Service Instructions

for use by heating contractor

Vitodens 200-W, B2HE
Models 85, 120, 150 and 199
Wall mounted gas-fired condensing boiler with 7 inch color touchscreen display
For operation with natural gas or liquid propane gas

Heating Input: 8.5 to 199 MBH
2.5 to 58.3 kW

VITODENS 200-W

Product may not be exactly as shown

IMPORTANT

Read and save these instructions for future reference.

Safety, Installation and Warranty Requirements

Please ensure that these instructions are read and understood before commencing installation. Failure to comply with the instructions listed below and details printed in this manual can cause product/property damage, severe personal injury, and/or loss of life. Ensure all requirements below are understood and fulfilled (including detailed information found in manual subsections).

- **Product documentation**
  Read all applicable documentation before commencing installation. Store documentation near boiler in a readily accessible location for reference in the future by service personnel.
  
  ▶*For a listing of applicable literature, please see section entitled "Important Regulatory and Safety Requirements".*

- **Warranty**
  Information contained in this and related product documentation must be read and followed. Failure to do so renders the warranty null and void.
  

- **Licensed professional heating contractor**
  The installation, adjustment, service and maintenance of this equipment must be performed by a licensed professional heating contractor.
  
  ▶*Please see section entitled "Important Regulatory and Installation Requirements".*

- **Contaminated air**
  Air contaminated by chemicals can cause by-products in the combustion process, which are poisonous to inhabitants and destructive to Viessmann equipment.
  
  ▶*For a listing of chemicals which cannot be stored in or near the boiler room, please see subsection entitled "Mechanical room" in the "Installation Instructions".*

- **Advice to owner**
  Once the installation work is complete, the heating contractor must familiarize the system operator/ ultimate owner with all equipment, as well as safety precautions/requirements, shutdown procedure, and the need for professional service annually before the heating season begins.

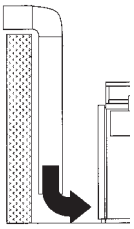
⚠ WARNING

Installers must follow local regulations with respect to installation of carbon monoxide detectors. Follow the Viessmann maintenance schedule of the boiler contained in this manual.

Operating and Service Documentation

It is recommended that all product documentation such as parts lists, operating and service instructions be handed over to the system user for storage. Documentation is to be stored near boiler in a readily accessible location for reference by service personnel.

- **Carbon monoxide**
  Improper installation, adjustment, service and/or maintenance can cause flue products to flow into living space. Flue products contain poisonous carbon monoxide gas.
  
  ▶*For information pertaining to the proper installation, adjustment, service and maintenance of this equipment to avoid formation of carbon monoxide, please see subsection entitled "Mechanical room" and "Venting requirements" in the "Installation Instructions".*

- **Fresh air**
  This equipment requires fresh air for safe operation and must be installed ensuring provisions for adequate combustion and ventilation air exist.
  
  ▶*For information pertaining to the fresh air requirements of this product, please see subsection entitled "Mechanical room" in the "Installation Instructions".*

- **Equipment venting**
  Never operate boiler without an installed venting system. An improper venting system can cause carbon monoxide poisoning.
  
  ▶*For information pertaining to venting and chimney requirements, please see section entitled "Venting Connection". All products of combustion must be safely vented to the outdoors.*

⚠ WARNING

This boiler requires fresh air for safe operation and must be installed with provisions for adequate combustion and ventilation air (in accordance with local codes and regulations of authorities having jurisdiction).

Do not operate this boiler in areas with contaminated combustion air. High levels of contaminants such as dust, lint or chemicals can be found at construction sites, home renovations, in garages, workshops, in dry cleaning/laundry facilities, near swimming pools and in manufacturing facilities.

Contaminated combustion air will damage the boiler and may lead to substantial property damage, severe personal injury and/or loss of life. Ensure boiler/burner is inspected and serviced by a qualified heating contractor at least once a year in accordance with the Service Instructions of the boiler.

⚠ WARNING

Do Not operate the boiler without the front cover in place.

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Safety, Installation and Warranty Requirements *(continued)*

Fiberglass wool and ceramic fiber materials

WARNING

Inhaling of fiberglass wool and/or ceramic fiber materials is a possible cancer hazard. These materials can also cause respiratory, skin and eye irritation.

The state of California has listed the airborne fibers of these materials as a possible cancer hazard through inhalation. When handling these materials, special care must be applied.

Suppliers of ceramic fiber products recommend the following first aid measures:

- Respiratory tract (nose and throat) irritation: If respiratory tract irritation develops, move the person to a dust free location.
- Eye irritation: If eyes become irritated, flush immediately with large amounts of lukewarm water for at least 15 minutes. Eyelids should be held away from the eyeball to ensure thorough rinsing. Do not rub eyes.
- Skin irritation: If skin becomes irritated, remove soiled clothing. Do not rub or scratch exposed skin. Wash area of contact thoroughly with soap and water. Using a skin cream or lotion after washing may be helpful.
- Gastrointestinal irritation: If gastrointestinal tract irritation develops, move the person to a dust free environment.

Suppliers of fiberglass wool products recommend the following precautions be taken when handling these materials:

- Avoid breathing fiberglass dust and contact with skin and eyes.
- Use NIOSH approved dust/mist respirator.
- Wear long-sleeved, loose fitting clothing, gloves and eye protection.
- Wash work clothes separately from other clothing. Rinse washer thoroughly.
- Operations such as sawing, blowing, tear-out and spraying may generate airborne fiber concentration requiring additional protection.

First aid measures

- If eye contact occurs, flush eyes with water to remove dust. If symptoms persist, seek medical attention.
- If skin contact occurs, wash affected areas gently with soap and warm water after handling.

WARNING

Appliance materials of construction, products of combustion and the fuel contain alumina, silica, heavy metals, carbon monoxide, nitrogen oxides, aldehydes and/or other toxic or harmful substances which can cause serious injury or loss of life and which are known to the State of California to cause cancer, birth defects and other reproductive harm. Always use proper safety clothing, respirators and equipment when servicing or working nearby the appliance.

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About these Service Instructions

Take note of all symbols and notations intended to draw attention to potential hazards or important product information. These include "WARNING", "CAUTION", and "IMPORTANT". See below.

WARNING

Indicates an imminently hazardous situation which, if not avoided, could result in death, serious injury or substantial product/property damage.

▶ *Warnings draw your attention to the presence of potential hazards or important product information.*

CAUTION

Indicates an imminently hazardous situation which, if not avoided, may result in minor injury or product/ property damage.

▶ *Cautions draw your attention to the presence of potential hazards or important product information.*

IMPORTANT

▶ *Helpful hints for installation, operation or maintenance which pertain to the product.*

▶

▶ *This symbol indicates that additional, pertinent information is to be found.*

▶ *This symbol indicates that other instructions must be referenced.*

Necessary Tools

Testing/analysis equipment (Use only calibrated equipment)

- Multimeter to measure 0 - 230VAC, 0 - 12A and 0-100 mA DC
- Flue gas analyzer to measure % CO_2 or O_2 (i.e.: Bacharach fluid samplers or suitable electronic analyzer)
- Manometer to measure gas pressure 0 to 11 "w.c. (accurately) and up to 28 "w.c. gas pressure (or a non-electric Magnehelic® manometer may also be utilized)
- Stack thermometer 0 to 500°F (0 to 260°C)
- Bacharach calculator or suitable tables to calculate efficiency
- Carbon monoxide measuring equipment 0 to 400 ppm

Cleaning supplies

- Plastic hand brush
- Rags

Special items

- Approved leak detection fluid for natural gas and liquid propane gas
- Pipe joint sealant

Important Regulatory and Installation Requirements

Codes

The installation of this unit shall be in accordance with local codes or, in the absence of local codes, use CAN/CSA-B149.1 or .2 Installation Codes for Gas Burning Appliances for Canada. For U.S. installations use the National Fuel Gas Code ANSI Z223.1. Always use latest editions of codes.

In Canada all electrical wiring is to be done in accordance with the latest edition of CSA C22.1 Part 1 and/or local codes. In the U.S. use the National Electrical Code ANSI/NFPA 70. The heating contractor must also comply with both the Standard for Controls and Safety Devices for Automatically Fired Boilers, ANSI/ASME CSD-1, and the Installation Code for Hydronic Heating Systems, CSA B214-01, where required by the authority having jurisdiction.

Instructing the system user

The installer of the system is responsible to ensure the system operator/ultimate owner is made familiar with the system functioning, its activation, and its shut-down.

The following topics must be covered:
- Proper system operation sequence.
- Explain the equipment.
- Demonstrate an emergency shut-down, what to do and what not.
- Explain that there is no substitute for proper maintenance to help ensure safe operation.

Initial start-up

Initial start-up must be performed by a qualified heating contractor. Proper completion of the Maintenance Record by the heating contractor is also required.

The Maintenance Record is located in the Service Instructions.

Carbon Monoxide Detectors

The installer must verify that at least one carbon monoxide alarm has been installed within a residential living space or home following the alarm manufacturer's instructions and applicable codes before putting the appliance into operation.

Working on the equipment

The installation, adjustment, service, and maintenance of this boiler must be done by a licensed professional heating contractor who is qualified and experienced in the installation, service, and maintenance of hot water boilers. There are no user serviceable parts on the boiler, burners, or control.

Please carefully read this manual prior to attempting start-up, maintenance or service. Any warranty is null and void if these instructions are not followed.

For information regarding other Viessmann System Technology componentry, please reference documentation of the respective product.

We offer frequent installation and service seminars to familiarize our partners with our products. Please inquire.

Ensure main power supply to equipment, the heating system, and all external controls has been deactivated. Close main gas supply valve. Take precautions in all instances to avoid accidental activation of power during service work.

The completeness and functionality of field supplied electrical controls and components must be verified by the heating contractor. These include low water cut-offs, flow switches (if used), staging controls, pumps, motorized valves, air vents, thermostats, etc.

Technical literature

Literature for the Vitodens boiler:
- Technical Data Manual
- Installation Instructions
- Service Instructions
- Operating Instructions and User's Information Manual
- Instructions of other Viessmann products utilized and installed
- Installation codes mentioned in this manual

Leave all literature at the installation site and advise the system operator/ultimate owner where the literature can be found. Contact Viessmann for additional copies.

This product comes with several safety instruction labels attached.
Do not remove!
Contact Viessmann immediately if replacement labels are required.

Important Regulatory and Installation Requirements *(continued)*

CSD-1 Field Testing of High Limit Switches for Vitodens boilers – where required by law.
As per ASME Boiler and Pressure Vessel Code, section IV, subsection HG-613 TEMPERATURE CONTROL requirements, Vitodens 200-W hot water boilers are protected from over-temperature by two temperature-operated controls. These temperature control devices conform to Standards for Limit Controls, and are accepted by CSA, a nationally recognized testing agency. Each boiler is equipped with a manual reset high temperature limit control and a temperature control that will cut off fuel supply when the system water temperature reaches a preset operating temperature. VIESSMANN IS NOT RESPONSIBLE FOR ANY DAMAGES THAT THE FOLLOWING TEST PROCEDURE MAY RESULT IN BY OVERHEATING THE SYSTEM.

The Vitodens 200 boilers are equipped with flow switches that when activated enable the burner to operate. The fixed high limit, when tripped, produces a fault that will require manual reset of the boiler control.

High Limit Safety Cut-out Test

IMPORTANT

To ensure proper operation of the high limit cut-out test in cascade systems, only activate it at one boiler at a time. While running the test the other boilers should be switched off or set to standby, Viguide is required to activate the high limit test on lag boilers.

Tap the following buttons:

1. " ☰ "
2. "Service"
3. Enter password "viservice".
4. Confirm with ✔.
5. "Test modes"
6. "High limit safety cut-out test"
7. Confirm with ✔.
8. Use ↩ to end the Test.

Flow Switch Procedure:
The Vitodens 200 boilers are equipped with a flow sensing device. Upon detection of an inadequate flow rate, the switch will open and the burner will shut down and will prevent restart until an adequate flow rate is restored.

Applicability

CAUTION

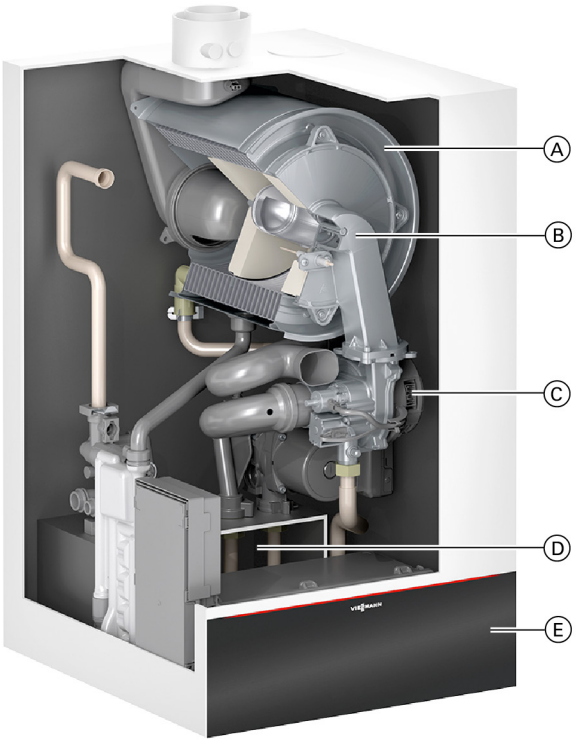
The boiler serial number must be provided when ordering replacement parts. Some replacement parts are not reverse compatible with previous versions of the Vitodens 200-W B2HE boiler.

IMPORTANT

When ordering replacement parts, provide either the 16-digit boiler serial number (on the bar code label) or the 12-digit ASME/NB serial number, located as shown underneath boiler front enclosure panel. Refer to page 19 for instructions on how to remove front enclosure panel.

NG and LPG

Model No.	Serial No.
B2HE - 85	7722778 □□□□□□□□□
B2HE - 120	7722779 □□□□□□□□□
B2HE - 150	7722780 □□□□□□□□□
B2HE - 199	7722781 □□□□□□□□□



Product may not be exactly as shown

Ⓐ Inox-Radial heat exchanger made from stainless steel – for high operational reliability and a long service life. Large heating output in the smallest of spaces

Ⓑ Modulating MatrixPlus cylinder burner for extremely clean combustion and quiet operation

Ⓒ Variable speed combustion fan for quiet and economical operation

Ⓓ Gas and water connections

Ⓔ 7 in. color touch screen boiler control unit

Intended Use

The appliance is only intended to be installed and operated in sealed unvented heating systems, with due attention paid to the associated installation, service and operating instructions. It is only designed for the heating of water that is of potable water quality.

Intended use presupposes that a fixed installation in conjunction with permissible, system-specific components has been carried out.

Commercial or industrial usage for a purpose other than heating the building or DHW shall be deemed inappropriate.

Any usage beyond this must be approved by the manufacturer in each individual case.

Incorrect usage or operation of the appliance (e.g. the appliance being opened by the system user) is prohibited and results in an exclusion of liability. Incorrect usage also occurs if the components in the heating system are modified from their intended use (e.g. if the flue gas and ventilation air paths are sealed).

Commissioning the System with the Commissioning Assistant

IMPORTANT

Only commission the appliance with a fully filled siphon trap. Check that the siphon trap has been filled with water.

Commissioning assistant - single boiler system

1. Open the gas shut-off valve.
2. ■ If the appliance has not been switched on yet:
   Turn on the ON/OFF switch.
   The commissioning assistant starts automatically.
   ■ If the appliance has already been switched on:
   See chapter “Calling up the commissioning assistant at a later point”, page 15.
3. Commission the boiler and follow the commissioning assistant. See the overview below.
   Note: Depending on the type of boiler, the accessories connected and other settings, not all menu points will be displayed.
   Note: After the commissioning assistant has finished, check that the actuators are connected and operating correctly. Start the actuator test.

Commissioning assistant sequence	Explanations and references
Commissioning	
Language	
With programming unit	If commissioning is to be carried out at the programming unit of the boiler.
With software tool	The appliance automatically switches on the WiFi access point. Further commissioning steps according to the instructions of the software tool used (e.g. “Viguide mobile”) **Note:** Apps for commissioning and service are available for iOS and Android devices. Download on the App Store GET IT ON Google Play
Altitude	Set the elevation of the installation site
Units of measurement	°C/m or °F/ft
Date and time	
Operating mode (based on boiler application)	■ Weather-compensated operation The outside temperature sensor must be connected. ■ Constant operation Operation with constant supply temperature
Building type	■ Detached house One shared vacation program and time program for DHW and heating ■ Apartment building A separate vacation program can be set for each heating circuit
Gas type	If operating with LPG, switch to “LPG”
Flue system type	■ Single connection Only one boiler is connected to the flue system (factory setting). ■ Multiple connections Several boilers are connected to the flue system.
Filling and purging	
If no further settings are to be performed, the commissioning assistant can now be closed.	

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Commissioning the System with the Commissioning Assistant *(continued)*

Commissioning assistant sequence	Explanations and references
System scheme	
Heating circuit 1 (based on boiler application)	Heating circuit without mixing valve or heating circuit without mixing valve with external hook-up (if installed)
Heating circuit 2, 3 ... (based on boiler application)	Heating circuits with mixing valve or heating circuits with mixing valve with external hook-up (if installed)
DHW ■ Not available ■ Tank with one sensor ■ Tank with one sensor and DHW circulation pump ■ Tank with temperature switch ■ Tank with temperature switch and DHW recirculation pump	external hook-up (if installed) Tank equipped with DHW temperature switch (such as an Aquastat) Tank equipped with DHW temperature switch (such as an Aquastat) and DHW recirculation pump
Low loss header/buffer cylinder ■ Not available ■ Low loss header, heating only ■ DHW heating upstream of low loss header ■ DHW heating downstream of low loss header ■ Buffer cylinder, heating only ■ DHW heating upstream of buffer cylinder ■ DHW heating downstream of buffer cylinder	Settings for the consumer circuits according to the system components There is no low loss header or heating water buffer tank in the system. System with low loss header, without DHW heating DHW heating with e.g. separate DHW tank connected upstream of the low loss header DHW heating with e.g. separate DHW tank connected downstream of the low loss header System with heating water buffer tank, without DHW heating DHW heating with e.g. separate DHW tank connected upstream of the heating water buffer tank DHW heating with e.g. separate DHW tank connected downstream of the heating water buffer tank
Solar (if installed) ■ No solar function	Solar thermal system connected to boiler via EM-S1 extension Setting subject to the design of the solar thermal system EM-S1 extension installation and service instructions
Heating zone/safety input ■ Heating zone 1 ■ Heating zone 2 ■ Heating zone 3 (based on boiler application type)	 Not available, or temperature controller or low water indicator Not available or temperature controller or monitoring for excessively low gas pressure Not available or temperature controller or monitoring for excessively high gas pressure

Commissioning the System with the Commissioning Assistant *(continued)*

Commissioning assistant sequence	Explanations and references
Floating contact: Function selection plug 96	If a contact has been connected to plug 96.
■ No function	
■ External demand, DHW circulation pump	Push button function, DHW recirculation pump runs for 5 min.
■ External demand (based on boiler application type)	Boiler demand with adjustable target supply temperature (parameter 528.0) and target primary pump speed (parameter 1100.2)
■ External blocking	
■ Heat demand (based on boiler application type)	Call for heat is shown in the display/menu as “Heating zone 4”.
EM-EA1 (DIO): Function selection (based on boiler application type)	If an EM-EA1 extension (DIO electronics module) is connected as a function extension.
Functions	Selection of the connected function according to the table in the EM-EA1 extension installation instructions.
Remote control units	
(based on boiler application type)	Set the type of remote control and subscriber no. as assignment to the respective heating circuit. Up to 4 heating circuits can be assigned to one remote control unit. It is not possible for several remote controls to act on one heating circuit.
Maintenance	
Interval in burner hours run until next maintenance	Interval adjustable in steps of 100 h.
Interval until next maintenance	Interval adjustable to 3, 6, 12, 18 or 24 months.

Multi boiler system
The lead boiler must be commissioned using the Viguide mobile app (service layer).
Note: Commission the lead boiler first, then the lag boilers.
- The lag boiler is numbered by manually setting the subscriber number (ID).
- Always enter the ID number consecutively and without gaps!

After this, the respective boiler has to be commissioned using the Viguide mobile app. Follow the instructions in the app and establish a connection between the lead appliance (boiler) and the Viguide app.

Commissioning the System with the Commissioning Assistant *(continued)*

Commissioning assistant sequence	Explanations and references
Commissioning	
Viguide function type:	Lead (1) Cascade lead without heat provides cascade functionalities to connected lag devices. Does not support DHW or heat supply by itself. Lead (1) Cascade heat lead provides cascade functionalities to its own and connected lag devices. Does not support DHW supply or global DHW supply. Lead (1) Cascade heat DHW lead provides cascade functionalities to its own and connected lag devices and provides local DHW production. Lag 1-15 (2-16) Heat lag is a device controller that provides lag heating device functionalities Lag 1-15 (2-16) Buffer lag to be applied for multivalent systems, e.g. CHP Lag 1-15 (2-16) DHW lag is a lag device that provides only support in DHW production – hydraulically separated (e.g. Vitocal 262) Lag 1-15 (2-16) Backup heater is a lag device that is taken out of the cascade sequence as a fall-back solution, central heating only..
Viguide cascade member sequencing strategy:	1.1 Dynamic strategy – fixed first dynamic sequence of the cascade members with manually configured fixed first device in sequence 1.2 Dynamic strategy – fixed last dynamic sequence of the cascade members with manually configured fixed last device in sequence 1.3 Dynamic strategy – runtime optimization dynamic sequence of the cascade members with runtime optimization of the cascade members 2 Manual mode – manual mode of the cascade members with fixed configured sequence. In general the whole cascade is supply temperature-controlled: A particular supply temperature is requested from all cascade members.

Commissioning assistant sequence	Explanations and references
Language	
Viguide lead boiler commissioning:	Units: ■ Gas type ■ Altitude ■ Filling ■ Purging Safety functions on MZIO (low water cut-off via input ZI1 (requires connection at each boiler); low gas pressure via ZI2; high gas pressure via ZI3). Central heating pump mode (auto or modulation controlled pump). Set up the combustion air interface. Flue gas sensor test. Time and auto summer/wintertime. DHW function: one-time load, hygiene function and scald protection. Supported number and type (direct/mixed/none) of heating circuits. Number of TT circuits. Function of TT circuits. Control type (weather-compensated/constant control) – if weather-compensated, then the setting “heating and TT circuit” or only “heating” without TT circuit is selectable. Setup of internet connection If weather-compensated, then source of valid outside air temperature is selectable. If constant mode control type: a) Constant flow control for heating circuits. b) Constant flow control with data interface for gateway/building automation system for heating circuits. c) Fixed temperature supply to TT zones with TT circuits is selectable.

Commissioning the System with the Commissioning Assistant *(continued)*

Commissioning assistant sequence	Explanations and references
Viguide lag boiler commissioning:	Units: ■ Gas type ■ Altitude ■ Filling ■ Purging Safety functions on MZIO (low water cut-off via input ZI1 (requires connection at each boiler); low gas pressure via ZI2; high gas pressure via ZI3). Central heating pump mode (auto or modulation controlled pump). Set up the combustion air interface. Flue gas sensor test.
Viguide service layer lead device:	Emissions test mode Actuator test mode Min. partial load Max. partial load Screed drying System configuration: ■ General – device/boiler – DHW – heating circuit 1/2/3/4 - TT circuits Diagnosis: ■ General – device/burner – DHW – heating circuit - TT circuits
Viguide service layer lag device:	Emissions test mode Actuator test mode Min. partial load Max. partial load System configuration: ■ General – device/boiler Diagnosis: ■ General – device/burner
If no further settings are performed, the commissioning assistant can now be closed.	

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Commissioning the System with the Commissioning Assistant *(continued)*

Switching WiFi ON/OFF (single or lead boilers only)
The appliance is equipped with an integrated WiFi communication module with extended type plate.
The internal communication module supports commissioning of the boiler with the "Viguide app", connectivity with the "ViCare app", and connection to the "Viguide Web" digital service centre.
The access details required for establishing a connection are recorded in the form of an access code with "WiFi symbol". Three copies of this code are located on the rear of the programming unit.
Before installing the programming unit, remove the access code labels from the rear. For commissioning, affix one label to the HMI as shown in the installation instructions.
Switch on the WiFi connection and establish a connection to the router.
Activating the internet connection:


Operating instructions

This device complies with part 15 of the FCC Rules.
Operation is subject to the following two conditions:
(1) This device may not cause harmful interference, and
(2) this device must accept any interference received, including interference that may cause undesired operation.

CAUTION

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Apply WiFi label here

Calling up the commissioning assistant at a later point
If you need to continue commissioning later, the commissioning assistant can be reactivated at any time.

Tap the following buttons:

1. ☰
2. "Service"
3. Enter password "viservice".
4. Confirm with ✔.
5. "Commissioning"

Filling the Heating System

Water connections

Vitodens 200-W boilers can be used in any fully pumped hot water heating system.
Minimum system pressure is 0.8 bar (12 psig).
Chemical corrosion protection products: Corrosion does not typically occur in sealed heating systems which have been correctly installed and are correctly operated.
Many manufacturers of plastic pipes recommend the use of chemical additives. In this case, only those commercially available corrosion protection products approved for boilers with domestic hot water heating via single-wall heat exchangers (instantaneous plate heat exchangers or DHW tanks) must be used.

Water quality

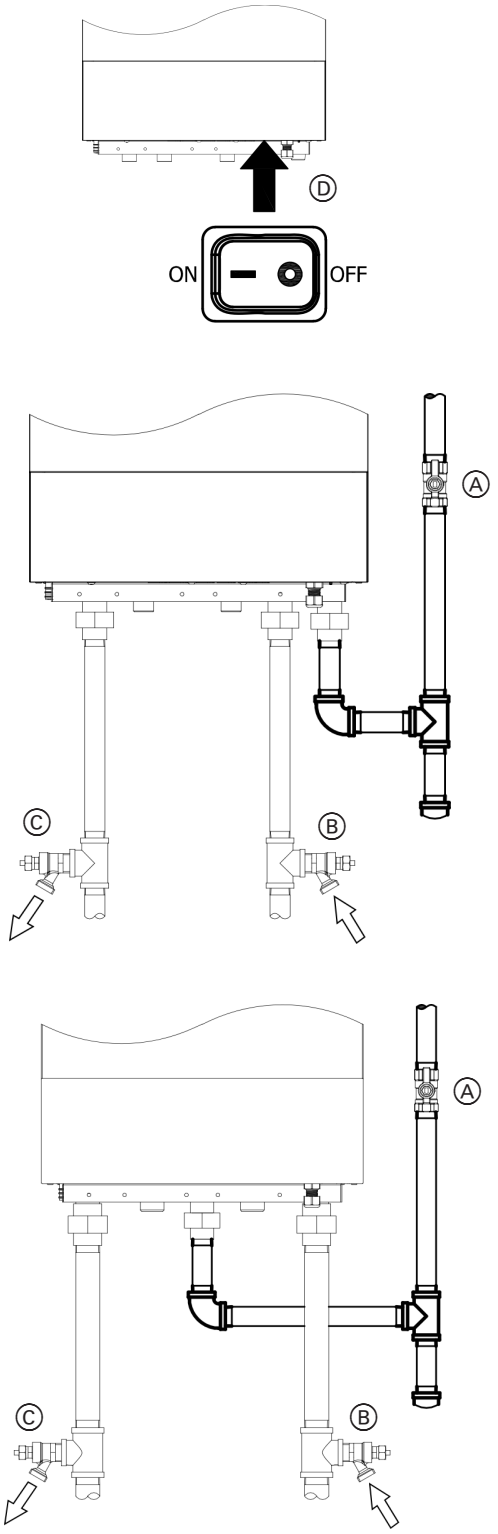
Treatment for boiler feed water should be considered in areas of known problems, such as where a high mineral content and hardness exist.
In areas where freezing might occur, an antifreeze may be added to the system water to protect the system. Please adhere to the specifications given by the antifreeze manufacturer.
Do not use automotive silicate based antifreeze.
Please observe that an antifreeze/water mixture may require a backflow preventer within the automatic water feed and influence components such as diaphragm expansion tanks, radiation, etc. Maximum antifreeze content is 50% for the Vitodens 200-W boiler.
Do not use sulphur-containing boiler feed water. Check pH-level after some operating time. It should be in the range from 8.2 to 9.5. If it is not, please take appropriate measures.
Do not use antifreeze other than specifically made for hot water heating systems. System also may contain components which might be negatively affected by antifreeze. Check total system frequently when filled with antifreeze. Advise system operator/ultimate owner that system is filled with a glycol mix. The heating contractor must provide a MSDS (Material Safety Data Sheet) for the antifreeze used to the system operator/ ultimate owner.

Total permissible hardness of the fill and top-up water

Total heating output	**Specific heating volume**					
MBH	**< 5 USG per 3412 BTU**		**≥5USG per 3412 BTU to < 13USG per 3412 BTU**		**≥13USG per 3412 BTU**	
≤170	300 ppm	17.5 gpg	200 ppm	11.7 gpg	2 ppm	0.11 gpg
> 170 to ≤682	200 ppm	11.7 gpg	150 ppm	8.8 gpg	2 ppm	0.11 gpg
> 682 to ≤2050	150 ppm	8.8 gpg	2 ppm	0.11 gpg	2 ppm	0.11 gpg
> 2050	2 ppm	0.11 gpg	2 ppm	0.11 gpg	2 ppm	0.11 gpg

ppm - parts per million
gpg - grains per gallon

Filling the Heating System *(continued)*



Valves/fittings on site:
- Ⓐ Gas shut-off valve
- Ⓑ Heating return with fill valve
- Ⓒ Heating supply with drain valve
- Ⓓ ON/OFF switch

1. Check the pre-charge pressure of the expansion tank.
2. Close gas shut-off valve Ⓐ.
3. Fill the heating system at boiler fill valve Ⓑ in the heating return (on site). Minimum system pressure > 12 psi (0.8 bar). Check the system pressure at pressure gauge. The indicator must be in the green band. If necessary, open the system air vents.
   Note: Pressure spikes may occur during filling, ensure pressure does not exceed pressure relief valve rating.
4. Fit hose to drain valve Ⓒ. Route the hose into a suitable container or drain outlet.
5. Close the shut-off valves on the heating water side.
6. Open drain valve Ⓒ and fill valve Ⓑ in the heating return. Vent (flush) until no more air noise is audible.
   Note: Required minimum flow rate for flushing: 800 L/h for B2HE 85/120 boilers; 1100 L/h for B2HE 150/199 boilers
7. Activate the filling function (see commissioning assistant or following chapter).
8. Close drain valve Ⓒ and fill valve Ⓑ. Check the system pressure at pressure gauge. The indicator must be in the green band.
9. Open the shut-off valves on the heating water side.

Activating the filling function

If the filling function is to be activated after commissioning. Tap the following buttons:

1. ☰
2. Select “Service”.
3. Enter password “viservice”.
4. Confirm with ✔.
5. Select “Service functions”.
6. “Filling”
7. Confirm with ✔.

The filling function ends automatically after 20 min. or when you tap ✔.

Checking all Connections on the Heating Water and DHW Sides for Leaks

Check heating system and domestic hot water connections (if applicable). Ensure all connections are pressure tight.
Correct any leaks found on fittings, pumps, valves, etc.

⚠ WARNING

Risk of electric shock from escaping heating water or DHW.
When commissioning and after carrying out maintenance work, check all water side connections for leaks.

Purging the Heating System

1. Close the gas shut-off valve and switch the boiler ON.
2. Open the automatic air vent valve.
   Note: To use the purging function, an automatic air vent valve must be installed on site.
3. Activate the purging program.
4. Adjust the system pressure.
   The boiler pressure gauge shows the system pressure.
5. Disconnect the supply hose from the boiler drain and fill valve.
6. Open the gas shut-off valve.

Activating the purging function
Tap the following buttons:
1. ☰
2. "Service"
3. Enter password "viservice".
4. Confirm with ✔.
5. "Service functions"
6. "Purging"
7. Use ✔ to activate the venting function.
   The display shows the system pressure.
   The venting function ends automatically after 20 min or when you tap ✔.

Naming Heating Zones or Heating Circuits

In the delivered condition, the heating zones or heating circuits are designated "Heating zone 1", "2", "3" and "4" (if available).
If the system user prefers, the heating zones can be renamed to suit the specific system.
To enter names for the heating zones:


Operating instructions

Entering Contact Details of Heating Contractor

The system operator can call up contact details when required and notify the heating contractor.
1. ☰
2. Select "Information".
3. Select "Contractor contact details".
4. Fill in the fields and confirm each with ✔.

Checking the Gas Type

The Vitodens 200-W boiler is for use with gases whose characteristics fall within the following ranges.
Do not use any other types of gas.

	Natural gas	Liquid Propane gas
Heating value (gross) Btu/ft³	970 to 1100	2466 to 2542
Specific gravity	0.57 to 0.70	1.522 to 1.574
Ultimate carbon dioxide (CO_2) %	11.7 to 12.2	13.73 to 13.82

1. Verify that the fuel type listed on the boiler rating plate is the correct type for the installation being attempted.
2. Once verified, record the fuel type in Maintenance Record on page 94.

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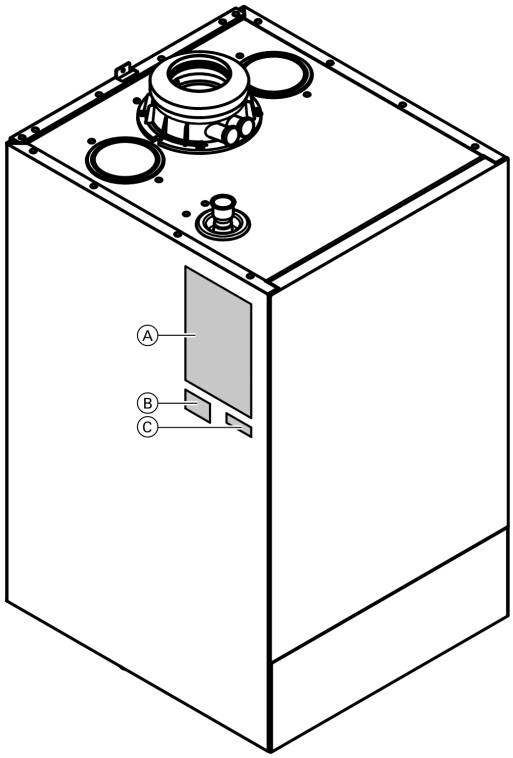
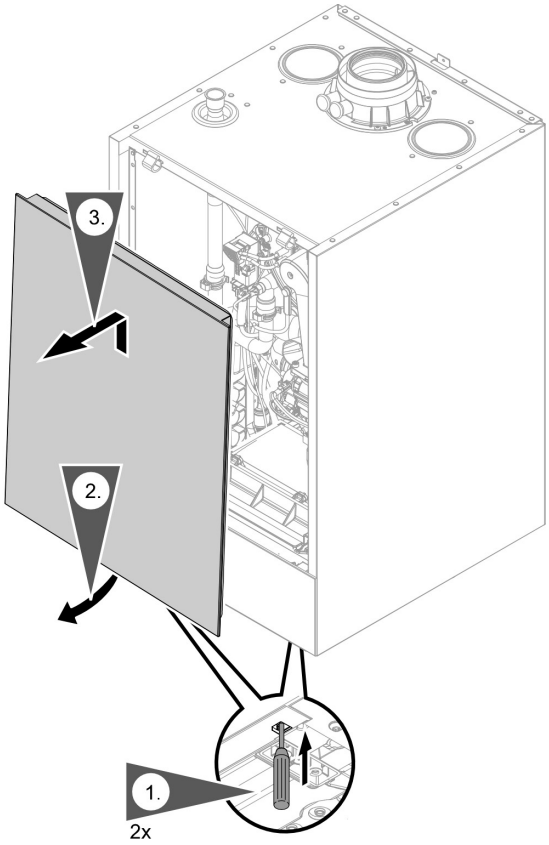
Converting the Gas Type for Operation with LPG

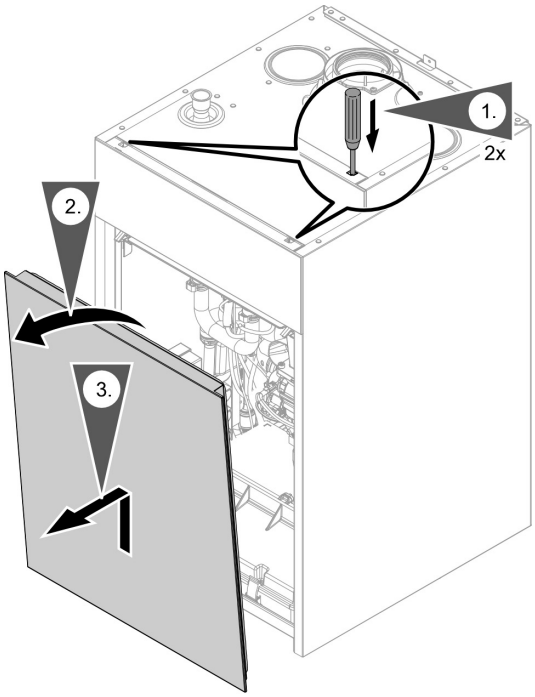


1. To change the gas type on the control unit, see "Commissioning the system with the commissioning assistant"
   Note: No mechanical adjustments are made to the gas solenoid valve.
2. Affix labels as shown.

