# Installation and service instructions

**for contractors**

**Vitodens 100-W**
**Type B1HF, B1KF**, 3.2 to 32 kW
**Type B1HF-M, B1KF-M (for multiple connection)**, 5.7 to 32 kW
Wall mounted gas condensing boiler
Natural gas and LPG version

Gas Council No.
- B1HF: 41-819-51, 41-819-48, 41-819-49, 41-819-50
- B1KF: 47-819-50, 47-819-51, 47-819-52

## VITODENS 100-W

6167586 GB 10/2021

**Please keep safe.**

## Safety instructions

⚠ Please follow these safety instructions closely to prevent accidents and material losses.

### Safety instructions explained

⚠ **Danger**
This symbol warns against the risk of injury.

! **Please note**
This symbol warns against the risk of material losses and environmental pollution.

***Note***
*Details identified by the word "Note" contain additional information.*

### Target group

These instructions are exclusively intended for qualified contractors.

- Work on gas installations may only be carried out by a registered gas fitter.
- Work on electrical equipment may only be carried out by a qualified electrician.
- The system must be commissioned by the system installer or a qualified person authorised by the installer.

### Regulations to be observed

- National installation regulations
- Statutory regulations for the prevention of accidents
- Statutory regulations for environmental protection
- Codes of practice of the relevant trade associations
- Relevant country-specific safety regulations

### Safety instructions for working on the system

#### Working on the system

- Where gas is used as the fuel, close the main gas shut-off valve and safeguard it 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.

## Safety instructions (cont.)

⚠ **Danger**
Hot surfaces and fluids can lead to 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.

! **Please note**
Electronic assemblies can be damaged by electrostatic discharge. Prior to commencing work, touch earthed objects such as heating or water pipes to discharge static loads.

### Repair work

! **Please note**
Repairing components that fulfil a safety function can compromise the safe operation of the system. Replace faulty components only with genuine Viessmann spare parts.

### Auxiliary components, spare and wearing parts

! **Please note**
Spare and wearing parts that have not been tested together with the system can compromise its function. Installing non-authorised components and making non-approved modifications or conversions can compromise safety and may invalidate our warranty.
For replacements, use only original spare parts supplied or approved by Viessmann.

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## Safety instructions (cont.)

### Safety instructions for operating the system

#### If you smell gas

**Danger**
Escaping gas can lead to explosions which may result in serious injury.
- Do not smoke. Prevent naked flames and sparks. Never switch lights or electrical appliances on or off.
- Close the gas shut-off valve.
- Open windows and doors.
- Evacuate any people from the danger zone.
- Notify your gas or electricity supply utility from outside the building.
- Have the power supply to the building shut off from a safe place (outside the building).

#### If you smell flue gas

**Danger**
Flue gas can lead to life threatening poisoning.
- Shut down the heating system.
- Ventilate the installation site.
- Close doors to living spaces to prevent flue gases from spreading.

#### What to do if water escapes from the appliance

**Danger**
If water escapes from the appliance there is a risk of electrocution.
Switch OFF the heating system at the external isolator (e.g. fuse box, domestic distribution board).

**Danger**
If water escapes from the appliance there is a risk of scalding.
Never touch hot heating water.

#### Condensate

**Danger**
Contact with condensate can be harmful to health.
Never let condensate touch your skin or eyes and do not swallow it.

#### Flue systems and combustion air

Ensure that flue systems are clear and cannot be sealed, for instance due to accumulation of condensate or other external causes.
Ensure an adequate supply of combustion air.
Inform system users that subsequent modifications to the building characteristics are not permissible (e.g. cable/pipework routing, cladding or partitions).

**Danger**
Leaking or blocked flue systems, or an inadequate supply of combustion air can cause life threatening poisoning from carbon monoxide in the flue gas.
Ensure the flue system is in good working order. Vents for supplying combustion air must be non-sealable.

#### Extractors

Operating appliances that exhaust air to the outside (extractor hoods, extractors, air conditioning units, etc.) can create negative pressure. If the boiler is operated at the same time, this can lead to a reverse flow of flue gas.

## Safety instructions (cont.)

⚠ **Danger**
The simultaneous operation of the boiler and appliances that exhausts air to the outside can result in life threatening poisoning due to a reverse flow of flue gas.
Fit an interlock circuit or take suitable steps to ensure an adequate supply of combustion air.

# Index





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## Index (cont.)

## Disposal of packaging

Please dispose of packaging waste in line with statutory regulations.

## Gas Council No.

| Type | Gas Council No.: |
|---|---|
| Vitodens 100-W, B1HF, 11 kW | **41-819-51** |
| Vitodens 100-W, B1HF, 19 kW | **41-819-48** |
| Vitodens 100-W, B1HF, 25 kW | **41-819-49** |
| Vitodens 100-W, B1HF, 32 kW | **41-819-50** |
| | |
| Vitodens 100-W, B1KF, 26 kW Combi | **47-819-50** |
| Vitodens 100-W, B1KF, 30 kW Combi | **47-819-51** |
| Vitodens 100-W, B1KF, 35 kW Combi | **47-819-52** |

## Symbols

| Symbol | Meaning |
|---|---|
|  | Reference to other document containing further information |
|  | Step in a diagram:<br>The numbers correspond to the order in which the steps are carried out. |
|  | Warning of material losses and environmental pollution |
|  | Live electrical area |
|  | Pay particular attention. |
|  | ▪ Component must audibly click into place.<br>or<br>▪ Acoustic signal |
|  | ▪ Fit new component.<br>or<br>▪ In conjunction with a tool: Clean the surface. |
|  | Dispose of component correctly. |
|  | Dispose of component at a suitable collection point. Do **not** dispose of component in domestic waste. |

The steps in connection with commissioning, inspection and maintenance are found in the "Commissioning, inspection and maintenance" section and identified as follows:

| Symbol | Meaning |
|---|---|
|  | Steps required during commissioning |
|  | Not required during commissioning |
|  | Steps required during inspection |
|  | Not required during inspection |
|  | Steps required during maintenance |
|  | Not required during maintenance |

## Intended use

The appliance is intended solely for installation and operation in sealed unvented heating systems that comply with EN 12828 (as well as CECS215-2017 and CE: CS215-2017 in relation to CN), with due attention paid to the associated installation, service and operating instructions. It is only designed for heating up heating 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 will result 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).



## Product information

### Vitodens 100-W, type B1HF, B1KF

Wall mounted gas condensing boiler with Inox-Radial heat exchanger and the following integrated components:

- Modulating MatriX-Plus burner for natural gas and LPG
- Hydraulics with 3-way diverter valve and variable speed high efficiency circulation pump
- Type B1KF: Plate heat exchanger for DHW heating
- Weather-compensated or constant temperature control unit
- Integral diaphragm expansion vessel (8 l capacity)

The selected gas category in the delivered condition and the associated nominal gas pressure are given on the boiler type plate. The type plate also shows the other gas types and pressures with which the boiler can be operated. A conversion within the stated natural gas groups is not required. For conversion to LPG (without conversion kit), see "Commissioning, inspection and maintenance".

**Type plate**

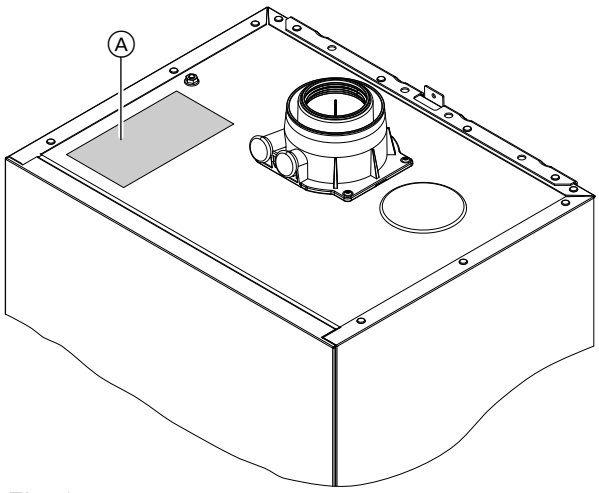


*Fig. 1*

Ⓐ Type plate with QR code for appliance registration

The type plate of the heat generator contains extensive product information and an appliance-specific **QR code with the marking "i"** for direct access to product-specific information and product registration on the internet.
The QR code contains the credentials for the registration and product information portal, and the 16-digit serial number.

***Note***
*A further label with the QR code is enclosed with the heat generator.*
*Stick the label in the installation and service instructions so it can be easily found again for later use.*

## Product information (cont.)

The Vitodens 100-W may only be delivered to countries listed on the type plate. For deliveries to other countries, approved contractors must arrange individual approval on their own initiative and in accordance with the law of the country in question.



## System examples

System examples with hydraulic and electrical connection diagrams and function descriptions are available to help setting up the heating system.

Detailed information on system examples can be found at: **www.viessmann-schemes.com**

## Spare parts lists

Information about spare parts can be found at **www.viessmann.com/etapp** or in the Viessmann spare part app.

Download on the App Store

GET IT ON Google Play

## Preparing for installation

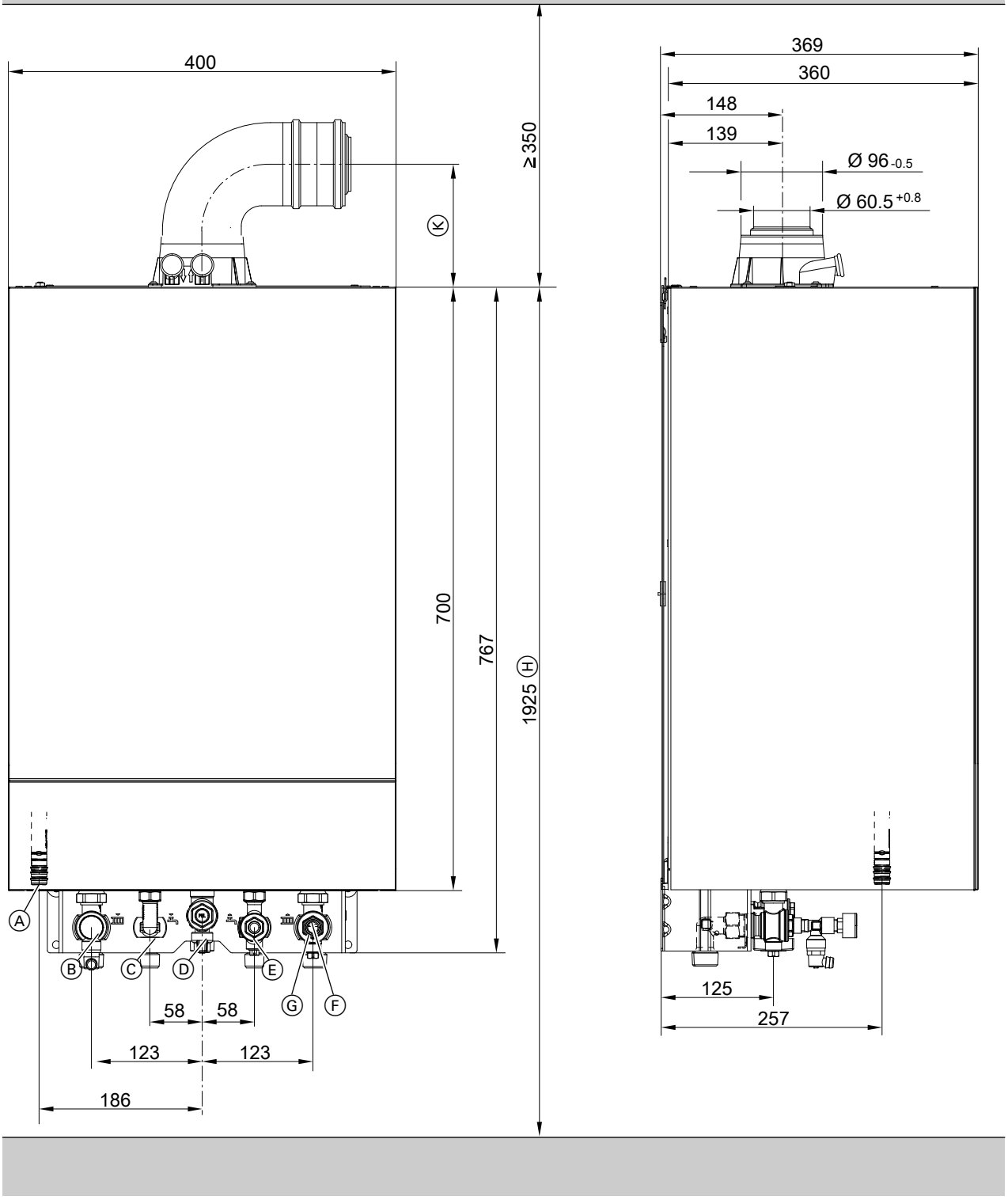


*Fig. 2 Illustration shows a gas condensing combi boiler*

Ⓐ Condensate drain
Ⓑ Heating flow
Ⓒ DHW (gas condensing combi boiler)
Cylinder flow (gas condensing system boiler)
Ⓓ Gas connection
Ⓔ Cold water (gas condensing combi boiler)
Cylinder return (gas condensing system boiler)
Ⓕ Heating return
Ⓖ Filling/draining

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## Preparing for installation (cont.)

Ⓗ Dimension for siting with DHW cylinder below the boiler
Ⓚ Dimension: 161 mm – for external wall connection, Order nos. 7441467, 7411961
Dimension: 131 mm – for external wall connection, Order no. 7946886 (with reduced flue bend)

***Note***
*This boiler (IP rating: IP X4) is approved for installation in wet rooms inside safety zone 1. Exposure to jets of water must be prevented.*
*For open flue operation, the boiler may only be operated with a splash cover.*



**1.** Subject to order: Fit supplied pre-plumbing jig, mounting frame or wall mounting bracket in the relevant installation location.

Installation instructions for pre-plumbing jig or mounting frame

***Note***
*Check the condition of the wall where the boiler is to be installed. For the suitability of the supplied rawl plugs for various building materials, see manufacturer's instructions: Fischer expansion plugs SX 10 x 80*
*For other construction materials, use fixing materials with sufficient load bearing capacity.*

**2.** Prepare the water connections to the valves/fittings of the mounting bracket.
Thoroughly flush the heating system.

**!** **Please note**
To prevent damage to the appliance, connect all pipework so that it is free of load and torque stress.

***Note***
*If an on-site expansion vessel also has to be installed: Install this expansion vessel in the cylinder return, as the 3-way diverter valve is located in the heating flow.*
*Not possible with type B1KF*

**3.** Prepare the gas connection according to TRGI or TRF [or local regulations].

**4.** Prepare the electrical connections.
- The appliance is delivered fitted with a power cable (approx. 2 m long).
  ***Note***
  *Connect the power cable to the electricity supply using a fixed connection.*
- Power supply: 230 V, 50 Hz, fuse rating max. 16 A
- Accessory cables: 0.75 $mm^2$ flexible PVC cable with required number of cores for external connections

## Preparing for installation (cont.)

### Connection on the DHW side for gas condensing combi boiler

**Cold water installation**

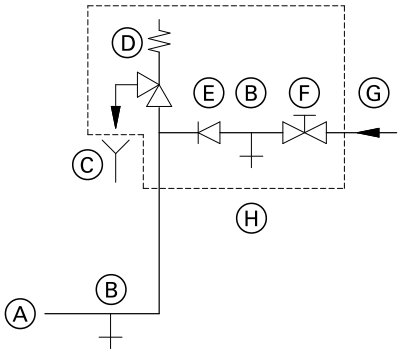


*Fig. 3*

Ⓐ Cold water connection of boiler
Ⓑ Drain outlet
Ⓒ Visible discharge pipe outlet point
Ⓓ Safety valve
Ⓔ Non-return valve
Ⓕ Shut-off valve
Ⓖ Cold water
Ⓗ Safety assembly

**Safety assembly Ⓗ is included in the standard delivery and requires installing.**
Only use a non-return valve or a combined shut-off and non-return valve in conjunction with a safety valve.
If the safety valve is used, the cold water shut-off valve on the boiler must not be shut off.
Remove the toggle on the cold water shut-off valve (if installed) to prevent manual shut-off.

## Removing the boiler from the packaging



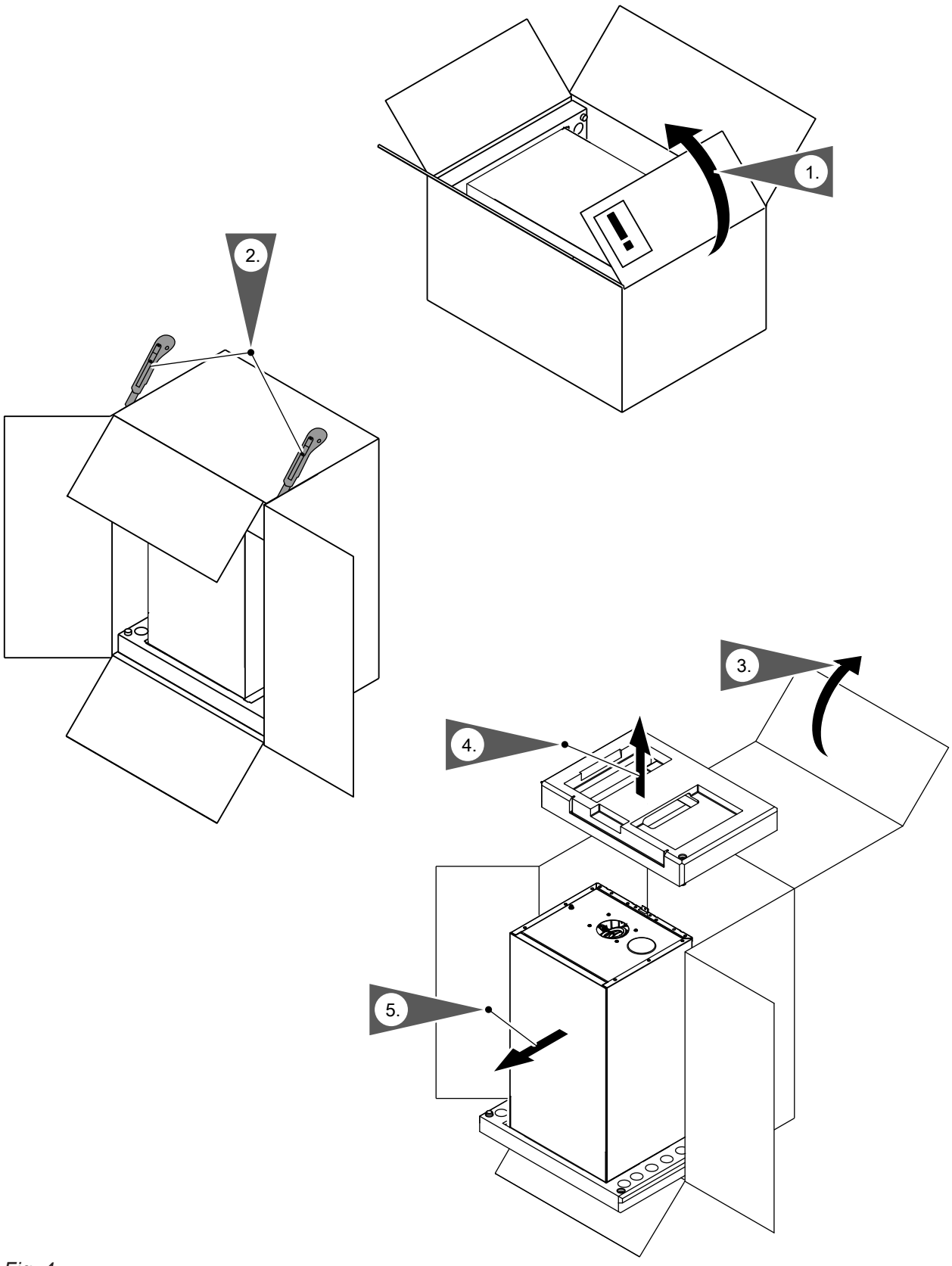


*Fig. 4*

## Mounting the boiler and making connections

### Removing the front panel

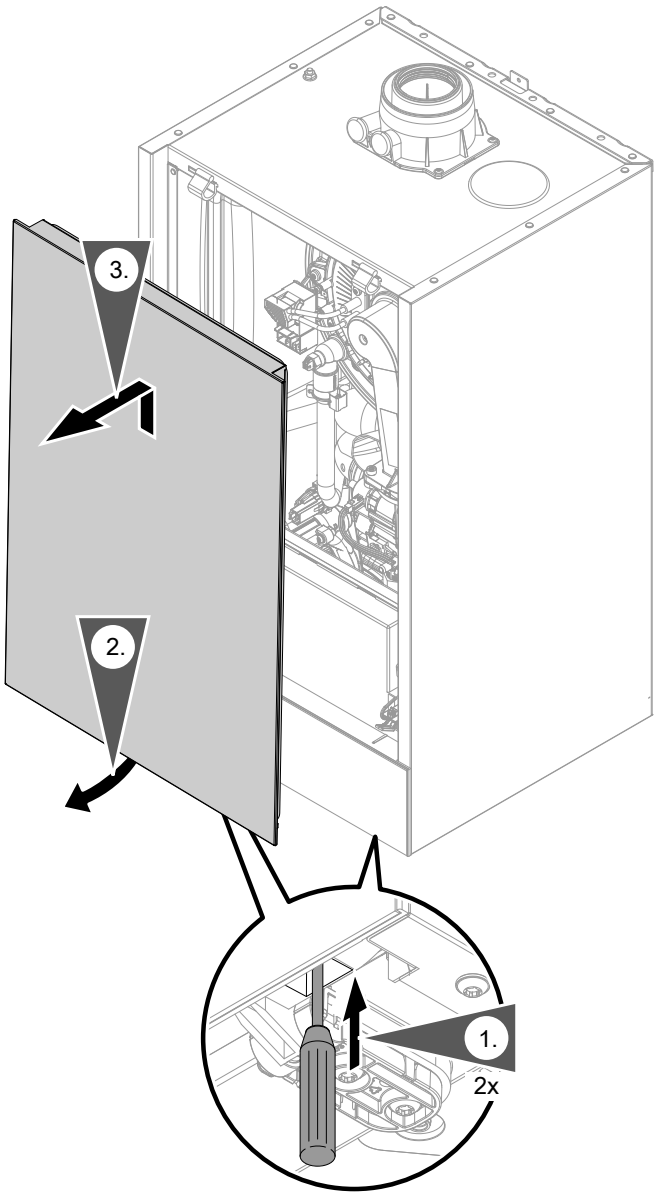


*Fig. 5*

**1.** Unlock the front panel on the underside (push in), using a screwdriver or similar tool.

**2.** Swivel the front panel forwards slightly and lift away upwards.

### Mounting the boiler on the pre-plumbing jig or mounting frame

***Note***
*Various installation components can be found in a separate pack. Keep the installation components safe, as they will be required for later installation.*

## Mounting the boiler and making connections (cont.)



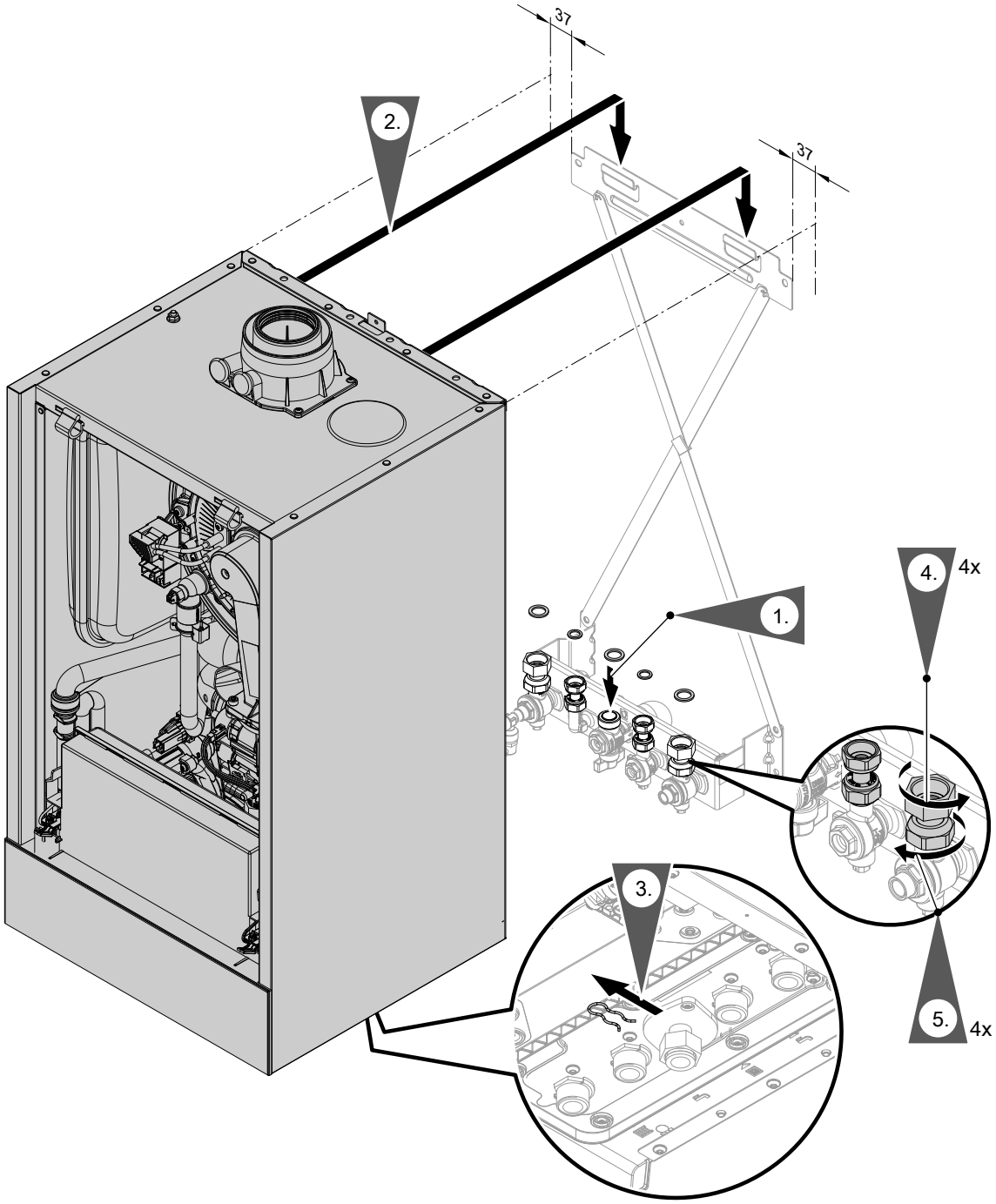


*Fig. 6*

***Note***
*The diagram shows installation on a pre-plumbing jig for a gas condensing combi boiler.*

*The boiler can be installed on the following accessories:*
- *Pre-plumbing jig*
- *Mounting frame*
- *Plumbing wall mounting frame*

**1.** Replace gaskets.

Internal gasket diameter:
- Gas connection Ø 18.5 mm
- Heating water side connections Ø 17.0 mm

***Note***
*Gasket for gas connection is attached to the gas shut-off valve.*

**2.** Suspend the Vitodens from the wall mounting bracket.

***Note***
*After mounting, ensure correct seating.*



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## Mounting the boiler and making connections (cont.)

3. ***Note***
   *Only remove the locking clip under the gas pipe union nut once the appliance has been installed. Clip is no longer required.*

4. Tighten union nuts so that they form a tight seal. Tighten the union nuts as tightly as necessary and ensure that the components are undamaged and are functioning correctly throughout service life. Observe torque settings if a torque wrench is available.
   Check for gas tightness to BSI 6891.

   Torque settings:
   - Union nuts G ¾: 30 Nm
   - Union nuts G ½: 24 Nm

   When carrying out any work on gas connection fittings, hold with a suitable tool. Never transfer any forces to the internal components.

5. Tighten locking ring fittings so that they form a tight seal:
   1 turn beyond finger-tight

### Fitting the boiler to the wall mounting bracket

***Note***
*Various installation components can be found in a separate pack. Keep the installation components safe, as they will be required for later installation.*

## Mounting the boiler and making connections (cont.)



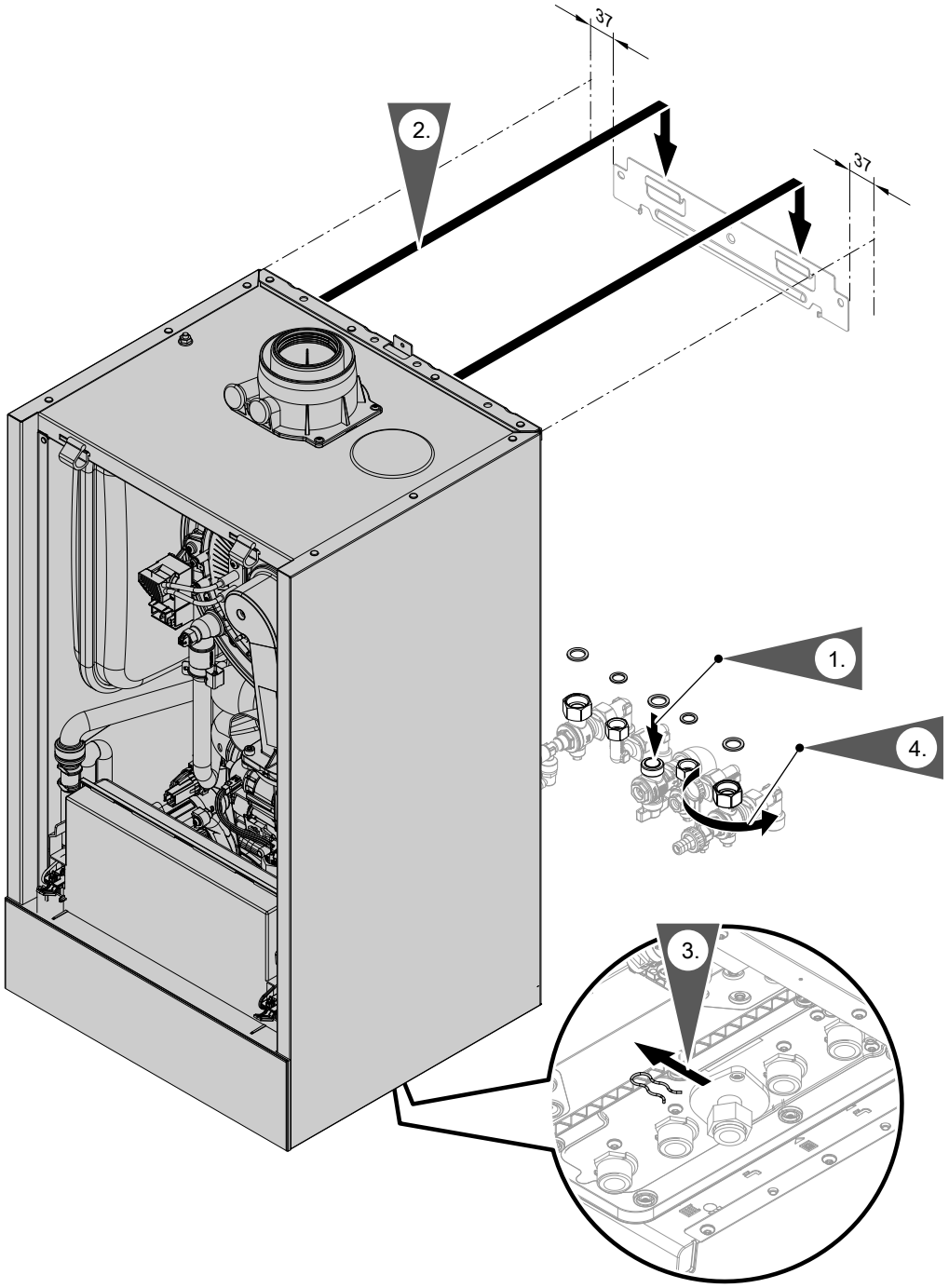


*Fig. 7*

**1.** Replace gaskets. Fit valves and gas shut-off valve.

Internal gasket diameter:
- Gas connection Ø 18.5 mm
- Connections on the heating water side Ø 17.0 mm

***Note***
*Gasket for gas connection is attached to the gas shut-off valve.*

**2.** Suspend the Vitodens from the wall mounting bracket.

**3.** ***Note***
*Only remove the locking clip under the gas pipe union nut once the appliance has been installed. Clip is no longer required.*

## Mounting the boiler and making connections (cont.)

**4.** Tighten union nuts so that they form a tight seal. Tighten the union nuts as tightly as necessary and ensure that the components are undamaged and are functioning correctly throughout service life. Observe torque settings if a torque wrench is available.
Check for gas tightness to BSI 6891.

