# Installation and service instructions

**for contractors**

**Vitodens 222-F**
**Type B2TE**, 1.9 to 32 kW
Gas condensing storage combi boiler
Natural gas and LPG version

## VITODENS 222-F

6130884 GB 6/2019

**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.

**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.

## 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.

**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.

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## Index (cont.)

## Disposal of packaging

Please dispose of packaging waste in line with statutory regulations.



## 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, 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.

## Intended use (cont.)

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 222-F, type B2TE

Gas condensing storage combi boiler with Inox-Radial heat exchanger and the following integrated components:

- Modulating MatriX Plus burner for natural gas and LPG
- DHW loading cylinder, 100 l capacity
- Hydraulics with 3-way diverter valve and variable speed high efficiency circulation pump
- Weather-compensated control unit
- Diaphragm expansion vessel (18 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 switching to LPG or natural gas M (without conversion kit), see "Commissioning, inspection and maintenance".
The Vitodens 222-F may only be delivered to the countries specified 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 on the Viessmann spare parts app.

Download on the App Store

GET IT ON Google Play

## Handling

! **Please note**
Prevent damage to the appliance during handling.
Never set the appliance down on its front or sides, or apply any load to these surfaces. If possible, leave the boiler on the pallet during handling.



## Siting in recesses

When delivered, the ON/OFF switch and the electrical connections are located on the left-hand side of the appliance. When installing in recesses, ensure that access is guaranteed. Otherwise relocate the ON/OFF switch and electrical connections accordingly. The ON/OFF switch can be relocated to the right-hand side or the top. The electrical connections can be relocated to the right-hand side.

### Relocating the ON/OFF switch and electrical connections (if necessary)

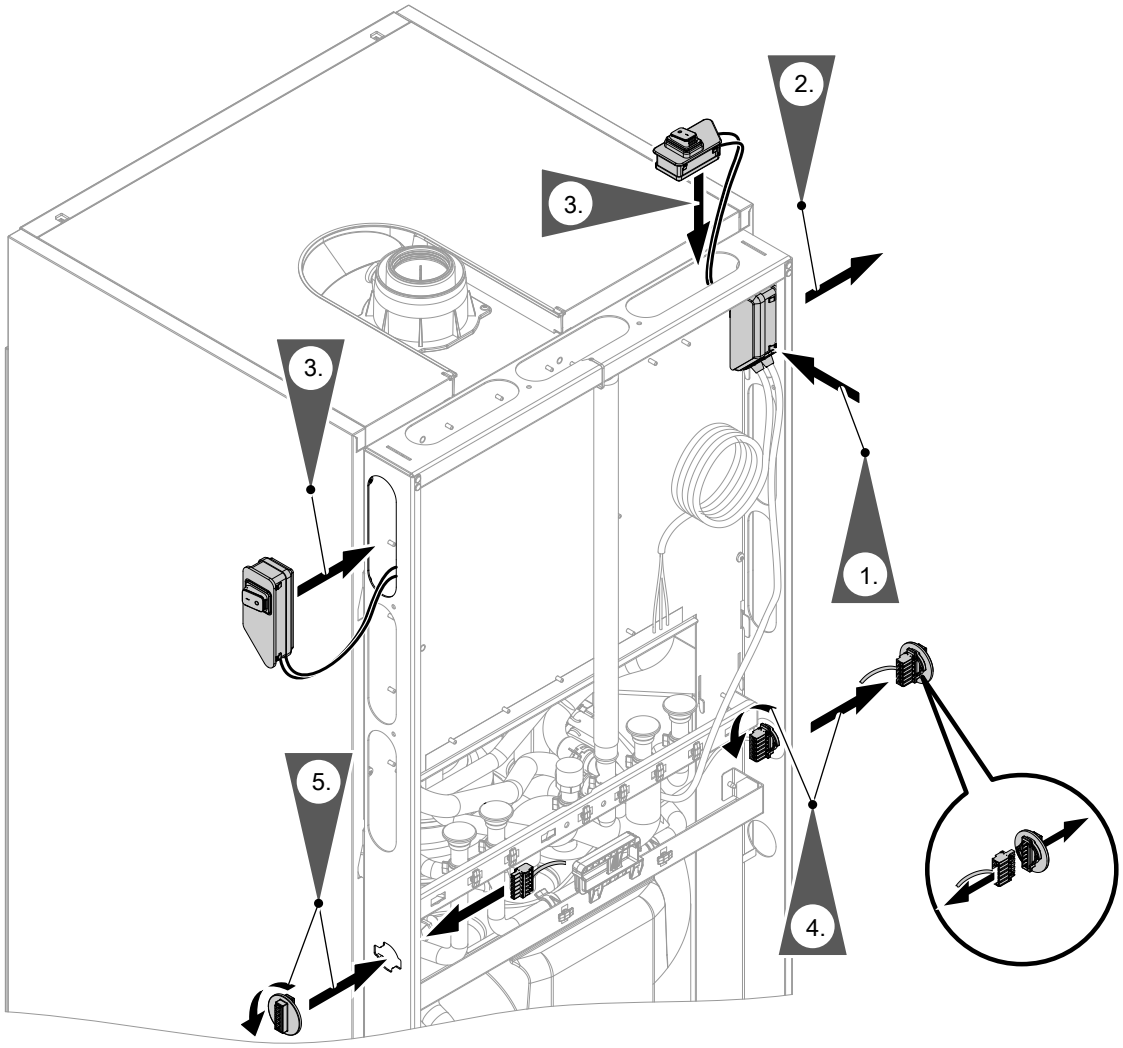


*Fig. 1*



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## Siting in recesses (cont.)

Open the electrical wiring chamber of the HMU. Disconnect the cable of the ON/OFF switch and remove. See electrical connections.

1. Unclip the ON/OFF switch from the frame
2. Remove the ON/OFF switch and its cable.
3. Clip the ON/OFF switch into the corresponding opening at the top or on the right-hand side. Reconnect the cable in the HMU wiring chamber and relieve strain.
4. Release plug of electrical connections by turning it a quarter turn.
5. Insert plug into the opening on the right-hand side and secure in place by turning it a quarter turn.

## Preparing for boiler installation

Use a connection set – available as an accessory – to make the connections on the gas and water sides. The following overview shows sample connection sets for surface mounting, with connection to the top or side.

***Attaching accessories***
*Before final siting, attach all of the accessories that are to be mounted from the back of the boiler (e.g. connection set). First fit the connection set for the DHW circulation pump.*

! **Please note**
To prevent appliance damage,
connect all pipework free of load and torque stress.

Preparing connections on site:


Connection set installation instructions

***Note***
*Fit safety equipment in accordance with the national regulations.*

## Preparing for boiler installation (cont.)



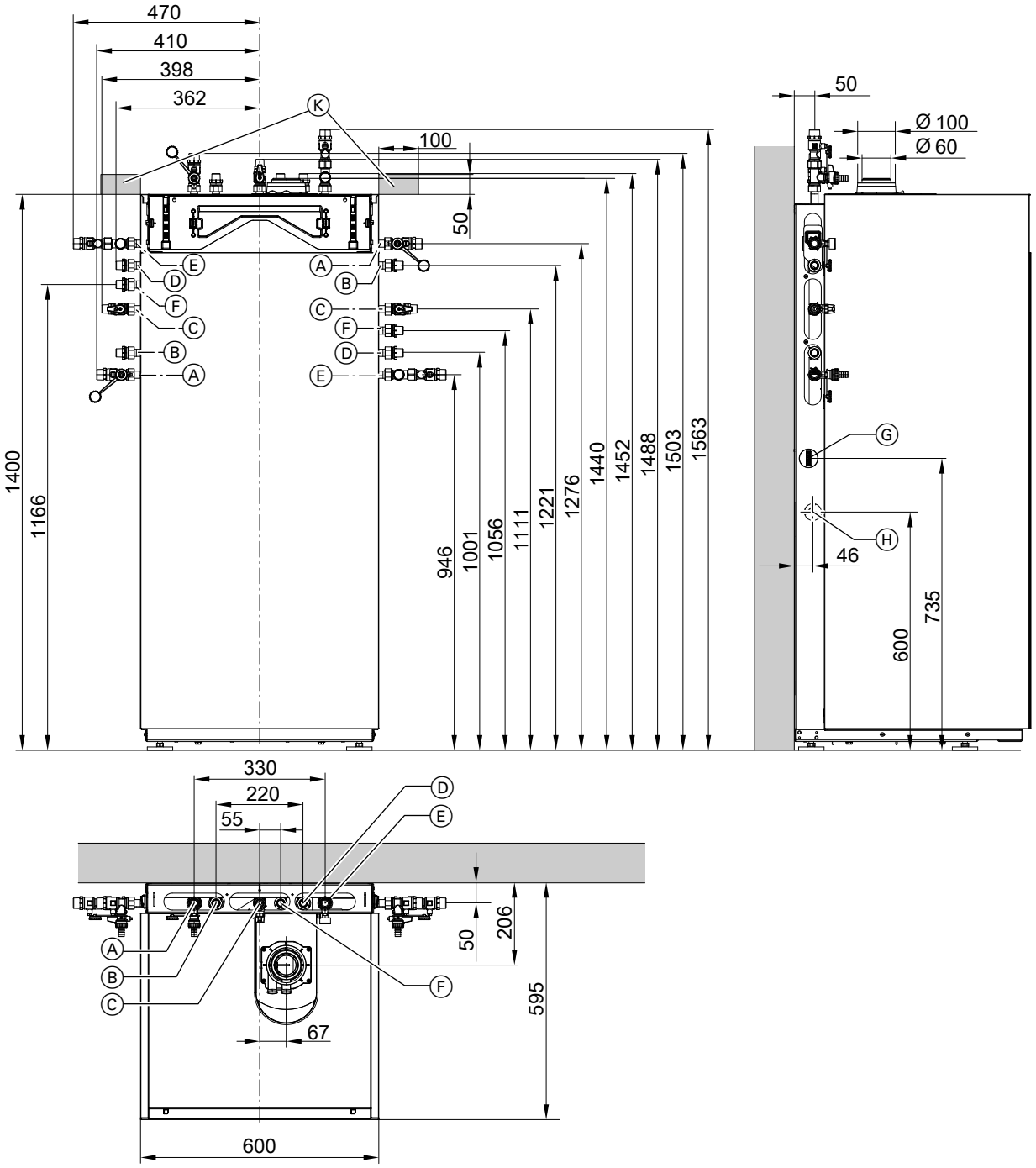


*Fig. 2*

Ⓐ Heating flow R ¾
Ⓑ DHW R ½
Ⓒ Gas connection R ¾
Ⓓ Cold water R ½
Ⓔ Heating return R ¾
Ⓕ DHW circulation R ½ (separate accessories)
Ⓖ External plug
Ⓗ Condensate drain to the side
Ⓚ Area for electrical cables (on-site junction box)

***Note***
*All height dimensions have a tolerance of +15 mm on account of the adjustable feet.*

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## Preparing for boiler installation (cont.)

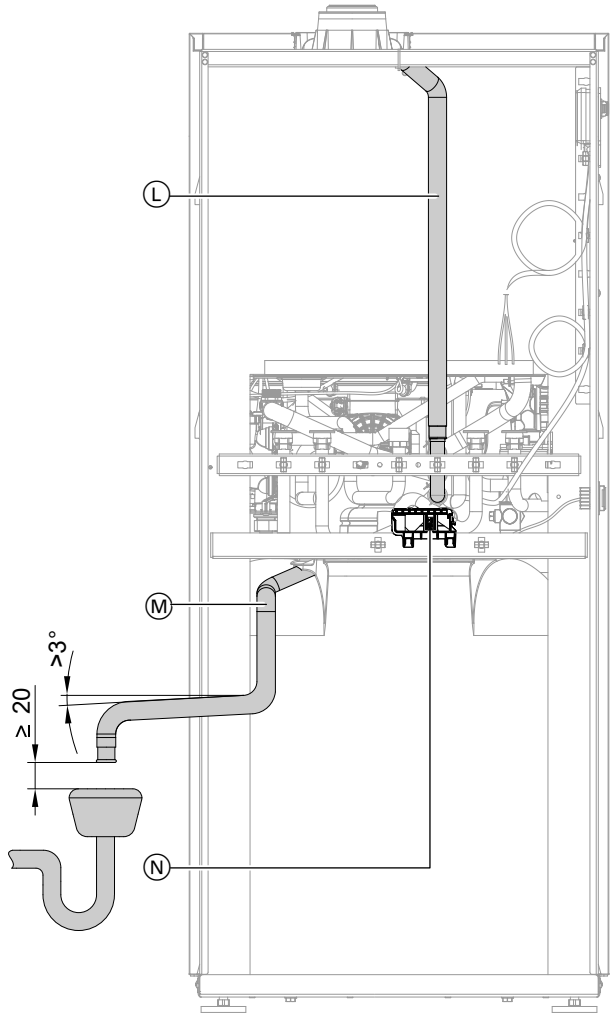


*Fig. 3*

**1.** Prepare the connections on the heating water side. Thoroughly flush the heating system.

***Note***
*Should an additional expansion vessel be required on site, connect this vessel in the heating return.*

**2.** Prepare the connections on the DHW side. Install the safety assembly (accessories or on-site provision) in accordance with EN 806 [or local regulations] in the cold water supply. See the following chapter.
Recommendation:
Install the safety valve above the DHW cylinder to protect it against contamination, scaling and high temperatures.
(CH): According to W3 "Principles for creating potable water installations", safety valves must be drained directly via a visible unrestricted drain or via a short outlet line to the drain network.

***Note***
*Do **not** connect the DHW cylinder safety valve to hose (L). Do **not** change the position of hose (L) (used for ventilation).*

**3.** Route condensate hose (M) to side opening (H) (see diagram on page 10).
Connect condensate hose with a fall to the on-site waste water pipe or trap.

***Note***
- *The on-site waste water pipe must have min. Ø 40 mm to allow inflow with no risk of backing up.*
- *Keep the drainage route from the appliance as short as possible.*
- *Do not connect the drain hose directly to the on-site waste water pipe. To prevent bacterial contamination from the drain network, observe a minimum clearance of 20 mm (see diagram).*

**!** **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***
*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.*

## Preparing for boiler installation (cont.)

4. Prepare gas connection to TRGI [or local regulations].

5. Prepare the electrical connections.
   - The appliance is delivered fitted with a power cable (approx. 1.5 m long).
   - Power supply: 230 V, 50 Hz, fuse rating max. 16 A
     ***Note***
     *Connect the power cable to the electricity supply using a fixed connection.*
   - Accessory cables: 0.75 mm$^2$ flexible PVC cable with required number of cores for external connections.

   ***Note***
   *Route external pipes through guide Ⓝ.*



### Safety assembly to DIN 1988 and EN 806

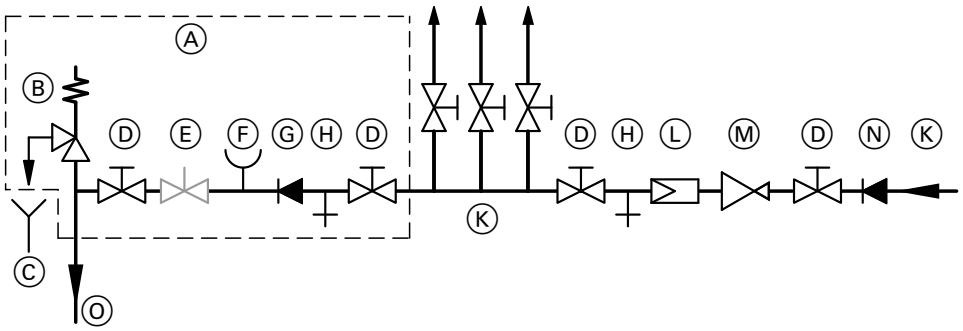


*Fig. 4*

Ⓐ Safety assembly to DIN 1988 and EN 806 (accessories for connection sets for flush mounting)
Ⓑ Safety valve
Ⓒ Visible discharge pipe outlet point
Ⓓ Shut-off valve
Ⓔ Flow regulating valve (installation recommended)
Ⓕ Pressure gauge connector
Ⓖ Non-return valve
Ⓗ Drain outlet
Ⓚ Cold water
Ⓛ Drinking water filter
Ⓜ Pressure reducer to DIN 1988-2, Dec. 1988 issue
Ⓝ Non-return valve/pipe separator
Ⓞ Cold water connection at connection set (accessories)



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## Siting the boiler

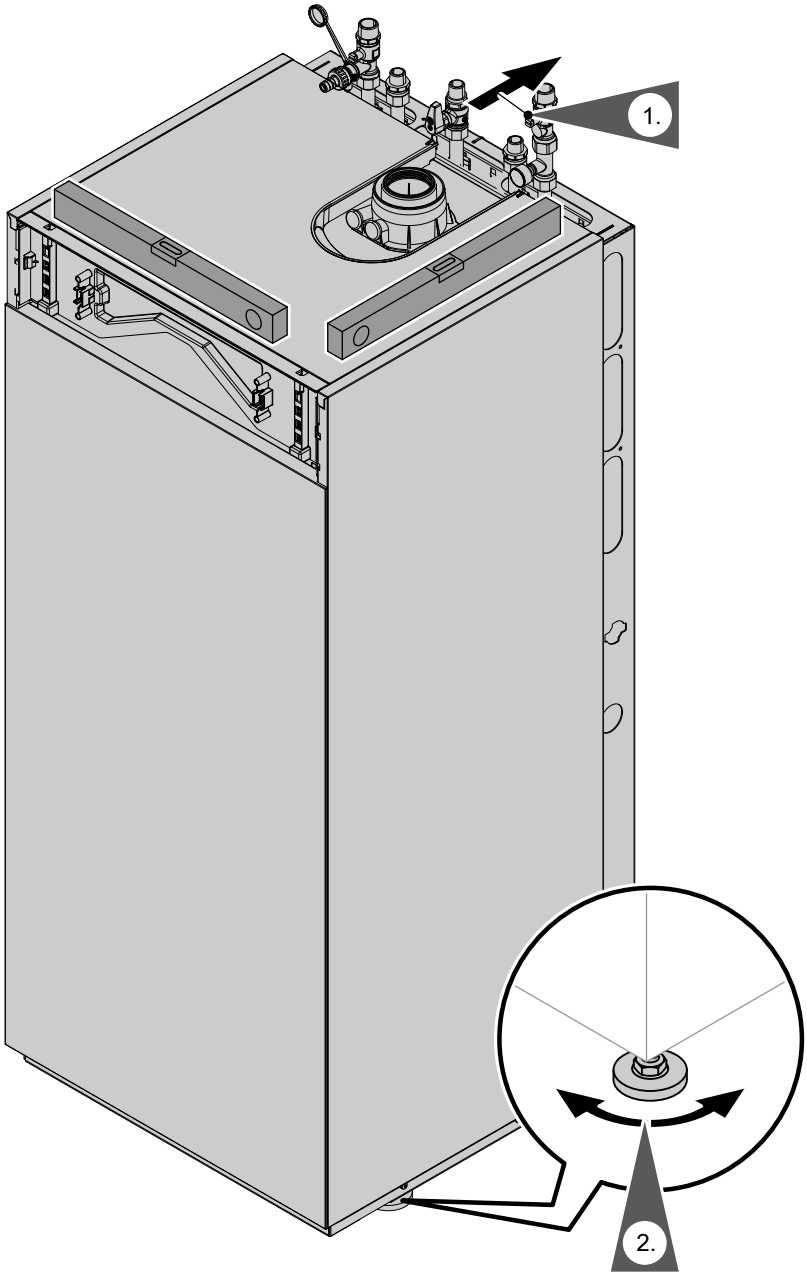


*Fig. 5*



## Type plate

***Note***
*The type plate is attached to cover panel Ⓐ in the appliance. See page 35.*

**Attaching the additional type plate**

**1.** Take the additional type plate from the documentation supplied with the boiler.

***Note***
*The documentation with additional type plate and QR code (for registering the appliance) can be found on top of the appliance.*

**2.** In consultation with the system user, affix the additional type plate to the outside of the appliance.
The additional type plate must be visible to the flue gas inspector.
Affix the QR code for appliance registration to the additional type plate.

## Removing the front panel

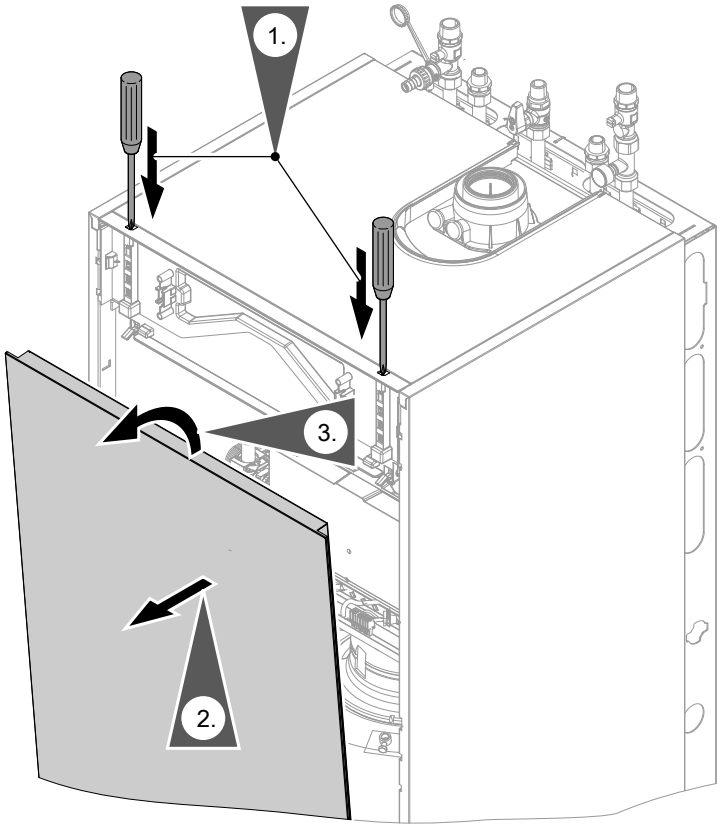


*Fig. 6*

## Connections on the heating water and DHW sides

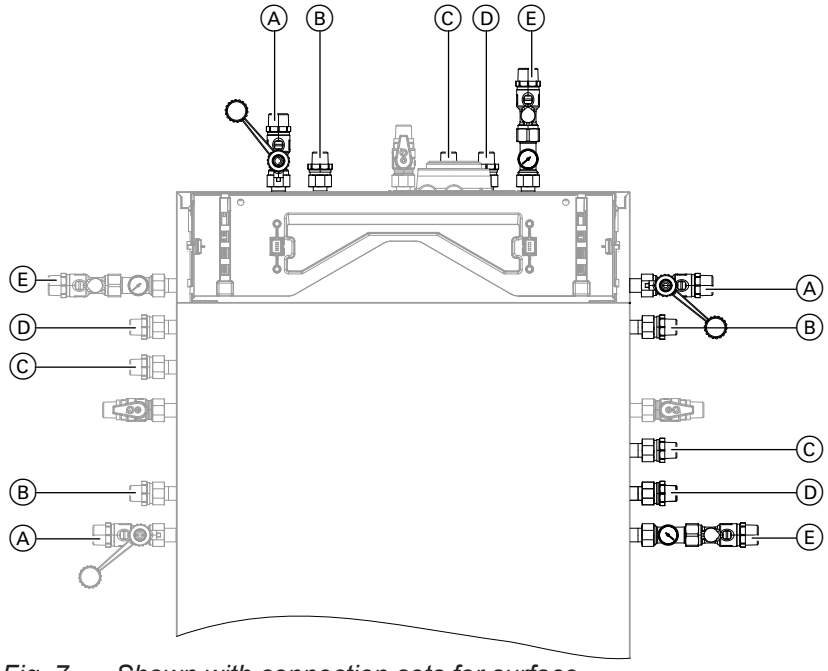


*Fig. 7 Shown with connection sets for surface mounting (accessories)*

Ⓐ Heating flow R ¾
Ⓑ DHW R ½
Ⓒ DHW circulation R ½ (separate accessories)
Ⓓ Cold water R ½
Ⓔ Heating return R ¾

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## Connections on the heating water and DHW sides (cont.)

### DHW circulation connection (potable water)

DHW circulation connection with DHW circulation pump connection set (accessories)

Separate installation instructions

## Filling the trap with water

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

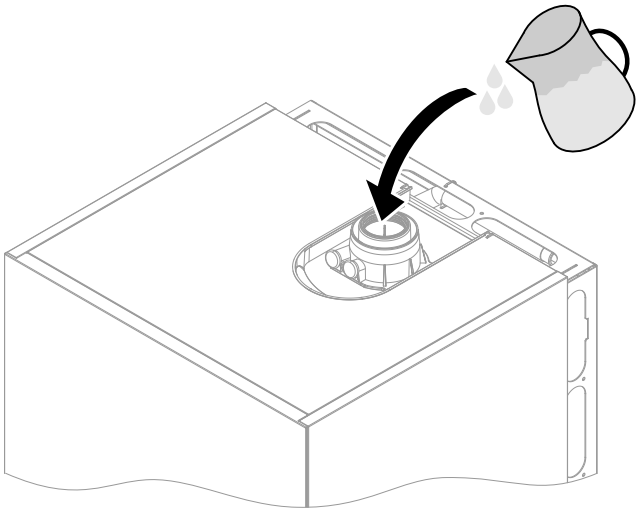

*Fig. 8*

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

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

## Flue gas connection

Connect the balanced flue pipe.

Flue system installation instructions

Do not carry out **commissioning** until the following conditions are met:
- Free passage through the flue gas pipes.
- Flue system with positive pressure is gas-tight.
- Inspection port covers checked for secure and tight seating.
- Apertures for ensuring sufficient combustion air supply are open and cannot be closed off.
- Applicable regulations on installing and commissioning flue systems have been followed.

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

**Danger**
Leaking or blocked flue systems or an insufficient supply of combustion air cause life threatening poisoning due to carbon monoxide in the flue gas.
Ensure the flue system functions correctly. Apertures for combustion air supply must not be able to be closed off.
Prevent condensate drainage via a wind protector.

## Gas connection

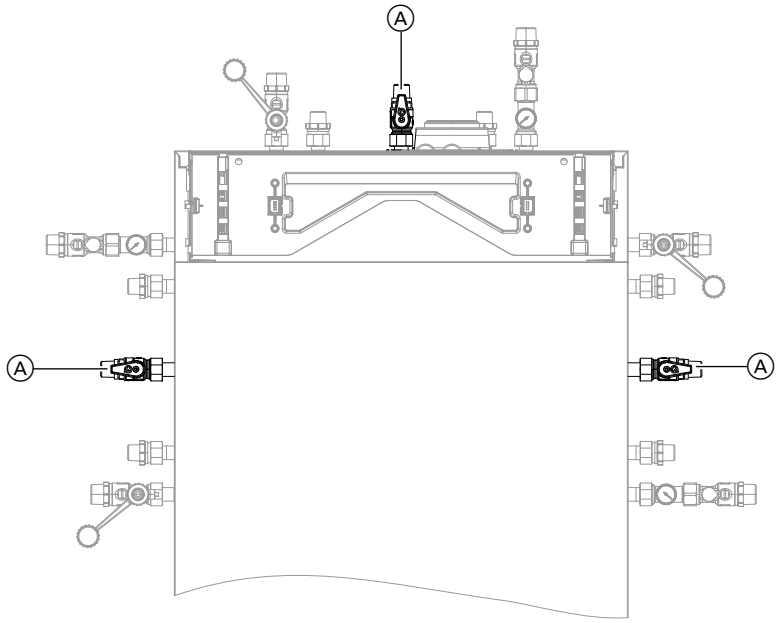


*Fig. 9*

**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 the gas train.
Max. test pressure 150 mbar (15 kPa).
Where higher pressure is required for tightness tests, disconnect the boiler and the gas train from the main supply pipe (undo the fitting).

