</tbody>
</table>

Table 19 Concentric pipe friction loss equivalent for fittings

Example:
• Model: combi 151 p
• 90° elbows used: 2
• 45° elbows used: 2

Maximum length of straight pipe: 32 ft (9.8 m)

6.8 Testing gas and water connections for leaks
NOTICE:
Pressure, control and safety equipment may be damaged by excessive pressure.

▶ When you carry out a leakage test, make sure that no pressure, control or safety equipment is installed that cannot be isolated from the test pressure.
▶ The boiler and its dedicated shutoff valve must be disconnected from the gas supply piping system during any pressure testing of that system at test pressures in excess of 14” W.C. (35 mbar).

Water connections
▶ Open the heating supply and return valves and fill the heating system.
▶ Check all connections for leakage (test pressure: Max. 30 psi (2.07 bar) on the pressure gauge).

Gas line
▶ Close the gas shutoff valve to protect the gas valve from damage.
▶ Check all connections for leakage (test pressure: Max. 60” W.C. (150 mbar)).
▶ Release pressure.
7 Electrical connection

7.1 General notes

⚠️ DANGER: Risk of electric shock!

▷ Before working on the power supply (120 VAC), disconnect the boiler from the grid by shutting off the emergency shutoff switch or disengaging the heating system circuit breaker. Take measures to prevent accidental reconnection.
▷ It is not sufficient to simply shut off the controls.
▷ Observe all applicable electrical codes and regulations.

Electrical components must be installed by a trained and certified electrician and the installation must meet the National Electric Code as well as all applicable local codes and regulations.

The boiler must be properly electrically grounded in accordance with the requirements of the authority having jurisdiction or, in the absence of such requirements with the National Electrical Code, ANSI/NFPA 70 and/or the Canadian Electrical Code Part I, CSA C221.1, Electrical Code.

Provide a dedicated circuit breaker for the boiler and heating system rated at least 15A. All line voltage wiring must use at least AWG14 size cables.

All appliance modulation, control and safety components are tested and pre-wired for use.

Observe safety precautions and all rules and regulations required by local code and the National Electric Code.

Fuses
The appliance is protected with a fuse. It is located on the circuit board (➔ Fig. 5, page 10).

Replacement fuses can be found on the back of the cover (➔ Fig. 36, page 32.)

Controls and modules
For installation and electrical connection of controls and modules, see the installation instructions of the accessory.

7.2 Low voltage electrical connections in the Heatronic boiler control

7.2.1 Open the Heatronic boiler control

NOTICE:
Small pieces of wire can cause shorts and damage the electronics.

▷ Always strip cables away from electronics.
▷ Unhook the clip (step 1) and fold the Heatronic down (step 2).

Fig. 35 Fold the Heatronic down

▷ Remove screws (step 1), unhook cable and remove cover (step 2).

Fig. 36 Remove the cover
7.2.2 Connecting the outdoor temperature sensor (accessory)
- Connecting the controls automatically establishes the internal communications BUS connection (see installation instructions for the controls).
- Punch out plastic insert.
- Connect cable of the outdoor temperature sensor according to Fig. 37.
- Insert cable for the outdoor temperature sensor.
- Secure the cable on the strain relief.

![Fig. 37 Electrical wiring outdoor temperature sensor](image1)

7.2.3 Connecting additional accessories
- For splash protection (IP), always cut the strain relief to match the diameter of the cable.

![Fig. 38 Cut off grommets](image2)

Connecting temperature guard TB 1 (external manual reset high limit or low water cut off (LWCO))
This connection allows the installation of external safety switches.
- External manual reset high limit
- Low water cut-off (LWCO)
- Radiant overheat protection

![Fig. 39 Electrical wiring TB 1](image3)

When the temperature guard trips, central heating and DHW modes are interrupted.

Connecting the supply temperature sensor (e.g. for low-loss header or system supply pipe)
Do not exceed a sensor cable length of 33 feet (10 m).

![Fig. 40 Installation of the supply temperature sensor](image4)

The supply temperature sensor is available as an accessory.

The supply temperature sensor for system supply pipe (Fig. 40 [2]) must be installed in closest vicinity with boiler supply Tee.

Bosch room controls
Connect only Bosch room controls to the internal BUS of this boiler. For installation and electrical connection, see the installation instructions for the products.
7.3 Connecting power supply

**NOTICE:**
The appliance is not suitable for connection via a terminal box.

- An electrical outlet is required for electrical connection.

- Insert plug (Fig. 43, [1]) of the main power cord into an electrical outlet.

---

**Fig. 41  Electrical wiring of external supply temperature sensor**
The service function 7.d connection of an external supply temperature sensor is automatically set to 01 (page 43).

**Connecting Third party room thermostats or zone controls**
A voltage free (dry contact) third party room thermostat or heat demand from a relay panel can be used to send an ON/OFF signal to the appliance.

**Fig. 42  Electrical wiring third party room thermostat or zone control**
To communicate a heat demand the third party room thermostat or zone control must connect pins 2 and 4.

**Fig. 43  Plugging in the power plug**
7.4 Connecting the LWCO device

**NOTICE:**

*System damage or malfunction!*

- Ensure the air box remains air-tight when routing the LWCO cable to the outside.
- Do not route the LWCO cable through the ignition cable grommet as appliance malfunction may occur.

- Punch a hole (maximum diameter 3/16" (5 mm)) through the fan cable grommet (steps 13) and run the LWCO cable through it.

![Fig. 44 Punch a hole in fan cable grommet for LWCO cable](image)

- Install a 24VAC 20 VA transformer near the boiler.
- Follow LWCO manufacturer’s instructions.
- Connect the lead labeled BOILER GROUND (green) to pin 2 (center) of the white plug in the junction box of the wall-mounted gas condensing boiler.
- Connect the two leads labeled 24 V HOT (red) and 24 V COMMON (white) to the external 24 VAC transformer.

![Fig. 45 Wires of a LWCO device with LWCO adapter](image)

- Connect the leads labeled SWITCH CONTACT (yellow) to the TB1 temperature switch (Fig. 39, page 33) on the Heatronic.

[1] LWCO device (Hydrolevel Safgard 1100)
[2] BOILER GROUND (green)
[3] SWITCH CONTACT (yellow)
[4] SWITCH CONTACT (yellow)
[5] 24 V HOT (red)
[6] 24 V COMMON (white)
Fig. 46  Overview of the controls

[1] Emissions test button
[2] Service button
[3] Burner operation indicator lamp
[4] ON/OFF power switch
[5] Key pad lock
[6] ECO button
[7] Reset button
[8] Display
[9] Automatic air vent
[10] Boiler water pressure gauge
[12] Safety relief valve discharge hose
[13] Condensate drain hose
[14] Heating return pipe
[15] Cold water
[16] Gas pipe
[17] DHW
[18] Supply pipe
[19] Boiler high limit dial
8.1 Before operating the appliance

**NOTICE:**
Commissioning without being properly filled and purged will damage the appliance.

- Only operate this appliance after ensuring there is sufficient water in the boiler and the system.
- Adjust the expansion vessel pre-charge pressure to the static head of the heating system (→ page 20).
- Open radiator and zone valves (as applicable).
- Open heating supply and return valves, fill heating system to 14.5 to 21.75 psi (1 - 1.5 bar) and close fill valve.
- Bleed all air from the system.
- If the boiler water pressure has dropped, fill the heating system again to 14.5 to 21.75 psi (1 to 1.5 bar).
- Verify that the gas type specified on the rating plate is the same as the gas type used.
- Open the gas cock.

8.2 Switching the appliance ON/OFF

**Turning the space heating ON**

- Switch the appliance ON using the ON/OFF switch.
The display indicates the supply temperature of the hot water in °F. If necessary, convert to °C (→ “Service function 0.E: Metric or US customary units”, page 44)

![Fig. 47 Switching the appliance ON/OFF](image)

When the appliance is switched ON for the first time, it performs a once-only purging sequence. This involves the heating zone pump switching on and off at intervals (for approx. 4 minutes). The symbol \( \bigcirc \) alternates on the display with the supply temperature.

- Open automatic air vent [9] and close again after bleeding (→ page 36).

When \( \bigcirc \) alternates on the display with the supply temperature, the trap filling function is active (→ page 42).

**Shutdown**

- Switch appliance OFF using the ON/OFF switch.
The display goes out.
- If the appliance is taken out of service for a longer period: Observe frost protection (→ Section 8.6).

8.3 Switch on heat

Set the maximum supply temperature based on the structure’s heat loss on design day.

<table>
<thead>
<tr>
<th>Boiler high limit dial</th>
<th>Typical supply temperatures</th>
<th>Sample application</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>approx. 95 °F (35 °C)</td>
<td>Frost protection</td>
</tr>
<tr>
<td>2</td>
<td>approx. 109 °F (43 °C)</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>approx. 122 °F (50 °C)</td>
<td>Radiant floor heating system</td>
</tr>
<tr>
<td>4</td>
<td>approx. 140 °F (60 °C)</td>
<td>Panel radiator system</td>
</tr>
<tr>
<td>5</td>
<td>approx. 153 °F (67 °C)</td>
<td>Cast iron radiator system</td>
</tr>
<tr>
<td>6</td>
<td>approx. 167 °F (75 °C)</td>
<td></td>
</tr>
<tr>
<td>max</td>
<td>approx. 187 °F (86 °C)</td>
<td>Baseboard and convector system</td>
</tr>
</tbody>
</table>

*Table 20 Typical supply temperatures*

With radiant floor heating, limit the maximum permissible supply temperature as recommended by the manufacturer.

- In order to set the maximum supply temperature, turn the supply temperature dial \( \bigcirc \) knob.