Torque settings:
- Union nuts G ¾: 30 Nm
- Union nuts G ½: 24 Nm

When carrying out any work on gas connection fittings, hold with a suitable tool. Never transfer any forces to the internal components.



### Connections on the heating water and DHW sides

If the connections have not been fitted previously, make the connections on the heating water and DHW sides.

**Gas condensing system boiler**

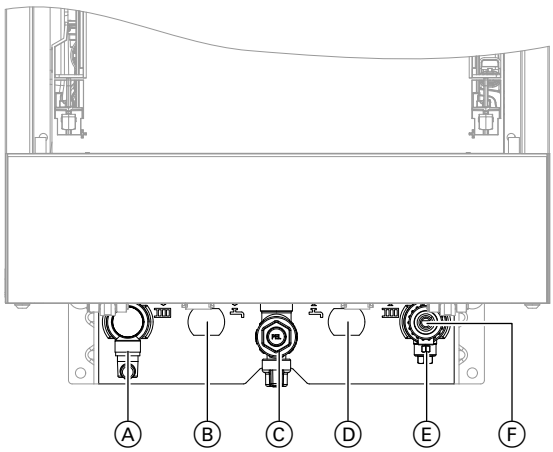


*Fig. 8 Specifications for threads in conjunction with connection accessories*

Ⓐ Heating flow **R ¾ (male thread)**
Ⓑ Cylinder flow **G ¾ (male thread)**
Ⓒ Gas connection **R ¾ (male thread)**
Ⓓ Cylinder return **G ¾ (male thread)**
Ⓔ Heating return **R ¾ (male thread)**
Ⓕ Filling/draining

***Connection on the heating water side of the DHW cylinder:***
*The required intermediate pieces (Rp ¾, female thread) on the cylinder flow and return are part of the connection set for the DHW cylinder.*
*If no DHW cylinder is being connected, seal off the connections with caps.*

**Gas condensing combi boiler**

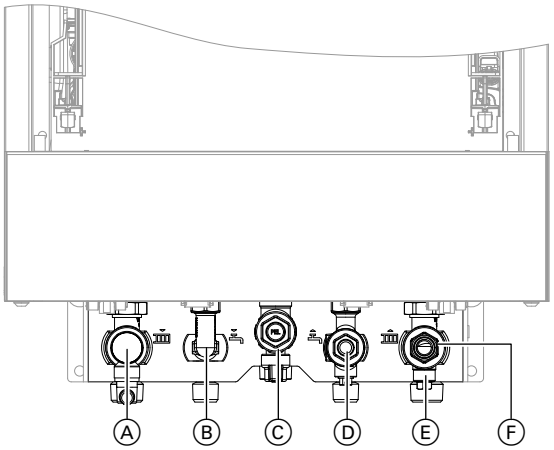


*Fig. 9 Specifications for threads in conjunction with connection accessories*

Ⓐ Heating flow **R ¾ (male thread)**
Ⓑ DHW **R ½ (male thread)**
Ⓒ Gas connection **R ¾ (male thread)**
Ⓓ Cold water **R ½ (male thread)**
Ⓔ Heating return **R ¾ (male thread)**
Ⓕ Filling/draining

**Scald protection**

DHW temperatures of over 60 °C can occur with gas condensing combi boilers. As a result, scald protection should be installed on site in the DHW pipe.

## Condensate connection

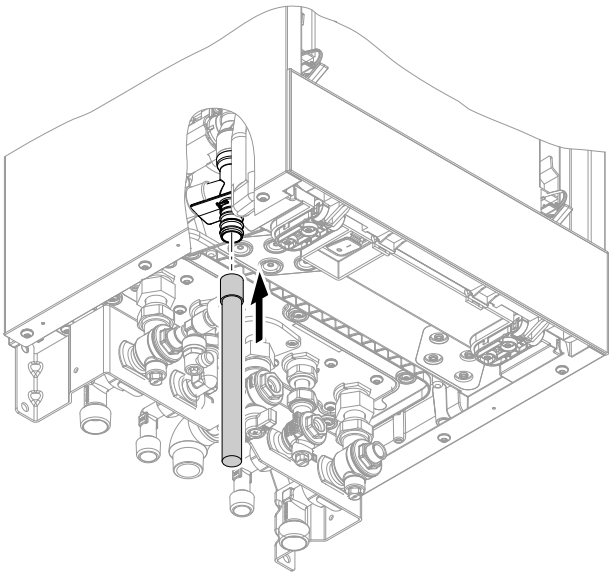

*Fig. 10*

1. Push the supplied drain hose on to the drain connector.

2. Connect the drain hose with a constant fall and a pipe vent to the drain network or a neutralising system.

***Note***
*Route the onward drain line inside the building as far as possible.*

*If the onward drain line is routed outside the building:*
- *Use a min. Ø 30 mm line.*
- *Protect the line from frost.*
- *Keep the line as short as possible.*

**!** **Please note**
The drain hose is used to route away any hot water discharged from the safety valve. Lay and secure the drain hose in a way that prevents any risk of scalding.

***Note***
*Observe local waste water regulations.*

## Filling the trap with water

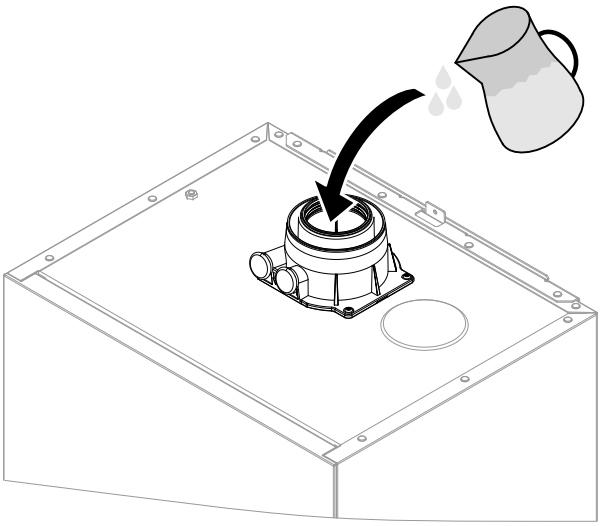

*Fig. 11*

***Note***
*If there is a risk of frost, only fill the trap just before commissioning.*

Pour at least 0.3 l of water into the flue gas connection.

**!** **Please note**
During commissioning, flue gas may escape from the condensate drain.
Always fill the trap with water before commissioning.





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## Flue gas connection

***Note***
*The labels "System certificate" and "Skoberne GmbH or Groppalli flue system" enclosed with the technical documentation may only be used in conjunction with the Viessmann flue system made by Skoberne or Groppalli.*


**Connecting the balanced flue pipe**
Flue system installation instructions

**Connecting several Vitodens to a shared flue system**

If several Vitodens are connected to a shared flue system at positive pressure using routing type $C_{10}$, $C_{11}$, $C_{13}$ or $C_{14}$:
For each boiler, install one back draught safety device (accessories) in the flue gas connection and one in the mixing shaft of the burner.

***Note***
*Not all appliance types are approved for "multiple connection".*
*Please order Vitodens appliances that are suitable for this; see pricelist.*

***Note***
*In appliances for "multiple connection", a special back draught safety device is installed in the mixing shaft of the burner, downstream of the fan.*
*A further back draught safety device is installed in the flue system.*

Installing the back draught safety devices:


Installation instructions for back draught safety device

Only carry out **commissioning** when the following conditions have been met:
- Unrestricted flow in the flue gas routes.
- Positive pressure flue system is gas-tight.
- Inspection port covers checked for secure and tight seating.
- Apertures for supplying sufficient combustion air are open and cannot be closed.
- All current regulations on installing and commissioning flue systems have been observed.


**Danger**
Leaking or blocked flue systems, or an inadequate supply of combustion air, can cause life threatening poisoning from carbon monoxide in the flue gas.
Ensure the flue system is in good working order. Apertures for combustion air supply must be non-sealable.
Prevent condensate drainage via a wind protector.

## Gas connection

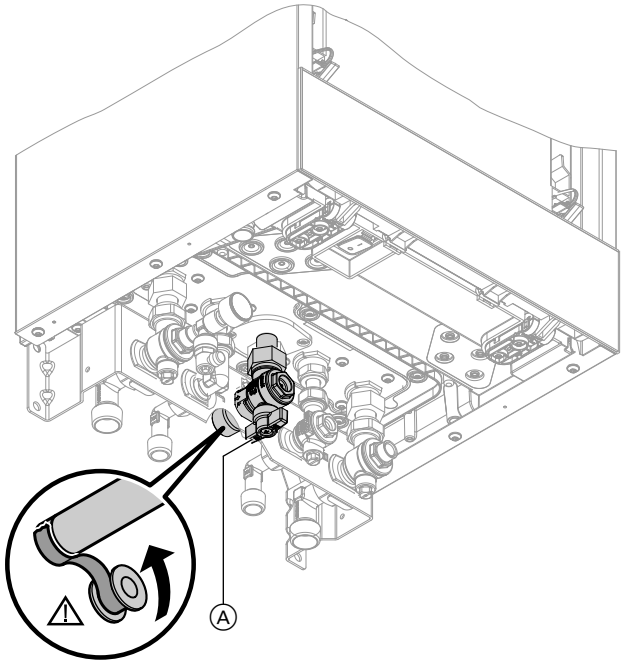


*Fig. 12*

**1.** If the gas connection has not been fitted previously, seal gas shut-off valve Ⓐ to the gas connection.
When carrying out any work on gas connection fittings, counterhold with a suitable tool. Never transfer any forces to the internal components.

***Information on operation with LPG***
*Install an external safety solenoid valve if the boiler is installed below ground level.*
*An EM-EA1 extension (accessories) is required to connect the safety solenoid valve.*

**2.** Check for leaks.

**Danger**
Escaping gas leads to a risk of explosion.
Check all connections on the gas side (also inside the appliance) for tightness.

***Note***
*Only use suitable and approved leak detection agents (EN 14291) and devices for the tightness test. Leak detection agents with unsuitable constituents (e.g. nitrides, sulphides) can cause material damage.*
*Remove residues of the leak detection agent after testing.*

**Please note**
Excessive test pressure will damage the boiler and gas solenoid valve.
Max. test pressure 150 mbar (15 kPa). If a higher pressure is required for leak tests, disconnect the boiler and the gas solenoid valve from the main supply pipe (undo the fitting).

**3.** Purge the gas line.

## Gas installation to BS 6891:2005

It is the gas installer's responsibility to size the gas installation lines in accordance with BS 6891:2005.

If it is determined that the operating pressure falls below the minimum outlet level for the measuring device of 19 MB, it should be checked to ensure that the gas pressure is sufficient for correct and safe operation.



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## Gas connection (cont.)

Taking into account a pressure drop from the installation lines of no more than 1 MB, it can be assumed that a permissible minimum pressure of 18 MB is present at the appliance's gas connection (reference BS 6400-1 Section 6.2, Pressure absorption).

The external gas tap may reduce operating pressure further if measured at its test point. The pressure drop is relative to the heat input of the boiler (kW).
Observe minimum gas pressure at the gas fitting in accordance with the table – see page 41

## Electrical connections

### Opening the wiring chamber

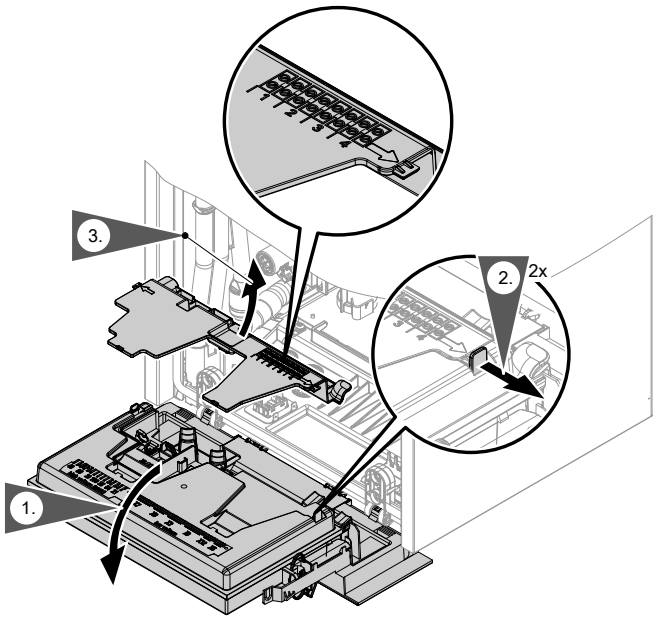


*Fig. 13*

**Please note**
Electronic assemblies can be damaged by electrostatic discharge.
Before beginning work, touch earthed objects, such as heating or water pipes to discharge static loads.

## Electrical connections (cont.)

### Layout of the electrical connections

***Note***
*For further information on the connections, see the following chapters.*

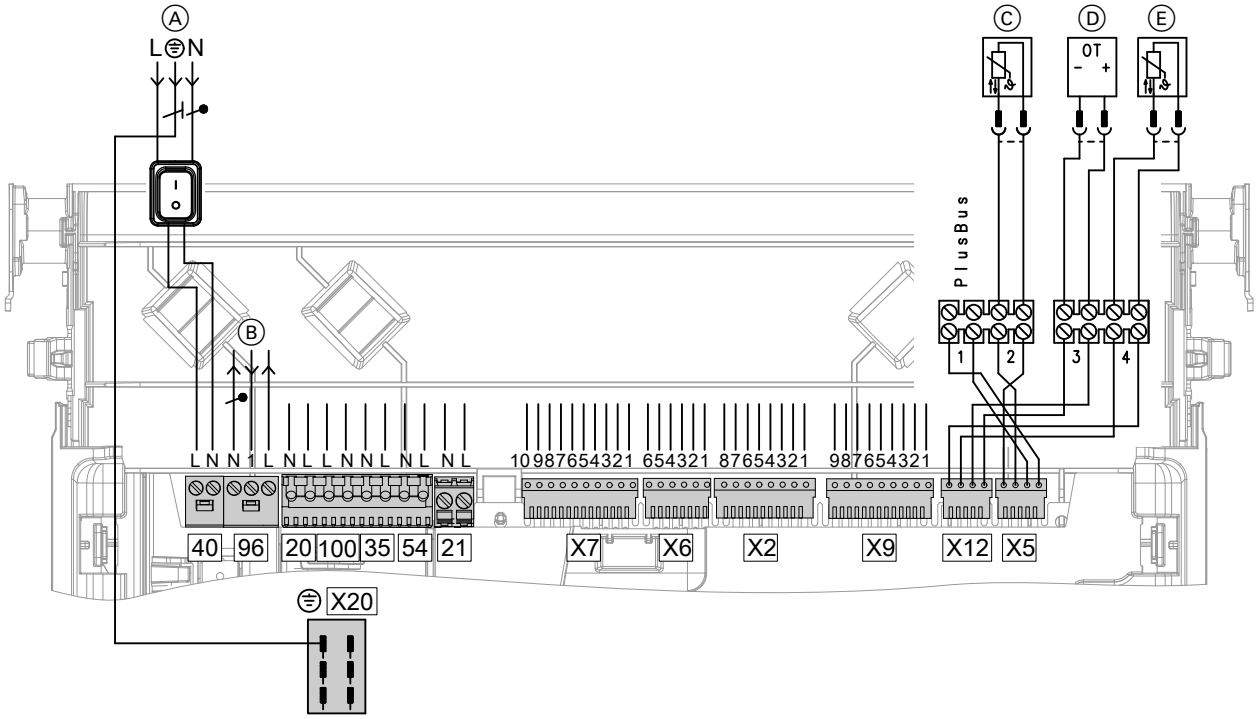


*Fig. 14*

**Connections to 230 V~ plugs**

Ⓐ Power supply 40
Ⓑ Configurable floating input 96, 230 V
230 V output
230 V room thermostat connection
20 Heating circuit pump
100 Fan motor
35 Gas solenoid valve
54 Ignition unit/ionisation
21 No function assigned

Ⓒ Cylinder temperature sensor (system boiler)
Ⓓ Remote control (OpenTherm device)
Ⓔ Outside temperature sensor
X20 Equipotential bonding (earth conductor)

**Note on connecting accessories**
When connecting accessories observe the separate installation instructions provided with them.



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## Electrical connections (cont.)

### On-site connections on the HBMU heat management unit

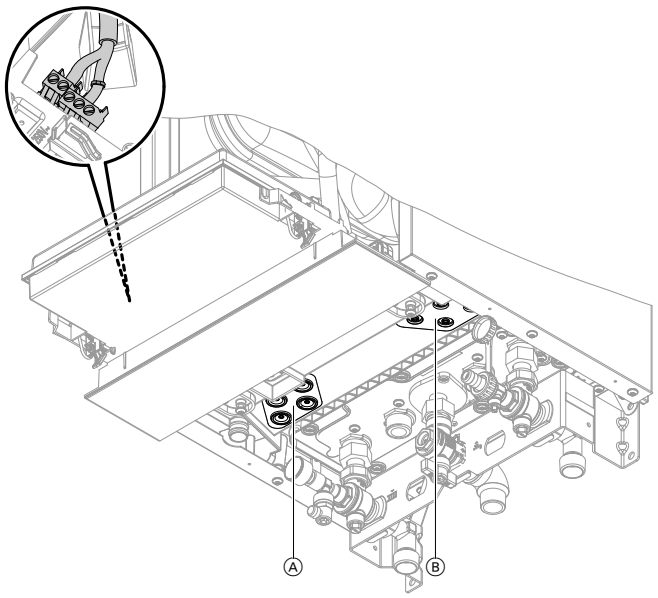


*Fig. 15*

Ⓐ Diaphragm grommets, 230 V cables
Ⓑ Diaphragm grommets, extra low voltage (ELV)

- Open diaphragm grommets as required. Thread through only one cable at a time without a plug. Ensure diaphragm grommets are airtight. If required, remove plug from cable. After threading the cable through, re-fit the plug to the wire ferrules.
- For cables without strain relief bushings, provide strain relief in the wiring chamber in the form of cable ties.

### Outside temperature sensor

#### Fitting location for outside temperature sensor

- North or north-westerly wall, 2 to 2.5 m above ground level; in multi storey buildings, in the upper half of the second floor
- Not above windows, doors or vents
- Not immediately below balconies or gutters
- Never render over.

#### Outside temperature sensor connection

See page 24
2-core lead, length up to 35 m with a cross-section of 1.5 mm$^2$

### Connecting the low loss header sensor 9

The sensor of the low loss header is connected to the accessory extension EM-P1 or EM-M1/MX (ADIO electronics module) respectively.

See installation instructions for extension EM-P1 or EM-M1/MX

### Connecting the cylinder temperature sensor

Connect cylinder temperature sensor to terminals Ⓒ.
See page 24.

### Connecting the DHW circulation pump (only type B1HF)

***Note***
*Connect DHW circulation pumps to EM-P1 extension. Configuration via software tool.*
*Connect DHW circulation pumps with standalone functions directly to the 230 V ~ supply.*

| Specification | |
|---|---|
| Rated current | 1 A |
| Rated voltage | 230 V ~ |

## Electrical connections (cont.)

### Floating switching contact connection

Connection at plug 96

**One** of the following functions can be connected:
- **"0"** No function or room thermostat
- **"2"** DHW circulation pump external demand (push-button function, pump runs for 5 min). Not for Vitodens 111-W
- **"4"** External demand
- **"5"** External blocking or alternatively connection for external heating circuit hook-up (if no more than one heating circuit hook-up is configured on commissioning. If more than one heating circuit hook-up is required, connect to EM-EA1 accessory)

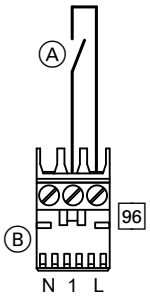


*Fig. 16*

Ⓐ Floating contact
Ⓑ Plug 96

**Assigning functions in the commissioning assistant**

See commissioning assistant in "Commissioning".

**Notes on connecting PlusBus subscribers**

As a maximum, the following PlusBus subscribers can be connected to the control unit (terminal 1):
- One EM-M1 or EM-MX extension
- One Vitotrol 200-E
- One EM-EA1 extension
- One EM-S1 extension
- One EM-P1 extension

***Note***
*The number of PlusBus subscribers is limited: Max. one Vitotrol 200-E plus a maximum of 3 additional extensions, e.g. EM-M1 or EM-EA1.*
*Example: 1 x Vitotrol 200-E + 1 x EM-M1 + 1 x EM-EA1.*
*If no Vitotrol 200-E is connected, 4 extensions can be connected.*

The max. total length of the PlusBus lead is 50 m. With an unscreened lead, 2-core, 0.34 $mm^2$.

**Accessories mains connection, connect plug to external power supply**

Connect one or more extensions via an ON/OFF switch directly to the mains supply (see next chapter).

## Electrical connections (cont.)

Accessories with direct mains connection

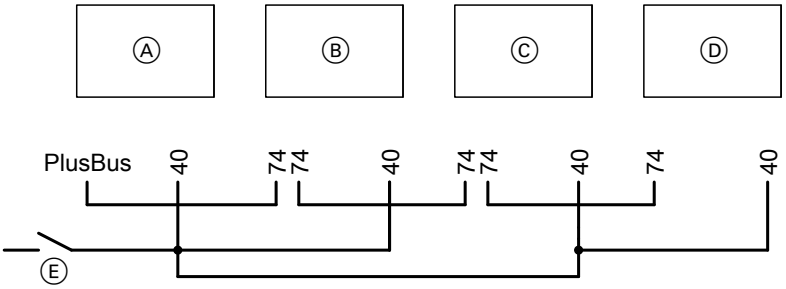


*Fig. 17*

Ⓐ HBMU heat management unit, heat generator
Ⓑ Mixer extension kit
Ⓒ EM-EA1 extension and/or EM-S1 extension
Ⓓ EM-P1 extension
Ⓔ External ON/OFF switch
40 Mains input
74 PlusBus

***Note***
*PlusBus system length max. 50 m for 0.34 mm² cable cross-section and unshielded cable.*
*If the current flowing to the connected working parts (e.g. circulation pumps) is higher than the fuse rating of the relevant accessory, only use the output concerned to control an on-site relay.*

***Note***
*Use addressing for rotary selector S1. See also the information in chapter "Notes on connecting PlusBus subscribers".*

| Accessories | Internal fuse protection |
|---|---|
| EM-M1, EM-MX mixer extension kit | 2 A |
| EM-EA1 extension | 2 A |
| EM-S1 extension (not for Vitodens 111) | 2 A |

**Danger**
Incorrect wiring can lead to serious injury from electrical current and result in appliance damage.
- Route extra low voltage (ELV) leads < 42 V separately from cables > 42 V/230 V~.
- Strip as little of the insulation as possible, directly before the terminals, and bundle close to the corresponding terminals.
- Secure cables/leads with cable ties.

## Power supply 40

**Danger**
Incorrectly executed electrical installations can result in injuries from electrical current and damage to the appliance.

Connect the power supply and implement all safety measures (e.g. RCD circuit) in accordance with the following regulations:
- IEC 60364-4-41
- IEEE Wiring Regulation; BS 7671:2018
- Connection conditions of the local grid operator

- Install an isolator in the power cable to provide omnipolar separation from the mains for all active conductors, corresponding to overvoltage category III (3 mm) for complete isolation. The isolator must be fitted in the permanent electrical installation, in line with installation requirements.
  We also recommend installing a pulse current-sensitive RCD (RCD class A ⏦).
- Connect the power cable to the electricity supply using a fixed connection.
- If the power supply to the appliance is connected with a flexible power cable, ensure that the live conductors are pulled taut before the earth conductor in the event of strain relief failure. The length of the earth conductor wire will depend on the design.
- Max. fuse rating 16 A.

## Electrical connections (cont.)

**Danger**
The absence of system component earthing can lead to serious injury from electric current if an electrical fault occurs.
The appliance and pipework must be connected to the equipotential bonding of the building.

### Routing connecting cables/leads



**Please note**
If closures or diaphragm grommets are damaged, splashproofing is no longer ensured.
Never open or damage closures or unused diaphragm grommets on the underside of the appliance. Seal cable entries with fitted diaphragm grommets.

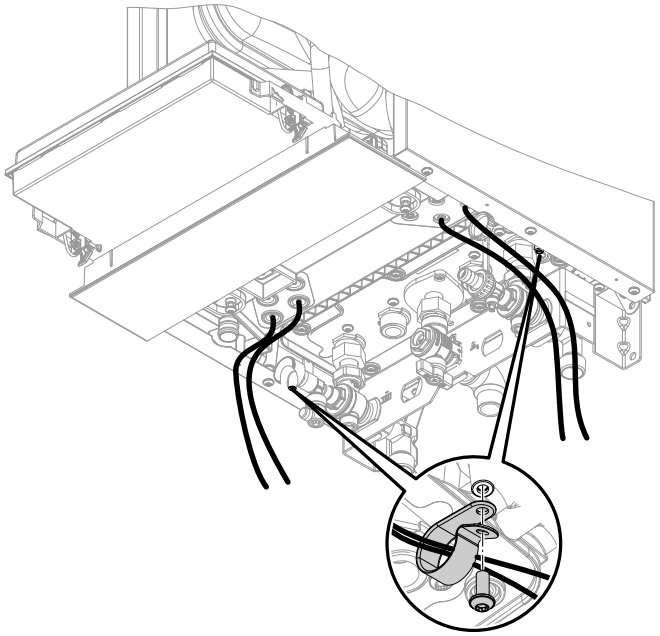

*Fig. 18*

Bundle cables using the supplied cable clips.
Route extra low voltage (ELV) leads < 42 V separately from cables > 42 V/230 V~.
Secure the cable clips on the underside using the supplied screws.
Do not route cables/leads over sharp edges and lying against the casing (sound transmission).

**Please note**
If connecting cables/leads come into contact with hot components, they will be damaged.
When routing and securing cables/leads on site, ensure that the maximum permissible temperatures for these cables/leads are not exceeded.

## WiFi operational reliability and system requirements

WiFi router system requirement
- WiFi router with activated WiFi:
  The WiFi router must be protected by a sufficiently secure WPA2 password.
  The WiFi router must always have the latest firmware update.
  Do not use unencrypted connections between the heat generator and the WiFi router.
- Internet connection with high availability:
  Flat rate (flat rate tariff **without** restriction on time or data volume)
- Dynamic IP addressing (DHCP, delivered condition) in the network (WiFi):
  Have this checked on site by an IT expert **prior** to commissioning. Arrange for set up if required.
- Set routing and security parameters in the IP network (LAN).
  Enable the following ports for direct outgoing connections:
  - Port 80
  - Port 123
  - Port 443
  - Port 8883

  Have this checked on site by an IT expert **prior** to commissioning. Set up enabling if required.

## WiFi operational reliability and system… (cont.)

### Wireless signal range of WiFi connection

The range of wireless signals may be reduced by walls, ceilings and interior fixtures. These weaken the wireless signal, causing poor reception due to the following circumstances.

- On their way between transmitter and receiver, wireless signals are **damped**, e.g. by air or when penetrating walls.
- Wireless signals are **reflected** by metallic objects, e.g. reinforcements embedded in walls, metal foil of thermal insulation and thermal glazing with metallised thermal vapour deposit.
- Wireless signals are **isolated** by service ducts and lift shafts.
- Wireless signals are **disrupted** by devices that also operate with high frequency signals. Maintain a distance of **at least 2 m** from these devices:
  - Computers
  - Audio and video systems
  - Devices with active WiFi connection
  - Electronic transformers
  - Pre-ballasts

Install the heat generator as close as possible to the WiFi router to ensure a good WiFi connection. The signal strength can be displayed on the programming unit: See operating instructions.

***Note***

*The WiFi signal strength can be increased with commercially available WiFi repeaters.*

### Angle of penetration

The reception quality remains best if radio signals hit the walls vertically.
Depending on the angle of penetration, the effective wall thickness changes and so does the extent to which the electromagnetic waves are damped.

**Flat (unfavourable) angle of penetration**

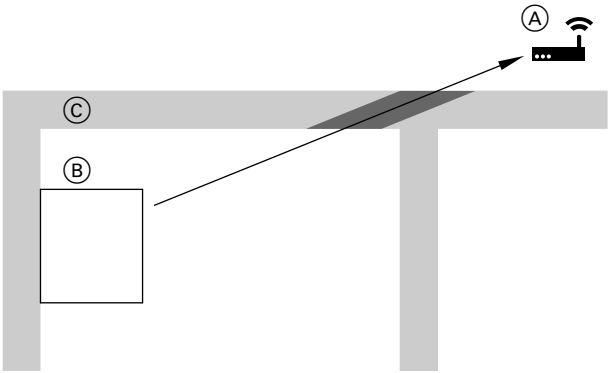


*Fig. 19*

Ⓐ WiFi router
Ⓑ Heat generator
Ⓒ Wall

**Ideal angle of penetration**

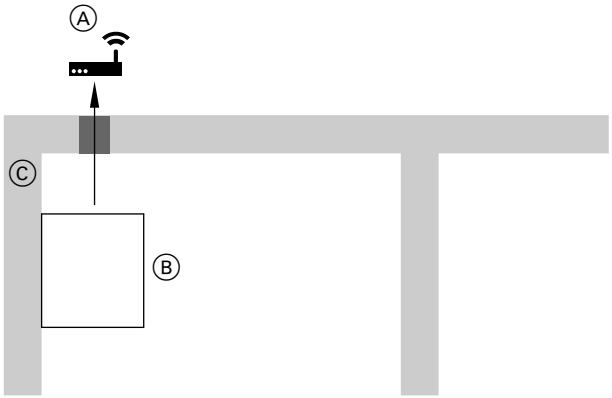


*Fig. 20*

Ⓐ WiFi router
Ⓑ Heat generator
Ⓒ Wall

## Closing the wiring chamber

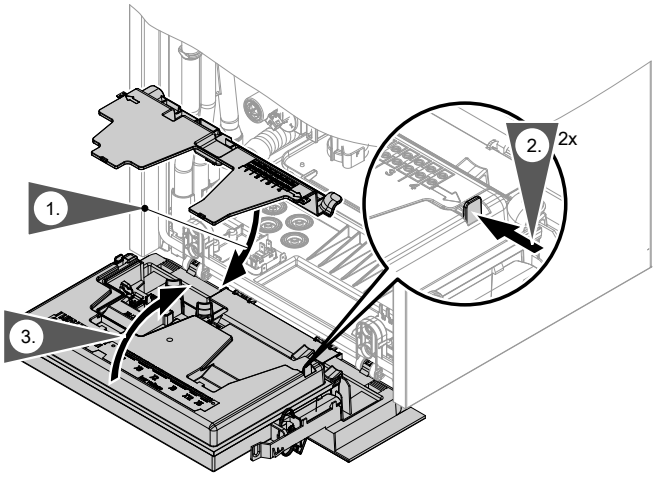


*Fig. 21*

## Fitting the front panel

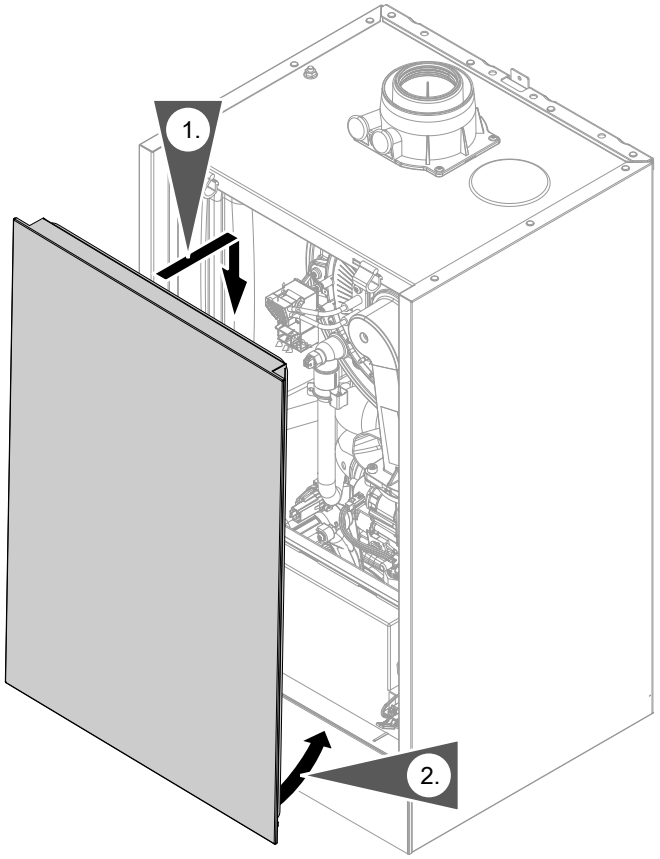


*Fig. 22*





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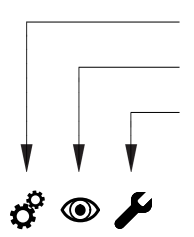
## Steps - commissioning, inspection and maintenance



## Commissioning the system

**Please note**
Only commission the appliance with a fully filled trap.
Check that the trap has been filled with water.

### Commissioning via commissioning assistant

1. Open the gas shut-off valve.

2. If the appliance has not yet been switched on:
   1. Turn on the ON/OFF switch.
   2. **AP** and appear on the display.
   3. Press menu button for 4 s to start the commissioning assistant.