**3.** Purge the gas line.





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## Electrical connections

### Opening the HMU wiring chamber

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

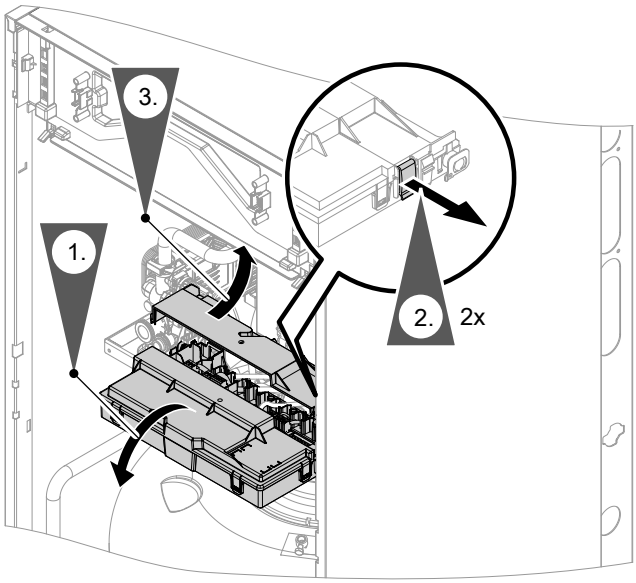


*Fig. 10*

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

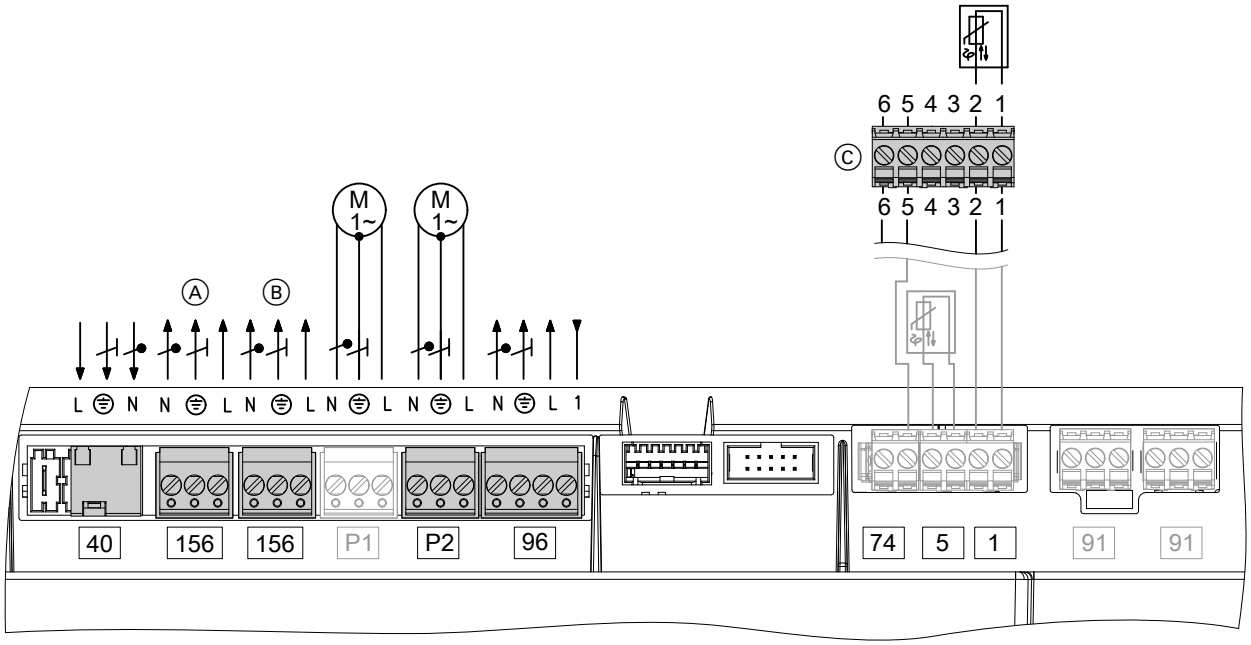


*Fig. 11*

**Connections to 230 V~ plugs**

- 40 Power supply
- 96 230 V input, floating
  Output 230 V
- 156 Switched power outlet

P1 Cylinder loading pump (connected in the delivered condition)

## Electrical connections (cont.)

P2 230 V parametrisable output:
DHW circulation pump or heating circuit pump for heating circuit without mixer (in systems with low loss header)
Ⓐ BCU burner control unit power supply (connected in the delivered condition)
Ⓑ Power supply for accessories
Ⓒ Plug located externally on the right or left-hand side of the appliance (see also following diagram)

**Connections to extra low voltage (ELV) plugs**

[1] Outside temperature sensor
Terminals 1 and 2 on external plug Ⓒ
[5] Cylinder temperature sensor (connected in the delivered condition)
[74] PlusBus
Terminals 5 and 6 on external plug Ⓒ
[91] CAN bus

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



### On-site connections on HMU heat management unit

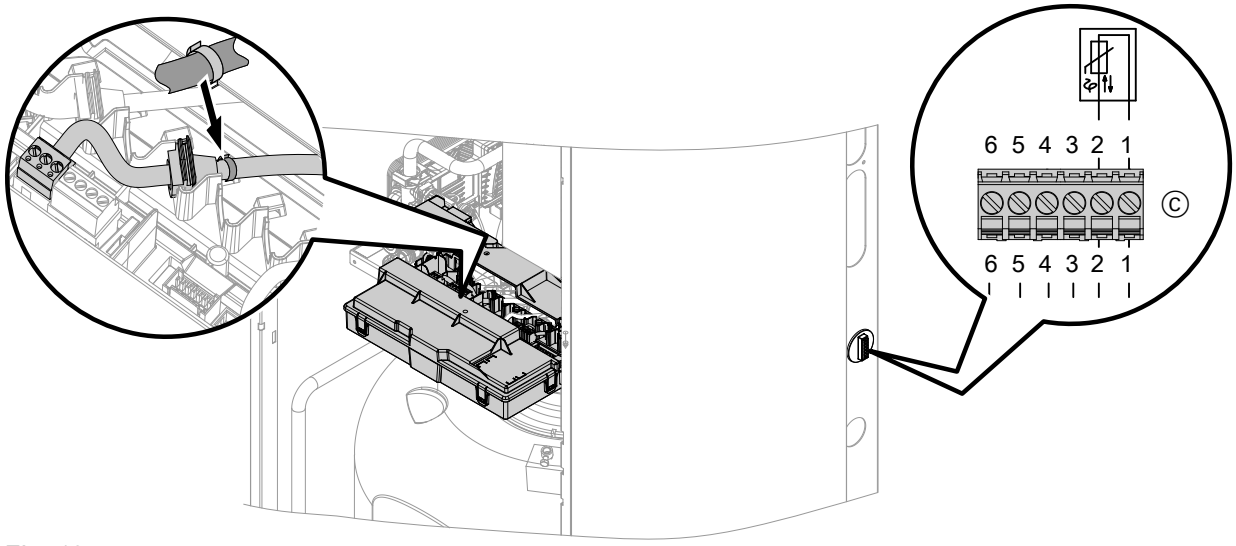


*Fig. 12*

Ⓒ Plug located externally on the right or left-hand side of the appliance (supplied separately)

Required plugs are supplied in separate packaging.

Provide strain relief for cables in the wiring chamber of the HMU heat management unit using cable ties.

### Outside temperature sensor [1]

**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**

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



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## Electrical connections (cont.)

### Connecting the circulation pump to P2

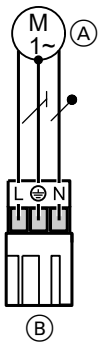


*Fig. 13*

Ⓐ Circulation pump
Ⓑ Plug P2 on HMU heat management unit

Possible functions:
- Heating circuit pump for heating circuit without mixer A1 in connection with low loss header and heating circuits with mixer
- DHW circulation pump
  Connect DHW circulation pumps with standalone functions directly to the 230 V~ supply.

***Information on priority of connection options:***
- *If heating circuit pump for heating circuit without mixer A1 is installed:*
  *Connect heating circuit pump to output P2.*
  *Then connect DHW circulation pump to an EM-P1 extension (accessories).*
- *If **no** heating circuit pump for heating circuit without mixer A1 is connected:*
  *Connect DHW circulation pump to output P2.*

The function is selected in the commissioning assistant by selecting the connected component.

**Specification**

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

### Floating switching contact connection

Connection at plug 96

**One** of the following functions can be connected:
- External demand
- External blocking
- DHW circulation pump external demand (pushbutton function, pump runs for 5 min). Cannot be connected with Vitodens 222-W.
- Room temperature controller (room thermostat)
  For room temperature-dependent operating mode

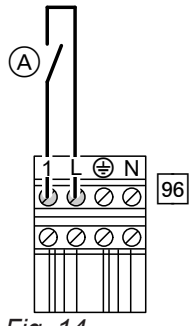


*Fig. 14*

Ⓐ Floating contact

**Assigning functions in the commissioning assistant**

See commissioning assistant in "Commissioning".

### Checking the CAN bus terminator switch setting

The CAN bus resistor is switched using switch Ⓐ in the wiring chamber.

## Electrical connections (cont.)

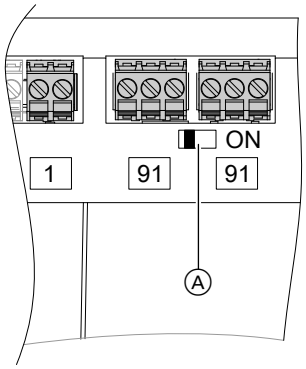


*Fig. 15*

- If the device is **not** integrated into a CAN bus system:
  Switch Ⓐ must **not** be set to "ON".
- If the device is integrated into a CAN bus system and is located at the beginning or end of this system (not in the middle) of the CAN bus system (connected to only one plug 91): Set switch Ⓐ to "ON".

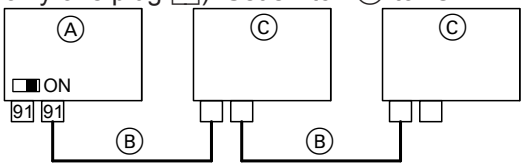


*Fig. 16*

- If the device is integrated into a CAN bus system and is **not** located at the beginning or end of the CAN bus system (both plugs 91 connected): Do **not** set switch Ⓐ to "ON".

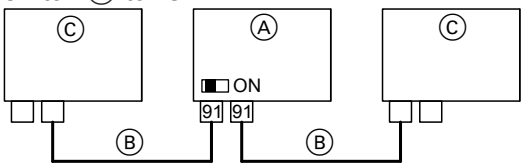


*Fig. 17*

## Power supply for accessories at plug 96/156 (230 V ~)

When positioned in wet rooms, accessories outside the wet area must not be connected to the power supply at the HMU heat management unit. If the boiler is not sited in a wet room, the power supply for accessories can be connected directly to the HMU heat management unit. This connection is switched directly with the ON/OFF switch of the appliance.

If the total system current exceeds 6 A, connect one or more extensions directly to the mains supply via an ON/OFF switch (see next chapter).

## Electrical connections (cont.)

### Power supply and PlusBus connection of accessories

Power supply of all accessories at the HMU heat management unit

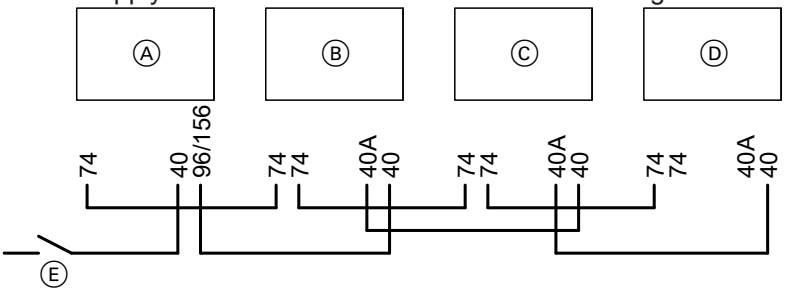


*Fig. 18*

Some accessories with direct power supply

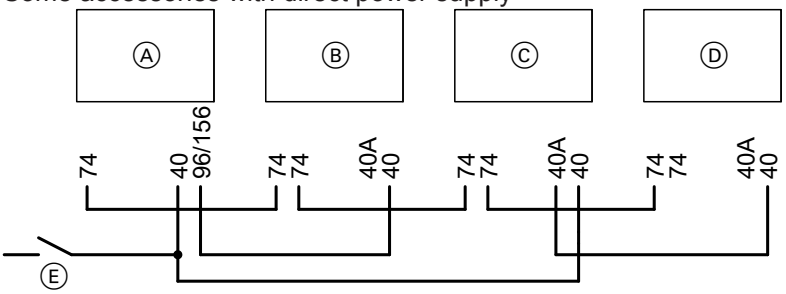


*Fig. 19*

Ⓐ HMU heat management unit, heat generator
Ⓑ Mixer extension kit (ADIO electronics module)
Ⓒ Mixer extension kit (ADIO electronics module)
Ⓓ EM-EA1 extension (DIO electronics module) and/or EM-S1 extension (ADIO or SDIO/ SM1A electronics module)
Ⓔ ON/OFF switch
40 Mains input
40A Power outlet
74 PlusBus
96/156 Power outlet on HMU heat management unit

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.

| Accessories | Internal fuse protection |
|---|---|
| EM-M1, EM-MX mixer extension kit | 2 A |
| EM-EA1 extension | 2 A |
| EM-S1 extension (not for Vitodens 222-F, 222-W and 333-F) | 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~.
- Only strip the minimum of insulation from cables as close as possible to the terminals and bundle tightly to the corresponding terminals.
- Secure cables with cable ties.

## Electrical connections (cont.)

### 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
- VDE regulations
- 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.
  In addition we recommend the installation of an AC/DC-sensitive RCD (FI Class B ) for DC (fault) currents that can arise from energy efficient equipment.
- Connect the power cable to the electricity supply using a fixed connection.
- If the power supply to the appliance is connected with a flexible 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.

**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.

### 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, and if required set up, by an IT expert **prior to** commissioning.
- Set routing and security parameters in the IP network (LAN):
  Enable port 80, port 123, port 443 and port 8883 for direct outward connections.
  Have this checked and, if necessary, set up on site by an IT expert **before** commissioning.

#### 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 heat generator (see the operating instructions).

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

## Electrical connections (cont.)

### 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

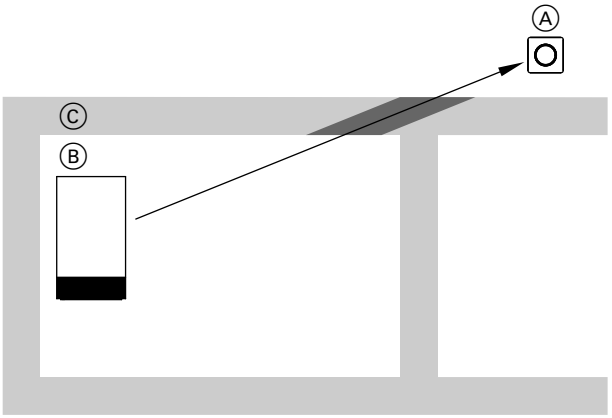


*Fig. 20*

Ⓐ WiFi router
Ⓑ Heat generator
Ⓒ Wall

### Ideal angle of penetration

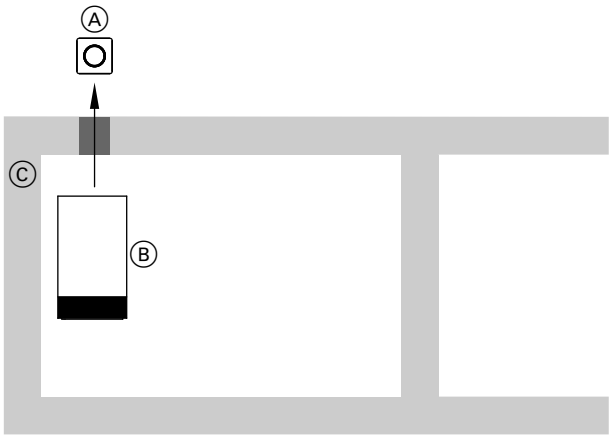


*Fig. 21*

Ⓐ WiFi router
Ⓑ Heat generator
Ⓒ Wall

## Routing connecting cables/leads

**!** **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.

## Closing the wiring chamber

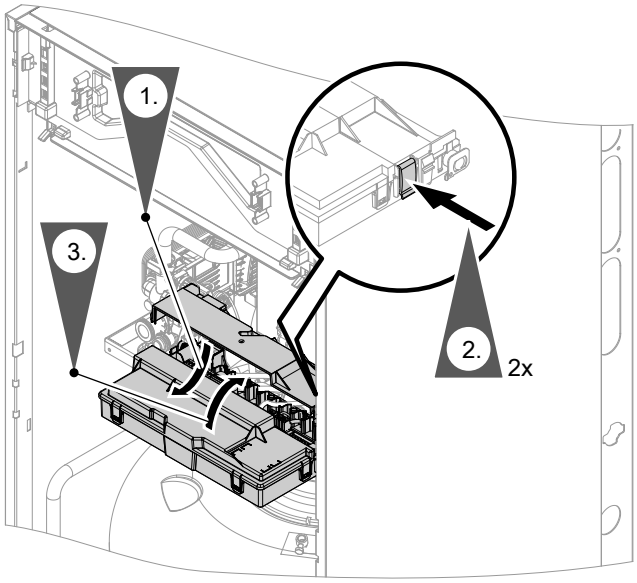


*Fig. 22*

## Fitting the front panel and programming unit

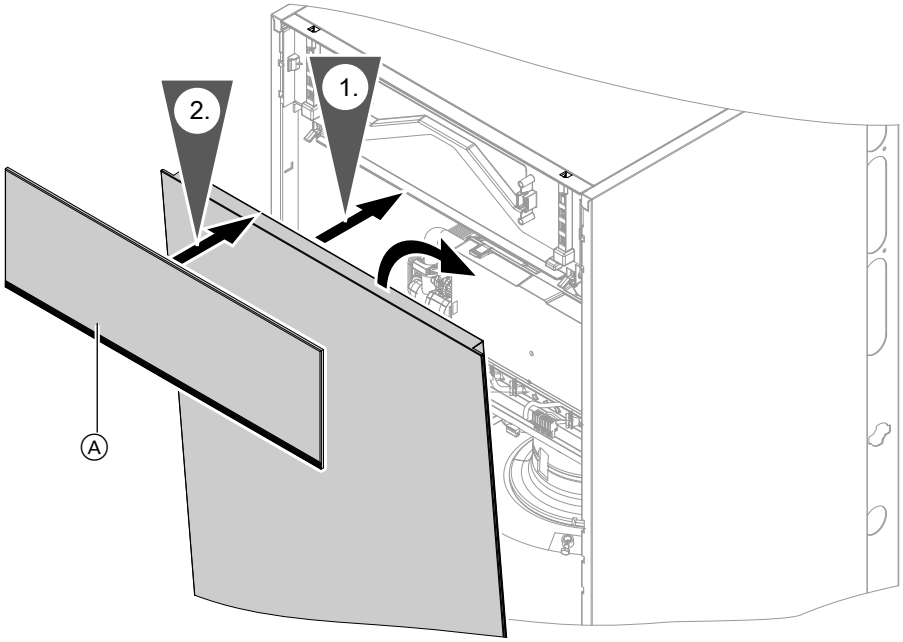


*Fig. 23*

Lightguide Ⓐ at the bottom

## Steps - commissioning, inspection and maintenance

Commissioning steps
Inspection steps
Maintenance steps



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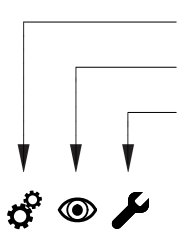
## Steps - commissioning, inspection and… (cont.)




Page

## Removing the front panels

See page 14, steps 1 to 5

## Moving the programming unit to the maintenance position

To carry out various maintenance jobs, move the programming unit downwards.

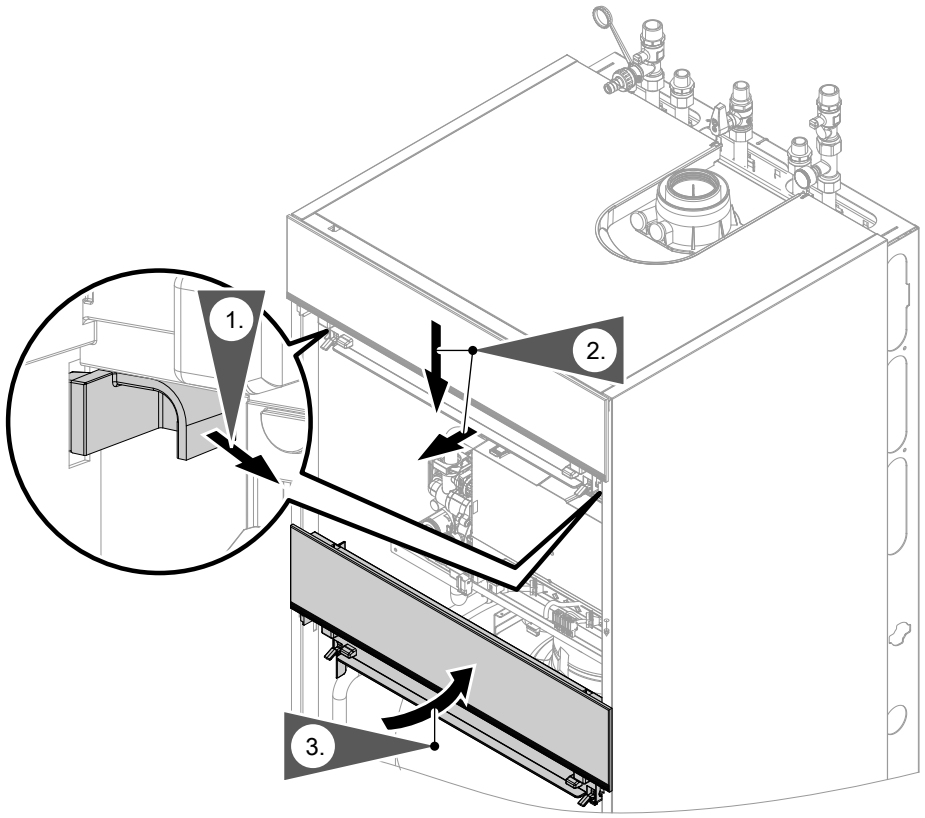



*Fig. 24*

## Commissioning the system

### Commissioning assistant

**1.** Open the gas shut-off valve.

**2.**
- If the appliance has not been switched on yet: Turn on the ON/OFF switch. The commissioning assistant starts automatically.
- If the appliance has already been switched on: See chapter "Calling up the commissioning assistant at a later point".

**3.** Commission the heat generator and follow the commissioning assistant. See the overview below.

***Note***
*Once the commissioning assistant has finished, run an actuator test to check that the actuators are connected correctly and working properly.*

## Commissioning the system (cont.)

| Commissioning assistant sequence | Explanations and references |
|---|---|
| **Commissioning** | |
| Language | |
| By app | The appliance automatically switches on the WiFi Access Point.<br>Further commissioning steps according to the instructions of the software tool used (e.g. "ViStart app")<br><br>***Note***<br>*Apps for commissioning and service are available for iOS and Android devices.*<br>Download on the App Store<br>GET IT ON Google Play |
| By programming unit | If commissioning is to be carried out at the programming unit of the heat generator. |
| Trade fair mode<br>▪ Off<br>▪ On | Only for demonstration purposes. Do not select for normal heating mode. |
| Units<br>▪ Temperature<br>▪ Length<br>▪ Pressure | Select the required units of measurement (e.g. °C or °F) |
| Date<br>▪ Format | |
| Time<br>▪ Format<br>▪ Time changeover | |
| Filling and venting<br>▪ Filling<br>▪ Venting | See chapters "Filling the heating system" and "Venting the heating system". |
| Gas type | If operating with LPG, switch to **"LPG"** |
| Flue system<br>▪ Single connection<br>▪ Multiple connections | <br>Only **one** heat generator is connected to the flue system (factory setting).<br>**Several** heat generators are connected to the flue system. |
| After confirmation with **OK**, an automatic test of the flue gas temperature sensor is carried out. See the following chapter. | |
| Building type<br>▪ Detached house<br>▪ Apartment building | <br>One shared holiday program and time program for DHW heating<br>Holiday program and time program for DHW heating can be set separately |
| Continue in the commissioning assistant with Yes or end commissioning with No. | |
| **Operating mode** | |
| ▪ Weather-compensated<br>▪ Constant mode<br>▪ Room temperature-dependent | The outside temperature sensor must be connected<br>Operation with constant flow temperature<br>A room temperature controller/room thermostat (accessories) must be connected to plug 96. Only one heating circuit without mixer in the system. |
| **System scheme** | |
| Heating circuit 1 | Heating circuit without mixer |
| Heating circuit 2, 3 | Heating circuits with mixer |

## Commissioning the system (cont.)

| Commissioning assistant sequence | Explanations and references |
|---|---|
| DHW | Settings for DHW heating according to the system components |
| ▪ Not installed | System without DHW heating |
| ▪ Cylinder with one sensor | System with DHW cylinder with 1 cylinder temperature sensor |
| ▪ Cylinder with one sensor and DHW circulation pump | System with DHW cylinder with 1 DHW cylinder temperature sensor and DHW circulation pump |
| ▪ DHW comfort function | Only for gas condensing combi boilers (cannot be changed) |
| ▪ Loading cylinder with one sensor | Gas condensing storage combi boiler with integral loading cylinder |
| ▪ Loading cylinder with one sensor and DHW circulation pump | Gas condensing storage combi boiler with integral loading cylinder and DHW circulation pump |
| ▪ Loading cylinder with two sensors | Gas condensing storage combi boiler or gas/solar condensing storage combi boiler with integral loading cylinder |
| ▪ Loading cylinder with two sensors and DHW circulation pump | Gas condensing storage combi boiler or gas/solar condensing storage combi boiler with integral loading cylinder and DHW circulation pump |
| Low loss header/buffer cylinder | Settings for the consumer circuits according to the system components |
| ▪ Not installed | There is no low loss header or heating water buffer cylinder in the system. |
| ▪ Low loss header, heating only | System with low loss header, without DHW heating |
| ▪ DHW heating upstream of low loss header | DHW heating with e.g. separate DHW cylinder connected upstream of the low loss header |
| ▪ DHW heating downstream of low loss header | DHW heating with e.g. separate DHW cylinder connected downstream of the low loss header |
| ▪ Buffer cylinder, heating only | System with heating water buffer cylinder, without DHW heating |
| ▪ DHW heating upstream of buffer cylinder | DHW heating with e.g. separate DHW cylinder connected upstream of the heating water buffer cylinder |
| ▪ DHW heating downstream of buffer cylinder | DHW heating with e.g. separate DHW cylinder connected downstream of the heating water buffer cylinder |
| Solar | Solar thermal system connected to heat generator via EM-S1 extension (ADIO, SDIO/SM1A electronics module)<br>Setting subject to the design of the solar thermal system<br>  EM-S1 extension installation and service instructions |
| ▪ No solar function<br>▪ With DHW heating | |
| ▪ With central heating backup | Only adjustable for SDIO/SM1A electronics module (not for Vitodens 242-F) |
| ▪ With 2nd cylinder preheating | Only adjustable for SDIO/SM1A electronics module (not for Vitodens 242-F) |
| ▪ With thermostat function | Only adjustable for SDIO/SM1A electronics module (not for Vitodens 242-F) |

## Commissioning the system (cont.)

| Commissioning assistant sequence | Explanations and references |
|---|---|
| **Plug 96 function** | Function selection if a contact has been connected to plug 96 of the HMU heat management unit |
| ▪ No function | |
| ▪ External demand, DHW circulation pump | Pushbutton function, DHW circulation pump runs for 5 min. |
| ▪ External demand | Heat generator demand with adjustable set flow temperature (parameter 528.0) and set primary circuit pump speed (parameter 1100.2) |
| ▪ External blocking | |
| ▪ Thermostat function | If a room temperature controller/room thermostat is connected in room temperature-dependent operating mode |
| **EM-EA1 function** | If an EM-EA1 extension (DIO electronics module) is connected as a function extension<br>Selection of the connected function according to the table in the installation instructions for the EM-EA1 extension |
| **Remote control unit** | Set the type of remote control and subscriber no. as assignment to the respective heating circuit. Up to 3 heating circuits can be assigned to one remote control unit. It is not possible for several remote control units to act on one heating circuit. |
| The system carries out a restart. | |

**Automatic flue gas sensor check**

The display shows: **"Testing, flue gas temperature sensor"** and **"Enabled, please wait ..."**.
If the flue gas temperature sensor is not positioned correctly, fault message F.416 appears on the display.
For further details regarding the flue gas temperature sensor test, see "Repairs".
If fault message F.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.
Confirm the message with **OK**.