Legend
Ⓐ CSA Rating Plate
Ⓑ Field Conversion Label
Ⓒ Gas Type Label

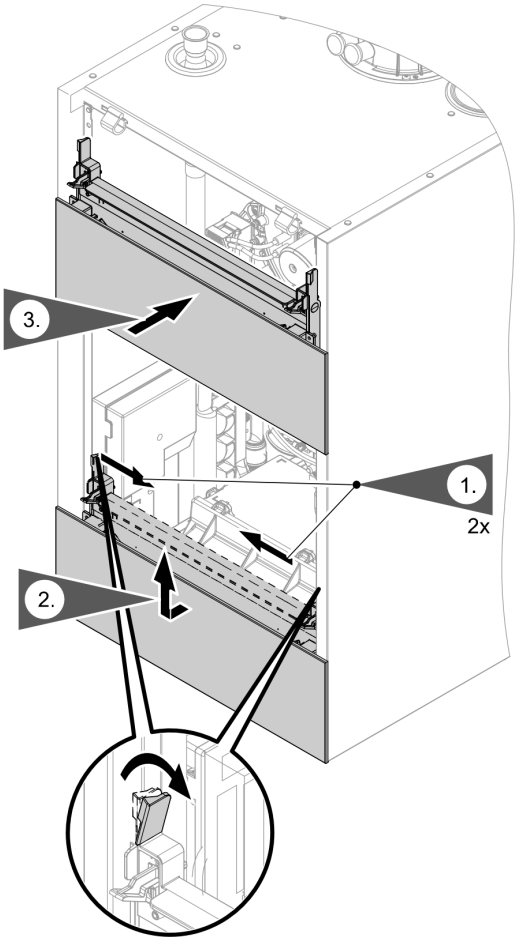
Removing the Front Panel



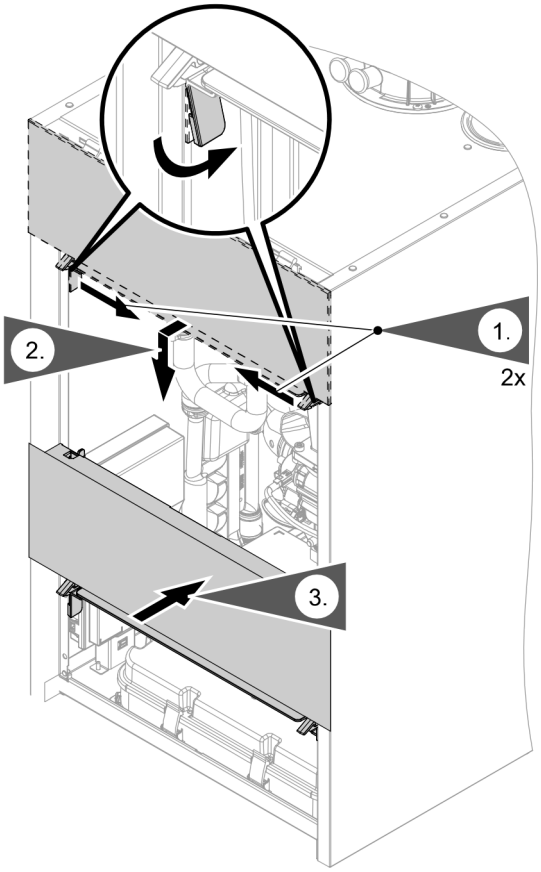


Moving the Programming Unit to the Service Position

To facilitate certain maintenance tasks, move the programming unit up or down, depending where it has been installed, to the service position shown.



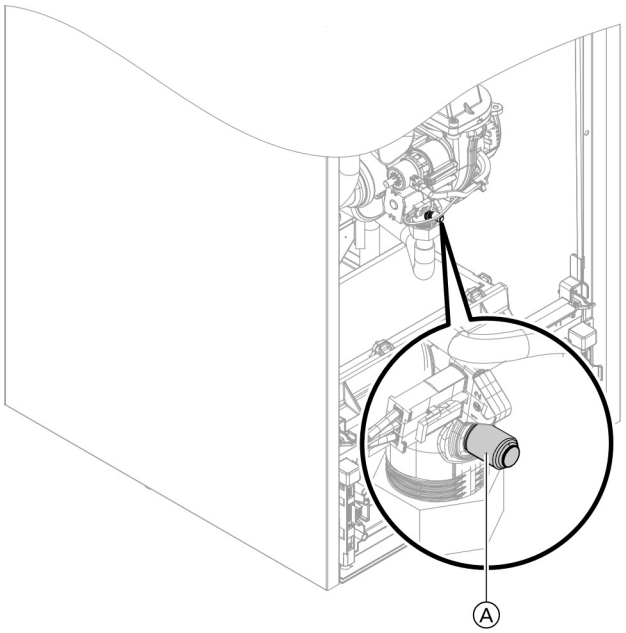
HMI mounted at the bottom



HMI mounted at the top

Do not disconnect the plug from the mounting panel.
Do not alter where and how the cable is secured (fixing point of the cable tie).

Checking the Static Pressure and Supply Pressure



Legend

Ⓐ Inlet gas pressure measurement port

Measuring running gas supply pressure, using test nipple Ⓐ

Static pressure

1. To measure static and/or running pressure remove burner cover panel as per the removal instructions on page 19.
2. Close gas shutoff valve.
3. Loosen screw in test nipple Ⓐ on the gas combination valve, do not remove completely. Connect calibrated manometer.
4. Open the gas shutoff valve.
5. Measure static pressure. Values must be:
   - 14 "w.c. max. for NG
   - 14 "w.c. max. for LPG
6. Enter measured value into Maintenance Record on page 94 in this manual.
7. Start up boiler, using the on/off service switch (field supplied).

IMPORTANT

A CO_2 measurement (see page 35) must be taken before and after working on gas appliances to eliminate health risks and to guarantee the satisfactory condition of the system.

8. All measurements must be made under high-fire conditions.
   Note: Use suitable measuring instruments calibrated with a minimum resolution of 0.04 "w.c. for measuring the running pressure.

Measure the running pressure; value must be:

Running supply pressure with Natural gas	Running supply pressure with Liquid propane gas	Corrective action
under 4 "w.c.	under 10 "w.c.	Do not attempt adjustment. Call local gas utility to increase pressure.
4 to 14 "w.c.	10 to 14 "w.c.	Start up boiler.
over 14 "w.c.	over 14 "w.c.	Do not attempt adjustment. Call local gas utility to decrease pressure. Boiler valve must not be exposed to pressure over 14 "w.c.

9. Enter gas type into Maintenance Record on page 94 in this manual.
10. Switch off the heating system ON/OFF service switch (boiler is shut down), close the gas shut-off valve, remove the manometer and re-tighten the screw in the test nipple Ⓐ.
11. Open gas shutoff valve and check that the test nipple Ⓐ and all gas connections are gas-tight.

⚠ WARNING

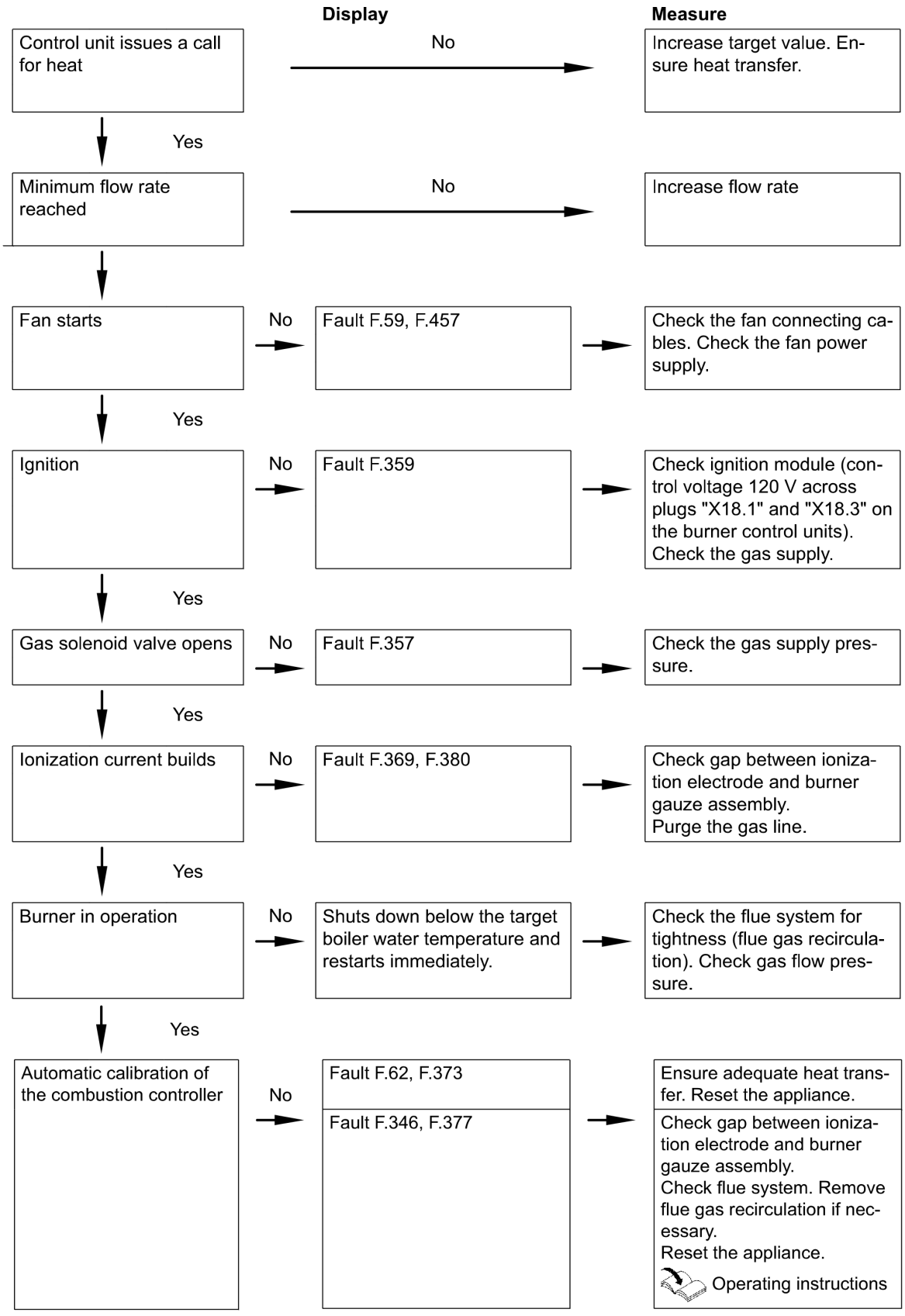
Ensure that there is no open flame in the room.

⚠ WARNING

Never purge a gas line into a combustion chamber. Never use matches, candles, flame, or other sources of ignition for purpose of checking leakage. Use a soap-and-water solution to check for leakage. A failure to follow this warning could result in fire, explosion, personal injury, or death.

Supply pressure (flow pressure)		Measures
For natural gas	For LPG	
< 4" w.c.	< 10" w.c.	Do not start the boiler. Notify the gas supply utility or LPG supplier.
4 - 14" w.c.	10 - 14" w.c.	Start the boiler.
> 14" w.c.	> 14" w.c.	Install a separate gas pressure governor upstream of the system. Set the pre-charge pressure to 4" w.c. for natural gas and 10" w.c. for LPG. The gas solenoid valve must not be exposed to pressures above 14 "w.c.

Function Sequence and Possible Faults



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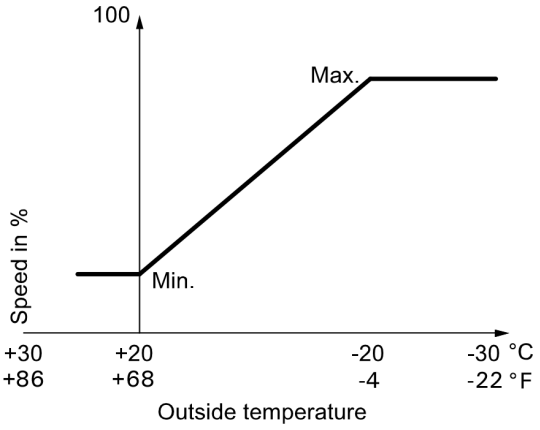
Setting the Max. Heating Output

A limit can be set on the maximum heating output for heating operation. The limit is set via the modulation range.

Note: The flow rate must be checked before the max. heating output can be adjusted. Ensure adequate heat transfer.

1. Tap ☰.
2. Select “Service”.
3. Enter password “viservice”.
4. Confirm with ✓.
5. Select “System configuration”.
6. Select “Boiler”.
7. Parameter 596.0 “Maximum heating output”
8. Check that a sufficient flow rate is ensured. If necessary, increase the heat transfer. Confirm the prompt with “ ✓“.
9. ✎
10. Set the required value as a % of the rated heating output and confirm with ✓. Factory setting 100 %.
11. End service functions.

Adjusting Pump Rate of Integral Circulation Pump



Setting (%) in Heating circuit 1 group:
- Min. speed: Parameter 1102.0
- Max. speed: Parameter 1102.1

Operation of the integral circulation pump as heating circuit pump for heating circuit 1

The pump speed and consequently the pump rate are controlled subject to the outside temperature and the switching times for heating operation or reduced mode. The minimum and maximum speeds for heating operation can be matched to the existing heating system at the control unit.

- The minimum pump rate and the maximum pump rate are factoy-set to the following values:

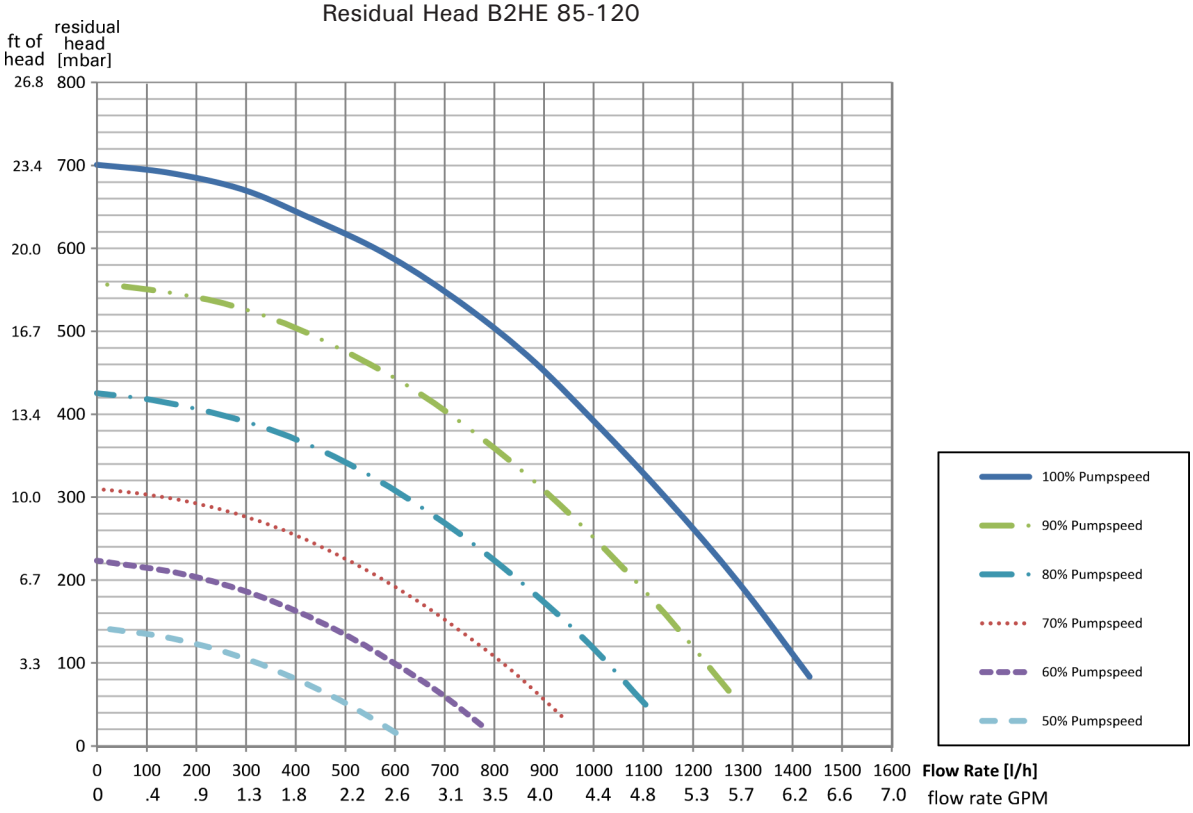
Rated heating output in MBH	Factory-set speed settings in %	
	Min. pump rate	Max. pump rate
B2HE-85	50	85
B2HE-120	50	100
B2HE-150	50	75
B2HE-199	50	100

- In the following system conditions, the internal circulation pump is operated at a constant speed:
  - Low loss header or heating water buffer tank and heating circuits with mixing valve
  - Constant supply temperature operation

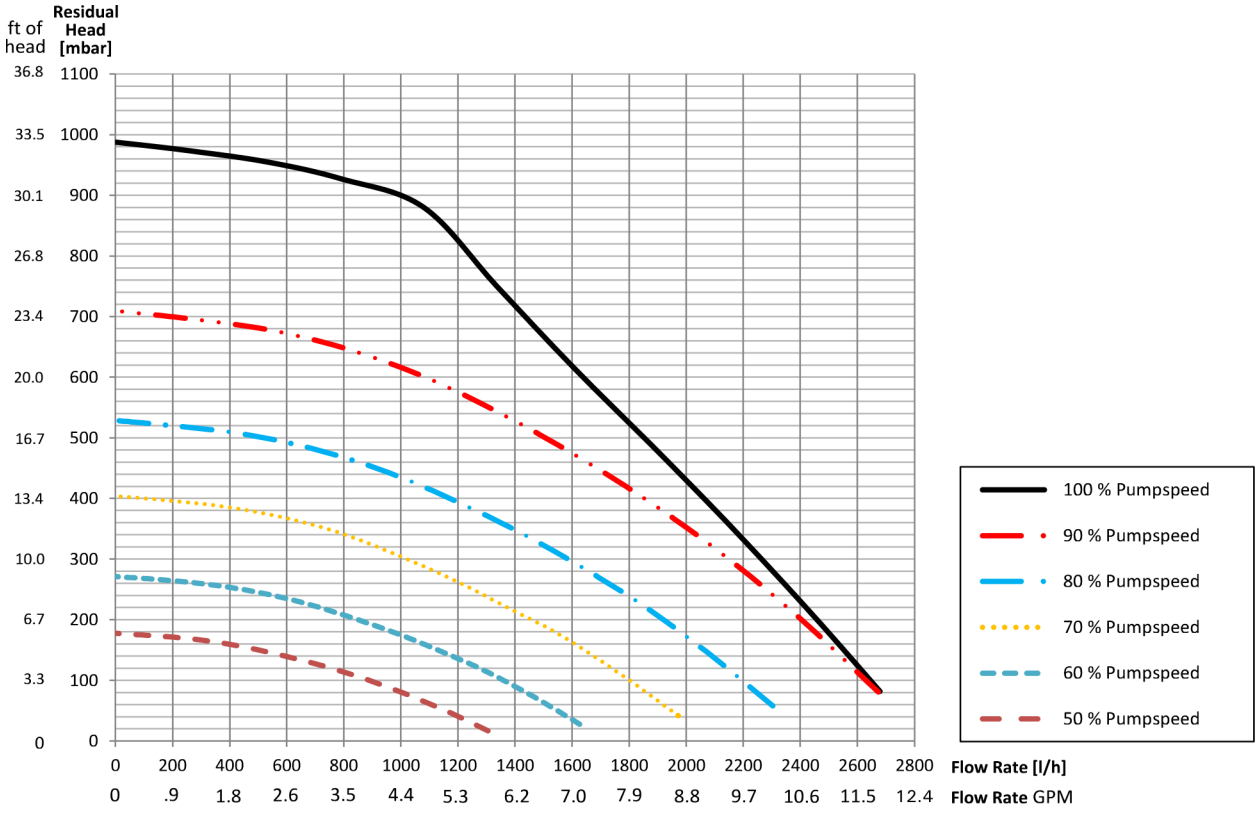
Speed setting (%): Parameter 1100.2 in the Boiler group

Adjusting Pump Rate of Integrated Circulation Pump *(continued)*

Residual Head B2HE 85-120



Residual Head B2HE 150-199



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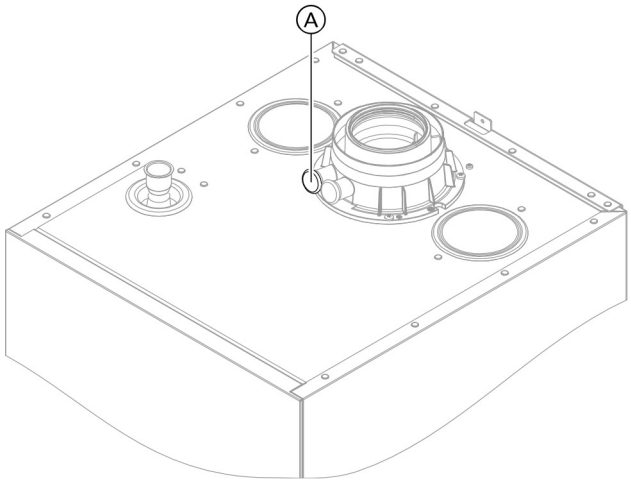
Seal Test on Coaxial Venting System (annular gap check)



Legend
Ⓐ Combustion air aperture

For sealed combustion, coaxial vent only
Viessmann strongly recommends that the heating contractor perform a simplified leak test during boiler start-up. For this purpose it is sufficient to measure the CO_2 concentration of the combustion air in the coaxial gap of the air intake pipe. The vent pipe is considered sufficiently leak-proof if a CO_2 concentration in the combustion air no higher than 0.2% or an O_2 concentration no lower than 20.6% is measured.

If higher CO_2 values or lower O_2 values are measured, check venting system thoroughly.

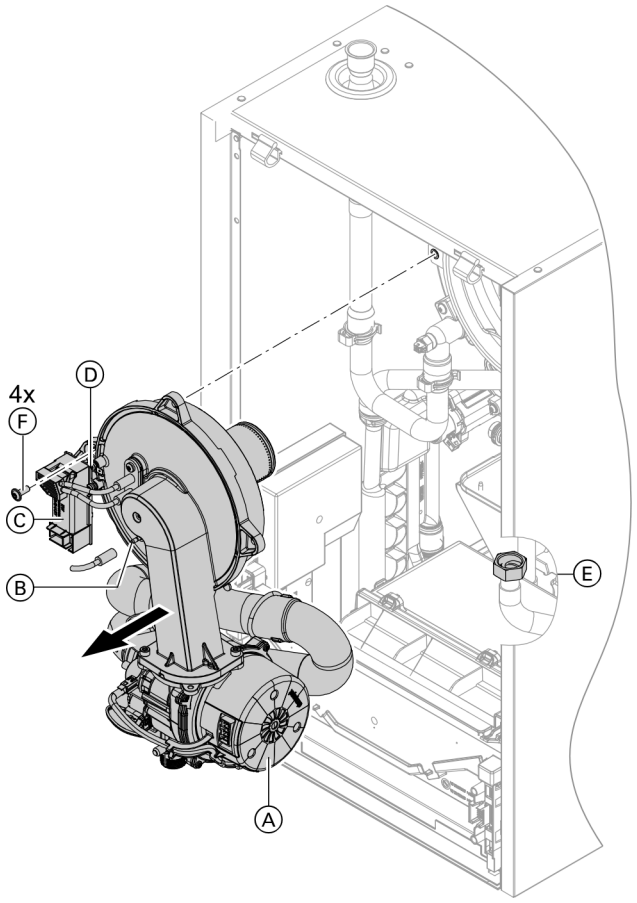
Note: The vent pipe adaptor comes with two measurement ports, one for combustion air intake measurement and one for flue gas measurement.

Note: This test is not applicable for single-wall venting systems (non-sealed combustion).

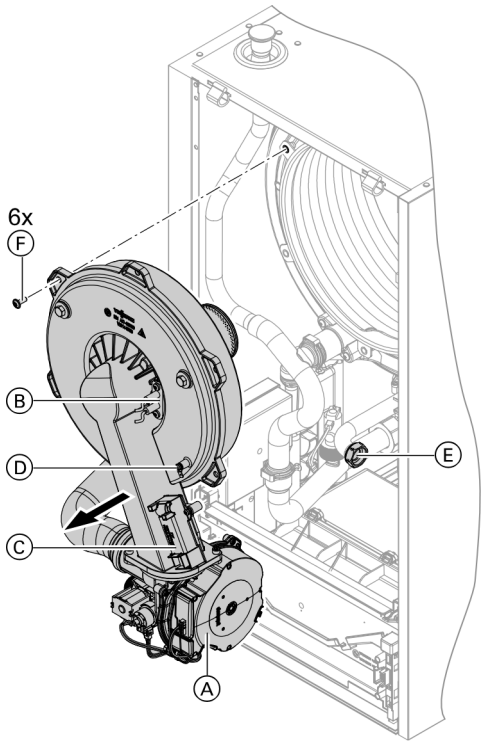
IMPORTANT

If the test port is not sealed, combustion air is drawn in from the room. After the leak test, re-seal the test port with the plug.

Removing the Burner



B2HE 85/120



B2HE 150/199

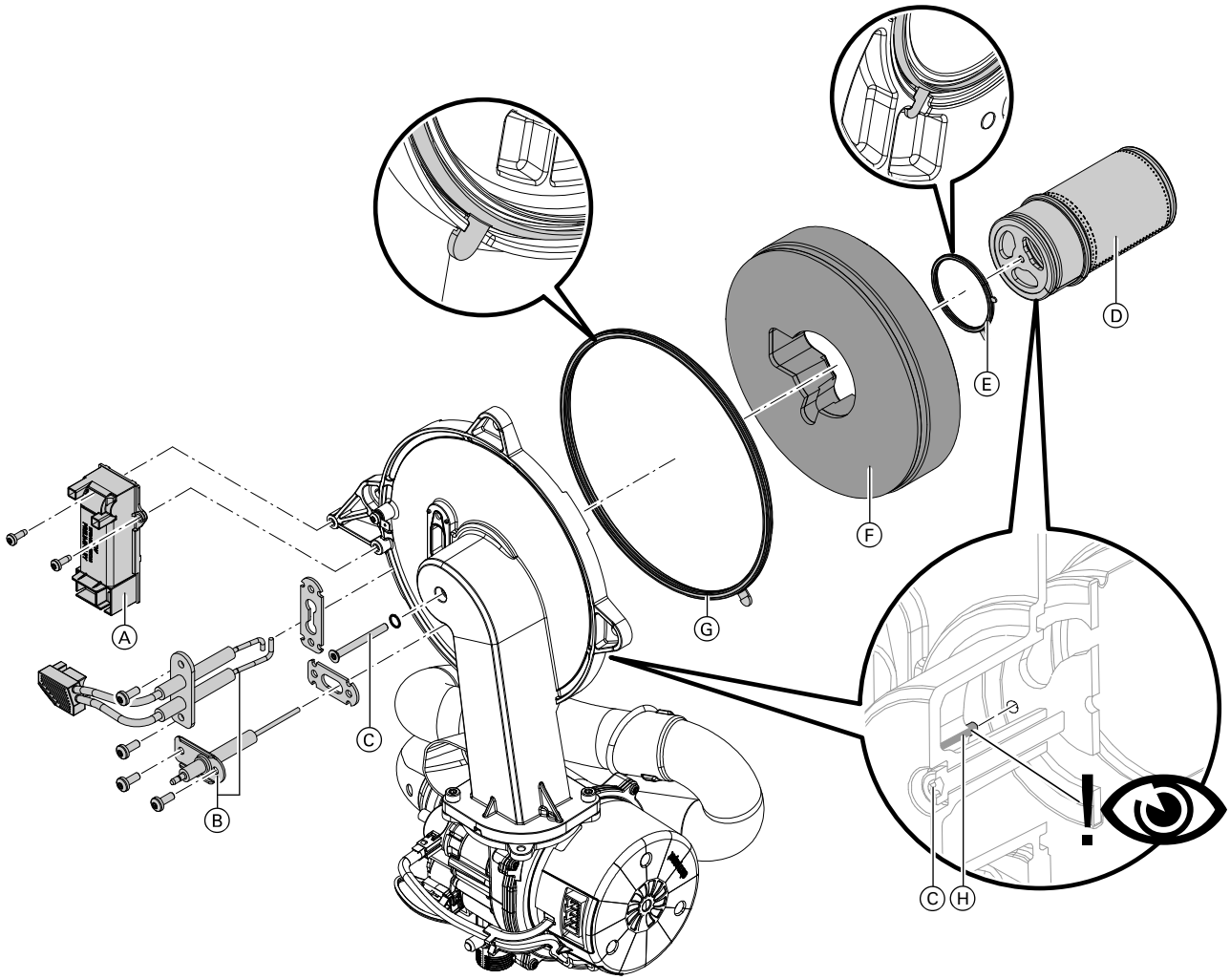
Note: If the programming unit is located at the top: Move the programming unit down into the maintenance position. See page 20.

1. Turn off the ON/OFF switch.
2. Close the gas shut-off valve and safeguard against reopening.
3. Disconnect cables and leads from:
   - Fan motor Ⓐ (2 plugs)
   - Ionization electrode Ⓑ
   - Ignition unit Ⓒ
   - Ground Ⓓ
4. Undo gas supply pipe fitting Ⓔ.
5. Undo screws Ⓕ and remove the burner.
   Note: Cover gas connection Ⓔ (B2HE 85/120) so that no small parts can fall into it.

IMPORTANT

Always hold the fitting of the gas connection pipe with a suitable open-ended wrench.
Use a two handed wrench method when tightening fittings, and ensure that the corragated gas line does not twist.
The gas pipe must not touch any other components.
Do not use pliers or similar tools.

Checking the Burner Gasket and Flame Body Assembly



Burner B2HE 85/120

Check flame body assembly Ⓓ, electrodes Ⓑ, thermal insulation ring Ⓕ and gasket Ⓖ for damage. Only remove and replace components if they are damaged or worn.

Note: If replacing the flame body assembly, also replace the flame body assembly gasket and the fixing screws.

1. Disconnect plug with ignition electrode leads from ignition unit Ⓐ.
2. Remove electrodes Ⓑ.
3. Undo Torx screw Ⓒ. Hold onto flame body assembly Ⓓ when undoing the screw.
4. Remove flame body assembly Ⓓ with gasket Ⓔ and thermal insulation ring Ⓕ. Check components for damage.
5. Install new burner gasket Ⓖ. Observe correct installation position. Align the tab as per the diagram.
6. Insert thermal insulation ring Ⓕ and flame body assembly Ⓓ with gasket Ⓔ. Observe correct installation position. Align the tab as per the diagram.
7. Align the hole in flame body assembly Ⓓ with the burner door pin Ⓗ.

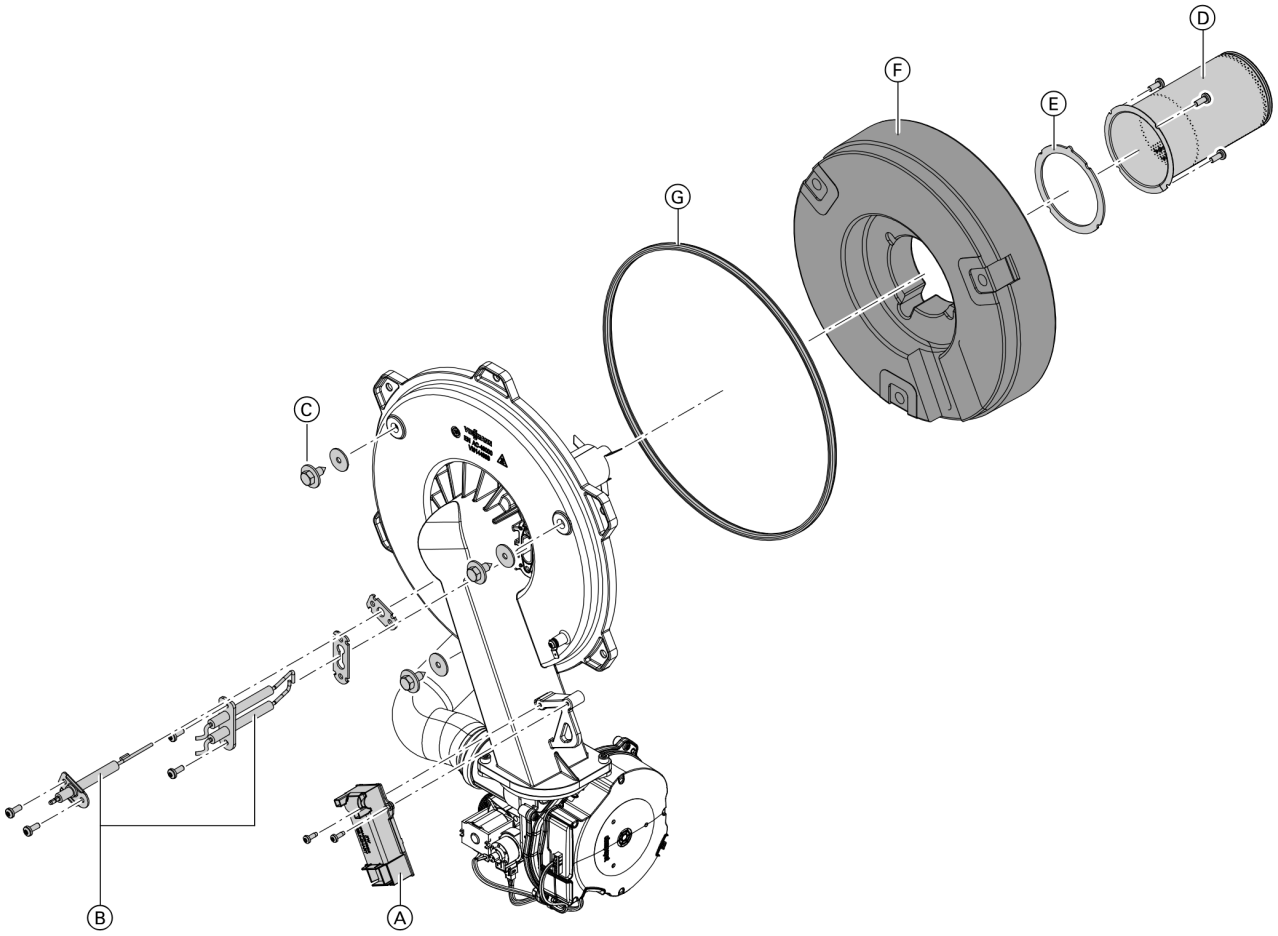
IMPORTANT

Incorrect positioning of the flame body assembly Ⓓ on the burner door will cause damage to the burner door. Insert the door pin Ⓗ into the hole in the flame body assembly Ⓓ.

Secure flame body assembly Ⓓ and gasket Ⓔ with Torx screw Ⓒ. Torque: 27 lb.in (3.0 Nm).

8. Check thermal insulation ring Ⓕ for firm seating.
9. Fit electrodes Ⓑ. Check clearances, see following chapter. Torque: 40 lb.in (4.5 Nm).

Checking the Burner Gasket and Flame Body Assembly *(continued)*



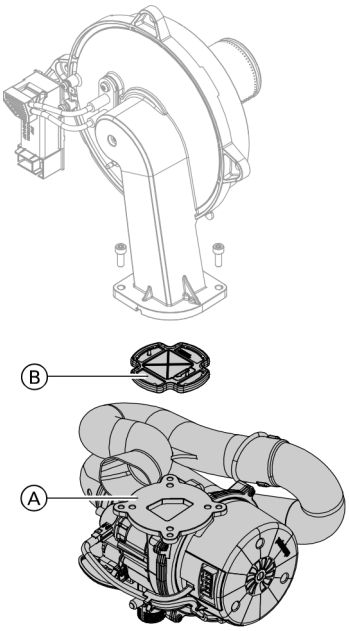
Burner B2HE 150/199

Check flame body assembly Ⓓ, electrodes Ⓑ, thermal insulation ring Ⓕ and gasket Ⓖ for damage. Only remove and replace components if they are damaged or worn.

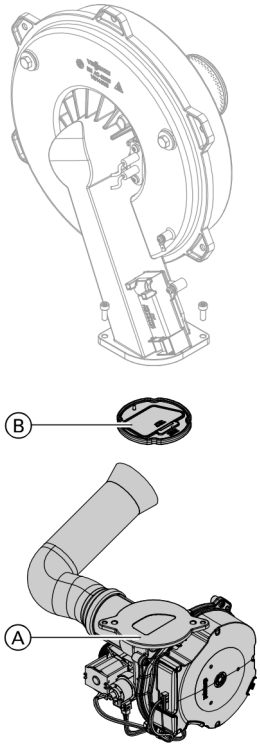
Note: If replacing the flame body assembly, also replace the flame body assembly gasket and the fixing screws.

1. Disconnect plug with ignition electrode leads from ignition unit Ⓐ.
2. Remove electrodes Ⓑ.
3. Undo the 3 hex head screws. Hold the insulation ring in place as you do so. Then carefully remove upwards over the flame body assembly.
   If the insulation mats behind the insulation ring are in good condition after removal, it is not necessary to replace them.
   If the insulation ring needs to be replaced due to damage:
   Undo 4 Torx screws Ⓒ. Hold onto flame body assembly Ⓓ when undoing the screw.
4. Remove flame body assembly Ⓓ with gasket Ⓔ.
5. Install new burner gasket Ⓖ. Observe correct installation position. Align the tab as per the diagram.
6. Insert thermal insulation ring Ⓕ and flame body assembly Ⓓ with gasket Ⓔ. Observe correct installation position. Align the tab as per the diagram.
7. Align the hole in flame body assembly Ⓓ with the burner door pin. Secure flame body assembly Ⓓ and gasket Ⓔ with Torx screw Ⓒ.
   Torque: 40 lb.in (4.5 Nm).
8. Place the inner and outer insulation mats in the burner door. Insert thermal insulation ring Ⓕ. Ensure that the outer insulation mat is not under the 3 support points of the retaining clips.
   Secure the thermal insulation ring with 3 hex head screws 35 lb.in (4 Nm).
   Check thermal insulation ring Ⓕ for firm seating.
9. Fit electrodes Ⓑ. Check clearances, see following chapter. Torque: 40 lb.in (4.5 Nm).