   If the appliance has already been switched on, you can call up the commissioning assistant yourself:
   1. and **OK** simultaneously for approx. 4 s.
   2. Use / to select **"b.5"** and confirm with **"OK"**.
      ***Note***
      ***AP** and appear on the display. Confirm with **OK** to start the connection with the software tool: See chapter "Commissioning via software tool".*
   3. for 4 s to start the commissioning assistant.

3. For further steps, see commissioning assistant in the following overview.

### Commissioning via software tool

***Note***
*Apps for commissioning and service are available for iOS and Android devices.*

Download on the App Store

GET IT ON Google Play

1. Open the gas shut-off valve.

2. **AP** and appear on the display.
   Press **OK** and enter the password for the heat generator to carry out commissioning with the software tool.

3. Select **ON** and confirm with **OK**.

4. Follow the instructions in the software tool.

## Commissioning the system (cont.)

| Commissioning assistant sequence | Explanations and references |
|---|---|
| **Commissioning** | |
| **"C.1"**<br>Filling program | ON = on<br>OFF = off<br><br>***Note***<br>*It is possible to interrupt or end the process while a rotating rectangle alternating with the current system pressure is displayed; to do so, press ≡ for 3 s.* |
| **"C.2"**<br>Venting program | ON = on<br>OFF = off<br><br>***Note***<br>*It is possible to interrupt or end the process while a rotating rectangle alternating with the current system pressure is displayed; to do so, press ≡ for 3 s.* |
| **"C.3"**[*1]<br>Gas type | 2 - Natural gas<br>3 - Liquid gas LPG |
| **"C.5"**[*1]<br>Flue system | 1 - Open flue 60 mm, rigid<br>2 - Room sealed 60/100 mm, rigid<br>3 - Open flue 80 mm, rigid<br>4 - Room sealed 80/100 mm, rigid |
| **"C.6"**[*1]<br>Flue length | Given in full metres (round up if necessary)<br><br>***Note***<br>*An additional length of 1 m must be factored in for every flue bend.* |
| **"C.7"**<br>Operating mode | 1 - Constant operation with time program<br>4 - Weather-compensated<br>13 - Constant operation with optional room thermostat<br>14 - OpenTherm<br>15 - Individual room control<br>16 - Individual room control with modulation<br><br>***Note***<br>*Operating modes 15 and 16 can only be set via the software tool.* |

*[*1] This setting is not required for appliances with multiple connection "M".*
*The gas type is preset to natural gas; the flue system and flue pipe length are automatically set correctly via the integral mass flow correction.*

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## Commissioning the system (cont.)

| Commissioning assistant sequence | Explanations and references |
|---|---|
| **"C.8"**<br>System scheme (depending on appliance type, not all schemes possible) | 1 - 1 direct heating circuit without low loss header<br>2 - 1 direct heating circuit with low loss header<br>3 - 1 direct heating circuit without low loss header with DHW cylinder<br>4 - 1 direct heating circuit with low loss header and DHW cylinder upstream of low loss header<br>5 - 1 direct heating circuit + 1 heating circuit with mixer and low loss header + DHW cylinder<br>6 - 1 direct heating circuit with low loss header + DHW cylinder upstream of low loss header + solar DHW cylinder<br>7 - 1 direct heating circuit + 1 heating circuit with mixer and low loss header + DHW cylinder upstream of low loss header + solar DHW cylinder<br>8 - 1 direct heating circuit + 1 heating circuit with mixer and low loss header<br>9 - 1 heating circuit with mixer and low loss header + DHW cylinder upstream of low loss header<br>10 - 1 direct heating circuit without low loss header + DHW cylinder + solar DHW cylinder<br><br>***Note***<br>*System schemes 11 - 18 and the DHW circulation pump can be set via the software tool.*<br><br>11 - 1 heating circuit with mixer without low loss header<br>12 - 1 heating circuit with mixer with low loss header<br>13 - 1 heating circuit with mixer without low loss header + DHW cylinder<br>14 - 1 direct heating circuit + 1 heating circuit with mixer without low loss header + DHW cylinder<br>15 - 1 heating circuit with mixer with low loss header + DHW cylinder + solar DHW cylinder<br>16 - 1 heating circuit with mixer without low loss header + DHW cylinder + solar DHW cylinder<br>17 - 1 direct heating circuit + 1 heating circuit with mixer without low loss header + DHW cylinder + solar DHW cylinder<br>18 - 1 direct heating circuit + 1 heating circuit with mixer without low loss header<br><br>***Note***<br>*If a DHW circulation pump has been configured via the software tool, it is shown with a "C" after the system scheme number.* |
| **"C.9"**<br>External heating circuit hook-up | ***Note***<br>*Only for weather-compensated operation.*<br><br>0 - No external heating circuit hook-up<br>1 - External heating circuit hook-up HC1<br>2 - External heating circuit hook-up HC2<br>3 - External heating circuit hook-up HC1 and HC2 (EM-EA1 extension (DIO) required) |

## Commissioning the system (cont.)

| Commissioning assistant sequence | Explanations and references |
|---|---|
| **"C.10"**<br>EM-EA1 (DIO) function<br><br>***Note***<br>*If "C.9" is set to 3, then no setting is required at "C.10".* | 0 - No function<br>4 - External set flow temperature 0-10 V<br>5 - External default output<br>8 - 230 V fault message input and fault message output (without system blocking)<br>9 - External LPG valve<br>10 - External extractor (e.g. cooker hood)<br>11 - Operating mode changeover<br>14 - Fault message input 24 V and system blocking (e.g. condensate lift pump)<br>17 - 230 V fault message input and system blocking<br>18 - External demand (digital)<br>19 - External blocking |
| **"C.11"**<br>Date (day, month, year) | |
| **"C.12"**<br>Time (hours, minutes) | |
| **"C.13"**<br>Autom. summer/wintertime changeover | ON = on<br>OFF = off |
| **"C.14"**<br>Plug 96 function | 0 - No function<br>2 - External demand DHW circulation pump<br>4 - External demand<br>5 - External blocking<br>If only one HC was configured with external hook-up, plug 96 setting is automatically applied. No selection or other function is then possible. |
| **"C.15"**<br>Remote control | Off - not installed<br>ON - Vitotrol 200-E with subscriber number 1 installed (all installed heating circuits can be controlled via the Vitotrol 200-E) |
| | After the final setting (C.15) has been completed, **"End"** appears on the display. Confirm with **"OK"**.<br>The commissioning is started, the flue temperature sensor test is launched and **"Fst"** appears on the display. |
| **Maintenance** | |
| Interval in burner hours run until next maintenance | Can be adjusted via software tool (notification also via software tool) |
| Interval until next maintenance | Can be adjusted via software tool (notification also via software tool) |
| The system carries out a restart. | |

### Automatic flue gas temperature sensor check

The display shows: **"Err"**
If the flue gas temperature sensor is not positioned correctly, fault message 416 appears.
For further details regarding the flue gas temperature sensor test, see "Repairs".
If fault message 416 appears, reposition the flue gas temperature sensor in the flue gas connection. Check for leaks on the flue gas side.

***Note***
*The burner remains locked out until the test has been passed.*

When the fault has been remedied, turn the ON/OFF switch off and back on again.

## Commissioning the system (cont.)

### Switching WiFi ON/OFF

The appliance is equipped with an integrated WiFi communication module with extended type plate.
The internal communication module supports commissioning of the heat generator with the "Vitoguide app", connectivity with the "ViCare app" and the connection to the "Vitoguide" 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 space marked out on the type plate.
Switch on the WiFi connection and establish a connection to the router; see also page 28.

***Note***
*If **"E10"** is displayed, the connection to the home network could not be established. Check the router and the network password.*
*If **"E12"** is displayed, the connection to the server could not be established. Re-establish the connection at a later time.*

Activating the internet connection:

Operating instructions

Affix a further credentials label here, so it can be found for subsequent use:

*Fig. 23*

Affix a label in the operating instructions.

***Note***
*If the communication module is to be switched on or off, press ⌄ and **OK** simultaneously for 4 s.*

## Filling the heating system

According to EN 1717, as a heat transfer medium for DHW heating, the heating water must meet fluid category ≤ 3. This requirement is met if water of potable quality is used as heating water. For example, if additives are used, the additive manufacturer must specify which category the treated heating water comes under.

**Please note**
Unsuitable fill water increases the level of deposits and corrosion and may lead to appliance damage.
- Flush the heating system thoroughly before filling.
- Only fill with water of potable quality.
- Fill water with a hardness above 300 ppm must be softened.
- Special antifreeze suitable for heating systems can be added to the fill water. The antifreeze manufacturer must verify its suitability.

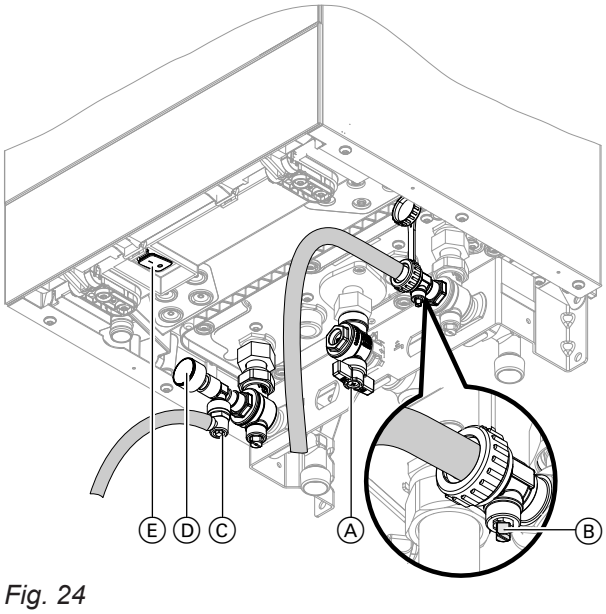



*Fig. 24*

1. Check the pre-charge pressure of the expansion vessel.
2. Close gas shut-off valve Ⓐ.
3. Activate the filling function (see commissioning assistant or following chapter).

## Filling the heating system (cont.)

4. Fill the heating system at boiler drain & fill valve Ⓑ in the heating return (on the connection set or on site). Minimum system pressure > 1.0 bar (0.1 MPa). Check the system pressure at pressure gauge Ⓓ. The indicator must be in the green band. If necessary, open the on-site air vent valves.

   ***Note***
   *Ensure that the safety valve does not respond when you are filling the system. If the flow rate through the safety valve becomes too high, water may enter the combustion chamber.*

5. Fit hose to air vent valve Ⓒ. Route the hose into a suitable container or drain outlet.

6. Close the shut-off valves on the heating water side.

7. Open air vent valve Ⓒ and fill valve Ⓑ in the heating return. Vent (flush) under mains pressure until no more air noise is audible.

8. Close air vent valve Ⓒ and boiler drain & 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. ☰ and **OK** simultaneously for approx. 4 s, then release.
2. Use ∧/∨ to select **"b.5"** for the commissioning assistant.
3. **OK**
4. The display shows **"AP"**.
   Press ☰ for 4 s.
5. Use ∧/∨ to select **"C.1"** for the filling function.
6. **OK**
7. ∧/∨ to select **"ON"** for filling.
8. **OK**
   The filling function is activated. The display shows a rotating rectangle.
   The filling function ends automatically after 20 min or press ☰ for 4 s.

## Checking all connections on the heating water and DHW sides for leaks

⚠ **Danger**
There is a 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.

! **Please note**
Leaking hydraulic connections lead to appliance damage.
- Check the internal and on-site hydraulic connections for leaks.
- In the event of leaks, switch off the appliance immediately. Drain the heating water. Check the seating of seal rings. **Always** replace displaced seal rings.

## Venting the heating system

1. Close the gas shut-off valve and switch the appliance ON.
2. Activate the venting program (see commissioning assistant or following chapter).
3. Adjust the system pressure.
   The display shows the system pressure.
4. Disconnect the supply hose from the boiler drain & fill valve.
5. Open the gas shut-off valve.

## Venting the heating system (cont.)

### Activating the venting function

If the venting function is to be activated after commissioning.

**Tap the following buttons:**

1. ☰ and **OK** simultaneously for approx. 4 s, then release.
2. Use ∧/∨ to select **"b.5"** for the commissioning assistant.
3. **OK**
4. The display shows **"AP"**.
   Press ☰ for 4 s.
5. Use ∧/∨ to select **"C.2"** for venting.
6. **OK**
7. ∧/∨ to select **"ON"** to switch on venting.
8. **OK**
   The venting function is activated. The display shows a rotating rectangle.
   The venting function ends automatically after 20 min or press ☰ for 4 s.

## Checking the gas type

The boiler is equipped with an electronic combustion controller that adjusts the burner for optimum combustion in accordance with the prevailing gas quality.

- For operation with natural gas, no adjustment is therefore required across the entire Wobbe index range. The boiler can be operated within the Wobbe index range 9.5 to 15.2 kWh/m³ (34.2 to 54.7 MJ/m³).
- For operation with LPG, the gas type needs to be changed on the control unit (see following chapter).

1. Determine the gas type and Wobbe index by asking your local gas supply utility or LPG supplier.
2. Record the gas type in the service report.

## 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 label "G31" (supplied with the technical documentation) adjacent to the type plate on the cover panel.

## Removing the front panel

**Danger**
Contact with live components can lead to serious injury from electric current. Some components on PCBs remain live even after the power supply has been switched off.

- **Never touch** the wiring chambers (control unit and power supply connections).
- When working on the appliance, isolate the system from the power supply, e.g. at a separate MCB/fuse or a mains isolator. Check the system is no longer live and safeguard against reconnection.
- Prior to working on the appliance, wait at least 4 min until the voltage has completely dropped out.

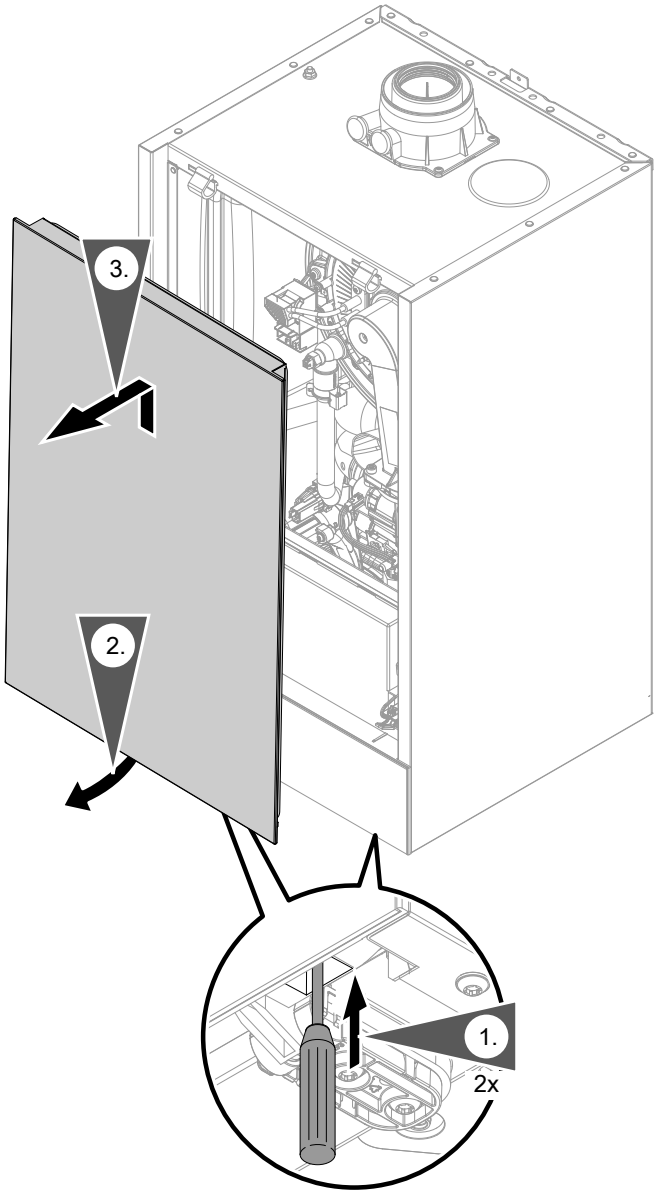



*Fig. 25*

## Checking the static pressure and supply pressure

**Danger**
CO formation as a result of incorrect burner adjustment can have serious health implications. Always carry out a CO test before and after work on gas appliances.

**Gas installation to BS 6891:2005**

It is the gas installer's responsibility to size the gas installation lines in accordance with BS 6891:2005. If it is determined that the operating pressure falls below the minimum outlet level for the measuring device of 19 MB, it should be checked to ensure that the gas pressure is sufficient for correct and safe operation.
Taking into account a pressure drop from the installation lines of no more than 1 MB, it can be assumed that a permissible minimum pressure of 18 MB is present at the appliance's gas connection (reference BS 6400-1 Section 6.2, Pressure absorption).

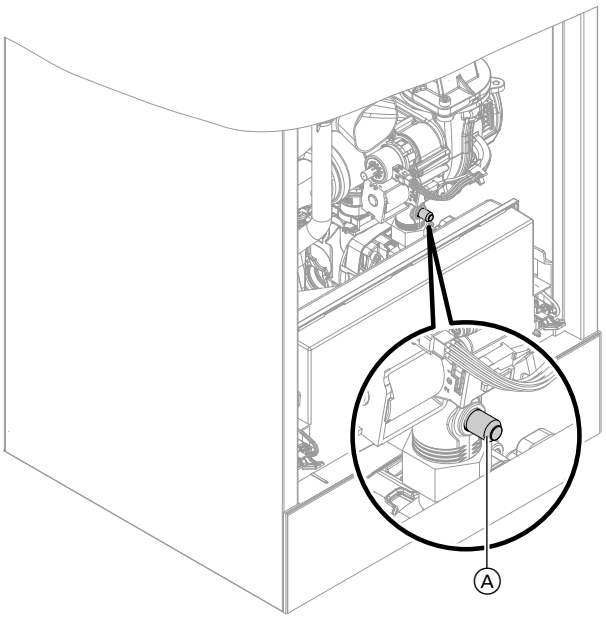



*Fig. 26*

The external gas tap may reduce operating pressure further if measured at its test point. The pressure drop is relative to the heat input of the boiler (kW).
Observe minimum gas pressure at the gas fitting in accordance with the table – see page 41

**Operation with LPG**

Purge the LPG tank twice on commissioning/replacement. Vent the tank and gas connection line thoroughly after purging.

1. Turn off the ON/OFF switch.
2. Close the gas shut-off valve.
3. Undo screw Ⓐ inside test connector on the gas solenoid valve, but do not remove it. Connect the pressure gauge.
4. Open the gas shut-off valve.
5. Measure the static pressure and record it in the report:
   Max. 57.5 mbar (5.75 kPa).
6. Turn on the ON/OFF switch and start the boiler.

   ***Note***
   *During commissioning, the appliance can enter a fault state if there are airlocks in the gas line. Reset the appliance after approx. 5 s (see operating instructions).*
7. Measure the supply (flow) pressure. For set values, see the following table.

   ***Note***
   *Use a suitable measuring device with a resolution of at least 0.1 mbar (0.01 kPa) to check the supply pressure.*
8. Record the measured value in the report. Implement measures as indicated in the table below.
9. Shut down the boiler. Close the gas shut-off valve. Remove the pressure gauge. Close test connector Ⓐ with the screw.

## Checking the static pressure and supply pressure (cont.)

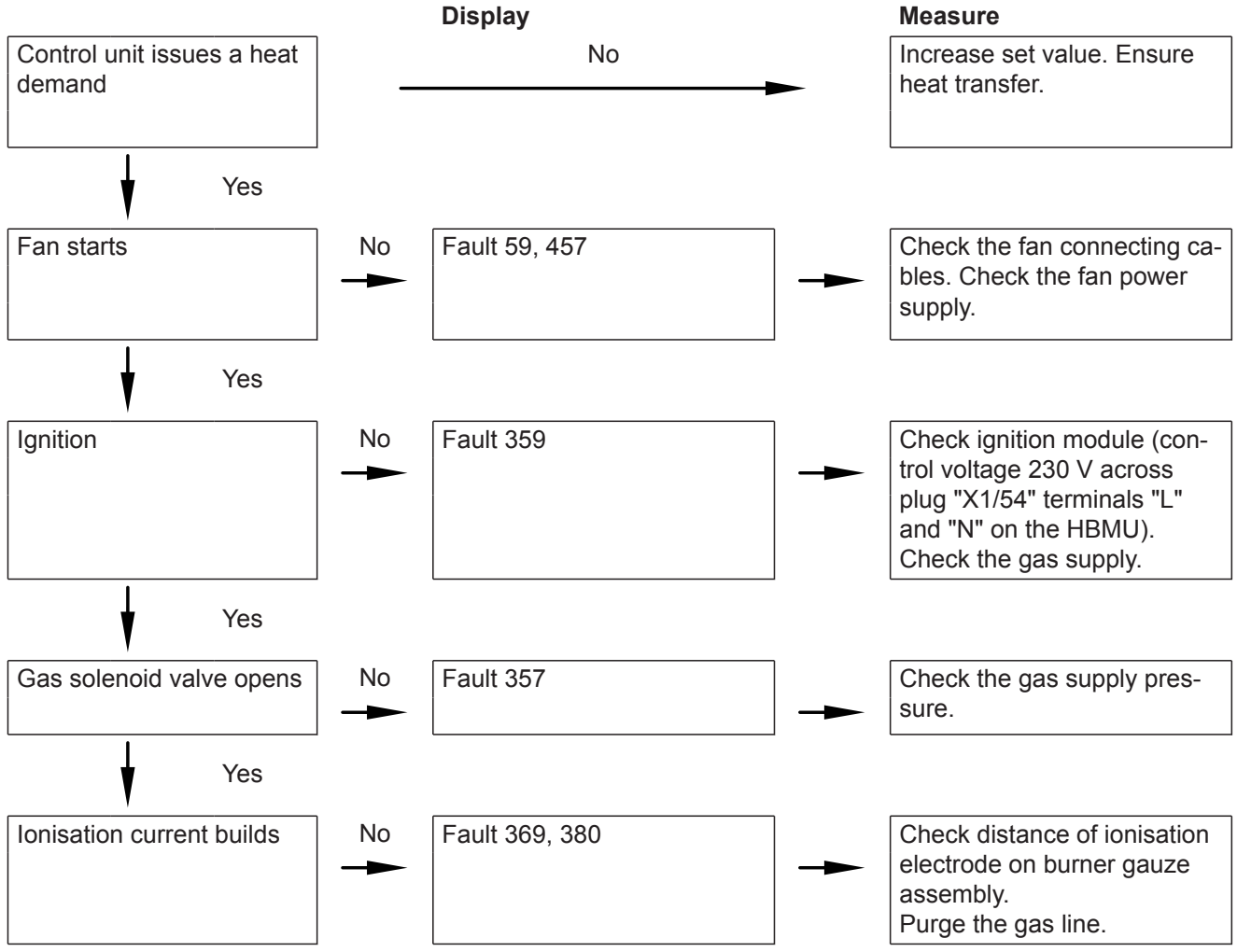
**10.** Open the gas shut-off valve and start the appliance.

**Danger**
Gas escaping from the test connector leads to a risk of explosion.
Check gas tightness at test connector Ⓐ.

**11.** Fit front panel (see installation sequence).

| Supply pressure (flow pressure) | | Measures |
|---|---|---|
| **For natural gas** | **For LPG** | |
| < 13 mbar (1.3 kPa) | < 25 mbar (2.5 kPa) | Do not start the boiler. Notify the gas supply utility or LPG supplier. |
| 13 to 25 mbar (1.3 to 2.5 kPa) | 25 to 57.5 mbar (2.5 to 5.75 kPa) | Start the boiler. |
| > 25 mbar (2.5 kPa) | > 57.5 mbar (5.75 kPa) | Install a separate gas pressure governor upstream of the system. Set the pre-charge pressure to 20 mbar (2.0 kPa) for natural gas and 50 mbar (5.0 kPa) for LPG. Notify the gas supply utility or LPG supplier. |

## Function sequence and possible faults

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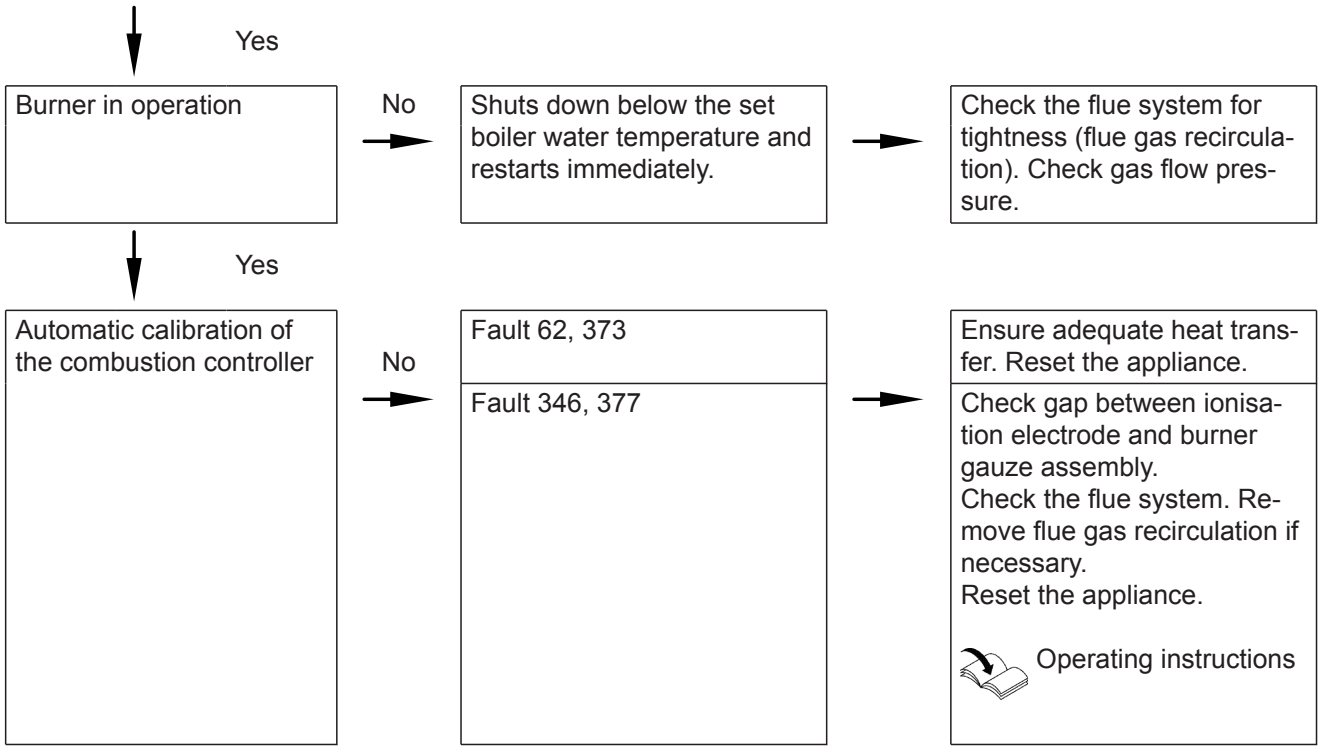
## Function sequence and possible faults (cont.)




For further details regarding faults, see "Troubleshooting".

## Setting the maximum heating output

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

***B1HF-11***
*The max. heating output is **not** adjustable.*

**Tap the following buttons:**

1. ☰ and **OK** simultaneously for approx. 4 s, then release.
2. Use ∧/∨ to select **"b.2"** for system configuration.
3. **OK**
4. Use ∧/∨ to select **"7"** for max. heating output.
5. **OK**
6. Use ∧/∨ to set the required value in % of rated heating output. Factory setting 100 %.
7. **OK**

## Testing outputs (actuator test)

Actuator test only adjustable via the software tool.

## Adjusting pump rate of integral circulation pump

### 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 mode or reduced mode. The max. speed for heating mode can be matched to the existing heating system at the control unit.

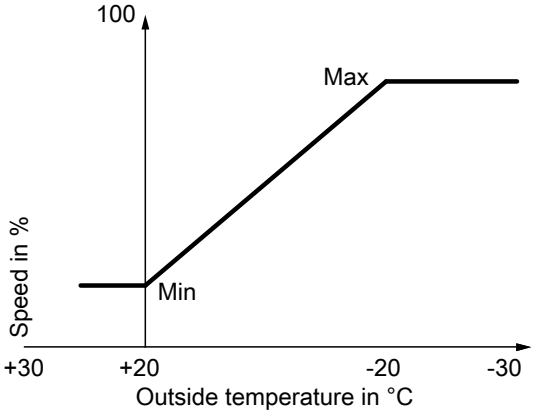



*Fig. 27*

Setting (%) in system configuration. See page 57.

- In the delivered condition, the minimum pump rate and the maximum pump rate are set to the following values:

| Rated heating output in kW | Speed settings in the delivered condition in % | |
|---|---|---|
| | Min. pump rate | Max. pump rate |
| 11 | 40 | 60 |
| 19 | 40 | 65 |
| 25 | 40 | 75 |
| 32 | 40 | 100 |

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

### Residual head of integral circulation pump

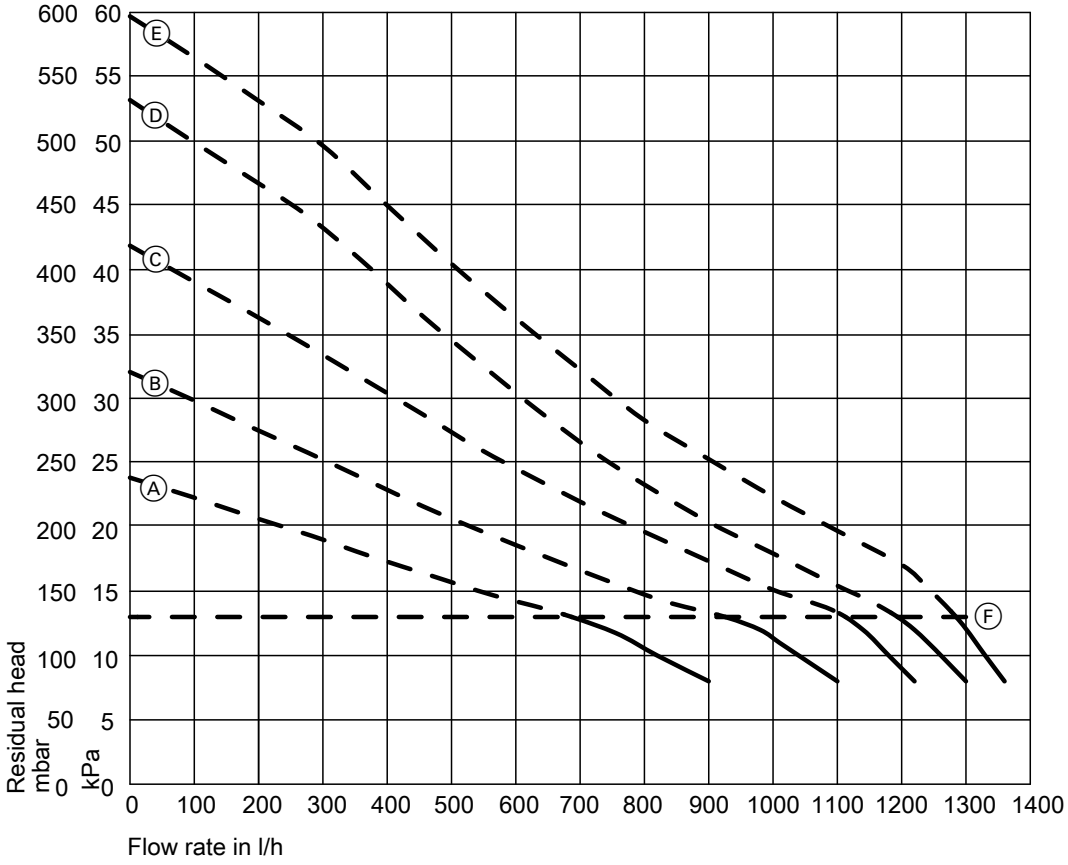



*Fig. 28*

Ⓕ Upper operational limit

## Adjusting pump rate of integral circulation pump (cont.)

| Curve | Pump rate of circulation pump |
|---|---|
| Ⓐ | 60 % |
| Ⓑ | 70 % |
| Ⓒ | 80 % |
| Ⓓ | 90 % |
| Ⓔ | 100 % |

## Activating screed drying

### Screed drying

Six different temperature profiles can be set for screed drying:
Default temperature profiles adjustable in **"System configuration"**.
For further details, see "Function description".