![Fig. 48 Switch on heat](image)

If the burner is operating, the burner operation indicator lamp is illuminated.

8.4 Setting the DHW temperature

**Setting the DHW temperature on the DHW thermostat**
The set DHW temperature flashes on the display for 30 seconds.

![Fig. 49 Setting the DHW temperature](image)

<table>
<thead>
<tr>
<th>DHW thermostat</th>
<th>Display DHW temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>min</td>
<td>approx. 104 °F (40 °C)</td>
</tr>
<tr>
<td>e</td>
<td>approx. 122 °F (50 °C)</td>
</tr>
<tr>
<td>max</td>
<td>approx. 140 °F (60 °C)</td>
</tr>
</tbody>
</table>

*Table 21 Hot water temperature*
ECO button
Pressing and holding the ECO button until it lights up switches between Comfort mode and Economy mode.

• Comfort mode, ECO button not illuminated (standard setting)
  The appliance is continually maintained at the set temperature. Consequently, DHW draws are immediate, however the appliance may run even if no DHW is being drawn.
• Economy mode, ECO button lights up
  - DHW is only generated when DHW is drawn.
  - On demand:
    Quickly open and close a DHW tap to signal the appliance to heat to the selected temperature. After a short wait DHW will be available.

The DHW on demand signal allows maximum gas and water savings.

8.5 Setting manual summer mode
In summer mode or warm weather shut down (WWSD), the heating zone pump and consequently central heating are switched off. DHW generation remains active following the DHW program.

See also the warm weather shutdown (WWSD) feature in the operating instructions for the heating control included in the scope of delivery.

NOTICE:
Heating system at risk of freezing. In manual summer mode, only the appliance is protected from freezing.

▶ Observe frost protection measures where there is a risk of frost (→ Chapter 8.6).
▶ Note the supply temperature controller setting.
▶ Turn the boiler high limit dial counterclockwise as far as it will go.

Fig. 50  Summer mode
For further information, see the operating instructions for the heating control included in the scope of delivery.

8.6 Setting frost protection

Frost protection of the heating system:
▶ Leave the appliance switched ON; set the boiler high limit to at least 95 °F (35 °C) (position 1, → Tab. 20, page 37).

Fig. 51  Frost protection of the heating system

- or If you want to leave the appliance switched OFF:
  ▶ Mix Bosch-approved anti-freeze into the heating water (→ Tab. 19, page) and drain the DHW circuit.

For further information, see the operating instructions for the heating control included in the scope of delivery.

Frost protection of the DHW tank:
▶ Leave the appliance switched ON; set the boiler high limit to at least 95 °F (35 °C) (position 1, → Tab. 20, page 37).
▶ Turn the DHW thermostat counterclockwise as far as it will go (50 °F (10 °C)).

Fig. 52  Frost protection for the DHW tank

8.7 Activating the key pad lock

The key pad lock affects the boiler high limit dial, the DHW thermostat, and all buttons except the ON/OFF switch, emissions test button, and reset button. It can be used to limit unauthorized access to the boiler.

Activating the key pad lock:
▶ Press the key pad lock button until and the heating supply temperature are alternating on the display.

Fig. 53  Key pad lock
Unlocking the key pad:
▶ Press the key pad lock button until the display shows only the supply temperature.
9 Boiler circulator

9.1 Pump anti-seize protection

This function prevents the heating zone pump from seizing up following longer idle periods.

The appliance will briefly run the pump at least every 24 hours after its last activation.

9.2 Changing the pump curve of the boiler pump

The speed of the boiler pump can be changed using the dial on the pump.

![Pump curve of the boiler pump](image)

**Key to Fig. 54:**
1. Residual head pressure at speed 1
2. Residual head pressure at speed 2
3. Residual head pressure at speed 3 (default setting)
4. Head pressure of the boiler pump by itself (at speed 3)

H  Head pressure in feet of head (m)
V  Circulating water volume in gallons per minute (l/h)

In order to save as much energy as possible and keep any water circulation noises to a minimum, select the lowest possible pump speed.

10 Heatronic boiler control settings

10.1 Guideline to service functions

The Heatronic allows easy setting and testing of many appliance functions.

For an overview of service functions, see Chapter 10.2 on page 40.

![Overview of the controls](image)

**Fig. 55  Overview of the controls**

[1] Emissions test button
[2] Service button
[3] Display
[4] ECO button, service functions “up”
[5] Key pad lock, service functions “down”

**Selecting a service function**

The service functions are subdivided into two levels: The 1st level includes service functions up to 0.E, the 2nd level includes service functions starting with 8.A.

- Press and hold the service button until it lights up. The display shows a code such as 1.A (first service level).
- Repeatedly press the key pad lock button or ECO button to scroll to the desired service function.
- Press and release the emissions test button . The chimney sweep button lights up and the display shows the setting for the selected service function.

**Adjust Value**

- Repeatedly press the key pad lock button or ECO button to adjust the value up or down.
- Record the value in the commissioning log (→ page 60).

**Saving the value**

- Press and hold the emissions test button until the display shows (value saved).

The unit automatically exits the service level if no button is pressed for 15 minutes.

**Exiting the service function without saving values**

- Briefly press the emissions test button . The light of the emissions test button will go out.
Restoring factory settings

In order to reset all values for the service levels 1 and 2 to the factory setting:

- Press and hold the service button until it lights up.
  
  The display shows a code such as 1.A (first service level). Press the button and key pad lock button simultaneously until the code 8.A appears (second service level).

- On the second service level, select the service function 8.E and value 00. The appliance restarts with the default settings.

10.2 Overview of the service functions

10.2.1 Service-level 1 (Press and hold the service button until it lights up)

<table>
<thead>
<tr>
<th>Service function</th>
<th>Display</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.A</td>
<td>Maximum space heating output</td>
<td>40</td>
</tr>
<tr>
<td>1.b</td>
<td>Maximum DHW output</td>
<td>40</td>
</tr>
<tr>
<td>1.E</td>
<td>Pump mode for space heating operation</td>
<td>41</td>
</tr>
<tr>
<td>1.F</td>
<td>-</td>
<td>41</td>
</tr>
<tr>
<td>2.C</td>
<td>Bleeding function</td>
<td>41</td>
</tr>
<tr>
<td>2.d</td>
<td>Thermal disinfection</td>
<td>41</td>
</tr>
<tr>
<td>3.A</td>
<td>Automatic anti-cycle function</td>
<td>41</td>
</tr>
<tr>
<td>3.b</td>
<td>Set anti-cycle time</td>
<td>42</td>
</tr>
<tr>
<td>3.C</td>
<td>Switching differential (hysteresis)</td>
<td>42</td>
</tr>
<tr>
<td>3.d</td>
<td>Minimum output (heating and DHW)</td>
<td>42</td>
</tr>
<tr>
<td>3.E</td>
<td>Cycle time, keeping DHW hot</td>
<td>42</td>
</tr>
<tr>
<td>3.F</td>
<td>Constant DHW period</td>
<td>42</td>
</tr>
<tr>
<td>4.b</td>
<td>Maximum heat exchanger temperature</td>
<td>42</td>
</tr>
<tr>
<td>4.d</td>
<td>Audible fault warning tone</td>
<td>42</td>
</tr>
<tr>
<td>4.E</td>
<td>Appliance type</td>
<td>42</td>
</tr>
<tr>
<td>4.F</td>
<td>Condensate trap filling sequence</td>
<td>42</td>
</tr>
<tr>
<td>5.A</td>
<td>Reset inspection interval</td>
<td>43</td>
</tr>
<tr>
<td>5.b</td>
<td>Fan post purge time</td>
<td>43</td>
</tr>
<tr>
<td>5.E</td>
<td>-</td>
<td>43</td>
</tr>
<tr>
<td>5.F</td>
<td>Set inspection interval</td>
<td>43</td>
</tr>
<tr>
<td>6.A</td>
<td>Display the latest fault code</td>
<td>43</td>
</tr>
<tr>
<td>6.b</td>
<td>Room temperature control, current voltage, terminal 2</td>
<td>43</td>
</tr>
<tr>
<td>6.C</td>
<td>Supply temperature required by outdoor reset control</td>
<td>43</td>
</tr>
<tr>
<td>6.d</td>
<td>Current DHW turbine flow rate</td>
<td>43</td>
</tr>
<tr>
<td>7.A</td>
<td>Indicator lamp for burner operation / faults</td>
<td>43</td>
</tr>
<tr>
<td>7.b</td>
<td>3-way valve in center position</td>
<td>43</td>
</tr>
<tr>
<td>7.d</td>
<td>Connecting an external supply or low-loss header temperature sensor</td>
<td>43</td>
</tr>
<tr>
<td>7.E</td>
<td>Building drying function</td>
<td>43</td>
</tr>
<tr>
<td>0.A</td>
<td>Do not use this setting!</td>
<td>43</td>
</tr>
<tr>
<td>0.d</td>
<td>Altitude adjustment</td>
<td>44</td>
</tr>
<tr>
<td>0.E</td>
<td>Metric or US customary units</td>
<td>44</td>
</tr>
</tbody>
</table>

- Service functions 1.F and 5.E are not used.

