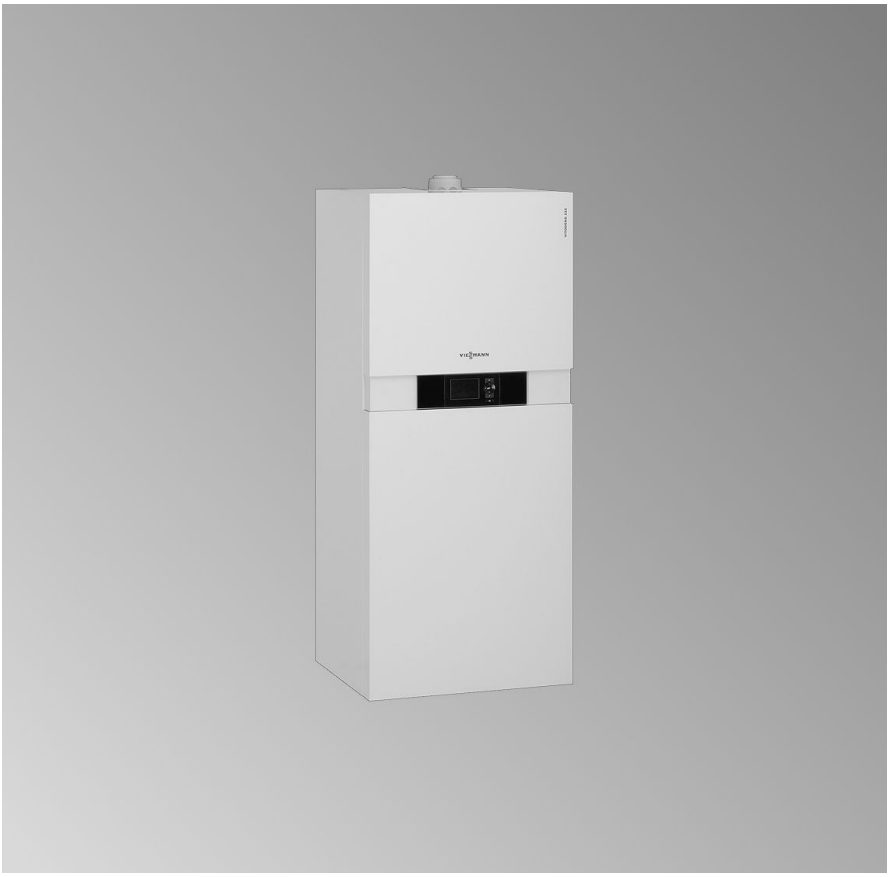
# Installation and service instructions

**for contractors**

**Vitodens 222-F**
**Type FS2A**
Compact gas condensing boiler
4.8 to 35 kW natural gas and LPG version

***For applicability, see the last page***

# VITODENS 222-F



5369 621 GB 10/2009

**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 designed for qualified personnel.
- Work on gas equipment must only be carried out by a qualified gas fitter.
- Work on electrical equipment must 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**

Observe the following when working on this system
- all legal instructions regarding the prevention of accidents,
- all legal instructions regarding environmental protection,
- the Code of Practice of relevant trade associations,
- all current safety regulations as defined by DIN, EN, DVGW, TRGI, TRF, VDE and all locally applicable standards,
- Gas Safety (Installation & Use) Regulations
  - the appropriate Building Regulation either the Building regulations, the Building Regulation (Scotland), Building Regulations (Northern Ireland),
  - the Water Fittings Regulation or Water Bylaws in Scotland,
  - the current I.E.E. Wiring Regulations.

**If you smell gas**

**Danger**
Escaping gas can lead to explosions which may result in serious injury.
- Never 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.
- Remove all people from the danger zone.
- Notify your gas or electricity supplier from outside the building.
- Shut off the electricity supply to the building from a safe place (outside the building).

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## Safety instructions (cont.)

### If you smell flue gas

**Danger**
Flue gas can lead to life-threatening poisoning.
- Shut down the heating system.
- Ventilate the boiler room.
- Close all doors leading to the living space.

### Working on the system

- When using gas as fuel, also close the main gas shut-off valve and safeguard against unauthorised reopening.
- Isolate the system from the power supply and check that it is no longer 'live', e.g. by removing a separate fuse or by means of a main isolator.
- Safeguard the system against unauthorised reconnection.

**Please note**
Electronic modules can be damaged by electro-static discharges.
Touch earthed objects, such as heating or water pipes, to discharge static loads.

### Repair work

**Please note**
Repairing components which fulfil a safety function can compromise the safe operation of your heating system.
Replace faulty components only with original Viessmann spare parts.

### Ancillary components, spare and wearing parts

**Please note**
Spare and wearing parts which have not been tested together with the heating system can compromise its function. Installing non-authorised components and non-approved modifications/conversion can compromise safety and may invalidate our warranty.
For replacements, use only original spare parts from Viessmann or those which are approved by Viessmann.

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## Product information

**Vitodens 222-F, FS2A**

Set up for operation with natural gas E and LL.
For conversion to LPG P (without conversion kit), see page 29.
The Vitodens 222-F should generally only be delivered to those countries specified on the type plate. For deliveries to alternative countries, an approved contractor, on his own initiative, must arrange individual approval in accordance with the law of the land.

## Preparing for installation

### Preparing the boiler installation

Use a connection set, available as an accessory, to make the connection on the gas and water sides. The following overview shows sample connection sets for installation on finished walls to the top or side.

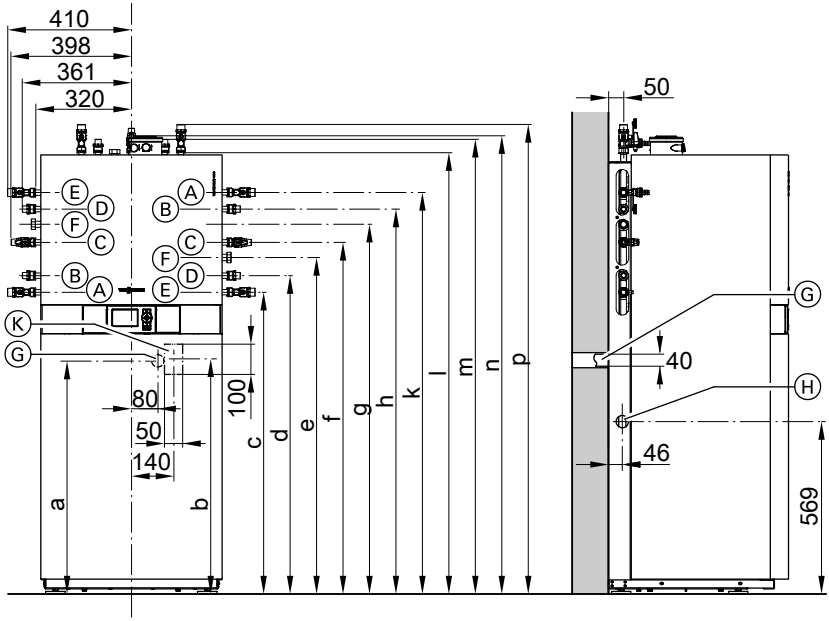
! **Please note**
To prevent equipment damage,
install all pipework free of load and torque stresses.

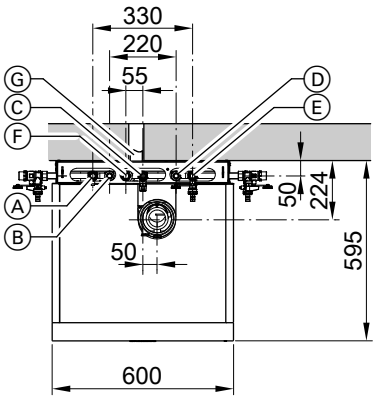
Preparing the connections on site:



Connection set installation instructions

## Preparing for installation (cont.)




- Ⓐ Heating flow R ¾"
- Ⓑ DHW R ½"
- Ⓒ Gas connection R ¾"
- Ⓓ Cold water R ½"
- Ⓔ Heating return R ¾"
- Ⓕ DHW circulation R ½" (separate accessory)
- Ⓖ Condensate drain to the back into the wall
- Ⓗ Side condensate drain
- Ⓚ Cable entry

| Rated output range | 4.8 to 19 kW | 6.5 to 26 kW | 8.8 to 35 kW |
|---|---|---|---|
| a (mm) | 745 | 745 | 945 |
| b (mm) | 750 | 750 | 950 |

## Preparing for installation (cont.)

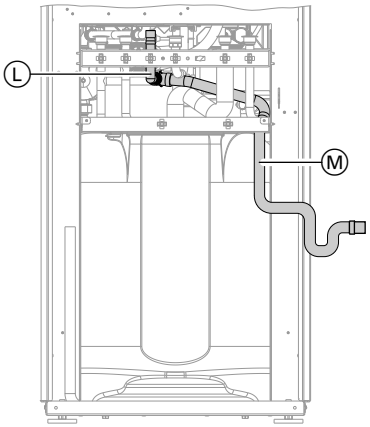
| Rated output range | 4.8 to 19 kW | 6.5 to 26 kW | 8.8 to 35 kW |
|---|---|---|---|
| c (mm) | 972 | 972 | 1172 |
| d (mm) | 1027 | 1027 | 1227 |
| e (mm) | 1082 | 1082 | 1302 |
| f (mm) | 1137 | 1137 | 1337 |
| g (mm) | 1191 | 1191 | 1391 |
| h (mm) | 1247 | 1247 | 1447 |
| k (mm) | 1302 | 1302 | 1562 |
| l (mm) | 1437 | 1437 | 1637 |
| m (mm) | 1466 | 1466 | 1666 |
| n (mm) | 1465 | 1465 | 1665 |
| p (mm) | 1526 | 1526 | 1726 |

***Note***
*The adjustable feet give all height measurements a tolerance of +15 mm.*

**1.** Prepare the heating water connections.
Flush the heating system thoroughly.

***Note***
*Should an additional diaphragm expansion vessel be required on site, connect that vessel into the heating return.*

## Preparing for installation (cont.)




**2.** Prepare the DHW connections.
Install the safety assembly (accessory or on-site provision) in accordance with DIN 1988 in the cold water line (see page 10).
Recommendation:
Install the safety valve above the DHW cylinder to protect it against contamination, scaling and high temperatures.
Connect the drain hose to condensate collector Ⓛ. Remove plug from condensate collector.

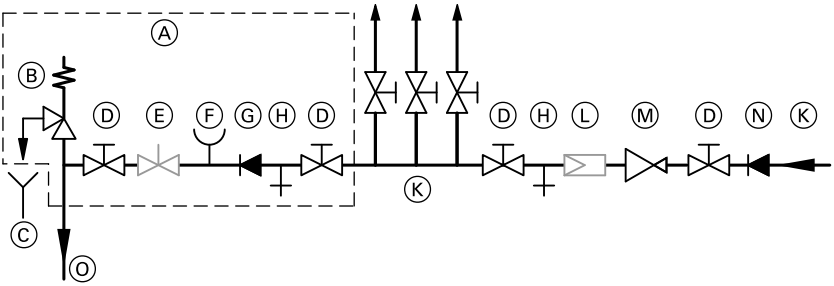
**3.** Route condensate hose Ⓜ to the back (drain in wall Ⓖ) or to the side aperture Ⓗ (see page 6).
Route condensate hose with a U-bend and connect to on-site drain line or siphon.

**4.** Prepare the gas connection according to TRGI or TRF or all local regulations.

**5.** Prepare the electrical connections.
- Power supply cable: NYM-J 3 x 1.5 $mm^2$, fuse max. 16 A, 230 V/50 Hz.
- Accessory cables: NYM with the required number of conductors for the external connections.
- Allow all cables in area "Ⓚ" (see page 7) to protrude 2000 mm from the wall.

## Preparing for installation (cont.)

**Safety assembly to DIN 1988**

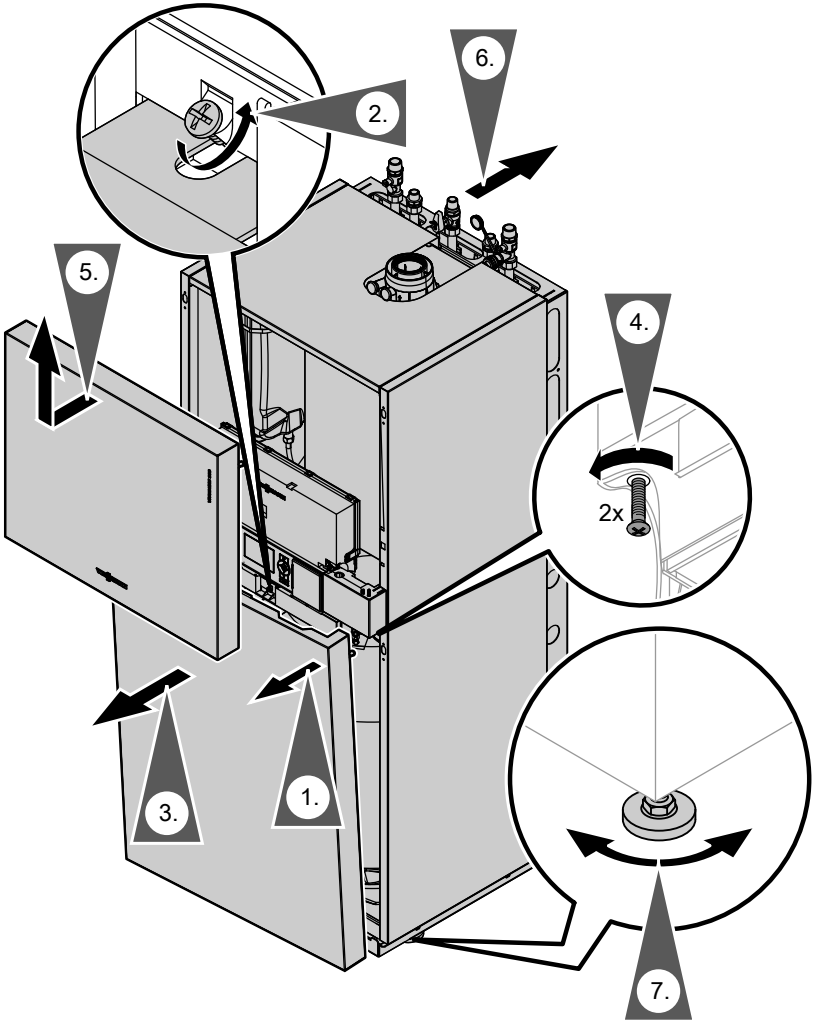



Ⓐ Safety assembly to DIN 1988 (accessory to connection sets for unfinished walls)
Ⓑ Safety valve
Ⓒ Visible blow-off line outlet
Ⓓ Shut-off valve
Ⓔ Flow regulating valve (installation recommended)
Ⓕ Pressure gauge connection
Ⓖ Non-return valve
Ⓗ Drain
Ⓚ Cold water
Ⓛ Drinking water filter
Ⓜ Pressure reducer to DIN 1988-2, issue Dec. 1988
Ⓝ Non-return valve/pipe separator
Ⓞ Cold water connection at connection set (accessory)

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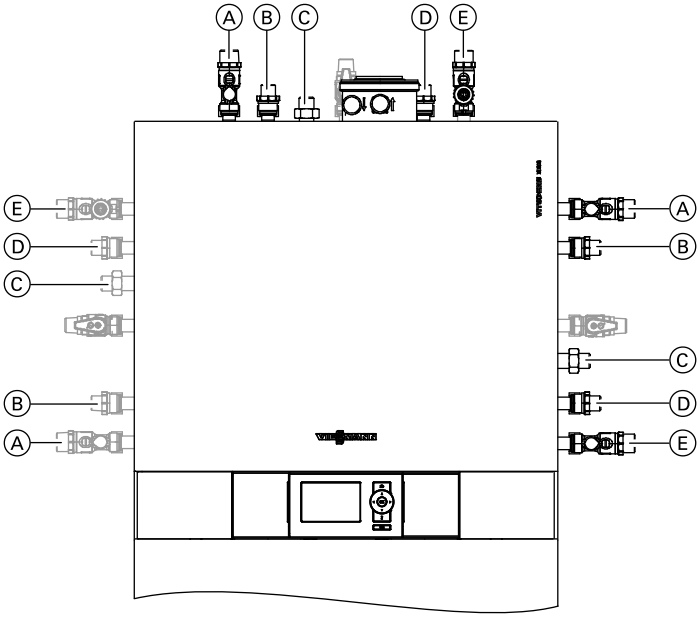
## Installing the boiler

### Assembling the boiler



## Installing the boiler (cont.)

### Connections on the heating water and the DHW side




Shown with connection sets for finished walls (accessories)

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

**DHW connection**

The DHW expansion vessel, available as an accessory, is installed in the cold water supply inside the boiler.

Separate installation instructions

**DHW circulation connection**

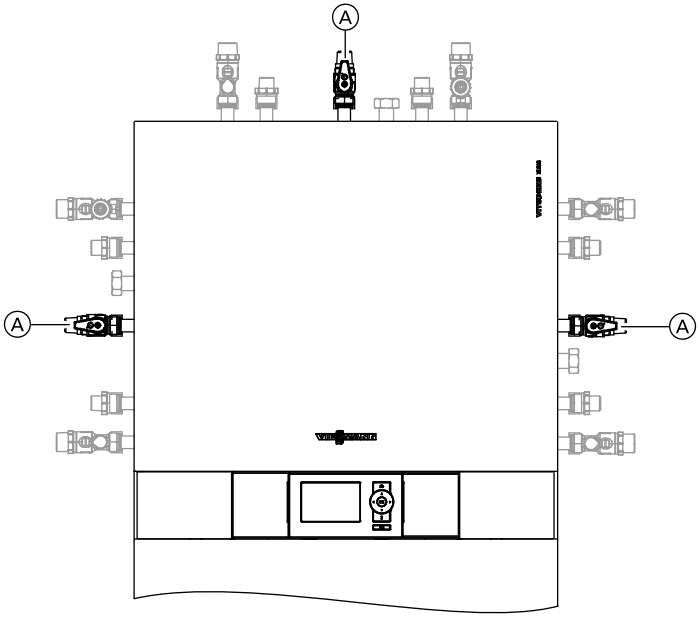
**DHW circulation connection with DHW circulation pump connection set (accessory)**

Separate installation instructions

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## Installing the boiler (cont.)

### Gas connection




***Notes regarding operation with LPG.***
*We recommend the installation of an external safety solenoid valve when installing the boiler in rooms below ground level.*

1. Secure gas shut-off valve Ⓐ at the gas connection.
2. Carry out a tightness test.

   ***Note***
   *For the tightness test, use only suitable and approved leak detecting agents (EN 14291) and devices. Leak detecting agents with unsuitable constituents (e.g. nitrides, sulphides) can lead to material damage.*
   *Remove residues of the leak detecting agent after testing.*

## Installing the boiler (cont.)

**!** **Please note**
Excessive test pressure may damage the boiler and the gas valve.
Max. test pressure 150 mbar. Where higher pressure is required for tightness tests, separate the boiler and the gas valves from the gas supply pipe (undo the fitting).

**3.** Vent the gas line.

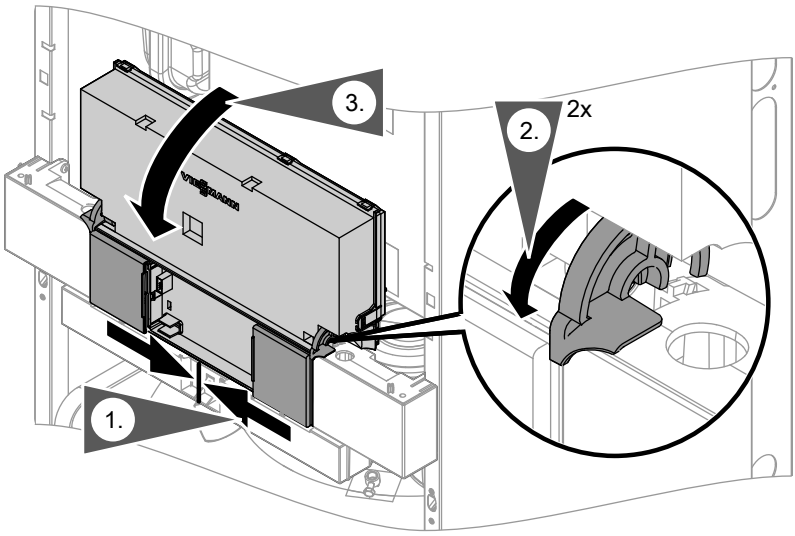
For conversion to a different gas type see page 29

### Flue gas connection

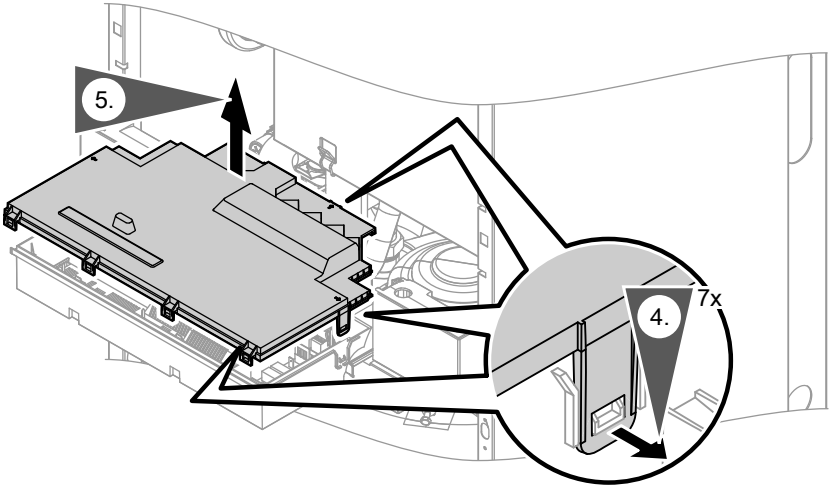
Connect the balanced flue.

Flue gas system installation instructions.

## Opening the control unit casing



## Opening the control unit casing (cont.)

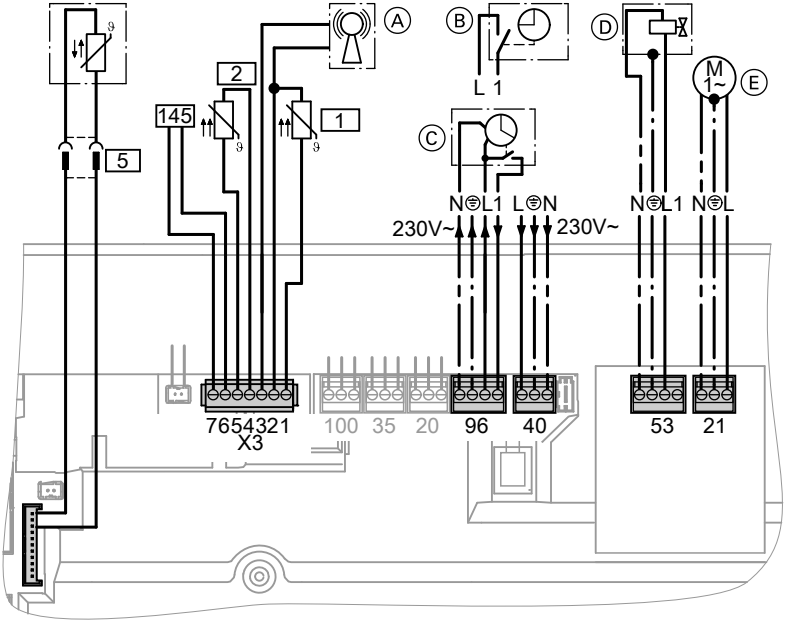



## Electrical connections

**Information regarding the connection of accessories**
For the connection, observe the separate installation instructions provided with the accessory components.

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

## Electrical connections (cont.)




Ⓐ Radio clock receiver
Ⓑ Vitotrol 100 UTD (only for constant temperature control units)
Ⓒ Vitotrol 100 UTA (only for constant temperature control units)
or
Vitotrol 100 UTD-RF wireless receiver (only for constant temperature control units)

**Plug 230 V~**

21 Cylinder primary pump Ⓔ (fitted and connected)

40 Power supply [terminals]
- Remove any existing individual cores.

**Danger**
Incorrect core termination can cause severe injuries and damage to the equipment.

## Electrical connections (cont.)

**Never** interchange cores "L1" and "N".

- Install an isolator in the power supply line that simultaneously isolates all non-earthed conductors from the mains with at least 3 mm contact separation.
  Remove the existing cable grommet when using larger cross-sections (up to ∅14 mm). Secure the cable with cable grommet Ⓕ (see page 18) integrated into the casing base.
- Max. fuse rating 16 A.