***Note***
*Screed drying applies to all connected heating circuits simultaneously. DHW heating is not possible during screed drying.*

## Leak test on balanced flue system (annular gap check)

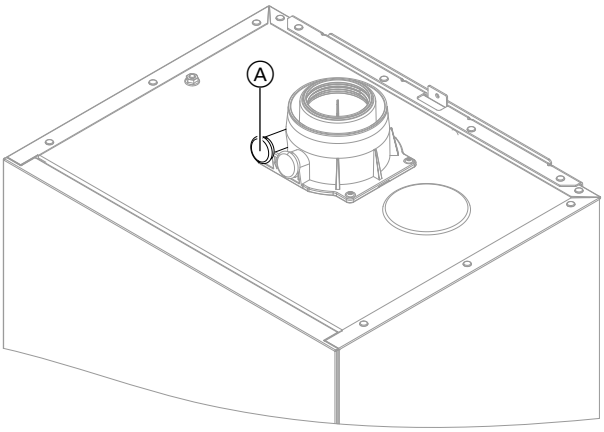



*Fig. 29*

Ⓐ Combustion air aperture

For balanced flue systems tested together with the heat generator, there is no requirement for a tightness test (overpressure test) during commissioning by the flue gas inspector.
In this case, we recommend that a simple tightness test is carried out during system commissioning. For this, check the $CO_2$ or $O_2$ concentration in the combustion air at the annular gap of the balanced flue pipe.
If the $CO_2$ concentration is less than 0.2 % or the $O_2$ concentration is greater than 20.6 %, the flue pipe is deemed to be sufficiently gas-tight.

If actual $CO_2$ values are greater or $O_2$ values are lower, then pressure test the flue pipe with a static pressure of 200 Pa.

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

## Burner adjustment when connecting multiple flues to a shared flue system

***Note***
*Only make this adjustment on appliances suitable for multiple connection.*
*For suitable Vitodens appliances, see pricelist.*

When connecting several Vitodens 100-W to a common flue system:
For multiple connection, in the **commissioning assistant** use **"C.4"**, **"C.5"** and **"C.6"** to match the burner setting to the flue system. See page 32.

System conditions:
- Shared flue in shaft ∅ 100 mm
- Balanced flue connection pipe from boiler to shaft, ∅ 80/125 mm
- Minimum shaft cross-section
  - Square: 175 x 175 mm
  - Round: ∅ 195 mm
- Height between floors min. 2.5 m
- Max. 6 boilers with the same rated heating output connected to the flue system

## Removing the burner

**Danger**
Contact with live components can lead to serious injury from electric current. Some components on PCBs remain live even after the power supply has been switched off.
- **Never touch** the wiring chambers (control unit and power supply connections).
- When working on the appliance, isolate the system from the power supply, e.g. at a separate MCB/fuse or a mains isolator. Check the system is no longer live and safeguard against reconnection.
- Prior to working on the appliance, wait at least 4 min until the voltage has completely dropped out.

## Removing the burner (cont.)

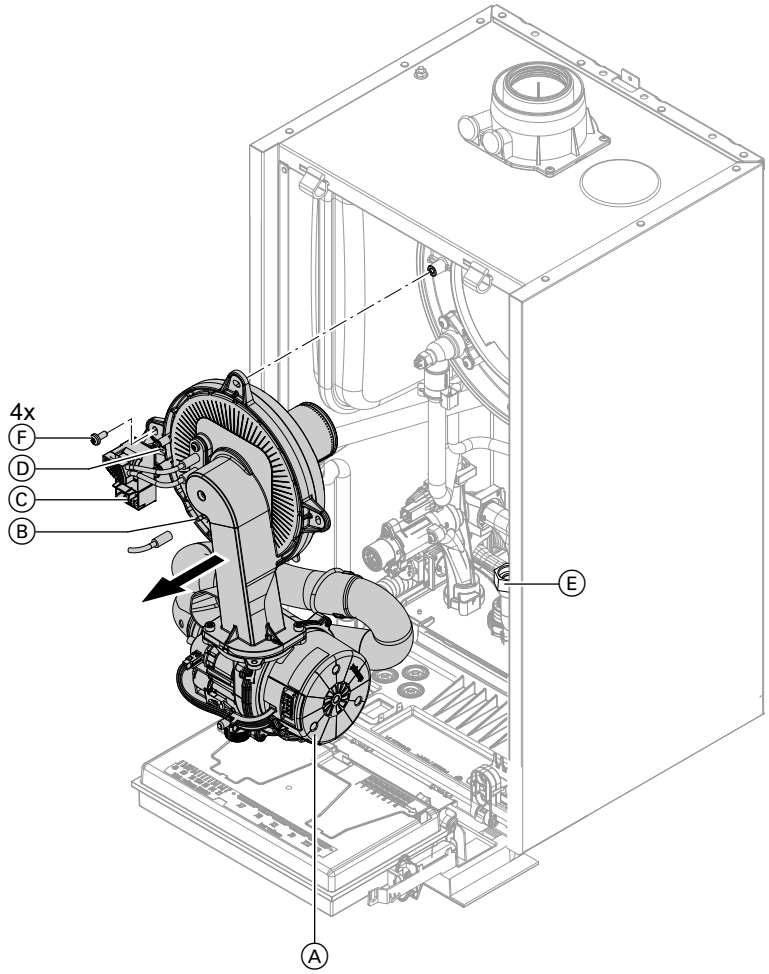



*Fig. 30*

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)
   - Ionisation electrode Ⓑ
   - Ignition unit Ⓒ
   - Earth Ⓓ
4. Undo gas supply pipe fitting Ⓔ.
5. Undo 4 screws Ⓕ and remove the burner.

   ***Note***
   *Cover gas connection Ⓔ so that no small parts can fall into it.*



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## Checking the burner gasket and burner gauze assembly

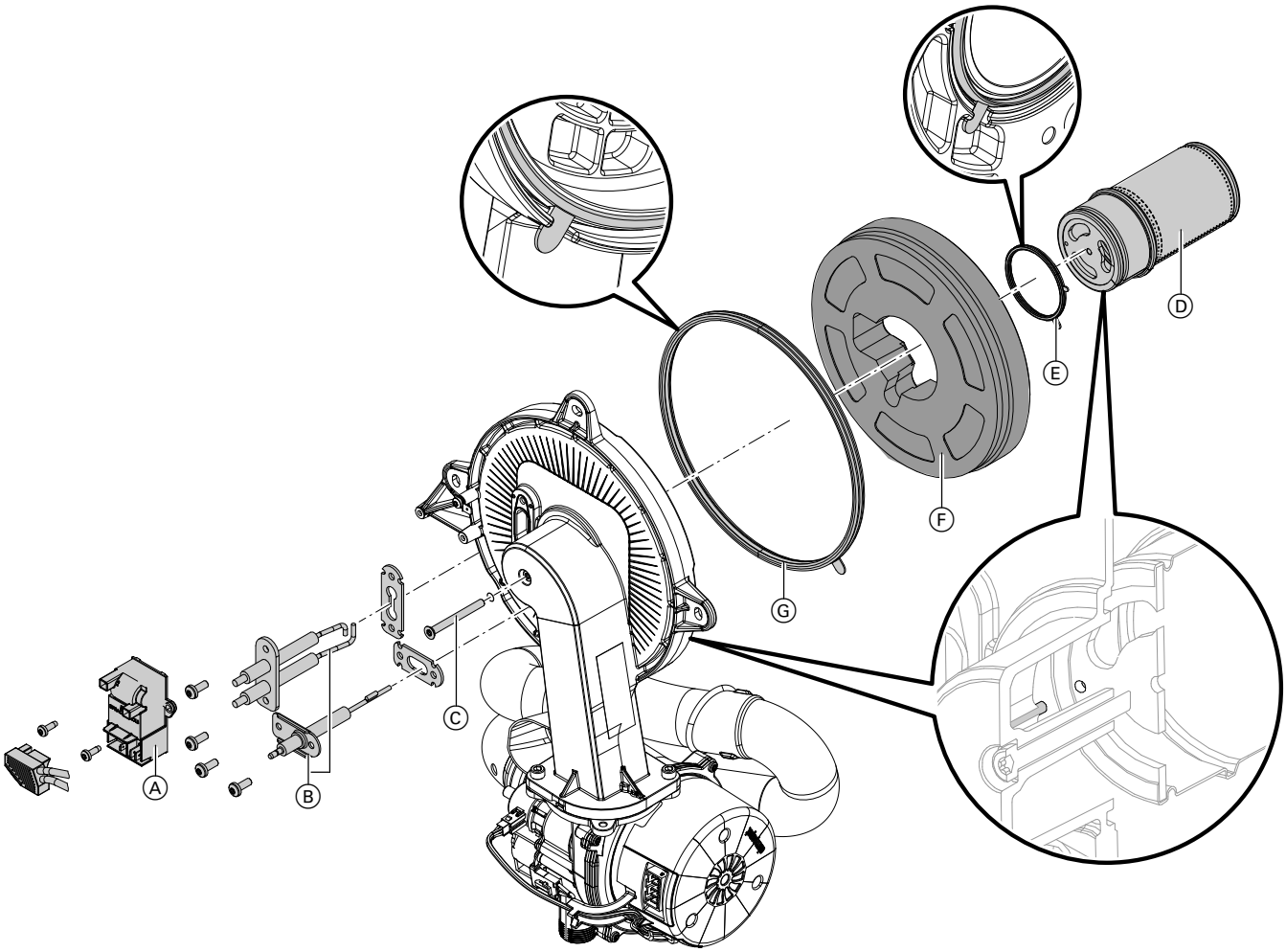


*Fig. 31*

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

***Note***
*If replacing the burner gauze assembly, also replace the gauze assembly gasket and the fixing screw.*

1. Disconnect plug with ignition electrode leads from ignition unit Ⓐ.
2. Remove electrodes Ⓑ.
3. Undo Torx screw Ⓒ. Hold onto burner gauze assembly Ⓓ when undoing the screw.
4. Remove burner gauze 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 burner gauze assembly Ⓓ with gasket Ⓔ. Observe correct installation position. Align the tab as per the diagram.
7. Align the hole in burner gauze assembly Ⓓ with the burner door pin.
   Secure burner gauze assembly Ⓓ and gasket Ⓔ with Torx screw Ⓒ.
   Tighten screws as tightly as necessary and ensure that the components are undamaged and are functioning correctly throughout service life.
   Observe torque settings if a torque wrench is available.
   Torque: 3.0 Nm.
8. Check thermal insulation ring Ⓕ for firm seating.
9. Fit electrodes Ⓑ. Check clearances, see following chapter.
   Tighten screws as tightly as necessary and ensure that the components are undamaged and are functioning correctly throughout service life.
   Observe torque settings if a torque wrench is available.
   Torque: 4.5 Nm.

## Checking and adjusting the ignition and ionisation electrodes

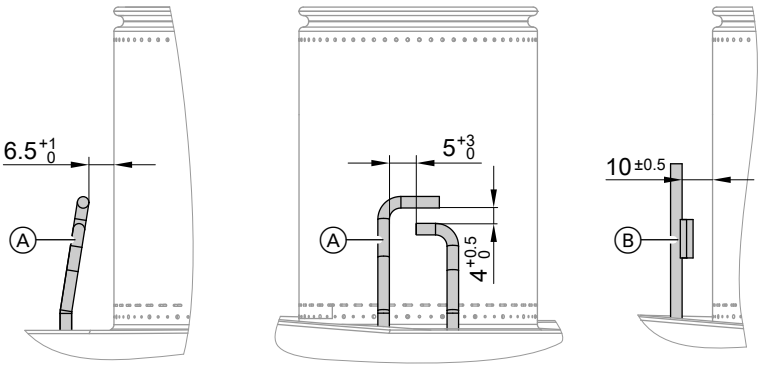


*Fig. 32*

Ⓐ Ignition electrodes
Ⓑ Ionisation electrode

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 screws as tightly as necessary and ensure that the components are undamaged and are functioning correctly throughout service life.
   Observe torque settings if a torque wrench is available.
   Tighten the electrode fixing screws to a torque of 4.5 Nm.

## Checking the back draught safety devices

Only for multiple connections to a flue system or multi boiler systems with a flue gas cascade.

**Back draught safety device in the mixing shaft of the burner**

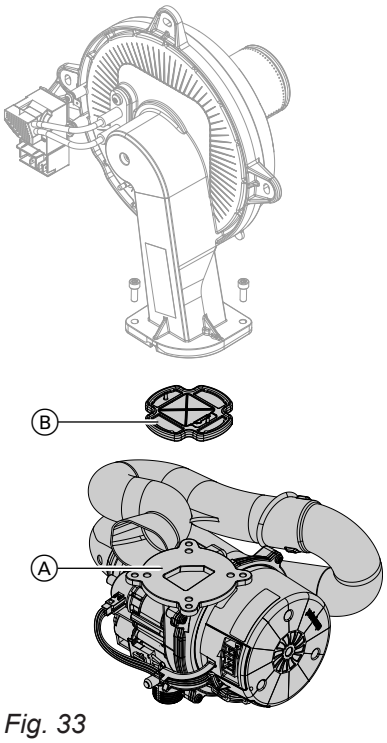


*Fig. 33*



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## Checking the back draught safety devices (cont.)

1. Undo 2 screws and remove fan Ⓐ.
2. Remove back draught safety device Ⓑ.
3. Check the damper and gasket for dirt and damage. Replace if necessary.
4. Refit back draught safety device Ⓑ.

   ***Note***
   *Observe correct installation position.*

5. Refit fan Ⓐ and secure with 2 screws.
   Tighten screws as tightly as necessary and ensure that the components are undamaged and are functioning correctly throughout service life.
   Observe torque settings if a torque wrench is available.
   Torque: 4.0 Nm

**Back draught safety device in the flue gas connection**

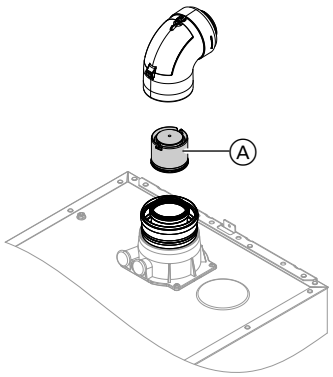


*Fig. 34*

1. Remove the balanced flue system.

   ***Note***
   *If the balanced flue system cannot be removed, clean and check the back draught safety device via the inspection cover.*

2. Check back draught safety device Ⓐ for dirt, ease of movement and function.
3. Refit the balanced flue system.
4. Pour a small amount of water through the inspection port to ensure the back draught safety device is working.

## Cleaning the heating surfaces

! **Please note**
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. **Never use brushes to clean the heating surfaces.**

! **Please note**
Prevent damage due to cleaning water.
Cover electronic components with suitable watertight material.

***Note***
*Discolouration on the heat exchanger surface is a normal sign of use. It has no bearing on the function and service life of the heat exchanger.*
*The use of chemical cleaning agents is not required.*

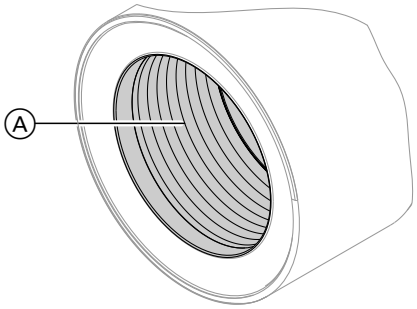


*Fig. 35*

1. Use a vacuum cleaner to remove combustion residues from heating surface Ⓐ of the heat exchanger.
2. Flush heating surface Ⓐ with water.

## Cleaning the heating surfaces (cont.)

3. Check condensate drain. Clean the trap: See the following chapter.
4. Check the thermal insulation mat (if installed) in the heat exchanger for damage, replace if necessary.

## Checking the condensate drain and cleaning the trap

**Please note**
Prevent damage due to condensate.
Cover electronic components with suitable watertight material.

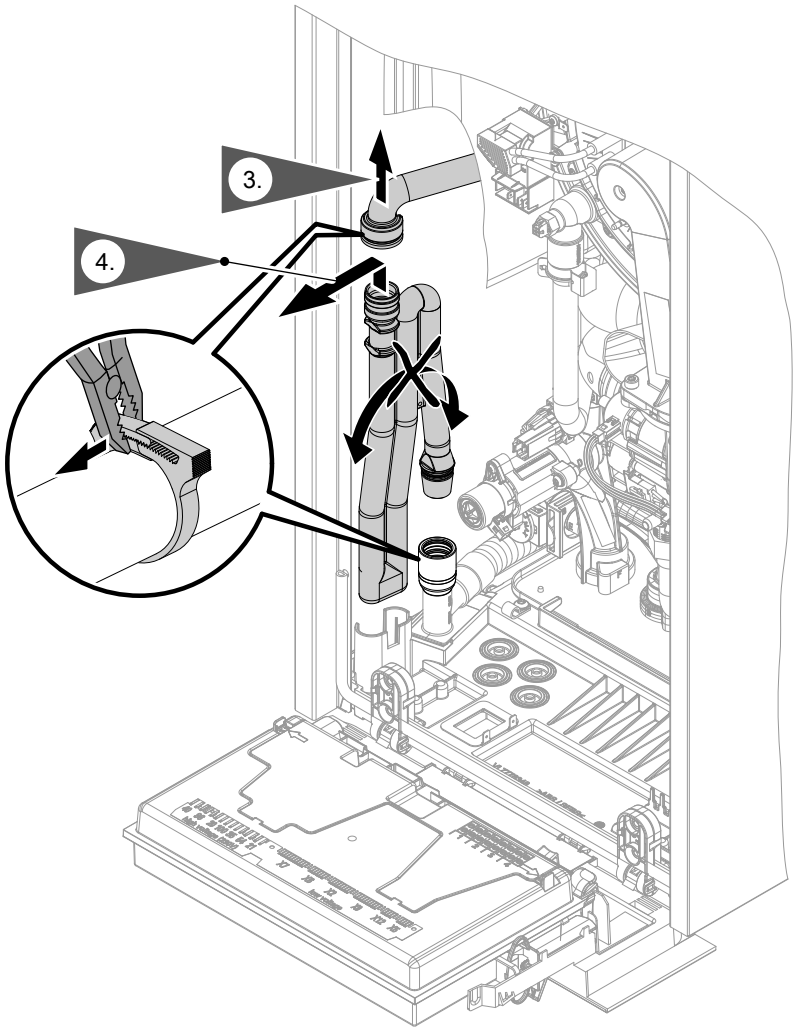


*Fig. 36*

1. Pivot the HBMU heat management unit forwards.
2. Cover electronic components with suitable watertight material.
3. Remove the black supply hose.
4. Pull trap upwards out of the drain hose.
5. Hold trap as straight as possible and remove. Ensure that no condensate runs out.
6. Clean the trap.
7. Fill the trap with water and refit it on the drain hose.

   **Please note**
   If the trap is not filled with water, flue gas can escape.
   Only start the appliance when the trap has been filled.
   Check that the trap is seated correctly.
8. Refit supply hose.

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## Checking the condensate drain and cleaning the… (cont.)

**9.** **Danger**
Risk of electric shock from escaping condensate.
Check the connections for leaks and check that the trap is seated correctly.

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

***Multi boiler system:***
*Clean the trap in the flue gas collector as well.*

## Installing the burner

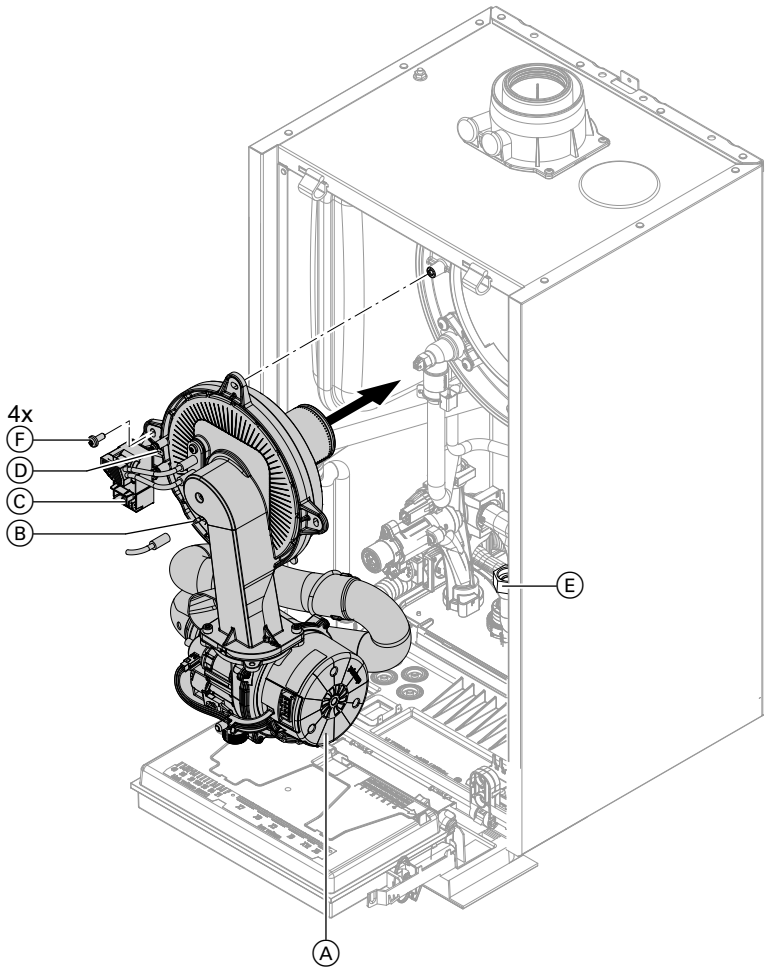


*Fig. 37*

**1.** Insert the burner. Tighten screws Ⓕ diagonally.
Tighten screws as tightly as necessary and ensure that the components are undamaged and are functioning correctly throughout service life.
Observe torque settings if a torque wrench is available.
Torque: 6.5 Nm

**2.** Fit gas connection pipe Ⓔ with a new gasket.
Tighten screws as tightly as necessary and ensure that the components are undamaged and are functioning correctly throughout service life.
Observe torque settings if a torque wrench is available.
Check for gas tightness to BSI 6891.
Torque: 30 Nm

## Installing the burner (cont.)

3. Check the gas connections for leaks.

**Danger**
Escaping gas leads to a risk of explosion. Check all fittings for gas tightness. In the case of wall mounted appliances, also check the gas shut-off valve fitting on the underside.

4. Connect the cables/leads:
   - Fan motor Ⓐ (2 plugs)
   - Ionisation electrode Ⓑ
   - Ignition unit Ⓒ
   - Earth Ⓓ

## Checking the neutralising system (if installed)

## Checking the flow limiter (only for gas condensing combi boiler)

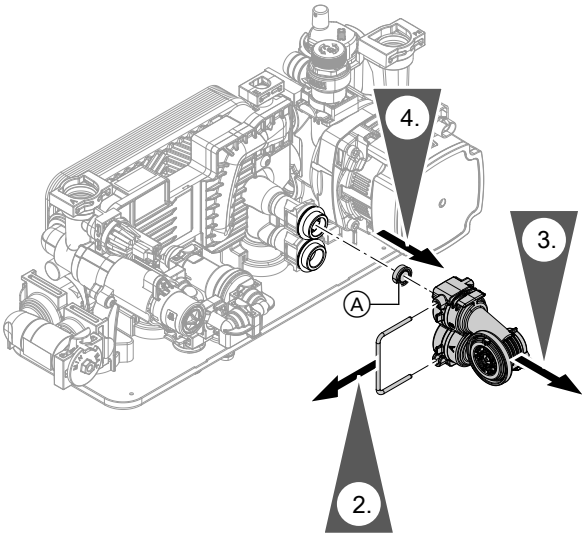


*Fig. 38*

1. Drain the boiler on the DHW side.
2. Remove the spring clip.
3. Remove the DHW flow sensor.
4. Check flow limiter Ⓐ. Replace in case of excessive scaling or damage. Reinsert.
5. Mount DHW flow sensor with new gaskets.

**Danger**
Risk of electric shock from escaping heating water or DHW
Check all water side connections for tightness.



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## Checking the flow limiter (only for gas… (cont.)

**Flow limiter**

| Serial no. (type plate) | Flow rate l/min | Colour |
|---|---|---|
| 7723181<br>7722712 | 10 (GB) | Light blue |
| 7544691<br>7544693<br>7722696<br>7722701<br>7722222<br>7720292<br>7723182<br>7722713 | 12 | Red |
| 7544692<br>7544694<br>7722697<br>7722702<br>7722223<br>7720293<br>7723183<br>7722714 | 14 | Pink |
| 7544695<br>7722703<br>7722224<br>7720294 | 16 | Blue |

## Checking the expansion vessel and system pressure

***Note***
*The expansion vessel can lose some of its charge pressure over time. When the boiler heats up, the pressure rises to 2 or 3 bar (0.2 or 0.3 MPa). The safety valve may also respond and discharge the excess pressure.*
*Therefore check the expansion vessel pre-charge pressure annually.*

Check whether the installed expansion vessel is adequate for the system water volume.
Carry out this test on a cold system.

1. Drain the system until "0" is shown on the display.

   ***Note***
   *For pressure indicator on the home screen,* ☰ *repeatedly until the pressure gauge symbol appears.*

2. If the pre-charge pressure of the expansion vessel is lower than the static system pressure: Top up with nitrogen at the valve of the diaphragm expansion vessel until the pre-charge pressure is 0.1 to 0.2 bar (10 to 20 kPa) higher than the static system pressure.

3. Top up with water until the charge pressure of the cooled system is at least 1.0 bar (0.1 MPa), and is 0.1 to 0.2 bar (10 to 20 kPa) higher than the pre-charge pressure of the expansion vessel.
   Permiss. operating pressure: 3 bar (0.3 MPa)

   ***Note***
   *The expansion vessel is supplied from the factory with a pre-charge pressure of 0.7 bar.*
   *Do not allow the pre-charge pressure to fall below this value (boiling noises). This also applies to single floor heating systems or attic heating centres (no static pressure).*
   *Top up with water until the charge pressure is 0.1 to 0.2 bar above the pre-charge pressure.*

## Checking the safety valve function

## Checking the electrical connections for firm seating

**Danger**
Contact with live components can lead to serious injury from electric current. Some components on PCBs remain live even after the power supply has been switched off.

- **Never touch** the wiring chambers (control unit and power supply connections).
- When working on the appliance, isolate the system from the power supply, e.g. at a separate MCB/fuse or a mains isolator. Check the system is no longer live and safeguard against reconnection.
- Prior to working on the appliance, wait at least 4 min until the voltage has completely dropped out.

## Checking all gas equipment for leaks at operating pressure

**Danger**
Escaping gas leads to a risk of explosion. Check gas equipment (including inside the appliance) for leaks.

***Note***
*Only use suitable and approved leak detection agents (EN 14291) and devices for the tightness test. Leak detection agents with unsuitable constituents (e.g. nitrides, sulphides) can cause material damage. Remove residues of the leak detection agent after testing.*

## Fitting the front panel

See page 30.

## Checking the combustion quality

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 content and $CO_2$ or $O_2$ content, and record these in the report on page 106.

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

### Permissible CO content

The CO content must be < 1000 ppm for all gas types.



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## Checking the combustion quality (cont.)

### Permissible $CO_2$ or $O_2$ content

**Operation with natural gas**

| Rated heating output (kW) | $CO_2$ content (%) | | $O_2$ content (%) | |
|---|---|---|---|---|
| | Upper heating output | Lower heating output | Upper heating output | Lower heating output |
| 11 | 7.3 to 10.5 | 7.3 to 10.5 | 2.1 to 7.9 | 2.1 to 7.9 |
| 19 | 7.5 to 10.5 | 7.5 to 10.5 | 2.1 to 7.6 | 2.1 to 7.6 |
| 25 | 7.5 to 10.5 | 7.5 to 10.5 | 2.1 to 7.6 | 2.1 to 7.6 |
| 32 | 7.3 to 10.0 | 7.3 to 10.5 | 3.1 to 7.9 | 2.1 to 7.9 |

**Operation with LPG**

- $CO_2$ content: 8.4 to 11.8 %
- $O_2$ content: 3.1 to 8.1 %

If the actual CO, $CO_2$ or $O_2$ values lie outside their respective ranges, proceed as follows:
- Check the balanced flue system for leaks; see page 44.
- Check the ionisation electrode and connecting cable, see page 48.

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

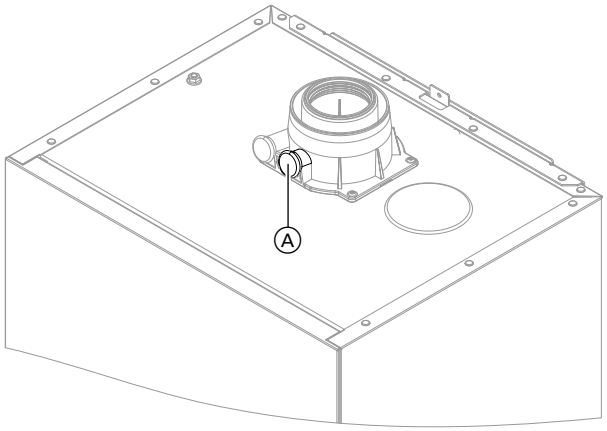


*Fig. 39*

1. Connect a flue gas analyser at flue gas port Ⓐ on the boiler flue connection.
2. Open the gas shut-off valve. Start the boiler. Create a heat demand.
3. Adjust the lower heating output. See the following chapter.
4. Check the $CO_2$ content. If the actual value deviates from the permissible ranges, implement steps listed above.
5. Enter the actual value into the report.
6. Adjust the upper heating output. See the following chapter.
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 actual value into the report.
9. Re-seal test port Ⓐ.

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

### Regulating to the upper/lower heating output

***Note***
*Ensure adequate heat transfer.*

**Tap the following buttons:**

1. ☰ and **OK** simultaneously for approx. 4 s, then release.
2. Use ∧/∨ to select **"b.6"** for the upper/lower heating output.
3. **OK**
4. Use ∧/∨ to set the value.
   **"OFF"** - off
   **"1"** - Min. heating output
   **"2"** - Max. heating output

## Checking the combustion quality (cont.)

5. **OK**
   Burner is operating with correspondingly adjusted heating output.

## Checking the flue system for unrestricted flow and leaks

## Checking the external LPG safety valve (if installed)

## 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

**Tap the following buttons:**

1. ☰
2. Use ∧/∨ to select **"P.3"** for heating curve.
3. **OK**
4. Use ∧/∨ to select **"HC1"** for "heating circuit 1" or **"HC2"** for "heating circuit 2".
5. **OK**
6. Use ∧/∨ to set the slope.
7. **OK**
8. Use ∧/∨ to set the level.
9. **OK** to confirm

## Instructing the system user

The system installer should hand the operating instructions to the system user and instruct the user in operating the system.

This includes all components installed as accessories, e.g. remote control units. In addition, the system installer must make the user aware of the required maintenance work.