Checking the Flue Gas Flapper



B2HE 85/120

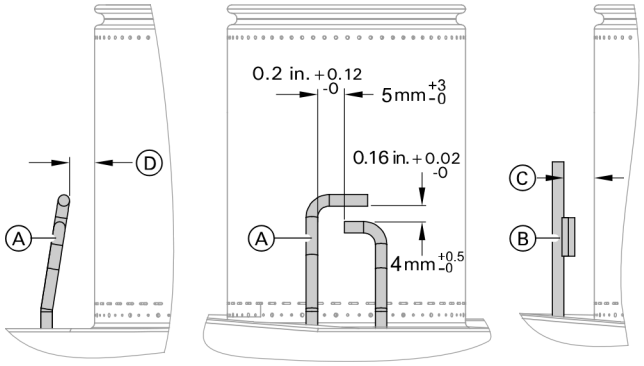


B2HE 150/199

Flue gas flapper in the mixing shaft of the burner

1. Undo 2 screws and remove fan Ⓐ.
2. Remove back flue gas flapper device Ⓑ.
3. Check the damper and gasket for dirt and damage. Replace if necessary.
4. Refit flue gas flapper safety device Ⓑ.
   Note: Observe correct installation position!
5. Refit fan Ⓐ and secure with 2 screws.
   Torque: 35 lb.in (4.0 Nm).

Checking and Adjusting the Ignition and Ionization Electrodes



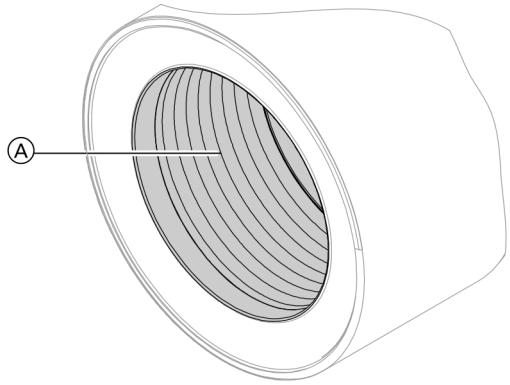
Legend

Ⓐ Ignition electrodes
Ⓑ Ionization electrode
Ⓒ Ionization electrode gap:
- B2HE-85, -120 [0.40 in. ± 0.02 in. (10 mm ±0.5)]
- B2HE-150, -199 [0.47 in. ± 0.02 in. (12 mm ±0.5)]

Ⓓ Ignition electrode gap:
- B2HE-85, -120 [0.25 in. ± 0.02 in. (6.5 mm ±0.5)]
- B2HE-150, -199 [0.24 in. ± 0.02 in. (6 mm ±0.5)]

1. Check the electrodes for wear and contamination.
2. Clean the electrodes with a small brush (not a wire brush) or sandpaper.
3. Check the electrode gaps. If the gaps are not as specified or the electrodes are damaged, replace the electrodes and gaskets and adjust them as required. Tighten the electrode fixing screws to a torque of 40 lb.in (4.5 Nm).

Cleaning the Heating Surfaces



WARNING

Follow cleaning agent manufacturer's safety instructions and wear appropriate protective equipment.

WARNING

Never use a metal wire brush or mechanically driven brushes.

IMPORTANT

Scratches to the surfaces of the heat exchanger that come into contact with hot gas can result in corrosion damage. Brushing can cause deposits to become lodged in the gaps between the coils.
Do not use brushes to clean the heating surfaces.

1. Remove burner assembly and reinstall upon completion of service work as per the instructions on page 26 in this manual.
2. Clean the combustion chamber Ⓐ by vacuuming loose debris out.
3. Remove embedded sediment from the stainless steel heat exchanger surface Ⓐ by thoroughly rinsing with water or cleaning agents such as Axiom Industries "Clean F Steel". Follow Axiom handling and application instructions when using cleaning agent.
   Avoid getting the refractory wet during cleaning.
   Note: Discoloration of the heat exchanger surface Ⓐ is the normal result of the combustion process. It has no impact on the functionality or the longevity of the heat exchanger.
4. If the gaps between the heat exchanger coil windings are plugged, carefully remove debris without scratching the heat exchanger surface using the Viessmann tool specific for this purpose.
   Tool part number 7858492;
   Replacement blade part number 7840346.
5. Flush the combustion chamber Ⓐ with water until it runs clear through the condensate trap.
6. Remove and clean out any accumulated debris from condensate trap. Reinstall condensate trap.
   See page 31 for details.

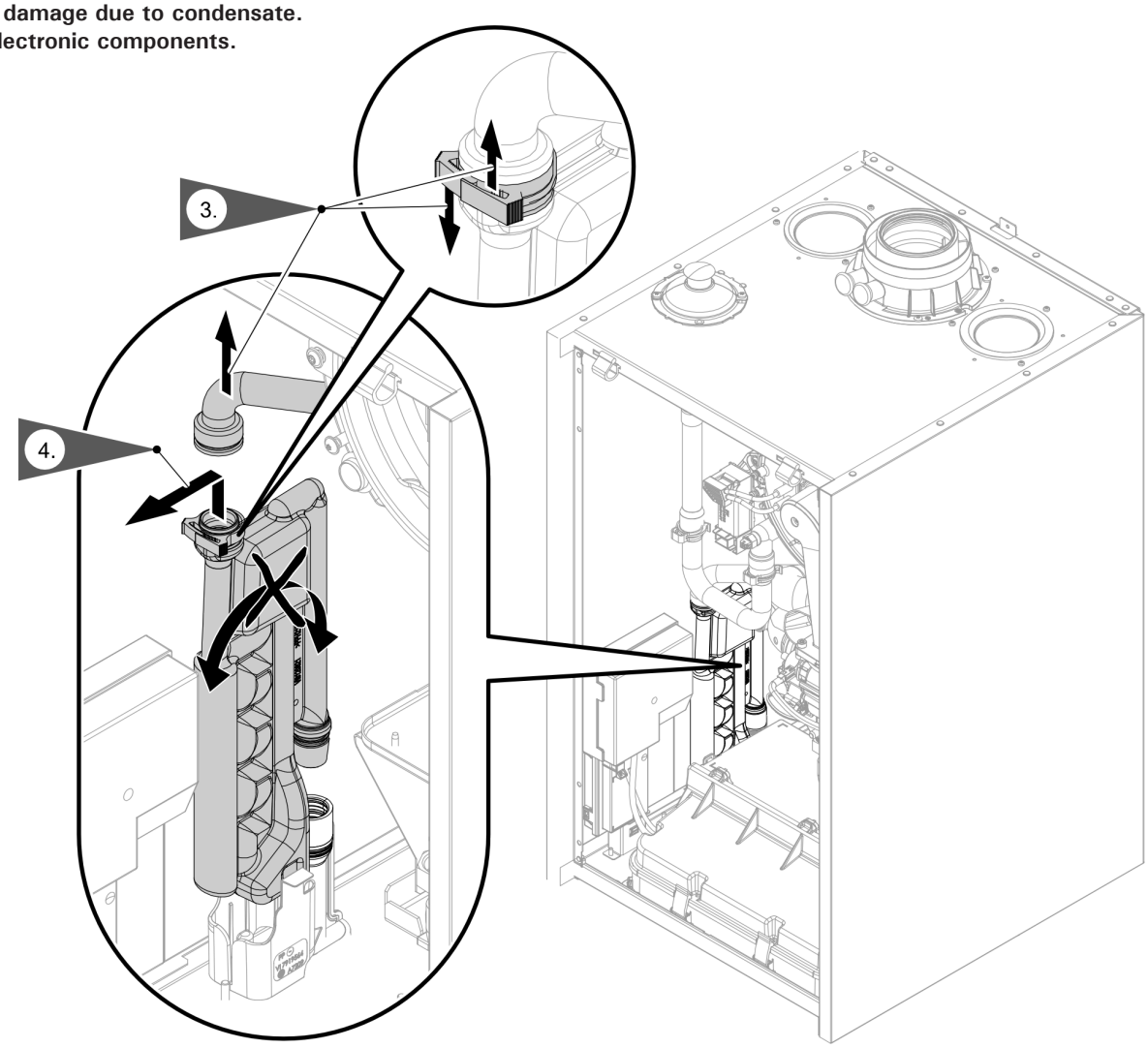
IMPORTANT

Prevent damage due to cleaning water. Cover electronic components with suitable watertight material.

Checking the Condensate Drain and Cleaning the Siphon Trap

IMPORTANT

Prevent damage due to condensate.
Cover electronic components.



1. Cover electronic components with suitable watertight material.
2. Move the bracket together with the programming unit upwards. See “Moving the programming unit to the maintenance position”.
3. Remove the supply hose.
4. Pull siphon trap upwards out of the drain hose.
5. Hold siphon trap as straight as possible and remove. Ensure that no condensate runs out.
6. Clean the siphon trap.
7. Fill the siphon trap with water and refit it on the drain hose, ensure that the clip is securely fastened.

IMPORTANT

If the siphon trap is not filled with water, flue gas can escape. Only start the appliance when the siphon trap has been filled. Check that the siphon trap is seated correctly.

8. Refit supply hose and clip.
9.

WARNING

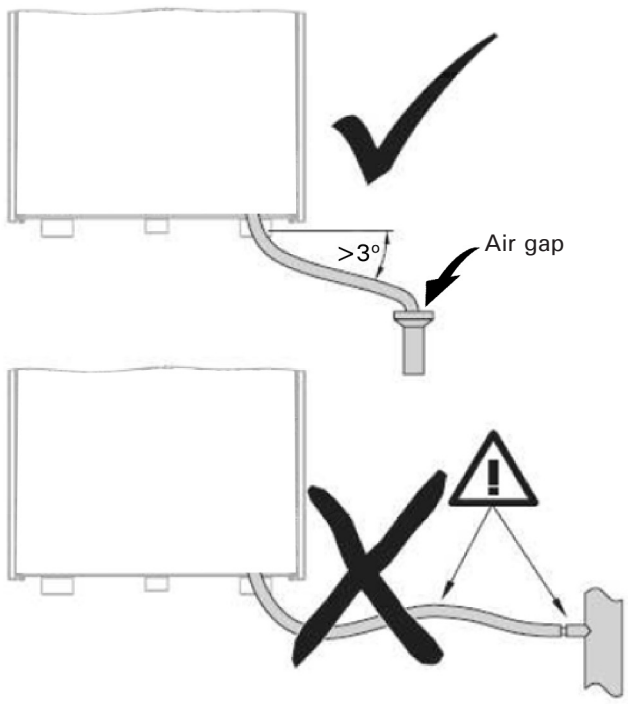
Risk of electric shock from escaping condensate
Check the connections for leaks and check that the siphon trap is seated correctly.
Before commissioning, remove any condensate that has escaped from the appliance.

Note: Route the drain hose without any bends and with a constant fall.

Common vent system:
Clean the siphon trap in the flue gas collector as well.

Checking the Condensate Drain and Cleaning the Siphon Trap *(continued)*

Examples of condensate drain installation



IMPORTANT

If the condensate does not drain freely, condensate will accumulate in bottom part of boiler resulting in a burner shut-down (fault message).

IMPORTANT

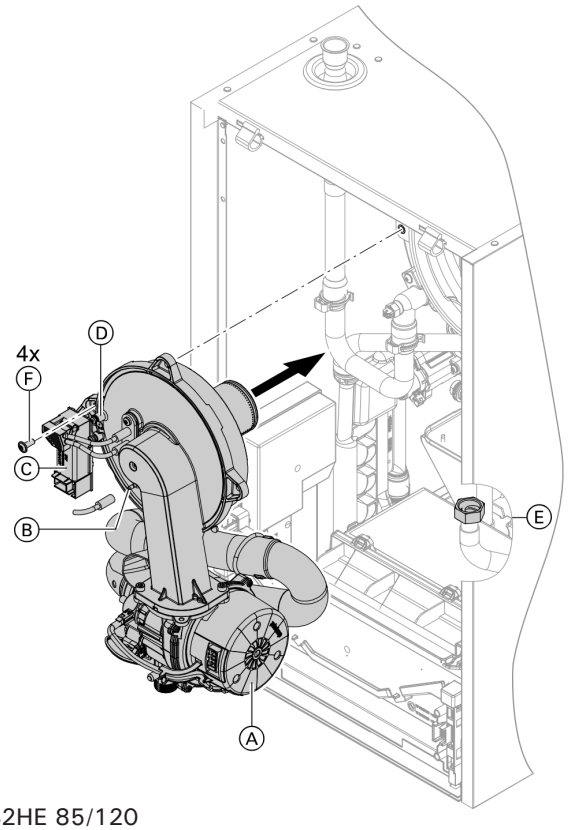
Pipe ventilation must take place between the condensate trap and the neutralization unit (if applicable).

Refer to Installation Instructions Neutralization Unit (if applicable)

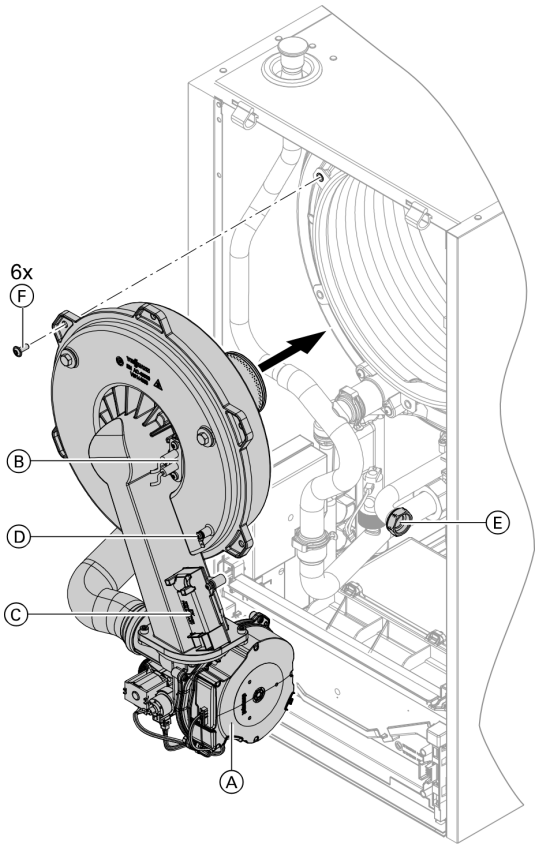
IMPORTANT

Do not connect the drain pipe from any other appliance, such as water softener backwash pipe, to Vitodens condensate drain pipe.

Installing the Burner



B2HE 85/120



B2HE 150/199

1. If necessary, move the programming unit.
2. Insert the burner. Tighten screws Ⓕ diagonally.
   Torque: 35 lb.in (4 Nm)
3. Fit gas supply pipe Ⓔ with a new gasket.
   Torque: 22 lb.ft (30 Nm)

⚠ WARNING

Do not damage the gas pipe! The gas pipe must not come into contact with any other components in the appliance. Keep the gas pipe from testing during tightening by using the two wrench system. Do not use pliers!

4. Check the gas connections for leaks.

⚠ WARNING

**Escaping gas leads to a risk of explosion.
Check all fittings and the gas shut-off valve for gas leaks.**

5. Connect the cables/leads:
   - Fan motor Ⓐ (2 plugs)
   - Ionization electrode Ⓑ
   - Ignition unit Ⓒ
   - Ground Ⓓ

Checking the Neutralizing System (if installed)

Checking the Expansion Tank (on site) and System Pressure

Perform check with the system cold.

1. Drain boiler/system and reduce pressure until the pressure gauge reading is “0”.
2. If the nitrogen pressure of the precharged expansion tank is less than the static pressure of the system, inflate membrane pressure to slightly exceed pressure of system.
   The static pressure required at the tank is based upon the static height of the system. The system fill pressure value must be equal to the expansion tank pressure value at approximately 60°F (15.6°C).
   Note: Static head of 33 ft. (10 m) (distance between boiler and topmost heat emitter surface) corresponds to a static pressure of 0.8 bar (12 psig).
3. Top up with water until filling pressure is higher than the inlet pressure of the diaphragm expansion tank.
   Note: With the system cold, the filling pressure must be approximately 3 psig higher than the static pressure.
   B2HE 85/120
   Maximum operating pressure: .....45 psig
   Minimum operating pressure: .....12 psig
   B2HE 150/199
   Maximum operating pressure: .....60 psig
   Minimum operating pressure: .....12 psig
4. When starting up the system for the first time, mark this value as the minimum filling pressure on the manometer.
   Note: A lower pressure gauge reading usually indicates loss of water due to leakage. All leaks must be repaired.

Checking the Safety Valve Function

Ensure proper operation of low water cut-off(s) (if applicable), pressure relief valve, and pump(s).

Check pressure gauge, air vent and pressure relief valve. Ensure that pressure relief valve does not leak and that it operates in accordance with information provided by the manufacturer.

Refer to maintenance instructions supplied with low water cut-offs, pumps, etc.

Flush float water type low water cut-offs (if used).

Follow local regulations with respect to backflow preventers.

If oil-lubricated pumps are used, ensure proper lubrication.

If motorized zone valves are used, refer to maintenance instructions provided with zone valves.

Checking the Electrical Connections

Ensure all plug-in connectors and strain reliefs make positive contact and are seated properly.

Refer to the Installation Instructions

Checking all Gas Equipment for Leaks at Operating Pressure

WARNING

The gas supply piping must be leak tested before placing the boiler in operation.

CAUTION

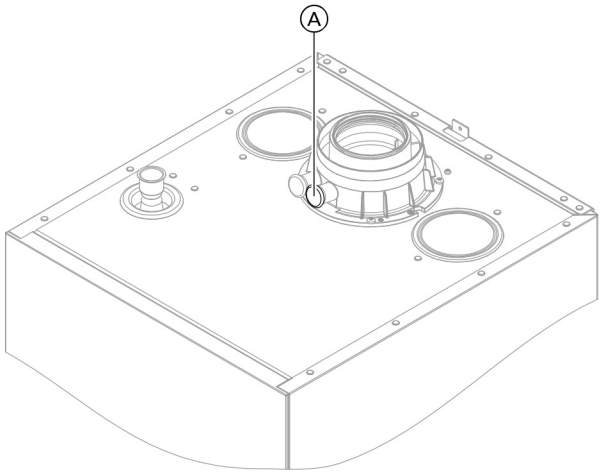
Ensure all joints of gas line are pressure tight and that gas valves do not leak when under normal operating pressure (use approved leak detection liquid).

Fitting the Front Panel

See page 35.

Checking the Combustion Quality

The Vitodens 200-W is factory set for operation with natural gas.
The electronic combustion controller automatically ensures optimum combustion quality.
During commissioning/maintenance, only the combustion values need to be checked. To do this, test the CO_2 and O_2 content, and record these in the report on page 94.



Note: To prevent operating faults and damage, operate the appliance with uncontaminated combustion air.

Permissible CO_2 or O_2 content
Operation with natural gas
- CO_2 content: 6.9 - 11%
- O_2 content: 2.1 - 8.4%

Operation with LPG
- CO_2 content: 8.3 - 12.4%
- O_2 content: 2.1 - 8.4%

The CO emissions shall not exceed 400 ppm within the specified range.
If the actual CO_2 or O_2 values are outside their respective ranges, proceed as follows:
- Check the balanced flue system for leaks; see page 25.
- Check the ionization electrode and connecting cable; see pages 27 and 28.

Note: During commissioning, the combustion controller carries out an automatic calibration. Allow approx. 50 sec. after the burner has started before testing the emissions.

1. Connect a flue gas analyzer at flue gas port Ⓐ on the boiler flue connection.
2. Open the gas shut-off valve. Start the boiler. Create a call for heat.
3. Adjust the lower heating output. See page 36.
4. Check the CO_2 content. If the actual value deviates from the permissible ranges, implement steps listed above.
5. Enter the value into the maintenance report.
6. Adjust the upper heating output. See page 36.
7. Check the CO_2 content. If the actual value deviates from the permissible ranges by more than 1%, implement steps listed above.
8. Enter the value into the maintenance report.
9. Re-seal test port Ⓐ.

⚠ WARNING

Escaping flue gas can damage your health.
Check test port Ⓐ for leaks.

IMPORTANT

A CO_2 measurement must be taken before and after working on gas boilers to eliminate health risks and to guarantee the satisfactory condition of the system.

Record the measured combustion values in the sequence stated in the Maintenance Record on page 94 in this manual.

Checking the Combustion Quality *(continued)*

Selecting the upper/lower heating output
(for multi boiler systems via the software tool)
Note; Ensure adequate heat transfer.

Tap the following buttons:

1. ☰
2. "Service"
3. Enter password "viservice".
4. Confirm with ✔.
5. "Actuator test"
6. Confirm with ✔.
7. Select "Primary circuit pump, set speed" and adjust the target value to the maximum value.
8. Select "Burner modulation, set value".
9. Set the lower heating output:
   Select "Minimum heating output".
   The burner now operates at the lower heating output.
10. Set the upper heating output:
    Select "Maximum heating output".
    The burner now operates at the upper heating output.
11. End output selection:
    ↩ or 🏠

Clock Natural Gas Meter

Clock natural gas meter to verify input

1. Ensure all other gas equipment served by the meter is turned off during timing of gas input to the Vitodens 200-W boiler.
2. Measure the time in seconds it takes for the boiler to use 10 cu. ft. of gas. Divide 3600 x 10 by the number of seconds and you get the number of cu. ft. of gas used per hour. Multiply this number by the heating value of the gas to obtain Btu per hour input.

⚠ CAUTION

Always contact your gas utility to obtain the correct heating value before clocking the meter.

IMPORTANT

A boiler under fired by 5% is still acceptable.
Do not over fire the boiler.

For example:
A Vitodens 200-W 150 boiler (150 000 Btu/h input) requires 240 seconds to use 10 cu. ft. of natural gas. After contacting the local utility, you find the heating value is e.g.
1000 Btu per cu. ft.
Therefore,
((3600 x 10)/240) x 1000 ≅ 150 000 Btu/h input.
Therefore, the boiler input is correct.
Burner input formulas:
INPUT = (3600 + t) x 1000 where
t = TIME (sec.) for 1 ft.3
INPUT = (3600 x .01 x 1000 x 35.31) + T where
T = TIME (sec.) for .01 m3 natural gas

Matching the Control Unit to the Heating System

The control unit must be matched to the system equipment level.
Set the parameters according to the accessories fitted:


Accessories installation and service instructions

Adjusting the Heating Curves (for multi boiler systems via the Viguide mobile)

Tap the following buttons:

1. ☰
2. "Heating"
3. Select "Heating circuit 1" or "Heating circuit ..." for the required heating circuit.
4. "Heating curve"
5. Set the heating curve according to the requirements of the system using "Slope" +/– or "Level" +/–.
6. ✔ to confirm

Emissions Test Mode

Note: For multiboiler systems, tap the 'emission test' symbol on the home screen of the lead or lag boiler to start the test.

Tap the following buttons:

1. " ☰ "
2. "Service"
3. Enter password "viservice".
4. Confirm with ✔.
5. "Test modes"
6. "Test mode"
7. Confirm with ✔.
   Note: Ensure adequate heat transfer.
8. Use ↩ to end Test mode.

High Limit Safety Cut-out Test

Tap the following buttons:

1. " ☰ "
2. "Service"
3. Enter password "viservice".
4. Confirm with ✔.
5. "Test modes"
6. "High limit safety cut-out test"
7. Confirm with ✔.
   Note: Ensure adequate heat transfer.
8. Use ↩ to end the Test.

Calling Up and Resetting the Maintenance Display

In the following cases, will be displayed (red indicator flashes):

- The specified limits have been reached.
- There is a need for maintenance.

Checking service messages

1. ☰
2. For "Message lists"
3. For "Service"

Acknowledging a service

1. ✔ to acknowledge the service messages
2. ✔ to confirm
   Note: An acknowledged service message that was not reset reappears the following Monday.

Reset maintenance
(for multi boiler systems via a software tool)

1. " ☰ "
2. "Service"
3. Enter password "viservice".
4. Confirm with ✔.
5. "System configuration"
6. "Boiler"
7. Select parameter 1411.0 "Clear maintenance messages" and "ON".

   Note: The selected service parameters for hours run and time intervals restart at 0.

Instructing the System User

The system installer must provide the operator of the system with the operating instructions and instruct the operator in the system operation.
This also includes all components added as accessories, e.g. remote controls. The system installer should also provide information on the required maintenance.

DHW hygiene

For optimum DHW hygiene, avoid DHW temperatures that are < 122°F (50°C). For larger systems and systems with low water exchange, the temperature should not drop below < 140°F (60°C).

Hygiene function

The DHW can be heated to a specified (higher) target DHW temperature for a period of one hour.
To activate the function, see the operating instructions.
Inform the system user what DHW temperatures should be set and the risks associated with having a raised outlet temperature at the draw-off points.

Calling Up Parameters

- Parameters are split into the following groups:
  - "General"
  - "Boiler"
  - "DHW"
  - "Heating circuit ..."
  - "Solar"
- Heating systems with one heating circuit without mixing valve and one to three heating circuits with mixing valve:
  In the following, the heating circuit without mixing valve is referred to as "Heating circuit 1" and the heating circuits with mixing valve as "Heating circuit 2"... (if installed).
  If the heating circuits have been given individual names, the chosen name appears.

Note: The display and setting of some parameters is dependent on:

- Boiler
- Connected accessories and the functions associated with them

Tap the following buttons:

1. " ☰ "
2. "Service"
3. Enter password "viservice".
4. Confirm with ✓.
5. "System configuration"
6. Select group.
7. ∧∨ to select parameters.
8. ✎
9. ∧∨ for the required value in line with the following tables.
10. ✓ to accept the set value.

General

Note: Parameter values in **bold** are factory settings.

508.0 "UTC time zone"

Setting		Explanations
	2 −24 to +24	Setting of the UTC time zone in which the appliance is located. The factory setting is UTC +1 h Time difference adjustable from −12 h to +12 h in increments of 0.5 h

528.0 "Set flow temperature for external demand"

Setting		Explanations
	70 20 to 82	Target supply temperature for external demand Target supply temperature in the factory setting 158°F (70°C) Target supply temperature adjustable from 68 to 180°F (20 to 82°C) in 1.8°F (1°C) increments

896.0 "Display correction for outside temperature"

Setting		Explanations
	0 -10 to + 10	Correction of measured outside temperature Target supply temperature in the factory setting 158°F (70°C) Target supply temperature adjustable from 68 to 180°F (20 to 82°C) in 1.8°F (1°C) increments

897.0 "Screed drying"

Setting		Explanations
Not active	**0**	Do not adjust

912.0 "Automatic summer/wintertime changeover"

Setting		Explanations
No Yes	0 **1**	Automatic changeover switched off Automatic changeover switched on

912.1 "Earliest day of changeover from winter to summertime"

	25 1 to 31	Changeover from 02:00 h to 03:00 h occurs on the Sunday after or on this set date. Day of changeover adjustable from 1st to 31st of the month

912.2 "Month of changeover from winter to summertime"

Setting		Explanations
	3 1 to 12	Month of changeover: March Month of changeover adjustable from January to December

General *(continued)*

912.3 "Earliest day of changeover from summer to wintertime"

Setting		Explanations
	25 1 to 31	Changeover from 03:00 h to 02:00 h occurs on the Sunday after or on this set date. Day of changeover adjustable from 1st to 31st of the month

912.4 "Month of changeover from summer to wintertime"

Setting		Explanations
	10 1 to 12	Month of changeover: October Month of changeover adjustable from January to December

1098.4 "Gas volume correction factor"

Setting		Explanations
	1.0000 0.7000 to 1.0000	Value is provided on the gas supplier's bill. Used for gas consumption data. Gas volume correction factor adjustable from 0.7000 to 1.0000 in increments of 0.0001.

1098.5 "Calorific value"

Setting		Explanations
	10.0000 5.0000 to 40.0000	Value is provided on the gas supplier's bill. Used for gas consumption data. Calorific value adjustable from 5.0000 to 40.0000 kWh/m^3 in increments of 0.0001 If you don't have a supplier's bill - Conversion factor for Natural Gas: 1kWh/m3 = 96.6 BTU/ft3 - Conversion factor for Liquid Propane Gas: 25.8745 kWh/m3 = 2500 BTU/ft3

1139.0 "Outside temperature limit for cancelling reduced set room temperature"

Setting		Explanations
	-5 -61 to +10	Temperature limit for cancelling reduced target room temperature Temperature limit in the factory setting 23°F (-5°C) Temperature limit adjustable from -78 to 50°F (-61 to +10°C) in 1.8°F (1°C)increments

1139.1 "Outside temperature limit for raising the reduced set room temperature to the standard set room temperature"

Setting		Explanations
	-14 -60 to +10	Temperature limit for raising the reduced target room temperature (see function description) Temperature limit in the factory setting -14°F (7°C) Temperature limit adjustable from 76 to 50°F (-60 to +10°C) in 1.8°F (1°C) increments

1504.0 "Source for date and time"

Setting		Explanations
Local	**0** 1	Selection of source for date and time The setting depends on the boiler and accessories. Factory setting: The date and time are adopted from the control unit. Internet protocol (see parameter "508.0")

2241.0 "Source outside temperature sensor "

Setting		Explanations
	0 1 2 3	Not available Hardwired Home automation Internet service provider: Outside temperature values via internet

Boiler

Note: Parameter values in **bold** are factory settings.

521.0 "Interval in burner hours run until next maintenance"

Setting		Explanations
		Number of burner hours to run until next service
	0	
	0 to 25500	Burner hours until next service adjustable from 0 to 25500

522.3 "Interval until next maintenance"

Setting		Explanations
		Interval until next maintenance
	0	No interval selected
	1	3 months
	2	6 months
	3	12 months
	4	18 months
	5	24 months

596.0 "Maximum heating output"

Setting		Explanations
		A limit can be set on the maximum heating output for heating operation.
	100	Heating output in the factory setting 100%
	0 to 100	Adjustable from 0 to 100%

597.0 "Limit, max. heating output for DHW heating"

Setting		Explanations
		A limit can be set on the maximum heating output for DHW heating.
	100	Heating output in the factory setting 100%
	0 to 100	Adjustable from 0 to 100%

1100.0 - minimum limit for pump modulation in line with burner modulation (related to VDD1240 = 2)

Setting		Explanations
	50	can only be adjusted via Viguide mobile

1100.1 - maximum limit for pump modulation in line with burner modulation (related to VDD1240 = 2)

Setting		Explanations
	100	can be adjusted via HMI

1100.2 "Set speed of the primary circuit pump in heating mode"

Setting		Explanations
		Target speed of internal circulation pump ■ In heating operation ■ With external demand ■ With demand in conjunction with a low loss header
	...	Factory settings defined by settings specific to the appliance
	20 to 100	Target speed adjustable from 20 to 100%

Boiler *(continued)*

1240.0 "Operating mode of primary circuit pump" (not for weather compensated operation)

Setting		Explanations
	1	"Automatic" Switched on regardless of current temperature level
	2	Modulating in line with the modulation level of the boiler. Appliance-specific min. and max. pump speeds are observed.
	7	Shutdown in reduced mode (in conjunction with constant operation or when no demand via room thermostat)

1411.0 "Clear maintenance messages"

Setting		Explanations
		Clear maintenance messages once maintenance has been performed.
No	**0**	Maintenance messages are active (if present).
Yes	1	Clear maintenance messages once.

1503.0 "Minimum heating output"

Setting		Explanations
		A limit can be set on the minimum heating output for heating operation.
	... 5 to 100	Factory settings defined by settings specific to the appliance Adjustable from 5 to 100%

1606.0 "Minimum burner pause time"

Setting		Explanations
		The minimum burner pause time can be set subject to boiler load.
	0	Fixed setting for minimum burner pause time
	1	Factory setting, integral method (see parameter 1606.4)

1606.4 "Integral threshold for burner switch-off"

Setting		Explanations
	50 5 to 255	Only effective if parameter 1606.0 has been set to 1. Factory setting 90°F x min (50 K x min) Adjustable from 9 to 459°F x min (5 to 255 K x min) in increments of 1K (1.8°F) The integral control mode allows for the adjustment of the supply water temperature dead band (supply temperature overshoot and undershoot) to extend burner cycle times and help minimize burner short cycling in low heat demand applications. The greater the setting the wider the dead band, the smaller the setting the tighter the dead band.

1706.0 "Function selection MZIO"

Setting		Explanations
	0	Cannot be selected
	1	Individual (plug 66 and 0-10V input have no function)
	2	Cannot be selected
	3	Ext. temperature demand via 0-10V input
	4	Ext. modulation demand via 0-10V input
	5	Fault message output
	6	Fault message output and ext. temperature demand
	7	Fault message output and ext. modulation demand
	8	Additional call for heat via plug 66 (see parameter 2445 in the software tool)
	9	Additional call for heat via plug 66 and ext. temperature demand via 0-10V input
	10	Additional call for heat via plug 66 and ext. modulation demand via 0-10V input

2344.0 "Feedback combustion air supply"

Setting		Explanations
		Setting for feedback from the ventilation air supply in minutes (if feedback does not occur within this time, fault message F.691 appears).
	2 1 to 10	Factory setting Range adjustable from 1 to 10 minutes.

DHW

Note: Parameter values in **bold** are factory settings.

396.0 "Set DHW temperature"

Setting		Explanations
		Factory setting depends on appliance

497.0 "Operating mode of DHW recirculation pump"

Setting		Explanations
	0 4	DHW recirculation pump: Time program Selected cycle (see parameter 497.3)

497.1 "DHW recirculation pump for hygiene function"

Setting		Explanations
Off On	**0** 1	DHW recirculation pump: In accordance with the selected time program Switched on during hygiene function **⚠ WARNING** **Risk of injury due to increased DHW temperature. Inform the system user of the risk from the raised outlet temperature at the draw-off points.**

497.2 "DHW recirculation pump for DHW heating"

Setting		Explanations
Off On	**0** 1	DHW recirculation pump: In accordance with the selected time program Switched on during DHW heating

497.3 "Number of cycles DHW recirculation pump"

Setting		Explanations
	0 1 2 3 4 **5**	Number of cycles per hour for 5 minutes each during the selected time phase: 1 cycle 2 cycles 3 cycles 4 cycles 5 cycles 6 cycles

503.0 "Scald protection"

Setting		Explanations
Off	0	The adjustable water temperature is limited to a maximum value. Scald protection switched off **⚠ WARNING** **Risk of injury due to increased DHW temperature. Inform the system user of the risk from the raised outlet temperature at the draw-off points.**
On	**1**	Scald protection switched on (maximum DHW temperature 140°F (60°C) **Note:** Even with the scald protection switched on, higher outlet temperatures may occur at the draw-off points in the following cases: ■ With active hygiene function ■ While the appliance is being calibrated

DHW *(continued)*

534.0 "Circulation pump run-on"

Setting		Explanations
120 sec.	**120** 0 to 900	Circulation pump run-on after storage tank heating Factory setting 120 sec. run-on Run-on time adjustable from 0 to 900 sec. in 60 sec. increments (the run-on time is rounded down to full minutes) **Note:** To avoid damaging the appliance, do not set the run-on time to < 120 sec.

1085.0 "Cylinder heating: Set start point"

Setting		Explanations
	25 10 to 100	Start point for DHW heating below target DHW temperature Factory-set start point 2.5 K (5°F) below target DHW temperature Adjustable start points: 10: 1.0 K (1.8°F) ... 100: 10.0 K (18°F) Irrespective of this, the stop point is 2.5 K (5°F) above the target DHW temperature.

1087.0 "Max. duration, DHW heating"

Setting		Explanations
	60 0 1 to 240	After a set period of time has elapsed, DHW heating ends even though the target DHW temperature has not yet been reached. Not adjustable on gas condensing combi boilers Factory setting 60 min No time limit for DHW heating Duration of DHW heating adjustable from 1 to 240 min in 1 min increments

1087.1 "Min. delay until next time DHW is heated"

Setting		Explanations
	60 60 to 240	Minimum delay before DHW heating starts again, after the max. duration for 1087.0 has been exceeded, even though there is a demand. Not adjustable on gas condensing combi boilers Factory setting, delay of 60 min Delay adjustable from 60 to 240 min in 1 min increments

1101.2 "Set speed of the primary circuit pump for DHW heating"

Setting		Explanations
	...	Target speed of the internal circulation pump when operated as a DHW pump Factory settings defined by settings specific to the appliance

Heating Circuits 1, 2, 3, 4

Note: Parameter values in **bold** are factory settings.