53 External safety solenoid valve (LPG) Ⓓ
Do **not** remove jumper between "1" and "L" when making this connection.

96 Power supply of accessories
Where the boiler is installed in a wet area, the connection of accessories to the power supply must not be carried out at the control unit. The power supply connection for accessories can be made immediately at the control unit, if the boiler is installed outside wet areas. This connection is controlled directly with the system ON/OFF switch (max. 3 A)
- Vitotrol 100 UTA
- Vitotrol 100 UTD
- Vitotrol 100 UTD-RF

**Low voltage plug X3**

1 Outside temperature sensor (only for weather-compensated control units)

Installation:
- North or north-western 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 ventilation outlets
- Not immediately below balconies or gutters
- Never render over
- Cable length max. 35 m with a cross-section of 1.5 mm$^2$

2 Flow temperature sensor for low loss header (accessories)

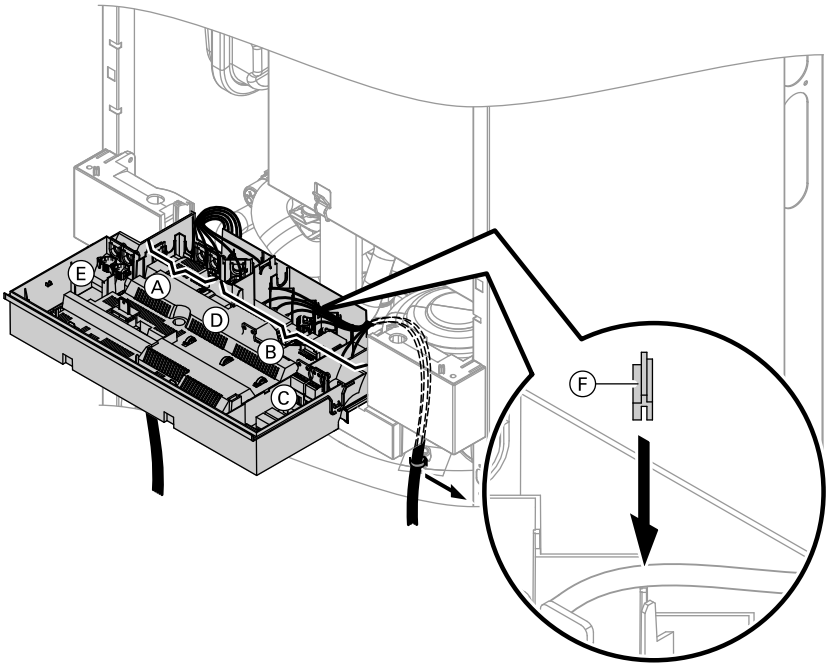
5 Cylinder temperature sensor (fitted and connected)

145 KM BUS subscriber (accessory)
- Vitotrol 200 or 300 remote control (only for weather-compensated control units)
- Vitocom 100
- Extension kit for one heating circuit with mixer (only for weather-compensated control units)
- External extension H1 or H2

## Electrical connections (cont.)

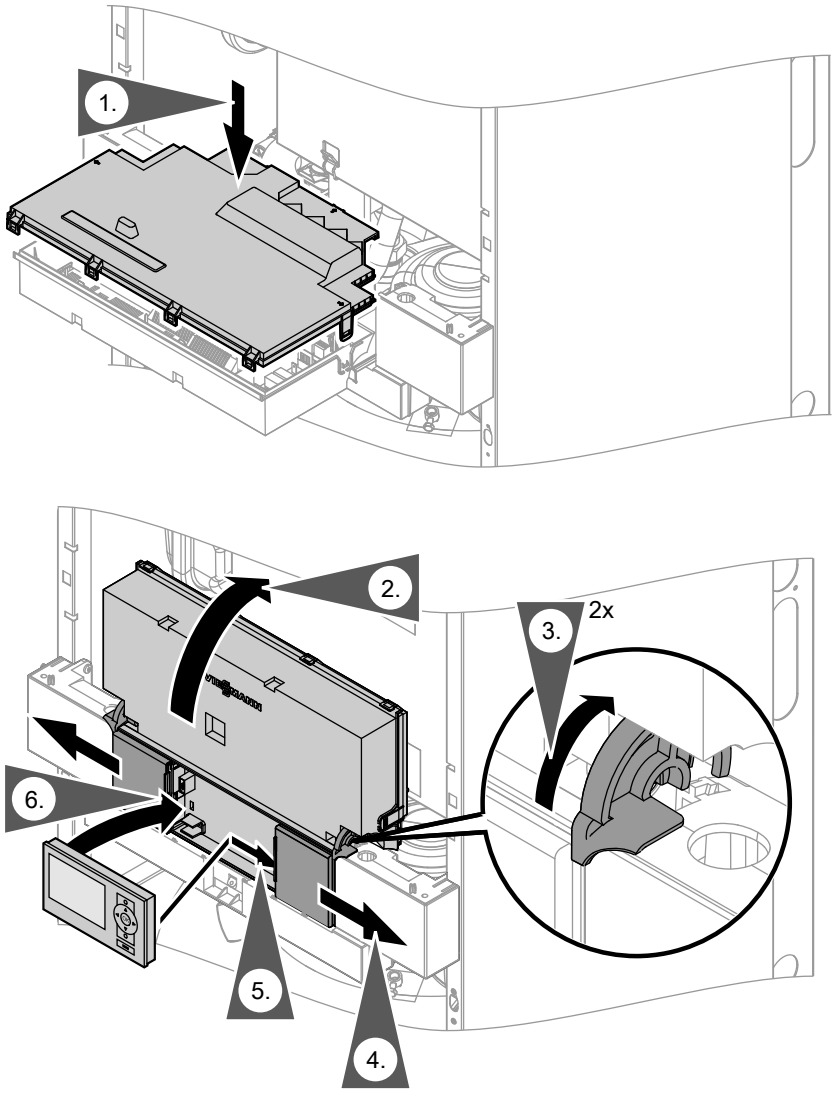
### Routing the connecting cables

**Please note**
Connecting cables will be damaged if they touch hot parts.
When routing and securing power cables on site, ensure that the maximum permissible temperatures for these cables are not exceeded.




Ⓐ Low voltage connections
Ⓑ 230 V connections
Ⓒ Internal extension
Ⓓ Main PCB
Ⓔ Communication module (accessories)
Ⓕ Cable grommet for power supply cable

## Closing the control unit casing




Close control unit casing and insert programming unit, packed separately.

***Note***

*The programming unit can also be used in a wall mounting base (accessory) near the boiler.*

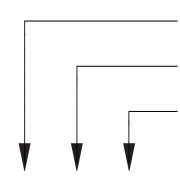
## Closing the control unit casing (cont.)



Wall mounting base installation instructions

## Steps - commissioning, inspection and maintenance

*For further information regarding the individual steps, see the page indicated*





| Commissioning | Inspection | Maintenance | | Page |
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| • | | | **41. Instructing the system user** | 60 |

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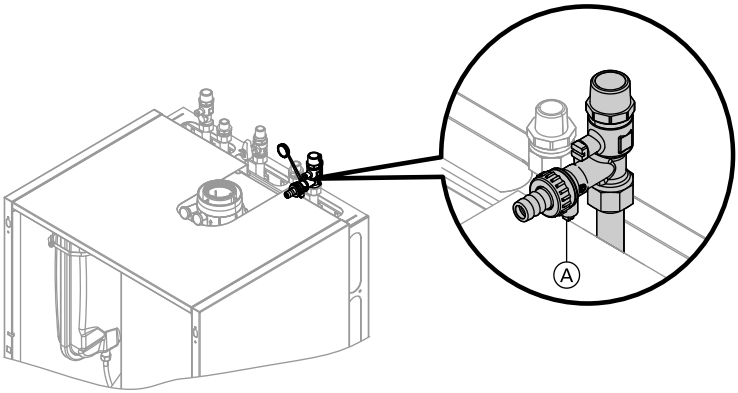
## Further details regarding the individual steps

### Removing the front panels

See page 11, steps 1 to 5.

### Filling the heating system

**Please note**
Unsuitable fill water increases the level of deposits and corrosion and may lead to boiler damage.
- Thoroughly flush the entire heating system prior to filling it with water.
- Only use fill water of potable quality.
- Soften fill water with hardness exceeding 16.8 °dH (3.0 mmol/l), e.g. use a small softening system for heating water (see Vitoset price list).
- An antifreeze additive suitable for heating systems can be mixed with the fill water.



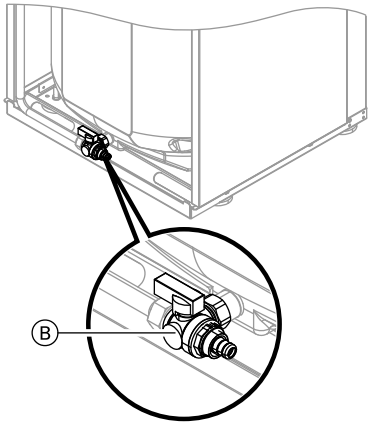

Shown with connection set for finished walls (accessory)

1. Check the pre-charge pressure of the diaphragm expansion vessel.
2. Close the gas shut-off valve.
3. Fill heating system via boiler fill & drain valve Ⓐ in the heating return (at the connection set on the side or above the boiler). (Minimum system pressure > 1.0 bar).

## Further details regarding the individual steps (cont.)

***Note***
*If the control unit has not been switched ON prior to filling the system, then the servomotor of the diverter valve will still be in its central position, and the system will be completely filled.*

***Note***
*Lever on valve Ⓑ must be in the "l.h." position.*




4. If the control unit had already been switched ON before filling began: Switch control unit ON and activate filling program (see next steps).

***Note***
*For function and details of the fill program, see page 122.*

5. Close boiler fill & drain valve Ⓐ.

**Activating filling function with weather-compensated control unit:**

1. Press **OK** and ☰ simultaneously for approx. 4 s.
2. **"Service functions"**
3. **"Filling"**
4. Ending filling function: Press **OK** or ⮌.

**Activating filling function with constant temperature control unit:**

1. Press **OK** and ☰ simultaneously for approx. 4 s.
2. Select ▸ **"④"** and confirm with **OK**. When the filling function is activated, **"bF on"** is shown on the display.
3. Ending filling function: Press ⮌.

## Further details regarding the individual steps (cont.)

### Selecting the language (if required) – only for weather-compensated control units

***Note***
*At the commissioning stage, the display is in German (default setting)*

**Extended menu:**

1. ☰

2. **"Settings"**

3. **"Language"**




4. Set the required language with ▲/▼.

### Setting the time and date (if required) – only for weather-compensated control units

During commissioning, or after prolonged time out of use, the time and date need to be reset.

**Extended menu:**

1. ☰

2. **"Settings"**

3. **"Time / Date"**

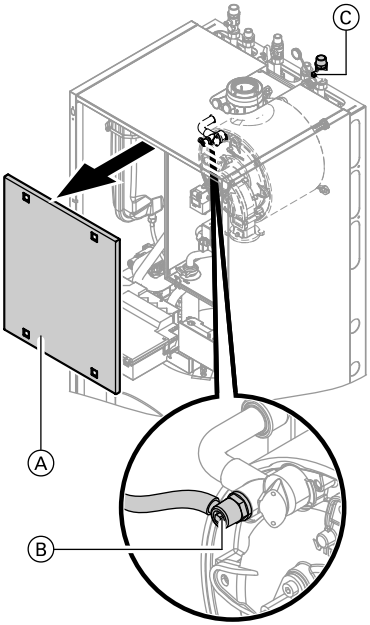
4. Set current time and date.



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## Further details regarding the individual steps (cont.)

### Venting the boiler




1. Close the shut-off valves on the heating water side.
2. Remove cover panel Ⓐ.
3. Connect the drain hose on valve Ⓑ with a drain.
4. Open air vent valve Ⓑ and fill valve Ⓒ in the heating return and vent using mains pressure (flush) until no more air noise can be heard.
5. Close valve Ⓑ and fill valve Ⓒ in the heating return, and open the shut-off valves on the heating water side.

### Venting the heating system

1. Close the gas shut-off valve and switch ON the control unit.
2. Activate venting program (see next steps).

   ***Note***
   *For function and sequence of the venting program, see page 122.*
3. Check the system pressure.

**Activating venting function with weather-compensated control unit:**

1. Press **OK** and ☰ simultaneously for approx. 4 s.
2. **"Service functions"**
3. **"Air venting valve"**
4. Ending venting function:
   Press **OK** or ⮌.

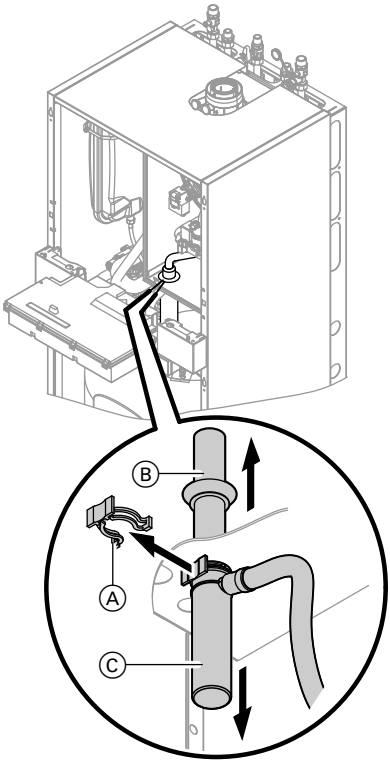
5369 621 GB

## Further details regarding the individual steps (cont.)

**Activating venting function with constant temperature control unit:**

1. Press **OK** and ☰ simultaneously for approx. 4 s.
2. Select ▸ **"⑤"** and confirm with **OK**. When the venting function is activated, **"EL on"** is shown on the display.
3. Ending venting function: Press ⮌.

## Filling siphon with water




1. Pivot control unit forward.
2. Pull retaining clip Ⓐ off.
3. Pull filler pipe Ⓑ upwards.
4. Pull off trap Ⓒ downwards.
5. Fill siphon with water and reassemble.

## Further details regarding the individual steps (cont.)

6. Check that the condensate pipe is connected correctly to the siphon and heat exchanger.
7. Refit cover panel.
8. Secure control unit back in operating position.

## Designating heating circuits - only for weather-compensated control units

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

Enter names for heating circuits:


Operating instructions

## Checking the gas type

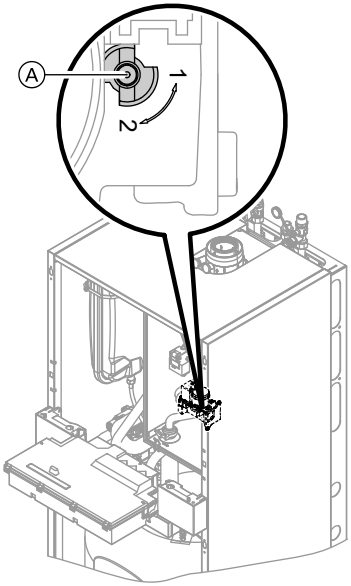
The boiler is equipped with an electronic combustion control unit that adjusts the burner for optimum combustion in accordance with the prevailing gas quality.

- Consequently, for natural gas there is no adjustment required across the entire Wobbe range.
  The boiler can be operated in the Wobbe index range 9.5 to 15.2 kWh/$m^3$ (34.2 to 54.7 MJ/$m^3$).
- Convert the burner for operation with LPG (see "Gas type conversion" on page 29).

1. Determine the gas type and Wobbe index by asking your local gas supply utility or LPG supplier.
2. Convert the burner for operation with LPG (see page 29).
3. Record the gas type in the service report on page 141.

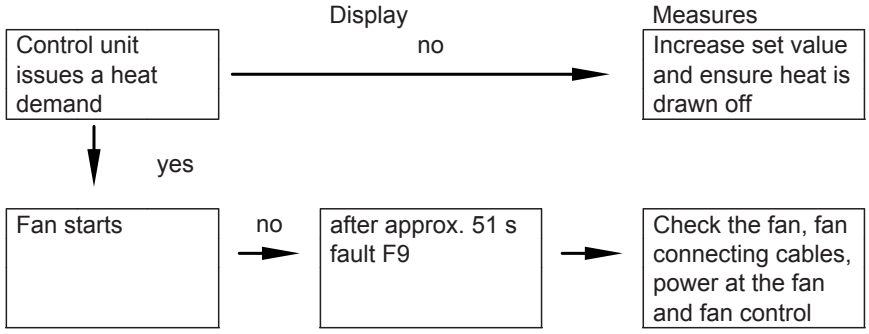
## Further details regarding the individual steps (cont.)

### Gas type conversion (only for operation with LPG)

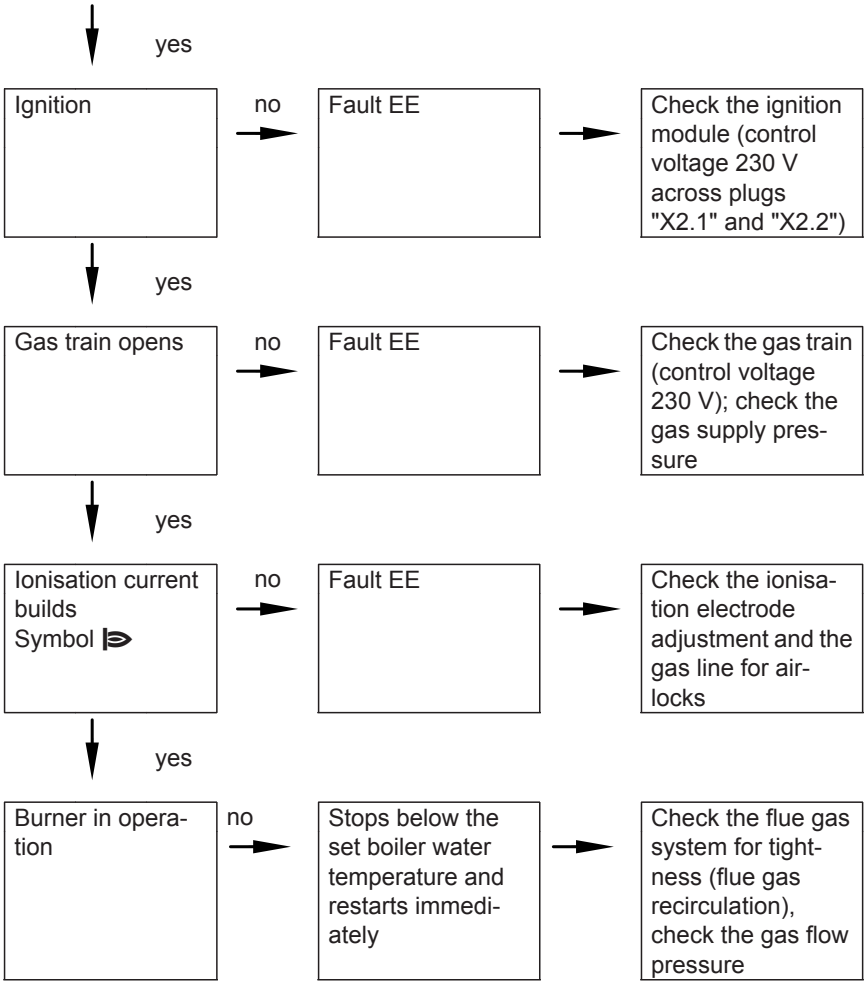



1. Set adjusting screw Ⓐ at the gas train to "2".
2. Switch ON/OFF switch ⏻ ON.
3. Select the gas type in coding address "82".
   - Call up code 2.
   - Generally, call up group 1.
   - In coding address "11", select value "9".
   - In coding address "82", select value "1" (operation with LPG).
   - In code "11" select value ≠ "9".
   - End service functions.
4. Open the gas shut-off valve.
5. Affix label "G31" (included with the technical documentation) adjacent to the type plate on the cover panel.

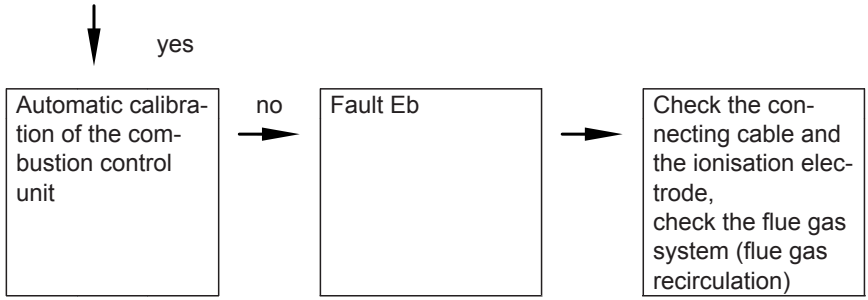
### Function sequence and possible faults



## Further details regarding the individual steps (cont.)



## Further details regarding the individual steps (cont.)



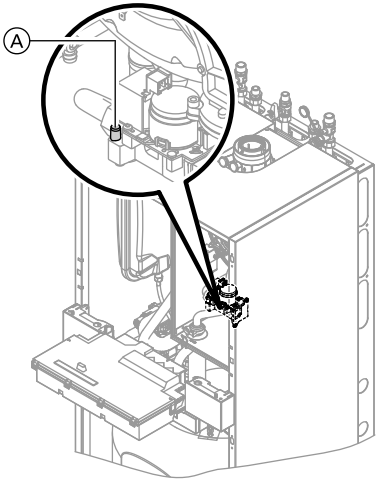

For further details regarding faults, see page 89.

## Checking the static and supply pressure

**Danger**
CO build-up as a result of an incorrect burner setup can have serious health implications.
Carry out a CO test prior to and after work on gas equipment.

***Operation with LPG***
*Flush the LPG tank twice during commissioning/replacement. Thoroughly vent the tank and gas supply lines after flushing.*

## Further details regarding the individual steps (cont.)




1. Close the gas shut-off valve.

2. Undo the screw inside test connector "PE" Ⓐ at the gas train but do not remove it, and connect the pressure gauge.

3. Open the gas shut-off valve.

4. Measure the static pressure and record it in the service report on page 141.
   Set value: max. 57.5 mbar

5. Start the boiler.

   ***Note***
   *During commissioning, the boiler can enter a fault state because of airlocks in the gas line. After approx. 5 s press the reset button **R** (see operating instructions) to reset the burner.*

6. Check the supply (flow) pressure.

   Set value:
   - Natural gas: 20 mbar
   - LPG: 50 mbar

   ***Note***
   *Use suitable test equipment with a resolution of at least 0.1 mbar to measure the supply pressure.*

7. Record the actual value in the service report on page 141.
   Take the action shown in the following table.

8. Shut down the boiler, close the gas shut-off valve, remove the pressure gauge and close test nipple Ⓐ with the screw.

9. Open the gas shut-off valve and start up the boiler.

   **Danger**
   Gas escaping from the test nipple leads to a risk of explosions.
   Check test connector Ⓐ for tightness.

## Further details regarding the individual steps (cont.)

| Supply (flow) pressure for natural gas | Supply (flow) pressure for LPG | Measures |
|---|---|---|
| below 17.4 mbar | below 42.5 mbar | Do not start the boiler. Notify your mains gas or LPG supplier. |
| 17.4 to 25 mbar | 42.5 to 57.5 mbar | Start the boiler. |
| above 25 mbar | above 57.5 mbar | Install a separate gas pressure governor upstream of the system and regulate the pre-charge pressure to 20 mbar for natural gas or 50 mbar for LPG. Notify your mains gas or LPG supplier. |

### Setting the maximum output

You can limit the maximum output for **heating operation**. The limit is set via the modulation range. The max. adjustable heating output is limited upwards by the boiler coding card.

**Weather-compensated control unit:**

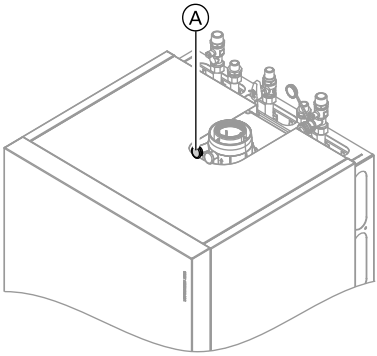
1. Press **OK** and ☰ simultaneously for approx. 4 s.
2. **"Service functions"**
3. **"Max. output"**
4. **"Change?"** Select **"Yes"**.
   A value flashes on the display (e.g. "85"). In the delivered condition, this value represents 100 % of rated output.
5. Select required value.

**Constant temperature control unit:**

1. Press **OK** and ☰ simultaneously for approx. 4 s.
2. Select ▸ **"③"** and confirm with **OK**.
   A value flashes on the display (e.g. "85") and "⊱" appears. In the delivered condition, this value represents 100 % of rated output.
3. Select required value and confirm with **OK**.

## Further details regarding the individual steps (cont.)

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



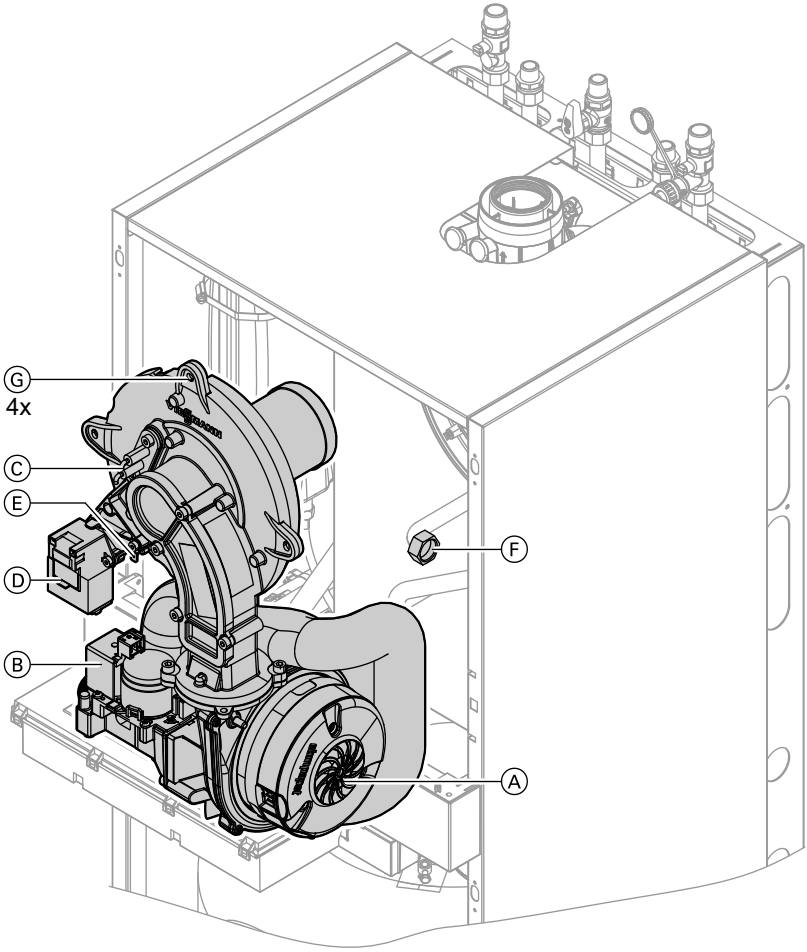

Ⓐ Combustion air port (ventilation air)

For balanced flue systems tested together with the wall mounted gas fired boiler, the requirement for a tightness test during commissioning by the flue gas inspector is not applicable.

We recommend that your heating engineer carries out a simple leak/tightness test during the commissioning of your system. For this, it would be sufficient to check the $CO_2$ or $O_2$ concentration in the combustion air at the annular gap of the balanced flue pipe.
The flue pipe is deemed to be gas-tight if the $CO_2$ concentration in the combustion air is no higher than 0.2 % or the $O_2$ concentration is at least 20.6 %.
If actual $CO_2$ values are higher or $O_2$ values are lower, then pressure test the flue pipe with a static pressure of 200 Pa.

## Further details regarding the individual steps (cont.)

### Burner removal




1. Switch ON/OFF switch ⏻ at the control unit and the main power supply OFF.
2. Close the gas shut-off valve and safeguard against reopening.

## Further details regarding the individual steps (cont.)

3. Pull electrical cables from fan motor Ⓐ, gas valve Ⓑ, ionisation electrode Ⓒ, ignition unit Ⓓ and earth tab Ⓔ.

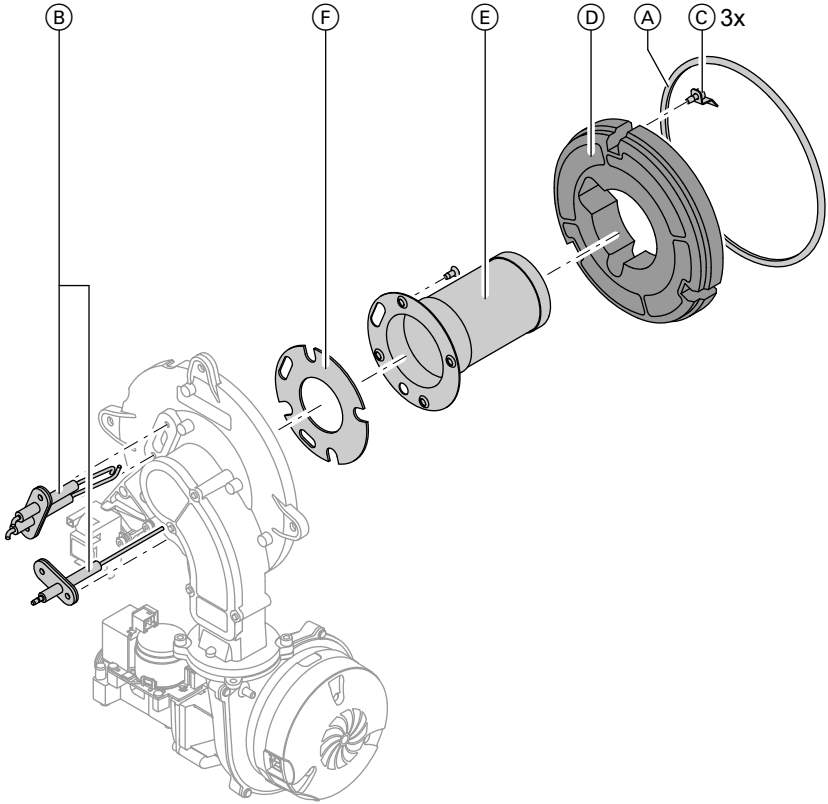
4. Undo gas supply pipe fitting Ⓕ.