### DHW hygiene

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

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

***Note***
*The display and setting of some parameters is dependent on:*
- *Heat generator*
- *Connected accessories and the functions associated with them*

**Tap the following buttons:**

1. ☰ and **OK** simultaneously for approx. 4 s, then release.
2. Use ∧/∨ to select **"b.2"** for system configuration.
3. **OK**
4. Use ∧/∨ to select the parameter for adjustment. See tables below.
5. **OK**
6. ∧/∨ for the required value.
7. **OK**

***Note***
*Further parameters can be called up via the software tool.*

## Parameter

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

**1 "Set flow temperature for external demand"**

| Setting | | Explanations |
|---|---|---|
| | | Set flow temperature for external demand |
| | **70** | Set flow temperature in the delivered condition 70 °C |
| | 20 to 82 | Set flow temperature adjustable from 20 to 82 °C in 1 °C increments |

**2 "Primary circuit pump operating mode"**

| Setting | | Explanations |
|---|---|---|
| | **1** | "Automatic"<br>Switched on regardless of current temperature level |
| | 7 | Switched off in reduced mode (in conjunction with constant operation with time program) or if there is no demand via the room thermostat. |

## Parameter (cont.)

**3 "Scald protection"**

| Setting | | Explanations |
|---|---|---|
| | | The adjustable DHW temperature is limited to a maximum value. |
| Out | 0 | Scald protection OFF<br><br>⚠ **Danger**<br>Risk of injury due to increased DHW temperature.<br>Inform the system user of the risk from the raised outlet temperature at the draw-off points. |
| In | **1** | Scald protection ON (maximum DHW temp. 60 °C)<br><br>***Note***<br>*Even with the scald protection switched on, higher outlet temperatures may occur at the draw-off points in the following cases:*<br>▪ *While the appliance is being calibrated* |

**4 "Max. speed of speed-controlled primary/heating circuit pump in standard mode, heating circuit 1"**

| Setting | | Explanations |
|---|---|---|
| | | Maximum speed of the internal circulation pump in heating mode with standard room temperature |
| | **...** | Delivered condition specified by settings specific to the heat generator |
| | 0 to 100 | Maximum speed adjustable from 0 to 100 % |

**5 "Screed drying"**

| Setting | | Explanations |
|---|---|---|
| Not active | **0** | Screed drying can be set in accordance with selectable temperature/time profiles. For individual profile curves, see chapter "Function description". |
| Temperature profile A | 2 | |
| Temperature profile B | 3 | |
| Temperature profile C | 4 | |
| Temperature profile D | 5 | |
| Temperature profile E | 6 | |
| Temperature profile F | 7 | |

**6 "Minimum heating output"**

| Setting | | Explanations |
|---|---|---|
| | | A limit can be set on the minimum heating output for heating mode. |
| | **...** | Delivered condition specified by settings specific to the appliance |
| | 0 to 100 | Adjustable from 0 to 100 % |

## Parameter (cont.)

**7 "Maximum heating output"**

| Setting | | Explanations |
|---|---|---|
| | | A limit can be set on the maximum heating output for heating mode. |
| | **100** | Heating output in the delivered condition 100 % |
| | 0 to 100 | Adjustable from 0 to 100 % |

**8 "Maximum flow temperature limit, heating circuit 1"**

| Setting | | Explanations |
|---|---|---|
| | | Maximum flow temperature limit for the heating circuit |
| 74 °C | **74** | Maximum limit in the delivered condition 74 °C |
| | 10 to 100 | Setting range limited by heat generator-specific parameters |

**9 "Operating mode, heating circuit 1"**

| Setting | | Explanations |
|---|---|---|
| | | Only adjust if there is just a single heating circuit in the system. |
| | **4** | Weather-compensated without room temperature influence |
| | 7 | Weather-compensated with room temperature influence; see also parameter 10. |

**10 "Room influence factor, heating circuit 1"**

| Setting | | Explanations |
|---|---|---|
| | | The higher the value, the greater the influence of the room temperature on the set flow temperature of the heating circuit (heating curve). Operation with room temperature hook-up must be set for the heating circuit. Only change the value for systems with one heating circuit. For a sample calculation, see chapter "Heating curve" under "Function description" |
| 8 | **8** | Maximum limit in the delivered condition |
| | 0 to 64 | Setting range |

**11 "Maximum flow temperature limit, heating circuit 2"**

| Setting | | Explanations |
|---|---|---|
| | | Maximum flow temperature limit for the heating circuit |
| 74 °C | **74** | Maximum limit in the delivered condition 74 °C |
| | 10 to 100 | Setting range limited by heat generator-specific parameters |

**12 "Operating mode of heating circuit 2"**

| Setting | | Explanations |
|---|---|---|
| | | Heating mode: |
| 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<br>See parameter 13. |

## Parameter (cont.)

**13 "Room influence factor, heating circuit 2"**

| Setting | | Explanations |
|---|---|---|
| | | The higher the value, the greater the influence of the room temperature on the flow temperature of the heating circuit (heating curve). Operation "with room temperature hook-up" must be set for the heating circuit. Only change the value for the heating circuit with mixer. For a sample calculation, see chapter "Heating curve" under "Function description"<br><br>***Note***<br>*With the combi boiler (B1KF), DHW heating is not possible during screed drying. With the system boiler (B1HF with diverter valve) or storage combi boiler (B1LF, B1TF, B1SF and B1UF), DHW heating is suspended after 30 minutes for an hour (parameter 1087.1) in order to run the screed drying program.* |
| | **8** | Maximum limit in the delivered condition |
| | 0 to 64 | Setting range |



## Further settings are only possible via the "software tool"

**1667.0 Pump control, heating circuit pump 1 in standby mode**

| Setting | | Explanations |
|---|---|---|
| | | Operating mode, heating circuit pump 1 |
| | **0** | In "standby mode" = permanently switched off |
| | 1-24 | In "standby mode" = switched on 1-24 times a day (in constant mode for 10 minutes each time; in weather-compensated mode for 50 minutes each time) |

**1668.0 Pump control, heating circuit pump 2 in standby mode**

| Setting | | Explanations |
|---|---|---|
| | | Operating mode, heating circuit pump 2 |
| | **0** | In "standby mode" = permanently switched off |
| | 1-24 | In "standby mode" = switched on 1-24 times a day (in constant mode for 10 minutes each time; in weather-compensated mode for 50 minutes each time) |

**2426.1 Weather-compensated heating circuit pump logic for heating circuit 1 (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 circuit pump is switched off.<br>If the outside temperature is below the threshold value (selected set room temperature plus hysteresis in K), the heating circuit pump is switched on. |

## Parameter (cont.)

**2426.3 Room temperature-dependent heating circuit pump logic for heating circuit 1 (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 room temperature is above the threshold value (selected set room temperature plus hysteresis in K), the heating circuit pump is switched off.<br>If the actual room temperature is below the threshold value (selected set room temperature plus hysteresis in K), the heating circuit pump is switched on. |

**2427.1 Weather-compensated heating circuit pump logic for heating circuit 2 (only for weather-compensated control units).**

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

**2427.3 Room temperature-dependent heating circuit pump logic for heating circuit 2 (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 room temperature is above the threshold value (selected set room temperature plus hysteresis in K), the heating circuit pump is switched off.<br>If the actual room 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 heat generator (except the SDIO/SM1A electronics module) must have a subscriber number. The subscriber number is set on rotary switch S1 at each extension.
Observe maximum number of PlusBus subscribers, see note in chapter "Connection".

## Subscriber numbers of connected extensions (cont.)

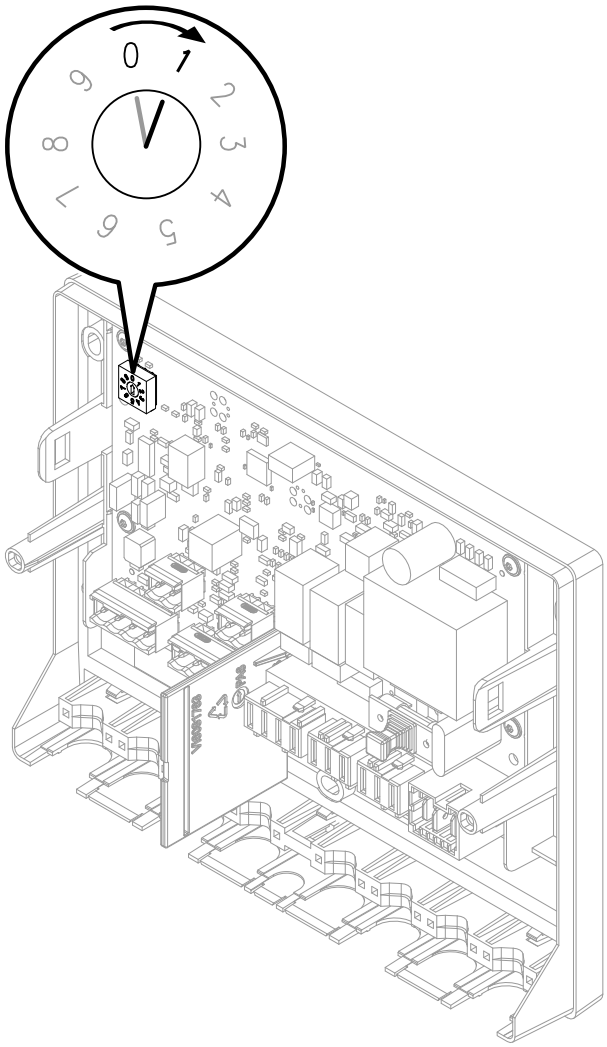


*Fig. 40*

Rotary switch S1 settings:
- EM-S1 extension (system with solar collectors): **0**
- EM-EA1 extension (max. 1 extensions in one system)

  ***Note***

  *On the EM-EA1 extension, select 1 if the "External heating circuit hook-up" function is being set for more than one heating circuit.*
- EM-P1 extension
  - If no heating circuits with mixer are available in the system: **1**
  - If heating circuits with mixer (EM-M1 or EM-MX extensions) are present in the system: Always set subscriber number for EM-P1 extension to the consecutive number after EM-M1 or EM-MX extensions.
- EM-M1 or EM-MX extensions
  - Heating circuit 2 with mixer: Rotary switch on extension kit to 1

***Note***

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

| Function | Electronics module | Extension | Setting<br>Rotary switch S1 |
|---|---|---|---|
| System with solar collectors | ADIO | EM-S1 | **0** |
| Heating circuit 2 with mixer | ADIO | EM-M1/EM-MX | **1** |
| Heating circuit 1 without mixer or DHW circulation pump (circulation pump downstream of low loss header) | ADIO | EM-P1 | **2** |
| Function extensions (e.g.):<br>▪ Fault message input<br>▪ Fault message output<br>▪ Operating mode changeover<br>▪ External heating circuit hook-up (for more than one heating circuit) | DIO | EM-EA1 | **1** |

***Note***

*A maximum of one Vitotrol 200-E can be connected*
*Solar module not compatible with all appliance versions.*





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## Service menu

### Calling up the service menu

**Tap the following buttons:**

1. ☰ and **OK** simultaneously for approx. 4 s, then release.

2. Select the required menu section (e.g. **"b.1"** Connect with software tool).

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

***Note***
*Tap "☰" to return to the service menu.*

**Service menu overview**

| Service | | | |
|---|---|---|---|
| Er Active messages | | | |
| b.1 Connect with software tool | | | |
| b.2 System configuration | | | |
| b.3 Diagnostics | | | |
| | d.1 Outside temperature | | |
| | d.2 Heat generator flow temperature | | |
| | d.3 Primary circuit pump speed % | | |
| | d.4 Flue gas temperature | | |
| | d.5 Burner hours run | | |
| | d.6 Burner output | | |
| | d.7 3-way valve position | | |
| | | 0 = Heating | |
| | | 1 = Middle position (if installed) | |
| | | 2 = DHW | |
| | d.8 Serial number of heat generator | | |
| | d.9 Heating circuit 1 flow temperature | | |
| | d.10 Heating circuit 2 flow temperature | | |
| | d.11 DHW temperature | | |
| b.4 Message history | | | |
| b.5 Commissioning assistant | | | |
| b.6 Start upper/lower heating output for trade fair mode | | | |

### Exiting the service menu

**Tap the following buttons:**

"☰" and **"OK"** simultaneously for 4 s.

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

## Diagnosis

### Checking operating data

Operating data can be checked in various areas. See **"Diagnosis"** in the service menu overview.
Operating data on heating circuits with mixer 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. ☰ and **OK** simultaneously for approx. 4 s, then release.
2. Use ∧/∨ to select **"b.3"** for diagnostics.
3. **OK**
4. Use ∧/∨ to select the required entry.

   ***Note***
   *Use ∧∨ to view "d.8" Serial number of heat generator in sections.*
5. **OK**





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## Fault display on the programming unit

The display shows **"⚠"** in the event of a fault.

***Note***
*If a central fault message facility is connected, this is switched on.*

**Calling up fault messages**

**Tap the following buttons:**

1. ☰ and **OK** simultaneously for approx. 4 s, then release.
2. ∧/∨ for **"Er"** message list
3. **OK**
4. ∧/∨ to select fault entry **"E.1, E.2..."**.
5. **OK**
6. Fault code is displayed.

**Acknowledging the fault display**

Calling up the fault in the **"Er"** menu automatically acknowledges the fault display.

**Calling up acknowledged fault messages**

**Tap the following buttons:**

1. "☰"
2. ∧/∨ to select **"Er"**.
3. **OK**
4. ∧/∨ to call up fault entry **"E.1 to E.5"**.
5. **OK**
6. ∧/∨ to display the fault code.

**Reading out fault messages from the fault memory (message history)**

The 5 most recent faults (including those remedied) are saved and can be called up.
Faults are sorted by date.

**Tap the following buttons:**

1. ☰ and **OK** simultaneously for approx. 4 s, then release.
2. ∧/∨ for **"b.4"** Message history
3. **OK**
4. Use ∧/∨ to select fault entry **"E.1, E.2... or E. 5"**.
   For messages, see chapter "Further messages".
5. **OK**
6. ∧/∨ for the required message
7. **OK**

## Overview of electronics modules

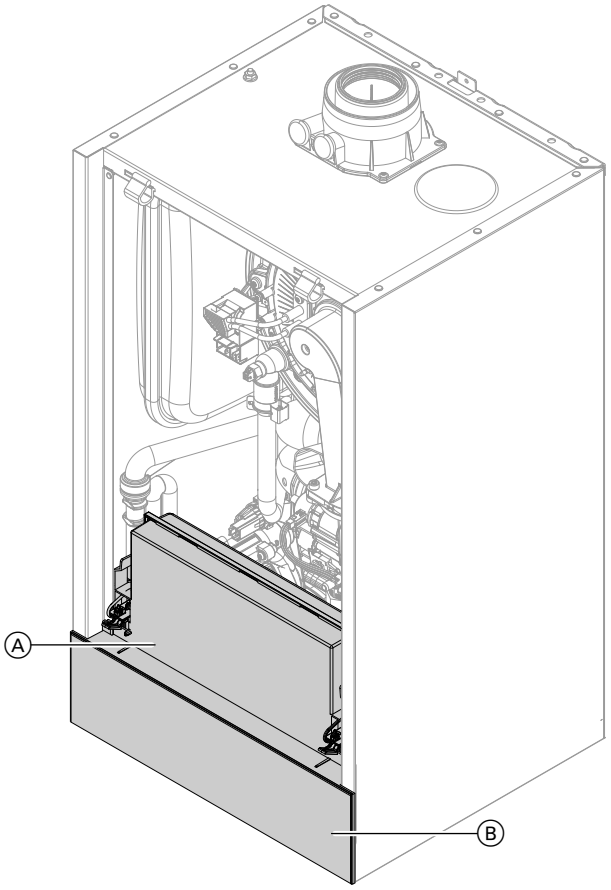


*Fig. 41*

Ⓐ HBMU heat management unit
Ⓑ HMI programming unit with TCU communication module



## Burner fault

The display shows and flashes.
The burner is locked due to a fault.
Reset the burner:

***Note***
*The burner fault display can be closed by pressing for 4 s. The fault can be opened later by pressing simultaneously.*

**Tap the following buttons:**

1. / to display the fault number.
2. and simultaneously for approx. 4 s.
   A rotating bar appears on the display. The reset process has started.
   If the fault no longer exists, the home screen will appear.



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## Fault messages

***Note***
*For diagnosis and troubleshooting, see chapter "Repairs".*
*Fault messages are dependent on appliance equipment level.*

| Displayed fault code | System characteristics | Cause | Measures |
|---|---|---|---|
| 7 | No DHW heating. | Lead break, cylinder temperature sensor. | ▪ Check the DHW setting in the commissioning assistant and correct if necessary.<br>▪ Check the cylinder temperature sensor (terminal 2).<br>▪ Measure voltage at sensor input on HBMU heat management unit. Set value: 3.3 V– with sensor disconnected.<br>Replace faulty component if necessary. |
| 8 | No DHW heating. | Short circuit, cylinder temperature sensor. | Check the cylinder temperature sensor (terminal 2).<br>Replace faulty component if required. |
| 11 | No solar DHW heating or central heating backup. | Lead break, collector temperature sensor. | ▪ Check collector temperature sensor.<br>▪ Measure voltage at sensor input on electronics module (ADIO). Set value: 3.3 V– with sensor disconnected. |
| 12 | No solar DHW heating. | Short circuit, collector temperature sensor. | ▪ Check collector temperature sensor.<br>▪ Measure voltage at sensor input on electronics module (ADIO). Set value: 3.3 V– with sensor disconnected. |
| 13 | Regulates as if the outside temperature were 0 °C. | Lead break, outside temperature sensor. | ▪ Check operating mode setting in commissioning assistant and remedy if required.<br>▪ Check outside temperature sensor and connection to sensor (terminal 4).<br>▪ Measure voltage at sensor input on HBMU heat management unit. Set value: 3.3 V– with sensor disconnected.<br>Replace faulty component if required. |
| 14 | Regulates as if the outside temperature were 0 °C. | Short circuit, outside temperature sensor. | Check outside temperature sensor and connection to sensor (terminal 4). Replace faulty components if necessary. |
| 15 | No solar DHW heating. | Lead break, solar cylinder temperature sensor (bottom). | Check cylinder temperature sensor.<br>Measure voltage at sensor input on ADIO electronics module. Set value: 3.3 V– with sensor disconnected. |

## Fault messages (cont.)

| Displayed fault code | System characteristics | Cause | Measures |
|---|---|---|---|
| 16 | No solar DHW heating. | Short circuit, solar cylinder temperature sensor (bottom). | Check cylinder temperature sensor.<br>Measure voltage at sensor input on ADIO electronics module. Set value: 3.3 V– with sensor disconnected. |
| 29 | Regulates without flow temperature sensor for low loss header. | Lead break, low loss header sensor. | ▪ Check commissioning assistant setting, low loss header.<br>▪ Check flow temperature sensor, low loss header.<br>▪ Measure voltage at sensor input on electronics module. Set value: 3.3 V– with sensor disconnected. |
| 30 | Regulates without flow temperature sensor for low loss header. | Short circuit, low loss header sensor. | Check flow temperature sensor, low loss header.<br>Measure voltage at sensor input on electronics module. Set value: 3.3 V– with sensor disconnected |
| 49 | Burner in a fault state. | Lead break, flue gas temperature sensor. | Check flue gas temperature sensor.<br>Reset the appliance. |
| 50 | Burner in a fault state. | Short circuit, flue gas temperature sensor. | Check flue gas temperature sensor.<br>Reset the appliance. |
| 57 | Normal operation without room influence. | Lead break, room temperature sensor. | ▪ Check commissioning setting of remote control.<br>▪ Check plug and cable of external room temperature sensor, heating circuit.<br>▪ If no external room temperature sensor installed, replace Vitotrol programming unit. |
| 58 | Normal operation without room influence. | Short circuit, room temperature sensor. | Check plug and cable of external room temperature sensor, heating circuit.<br>If no external room temperature sensor installed, replace Vitotrol programming unit. |
| 59 | Burner locked out, boiler circuit pump off. No central heating, no DHW heating. | Power supply, undervoltage. | Check mains voltage.<br>If voltage is correct and the fault occurs repeatedly, replace the fan unit. |
| 62 | Burner in a fault state. | High limit safety cut-out has responded. | ▪ Check heating system fill level.<br>▪ Check pre-charge pressure in diaphragm expansion vessel. Adjust to required system pressure.<br>▪ Check whether flow rate is sufficient (circulation pump).<br>▪ Check function of 3-way diverter valve. Vent the system.<br>Reset the appliance. |

## Fault messages (cont.)

| Displayed fault code | System characteristics | Cause | Measures |
|---|---|---|---|
| 63 | Burner in a fault state. | Flue gas temperature limiter has responded. | ▪ Check heating system fill level.<br>▪ Check pre-charge pressure in diaphragm expansion vessel. Adjust to required system pressure.<br>▪ Check whether flow rate is sufficient (circulation pump).<br>▪ Check function of 3-way diverter valve.<br>Vent the system.<br>Reset the appliance once the flue system has cooled down. |
| 64 | Normal operation; burner restarts. | Flame loss in the stabilisation or operating phase. | ▪ Check gas supply (gas pressure and gas flow switch).<br>▪ Check balanced flue system for flue gas recirculation.<br>▪ Check ionisation electrode (replace if necessary).<br>▪ Check the distance of the electrode to the burner gauze assembly and its contamination level. |
| 65 | Burner in a fault state. | Flame signal not present or insufficient at burner start. | ▪ Check gas supply (gas pressure and gas flow switch).<br>▪ Check gas solenoid valve.<br>▪ Check the system for condensate backup; check the condensate drain.<br>***Note***<br>*Prevent water damage.*<br>▪<br>Detach fan unit before removing the burner.<br>Check ionisation electrode and connecting cable. Check the ignition. Connecting cables to ignition module and ignition electrode. Ignition electrode for distance and contamination (see also chapter "Checking and adjusting the ignition and ionisation electrodes").<br>Check ignition electrode for broken insulation.<br>Reset the appliance. |
| 67 | Burner in a fault state. | Ionisation current outside permissible range. | Check gas supply (gas pressure and gas flow switch), check gas solenoid valve and inlet strainer.<br><br>Check ionisation electrode for the following:<br>▪ Distance to burner gauze assembly.<br>▪ Check electrode/burner gauze assembly for contamination.<br><br>If specified measures don't help, replace fan unit.<br>Reset the appliance. |

## Fault messages (cont.)

| Displayed fault code | System characteristics | Cause | Measures |
|---|---|---|---|
| 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 ionisation electrode. Reset the appliance.<br>If the fault persists, replace the HBMU heat management unit. See chapter "Replacing the HBMU heat management unit". |
| 69 | Burner in a fault state. | Ionisation current outside permissible range. | Check ionisation electrode for the following:<br>▪ Check whether insulation block is touching electrode ceramic.<br>▪ To check the gas solenoid valve: In the service menu under "b.6", set the burner output to the lower heating output for approx. 4 min. If the fault occurs, replace the HBMU heat management unit. See chapter "Replacing the HBMU heat management unit".<br>▪ In the service menu under "b.6", switch the burner output from the lower to the upper heating output. If this fault occurs during modulation, check the intake screen for contamination. Replace the fan unit if necessary. |
| 70 | Burner in a fault state. | HBMU heat management unit internal fault. | Replace the HBMU heat management unit. See chapter "Replacing the HBMU heat management unit". |
| 71 | Burner in a fault state. | Fan speed too low. | ▪ Check fan for blockage.<br>▪ Check setting for gas type and flue system.<br>Reset the appliance. |
| 72 | Burner in a fault state. | Fan idle state not reached. | ▪ Reset the appliance.<br>▪ If the fault occurs repeatedly, replace the fan unit. |
| 73 | Burner in a fault state. | Internal communication error. | Reset the appliance.<br>If the fault occurs repeatedly, replace the HBMU heat management unit. See chapter "Replacing the HBMU heat management unit". |
| 74 | Burner locked out.<br>Internal circulation pump off.<br>No central heating and no DHW heating. | System pressure too low. | Top up with water.<br>Vent the system.<br><br>If the fault occurs repeatedly:<br>▪ Check system pressure sensor with external pressure gauge.<br>▪ Check diaphragm expansion vessel pre-charge pressure.<br>▪ Check settings for set system pressure and range. |

## Fault messages (cont.)

| Displayed fault code | System characteristics | Cause | Measures |
|---|---|---|---|
| 75 | System in a fault state. | No flow rate. | Top up with water.<br>Vent the system.<br><br>If the fault occurs repeatedly:<br>▪ Check/open the BDF valves.<br>▪ Check/replace the flow sensor (if installed).<br>▪ Check/replace the circulation pump. |
| 77 | Burner in a fault state. | HBMU heat management unit data memory. | Reset the appliance.<br>If the fault occurs repeatedly, replace the HBMU heat management unit. See chapter "Replacing the HBMU heat management unit". |
| 78 | Normal operation. | No communication between heat management unit and programming unit. | Check cables and plug-in connections between central control unit and programming unit.<br>Check that the cables are correctly routed and positioned. |
| 87 | Burner locked out. Internal pump off. No central heating and no DHW heating. | System pressure too high. | Check the system pressure and correct if necessary. Check diaphragm expansion vessel precharge pressure. Check whether BDF valves are open.<br>Check the system pressure sensor with an external pressure gauge. |
| 89 | No central heating and no DHW heating. | Internal circulation pump blocked. | Check circulation pump. Replace if necessary. |
| 91 | Function of affected extension in emergency mode. | DIO electronics module communication error. | Check connections to DIO electronics module and connection to HBMU heat management unit. |
| 92 | Function of the relevant electronics module in emergency mode. | ADIO electronics module communication error. | ▪ Check setting in the commissioning assistant and correct if required.<br>▪ Check connections and leads to the ADIO electronics module.<br>▪ Check PlusBus voltage level (24 to 28 V).<br>▪ Check subscriber number on rotary switch S1 and correct if required. |
| 95 | Burner not operational. | OpenTherm remote control not connected. | ▪ Check connection to the OpenTherm remote control. unit.<br>▪ If OpenTherm is not required, set C.7 in the commissioning assistant to a value other than 14. |
| 100 | Electronics modules connected to PlusBus not working. | PlusBus voltage error. | Check whether the PlusBus power supply on the HBMU heat management unit is OK: Remove all connected PlusBus components and reconnect one by one.<br>Check that no more than 1 Vitotrol 200-E is connected to the HBMU.<br>Check whether there is a short circuit at the PlusBus cable. |





▶▶

## Fault messages (cont.)

| Displayed fault code | System characteristics | Cause | Measures |
|---|---|---|---|
| 102 | No internet connection. | Error with communication module. | Check cables and plug-in connections between heat management unit and communication module. |
| 103 | Normal operation. | Internal communication error, programming unit. | Check cables and plug-in connections between heat management unit and HMI programming unit. |
| 104 | Depending on configuration of EM-EA1 extension (DIO electronics module). | External fault message input active. | Check connected external device. |
| 142 | Burner in a fault state. | Communication restriction on CAN bus. INR. | Check the fan unit for correct function. For this, check the stepper motor of the fan unit (reference run with mains ON).<br>If the fault persists, check the plug-in connections and cables of the CAN bus.<br>Check further CAN bus subscribers. If fault occurs repeatedly, replace fan unit. |
| 161 | Burner in a fault state. | Access error, data memory, HBMU heat management unit. | Reset the appliance.<br>If the fault occurs repeatedly, replace the HBMU heat management unit. See chapter "Replacing the HBMU heat management unit". |
| 162 | Burner in a fault state. | Processor, undervoltage. | Reset the appliance.<br>If the fault occurs repeatedly, replace the HBMU heat management unit. See chapter "Replacing the HBMU heat management unit". |
| 163 | Burner in a fault state. | Checksum error, data memory access, HBMU heat management unit. | Reset the appliance.<br>If the fault occurs repeatedly, replace the HBMU heat management unit. See chapter "Replacing the HBMU heat management unit". |
| 176 | Burner in a fault state. | Condensate backup in the heat cell. | Clear the condensate backup. Replace insulation blocks, electrodes and burner gauze assembly.<br><br>***Note***<br>*Remove the fan unit before opening the burner. Protect the PCB from water damage.* |
| 182 | No DHW heating. | Short circuit, outlet temperature sensor (if installed). | Check outlet temperature sensor (plug X7, cores 3 and 4). Measure sensor input on HBMU heat management unit. Set value: 3.3 V– with sensor disconnected. |
| 183 | No DHW heating. | Lead break, outlet temperature sensor (if installed). | Check outlet temperature sensor (plug X7, cores 3 and 4). |

## Fault messages (cont.)

| Displayed fault code | System characteristics | Cause | Measures |
|---|---|---|---|
| 184 | Burner in a fault state. | Short circuit, flow temperature sensor/high limit safety cut-out. | Check the flow temperature sensor/high limit safety cut-out.<br>Check sensor lead. Replace faulty component if required.<br>Reset the appliance. |
| 185 | Burner in a fault state. | Lead break, flow temperature sensor/high limit safety cut-out. | Check the flow temperature sensor/high limit safety cut-out. Replace faulty component if required.<br>Reset the appliance. |
| 299 | Date/time wrong. | Real-time clock fault. | Check the date and time; amend if necessary. |
| 345 | Burner locked out, automatic enabling after appliance cool-down. Independent restart | Temperature limiter has responded. | ▪ Ensure adequate heat transfer.<br>▪ Check heating system fill level.<br>▪ Check pre-charge pressure in diaphragm expansion vessel. Adjust to required system pressure.<br>▪ Check whether flow rate is sufficient (circulation pump).<br>▪ Check function of 3-way diverter valve. Vent the system.<br>If the fault occurs during DHW heating: Check DHW cylinder or plate heat exchanger for contamination and scaling. |
| 346 | Burner in a fault state. | Ionisation current calibration error. | ▪ Check the gas supply pressure.<br>▪ Check gas solenoid valve strainer on the inlet side for contamination.<br>▪ Check ionisation electrode for contamination.<br>▪ Check flue system. Remove flue gas recirculation if required.<br>▪ Check the condensate drain (condensate blockage).<br>Reset the appliance. |
| 347 | Burner in a fault state. | Flue gas recirculation | ▪ Check the flue system for leaks; rectify if necessary.<br>▪ Check the flue system for flue gas back pressure, e.g. caused by an insufficient fall in the flue system, constrictions or blockages. Rectify if necessary.<br>Reset the appliance. |
| 348 | Burner in a fault state. | Gas modulation valve | If several heat generators are connected to a common flue system: Check whether **"Multiple connections"** is set in the commissioning assistant.<br>Check the flue system for unrestricted flow.<br>If fault remains, replace gas fan unit. |

## Fault messages (cont.)

| Displayed fault code | System characteristics | Cause | Measures |
|---|---|---|---|
| 349 | Burner in a fault state | Air mass rate flow not detected correctly in fan unit. | ▪ Check for dust contamination in the supply air.<br>▪ Check burner gauze assembly for contamination.<br>Reset the appliance. If the fault occurs repeatedly, replace the gas fan unit. |
| 350, 351 | Burner in a fault state. | Ionisation current outside permissible range. | Replace the HBMU heat management unit. See chapter "Replacing the HBMU heat management unit". |
| 352 | Burner in a fault state. | Combustion CO limit exceeded. | Check entire flue gas path for the following:<br>▪ Leaks<br>▪ Flue gas back pressure caused by water pocket (if flue system fall is insufficient).<br>▪ Constrictions<br>▪ Blockages<br><br>Repair flue system if necessary.<br>Reset the appliance. |
| 353 | Shutdown with restart if demand exists. | Insufficient gas supply, burner output reduced. | Check the gas supply.<br>Optically check input-side screen in the gas solenoid valve for contamination.<br>Reset the appliance. |
| 354 | Burner in a fault state. | Gas modulation valve tolerance outside permissible range. | Replace gas fan unit. |
| 355 | Burner in a fault state. | Analogue signal reference check: Flame signal is already present at burner start. | Replace the HBMU heat management unit. See chapter "Replacing the HBMU heat management unit". |
| 357 | Burner in a fault state. | Insufficient gas supply. | ▪ Check that the main gas valve and the gas shut-off valve are open.<br>▪ Test static gas pressure and gas flow pressure.<br>▪ Check that on-site gas line and gas flow switch are correctly sized.<br>***Note***<br>*If the building pressure regulator has a leak, you may notice rising pressure when the burner is idle. When the system is restarted, the gas flow switch may trip.*<br>▪ If the static pressure doesn't drop, check cable to the fan unit. Check that the coil resistance at the fuel valve is approx. 4 kΩ (plug 35).<br>▪ Check the ignition electrode for damaged insulation.<br>Reset the appliance. |