Table 22 Service functions, 1st level

10.2.2 Second service level (at first service level, service button lights up, press ECO button and key pad lock button simultaneously until 8.A appears)

<table>
<thead>
<tr>
<th>Service function</th>
<th>Display</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>8.A</td>
<td>Software version</td>
<td>44</td>
</tr>
<tr>
<td>8.b</td>
<td>Code plug number</td>
<td>44</td>
</tr>
<tr>
<td>8.C</td>
<td>GFA Gas burner control status</td>
<td>44</td>
</tr>
<tr>
<td>8.d</td>
<td>GFA fault</td>
<td>44</td>
</tr>
<tr>
<td>8.E</td>
<td>Restore boiler to factory settings</td>
<td>44</td>
</tr>
<tr>
<td>8.F</td>
<td>Permanent ignition</td>
<td>44</td>
</tr>
<tr>
<td>9.A</td>
<td>Constant mode</td>
<td>44</td>
</tr>
<tr>
<td>9.b</td>
<td>Current fan speed</td>
<td>44</td>
</tr>
<tr>
<td>9.C</td>
<td>Current boiler output</td>
<td>44</td>
</tr>
<tr>
<td>9.d</td>
<td>Set fan start speed</td>
<td>44</td>
</tr>
<tr>
<td>9.E</td>
<td>Turbine signal delay</td>
<td>45</td>
</tr>
<tr>
<td>9.F</td>
<td>Heating zone pump post purge</td>
<td>45</td>
</tr>
<tr>
<td>A.b</td>
<td>Display DHW temperature</td>
<td>45</td>
</tr>
<tr>
<td>A.C</td>
<td>Display DHW tank temperature</td>
<td>45</td>
</tr>
<tr>
<td>b.F</td>
<td>Solar DHW backup heating delay</td>
<td>45</td>
</tr>
<tr>
<td>C.d</td>
<td>Display current heat demand</td>
<td>45</td>
</tr>
</tbody>
</table>

- GFA: Gas burner control unit

Table 23 Service functions, 2nd level

10.3 Description of the service functions

10.3.1 First service level

Service function 1.A: Maximum space heating output

Some gas supply companies offer a performance-dependent basic price.

The output can be limited in percent between the minimum and maximum nominal output to suit the specific heat demand.

Even if the heating output has been limited, the maximum nominal output is still available for DHW generation.

- Select service function 1.A.
- Select heat output in MBH (kW) and determine associated setting in percent (%).
- Enter the setting (→ Chapter 10.1).
- Save the setting (→ Chapter 10.1).
- Record the set heat output in the commissioning log (→ page 60).
- Exit the service functions.

The factory setting is the maximum nominal output: \( U_0 \) (100%).

Service function 1.b: Maximum DHW output

The hot water output can be adjusted between the minimum and maximum DHW outputs to suit the heat transfer capacity of the DHW tank coil.

- Select service function 1.b.
- Select the DHW output in MBH (kW) and determine the associated setting in percent (%).
- Enter the setting (→ 10.1).
- Save the setting (→ 10.1).
Heatronic boiler control settings

▶ Record the set DHW output in the commissioning log (→ page 60).
▶ Exit the service functions.
The display returns to the supply temperature.
The factory setting is the maximum nominal output: **U0** (100 %).

**Service function 1.E: Pump mode for space heating operation**

If an outdoor temperature sensor for an outdoor reset control is connected, pump control mode 04 is automatically set.

- **Pump control mode 00 (automatic mode):** The BUS control controls the central heating pump.
- **Pump control mode 01:** For heating systems without control. When there is a demand for heat, the central heating pump and the burner start up.
- **Pump control mode 02:** Do not use.
- **Pump control mode 03:** The central heating pump runs continuously (exceptions: See heating control operating instructions).
- **Pump control mode 04:** Intelligent control of central heating pump in heating systems with outdoor reset control. The heating zone pump is only switched on when needed.

Default setting is **00**.

**Service function 1.F is not used**

**NOTICE:**
System damage or boiler malfunction!
▶ Never change the setting of this service function on combi boiler ZWB...-3A appliances.

**Service function 2.C: Purging function**

When the appliance is switched ON for the first time, it performs a once-only purging sequence. This involves the heating zone pump switching on and off at intervals (for approx. 4 minutes). The symbol alternates on the display with the supply temperature.

This service function allows activating the purging function manually, e.g. after servicing.

The following settings are available:
• **00:** Purging function off
• **01:** Purging function is switched on and after completion automatically reset to **00**
• **02:** Purging function is permanently on and is not reset to **00**

Default setting is **01**.

**Service function 2.d: Thermal disinfection (legionella protection)**

⚠️ **WARNING:**
Danger of scalding!
Hot water can scald.
▶ Carry out thermal disinfection only outside the normal hours of use.
▶ Install a tempering valve if running at water temperatures above 104 °F (40 °C).

When this service function is enabled, the DHW is **permanently** heated to approx. 158 °F (70 °C) if the DHW temperature dial has been turned clockwise to **max**.

The following settings are available:
• **00:** Thermal disinfection not enabled
• **01:** Thermal disinfection enabled

Default setting is **00** (disabled).

**Service function 2.F: Operating mode**

With this service function, you can temporarily change the appliance’s operating mode.

The following settings are available:
• **00:** Default mode; the appliance runs according to control settings.
• **01:** The appliance runs for 15 minutes at minimum output. The display shows 2.F. When this service function is aborted or has been active for 15 minutes, the appliance reverts to default mode.
• **02:** The appliance runs for 15 minutes at maximum output. The display shows 2.F. When this service function is aborted or has been active for 15 minutes, the appliance reverts to default mode.

Default setting is **00**.

**Service function 3.A: Automatic anti-cycle function**

If an outdoor reset control is connected, there is no need to adjust this setting on the appliance.
The control automatically optimizes the anti-cycle time.

Use service function 3.A to set the automatic adaptation of the anti-cycle time. This can be required in case of unfavorably-dimensioned heating systems. Short cycling may increase boiler and system wear and tear, increase emissions, reduce comfort, and should be avoided. With auto-adaptation of the anti-cycle time disabled, the anti-cycle time must be set using service function 3.b (→ page 42).

The following settings are available:
• **00:** Automatic adaptation of the anti-cycle time is disabled
• **01:** Automatic adaptation of the anti-cycle time is enabled

Default setting is **00** (switched off).
Service function 3.b: Set anti-cycle time
Only if the automatic anti-cycle time is disabled (service function 3.A) will this function be active.

If an outdoor reset control is connected, there is no need to adjust this setting on the appliance.
The control automatically optimizes the anti-cycle time.

The anti-cycle time can be set from 00 to 15 (0 to 15 minutes).
With 00, the anti-cycle lock is switched off.
The shortest possible switching interval is 1 minute (recommended for single zone or forced air heating systems).

Default setting is 03.

Service function 3.C: Switching differential
Only if the automatic anti-cycle time is disabled (service function 3.A) will this function be active.

If an outdoor reset control is connected, there is no need to adjust this setting on the appliance.
The control automatically optimizes this setting.

The switching differential is the permitted boiler differential from the target supply temperature. It can be set in increments of 1 °F (0.5 °C).
The minimum supply temperature is 95 °F (35 °C).
Service function 0.E is set to 00 (metric units):
• You can set the switching differential between 00 and 30 (0 - 30 °C).
Service function 0.E is set to 01 (US-customary units):
• You can set the switching differential between 00 and 54 (0 - 54 °F).

Default setting is 18 (18 °F (10 °C)).

Service function 3.d: Minimum output (heating and DHW)
The output for heating and DHW can be set to any level in percent between the minimum and maximum nominal output.
The default setting is the minimum nominal output (heating and DHW) and varies according to appliance.

Service function 3.e: Cycle time, keeping DHW hot
This service function is only active in comfort mode.
It specifies the time from completion of preheating or DHW demand until the next time the plate-type heat exchanger is heated up. This prevents the plate-type heat exchanger from overheating.
The cycle time can be set from 20 to 60 minutes.

Default setting is 20 (20 minutes).

Service function 3.f: Duration of temperature maintenance
The constant DHW period specifies how long the space heating mode remains disabled after DHW is drawn.
The duration for keeping DHW hot can be set from 00 to 30 (0 to 30 minutes).

Default setting is 01 (1 minute).

Service function 4.b: Maximum heat exchanger temperature
This function can be used to reduce limestone built-up in the heat exchanger, which increases with temperature. The maximum constant DHW temperature for the heating block can be set in increments of 1 °F (0.5 °C).
Service function 0.E is set to 00 (metric units):
• The maximum temperature for keeping the heat exchanger hot can be set from 40 to 65 (40 to 65 °C).
Service function 0.E is set to 01 (US-customary units):
• The maximum temperature for keeping the heat exchanger hot can be set from 104 to 150 (104 to 150 °F).

Default setting is 140 (140 °F (60 °C)).

Service function 4.d: Audible fault warning tone
The appliance can be set to sound an audible alarm to alert the operator of a fault present. The audible warning tone can be deactivated with the service function 4.d.

00: Warning tone off
01: Warning tone on

Default setting is 01 (ON).

Service function 4.e: Appliance type
This service function displays the appliance type detected.
Available displays are:
• 00: Central heating only
• 01: Combi appliance
• 02: DHW tank temperature sensor () connected to Heatronic.
• 03: DHW tank thermostat connected to Heatronic.
• 04: Stratified DHW tank
• 05: Tank with NTC return

Service function 4.f: Condensate trap filling sequence

⚠️ DANGER: Risk of flue gas poisoning.
If the condensate trap is not filled, flue gas may escape from the dry trap.
▶ Only deactivate the trap filling sequence for servicing purposes.
▶ When servicing is complete, reactivate the trap filling function.