**Switching WiFi ON/OFF**

The system can be remotely controlled via the internet using an app. To do this, establish a connection to the router; see also page 22.
Activating the internet connection:

Operating instructions

Labels with the credentials required for commissioning are attached to the programming unit.
Affix one of the labels with the credentials here so that you can find it again when you need it:

*Fig. 25*

Affix a further credentials label to the place marked on the type plate.

**Calling up the commissioning assistant at a later point**

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

**Tap the following buttons:**

1. ☰ and **OK** – press simultaneously for approx. 4 s, then release.
2. Use ∧/∨ to select **"Basic settings"**.
3. **OK**
4. Use ∧/∨ to select **"Commissioning assistant"**.
5. **OK**

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## Filling the heating system

### Fill water

According to EN 1717 with DIN 1988-100, 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 use fill water of potable water quality.
- Special antifreeze suitable for heating systems can be added to the fill water. The antifreeze manufacturer must verify its suitability.
- Fill and top-up water with a water hardness in excess of the following values must be softened, e.g. with a small softening system for heating water.

**Total permissible hardness of the fill and top-up water**

| Total heating output | Specific system volume | | |
|---|---|---|---|
| kW | < 20 l/kW | ≥ 20 l/kW to < 50 l/kW | ≥ 50 l/kW |
| ≤ 50 | ≤ 3.0 mol/m³ (16.8 °dH) | ≤ 2.0 mol/m³ (11.2 °dH) | < 0.02 mol/m³ (0.11 °dH) |
| > 50 to ≤ 200 | ≤ 2.0 mol/m³ (11.2 °dH) | ≤ 1.5 mol/m³ (8.4 °dH) | < 0.02 mol/m³ (0.11 °dH) |
| > 200 to ≤ 600 | ≤ 1.5 mol/m³ (8.4 °dH) | ≤ 0.02 mol/m³ (0.11 °dH) | < 0.02 mol/m³ (0.11 °dH) |
| > 600 | < 0.02 mol/m³ (0.11 °dH) | < 0.02 mol/m³ (0.11 °dH) | < 0.02 mol/m³ (0.11 °dH) |

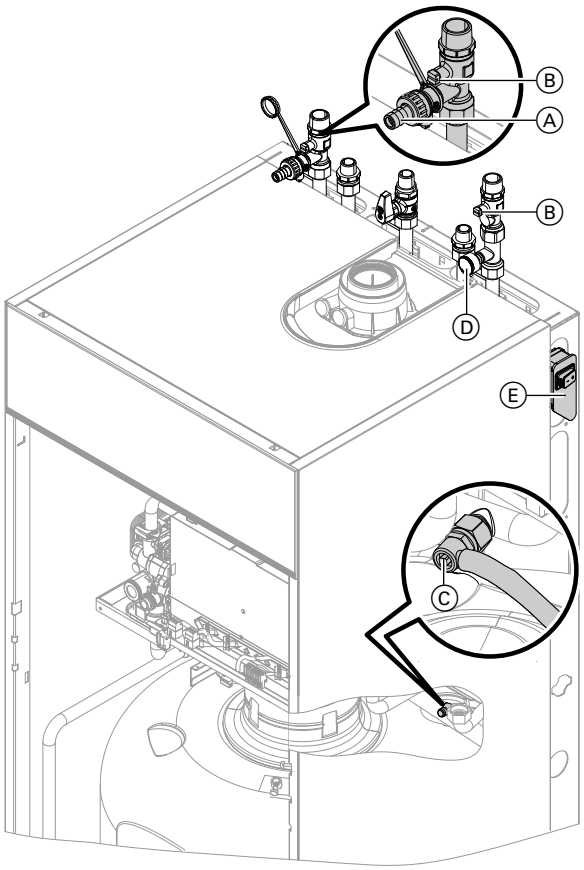


*Fig. 26 Shown with the connections at the top*

1. Check the pre-charge pressure of the expansion vessel.
2. Close the gas shut-off valve.

## Filling the heating system (cont.)

3. Connect the fill hose to boiler drain & fill valve Ⓐ in the heating flow. Either on the side or top of the boiler depending on the connection set.
4. Open shut-off valves Ⓑ on the heating water side.
5. Fit hose to air vent valve Ⓒ. Route the hose into a suitable container or drain outlet.
6. Activate the filling function (see commissioning assistant or following chapter).
7. Fill the heating system via boiler drain & fill valve Ⓐ. Minimum system pressure > 1.0 bar (0.1 MPa). Check the system pressure at pressure gauge Ⓓ. Indicator must be in the green band.

   ***Note***
   *Close air vent valve Ⓒ and adjust system pressure at boiler drain & fill valve Ⓐ.*
8. Close boiler drain & fill valve Ⓐ.

### Activating the filling function

If the filling function is to be activated after commissioning.

**Tap the following buttons:**

1. ☰ and **OK** – press simultaneously for approx. 4 s, then release.
2. Use ∧/∨ to select **"Basic settings"**.
3. **OK**
4. Use ∧/∨ to select **"Commissioning assistant"**.
5. **OK**
6. ∧/∨ for **"Next"** and **OK** until **"Filling"** appears.
7. **OK**
   The filling function is activated. The display shows the system pressure.
   The filling function ends automatically after 20 min or when you tap **OK**.

## Venting the boiler

! **Please note**
To prevent appliance damage,
Do not vent the boiler via the safety valve on the heating water side.

1. Close shut-off valves Ⓑ on the heating water side.
2. Open air vent valve Ⓒ and fill valve Ⓐ in the heating flow. Vent (flush) under mains pressure until no more air noise is audible.
3. Close air vent valve Ⓒ and fill valve Ⓐ. At the same time, adjust operating pressure > 1.0 bar (0.1 MPa).

   ***Note***
   *Call up the pressure indicator in the **"System overview"** menu point. See operating instructions.*
4. Open shut-off valves Ⓑ on the heating water side.
5. Remove drain hose from air vent valve Ⓒ and keep safe.



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## Venting the heating system

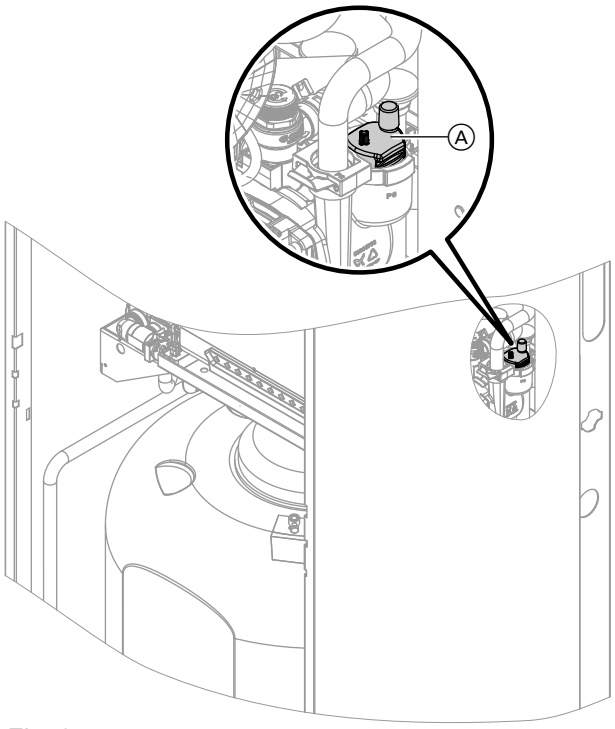



*Fig. 27*

1. Check whether the air vent screw in quick-action air vent valve Ⓐ of the heating circuit pump is open.
2. Close the gas shut-off valve. Switch the appliance on.
3. Activate venting function (see following steps).
4. Call up the pressure display with **"System overview"**.
   Check the system pressure.

### Activating the venting function

If the venting function is to be activated after commissioning.

**Tap the following buttons:**

1. ☰ and **OK** – press simultaneously for approx. 4 s, then release.
2. Use ∧/∨ to select **"Basic settings"**.
3. **OK**
4. Use ∧/∨ to select **"Commissioning assistant"**.
5. **OK**
6. ∧/∨ for **"Next"** and **OK** until **"Venting"** appears.
7. **OK**
   The venting function is activated. The display shows the system pressure.
   The venting function ends automatically after 20 min or when you tap **OK**.

## Filling the DHW cylinder on the DHW side

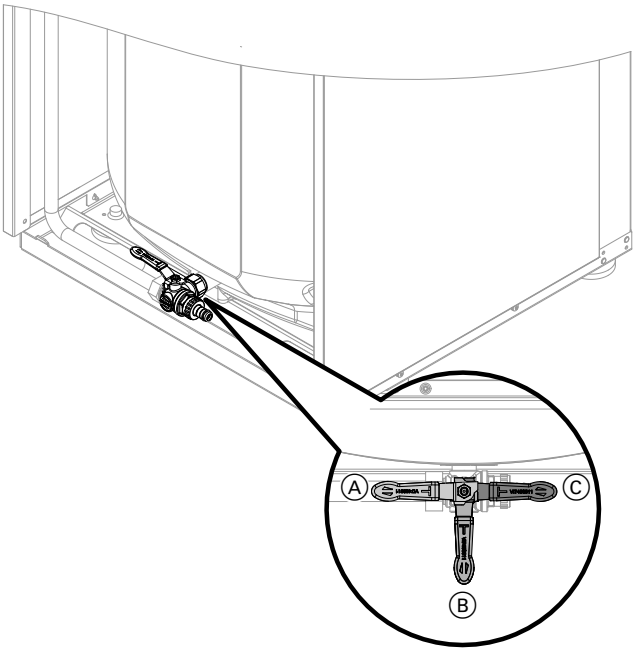



*Fig. 28*

1. The lever on the valve must be in position Ⓐ.
2. Open the on-site DHW supply and a DHW draw-off point.
3. Once air stops coming out of the DHW draw-off point, the DHW cylinder is completely filled.

## Checking the connections on the heating water and the DHW side

**Danger**
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.

## Naming the heating circuits

In the delivered condition, the heating circuits are designated "Heating circuit 1", "Heating circuit 2", "Heating circuit 3" and "Heating circuit 4" (if installed).
If the system user prefers, the heating circuits can be renamed to suit the specific system.

To enter names for heating circuits:

Operating instructions

## 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/m$^3$ (34.2 to 54.7 MJ/m$^3$).
- For operation with LPG or natural gas M, 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 (only for operation with LPG)

1. To change the gas type on the control unit, see "Commissioning the system with the commissioning assistant"

   ***Note***
   *Mechanical conversion on the gas train is not possible.*

2. Affix label "G31" (supplied with the technical documentation) adjacent to the type plate on the outside of the appliance.

## Checking the static pressure and supply pressure

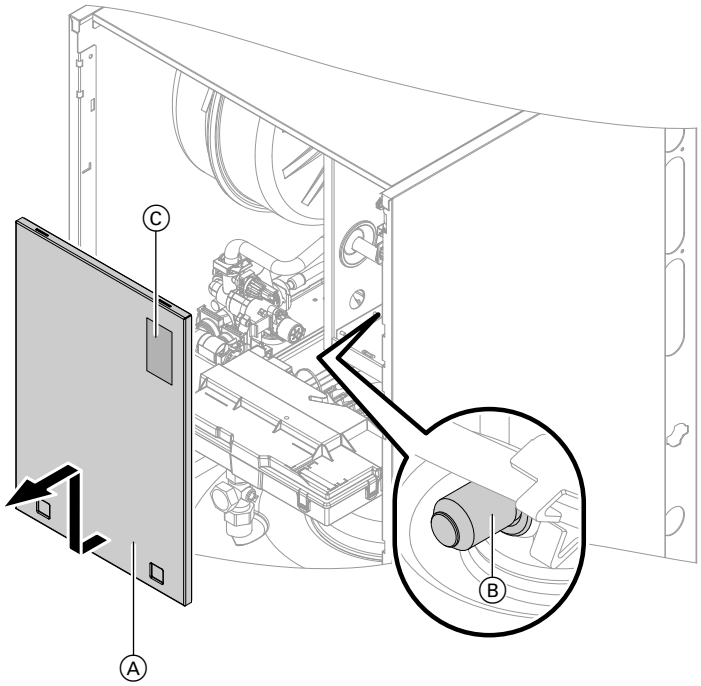



*Fig. 29*

Ⓐ Cover panel
Ⓑ Test connector
Ⓒ Type plate

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

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

1. Close the gas shut-off valve.
2. Undo clips and remove cover panel Ⓐ.
3. Undo screw in test connector Ⓑ on the gas train, but do not remove it. Connect the pressure gauge.
4. Open the gas shut-off valve.
5. Test the static pressure and record it in the report. Set value: Max. 57.5 mbar (5.75 kPa).
6. 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. Check 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.*

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

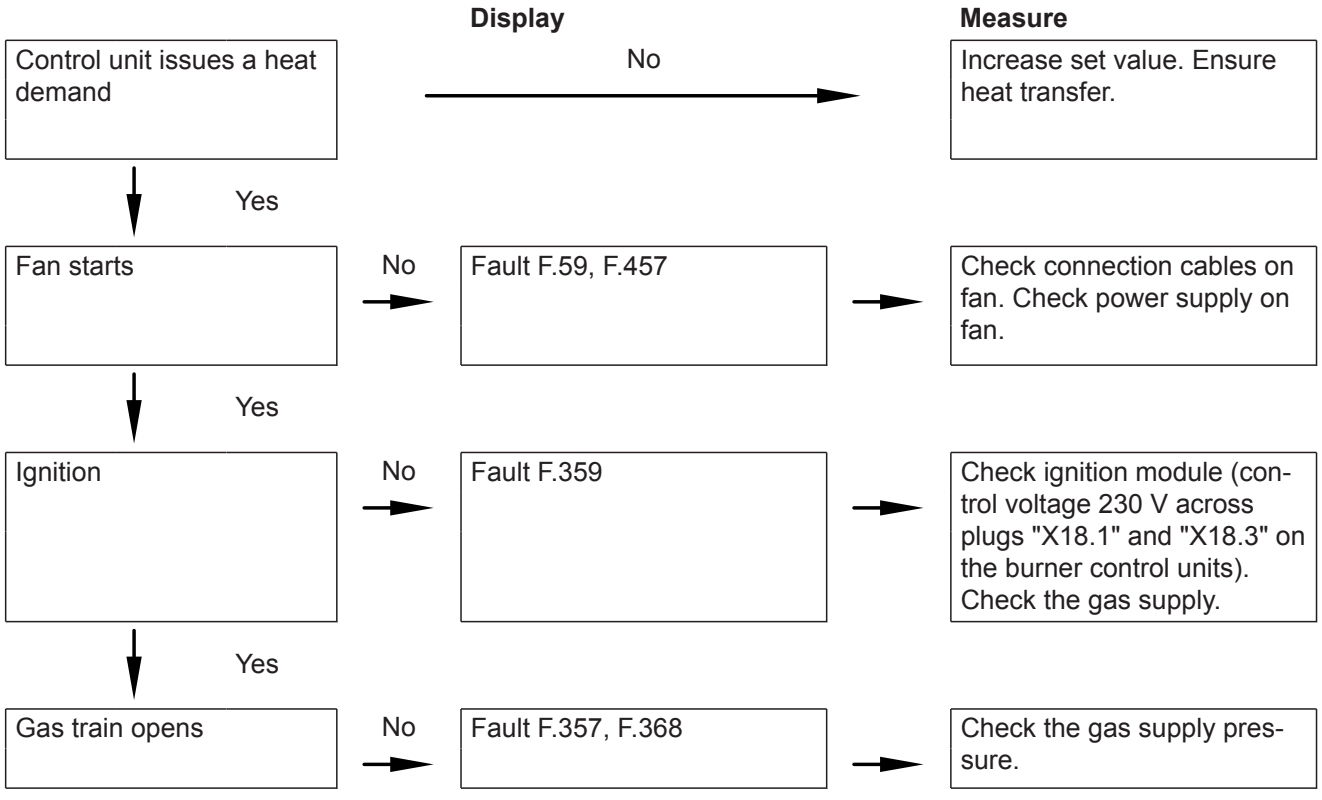
8. Record the actual value in the report. Implement measures as indicated in the table below.
9. Shut down the boiler. Close the gas shut-off valve.
10. Remove the pressure gauge. Tighten the screw in test connector Ⓑ.
11. Open the gas shut-off valve and start the appliance.

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

12. Fit cover panel Ⓐ.

| Supply pressure (flow pressure) | | | | | Measures |
|---|---|---|---|---|---|
| For natural gas | | | | For LPG | |
| H | E, E+, M | L, LL, S, K | Lw | | |
| Below 13 mbar (1.3 kPa) | Below 17 mbar (1.7 kPa) | Below 18 mbar (1.8 kPa) | Below 16 mbar (1.6 kPa) | Below 25 mbar (2.5 kPa) | Do not start the boiler. Notify your gas supply utility or LPG supplier. |
| 13 to 33 mbar (1.3 to 3.3 kPa) | 17 to 33 mbar (1.7 to 3.3 kPa) | 18 to 33 mbar (1.8 to 3.3 kPa) | 16 to 33 mbar (1.6 to 3.3 kPa) | 25 to 57.5 mbar (2.5 to 5.75 kPa) | Start the boiler. |
| Above 33 mbar (3.3 kPa) | Above 33 mbar (3.3 kPa) | Above 33 mbar (3.3 kPa) | Above 33 mbar (3.3 kPa) | Above 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 your gas supply utility or LPG supplier. |

## Function sequence and possible faults

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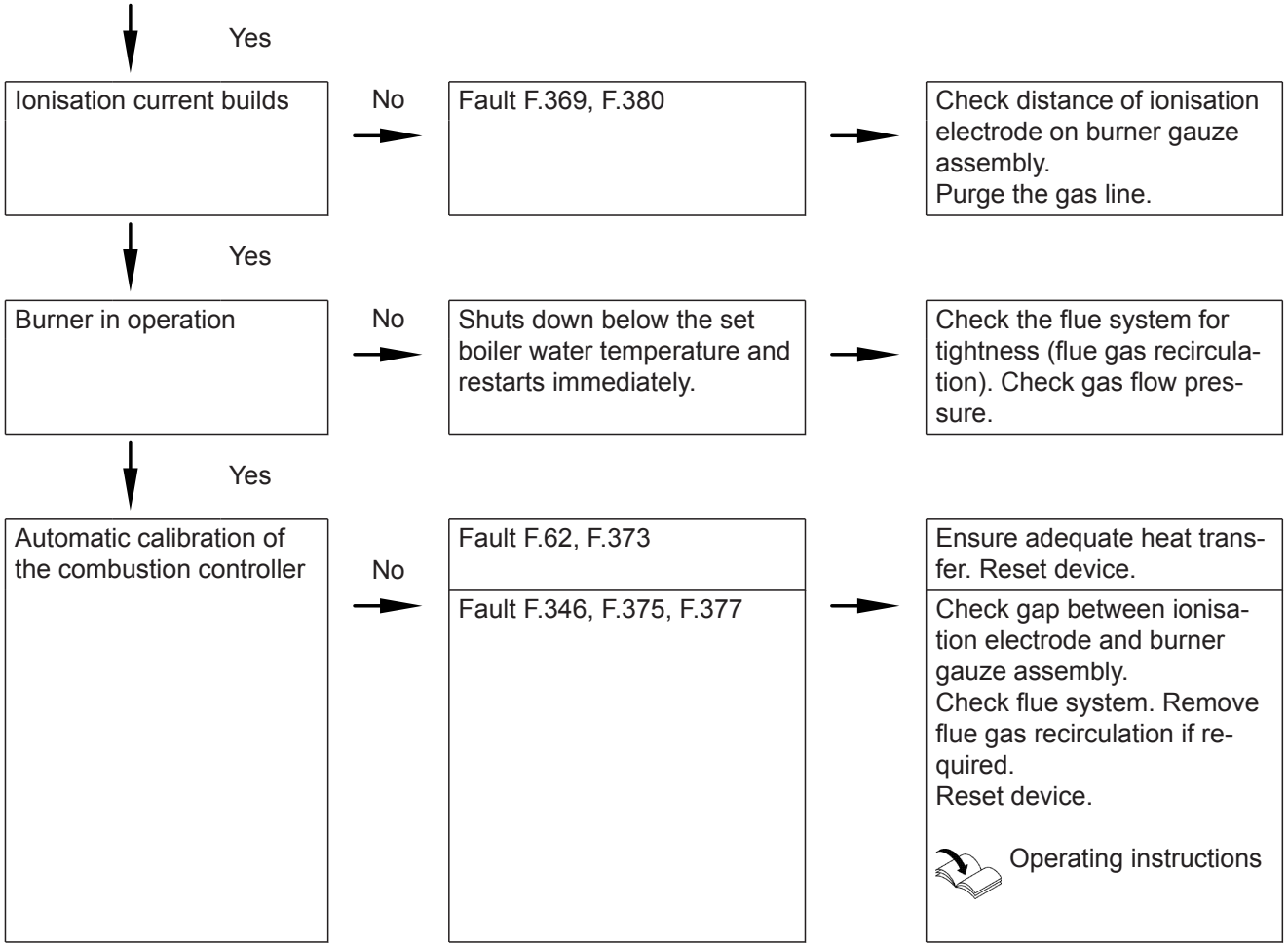
## Function sequence and possible faults (cont.)




For further details regarding faults, see page "Trouble-shooting".

## Setting the max. heating output

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

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

**Tap the following buttons:**

1. ≡ and **OK** – press simultaneously for approx. 4 s, then release.
2. Use ∧/∨ to select **"System configuration"**.
3. **OK**
4. Use ∧/∨ to select **"Boiler"**.
5. **OK**
6. Use ∧/∨ to select parameter **596.0 "Maximum heating output"**.
7. **OK**
8. Use ∧/∨ to set the required value in % of rated heating output. Delivered condition 100 %.
9. **OK**

## Activating screed drying

### Screed drying

6 different temperature profiles can be set for screed drying:
Preset temperature profiles can be set via parameter **897.0 "Screed drying"** in the General group.

For further details, see “Function description”.

## Adjusting the pump rate of the integral circulation pump

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

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

- 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 |
| 19 | 50 | 75 |
| 25 | 50 | 95 |
| 32 | 40 | 100 |

- In conjunction with a low loss header, heating water buffer cylinder and heating circuits with mixer, the internal circulation pump runs at a constant speed. Speed setting (%): Parameter 1100.2 in the Boiler group

### Residual head of integral circulation pump

19 to 25 kW

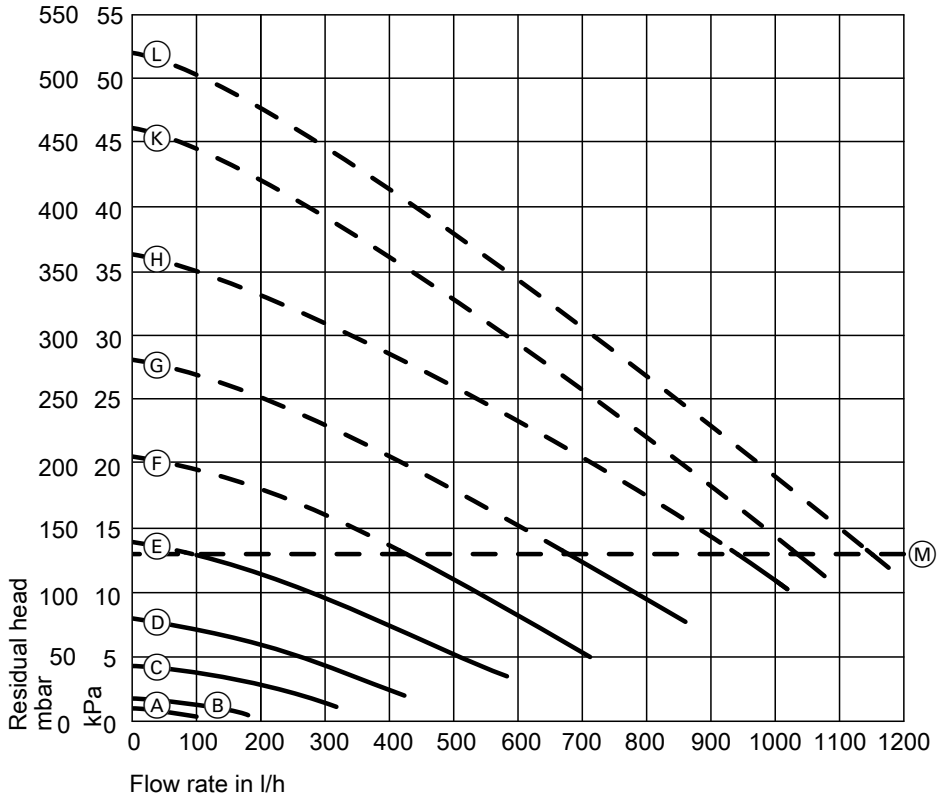



*Fig. 30*

Ⓜ Operating range upper limit

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## Adjusting the pump rate of the integral… (cont.)

| Curve | Pump rate, circulation pump |
|---|---|
| Ⓐ | 10 % |
| Ⓑ | 20 % |
| Ⓒ | 30 % |
| Ⓓ | 40 % |
| Ⓔ | 50 % |
| Ⓕ | 60 % |
| Ⓖ | 70 % |
| Ⓗ | 80 % |
| Ⓚ | 90 % |
| Ⓛ | 100 % |

32 kW

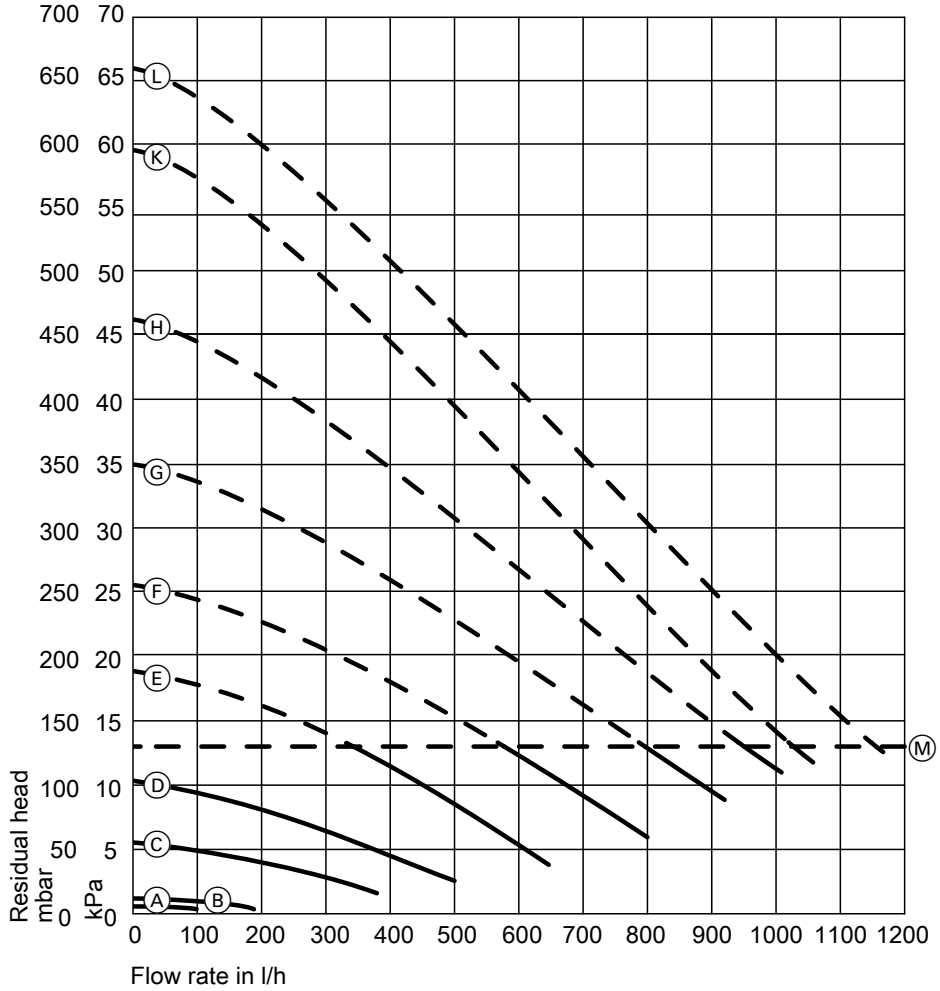


*Fig. 31*

Ⓜ Operating range upper limit

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## Adjusting the pump rate of the integral… (cont.)

| Curve | Pump rate, circulation pump |
|---|---|
| Ⓐ | 10 % |
| Ⓑ | 20 % |
| Ⓒ | 30 % |
| Ⓓ | 40 % |
| Ⓔ | 50 % |
| Ⓕ | 60 % |
| Ⓖ | 70 % |
| Ⓗ | 80 % |
| Ⓚ | 90 % |
| Ⓛ | 100 % |

## Checking the balanced flue system tightness (annular gap check)

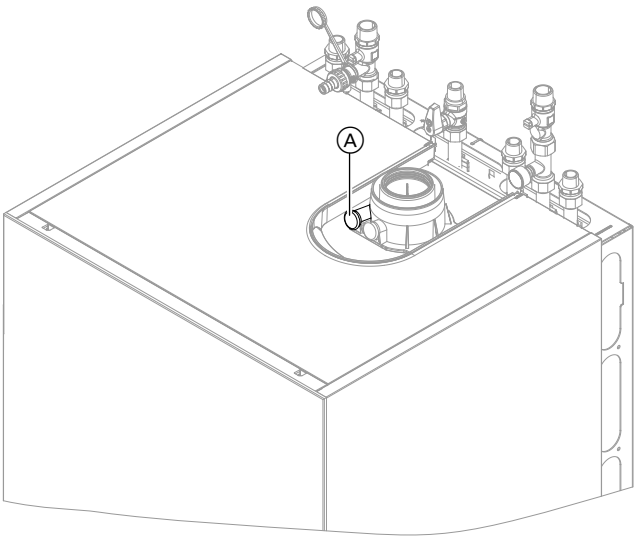


*Fig. 32*

Ⓐ Combustion air aperture (ventilation air)

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.