5. Release four nuts Ⓖ and remove the burner.

**!** **Please note**
Prevent damage to the wire gauze.
Never rest the burner on the gauze assembly.

## Checking the burner gasket and the burner gauze assembly

Check burner gasket Ⓐ and burner gauze assembly Ⓔ for damage and replace, if required.

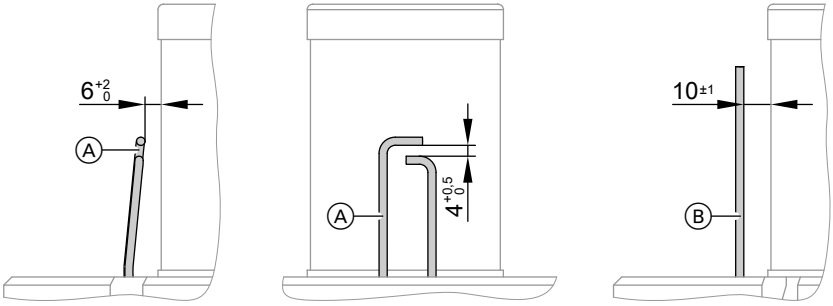



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## Further details regarding the individual steps (cont.)

1. Remove electrodes Ⓑ.
2. Undo three retaining clips Ⓒ at thermal insulation ring Ⓓ and remove thermal insulation ring Ⓓ.
3. Undo four Torx screws and remove burner gauze assembly Ⓔ with its gasket Ⓕ.
4. Insert and secure a new burner gauze assembly Ⓔ with a new gasket Ⓕ.
   Torque: 3.5 Nm.
5. Refit thermal insulation ring Ⓓ.
6. Refit electrodes Ⓑ.
   Torque: 2.5 Nm.

## Checking and adjusting the ignition and ionisation electrodes




Ⓐ Ignition electrodes

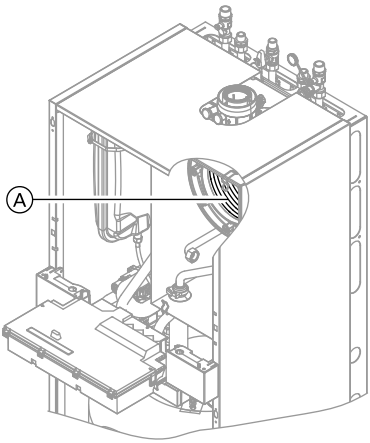
Ⓑ Ionisation electrode

1. Check the electrodes for wear and contamination.
2. Clean the electrodes with a small brush (not with a wire brush) or sand paper.
3. Check the electrode gaps. If the gaps are not as specified or the electrodes are damaged, replace and align the electrodes together with new gaskets. Tighten the electrode fixing screws with 2.5 Nm.

## Cleaning the heat exchanger and fitting the burner

**!** **Please note**
Scratches on parts that are in contact with flue gas can lead to corrosion.
**Never use brushes to clean the heat exchanger.**

## Further details regarding the individual steps (cont.)




1. Use a vacuum cleaner to remove residues from the heat exchanger Ⓐ inside the combustion chamber.

2. If required, spray slightly acidic, chloride-free cleaning agents based on phosphoric acid onto heat exchanger Ⓐ and let the solution soak in for approx. 20 min.

3. Thoroughly flush the heat exchanger Ⓐ with water.

4. Install the burner. Fit the screw with a serrated washer and the remaining screws, then tighten diagonally with 4 Nm torque.

5. Fit the gas supply pipe with a new gasket.

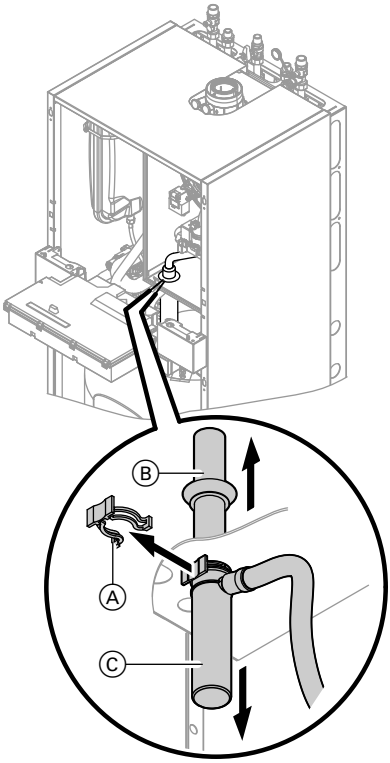
6. Check the gas connections for tightness.

   **Danger**
   Escaping gas leads to a risk of explosion.
   Check all fittings for gas tightness.

7. Connect the electrical cables/leads to each corresponding component.

## Further details regarding the individual steps (cont.)

### Checking the condensate drain and cleaning the siphon

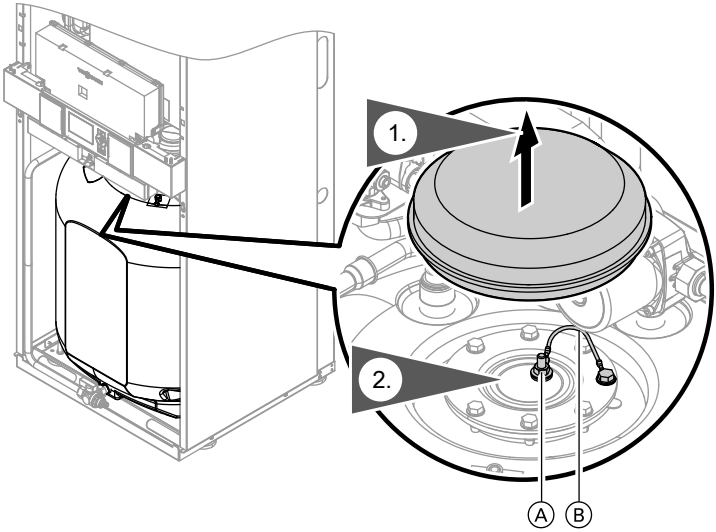



1. Check that the condensate can drain freely at the siphon.
2. Pull retaining clip Ⓐ off.
3. Pull filler pipe Ⓑ upwards.
4. Pull off trap Ⓒ downwards.
5. Pull the condensate hose from trap Ⓒ.
6. Clean the siphon.
7. Fill siphon with water and reassemble.
8. Check that the condensate pipe is connected correctly to the siphon and heat exchanger.

### Checking the anode connection

Check that the earth lead is connected to the magnesium anode.

## Further details regarding the individual steps (cont.)




Ⓐ Magnesium anode

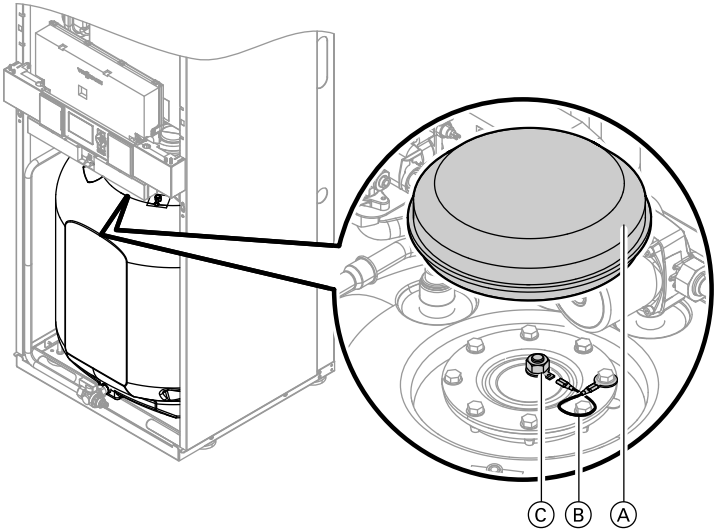
Ⓑ Earth cable

## Testing the anode earth current with an anode tester

***Note***

*We recommend that the magnesium anode function is checked annually. This function test can be carried out without interrupting operation, by measuring the earth current with an anode tester.*

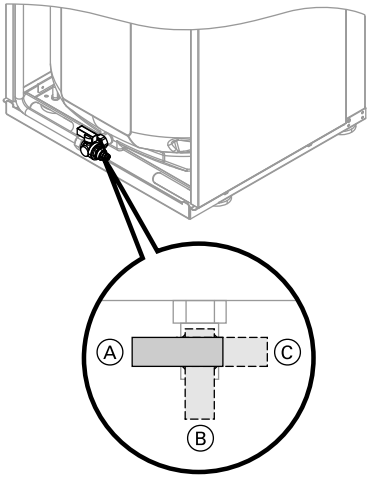
## Further details regarding the individual steps (cont.)




1. Remove cover Ⓐ.
2. Pull earth lead Ⓑ from tab Ⓒ.
3. Connect the tester (up to 5 mA) in series between tab Ⓒ and earth cable Ⓑ.
   - The anode is OK if the indicated current is > 0.3 mA.
   - Visually inspect the anode if the current measures < 0.3 mA, or if there is no current at all (see page 44).

## Further details regarding the individual steps (cont.)

### Draining the boiler on the DHW side




1. Connect hose to drain valve and route into a suitable container or drain outlet.

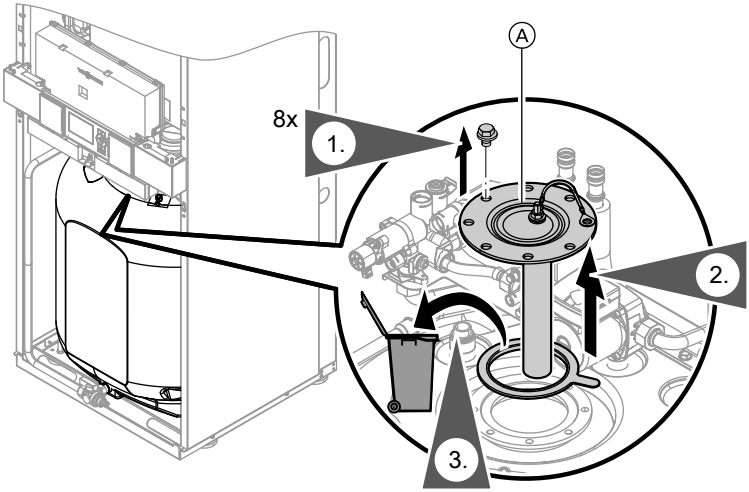
   ***Note***
   *Ensure adequate ventilation in the DHW pipework.*

2. Turn drain valve from lever position Ⓐ to lever position Ⓑ or Ⓒ as required.
   - Lever position Ⓑ: Drain heating system **excluding** cylinder via the cold water connection.
   - Lever position Ⓒ: Drain heating system **and** cylinder via the DHW connection. Cold water connection remains filled.

## Further details regarding the individual steps (cont.)

### Cleaning the primary cylinder

***Note***
*EN 806 specifies a visual inspection and (if required) cleaning every two years after the cylinder has been taken into use and thereafter according to requirements.*




1. Drain the primary cylinder.
2. Remove flange lid Ⓐ.
3. Disconnect the primary cylinder from the pipework to prevent contamination from entering the pipe system.
4. Remove loose deposits with a high pressure cleaner.

   **Please note**
   When cleaning the inside, only use plastic cleaning utensils.

5. Use a chemical cleaning agent to remove hard deposits that cannot be removed by a high pressure cleaner.

   **Please note**
   Never use hydrochloric acid based cleaning agents.

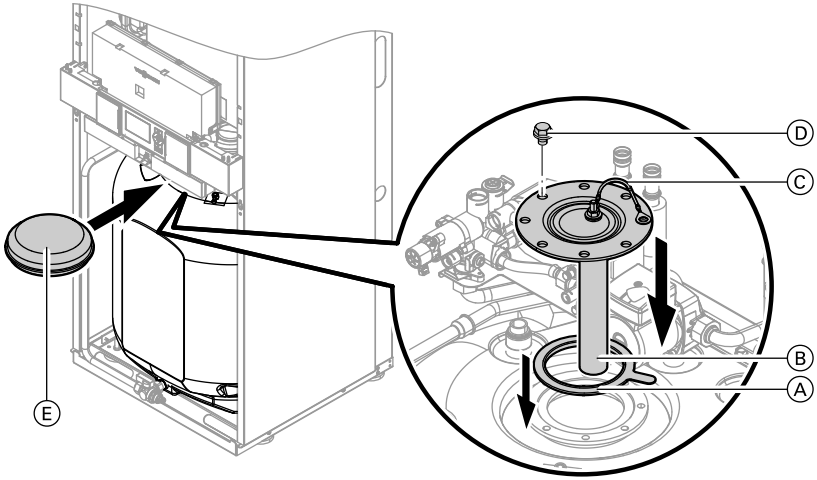
6. Thoroughly flush the primary cylinder after cleaning.

## Further details regarding the individual steps (cont.)

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

Check the magnesium anode. If it is discovered that the anode has degraded to 10 to 15 mm Ø, we recommend replacing the magnesium anode.

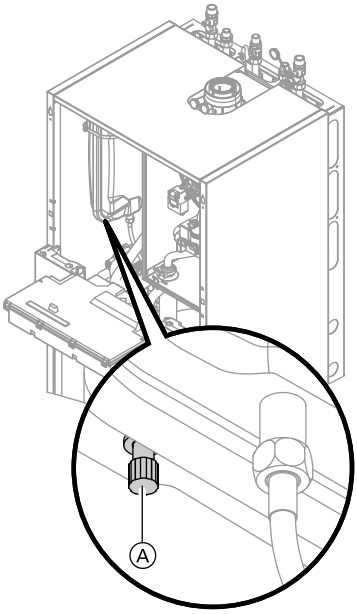
### Returning the primary cylinder into use




1. Reconnect the primary cylinder to the pipework.
2. Insert new gasket Ⓐ underneath flange lid Ⓑ.
3. Fit flange lid Ⓑ and tighten eight screws Ⓓ with up to 25 Nm.
4. Push earth cable Ⓒ onto tab.
5. Fit cover Ⓔ.
6. Fill the primary cylinder with drinking water.

## Further details regarding the individual steps (cont.)

### Checking the diaphragm expansion vessel and system pressure




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

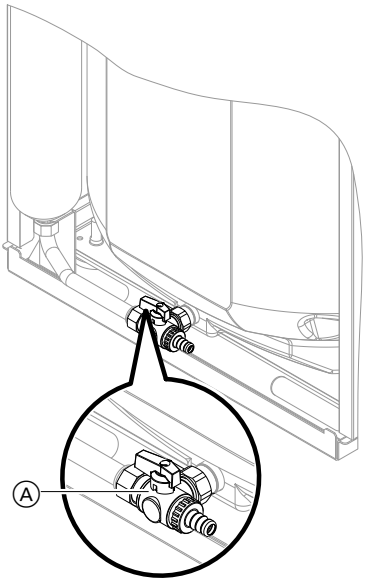
1. Drain the system, until the pressure gauge indicates "0".

2. If the diaphragm expansion vessel inlet pressure is lower than the static system pressure: Top up with nitrogen via connection Ⓐ, until the inlet pressure is 0.1 to 0.2 bar.

3. Top up your heating system with water and vent until the filling pressure of a cooled system is 0.1 to 0.2 bar higher than the inlet pressure of the diaphragm expansion vessel. Permiss. operating pressure: 3 bar

## Further details regarding the individual steps (cont.)

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




1. Check the static pressure of the DHW line downstream of the pressure reducer and adjust if required. Set value: Max. 3.0 bar
2. Close the on-site shut-off valve in the cold water line.
3. Turn lever on valve Ⓐ to the "front" position.
4. Check the pre-charge pressure of the DHW expansion vessel and adjust if required. Set value: Static pressure minus 0.2 bar
5. Turn lever on valve Ⓐ back to the "l.h." position and open the on-site shut-off valve in the cold water line.

### Checking all gas equipment for tightness at operating pressure

⚠ **Danger**
Escaping gas leads to a risk of explosion.
Check gas equipment for tightness.

***Note***
*For the tightness test, use only suitable and approved leak detecting agents (EN 14291) and devices. Leak detecting agents with unsuitable constituents (e.g. nitrites, sulphides) can lead to material damage.*
*Remove residues of the leak detecting agent after testing.*

### Checking the combustion quality

The electronic combustion control unit automatically ensures an optimum combustion quality. Only the combustion values need to be checked during commissioning and maintenance. For this, check the $CO_2$ or $O_2$ content. For a function description of the electronic combustion control unit, see page 128.

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## Further details regarding the individual steps (cont.)

***Note***
*Operate the appliance with uncontaminated combustion air to prevent operating faults and damage.*

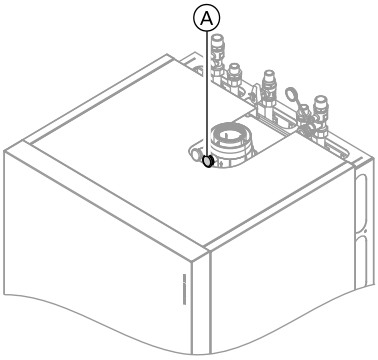
**$CO_2$ or $O_2$ content**

- The $CO_2$ content must be within the following ranges (upper and lower output):
  - 7.7 to 9.2% for natural gas E and LL
  - 9.3 to 10.9% for LPG P
- For all gas types, the $O_2$ content must be between 4.4% and 6.9%.

If the actual $CO_2$ or $O_2$ values lie outside their respective ranges, proceed with the following steps:

- Check the balanced flue system for tightness, see page 34.
- Check the ionisation electrode and connecting cable, see page 37.

***Note***
*During commissioning, the combustion control unit carries out an automatic calibration. Only test the emissions approx. 30 s after the burner has started.*




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 and create a heat demand.
3. Select the lower output (see page 48).
4. Check the $CO_2$ content. Should the actual value deviate from the above ranges by more than 1%, implement steps from page 46.
5. Enter actual values into the service report.
6. Select the upper output (see page 48).
7. Check the $CO_2$ content. Should the actual value deviate from the above ranges by more than 1%, implement steps from page 46.
8. After testing, press **OK**.
9. Enter actual values into the service report.



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## Further details regarding the individual steps (cont.)

**Selecting the upper/lower output for weather-compensated control units:**

1. Press **OK** and ☰ simultaneously for approx. 4 s.
2. **"Actuator test"**
3. Select the lower output:
   Select **"Base load" "ON"** and confirm with **OK**.
4. Select the upper output:
   Select **"Full load" "ON"** and confirm with **OK**.

**Selecting the upper/lower output for constant temperature control units:**

1. Press **OK** and ☰ simultaneously for approx. 4 s.
   **"🔧"** flashes on the display.
2. Select ▶ **"⇄"** and confirm with **OK**.
   The display shows "**I**".
3. Select the lower output:
   Press **OK**.
4. Select the upper output:
   Press **OK**, select **"2"** with ▶ and confirm with **OK**.

## Matching the control unit to the heating system

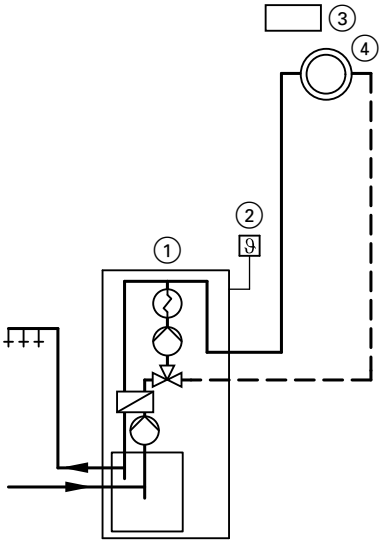
Subject to the equipment level, the control unit must be matched to the system. Various system components are recognised automatically by the control unit and the relevant codes are adjusted automatically.

- For the selection of an appropriate design, see the following diagrams.
- For coding steps, see page 61.

## Further details regarding the individual steps (cont.)

**System version 1**

**One heating circuit without mixer A1**



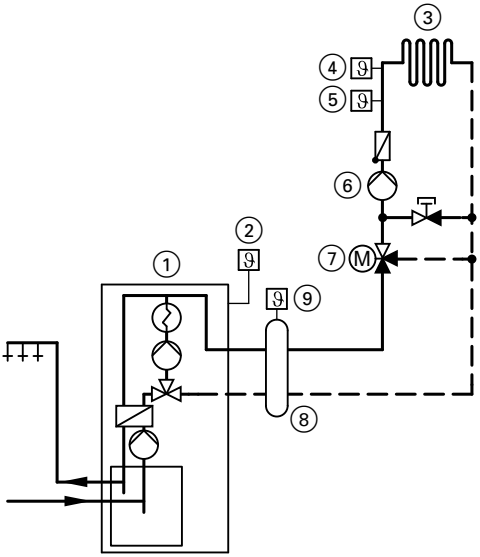

① Vitodens 222-F
② Outside temperature sensor (only for weather-compensated control units)
③ Vitotrol 100 (only for constant temperature control units)
④ Heating circuit without mixer A1

| Required code | |
|---|---|
| Operation with LPG | 82:1 |

## Further details regarding the individual steps (cont.)

**System version 2**

**One heating circuit with mixer M2 and a low loss header**



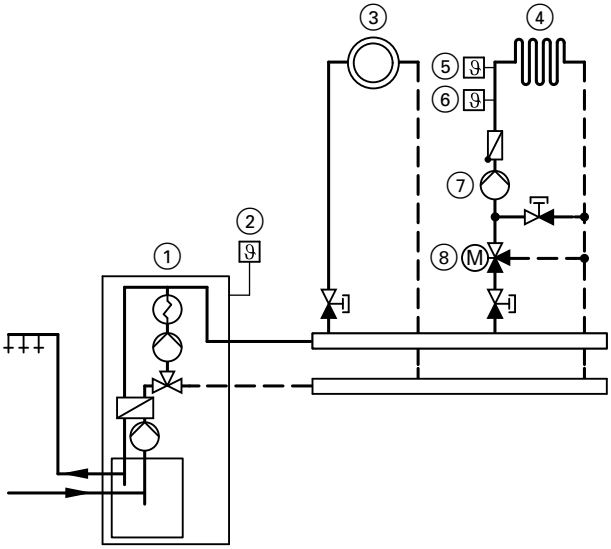

① Vitodens 222-F
② Outside temperature sensor
③ Heating circuit with mixer M2
④ Temperature limiter for limiting the maximum temperature of underfloor heating systems
⑤ Flow temperature sensor M2
⑥ Heating circuit pump M2
⑦ Extension kit for one heating circuit with mixer M2
⑧ Low loss header
⑨ Flow temperature sensor, low loss header

| Required coding | |
|---|---|
| Operation with LPG | 82:1 |
| System with only one heating circuit with mixer and DHW heating | 00:4 |

## Further details regarding the individual steps (cont.)

**System version 3**

**One heating circuit without mixer A1 and one heating circuit with mixer M2**




① Vitodens 222-F
② Outside temperature sensor
③ Heating circuit without mixer A1
④ Heating circuit with mixer M2
⑤ Temperature limiter for limiting the maximum temperature of underfloor heating systems
⑥ Flow temperature sensor M2
⑦ Heating circuit pump M2
⑧ Extension kit for one heating circuit with mixer M2

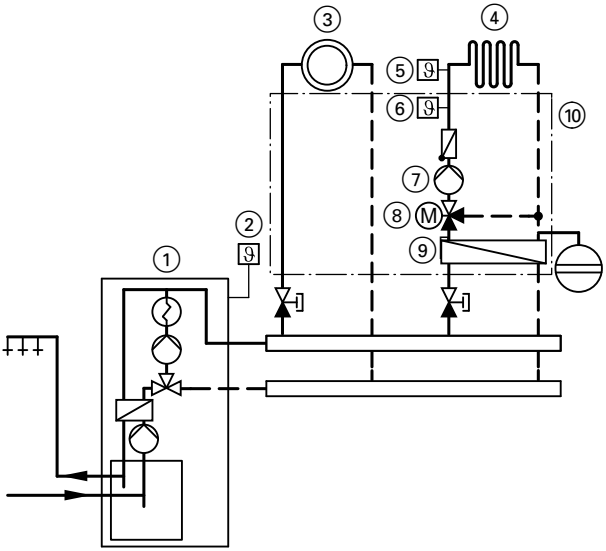
***Note***
*The volume flow of the heating circuit without mixer must be at least 30% greater than the volume flow of the heating circuit with mixer.*

| **Required coding** | |
|---|---|
| Operation with LPG | 82:1 |

## Further details regarding the individual steps (cont.)

**System version 4**

**One heating circuit without mixer A1, one heating circuit with mixer M2 and system separation**




① Vitodens 222-F
② Outside temperature sensor
③ Heating circuit without mixer A1
④ Heating circuit with mixer M2
⑤ Temperature limiter for limiting the maximum temperature of underfloor heating systems
⑥ Flow temperature sensor M2
⑦ Heating circuit pump M2
⑧ Extension kit for one heating circuit with mixer M2
⑨ Heat exchanger for system separation
⑩ Assembly kit with mixer (accessory)

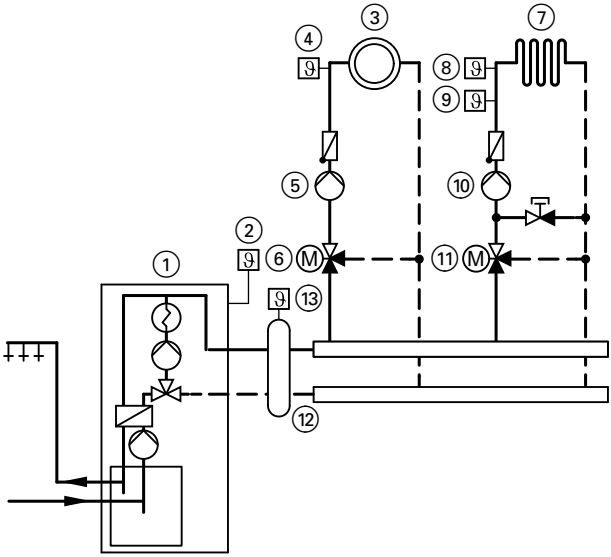
| **Required coding** | |
|---|---|
| Operation with LPG | 82:1 |

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## Further details regarding the individual steps (cont.)