The trap filling sequence ensures that the condensate trap is filled after initial installation or after a longer downtime of the appliance.
The trap filling sequence is activated if:
• The appliance is switched OFF using the ON/OFF switch
• The burner has not been in use for at least 28 days
• You are switching between summer and winter mode

The next time there is a demand for heat in central heating or hot water mode, the appliance is held at low output for 15 minutes. The trap filling sequence remains active until the appliance has completed 15 minutes of operation at low output. The display shows •-|-: alternating with the supply temperature.
The following settings are available:
• 00: Condensate trap filling sequence is off.
• 01: Trap filling program at the lowest output.
• 02: Trap filling sequence at set minimum output.

Default setting is 01.
Service function 5.A: Reset inspection interval
This function enables you to reset the indication \( \text{I} \) on the display after completing inspection/servicing of the appliance.
**Default setting 00.**

Service function 5.b: Fan post purge time
This service function allows setting the time the fan purges after the burner is shut off.
The post purge time can be set from **01** to **18** (10 - 180 seconds).
**Default setting is 03** (30 seconds).

Service function 5.E is not used

Service function 5.F: Set inspection interval
This service function allows you to set the number of months after which the ‘service due’ indication \( \text{I} \) (Inspection) alternates on the display with the supply temperature.
The number of months can be set from **00** - **72** (0 to 72 months).
**Default setting is 00** (disabled).

If **U0** appears on the display, the function was already set via the FW 200 control.

Service function 6.A: Display the latest fault code
Use this service function to display the most recent fault code.

Service function 6.b: Room temperature control, current voltage, terminal 2
The current voltage of the analog control at terminal 2 is displayed.
Available displays are:
- **00** - **24**: 0 V to 24 V in increments of 1 V

Service function 6.C: Supply temperature required by outdoor reset control
This service function allows displaying the current target supply temperature set by the outdoor reset control.

Service function 6.d: Current turbine flow rate
The current flow rate of the DHW turbine is displayed.
Service function **0.E** is set to **00** (metric units):
- **0.0** - **99.9**: 0.0 to 99 L/min in increments of 0.1 L/min
Service function **0.E** is set to **01** (US-customary units):
- **0.0** - **99.9**: 0.0 to 99 gpm in 0.1 gpm increments

Service function 7.A: Indicator lamp for burner operation / faults
With this service function you can activate and deactivate the indicator lamp for burner operation (continuously illuminated) and faults (flashing).
The following settings are available:
- **00**: Off
- **01**: On
**Default setting is 00.**

Service function 7.b: 3-way valve in center position
After the value **01** has been saved, the 3-way valve moves to the center position. This allows draining the system completely and removing the motor easily.
When you exit this service function, the appliance returns to setting **00**.

Service function 7.d: Connecting an external supply or low-loss header temperature sensor
Presence of an external supply or low loss header temperature sensor is automatically detected by default; you do not need to change any settings.

If a sensor is disconnected, change the setting back to the default setting **00**.

The following settings are available:
- **00**: Once-only automatic detection of a sensor
- **01**: External supply temperature sensor connected to Heatronic.
- **02**: External supply temperature sensor connected to IPM2.
**Default setting is 00.**

Service function 7.E: Building drying function
This service function allows you to start and stop the building drying function.

Never confuse the appliance building drying function with the slab drying function of the outdoor reset control FW 200.

When the building drying function is on, you cannot adjust the appliance gas settings.

The following settings are available:
- **00**: Off
- **01**: Heating operation only in accordance with the appliance or control setting, i.e. all other heat demands are blocked.
**Default setting is 00.**

Service function 0.A: Do not use this setting!
**Default setting is 00** (disabled).
Service function 0.d: Altitude adjustment

Input and output rates are reduced at higher altitudes due to thin air with reduced oxygen levels. The heat output is reduced by 3 % per 1000 ft (305 m).

This service function is used to set the fan speed for operation at higher elevations (not available with this heat source).

The following settings are available:
- **00**: Normal
- **01**: Medium
- **02**: High

<table>
<thead>
<tr>
<th>Setting</th>
<th>Elevation above sea level/Installation location higher than 2,000 feet (610 m) above sea level</th>
</tr>
</thead>
<tbody>
<tr>
<td>00</td>
<td>0 ft – 2,000 ft (0 m – 610 m)</td>
</tr>
<tr>
<td>01</td>
<td>2,001 ft – 4,500 ft (611 m – 1,372 m)</td>
</tr>
<tr>
<td>02</td>
<td>above 4,500 ft (1,372 m)</td>
</tr>
</tbody>
</table>

Table 24 Altitude adjustment (service function 0.d) Altitude adjustment (service function 0.d)

Default setting is **00**.

Service function 0.E: Metric or US customary units

With this service function you can set if Metric or US customary units are displayed on the boiler.

The following settings are available:
- **00**: °C, l/min (metric units)
- **01**: °F, gpm (US-customary units)

Default setting is **01**.

10.3.2 Second service level

Service function 8.A: Software version

The current software version is displayed.

Service function 8.b: Code plug number

The last four digits of the code plug number are shown. The code plug determines the appliance functions. If the appliance has been converted from natural gas to LPG (or vice versa), the code plug must be replaced.

Service function 8.C: GFA Gas burner control unit status

Internal parameter. If you are on the line with Bosch Technical Support you may be asked for this number.

Service function 8.d: GFA Gas burner control unit fault

Internal parameter.

Service function 8.E: Restore boiler to factory settings

This function allows resetting all parameters of the boiler including all service functions to their factory settings.

- Press and hold the service button until it lights up.
- The display shows a code such as 1.A (first service level).
- Press and hold button and key pad lock button simultaneously until a service function, e.g. 8.A, is displayed (second service level).
- Repeatedly press the key pad lock button or button until service function 8.E is displayed.
- Press and release the emissions test button.
- The emissions test button lights up and the display shows 00.
- Press and hold the emissions test button until the display shows appears on the display. All settings are reset and the appliance restarts with the default settings.
- Reset altered service functions to the settings recorded in the commissioning log (page 60).

Service function 8.F: Permanent ignition

**NOTICE:**

Ignition transformer damage.

- Never leave this function on for longer than 2 minutes at a time.

This function enables permanent ignition without gas supply to test the performance of all ignition related components.

The following settings are available:
- **00**: Off
- **01**: On

Default setting is **00**.

Service function 9.A: Constant mode

This function permanently sets one operating mode (Service function 2.F: Operating mode, page 41).

The following settings are available:
- **00**: Default mode: the appliance runs according to control settings.
- **01**: The appliance runs permanently at minimum output. The display shows 9.A.
- **02**: The appliance runs permanently at maximum output. The display shows 9.A.

Default setting is **00**.

Service function 9.b: Current fan speed

This service function allows you to display the current fan speed in revolutions per second (1/s).

Service function 9.C: Current boiler output

This service function displays the current boiler output (in percent (%)).

Service function 9.d: Set fan start speed

At higher elevations the boiler fan may need to spin faster upon startup to ensure reliable ignition every time. The start speed of the boiler fan can be set from **45** to **77** revolutions per second (1/s).

Default setting is **50**.
Service function 9.E: Turbine signal delay
This service function allows setting a time delay to prevent the appliance starting up as a result of transient pressure spikes in the water supply. Through spontaneous pressure change in the water supply, the flow meter (turbine) can signal that DHW is being drawn and cause the burner to come on unnecessarily. The turbine signal delay can be set from 02 to 08 (0.5 seconds to 2 seconds) in increments of 0.25 seconds.
Default setting is 04 (1 second).

Service function 9.F: Heating zone pump post purge
This service function allows setting a pump post purge time after the end of the heat demand from the external control. The pump post purge time can be set from 01 to 10 (1 to 10 minutes).
Default setting is 03.

Service function A.b: Display DHW temperature
This service function allows displaying the current DHW temperature.

Service function A.C: Display DHW tank temperature
This service function allows displaying the temperature of the DHW tank temperature sensor.

Service function b.F: Solar DHW backup heating delay
For systems with a solar thermal DHW tank in series before the DHW line of the combi boiler. DHW heating by the boiler will be suppressed expecting that solar thermal DHW will reach the hot water temperature sensor prior eliminating the need to run the boiler. Set the heating delay in accordance with system conditions.

If this setting is enabled, the DHW demand signal is no longer available → page 38.

The start delay can be set between 0 to 50 (0 to 50 seconds) in increments of 1 second.
Default setting is 00.

Service function C.d: Display current heat demand
Available displays are:
- 00: No heat demand
- 01: Space heating demand present
- 02: DHW heat demand present

11 Gas adjustment

11.1 Converting to a different gas type

WARNING:
Risk of fatal injury from explosion!
Escaping gas can cause an explosion.
- Allow only a licensed contractor to work on parts that carry gas.
- Close the gas shut-off valve before working on parts that carry gas.
- Replace used seals with new seals.
- After completing the work on parts that carry gas, carry out a leak test.

A gas conversion kit with instructions for gas conversion is included in the scope of delivery.
- Follow the instructions from the conversion kit.

With the gas conversion kit there is no setting of the gasair ratio (CO₂ or O₂) necessary.
11.2 Installation location higher than 2000 feet (610 m) above sea level

Input and output rates are reduced at higher altitudes due to thin air with reduced oxygen levels.

The heat output is reduced by 3 % per 1000 ft (305 m).

The boiler is factory set for installation below 2000 feet (610 m) above sea level.

- Correction of the fan speed curve of the burner:
  Use service function 0.d to adjust the elevation setting ( page 44).

11.3 Checking and setting the gas-air ratio (CO₂ or O₂), if required

- Switch the appliance OFF using the ON/OFF switch.
- Remove the cover ( page 22).
- Switch the appliance ON using the ON/OFF switch.
- Open one of the flue gas test ports.

![Fig. 56 Open one of the flue gas test ports](image)

- On the gas throttle, break the seal at the slot and remove the cap.