424.3 "Set flow temperature increase when switching from operation with reduced room temperature to operation with standard/comfort room temperature, heating circuit 1"

Setting		Explanations
0 K	**0** 0 to 20	Increase in target supply temperature when changing from operation at reduced room temperature to operation at standard room temperature or comfort room temperature. See also chapter "Function description" Factory setting increase 0 K (0°F) Temperature rise adjustable from 0 to 20 K (0 to 36°F) increment steps of 1.0 K (1.8°F)

424.4 "Duration for set flow temperature increase, heating circuit 1"

Setting		Explanations
60 min	**60** 0 to 120	Duration for target supply temperature increase See also chapter "Function description" Factory setting 60 min Temperature rise adjustable from 0 to 120 min

426.3 "Set flow temperature increase when switching from operation with reduced room temperature to operation with standard/comfort room temperature, heating circuit 2"

Setting		Explanations
0 K	**60** 0 to 20	Increase in target supply temperature when changing from operation at reduced room temperature to operation at standard room temperature or comfort room temperature. See also chapter "Function description" Factory setting increase 0K (0 °F) Temperature rise adjustable from 0 to 20 K (0 to 36°F) increment steps of 1.0 K (1.8°F)

426.4 "Duration for set flow temperature increase, heating circuit 2"

Setting		Explanations
60 min	**60** 0 to 120	Duration for target supply temperature increase See also chapter "Function description" Factory setting 60 min Temperature rise adjustable from 0 to 120 min

428.3 "Set flow temperature increase when switching from operation with reduced room temperature to operation with standard/comfort room temperature, heating circuit 3"

Setting		Explanations
0 K	**0** 0 to 20	Increase in target supply temperature when changing from operation at reduced room temperature to operation at standard room temperature or comfort room temperature. See also chapter "Function description" Factory setting increase 0 K (0 °F) Temperature rise adjustable from 0 to 20 K (0 to 36°F) increment steps of 1.0 K (1.8°F)

428.4 "Duration for set flow temperature increase, heating circuit 3"

Setting		Explanations
60 min	**0** 0 to 120	Duration for target supply temperature increase See also chapter "Function description" Factory setting 60 min Temperature rise adjustable from 0 to 120 min

Heating Circuits 1, 2, 3, 4 *(continued)*

430.3 "Set flow temperature increase when switching from operation with reduced room temperature to operation with standard/comfort room temperature, heating circuit 4"

Setting		Explanations
O K	**0** 0 to 20	Increase in target supply temperature when changing from operation at reduced room temperature to operation at standard room temperature or comfort room temperature. See also chapter "Function description" Factory setting increase 0°F (0 K) Temperature rise adjustable from 0 to 36°F (0 to 20 K) increment steps of 1.0 K (1.8°F)

430.4 "Duration for set flow temperature increase, heating circuit 4"

Setting		Explanations
60 min	**60** 0 to 120	Duration for target supply temperature increase See also chapter "Function description" Factory setting 60 min Temperature rise adjustable from 0 to 120 min

933.3 "DHW heating priority, heating circuit 1"

Setting		Explanations
		Priority of DHW heating over the heating circuit **Note:** If several heating circuits are connected, only adjust in conjunction with low loss header.
Off	0	Without DHW heating priority
DHW	**1**	With DHW heating priority

933.6 "Operating mode of heating circuit 1"

Setting		Explanations
Weather-compensated without room temperature hook-up	**4**	Only adjust for systems with one heating circuit. Heating operation: Weather-compensated without room temperature influence
Weather-compensated with room temperature hook-up	7	Weather-compensated with room temperature influence (see also parameter 933.7)

933.7 "Room influence factor, heating circuit 1"

Setting		Explanations
	8 0 to 64	The higher the value, the greater the influence of the room temperature on the set supply temperature of the heating circuit (heating curve). Operation with room temperature hook-up must be set for the heating circuit (parameter 933.6). Only change the value for systems with one heating circuit. For a sample calculation, see chapter "Heating curve" in the "Function description" Room influence factor Room influence adjustable from 0 to 64

Heating Circuits 1, 2, 3, 4 *(continued)*

934.3 "DHW heating priority, heating circuit 2"

Setting		Explanations
Off DHW	0 **1**	Priority of DHW heating over heating circuit pump and mixing valve Without DHW heating priority With DHW heating priority

934.5 "Differential temperature, heating circuit 2"

Setting		Explanations
8 K	**8** 0 to 20	The supply temperature of the boiler is higher than the supply temperature of the heating circuit with mixing valve by an adjustable differential temperature. See also chapter Function description. Differential temperature in factory setting 8 K (14.4°F) Differential temperature adjustable from 0 to 20 K (0 to 36°F) increment steps of 1.0 K (1.8°F)

934.6 "Operating mode of heating circuit 2"

Setting		Explanations
Weather-compensated without room temperature hook-up	**4**	Heating operation: Weather-compensated without room temperature influence
Weather-compensated with room temperature hook-up	7	Weather-compensated with room temperature influence See also parameter 934.7

934.7 "Room influence factor, heating circuit 2"

Setting		Explanations
	8 0 to 64	The higher the value, the greater the influence of the room temperature on the set supply temperature of the heating circuit (heating curve). Operation with room temperature hook-up must be set for the heating circuit (parameter 934.6). Change value for heating circuit with mixing valve only. For a sample calculation, see chapter "Heating curve" in the "Function description" Room influence factor Room influence adjustable from 0 to 64

935.3 "DHW heating priority, heating circuit 3"

Setting		Explanations
8 K	0 **1**	Priority of DHW heating over heating circuit pump and mixing valve Without DHW heating priority With DHW heating priority

935.5 "Differential temperature, heating circuit 3"

Setting		Explanations
8 K	**8** 0 to 20	The supply temperature of the boiler is higher than the supply temperature of the heating circuit with mixing valve by an adjustable differential temperature. See also chapter Function description. Differential temperature in factory setting 8 K (14.4°F) Differential temperature adjustable from 0 to 20 K (0 to 36°F) increment steps of 1.0 K (1.8°F)

Heating Circuits 1, 2, 3, 4 *(continued)*

"Operating mode of heating circuit 3"

Setting		Explanations
		Heating operation:
Weather-compensated without room temperature hook-up	**4**	Weather-compensated without room temperature influence
Weather-compensated with room temperature hook-up	7	Weather-compensated with room temperature influence (see also parameter 935.7)

935.7 "Room influence factor, heating circuit 3"

Setting		Explanations
		The higher the value, the greater the influence of the room temperature on the set supply temperature of the heating circuit (heating curve). Operation with room temperature hook-up must be set for the heating circuit (parameter 935.6). Change value for heating circuit with mixing valve only. For a sample calculation, see chapter "Heating curve" in the "Function description"
	8	Room influence factor
	0 to 64	Room influence adjustable from 0 to 64

936.3 "DHW heating priority, heating circuit 4"

Setting		Explanations
		Priority of DHW heating over heating circuit pump and mixing valve
Off	0	Without DHW heating priority
DHW	**1**	With DHW heating priority

936.5 "Differential temperature, heating circuit 4"

Setting		Explanations
		The supply temperature of the boiler is higher than the supply temperature of the heating circuit with mixing valve by an adjustable differential temperature. See also chapter Function description.
8 K	**8**	Differential temperature in factory setting 8 K (14.4°F)
	0 to 20	Differential temperature adjustable from 0 to 20 K (0 to 36°F) increment steps of 1.0 K (1.8°F)

936.6 "Operating mode of heating circuit 4"

Setting		Explanations
		See also parameter 936.7 Heating operation:
Weather-compensated without room temperature hook-up	**4**	Weather-compensated without room temperature influence
Weather-compensated with room temperature hook-up	7	Weather-compensated with room temperature influence

Heating Circuits 1, 2, 3, 4 *(continued)*

936.7 "Room influence factor, heating circuit 4"

Setting		Explanations
	8 0 to 64	The higher the value, the greater the influence of the room temperature on the set supply temperature of the heating circuit (heating curve). Operation with room temperature hook-up must be set for the heating circuit (parameter 936.6). Change value for heating circuit with mixing valve only. For a sample calculation, see chapter "Heating curve" in the "Function description" Room influence factor Room influence adjustable from 0 to 64

1102.0 "Min. speed of the variable speed primary circuit/heating circuit pump in standard mode, heating

Circuit 1"		Explanations
	...	Minimum speed of the internal circulation pump in heating operation with standard room temperature Factory settings defined by settings specific to the boiler The setting range depends on the appliance.

1102.1 "Max. speed of the variable speed primary circuit/heating circuit pump in standard mode, heating circuit 1"

Setting		Explanations
	...	Maximum speed of the internal circulation pump in heating operation with standard room temperature Factory settings defined by settings specific to the boiler The setting range depends on the appliance.

1192.0 "Minimum flow temperature limit, heating circuit 1"

Setting		Explanations
20°C	**20** 1 to 90	Minimum supply temperature limit for the heating circuit Minimum limit in the factory setting 68°F (20°C) Setting range limited by boiler-specific parameters

1192.1 "Maximum flow temperature limit, heating circuit 1"

Setting		Explanations
74°C	**74** 10 to 100	Maximum supply temperature limit for the heating circuit Maximum limit in the factory setting 165°F (74°C) Setting range limited by boiler-specific parameters

1193.0 "Minimum flow temperature limit, heating circuit 2"

Setting		Explanations
20°C	**20** 1 to 90	Minimum supply temperature limit for the heating circuit Minimum limit in the factory setting 68°F (20°C) Setting range limited by boiler-specific parameters

1193.1 "Maximum flow temperature limit, heating circuit 2"

Setting		Explanations
74°C	**74** 10 to 100	Maximum supply temperature limit for the heating circuit Maximum limit in the factory setting 165°F (74°C) Setting range limited by boiler-specific parameters

1194.0 "Minimum flow temperature limit, heating circuit 3"

Setting		Explanations
20°C	**20** 1 to 90	Minimum supply temperature limit for the heating circuit Minimum limit in the factory setting 68°F (20°C) Setting range limited by boiler-specific parameters

Heating Circuits 1, 2, 3, 4 *(continued)*

1194.1 "Maximum flow temperature limit, heating circuit 3"

Setting		Explanations
74°C	**74** 10 to 100	Maximum supply temperature limit for the heating circuit Maximum limit in the factory setting 165°F (74°C) Setting range limited by boiler-specific parameters

1195.0 "Minimum flow temperature limit, heating circuit 4"

Setting		Explanations
20 °C	**20** 1 to 90	Minimum supply temperature limit for the heating circuit Minimum limit in the factory setting 68°F (20°C) Setting range limited by boiler-specific parameters

1195.1 "Maximum flow temperature limit, heating circuit 4"

Setting		Explanations
74°C	**74** 10 to 100	Maximum supply temperature limit for the heating circuit Maximum limit in the factory setting 165°F (74°C) Setting range limited by boiler-specific parameters

1395.1 "Heating limit: Economy function, outside temperature, heating circuit 1"

Setting		Explanations
25°C	**25** 10 to 35	Heating circuit pump logic function (summer economy control): Heating circuit pump switches off when outside temperature 1 K (1.8°F) above selected value. Heating circuit pump switches back on when outside temperature 1 K (1.8°F) below selected value. Factory setting: Heating limit at outside temperature 25°C Heating limit adjustable from (50 to 95°F (10 to 35°C) in 1.8°F (1°C) increments

1396.1 "Heating limit: Economy function, outside temperature, heating circuit 2"

Setting		Explanations
25°C	**25** 10 to 35	Heating circuit pump logic function (summer economy control): Heating circuit pump switches off when outside temperature 1 K (1.8°F) above selected value. Heating circuit pump switches back on when outside temperature 1 K (1.8°F) below selected value. Factory setting: Heating limit at outside temperature 77°F (25°C) Heating limit adjustable from (50 to 95°F (10 to 35°C) in 1.8°F (1°C) increments

1397.1 "Heating limit: Economy function, outside temperature, heating circuit 3"

Setting		Explanations
25°C	**25** 10 to 35	Heating circuit pump logic function (summer economy control): Heating circuit pump switches off when outside temperature 1 K (1.8°F) above selected value. Heating circuit pump switches back on when outside temperature 1 K (1.8°F) below selected value. Factory setting: Heating limit at outside temperature 77°F (25°C) Heating limit adjustable from (50 to 95°F (10 to 35°C) in 1.8°F (1°C) increments

1398.1 "Heating limit: Economy function, outside temperature, heating circuit 4"

Setting		Explanations
25°C	**25** 10 to 35	Heating circuit pump logic function (summer economy control): Heating circuit pump switches off when outside temperature 1 K (1.8°F) above selected value. Heating circuit pump switches back on when outside temperature 1 K (1.8°F) below selected value. Factory setting: Heating limit at outside temperature 77°F (25°C) Heating limit adjustable from (50 to 95°F (10 to 35°C) in 1.8°F (1°C) increments

Solar

Note: Parameter values in **bold** are factory settings.

950.0 "Flow rate, solar circuit at max. pump speed"

Setting		Explanations
0.1 to 25.5 L/min	**7** 0.1 to 25.5	Required for calculating the solar yield Flow rate adjustable from 0.02 to 6.7 gpm (0.1 to 25.5 L/min) 1 step ≙ 0.02 gpm (0.1 L/min)

1118.0 "Min. speed, solar circuit pump"

Setting		Explanations
	0 to 100	Minimum speed of solar circuit pump in % Speed adjustable from 0 to 100%

1125.0 "Maximum cylinder temperature for solar DHW heating"

Setting		Explanations
60°C	**60** 10 to 90	Maximum temperature for solar heating of storage medium Factory setting: Target value 140°F (60°C) Target value adjustable from 50 to 194°F (10 to 90°C) **IMPORTANT** **A high target value may incur a risk of scalding at the draw-off points. If necessary, take on-site action and inform the system user.**

1126.0 "Minimum collector temperature"

Setting		Explanations
10°C None	**10** 0 1 to 90	Min. collector temperature for starting the solar circuit pump Factory setting: 50°F (10°C) Minimum temperature limit not active Minimum start temperature adjustable from 34 to 194°F (1 to 90°C)

1126.1 "Maximum collector temperature"

Setting		Explanations
130°C 20 - 200°C	130 20 to 200	Maximum collector temperature (to protect system components) 266°F (130°C) Maximum collector temperature adjustable from 68 to 392°F (20 to 200°C) in 1.8°F (1°C) increments

1127.0 "Frost protection function for solar circuit"

Setting		Explanations
Off On	**0** 1	Frost protection function for the solar circuit: Not active Active Not required for Viessmann heat transfer medium

Solar *(continued)*

1136.2 "Heat transfer medium solar circuit"

Setting		Explanations
		Setting is required for calculating the solar yield
	0	Calculation of solar yield with water as heat transfer medium
	1	Calculation of solar yield with Viessmann heat transfer medium

1394.0 "Set DHW temperature for reheating suppression"

Setting		Explanations
40°C	40	Target DHW temperature for reheating suppression.
		Reheating suppression is active above the set target value.
	0 to 95	Target DHW temperature adjustable from 0 to 203°F (0 to 95°C)

1492.0 "Start temperature differential, solar circuit pump"

Setting		Explanations
		Start temperature differential between the actual temperature of temperature sensor [5] and the actual temperature of collector temperature sensor [6]
8 K	**8**	Factory setting: 14.4°F (8 K)
	2 to 30	Start temperature differential adjustable from 2 to 30 K (3.6 to 54°F)

1492.1 "Stop temperature differential, solar circuit pump"

Setting		Explanations
		Stop temperature differential between the actual temperature of temperature sensor [5] and the actual temperature of collector temperature sensor [6]
4 K	**4**	Factory setting: 4 K (7.2°F)
	1 to 29	Stop temperature differential adjustable from 1 to 29 K (1.8 to 52°F)

1505.0 "Stagnation time reduction"

Setting		Explanations
		Temperature hysteresis for target storage tank temperature
		Reduction in the speed of the solar circuit pump to protect system components and heat transfer medium
5 K	**5**	Factory setting: 9°F (5 K)
	0	Stagnation time reduction not active
	1 to 40	Temperature differential adjustable from 1 to 40 K (1.8 to 72°F)

1598.0 "Start temperature for thermostat function"

Setting		Explanations
50°C	**50**	Only in conjunction with SDIO/SM1A electronics module
	0 to 100	Target start temperature adjustable from 0 to 100 °C
		(not in conjunction with parameter 1599...)

1598.1 "Stop temperature for thermostat function"

Setting		Explanations
40°C	**40**	Only in conjunction with SDIO/SM1A electronics module
	0 to 100	Target stop temperature adjustable from 0 to 100°C
		(not in conjunction with parameter 1599...)

Solar *(continued)*

1599.0 "Start temperature differential for central heating backup/solar preheating"

Setting		Explanations
8 K	**8** 2 to 30	Only in conjunction with SDIO/SM1A electronics module Start temperature differential adjustable from 2 to 30 K With central heating backup: Temperature differential between heating circuit return and tank. With solar preheating: Temperature differential between the two tanks. Do not set in conjunction with parameter 1598....

1599.1 "Stop temperature differential for central heating backup/solar preheating"

Setting		Explanations
4 K	4 1 to 29	Only in conjunction with SDIO/SM1A electronics module Stop temperature differential adjustable from 1 to 29 K With central heating backup: Temperature differential between heating circuit return and tank. With solar preheating: Temperature differential between the two tanks. Do not set in conjunction with parameter 1598....

1719.0 "Interval function solar circuit pump"

Setting		Explanations
	0 1	Not active Active For capturing the collector temperature, the collector circuit pump is cyclically switched on briefly.

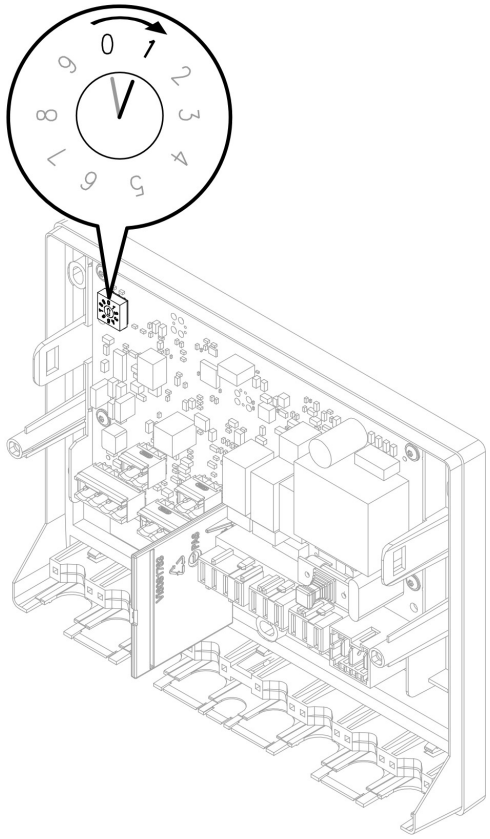
2426.1 Weather-compensated heating circuit pump logic function (only for weather-compensated control units)

Setting		Explanations
		If the outside temperature is above the threshold value (selected set room temperature plus hysteresis in K), the heating cicuit pump is switched off. If the outside temperature is below the threshold value (selected set room temperature plus hysteresis in K), the heating circuit pump is switched on.

2426.2 Room temperature-depentent heating circuit pump logic (only for weather-compensated control units with room temperature hook-up).

Setting		Explanations
Only activate this function for the heating circuit with mixer or if there is only one direct heating circuit in the system.		If the actual temperature is above the threshold value (selected set room temperature plus hysteresis in K), the heating cicuit pump is switched off. If the actual temperature is below the threshold value (selected set room temperature plus hysteresis in K), the heating circuit pump is switched on.

Subscriber Numbers of Connected Extensions



All extensions connected to the boiler must have a subscriber number. The subscriber number is set on rotary switch S1 at each extension.

Rotary switch S1 settings:

- EM-S1 extension (system with solar collectors): 0
- EM-EA1 extension (max. 3 extensions in one system) Consecutive no. (any sequence): 1 up to 3
- EM-P1 extension
  - If no heating circuits with mixing valve are available in the system: 1
  - If heating circuits with mixing valve (EM-M1 extensions) are present in the system: Always set subscriber number for EM-P1 extension to the consecutive number after EM-M1 extensions.
- EM-M1 extension
  - Heating circuit 2 with mixing valve: Rotary switch on extension kit to 1
  - Heating circuit 3 with mixing valve: Rotary switch on extension kit to 2
  - Heating circuit 4 with mixing valve: Rotary switch on extension kit to 3

Note: EM-EA1 extensions may have the same subscriber number as the EM-P1 or EM-M1 extensions.
The following table shows an example of how a system may be equipped.

Function	Electronics module	Extension	Setting Rotary switch S1
System with solar collectors	ADIO	EM-S1	0
Heating circuit 2 with mixing valve	ADIO	EM-M1	1
Heating circuit 3 with mixing valve	ADIO	EM-M1	2
Heating circuit 4 with mixing valve	ADIO	EM-M1	3
Heating circuit 1 without mixing valve (circulation pump downstream of low loss header)	ADIO	EM-P1	4
Function extensions (e.g.): ■ Fault message input	DIO	EM-EA1	1
■ Fault message output	DIO	EM-EA1	2
■ Operating mode changeover	DIO	EM-EA1	3

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Service Menu

Service menu overview (for single boiler systems)

Service	
Diagnosis	
	General
	Burner
	Heating circuit 1
	Heating circuit 2
	Heating circuit 3
	Heating circuit 4
	DHW
	Solar energy
	Communication module
	Heating zone 1
	Heating zone 2
	Heating zone 3
	Heating zone 4
Actuator test	
System configuration	
Message history	
Service functions	
	Reset service
	Filling
	Purging
	System log
	WLAN information
Change passwords	
Commissioning	
Appliances detected	
Exit demo mode	
Exit service	
Access point on/off	

Note: Tap to return to the "Main service menu"

Calling up the service menu (for single boiler systems)

Tap the following buttons:

1. " ☰ "
2. "Service"
3. Enter password "viservice".
4. Confirm with ✔.
5. Select the required menu section.

   Note: Not all menu areas will be available, depending on the system equipment level.

Overview of service menu, lead boiler (for multi boiler systems via software tool)

Service	
Message history	
	Reset service
	Filling
	Purging
	System log
	WiFi information
Change passwords	
Commissioning	
Emissions test mode	
High limit safety cut-out test	
Exit service	
Access point on/off	

Overview of the service menu for lag boilers (for multi boiler systems via software tool)

Service	
Message history	
	Reset service
	Filling
	Purging
	System log
	WiFi information
Change passwords	
Commissioning	
Emissions test mode	
High limit safety cut-out test	
Exit service	

Leaving the Service Menu

Tap the following buttons:

"Exit service" or ⮌.

Note: The system exits the service menu automatically after 30 min.

Changing the Service Password

In the factory setting, “viservice” is preset as the password for accessing the “Service menu”.

Tap the following buttons:

1. “ ☰ “
2. “Service”
3. Enter password “viservice”.
4. Confirm with ✔.
5. “Change passwords”.
6. “Service menu”
7. Enter current password.
8. Confirm with ✔.
9. Enter new password.
10. Confirm twice with ✔.

Resetting all Passwords to the Factory Settings

Tap the following buttons:

1. Request the master password from the Viessmann Technical Service Department
2. “ ☰ “
3. “Service”
4. Enter password “viservice”.
5. Confirm with ✔.
6. “Change passwords”
7. “Reset all passwords”
8. Enter master password.
9. Confirm twice with ✔.

Diagnostics

Checking operating data

Operating data can be checked in various areas.
See “Diagnosis” in the service menu overview. Operating data on heating circuits with mixing valve can only be called up if such components are installed in the system.

Note: If a called up sensor is faulty, “- - -” appears on the display.

Calling up operating data

Tap the following buttons:

1. “ ☰ “
2. “Service”
3. Enter password “viservice”.
4. Confirm with ✔.
5. “Diagnosis”
6. Select required group, e.g. “General”.

Calling Up Messages (message history)

The messages are sorted by date.
Tap the following buttons:

1. " ☰ "
2. "Service"
3. Enter password "viservice".
4. Confirm with ✔.
5. "Message history"

The following is displayed in the message lists:

- Date and time of the occurrence of the notification
- Notification number
- Description of the notification
- Subscriber number of the component on which the message has occurred:

PlusBus subscriber components

0	EM-S1 extension (ADIO electronics module)
1 - 15	EM-M1 and EM-P1 extensions (ADIO electronics module)
17 - 31	EM-EA1 extension (DIO electronics module)
81	MZIO electronics module

CAN BUS subscriber components

1	HMU heat management unit
50	BCU burner control unit
58	Communication module (TCU 200)
59	HMI programming unit
60	Fan unit
70 - 85	Cascade subscribers
90	Gateway

6. - "Faults" to call up saved fault messages. For further details, see the following chapter "Fault messages".
   - "Service messages" to call up saved service messages.
   - "Status", to call up the saved status messages.
   - "Warnings" to call up saved warning messages.
   - "Information", to call up saved service information.

   For messages, see chapter "Further messages".
7. If you wish to delete messages, tap 🗑.
8. ✔ to confirm

Checking Outputs (actuator test)

Note: For multi boiler cascade systems the Viguide mobile app is required.

Note: When the actuator test is started, all actuators are initially disabled and valves moved to their central position.

Tap the following buttons:

1. "☰"
2. "Service"
3. Enter password "viservice".
4. Confirm with ✔.
5. "Actuator test"
6. ✔ to confirm the security prompt.
   Note: If an actuator function is not possible due to the running process, the function is interrupted. A prompt appears.
7. Use ◀ ▶ to select the required group. See the table below.
8. Tap the required actuator function. Several functions can be activated simultaneously.
9. If necessary, tap ✔ to confirm. The functions are active for 30 sec.
10. Use ⮌ to end the Actuator test.

The following actuator functions can be controlled subject to the system equipment level:		
Display		**Explanation**
Gas condensing boiler group		
Fan speed	Target value	Burner fan speed in rpm (rotations/minute)
Burner modulation, target value	■ Off ■ Minimum heating output ■ Maximum heating output ■ Maximum DHW output	Modulation level (in accordance with specific boiler settings)
3-way valve target position	Heating Centre DHW	3-way diverter valve set to heating operation 3-way diverter valve in central position (filling/draining) 3-way diverter valve set to DHW heating
Ventilation air supply 0-10V output/input		

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Checking Outputs (actuator test) *(continued)*

The following actuator functions can be controlled subject to the system equipment level:		
Display		**Explanation**
Heating group		
Primary circuit pump speed	Target value	Internal circulation pump speed in %
3-way valve target position	Heating	3-way diverter valve set to heating operation
	Centre	3-way diverter valve in central position (filling/draining)
	DHW	3-way diverter valve set to DHW heating
Heating circuit 1 pump speed	Target value	Speed, heating circuit pump, heating circuit 1 without mixing valve in %
Heating circuit 2 pump speed	Target value	Speed, heating circuit pump, heating circuit 2 with mixing valve in %
Heating circuit 3 pump speed	Target value	Speed, heating circuit pump, heating circuit 3 with mixing valve in %
Heating circuit 4 pump speed	Target value	Speed, heating circuit pump, heating circuit 4 with mixing valve in %
Mixer, HC2	Open	Output for “Mixing valve open” active (mixing valve extension kit)
	Stop	Current position is maintained
	Close	Output for “Mixing valve close” active
Mixer, HC3	Open	Output for “Mixing valve open” active (mixing valve extension kit)
	Stop	Current position is maintained
	Close	Output for “Mixing valve close” active
Mixer, HC4	Open	Output for “Mixing valve open” active (mixing valve extension kit)
	Stop	Current position is maintained
	Close	Output for “Mixing valve close” active
Heating zone pump 1	On	
	Off	
Heating zone pump 2	On	
	Off	
Heating zone pump 3	On	
	Off	
DHW group		
Primary circuit pump, set speed	Target value	Internal circulation pump in %
3-way valve target position	Heating	3-way diverter valve set to heating operation
	Centre	3-way diverter valve in central position (filling/draining)
	DHW	3-way diverter valve set to DHW heating
Circulation pump for DHW	On	
tank heating	Off	
DHW circulation pump	On	
	Off	
Solar group		
Solar circuit pump, set speed	Target value	Speed, solar circuit pump in %
Circulation pump hygiene	On	
function	Off	
Circulation pump, solar	On	
	Off	
3-way valve, solar	Open	
Target position	Close	
	Stop	

Fault Display on the Programming Unit

If there is a fault, the display shows the fault message plus ⚠.

Note: If a central fault message facility is connected, this is started.

1. Tap ⚠ in the footer to call up the fault messages. For an explanation of the fault codes, see the following table.
2. Tap ✔ to hide the fault messages. For an explanation of the fault codes, see the following table.

If "Connection error" and ⚠ appear on the display: Check connecting cable and plug between HMU heat management unit and HMI programming unit.

Acknowledge fault display

Tap ✔.

Note: Any connected central fault message facility stops. If an acknowledged fault is not remedied, the fault message will be re-displayed the following day at 07:00, and the fault message facility restarts.

Calling up acknowledged fault messages

Tap the following buttons:

1. " ☰ "
2. Tap "Message lists".

The fault messages appear in chronological order.

Note: When troubleshooting, note the subscriber number of the component.

Check the component displayed and rectify the fault if necessary. The subscriber number of the component depends on the position of rotary switch S1 on the corresponding extension module. The rotary switch position was set during installation. To identify the affected module, check the position of rotary switch S1 on the module if necessary.

Note: See also page 54

The following is displayed:

- Date and time of the occurrence of the fault
- Fault code
- Description of the fault
- Subscriber number of the component on which the fault has occurred:

PlusBus subscriber components

0 EM-S1 extension (ADIO electronics module)
1 - 15 EM-M1 and EM-P1 extensions (ADIO electronics module)
17 - 31 EM-EA1 extension (DIO electronics module)
48 - 63 Vitotrol 200-E
81 MZIO electronics module

CAN BUS subscriber components

1 HMU heat management unit
50 BCU burner control unit
58 Communication module (TCU 200)
59 HMI programming unit
60 Fan unit
70 - 85 Cascade subscribers
90 Gateway

Calling up fault messages from the fault memory (message history)

The 10 most recent faults (including those remedied) and service messages are saved and can be called up. Faults are sorted by date.

Calling up acknowledged fault messages

Tap the following buttons:

1. " ☰ "
2. "Service"
3. Enter password "viservice".
4. Confirm with ✔.
5. "Message history"
6. "Faults" to call up saved fault messages.
7. If you wish to delete the list, tap 🗑.
8. ✔ to confirm.

Fault In Cascade System

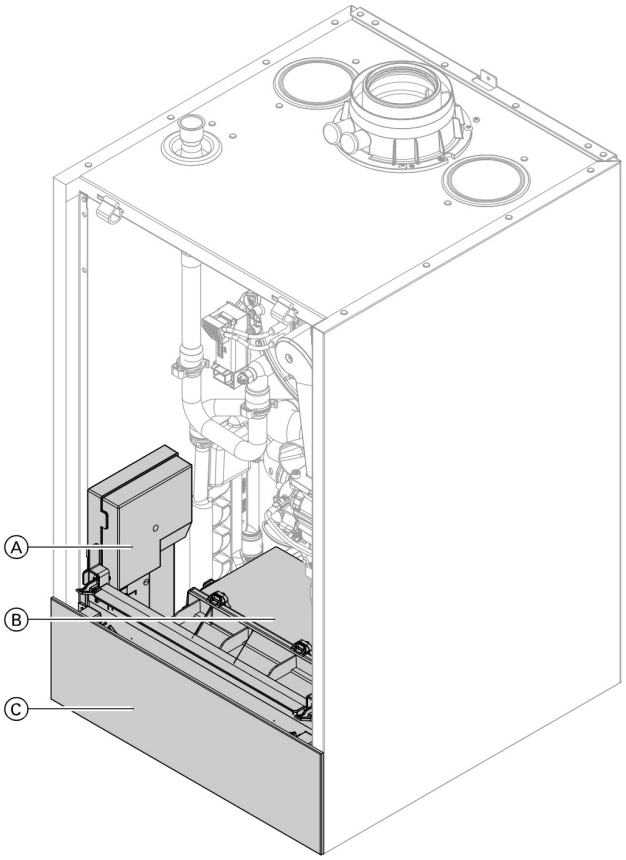
CAN bus cascade with at least 2 boiler participating.
The individual boiler can control the combustion air device (CAI) independently.
In the event of a communication failure to the lead boiler, the respective boilers automatically perform emergency operation by automatically controlling to a configurable flow temperature setpoint.

Procedure
The boilers control 'autonomously' to a configurable boiler setpoint. The time of communication failure / transition to emergency operation is 60 seconds (until then the individual boilers control to the last received value).

The boiler setpoint for emergency operation can be set / enabled via a VDD.
The boiler frost protection monitoring remains active (actual boiler value <41°F (<5°C).
VDD: CascadeEmergencyOperationMode (parameter 2451)
Boiler setpoint emergency operation / Enable emergency operation Enable emergency operation(BOOL) Default
Enable emergency operation: By default, the function is disabled (OFF).
Boiler setpoint emergency operation Setting range :
32 to 176°F (0°C to 80°C)
Default for emergency operation: 140°F (60°C)

Note: the minimum / maximum system flow temperature (min/max) cannot be set.
Minimum limit: 32°F (0°C)
Maximum limit: 176°F (80°C)

Overview of Electronics Modules



Legend

Ⓐ BCU burner control unit
Ⓑ HMU heat management unit with MZIO electronics module and wiring panel
Ⓒ HMI programming unit with communication module

Fault Messages

Note: For diagnostics and troubleshooting, see chapter "Repairs".
Fault messages dependent on appliance equipment level

Displayed fault code	System characteristics	Cause	Measures
F.5	System continues operating in normal mode with replacement value.	Lead break or short circuit	Check plug 33/X6 and cable: ■ Check voltage level, to see if 5V present at plug 33, pin 1 and 2. ■ Turn the gas condensing system boiler ON/OFF switch off and back on again.
F.7	No DHW heating	Lead break, storage tank temperature sensor	■ Check DHW setting in the commissioning assistant and correct if necessary. ■ Check storage tank temperature sensor (plug 5, wires 3 and 4). ■ Measure voltage at sensor input on electronics module. Target value: 3.3V– with sensor disconnected. Replace faulty component if necessary.
F.8	No DHW heating	Short circuit, storage tank temperature sensor	Check storage tank temperature sensor (plug 5, wires 3 and 4). Replace faulty component if necessary.
F.11	No solar DHW heating or central heating backup	Lead break, collector temperature sensor	■ Check collector temperature sensor. ■ Measure voltage at sensor input on electronics module. Target value: 3.3V– with sensor disconnected
F.12	No solar DHW heating	Short circuit, collector temperature sensor	■ Check the operating mode setting in the commissioning assistant and correct if necessary. ■ Check outside temperature sensor and connection to sensor (external plug, contacts 1 and 2). ■ Measure voltage at sensor input on electronics module. Target value: 3.3 V– with sensor disconnected. Replace faulty component if necessary.
F.13	Regulates as if the outside temperature were 32°C (0°C).	Lead break, outside temperature sensor	■ Check the operating mode setting in the commissioning assistant and correct if necessary. ■ Check outside temperature sensor and connection to sensor (external plug, contacts 1 and 2). ■ Measure voltage at sensor input on electronics module. Target value: 3.3V– with sensor disconnected. Replace faulty component if necessary.
F.14	Regulates as if the outside temperature were 32°C (0°C).	Short circuit, outside temperature sensor	Check outside temperature sensor and connection to sensor (external plug, and contacts 1 and 2). Replace faulty components if necessary.
F.15	No solar DHW heating or central heating backup	Lead break, storage tank temperature sensor	Check storage tank temperature sensor. Measure voltage at sensor input on electronics module. Target value: 3.3V– with sensor disconnected
F.16	No solar DHW heating or central heating backup	Short circuit, storage tank temperature sensor	Check storage tank temperature sensor. Measure voltage at sensor input on electronics module. Target value: 3.3V– with sensor disconnected
F.29	Regulates without supply temperature sensor for low loss header.	Lead break, low loss header sensor	■ Check low loss header setting in the commissioning assistant and correct if necessary. ■ Check supply temperature sensor, low loss header. ■ Measure voltage at sensor input on electronics module. Target value: 3.3V– with sensor disconnected
F.30	Regulates without supply temperature sensor for low loss header.	Short circuit, low loss header sensor	Check supply temperature sensor, low loss header. Measure voltage at sensor input on electronics module. Target value: 3.3V– with sensor disconnected
F.49	Burner in a fault state	Flue gas temperature sensor disconnection	Check flue gas temperature sensor. Reset the appliance.

Fault Messages *(continued)*

Displayed fault code	System characteristics	Cause	Measures
F.50	Burner in a fault state	Short circuit, flue gas temperature sensor	Check flue gas temperature sensor. Reset the appliance.
F.57	Normal operation without room influence	Lead break, room temperature sensor	■ Check remote control setting in the commissioning assistant and correct if necessary. ■ Check plug and cable of external room temperature sensor, heating circuit. ■ If no external room temperature sensor installed, replace Vitotrol programming unit.
F.58	Normal operation without room influence	Short circuit, room temperature sensor	Check plug and cable of external room temperature sensor, heating circuit. If no external room temperature sensor installed, replace Vitotrol programming unit.
F.59	Burner locked out	Power supply, low voltage	Check mains voltage. If voltage is correct and the fault occurs repeatedly, replace the fan unit.
F.62	Burner in a fault state	High limit safety cut-out has responded.	■ Check heating system fill level. ■ Check pre-charge pressure in diaphragm expansion tank. Adjust to required system pressure. ■ Check whether flow rate is sufficient (flow sensor and circulation pump). ■ Check 3-way diverter valve function in actuator test. Vent the system. Reset the appliance.
F.63	Burner in a fault state	Flue gas temperature limiter has responded.	■ Check heating system fill level. ■ Check pre-charge pressure in diaphragm expansion tank. Adjust to required system pressure. ■ Check whether flow rate is sufficient (flow sensor and circulation pump). ■ Check 3-way diverter valve function in actuator test. Vent the system. Reset the appliance once the flue system has cooled down.
F.67	Burner in a fault state	Ionization current lies outside the permissible range	Check gas supply (gas pressure), check gas solenoid valve and inlet strainer. Check ionization electrode: ■ Clearance to flame body assembly. ■ Check electrode/flame body assembly for contamination. If specified measures don't help, replace fan unit. Reset the appliance.
F.68	Burner in a fault state	Flame signal is already present at burner start.	Close the gas shut-off valve. Remove connecting cable of the ionization electrode. Reset the appliance. If the fault persists, replace BCU burner control unit: See page 61.
F.69	Burner in a fault state	Ionization current lies outside the permissible range	Check ionization electrode: ■ Check whether insulation block is touching electrode ceramic. ■ Check gas solenoid valve: Activate "Minimum heating output" for approx. 4 min in actuator test. If this causes a fault to occur, replace BCU burner control unit. ■ In the actuator test, switch from "Minimum heating output" to "Maximum heating output". If this fault occurs during modulation, check the intake screen for contamination. Replace the fan unit if necessary.