## Removing the burner

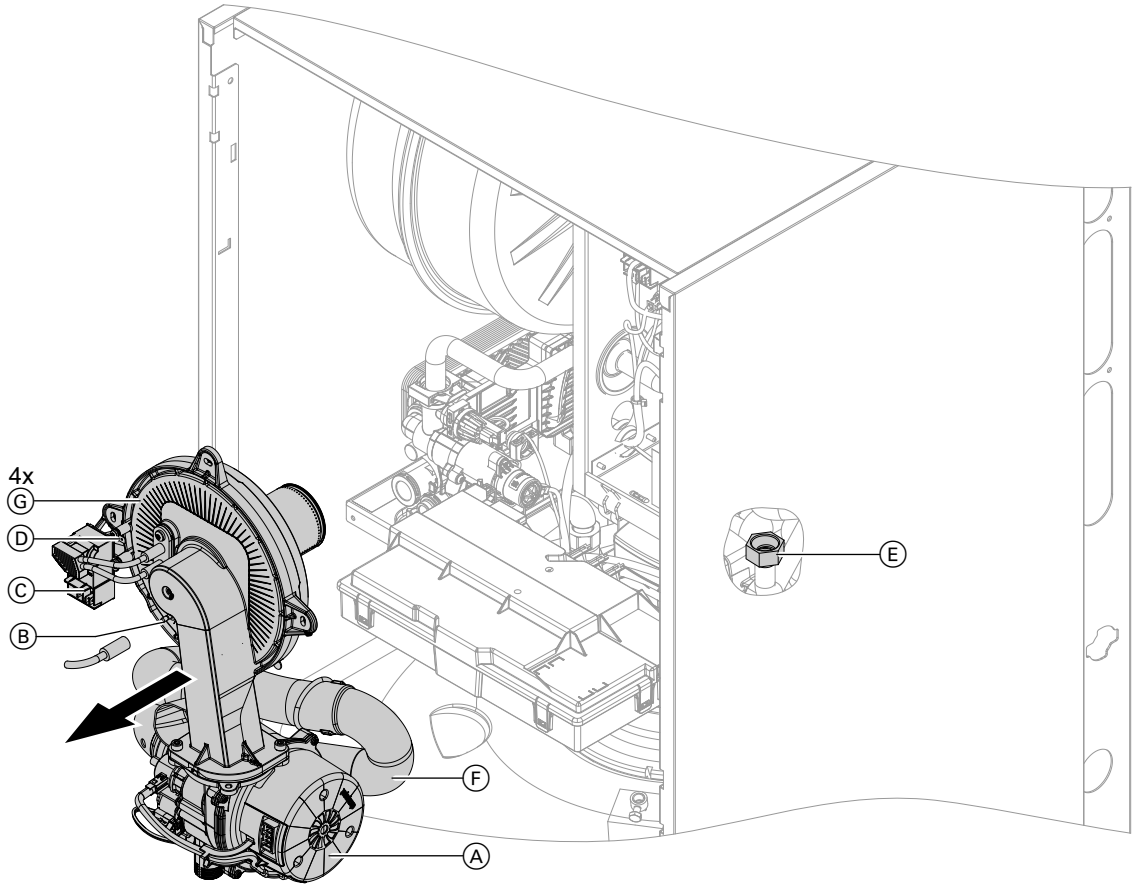


*Fig. 33*

**1.** Turn off the ON/OFF switch.

**2.** Close the gas shut-off valve and safeguard against reopening.

**3.** Release the clips and remove the cover panel.

**4.** Disconnect cables and leads from:
- Fan motor Ⓐ
  Adaptor, CAN bus fan
- Ionisation electrode Ⓑ
- Ignition unit Ⓒ
- Earth Ⓓ

**5.** Undo gas supply pipe fitting Ⓔ.

**6.** Detach Venturi extension Ⓕ from fan unit.

**7.** Undo 4 screws Ⓖ and remove the burner.

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

## Checking the burner gasket and burner gauze assembly

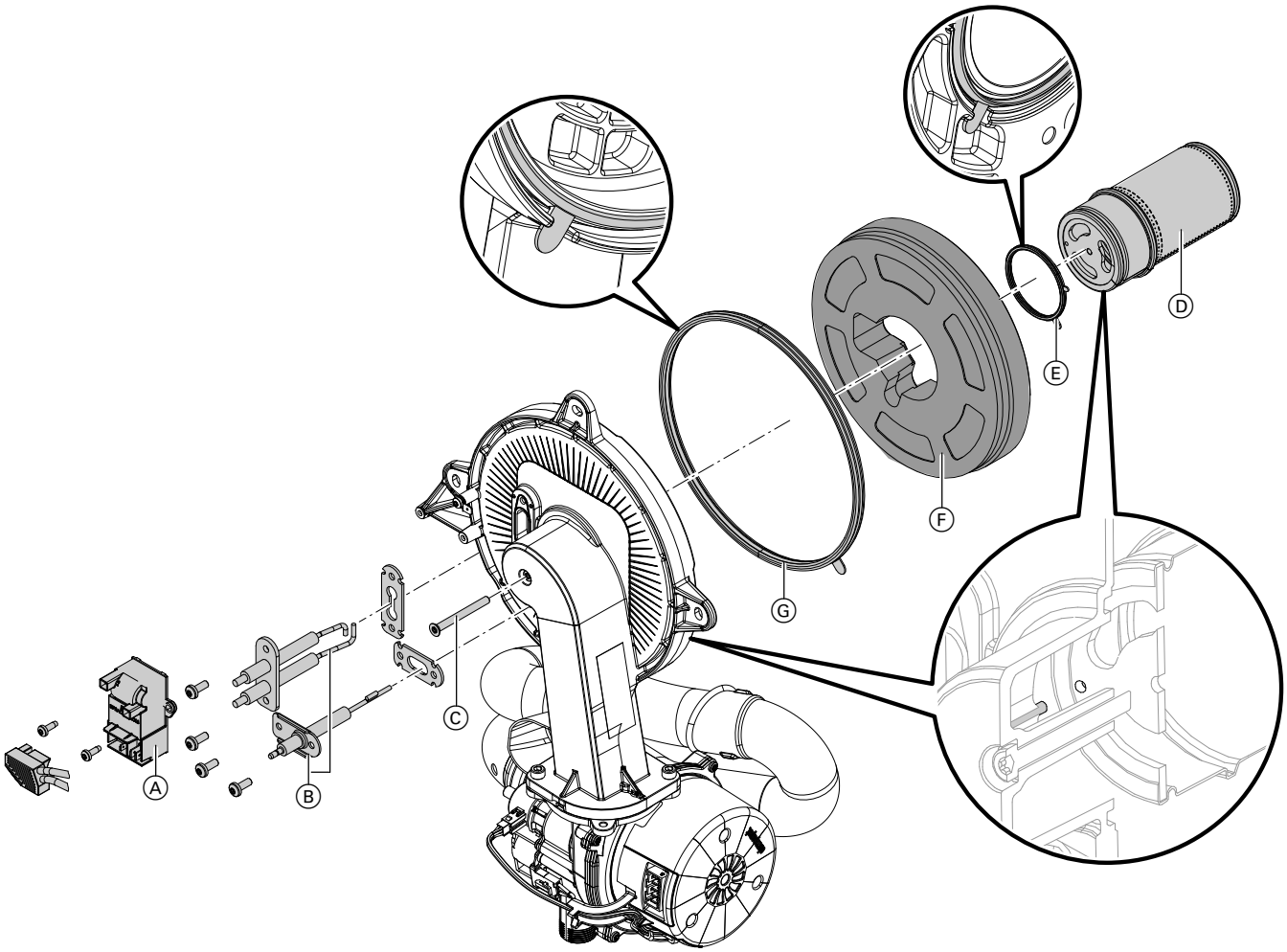


*Fig. 34*

Check burner gauze assembly Ⓓ, electrodes Ⓑ 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 Ⓓ with Torx screw Ⓒ.
   Torque: 3.0 Nm.
8. Check thermal insulation ring Ⓕ for firm seating.
9. Fit electrodes Ⓑ. Check clearances, see following chapter.
   Torque: 4.5 Nm.

## Checking and adjusting the ignition and ionisation electrodes

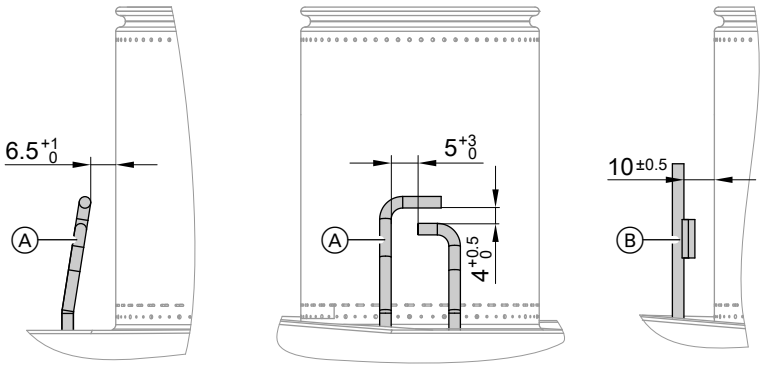


*Fig. 35*

Ⓐ 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 the electrode fixing screws to a torque of 4.5 Nm.

## 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.*

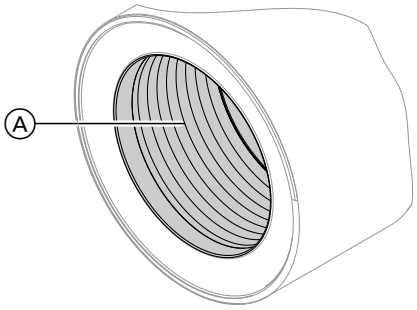


*Fig. 36*

1. Use a vacuum cleaner to remove combustion residues from heating surface Ⓐ of the heat exchanger.
2. Flush heating surface Ⓐ with water.
3. Check condensate drain. Clean the trap: See the following chapter.

## Checking the condensate drain and cleaning the trap

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

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

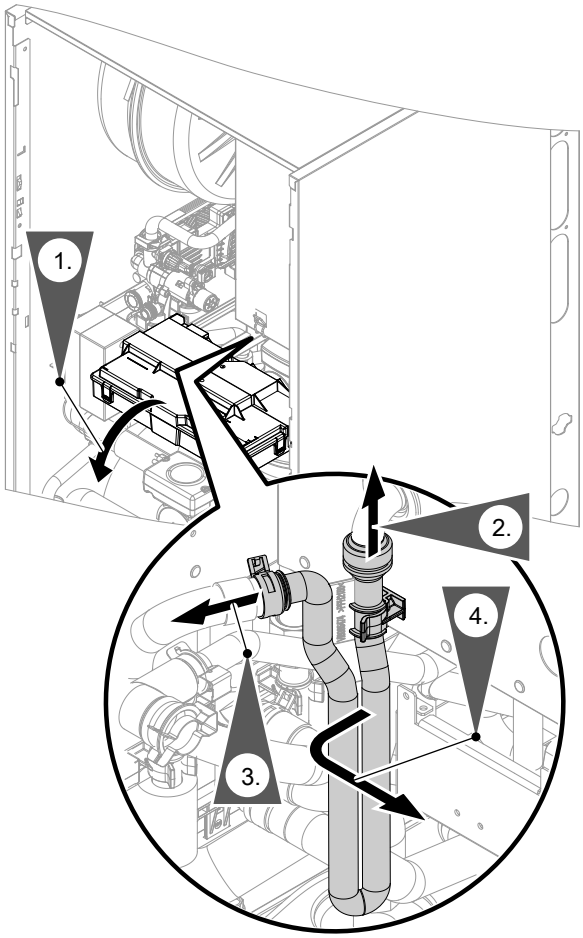


*Fig. 37*

**1.** Pivot the HMU heat management unit forwards.

**2.** Remove the supply hose.

**3.** Undo hose clip and pull off drain hose.

**4.** Release trap from retaining clip.
Hold trap as straight as possible and remove.
Ensure that no condensate runs out.

**5.** Clean the trap.

**6.** Refit the trap.

**7.** Refit the hoses. Secure the drain hose with the hose clip.

**8.** Check that connections on the trap and the heat exchanger are seated correctly.

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

**9.** Flush the heating surface again with min. 0.3 l of water. This will also fill the trap with water.

**Please note**
If the trap is not filled with water, flue gas can escape.
Only start the appliance when the trap has been filled.



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## Installing the burner

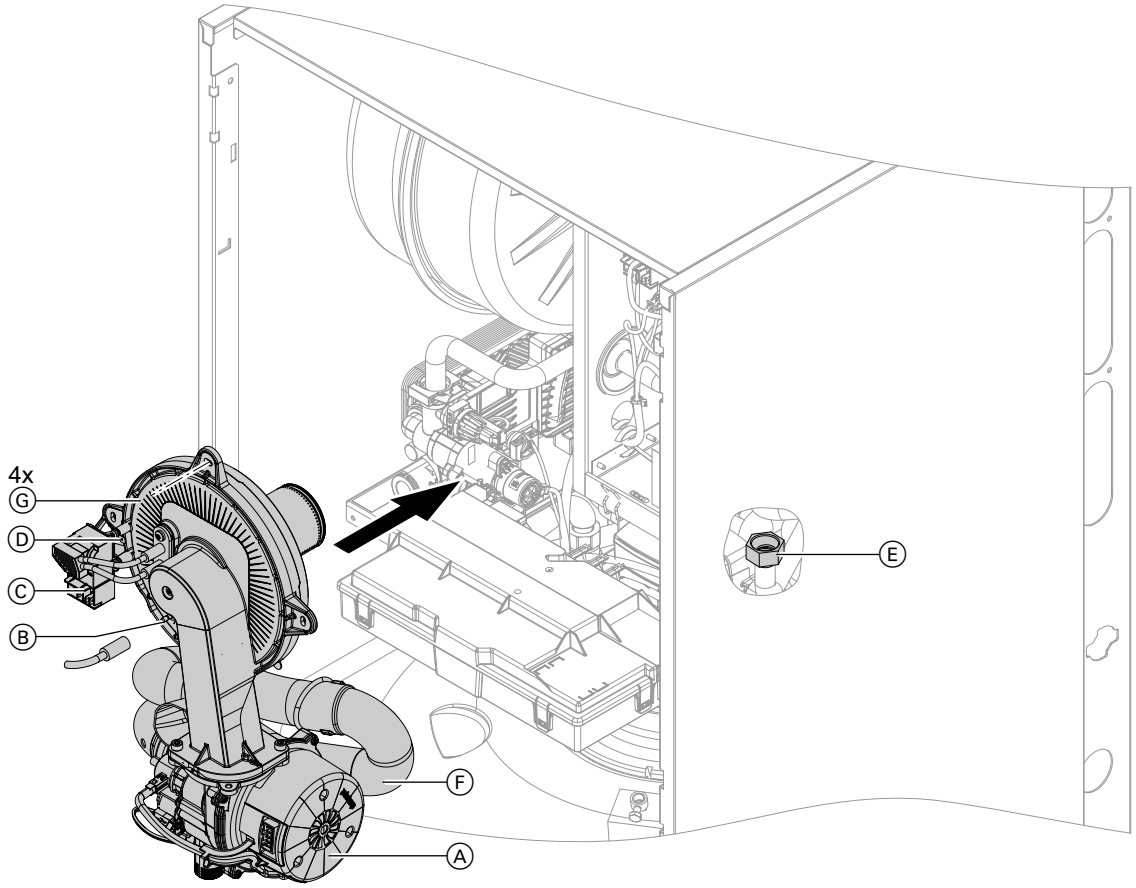


*Fig. 38*

1. If necessary, move the programming unit.
2. Insert the burner and tighten screws Ⓖ diagonally.
   Torque: **6.5 Nm**

   ***Note***
   *Before installation, check burner gasket for damage.*
3. Attach Venturi extension Ⓕ to fan unit.
4. Fit gas supply pipe Ⓔ with a new gasket.
   Torque: 30 Nm
5. Check the gas connections for leaks.

   ⚠ **Danger**
   Escaping gas leads to a risk of explosion.
   Check the fitting for gas tightness.
6. Connect the cables/leads:
   - Fan motor Ⓐ
     Connect CAN bus fan to adaptor.
   - Ionisation electrode Ⓑ
   - Ignition unit Ⓒ
   - Earth Ⓓ
7. Fit cover panel.

## Checking the neutralising system (if installed)

## Checking the anode connection and anode earth current with an anode tester

Check that the earth cable is connected to the protective magnesium anode.

***Note***
*We recommend checking the function of the protective magnesium anode annually. This function test can be carried out without interrupting operation, by measuring the earth current with an anode tester.*

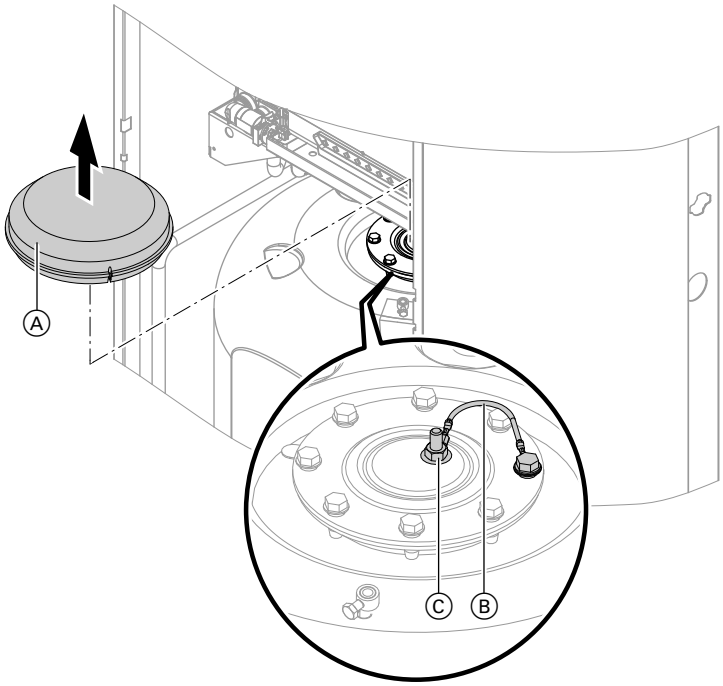


*Fig. 39*

1. Remove cover Ⓐ (two-part design up to 26 kW).
2. Remove earth cable Ⓑ from tab Ⓒ.
3. Connect tester (up to 5 mA) in series between tab Ⓒ and earth cable Ⓑ.
   - If the current measures > 0.3 mA the protective magnesium anode is OK.
   - If the current measures < 0.3 mA or if there is no current at all, inspect the protective magnesium anode visually (see page 48).

## Draining the boiler on the DHW side

1. Shut off the DHW supply upstream of the appliance.

## Draining the boiler on the DHW side (cont.)

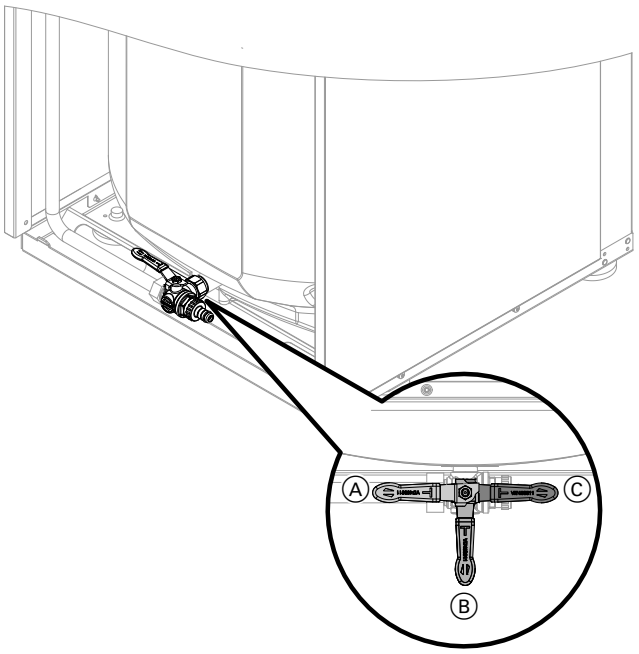


*Fig. 40*

2. Connect the hose to the drain valve and route it into a suitable container or drain outlet.

   ***Note***
   *Ensure adequate ventilation in the DHW pipework.*

3. Turn the drain valve from lever position Ⓐ (operational) to lever position Ⓑ or Ⓒ as required.
   - Lever position Ⓑ: The DHW circuit in the appliance **excluding** the DHW cylinder is drained via the cold water connection.
   - Lever position Ⓒ: The DHW circuit in the appliance **and** the DHW cylinder are drained via the hot water connection.
     The cold water connection remains filled.

## Cleaning the loading cylinder

***Note***
*According to EN 806, a visual inspection and (if necessary) cleaning must be carried out no later than 2 years after commissioning, and as required thereafter.*

## Cleaning the loading cylinder (cont.)

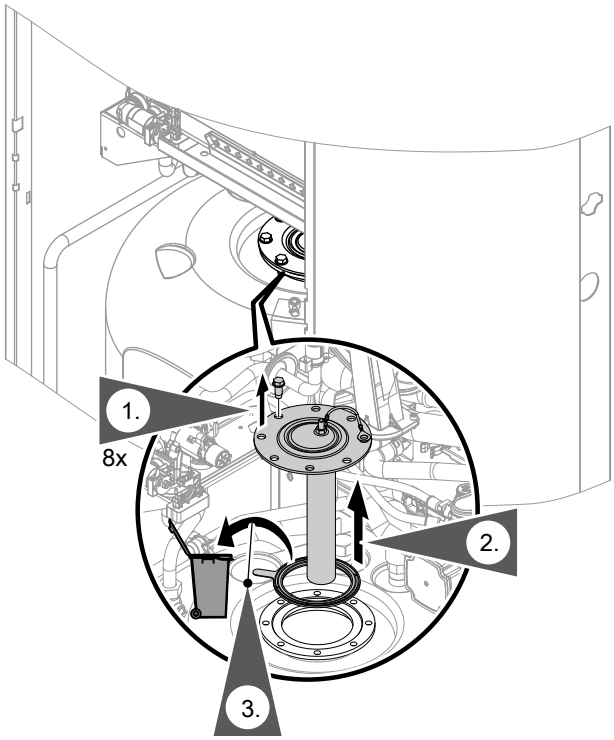


*Fig. 41*

**1.** Drain the loading cylinder.

**2.** Remove flange cover Ⓐ.

**3.** Disconnect the loading cylinder from the pipework to prevent contamination from entering the pipework.

**4.** Remove loose deposits with a pressure cleaner. Use a chemical cleaning agent to remove hard deposits that cannot be removed with a pressure cleaner.

> **!** **Please note**
> Do not damage the cylinder:
> - Only use plastic cleaning equipment to clean the inside.
> - Never use cleaning agents containing hydrochloric acid.

**5.** Thoroughly flush the loading cylinder after cleaning.

## Checking and replacing the protective magnesium anode (if required)

Visual inspection of protective magnesium anode. If the anode has degraded to between 10 and 15 mm Ø, we recommend replacing the magnesium protective anode.

## Re-assembling and filling the loading cylinder

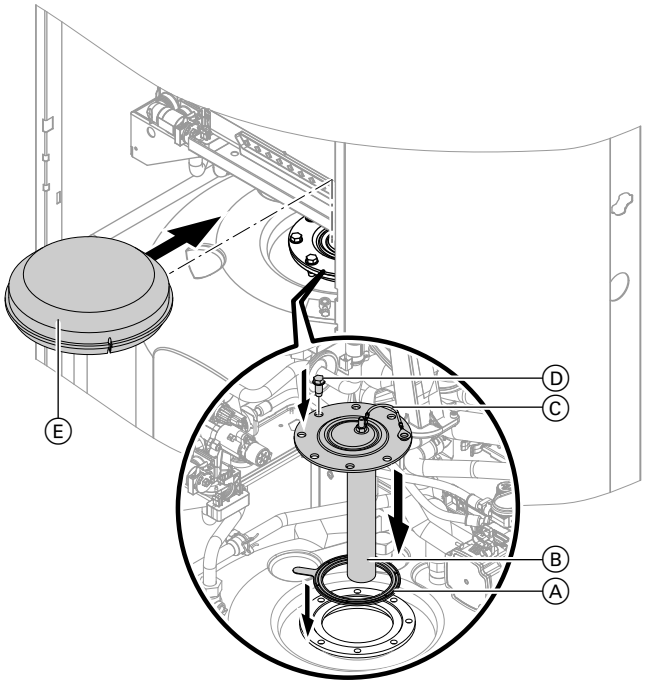


*Fig. 42*

1. Reconnect the loading cylinder to the pipework.
2. Insert new gasket Ⓐ underneath flange cover Ⓑ.
3. Fit flange cover Ⓑ and tighten 8 screws Ⓓ with a maximum torque of 25 Nm.
4. Push earth cable Ⓒ onto the tab.
5. Fit cover Ⓔ (two-part design up to 26 kW).
6. Fill the loading cylinder with potable water.