**System version 5**

**One heating circuit with mixer M1 (with Vitotronic 200-H), one heating circuit with mixer M2 (with extension kit) and low loss header (with/without DHW heating)**



① Vitodens 222-F
② Outside temperature sensor
③ Heating circuit with mixer M1
④ Flow temperature sensor M1
⑤ Heating circuit pump M1
⑥ Vitotronic 200-H
⑦ Heating circuit with mixer M2
⑧ Temperature limiter for limiting the maximum temperature of underfloor heating systems
⑨ Flow temperature sensor M2
⑩ Heating circuit pump M2
⑪ Extension kit for one heating circuit with mixer M2
⑫ Low loss header
⑬ Flow temperature sensor, low loss header

| **Required coding** | |
|---|---|
| Operation with LPG | 82:1 |
| System with only one heating circuit with mixer and DHW heating | 00:4 |

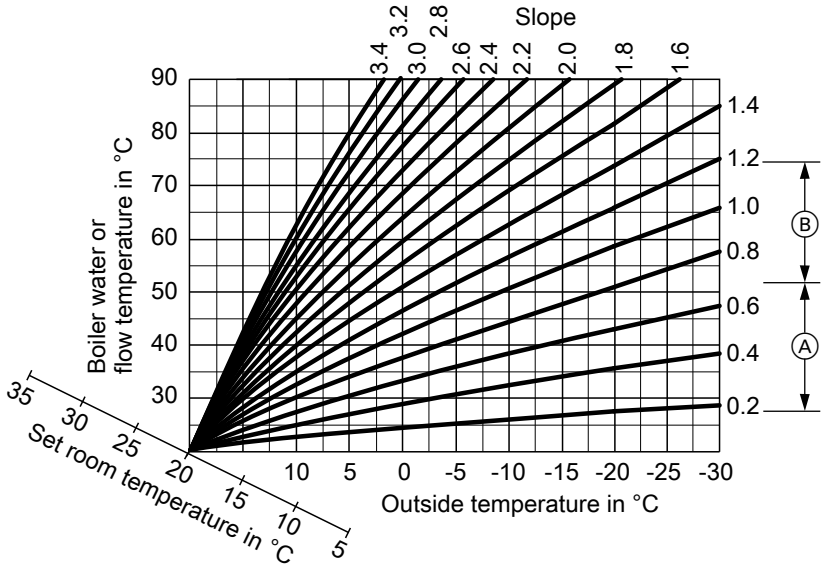
## Further details regarding the individual steps (cont.)

### Adjusting the heating curves (only for weather-compensated control units)

The heating curves illustrate the relationship between the outside temperature and the boiler water or flow temperature.
To put it simply: The lower the outside temperature, the higher the boiler water or flow temperature.

The room temperature, again, depends on the boiler water or the flow temperature.

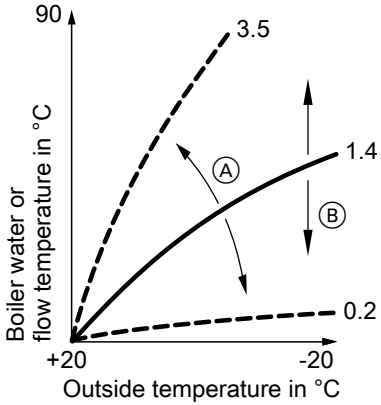
Settings in the delivered condition:
- Slope = 1.4
- Level = 0




Ⓐ Heating curve slope for underfloor heating systems
Ⓑ Heating curve slope for low temperature heating systems (according to the Energy Savings Order [Germany])

## Further details regarding the individual steps (cont.)

### Changing the slope and level



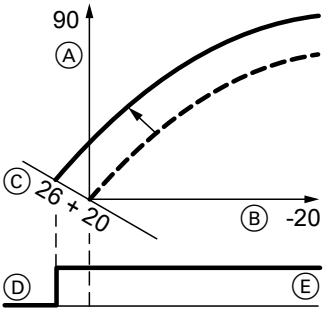

Ⓐ Changing the slope
Ⓑ Changing the level (vertical parallel offset of the heating curve)

**Extended menu:**

1. ☰:
2. **"Heating"**
3. Select a heating circuit: "HC1" or "HC2".
4. **"Heating curve"**
5. **"Slope"** or **"Level"**
6. Select heating curve according to the requirements of the system.

### Adjusting the set room temperature

**Standard room temperature**




Example 1: Adjustment of the standard room temperature from 20 to 26°C

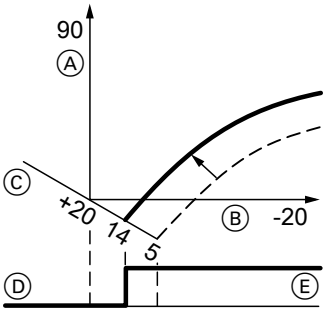
Ⓐ Boiler water temperature or flow temperature in °C
Ⓑ Outside temperature in °C
Ⓒ Set room temperature in °C
Ⓓ Heating circuit pump "OFF"
Ⓔ Heating circuit pump "ON"

**Adjustment of the standard room temperature:**

Operating instructions

## Further details regarding the individual steps (cont.)

**Reduced room temperature**




Example 2: Adjustment of the reduced room temperature from 5 °C to 14 °C

Ⓐ Boiler water temperature or flow temperature in °C
Ⓑ Outside temperature in °C
Ⓒ Set room temperature in °C
Ⓓ Heating circuit pump "OFF"
Ⓔ Heating circuit pump "ON"

**Adjustment of the reduced room temperature:**

Operating instructions

## Connecting the control unit to the LON system (only for weather-compensated control units)

The LON communication module (accessories) must be plugged in.

Installation instructions LON communication module

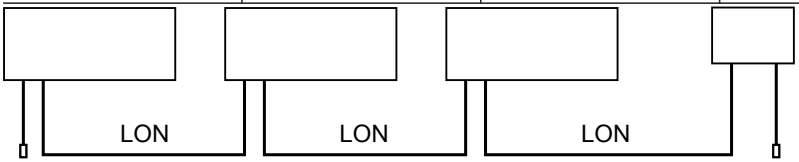
***Note***
*The data transfer via LON can take several minutes.*

**Single boiler system with Vitotronic 200-H and Vitocom 300 (example)**

Set the LON subscriber numbers and further functions via code 2 (see the following table).

***Note***
*In the same LON system, the same number **cannot** be allocated twice.*
***Only one Vitotronic** may be programmed as fault manager.*

## Further details regarding the individual steps (cont.)

| Boiler control unit | Vitotronic 200-H | Vitotronic 200-H | Vitocom |
|---|---|---|---|
|  | | | |
| Subscriber no. 1<br>Code "77:1" | Subscriber no. 10<br>Code "77:10" | Subscriber no. 11<br>**Set** code "77:11" | Subscriber no. 99 |
| Control unit is fault manager<br>Code "79:1" | Control unit is not fault manager<br>Code "79:0" | Control unit is not fault manager<br>Code "79:0" | Device is fault manager |
| Control unit transmits the time<br>Code "7b:1" | The control unit receives the time<br>**Set** code "81:3" | The control unit receives the time<br>**Set** code "81:3" | Device receives the time |
| Control unit transmits outside temperature<br>**Set** code "97:2" | The control unit receives the outside temperature<br>**Set** code "97:1" | The control unit receives the outside temperature<br>**Set** code "97:1" | — |
| LON subscriber fault monitoring<br>Code "9C:20" | LON subscriber fault monitoring<br>Code "9C:20" | LON subscriber fault monitoring<br>Code "9C:20" | — |

**Carrying out a LON subscriber check**

Communication with the system devices connected to the fault manager is tested with a subscriber check.

Preconditions:
- The control unit must be programmed as **fault manager** (code "79:1")
- The LON subscriber number must be programmed in all control units (see page 57)
- The LON subscriber list in the fault manager must be up to date (see page 57)

**Carrying out a subscriber check:**

1. Press **OK** and ☰: simultaneously for approx. 4 s.
2. **"Service functions"**
3. **"Subscriber check"**

## Further details regarding the individual steps (cont.)

4. Select subscriber (e.g. subscriber 10).
   The subscriber check for the selected subscriber is introduced.
   - Successfully tested subscribers are designated with **"OK"**.
   - Unsuccessfully tested subscribers are designated with **"Not OK"**.

   ***Note***
   *To carry out a new subscriber check, create a new subscriber list with menu item **"Delete list?"***

***Note***
*If the subscriber check is carried out by another control unit, the subscriber number and **"Wink"** are shown on the display for approx. 1 min.*

## Scanning and resetting the "Service" display

After the limit values specified in coding address "21" and "23" have been reached, the following appears on the programming unit display:
- On a constant temperature control unit:
  The specified hours run or the specified interval with clock symbol "🕘" (subject to setting) and "🔧"
- On a weather-compensated control unit:
  "Service" and "🔧"

**Scanning and resetting service**

Press **OK** to acknowledge a service message.

***Note***
*An acknowledged service message that was not reset reappears:*
- *On a weather-compensated control unit, on the following Monday.*
- *On a constant temperature control unit, after seven days.*

**After a service has been carried out (reset service)**

**Weather-compensated control unit**

1. Press **OK** and ☰ simultaneously for approx. 4 s.
2. **"Service functions"**
3. **"Service reset"**

   ***Note***
   *The selected service parameters for hours run and time interval restart at 0.*

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## Further details regarding the individual steps (cont.)

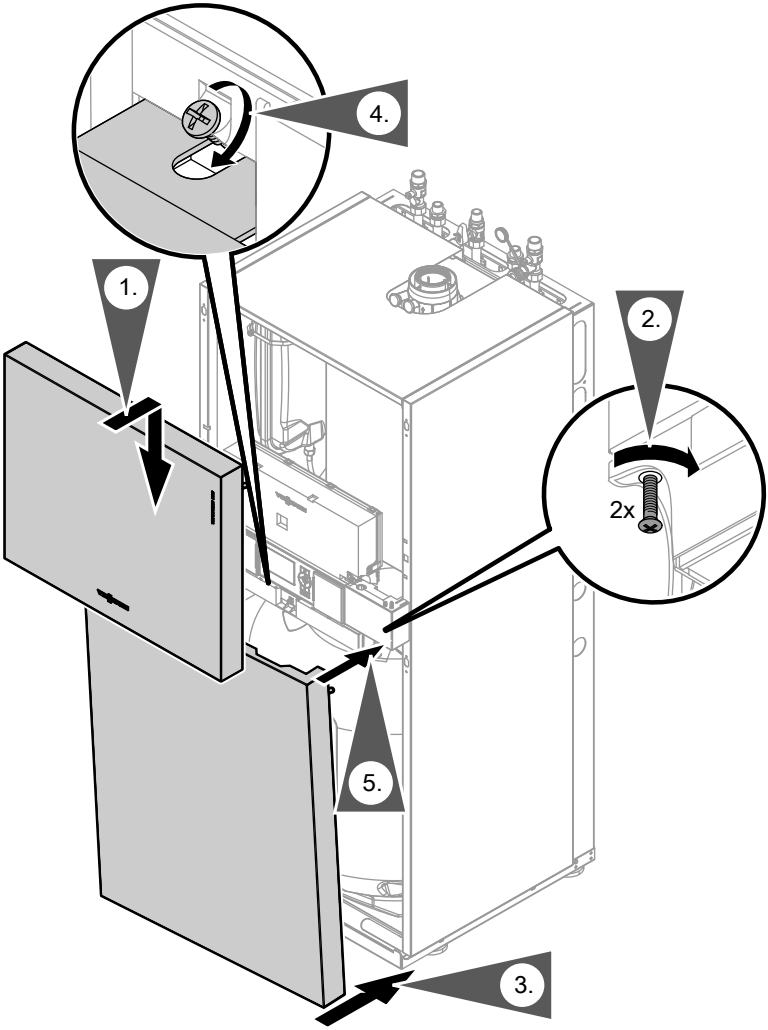
**Constant temperature control unit**

Reset code 24:1 to 24:0.

***Note***
*The selected service parameters for hours run and time interval restart at 0.*

## Further details regarding the individual steps (cont.)

### Fitting the front panels




### Instructing the system user

The system installer must hand the operating instructions to the system user and instruct him/her in the operation of the system.

## Calling up code 1

***Note***

- *On weather-compensated control units, codes are displayed as plain text.*
- *Codes that have no function due to the heating system equipment level or the setting of other codes are not displayed.*
- *Heating systems with one heating circuit without mixer and one heating circuit with mixer:*
  *The heating circuit without mixer is designated with* ***"Heating circuit 1"*** *and the heating circuit with mixer with* ***"Heating circuit 2"****.*
  *If the heating circuits were given individual designations (see page 28), the selected designation and* ***"HC1"*** *or* ***"HC2"*** *appears instead of the above.*

**Weather-compensated control unit:**

1. Press **OK** and ☰ simultaneously for approx. 4 s.

2. **"Coding level 1"**

3. Select group of required coding address:
   - **"General"**
   - **"Boiler"**
   - **"DHW"**
   - **"Heating circuit 1/heating circuit 2"**

4. Select coding address.

5. Select value according to the following tables and confirm with **OK**.

6. **If you want to reset all codes to the delivered condition:**
   Select **"Standard setting"** in **"Coding level 1"**.

   ***Note***
   *The codes from coding level 2 are also reset.*

**Constant temperature control unit:**

1. Press **OK** and ☰ simultaneously for approx. 4 s.

2. With ▶, select **"①"** for coding level 1 and confirm with **OK**.
   "**I**" flashes on the display for the coding addresses in group 1.

3. Select group of the required coding address with ▲/▼. For example, "1" for group "General" (see following section):
   Confirm selected group with **OK**.

4. Select coding address with ▲/▼.

5. Select value according to the following tables with ▲/▼ and confirm with **OK**.

6. **If you want to reset all codes to the delivered condition:**
   Select ▶ **"⑥"** and confirm with **OK**.
   When "⏐" flashes, confirm with **OK**.

   ***Note***
   *The codes from coding level 2 are also reset.*

## General/Group "1"

Select **"General"** for weather-compensated control units (see page 61).
Select **"1"** for constant temperature control units (see page 61).

## Coding

| Coding in the delivered condition | | Possible change | |
|---|---|---|---|
| **System design** | | | |
| 00:2 | System version 1:<br>One heating circuit without mixer A1, with DHW heating | 00:4 | System version 2, 5:<br>One heating circuit with mixer M2, with DHW heating |
| | | 00:6 | System version 3, 4:<br>One heating circuit without mixer A1 and one heating circuit with mixer M2, with DHW heating |
| **Internal circulation pump function** | | | |
| 51:0 | Internal circulation pump is always started when there is a heat demand | 51:1 | When there is a heat demand, the internal circulation pump will only be started when the burner is operational. System with heating water buffer cylinder. |
| **Subscriber no.** | | | |
| 77:1 | LON subscriber number (only for weather-compensated control units) | 77:2<br>to<br>77:99 | LON subscriber number, adjustable from 1 to 99:<br>1 - 4 = Boiler<br>5 = Cascade<br>10 - 98 = Vitotronic 200-H<br>99 = Vitocom<br><br>***Note***<br>*Allocate each number* ***only*** *once.* |
| **Detached house/apartment building** | | | |
| 7F:1 | Detached house (only for weather-compensated control units) | 7F:0 | Apartment building<br>Separate adjustment of holiday program and time program for DHW heating, as option |

## General/Group "1" (cont.)

| Coding in the delivered condition | | Possible change | |
|---|---|---|---|
| **Lock out controls** | | | |
| 8F:0 | All control elements active | 8F:1 | All control elements locked out<br>Only setting test mode possible |
| | | 8F:2 | Standard menu and test mode enabled<br>Extended menu locked out |
| **Ext. heating program changeover to heating circuit** | | | |
| 91:0 | No external heating program changeover via external extension (only for weather-compensated control units) | 91:1 | The external heating program changeover affects the heating circuit without mixer |
| | | 91:2 | The external heating program changeover affects the heating circuit with mixer |
| | | 91:3 | The external heating program changeover affects the heating circuit without mixer and the heating circuit with mixer |
| **Set flow temperature in case of external demand** | | | |
| 9b:0 | No minimum flow temperature in case of external demand | 9b:1<br>to<br>9b:127 | Set value for minimum flow temperature in case of external demand, adjustable from 1 to 127 °C (limited by boiler-specific parameters) |

## Boiler/Group "2"

Select **"Boiler"** for weather-compensated control units (see page 61).
Select **"2"** for constant temperature control units (see page 61).

## Boiler/Group "2" (cont.)

## Coding

| Coding in the delivered condition | | Possible change | |
|---|---|---|---|
| **Burner service in 100 hours** | | | |
| 21:0 | No maintenance interval (hours run) selected | 21:1 to 21:100 | The number of hours run before the burner should be serviced is adjustable from 100 to 10 000 h One step ≙ 100 h |
| **Service interval in months** | | | |
| 23:0 | No time interval for burner service | 23:1 to 23:24 | Interval adjustable from 1 to 24 months |
| **Service status** | | | |
| 24:0 | No **"Service"** display | 24:1 | **"Service"** display (the address is automatically set and must be manually reset after a service has been carried out) |
| **Filling/venting** | | | |
| 2F:0 | Venting program/fill program disabled | 2F:1 | Venting program enabled |
| | | 2F:2 | Fill program enabled |
| **Ext. pump blocking** | | | |
| 32:0 | Influence of the signal "External blocking" on circulation pumps: All pumps in control function | 32:1 to 32:15 | Influence of the signal "External blocking" on circulation pumps: See the following table |

***Note***
*Generally, the burner will be blocked when signal "External blocking" is enabled.*

| Value address 32: ... | Internal circulation pump | Heating circuit pump Heating circuit without mixer | Heating circuit pump Heating circuit with mixer | Circulation pump for cylinder heating |
|---|---|---|---|---|
| 0 | Control funct. | Control funct. | Control funct. | Control funct. |
| 1 | Control funct. | Control funct. | Control funct. | OFF |
| 2 | Control funct. | Control funct. | OFF | Control funct. |
| 3 | Control funct. | Control funct. | OFF | OFF |
| 4 | Control funct. | OFF | Control funct. | Control funct. |
| 5 | Control funct. | OFF | Control funct. | OFF |
| 6 | Control funct. | OFF | OFF | Control funct. |

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## Boiler/Group "2" (cont.)

| Value address 32: ... | Internal circulation pump | Heating circuit pump Heating circuit without mixer | Heating circuit pump Heating circuit with mixer | Circulation pump for cylinder heating |
|---|---|---|---|---|
| 7 | Control funct. | OFF | OFF | OFF |
| 8 | OFF | Control funct. | Control funct. | Control funct. |
| 9 | OFF | Control funct. | Control funct. | OFF |
| 10 | OFF | Control funct. | OFF | Control funct. |
| 11 | OFF | Control funct. | OFF | OFF |
| 12 | OFF | OFF | Control funct. | Control funct. |
| 13 | OFF | OFF | Control funct. | OFF |
| 14 | OFF | OFF | OFF | Control funct. |
| 15 | OFF | OFF | OFF | OFF |

| Coding in the delivered condition | | Possible change | |
|---|---|---|---|
| **Ext. pump demand** | | | |
| 34:0 | Influence of the signal "External demand" on the circulation pumps: All pumps in control function | 34:1 to 34:23 | Influence of the signal "External demand" on the circulation pumps: See the following table |

| Value address 34: ... | Internal circulation pump | Heating circuit pump Heating circuit without mixer | Heating circuit pump Heating circuit with mixer | Circulation pump for cylinder heating |
|---|---|---|---|---|
| 0 | Control funct. | Control funct. | Control funct. | Control funct. |
| 1 | Control funct. | Control funct. | Control funct. | OFF |
| 2 | Control funct. | Control funct. | OFF | Control funct. |
| 3 | Control funct. | Control funct. | OFF | OFF |
| 4 | Control funct. | OFF | Control funct. | Control funct. |
| 5 | Control funct. | OFF | Control funct. | OFF |
| 6 | Control funct. | OFF | OFF | Control funct. |
| 7 | Control funct. | OFF | OFF | OFF |
| 8 | OFF | Control funct. | Control funct. | Control funct. |
| 9 | OFF | Control funct. | Control funct. | OFF |
| 10 | OFF | Control funct. | OFF | Control funct. |
| 11 | OFF | Control funct. | OFF | OFF |
| 12 | OFF | OFF | Control funct. | Control funct. |
| 13 | OFF | OFF | Control funct. | OFF |
| 14 | OFF | OFF | OFF | Control funct. |
| 15 | OFF | OFF | OFF | OFF |

## Boiler/Group "2" (cont.)

| Value address 34: ... | Internal circulation pump | Heating circuit pump Heating circuit without mixer | Heating circuit pump Heating circuit with mixer | Circulation pump for cylinder heating |
|---|---|---|---|---|
| 16 | ON | Control funct. | Control funct. | Control funct. |
| 17 | ON | Control funct. | Control funct. | OFF |
| 18 | ON | Control funct. | OFF | Control funct. |
| 19 | ON | Control funct. | OFF | OFF |
| 20 | ON | OFF | Control funct. | Control funct. |
| 21 | ON | OFF | Control funct. | OFF |
| 22 | ON | OFF | OFF | Control funct. |
| 23 | ON | OFF | OFF | OFF |

## DHW/Group "3"

Select **"DHW"** for weather-compensated control units (see page 61).
Select **"3"** for constant temperature control units (see page 61).

### Coding

| Coding in the delivered condition | | Possible change | |
|---|---|---|---|
| **Enable DHW circulation pump** | | | |
| 73:0 | DHW circulation pump "ON" in accordance with the time program (only for weather-compensated control units) | 73:1 to 73:6 | During the time program 1x/h "ON" for 5 min Up to 6x/h "ON" for 5 min |
| | | 73:7 | Constantly "On" |

## Heating circuit 1, heating circuit 2/Group "5"

Select **"Heating circuit ..."** for weather-compensated control units (see page 61).
Select **"5"** for constant temperature control units (see page 61).

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## Heating circuit 1, heating circuit 2/Group "5" (cont.)

### Coding

| Coding in the delivered condition | | Possible change | |
|---|---|---|---|
| **Summer eco function outside temperature** | | | |
| A5:5 | With heating circuit pump logic function (economy circuit): Heating circuit pump "Off" when the outside temperature (AT) is 1 K higher than the set room temperature ($RT_{set}$) AT > $RT_{set}$ + 1 K (only for weather-compensated control units) | A5:0 | Without heating circuit pump logic function |
| | | A5:1 to A5:15 | With heating circuit pump logic function: Heating circuit pump "OFF" (see the following table) |

| Parameter address A5:... | With heating circuit pump logic function: Heating circuit pump "OFF" |
|---|---|
| 1 | AT > $RT_{set}$ + 5 K |
| 2 | AT > $RT_{set}$ + 4 K |
| 3 | AT > $RT_{set}$ + 3 K |
| 4 | AT > $RT_{set}$ + 2 K |
| 5 | AT > $RT_{set}$ + 1 K |
| 6 | AT > $RT_{set}$ |
| 7 to 15 | AT > $RT_{set}$ - 1 K to AT > $RT_{set}$ - 9 K |



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## Heating circuit 1, heating circuit 2/Group "5" (cont.)

| Coding in the delivered condition | | Possible change | |
|---|---|---|---|
| **Summer eco function absolute** | | | |
| A6:36 | Extended economy function **disabled** (only for weather-compensated control units) | A6:5 to A6:35 | Extended economy control enabled, i.e. the burner and heating circuit pump will be switched off and the mixer closed at a variable value, adjustable between 5 and 35 °C plus 1 °C. Base value is the adjusted outside temperature. This value is based on the actual outside temperature and a time constant that takes the cooling down of an average building into consideration. |
| **Mixer economy function** | | | |
| A7:0 | Without mixer economy function (only for a weather-compensated control unit and heating circuit with mixer) | A7:1 | With mixer economy function (extended heating circuit pump logic):<br>Heating circuit pump also "OFF":<br>■ If the mixer has been closed for longer than 20 min.<br>Heating pump "ON":<br>■ If the mixer changes to control function<br>■ If there is a risk of frost |
| **Pump idle time change red. mode** | | | |
| A9:7 | With pump idle time: Heating circuit pump "OFF" if the set value changes through a change in operating mode or through a change in the set room temperature (only for weather-compensated control units) | A9:0 | Without pump idle time |
| | | A9:1 to A9:15 | With pump idle time; adjustable from 1 to 15 |

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## Heating circuit 1, heating circuit 2/Group "5" (cont.)

| Coding in the delivered condition | | Possible change | |
|---|---|---|---|
| **Weather-compensated/ room temperature hook-up** | | | |
| b0:0 | With remote control: Heating mode/reduced mode: Weather-compensated (only for weather-compensated control units; change the coding only for the heating circuit with mixer M2) | b0:1 | Heating mode: Weather-compensated<br>Reduc. mode: With room temperature hook-up |
| | | b0:2 | Heating mode: With room temperature hook-up<br>Reduc. mode: Weather-compensated |
| | | b0:3 | Heating mode/reduced mode: With room temperature hook-up |
| **Summer eco function room temperature** | | | |
| b5:0 | With remote control: No room temperature-dependent heating circuit pump logic function (only for weather-compensated control units; change the coding only for the heating circuit with mixer M2) | b5:1<br>to<br>b5:8 | Heating circuit pump logic function, see the following table: |

| Parameter address b5:... | With heating circuit pump logic function: Heating circuit pump "OFF" | Heating circuit pump "ON" |
|---|---|---|
| 1 | $RT_{actual} > RT_{set} + 5$ K | $RT_{actual} < RT_{set} + 4$ K |
| 2 | $RT_{actual} > RT_{set} + 4$ K | $RT_{actual} < RT_{set} + 3$ K |
| 3 | $RT_{actual} > RT_{set} + 3$ K | $RT_{actual} < RT_{set} + 2$ K |
| 4 | $RT_{actual} > RT_{set} + 2$ K | $RT_{actual} < RT_{set} + 1$ K |
| 5 | $RT_{actual} > RT_{set} + 1$ K | $RT_{actual} < RT_{set}$ |
| 6 | $RT_{actual} > RT_{set}$ | $RT_{actual} < RT_{set} - 1$ K |
| 7 | $RT_{actual} > RT_{set} - 1$ K | $RT_{actual} < RT_{set} - 2$ K |
| 8 | $RT_{actual} > RT_{set} - 2$ K | $RT_{actual} < RT_{set} - 3$ K |

| Coding in the delivered condition | | Possible change | |
|---|---|---|---|
| **Flow temperature minimum limit** | | | |
| C5:20 | Electronic minimum flow temperature limit 20 °C (only for weather-compensated control units) | C5:1<br>to<br>C5:127 | Minimum limit adjustable from 1 to 127 °C (limited by boiler-specific parameters) |