Fault Messages *(continued)*

Displayed fault code	System characteristics	Cause	Measures
F.70	Burner in a fault state	Internal error burner control unit	Replace BCU burner control unit: See page 61.
F.71	Burner in a fault state	Fan speed too low	■ Check fan for blockage. ■ Check the gas type and flue system setting in the commissioning assistant and correct if necessary. Reset the appliance.
F.72	Burner in a fault state	Fan idle state not reached	Reset the appliance. If fault occurs repeatedly, replace fan unit.
F.73	Burner in a fault state	Internal communication error	Reset the appliance. If fault recurs, replace BCU burner control unit: See page 61.
F.74	Burner locked out. Internal circulation pump off. No central heating and no DHW heating.	Water pressure too low	Top up with water. Vent the system. If the fault occurs repeatedly: ■ Check system pressure sensor with external manometer. ■ Check diaphragm expansion tank pre-charge pressure. ■ Check settings for target system pressure and range.
F.77	Burner in a fault state	Data memory burner control unit	Reset the appliance. If fault recurs, replace BCU burner control unit: See page 61.
F.89	No central heating and no DHW heating	Internal circulation pump blocked	Check circulation pump. Replace if necessary.
F.91	Function of affected extension in emergency mode	DIO electronics module communication error	Check connections to DIO electronics module and connection to heat management unit.
F.92	Function of the relevant electronics module in emergency mode	ADIO electronics module communication error	■ Check setting in the commissioning assistant and correct if necessary. ■ Check connections and leads to the ADIO electronics module. ■ Check PlusBus voltage level (24 to 28V). ■ Check subscriber number on rotary switch S1 and correct if necessary.
F.94	Electronics modules connected to PlusBus not functioning	Voltage error PlusBus	Check whether the PlusBus power supply on the HMU heat management unit is OK: Remove all connected PlusBus components and reconnect one by one. Check that there aren't more than 2 Vitotrol 200-E connected to the HMU. Check whether there is a short circuit at the PlusBus cable.
F.100	Electronics modules connected to PlusBus not functioning	Voltage error PlusBus	Check whether the PlusBus power supply on the HMU heat management unit is OK: Remove all connected PlusBus components and reconnect one by one. Check that there aren't more than 2 Vitotrol 200-E connected to the HMU. Check whether there is a short circuit at the PlusBus cable.
F.104	Depending on configuration of EM EA1 extension (DIO electronics module)	External fault message input active	Check connected external device.
F.142	Burner in a fault state	Communication error CAN bus	■ Check the fan unit for correct function. For this, check the stepper motor of the fan unit (reference run with mains ON). ■ If the fault still persists, visually check the plug-in connections and cables of the CAN bus. ■ Check further CAN bus subscribers. If fault still persists, replace the fan unit.

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Fault Messages *(continued)*

Displayed fault code	System characteristics	Cause	Measures
F.160	Burner in a fault state	Communication error CAN bus	■ If "Connection error" is displayed, check the internal CAN bus subscriber connections. ■ If only F.160 is displayed, check the connections of the external CAN bus subscribers. ■ Check the connecting cables for firm seating and corrosion. Reset the appliance.
F.161	Burner in a fault state	BCU data memory access error	Reset the appliance. If fault recurs, replace BCU burner control unit: See page 61.
F.163	Burner in a fault state	Memory access checksum error BCU	Reset the appliance. If fault recurs, replace BCU burner control unit: See page 61.
F.180	Burner in a fault state	Gas pressure too low	■ Check gas pressure. Notify the gas supply utility if necessary. ■ Check whether the gas pressure switch is working properly. Replace the gas fitting if necessary. Direct replacement of the gas pressure switch is not permissible.
F.182	No DHW heating	Short circuit, outlet temperature sensor (if installed)	Check outlet temperature sensor (plug X1, cores 13 and 14). Measure sensor input on electronics module. Target value: 3.3V– with sensor disconnected
F.183	No DHW heating	Lead break, outlet temperature sensor (if installed)	Check outlet temperature sensor (plug X1, cores 13 and 14).
F.184	Burner in a fault state	Short circuit, common supply temperature sensor/ high limit safety cutout	Check the supply temperature sensor/high limit safety cut-out. Check sensor lead. Replace faulty component if necessary. Reset the appliance.
F.185	Burner in a fault state	Lead break, common supply temperature sensor/high limit safety cut-out	Check the supply temperature sensor/high limit safety cut-out. Replace faulty component if necessary. Reset the appliance.
F.299	Time/date incorrect	Real time clock setting incorrect	Set the time and date.
F.342	No central heating, no DHW heating	Communication error, BCU burner control unit	■ Check connecting cable to the burner control unit plug X4 on BCU. ■ Check all plug-in connections and cables of the internal CAN. ■ Remove all plugs except X4, X2, X16 and X18 from the BCU burner control unit. Check whether fault persists. **Note:** Several other fault messages will be added due to the removed plugs. Ignore these. If fault message F.342 is no longer shown, reinsert the plugs one by one and establish which component is faulty. Reset the appliance.

Fault Messages *(continued)*

Displayed fault code	System characteristics	Cause	Measures
F.345	Burner locked out, automatic enabling after appliance cool down. Independent restart.	Temperature limiter has responded. See boiler specification.	■ Ensure adequate heat transfer. ■ Check heating system fill level. ■ Check pre-charge pressure in diaphragm expansion tank. Adjust to required system pressure. ■ Check whether flow rate is sufficient (flow sensor and pump). ■ Check 3-way diverter valve function in actuator test. Vent the system. If the fault occurs during DHW heating: Check DHW tank or plate heat exchanger for contamination and scaling.
F.346	Burner in a fault state	Ionization current calibration error	■ Check the gas supply pressure. ■ Check gas solenoid valve strainer on the inlet side for contamination. ■ Check ionization electrode for contamination. ■ Check flue system. Remove flue gas recirculation if necessary. ■ Check the connecting cable to the fan unit. ■ Check whether condensate is backed up. Reset the appliance.
F.348	Burner in a fault state	Gas modulation valve	If several boilers are connected to a common flue system: Check whether “Multiple connections” is set in the commissioning assistant. Check the flue system for unrestricted flow. If the fault persists, replace the gas fan unit.
F.349	Burner in a fault state	Air mass flow rate not detected correctly in fan unit.	■ Check for dust contamination in the ventilation air. ■ Check flame body assembly for contamination. Reset the appliance. If the fault occurs repeatedly, replace the gas fan unit.
F.350, F.351	Burner in a fault state	Ionization current lies outside the permissible range	Replace BCU burner control unit: See page 61.
F.352	Burner in a fault state	CO limit within appliance exceeded	Check entire flue gas path for the following: ■ Flue gas recirculation ■ Leaks ■ Flue gas back pressure caused by water pocket (if flue system fall is insufficient) ■ Constrictions ■ Blockages Repair flue system if necessary. Reset the appliance.
F.353	Burner shutdown with restart if demand exists	Insufficient gas supply, burner output reduced	Check the gas supply. Optically check input-side screen in the gas solenoid valve for contamination. Reset the appliance.
F.354	Burner in a fault state	Gas modulation valve tolerance outside permissible range	Replace gas fan unit.
F.355	Burner in a fault state	Analogue signal reference check: Flame signal is already present at burner start.	Replace BCU burner control unit: See page 61.

Fault Messages *(continued)*

Displayed fault code	System characteristics	Cause	Measures
F.357	Burner in a fault state	Insufficient gas supply	■ Check that the gas shut-off valve is open. ■ Optically check input-side screen in the gas solenoid valve for contamination. ■ Test static gas pressure and gas flow pressure. ■ Check that on-site gas line is correctly sized. **Note:** If the building pressure regulator has a leak, you may notice rising pressure when the burner is idle. If the static pressure doesn't drop, check cable to the fan unit. Check whether the coil resistance at the fuel valve is approx. 4 kΩ (plug 35, contact 2 and 4). Check the ignition electrode for damaged insulation. Reset the appliance.
F.359	Burner in a fault state	No ignition spark	■ Check whether the ignition electrode insulation is damaged. ■ Check for a voltage of 120V~ at the ignition module during the ignition phase. If not, replace the BCU burner control unit. ■ If 120V~ is present at the ignition module but there is still a fault, replace the ignition module. ■ Check connecting cables and leads from ignition module and ignition electrode. Reset the appliance.
F.361	Burner in a fault state	Flame signal is not present or insufficient at burner start.	Check ionization electrode and connecting cable. Check plug-in connections for loose contacts. Check for condensate back-up. **Note:** Deposits on the electrodes indicate foreign bodies in the combustion air. Check the installation room and flue system for causes of the deposits. For example: Laundry detergents, cleaning agents, toiletries, deposits in the ventilation air supply (chimney). Reset the appliance
F.366, F.367	Burner in a fault state	Gas valve electricity supply does not turn off.	Replace BCU burner control unit: See page 61.
F.369	Burner in a fault state	Flame loss immediately after flame formation (during safety time)	Check gas supply (gas pressure). Check balanced flue system for flue gas recirculation. Check ionization electrode: ■ Clearance to flame body assembly. ■ Contamination on electrode. Reset the appliance.
F.370	Burner in a fault state	Fuel valve or modulation valve will not close.	Reset the appliance. If fault occurs repeatedly, replace fan unit.

Fault Messages *(continued)*

Displayed fault code	System characteristics	Cause	Measures
F.372	Burner in a fault state	Repeated flame loss during calibration	■ Check ionization electrode and connecting cable. ■ Check plug-in connections for loose contacts. ■ Check flue system. Remove flue gas recirculation if necessary. ■ Check system for condensate backup. ■ Visually inspect gas solenoid valve inlet and strainer on the inlet side for contamination. **Note:** To prevent water damage, detach fan unit before removing the burner. Deposits on the electrodes indicate foreign bodies in the combustion air. Check the installation room and flue system for causes of the deposits. For example: Laundry detergents, cleaning agents, toiletries, deposits in the ventilation air supply (chimney). If flame body assembly and ionization electrode have been replaced, also clean fan unit, gas/air channel and Venturi extension. Reset the appliance.
F.373	Burner in a fault state	Heat transfer too low during calibration Temperature limiter has shut down.	■ Ensure adequate heat transfer. ■ Check circulation pump for faults, scale or blockages. ■ Check 3-way diverter valve function in actuator test. Vent the system. ■ Check function of flow sensor. Reset the appliance.
F.377	Burner in a fault state	Post-processing of ionization adjustment: Stabilization conditions for post calibration not met	Check gas type setting. If fault recurs, replace BCU burner control unit: See page 61. Reset the appliance.
F.378	Burner in a fault state	Flame loss during stabilization or operating phase	■ Check gas supply (gas pressure). ■ Check flue gas recirculation. ■ Check for contamination of ionization electrode and flame body assembly. Reset the appliance.
F.379	Burner in a fault state	Flame signal not present or insufficient	■ Check ionization electrode connecting cable for damage and firm seating. ■ Check ionization electrode; replace if necessary. Reset the appliance.
F.380	Burner in a fault state	Flame loss immediately after flame formation (during safety time)	Check gas supply (gas pressure). Check balanced flue system for flue gas recirculation. Check ionization electrode and flame body assembly: ■ Clearance to flame body assembly ■ Contamination on electrode Reset the appliance.
F.381	Burner in a fault state	Flame loss during operating phase	Check gas supply (gas pressure). Check balanced flue system for flue gas recirculation. Check ionization electrode and flame body assembly: ■ Clearance to flame body assembly. ■ Contamination on electrode Reset the appliance.
F.382	Burner in a fault state	Error counter has exceeded limit.	Reset the appliance. Work through fault analysis using fault history.
F.383, F.384	Burner in a fault state	Possible contamination of gas line	■ Check gas line for contamination. ■ Check the gas supply pressure. ■ Replace gas fan if necessary. Reset the appliance.
F.385	Burner in a fault state	Short circuit, signal 1, ionization current. BCU burner control unit faulty.	Check ionization electrode and connecting cable. If fault persists, replace BCU burner control unit: See page 61. Reset the appliance.

Fault Messages *(continued)*

Displayed fault code	System characteristics	Cause	Measures
F.386	Burner in a fault state	BCU burner control unit faulty	Replace BCU burner control unit: See page 61. Reset the appliance.
F.387	Burner in a fault state	Ground fault, ionization current. BCU burner control unit faulty.	Check ionization electrode and connecting cable. Check system for condensate backup. - Check the condensate drain and siphon trap. - Replace insulation blocks, electrodes and flame body assembly if necessary. **Note:** To prevent water damage, detach fan unit before removing the burner. Protect electronic components from escaping condensate. If there is no condensate backup, take the following steps If fault persists, replace BCU burner control unit: See page 61. Reset the appliance.
F.388	Burner in a fault state	BCU burner control unit faulty	Replace BCU burner control unit: See page 61. Reset the appliance.
F.395	Burner in a fault state	IO electrode ground fault, BCU burner control unit faulty	Check ignition electrode for ground fault. If fault persists, replace BCU burner control unit: See page 61. Reset the appliance.
F.396	Burner in a fault state	BCU burner control unit faulty	Replace BCU burner control unit: See page 61. Reset the appliance.
F.399	Burner in a fault state	IO electrode ground fault, BCU burner control unit faulty	Check IO electrode for ground fault. If fault persists, replace BCU burner control unit: See page 61. Reset the appliance.
F.400	Burner in a fault state	BCU burner control unit faulty	Replace BCU burner control unit: See page 61. Reset the appliance.
F.401	Burner in a fault state	IO electrode ground fault, BCU burner control unit faulty	Check IO electrode for ground fault. If fault persists, replace BCU burner control unit: See page 61. Reset the appliance.
F.402	Burner in a fault state	BCU burner control unit faulty	Replace BCU burner control unit: See page 61. Reset the appliance.
F.403	Burner in a fault state	Ionization electrode ground fault, BCU burner control unit faulty	Check IO electrode for ground fault. If fault persists, replace BCU burner control unit: See page 61. Reset the appliance.
F.404	Burner in a fault state	BCU burner control unit faulty	Replace BCU burner control unit: See page 61. Reset the appliance.
F.405	Burner in a fault state	Ionization electrode ground fault, BCU burner control unit faulty	Check IO electrode for ground fault. If fault persists, replace BCU burner control unit: See page 61. Reset the appliance.
F.406, F.408, F.410	Burner in a fault state	BCU burner control unit faulty	Replace BCU burner control unit: See page 61. Reset the appliance.
F.416	Burner locked out	Flue gas temperature sensor incorrectly positioned	Fit flue gas temperature sensor correctly. See “Repairs”. Carry out mains reset after fault has been remedied.
F.417, F.418	Burner in a fault state	BCU burner control unit faulty	Replace BCU burner control unit: See page 61. Reset the appliance.

Fault Messages *(continued)*

Displayed fault code	System characteristics	Cause	Measures
F.425	System operating normally; calculation not working	Time synchronization failed	Set the time. If external time is used, check parameters 1504 and 508.
F.430	Normal operation in line with target values of boiler	Communication error gateway	Check gateway module connecting cable and power supply.
F.446	Burner in a fault state	Deviation, boiler supply temperature sensor/ high limit safety cutout	Check the supply temperature sensor/high limit safety cut-out. Check plug-in connection and lead to sensor. Reset the appliance.
F.447, F.448	Burner in a fault state	Deviation, ionization current signal	Replace BCU burner control unit: See page 61. Reset the appliance.
F.449, F.450, F.451, F.452	Burner in a fault state	Error in scheduled program run monitoring	Reset the appliance. If fault recurs, replace BCU burner control unit: See page 61.
F.453	Burner in a fault state	Synchronization error, sequence	Reset the appliance. If fault recurs, replace BCU burner control unit: See page 61.
F.454	Burner in a fault state	Incorrect BCU software version	Flash the correct software version for the BCU burner control unit.
F.455, F.456	Burner in a fault state	Error in program run monitoring	Reset the appliance. If fault recurs, replace BCU burner control unit: See page 61.
F.457	Burner in a fault state	Fan sluggish or blocked.	Reset the appliance. Check fan for sluggishness. In the case of severe contamination or grinding noises, replace fan unit.
F.458	Burner in a fault state	Faulty reset sequence. Safety-relevant reset sequence is faulty.	Reset the appliance.
F.463	Burner in a fault state	Contaminated combustion air, flue gas recirculation	Check flue system for contamination and flue gas recirculation. Clean flue system if necessary. Reset the burner. **Note:** Deposits on the electrodes indicate foreign bodies in the combustion air. Check the installation room and flue system for causes of the deposits. For example: Laundry detergents, cleaning agents, toiletries, deposits in the ventilation air supply (chimney) If flame body assembly and ionization electrode have been replaced, also clean fan unit, gas/air channel and Venturi extension. Reset the appliance.

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Fault Messages *(continued)*

Displayed fault code	System characteristics	Cause	Measures
F.464	Burner in a fault state	Ionization current too low during calibration. Differential compared to previous value not plausible.	■ Check ionization electrode and connecting cable. Check plug-in connections for loose contacts. ■ Check whether there is a lot of dust in the ventilation air (e.g. from construction work). ■ Check flue system. Remove flue gas recirculation if necessary. ■ Check system for condensate backup. Reset the appliance. **Note:** To prevent water damage, detach fan unit before removing the burner. Protect electronic components from escaping condensate. If fault is permanently present, replace the BCU burner control unit: See page 61. **Note:** Deposits on the electrodes indicate foreign bodies in the combustion air. Check the installation room and flue system for causes of the deposits. For example: Laundry detergents, cleaning agents, toiletries, deposits in the ventilation air supply (chimney) If flame body assembly and ionization electrode have been replaced, also clean fan unit, gas/air channel and Venturi extension.
F.467	Burner in a fault state	Gas supply insufficient during calibration. Contaminated or insufficiently sized gas line.	■ Test static gas pressure and gas flow pressure. ■ Check that on-site gas line is correctly sized. ■ Visually inspect gas solenoid valve inlet and strainer on the inlet side for contamination. Reset the appliance. **Note:** Contamination from a brazed gas line, for example, can block up the gas solenoid valve strainer on the inlet side.
F.468	Burner in a fault state	Ionization current too high during calibration	Check gap between ionization electrode and flame body assembly. Check whether there is a lot of dust in the ventilation air (e.g. from construction work). Reset the appliance. **Note:** Deposits on the electrodes indicate foreign bodies in the ventilation air. Check the installation room and flue system for causes of the deposits. For example: Laundry detergents, cleaning agents, toiletries, deposits in the ventilation air supply (chimney) If flame body assembly and ionization electrode have been replaced, also clean fan unit, gas/air channel and Venturi extension.
F.471	No call for heat	lead break or short circuit	■ Check system (plug 33). ■ Check lead and plug-in connection. ■ Measure, to see if supply voltage to sensor is 5V–.
F.473	No call for heat	HMU heat management unit communication error	Check connecting cable between BCU burner control unit and HMU heat management unit.
F.474	Burner in a fault state	Error in scheduled program run monitoring	Reset the appliance. If fault recurs, replace BCU burner control unit: See page 61.
F.477	Limited solar thermal system functionality	Differential temperature monitoring, solar	Check the solar circuit, solar circuit pump and sensors.
F.517	Normal operation, remote control unit not functioning	Lead break, PlusBus cable, incorrect appliance address set, remote control faulty	■ Check setting in commissioning assistant. ■ Check remote control cable. ■ Check remote control subscriber number. Replace faulty remote control if applicable.

Fault Messages *(continued)*

Displayed fault code	System characteristics	Cause	Measures
F.527	Burner in a fault state	Incorrect parameter set, HMU heat management unit	Overwrite (flash) the HMU heat management unit with the correct parameter set: See page 61
F.528	Burner in a fault state	Incorrect parameter set, BCU burner control unit	Overwrite (flash) the BCU burner control unit with the correct parameter set: See page 61.
F.530	Solar function limited	Sensor value not available or lead break of one or more sensors/sensor(s) missing	Check sensor(s), or connect missing sensor(s) to SDIO electronics module.
F.538	No solar central heating backup with SDIO	Lead break, system return temperature sensor	Check sensor(s), or connect missing sensor(s) to SDIO electronics module.
F.540	Burner in a fault state	Condensate backup in the heat cell	■ Check system for condensate backup. ■ Check the condensate drain and siphon trap. ■ Replace insulation blocks, electrodes and flame body assembly if necessary. **Note:** To prevent water damage, detach fan unit before removing the burner. Protect electronic components from escaping condensate. Reset the appliance.
F.544	Mixing valve closes. Heating circuit pump is operational.	Lead break, common supply temperature sensor, heating circuit 2 with mixing valve Incorrect setting during commissioning	Check supply temperature sensor, mixing valve 2. Measure voltage at sensor input on electronics module. Target value: 3.3V– with sensor disconnected. Check commissioning assistant setting. Checking setting of ADIO rotary switch.
F.545	Mixing valve closes. Heating circuit pump is operational.	Short circuit, common supply temperature sensor for heating circuit 2 with mixing valve	Check supply temperature sensor, mixing valve 2. Measure voltage at sensor input on electronics module. Target value: 3.3V– with sensor disconnected
F.546	Mixing valve closes. Heating circuit pump is operational.	Lead break, common supply temperature sensor, heating circuit 3 with mixing valve	Check supply temperature sensor, mixing valve 3. Measure voltage at sensor input on electronics module. Target value: 3.3V– with sensor disconnected. Check commissioning assistant setting. Checking setting of ADIO rotary switch.
F.547	Mixing valve closes. Heating circuit pump is operational.	Short circuit, common supply temperature sensor for heating circuit 3 with mixing valve	Check supply temperature sensor, mixing valve 3. Measure voltage at sensor input on electronics module. Target value: 3.3V– with sensor disconnected
F.548	Mixing valve closes. Heating circuit pump is operational.	Short circuit, common supply temperature sensor for heating circuit 4 with mixing valve	■ Check supply temperature sensor, mixing valve 4. ■ Measure voltage at sensor input on electronics module. Target value: 3.3V– with sensor disconnected ■ Check commissioning assistant setting. ■ Checking setting of ADIO rotary switch.
F.549	Mixing valve closes. Heating circuit pump is operational.	Short circuit, common supply temperature sensor for heating circuit 4 with mixing valve	Check supply temperature sensor, mixing valve 4. Measure voltage at sensor input on electronics module. Target value: 3.3V– with sensor disconnected
F.574	Room temperature sensor for heating circuit 1 not available.	Normal operation without room influence	Check external room temperature sensor for heating circuit or room temperature sensor with remote control unit.

Fault Messages *(continued)*

Displayed fault code	System characteristics	Cause	Measures
F.666	Lead break, DHW preheating sensor TS3	No solar function with preheating. 2nd storage tank and solar transfer pump not working	Check temperature sensor TS3.
F.667	Short circuit, DHW preheating sensor TS3	No solar function with preheating. 2nd storage tank and solar transfer pump not working	Check temperature sensor TS3.
F.668	Lead break, DHW reheating sensor TS4	No solar function with preheating. 2nd storage tank and solar transfer pump not working	Check temperature sensor TS4.
F.669	Short circuit, DHW reheating sensor TS4	No solar function with preheating. 2nd storage tank and solar transfer pump not working	Check temperature sensor TS4.
F.670	Lead break, buffer temperature sensor TS3	No solar central heating backup	Check temperature sensor TS3.
F.671	Short circuit, buffer temperature sensor TS3	No solar central heating backup	Check temperature sensor TS3.
F.672	Lead break, temperature sensor, thermostat function TS3	No solar function with thermostat function and solar transfer pump not working.	Check temperature sensor TS3.
F.673	Short circuit, temperature sensor, thermostat function TS3	No solar function with thermostat function and solar transfer pump not working.	Check temperature sensor TS3.
F.691	Burner in a fault state	Missing feedback combustion air supply	■ Check connection at CAI. ■ Check operation of proving switch. ■ Time for proving switch set to low increase the setting of parameter 2344.0.
F.762	System in a fault state	System pressure too low	Top up with water. Vent the system. If the fault recurs: Check the minimum pressure switch with an external pressure gauge. Check diaphragm expansion tank pre-charge pressure. Check safety chain plugs on burner control unit.
F.763	System in a fault state	Gas pressure too high	Check gas supply pressure.
F.764	System in a fault state	Lag boiler reports a fault	Check the lag boiler fault.
F.765	System in a fault state	Communication error lead boiler	Check the lead boiler fault.

Note: If subscriber faults occur, “Fault, subscriber …” is displayed.

Further Messages

Service messages

Message on the display	Meaning
P.1	Interval until the next service.
P.4	Top up heating water.
P.8	Service due after burner hours run.

Status messages

Message on the display	Meaning
S.60	Summer mode active (outside temperature economy function)
S.74	Heating suppression, heating
S.75	DHW recirculation pump active
S.94	No demand, external hook-up, heating circuit 1
S.95	No demand, external hook-up, heating circuit 2
S.96	No demand, external hook-up, heating circuit 3
S.154	Boiler internal flow switch is in the open position.

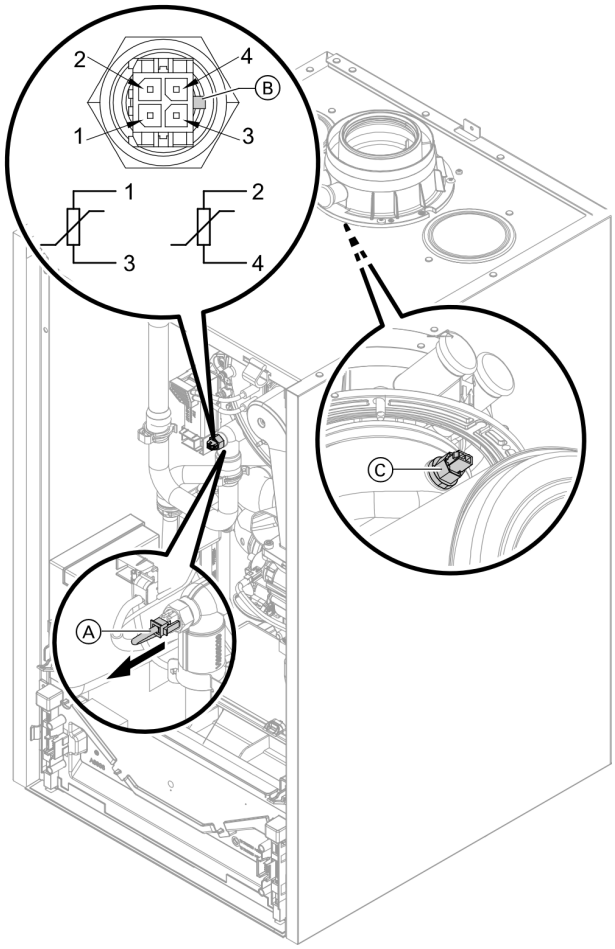
Warning messages

Messages on the display	Meaning	Measure
A.12	Real time clock battery flat.	Replace the battery (type CR2032) in the HMU heat management unit.
A.18	Possible condensate backup in the heat cell	Check combustion chamber and condensate drain. Condensate may escape when removing the burner door. Take appropriate precautions to protect the electronic components. If condensate is backed up into the combustion chamber, replace the insulation ring, insulating block, insulation mats and ionization electrode. If the condensate has reached the flame body assembly, also replace the gasket of the flame body assembly.
A.19	Temperature limiter has responded	
A.20	Service interval could not be activated.	Check the time and date settings.

Information

Message on the display	Meaning
I.56	External demand active
I.57	External blocking active
I.59	Parameters were restored (parameter set was flashed to BCU electronics module).

Repairs



IMPORTANT

Residual water will escape when the boiler or one of the following components is fitted or removed:

- Water-filled pipework
- Heat exchanger
- Circulation pumps
- Plate heat exchanger
- Components fitted in the heating water or DHW circuit.
- Flow switch

Water ingress can result in damage to other components.

Protect the following components against ingress of water:

- Control unit components (in particular in the maintenance position)
- Electrical components
- Plug-in connections
- Electrical cables/leads

Shutting down the boiler

1. Switch off the power supply.
2. Shut off the gas supply.
3. If the boiler needs to be removed:
   - Isolate the system from the power supply.
   - Safeguard against system reconnection.
   - Disconnect the balanced flue system.
   - Drain the boiler on the heating water and DHW sides.
   - Disconnect the on-site cables/leads.

Checking the temperature sensors

Boiler circuit supply temperature sensor (dual sensor)

1. Check the leads and plugs of supply temperature sensors Ⓐ.
2. Disconnect the leads from supply temperature sensors Ⓐ.
3. Check the sensor resistance. Note position of guide lug Ⓑ.
   - Sensor 1: Connections 1 and 3
   - Sensor 2: Connections 2 and 4

   Compare the resistances with the value for the current temperature from the following diagram.
   In the event of severe deviation (> 10%), replace the dual sensor.

⚠ WARNING

The dual sensor is directly immersed in the heating water (risk of scalding).
Drain the boiler on the heating water side before replacing the sensor.

⚠ WARNING

Risk of electric shock from escaping heating water.
Check the dual sensor for leaks.

Repairs *(continued)*

DHW storage tank temperature sensor

1. Check the lead and plug of storage tank temperature sensor [5].
2. Disconnect wires of sensor plug.
3. Check the sensor resistance. Compare the resistance with the value for the current temperature from the following diagram.
   In the event of severe deviation (> 10%), replace the sensor.

Low loss header sensor

1. Check the lead and plug of temperature sensor [TS1] at the boiler.
2. Disconnect wires of sensor plug.
3. Check the sensor resistance. Compare the resistance with the value for the current temperature from the following diagram.
   In the event of severe deviation (> 10%), replace the sensor.

Outside temperature sensor

1. Check the lead and plug of the outside temperature sensor.
2. Disconnect wires 1 and 2 from terminal [1] on the wiring panel.
3. Check the sensor resistance. Compare the resistance with the value for the current temperature from the following diagram.
   If the results are very different from the curve (> 10%), disconnect the wires from the sensor. Repeat the test directly on the sensor.
   Check the on-site lead. 2-wire cable, length up to 115 ft. (35 m) with a cross-section of 16 AWG (1.5 mm2).
   Depending on the result, replace the lead or the outside temperature sensor.

Flue gas temperature sensor

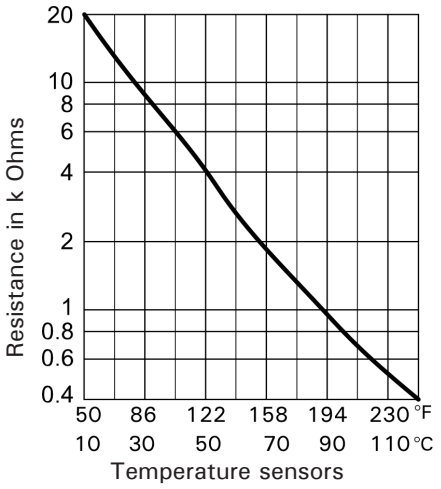
1. Check the lead and plug of flue gas temperature sensor Ⓒ.
2. Disconnect leads, flue gas temperature sensor Ⓒ.
3. Rotate sensor (anti-clockwise) by ¼ turn to remove it (bayonet fitting).
4. Check the sensor resistance. Compare the resistance with the value for the currently recorded temperature from the following diagram.
   In the event of severe deviation (> 10%), replace the sensor.
5. Rotate sensor (clockwise) by ¼ turn to install it.

⚠ WARNING

Escaping flue gas can cause poisoning.
When restarting, check for leaks on the flue gas side.

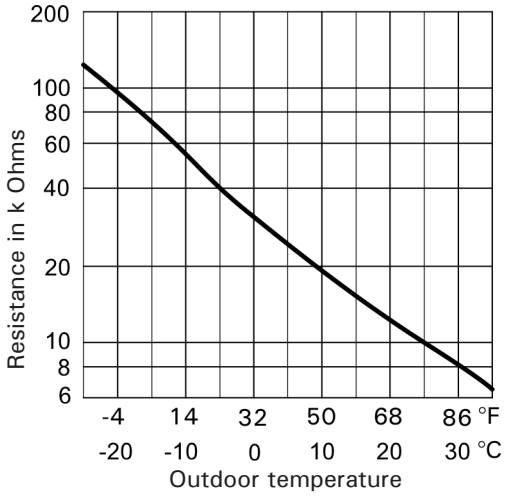
6. Reconnect leads, flue gas temperature sensor Ⓒ.
7. If the permissible flue gas temperature has been exceeded, the flue gas temperature sensor locks out the appliance. Reset the burner on the programming unit once the flue system has cooled down.

Repairs *(continued)*



Sensor type: NTC 10 kΩ

- Flue gas temperature sensor
- Supply temperature sensor
- Storage tank temperature sensor
- Temperature sensor, low loss header



Sensor type: NTC 10 kΩ

- Outside temperature sensor

Note on replacing the HMU heat management unit and BCU burner control unit

If BCU burner control units and/or HMU heat management unit are replaced, the replacement must be carried out with the help of the "Viguide".

See spare part installation instructions and internet address: "www.Viguide.info"

Replacing the HMI connecting cable

IMPORTANT

Incorrect routing of the cable can lead to heat damage and impairment of the EMC properties.
For positioning and securing of the cable (fixing point of the cable tie) see connecting cable installation instructions.

Repairs *(continued)*

⚠ WARNING

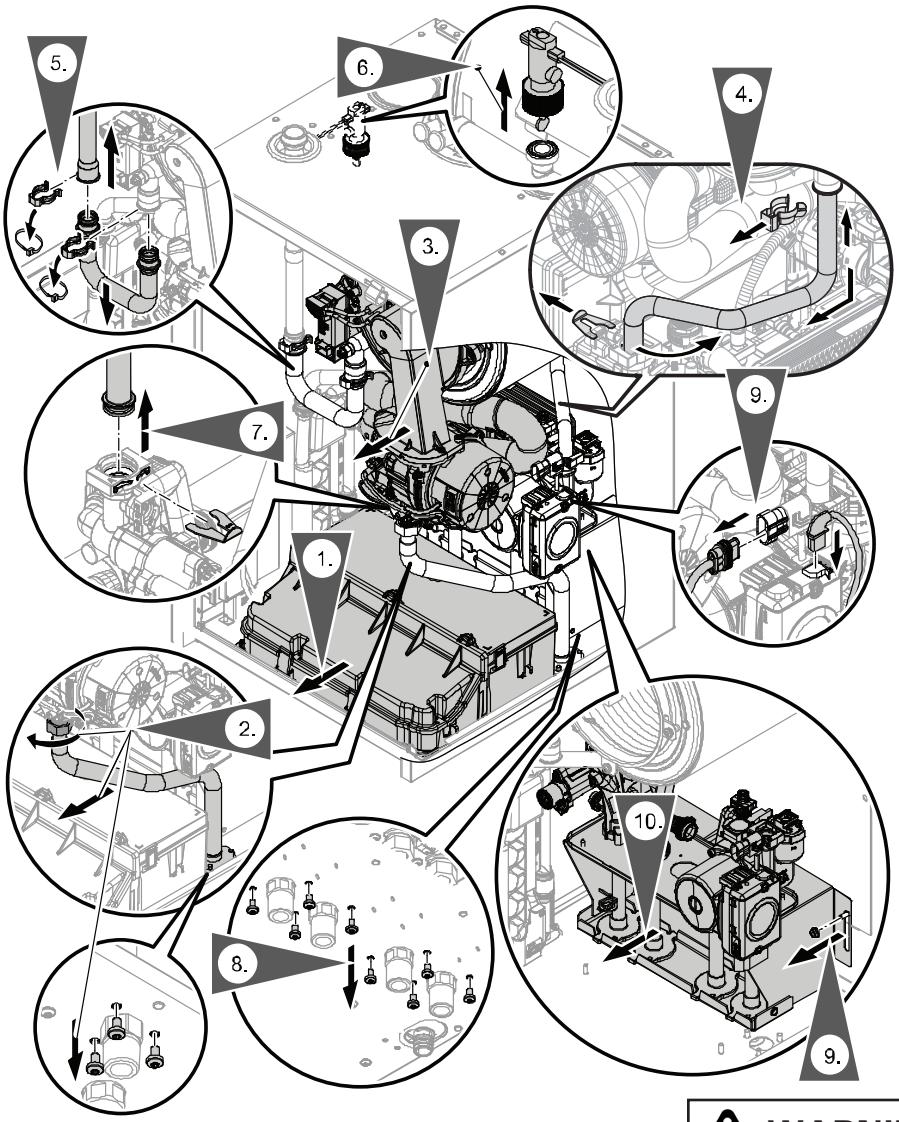
Hot surfaces and media can cause burns or scalding.

- Before maintenance and service work, switch off the appliance and let it cool down.
- Never touch hot surfaces on the boiler, burner, flue system or pipework.

IMPORTANT

Electronic assemblies can be damaged by electrostatic discharge. Before beginning work, touch grounded objects, such as heating or water pipes, to discharge any static. Disconnect all water and gas connections.

B2HE 85/120



Removing the hydraulic unit

If components of the hydraulic unit have to be replaced.

- Close the gas shut-off valve and secure against unintentional reopening.
- Isolate the system from the power supply, e.g. by removing the separate fuse or by means of a mains isolator, and check that it is no longer live.
- Safeguard the system against reconnection.
- Wear suitable personal protective equipment when carrying out any work.

⚠ WARNING

Risk of electric shock from escaping heating water or DHW. After installation, check all connections on the water side for leaks.

1. Remove the control unit.
2. Unscrew the union nut at the top and screws at the bottom of the gas pipe.
3. Remove the burner.
4. Pull off the clips. Push the pipe upwards and pivot it backwards. Then remove the pipe downwards.
5. Pull off the clips. Push the supply pipe upwards. Push the pipe bend downwards and remove it. **Note:** If necessary, the safety valve with drain must be removed.
6. Remove flow switch.
7. Undo the screws at the bottom of the hydraulic unit.
8. Undo the nuts.
9. Raise the hydraulic unit and remove it toward the front.

The hydraulic unit is installed in reverse order. Ensure to install new cable ties on the clips.

⚠ WARNING

Do not damage the gas pipe! The gas pipe must not come into contact with any other components in the appliance. Keep the gas pipe from testing during tightening by using the two wrench system. Do not use pliers!