## Checking the diaphragm expansion vessel and system pressure

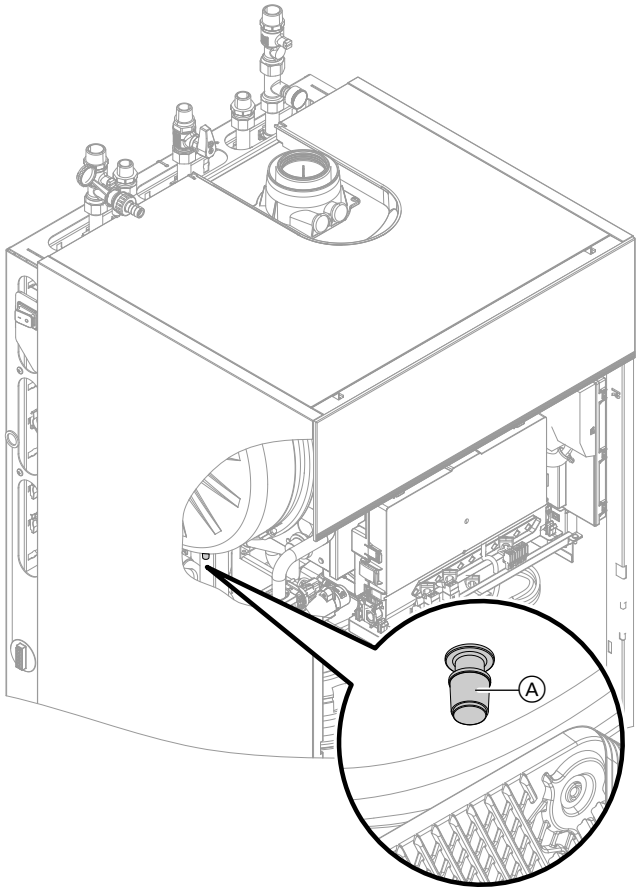


*Fig. 43*

***Note***
*Carry out this test on a cold system.*

1. Drain the system until the pressure gauge shows "0".

2. If the expansion vessel pre-charge pressure is lower than the static system pressure: top up with nitrogen at connection Ⓐ 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 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)

## Checking the pre-charge pressure and the DHW expansion vessel (if installed)

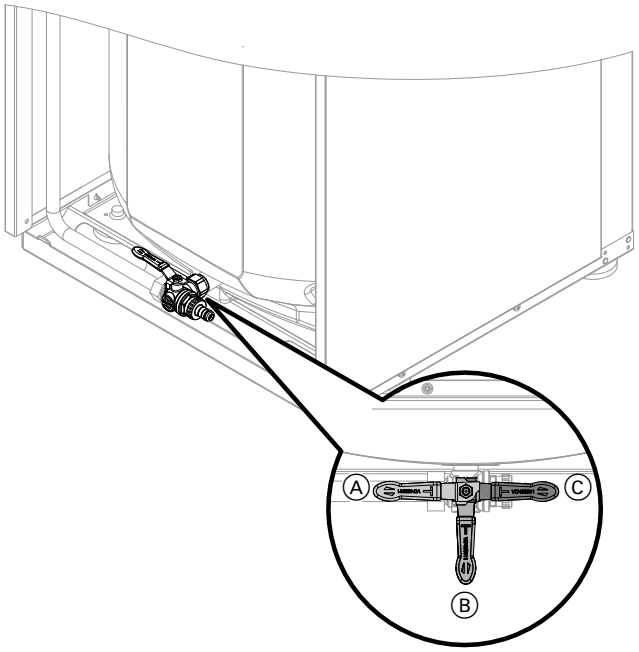


*Fig. 44*

1. Check the static pressure of the DHW line downstream of the pressure reducer and adjust if required. Set value: Max. 3.0 bar (0.3 MPa)
2. Close the on-site shut-off valve in the cold water line.
   Relieve the water pressure.
3. Turn lever on valve to position Ⓑ.
4. Check the pre-charge pressure of the DHW expansion vessel and adjust if required. Set value: Static pressure minus 0.2 bar (20 kPa).
5. Turn lever on valve back to position Ⓐ. Open the on-site shut-off valve in the cold water line.

## Checking the safety valve function

## Checking the electrical connections for firm seating

## Checking gas equipment for leaks at operating pressure

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

## Checking the combustion quality

The electronic combustion controller automatically ensures optimum combustion quality. During commissioning/maintenance, only the combustion values need to be checked. For this, measure the CO content and the $CO_2$ or $O_2$ content.

***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.

## 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 - 10.5 | 7.5 - 10.5 | 2.1 - 7.9 | 2.1 - 7.6 |
| 19 | 7.5 - 10.5 | 7.5 - 10.5 | 2.1 - 7.6 | 2.1 - 7.6 |
| 25 | 7.5 - 10.5 | 7.5 - 10.5 | 2.1 - 7.6 | 2.1 - 7.6 |
| 32 | 7.3 - 10.0 | 7.5 - 10.5 | 3.1 - 7.9 | 2.1 - 7.6 |

**Operation with LPG**
- $CO_2$ content: 8.4 - 11.8 %
- $O_2$ content: 3.1 - 8.1 %

If the actual $CO_2$ or $O_2$ values lie outside their respective ranges, proceed as follows:
- Check the balanced flue system for tightness; see page 40.
- Check ionisation electrode and connecting cable.

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

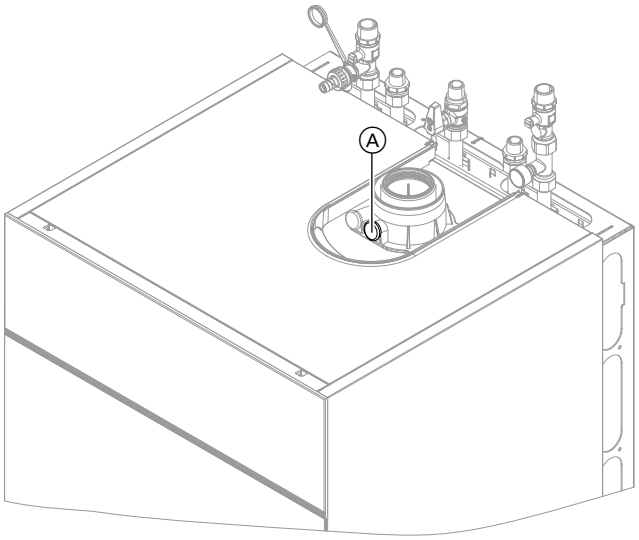


*Fig. 45*

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.

### Setting the upper/lower heating output

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

**Tap the following buttons:**

1. ☰ and **OK** – press simultaneously for approx. 4 s, then release.
2. Use ∧/∨ to select **"Actuator test"**.
3. **OK**
4. Use ∧/∨ to select the **"Heating"** group.
5. **OK**
6. Use ∧/∨ to select **"Primary circuit pump, speed"**.



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## Checking the combustion quality (cont.)

7. **OK**
8. Use ∧/∨ to set the max. value.
9. **OK**
10. ≡
11. Use ∧/∨ to select the **"Boiler"** group.
12. **OK**
13. Use ∧/∨ to select **"Burner modulation, set value"**.
14. **OK**
15. Set the lower heating output:
    Select **"Minimum heating output"**.
    The burner now operates at the lower heating output.
16. Set the upper heating output:
    Select **"Maximum heating output"**.
    The burner now operates at the upper 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 heating curves

**Tap the following buttons:**

1. ≡
2. Use ∧/∨ to select **"Settings"**.
3. **OK**
4. Use ∧/∨ to select **"Heating curve"**.
5. **OK**
6. Use ∧/∨ to select **"Heating circuit ..."** for the required heating circuit.
7. **OK**
8. Use ∧/∨ to select **"Slope"** or **"Level"**.
9. **OK**
10. Use ∧/∨ to set a value according to the system requirements.
11. **OK** to confirm

## Calling up and resetting the service display

**Checking service messages**

1. ≡
2. Use ∧/∨ to select **"Active messages"**.
3. **OK**
4. Use ∧/∨ to select **"Service"**.
5. **OK**
   Existing messages are displayed.

## Calling up and resetting the service display (cont.)

**Service reset (after service has been carried out)**

1. ☰ and **OK** – press simultaneously for approx. 4 s, then release.
2. Use ∧/∨ to select **"Reset service messages"**.
3. **OK**

## Fitting the front panel

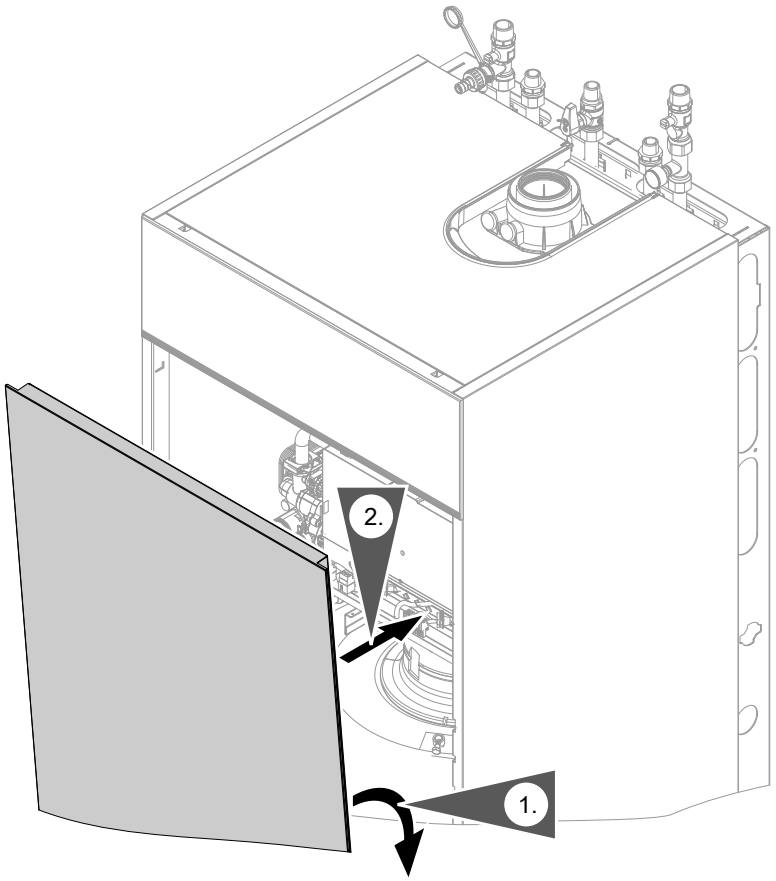


*Fig. 46*

## Instructing the system user

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

### 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.

To activate the function, see the operating instructions. Inform the system user what DHW temperatures should be set and the risks associated with having a raised outlet temperature at the draw-off points.

#### Hygiene function

The DHW can be heated to a specified (higher) set DHW temperature for a period of one hour.

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## Calling up parameters

- Parameters are split into the following groups:
  - **"General"**
  - **"Boiler"**
  - **"DHW"** (domestic hot water)
  - **"Heating circuit 1/2/3"**
  - **"Solar"**
- Heating systems with one heating circuit without mixer and one or 2 heating circuits with mixer: Below, the heating circuit without mixer is designated **"Heating circuit 1"** and the heating circuits with mixer as **"Heating circuit 2"** or **"Heating circuit 3"**. If the heating circuits have been renamed, the chosen designation appears.

***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** – press simultaneously for approx. 4 s, then release.
2. Use ∧/∨ to select **"System configuration"**.
3. **OK**
4. Use ∧/∨ to select the required group.
5. **OK**
6. Use ∧/∨ to select the parameter to be set. See tables below.
7. **OK**
8. ∧/∨ for the required value.
9. **OK**

## General

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

**508.0 "UTC time zone"**

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

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

| Setting | | Explanations |
|---|---|---|
| | | 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 |

**896.0 "Display correction for outside temperature"**

| Setting | | Explanations |
|---|---|---|
| | | Correction of measured outside temperature |
| | **0** | Correction in the delivered condition 0 K |
| | -10 to + 10 | Correction adjustable from -10 to + 10 K in 1 K increments |

## General (cont.)

**897.0 "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". |
| Diagram 1 | 2 | |
| Diagram 2 | 3 | |
| Diagram 3 | 4 | |
| Diagram 4 | 5 | |
| Diagram 5 | 6 | |
| Diagram 6 | 7 | |

**912.0 "Automatic summer/wintertime changeover"**

| Setting | | Explanations |
|---|---|---|
| No | 0 | Automatic changeover disabled |
| Yes | **1** | Automatic changeover enabled |

**912.1 "Earliest day of changeover from winter to summertime"**

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

**912.2 "Month of changeover from winter to summertime"**

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

**912.3 "Earliest day of changeover from summer to wintertime"**

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

**912.4 "Month of changeover from summer to wintertime"**

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

**1098.4 "Gas volume correction factor"**

| Setting | | Explanations |
|---|---|---|
| | | Value is provided on the gas supplier's bill. Used for gas consumption data. |
| | **1.0000** | |
| | 0.7000 to 1.0000 | Gas volume correction factor adjustable from 0.7000 to 1.0000 in increments of 0.0001. Round the value up or down if necessary. |

## General (cont.)

**1098.5 "Calorific value"**

| Setting | | Explanations |
|---|---|---|
| | | Value is provided on the gas supplier's bill.<br>Used for gas consumption data. |
| | **10.0000** | |
| | 5.0000 to 40.0000 | Calorific value adjustable from 5.0000 to 40.0000 kWh/$m^3$ in increments of 0.0001 |

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

| Setting | | Explanations |
|---|---|---|
| | | Temperature limit for cancelling reduced set room temperature |
| | **-5** | Temperature limit in the delivered condition - 5 °C |
| | -61 to +10 | Temperature limit adjustable from - 61 to + 10 °C in 1°C increments |

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

| Setting | | Explanations |
|---|---|---|
| | | Temperature limit for raising the reduced set room temperature (see function description) |
| | **-14** | Temperature limit in the delivered condition - 14 °C |
| | -60 to +10 | Temperature limit adjustable from - 60 to + 10 °C in 1 °C increments |

**1504.0 "Source for date and time"**

| Setting | | Explanations |
|---|---|---|
| | | Selection of source for date and time<br>The setting depends on the heat generator and accessories. |
| Local | **0** | Factory setting: The date and time are adopted from the control unit. |
| | 1 | Higher ranking control system |
| | 2 | Internet protocol (see parameter "508.0") |

## Boiler

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

**521.0 "Time interval in burner hours until the next service"**

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

## Boiler (cont.)

**522.3 "Interval until the next service"**

| Setting | | Explanations |
|---|---|---|
| | | Interval until the next service |
| | **0** | No interval selected |
| | 1 | 3 months |
| | 2 | 6 months |
| | 3 | 12 months |
| | 4 | 18 months |
| | 5 | 24 months |

**1411.0 "Clear maintenance messages"**

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

**596.0 "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 % |

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

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

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

| Setting | | Explanations |
|---|---|---|
| | | Set speed of internal circulation pump<br>▪ In heating mode<br>▪ With external demand<br>▪ With demand in conjunction with a low loss header |
| | **...** | Delivered condition specified by settings specific to the appliance |
| | 20 to 100 | Set speed adjustable from 20 to 100 % |

**1432.1 "Residual head control of primary circuit pump"**

| Setting | | Explanations |
|---|---|---|
| | | Residual head limit value for reducing pump speed of the internal circulation pump, in mbar |
| | **0** | Internal circulation pump is controlled in line with the outside temperature |
| | 1 to 255 | Internal circulation pump is operated with constant residual head.<br>Recommended setting: 120 mbar<br>1 step ≙ 1 mbar |

## Boiler (cont.)

**1432.2 "Operating mode of primary circuit pump"**

| Setting | | Explanations |
|---|---|---|
| | **0** | Internal circulation pump is operated with constant differential pressure. |
| | 1 to 20 | Internal circulation pump is operated with rising differential pressure.<br>Adjustable from 1 to 20 mbar |

**1503.0 "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 |
| | 5 to 100 | Adjustable from 5 to 100 % |

**1606.4 "Integral threshold for burner switch-off"**

| Setting | | Explanations |
|---|---|---|
| | | Only effective if parameter 1606.0 has been set to 1. |
| | **20** | Factory setting 20 K x min |
| | 5 to 255 | Adjustable from 5 to 255 20 K x min<br>The higher the value, the later the burner switches off. |

**1606.0 "Minimum burner pause time"**

| Setting | | Explanations |
|---|---|---|
| | | The minimum burner pause time can be set subject to boiler load. |
| | **0** | Delivered condition, fixed setting for minimum burner pause time |
| | 1 | Integral method |

## DHW

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

**497.1 "DHW circulation pump for auxiliary function DHW heating"**

| Setting | | Explanations |
|---|---|---|
| | | DHW circulation pump: |
| OFF | **0** | OFF during hygiene function |
| ON | 1 | ON during hygiene function |
| | | ⚠ **Danger**<br>Risk of injury due to increased DHW temperature.<br>Inform the system user of the risk from the higher outlet temperature at the taps. |

## DHW (cont.)

**497.2 "DHW circulation pump for DHW heating"**

| Setting | | Explanations |
|---|---|---|
| | | DHW circulation pump: |
| OFF | **0** | OFF during DHW heating to standard set value |
| ON | 1 | ON during DHW heating to standard set value |

**503.0 "Scald protection"**

| Setting | | Explanations |
|---|---|---|
| | | The adjustable water temperature is limited to a maximum value. |
| OFF | 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 higher outlet temperature at the taps. |
| ON | **1** | Scald protection ON (maximum value 60 °C) |

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

| Setting | | Explanations |
|---|---|---|
| | | Set speed of the internal circulation pump when operated as a circulation pump for cylinder heating |
| | **...** | Delivered condition specified by settings specific to the appliance |
| | 20 to 100 | Set speed adjustable from 20 to 100 % |



## Heating circuit 1, Heating circuit 2, Heating circuit 3, Heating circuit 4

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

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

| Setting | | Explanations |
|---|---|---|
| | | Set flow temperature increased when changing from operation at reduced room temperature to operation at standard room temperature or comfort room temperature.<br>See also chapter "Function description" |
| 0 K | **0** | Delivered condition increase 0 K |
| | 0 to 20 | Temperature rise adjustable from 0 to 20 K |

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

| Setting | | Explanations |
|---|---|---|
| | | Duration for set flow temperature increase<br>See also chapter "Function description" |
| 60 min | **60** | Delivered condition 60 min |
| | 0 to 120 | Temperature rise adjustable from 0 to 120 min |

## Heating circuit 1, Heating circuit 2, Heating… (cont.)

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

| Setting | | Explanations |
|---|---|---|
| | | Set flow temperature increased when changing from operation at reduced room temperature to operation at standard room temperature or comfort room temperature.<br>See also chapter "Function description" |
| 0 K | **0** | Delivered condition increase 0 K |
| | 0 to 20 | Temperature rise adjustable from 0 to 20 K |

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

| Setting | | Explanations |
|---|---|---|
| | | Duration for set flow temperature increase<br>See also chapter "Function description" |
| 60 min | **60** | Delivered condition 60 min |
| | 0 to 120 | Temperature rise adjustable from 0 to 120 min |

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

| Setting | | Explanations |
|---|---|---|
| | | Set flow temperature increased when changing from operation at reduced room temperature to operation at standard room temperature or comfort room temperature.<br>See also chapter "Function description" |
| 0 K | **0** | Delivered condition increase 0 K |
| | 0 to 20 | Temperature rise adjustable from 0 to 20 K |

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

| Setting | | Explanations |
|---|---|---|
| | | Duration for set flow temperature increase<br>See also chapter "Function description" |
| 60 min | **60** | Delivered condition 60 min |
| | 0 to 120 | Temperature rise adjustable from 0 to 120 min |

**933.3 "Priority, DHW heating, heating circuit 1"**

| Setting | | Explanations |
|---|---|---|
| | | Priority of DHW heating over the heating circuit |
| OFF | 0 | Without DHW heating priority |
| DHW | **1** | With DHW heating priority |

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

| Setting | | Explanations |
|---|---|---|
| | | Only adjust for systems with one heating circuit. See also parameter 933.7<br>Heating mode: |
| Weather-compensated without room temperature hook-up | **0** | Weather-compensated **without** room temperature influence |
| Weather-compensated with room temperature hook-up | 1 | Weather-compensated **with** room temperature influence |

## Heating circuit 1, Heating circuit 2, Heating… (cont.)

**933.7 "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 (parameter 933.6). Only change the value for systems with one heating circuit.<br>For a sample calculation, see chapter "Heating curve" in the "Function description" |
| | **8** | Room influence factor |
| | 0 to 64 | Room influence adjustable from 0 to 64 |

**934.3 "Priority, DHW heating, heating circuit 2"**

| Setting | | Explanations |
|---|---|---|
| | | Priority of DHW heating over heating circuit pump and mixer |
| OFF | 0 | Without DHW heating priority |
| DHW | **1** | With DHW heating priority |

**934.5 "Differential temperature, heating circuit 2"**

| Setting | | Explanations |
|---|---|---|
| | | The flow temperature of the heat generator is higher than the flow temperature of the heating circuit with mixer by an adjustable differential temperature. See also chapter "Function description". |
| 8 K | **8** | Differential temperature in delivered condition 8 K |
| | 0 to 20 | Differential temperature adjustable from 0 to 20 K |

**934.6 "Operating mode, heating circuit 2"**

| Setting | | Explanations |
|---|---|---|
| | | See also parameter 934.7<br>Heating mode: |
| Weather-compensated without room temperature hook-up | **0** | Weather-compensated **without** room temperature influence |
| Weather-compensated with room temperature hook-up | 1 | Weather-compensated **with** room temperature influence |

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

| 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 (parameter 934.6). Change value for heating circuit with mixer only.<br>For a sample calculation, see chapter "Heating curve" in the "Function description" |
| | **8** | Room influence factor |
| | 0 to 64 | Room influence adjustable from 0 to 64 |

## Heating circuit 1, Heating circuit 2, Heating… (cont.)

**935.3 "Priority, DHW heating, heating circuit 3"**

| Setting | | Explanations |
|---|---|---|
| | | Priority of DHW heating over heating circuit pump and mixer |
| OFF | 0 | Without DHW heating priority |
| DHW | **1** | With DHW heating priority |

**935.5 "Differential temperature, heating circuit 3"**

| Setting | | Explanations |
|---|---|---|
| | | The flow temperature of the heat generator is higher than the flow temperature of the heating circuit with mixer by an adjustable differential temperature. See also chapter "Function description". |
| 8 K | **8** | Differential temperature in delivered condition 8 K |
| | 0 to 20 | Differential temperature adjustable from 0 to 20 K |

**935.6 "Operating mode, heating circuit 3"**

| Setting | | Explanations |
|---|---|---|
| | | See also parameter 935.7<br>Heating mode: |
| Weather-compensated without room temperature hook-up | **0** | Weather-compensated **without** room temperature influence |
| Weather-compensated with room temperature hook-up | 1 | Weather-compensated **with** room temperature influence |

**935.7 "Room influence factor, heating circuit 3"**

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

**1102.0 "Min. speed of speed-controlled primary/heating circuit pump in standard mode, heating circuit 1"**

| Setting | | Explanations |
|---|---|---|
| | | Minimum 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 | Minimum speed adjustable from 0 to 100 % |

**1102.1 "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 % |

## Heating circuit 1, Heating circuit 2, Heating… (cont.)

**1192.0 "Minimum flow temperature limit, heating circuit 1"**

| Setting | | Explanations |
|---|---|---|
| 20 °C | **20**<br>1 to 90 | Minimum flow temperature limit for the heating circuit<br>Minimum limit in the delivered condition 20 °C<br>Setting range limited by heat generator-specific parameters |

**1192.1 "Maximum flow temperature limit, heating circuit 1"**

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

**1193.0 "Minimum flow temperature limit, heating circuit 2"**

| Setting | | Explanations |
|---|---|---|
| 20 °C | **20**<br>1 to 90 | Minimum flow temperature limit for the heating circuit<br>Minimum limit in the delivered condition 20 °C<br>Setting range limited by heat generator-specific parameters |

**1193.1 "Maximum flow temperature limit, heating circuit 2"**

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

**1194.0 "Minimum flow temperature limit, heating circuit 3"**

| Setting | | Explanations |
|---|---|---|
| 20 °C | **20**<br>1 to 90 | Minimum flow temperature limit for the heating circuit<br>Minimum limit in the delivered condition 20 °C<br>Setting range limited by heat generator-specific parameters |

**1194.1 "Maximum flow temperature limit, heating circuit 3"**

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

## Heating circuit 1, Heating circuit 2, Heating… (cont.)

**1395.0 "Heating limit: Economy function, outside temperature, heating circuit 1"**

| Setting | | Explanations |
|---|---|---|
| | | Heating circuit pump logic function (summer economy control): Heating circuit pump switches off when outside temperature 1 K above selected value. Heating circuit pump switches back on when outside temperature 1 K below selected value. |
| 25 °C | **25** | Delivered condition: Heating limit at outside temperature 25 °C |
| | 10 to 35 | Temperature limit adjustable from 10 to 35 °C in 1 °C increments |

**1396.0 "Heating limit: Economy function, outside temperature, heating circuit 2"**

| Setting | | Explanations |
|---|---|---|
| | | Heating circuit pump logic function (summer economy control): Heating circuit pump switches off when outside temperature 1 K above selected value. Heating circuit pump switches back on when outside temperature 1 K below selected value. |
| 25 °C | **25** | Delivered condition: Heating limit at outside temperature 25 °C |
| | 10 to 35 | Temperature limit adjustable from 10 to 35 °C in 1 °C increments |

**1397.0 "Heating limit: Economy function, outside temperature, heating circuit 3"**

| Setting | | Explanations |
|---|---|---|
| | | Heating circuit pump logic function (summer economy control): Heating circuit pump switches off when outside temperature 1 K above selected value. Heating circuit pump switches back on when outside temperature 1 K below selected value. |
| 25 °C | **25** | Delivered condition: Heating limit at outside temperature 25 °C |
| | 10 to 35 | Temperature limit adjustable from 10 to 35 °C in 1 °C increments |

## 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.

## Subscriber numbers of connected extensions (cont.)

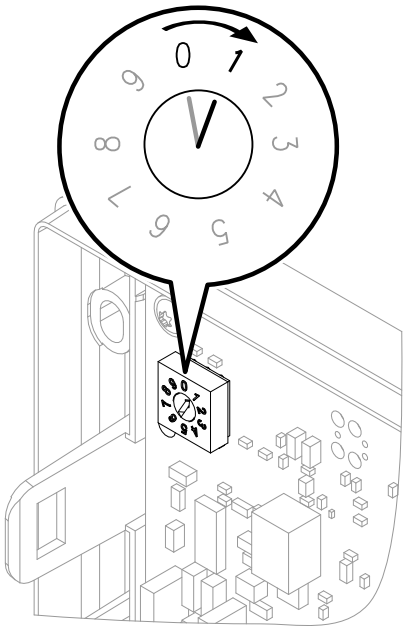


*Fig. 47*

Rotary switch S1 settings:
- EM-S1 extension (system with solar collectors): **0**
- EM-EA1 extension (max. 3 extensions in one system)
  Consecutive no. (any sequence): **1** up to **3**

- EM-P1 extension
  - If no heating circuits with 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
  - Heating circuit 3 with mixer: Rotary switch on extension kit to 2

***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 Rotary switch S1 |
|---|---|---|---|
| System with solar collectors | ADIO | EM-S1 | **0** |
| Heating circuit 2 with mixer | ADIO | EM-M1/EM-MX | **1** |
| Heating circuit 3 with mixer | ADIO | EM-M1/EM-MX | **2** |
| Heating circuit 1 without mixer (circulation pump downstream of low loss header) | ADIO | EM-P1 | **3** |
| Function extensions (e.g.):<br>▪ Fault message input | DIO | EM-EA1 | **1** |
| ▪ Fault message output | DIO | EM-EA1 | **2** |
| ▪ Operating mode changeover | DIO | EM-EA1 | **3** |





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## Service menu

### Calling up the service menu

**Tap the following buttons:**

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

2. Select the required menu section.

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

***Note***
*Tap "☰" to return to* ***"Service, main menu"***

**Service menu overview**

| **Service** | |
|---|---|
| Active messages | |
| Reset service messages | |
| Connect to app | |
| Diagnosis | |
| | General |
| | Heating circuit 1 |
| | Heating circuit 2 |
| | Heating circuit 3 |
| | DHW |
| | Solar |
| | WiFi |
| Actuator test | |
| System configuration | |
| Message history | |
| Basic settings | |
| | Factory settings |
| | Commissioning assistant |
| Appliances detected | |
| Exit trade fair mode | |

## 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** – press simultaneously for approx. 4 s, then release.

2. Use ∧/∨ to select **"Diagnosis"**.





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## Diagnosis (cont.)

3. **OK**
4. Use ∧/∨ to select the required group.
5. **OK**
6. Select the required information with ∧/∨.