## Heating circuit 1, heating circuit 2/Group "5" (cont.)

| Coding in the delivered condition | | Possible change | |
|---|---|---|---|
| **Flow temperature maximum limit** | | | |
| C6:74 | Electronic maximum flow temperature limit 74 °C (only for weather-compensated control units) | C6:10 to C6:127 | Maximum limit adjustable from 10 to 127 °C (limited by boiler-specific parameters) |
| **Heating program changeover** | | | |
| d5:0 | The external heating program changeover changes the heating program to "Constant operation with reduced room temperature" (only for weather-compensated control units) | d5:1 | The external heating program changeover changes to "Constant operation with standard room temperature" |
| **Max. pump speed in standard mode** | | | |
| E6:65 | Maximum speed of the variable speed heating circuit pump: 65 % of the maximum speed (only for weather-compensated control units) | E6:0 to E6:100 | Maximum speed adjustable from 0 to 100% |
| **Min. pump speed** | | | |
| E7:30 | Minimum speed of the variable speed heating circuit pump: 30 % (only for weather-compensated control units) | E7:0 to E7:100 | Minimum speed adjustable from 0 to 100% of the maximum speed |
| **Screed function** | | | |
| F1:0 | Screed drying function disabled (only for weather-compensated control units) | F1:1 to F1:6 | Screed drying function adjustable in accordance with 6 optional temperature/time profiles (see page 123) |
| | | F1:15 | Constant flow temperature 20 °C |

## Heating circuit 1, heating circuit 2/Group "5" (cont.)

| Coding in the delivered condition | | Possible change | |
|---|---|---|---|
| **Party mode time limit** | | | |
| F2:8 | Time limit for party mode or external heating program changeover via key: 8 h (only for weather-compensated control units)[*1] | F2:0 | No time limit for party mode[*1] |
| | | F2:1 to F2:12 | Time limit adjustable from 1 to 12h[*1] |
| **Pump control in "Only DHW"** | | | |
| F6:25 | In the "Only DHW" operating mode, the internal circulation pump is permanently ON (only for constant temperature control units) | F6:0 | In the "Only DHW" operating mode, the internal circulation pump is permanently OFF |
| | | F6:1 to F6:24 | In the "DHW only" operating mode, the internal circulation pump will be started for 10 min respectively 1 to 24 times per day. |
| **Pump control in "standby mode"** | | | |
| F7:25 | In "Standby mode", the internal circulation pump is permanently ON (only for constant temperature control units) | F7:0 | In "Standby mode", the internal circulation pump is permanently OFF |
| | | F7:1 to F7:24 | In "Standby mode", the internal circulation pump in operating mode will be started for 10 min respectively 1 to 24 times per day. |
| **Start temperature raising** | | | |
| F8:-5 | Temperature limit for terminating the reduced mode -5 ºC, see example on page 125. Observe the setting of coding address "A3" (only for weather-compensated control units) | F8:+10 to F8:-60 | Temperature limit adjustable from +10 to -60 °C |
| | | F8:-61 | Function disabled |

[*1] *Party mode ends **automatically** in the "Heating and DHW" program, when the system changes over to operation with standard room temperature.*

## Heating circuit 1, heating circuit 2/Group "5" (cont.)

| Coding in the delivered condition | | Possible change | |
|---|---|---|---|
| **End temperature raising** | | | |
| F9:-14 | Temperature limit for raising the reduced set room temp. -14 ºC, see example on page 125 (only for weather-compensated control units) | F9:+10<br>to<br>F9:-60 | Temperature limit for raising the set room temperature to the value selected for standard mode adjustable from<br>+10 to -60 °C |
| **Increase set flow temperature** | | | |
| FA:20 | Raising the set boiler water temperature or the set flow temperature when changing from operation with reduced room temperature to operation with standard room temperature, by 20 %. See example on page 126 (only for weather-compensated control units) | FA:0<br>to<br>FA:50 | Temperature rise adjustable from 0 to 50 % |
| **Duration set flow temperature increase** | | | |
| Fb:30 | Duration for raising the set boiler water temperature or the set flow temperature (see coding address "FA") 60 min. See example on page 126 (only for weather-compensated control units) | Fb:0<br>to<br>Fb:150 | Duration adjustable from 0 to 300 min;<br>one step ≙ 2 min |

## Calling up coding level 2

***Note***

- *In coding level 2, all codes are accessible, including the codes from coding level 1.*
  *The following lists only those codes not accessible in coding level 1.*
- *Codes that have no function due to the heating system equipment level or the setting of other codes are not displayed.*
- *Heating systems with one heating circuit without mixer and one heating circuit with mixer:*
  *The heating circuit without mixer is designated with "**Heating circuit 1**" and the heating circuit with mixer with **"Heating circuit 2"**.*
  *If the heating circuits were given individual designations (see page 28), the selected designation and **"HC1"** or **"HC2"** appears instead of the above.*

**Weather-compensated control unit:**

1. Press **OK** and ☰ simultaneously for approx. 4 s.
2. Press **OK** and ⮌ simultaneously for approx. 4 s.
3. **"Coding level 2"**
4. Select group of required coding address:
   - **"General"**
   - **"Boiler"**
   - **"DHW"**
   - **"Heating circuit 1/heating circuit 2"**
5. Select coding address.
6. Select value according to the following tables and confirm with **"OK"**.
7. **If you want to reset all codes to the delivered condition:**
   Select **"Standard setting"** in **"Coding level 2"**.

   ***Note***
   *The codes from coding level 1 are also reset.*

**Constant temperature control unit:**

1. Press **OK** and ☰ simultaneously for approx. 4 s.
2. Press **OK** and ⮌ simultaneously for approx. 4 s.
3. With ▸, select **"②"** for coding level 2 and confirm with **OK**.
   "**I**" flashes on the display for the coding addresses in group 1.
4. Select group of the required coding address with ▲/▼. For example, "1" for group "General" (see following section):
   Confirm selected group with **OK**.
5. Select coding address with ▲/▼.
6. Select value according to the following tables with ▲/▼ and confirm with **OK**.



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## Calling up coding level 2 (cont.)

7. **If you want to reset all codes to the delivered condition:**
   Select ► **"⑥"** and confirm with **OK**.
   When "⊣⊢" flashes, confirm with **OK**.

   ***Note***
   *The codes from coding level 1 are also reset.*

## General/Group "1"

Select **"General"** for weather-compensated control units (see page 73).
Select **"1"** for constant temperature control units (see page 73).

## Coding

| Coding in the delivered condition | | Possible change | |
|---|---|---|---|
| 11:≠9 | No access to the coding addresses for the parameters of the combustion controller | 11:9 | Access open to the coding addresses for the parameters of the combustion controller |
| 25:0 | Without outside temperature sensor | 25:1 | With outside temperature sensor and fault monitoring of the sensor (automatic recognition) |
| 52:0 | Without flow temperature sensor for low loss header | 52:1 | With flow temperature sensor for low loss header (automatic recognition) |
| 54:3 | Never adjust | | |
| 6E:50 | Never adjust | | |
| 76:0 | Without LON communication module (only for weather-compensated control units) | 76:1 | With LON communication module (automatic recognition) |
| 79:1 | With LON communication module: Control unit is fault manager (only for weather-compensated control units) | 79:0 | Control unit is not fault manager |

## General/Group "1" (cont.)

| Coding in the delivered condition | | Possible change | |
|---|---|---|---|
| 7b:1 | With LON communication module: The control unit transmits the time (only for weather-compensated control units) | 7b:0 | Does not transmit time |
| 80:6 | A fault message is displayed, providing a fault is active for at least 30 s | 80:0 | Immediate fault message |
| | | 80:2 to 80:199 | The minimum fault duration before a fault message is issued is adjustable from 10 s to 995 s; one step ≙ 5 s |
| 81:1 | Automatic summer/winter time changeover | 81:0 | Manual summer/winter time changeover |
| | | 81:2 | Use of the radio clock receiver (automatic recognition) |
| | | 81:3 | With LON communication module: The control unit receives the time |
| 82:0 | Operation with natural gas | 82:1 | Operation with LPG (only adjustable if coding address 11:9 has been set) |
| 86:0 | Never adjust | | |
| 87:0 | Never adjust | | |
| 88:0 | Temperature displayed in °C (Celsius) | 88:1 | Temperature displayed in °F (Fahrenheit) |
| 8A:175 | Do not adjust. | | |
| 90:128 | Time constant for calculating the adjusted outside temperature 21.3 h | 90:1 to 90:199 | Fast (low values) or slow (high values) matching of the flow temperature, subject to the set value when the outside temperature changes; one step ≙ 10 min |
| 94:0 | Without Open Therm extension | 94:1 | With Open Therm extension (automatic recognition) |
| 95:0 | Without Vitocom 100 communication interface | 95:1 | With Vitocom 100 communication interface (automatic recognition) |

## General/Group "1" (cont.)

| Coding in the delivered condition | | Possible change | |
|---|---|---|---|
| 97:0 | With LON communication module: The outside temperature of the sensor connected to the control unit is utilised internally (only for weather-compensated control units) | 97:1 | The control unit receives the outside temperature |
| | | 97:2 | The control unit sends the outside temperature to the Vitotronic 200-H |
| 98:1 | Viessmann system number (in conjunction with monitoring several systems via Vitocom 300) | 98:1 to 98:5 | System number adjustable from 1 to 5 |
| 9C:20 | Monitoring LON subscribers. If a subscriber fails to respond, the values specified inside the control unit will be used after 20 min. Only then will a fault message be issued. (Only for weather-compensated control units) | 9C:0 | No monitoring |
| | | 9C:5 to 9C:60 | The time is adjustable from 5 to 60 min |
| 9F:8 | Differential temperature 8 K; only in conjunction with the mixer circuit (only for weather-compensated control units) | 9F:0 to 9F:40 | Differential temperature adjustable from 0 to 40 K |

## Boiler/Group "2"

Select **"Boiler"** for weather-compensated control units (see page 73).
Select **"2"** for constant temperature control units (see page 73).

### Coding

| Coding in the delivered condition | | Possible change | |
|---|---|---|---|
| 06:... | Maximum limit of the boiler water temperature, specified in °C by the boiler coding card | 06:20 to 06:127 | Maximum limit of the boiler water temperature within the ranges specified by the boiler |
| 12:0 | Never adjust | | |

## Boiler/Group "2" (cont.)

| Coding in the delivered condition | | Possible change | |
|---|---|---|---|
| 28:0 | No burner interval ignition | 28:1 to 28:24 | Time interval adjustable from 1 to 24 h. The burner is force-started once every 30 s (only when operating with LPG) |
| 2E:0 | Without external extension | 2E:1 | With external extension (automatic recognition) |
| 30:1 | Internal variable speed circulation pump (automatic adjustment) | 30:0 | Internal circulation pump without variable speed (e.g. temporarily for service) |
| 31:... | Set speed of the internal circulation pump when operated as boiler circuit pump %, specified by the boiler coding card | 31:0 to 31:100 | Set speed adjustable from 0 to 100 % |
| 38:0 | Status burner control unit: Operational (no fault) | 38:≠0 | Status burner control unit: Fault |

## DHW/Group "3"

Select **"DHW"** for weather-compensated control units (see page 73).
Select **"3"** for constant temperature control units (see page 73).

### Coding

| Coding in the delivered condition | | Possible change | |
|---|---|---|---|
| **DHW** | | | |
| 56:0 | Set DHW temperature adjustable from 10 to 60 °C | 56:1 | Set DHW temperature adjustable from 10 to above 60 °C<br><br>***Note***<br>*Maximum value subject to boiler coding card.*<br>*Observe the max. permissible DHW temperature.* |

## DHW/Group "3" (cont.)

| Coding in the delivered condition | | Possible change | |
|---|---|---|---|
| 58:0 | Without auxiliary function for DHW heating | 58:10 to 58:60 | Input of a second set DHW temperature, adjustable from 10 to 60 °C (observe coding addresses "56" and "63") |
| 59:0 | Cylinder heating:<br>Starting point -2.5 K<br>Stopping point +2.5 K | 59:1 to 59:10 | Starting point adjustable from 1 to 10 K below the set value |
| 63:0 | Without auxiliary function for DHW heating (only for constant temperature control units) | 63:1 | Auxiliary function: 1 x daily |
| | | 63:2 to 63:14 | Every 2 days to every 14 days |
| | | 63:15 | 2 x daily |
| 65:... | Information regarding the type of diverter valve; do not adjust.<br>■ 65:0 No diverter valve<br>■ 65:1 Viessmann diverter valve<br>■ 65:2 Wilo diverter valve<br>■ 65:3 Grundfos diverter valve | | |
| 6C:100 | Set speed; internal primary pump for DHW heating<br>100 %. Never adjust. | | |
| 6F:... | Maximum output for DHW heating in %, specified by the boiler coding card | 6F:0 to 6F:100 | Max. output during DHW heating adjustable from min. output to 100 % |
| 71:0 | DHW circulation pump "ON" in accordance with the time program (only for weather-compensated control units) | 71:1 | "OFF" during DHW heating to the first set value |
| | | 71:2 | "ON" during DHW heating to the first set value |
| 72:0 | DHW circulation pump "ON" in accordance with the time program (only for weather-compensated control units) | 72:1 | "OFF" during DHW heating to the second set value |
| | | 72:2 | "ON" during DHW heating to the second set value |

## Heating circuit 1, heating circuit 2/Group "5"

Select **"Heating circuit ..."** for weather-compensated control units (see page 73).
Select **"5"** for constant temperature control units (see page 73).

## Coding

| Coding in the delivered condition | | Possible change | |
|---|---|---|---|
| A0:0 | Without remote control (only for weather-compensated control units) | A0:1 | With Vitotrol 200 (automatic recognition) |
| | | A0:2 | With Vitotrol 300 (automatic recognition) |
| A3:2 | Outside temperature below 1 °C: Heating circuit pump "ON"<br>Outside temperature above 3 °C: Heating circuit pump "OFF" | A3:-9 to A3:15 | Heating circuit pump "ON/OFF" (see the following table) |

**Please note**
If a value is selected below 1 °C, there is a risk of pipes outside the thermal envelope of the building freezing up.
The standby mode, in particular, should be taken into consideration, e.g. during holidays.

| Parameter Address A3:... | Heating circuit pump "ON" | "OFF" |
|---|---|---|
| -9 | -10 °C | -8 °C |
| -8 | -9 °C | -7 °C |
| -7 | -8 °C | -6 °C |
| -6 | -7 °C | -5 °C |
| -5 | -6 °C | -4 °C |
| -4 | -5 °C | -3 °C |
| -3 | -4 °C | -2 °C |
| -2 | -3 °C | -1 °C |
| -1 | -2 °C | 0 °C |
| 0 | -1 °C | 1 °C |
| 1 | 0 °C | 2 °C |
| 2 to 15 | 1 °C to 14 °C | 3 °C to 16 °C |

## Heating circuit 1, heating circuit 2/Group "5" (cont.)

| Coding in the delivered condition | | Possible change | |
|---|---|---|---|
| A4:0 | With frost protection (only for weather-compensated control units) | A4:1 | No frost protection; this setting is only possible if code "A3: -9" has been selected.<br><br>***Note***<br>*Observe the information regarding coding address "A3"* |
| A8:1 | Heating circuit with mixer creates a demand for the internal circulation pump (only for weather-compensated control units) | A8:0 | Heating circuit with mixer creates no demand for the internal circulation pump |
| b2:8 | With remote control and for the heating circuit, operation with room temperature hook-up must be programmed: Room influence factor 8 (only for weather-compensated control units; change the coding only for the heating circuit with mixer) | b2:0 | Without room influence |
| | | b2:1 to b2:64 | Room influence factor adjustable from 1 to 64 |
| d3:14 | Heating curve slope = 1.4 (only for weather-compensated control units) | d3:2 to d3:35 | Heating curve slope adjustable from 0.2 to 3.5 (see page 54) |
| d4:0 | Heating curve level = 0 (only for weather-compensated control units) | d4:–13 to d4:40 | Heating curve level adjustable from –13 to 40 (see page 54) |
| E1:1 | With remote control: Set value for standard room temperature, adjustable at the remote control from 10 to 30 °C (only for weather-compensated control units) | E1:0 | Set value for standard room temperature, adjustable from 3 to 23 °C |
| | | E1:2 | Set value for standard room temperature, adjustable from 17 to 37 °C |

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## Heating circuit 1, heating circuit 2/Group "5" (cont.)

| Coding in the delivered condition | | Possible change | |
|---|---|---|---|
| E2:50 | With remote control: No display correction for the actual room temperature (only for weather-compensated control units) | E2:0 to E2:49 | Display correction –5 K to Display correction –0.1 K |
| | | E2:51 to E2:99 | Display correction +0.1 K to Display correction +4.9 K |
| E5:0 | Without external variable speed heating circuit pump (only for weather-compensated control units) | E5:1 | With external variable speed heating circuit pump (automatic recognition) |
| E8:1 | Minimum speed in operation with reduced room temperature subject to the setting in coding address "E9" (only for weather-compensated control units) | E8:0 | Speed subject to the setting in coding address "E7" |
| E9:45 | Speed of the variable speed heating circuit pump: 45% of the maximum speed during operation with reduced room temperature (only for weather-compensated control units) | E9:0 to E9:100 | Speed adjustable from 0 to 100% of the maximum speed during operation with reduced room temperature |
| F5:12 | Run-on time of the internal circulation pump in heating mode: 12 min (only for constant temperature control units) | F5:0 | No run-on time for the internal circulation pump |
| | | F5:1 to F5:20 | Run-on time of the internal circulation pump adjustable from 1 to 20 min |

## Diagnosis

- Weather-compensated control unit:
  Operating data can be scanned in the following areas:
  – General
  – Heating circuit 1
  – Heating circuit 2 (if heating circuit with mixer installed)
  – DHW
  – Solar (only if a solar thermal system is connected)
  – Brief scan (for further information, see page 83)
  – Reset data
- Constant temperature control unit:
  Operating data can be scanned in the brief scan (see page 83).

***Note***
*If a sensor that has been scanned is not connected,* ***"- - -"*** *appears on the display.*

### Calling up operating data

**Weather-compensated control unit**

1. Press **OK** and ☰ simultaneously for approx. 4 s.
2. **"Diagnosis"**.
3. Select required group, e.g. **"General"**.

**Constant temperature control unit**

 Operating instructions

### Resetting operating data

Saved operating data (e.g. hours run) can be reset to 0.
The value "Adjusted outside temp" is reset to the actual value.

**Weather-compensated control unit**

1. Press **OK** and ☰ simultaneously for approx. 4 s.
2. **"Diagnosis."**
3. **"Reset data"**

**Constant temperature control unit**

 Operating instructions

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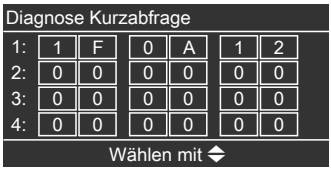
## Diagnosis (cont.)

### Brief scan

In the brief scan, you can scan temperatures, software versions and connected components, for example.

**Weather-compensated control unit**

1. Press **OK** and ☰: simultaneously for approx. 4 s.
2. **"Diagnosis"**.
3. **"Brief scan"**.
4. Press **OK**.
   The display shows 8 lines with 6 fields each.




**For an explanation of the relevant values in the individual lines, see the following table:**

| Line (brief scan) | Field | | | | | |
|---|---|---|---|---|---|---|
| | **1** | **2** | **3** | **4** | **5** | **6** |
| 1: | Software version Control unit | | Equipment version | | Burner control unit version | |
| 2: | System designs 01 to 06 | | Number of KM BUS subscribers | Maximum demand temperature | | |

## Diagnosis (cont.)

| Line (brief scan) | Field | | | | | |
|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 |
| 3: | 0 | Software version Programming unit | Software version Mixer extension 0: no mixer extension | 0 | Software version LON module | Software version External extension 0: no external extension |
| 4: | Software version Burner control unit | | Type Burner control unit | | Appliance type | |
| 5: | 0: no external demand 1: external demand | 0: no external blocking 1: external blocking | 0 | External 0 to 10 V hook-up Display in °C 0: no external hook-up | | |
| 6: | Number of LON subscribers | | Check digit | Max. output Details in % | | |
| | **Boiler** | | **Heating circuit A1 (without mixer)** | | **Heating circuit with mixer M2** | |
| 7: | 0 | 0 | Remote control 0 w/o 1 Vitotrol 200 2 Vitotrol 300 | Software version Remote control 0: no remote control | Remote control 0 w/o 1 Vitotrol 200 2 Vitotrol 300 | Software version Remote control 0: no remote control |

## Diagnosis (cont.)

| Line (brief scan) | Field | | | | | |
|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 |
| | Internal circulation pump | | Heating circuit pump to connection extension | | | |
| 8: | Variable speed pump<br>0 w/o<br>1 Wilo<br>2 Grundfos | Software version Variable speed pump<br>0: no variable speed pump | Variable speed pump<br>0 w/o<br>1 Wilo<br>2 Grundfos | Software version Variable speed pump<br>0: no variable speed pump | Variable speed pump<br>0 w/o<br>1 Wilo<br>2 Grundfos | Software version Variable speed pump<br>0: no variable speed pump |

**Constant temperature control unit**

1. Press **OK** and ☰: simultaneously for approx. 4 s.
   "🔧" flashes on the display.

2. Confirm with **OK**.

3. Select scan with ▲/▼. For example, "b" for "Max. output" (see following table):

4. Confirm selected scan with **OK**.

**For explanations of individual scans, see the following table:**

| Brief scan | Display | | | | |
|---|---|---|---|---|---|
| 0 | 0 | System designs 1 to 6 | Software version Control unit | | Software version Programming unit |
| 1 | 0 | Software version Burner control unit | | External extension software version<br>0: no external extension | 0 |

## Diagnosis (cont.)

| Brief scan | Display | | | | |
|---|---|---|---|---|---|
| 0 | 0 | 0 | 0 | 0 | 0 |
| E | 0: no external demand<br>1: external demand | 0: no external blocking<br>1: external blocking | External 0 to 10 V hook-up<br>Display in °C<br>0: no external hook-up | | |
| 3 | 0 | 0 | Set boiler water temperature | | |
| A | 0 | 0 | Highest demand temperature | | |
| 4 | 0 | Burner control unit type | | Appliance type | |
| 5 | 0 | 0 | Set cylinder temperature | | |
| b | 0 | 0 | Max. output in % | | |
| C | 0 | Boiler coding card (hexadecimal) | | | |
| c | 0 | Version Appliance | | Version Burner control unit | |
| d | 0 | 0 | 0 | Variable speed pump<br>0 w/o<br>1 Wilo<br>2 Grundfos | Software version Variable speed pump<br>0: no variable speed pump |

## Reset data

Saved operating data (e.g. hours run) can be reset to 0.
The value "Adjusted outside temp" is reset to the actual value.

1. Press **OK** and ☰ simultaneously for approx. 4 s.
2. **"Diagnosis"**
3. **"Reset data"**

## Checking outputs (relay test)

## Weather-compensated control unit

1. Press **OK** and ☰ simultaneously for approx. 4 s.
2. **"Actuator test"**

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

**The following relay outputs can be controlled subject to system design:**

| Display | Explanation |
|---|---|
| Base load | Burner modulation base load |
| Full load | Burner modulation full load |
| Internal pump ON | Int. output 20 |
| Htg. system valve | Diverter valve set to heating mode |
| Valve Centre | Diverter valve in central position (filling/draining) |
| Valve Cylinder | Diverter valve set to DHW mode |
| Heating circ pump M2 ON | Extension heating circuit with mixer |
| Mix.valve open | Extension heating circuit with mixer |
| Mix.valve closed | Extension heating circuit with mixer |
| Output internal ON | Output 28 Internal extension |
| Heating circ pump A1 ON | Connection to external extension H1 |
| Cyl. prim. pump ON | Connection to external extension H1 |
| DHW circ pump ON | Connection to external extension H1 |
| Central fault ON | Connection to external extension H1 |
| Solar circuit pump ON | Output solar circuit pump on solar control module active |
| Solar circ pmp min ON | Output solar circuit pump on solar control module switched to minimum speed |
| Solar circ pmp max ON | Output solar circuit pump on solar control module switched to maximum speed |

## Constant temperature control unit

1. Press **OK** and ☰ simultaneously for approx. 4 s.
   "🔧" flashes on the display.
2. Select ▶ "⊟" and confirm with **OK**.
3. Select required actuator (output) with ▲/▼ (see following table):
4. Confirm selected actuator with **OK**.
   The display shows the number for the activated actuator and "**ON**".

**The following actuators (relay outputs) can be controlled subject to system design:**

| Display | Explanation |
|---|---|
| 1 | Burner modulation base load |
| 2 | Burner modulation full load |
| 3 | Internal pump / output 20 "ON" |

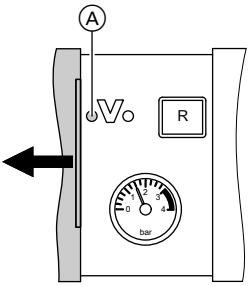
## Checking outputs (relay test) (cont.)

| Display | Explanation |
|---|---|
| 4 | Diverter valve set to heating mode |
| 5 | Diverter valve in central position (filling/draining) |
| 6 | Diverter valve set to DHW mode |
| 10 | Output [28] Internal extension |
| 11 | Heating circuit pump A1, External extension H1 |
| 12 | Circulation pump for cylinder heating, External extension H1 |
| 13 | DHW circulation pump, External extension H1 |
| 14 | Central fault message, External extension H1 |

## Fault display

### Weather-compensated control unit

If there is a fault, the red fault indicator Ⓐ flashes. **"⚠"** flashes on the display and **"Fault"** is shown.




The fault code is displayed with **OK**. For an explanation of the fault code, see the following pages.
For some faults, the type of fault is also displayed in plain text.

**Acknowledging a fault**

Follow the instructions on the display.

***Note***
*The fault message goes into the standard display of the short menu.*
*A fault messaging facility, if connected, will be switched off.*
*If an acknowledged fault is not remedied, the fault message will be re-displayed the following day.*

**Calling up acknowledged faults**

Select **"Fault"** in the standard menu. The current faults will be displayed in a list.

**Calling up fault codes from the fault memory (fault history)**

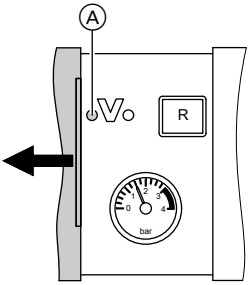
The 10 most recent faults (including resolved ones) are saved and can be scanned.
Faults are sorted by date.

1. Press **OK** and ☰ simultaneously for approx. 4 s.
2. **"Fault history"**
3. **"Display?"**

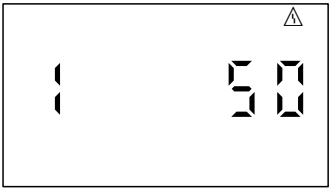
### Constant temperature control unit

If there is a fault, the red fault indicator Ⓐ flashes. The two-digit fault code and (subject to the type of fault) **"⚠"** or **"⏚"** flash on the programming unit display.