⚠ WARNING

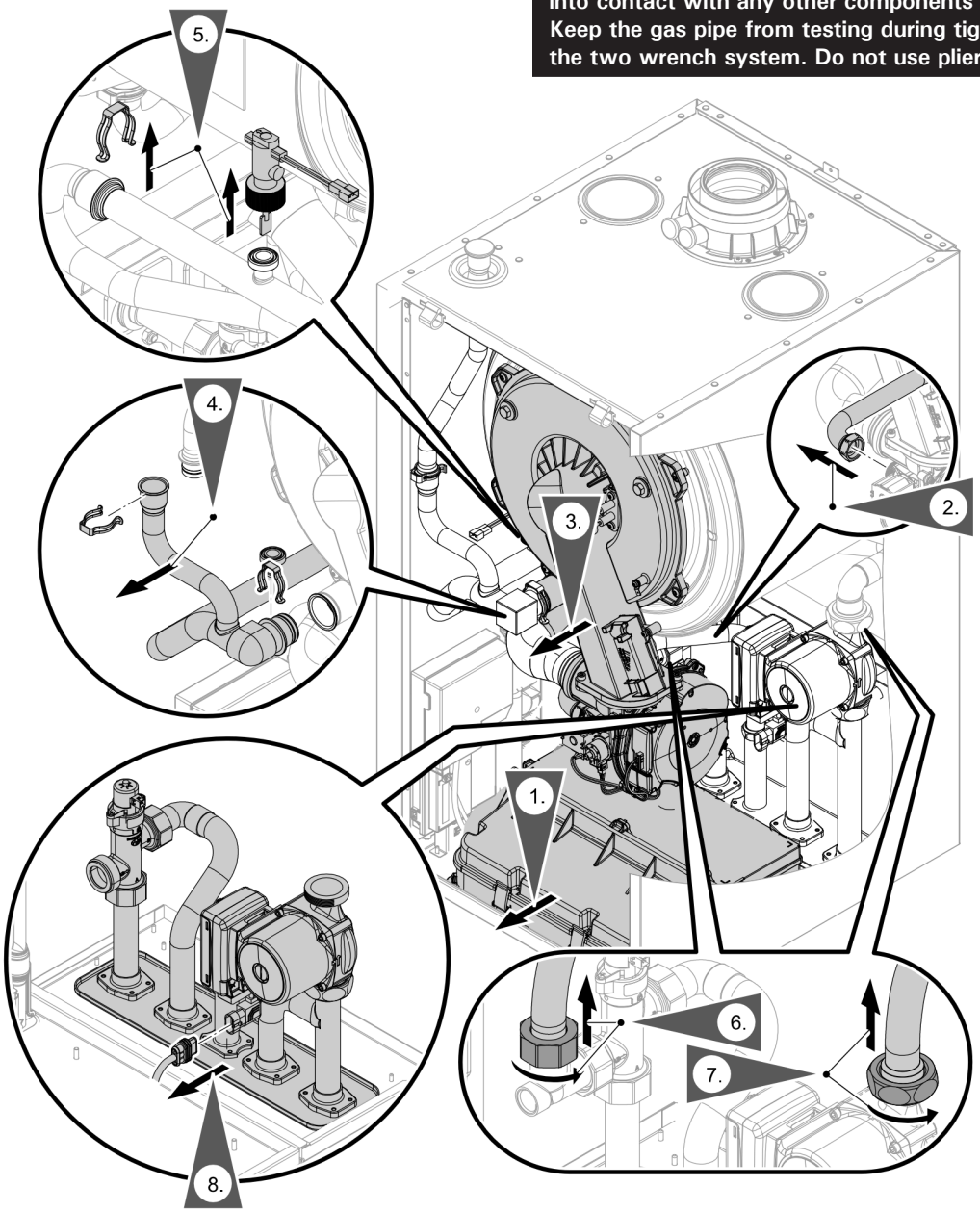
The gas supply piping must be leak tested before placing the boiler in operation.

Repairs *(continued)*

B2HE 150/199

⚠ WARNING

Do not damage the gas pipe! The gas pipe must not come into contact with any other components in the appliance. Keep the gas pipe from testing during tightening by using the two wrench system. Do not use pliers!



1. Remove the control unit.
2. Loosen the union nut on the gas pipe.
3. Remove the burner.
4. Pull off the clips and remove the supply pipe toward the front.
5. Unplug the flow switch.
6. Disconnect the electrical connections from the diverter valve and circulation pump. Undo the union nut.
7. Undo union nut on the circulation pump.
8. Undo 8 mounting screws, raise the hydraulic unit and remove it towards the front.
9. Install the hydralic unit in reverse order, ensure to in stall new cable ties on the clips.

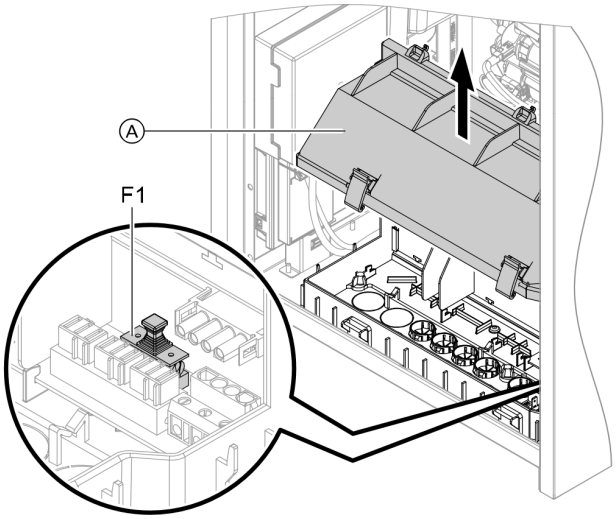
⚠ WARNING

Risk of electric shock from escaping heating water or DHW. After installation, check all connections on the water side for leaks.

⚠ WARNING

The gas supply piping must be leak tested before placing the boiler in operation.

Repairs *(continued)*



Checking the fuse

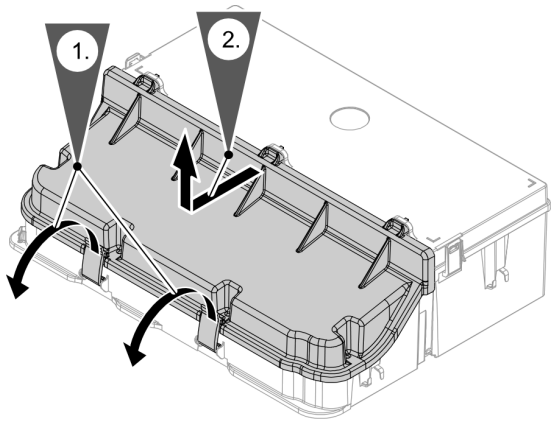
1. Turn off the ON/OFF switch.
2. Depending on the configuration:
   Move programming unit together with bracket to maintenance position.
3. Remove cover Ⓐ.
4. Check fuse F1 (see connection and wiring diagram).

⚠ WARNING

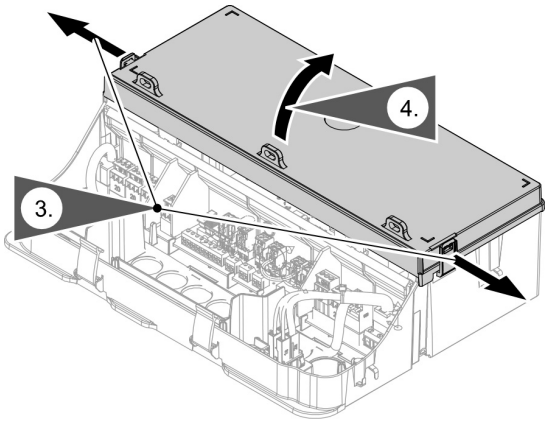
Incorrect or improperly fitted fuses can lead to an increased risk of fire.

- **Insert fuses without using any force. Position fuses correctly.**
- **Only use structurally identical types with the specified response characteristics.**

Opening the Junction Box

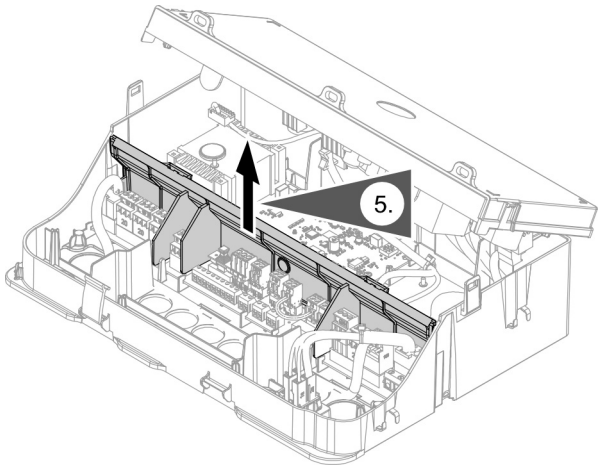


1. Folding down the red clips to open the front cover of the junction box.
2. Open the front cover by a turning movement.

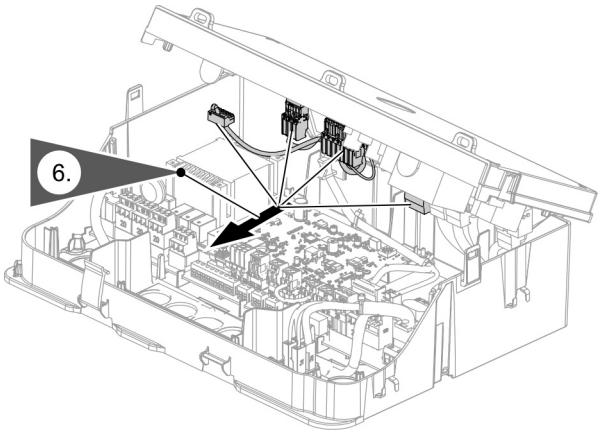


3. Push the side clips to the side to unlock the rear cover.
4. Now the rear cover is unlocked and can be turned out upwards and opened

Opening the Junction Box *(continued)*



5. Now the separation wall can be removed.
   Pull it vertically upwards out of the lateral guides to its left and right.



6. The cables are now exposed and can be pulled off the pcbs.
7. The rear cover can then be removed and the circuit boards are fully visible.
   The interlock must be observed.
8. To remove the rear cover pull forward to unlock the hinges.
9. Lift cover straight up.
10. Pull forward to remove.

WARNING

Errors in assembly can result in a leaking air box.

Boiler Functions

Heating operation

- Weather-compensated operation:
  The rooms are heated in accordance with the room temperature and time program settings.
  The control unit determines a target supply temperature for the boiler, subject to the outside temperature, the room temperature and the slope/ level of the heating curve.
- Constant operation with/without room thermostat:
  The rooms are heated according to the time program settings.
  In the time phases at standard room temperature, the standard target supply temperature or the target comfort supply temperature is maintained. Outside the set time phases, the reduced target supply temperature is maintained.

Heating circuit pump connection for heating circuit without mixing valve

Only for systems with several heating circuits.
If a heating circuit without mixing valve is connected downstream of the low loss header, the circulation pump is connected to output P2. The function of the output is set in the commissioning assistant.

To start the commissioning assistant: See "Commissioning, inspection and maintenance".

If output P2 is being used for another function, the circulation pump can be connected to output P1 or an EM-P1 extension (accessories).

Purging program

During the purging program, the circulation pump will be alternately switched on and off for 30 sec. over a period of 20 min.
The 3-way diverter valve alternates between central heating and DHW heating for a certain period of time.
The burner is switched off during the purging program.

Activate purging program: See "Commissioning, inspection and maintenance".

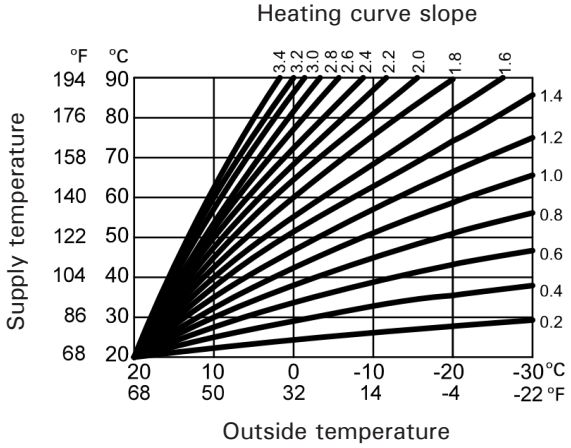
Filling program

In the delivered condition, the 3-way diverter valve is set to its central position, so the system can be filled completely. After the control unit has been switched on, the 3-way diverter valve no longer goes into its central position.
If the system is to be filled with the control unit switched on, the 3-way diverter valve is moved to its central position in the filling program and the pump is started.

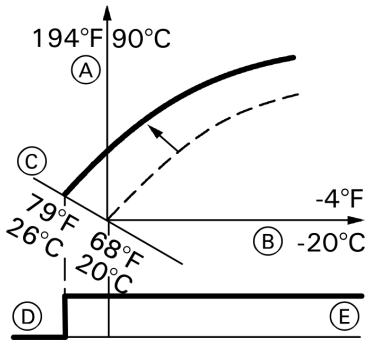
Activate filling program: See "Commissioning, inspection and maintenance".

In this position, the control unit can be switched off and the system can be filled completely. When the function is activated, the burner shuts down. The program automatically becomes inactive after 20 min.

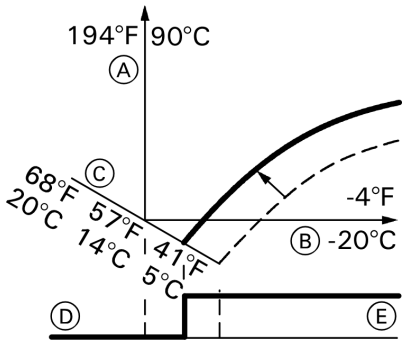
Boiler Functions *(continued)*



Slope setting ranges:
- Infloor heating systems: 0.2 to 0.8
- Low temperature heating systems: 0.8 to 1.6



Example 1: Adjusting the room temperature setpoint from 68°F to 79°F (20°C to 26°C)



Example 2: Adjusting the room temperature setback from 41°F to 57°F (5°C to 14°C)

Heating curve

The heating curves represent the relationship between the outside temperature and the supply temperature. Simplified: The lower the outside temperature, the higher the supply temperature must be in order to reach the target room temperature.

Factory settings:
- Slope = 1.4
- Level = 0

Note: If heating circuits with mixing valve are present in the heating system: The supply temperature of the boiler is one differential temperature higher than the supply temperature for the heating circuits with mixing valve. Differential temperature in factory setting 8 K (14.4°F).

The differential temperature is adjustable using the following parameters:
- Heating circuit 2: Parameter 934.5
- Heating circuit 3: Parameter 935.5
- Heating circuit 4: Parameter 936.5

Target room temperature

Standard room temperature or comfort room temperature

Individually adjustable for each heating circuit.
The heating curve is offset along the target room temperature axis. The start and stop points of the heating circuit pumps depend on the Heating limit, outside temperature, heating circuit... setting.

Legend
Ⓐ Supply temperature
Ⓑ Outside temperature
Ⓒ Target room temperature
Ⓓ Heating circuit pump "OFF"
Ⓔ Heating circuit pump "ON"

Changing the target room temperature

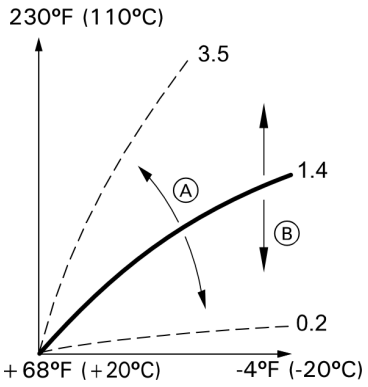
Operating instructions

Legend
Ⓐ Supply temperature
Ⓑ Outside temperature
Ⓒ Target room temperature
Ⓓ Heating circuit pump "OFF"
Ⓔ Heating circuit pump "ON"

Changing the reduced target room temperature

Operating instructions

Boiler Functions *(continued)*



Legend
Ⓐ Changing the slope
Ⓑ Changing the level
(vertical parallel offset of the heating curve)

Changing the slope and level
Individually adjustable for each heating circuit.

Raising the supply temperature of the heating circuits during operation with room temperature hook-up
The higher the value, the greater the influence of the room temperature on the supply temperature of the heating circuit.

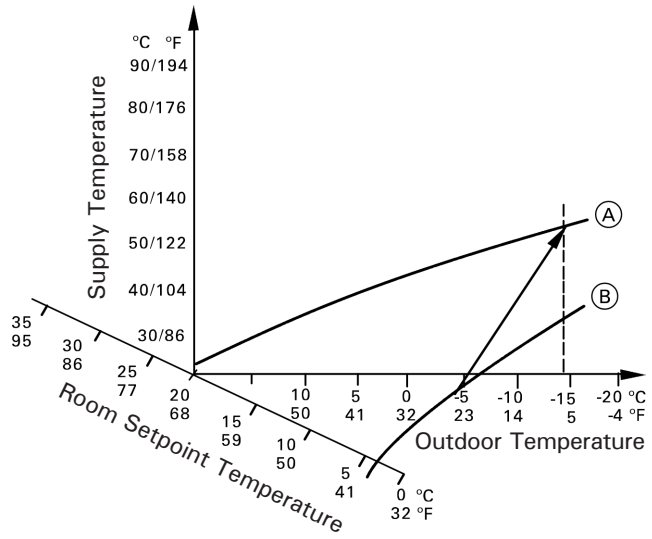
Room influence factor parameter

Heating circuit	Parameter
1 (without mixing valve)	933.7 (only set if just one heating circuit is installed)
2 (with mixing valve)	934.7
3 (with mixing valve)	935.7
4 (with mixing valve)	936.7

Example for determining the increase in the supply temperature using the value of the heating curve when the actual room temperature deviates from the target room temperature:
- Target room temperature = 68°F (20.0°C) (RT target)
- Actual room temperature = 64°F (18.0°C) (RT actual)
- Heating curve slope = 1.4
- Room influence factor = 8 (factory setting)

Determining the increase in supply temperature
(RT target - RT actual) x (1 + slope) x room influence factor/4 = raising the supply temperature via heating curve value
(20 - 18) x (1 + 1.4) x 8/4 = 9.6
Increase in supply temperature via heating curve value = 9.6 K

Boiler Functions *(continued)*



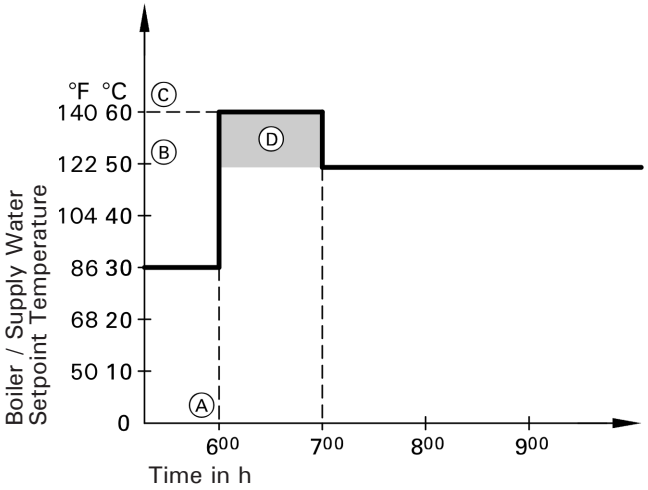
Legend

Ⓐ Heating curve for operation with standard room temperature

Ⓑ Heating curve for operation with reduced room temperature

Raising the reduced room temperature

During operation with reduced room temperature, the reduced target room temperature can be automatically raised subject to the outside temperature.
The temperature is raised in accordance with the selected heating curve, and no higher than the standard target room temperature or comfort room temperature. Depending on which target room temperature will become active in the next time phase.
The outside temperature limits for the start and end of temperature raising can be set in parameters 1139.0 and 1139.1.



Legend

Ⓐ Start of operation at standard room temperature or comfort room temperature

Ⓑ Target supply temperature in accordance with the set heating curve

Ⓒ Target supply temperature in accordance with parameter 424.3

Ⓓ Duration of operation with higher target supply temperature in accordance with parameter 424.4: 60 min

Reducing the heat-up time

During the transition from operation at reduced room temperature to operation at standard room temperature or comfort room temperature, the supply temperature will be raised in accordance with the selected heating curve.
The value and duration of the additional increase in the target supply temperature is adjusted in parameters 424.3 and 424.4.

DHW Heating

The burner, circulation pump and 3-way diverter valve are started or changed over if the storage tank temperature is 2.5 K (5°F) below the target storage tank temperature.
The factory-set target boiler water temperature is 36°F (20 K) higher than the target storage tank temperature.
If the actual storage tank temperature exceeds the target storage tank temperature by 2.5 K (5°F), the burner shuts down and circulation pump run-on begins.

⚠ WARNING

Risk of injury due to increased DHW temperature.

Inform the system user of the risk from the raised outlet temperature at the draw-off points.

- Gas condensing system boiler:
  If the target DHW temperature is set to over 140°F (60°C)

Increased DHW Hygiene

The DHW can be heated to a specified (higher) target DHW temperature [approx. 149°F (65°C)] for a period of one hour.

⚠ WARNING

Risk of injury due to increased DHW temperature.

Inform the system user of the risk from the raised outlet temperature at the draw-off points. If necessary, provide on-site scald protection measures.

Interval Function Solar Circuit Pump

For correct capture of the collector temperature, the interval function cyclically switches on the collector circuit pump briefly.
See parameter 1719.0

Control Strategies for Cascade Application

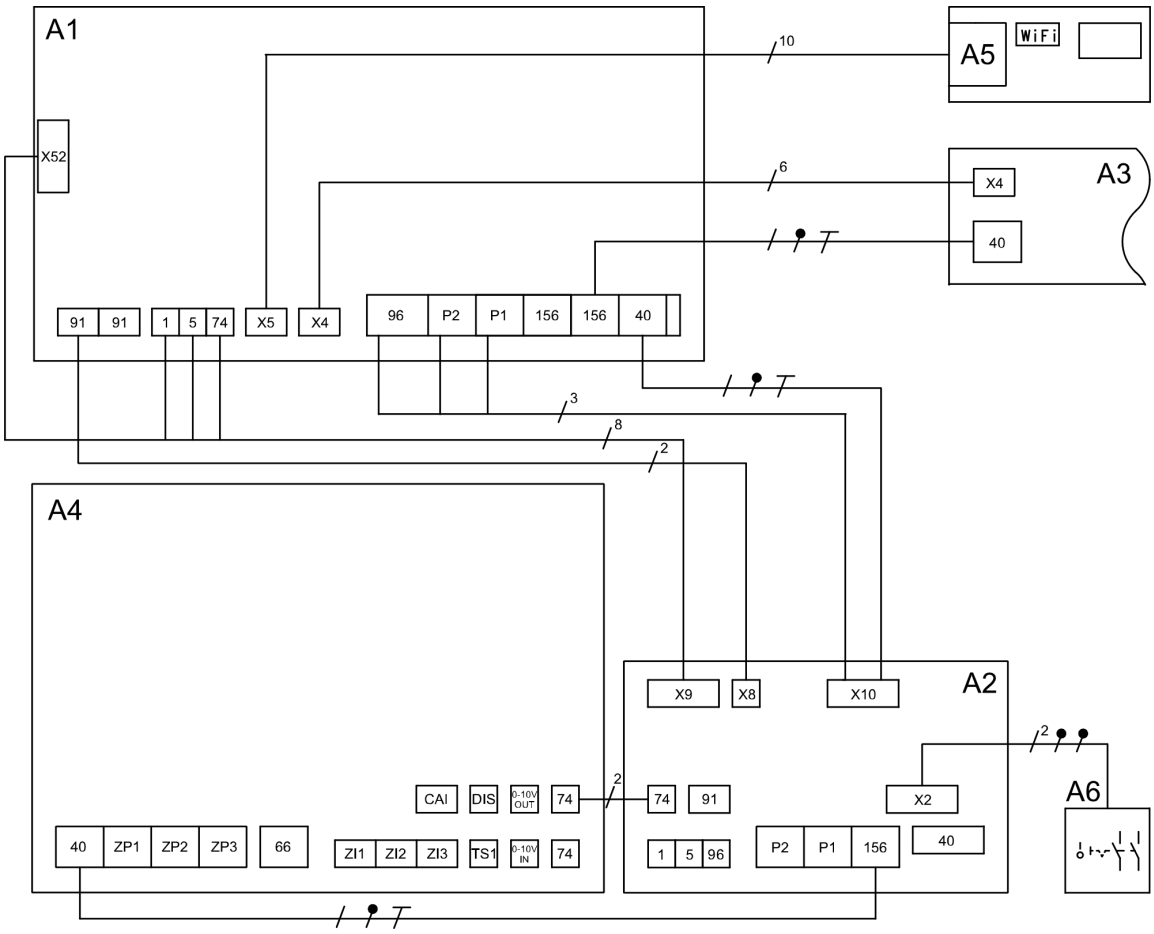
Condensing strategy

Benefit	Optimum utilization of the condensing effect and long burner runtimes It is the aim of the condensing strategy to operate as many boilers as possible at the lowest output level.
Starting criterion	The boilers are switched on via a power balance (only adjustable via software tool parameter 2235.3). An additional boiler starts if the current heat demand can also be covered by the currently active boilers plus the next boiler in the boiler sequence.
Switch-off criterion	The boilers are switched off via a switch-off integral (only adjustable via software tool parameter 2235.3). If the switch-off integral exceeds a set limit, the boiler most recently started is switched off.

Cascade strategy

Type of control: Autonomous/parallel with system supply temperature sensor.
All boilers operate to the same transfer point (heating circuit manifold).
The boilers receive a temperature target value from the lead appliance (heat manager).
The boilers work autonomously toward the temperature target value transferred by the cascade (system supply temperature sensor required).
Connect the system supply temperature sensor to the MZIO electronics module of the boiler.

Overview of the Modules



Legend

A1 HMU heat management unit
A2 Wiring panel
A3 BCU burner control unit
A4 MZIO electronics module
A5 HMI programming unit with communication module (TCU 200)
A6 ON/OFF switch

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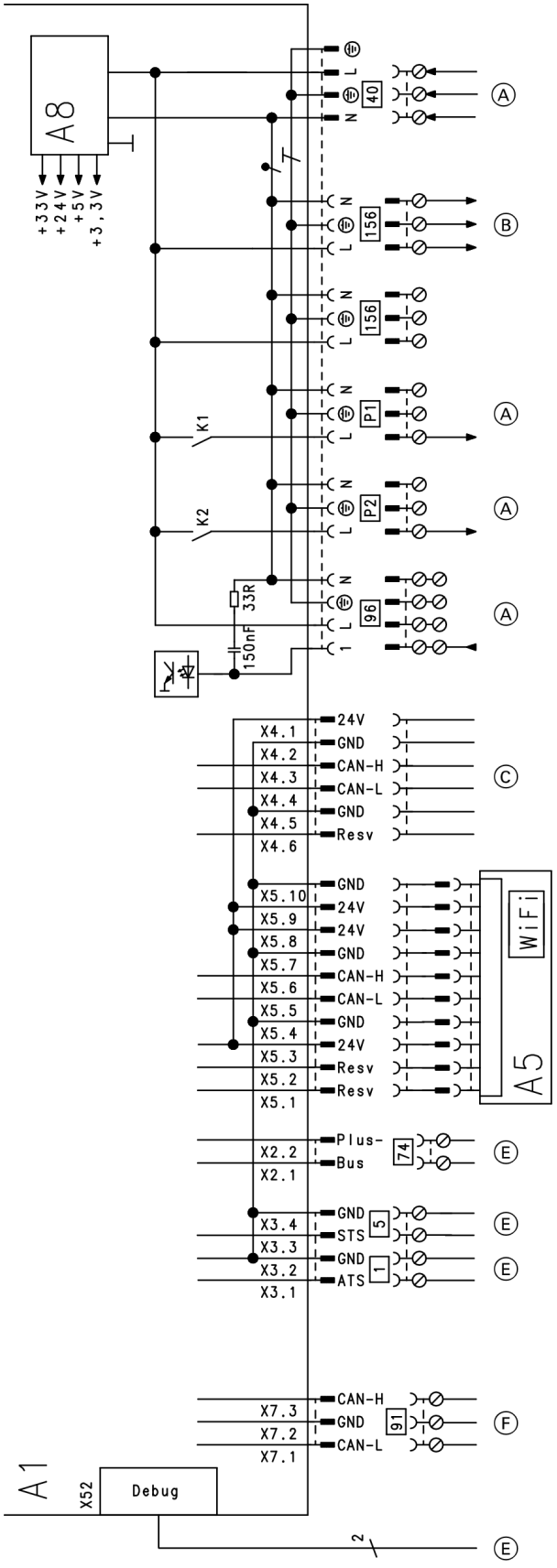
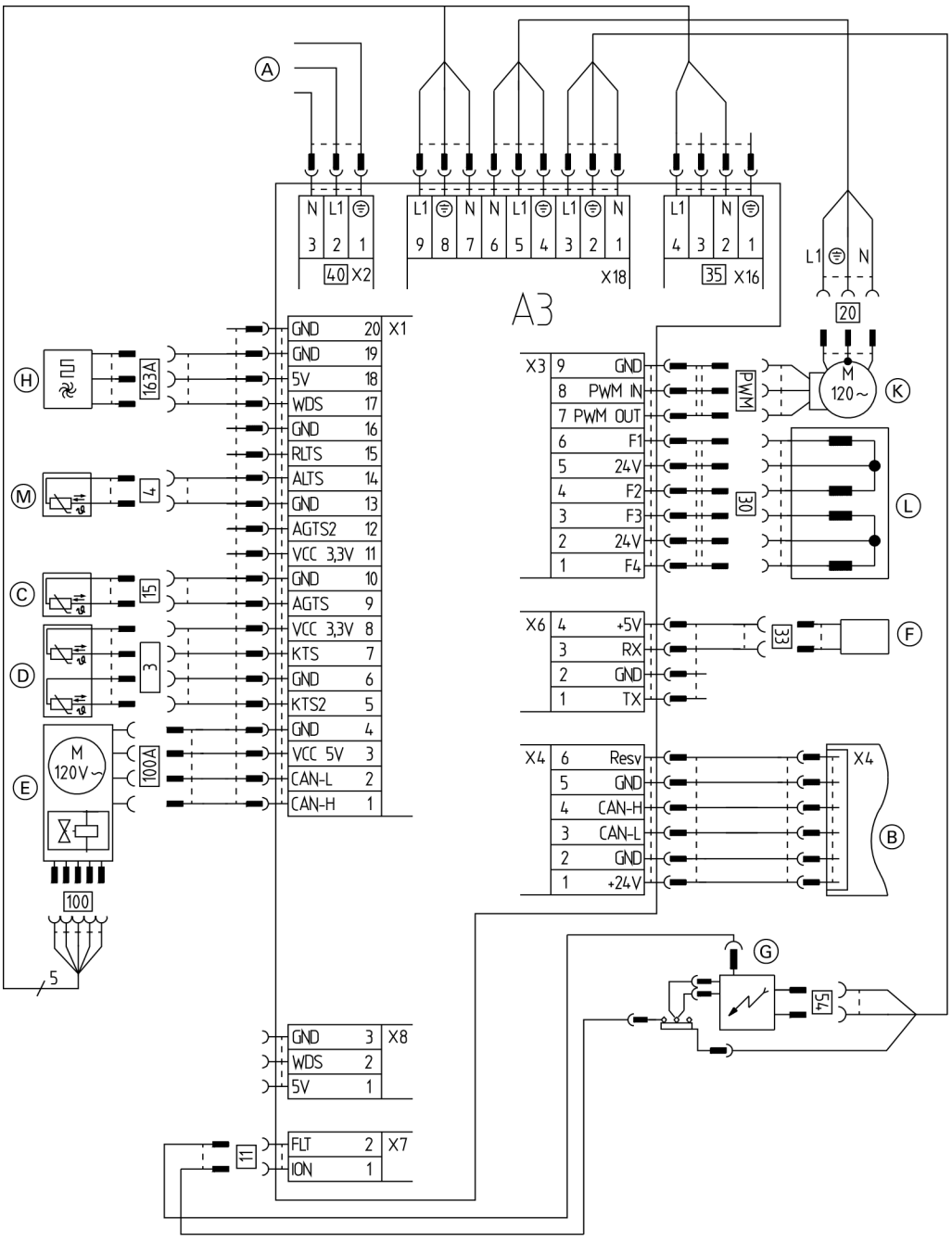
HMU Heat Management Unit



Legend

A1 HMU heat management unit
A5 HMI programming unit with communication module (TCU 200)
A8 Power supply unit
[1] Outside temperature sensor (for weather-compensated operation)
[5] Storage tank temperature sensor
[40] Power supply
[74] PlusBus
[91] CAN bus
[96] Input 120V (function configurable through K1 relay on WP board)
[156] No function
P1 Output 120V, 60 Hz
P2 Output 120V, 60 Hz
Ⓐ To wiring panel X10
Ⓑ To the BCU burner control unit, plug 40
Ⓒ To the BCU burner control unit, terminal X4
Ⓔ Wiring panel terminal X9
Ⓕ Wiring panel terminal X8

BCU Burner Control Unit



Legend

A3 BCU burner control unit

- Ⓐ HMU heat management unit (plug 156)
- Ⓑ HMU heat management unit (terminal X4)
- Ⓒ Flue gas temperature sensor
- Ⓓ Boiler water temperature sensor 1 and 2
- Ⓔ Gas solenoid valve and fan motor with PWM switching and feedback
- Ⓕ Boiler flow switch
- Ⓖ Ignition unit and flame monitoring
- Ⓚ Internal circulation pump (boiler pump)
- Ⓛ 3-way diverter valve

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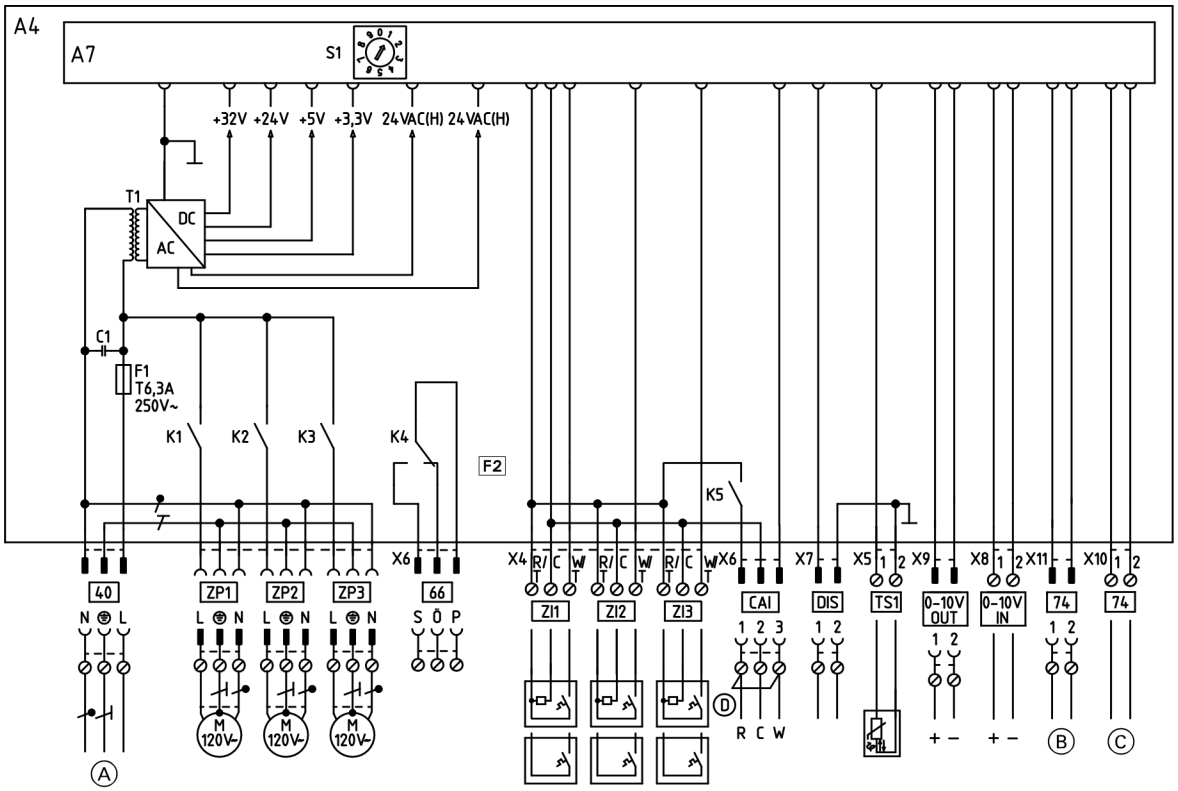
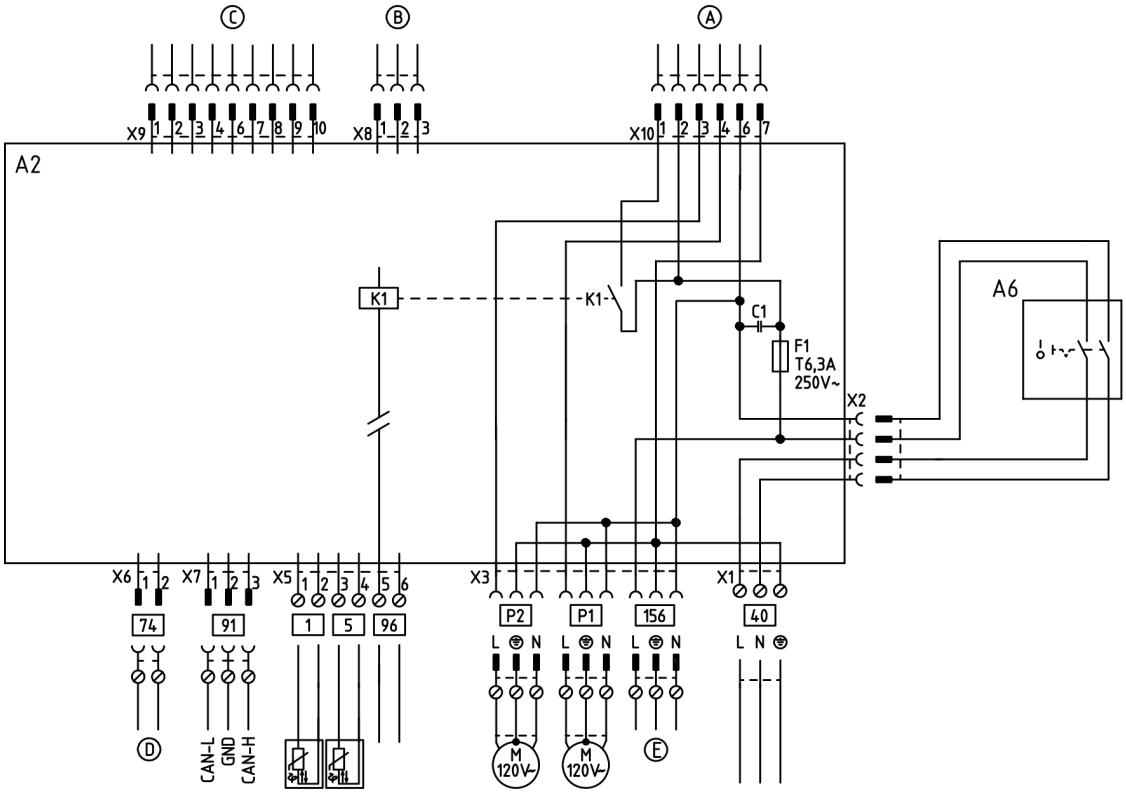
MZIO Electronics Module