## Checking outputs (actuator test)

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

**Tap the following buttons:**

1. ☰ and **OK** – press simultaneously for approx. 4 s, then release.
2. **"Actuator test"**
3. **OK**
4. **OK** to confirm the message.
5. Use ∧/∨ to select the required group.
6. **OK**
7. Use ∧/∨ to select the actuator. See the table below.
8. **OK**
9. ∧/∨ for the required value.
10. **OK**

    ***Note***
    *The function is active for 30 min.*
11. Use ☰ to end the Actuator test.

**The following actuator functions can be controlled subject to the system equipment level:**

| Display | | Explanation |
|---|---|---|
| **Boiler group** | | |
| Fan speed | Set value | Burner fan speed in rpm (rotations/minute) |
| Burner modulation, set value | ▪ Off<br>▪ Minimum heating output<br>▪ Maximum heating output<br>▪ Maximum DHW output | Modulation level (in accordance with specific heat generator settings) |
| 3-way valve target position | Heating | Diverter valve set to heating mode |
| | Middle | Diverter valve in central position (filling/draining) |
| | DHW | Diverter valve set to DHW heating |
| **Heating group** | | |
| Primary circuit pump speed | Set value | Internal circulation pump speed in % |
| 3-way valve target position | Heating | Diverter valve set to heating mode |
| | Middle | Diverter valve in central position (filling/draining) |
| | DHW | Diverter valve set to DHW heating |
| Heating circuit pump 1 speed | Set value | Speed, heating circuit pump, heating circuit 1 without mixer in % |
| Heating circuit pump 2 speed | Set value | Speed, heating circuit pump, heating circuit 2 with mixer in % |
| Heating circuit pump 3 speed | Set value | Speed, heating circuit pump, heating circuit 3 with mixer in % |

## Checking outputs (actuator test) (cont.)

| Display | | Explanation |
|---|---|---|
| Mixer, heating circuit 2 | Open | Output for "Mixer open" enabled (mixer extension kit) |
| | Stop | Current position is maintained |
| | Close | Output for "Mixer close" enabled |
| Mixer, heating circuit 3 | Open | Output for "Mixer open" enabled (mixer extension kit) |
| | Stop | Current position is maintained |
| | Close | Output for "Mixer close" enabled |
| **DHW group** (domestic hot water) | | |
| Primary circuit pump, set speed | Set value | Internal circulation pump in % |
| 3-way valve target position | Heating | Diverter valve set to heating mode |
| | Middle | Diverter valve in central position (filling/draining) |
| | DHW | Diverter valve set to DHW heating |
| Cylinder loading pump | On | |
| | Off | |
| DHW circulation pump | On | |
| | Off | |
| Transfer pump hygiene function | On | |
| | Off | |
| Circulation pump for cylinder heating | On | |
| | Off | |
| **Solar group** | | |
| Solar circuit pump, set speed | Set value | Speed, solar circuit pump in % |
| Transfer pump hygiene function | On | |
| | Off | |
| Solar circulation pump | On | |
| | Off | |
| Solar 3-way valve, target position | Open | |
| | Close | |
| | Stop | |

## Fault display on the programming unit

If there is a fault, the display shows **"Burner fault"** or **"Active messages"**.

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

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

### Calling up fault messages

**Tap the following buttons:**

1. "☰"
2. ∧/∨ for:
   - **"Details"** if burner faults are present
   - **"Active messages"** if further faults are present
3. **OK**
4. ∧/∨ for **"Error"** to display all fault messages.
5. **OK**
6. ∧/∨ for the required message
   For an explanation of the fault codes, see the following table.
7. **OK**
8. "☰" for **"Error"**
9. ∧/∨ to call up further messages

### Acknowledging the fault display

1. "☰"
2. ∧/∨ for **"Active messages"**
3. **OK**
4. ∧/∨ for **"Error"** to display all fault messages.
5. **OK**
6. ∧/∨ for **"Acknowledge"** to acknowledge all fault messages.

   ***Note***
   *Service messages are also acknowledged.*

***Note***
*Any connected central fault message facility is switched off.*
*If an acknowledged fault is not remedied, the fault message will be redisplayed the following day at 07:00 h, and the fault message facility restarts.*

### Calling up acknowledged fault messages

**Tap the following buttons:**

1. "☰"
2. ∧/∨ for **"Active messages"**.
3. **OK**
4. ∧/∨ for **"Error"**
5. **OK**

   ***Note***
   ***When troubleshooting, always observe the subscriber number of the component.***
   *Check the component displayed, rectify the fault if required. The subscriber number of the component depends on the rotary switch position of the corresponding extension module. The rotary switch position was set during installation.*
   *To identify the affected module, check the rotary switch position on the module if necessary.*

**The following is displayed:**
- Date and time of the occurrence of the fault
- Fault number





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## Fault display on the programming unit (cont.)

- Description of the fault
- Subscriber number of the component on which the fault has occurred:
  PlusBus subscriber components
  0 EM-S1 extension (ADIO electronics module)
  1 - 15 EM-M1, EM-MX and EM-P1 extensions (ADIO electronics module)
  17 - 31 EM-EA1 extension (DIO electronics module)
  32 - 47 Cylinder module, EM-M2, EM-S2 extensions (M2IO electronics module)
  49 - 63 Vitotrol 200-E
  64 SDIO/SM1A electronics module
  CAN BUS subscriber components
  1 HMU heat management unit
  50 BCU burner control unit
  58 RF module (wireless module)
  59 HMI programming unit
  60 Fan unit
  90 Gateway
  Low power radio subscriber components
  48 - 63 Vitotrol 300-E

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

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

**Tap the following buttons:**

1. ☰ and **OK** – press simultaneously for approx. 4 s, then release.
2. ∧/∨ for **"Message history"**
3. **OK**
4. Use ∧/∨ to select the required category.
   - **"Faults"** to call up saved fault messages.
   - **"Service messages"** to call up saved service messages.
     P.1 Interval until the next service
     P.8 Service due in burner hours run
   - **"Status"**, to call up the saved status messages.
     S.60 Summer mode active (exterior temperature savings function)
     S.74 Heating suppression, heating
     S.75 DHW circulation pump active
   - **"Warnings"** to call up saved warning messages.
     A.12 Real time clock battery flat
     Measure: Replace the battery of the HMU heat management unit.
     A.18 Possible condensate backup in the heat cell
     Measure: Check the combustion chamber and condensation drain.
     A.20 Service interval could not be activated.
     Measure: Check the time and date settings.
   - **"Information"**, to call up saved service information.
     I.56 External demand active
     I.57 External blocking active
     I.59 Parameters have been restored (parameter set was flashed to the BCU electronics module).
5. **OK**
6. ∧/∨ for the required message
7. **OK**

## Fault display on the programming unit (cont.)

### Deleting messages

1. ☰ and **OK** – press simultaneously for approx. 4 s, then release.
2. **"Message history"**
3. **OK**
4. Use ∧/∨ to select **"Delete messages"**.
5. **OK**
6. **OK** to confirm the message.

## Overview of electronics modules

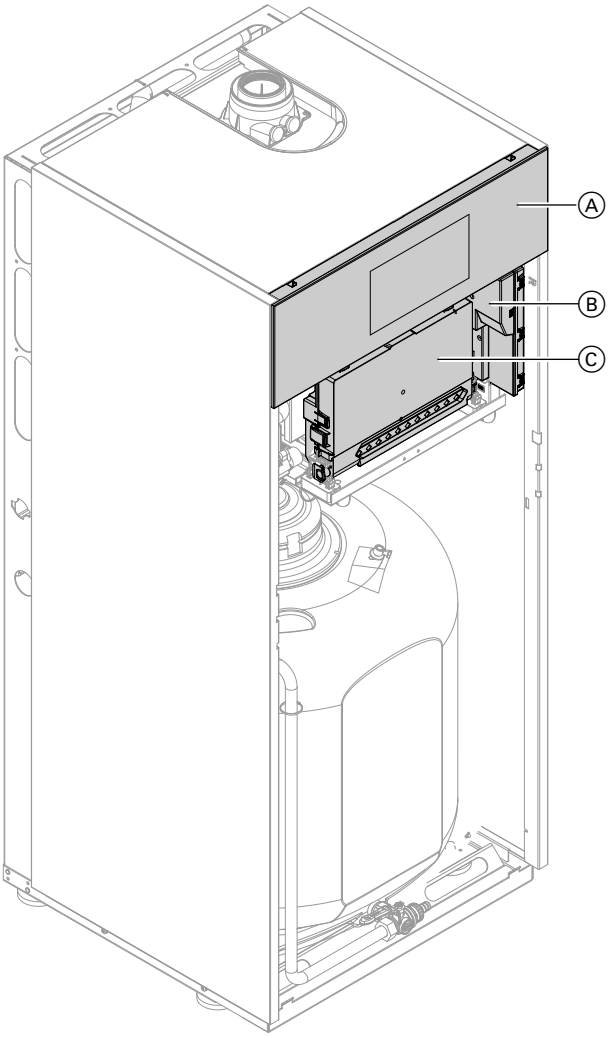


*Fig. 48*

Ⓐ HMI programming unit
Ⓑ BCU burner control unit
Ⓒ HMU heat management unit





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## Fault messages

| Fault number on the display | System characteristics | Cause | Measures |
|---|---|---|---|
| F.7 | No DHW heating | Lead break, cylinder temperature sensor | Check cylinder temperature sensor (see page 91). |
| F.8 | No DHW heating | Short circuit, cylinder temperature sensor | Check cylinder temperature sensor (see page 91). |
| F.9 | No DHW heating | Lead break, outlet temperature sensor DHW | Check DHW outlet temperature sensor (see page 91). |
| F.10 | No DHW heating | Short circuit, outlet temperature sensor DHW | Check DHW outlet temperature sensor (see page 91). |
| F.13 | Regulates as if the outside temperature were 0 °C. | Lead break, outside temperature sensor | Check outside temperature sensor (see page 91). |
| F.14 | Regulates as if the outside temperature were 0 °C. | Short circuit, outside temperature sensor | Check outside temperature sensor (see page 91). |
| F.29 | Regulates without flow temperature sensor (low loss header) | Lead break, low loss header sensor | Check the low loss header sensor. |
| F.30 | Regulates without flow temperature sensor (low loss header) | Short circuit, low loss header sensor | Check the low loss header sensor. |
| F.49 | Burner in a fault state | Flue gas temperature sensor disconnection | Check flue gas temperature sensor (see page 91).<br>Reset the appliance. |
| F.50 | Burner in a fault state | Short circuit, flue gas temperature sensor | Check flue gas temperature sensor (see page 91).<br>Reset the appliance. |
| F.55 | Burner in a fault state | Lead break, CO sensor | Check CO sensor.<br>Reset the appliance. |
| F.56 | Burner in a fault state | Short circuit, CO sensor | Check CO sensor.<br>Reset the appliance. |
| F.57 | Control mode without room influence | Lead break, room temperature sensor | Check external room temperature sensor of heating circuit or room temperature sensor of remote control unit. |
| F.58 | Control mode without room influence | Short circuit, room temperature sensor | Check external room temperature sensor of heating circuit or room temperature sensor of remote control unit. |
| F.59 | Burner locked out | Power supply, low voltage | Check the power supply. |
| F.62 | Burner in a fault state | High limit safety cut-out has responded. | Check heating system fill level.<br>Check circulation pump. Vent the system.<br>Reset the appliance. |
| F.63 | Burner in a fault state | Flue gas temperature limiter has responded. | Check heating system fill level.<br>Vent the system.<br>Reset the appliance once the flue system has cooled down. |

## Fault messages (cont.)

| Fault number on the display | System characteristics | Cause | Measures |
|---|---|---|---|
| F.67 | Burner in a fault state | Ionisation current lies outside the permissible range | Check gas supply (gas pressure and gas flow switch), gas train and connection line.<br><br>Check ionisation electrode for the following:<br>▪ Distance to burner gauze assembly (see page 43)<br>▪ Contamination on electrode<br><br>Reset the appliance. |
| F.68 | Burner in a fault state | Flame signal is already present at burner start. | Check ionisation electrode and connecting cable.<br>Reset the appliance. |
| F.69 | Burner in a fault state | Ionisation current lies outside the permissible range | Check ionisation electrode and connecting cable.<br>Reset the appliance. |
| F.70 | Burner in a fault state | Internal burner control unit fault | Reset the appliance. |
| F.71 | Burner in a fault state | Fan speed too low | Check fan for blockage.<br>Reset the appliance. |
| F.72 | Burner in a fault state | Fan idle state not reached | Check draught in flue system.<br>Check the fan.<br>Check the fan connecting cables.<br>Check the fan control.<br>Reset the appliance. |
| F.73 | Burner in a fault state | Internal communication error | Check CAN bus connection and cables.<br>Reset the appliance. |
| F.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. |
| F.77 | Burner in a fault state | Data memory burner control unit | Check software version. Flash new version if necessary.<br>Reset the appliance. |
| F.89 | No central heating and no DHW heating. | Internal pump blocked | Check pump and replace if necessary. |
| F.91 | Function of affected extension in emergency mode. | DIO electronics module communication error | Check connections on DIO electronics module and connection to HMU heat management unit. |
| F.92 | Function of affected extension in emergency mode | ADIO electronics module communication error | Check connections and cables between ADIO electronics module and HMU heat management unit. |
| F.93 | Function of affected extension in emergency mode. | M2IO electronics module communication error | Check connections on M2IO electronics module and connection to HMU heat management unit. |
| F.94 | Reheating suppression disabled. | SDIO/SM1A electronics module communication error | Check connections on SDIO/SM1A electronics module and connection to HMU heat management unit. |
| F.100 | Function of the connected electronics module in emergency mode | Voltage error PlusBus | Check the PlusBus connecting cable. |





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## Fault messages (cont.)

| Fault number on the display | System characteristics | Cause | Measures |
|---|---|---|---|
| F.104 | Depending on configuration of EM-EA1 extension (DIO electronics module) | External fault message input active | Check connected external device. |
| F.142 | Burner in a fault state | Communication error, fan unit | Check the fan unit connecting cable.<br>Reset the appliance. |
| F.160 | Control mode | No communication via CAN BUS to connected electronics modules | Check HMU heat management unit connections.<br>Reset the appliance. |
| F.161 | Burner in a fault state | Data memory access error | Turn the appliance off and on again.<br>Reset the appliance. |
| F.162 | Burner in a fault state | Processor low voltage | Turn the appliance off and on again.<br>Check the connecting cable.<br>Reset the appliance. |
| F.163 | Burner in a fault state | Memory access checksum error | Turn the appliance off and on again.<br>Reset the appliance. |
| F.182 | No DHW heating | Short circuit, outlet temperature sensor | Check outlet temperature sensor (see page 91). |
| F.183 | No DHW heating | Lead break, outlet temperature sensor | Check outlet temperature sensor (see page 91). |
| F.184 | Burner in a fault state | Short circuit, flow temperature sensor/high limit safety cut-out | Check flow temperature sensor/ high limit safety cut-out (see page 91).<br>Reset the appliance. |
| F.185 | Burner in a fault state | Lead break, flow temperature sensor/high limit safety cut-out | Check flow temperature sensor/ high limit safety cut-out (see page 91).<br>Reset the appliance. |
| F.299 | Wrong time | Real-time clock fault | Set the time. Check battery in HMU heat management unit. |
| F.342 | Burner in a fault state | Communication error, burner control unit BCU | Check the connecting cable to the BCU burner control unit.<br>Reset the appliance. |
| F.345 | Burner locked out | Temperature limiter has responded | Ensure adequate heat transfer. |

## Fault messages (cont.)

| Fault number on the display | System characteristics | Cause | Measures |
|---|---|---|---|
| F.346 | Burner in a fault state | Ionisation current calibration error | ▪ Check the gas supply pressure. Check gas train strainer on the inlet side for contamination.<br>▪ Check ionisation electrode for contamination. Check gap between ionisation electrode and burner gauze assembly (see page 43). Reset the appliance.<br>▪ Check flue system; remove flue gas recirculation if required.<br>▪ Check the connecting cable to the fan unit.<br>▪ Check impeller for ease of operation.<br>Reset the appliance. |
| F.348 | Burner in a fault state | Gas modulation valve | Check connecting cables to the gas train for damage.<br>Check the flue system for flue gas back pressure.<br>Check gas train.<br>Reset the appliance. |
| F.349 | Control mode<br>Burner is operating with a limited modulation range. | Air mass rate flow not detected correctly in fan unit. | Check mass flow sensor on the fan unit. Check the flue system for flue gas back pressure. |
| F.350 | Burner in a fault state | Ionisation voltage lies outside the permissible range | Check ionisation electrode and connecting cable.<br>Reset the appliance. |
| F.351 | Burner in a fault state | Ionisation current lies outside the permissible range | Check ionisation electrode and connecting cable.<br>Reset the appliance. |
| F.352 | Burner in a fault state | CO limit within appliance exceeded. | Check entire flue gas path for the following:<br>▪ Flue gas recirculation<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. |
| F.353 | Burner locked out | Insufficient gas supply, burner output reduced. | Check the gas supply.<br>Optically check input-side screen in the gas train for contamination.<br>Reset the appliance. |
| F.354 | Burner in a fault state | Gas modulation valve tolerance outside permissible range | Check connecting cables to the gas train for damage.<br>Check gas train.<br>Check the flue system for blockages or constrictions.<br>Reset the appliance. |

## Fault messages (cont.)

| Fault number on the display | System characteristics | Cause | Measures |
|---|---|---|---|
| F.355 | Burner in a fault state | Analogue signal reference check: Flame signal is already present at burner start. | Check system for condensate backup.<br><br>***Note***<br>*To prevent water damage, detach fan unit before removing the burner.*<br><br>Reset the appliance. |
| F.357 | Burner in a fault state | Insufficient gas supply | Check that the gas shut-off valve is open.<br>Optically check input-side screen in the gas train for contamination.<br>Test static gas pressure and gas flow pressure. Check that on-site gas line and gas flow switch are correctly sized.<br><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><br>Reset the appliance. |
| F.359 | Burner in a fault state | No ignition spark | Check connection cables and leads from ignition module and ignition electrode.<br>Check for a voltage of 230 V~ at the ignition module during the ignition phase<br>Check whether the ignition electrode insulation is damaged.<br>Reset the appliance. |
| F.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. |
| F.365 | Burner in a fault state | Relay contact gas valve feedback implausible | Reset the appliance. |
| F.366 | Burner in a fault state | Gas valve electricity supply does not turn off. | Reset the appliance. |

## Fault messages (cont.)

| Fault number on the display | System characteristics | Cause | Measures |
|---|---|---|---|
| F.367 | Burner in a fault state | Gas valve electricity supply does not turn off. | Reset the appliance. |
| F.368 | Burner locked out | Gas pressure switch fault. Forced ventilation time expired. | ▪ Check gas supply (gas pressure).<br>▪ If installed: Check gas pressure switch for correct function. If necessary, disconnect the gas pressure switch connector and check whether the burner starts. |
| F.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>▪ Distance to burner gauze assembly (see page 43)<br>▪ Contamination on electrode<br><br>Reset the appliance. |
| F.370 | Burner in a fault state | Fuel valve or modulation valve will not close. | Check the gas train, replace if necessary.<br>Reset the appliance. |
| F.371 | Burner in a fault state | Fan speed too low | Check the fan.<br>Check the fan connecting cables.<br>Check the fan power supply.<br>Reset the appliance. |

## Fault messages (cont.)

| Fault number on the display | System characteristics | Cause | Measures |
|---|---|---|---|
| F.372 | Burner in a fault state | Repeated flame loss during calibration | Check ionisation electrode and connecting cable. Check the plug-in connections.<br>Check flue system; remove flue gas recirculation if required.<br>Check system for condensate backup.<br>Visually inspect gas train inlet and strainer on the inlet side for contamination.<br><br>***Note***<br>*To prevent water damage, detach fan unit before removing 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><br>Reset the appliance. |
| F.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>Reset the appliance. |

## Fault messages (cont.)

| Fault number on the display | System characteristics | Cause | Measures |
|---|---|---|---|
| F.375 | Burner in a fault state | Performing ionisation current calibration: Calibration not performed. Minimum value or termination criterion not reached. | Check ionisation electrode and connecting cable. 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 train inlet and strainer on the inlet side for contamination.<br><br>***Note***<br>*To prevent water damage, detach fan unit before removing 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><br>Reset the appliance. |

## Fault messages (cont.)

| Fault number on the display | System characteristics | Cause | Measures |
|---|---|---|---|
| F.377 | Burner in a fault state | Post-processing ionisation current calibration: Stabilisation conditions for post-calibration not reached | Check ionisation electrode and connecting cable. 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 train inlet and strainer on the inlet side for contamination.<br><br>***Note***<br>*To prevent water damage, detach fan unit before removing 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><br>Reset the appliance. |
| F.378 | Burner in a fault state | Flame loss during stabilisation or operating phase | ▪ Check gas supply (gas pressure and gas flow switch).<br>▪ Check gas train.<br>▪ Check system for condensate backup.<br>***Note***<br>*To prevent water damage, detach fan unit before removing the burner.*<br>▪ Check ionisation electrode and connecting cable.<br><br>Check ignition:<br>▪ Connecting cables to ignition module and ignition electrode<br>▪ Ignition electrode clearance and contamination.<br>▪ Check ignition electrode for broken ceramic.<br><br>Reset the appliance. |

## Fault messages (cont.)

| Fault number on the display | System characteristics | Cause | Measures |
|---|---|---|---|
| F.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 for the following:<br>▪ Distance to burner gauze assembly (see page 43)<br>▪ Contamination on electrode<br><br>Reset the appliance. |
| F.381 | Burner in a fault state | Flame loss during stabilisation or 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 for the following:<br>▪ Distance to burner gauze assembly (see page 43)<br>▪ Contamination on electrode<br><br>Reset the appliance. |
| F.382 | Burner in a fault state | Error counter has exceeded limit. | Reset the appliance. |
| F.383 | Burner in a fault state | Gas valve does not close. | Check the gas train, replace if necessary.<br>Reset the appliance. |
| F.384 | Burner in a fault state | Gas valve does not close. | Check the gas train, replace if necessary.<br>Reset the appliance. |
| F.385 | Burner in a fault state | Short circuit, signal 1, ionisation current | Check ionisation electrode and connecting cable.<br>Reset the appliance. |
| F.386 | Burner in a fault state | Lead break, signal 1, ionisation current | Check ionisation electrode and connecting cable.<br>Reset the appliance. |
| F.387 | Burner in a fault state | Short circuit, signal 2, ionisation current | Check ionisation electrode and connecting cable.<br>Reset the appliance. |
| F.388 | Burner in a fault state | Lead break, signal 2, ionisation current | Check ionisation electrode and connecting cable.<br>Reset the appliance. |
| F.395 | Burner in a fault state | Short circuit, flame temperature signal 1 | Check ionisation electrode and connecting cable.<br>Reset the appliance. |
| F.396 | Burner in a fault state | Lead break, flame temperature signal 1 | Check ionisation electrode and connecting cable.<br>Reset the appliance. |
| F.399 | Burner in a fault state | Short circuit, ionisation voltage, signal 1 | Check ionisation electrode and connecting cable.<br>Reset the appliance. |

## Fault messages (cont.)

| Fault number on the display | System characteristics | Cause | Measures |
|---|---|---|---|
| F.400 | Burner in a fault state | Lead break, ionisation voltage, signal 1 | Check ionisation electrode and connecting cable.<br>Reset the appliance. |
| F.401 | Burner in a fault state | Short circuit, ionisation voltage, signal 2 | Check ionisation electrode and connecting cable.<br>Reset the appliance. |
| F.402 | Burner in a fault state | Lead break, ionisation voltage, signal 2 | Check ionisation electrode and connecting cable.<br>Reset the appliance. |
| F.403 | Burner in a fault state | Short circuit, dynamic ionisation current, signal 1 | Check ionisation electrode and connecting cable.<br>Reset the appliance. |
| F.404 | Burner in a fault state | Lead break, dynamic ionisation current, signal 1 | Check ionisation electrode and connecting cable.<br>Reset the appliance. |
| F.405 | Burner in a fault state | Short circuit, dynamic ionisation current, signal 2 | Check ionisation electrode and connecting cable.<br>Reset the appliance. |
| F.406 | Burner in a fault state | Lead break, dynamic ionisation current, signal 2 | Check ionisation electrode and connecting cable.<br>Reset the appliance. |
| F.407 | Burner in a fault state | Safety chain | Check heating system fill level.<br>Check circulation pump.<br>Vent the system.<br>Reset the appliance. |
| F.408 | Burner in a fault state | Gas valve monitoring relay 1 has responded. | Reset the appliance. |
| F.410 | Burner in a fault state | Internal error, processor, BCU burner control unit | Reset the appliance. |
| F.416 | Burner locked out | Flue gas temperature sensor incorrectly positioned | Fit flue gas temperature sensor correctly. See "Repairs". |
| F.417 | Burner in a fault state | Short circuit, 24 V power supply | Check connecting cable and supply voltage to the BCU burner control unit.<br>Reset the appliance. |
| F.418 | Burner locked out | Lead break, 24 V supply voltage | Check connecting cable and supply voltage to the BCU burner control unit.<br>Reset the appliance. |
| F.425 | System in control mode, calculation out of operation | Time synchronisation failed. | Set the time. If external time is used, check parameters 1504 and 508. |
| F.426 | Burner in a fault state | Short circuit, external unlock signal | Check the connection to the HMU heat management unit.<br>Reset the appliance. |
| F.427 | Burner in a fault state | Lead break, external unlock signal | Check the connection to the HMU heat management unit.<br>Reset the appliance. |
| F.428 | Control mode | Short circuit, air mass sensor, fan unit | Check connecting cable and plug-in connector. |
| F.429 | Control mode | Lead break, air mass sensor, fan unit | Check connecting cable and plug-in connector. |

## Fault messages (cont.)

| Fault number on the display | System characteristics | Cause | Measures |
|---|---|---|---|
| F.430 | Connection of automation modules not possible | Communication error gateway | Check gateway module connecting cable and power supply. |
| F.432 | Burner locked out if fault continues to occur | Short circuit, fan speed signal | Check ventilation air supply; clean if necessary. Check the fan and connecting cable. |
| F.433 | Burner locked out if fault continues to occur | Lead break, fan speed signal | Check ventilation air supply; clean if necessary. Check the fan and connecting cable. |
| F.440 | Burner locked out | Short circuit gas pressure switch on EM-EA1 extension (DIO electronics module) | Check gas pressure switch connection at EM-EA1 extension (DIO electronics module). |
| F.441 | Burner locked out | Lead break gas pressure switch on EM-EA1 extension (DIO electronics module) | Check gas pressure switch connection at EM-EA1 extension (DIO electronics module). |
| F.442 | Burner locked out | Short circuit signal, flue gas damper at EM-EA1 extension (DIO electronics module) | Check flue gas damper connection at EM-EA1 extension (DIO electronics module). |
| F.443 | Burner locked out | Lead break signal, flue gas damper connection at EM-EA1 extension (DIO electronics module) | Check flue gas damper connection at EM-EA1 extension (DIO electronics module). |
| F.444 | Burner locked out | Short circuit, LPG safety valve (solenoid valve) signal at EM-EA1 extension (DIO electronics module) | Check solenoid valve connection at EM-EA1 extension (DIO electronics module). |
| F.445 | Burner locked out | Lead break, LPG safety valve (solenoid valve) signal at EM-EA1 extension (DIO electronics module) | Check solenoid valve connection at EM-EA1 extension (DIO electronics module). |
| F.446 | Burner in a fault state | Deviation, flow temperature sensor/high limit safety cut-out, heat generator | Check the flow temperature sensor/high limit safety cut-out. See page 91.<br>Reset the appliance. |
| F.447 | Burner in a fault state | Deviation, ionisation voltage signal | Check ionisation electrode.<br>Reset the appliance. |
| F.448 | Burner in a fault state | Deviation, ionisation current signal | Check ionisation electrode.<br>Reset the appliance. |
| F.449 | Burner in a fault state | Error in scheduled program run monitoring | Reset the appliance. |
| F.450 | Burner in a fault state | Error in scheduled program run monitoring | Reset the appliance. |
| F.451 | Burner in a fault state | Error in scheduled program run monitoring | Reset the appliance. |
| F.452 | Burner in a fault state | Error in scheduled program run monitoring | Reset the appliance. |
| F.453 | Burner in a fault state | Synchronisation error, sequence | Reset the appliance. |
| F.454 | Burner in a fault state | Incorrect software version | Flash the correct software version for the burner control unit (BCU). |

## Fault messages (cont.)

| Fault number on the display | System characteristics | Cause | Measures |
|---|---|---|---|
| F.455 | Burner in a fault state | Error in logical program run monitoring | Reset the appliance. |
| F.456 | Burner in a fault state | System status at system start | Reset the appliance. |
| F.457 | Burner in a fault state | Fan blocked | Check free movement of the impeller. Replace the fan unit if required. Reset the appliance. |
| F.458 | Burner locked out | Internal error | Restart the heat generator. If necessary, reset the appliance. |
| F.461 | Burner in a fault state | Feedback signal of flue gas damper connection at EM-EA1 extension input (DIO electronics module) preventing burner start. | Check flue gas damper connection at EM-EA1 extension (DIO electronics module). Reset the appliance. |
| F.462 | Burner in a fault state | LPG safety valve (solenoid valve) at EM-EA1 extension does not open (DIO electronics module). | Check solenoid valve connection at EM-EA1 extension (DIO electronics module). Reset the appliance. |
| F.463 | Burner in a fault state | Ionisation current too low during calibration | Check ionisation electrode and connecting cable. Check plug-in connections for loose contacts.<br><br>Heat generator installation and service instructions<br><br>Check flue system; remove flue gas recirculation if required. 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.* |