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## Fault messages (cont.)

| Displayed fault code | System characteristics | Cause | Measures |
|---|---|---|---|
| 359 | Burner in a fault state. | No ignition spark. | ▪ Check whether the ignition electrode insulation is damaged.<br>▪ Check for a voltage of 230 V~ at the ignition module during the ignition phase. If not, replace the HBMU heat management unit.<br>▪ If 230 V~ is present at the ignition module but there is still a fault, replace the ignition module.<br>▪ Check connection cables and leads from ignition module and ignition electrode.<br>Reset the appliance. |
| 361 | Burner in a fault state. | Flame signal is not present or insufficient at burner start. | Check ionisation electrode and connecting cable. Check plug-in connections for loose contacts.<br><br>***Note***<br>*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).*<br><br>Reset the appliance. |
| 364 | Burner in a fault state. | Internal fault. | Replace the HBMU heat management unit. |
| 365 | Burner in a fault state. | Feedback from gas valve relay contact implausible (relay contact is "welded up"). | Replace the HBMU heat management unit. |
| 366, 367 | Burner in a fault state | Gas valve electricity supply does not turn off. | Replace the HBMU heat management unit. See chapter "Replacing the HBMU heat management unit". |
| 369 | Burner in a fault state. | Flame is lost immediately after flame formation (during safety time). | Check gas supply (gas pressure and gas flow switch).<br>Check balanced flue system for flue gas recirculation.<br><br>Check ionisation electrode for the following:<br>▪ Clearance to burner gauze assembly.<br>▪ Contamination on electrode.<br><br>Reset the appliance. |
| 370 | Burner in a fault state. | Gas valve or modulation valve will not close. | Reset the appliance.<br>If fault occurs repeatedly, replace fan unit. |

## Fault messages (cont.)

| Displayed fault code | System characteristics | Cause | Measures |
|---|---|---|---|
| 372 | Burner in a fault state. | Repeated flame loss during calibration. | ▪ Check ionisation electrode and connecting cable.<br>▪ Check plug-in connections for loose contacts.<br>▪ Check flue system. Remove flue gas recirculation if required.<br>▪ Check system for condensate backup.<br>▪ Visually inspect gas solenoid valve inlet and strainer on the inlet side for contamination.<br><br>***Note***<br>*To prevent water damage, detach fan unit before removing the burner. Deposits on the electrodes indicate foreign bodies in the combustion air.*<br><br>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 burner gauze assembly and ionisation electrode have been replaced, also clean fan unit, gas/air channel and Venturi extension.<br>Reset the appliance. |
| 373 | Burner in a fault state. | Heat transfer too low during calibration.<br>Temperature limiter has shut down. | ▪ Ensure adequate heat transfer.<br>▪ Check circulation pump for faults, scale or blockages.<br>▪ Check function of 3-way diverter valve. Vent the system.<br>▪ Check function of flow sensor.<br>Reset the appliance. |

## Fault messages (cont.)

| Displayed fault code | System characteristics | Cause | Measures |
|---|---|---|---|
| 374 | Burner restarts | Preparation for calibration of ionisation current: Stabilisation conditions for pre-calibration not met. | ▪ Check ionisation electrode and connecting cable.<br>▪ Check plug-in connections for loose contacts.<br>▪ Check flue system; remove flue gas recirculation if necessary.<br>▪ Check system for condensate backup.<br>▪ Visually inspect gas solenoid valve inlet and inlet strainer for contamination.<br><br>***Note***<br>*To prevent water damage, detach fan unit before removing the burner.*<br>*Deposits on the electrodes indicate foreign bodies in the combustion air. Check the installation room and flue system for causes of the deposits, e.g. laundry detergents, cleaning agents, toiletries, deposits in the ventilation air supply (chimney). If burner gauze assembly and ionisation electrode have been replaced, also clean fan unit, gas/air channel and Venturi extension.*<br><br>Reset the appliance. |

## Fault messages (cont.)

| Displayed fault code | System characteristics | Cause | Measures |
|---|---|---|---|
| 375 | Burner restarts. | Performing ionisation current calibration: Calibration not performed. Minimum value or termination criterion not reached. | ▪ Check ionisation electrode and connecting cable.<br>▪ Check plug-in connections for loose contacts.<br>▪ Check flue system; remove flue gas recirculation if necessary.<br>▪ Check system for condensate backup.<br>▪ Visually inspect gas solenoid valve inlet and inlet strainer for contamination.<br><br>***Note***<br>*To prevent water damage, detach fan unit before removing the burner.*<br>*Deposits on the electrodes indicate foreign bodies in the combustion air. Check the installation room and flue system for causes of the deposits, e.g. laundry detergents, cleaning agents, toiletries, deposits in the ventilation air supply (chimney). If burner gauze assembly and ionisation electrode have been replaced, also clean fan unit, gas/air channel and Venturi extension.*<br><br>Reset the appliance. |

## Fault messages (cont.)

| Displayed fault code | System characteristics | Cause | Measures |
|---|---|---|---|
| 376 | Burner restarts. | Ionisation current differential compared to previous value not plausible | ▪ Check ionisation electrode and connecting cable.<br>▪ Check plug-in connections for loose contacts.<br>▪ Check flue system; remove flue gas recirculation if necessary.<br>▪ Check system for condensate backup.<br>▪ Visually inspect gas solenoid valve inlet and inlet strainer for contamination.<br><br>***Note***<br>*To prevent water damage, detach fan unit before removing the burner.*<br>*Deposits on the electrodes indicate foreign bodies in the combustion air. Check the installation room and flue system for causes of the deposits, e.g. laundry detergents, cleaning agents, toiletries, deposits in the ventilation air supply (chimney). If burner gauze assembly and ionisation electrode have been replaced, also clean fan unit, gas/air channel and Venturi extension.*<br><br>Reset the appliance. |
| 377 | Burner in a fault state. | Post-processing of ionisation current calibration: Stabilisation conditions for post-calibration not met. | Check gas type setting. If the fault occurs repeatedly, replace the HBMU heat management unit. See chapter "Replacing the HBMU heat management unit".<br>Reset the appliance. |
| 378 | Burner in a fault state. | Flame loss in the stabilisation or operating phase. | ▪ Check gas supply (gas pressure and gas flow switch).<br>▪ Check flue gas recirculation.<br>▪ Check for contamination of ionisation electrode and burner gauze assembly.<br>Reset the appliance. |
| 379 | Burner in a fault state. | Flame signal not present or insufficient. | ▪ Check ionisation electrode connecting cable for damage and firm seating.<br>▪ Check ionisation electrode, replace if necessary.<br>Reset the appliance. |

## Fault messages (cont.)

| Displayed fault code | System characteristics | Cause | Measures |
|---|---|---|---|
| 380 | Burner in a fault state. | Flame is lost immediately after flame formation (during safety time). | Check gas supply (gas pressure and gas flow switch).<br>Check balanced flue system for flue gas recirculation.<br><br>Check ionisation electrode, burner gauze assembly:<br>▪ Distance to burner gauze assembly.<br>▪ Contamination on electrode.<br><br>Reset the appliance. |
| 381 | Burner in a fault state. | Flame loss during operating phase. | Check gas supply (gas pressure and gas flow switch).<br>Check balanced flue system for flue gas recirculation.<br><br>Check ionisation electrode, burner gauze assembly:<br>▪ Clearance to burner gauze assembly.<br>▪ Contamination on electrode.<br><br>Reset the appliance. |
| 382 | Burner in a fault state. | Fault counter has exceeded limit. | Reset the appliance. Work through fault analysis using fault history. |
| 383, 384 | Burner in a fault state. | Possible contamination of gas line. | ▪ Check gas line for contamination.<br>▪ Check the gas supply pressure.<br>▪ Replace gas fan if required.<br>Reset the appliance. |
| 385 | Burner in a fault state. | Short circuit, signal 1, ionisation current.<br>HBMU heat management unit faulty. | Check IO electrode for earth fault. If the fault persists, replace the HBMU heat management unit.<br>Reset the appliance. |
| 386 | Burner in a fault state. | HBMU heat management unit faulty. | Replace the HBMU heat management unit. See chapter "Replacing the HBMU heat management unit".<br>Reset the appliance. |
| 387 | Burner in a fault state. | Earth fault, ionisation current. HBMU heat management unit faulty. | Check ionisation electrode and connecting cable. If the fault persists, replace the HBMU heat management unit. See chapter "Replacing the HBMU heat management unit".<br>Reset the appliance. |
| 388 | Burner in a fault state. | HBMU heat management unit faulty. | Replace the HBMU heat management unit. See chapter "Replacing the HBMU heat management unit".<br>Reset the appliance. |
| 393 | Burner in a fault state. | Short circuit, second flue gas temperature sensor. | Check sensor and leads to sensor. Replace the sensor if necessary.<br>Reset the appliance. |
| 394 | Burner in a fault state. | Lead break, second flue gas temperature sensor. | Check sensor and leads to sensor. Replace the sensor if necessary.<br>Reset the appliance. |





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## Fault messages (cont.)

| Displayed fault code | System characteristics | Cause | Measures |
|---|---|---|---|
| 395 | Burner in a fault state. | IO electrode earth fault, HBMU heat management unit faulty. | Check ignition electrode for earth fault. If the fault persists, replace the HBMU heat management unit. Reset the appliance. |
| 396 | Burner in a fault state. | HBMU heat management unit faulty. | Replace the HBMU heat management unit. See chapter "Replacing the HBMU heat management unit". Reset the appliance. |
| 399 | Burner in a fault state. | IO electrode earth fault, HBMU heat management unit faulty. | Check IO electrode for earth fault. If the fault persists, replace the HBMU heat management unit. See chapter "Replacing the HBMU heat management unit". Reset the appliance. |
| 400 | Burner in a fault state. | HBMU heat management unit faulty. | Replace the HBMU heat management unit. See chapter "Replacing the HBMU heat management unit". Reset the appliance. |
| 401 | Burner in a fault state. | IO electrode earth fault, HBMU heat management unit faulty. | Check IO electrode for earth fault. If the fault persists, replace the HBMU heat management unit. See chapter "Replacing the HBMU heat management unit". Reset the appliance. |
| 402 | Burner in a fault state. | HBMU heat management unit faulty. | Replace the HBMU heat management unit. See chapter "Replacing the HBMU heat management unit". Reset the appliance. |
| 403 | Burner in a fault state. | Ionisation electrode earth fault, HBMU heat management unit faulty. | Check IO electrode for earth fault. If the fault persists, replace the HBMU heat management unit. See chapter "Replacing the HBMU heat management unit". Reset the appliance. |
| 404 | Burner in a fault state. | HBMU heat management unit faulty. | Replace the HBMU heat management unit. See chapter "Replacing the HBMU heat management unit". Reset the appliance. |
| 405 | Burner in a fault state. | Ionisation electrode earth fault, HBMU heat management unit faulty. | Check IO electrode for earth fault. If the fault persists, replace the HBMU heat management unit. See chapter "Replacing the HBMU heat management unit". Reset the appliance. |
| 406, 408, 410 | Burner in a fault state. | HBMU heat management unit faulty. | Replace the HBMU heat management unit. See chapter "Replacing the HBMU heat management unit". Reset the appliance. |
| 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. |

## Fault messages (cont.)

| Displayed fault code | System characteristics | Cause | Measures |
|---|---|---|---|
| 417, 418 | Burner in a fault state. | HBMU heat management unit faulty. | Replace the HBMU heat management unit. See chapter "Replacing the HBMU heat management unit". Reset the appliance. |
| 425 | System in control mode, calculation out of operation. Calculation values can be viewed via the software tool. | Time synchronisation failed. | Set the time. |
| 446 | Burner in a fault state. | Deviation, flow temperature sensor/high limit safety cut-out of heat generator. | Check the flow temperature sensor/high limit safety cut-out. Check plug-in connection and lead to sensor. Reset the appliance. |
| 447, 448 | Burner in a fault state. | Deviation, ionisation voltage/ionisation current signal. | Replace the HBMU heat management unit. See chapter "Replacing the HBMU heat management unit". Reset the appliance. |
| 449, 451, 452 | Burner in a fault state. | Error in scheduled program run monitoring. | Reset the appliance. If the fault occurs repeatedly, replace the HBMU heat management unit. See chapter "Replacing the HBMU heat management unit". |
| 453 | Burner in a fault state. | Synchronisation error, sequence. | Reset the appliance. If the fault occurs repeatedly, replace the HBMU heat management unit. See chapter "Replacing the HBMU heat management unit". |
| 454 | Burner in a fault state. | Incorrect parameter set of HBMU heat management unit. | Flash correct HBMU heat management unit parameter set. |
| 455, 456 | Burner in a fault state. | Error in program run monitoring. | Reset the appliance. If the fault occurs repeatedly, replace the HBMU heat management unit. See chapter "Replacing the HBMU heat management unit". |
| 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. |
| 458 | Burner in a fault state. | Incorrect reset sequence. | Check connecting cable between HBMU heat management unit and HMI programming unit. Reset the appliance. |

## Fault messages (cont.)

| Displayed fault code | System characteristics | Cause | Measures |
|---|---|---|---|
| 463 | Burner in a fault state. | Contaminated combustion air, flue gas recirculation. | Check flue system for contamination and flue gas recirculation.<br>Clean flue system if required.<br>Reset the burner.<br><br>***Note***<br>*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).*<br>*If burner gauze assembly and ionisation electrode have been replaced, also clean fan unit, gas/air channel and Venturi extension.*<br>*Reset the appliance.* |
| 464 | Burner in a fault state. | Ionisation current too low during calibration. Differential compared to previous value not plausible. | ▪ Check ionisation electrode and connecting cable. Check plug-in connections for loose contacts.<br>▪ Check whether there is a lot of dust in the ventilation air (e.g. from construction work).<br>▪ Check flue system. Remove flue gas recirculation if required.<br>▪ Check system for condensate backup.<br>Reset the appliance.<br><br>***Note***<br>*To prevent water damage, detach fan unit before removing the burner.*<br><br>If the fault is constantly present, replace the HBMU heat management unit: See chapter "Replacing the HBMU heat management unit."<br><br>***Note***<br>*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).*<br>*If burner gauze assembly and ionisation electrode have been replaced, also clean fan unit, gas/air channel and Venturi extension.* |

## Fault messages (cont.)

| Displayed fault code | System characteristics | Cause | Measures |
|---|---|---|---|
| 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.<br>▪ Check that on-site gas line and gas flow switch are correctly sized.<br>▪ Visually inspect gas solenoid valve inlet and strainer on the inlet side for contamination.<br>Reset the appliance.<br><br>***Note***<br>*Contamination from a brazed gas line, for example, can block up the gas solenoid valve strainer on the inlet side.* |
| 468 | Burner in a fault state. | Ionisation current too high during calibration. | Check gap between ionisation electrode and burner gauze assembly.<br>Check whether there is a lot of dust in the ventilation air (e.g. from construction work).<br>Reset the appliance.<br><br>***Note***<br>*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).*<br>*If burner gauze assembly and ionisation electrode have been replaced, also clean fan unit, gas/air channel and Venturi extension.* |
| 471 | No heat demand. | System pressure sensor not available, lead break or short circuit. | ▪ Check system pressure sensor (plug 163).<br>▪ Check lead and plug-in connection.<br>▪ Measure, to see if supply voltage to sensor is 5 V–. |
| 474 | Burner in a fault state. | Error in scheduled program run monitoring. | Reset the appliance.<br>If the fault occurs repeatedly, replace the HBMU heat management unit. See chapter "Replacing the HBMU heat management unit". |
| 517 | Normal operation; remote control not working. | Lead break, PlusBus cable, incorrect appliance address set, remote control faulty. | ▪ Check setting in the commissioning assistant and correct as necessary.<br>▪ Check remote control cable.<br>▪ Check remote control subscriber number. Replace faulty remote control if applicable. |

## Fault messages (cont.)

| Displayed fault code | System characteristics | Cause | Measures |
|---|---|---|---|
| 527, 528 | Burner in a fault state. | Incorrect parameter set, HBMU heat management unit. | Overwrite (flash) the HBMU heat management unit with the correct parameter set. |
| 540 | Burner in a fault state. | Condensate backup in the heat cell. | ▪ Check system for condensate backup.<br>▪ Check the condensate drain and trap.<br>▪ Replace insulation blocks, electrodes and burner gauze assembly if required.<br><br>***Note***<br>*To prevent water damage, detach fan unit before removing the burner.*<br><br>Reset the appliance. |
| 544 | Emergency function operating mode is activated for heating circuit 2:<br>Mixer closes. Heating circuit pump is operational. | Lead break, flow temperature sensor, heating circuit 2 with mixer.<br>Incorrect setting during commissioning. | Check flow temperature sensor, mixer 2.<br>Measure voltage at sensor input on electronics module. Set value:<br>3.3 V– with sensor disconnected.<br>Check setting in the commissioning assistant and correct if required.<br>Checking setting of ADIO rotary switch. |
| 545 | Emergency function operating mode is activated for heating circuit 2:<br>Mixer closes. Heating circuit pump is operational. | Short circuit, flow temperature sensor, heating circuit 2 with mixer. | Check flow temperature sensor, mixer 2.<br>Measure voltage at sensor input on electronics module. Set value:<br>3.3 V– with sensor disconnected |
| 574 | Normal operation without room influence. | Room temperature sensor, heating circuit 1 not available. | Check external room temperature sensor for heating circuit or room temperature sensor on remote control unit. |
| 575 | Normal operation without room influence. | Lead break, room temperature sensor, heating circuit 1. | Check external room temperature sensor for heating circuit or room temperature sensor on remote control unit. |
| 576 | Normal operation without room influence. | Short circuit, room temperature sensor, heating circuit 1. | Check external room temperature sensor for heating circuit or room temperature sensor on remote control unit. |
| 577 | Normal operation without room influence. | Room temperature sensor, heating circuit 2 not available. | Check external room temperature sensor for heating circuit or room temperature sensor on remote control unit. |
| 578 | Normal operation without room influence. | Lead break, room temperature sensor, heating circuit 2. | Check external room temperature sensor for heating circuit or room temperature sensor on remote control unit. |

## Fault messages (cont.)

| Displayed fault code | System characteristics | Cause | Measures |
|---|---|---|---|
| 579 | Normal operation without room influence. | Short circuit, room temperature sensor, heating circuit 1. | Check external room temperature sensor for heating circuit or room temperature sensor on remote control unit. |
| 682 | Burner in a fault state | Air mass flow rate sensor not available. | Check air mass flow rate sensor. |
| 683 | Burner in a fault state. | Air mass flow rate sensor faulty. | Check air mass flow rate sensor. |
| 684 | Burner in a fault state. | Back draught safety device faulty. | Check back draught safety device. |
| 694 | Burner in a fault state. | Signal comparison, deviation, flue gas high limit safety cut-out. | Check plug-in connection and lead to sensor. Check sensor. Replace sensor if necessary.<br>Reset the appliance. |
| 738 | Normal operation | OpenTherm remote control unit connected but not configured | Set C.7 in the commissioning assistant to a value of 14. |
| 799 | No DHW heating, no central heating. | Central heating circuit pump reports an electrical fault.<br>No flow rate. | Perform a power reset.<br>If this occurs repeatedly, replace the heating circuit pump. |
| 979 | Constant heat demand. Set room temperature is exceeded. | Both inputs – plug 96 and OpenTherm – are occupied and reporting a heat demand. | ***Note***<br>*Only one input can be used. Either plug 96 or OpenTherm.*<br><br>Remove external devices or wire jumper from one of the inputs. |
| 980 | No DHW heating. | Water flow rate undershot. | Check that the cylinder flow and return are open.<br>Check DHW setting in commissioning assistant and correct if necessary.<br>Check the circulation pump; replace if necessary.<br><br>***Note***<br>*Pause time for DHW heating can be terminated by mains reset.* |
| 981 | No DHW heating. | Water flow rate undershot. | Check that the cylinder flow and return are open.<br>Check DHW setting in commissioning assistant and correct if necessary.<br>Check the circulation pump; replace if necessary.<br><br>***Note***<br>*Pause time for DHW heating can be terminated by mains reset.* |
| 982 | No central heating. No DHW heating. | Circulation pump heating circuit 1 running dry. | Check the diaphragm expansion vessel; check the circulation pump. |

## Fault messages (cont.)

***Status messages***
*The following messages can be displayed using the "Vitoguide" software tool:*

| Message on the display | Meaning |
|---|---|
| S.60 | Summer mode active (outside temperature economy function) |
| S.74 | Heating suppression, heating |
| S.75 | DHW circulation 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 | Due to insufficient heat transfer in heating system, burner operation not required |

## Repairs

! **Please note**
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.

Water ingress can result in damage to other components.

Protect the following components against ingress of water:
- Control unit components (especially in the service position)
- Electrical components
- Plug-in connections
- Cables and leads

### Shutting down the boiler

1. Turn off the power supply at the ON/OFF switch.
2. Shut off the gas supply.
3. If the boiler needs to be removed:
   - 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.
   - Disconnect the balanced flue system.
   - Drain the boiler on the heating water and DHW sides.
   - Disconnect the on-site cables/leads.

## Repairs (cont.)

### Removing the boiler from the pre-plumbing jig or mounting frame

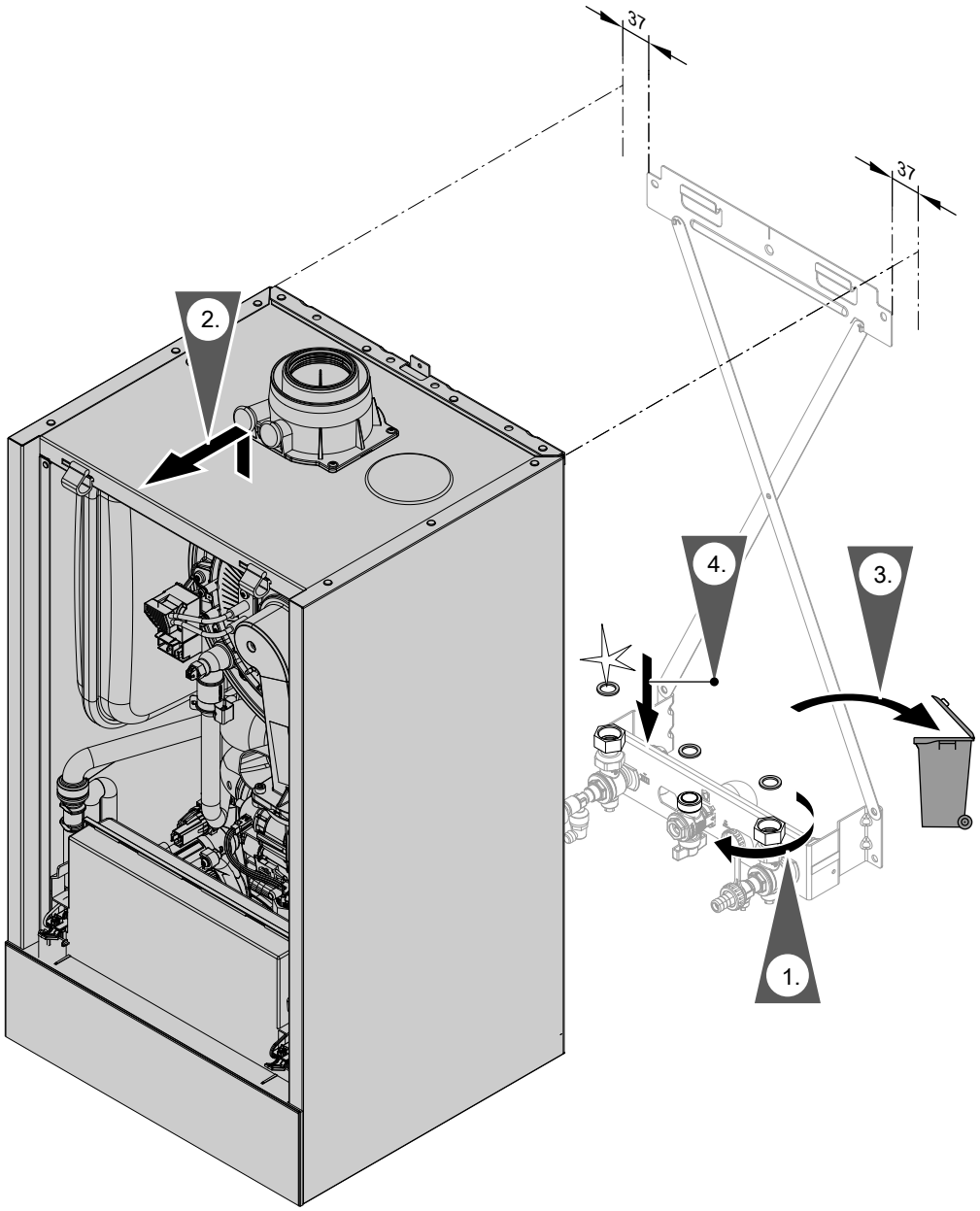


*Fig. 42*

***Note***
*When assembling, use new gaskets and, if required, new locking ring fittings.*

*Internal gasket diameter:*
- *Gas connection Ø 18.5 mm*
- *Heating water side connections Ø 17.0 mm*

*Gaskets and locking ring connections are available as spare parts (if required).*

***Note***
*When carrying out any work on gas connection fittings, hold with a suitable tool. Never transfer any forces to the internal components.*

**Danger**
Escaping gas leads to a risk of explosion.
Check all connections on the gas side (also inside the appliance) for tightness.

### Status/checking/diagnosing the internal circulation pump

The internal circulation pump is fitted with a status LED.





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## **Repairs** (cont.)

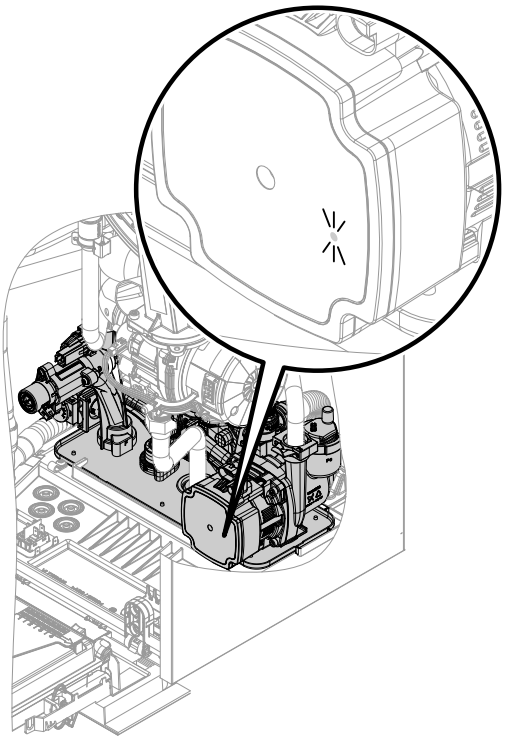

*Fig. 43*

- Constant green LED:
  Pump is running without external control from the boiler controller
- Flashing green LED:
  Pump is running with external control from the boiler controller
- Constant red LED:
  Pump failure

***Note***

*The pump is controlled by a PWM signal. A lead break in the data line will not generate a fault message.*
*The pump is operating at 100 % of its maximum output.*

## Repairs (cont.)

### Checking the temperature sensors

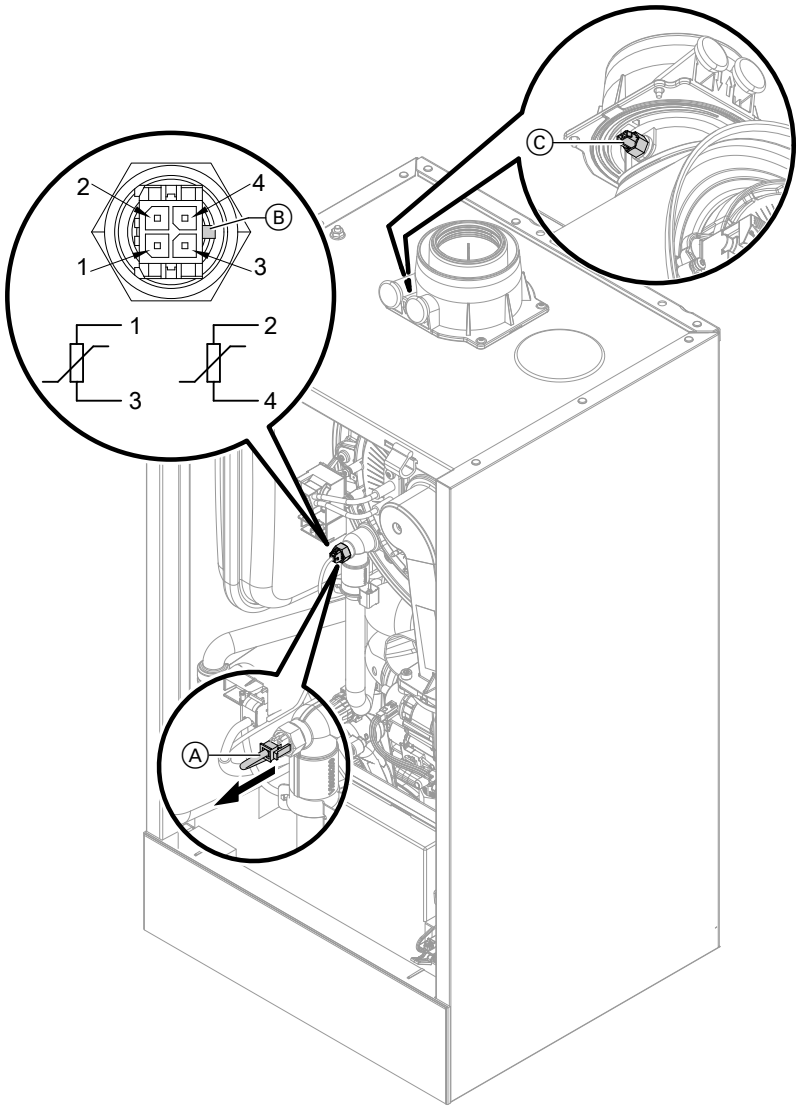


*Fig. 44*

**Heat generator circuit flow temperature sensor (dual sensor)**

1. Check the leads and plugs of flow temperature sensors Ⓐ.

2. Disconnect the leads from flow 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.

**Danger**
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.

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





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## Repairs (cont.)

### Cylinder temperature sensor/outlet temperature sensor

1. Check lead and plug of the cylinder temperature sensor or outlet temperature sensor.
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 lead and plug of temperature sensor [9] on the ADIO electronics module (mixer extension kit).
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 7 and 8 from terminal 4.
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-core lead, length up to 35 m with a cross-section of 1.5 $mm^2$
   Depending on the test result, replace the lead or the outside temperature sensor.

### Flue gas temperature sensor

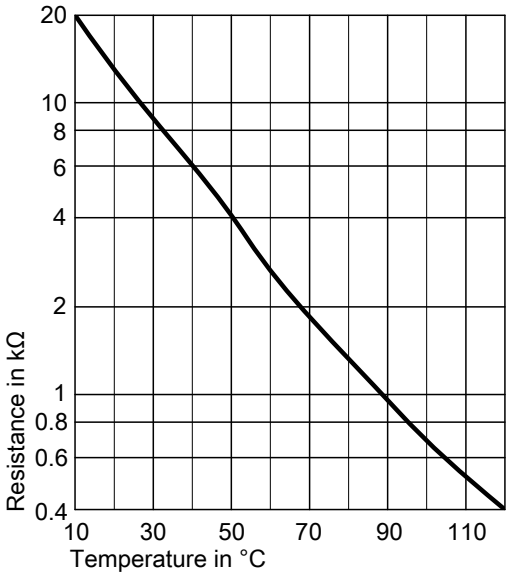
1. Check the lead and plug of flue gas temperature sensor Ⓒ.
2. Disconnect leads, flue gas temperature sensor Ⓒ.
3. Rotate sensor (anti-clockwise) by ¼ turn to remove it (bayonet fitting).
4. Check the sensor resistance. Compare the resistance with the value for the currently recorded temperature from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

   **Danger**
   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.

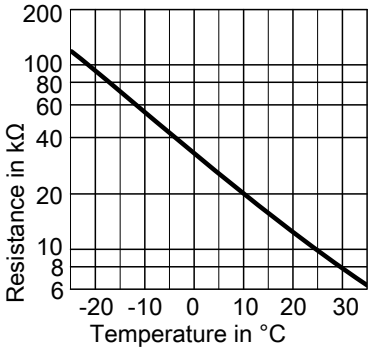
## Repairs (cont.)