Legend

Ⓐ	Power input, wiring panel (plug 156)
Ⓑ	PlusBus wiring panel (plug 74)
Ⓒ	PlusBus accessories
Ⓓ	Combustion air device connection
A4	MZIO electronics module
A7	PCB
40	Power input 120V AC, 60 Hz
ZP1	Circulation pump, zone 1
ZP2	Circulation pump, zone 2
ZP3	Circulation pump, zone 3
66	Potential-free switching contact
ZI1	Connecting the temperature controller for zone 1 (optional water pressure sensor)
ZI2	Connecting the temperature controller for zone 2 (optional gas pressure sensor, pressure too low)
ZI3	Connecting the temperature controller for zone 3 (optional gas pressure sensor, pressure too high)
CAI	Combustion air interface
DIS	Digital input (no function)
TS1	Low loss header sensor
74	PlusBus
F1	Fuse, 6.3A (slow), 120V
F2	Fuse, 1A (slow), 120V
0-10V (OUT)	Output 0-10V
0-10V (IN)	Input 0-10V
S1	Rotary switch

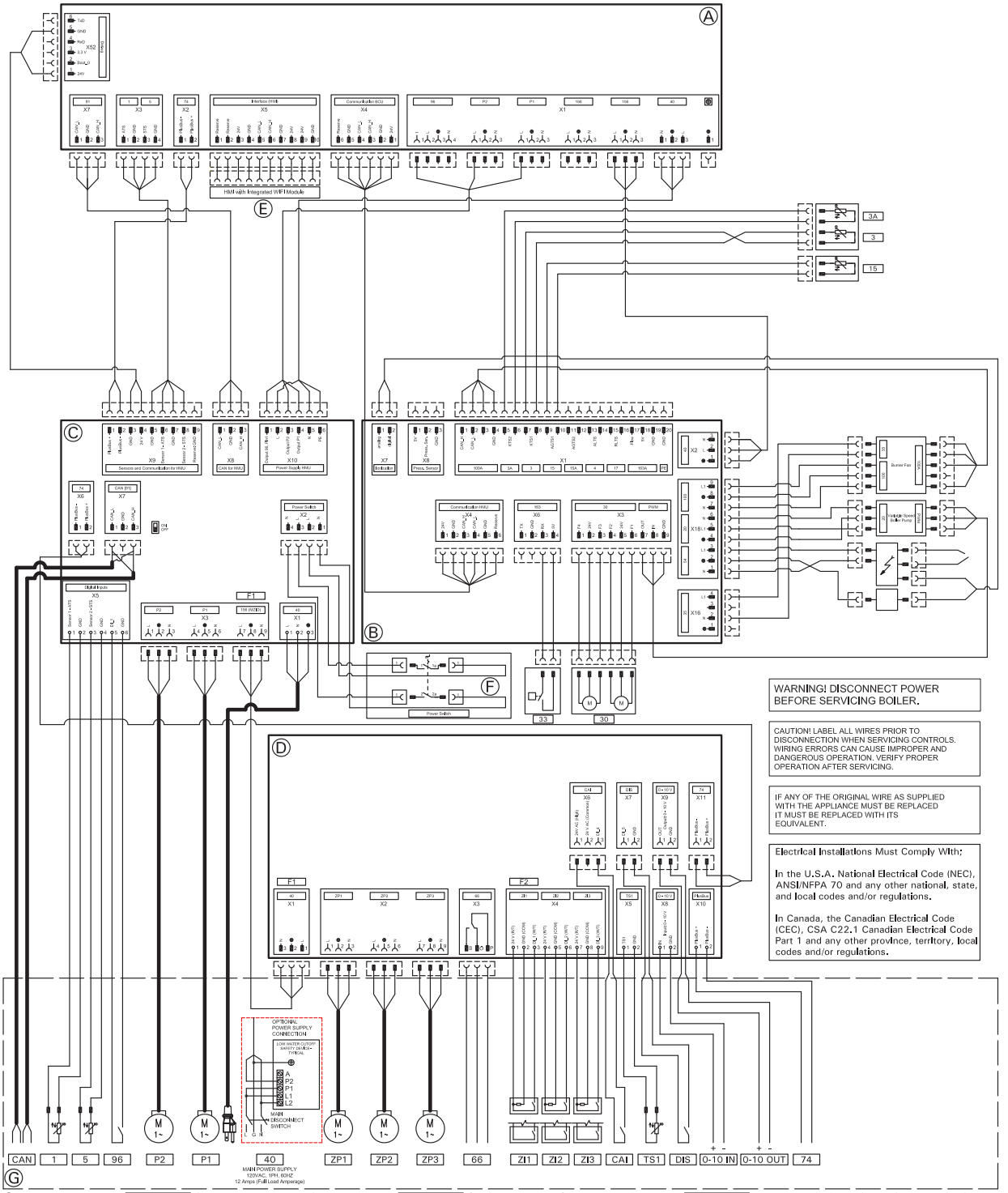
Wiring Panel



Legend

A2 Wiring panel
A6 ON/OFF switch
40 ON/OFF switch
156 Switched mains output 120V, AC 60 Hz
P1 Storage tank loading pump downstream of low loss header
P2 Circulation pump, zone 4
96 Programable input
5 Storage tank temperature sensor
1 Outside temperature sensor
91 No function
74 No function
F1 Fuse, 6.3 A (slow blow), 120V
Ⓐ HMU heat management unit connection, 120VAC
Ⓑ CAN plug 91, HMU heat management unit
Ⓒ HMU heat management unit extra low voltage connection

Overview of Electrical Connections



Ⓐ HMU Control Board
Ⓑ BCU Control Board
Ⓒ WP Control Board
Ⓓ MZIO Control Board
Ⓔ HMI With WIFI Module
Ⓕ Power Switch
Ⓖ Field Wiring Connections

1	Outdoor Temperature Sensor
3	Boiler Temperature Sensor 1
3A	Boiler Temperature Sensor 2
5	DHW Temperature Sensor/Dry Contact
11	Ionization Signal
15	Flue Gas Temperature Sensor
20	Variable Speed Boiler Pump (Internal)
30	Diverting Valve Stepper Motor
33	Boiler Flow Switch
35	Gas Valve
40	Power Supply
54	Ignition Transformer
66	Potential Free Switching Contact**
74	PlusBus Communication
96	Configurable Dry Contact Input*
100	Burner Fan Motor Power Supply
100A	Burner Fan Motor Speed Control
156	120VAC Output
0-10 IN	0-10 VDC External Setpoint Demand
0-10 OUT	0-10 VDC Output Signal
CAI	Combustion Air Interlock
CAN [91]	CANBus Connection (Cascade)
DIS	Digital Input Signal
PWM	Internal Pump Speed Control
P1	DHW Pump/Heating 1 Circuit Pump*
P2	Heating Circuit 1 Pump/DHW Re-Circulation Pump*
TS1	LLH Temperature Sensor
ZI1	Zone Input 1 (24VAC/Dry Contact/LWCO)*
ZI2	Zone Input 2 (24VAC/Dry Contact/LGP Switch)*
ZI3	Zone Input 3 (24VAC/Dry Contact/HGP Switch)*
ZP1	Zone Pump 1
ZP2	Zone Pump 2
ZP3	Zone Pump 3
F1	Fuse, 6.3A (slow), 120V
F2	Fuse, 1A (slow), 120V

*FUNCTIONALITY AUTOMATICALLY SET BASED ON SYSTEM CONFIGURATION SELECTED IN THE COMMISSIONING ASSISTANT

**FUNCTIONALITY SELECTED IN PARAMETER SETTINGS

Service Reports

Measurements		Service date: by:	Service date: by:	Service date: by:	Service date: by:	Service date: by:	Service date: by:	**Setpoint value**
Static pressure	*"w.c.*							max. 14 "w.c.
Running pressure (supply pressure)								
☐ Natural gas	*"w.c.*							4-14 "w.c.
☐ LPG	*"w.c.*							10-14 "w.c.
Check gas type								
Carbon dioxide content CO_2								
■ at lower end of rated input range	*vol.-%*							
■ at upper end of rated input range	*vol.-%*							
Oxygen content O_2								
■ at lower end of rated input range	*vol.-%*							
■ at upper end of rated input range	*vol.-%*							
Carbon monoxide content CO								
■ at lower end of rated input range	*ppm*							50 ppm air-free*
■ at upper end of rated input range	*ppm*							

* Fuel type, altitude, venting and other site parameters may change.

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Technical Data

Boiler Model No. 200-W B2HE		85	120	150	199
CSA input Natural Gas (NG)	MBH kW	8.5-85 2.5-24.9	8.5-120 2.5-35.2	14-150 4.1-44.0	14-199 4.1-58.3
CSA input Liquid Propane Gas (LPG)	MBH kW	14-85 4.1-24.9	14-120 4.1-35.2	22.7-150 6.7-44.0	22.7-199 6.7-58.3
CSA output/DOE **1* **heating capacity NG**	MBH kW	8-80 2.3-23.4	8-113 2.3-33.1	13-141 3.8-41.3	13-187 3.8-54.8
CSA output/DOE **1* **heating capacity LPG**	MBH kW	13-80 3.8-23.4	13-113 3.8-33.1	21-141 6.1-41.3	21-187 6.1-54.8
Net AHRI rating **2*	MBH kW	70 20.5	98 28.7	123 36.0	163 47.8
Common Venting Input (NG)	MBH kW	28-85 8.2-24.9	28-120 8.2-35.2	40-150 11.7-44.0	40-199 11.7-58.3
Common Venting Input (LPG)	MBH kW	28-85 8.2-24.9	28-120 8.2-35.2	40-150 11.7-44.0	40-199 11.7-58.3
Heat exchanger surface area	$ft.^2$ m^2	12.96 1.20	12.96 1.20	27.44 2.55	27.44 2.55
Min. gas supply pressure					
Natural gas	"w.c.	4	4	4	4
Liquid propane gas	"w.c.	10	10	10	10
Max. gas supply pressure **3*					
Natural gas and liquid propane gas	"w.c.	14	14	14	14
A.F.U.E.	%	95	95	95	95
Weight	lbs (kg)	108 49	108 49	179 81	179 81
Boiler water content	USG L	1.02 3.88	1.02 3.88	2.5 9.50	2.5 9.50
Boiler max. flow rate **4*	GPM L/h	5.3 1204	6.2 1408	9.3 2112	10.6 2408
Max. operating pressure at 210°F (99°C)	psig bar	45 (3)	45 (3)	60 (4)	60 (4)
Boiler water temperature					
- Adjustable high limit (AHL) range					
space heating (steady state)	°F °C	68-180 20-82	68-180 20-82	68-180 20-82	68-180 20-82
DHW production	°F °C	194 90	194 90	194 90	194 90
- Fixed high limit (FHL)	°C (°F)	99 (210)	99 (210)	99 (210)	99 (210)
Boiler connections					
Boiler heating supply and return	NPTM	¾ in.	¾ in.	1 in.	1 in.
Pressure relief valve	NPTF	¾ in.	¾ in.	¾ in.	¾ in.
Drain valve	(male thread)	¾ in.	¾ in.	¾ in.	¾ in.
Boiler supply/return for indirect-fired DHW storage tank	NPT	¾ in.	¾ in.	1 in.	1 in.
Gas valve connection	NPTF	¾ in.	¾ in.	¾ in.	¾ in.

**1* Output based on 140°F (60°C), 120°F (49°C) system supply/return temperature.

**2* Net AHRI rating based on piping and pick-up allowance of 1.15.

**3* If the gas supply pressure exceeds the maximum gas supply pressure value, a separate gas pressure regulator must be installed upstream of the heating system.

**4* See page 24 in this manual.

Technical Data *(continued)*

Boiler Model No. 200-W B2HE		85	120	150	199
Dimensions					
Overall depth	in. (mm)	19¾ (500)	19¾ (500)	21¾ (550)	21¾ (550)
Overall width	in. (mm)	17¾ (450)	17¾ (450)	17¾ (450)	17¾ (450)
Overall height	in. (mm)	33¾ (859)	33¾ (859)	39 (989)	39 (989)
Flue gas **5*					
Temperature (at boiler return temperature of 86°F (30°C)					
- at rated full load	°F (°C)	99 (37)	102 (39)	106 (41)	104 (40)
- at rated partial load	°F (°C)	95 (35)	95 (35)	111 (44)	111 (44)
Temperature (at boiler return temperature of 140°F (60°C)	°F (°C)	144 (62)	145 (63)	151 (66)	149 (65)
Flue gas parameters					
Mass flow rate					
- at rated heating output (DHW heating)	lb/h (kg/h)	86.9 (39.4)	126.0 (57.1)	155.9 (70.7)	207.0 (93.9)
- at partial load	lb/h (kg/h)	8.9 (4.0)	8.9 (4.0)	14.5 (6.6)	14.5 (6.6)
Max. condensate flow rate **6* with natural gas and T_S/T_R = 122/86°F (50/30°C)	USG/h (L/h)	0.8 (3.2)	1.2 (4.4)	1.5 (5.5)	1.9 (7.4)
Condensate connection **7*	hose nozzle Ø in	¾ in.	¾ in.	¾ in.	¾ in.
Boiler flue gas connection **8*	Ø in (mm)	3 (80)	3 (80)	3 (80)	3 (80)
Combustion air supply connection	coaxial outer Ø in (mm)	5 (125)	5 (125)	5 (125)	5 (125)
	single Ø in (mm)	3 (80)	3 (80)	3 (80)	3 (80)
Sound Rating					
- at maximum input	dB	52	59	51	55
- at minimum input	dB	34	34	31	31
NOx @ 3% O_2 **9*		< 20 ppm			
Communication Module (integral) WiFi Frequency Band	MHz	2400 to 2483.5			
Maximum Transmission Power	dBm	15			
Lower Power Radio Frequency Band	MHz	2400 to 2483.5			
Maximum Transmission Power	dBm	6			

**5* Measured flue gas temperature with a combustion air temperature of 68°F (20°C).

**6* Based on maximum input rate.

**7* Requires ¾ inch (19 mm) tubing. See the Installation Instructions of the Vitodens 200-W, B2HE for details.

**8* For side wall vent installations (coaxial system):
Do not exceed max. equivalent length specified in the Installation Instructions of the Vitodens 200-W, B2HE Venting System.
The Vitodens 200-W B2HE can only be common vented with other Vitodens 200-W B2HE boilers of the same size and series.
Side wall co-axial vent installation must include Viessmann protective screen!
For details refer to the Installation Instructions for the Vitodens 200-W, B2HE Venting System.

For information regarding other Viessmann System Technology componentry, please reference documentation of respective product.

**9* The Vitodens 200 B2HE boilers are certified to the requirements of South Coast Air Quality Management District (SCAQMD) Rule 1146.2, Bay Area Air Quality Management District (BAAQMD) Regulation 9 Rule 6, and San Juaquin Valley Air Pollution Control District (SJVAPCD) Rule 4308.

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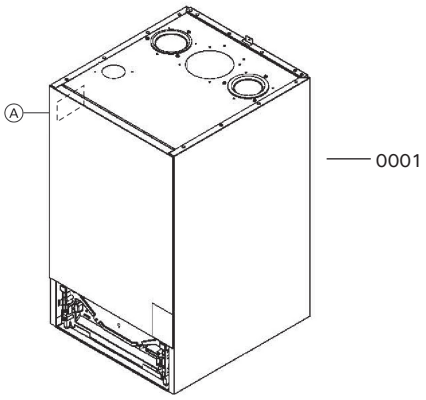
Parts List

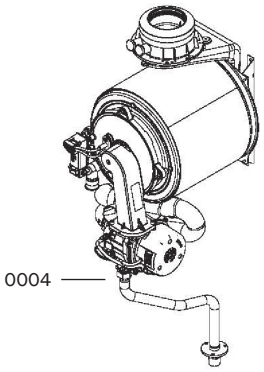
Boiler Model No.	Serial No.
B2HE-85	7722778□□□□□□□□
B2HE-120	7722779□□□□□□□□

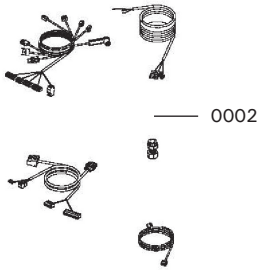
Ordering Parts:
Please provide Serial Number Ⓐ when ordering replacement parts. Order replacement components from your Viessmann distributor.

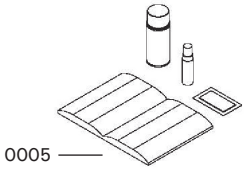
0001 Casing
0002 Cable Set
0003 Hydraulic System
0004 Heat Cell
0005 Other
0006 Electronic Equipment
0007 Programming Unit

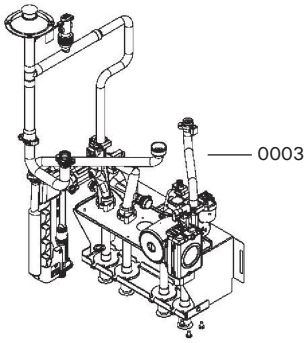
Ⓐ Rating plate with serial number

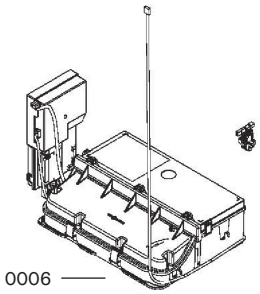


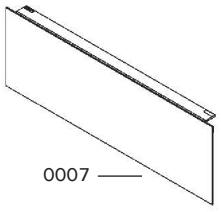












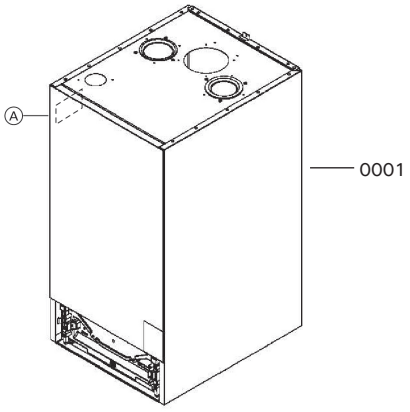
Parts List *(continued)*

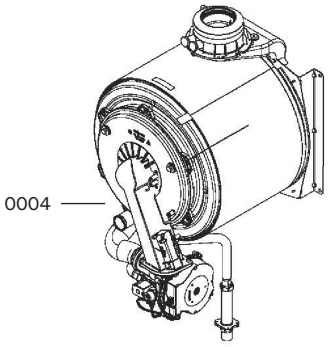
Boiler Model No.	Serial No.
B2HE-150	7722780□□□□□□□□
B2HE-199	7722781□□□□□□□□

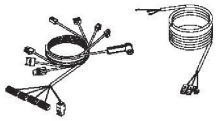
Ordering Parts:
Please provide Serial Number Ⓐ when ordering replacement parts. Order replacement components from your Viessmann distributor.

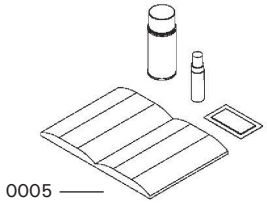
0001 Casing
0002 Cable Set
0003 Hydraulic System
0004 Heat Cell
0005 Other
0006 Electronic Equipment
0007 Programming Unit

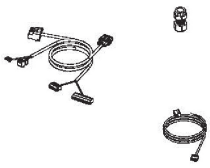
Ⓐ Rating plate with serial number

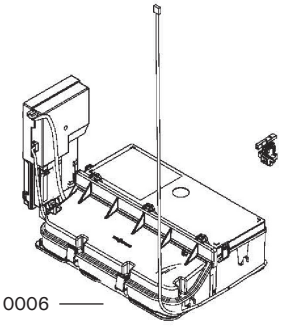


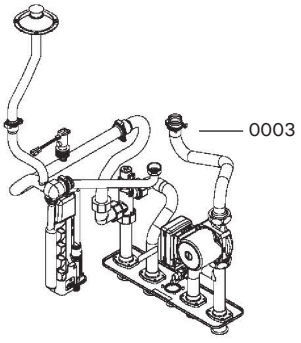


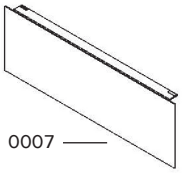












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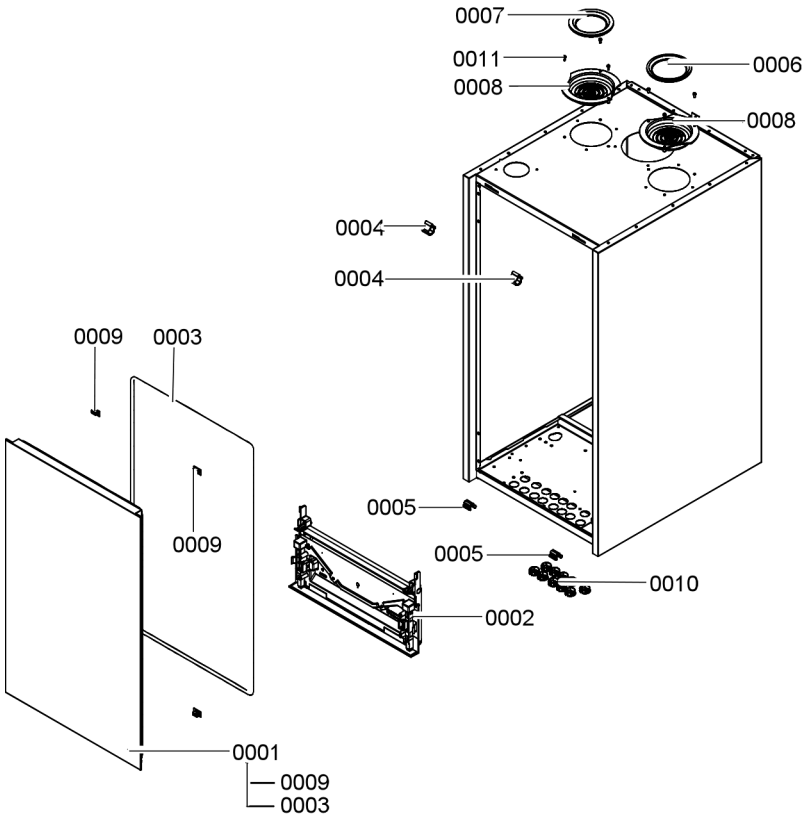
Parts List *(continued)*

Boiler Model No.	Serial No.
B2HE-85	7722778□□□□□□□□
B2HE-120	7722779□□□□□□□□
B2HE-150	7722780□□□□□□□□
B2HE-199	7722781□□□□□□□□

Ordering Parts:
Please provide Serial Number when ordering replacement parts. Order replacement components from your Viessmann distributor.

Casing

0001	Front cover
0002	Seal cover
0003	Seal profile
0004	Hinge
0005	Hinge bottom (2 pcs)
0006	Diaphragm grommet 88.9 mm
0007	Diaphragm grommet 80 mm
0008	Ventilation cover
0009	Center clip (2 pcs)
0010	Cable inlet grommets (2 pcs)
0011	Screw EJOT (6 pcs)



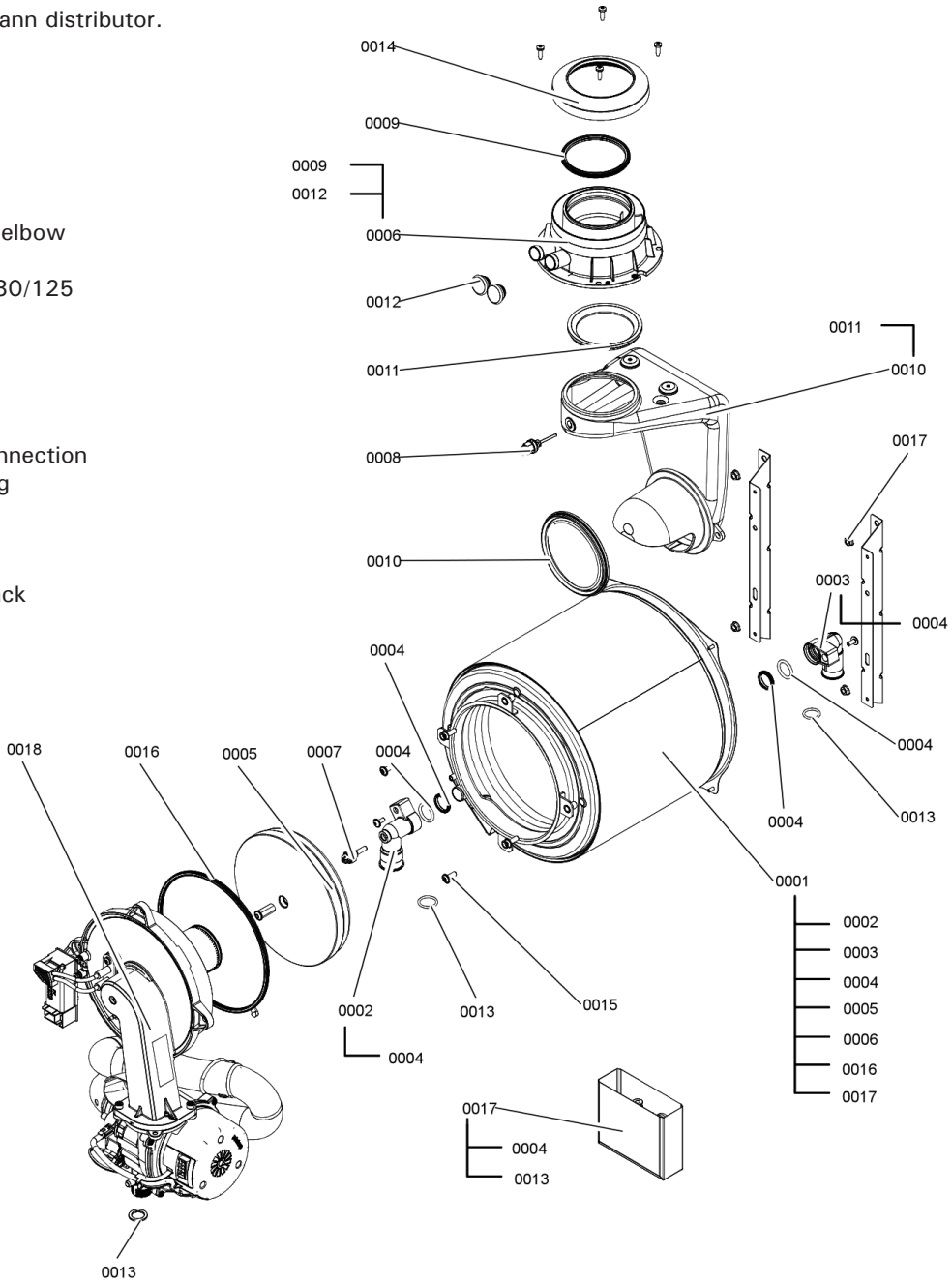
Parts List *(continued)*

Boiler Model No.	Serial No.
B2HE-85	7722778□□□□□□□□
B2HE-120	7722779□□□□□□□□

Ordering Parts:
Please provide Serial Number when ordering replacement parts. Order replacement components from your Viessmann distributor.

Heat Cell

0001 Heat exchanger
0002 Connection elbow HV
0003 Connection elbow HR
0004 Gasket set connection elbow
0005 Insulation block
0006 Boiler flue connection 80/125
0007 Flow sensor (Duplex)
0008 Flue gas sensor
0009 Flue gas gasket DN80
0010 Flue duct and gaskets
0011 Grommet DN80
0012 Cap plug boiler flue connection
0013 O-ring connected piping
0014 Ventilation cover
0015 Burner door screws
0016 Burner door gaskets
0017 ETT heat exchanger pack
0018 Burner



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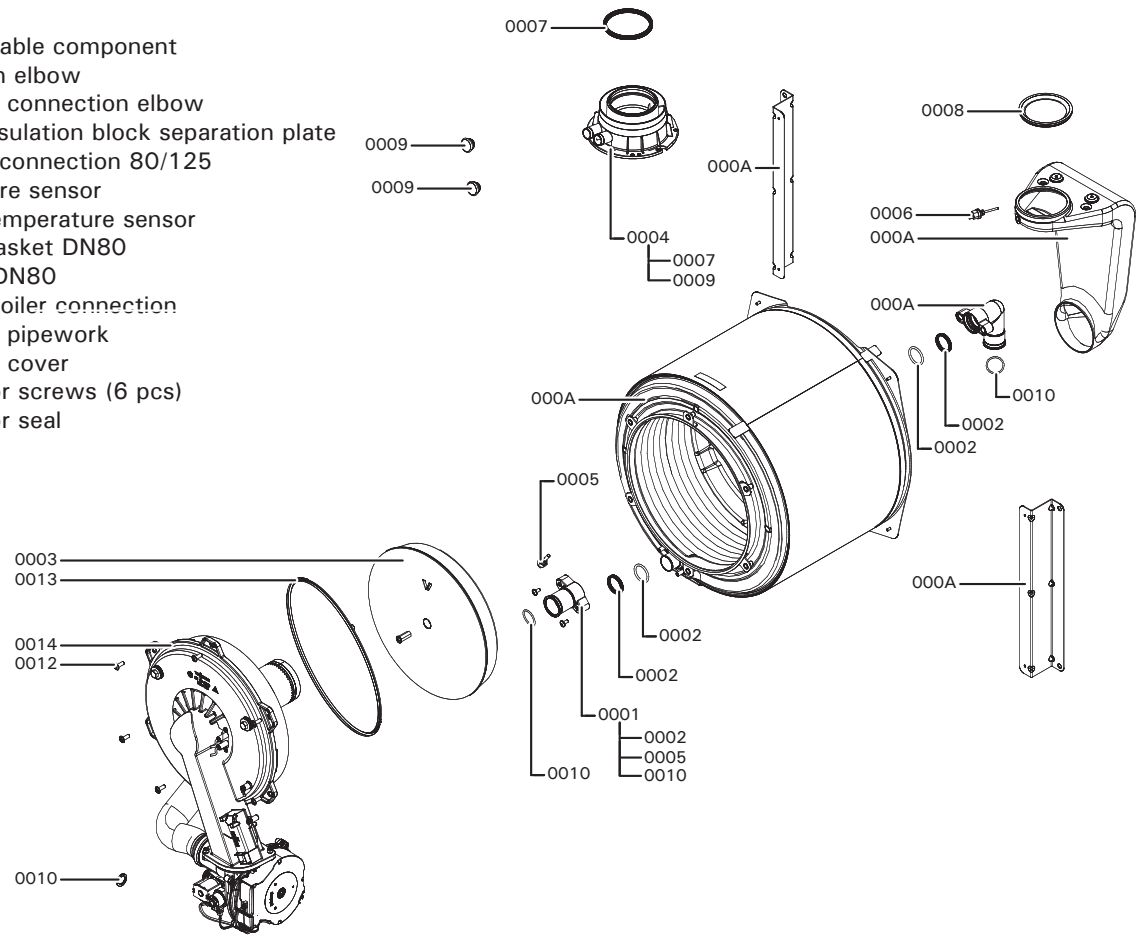
Parts List *(continued)*

Boiler Model No.	Serial No.
B2HE-150	7722780□□□□□□□□
B2HE-199	7722781□□□□□□□□

Ordering Parts:
Please provide Serial Number when ordering replacement parts. Order replacement components from your Viessmann distributor.

Heat Cell

000A	Non-replacable component
0001	Connection elbow
0002	Gasket set connection elbow
0003	Thermal insulation block separation plate
0004	Boiler flue connection 80/125
0005	Temperature sensor
0006	Flue gas temperature sensor
0007	Flue gas gasket DN80
0008	Grommet DN80
0009	Cap plug boiler connection
0010	Gasket set pipework
0011	Ventilation cover
0012	Burner door screws (6 pcs)
0013	Burner door seal
0014	Burner



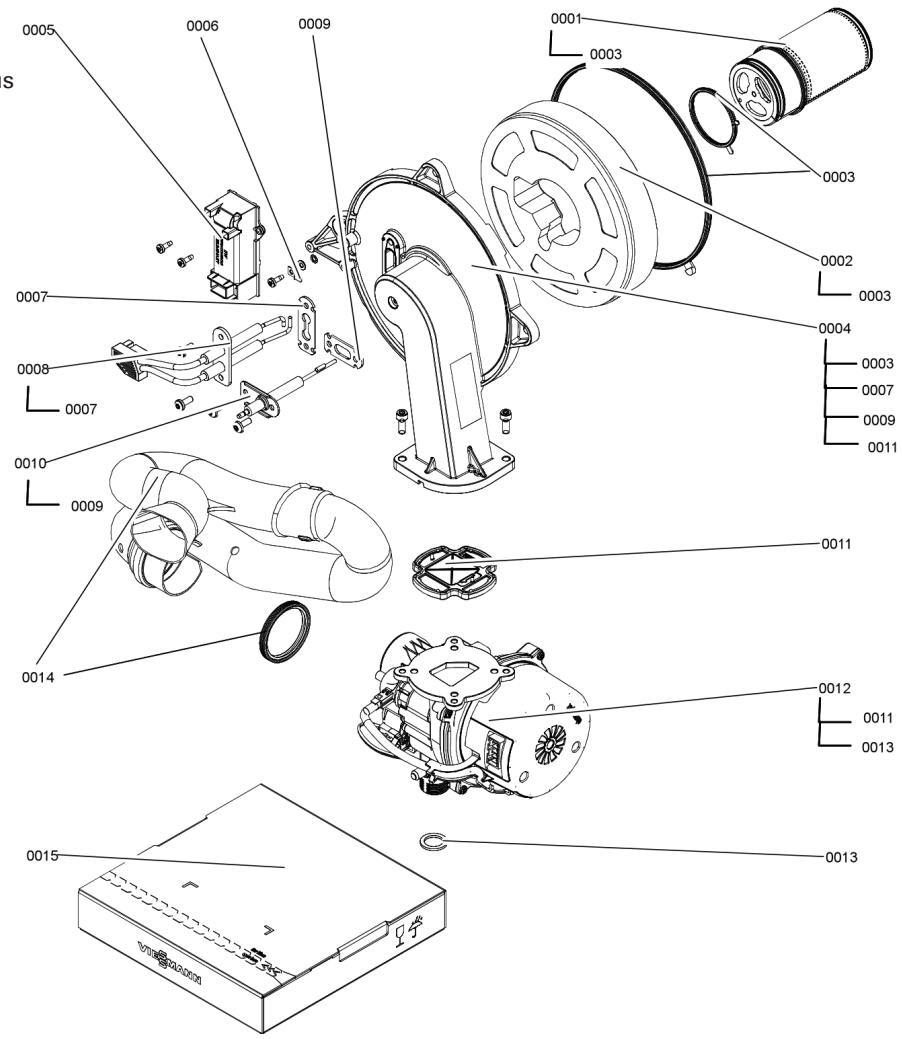
Parts List *(continued)*

Boiler Model No.	Serial No.
B2HE-85	7722778□□□□□□□□
B2HE-120	7722779□□□□□□□□

Ordering Parts:
Please provide Serial Number when ordering replacement parts. Order replacement components from your Viessmann distributor.

Burner

0001	Cylinder flame body Matrix Plus
0002	Thermal insulation ring with Mutlitherm
0003	Gasket set incl. screws
0004	Burner door
0005	Ignition transformer
0006	Blade terminal (5 pcs)
0007	Ignition electrode gasket
0008	Ignition electrode
0009	IO electrode gasket
0010	IO electrode
0011	Diaphragm backflow protection
0012	Radial fan 120V
0013	Gasket A 17 x 24 (5 pcs)
0014	Venturi extension
0015	Maintenance kit



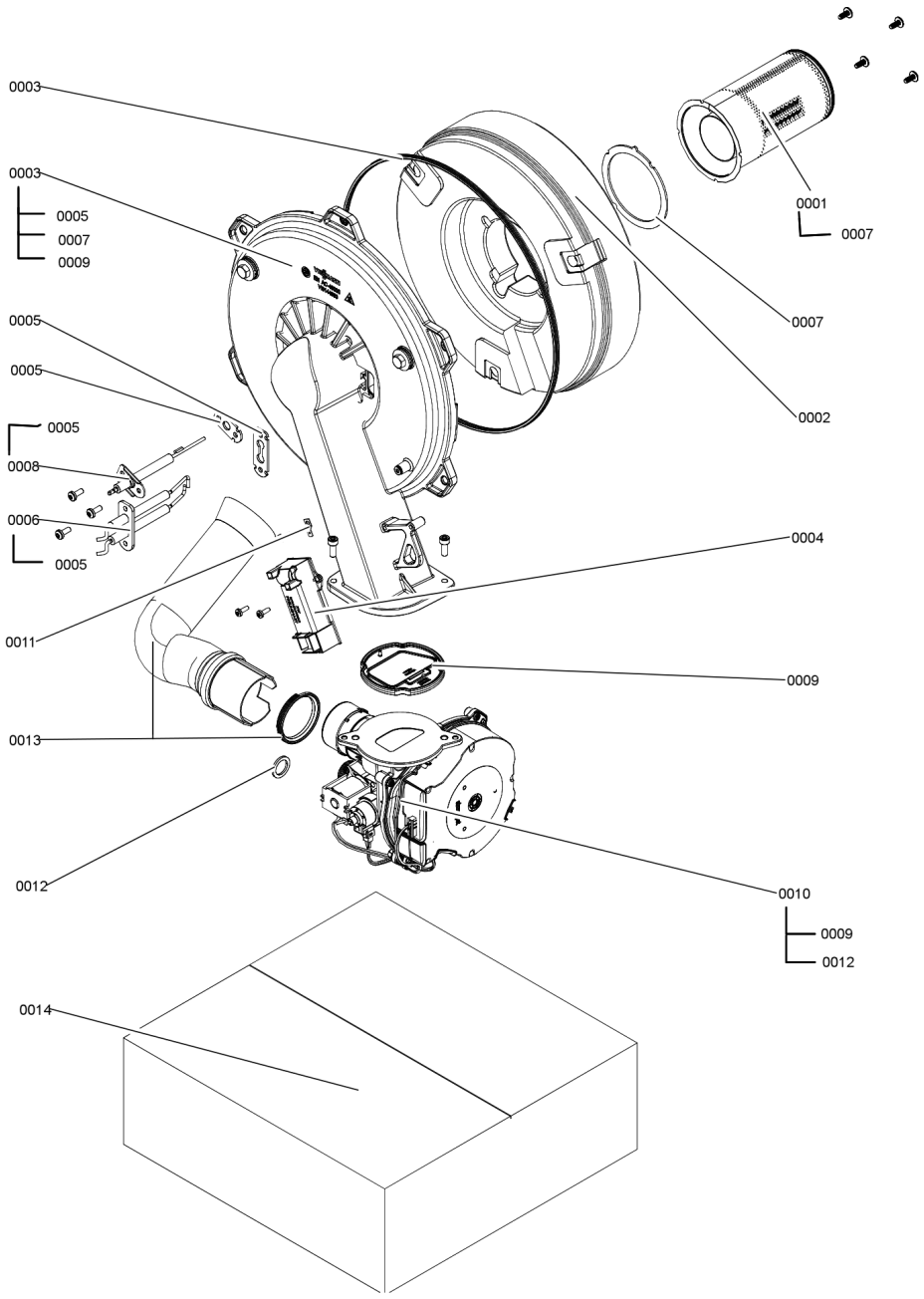
Parts List *(continued)*

Boiler Model No.	Serial No.
B2HE-150	7722780□□□□□□□□
B2HE-199	7722781□□□□□□□□

Ordering Parts:
Please provide Serial Number when ordering replacement parts. Order replacement components from your Viessmann distributor.