![Fig. 57 Remove seal from the gas throttle](image)

- Adjust the gas throttle to set the CO₂ or O₂ level for maximum nominal output according to the table 25.

![Fig. 58 Set CO₂ or O₂ level for maximum nominal output](image)

<table>
<thead>
<tr>
<th>Gas type</th>
<th>Maximum nominal output CO₂</th>
<th>O₂</th>
<th>Minimum nominal output CO₂</th>
<th>O₂</th>
</tr>
</thead>
<tbody>
<tr>
<td>NG</td>
<td>9.4 %</td>
<td>4.0 %</td>
<td>8.6 %</td>
<td>5.5 %</td>
</tr>
<tr>
<td>LPG (propane)</td>
<td>11.0 %</td>
<td>4.2 %</td>
<td>10.4 %</td>
<td>5.1 %</td>
</tr>
</tbody>
</table>

Table 25 CO₂ or O₂ values at maximum and minimum nominal output

- Briefly press the emissions test button .
  The supply temperature alternates on the display with = minimum nominal output.

- Measure the CO₂ or O₂ level and the CO content of the flue gas ( → Section 12).

![Fig. 59 Measure CO₂ or O₂ level and CO content](image)
- Remove screw (→ Fig. 59, [3]) from the gas valve adjustment screw (→ Fig. 59, [2]) and set CO₂ or O₂ value for minimum nominal output.

Fig. 59  Setting the CO₂ or O₂ values for minimum nominal output

- Re-check settings at maximum and minimum nominal output and readjust if necessary.
- Repeatedly press the emissions test button until the light goes out.
The display returns to the supply temperature.
- Record the CO₂ or O₂ levels and the CO content of the flue gas in the commissioning log.
- Reinstall screw (→ Fig. 59, [3]) to cover the adjustment screw (→ Fig. 59, [2]) on the gas valve again.
- Remove flue gas probe and close the flue gas test port properly.

Fig. 60  Close flue gas test ports

11.4 Dynamic gas pressure test port

- Switch the appliance OFF and close the gas shut-off valve.
- Loosen the screw in the test port for gas inlet pressure (→ Fig. 47, [1]) and connect a pressure gauge (→ Fig. 61).

Fig. 61  Dynamic gas pressure test port

- Turn on the gas cock and switch the appliance ON.
- Press and hold the emissions test button until it lights up.
The supply temperature alternates on the display with = maximum set heat output.
- Briefly press the emissions test button chimney sweep button.
The supply temperature alternates on the display with = maximum nominal output.
- Check the required inlet gas pressure according to table 26.

<table>
<thead>
<tr>
<th>Gas type</th>
<th>Nominal pressure &quot;W.C. (mbar)</th>
<th>Permissible pressure range for maximum nominal output &quot;W.C. (mbar)</th>
</tr>
</thead>
<tbody>
<tr>
<td>NG</td>
<td>7 (17.4)</td>
<td>3.5-10.5 (8.7-26.1)</td>
</tr>
<tr>
<td>LPG (propane)</td>
<td>11 (27.4)</td>
<td>8-13 (19.9-32.3)</td>
</tr>
</tbody>
</table>

Table 26  Inlet gas pressure

Do not operate the appliance if the measured value is below or above these values. Determine the cause and eliminate the fault. If this is not possible, block the appliance on the gas side and notify the gas supplier.

- Repeatedly press the emissions test button until the light goes out.
The display returns to the supply temperature.
- Switch the appliance OFF, turn off the gas cock, remove the pressure gauge and tighten the screw in the test port for gas inlet pressure.
- Reinstall the cover.
12 Flue gas test

12.1 Emissions test button

The following appliance outputs can be selected by pressing the emissions test button until it lights up:

- = Maximum set output in heating mode (Maximum heating output, page 40)
- = maximum nominal output
- = Minimum nominal output

![Fig. 62  Press the emissions test button](image)

You have 15 minutes to complete the tests. After that, the appliance returns to default mode.

12.2 Measuring CO content of flue gas

Use a multiport flue gas probe for the measurements.

- Remove plug from flue gas test port (Fig. 56, page 46).
- Insert the flue gas probe approx. 2-3/4 inches (70 mm) into the test port and seal around it.
- Press the emissions test button to select = maximum nominal output.
- Measure the CO levels.

**DANGER:**

**Risk of flue gas poisoning.**

The CO level in the flue gas must be below 200 ppm (air free).
- If 9.4 Vol.% CO₂ and a CO level under 200 ppm (af) can not be achieved due to the gas supplied, use a lower CO₂ level with CO emissions under 200 ppm (af) instead.

- Repeatedly press the emissions test button until the light goes out.
  The display returns to the supply temperature.
- Remove the flue gas probe and seal the flue gas test port properly (Fig. 60, page 47).

13 Environmental protection and disposal

Environmental protection is one of the fundamental company policies of the Bosch Group. Quality of products, efficiency and environmental protection are equally important objectives for us. Environmental protection laws and regulations are strictly adhered to.

To protect the environment, we use the best possible technology and materials taking into account economic points of view.

**Packaging method**

For the packaging, we participate in the country-specific recycling systems, which guarantee optimal recycling.

**Old appliances**

Old appliances contain valuable materials that can be recycled. The components are easy to separate. Plastics are identified. This allows the various assemblies to be sorted and recycled or disposed of.

14 Inspection and maintenance

Regular service and maintenance are recommended for a long service life of the appliance, for efficient and economical operation, and to keep the environmental impact as low as possible.

**DANGER:**

**Explosion!**
- Close the gas cock prior to working on the gas train.
- Check for gas leaks after carrying out work on the gas train.

**DANGER:**

**Risk of flue gas poisoning.**
- Check for leaks after carrying out work on the venting system.

**DANGER:**

**Risk of electric shock!**
- Always disconnect the appliance from the mains power before performing any work. Always disconnect the appliance from the mains power before performing any work. Take measures to prevent accidental reconnection.

**NOTICE:**

**Insufficient antifreeze can accelerate corrosion.**
- Frost protection level has to be checked annually during the regular scheduled maintenance of the condensing boiler.

---

1) 9.4 Vol.% with NG and 11.0 Vol.% with LPG (propane)
Heat exchanger

**NOTICE:**

**Damage to the coating of the heat exchanger.**
- Cleaning of the heat exchanger should not be necessary until five years after the initial commissioning.
- Only use a Bosch cleaning blade and Bosch cleaning brush.
- Only clean heat exchanger in case if soiling is clearly visible.

Heatronic boiler control

In case of a component defect, a fault is shown on the display.
The Heatronic boiler control monitors all safety and control components.

**NOTICE:**

The Heatronic boiler control can be damaged by leaking water.
- Cover the Heatronic prior to working on water filled components.

Important notes

An overview of the faults can be found on page 56.

- The following analytical tools are needed for service and maintenance:
  - Electronic flue gas analyzer for CO₂, O₂, CO, and flue gas temperature
  - (0 to 30 mbar)
  - pH Test strips
  - Glycol tester of antifreeze is being used
- Special tools are not required.
- Approved lubricants are:
  - For parts touched by water: Unisilkon L 641 (part- # 8 709 918 413 0)
  - or fittings: HFt 1 v 5 (part- # 8 709 918 010 0).
- Use part- # 8 719 918 658 0 as heat conducting paste.
- Request spare parts.
- Replace removed gaskets and O-rings with new ones.

⚠︎ **After the inspection/maintenance**
- Re-tighten all loosened threaded connections.
- Restart the appliance (→ page 36).
- Check all connections used during maintenance for leaks.
- Check the gas-air ratio.

14.1 Description of various steps

14.1.1 Calling up the latest fault (service function 6.A)
- Select service function 6A (→ page 43).

An overview of the faults can be found on page 56.

14.1.2 Fresh water filter in the cold water pipe
- Close cold water tap.
- Depressurize the cold water pipe.
- To access the filter remove the safety clip (step 1), pull out the pipe (step 2), and remove the filter from the pipe (step 3).
- If necessary, clean with plastic brush under running water.

![Strainer in the cold water pipe](image1)

14.1.3 Plate-type heat exchanger
If the DHW output on the combi boiler is significantly reduced:
- Check filter in the cold water pipe for contamination (→ Fig. 49).
- Depressurize the appliance.
- Remove plate type heat exchanger and replace
  -or-
  - Descale with descaling agent approved for stainless steel (Grade 316-1.4401).

To remove the plate type heat exchanger:
- Unplug electrical connections.
- Remove hose from safety relief valve.

![Unplugging electrical connections / removing hose from safety relief valve](image2)
▶ Loosen/remove pipe connections.

Fig. 65 Removing pipe connections

▶ Remove the boiler pressure gauge from the Heatronic boiler control.

Fig. 66 Removing the boiler pressure gauge

▶ Loosen the quick releases (steps 1 and 2) and remove the hydraulic assembly in its entirety (step 3).

Fig. 67 Removing the hydraulic assembly

▶ Remove the plate type heat exchanger.

Fig. 68 Removing the plate heat exchanger

▶ Install new plate type heat exchanger with new gaskets and reconnect the hydraulic assembly in reverse order.

▶ Check all connections used during maintenance for leaks.

14.1.4 Checking electrodes

▶ Remove electrode set including gasket and check electrodes for contamination; clean or replace, if required.

▶ Reinstall electrode set with new gaskets and check for leaks.

Fig. 69 Reinstalling the electrode set

Fig. 70 Check for leaks
14.1.5 Burner servicing

**DANGER:**

Fire danger!
- The burner may be operated only while installed in a wall-mounted gas condensing boiler.
- Remove burner lid (steps 1 - 4).