## **Fault display** (cont.)




Other current faults can be displayed with ▲/▼. For an explanation of the fault codes, see the following pages.




Example: Fault code "50"

**Acknowledge fault**

Press **OK**; the standard display is shown again.

A fault messaging facility, if connected, will be switched off.

**Calling up acknowledged faults**

Press **OK** for approx. 4 s.
The 10 most recent faults (including resolved ones) are saved and can be scanned.

**Calling up fault codes from the fault memory (fault history)**

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

1. Press **OK** and ☰ simultaneously for approx. 4 s.
2. Select "⚠" and enable fault history with **OK**.
3. Select fault messages with ▲/▼.

## Fault codes

| Fault code on the display | Const. | Weath.-comp. | System characteristics | Cause | Measures |
|---|---|---|---|---|---|
| 0F | X | X | Control mode | Service | Service the appliance. After servicing, set coding address "24:0" |
| 10 | X | X | Controls as if the outside temperature were 0 °C | Short circuit, outside temperature sensor | Check the outside temperature sensor (see page 102) |
| 18 | X | X | Controls as if the outside temperature were 0 °C | Lead break, outside temperature sensor | Check the outside temperature sensor (see page 102) |
| 20 | X | X | Regulates without flow temperature sensor (low loss header) | Short circuit, system flow temperature sensor | Check the low loss header sensor (see page 104) |
| 28 | X | X | Regulates without flow temperature sensor (low loss header) | Lead break, system flow temperature sensor | Check the low loss header sensor (see page 104) |
| 30 | X | X | Burner blocked | Short circuit, boiler water temperature sensor | Check the boiler water temperature sensor (see page 104) |
| 38 | X | X | Burner blocked | Lead break, boiler water temperature sensor | Check the boiler water temperature sensor (see page 104) |
| 40 | | X | Mixer closes | Short circuit, flow temperature sensor, heating circuit 2 (with mixer) | Check flow temperature sensor |

## Fault codes (cont.)

| Fault code on the display | Const. | Weath.-comp. | System characteristics | Cause | Measures |
|---|---|---|---|---|---|
| 48 | | X | Mixer closes | Lead break, flow temperature sensor, heating circuit 2 (with mixer) | Check flow temperature sensor |
| 50 | X | X | No DHW heating | Short circuit, cylinder temperature sensor | Check sensors (see page 104) |
| 51 | X | X | No DHW heating | Short circuit, outlet temperature sensor | Check sensors (see page 104) |
| 58 | X | X | No DHW heating | Lead break, cylinder temperature sensor | Check sensors (see page 104) |
| 59 | X | X | No DHW heating | Lead break, outlet temperature sensor | Check sensors (see page 104) |
| A7 | | X | Control mode as per delivered condition | Faulty programming unit | Replace programming unit |
| A8 | | X | Burner blocked The venting program is started automatically (see page 61) | Air lock in the internal circulation pump or minimum flow rate not achieved | Vent the system if the fault message continues to be displayed |

## Fault codes (cont.)

| Fault code on the display | Const. | Weath.-comp. | System characteristics | Cause | Measures |
|---|---|---|---|---|---|
| A9 | | X | The burner operates at its lower output if a heating circuit with mixer is connected. The burner is blocked if only one heating circuit without mixer is connected. | Internal circulation pump blocked | Check the circulation pump |
| b0 | X | X | Burner blocked | Short circuit, flue gas temperature sensor | Checking the flue gas temperature sensor |
| b1 | X | X | Control mode as per delivered condition | Communication error, programming unit | Check connections and replace the programming unit, if required |
| b4 | X | X | Controls as if the outside temperature were 0 °C | Internal fault | Replacing the control unit |
| b5 | X | X | Control mode as per delivered condition | Internal fault | Replacing the control unit |
| b7 | X | X | Burner blocked | Boiler coding card fault | Plug in boiler coding card or replace, if faulty |
| b8 | X | X | Burner blocked | Lead break, flue gas temperature sensor | Checking the flue gas temperature sensor |

## Fault codes (cont.)

| Fault code on the display | Const. | Weath.-comp. | System characteristics | Cause | Measures |
|---|---|---|---|---|---|
| bA | | X | Mixer M2 regulates to 20 °C flow temperature | Communication error, extension kit for heating circuit 2 (with mixer) | Check the extension kit connections and code |
| bC | | X | Control mode without remote control | Communication error, remote control Vitotrol heating circuit 1 (without mixer) | Check connections, cable, coding address "A0" and remote control DIP switches (see page 127) |
| bd | | X | Control mode without remote control | Communication error, remote control Vitotrol heating circuit 2 (with mixer) | Check connections, cable, coding address "A0" and remote control DIP switches (see page 127) |
| bE | | X | Control mode | Vitotrol remote control incorrectly programmed | Check remote control DIP switch setting (see page 127) |
| bF | | X | Control mode | Incorrect LON communication module | Replace the LON communication module |
| C4 | X | X | Control mode | Communication error, Open Therm extension | Check Open Therm extension |
| C5 | X | X | Control mode, max. pump speed | Communication fault, variable speed internal pump | Check the setting of coding address "30" |

## Fault codes (cont.)

| Fault code on the display | Const. | Weath.-comp. | System characteristics | Cause | Measures |
|---|---|---|---|---|---|
| C6 | | X | Control mode, max. pump speed | Communication error, external variable speed heating circuit pump, heating circuit 2 (with mixer) | Check setting of coding address "E5". |
| C7 | X | X | Control mode, max. pump speed | Communication error, external variable speed heating circuit pump, heating circuit 1 (without mixer) | Check setting of coding address "E5". |
| Cd | X | X | Control mode | Communication fault, Vitocom 100 (KM BUS) | Check connections, Vitocom 100 and coding address "95" |
| CE | X | X | Control mode | Communication fault, ext. extension | Check connections and coding address "2E" |
| CF | | X | Control mode | Communication fault, LON communication module | Replace the LON communication module |
| dA | | X | Control mode without room influence | Short circuit, room temperature sensor, heating circuit 1 (without mixer) | Check room temperature sensor, heating circuit 1 |

## Fault codes (cont.)

| Fault code on the display | Const. | Weath.-comp. | System characteristics | Cause | Measures |
|---|---|---|---|---|---|
| db | | X | Control mode without room influence | Short circuit, room temperature sensor, heating circuit 2 (with mixer) | Check room temperature sensor, heating circuit 2 |
| dd | | X | Control mode without room influence | Lead break, room temperature sensor, heating circuit 1 (without mixer) | Check room temperature sensor, heating circuit 1 and remote control DIP switch settings (see page 127) |
| dE | | X | Control mode without room influence | Lead break, room temperature sensor, heating circuit 2 (with mixer) | Check room temperature sensor, heating circuit 2 and remote control DIP switch settings (see page 127) |
| E4 | X | X | Burner blocked | Fault, supply voltage 24 V | Replace the control unit. |
| E5 | X | X | Burner blocked | Fault, flame amplifier | Replace the control unit. |
| E8 | X | X | Burner in a fault state | The ionisation current lies outside the permissible range | Check the ionisation electrode and cable.<br>Press reset button **R** |
| E9 | X | X | Burner in a fault state | The ionisation current lies outside the permissible range during calibration | Check the ionisation electrode and cable.<br>Check the flue gas system for tightness.<br>Press reset button **R** |

## Fault codes (cont.)

| Fault code on the display | Const. | Weath.-comp. | System characteristics | Cause | Measures |
|---|---|---|---|---|---|
| EA | X | X | Burner in a fault state | The ionisation current lies outside the permissible range during calibration | Check the ionisation electrode and cable.<br>Press reset button **R** |
| EC | X | X | Burner in a fault state | The ionisation current lies outside the permissible range during calibration | Check the ionisation electrode and cable.<br>Press reset button **R** |
| Ed | X | X | Burner in a fault state | Internal fault | Replace the control unit. |
| EE | X | X | Burner in a fault state | Flame signal is not present or too weak at burner start. | Check the ionisation electrode and connecting cable, measure the ionisation current, check the gas supply (gas pressure and gas flow limiter), check the gas train, ignition, ignition module, ignition electrodes and the condensate drain.<br>Press reset button **R** |

## Fault codes (cont.)

| Fault code on the display | Const. | Weath.-comp. | System characteristics | Cause | Measures |
|---|---|---|---|---|---|
| EF | X | X | Burner in a fault state | The flame extinguishes immediately after formation (during the safety time). | Check the gas supply (gas pressure and gas flow limiter), check the flue gas/ventilation air system for flue gas recirculation, check the ionisation electrode (replace if required). Press reset button **R** |
| F0 | X | X | Burner blocked | Internal fault | Replace the control unit. |
| F1 | X | X | Burner in a fault state | Flue gas temperature limiter has responded. | Check the heating system fill level. Vent the system. Press reset button **R** after the flue system has cooled down. |
| F2 | X | X | Burner in a fault state | The temperature limiter has responded | Check the heating system fill level. Check the circulation pump. Vent the system. Check the temperature limiter and connecting cables. Press reset button **R** |
| F3 | X | X | Burner in a fault state | Flame signal is already present at burner start | Check the ionisation electrode and connecting cable. Press reset button **R** |

## Fault codes (cont.)

| Fault code on the display | Const. | Weath.-comp. | System characteristics | Cause | Measures |
|---|---|---|---|---|---|
| F8 | X | X | Burner in a fault state | The fuel valve closes too late | Check the gas train. Check both control paths. Press reset button **R** |
| F9 | X | X | Burner in a fault state | Fan speed too low during the burner start | Check the fan, check the fan connecting cables and power supply; check the fan control. Press reset button **R** |
| FA | X | X | Burner in a fault state | Fan not at standstill | Check the fan, fan connecting cables and fan control. Press reset button **R** |
| FC | X | X | Burner in a fault state | Gas train faulty or faulty modulation valve control or flue gas path blocked | Check the gas train. Check flue gas system. Press reset button **R** |
| Fd | X | X | Burner in a fault state | Fault, combustion controller | Check ignition electrodes and connecting cables. Check whether a strong interference (EMC) field exists near the equipment. Press reset button **R** Replace control unit if the fault persists |

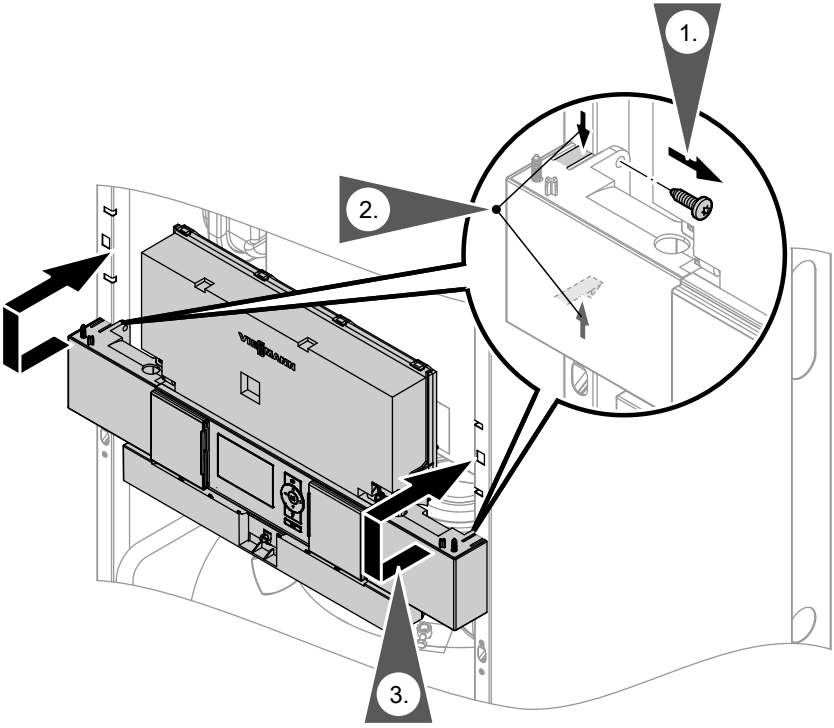
## Fault codes (cont.)

| Fault code on the display | Const. | Weath.-comp. | System characteristics | Cause | Measures |
|---|---|---|---|---|---|
| FE | X | X | Burner blocked or in a fault state | Boiler coding card or main PCB faulty | Press reset button **R.** Replace boiler coding card or control unit if the fault persists |
| FF | X | X | Burner blocked or in a fault state | Internal fault or reset button **R** blocked | Start the equipment again. Replace the control unit if the equipment will not restart |

## Repairs

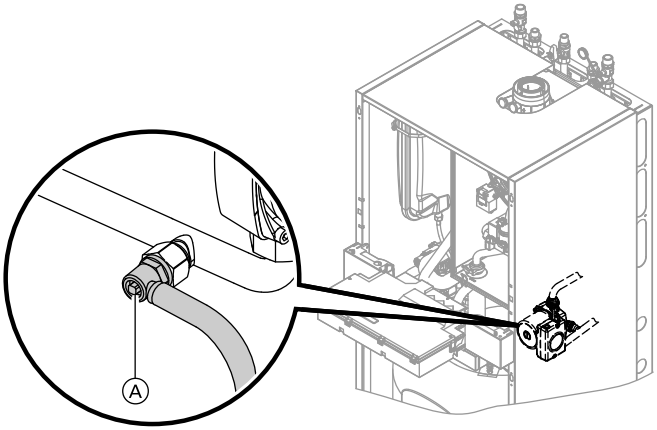
### Putting control unit in maintenance position

If required for commissioning and servicing, the control unit can be put in a different position.



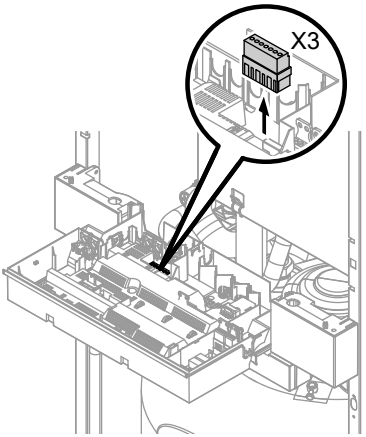
## Repairs (cont.)

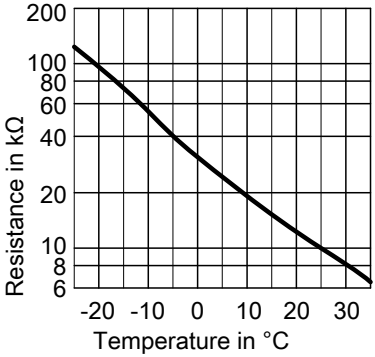
### Draining the boiler on the heating water side




1. Close the shut-off valves on the heating water side.
2. Route hose at drain valve Ⓐ into a suitable container or drain outlet.
3. Open drain valve Ⓐ and drain the boiler as much as required.

### Checking the outside temperature sensor (weather-compensated control unit)




1. Pull plug "X3" from the control unit.

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## **Repairs** (cont.)

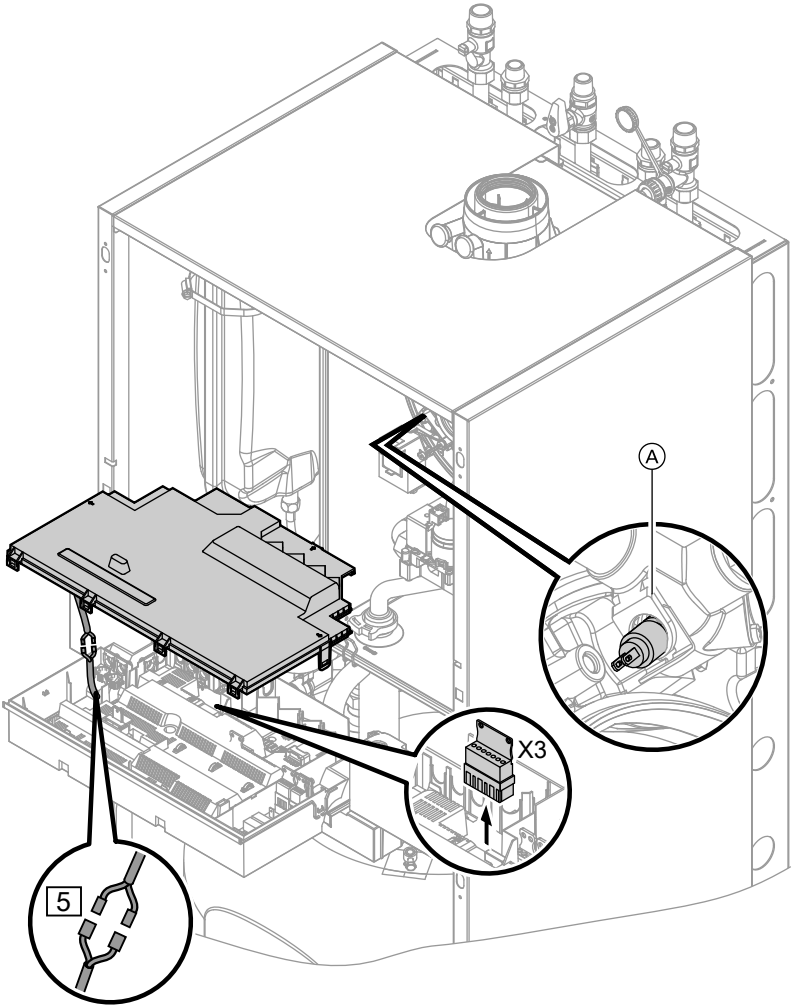
2. Test the resistance of the outside temperature sensor across terminals "X3.1" and "X3.2" on the disconnected plug and compare it with the curve.
3. Where actual values strongly deviate from the curve values, disconnect the wires at the sensor and repeat test on the sensor itself.
4. Subject to result, replace the lead or the outside temperature sensor.



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## **Repairs** (cont.)

### Checking the boiler temperature sensor, cylinder temperature sensor or flow temperature sensor for the low loss header

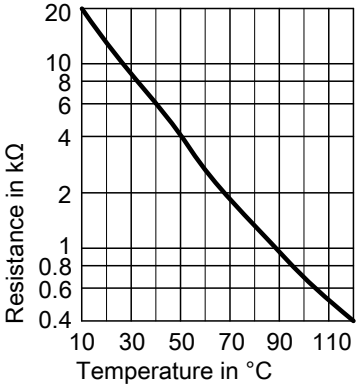



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## Repairs (cont.)

1. ■ **Boiler water temperature sensor**
   Pull the leads from boiler water temperature sensor Ⓐ and check the resistance.
   ■ **Cylinder temperature sensor**
   Pull plug [5] from the cable harness at the control unit and check the resistance.
   ■ **Flow temperature sensor**
   Pull plug "X3" from the control unit and check the resistance across terminals "X3.4" and "X3.5".

2. Check the sensor resistance and compare the actual values with the curve.

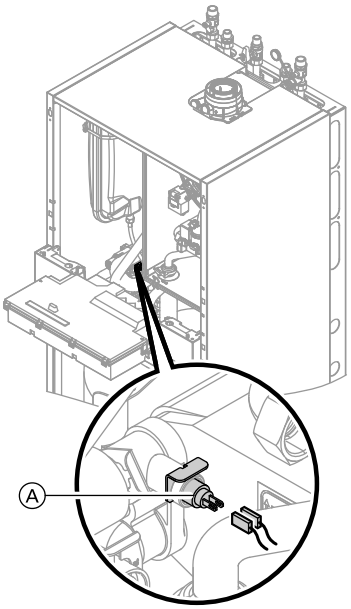



3. Replace the sensor in case of severe deviation.

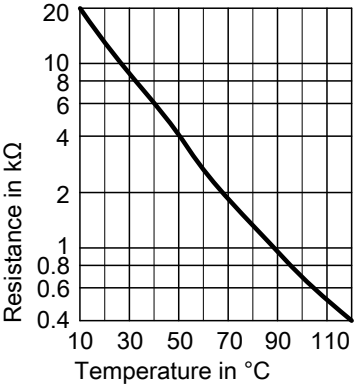
**Danger**
The boiler water temperature sensor is immersed in the heating water (risk of scalding).
Drain the boiler on the heating water side before replacing the sensor.

## Repairs (cont.)

### Checking the outlet temperature sensor




1. Pull the leads from outlet temperature sensor Ⓐ.




2. Check the sensor resistance and compare it with the curve.

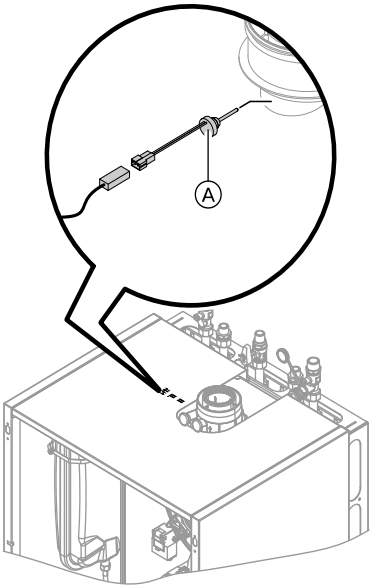
3. Replace the sensor in case of severe deviation.

**Danger**
The outlet temperature sensor is immersed in the DHW (risk of scalding).
Drain the DHW side of the boiler before replacing the sensor.

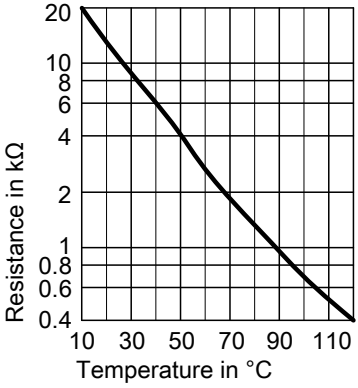
## Repairs (cont.)

### Checking the flue gas temperature sensor

The flue gas temperature sensor locks out the boiler when the permissible flue gas temperature is exceeded. Reset the interlock after the flue system has cooled down by pressing reset button **R**




1. Pull the leads from flue gas temperature sensor Ⓐ.

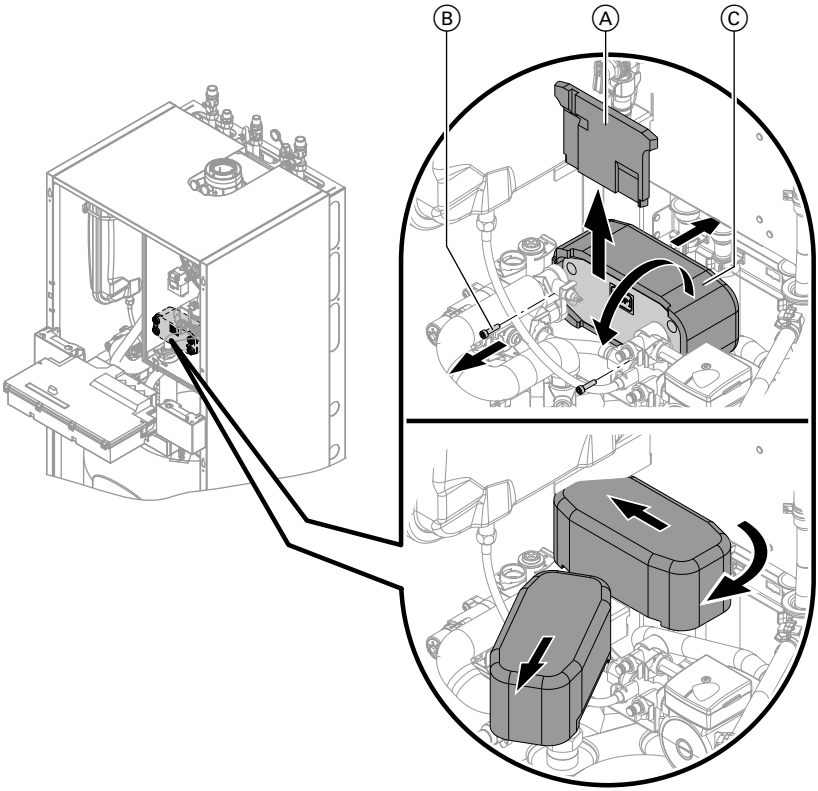



2. Check the sensor resistance and compare it with the curve.
3. Replace the sensor in case of severe deviation.

## **Repairs** (cont.)

### Checking the plate heat exchanger

***Note***
*Drain the boiler on its heating water and DHW side.*
*During removal, small amounts of water may trickle out and escape from the plate heat exchanger.*



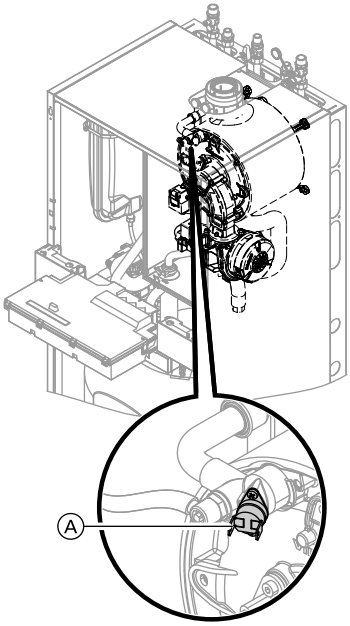

1. Shut off and drain the boiler on its heating water and DHW side.
2. Release the side closures and pivot the control unit forward.
3. Remove the siphon (see page 27).
4. Push insulating mat Ⓐ upwards and remove.
5. Undo two screws Ⓑ and pull out plate heat exchanger Ⓒ to the front.

## **Repairs** (cont.)

6. Check the connections on the heating water and DHW side for contamination and scaling; if required, replace the plate heat exchanger.
7. Lubricate the new gaskets/seals. Install in reverse order with new gaskets.

## Checking the temperature limiter

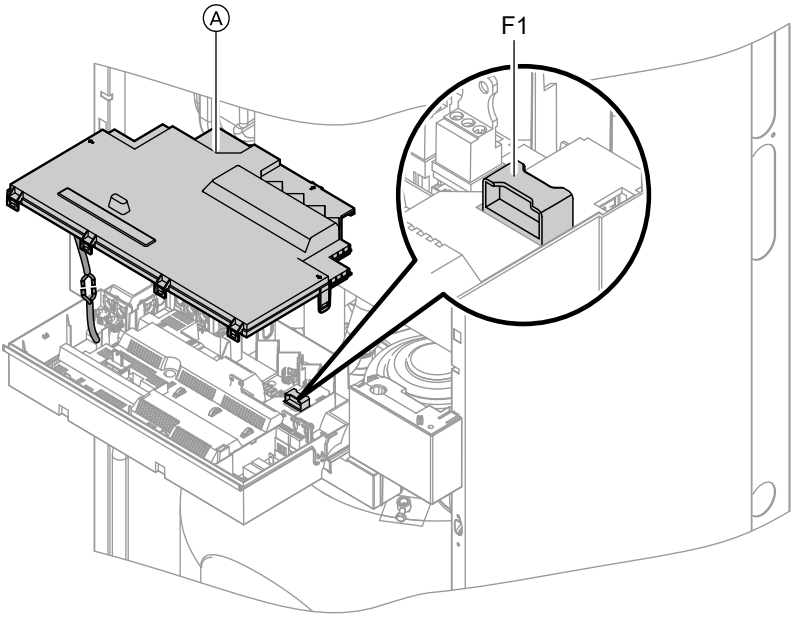
If the burner control unit cannot be reset after a fault shutdown, although the boiler water temperature is below approx. 75 °C, check the following:




1. Pull the leads from temperature limiter Ⓐ.
2. Check the continuity of the temperature limiter with a multimeter.
3. Remove the faulty temperature limiter.
4. Coat the replacement temperature limiter with heat conducting paste and install it.
5. After commissioning, press reset button **R** on the control unit.