## Fault messages (cont.)

| Fault number on the display | System characteristics | Cause | Measures |
|---|---|---|---|
| F.464 | Burner in a fault state | Ionisation current too low during calibration. Difference 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><br>***Note***<br>*To prevent water damage, detach fan unit before removing the burner.*<br><br>Replace burner control unit if fault is permanent.<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><br>Reset the appliance. |
| F.467 | Burner in a fault state | Gas supply insufficient during calibration | 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 train inlet and strainer on the inlet side for contamination.<br><br>***Note***<br>*Contamination from a brazed gas line, for example, can block up the gas train strainer on the inlet side.*<br><br>Reset the appliance. |

## Fault messages (cont.)

| Fault number on the display | System characteristics | Cause | Measures |
|---|---|---|---|
| F.468 | Burner in a fault state | Ionisation current too high during calibration | Check gap between ionisation electrode and burner gauze assembly.<br><br>Heat generator installation and service instructions<br><br>Check whether there is a lot of dust in the ventilation air (e.g. from construction work).<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.*<br><br>Reset the appliance. |
| F.471 | No heat demand | System pressure sensor not available | Check the system pressure sensor. |
| F.473 | No heat demand | HMU heat management unit communication error | Check connecting cable between burner control unit and HMU heat management unit. |
| F.474 | Burner in a fault state | Error in scheduled program run monitoring | Reset the appliance. |
| F.517 | Control mode, remote control unit not functioning | Communication error wired remote control Vitotrol | Check remote control unit connecting cable and setting. |
| F.527 | Burner locked out | Update parameters faulty or incomplete | Repeat BCU burner control unit flash operation. |
| F.528 | Burner locked out | Basic programming faulty or incomplete | Repeat BCU burner control unit flash operation. |
| F.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><br>***Note***<br>*To prevent water damage, detach fan unit before removing the burner.*<br><br>Reset the appliance. |
| F.542 | Mixer closes. Heating circuit pump is operational. | Lead break, flow temperature sensor, heating circuit 1 with mixer | Check flow temperature sensor TS1 on extension kit mixer (ADIO electronics module). See page 91. |

## Fault messages (cont.)

| Fault number on the display | System characteristics | Cause | Measures |
|---|---|---|---|
| F.543 | Mixer closes. Heating circuit pump is operational. | Short circuit, flow temperature sensor for heating circuit 1 with mixer | Check flow temperature sensor TS1 on extension kit mixer (ADIO electronics module). See page 91. |
| F.544 | Mixer closes. Heating circuit pump is operational. | Lead break, flow temperature sensor, heating circuit 2 with mixer | Check flow temperature sensor TS1 on extension kit mixer (ADIO electronics module). See page 91. |
| F.545 | Mixer closes. Heating circuit pump is operational. | Short circuit, flow temperature sensor for heating circuit 2 with mixer | Check flow temperature sensor TS1 on extension kit mixer (ADIO electronics module). See page 91. |
| F.546 | Mixer closes. Heating circuit pump is operational. | Lead break, flow temperature sensor, heating circuit 3 with mixer | Check flow temperature sensor TS1 on extension kit mixer (ADIO electronics module). See page 91. |
| F.547 | Mixer closes. Heating circuit pump is operational. | Short circuit, flow temperature sensor for heating circuit 3 with mixer | Check flow temperature sensor TS1 on extension kit mixer (ADIO electronics module). See page 91. |
| F.574 | Control mode without room influence | Room temperature sensor for heating circuit 1 not available | Check external room temperature sensor for heating circuit or room temperature sensor for remote control unit. |
| F.575 | Control mode without room influence | Lead break, room temperature sensor, heating circuit 1 | Check external room temperature sensor for heating circuit or room temperature sensor for remote control unit. |
| F.576 | Control mode without room influence | Short circuit, room temperature sensor, heating circuit 1 | Check external room temperature sensor for heating circuit or room temperature sensor for remote control unit. |
| F.577 | Control mode without room influence | Room temperature sensor for heating circuit 2 not available | Check external room temperature sensor for heating circuit or room temperature sensor for remote control unit. |
| F.578 | Control mode without room influence | Lead break, room temperature sensor, heating circuit 2 | Check external room temperature sensor for heating circuit or room temperature sensor for remote control unit. |
| F.579 | Control mode without room influence | Short circuit, room temperature sensor, heating circuit 2 | Check external room temperature sensor for heating circuit or room temperature sensor for remote control unit. |
| F.580 | Control mode without room influence | Room temperature sensor for heating circuit 3 not available | Check external room temperature sensor for heating circuit or room temperature sensor for remote control unit. |
| F.581 | Control mode without room influence | Lead break, room temperature sensor, heating circuit 3 | Check external room temperature sensor for heating circuit or room temperature sensor for remote control unit. |

## Fault messages (cont.)

| Fault number on the display | System characteristics | Cause | Measures |
|---|---|---|---|
| F.582 | Control mode without room influence | Short circuit, room temperature sensor, heating circuit 3 | Check external room temperature sensor for heating circuit or room temperature sensor for remote control unit. |
| F.682 | Burner in a fault state | Air mass flow rate sensor not installed | Install the correct fan.<br>Reset the appliance. |
| F.683 | Burner in a fault state | Air mass flow rate sensor faulty | Replace fan.<br>Reset the appliance. |
| F.684 | Burner in a fault state | Back draught safety device faulty | Check the back draught safety device and replace if necessary.<br>Reset the appliance. |

***Note***
*If subscriber faults occur,* ***"Fault, subscriber ..."*** *is displayed.*

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

## Repairs (cont.)

### Draining the boiler on the heating water side

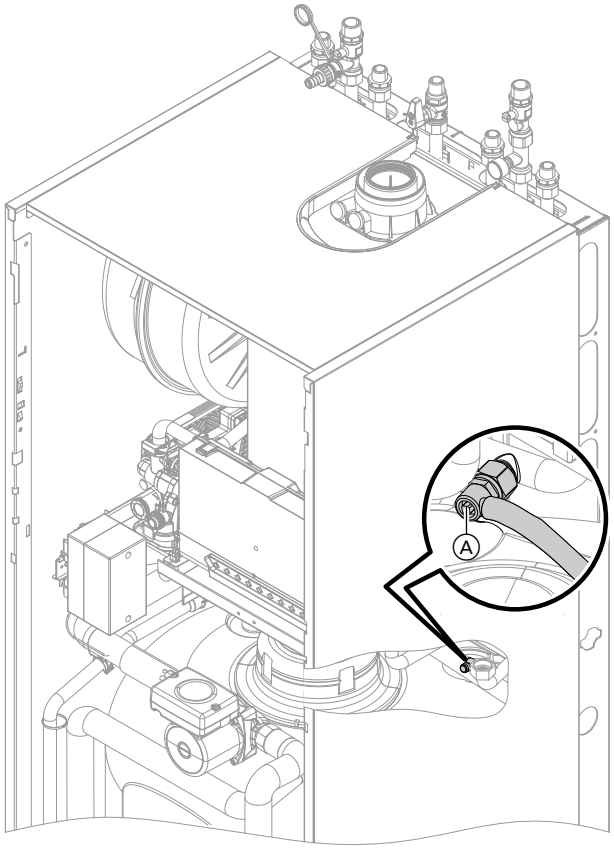



*Fig. 49*

1. Close the shut-off valves on the heating water side.
2. Connect hose to air vent valve Ⓐ and route it into a suitable container or drain outlet.
3. By means of an actuator test, move the 3-way valve to its centre position.
4. Open air vent valve Ⓐ and drain the boiler as much as required.

## Repairs (cont.)

### Checking the temperature sensors

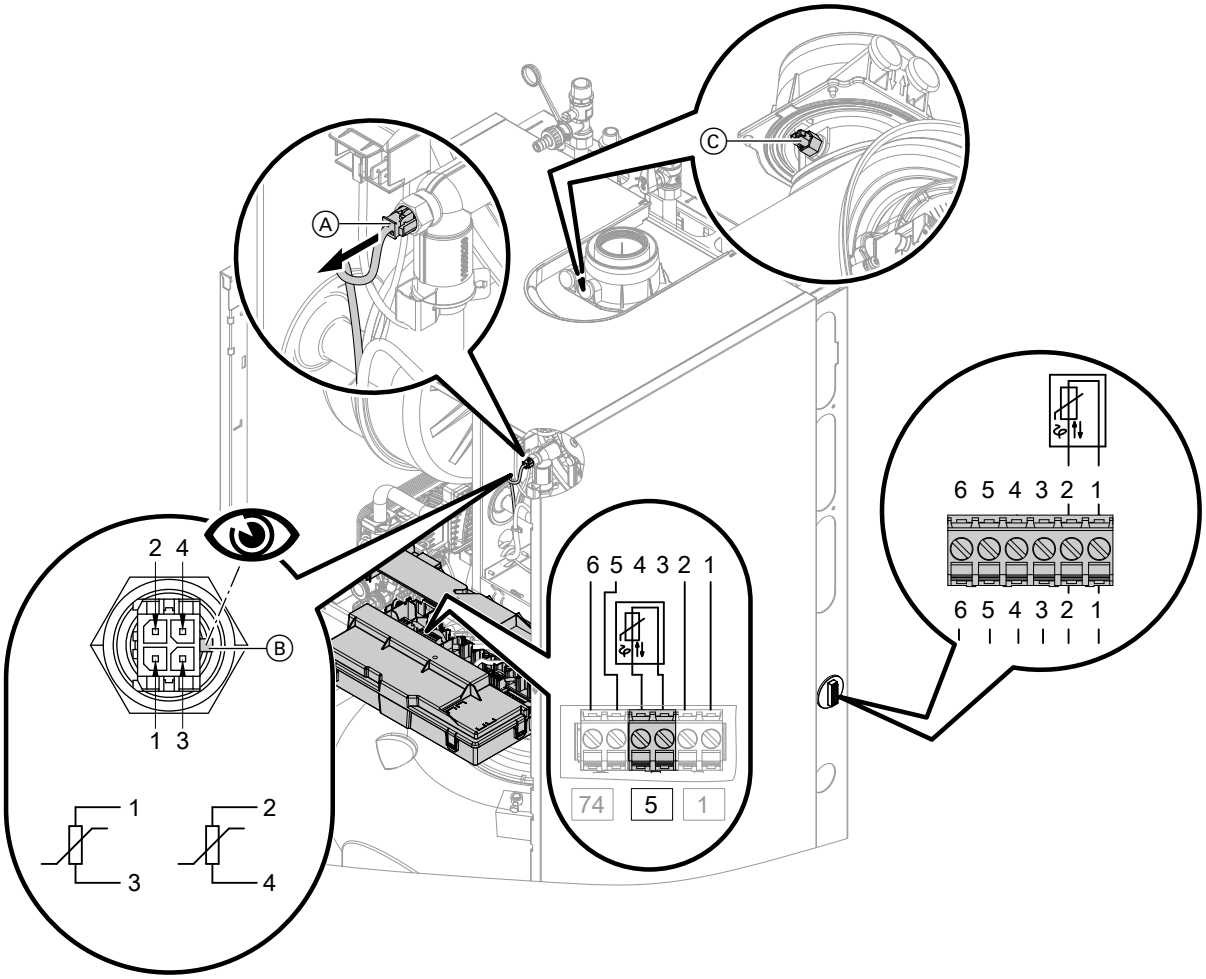



*Fig. 50*

**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.

## Repairs (cont.)

**Cylinder temperature sensor/outlet temperature sensor**

1. Check lead and plug of cylinder temperature sensor [5] or outlet temperature sensor [4].
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.

**Temperature sensor, low loss header**

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 1 and 2 from the external plug.
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.

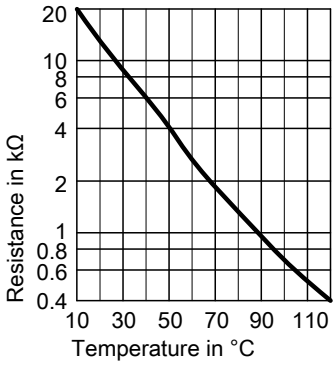
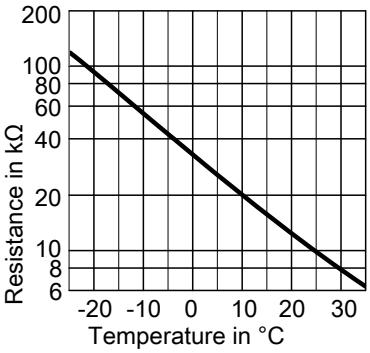
**Flue gas temperature sensor**

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**<br>▪ **Flow temperature sensor**<br>▪ **Cylinder temperature sensor**<br>▪ **Outlet temperature sensor**<br>▪ **Temperature sensor, low loss header** | ▪ **Outside temperature sensor** |
|  <br>*Sensor type: NTC 10 kΩ* |  <br>*Sensor type: NTC 10 kΩ* |

**Fault during commissioning (fault F.416)**

During commissioning, the control unit checks for correct placement of the flue gas temperature sensor. If fault message F.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 F.416 continues to be displayed although the flue gas temperature sensor has been correctly positioned: Initial commissioning may result in burner faults e.g. caused by air in the gas line. Eliminate the fault and unlock the device.*

## Information on replacing the HMU heat management unit and BCU burner control unit

If the burner control unit (BCU) is being replaced, commissioning is carried out with the "Service assistant" software tool.

Spare part installation instructions and **"www.service-assistent.info"**

## Repairs (cont.)

### Checking the plate heat exchanger

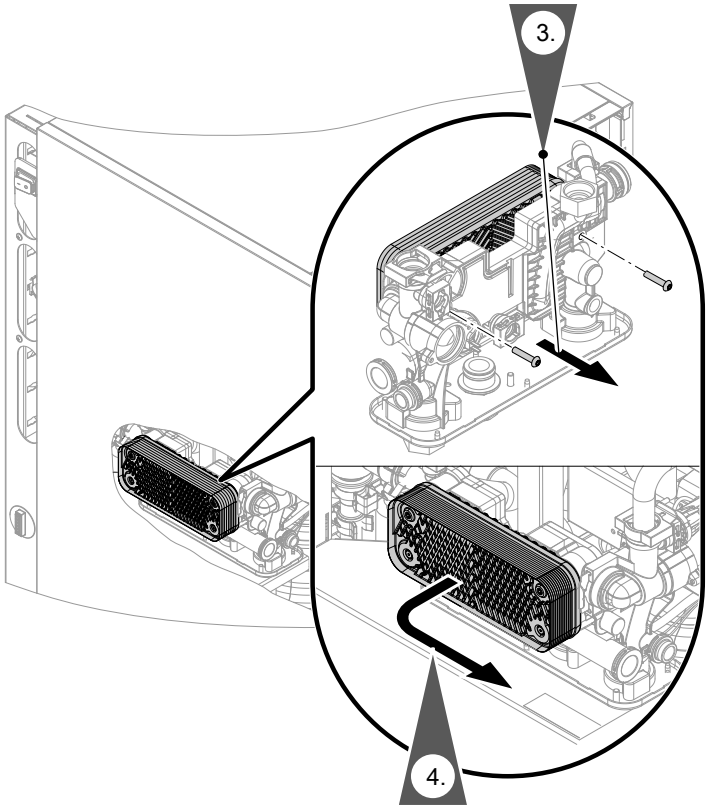



*Fig. 51*

1. Drain the boiler:
   - On the heating water side, see page 90
   - On the DHW side, see page 46
2. Move programming unit to maintenance position (see page 27).
3. Undo the fixing screws.
4. Detach the plate heat exchanger and remove towards the front.
5. Check the connections on the heating water and DHW sides for contamination and scaling; replace the plate heat exchanger if necessary.
6. Install in reverse order using new gaskets. Torque for fixing screws 3.2 Nm

## Repairs (cont.)

### Removing the hydraulic unit and return pipe

In case hydraulic unit components have to be replaced.

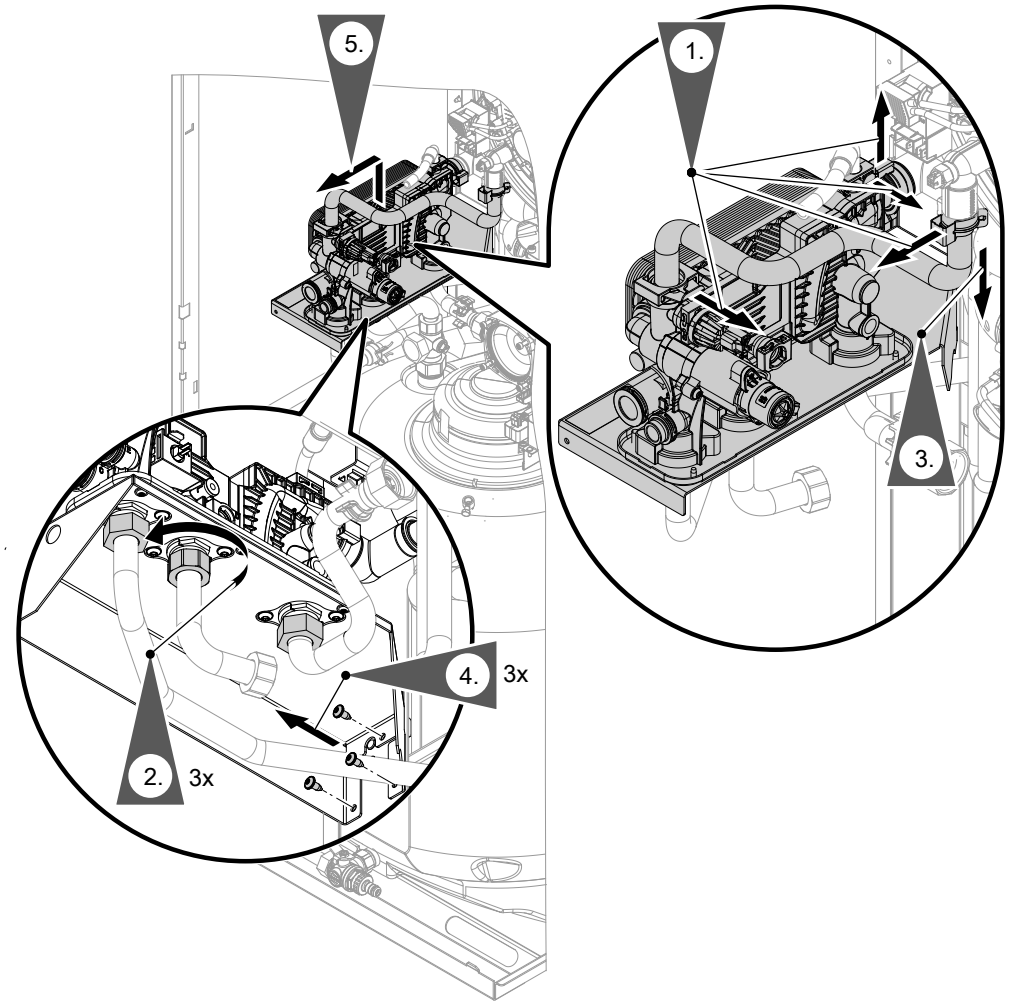



*Fig. 52*

## **Repairs** (cont.)

**Remove the return pipe:**

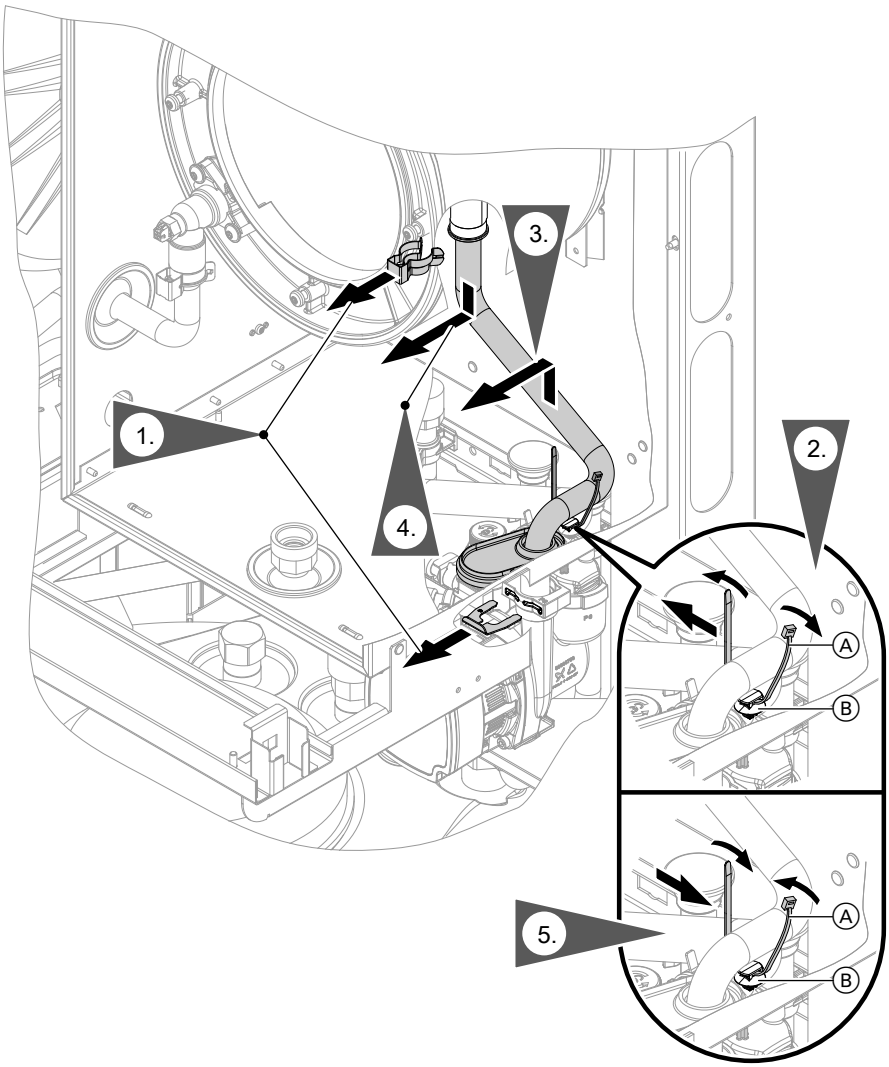



*Fig. 53*

***Note***
*After replacing the return pipe, use a new cable tie.*

### Replacing the power cable

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

## Repairs (cont.)

### Checking the fuse

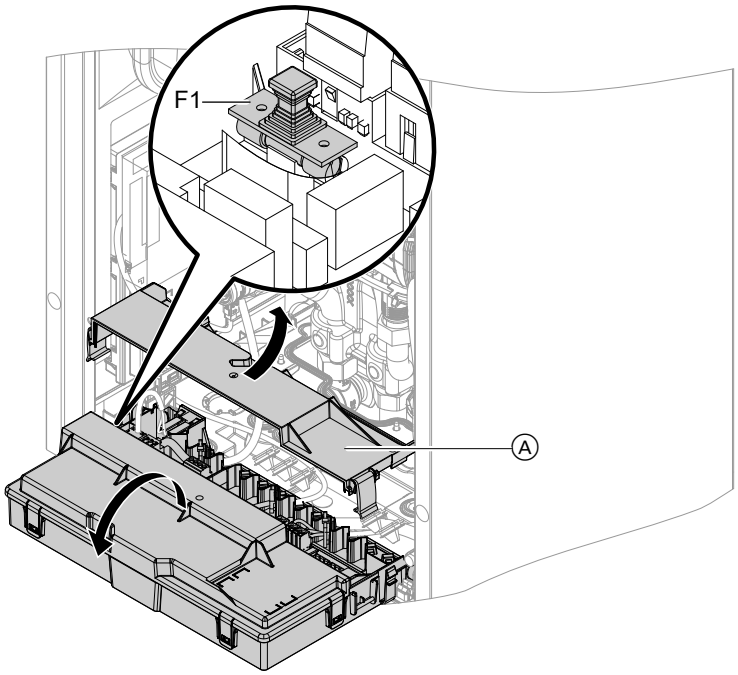



*Fig. 54*

1. Turn off the ON/OFF switch.
2. Depending on the configuration: Move programming unit together with bracket to service position.
3. Pivot the HMU 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.

## Control functions

### Heating mode

The control unit determines a set flow temperature for the heat generator, subject to the outside temperature or the room temperature and the slope/level of the heating curve.
The determined set flow temperature is transferred to the burner control unit. The burner control unit calculates the modulation level from the set and actual flow temperatures and regulates the burner accordingly.
The electronic temperature limiter inside the burner control unit limits the flow temperature.

**Heating circuit pump connection for heating circuit without mixer**

Only for systems with several heating circuits.

If a heating circuit without mixer is connected downstream of the low loss header, the circulation pump can be connected to output P2. The function of the output is set in the commissioning assistant.

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

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

### 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 diverter valve alternates between heating and DHW heating for a given 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 diverter valve is set to its central position, so the system can be filled completely. After the control unit has been switched on, the diverter valve no longer goes into its central position. If the system is to be filled with the control unit switched on, the diverter valve is moved in the filling program to its central position 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 outdoor temperature, the higher the flow temperature must be in order to reach the room temperature set point.

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.*

*The differential temperature can be adjusted using the following parameters:*
- *Heating circuit 2: Parameter 934.5*
- *Heating circuit 3: Parameter 935.5*
- *Heating circuit 4 (if installed): Parameter 936.5*

## Control functions (cont.)

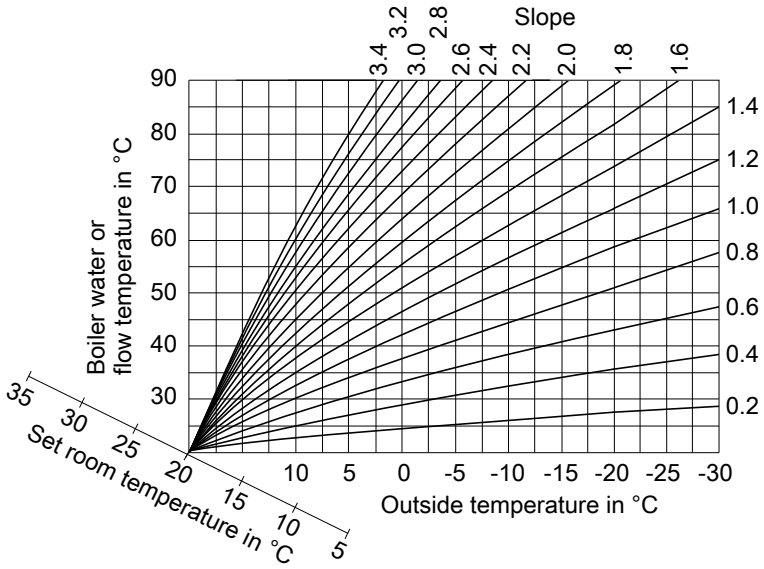



*Fig. 55*

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, heating circuit... setting.

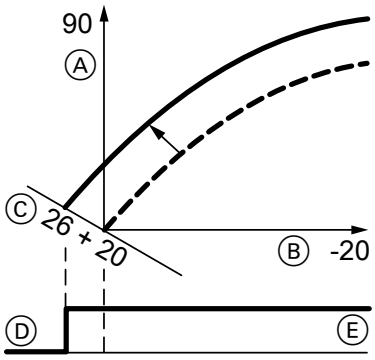



*Fig. 56 Example 1: Adjusting the set room temperature from 20 to 26 °C*

Ⓐ 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**

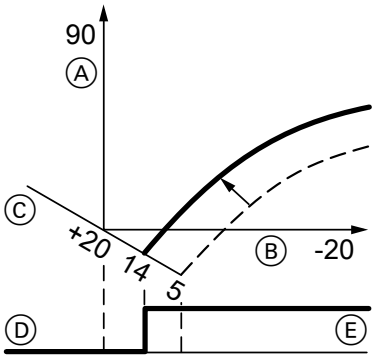



*Fig. 57 Example 2: Adjusting the reduced set room temperature from 5 °C to 14 °C*

Ⓐ 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

**Change curve and level**

Individually adjustable for each heating circuit.

## Control functions (cont.)

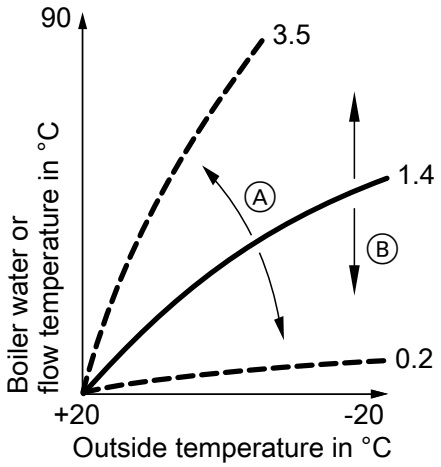



*Fig. 58*

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

**Raising the flow temperature of the heating circuits during operation with room temperature hook-up**

The higher the value, the greater the influence of the room temperature on the set flow temperature of the heating circuit.