**NOTICE:**

Damage to the coating of the heat exchanger.
- Cleaning of the heat exchanger should not be necessary until five years after the initial commissioning.
- Only use a Bosch cleaning blade and Bosch cleaning brush.
- Only clean heat exchanger in case if soiling is clearly visible.

**If mechanical cleaning is required:**
To clean the heat exchanger, use Bosch burner gaskets, cleaning brush kit and cleaning blade, all of which are available as spare parts.
- Remove the condensate trap (steps 1 and 2) and place a suitable container underneath.

**Fig. 71 Removing the burner cover**
- Remove burner and clean its components.

- Reinstall burner in reverse order, including a new gasket if necessary.
- Adjust the gas-air ratio (page 46).

14.1.6 Heat exchanger block inspection and cleaning

**NOTICE:**

- Only clean the heat exchanger in case of soiling that is clearly visible.
- Use only a Bosch cleaning blade and Bosch cleaning brush.
- Only clean the heat exchanger after five years from the initial commissioning.

**If mechanical cleaning is required:**
To clean the heat exchanger, use Bosch burner gaskets, cleaning brush kit, and cleaning blade, all of which are available as spare parts.
- Remove the condensate trap (steps 1 and 2) and place a suitable container underneath.

**Fig. 72 Burner**

**Fig. 73 Removing the condensate trap**
▶ With the cleaning blade, clean the heat exchanger block from the bottom to the top.

![Fig. 74 Cleaning the heat exchanger with the cleaning blade](image)

▶ Clean the heat exchanger block with the brush from top to bottom.

![Fig. 75 Cleaning the heat exchanger with the cleaning brush](image)

▶ Rinse the heat exchanger with water from the top.

![Fig. 76 Rinsing the heat exchanger](image)

▶ Clean the condensate tray (with reversed brush).

![Fig. 77 Cleaning the condensate tray](image)

▶ Rinse the heat exchanger with water from the top.

▶ Clean the condensate trap connection.

▶ Close the inspection opening again using a new gasket and tighten the screws with approx. 3.69 ft.-lbf. (5 Nm).

▶ Remove burner (→ Chapter 14.1.5 “Burner servicing”).
14.1.7 Cleaning condensate trap
► Remove condensate trap (steps 1 and 2) and check heat exchanger orifice for clear passage.

Fig. 78 Removing the condensate trap
► Remove and clean the condensate trap lid.
► Check condensate hose and clean if necessary.
► Fill the condensate trap with approx. 1 cup (1/4 l) of water and reinstall it.

14.1.8 Checking the mixer diaphragm
► Open the mixer unit.
► Carefully remove the diaphragm from the fan air intake and check for contamination and cracks.

Fig. 79 Opening the mixer unit
► Insert the diaphragm into the fan connector.

The diaphragm flaps must open upwards.
► Close the mixer unit.

14.1.9 Checking the expansion vessel
Annual inspection of the expansion vessel is required.
► Depressurize the appliance.
► If necessary, adjust the expansion vessel pre-charge pressure to the static head of the heating system.

14.1.10 Setting the boiler water pressure
Table 27 Operating pressure

<table>
<thead>
<tr>
<th>Display on the pressure gauge</th>
<th>Water preparation for filling and maintaining the heating system (pH-value)</th>
</tr>
</thead>
<tbody>
<tr>
<td>14.5 psi (1 bar) Minimum filling pressure (when system is cold)</td>
<td>pH-value</td>
</tr>
<tr>
<td>14.5 psi to 21.75 psi (1 bar to 1.5 bar) Optimal filling pressure</td>
<td>Not needed</td>
</tr>
<tr>
<td>30 psi (2.07 bar) Maximum pressure at maximum heating water temperature must not be exceeded (safety valve will spill).</td>
<td>4.5-7 Required</td>
</tr>
</tbody>
</table>

Table 28 Operating pressure
► If the indicator is below 14.5 psi (1 bar) when the system is cold, top up the water. The indicator must be between 14.5 psi (1 bar) and 21.75 psi (1.5 bar).

If using a hose to fill the heating system, prefill the hose with water to prevent air being introduced into the system.
► If the pressure is not held, check the expansion vessel and heating system for leaks.

14.1.11 Testing system water quality
► Take a representative sample of the system water and analyze pH using a pH meter or pH test strips.

Table 28 Water preparation for filling and maintaining the heating system (pH-value)
► If the value is outside of the permitted range, drain the system, flush, and refill with fresh water to prevent system damage or leaks.
► If the fill water does not meet the requirements of page 19, treat the water to bring it within the permissible range.
► If antifreeze is being used in the system, check the frost protection properties to ensure the site specific requirements are met.

14.1.12 Checking the electrical wiring
► Check electrical wiring for mechanical damage and replace defective cables.
14.2 Maintenance and inspection checklist

▶ Use this form to guide you through the service and maintenance procedure. Fill out each step according to the findings and work performed.

<table>
<thead>
<tr>
<th>Date</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Latest fault code from service function 6.A.</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Fresh water inlet filter (Combi boiler ZWB appliances only).</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Visual inspection of the combustion air pipes and vent pipes.</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Dynamic gas pressure (mbar)</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Gas-air ratio at min./max. nominal output. min. % max. %</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Gas and water-side leak test.</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Inspect electrodes.</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Inspect heat exchanger block.</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Check burner.</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Inspect diaphragm in mixer unit.</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Clean condensate trap.</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>With the system depressurized, check the expansion vessel pre-charge pressure vs. the static head of the heating system. psi (bar)</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Check the heating system filling pressure. psi (bar)</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Inspect electrical wiring for damage.</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>Check settings of the heating control.</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>Check set service functions according to commissioning report.</td>
<td></td>
</tr>
</tbody>
</table>

Table 29 Maintenance and inspection checklist
Readings on the display

The 7-segment display shows the following (Tab. 30 and 31):

<table>
<thead>
<tr>
<th>Value displayed</th>
<th>Description</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number or letter, dot</td>
<td>Service function ( Tab. 23/23, page 40/40)</td>
<td></td>
</tr>
<tr>
<td>followed by letter</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Letter followed by number or letter</td>
<td>Fault code ( Tab. 32, page 58) (exception: b.A = service function)</td>
<td></td>
</tr>
<tr>
<td>Three numbers (≤ 199)</td>
<td>Decimal value, e.g. supply temperature</td>
<td>00..199</td>
</tr>
<tr>
<td>One number (displayed for longer)</td>
<td>Decimal figure (three digits); first digit is shown alternating with two last digits (e.g. 2.69..69 for 269)</td>
<td>0..999</td>
</tr>
<tr>
<td>followed by two numbers (displayed briefly)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Two dashes followed by two pairs of numbers</td>
<td>Code is shown in three stages: 1. Two dashes 2. First two digits 3. Last two digits (e.g. -- 10 04)</td>
<td>1000 ... 9999</td>
</tr>
<tr>
<td>Two letters followed by two pairs of numbers</td>
<td>Code is shown in three stages: 1. Two letters 2. First two CF 10 digits 3. Last two digits (e.g. 20)</td>
<td></td>
</tr>
</tbody>
</table>

Table 30 Display readings

<table>
<thead>
<tr>
<th>Status code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Acknowledge by pressing any button (except reset).</td>
</tr>
<tr>
<td></td>
<td>Acknowledge by pressing two buttons simultaneously</td>
</tr>
<tr>
<td></td>
<td>Acknowledge by pressing the button and holding longer than 3 seconds (Save function).</td>
</tr>
<tr>
<td></td>
<td>The display shows the supply temperature in alternation with . The appliance works for 15 minutes at the minimum nominal output, service function 2.F.</td>
</tr>
<tr>
<td></td>
<td>The display shows the supply temperature in alternation with . The appliance works with the set maximum output in heating mode, service function 1.A.</td>
</tr>
<tr>
<td></td>
<td>The display shows the supply temperature alternating with . The appliance works for 15 minutes at the maximum nominal output, service function 2.F.</td>
</tr>
<tr>
<td></td>
<td>The air purging function is active, service function 2.C</td>
</tr>
<tr>
<td></td>
<td>The display shows the supply temperature alternating with . The trap filling sequence is active, service function 4.F.</td>
</tr>
<tr>
<td></td>
<td>The display shows the supply temperature alternating with . Service due, service function 5.A.</td>
</tr>
<tr>
<td></td>
<td>The display shows the supply temperature alternating with . The pump has seized, fault E9.</td>
</tr>
<tr>
<td></td>
<td>The display shows the supply temperature alternating with . The temperature gradient limiter was triggered. Excessive supply temperature increase: Heating mode is suspended for two minutes.</td>
</tr>
<tr>
<td></td>
<td>Slab drying function of the FW 200 outdoor reset control ( operating instructions) or building drying function ( service function 7.E) are activated.</td>
</tr>
<tr>
<td></td>
<td>Key pad lock enabled. To unlock the key pad, press until the supply temperature is shown on the display.</td>
</tr>
</tbody>
</table>

Table 31 Special displays
16 Faults

16.1 Troubleshooting

**DANGER:**

Explosion!

► Close the gas cock prior to working on the gas train.
► Check for gas leaks after carrying out work on the gas train.

**DANGER:**

Risk of flue gas poisoning.

► Check for leaks after carrying out work on the venting system.

**DANGER:**

Risk of electric shock!

► Always disconnect the appliance from the mains power before performing any work. Always disconnect the appliance from the mains power before performing any work.
Take measures to prevent accidental reconnection.

**WARNING:**

Danger of scalding!

Hot water can scald.

► Drain the appliance before working on components that are water filled.

**NOTICE:**

Risk of system damage from freezing!

The heating system can freeze up in cold weather if it has been disabled by a fault shutdown.