Burner

0001	Flame body assembly
0002	Thermal insulation ring
0003	Burner door
0004	Ignition transformer
0005	Ignition + IO electrode gasket (3 pcs)
0006	Ignition electrode block
0007	FK gasket
0008	Ionization electrode
0009	Membrane non-return device
0010	Radial Fan 120V
0011	Blade terminal (5 pcs)
0012	Seal rings pack (9 pcs)
0013	Venturi extension
0014	Maintenance kit



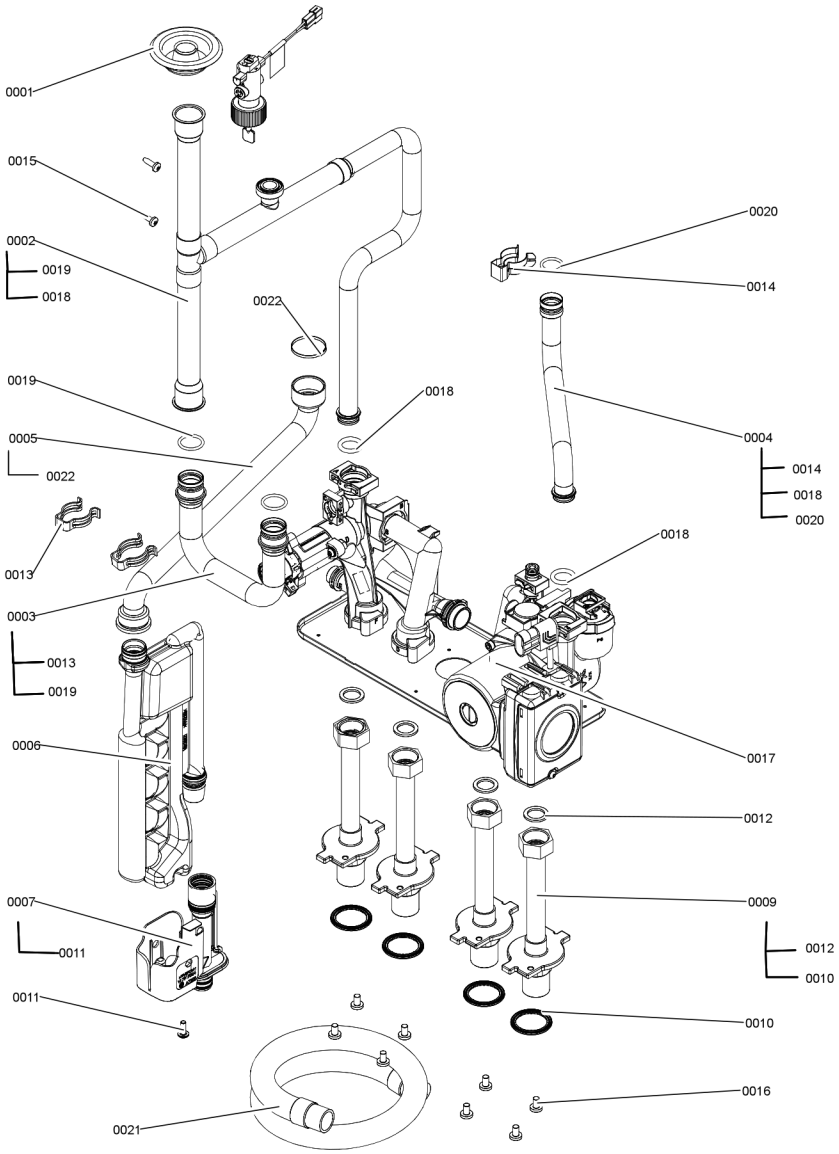
Parts List *(continued)*

Boiler Model No.	Serial No.
B2HE-85	7722778□□□□□□□□
B2HE-120	7722779□□□□□□□□

Ordering Parts:
Please provide Serial Number when ordering replacement parts. Order replacement components from your Viessmann distributor.

Hydraulic System

0001 Diaphragm grommet
0002 Hydraulics flow pipe
0003 VT flow pipe with O-rings
0004 Connection pipe return
0005 Condensate hose
0006 Meander Siphon
0007 Siphon holder
0009 Hydraulics connection pipe
0010 Air box hydraulics gasket (4 pcs)
0011 Screw PT 50 x 14 (5 pcs)
0012 Gasket A 17 x 24 (5 pcs)
0013 Spring clip d = 25
0014 Connector fittings (2 pcs)
0015 Self-tapping screw (5 pcs)
0016 Round head screw (5 pcs)
0017 Pump Module
0018 O-Ring (5 pcs)
0019 Seal set O-Ring (5 pcs)
0020 O-Ring (5 pcs)
0021 Condensate hose
0022 Cable tie (5 pcs)



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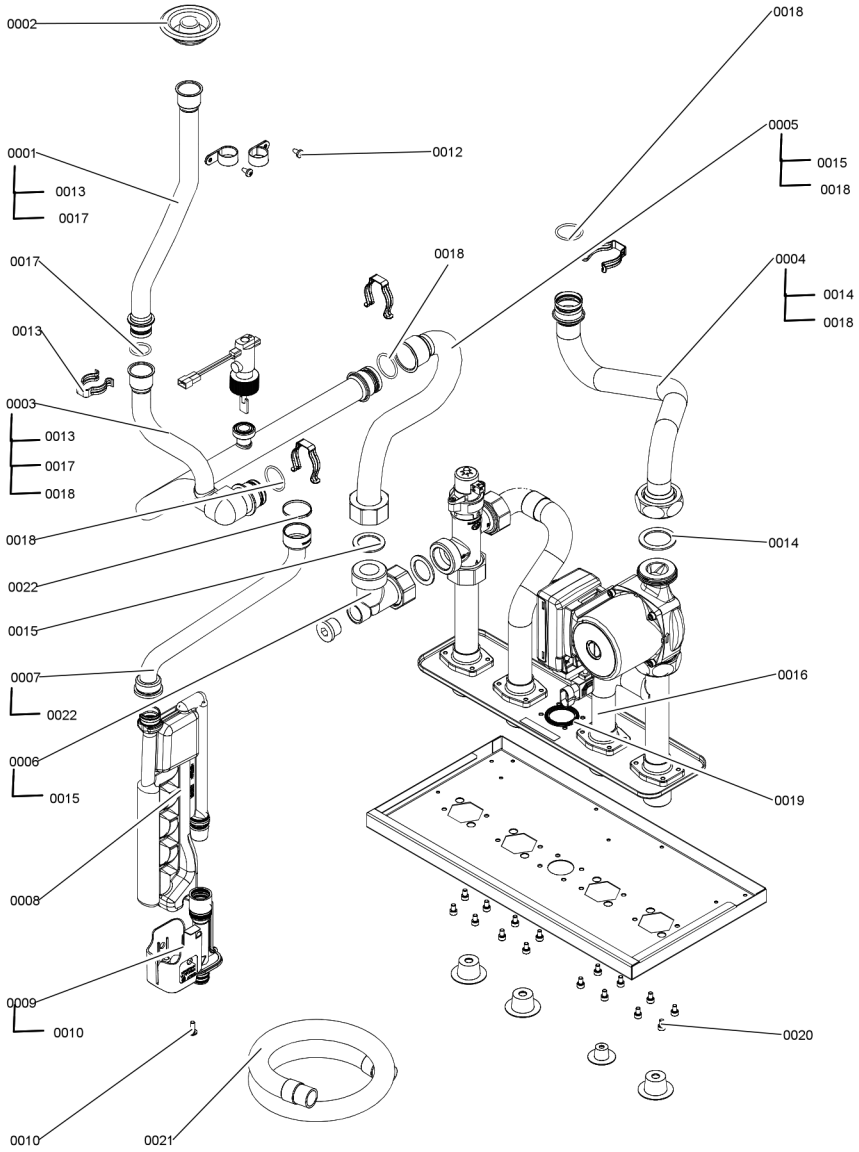
Parts List *(continued)*

Boiler Model No.	Serial No.
B2HE-150	7722780□□□□□□□□
B2HE-199	7722781□□□□□□□□

Ordering Parts:
Please provide Serial Number when ordering replacement parts. Order replacement components from your Viessmann distributor.

Hydraulic System

0001 Connection pipe
0002 Diaphragm grommet
0003 Connection pipe
0004 Connection pipe HR circulation
0005 Connection pipe HV circulation bottom
0006 Angle piece G1 1/4 - G1 1/4
0007 Condensate hose
0008 Meander Siphon
0009 Siphon holder
0010 Screw (5 pcs)
0012 Self-tapping screw (5 pcs)
0013 Spring clip d = 25
0014 Gaskets and O-rings
0015 Gasket set 1 1/4 in. (5 pcs)
0016 Pump Module
0017 Seal set O-Ring (5 pcs)
0018 O-Ring
0019 Air box hydraulics gasket (4 pcs)
0020 Screw pack
0021 Condensate hose
0022 Cable tie (5 pcs)



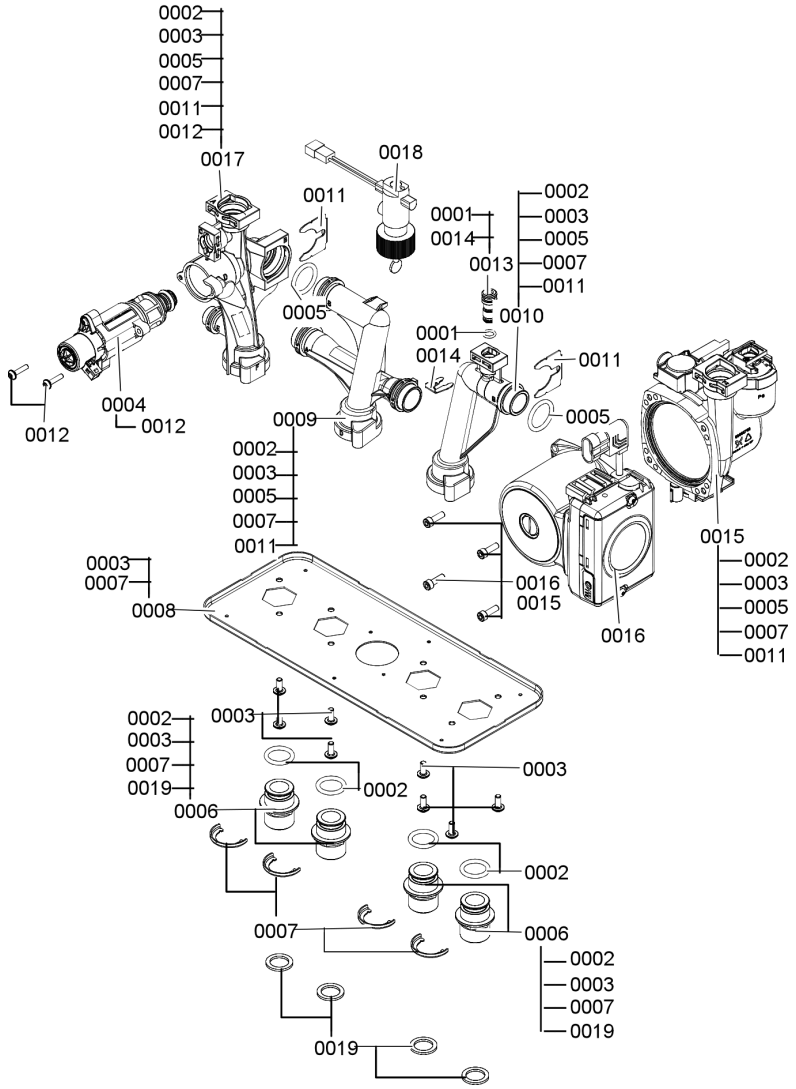
Parts List *(continued)*

Boiler Model No.	Serial No.
B2HE-85	7722778□□□□□□□□
B2HE-120	7722779□□□□□□□□

Ordering Parts:
Please provide Serial Number when ordering replacement parts. Order replacement components from your Viessmann distributor.

Pump Module

0001 Round seal ring (5 pcs)
0002 O-Rings (5 pcs)
0003 Screw (5 pcs)
0004 Valve insert
0005 O-Ring (5 pcs)
0006 Connector G3/4
0007 Fuse clip nipple connection
0008 Compact carrier sheet hydraulics
0009 Circulation adapter
0010 Circulation adapter return flow side
0011 Clip D = 24 (5 pcs)
0012 Screw EJOT (5 pcs)
0013 Plug D = 8/D = 10
0014 Clip D = 8 small (5 pcs)
0015 Return flow housing with cap and plug
0016 Circulation pump motor 115V
0017 Flow housing
0018 Flow switch
0019 Gasket set



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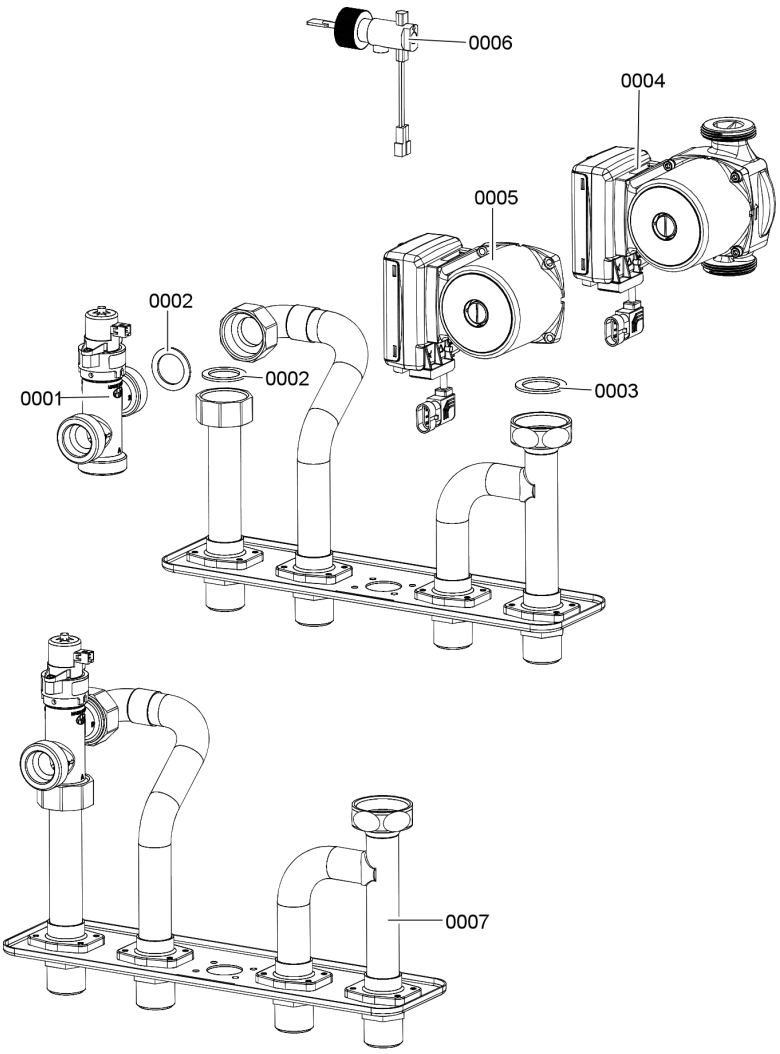
Parts List *(continued)*

Boiler Model No.	Serial No.
B2HE-150	7722780□□□□□□□□
B2HE-199	7722781□□□□□□□□

Ordering Parts:
Please provide Serial Number when ordering replacement parts. Order replacement components from your Viessmann distributor.

Pump Module
0001 3-Way Diverter valve
0002 Gasket set (5 pcs)
0003 Gasket set (5 pcs)
0004 Pump 115V
0005 Circulation pump motor 115V
0006 Flow switch
0007 Hydraulic module



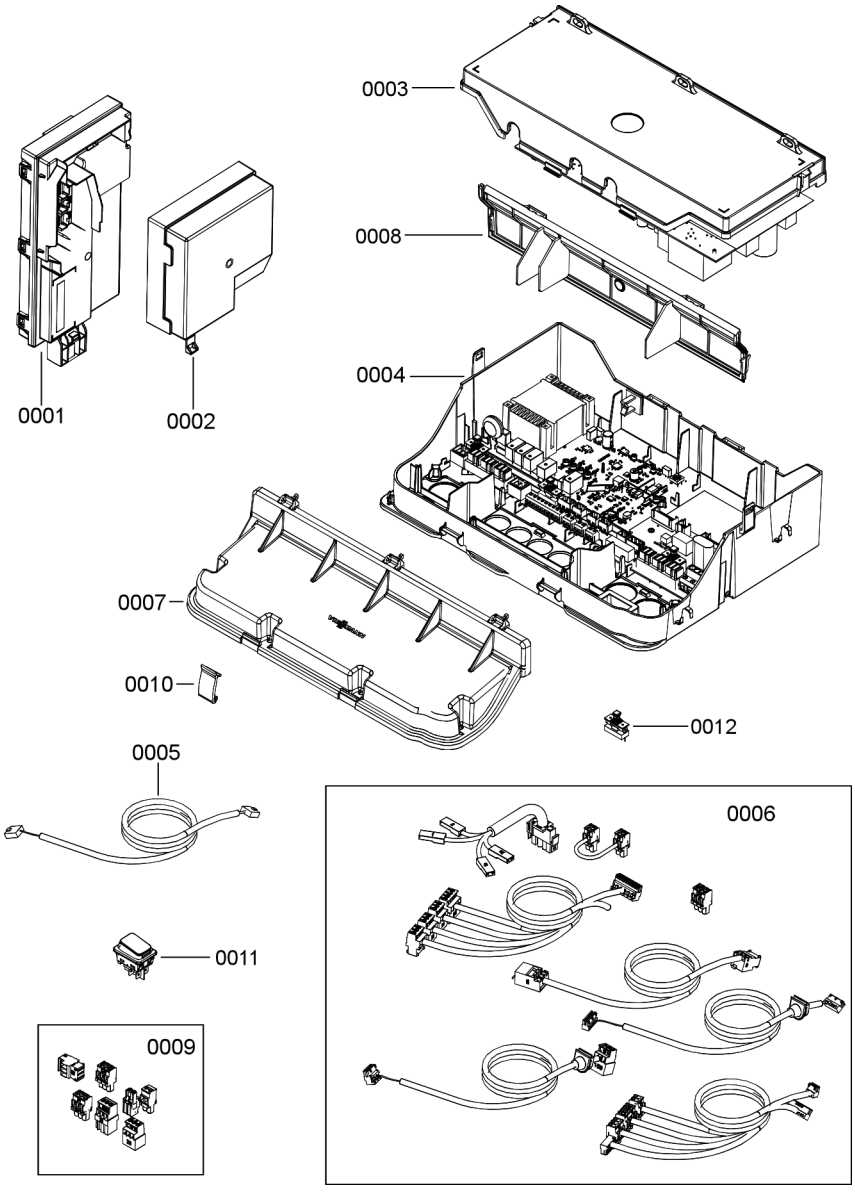
Parts List *(continued)*

Boiler Model No.	Serial No.
B2HE-85	7722778□□□□□□□□
B2HE-120	7722779□□□□□□□□
B2HE-150	7722780□□□□□□□□
B2HE-199	7722781□□□□□□□□

Ordering Parts:
Please provide Serial Number when ordering replacement parts. Order replacement components from your Viessmann distributor.

Electronic Equipment

0001	BCU
0002	Cover
0003	Rear Cover
0004	Base Enclosure
0005	Cable
0006	Cable Set
0007	Front Cover
0008	Divider
0009	Plug Set
0010	Board
0011	Power switch
0012	Fuse 1.0A



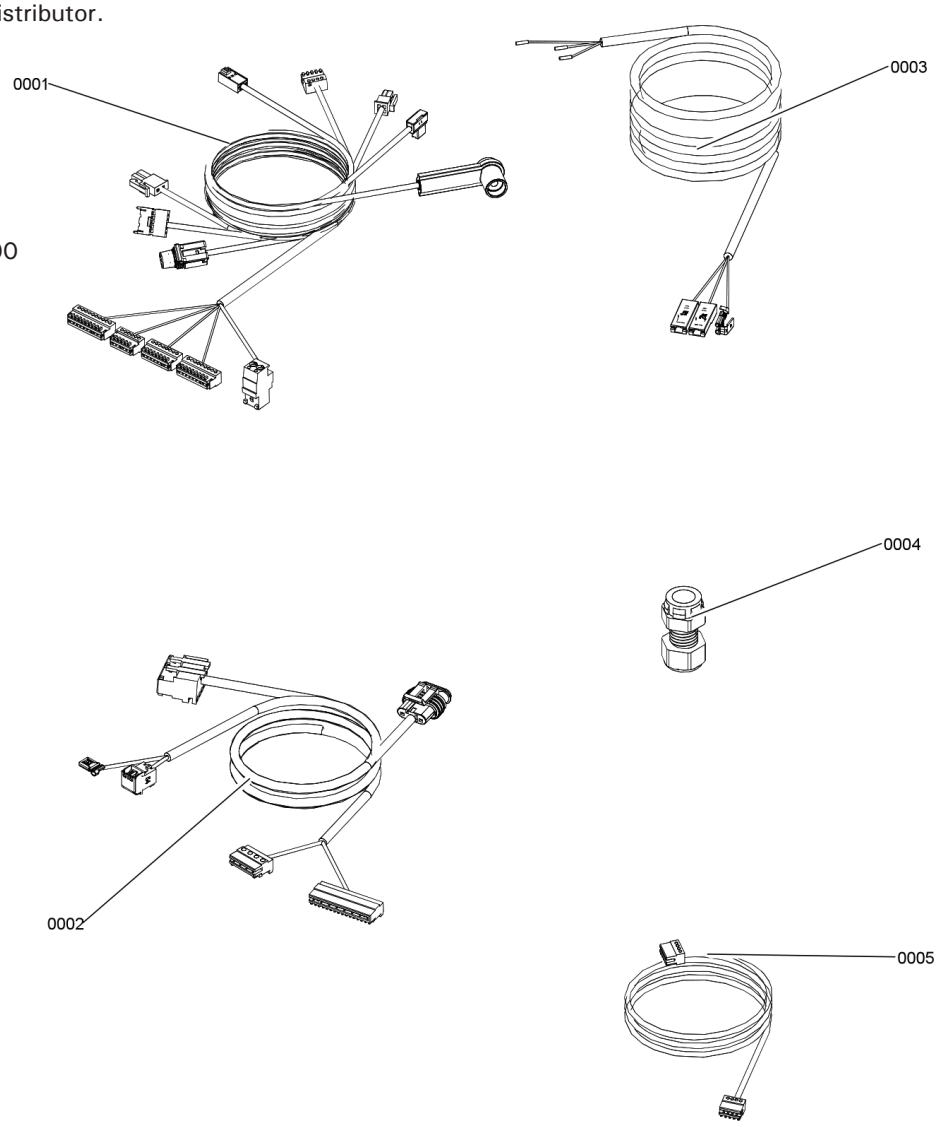
Parts List *(continued)*

Boiler Model No.	Serial No.
B2HE-85	7722778□□□□□□□□
B2HE-120	7722779□□□□□□□□
B2HE-150	7722780□□□□□□□□
B2HE-199	7722781□□□□□□□□

Ordering Parts:
Please provide Serial Number when ordering replacement parts. Order replacement components from your Viessmann distributor.

Cable Set

0001 Wiring harness low voltage
0002 Wiring harness 120V
0003 Power cable
0004 Cable gland
0005 Cable 10-pin twisted L = 1300



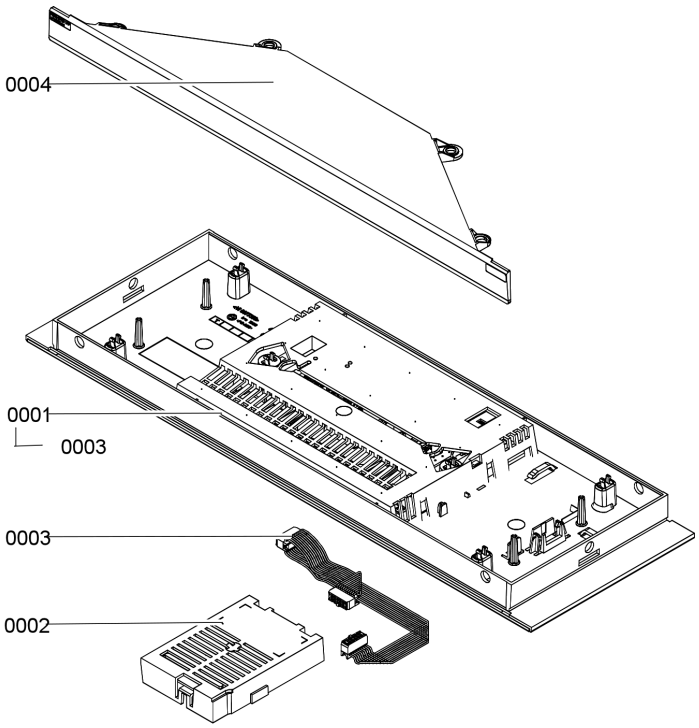
Parts List *(continued)*

Boiler Model No.	Serial No.
B2HE-85	7722778□□□□□□□□
B2HE-120	7722779□□□□□□□□
B2HE-150	7722780□□□□□□□□
B2HE-199	7722781□□□□□□□□

Ordering Parts:
Please provide Serial Number when ordering replacement parts. Order replacement components from your Viessmann distributor.

Programming Unit

0001 Programming unit HMI 7 in. (450 mm) Touch
0002 Telemetric Control Unit (TCU200)
0003 Ribbon cable Wifi module
0004 Fiber optic HMI 450



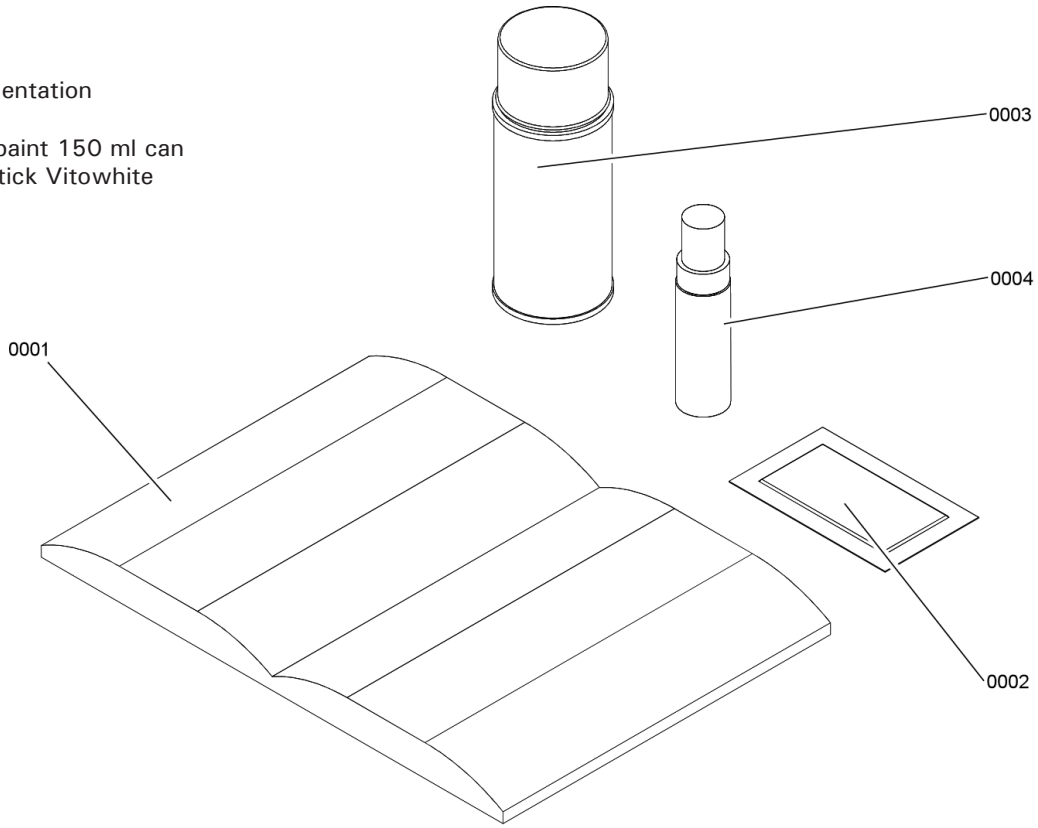
Parts List *(continued)*

Boiler Model No.	Serial No.
B2HE-85	7722778□□□□□□□□
B2HE-120	7722779□□□□□□□□
B2HE-150	7722780□□□□□□□□
B2HE-199	7722781□□□□□□□□

Ordering Parts:
Please provide Serial Number when ordering replacement parts. Order replacement components from your Viessmann distributor.

Other

0001 Technical Documentation
0002 Lubricant
0003 Vitowhite spray paint 150 ml can
0004 Touch-up paint stick Vitowhite



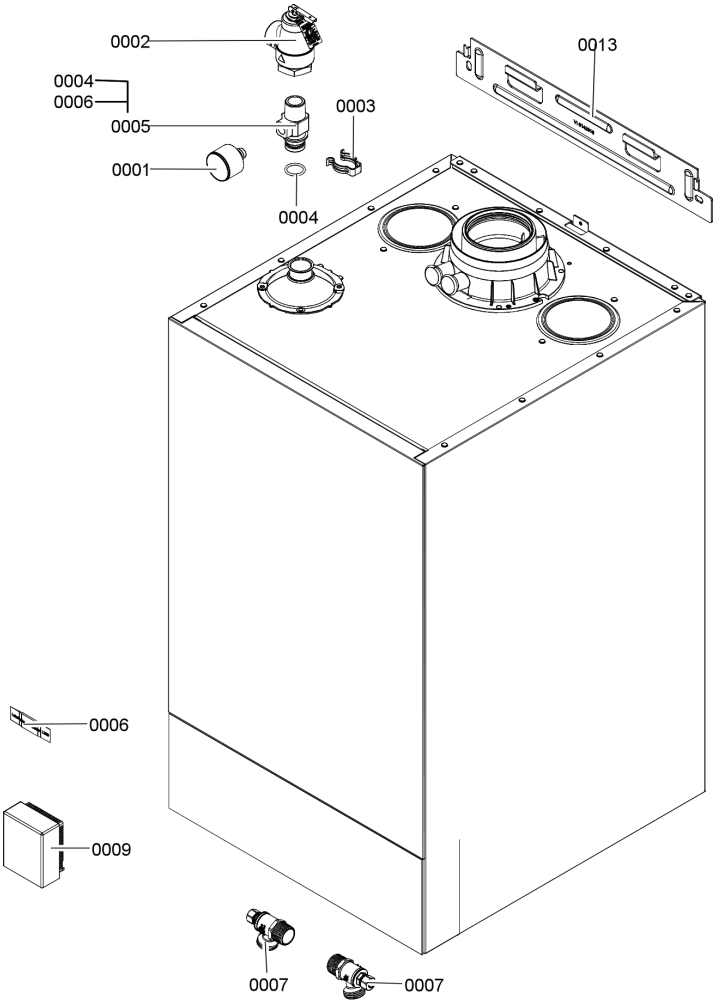
Parts List *(continued)*

Boiler Model No.	Serial No.
B2HE-85	7722778□□□□□□□□
B2HE-120	7722779□□□□□□□□
B2HE-150	7722780□□□□□□□□
B2HE-199	7722781□□□□□□□□

Ordering Parts:
Please provide Serial Number when ordering replacement parts. Order replacement components from your Viessmann distributor.

Accessories

0001 Pressure Gauge
0002 Boiler Pressure Relief Valve
0003 Locking Clip
0004 O Ring
0005 Adaptor
0006 Label
0007 Boiler Drain/Fill Valve
0009 Outdoor Temperature Sensor
0013 Wall Mounting Bracket



Electronic Combustion Controller

The electronic combustion controller utilizes the physical correlation between the level of the ionization current and the air ratio λ. The maximum ionization current is achieved at an air ratio of 1 for all gas qualities.
The ionization signal is evaluated by the combustion controller. The air ratio is regulated to a value that is between λ= 1.2 and 1.6. This range provides for optimum combustion quality. Thereafter, the electronic gas solenoid valve regulates the required gas volume subject to the prevailing gas quality.
To check the combustion quality, the CO_2 content or the O_2 content of the flue gas is measured. The prevailing air ratio is determined using the measured values.

To achieve optimum combustion control, the system regularly carries out an automatic self-calibration; also after a power outage (shutdown). For this, the combustion is briefly regulated to maximum ionization current (corresponding to air ratio λ=1). Self-calibration takes place shortly after the burner starts. The process lasts approx. 20 sec. during which higher than normal CO emissions may occur briefly.

Final Decommissioning and Disposal

Viessmann products can be recycled. Components and substances from the system are not part of ordinary household waste.
For decommissioning the system, isolate the system from the power supply and allow components to cool down where appropriate.
All components must be disposed of correctly.

Lighting and Operating Instructions

FOR YOUR SAFETY READ BEFORE OPERATING

W A R N I N G: If you do not follow these instructions exactly, a fire or explosion may result causing property damage, personal injury or loss of life.

A. This boiler does not have a pilot. It is equipped with an ignition device which automatically lights the burner. Do Not try to light the burner by hand.

B. BEFORE OPERATING smell all around the boiler area for gas. Be sure to smell next to the floor because some gas is heavier than air and will settle on the floor.

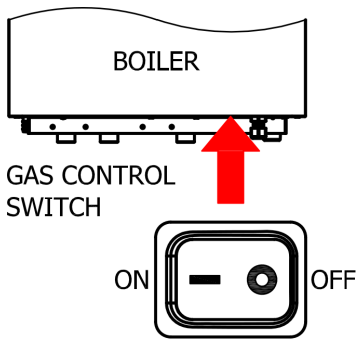
WHAT TO DO IF YOU SMELL GAS
- Do not try to light any boiler.
- Do not touch any electric switch; do not use any phone in your building.
- Immediately call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions.
- If you cannot reach your gas supplier, call the fire department.

C. Use only your hand to push the main gas supply switch. Never use tools. If the main gas supply switch will operate by hand, don't try to repair it, call a qualified service technician.
Force or attempted repair may result in a fire or explosion.

D. Do not use this boiler if any part has been under water. Immediately call a qualified service technician to inspect the boiler and to replace any part of the control system and any gas control which has been under water.

OPERATING INSTRUCTIONS

1. STOP! Read the safety information above.
2. Set thermostat or other operating control to lowest setting.
3. Turn off all electric power to the boiler.



4. This boiler is equipped with an ignition device which automatically lights the burner. Do not try to light the burner by hand.
5. Close main gas shut-off valve.
6. Wait five (5) minutes to clear out any gas. Then smell for gas, including near the floor. If you smell gas, STOP! Follow "B" in the safety information above. If you don't smell gas, go to the next step.
7. Open main gas shut-off valve.
8. Turn on all electric power to the boiler.
9. Set thermostat or other operating control to desired setting.
10. If the boiler will not operate, follow the instructions "To Turn Off Gas To Boiler" and call your service technician or gas supplier.

TO TURN OFF GAS TO BOILER

1. Set thermostat or other operating control to lowest setting.
2. Turn off all electric power to the boiler if service is to be performed.
3. Turn off the control gas switch.

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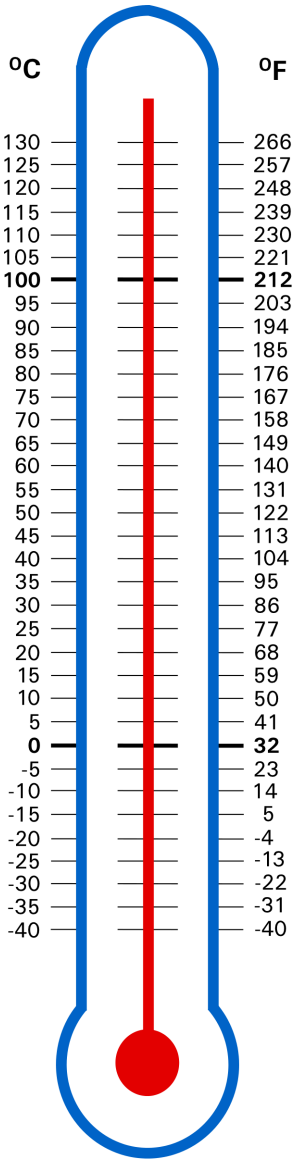

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