## Repairs (cont.)

### Checking the fuse




1. Switch OFF the power.
2. Release the side closures and pivot the control unit down.
3. Remove cover Ⓐ.
4. Check fuse F1 (see connection and wiring diagram).

### Extension kit for heating circuit with mixer

***Note***
*The DIP switch on the PCB of the extension set must be set to "2".*

**Checking the rotational direction of the mixer motor**

After being switched on, the boiler implements a self-test. During this, the mixer is opened and closed again.

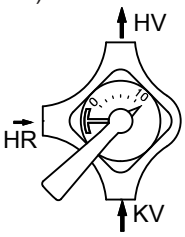
## Repairs (cont.)

Note the rotational direction of the mixer motor during its self-test.
Then set the mixer manually to "Open" again.

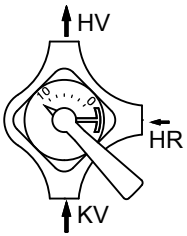
***Note***
*The flow temperature sensor must now capture a higher temperature. If the temperature drops, either the motor is turning in the wrong direction or the mixer set is incorrectly fitted.*

Mixer installation instructions

In the delivered condition, the mixer motor is set up for the following mixer arrangement (heating return from the left).



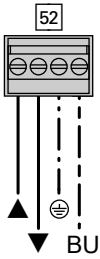

For the following mixer arrangement (heating return from the right), change the rotational direction.




**Changing the rotational direction of the mixer motor (if required)**

**Danger**
An electric shock can be life-threatening.
Before opening the boiler, disconnect from the mains voltage, for example at the fuse or the main isolator.

## **Repairs** (cont.)

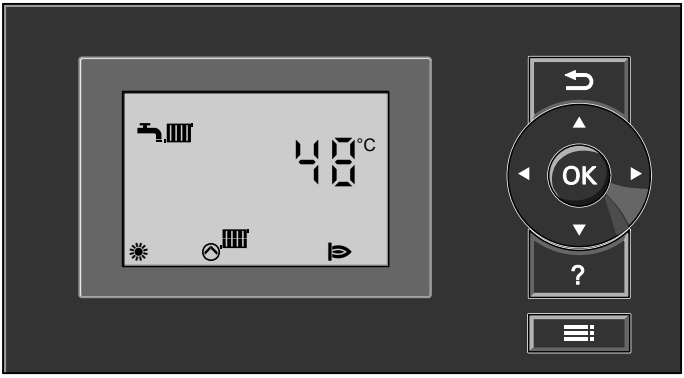



1. Remove the upper casing cover of the extension kit.
2. At plug 52, swap the cores at terminals "▲" and "▼".
3. Refit the casing cover.

## Checking the Vitotronic 200-H (accessories)

The Vitotronic 200-H is connected to the control unit via the LON cable. To test the connection, carry out a subscriber check at the boiler control unit (see page 57).

## Constant temperature control unit




### Heating operation

The selected set boiler water temperature will be maintained when a demand is being raised by the room thermostat and the heating program is set to DHW and central heating "".
The boiler water temperature will be maintained at the default frost protection temperature when there is no demand.

The electronic temperature limiter inside the burner control unit limits the boiler water temperature to 82 °C.
Flow temperature setting range: 40 to 74 °C.

### Heating the DHW primary cylinder from cold

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

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

The primary cylinder is heated up to the set DHW temperature. Heating stops when the set temperatures have been reached at the cylinder temperature sensor and at the outlet temperature sensor.
After heating, the cylinder primary pump and the three-way diverter valve remain ON for a further 30 s.

## Constant temperature control unit (cont.)

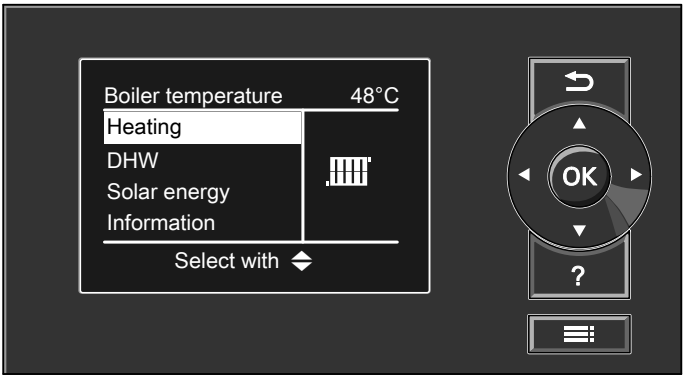
### Boosting when DHW is drawn off

When DHW is drawn off, cold water enters at the bottom of the primary cylinder.
The heating circuit pump is switched ON and the three-way diverter valve is changed over, if the cylinder temperature sensor recognises a temperature lower than the set temperature.

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

The DHW is controlled to the specified temperature via the cylinder temperature sensor.
The primary cylinder continues to be heated up after the draw off process has terminated, until the set DHW temperature has been reached at the cylinder temperature sensor.
The cylinder primary pump and the three-way diverter valve remain ON for a further 30 s.

## Weather-compensated control unit



## Weather-compensated control unit (cont.)

### Heating operation

The control unit determines a set boiler water temperature subject to outside temperature or room temperature (if a room temperature-dependent remote control is connected) and to the slope/ level of the heating curve.
The determined set boiler water temperature is transferred to the burner control unit. From the set and actual boiler water temperatures, the burner control unit calculates the modulation level and regulates the burner accordingly.

The electronic temperature limiter inside the burner control unit limits the boiler water temperature to 82 °C.

### Heating the DHW primary cylinder from cold

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

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

The primary cylinder is heated up to the set DHW temperature. Heating stops when the set temperatures have been reached at the cylinder temperature sensor and at the outlet temperature sensor.
After heating, the cylinder primary pump and the three-way diverter valve remain ON for a further 30 s.

### Boosting when DHW is drawn off

When DHW is drawn off, cold water enters at the bottom of the primary cylinder.
The heating circuit pump is switched ON and the three-way diverter valve is changed over, if the cylinder temperature sensor recognises a temperature lower than the set temperature.

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



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## Weather-compensated control unit (cont.)

The DHW is controlled to the specified temperature via the cylinder temperature sensor.
The primary cylinder continues to be heated up after the draw off process has terminated, until the set DHW temperature has been reached at the cylinder temperature sensor.

The cylinder primary pump and the three-way diverter valve remain ON for a further 30 s.

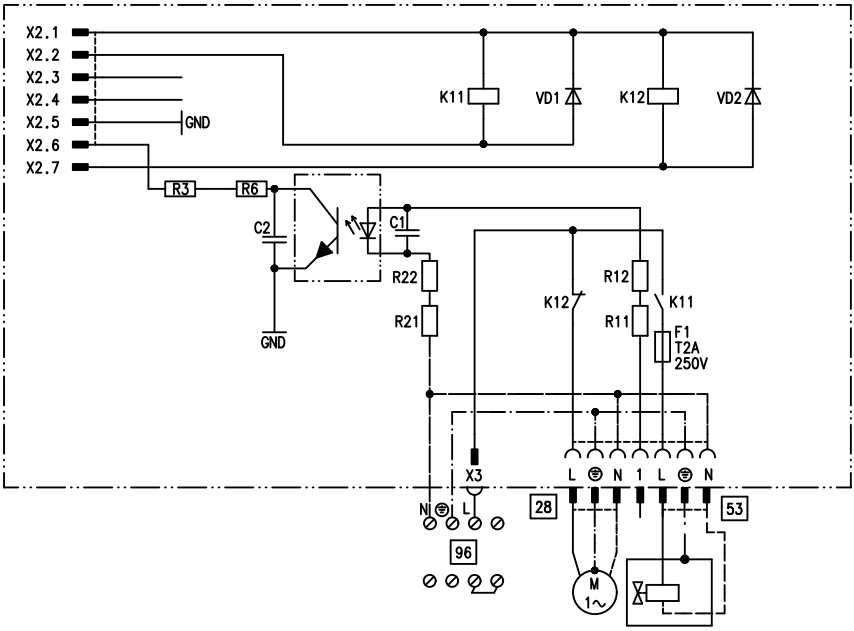
### Boosting DHW heating

The booster heating function is activated if a switching period is selected for the fourth time phase.

The set temperature value for the heating boost is adjustable in coding address "58".

## Internal extensions

### Internal extension H1

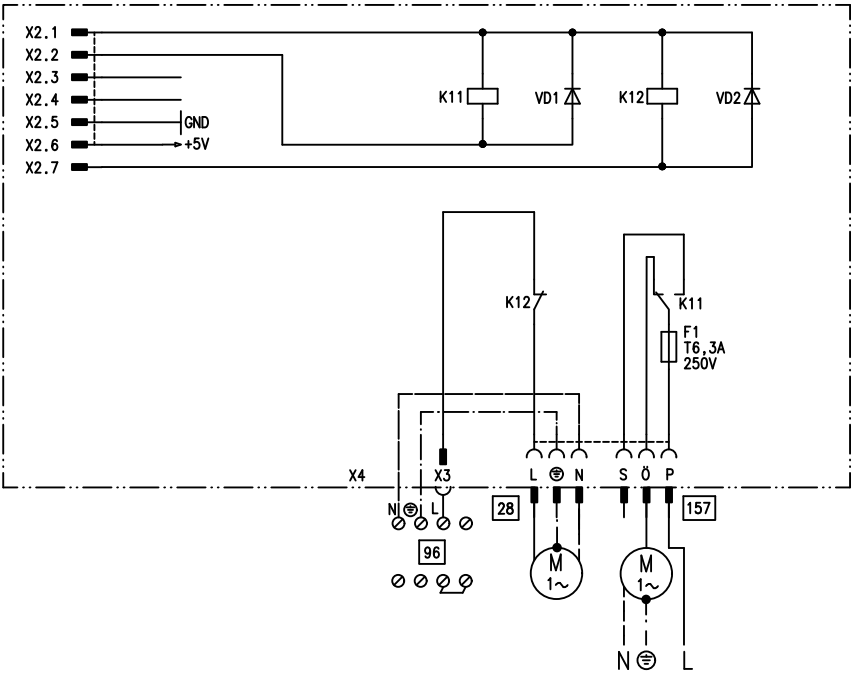



The internal extension H1 is integrated into the control unit casing. The cylinder primary pump is connected to relay output 28.

An external safety valve can be connected to 53.

## Internal extensions (cont.)

### Internal extension H2 (accessories)



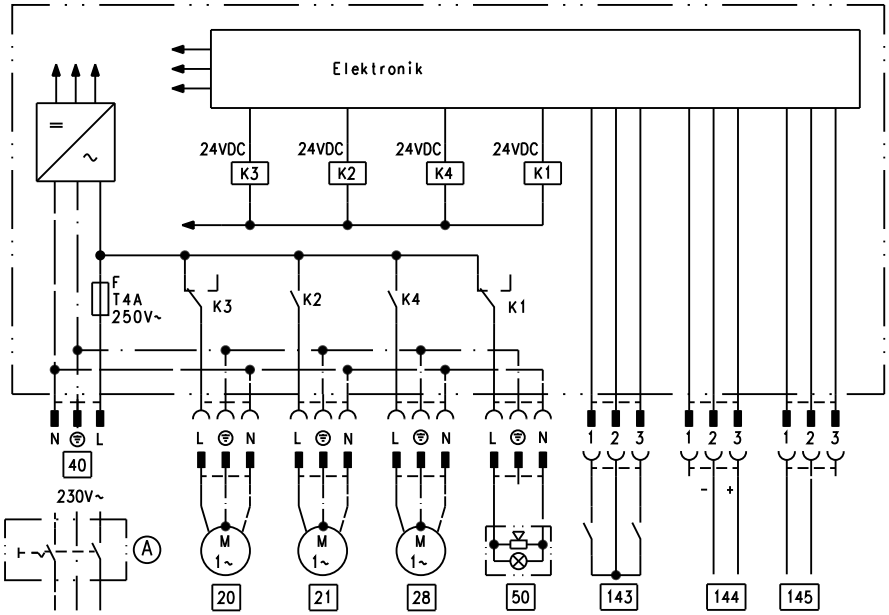

The internal extension H2 is integrated into the control unit casing instead of the internal extension H1. The cylinder primary pump is connected to relay output 28.

An external extractor interlock can be connected to 157.

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## External extensions (accessories)

### External extension H1

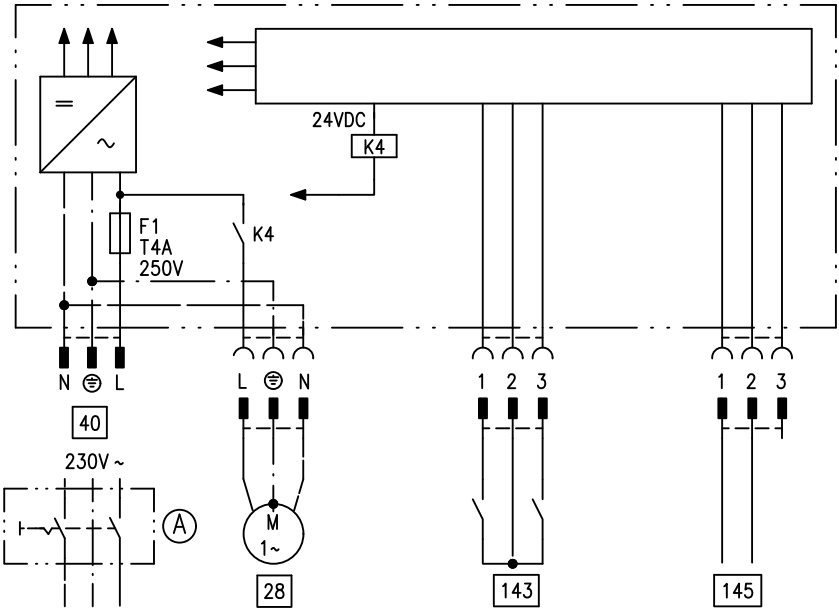



The external extension is connected to the boiler control unit via the KM BUS. The following functions can be controlled or processed simultaneously via the extension:

- Ⓐ ON/OFF switch (on site)
- 20 Heating circuit pump for the heating circuit without mixer
- 21 Circulation pump for cylinder heating
- 28 DHW circulation pump (only for weather-compensated operation)
- 40 Power supply
- 50 Central fault message
- 143 ■ External blocking (terminals 2 - 3)
  ■ External demand (terminals 1 - 2)
  ■ External heating program changeover (terminals 1 - 2) (only for weather-compensated operation)
  The allocation of function "External heating program changeover" is set via coding address "91"
- 144 External set value 0 to 10 V
- 145 KM BUS

## External extensions (accessories) (cont.)

### External extension H2




The external extension is connected to the boiler control unit via the KM BUS. The following functions can be controlled or processed simultaneously via the extension:

- Ⓐ ON/OFF switch (on site)
- 28 DHW circulation pump (only for weather-compensated operation)
- 40 Power supply
- 143
  - External blocking (terminals 2 - 3)
  - External demand (terminals 1 - 2)
  - External heating program changeover (terminals 1 - 2) (only for weather-compensated operation)
    The allocation of the function "External heating program changeover" is set via coding address "91".
- 145 KM BUS

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## Control functions

### External heating program changeover

The "External heating program changeover" function is connected via external extension input "143". You can select which heating circuits the heating program changeover affects in coding address "91":

| Heating program changeover | Coding |
|---|---|
| No changeover | 91:0 |
| Heating circuit without mixer A1 | 91:1 |
| Heating circuit with mixer M2 | 91:2 |
| Heating circuit without mixer and heating circuit with mixer | 91:3 |

You can select in which direction the heating program changes over in coding address "D5":

| Heating program changeover | Coding |
|---|---|
| Changeover towards "Permanently reduced" or "Permanent standby" mode (subject to the selected set value) | d5:0 |
| Changeover towards "Constant heating mode" | d5:1 |

The duration of the heating program changeover can be adjusted in coding address "F2":

| Heating program changeover | Coding |
|---|---|
| No heating program changeover | F2:0 |
| Duration of the heating program changeover 1 to 12 hours | F2:1 to F2:12 |

The heating program changeover stays enabled for as long as the contact remains closed, but at least as long as the duration selected in coding address "F2".

## Control functions (cont.)

### External blocking

The "External blocking" function is connected via external extension input "143".

In coding address "32" you can select the influence the "Ext. blocking" signal should have on the connected circulation pumps.

### External demand

The "External demand" function is connected via external extension input "143".
In coding address "34" you can select the influence the "Ext. demand" signal should have on the connected circulation pumps.

The minimum set boiler water temperature in case of external demand is selected in coding address "9b".

### Venting program

During the venting program, the circulation pump will be alternately switched ON and OFF for 30 s respectively over a period of 20 min.
For a certain period, the diverter valve is alternately set towards heating and DHW heating. The burner is switched OFF during the venting program.

The venting program is activated via code "2F:1". The program is automatically disabled after 20 min, and coding address "2F" is set to "0".

### Fill program

In the delivered condition, the diverter valve is set to its central position, enabling the system to be filled completely.
After switching ON the control unit, the diverter valve no longer goes into its central position.
Afterwards, the diverter valve can be moved via code "2F:2" into the central position. In this position, the control unit can be switched OFF, and the system can be filled completely.

**Filling with the control unit switched ON**

If the system is to be filled with the control unit switched ON, the diverter valve will be moved to its central position via code "2F:2" and the pump will be started.
The burner shuts down if this function is enabled via coding address "2F". The program is automatically disabled after 20 min, and coding address "2F" is set to "0".

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## Control functions (cont.)

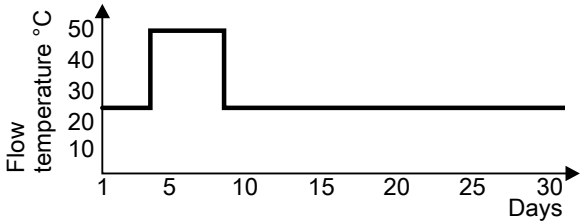
### Screed drying function

The screed function enables screeds to be dried. For this, always observe the details specified by the screed manufacturer.
When the screed drying function is activated, the heating circuit pump of the mixer circuit is switched ON and the flow temperature will be held at the selected profile. After completion (30 days), the mixer circuit will again be regulated automatically via the set parameters.
Observe EN 1264. The report to be provided by the heating contractor must contain the following heat-up details:

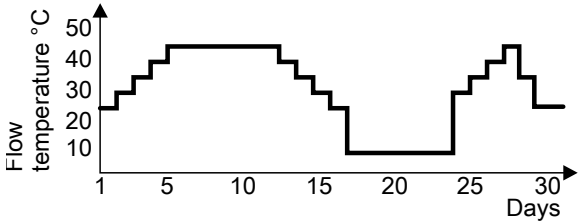
- Heat-up data with respective flow temperatures
- Max. flow temperature achieved
- Operating condition and outside temperature during handover

The various temperature profiles are adjustable via coding address "F1".
The function continues after power failure or after the control unit has been switched OFF. "Heating and DHW" will be started after the screed drying function has been terminated or if code "F1:0" is manually adjusted.

**Temperature profile 1: (EN 1264-4) code "F1:1"**




**Temperature profile 2: (ZV parquet and flooring technology) code "F1:2"**

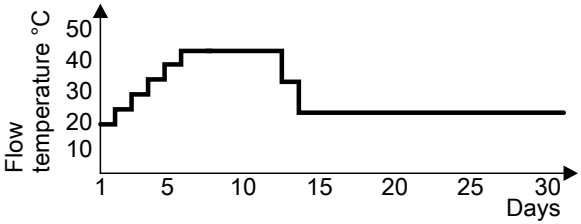




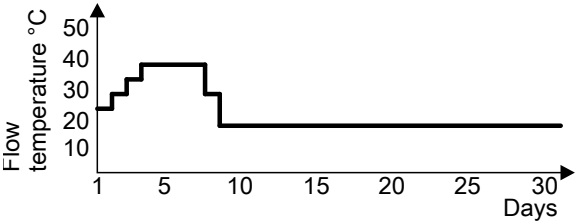

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## Control functions (cont.)

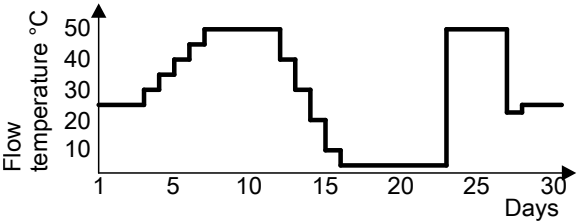
**Temperature profile 3: Code "F1:3"**




**Temperature profile 4: Code "F1:4"**

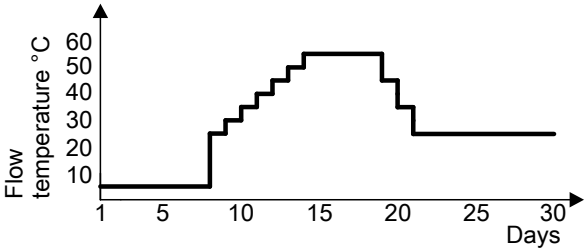



**Temperature profile 5: Code "F1:5"**

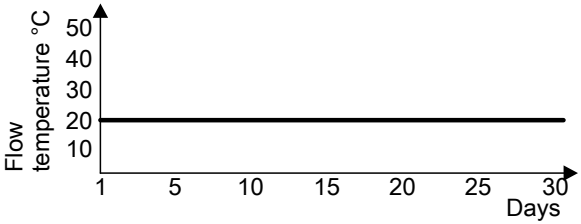


## Control functions (cont.)

**Temperature profile 6: Code "F1:6"**




**Temperature profile 7: Code "F1:15"**



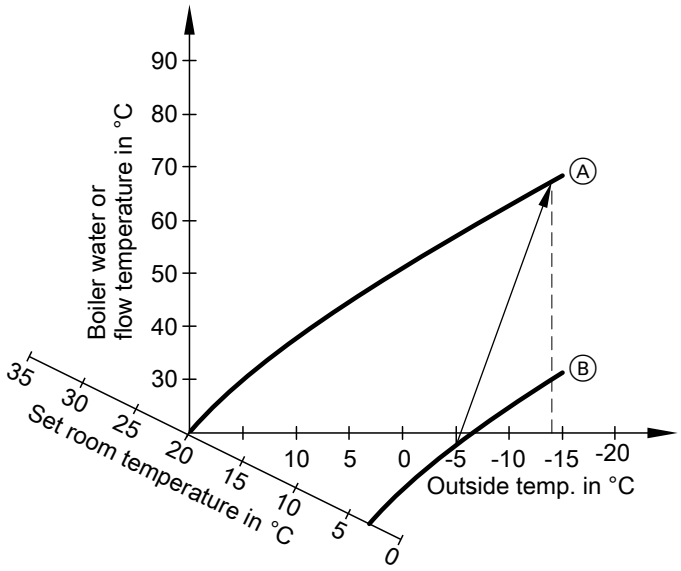

## Raising the reduced room temperature

During operation with 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, but no higher than the set standard room temperature.

The outside temperature limits for the start and end of the temperature raising can be adjusted via coding addresses "F8" and "F9".

## Control functions (cont.)

**Example using the settings in the delivered condition**




Ⓐ Heating curve for operation with standard room temperature

Ⓑ Heating curve for operation with reduced room temperature

## Reducing the heat-up time

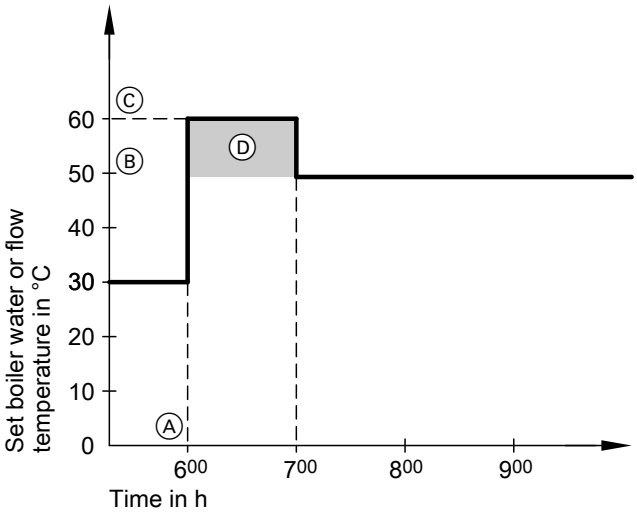
During the transition from operation with reduced room temperature to operation with standard room temperature, the boiler water or flow temperature will be raised in accordance with the selected heating curve. The boiler water or flow temperature can be automatically increased.

The value and duration of the additional increase of the set boiler water or flow temperature can be adjusted in coding addresses "FA" and "Fb".

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## Control functions (cont.)

**Example using the settings in the delivered condition**




Ⓐ Start of operation with standard room temperature
Ⓑ Set boiler water or flow temperature in accordance with the selected heating curve
Ⓒ Set boiler water or flow temperature in accordance with coding address "FA":
50 °C + 20 % = 60 °C
Ⓓ Duration of operation with raised set boiler water or flow temperature in accordance with coding address "Fb":
60 min

## Remote control DIP switches

The DIP switches are located on the PCB in the top part of the casing.

## Remote control DIP switches (cont.)

| Remote control | DIP switch setting |
|---|---|
| The remote control affects the heating circuit without mixer A1 |   |
| The remote control affects the heating circuit with mixer M2 |   |
| When connecting a separate room temperature sensor, set DIP switch "3" to "ON". |   |

## Electronic combustion controller

The electronic combustion controller utilises the physical correlation between the level of the ionisation current and the air factor λ. For all gas qualities, the maximum ionisation current results with air factor 1.
The ionisation signal is evaluated by the combustion controller, and the air factor is adjusted to between λ=1.24 and 1.44. This range provides for an optimum combustion quality. Thereafter, the electronic gas valve regulates the required gas volume subject to the prevailing gas quality.

To check the combustion quality, the $CO_2$ content or the $O_2$ content of the flue gas is measured. The actual values enable the prevailing air factor to be determined. The relationship between the $CO_2$ or $O_2$ content and air factor λ is illustrated in the following table.