► Rectify the fault immediately and restart the heating system.
► If this is not possible, protect your heating system from freezing by draining the heating system and hot water pipes at the lowest point.

16.2 Faults that are shown on the display

<table>
<thead>
<tr>
<th>Display</th>
<th>Description</th>
<th>Elimination</th>
</tr>
</thead>
<tbody>
<tr>
<td>A7</td>
<td>DHW temperature sensor defective.</td>
<td>► Check temperature sensor and leads for interruptions or shorts, and replace if defective.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>► Insert code plug correctly; replace if defective.</td>
</tr>
<tr>
<td>b1</td>
<td>Code plug not detected.</td>
<td>► Insert code plug correctly; replace if defective.</td>
</tr>
<tr>
<td>b7</td>
<td>Fault in the burner controls.</td>
<td>► Reset boiler to factory to default setting ( service function 8.E).</td>
</tr>
<tr>
<td>C6</td>
<td>Fan not running.</td>
<td>► Check fan leads and fan, replace if defective.</td>
</tr>
<tr>
<td>CC</td>
<td>Outdoor temperature sensor not recognized.</td>
<td>► Check outdoor temperature sensor and leads for interruptions, replace if defective.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>► Verify the outdoor temperature sensor is connected to terminals A and F.</td>
</tr>
</tbody>
</table>

**NOTICE:**

The Heatronic boiler control can be damaged by leaking water.

► Cover the Heatronic prior to work on water filled components.

The Heatronic boiler control monitors all safety and control components. If a fault arises during operation, an audible warning tone sounds.

Press a button to mute the warning sound.

The display indicates a fault code (e.g. $E$) and the reset button flashes. If the reset button is flashing:

► press the reset button and hold it until $- -$ appears on the display.
   The appliance starts up again and the current supply temperature is displayed.

If the reset button is not flashing:

► Switch the appliance OFF and ON again.
   The appliance starts up again and the current supply temperature is displayed.

An overview of the faults can be found on page 56.
An overview of the status codes can be found on page 55.

If the fault persists:

► Check the PCB and replace if required. Adjust the service functions in accordance with the commissioning report ( page 60).
<table>
<thead>
<tr>
<th>Display</th>
<th>Description</th>
<th>Elimination</th>
</tr>
</thead>
</table>
| d3      | Temperature high limit defective. | ▶ Check temperature sensor and leads for interruptions or shorts, and replace if defective.  
▶ Temperature guard TB1 has tripped. Check if jumper across 8-9 or PR-P0 is missing.  
▶ Reset external temperature limiter (if installed). Reset LWCO (if installed).  
▶ Reset pressure regulator (if installed). |
|         | External guard has tripped. |  |
|         | Temperature limiter locked out. |  |
| d5      | External supply temperature sensor defective (low-loss header). | ▶ Check temperature sensor and leads for interruptions or shorts, and replace if defective.  
▶ Check whether only one temperature sensor is connected; otherwise remove second temperature sensor.  
▶ Reset the boiler to the factory default settings (→ service function 8.E). reset the IPM 2 (if installed) to the factory default settings and carry out the automatic system configuration. |
|         | The external supply temperature sensor was recognized on the BUS and then reconnected to the appropriate terminal. |  |
| E2      | Supply temperature sensor defective. | ▶ Check temperature sensor and leads for interruptions or shorts, and replace if defective. |
| E3      | Additional supply temperature sensor defective. | ▶ Check temperature sensor and leads for interruptions or shorts, and replace if defective. |
| E9      | Heat exchanger safety high limit or flue gas temperature limiter has tripped. | ▶ Check flue gas safety high limit and leads for interruptions or shorts, and replace if defective.  
▶ Check heat exchanger safety high limit and leads for interruptions or shorts, and replace if defective.  
▶ Check the operating pressure.  
▶ Check temperature limit; replace if defective.  
▶ Check pump capacitor; replace pump if defective.  
▶ Check PCB fuse, replace if blown (6.3 A fuse according to IEC default).  
▶ Purge the appliance  
▶ Check heat exchanger on the DHW side; replace if clogged. |
| EA      | No flame detected. | ▶ Check that ground lead is properly connected, replace if defective.  
▶ Check that gas cock is open.  
▶ Check inlet gas pressure; correct if needed.  
▶ Check power supply.  
▶ Check electrodes for visual damage; replace if defective.  
▶ Check flue gas system; clean or repair if defective.  
▶ Check gas/air ratio; correct if out of range.  
▶ Check gas valve; replace if defective.  
▶ In room air operation, check air supply or ventilation apertures.  
▶ Clean condensate trap.  
▶ Remove diaphragm at fan inlet connection and check for contamination or cracks.  
▶ Check heat exchanger for soiling (→ Chapter 14.1.6, page 51).  
▶ Check gas valve; replace if defective.  
▶ Insert code plug correctly; replace if defective. |
| F0      | Internal fault | ▶ Press reset for 3 seconds and release. When the button is released, the appliance will restart.  
▶ Check electrical plug in contacts and ignition leads; replace PCB if defective. Check gas/air ratio; correct if out of specification. |
| F1      | Internal data error. | ▶ Reset boiler to the factory default setting (→ service function 8.E). |
| F7      | Flame detected even when burner is off. | ▶ Check electrodes; replace if defective.  
▶ Check flue gas system; clean or repair if defective.  
▶ Check PCB for moisture; dry if needed. |
### Table 32  Faults shown on the display

<table>
<thead>
<tr>
<th>Display</th>
<th>Description</th>
<th>Elimination</th>
</tr>
</thead>
</table>
| FA      | After switching gas off: Flame is detected. | ▶ Check gas valve; replace if defective.  
▶ Clean condensate trap.  
▶ Check electrodes and leads; replace if defective.  
▶ Check flue gas system; clean or repair if defective. |
| Fd      | Reset button pressed by mistake. | ▶ Press reset button again.  
▶ Check cable harness to safety high limit and gas cock for ground connection. |
| **Temperature gradient limiter**: Temperature rise too fast | | ▶ Fully open service shut-off valves.  
▶ Check electrical connection between heating zone pump and Heatronic.  
▶ Check pump plug connection per installation instructions.  
▶ Manually test operation of heating zone pump and replace if defective.  
▶ Set pump speed correctly to match maximum output. |

**Table 33  Faults not shown on the display**

#### Appliance faults

<table>
<thead>
<tr>
<th>Description</th>
<th>Elimination</th>
</tr>
</thead>
</table>
| Combustion noise too loud; rumbling noises | ▶ Insert code plug correctly; replace if defective.  
▶ Check gas type.  
▶ Check inlet gas pressure; adjust if defective.  
▶ Check flue gas system; clean or repair if defective.  
▶ Check gas/air ratio in the combustion air and flue gas; replace gas valve if defective. |
| Flow noises | ▶ Set pump speed correctly to match maximum output.  
▶ Set pump mode. |
| Heating-up takes too long | ▶ Set pump speed correctly to match maximum output.  
▶ Set pump mode. |
| Flue gas readings incorrect; CO levels too high | ▶ Check gas type.  
▶ Check inlet gas pressure; adjust if defective.  
▶ Check flue gas system; clean or repair if defective.  
▶ Check gas/air ratio in flue gas; replace gas valve if defective. |
| Violent ignition, poor ignition | ▶ Check gas type.  
▶ Check inlet gas pressure; adjust if defective.  
▶ Check power supply.  
▶ Check electrodes for visual damage; replace if defective.  
▶ Check flue gas system; clean or repair if defective.  
▶ Check gas/air ratio; replace gas valve if defective.  
▶ Check gas valve; replace if defective.  
▶ Check burner; replace if required. |
| DHW has unpleasant odor or has a dark color | ▶ Perform thermal disinfection of the DHW circuit.  
▶ Replace sacrificial anode in the tank (if installed).  
▶ Consult local water department. |
| Set supply temperature (e.g. of the FW 200 control) exceeded | ▶ Switch off automatic anti-cycle timer, i.e., set value to 0.  
▶ Set the required anti-cycle timer, e.g. default setting of 3 minutes. |
| Condensate in air box | ▶ Insert diaphragm in the mixer unit per installation instructions; replace if defective. |
| DHW outlet temperature is not reached | ▶ Insert code plug correctly; replace if defective.  
▶ Check whether voltage (120 VAC) is present between terminal 1 and terminal 3; repair if defective.  
▶ Check turbine; replace if defective. |
| Heatronic is flashing (i.e. all buttons, all display segments, burner indicator etc. are flashing) | ▶ Replace fuse Si 3 (24 V) (6.3 A fuse according to IEC default). |
### 16.4 Check sensor values

#### 16.4.1 Outdoor temperature sensor (available as accessory)

<table>
<thead>
<tr>
<th>Temperature °F (°C) Testing tolerance ± 10%</th>
<th>Resistance [Ω]</th>
</tr>
</thead>
<tbody>
<tr>
<td>-4 (-20)</td>
<td>2,392</td>
</tr>
<tr>
<td>3 (-16)</td>
<td>2,088</td>
</tr>
<tr>
<td>10 (-12)</td>
<td>1,811</td>
</tr>
<tr>
<td>17 (-8)</td>
<td>1,562</td>
</tr>
<tr>
<td>24 (-4)</td>
<td>1,342</td>
</tr>
<tr>
<td>32 (0)</td>
<td>1,149</td>
</tr>
<tr>
<td>39 (4)</td>
<td>984</td>
</tr>
<tr>
<td>46 (8)</td>
<td>842</td>
</tr>
<tr>
<td>50 (10)</td>
<td>781</td>
</tr>
<tr>
<td>59 (15)</td>
<td>642</td>
</tr>
<tr>
<td>68 (20)</td>
<td>528</td>
</tr>
<tr>
<td>77 (25)</td>
<td>436</td>
</tr>
</tbody>
</table>