- Flue gas temperature sensor
- Flow temperature sensor
- Cylinder temperature sensor
- Outlet temperature sensor
- Temperature sensor, low loss header




*Sensor type: NTC 10 kΩ*

- Outside temperature sensor




*Sensor type: NTC 10 kΩ*

**Fault during commissioning (fault message 416)**

During commissioning, the control unit checks for correct placement of the flue gas temperature sensor. If fault message 416 is displayed:

1. Check whether the flue gas temperature sensor is correctly installed (bayonet fitting). See previous diagram.
2. If required, correct the position of the flue gas temperature sensor.
3. Check the flue gas temperature sensor resistance. See previous chapter. Replace faulty flue gas temperature sensor if required.
4. Turn off the ON/OFF switch.
5. Turn the ON/OFF switch back on. Restart the commissioning assistant.
6. Check for leaks on the flue gas side.

***Note***
*If fault message 416 continues to be displayed although the flue gas temperature sensor is correctly positioned: Initial commissioning may result in burner faults e.g. caused by air in the gas line. Eliminate the fault and reset the appliance.*

**Check temperature sensors at EM-S1 extension (ADIO electronics module) or at SDIO/SM1A electronics module**

Check temperature sensors: Installation and service instructions of relevant accessory.





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## Repairs (cont.)

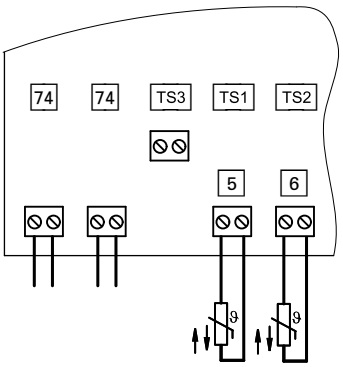


*Fig. 45*

### Check cylinder temperature sensor

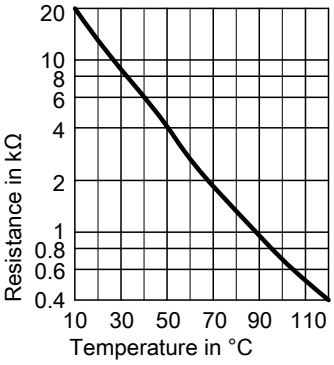


*Fig. 46 Sensor type: NTC 10 kΩ*

1. Disconnect plug TS1 [5] from the electronics module. Measure the resistance.
2. Compare the sensor resistance to the curve.
3. In the event of severe deviation (> 10 %), replace the sensor.

### Check collector temperature sensor

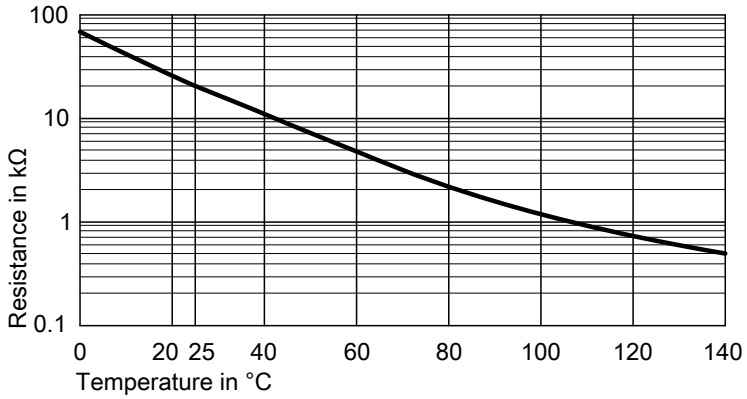


*Fig. 47 Sensor type: NTC 20 kΩ*

1. Disconnect plug TS2 [6] from the electronics module. Measure the resistance.
2. Compare the sensor resistance to the curve.
3. In the event of severe deviation (> 10 %), replace the sensor.

## Repairs (cont.)

### Information on replacing the HBMU heat management unit

If replacing the HBMU heat management unit, "Vitoguide" must be used.

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

### Replacing the power cable

When replacing the power cable, only use the power cable available as a spare part from Viessmann.

### Replacing the HMI connecting cable

**Please note**
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.

### Checking the plate heat exchanger

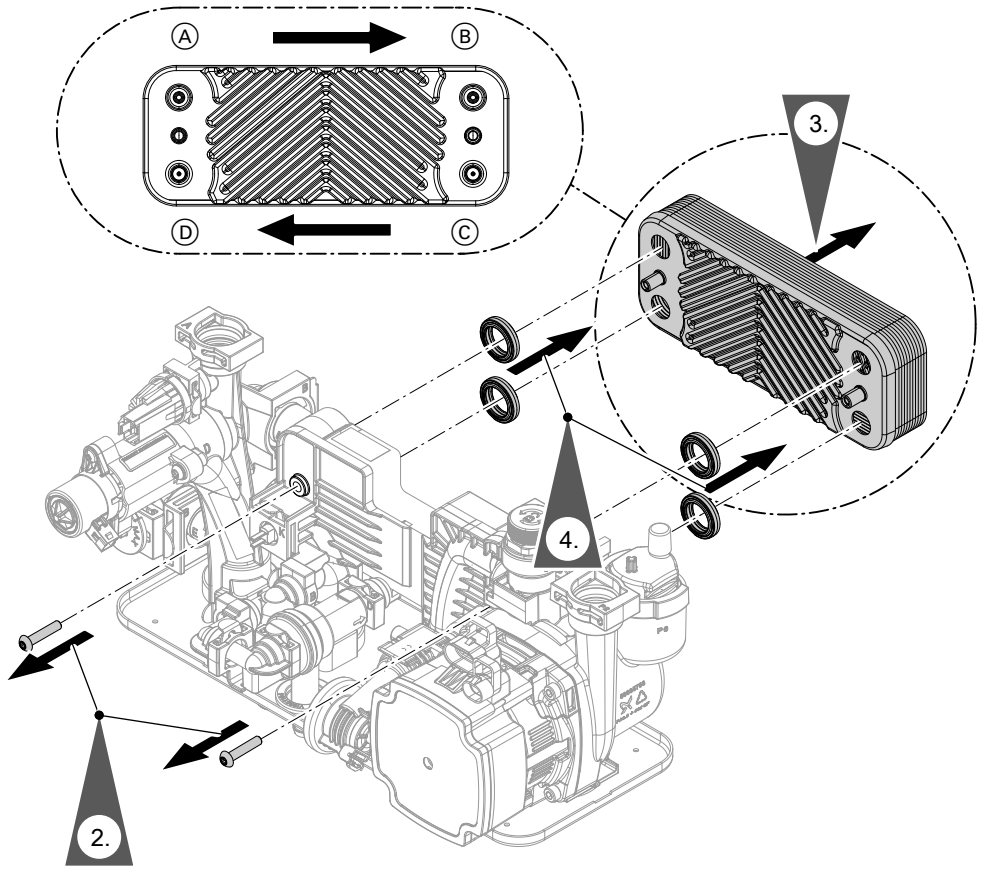


*Fig. 48*

Ⓐ Heating water flow
Ⓑ Heating water return
Ⓒ Cold water
Ⓓ DHW

**1.** Shut off and drain the boiler on the heating water and DHW sides.

**2.** Undo screws.

## Repairs (cont.)

3. Remove plate heat exchanger.

   ***Note***
   *During and after removal, small amounts of water may trickle from the plate heat exchanger.*

4. Remove gaskets and dispose of them.

5. Check connections on the DHW side for scaling. Clean or replace the plate heat exchanger as required.

6. Check connections on the heating water side for contamination. Clean or replace the plate heat exchanger as required.

7. Install plate heat exchanger in reverse order using new gaskets.
   Tighten screws as tightly as necessary and ensure that the components are undamaged and are functioning correctly throughout service life.
   Observe torque settings if a torque wrench is available.
   Screw torque: 3.2 Nm ± 0.2

   ***Note***
   *During installation, ensure the connections are positioned and the gaskets seated correctly.*

   **Danger**
   Risk of electric shock from escaping heating water or DHW.
   Check all water side connections for tightness.

### Removing the hydraulic unit

If components of the hydraulic unit have to be replaced.

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

## **Repairs** (cont.)

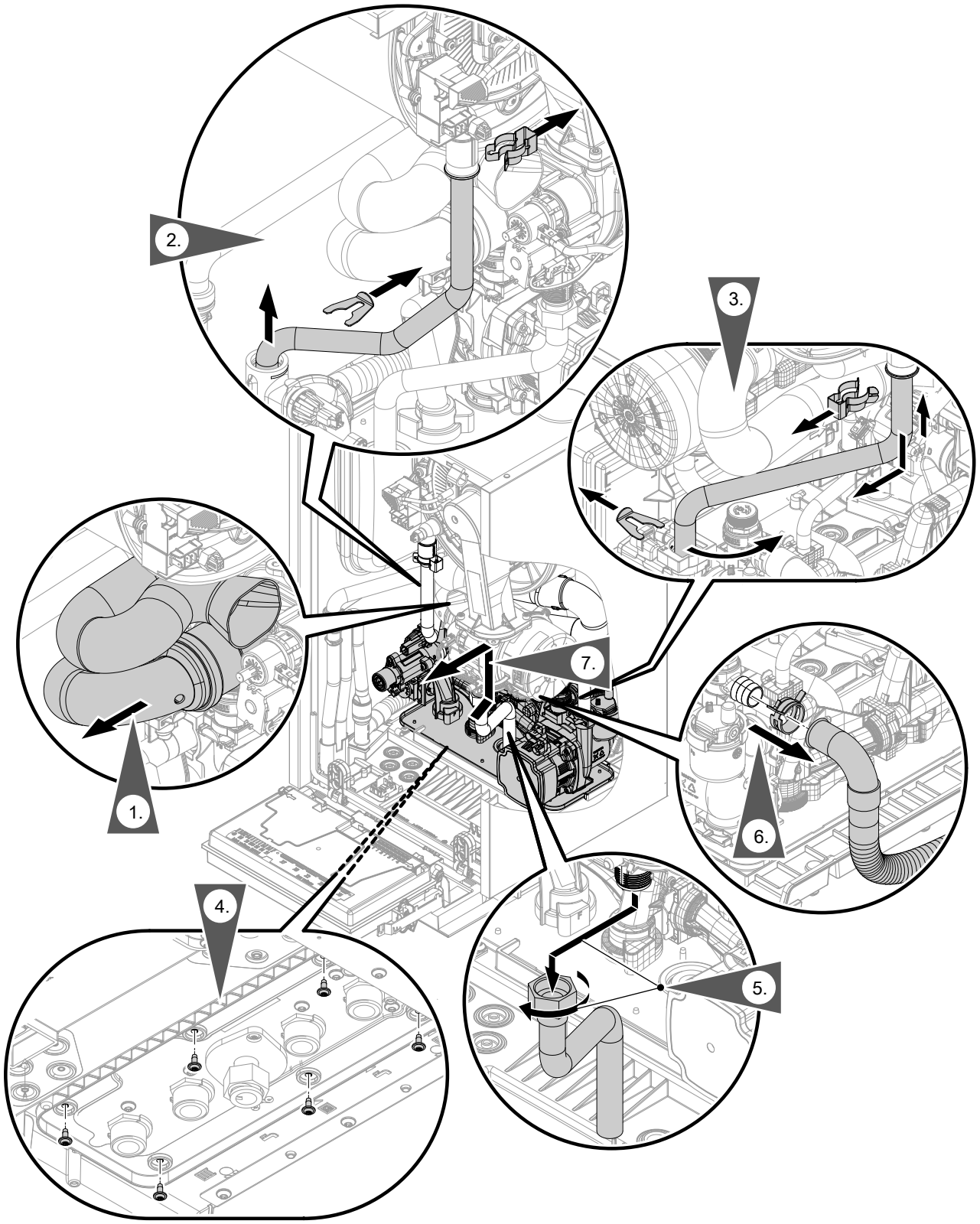


*Fig. 49*





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## Repairs (cont.)

### Checking the fuse

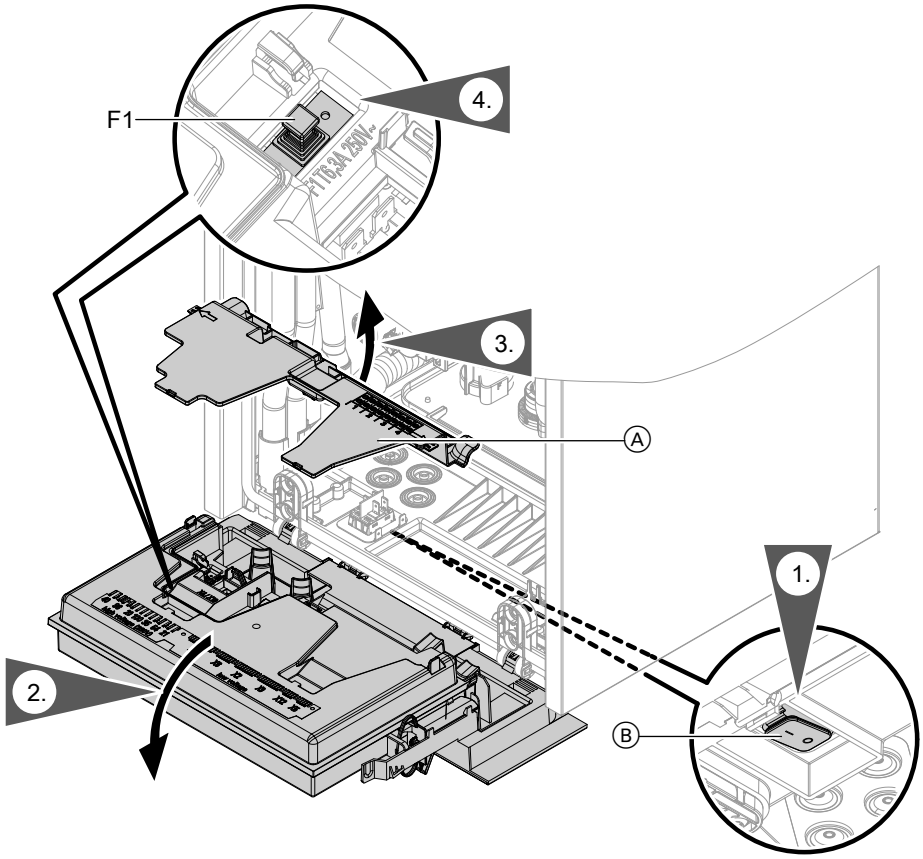


*Fig. 50*

1. Switch ON/OFF switch Ⓑ OFF.
2. Remove the programming unit.
3. Pivot the HBMU heat management unit down.
4. Remove cover Ⓐ.
5. Check fuse F1 (see connection and wiring diagram).

**Danger**
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.

## Appliance functions

### Heating mode

- **Weather-compensated operation:**
  The rooms are heated in accordance with the room temperature and time program settings.
  The control unit determines a set flow temperature for the heat generator, subject to the outside temperature, the room temperature and the slope/level of the heating curve.
- **Room temperature-dependent operation (constant operation with room thermostat):**
  System with one heating circuit without mixer. The rooms are heated in accordance with the settings of the room temperature controller/room thermostat (accessories).
  If the room temperature controller/room thermostat issues a demand, the standard set flow temperature is maintained. If there is no demand present, the reduced set flow temperature is maintained.
- **Constant operation without room thermostat:**
  The rooms are heated according to the time program settings.
  In the time phases at standard room temperature, the standard set flow temperature or the set comfort flow temperature is maintained. Outside the set time phases, the reduced set flow temperature is maintained.
- **OpenTherm:**
  Rooms are heated in accordance with the settings of the room temperature controller/room thermostat (accessories). The OpenTherm controller specifies the flow temperature for the heat generator.

### Venting program

During the venting program, the circulation pump will be alternately switched on and off for 30 s 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 venting program.

Activate venting 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 enabled, the burner shuts down. The program automatically becomes inactive after 20 min.

### Heating curve

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

Factory settings:
- Slope = 1.4
- Level = 0

***Note***
*If heating circuits with mixer are present in the heating system: The flow temperature of the heat generator is one differential temperature higher than the flow temperature for the heating circuits with mixer. Differential temperature in delivered condition set to 8 K.*





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## Appliance functions (cont.)

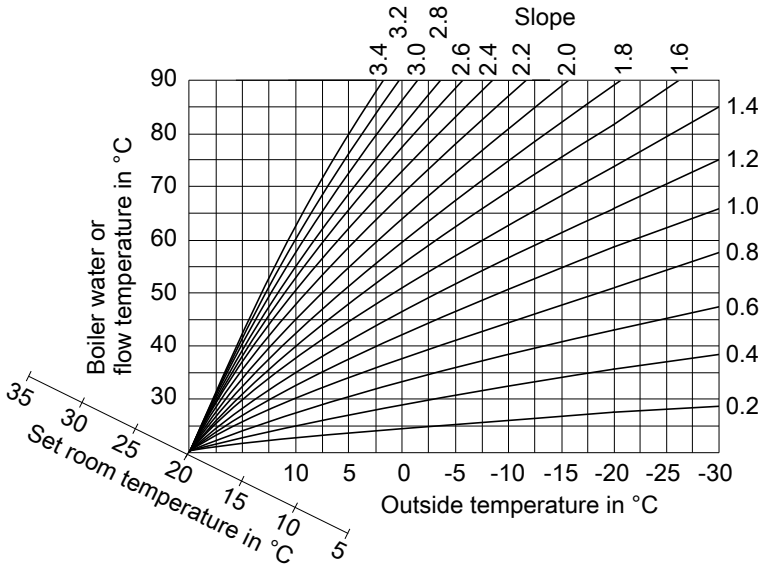


*Fig. 51*

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

**Set room temperature**

**Standard room temperature or comfort room temperature**

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

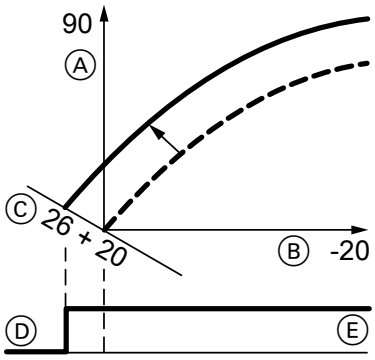


*Fig. 52 Example 1: Changing the set room temperature from 20 to 26 °C*

Ⓐ Flow temperature in °C
Ⓑ Outside temperature in °C
Ⓒ Set room temperature in °C
Ⓓ Heating circuit pump "OFF"
Ⓔ Heating circuit pump "ON"

Changing the set room temperature

Operating instructions

**Reduced room temperature**

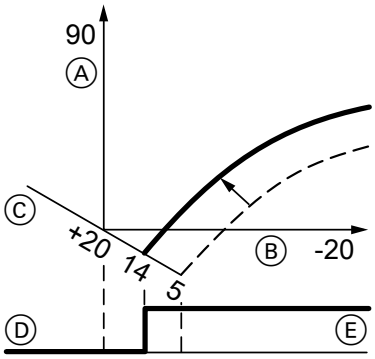


*Fig. 53 Example 2: Changing the reduced set room temperature from 5 °C to 14 °C*

Ⓐ Flow temperature in °C
Ⓑ Outside temperature in °C
Ⓒ Set room temperature in °C
Ⓓ Heating circuit pump "OFF"
Ⓔ Heating circuit pump "ON"

Changing the reduced set room temperature

Operating instructions

**Changing the slope and level**

Individually adjustable for each heating circuit

## Appliance functions (cont.)

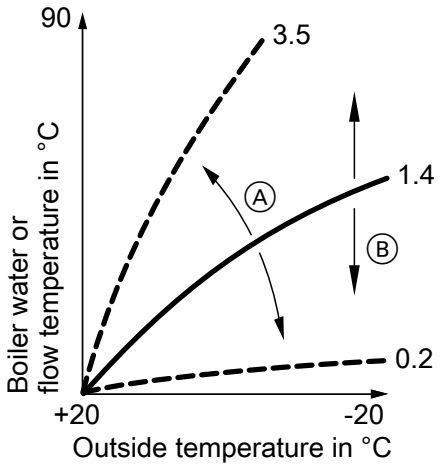


*Fig. 54*

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

### Screed drying

When enabling screed drying, observe the information provided by the screed manufacturer.
When the screed drying function is activated, the heating circuit pumps of **all** heating circuits are switched on and the flow temperature is maintained in accordance with the selected profile. After completion (30 days), the heating circuits with mixer are automatically controlled with the set parameters.
Screed drying is adjusted in the system configuration:

- 0 = OFF
- 2 = Temperature profile A
- 3 = Temperature profile B
- ...
- 7 = Temperature profile F

***Note***
*During screed drying, DHW heating is not available.*

**Parameter "Screed drying":**

Temperature profile A (EN 1264-4)


*Fig. 55*

Observe EN 1264. The report to be provided by the heating contractor must contain the following details regarding heat-up:

- Heat-up data with the relevant set flow temperatures
- Max. flow temperature achieved.
- Operating state and outside temperature at handover

***Note***
*Temperature profile 6 ends after 21 days.*

The function continues after a power failure or after the control unit has been switched off. When screed drying has completed or been manually switched off, the system is controlled in accordance with the selected parameters.

## Appliance functions (cont.)

Temperature profile B (ZV parquet and flooring technology)

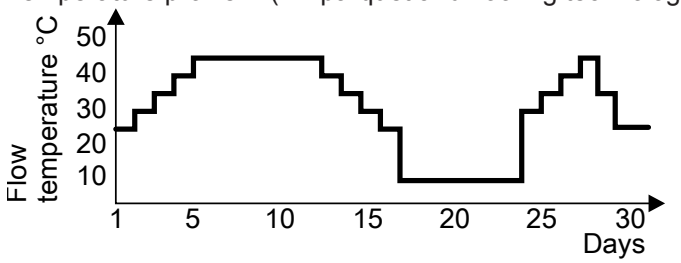


*Fig. 56*

Temperature profile C

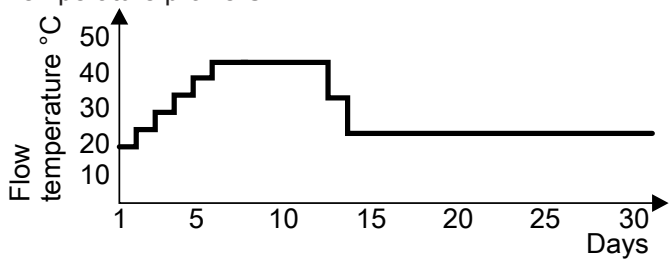


*Fig. 57*

Temperature profile D

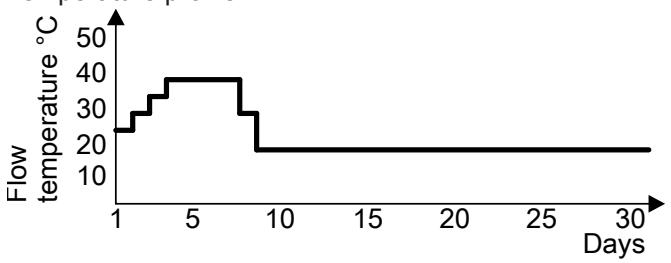


*Fig. 58*

Temperature profile E

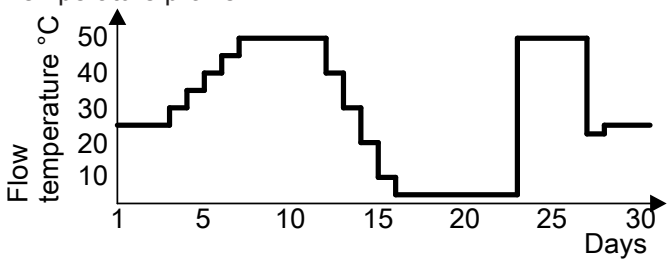


*Fig. 59*

Temperature profile F

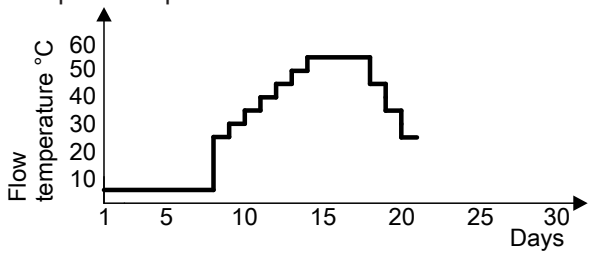


*Fig. 60 Ends after 21 days.*

## DHW heating

The burner, the circulation pump and the 3-way diverter valve are started or changed over if the cylinder temperature lies 2.5 K below the set cylinder temperature.
In the delivered condition, the set boiler water temperature is 20 K higher than the set cylinder temperature.
If the actual cylinder temperature exceeds the set cylinder temperature by 2.5 K, the burner shuts down and circulation pump run-on begins.

**Danger**
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 set DHW temperature is set to over 60 °C
- Gas condensing combi boiler:
  If there are several draw-off events in quick succession or several appliance calibration processes

## External heating circuit hook-up (if installed)

***Note***
*Only in conjunction with weather-compensated operation.*

- Function:
  - If the external demand is active (plug 96 or digital input on EM-EA1 (DIO) electronics module closed), the heating circuit is supplied with heat.
  - If the external demand is inactive (contact open), heat supply to the heating circuit ends (regardless of the current set room temperature or the switching time).

    **Please note**

    There is no frost protection for the connected heating circuits.
- Connection:
  - If only one heating circuit is hooked up, use connection at plug 96: See page 26.
  - If multiple heating circuits are hooked up, connect all contacts to EM-EA1 extension (DIO electronics module) with the subscriber number. 1 (rotary switch = 1).

    See EM-EA1 extension installation instructions

    ***Note***
    *Perform the hook-up with subscriber number **"1"**.*

## HBMU heat management unit

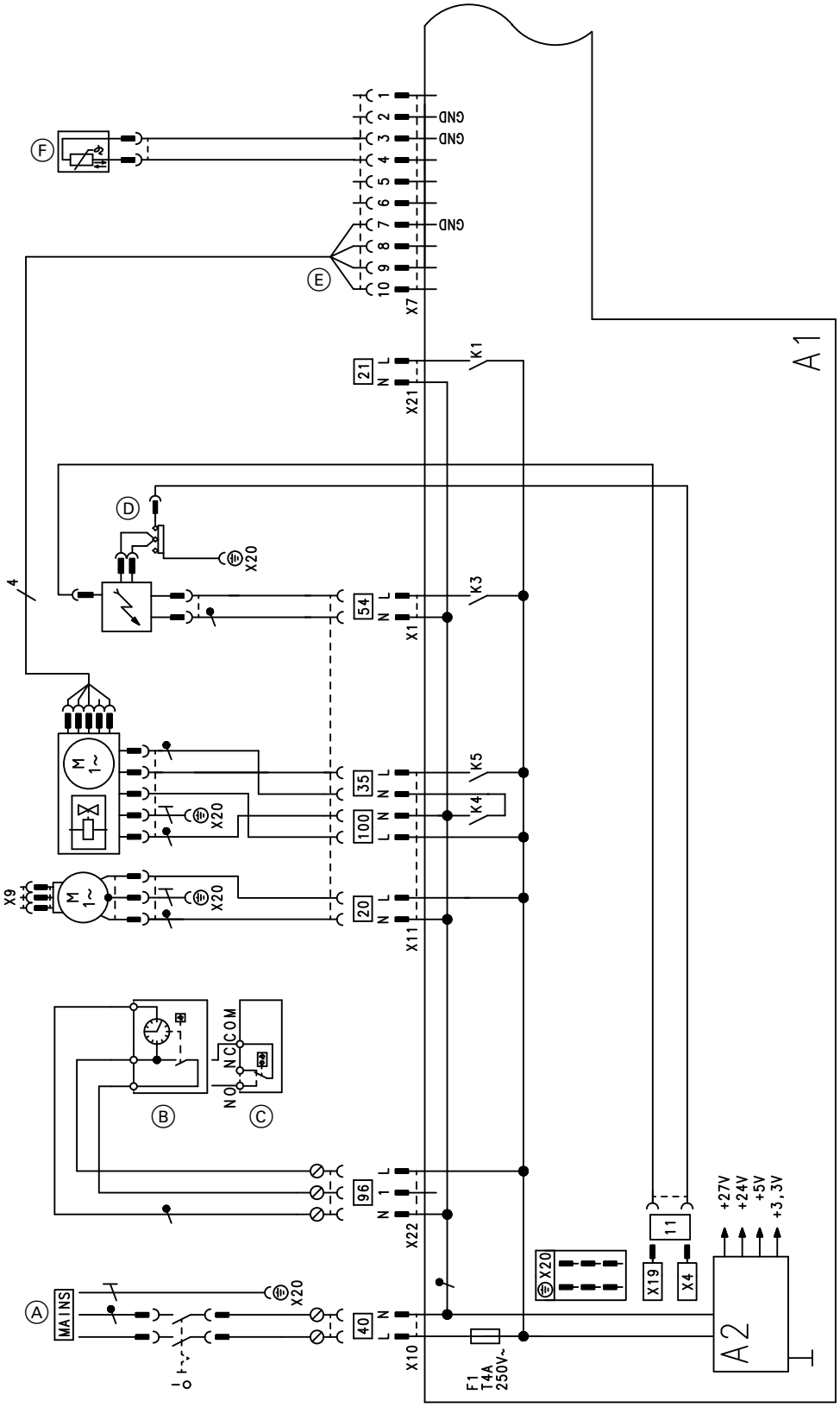


*Fig. 61*

A1 HBMU heat management unit
X... Electrical interfaces
A2 Power supply unit
Ⓐ Power supply [40]
Ⓑ Vitotrol 100, type UTA
Ⓒ Vitotrol 100, type UTDB
Ⓓ Ignition unit/ionisation [54]
Ⓕ Outlet temperature sensor (combi boiler only)
[35] Gas solenoid valve
[100] Fan motor
Ⓔ Fan motor control
[96] 230 V connection accessories
[20] Heating circuit pump
[21] No function

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(cont.)

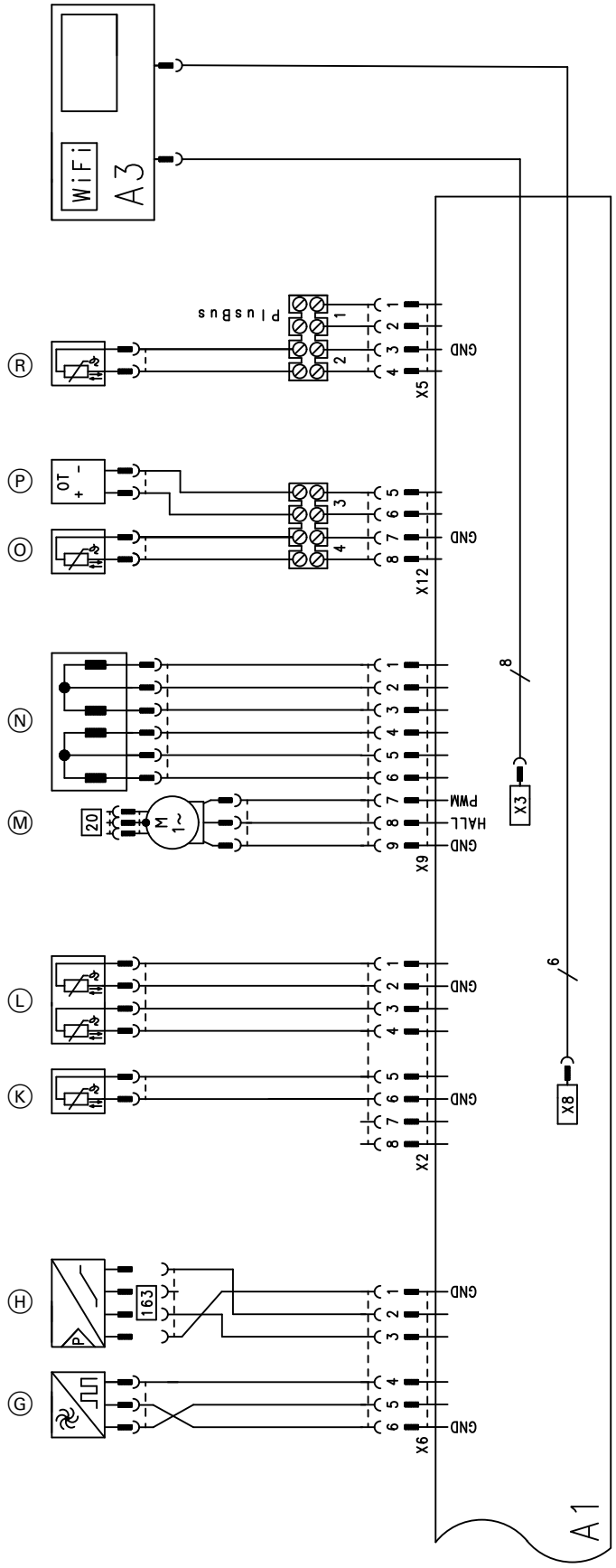


*Fig. 62*

A1 HBMU heat management unit
A3 Programming unit with communication module
X... Electrical interfaces
Ⓖ Flow sensor (combi boiler only)
Ⓗ Water pressure sensor
Ⓚ Flue gas temperature sensor
Ⓛ Boiler water temperature sensor
Ⓜ Circulation pump (PWM)





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(cont.)