**Room influence factor parameter**

| Heating circuit | Parameter |
|---|---|
| 1 (without mixer) | 933.7 (not assigned) |
| 2 (with mixer) | 934.7 |
| 3 (with mixer) | 935.7 |
| 4 (with mixer) | 936.7 |

Example for determining the increase in the flow temperature using the value of the heating curve when the actual room temperature deviates from the set room temperature:
- Set room temperature = 20.0 °C
- Actual room temperature = 18.0 °C
- Heating curve slope =1.4
- Room influence factor = 8 (delivered condition)

**Determining the increase in flow temperature**

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

## Screed drying

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

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

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

Different temperature profiles can be set via parameter 897.0.

***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 regulated in accordance with the selected parameters.

## Control functions (cont.)

**Parameter 897.0 "Screed drying":**

Temperature profile 1 (EN 1264-4)

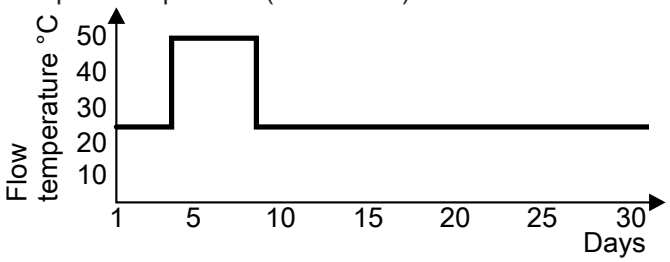



*Fig. 59*

Temperature profile 2 (ZV parquet and flooring technology)

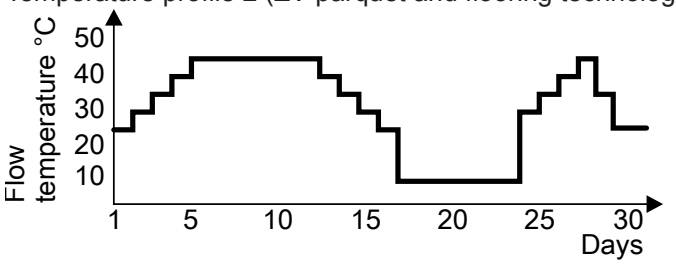



*Fig. 60*

Temperature profile 3

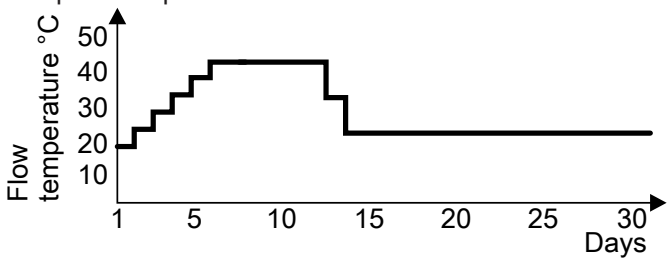



*Fig. 61*

Temperature profile 4

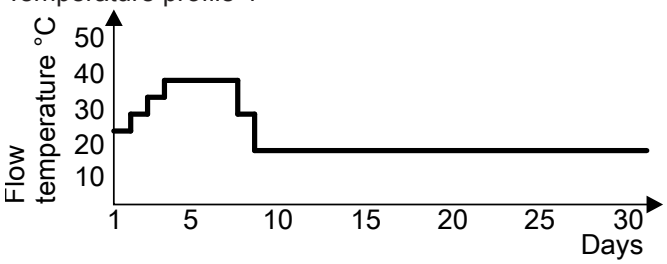



*Fig. 62*

Temperature profile 5

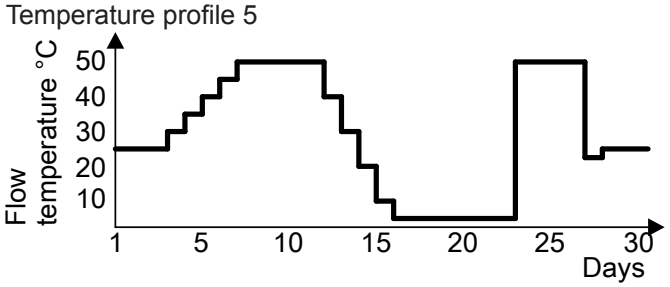



*Fig. 63*

## Control functions (cont.)

Temperature profile 6

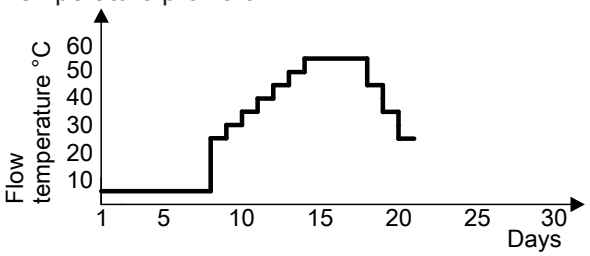



*Fig. 64 Ends after 21 days.*

### Raising the reduced room temperature

During operation at reduced room temperature, the reduced set room temperature can be automatically raised subject to the outside temperature. The temperature is raised in accordance with the selected heating curve, and no higher than the standard set room temperature or comfort room temperature. Depending on which set room temperature will become active in the next time phase.

The outside temperature limits for the start and end of temperature raising can be set in parameters 1139.0 and 1139.1.

Example using the settings in the delivered condition

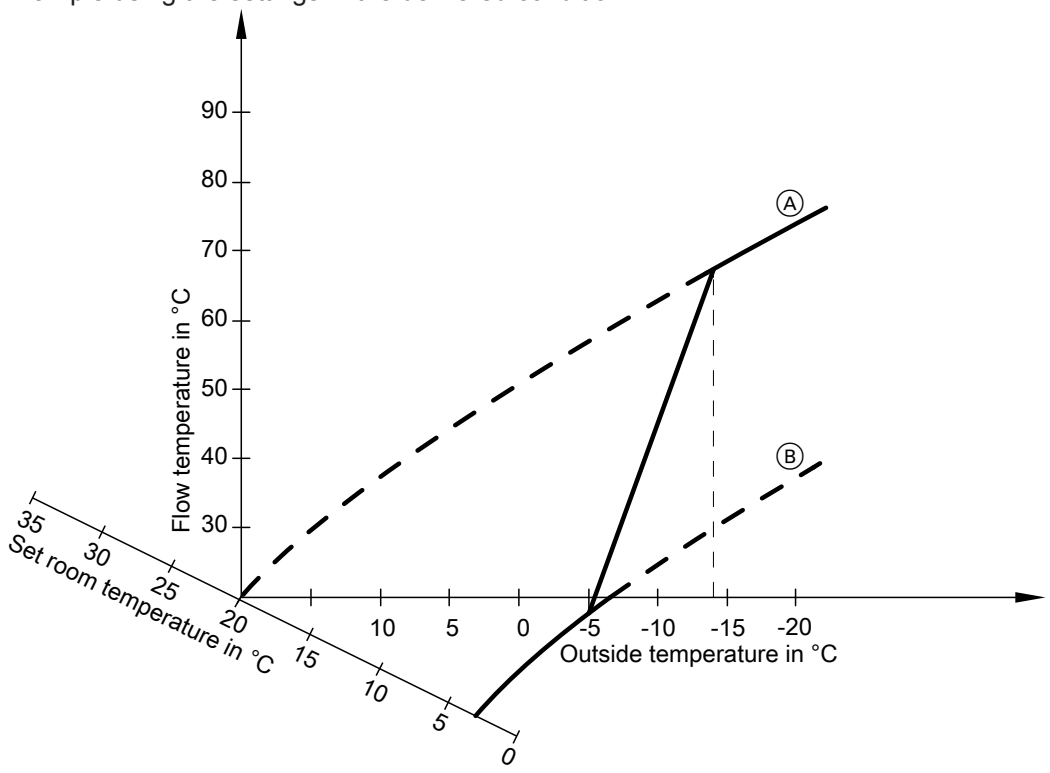



*Fig. 65*

Ⓐ Heating curve for operation at standard room temperature or comfort room temperature
Ⓑ Heating curve for operation at reduced room temperature

## Control functions (cont.)

### Reducing the heat-up time

During the transition from operation at reduced room temperature to operation at standard room temperature or comfort room temperature, the flow temperature will be raised in accordance with the selected heating curve.

Example

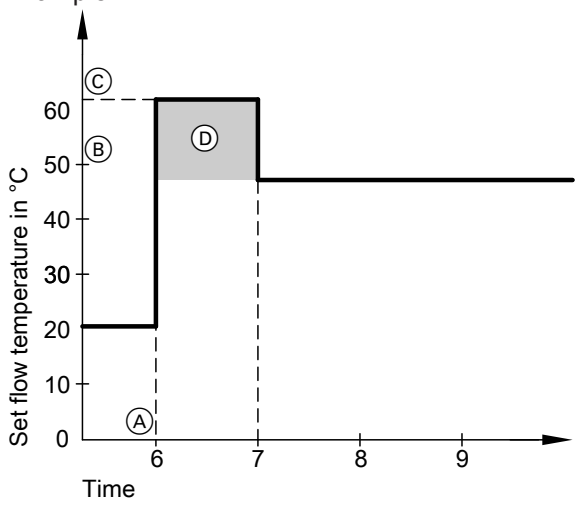



*Fig. 66*

Ⓐ Start of operation at standard room temperature or comfort room temperature
Ⓑ Set flow temperature in accordance with the set heating curve
Ⓒ Set flow temperature in accordance with parameter 424.3
Ⓓ Duration of operation with higher set flow temperature in accordance with parameter 424.4: 60 min

The value and duration of the additional increase in the set flow temperature is adjusted in parameters 424.3 and 424.4.

## DHW heating

### Heating the DHW loading cylinder from cold

The heating circuit pump is switched ON and the 3-way diverter valve will be changed over, if the cylinder temperature sensor captures a temperature lower than the defaulted set value.

- The cylinder loading pump is switched ON if the boiler water temperature ≥ set cylinder temperature.
- The burner is switched ON if the boiler water temperature ≤ set cylinder temperature, and the cylinder loading pump is switched ON when the required boiler water temperature is reached.

The loading cylinder is heated up to the set cylinder temperature. Heating stops when the specified temperature has been reached at the cylinder temperature sensor.

### Reheating when DHW is drawn off

When DHW is drawn off, cold water enters the lower section of the loading cylinder.
The heating circuit pump is switched ON and the 3-way diverter valve is changed over, if the cylinder temperature sensor captures a temperature lower than the defaulted set value.

- The cylinder loading pump is switched ON if the boiler water temperature ≥ set cylinder temperature.
- The burner is switched ON if the boiler water temperature ≤ set cylinder temperature, and the cylinder loading pump is switched ON when the required boiler water temperature is reached.

DHW is regulated to the set temperature via the outlet temperature sensor.

## DHW heating (cont.)

After the draw-off process has ended, the loading cylinder continues to be heated up until the set DHW temperature is reached at the cylinder temperature sensor.

### Increased DHW hygiene

The DHW can be heated to a specified (higher) set DHW temperature (approx. 70 °C) for a period of one hour.

**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.
If required, provide on-site scald protection measures.

## HMU heat management unit

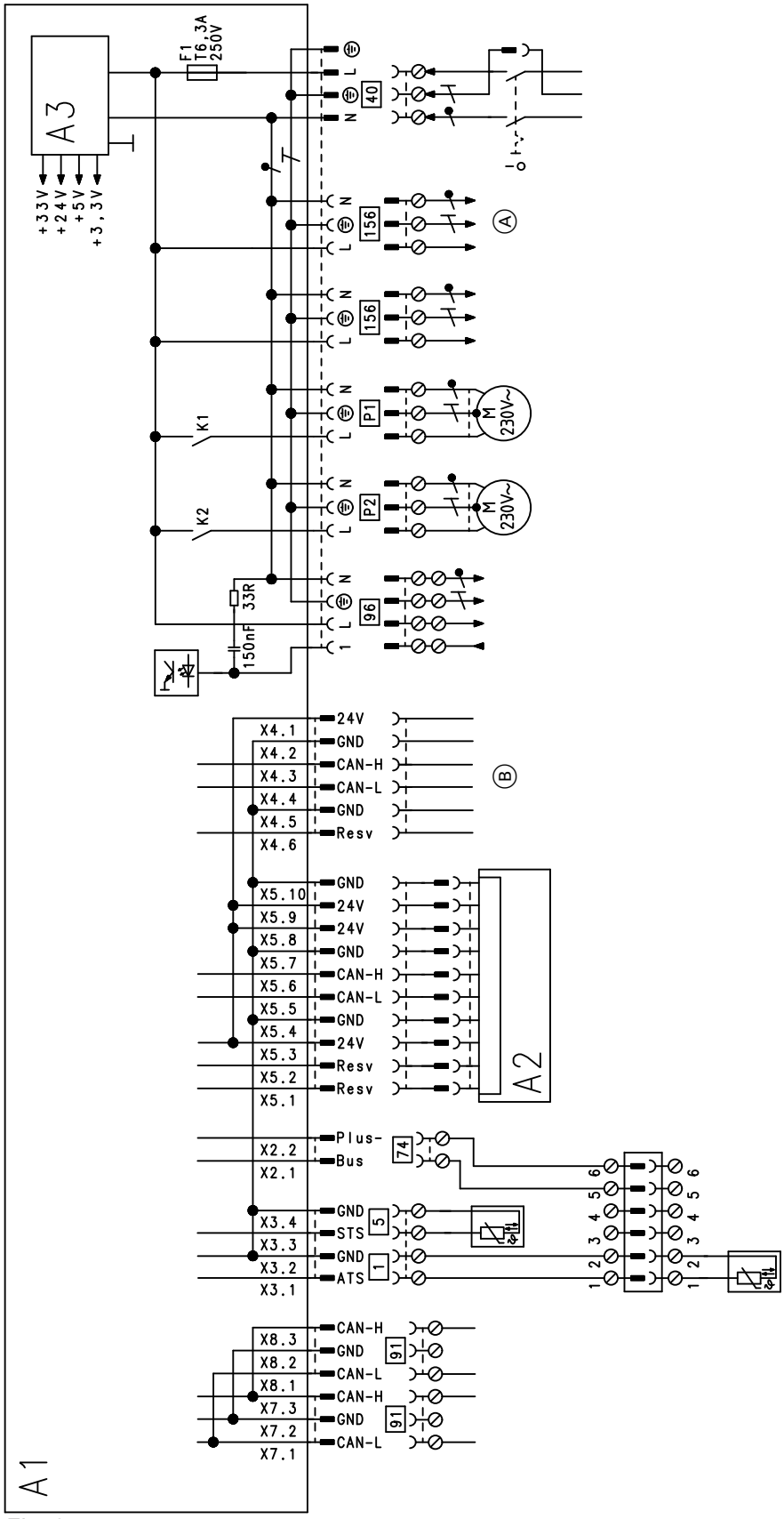



*Fig. 67*

A1 HMU heat management unit
A2 HMI programming unit with RF module (wireless module)
A3 Switching mode power supply
X... Electrical interfaces

1 Outside temperature sensor
5 Cylinder temperature sensor
40 Power supply
74 PlusBus
91 CAN bus

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## HMU heat management unit (cont.)



96 Floating input 230 V, output 230 V
156 Mains voltage output
P1 Cylinder loading pump
P2 Parametrisable output for:
- DHW circulation pump
  or
- Circulation pump for heating circuit without mixer

Ⓐ To BCU burner control unit
Ⓑ To BCU burner control unit

## BCU burner control unit

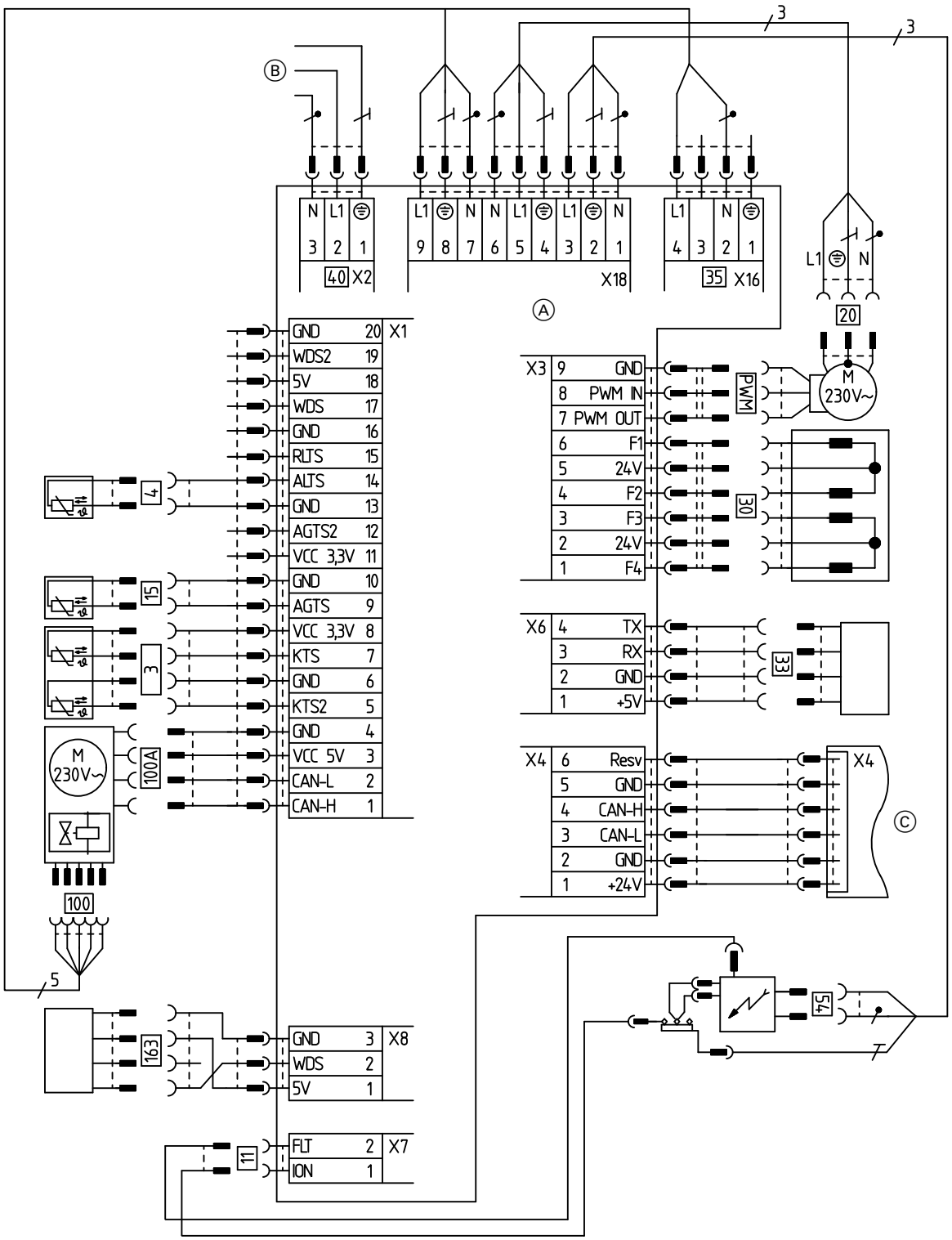


*Fig. 68*

| | | | |
|---|---|---|---|
| PWM | Control signal | 40 | Power supply |
| X... | Electrical interfaces | 54 | Ignition unit |
| 3 A/B | Flow temperature sensors 1 and 2 | 100 | Fan motor |
| 4 | Outlet temperature sensor | 100 A | Fan motor control |
| 11 | Ionisation electrode | 163 | Water pressure sensor |
| 15 | Flue gas temperature sensor | 163 A | Water pressure sensor |
| 20 | Internal circulation pump (primary pump) | Ⓐ | BCU burner control unit |
| 30 | 3-way diverter valve | Ⓑ | HMU heat management unit (plug 156) |
| 35 | Gas solenoid valve | Ⓒ | HMU heat management unit (plug X4) |

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## 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

| | | | | |
|---|---|---|---|---|
| **Rated heating output range (to EN 15502-1)** | | | | |
| **$T_F/T_R$ = 50/30 °C (P(50/30))** | | | | |
| **Natural gas** | **kW** | **1.9 - 19** | **1.9 - 25** | **1.9 - 32** |
| **LPG** | **kW** | **2.5 - 19** | **2.5 - 25** | **2.5 - 32** |
| **$T_F/T_R$ = 80/60 °C (Pn(80/60))** | | | | |
| **Natural gas** | **kW** | **1.7 - 17.4** | **1.7 - 22.9** | **1.7 - 29.3** |
| **LPG** | **kW** | **2.2 - 17.4** | **2.2 - 22.9** | **2.2 - 29.3** |
| **Rated heating output for DHW heating** | | | | |
| Natural gas | kW | 1.7 - 21.8 | 1.7 - 28.3 | 1.7 - 33.5 |
| LPG | kW | 2.2 - 21.8 | 2.2 - 28.3 | 2.2 - 33.5 |
| **Rated heat input (Qn)** | | | | |
| Natural gas | kW | 1.8 - 17.8 | 1.8 - 23.4 | 1.8 - 29.9 |
| LPG | kW | 2.3 - 17.8 | 2.3 - 23.4 | 2.3 - 29.9 |
| **Rated heat input for DHW heating (Qnw)** | kW | 22.7 | 29.5 | 34.9 |
| **Product ID** | | CE-0085CT0017 | | |
| **IP rating** | | | | |
| ▪ Room sealed operation | | IP X4 to EN 60529 | | |
| ▪ Open flue operation | | IP X0 to EN 60529 | | |
| **Protection class** | | I | | |
| **$NO_X$** | Category | 6 | 6 | 6 |
| **Gas supply pressure** | | See type plate | | |
| **Max. permissible gas supply pressure**[*1] | | See "Supply pressure" table (commissioning …) Page 36 | | |
| **Rated voltage** | V | 230 | | |
| Rated frequency | Hz | 50 | | |
| Appliance protection | A | 6.3 | | |
| Backup fuse (power supply) | A | 16 | | |
| **RF module** (integral) | | | | |
| WiFi frequency band | MHz | 2400 - 2483.5 | | |
| Max. transmitting power | dBm | 17 | | |
| Zigbee frequency band | MHz | 2400 - 2483.5 | | |
| Max. transmitting power | dBm | 10 | | |
| Supply voltage | V DC | 24 | | |
| Power consumption | W | 4 | | |
| **Power consumption** | | | | |
| ▪ In the delivered condition | W | 54 | 68 | 110 |
| **Permissible ambient temperature** | | | | |
| ▪ During operation | °C | +5 to +35 | | |
| ▪ During storage and transport | °C | -5 to +60 | | |
| **Electronic temperature limiter setting (TN)** | °C | 91 | | |
| **Setting of electronic temperature limiter** | °C | 110 | | |
| **Weight without heating water** | kg | 111.5 | | |
| **Permiss. operating pressure, heating water side (PMS)** | bar<br>MPa | 3<br>0.3 | 3<br>0.3 | 3<br>0.3 |
| **DHW heating** | | | | |
| Loading cylinder capacity | l | 100 | 100 | 100 |

[*1] *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.)

| | | | | |
|---|---|---|---|---|
| **Rated heating output range (to EN 15502-1)** | | | | |
| **$T_F/T_R$ = 50/30 °C (P(50/30))** | | | | |
| **Natural gas** | **kW** | **1.9 - 19** | **1.9 - 25** | **1.9 - 32** |
| **LPG** | **kW** | **2.5 - 19** | **2.5 - 25** | **2.5 - 32** |
| **$T_F/T_R$ = 80/60 °C (Pn(80/60))** | | | | |
| **Natural gas** | **kW** | **1.7 - 17.4** | **1.7 - 22.9** | **1.7 - 29.3** |
| **LPG** | **kW** | **2.2 - 17.4** | **2.2 - 22.9** | **2.2 - 29.3** |
| Permiss. operating pressure, DHW side (PWM) | bar<br>MPa | 10<br>1 | 10<br>1 | 10<br>1 |
| Specific flow rate | l/h | 20.26 | 23.84 | 25.87 |
| Max. DHW temperature | °C | 60 | 60 | 60 |
| **Dimensions** | | | | |
| Length | mm | 595 | 595 | 595 |
| Width | mm | 600 | 600 | 600 |
| Height | mm | 1400 | 1400 | 1400 |
| **Gas connection** | R | ¾ | ¾ | ¾ |
| **Flue gas connection** | Ø mm | 60 | 60 | 60 |
| **Ventilation air connection** | Ø mm | 100 | 100 | 100 |
| **Connection values**<br>relative to max. load | | | | |
| With gas | | | | |
| Natural gas E | $m^3/h$ | 2.40 | 3.12 | 3.69 |
| Natural gas LL | $m^3/h$ | 2.79 | 3.63 | 4.29 |
| LPG | kg/h | 1.76 | 2.29 | 2.71 |
| **Flue gas values** | | | | |
| Mass flow rate (for DHW heating) | | | | |
| ▪ Natural gas | g/s | 40.4 | 54.2 | 62.1 |
| ▪ LPG | g/s | 39.8 | 53.2 | 61.1 |
| Temperature (for DHW heating) | °C | 67 | 72 | 77 |
| Max. temperature | °C | 120 | 120 | 120 |

***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).*

**Type of flue system**

| Available in the following countries | Type of flue system |
|---|---|
| AE, AM, AT, BA, BG, BY, CH, CY, CZ, DK, EE, ES,FI, GB, GR, HR, HU, IE, IS, IT, KG, KZ, LI, LT, LU, LV, MT, NL, NO, PL, PT, RO, RS, RU, SE, SK, TR, UA | $B_{23}$, $B_{33}$, $C_{13}$, $C_{33}$, $C_{43}$, $C_{53}$, $C_{63}$, $C_{83}$, $C_{93}$ |
| BE | $B_{23}$, $B_{23P}$, $B_{33}$, $C_{13}$, $C_{33}$, $C_{43}$, $C_{53}$, $C_{83}$, $C_{83P}$, $C_{93}$ |
| DE, SI | $B_{23}$, $B_{33}$, $C_{13X}$, $C_{33X}$, $C_{43X}$, $C_{53X}$, $C_{63X}$, $C_{83X}$, $C_{93X}$ |
| FR | $B_{23}$, $B_{23P}$, $B_{33}$, $C_{13}$, $C_{33}$, $C_{43}$, $C_{53}$, $C_{63}$, $C_{83}$, $C_{83P}$ $C_{93}$ |

(cont.)

**Gas categories**

| Available in the following countries | Gas categories |
|---|---|
| AE, AT, AM, BA, BG, BY, CH, CZ, DK, EE, ES, FI, GB, GR, HR, IE, IS, IT, KG, KZ, LI, LT, LU, LV, MT, NO, PT, RO, RS, RU, SE, SI, SK, TR, UA | $II_{2N3P}/II_{2H3P}$ |
| AM, BY, KG, KZ, RU, UA | $I_{2N}/I_{2H}$ |
| BE | $I_{2N}$ |
| DE, FR | $II_{2N3P}$ |
| CY | $I_{3P}$ |
| FR, IT | $I_{2HM}$ |
| HU | $II_{2N3P}/II_{2HS3P}$ |
| NL | $II_{2EK3P}$ |
| PL | $II_{2N3P}/II_{2ELw3P}$ |



## 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.

## Final decommissioning and disposal

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

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

## Declaration of conformity

We, Viessmann Werke GmbH & Co. KG, D-35107 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 Werke GmbH & Co. KG, D-35107 Allendorf hereby declares that the radio equipment type of the named product is in compliance with Directive 2014/53/EU.

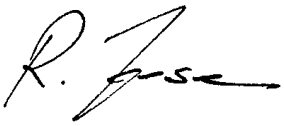
Using the serial number, the full Declaration of Conformity can be found on the following website:
**www.viessmann.co.uk/eu-conformity**

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

We, Viessmann Werke GmbH & Co. KG,
D-35107 Allendorf, confirm that the product
**Vitodens 222-F** complies with the $NO_x$ limits specified by the 1st BImSchV, paragraph 6 [Germany].

Allendorf, 1 February 2018

Viessmann Werke GmbH & Co. KG



Authorised signatory Reiner Jansen
Head of Strategic Quality Management

## Keyword index



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## Keyword index (cont.)


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