*Table 34 Resistance table outdoor temperature sensor*

#### 16.4.2 Additional supply temperature limiter

<table>
<thead>
<tr>
<th>Temperature (°F °C) Measuring tolerance ± 10%</th>
<th>Resistance [Ω]</th>
</tr>
</thead>
<tbody>
<tr>
<td>32 (0)</td>
<td>33,555</td>
</tr>
<tr>
<td>50 (10)</td>
<td>21,232</td>
</tr>
<tr>
<td>68 (20)</td>
<td>13,779</td>
</tr>
<tr>
<td>86 (30)</td>
<td>9,128</td>
</tr>
<tr>
<td>104 (40)</td>
<td>6,205</td>
</tr>
<tr>
<td>122 (50)</td>
<td>4,298</td>
</tr>
<tr>
<td>140 (60)</td>
<td>3,025</td>
</tr>
<tr>
<td>158 (70)</td>
<td>2,176</td>
</tr>
<tr>
<td>176 (80)</td>
<td>1,589</td>
</tr>
<tr>
<td>194 (90)</td>
<td>1,177</td>
</tr>
<tr>
<td>212 (100)</td>
<td>886</td>
</tr>
</tbody>
</table>

*Table 35 Resistance table supply temperature limiter*

#### 16.4.3 Supply temperature sensor, DHW temperature sensor, external supply temperature sensor

<table>
<thead>
<tr>
<th>Temperature °F (°C) Testing tolerance ± 10%</th>
<th>Resistance [Ω]</th>
</tr>
</thead>
<tbody>
<tr>
<td>68 (20)</td>
<td>14,772</td>
</tr>
<tr>
<td>77 (25)</td>
<td>11,981</td>
</tr>
<tr>
<td>86 (30)</td>
<td>9,786</td>
</tr>
<tr>
<td>95 (35)</td>
<td>8,047</td>
</tr>
<tr>
<td>104 (40)</td>
<td>6,653</td>
</tr>
<tr>
<td>113 (45)</td>
<td>5,523</td>
</tr>
<tr>
<td>122 (50)</td>
<td>4,608</td>
</tr>
<tr>
<td>131 (55)</td>
<td>3,856</td>
</tr>
<tr>
<td>140 (60)</td>
<td>3,243</td>
</tr>
<tr>
<td>149 (65)</td>
<td>2,744</td>
</tr>
<tr>
<td>158 (70)</td>
<td>2,332</td>
</tr>
<tr>
<td>167 (75)</td>
<td>1,990</td>
</tr>
<tr>
<td>176 (80)</td>
<td>1,704</td>
</tr>
<tr>
<td>185 (85)</td>
<td>1,464</td>
</tr>
<tr>
<td>194 (90)</td>
<td>1,262</td>
</tr>
<tr>
<td>203 (95)</td>
<td>1,093</td>
</tr>
<tr>
<td>212 (100)</td>
<td>950</td>
</tr>
</tbody>
</table>

*Table 36 Resistance table NTCs*

### 16.5 Replacement code plug

<table>
<thead>
<tr>
<th>Appliance</th>
<th>Order number</th>
</tr>
</thead>
<tbody>
<tr>
<td>ZWB28-3A NG</td>
<td>8 714 432 520 0</td>
</tr>
<tr>
<td>ZWB28-3A LPG</td>
<td>8 714 432 521 0</td>
</tr>
<tr>
<td>ZWB42-3A NG</td>
<td>8 714 432 500 0</td>
</tr>
<tr>
<td>ZWB42-3A LPG</td>
<td>8 714 432 505 0</td>
</tr>
</tbody>
</table>

*Table 37 Code plug*
# Commissioning log for the appliance

**Home owner/operator:**

<table>
<thead>
<tr>
<th>Last name, first name</th>
<th>Number, Street</th>
</tr>
</thead>
<tbody>
<tr>
<td>Telephone/fax</td>
<td>ZIP code, town</td>
</tr>
</tbody>
</table>

**System installer:**

<table>
<thead>
<tr>
<th>Order number:</th>
<th>Appliance type:</th>
<th>(Complete a separate log for every appliance!)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Serial number:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Date commissioned:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>☐ Individual appliance</td>
<td>☐ Cascade, Number of appliances: ......</td>
<td></td>
</tr>
</tbody>
</table>

**Installation location:**

<table>
<thead>
<tr>
<th>☐ Cellar</th>
<th>☐ Attic</th>
<th>☐ Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ventilation openings: Number: ......, Size: Approx.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Vent pipe routing:**

<table>
<thead>
<tr>
<th>☐ Twin pipe system</th>
<th>☐ Balanced flue system</th>
<th>☐ Duct</th>
</tr>
</thead>
<tbody>
<tr>
<td>☐ Separate pipe routing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>☐ PVC</td>
<td>☐ CPVC</td>
<td>☐ PP</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Total length: Approx. ...... ft (m)</th>
<th>Elbows 90°: ...... Qty</th>
<th>Elbows 15 - 45°: ...... Qty</th>
</tr>
</thead>
</table>

**Flue checked for leaks with countercurrent:**

<table>
<thead>
<tr>
<th>☐ Yes</th>
<th>☐ No</th>
</tr>
</thead>
</table>

**CO₂ value in the combustion air at maximum nominal output:**

<table>
<thead>
<tr>
<th>%</th>
</tr>
</thead>
</table>

**O₂ value in the combustion air at maximum nominal output:**

<table>
<thead>
<tr>
<th>%</th>
</tr>
</thead>
</table>

**Notes regarding under or overpressure operation:**

**Gas setting and flue gas test:**

**Set gas type:**

<table>
<thead>
<tr>
<th>Inlet gas pressure:</th>
<th>Gas static supply pressure:</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot; W.C. (mbar)</td>
<td>&quot; W.C. (mbar)</td>
</tr>
</tbody>
</table>

**Selected maximum output:**

<table>
<thead>
<tr>
<th>MBH (kW)</th>
<th>MBH (kW)</th>
</tr>
</thead>
</table>

**Gas flow rate at maximum nominal output:**

<table>
<thead>
<tr>
<th>gpm (l/min)</th>
<th>gpm (l/min)</th>
</tr>
</thead>
</table>

**Net calorific value \( H_B \) (per gas supplier):**

<table>
<thead>
<tr>
<th>MBTU/ft³ (kWh/m³)</th>
<th></th>
</tr>
</thead>
</table>

**CO₂ at max. nominal output:**

<table>
<thead>
<tr>
<th>%</th>
</tr>
</thead>
</table>

**CO₂ at minimum nominal output:**

<table>
<thead>
<tr>
<th>%</th>
</tr>
</thead>
</table>

**O₂ at maximum nominal output:**

<table>
<thead>
<tr>
<th>%</th>
</tr>
</thead>
</table>

**O₂ at minimum nominal output:**

<table>
<thead>
<tr>
<th>%</th>
</tr>
</thead>
</table>

**CO at maximum nominal output:**

<table>
<thead>
<tr>
<th>ppm</th>
<th>ppm</th>
</tr>
</thead>
</table>

**CO at minimum nominal output:**

<table>
<thead>
<tr>
<th>ppm</th>
<th>ppm</th>
</tr>
</thead>
</table>

**Flue gas temperature at maximum nominal output:**

<table>
<thead>
<tr>
<th>°F (°C)</th>
<th>°F (°C)</th>
</tr>
</thead>
</table>

**Maximum measured supply temperature:**

<table>
<thead>
<tr>
<th>°F (°C)</th>
<th>°F (°C)</th>
</tr>
</thead>
</table>

**System hydraulics:**

<table>
<thead>
<tr>
<th>☐ Low-loss header, type:</th>
<th>☐ Additional expansion vessel</th>
</tr>
</thead>
<tbody>
<tr>
<td>☐ Heating pump:</td>
<td>Size/pre-charge pressure:</td>
</tr>
<tr>
<td>☐ Hydraulic separation</td>
<td>Automatic air vent present: ☐ Yes</td>
</tr>
</tbody>
</table>

6720872361 (2017/04)  Greenstar combi 100 p / 151 p
DHW tank/type/Number/heating surface output:

System hydraulics checked, notes:

**Modified service functions:**
Select the modified service functions and enter the values here.

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Heating control:**

- ☐ Weather-compensated control  ☐ Room temperature-dependent control
- ☐ Remote control × ...... Qty, heating zone(s) coding:
- ☐ Room temperature-dependent control × ...... Qty, heating zone(s) coding:
- ☐ Module × ...... Qty, heating zone(s) coding:

Other:

- ☐ Heating controls set, notes:
- ☐ Modified heating control settings documented in the controller operating/installation instructions

**The following work has been carried out:**

- ☐ Electrical connections checked, notes:
- ☐ Condensate trap filled  ☐ Combustion air/flue gas test carried out
- ☐ Function check carried out  ☐ Leak test carried out on the gas and water sides

Commissioning includes checking the settings, a visual heating leak test and a functional check of the boiler and control. The system installer conducts a test of the heating system.

The system named above has been checked to the extent described.

The documents have been handed over to the home owner/operator. The home owner/operator has been instructed regarding safety and operation of the boiler and accessories, including the need for regular scheduled maintenance. Attention has been drawn to the requirement for regular maintenance of the above-mentioned heating system.

Name of service engineer: _____________________________

Date, user’s signature: _____________________________

**Affix the test report here.**

Date, system installer’s signature: _____________________________

**Table 38 Commissioning log**
List of keywords

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