Ⓝ Diverter valve stepper motor
Ⓞ Outside temperature sensor
Ⓟ Remote control (OpenTherm device)
Ⓡ Cylinder temperature sensor (system boiler only)

## Commissioning/service reports

| Settings and test values | | Set value | Commissioning | Maintenance/ service | Maintenance/ service |
|---|---|---|---|---|---|
| Date | | | | | |
| Signature | | | | | |
| **Static pressure** | mbar<br>kPa | ≤ 57.5<br>≤ 5.75 | | | |
| **Supply pressure (flow pressure)** | | | | | |
| ☐ For natural gas ..... | mbar<br>kPa | See table "Supply pressure" (Commissioning ...) | | | |
| ☐ For LPG ..... | mbar<br>kPa | | | | |
| ☐ *Enter gas type* | | | | | |
| **Carbon dioxide content $CO_2$**<br>For natural gas | | | | | |
| ▪ At lower heating output | % by vol. | See "Checking the combustion quality" (Commissioning ...) | | | |
| ▪ At upper heating output | % by vol. | | | | |
| For LPG | | | | | |
| ▪ At lower heating output | % by vol. | | | | |
| ▪ At upper heating output | % by vol. | | | | |
| **Oxygen content $O_2$** | | | | | |
| ▪ At lower heating output | % by vol. | | | | |
| ▪ At upper heating output | % by vol. | | | | |
| **Carbon monoxide content CO** | | | | | |
| ▪ At lower heating output | ppm | < 1000 | | | |
| ▪ At upper heating output | ppm | < 1000 | | | |

# Specification

## Gas condensing system boiler

| | | | | | |
|---|---|---|---|---|---|
| **Gas boiler, type B and C, category $II_{2N3P}$** | | | | | |
| **Type** | | **B1HF** | | | |
| **Rated heating output range (details to EN 15502)** | | | | | |
| **$T_F/T_R$ = 50/30 °C** | | | | | |
| **Natural gas** | **kW** | **3.2 (5.7[*2]) to 11.0** | **3.2 (5.7[*2]) to 19.0** | **3.2 (5.7[*2]) to 25.0** | **3.2 (5.7[*2]) to 32.0** |
| **LPG** | **kW** | **3.2 to 11.0** | **3.2 to 19.0** | **3.2 to 25.0** | **3.2 to 32.0** |
| **$T_F/T_R$ = 80/60 °C** | | | | | |
| **Natural gas** | **kW** | **2.9 (5.2[*2]) to 10.1** | **2.9 (5.2[*2]) to 17.5** | **2.9 (5.2[*2]) to 23.0** | **2.9 (5.2[*2]) to 29.3** |
| **LPG** | **kW** | **2.9 to 10.1** | **2.9 to 17.5** | **2.9 to 23.0** | **2.9 to 29.3** |
| **Rated heating output for DHW heating** | | | | | |
| Natural gas | kW | 2.9 (5.2[*2]) to 17.5 | 2.9 (5.2[*2]) to 17.5 | 2.9 (5.2[*2]) to 23.0 | 2.9 (5.2[*2]) to 29.3 |
| LPG | kW | 2.9 to 17.5 | 2.9 to 17.5 | 2.9 to 23.0 | 2.9 to 29.3 |
| **Rated heat input (Qn)** | | | | | |
| Natural gas | kW | 3.0 (5.3[*2]) to 10.3 | 3.0 (5.3[*2]) to 17.8 | 3.0 (5.3[*2]) to 23.4 | 3.0 (5.3[*2]) to 29.9 |
| LPG | kW | 3.0 to 10.3 | 3.0 to 17.8 | 3.0 to 23.4 | 3.0 to 29.9 |
| **Rated heat input for DHW heating (Qnw)** | | | | | |
| Natural gas | kW | 3.0 (5.3[*2]) to 17.8 | 3.0 (5.3[*2]) to 17.8 | 3.0 (5.3[*2]) to 23.4 | 3.0 (5.3[*2]) to 29.9 |
| LPG | kW | 3.0 to 17.8 | 3.0 to 17.8 | 3.0 to 23.4 | 3.0 to 29.9 |
| **Product ID** | | CE-0085DL0217 | | | |
| **IP rating** to EN 60529 | | IP X4 to EN 60529 | | | |
| $NO_x$ | | 6 | 6 | 6 | 6 |
| **Gas supply pressure** | | | | | |
| Natural gas | mbar<br>kPa | 20<br>2 | 20<br>2 | 20<br>2 | 20<br>2 |
| LPG | mbar<br>kPa | 50<br>5 | 50<br>5 | 50<br>5 | 50<br>5 |
| **Max. permiss. gas supply pressure**[*3] | | | | | |
| Natural gas | mbar<br>kPa | 13 to 25.0<br>1.3 to 2.5 | 13 to 25.0<br>1.3 to 2.5 | 13 to 25.0<br>1.3 to 2.5 | 13 to 25.0<br>1.3 to 2.5 |
| LPG | mbar<br>kPa | 25 to 57.5<br>2.5 to 5.75 | 25 to 57.5<br>2.5 to 5.75 | 25 to 57.5<br>2.5 to 5.75 | 25 to 57.5<br>2.5 to 5.75 |
| **Sound power level** (to EN ISO 15036-1) | | | | | |
| ▪ At partial load | dB(A) | 31.9 | 31.9 | 31.9 | 31.9 |
| ▪ At rated heating output (DHW heating) | dB(A) | 42.3 | 42.3 | 46.1 | 48.4 |

[*2] *Appliances for multiple connection of type B1HF-[kW]-M and B1KF-[kW]-M*

[*3] *If the gas supply pressure is higher than the maximum permissible value, install a separate gas pressure governor upstream of the system.*

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## Specification (cont.)



| | | | | | |
|---|---|---|---|---|---|
| **Gas boiler, type B and C, category $II_{2N3P}$** | | | | | |
| **Type** | | **B1HF** | | | |
| **Rated heating output range (details to EN 15502)** | | | | | |
| **$T_F/T_R$ = 50/30 °C** | | | | | |
| **Natural gas** | **kW** | **3.2 (5.7[*2]) to 11.0** | **3.2 (5.7[*2]) to 19.0** | **3.2 (5.7[*2]) to 25.0** | **3.2 (5.7[*2]) to 32.0** |
| **LPG** | **kW** | **3.2 to 11.0** | **3.2 to 19.0** | **3.2 to 25.0** | **3.2 to 32.0** |
| **$T_F/T_R$ = 80/60 °C** | | | | | |
| **Natural gas** | **kW** | **2.9 (5.2[*2]) to 10.1** | **2.9 (5.2[*2]) to 17.5** | **2.9 (5.2[*2]) to 23.0** | **2.9 (5.2[*2]) to 29.3** |
| **LPG** | **kW** | **2.9 to 10.1** | **2.9 to 17.5** | **2.9 to 23.0** | **2.9 to 29.3** |
| **Power consumption** (in the delivered condition) | W | 38 | 45 | 64 | 110 |
| **Rated voltage** | V | 230 | | | |
| Rated frequency | Hz | 50 | | | |
| Appliance fuse protection | A | 4.0 | | | |
| Backup fuse (power supply) | A | 16 | | | |
| **Communication module** (integral) | | | | | |
| WiFi frequency band | MHz | 2400 to 2483.5 | | | |
| Max. transmission power | dBm | 20 | | | |
| Low power radio frequency band | MHz | 2400 to 2483.5 | | | |
| Max. transmission power | dBm | 10 | | | |
| Supply voltage | V ⎓ | 24 | | | |
| Power consumption | W | 4 | | | |
| **Electronic temperature limiter setting (TN)** | °C | 91 | | | |
| **Electronic temperature cut-out setting** | °C | 110 | | | |
| **Electronic flue gas temperature limiter setting** | °C | 110 | | | |
| **Permissible ambient temperature** | | | | | |
| ▪ During operation | | Frost-free, dry and heated rooms | | | |
| ▪ During storage and transport | °C | -5 to +60 | | | |
| **Weight** | | | | | |
| ▪ Excl. heating water and packaging | kg | 32 | 32 | 32 | 32 |
| ▪ Incl. heating water | kg | 37.6 | 37.6 | 37.6 | 37.6 |
| **Water capacity** (excl. diaphragm expansion vessel) | l | 3.0 | 3.0 | 3.0 | 3.0 |
| **Max. flow temperature** | °C | 82 | 82 | 82 | 82 |
| **Max. flow rate** (Limit for the use of hydraulic separation) | l/h | See residual head graph | | | |
| **Nominal circulating water volume** At $T_F/T_R$ = 80/60 °C | l/h | 434 | 752 | 988 | 1259 |

[*2] *Appliances for multiple connection of type B1HF-[kW]-M and B1KF-[kW]-M*

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## Specification (cont.)

| Gas boiler, type B and C, category $II_{2N3P}$ | | | | | |
|---|---|---|---|---|---|
| **Type** | | **B1HF** | | | |
| **Rated heating output range (details to EN 15502)** | | | | | |
| **$T_F/T_R$ = 50/30 °C** | | | | | |
| **Natural gas** | **kW** | **3.2 (5.7[*2]) to 11.0** | **3.2 (5.7[*2]) to 19.0** | **3.2 (5.7[*2]) to 25.0** | **3.2 (5.7[*2]) to 32.0** |
| **LPG** | **kW** | **3.2 to 11.0** | **3.2 to 19.0** | **3.2 to 25.0** | **3.2 to 32.0** |
| **$T_F/T_R$ = 80/60 °C** | | | | | |
| **Natural gas** | **kW** | **2.9 (5.2[*2]) to 10.1** | **2.9 (5.2[*2]) to 17.5** | **2.9 (5.2[*2]) to 23.0** | **2.9 (5.2[*2]) to 29.3** |
| **LPG** | **kW** | **2.9 to 10.1** | **2.9 to 17.5** | **2.9 to 23.0** | **2.9 to 29.3** |
| **Diaphragm expansion vessel** | | | | | |
| Capacity | l | 8 | 8 | 8 | 8 |
| Pre-charge pressure | bar<br>kPa | 0.75<br>75 | 0.75<br>75 | 0.75<br>75 | 0.75<br>75 |
| **Permiss. operating pressure** | bar<br>MPa | 3<br>0.3 | 3<br>0.3 | 3<br>0.3 | 3<br>0.3 |
| **Connections** (with connection accessories) | | | | | |
| Boiler flow and return | R | ¾ | ¾ | ¾ | ¾ |
| Cold water and DHW | G | ½ | ½ | ½ | ½ |
| **Dimensions** | | | | | |
| Length | mm | 360 | 360 | 360 | 360 |
| Width | mm | 400 | 400 | 400 | 400 |
| Height | mm | 700 | 700 | 700 | 700 |
| **Gas connection** | R | ¾ | ¾ | ¾ | ¾ |
| **Supply values**<br>Relative to the max. load and 1013 mbar/15 °C | | | | | |
| With gas | | | | | |
| Natural gas E | $m^3/h$ | 1.88 | 1.88 | 2.48 | 3.16 |
| Natural gas LL | $m^3/h$ | 2.19 | 2.19 | 2.88 | 3.68 |
| LPG | kg/h | 1.38 | 1.38 | 1.82 | 2.32 |
| **Flue gas parameters** | | | | | |
| **Temperature** (at a return temperature of 30 °C) | | | | | |
| ▪ At rated heating output | °C | 39 | 41 | 46 | 59 |
| ▪ At partial load | °C | 38 | 38 | 38 | 38 |
| **Temperature** (at a return temperature of 60 °C, for DHW heating) | °C | 64 | 65 | 67 | 72 |
| Flue gas superheating temperature | °C | 120 | 120 | 120 | 120 |
| **Mass flow rate** (for DHW heating) | | | | | |
| Natural gas | | | | | |
| ▪ At maximum heating output | kg/h | 31.7 | 31.7 | 41.6 | 54.9 |
| ▪ At partial load | kg/h | 5.6 (9.8) | 5.6 (9.8) | 5.6 (9.8) | 5.6 (9.8) |

[*2] *Appliances for multiple connection of type B1HF-[kW]-M and B1KF-[kW]-M*

## Specification (cont.)



| Gas boiler, type B and C, category $II_{2N3P}$ | | | | | |
|---|---|---|---|---|---|
| **Type** | | **B1HF** | | | |
| **Rated heating output range (details to EN 15502)** | | | | | |
| **$T_F/T_R$ = 50/30 °C** | | | | | |
| **Natural gas** | **kW** | **3.2 (5.7[*2]) to 11.0** | **3.2 (5.7[*2]) to 19.0** | **3.2 (5.7[*2]) to 25.0** | **3.2 (5.7[*2]) to 32.0** |
| **LPG** | **kW** | **3.2 to 11.0** | **3.2 to 19.0** | **3.2 to 25.0** | **3.2 to 32.0** |
| **$T_F/T_R$ = 80/60 °C** | | | | | |
| **Natural gas** | **kW** | **2.9 (5.2[*2]) to 10.1** | **2.9 (5.2[*2]) to 17.5** | **2.9 (5.2[*2]) to 23.0** | **2.9 (5.2[*2]) to 29.3** |
| **LPG** | **kW** | **2.9 to 10.1** | **2.9 to 17.5** | **2.9 to 23.0** | **2.9 to 29.3** |
| LPG | | | | | |
| ▪ At maximum heating output | kg/h | 30.1 | 30.1 | 41.0 | 53.9 |
| ▪ At partial load | kg/h | 5.1 | 5.1 | 5.1 | 5.1 |
| **Available draught** | Pa | 116 | 116 | 168 | 323 |
| | mbar | 1.16 | 1.16 | 1.68 | 3.23 |
| **Available draught** For type $C_{(10)}$ (at interface to collector pipe system) | Pa | 25 | 25 | 25 | 25 |
| Maximum permissible pressure differential between flue gas outlet and air inlet with $C_{(10)}$[*4] | Pa | -200 | -200 | -200 | -200 |
| **Available draught** For type $B_{23P}$ | Pa | 232 | 527 | 698 | 635 |
| **Max. amount of condensate** To DWA-A 251 | l/h | 2.5 | 2.5 | 3.3 | 4.2 |
| **Condensate connection (hose nozzle)** | Ø mm | 20 to 24 | 20 to 24 | 20 to 24 | 20 to 24 |
| **Flue gas connection** | Ø mm | 60 | 60 | 60 | 60 |
| **Ventilation air connection** | Ø mm | 100 | 100 | 100 | 100 |
| **Standard seasonal efficiency [to DIN] at** | | | | | |
| $T_F/T_R$ = 40/30 °C | % | Up to 98 ($H_s$) [gross cv] | | | |
| **Energy efficiency class** | | A | A | A | A |

***Note***

*The supply values are only for reference (e.g. in the gas contract application) or for a supplementary, rough estimate to check the volumetric settings. Due to factory settings, the gas pressure must not be altered from these values. Reference: 15 °C, 1013 mbar (101.3 kPa).*

[*2] *Appliances for multiple connection of type B1HF-[kW]-M and B1KF-[kW]-M*

[*4] *Appliances for multiple connection, type B1HF-M (for multiple connection)*



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## Specification (cont.)

### Gas condensing combi boiler

| **Gas boiler, type B and C, category $II_{2N3P}$** | | | | |
|---|---|---|---|---|
| **Type** | | **B1KF-26** | **B1KF-30** | **B1KF-35** |
| **Rated heating output range (details to EN 15502)** | | | | |
| **$T_F/T_R$ = 50/30 °C** | | | | |
| **Natural gas** | **kW** | **3.2 (5.7[*5]) to 25.0** | **3.2 (5.7[*5]) to 25.0** | **3.2 (5.7[*5]) to 32.0** |
| **LPG** | **kW** | **3.2 to 25.0** | **3.2 to 25.0** | **3.2 to 32.0** |
| **$T_F/T_R$ = 80/60 °C** | | | | |
| **Natural gas** | **kW** | **2.9 (5.2[*5]) to 23.0** | **2.9 (5.2[*5]) to 23.0** | **2.9 (5.2[*5]) to 29.3** |
| **LPG** | **kW** | **2.9 to 23.0** | **2.9 to 23.0** | **2.9 to 29.3** |
| **Rated heating output for DHW heating** | | | | |
| Natural gas | kW | 2.9 (5.2[*5]) to 26 | 2.9 (5.2[*5]) to 30 | 2.9 (5.2[*5]) to 35 |
| LPG | kW | 2.9 to 26 | 2.9 to 30 | 2.9 to 35 |
| **Rated heat input (Qn)** | | | | |
| Natural gas | kW | 3.0 (5.3[*5]) to 23.4 | 3.0 (5.3[*5]) to 23.4 | 3.0 (5.3[*5]) to 29.9 |
| LPG | kW | 3.0 to 23.4 | 3.0 to 23.4 | 3.0 to 29.9 |
| **Rated heat input for DHW heating (Qnw)** | | | | |
| Natural gas | kW | 3.0 (5.3[*5]) to 26.5 | 3.0 (5.3[*5]) to 30.6 | 3.0 (5.3[*5]) to 35.3 |
| LPG | kW | 3.0 to 26.5 | 3.0 to 30.6 | 3.0 to 35.3 |
| **Product ID** | | CE-0085DL0217 | | |
| **IP rating** to EN 60529 | | IP X4 to EN 60529 | | |
| **Gas supply pressure** | | | | |
| Natural gas | mbar | 20 | 20 | 20 |
| | kPa | 2 | 2 | 2 |
| LPG | mbar | 50 | 50 | 50 |
| | kPa | 5 | 5 | 5 |
| **Max. permiss. gas supply pressure**[*6] | | | | |
| Natural gas | mbar | 25.0 | 25.0 | 25.0 |
| | kPa | 2.5 | 2.5 | 2.5 |
| LPG | mbar | 57.5 | 57.5 | 57.5 |
| | kPa | 5.75 | 5.75 | 5.75 |
| **Sound power level** (to EN ISO 15036-1) | | | | |
| ▪ At partial load | dB(A) | 31.9 | 31.9 | 31.9 |
| ▪ At rated heating output (DHW heating) | dB(A) | 49.1 | 50 | 50.4 |
| **Power consumption** (in the delivered condition) | W | 45 | 64 | 110 |
| **Rated voltage** | V | 230 | | |
| Rated frequency | Hz | 50 | | |
| Appliance fuse protection | A | 4 | | |
| Backup fuse (power supply) | A | 16 | | |

*[*5] Appliances for multiple connection of type B1HF-[kW]-M and B1KF-[kW]-M*

*[*6] If the gas supply pressure is higher than the maximum permissible value, install a separate gas pressure governor upstream of the system.*

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## Specification (cont.)



| **Gas boiler, type B and C, category $II_{2N3P}$** | | | | |
|---|---|---|---|---|
| **Type** | | **B1KF-26** | **B1KF-30** | **B1KF-35** |
| **Rated heating output range (details to EN 15502)** | | | | |
| **$T_F/T_R$ = 50/30 °C** | | | | |
| **Natural gas** | **kW** | **3.2 (5.7[*5]) to 25.0** | **3.2 (5.7[*5]) to 25.0** | **3.2 (5.7[*5]) to 32.0** |
| **LPG** | **kW** | **3.2 to 25.0** | **3.2 to 25.0** | **3.2 to 32.0** |
| **$T_F/T_R$ = 80/60 °C** | | | | |
| **Natural gas** | **kW** | **2.9 (5.2[*5]) to 23.0** | **2.9 (5.2[*5]) to 23.0** | **2.9 (5.2[*5]) to 29.3** |
| **LPG** | **kW** | **2.9 to 23.0** | **2.9 to 23.0** | **2.9 to 29.3** |
| **Communication module** (integral) | | | | |
| WiFi frequency band | MHz | 2400 to 2483.5 | | |
| Max. transmission power | dBm | 20 | | |
| Low power radio frequency band | MHz | 2400 to 2483.5 | | |
| Max. transmission power | dBm | 10 | | |
| Supply voltage | V ⎓ | 24 | | |
| Power consumption | W | 4 | | |
| **Electronic temperature limiter setting (TN)** | °C | 91 | | |
| **Electronic temperature cut-out setting** | °C | 110 | | |
| **Electronic flue gas temperature limiter setting** | °C | 110 | | |
| **Permissible ambient temperature** | | | | |
| ▪ During operation | | Frost-free, dry and heated rooms | | |
| ▪ During storage and transport | °C | -5 to +60 | | |
| **Weight** | | | | |
| ▪ Excl. heating water and packaging | kg | 35 | 35 | 35 |
| ▪ Incl. heating water | kg | 41 | 41 | 41 |
| **Water capacity** (excl. diaphragm expansion vessel) | l | 3.0 | 3.0 | 3.0 |
| **Max. flow temperature** | °C | 82 | 82 | 82 |
| **Max. flow rate** (Limit for the use of hydraulic separation) | l/h | See residual head graphs | | |
| **Nominal circulating water volume** At $T_F/T_R$ = 80/60 °C | l/h | 752 | 988 | 1259 |
| **Diaphragm expansion vessel** | | | | |
| Capacity | l | 8 | 8 | 8 |
| Pre-charge pressure | bar | 0.75 | 0.75 | 0.75 |
| | kPa | 75 | 75 | 75 |

*[*5] Appliances for multiple connection of type B1HF-[kW]-M and B1KF-[kW]-M*



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## Specification (cont.)

| Gas boiler, type B and C, category $II_{2N3P}$ | | | | |
|---|---|---|---|---|
| **Type** | | **B1KF-26** | **B1KF-30** | **B1KF-35** |
| **Rated heating output range (details to EN 15502)** | | | | |
| **$T_F/T_R$ = 50/30 °C** | | | | |
| **Natural gas** | **kW** | **3.2 (5.7[*5]) to 25.0** | **3.2 (5.7[*5]) to 25.0** | **3.2 (5.7[*5]) to 32.0** |
| **LPG** | **kW** | **3.2 to 25.0** | **3.2 to 25.0** | **3.2 to 32.0** |
| **$T_F/T_R$ = 80/60 °C** | | | | |
| **Natural gas** | **kW** | **2.9 (5.2[*5]) to 23.0** | **2.9 (5.2[*5]) to 23.0** | **2.9 (5.2[*5]) to 29.3** |
| **LPG** | **kW** | **2.9 to 23.0** | **2.9 to 23.0** | **2.9 to 29.3** |
| **Permiss. operating pressure** | bar<br>MPa | 3<br>0.3 | 3<br>0.3 | 3<br>0.3 |
| Connections (with connection accessories) | | | | |
| Boiler flow and return | R | ¾ | ¾ | ¾ |
| Cold water and DHW | G | ½ | ½ | ½ |
| **Dimensions** | | | | |
| Length | mm | 360 | 360 | 360 |
| Width | mm | 400 | 400 | 400 |
| Height | mm | 700 | 700 | 700 |
| **Gas connection** | R | ¾ | ¾ | ¾ |
| **Standby instantaneous water heater** | | | | |
| DHW and cold water connections | G | ½ | ½ | ½ |
| Permiss. operating pressure (DHW side) | bar<br>MPa | 10<br>1 | 10<br>1 | 10<br>1 |
| Minimum pressure, cold water connection | bar<br>MPa | 1.0<br>0.1 | 1.0<br>0.1 | 1.0<br>0.1 |
| Outlet temperature, adjustable | °C | 30 to 60 | 30 to 60 | 30 to 60 |
| Continuous DHW output | kW | 26.3 | 30.0 | 34.4 |
| Spec. water flow rate (D) At ΔT = 30 K (to EN 13203-1) | l/min | 13.26 | 15.59 | 17.04 |
| **Supply values** Relative to the max. load and 1013 mbar/15 °C | | | | |
| Natural gas E | $m^3/h$ | 2.89 | 3.35 | 3.69 |
| Natural gas LL | $m^3/h$ | 3.36 | 3.90 | 4.29 |
| LPG | kg/h | 2.12 | 2.46 | 2.71 |
| **Flue gas parameters** | | | | |
| **Temperature** (at a return temperature of 30 °C) | | | | |
| ▪ At rated heating output | °C | 41 | 46 | 59 |
| ▪ At partial load | °C | 38 | 38 | 38 |

[*5] *Appliances for multiple connection of type B1HF-[kW]-M and B1KF-[kW]-M*

## Specification (cont.)



| Gas boiler, type B and C, category $II_{2N3P}$ | | | | |
|---|---|---|---|---|
| **Type** | | **B1KF-26** | **B1KF-30** | **B1KF-35** |
| **Rated heating output range (details to EN 15502)** | | | | |
| **$T_F/T_R$ = 50/30 °C** | | | | |
| **Natural gas** | **kW** | **3.2 (5.7[*5]) to 25.0** | **3.2 (5.7[*5]) to 25.0** | **3.2 (5.7[*5]) to 32.0** |
| **LPG** | **kW** | **3.2 to 25.0** | **3.2 to 25.0** | **3.2 to 32.0** |
| **$T_F/T_R$ = 80/60 °C** | | | | |
| **Natural gas** | **kW** | **2.9 (5.2[*5]) to 23.0** | **2.9 (5.2[*5]) to 23.0** | **2.9 (5.2[*5]) to 29.3** |
| **LPG** | **kW** | **2.9 to 23.0** | **2.9 to 23.0** | **2.9 to 29.3** |
| **Temperature** (at a return temperature of 60 °C, for DHW heating) | °C | 65 | 67 | 72 |
| Flue gas superheating temperature | °C | 120 | 120 | 120 |
| **Mass flow rate** (for DHW heating) | | | | |
| Natural gas | | | | |
| ▪ At maximum heating output | kg/h | 49.3 | 57.3 | 62.1 |
| ▪ At partial load | kg/h | 5.6 (9.8[*5]) | 5.6 (9.8[*5]) | 5.6 (9.8[*5]) |
| LPG | | | | |
| ▪ At maximum heating output | kg/h | 30.1 | 41 | 53.9 |
| ▪ At partial load | kg/h | 3.9 | 3.9 | 3.9 |
| **Available draught** | Pa | 334 | 340 | 474 |
| | mbar | 3.34 | 3.40 | 4.74 |
| **Available draught** For type $C_{(10)}$ (at interface to collector pipe system) | Pa | 25 | 25 | 25 |
| Maximum permissible pressure differential between flue gas outlet and air inlet with $C_{(10)}$[*7] | Pa | -200 | -200 | -200 |
| **Available draught** For type $B_{23P}$ | Pa | 527 | 698 | 635 |
| **Max. amount of condensate** To DWA-A 251 | l/h | 3.7 | 4.3 | 4.9 |
| **Condensate connection (hose nozzle)** | Ø mm | 20 to 24 | 20 to 24 | 20 to 24 |
| **Flue gas connection** | Ø mm | 60 | 60 | 60 |
| **Ventilation air connection** | Ø mm | 100 | 100 | 100 |
| **Standard seasonal efficiency [to DIN] at** | | | | |
| $T_F/T_R$ = 40/30 °C | % | Up to 98 ($H_s$) [gross cv] | | |
| **Energy efficiency class** | | A | A | A |

*[*5] Appliances for multiple connection of type B1HF-[kW]-M and B1KF-[kW]-M*
*[*7] Appliances for multiple connection, type B1HF-M (for multiple connection)*



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## Specification (cont.)

***Note***
*The supply values are only for reference (e.g. in the gas contract application) or for a supplementary, rough estimate to check the volumetric settings. Due to factory settings, the gas pressure must not be altered from these values. Reference: 15 °C, 1013 mbar (101.3 kPa).*

### Flue system types

| Available in the following countries | Flue system types |
|---|---|
| AE, AM, AT, AZ, BA, BG, BY, CH, CY, CZ, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, KG, KZ, LT, LV, MD, ME, MT, NL, NO, PL, PT, RO, RS, RU, SE, SK, TR, UA, UZ | $B_{23}$, $B_{23P}$, $B_{33}$, $C_{13}$, $C_{33}$, $C_{53}$, $C_{63}$, $C_{83}$, $C_{83P}$, $C_{93}$ ($C_{43}$, $C_{43P}$, $C_{(10)3}$, $C_{(11)3}$, $C_{(13)3}$, $C_{(14)3}$[*8]) |
| AU, BE, NZ | $B_{23}$, $B_{23P}$, $B_{33}$, $C_{13}$, $C_{33}$, $C_{53}$, $C_{83}$, $C_{83P}$, $C_{93}$ ($C_{43}$, $C_{43P}$, $C_{(10)3}$, $C_{(11)3}$, $C_{(13)3}$, $C_{(14)3}$[*8]) |
| DE, LU, SI | $B_{23}$, $B_{23P}$, $B_{33}$, $C_{13X}$, $C_{33X}$, $C_{53X}$, $C_{63X}$, $C_{83X}$, $C_{93X}$ ($C_{43}$, $C_{43P}$, $C_{(10)3}$, $C_{(11)3}$, $C_{(13)3}$, $C_{(14)3}$[*8]) |
| CN | C13 |

### Gas categories

| Available in the following countries | Gas categories |
|---|---|
| AE,AM, AT, DK, EE, KG, LV, LU, LT, RO, RU, SE AZ, BA, BG, BY, CH, CZ, ES, FI, GB, GR, HR, IE, IS, KZ, IT, MD, ME, NO, PT, RS, SI, SK, TR, UZ HU, MT, UA | $II_{2N3P}$/$II_{2H3P}$ |
| AU, BE, NZ | $I_{2N}$ |
| DE, FR | $II_{2N3P}$ |
| CY | $I_{3P}$ |
| NL | $II_{2EK3P}$ |
| PL | $II_{2N3P}$/$II_{2ELw3P}$ |
| CN | 12T |

The gas condensing appliance is suitable for operation with a hydrogen admixture of up to 20 % by volume.

## Electronic combustion control unit

The electronic combustion controller utilises the physical correlation between the level of the ionisation current and the air ratio λ. The maximum ionisation current is achieved at an air ratio of 1 for all gas qualities. The ionisation signal is evaluated by the combustion controller. The air ratio is regulated to a value that is between λ= 1.2 and 1.5. This range provides for an optimum combustion quality. Thereafter, the electronic gas train 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 actual values.

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

[*8] *Only for specifically marked appliances.*

## Final decommissioning and disposal

Viessmann products can be recycled. Components and substances from the system are not part of ordinary domestic waste.

For decommissioning, isolate the system from the power supply and allow components to cool down where appropriate.
All components must be disposed of correctly.

## Declaration of conformity

We, Viessmann Climate Solutions SE, D-35108 Allendorf, declare as sole responsible body that the named product complies with the European directives and supplementary national requirements in terms of its design and operational characteristics. Viessmann Climate Solutions SE, D-35108 Allendorf, hereby declares that the radio equipment type of the named product is in compliance with Directive 2014/53/EU.

Using the serial number, the full Declaration of Conformity can be found on the following website:
**www.viessmann.co.uk/eu-conformity**

## Manufacturer's certificate according to the 1st BImSchV [Germany]

We, Viessmann Climate Solutions SE, D-35108 Allendorf, confirm that the product **Vitodens 100-W** complies with the $NO_x$ limits specified by the 1st BImSchV, paragraph 6 [Germany].

Allendorf, 1 March 2021

Viessmann Climate Solutions SE

Authorised signatory Uwe Engel
Senior Vice President Engineering & Technology

## Keyword index



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## Keyword index (cont.)


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