## Electronic combustion controller (cont.)

**Air factor λ – $CO_2$/$O_2$ content**

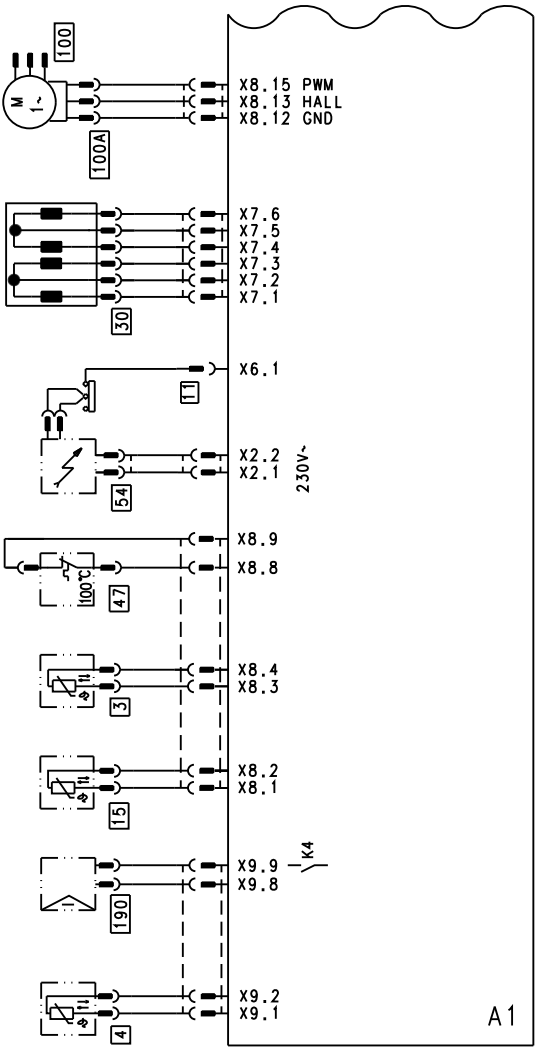
| Air factor λ | $O_2$ content (%) | $CO_2$ content (%) for natural gas E | $CO_2$ content (%) for natural gas LL | $CO_2$ content (%) for LPG P |
|---|---|---|---|---|
| 1.24 | 4.4 | 9.2 | 9.1 | 10.9 |
| 1.27 | 4.9 | 9.0 | 8.9 | 10.6 |
| 1.30 | 5.3 | 8.7 | 8.6 | 10.3 |
| **1.34** | **5.7** | **8.5** | **8.4** | **10.0** |
| 1.37 | 6.1 | 8.3 | 8.2 | 9.8 |
| 1.40 | 6.5 | 8.1 | 8.0 | 9.6 |
| 1.44 | 6.9 | 7.8 | 7.7 | 9.3 |

To achieve an optimum combustion control, the system regularly carries out an automatic self-calibration; also after a power failure (shutdown). For this, the combustion is briefly regulated to max. ionisation current (equals air factor λ=1). The automatic calibration is carried out shortly after the burner start and lasts approx. 5 s. During calibration, higher than normal CO emissions may occur briefly.



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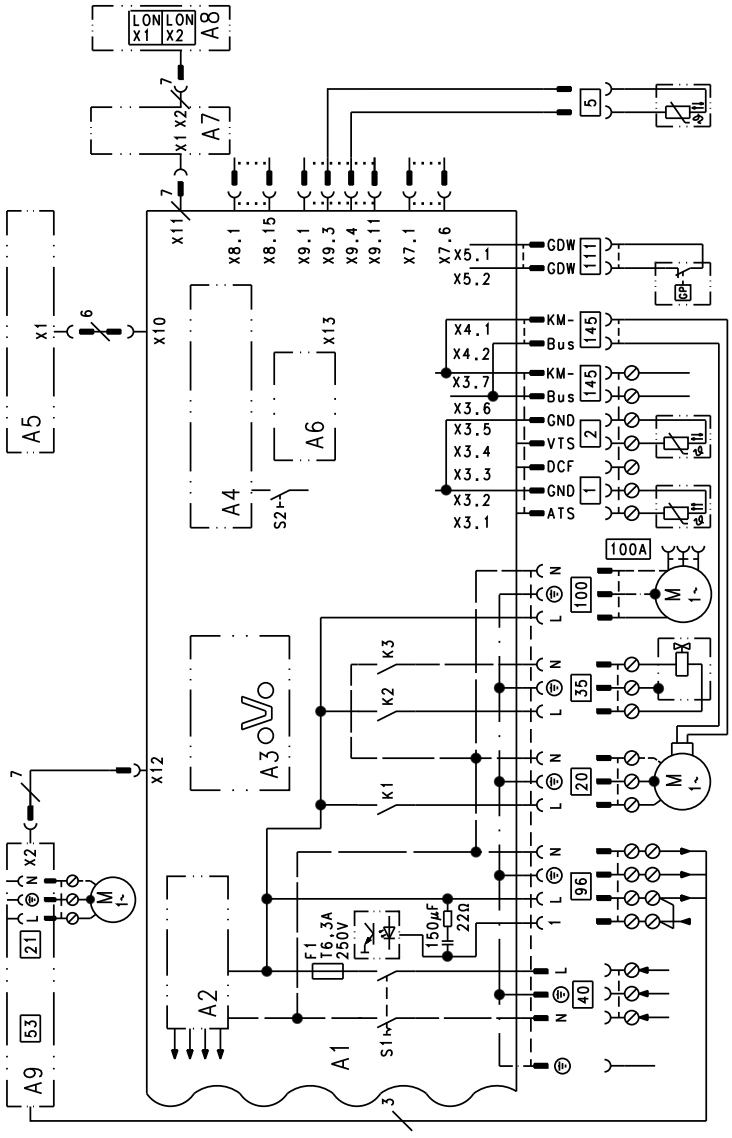
## Internal connection diagram




| | | | |
|---|---|---|---|
| A1 | Main PCB | 30 | Stepper motor for diverter valve |
| X... | Electrical interfaces | 47 | Thermal circuit breaker |
| 3 | Boiler water temperature sensor | 54 | Ignition unit |
| 4 | Outlet temperature sensor | 100 | Fan motor |
| 11 | Ionisation electrode | 100A | Fan motor control |
| 15 | Flue gas temperature sensor | 190 | Modulation coil |

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## External connection diagram




| | | | |
|---|---|---|---|
| A1 | Main PCB | A4 | Combustion controller |
| A2 | Power supply unit | A5 | Programming unit |
| A3 | Optolink | A6 | Coding card |

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## External connection diagram (cont.)

| | |
|---|---|
| A7 | Connection adaptor |
| A8 | LON communication module |
| A9 | Internal extension H1 |
| S1 | ON/OFF switch |
| S2 | Reset button |
| X... | Electrical interfaces |
| 1 | Outside temperature sensor |
| 2 | Flow temperature sensor, low loss header |
| 5 | Cylinder temperature sensor (plug on the cable harness) |
| 20 | Internal circulation pump |
| 35 | Gas solenoid valve |
| 40 | Power supply [terminals] |
| 96 | Power supply accessories and Vitotrol 100 |
| 100 | Fan motor |
| 100A | Fan motor control |
| 111 | Gas pressure limiter |
| 145 | KM BUS |

## Parts lists

***Spare parts information***
*Quote the part and serial no. (see type plate) and the item number of the required part (as per this parts list). Obtain standard parts from your local supplier.*

001 Diaphragm expansion vessel
002 Connection line; diaphragm expansion vessel
003 Cap panel with gasket
004 Profiled seal
005 Boiler flue connection
006 Plug
007 Ventilation air gasket
008 Flue gas gasket
010 Heat exchanger
011 Moulded hose, return
012 Condensate hose
013 Siphon
015 Hose (2300 mm long)
016 Hose (500 mm long)
017 Hose (270 mm long)
019 Condensate collector
021 Safety valve
023 Hose ferrule
024 Right-angle shut-off valve, DHW cylinder heating
025 Connection line, DHW heating
026 Bezel
027 Non-return valve
028 Air vent valve G ⅜"
029 Pressure gauge
030 Right-angle shut-off valve, cylinder cold water
031 Gas pipe
032 Flow pipe
033 Connection pipe, cold water, cylinder
034 Heating water flow connection pipe
035 Connection pipework, heating water return
036 Connection pipework, cold water
037 DHW connection pipe
038 Heating water flow connection pipe
039 Cold water connection
040 Return connection pipe
050 Flow unit
051 Return unit
052 Overflow valve
053 Plug ∅ 8/10
054 Plate heat exchanger
055 Profiled gasket
056 Valve insert
057 Overflow pipe
062 Burner gauze assembly
063 Burner gauze assembly gasket
066 Gasket burner flange
067 Fan
068 Gas train
069 Burner door
070 Ignition unit
071 Ionisation electrode gasket
072 Ignition electrode gasket
074 Gas nozzle
075 Venturi extension
080 Gasket set A 16 x 24 x 2.0 (5 pce)
081 Gasket set A 17 x 24 x 2.0 (5 pce)
082 Gasket set A 10 x 15 x 1.5 (5 pce)
084 Gasket 23 x 30 x 2.0 (5 pce)
085 O-ring gasket set 17.86 x 2.62 (5 pce)
087 O-ring 14.3 x 2.4 (5 pce)
088 O-ring 35.4 x 3.6 (5 pce)
089 Set of plug-in connector retainers (2 pce)
090 Toggle fastener (4 pce)
092 Grommet
093 Pipe clip ∅ 18
094 Pipe clip ∅ 18/1.5
095 Hose clip DN 25
096 Clip ∅ 8 (5 pce)
097 Clip ∅ 10 (5 pce)
098 Clip ∅ 15 (5 pce)
099 Clip ∅ 18 (5 pce)
102 Locking clip, condensate drain

## Parts lists (cont.)

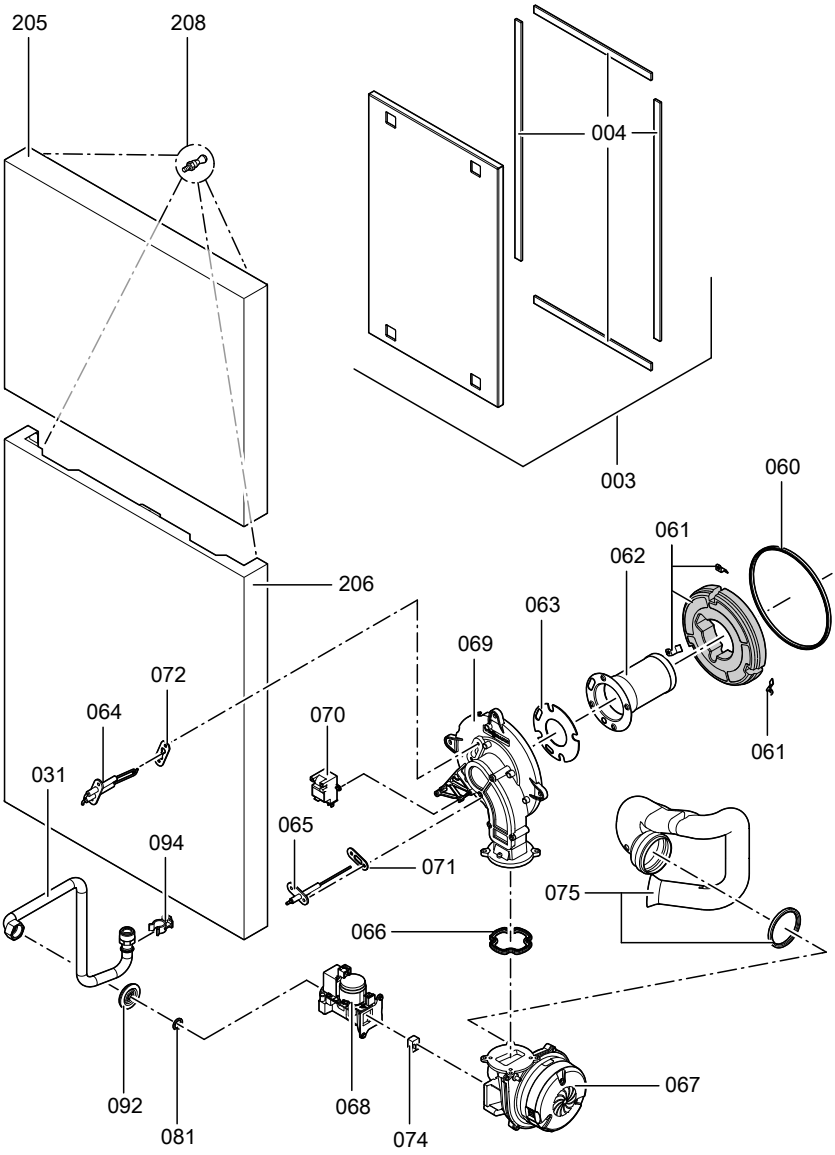
103 Drain plug (set)
104 Cap
105 Hose ∅ 10 x 1.5 x 750
106 Union nut G 1"
110 Quick-action air vent valve
111 Cylinder mounting bracket
112 Control unit support
113 Top panel insert
114 Plate heat exchanger insulation shell
115 Plate heat exchanger insulation board
117 Spring clip (5 pce)
130 VIUPM circulation pump
131 VIUP circulation pump
133 Circulation pump motor
134 Circulation pump motor
140 Flue gas temperature sensor
141 Thermal circuit breaker
142 Temperature sensor
143 Cylinder temperature sensor
160 Cylinder
162 Sleeve
163 Strain relief
164 Cylinder gasket
166 Anode flange with gasket
167 Flange insulation
171 Sleeve
172 Cover
200 Side panel, left
202 Side panel, right
204 Top cover
205 Front panel, top
206 Front panel, bottom
207 Adjustable foot
208 Fixing elements
300 Control unit
301 Casing back panel
302 Boiler coding card
303 Fuse 6.3 A slow (10 pce)
304 Fuse holder
305 Programming unit for weather-compensated mode
306 Programming unit for constant temperature mode
307 LON communication module (accessories)
308 PCB adaptor, LON module (accessories)
309 Internal extension H1
315 Locking bolts, left and right
316 Slider, left and right
317 Outside temperature sensor

Wearing parts
060 Burner gasket
061 Insulation ring
064 Ignition electrode with gasket
065 Ionisation electrode with gasket
165 Magnesium anode

Parts not shown
108 Special grease
209 Touch-up paint stick, Vitowhite
210 Spray paint, Vitowhite
310 Cable harness X8/X9/Ionisation
311 Cable harness 100/35/54 (auxiliary earth)
312 Cable harness stepper motor
313 Mating plug
314 Cable fixing
400 Operating instructions for constant temperature mode
401 Operating instructions for weather-compensated mode
402 Installation and service instructions
Ⓐ Type plate

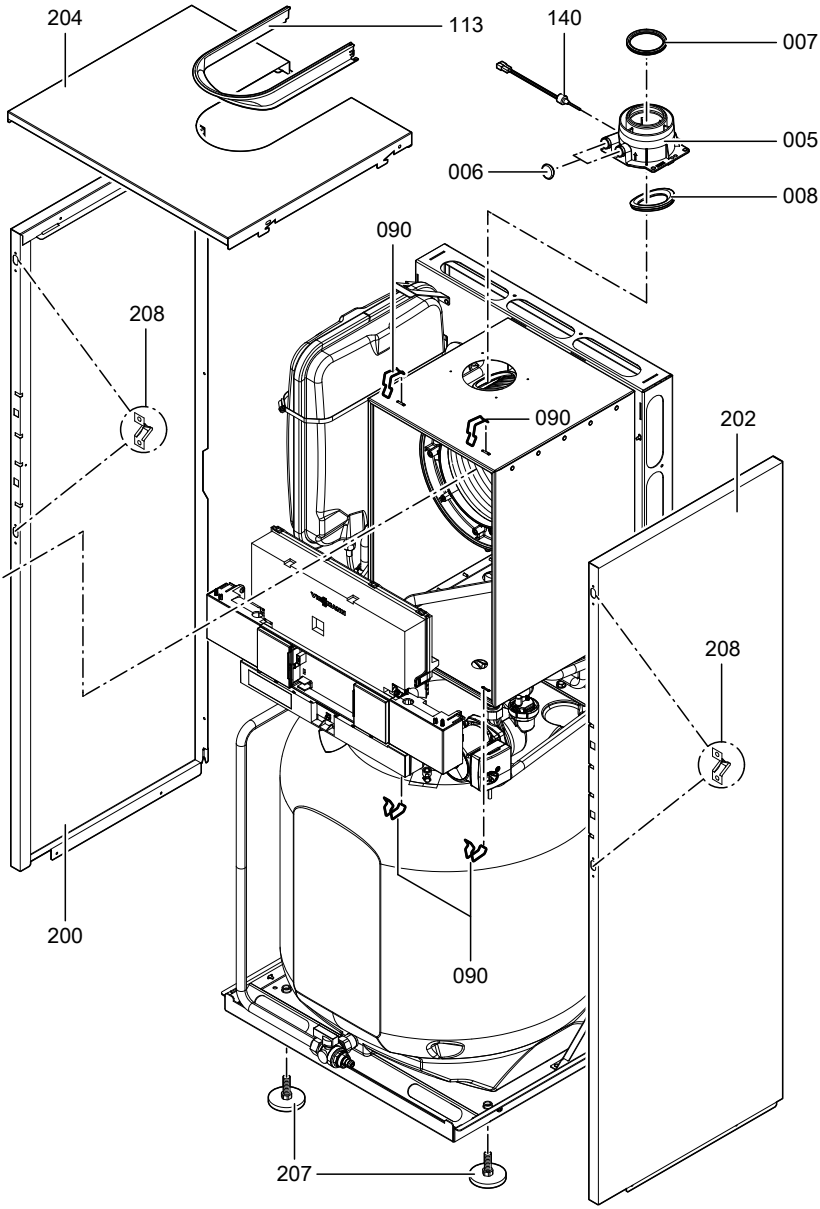
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## **Parts lists** (cont.)



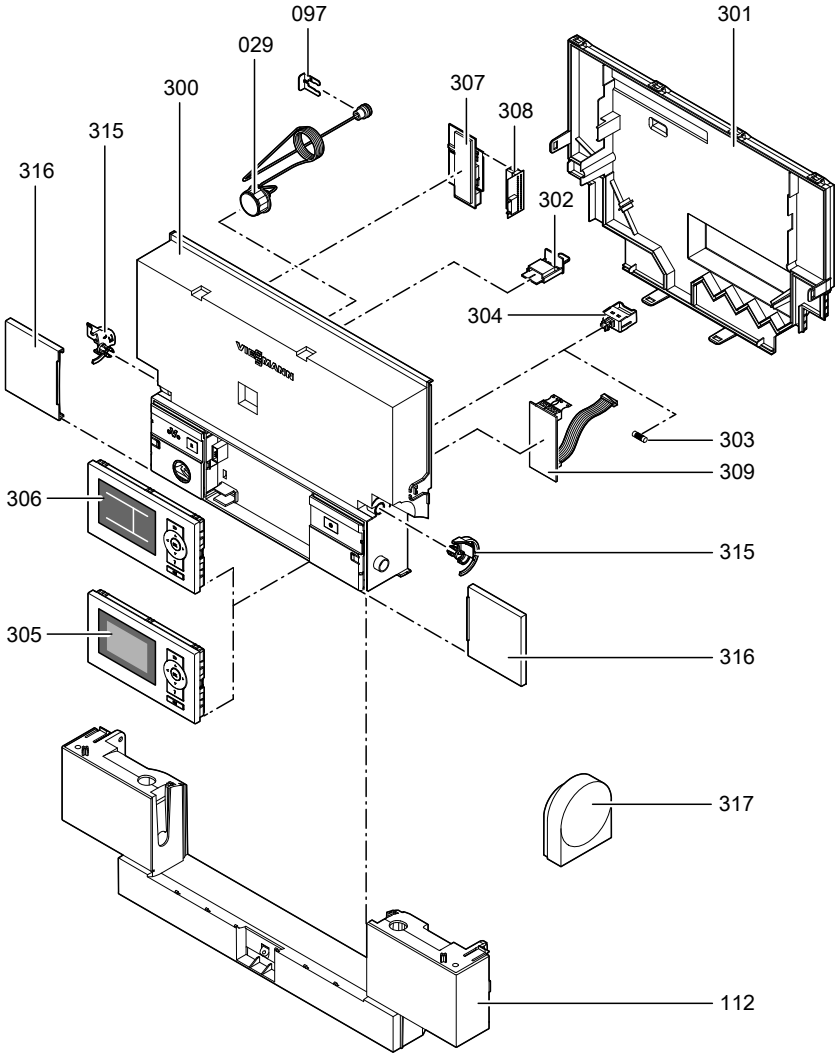

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## **Parts lists** (cont.)

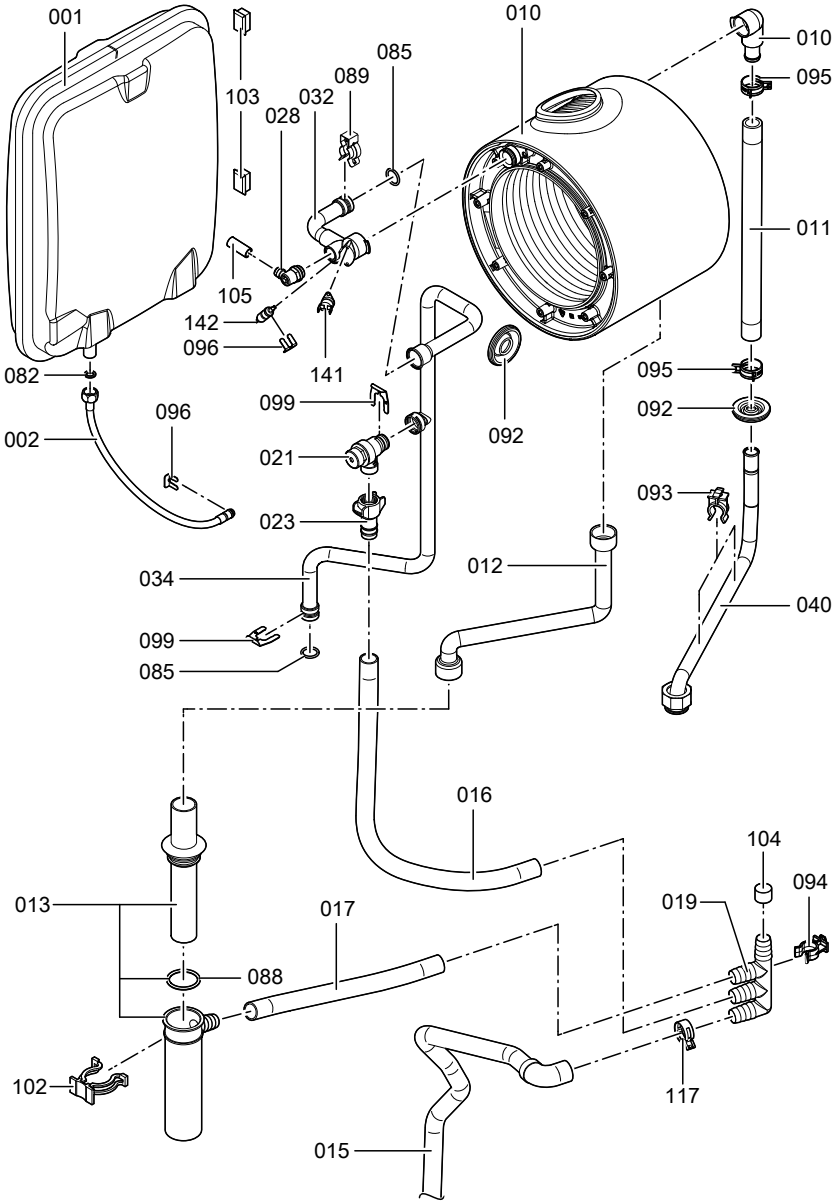



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## Parts lists (cont.)

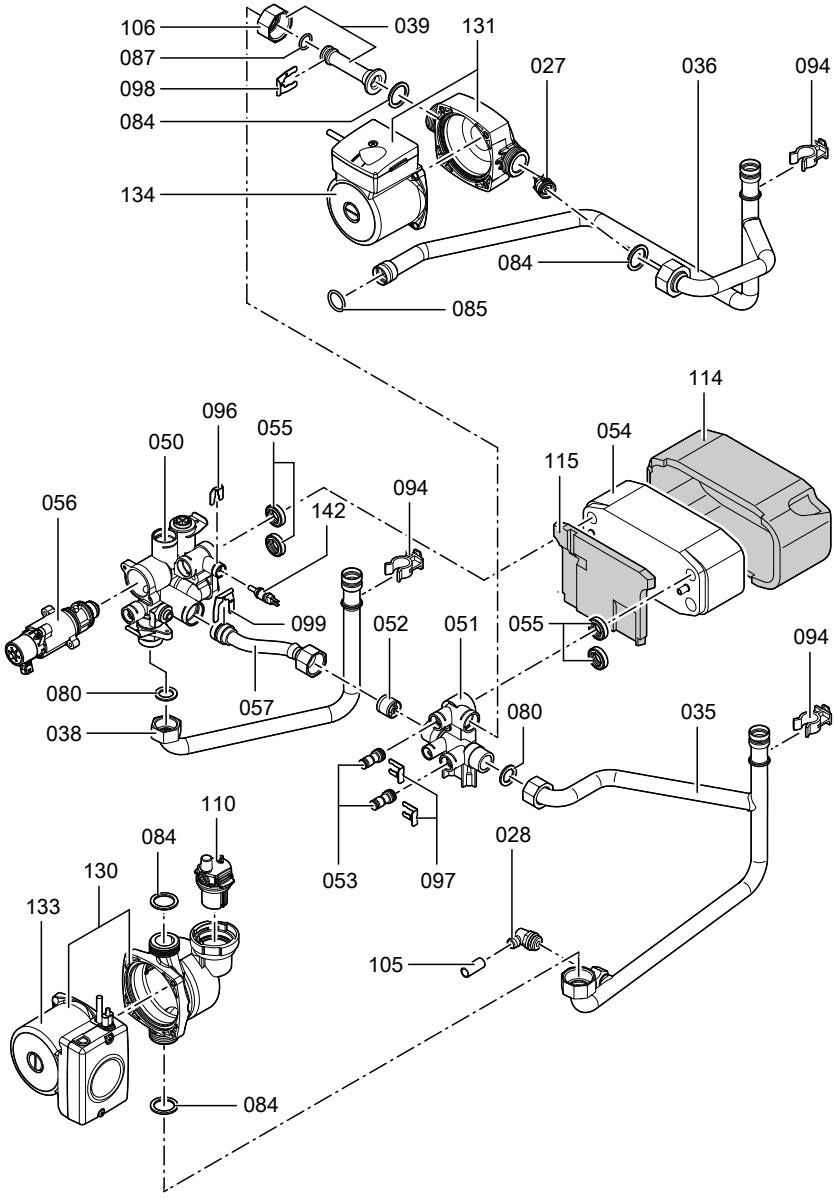


## **Parts lists** (cont.)



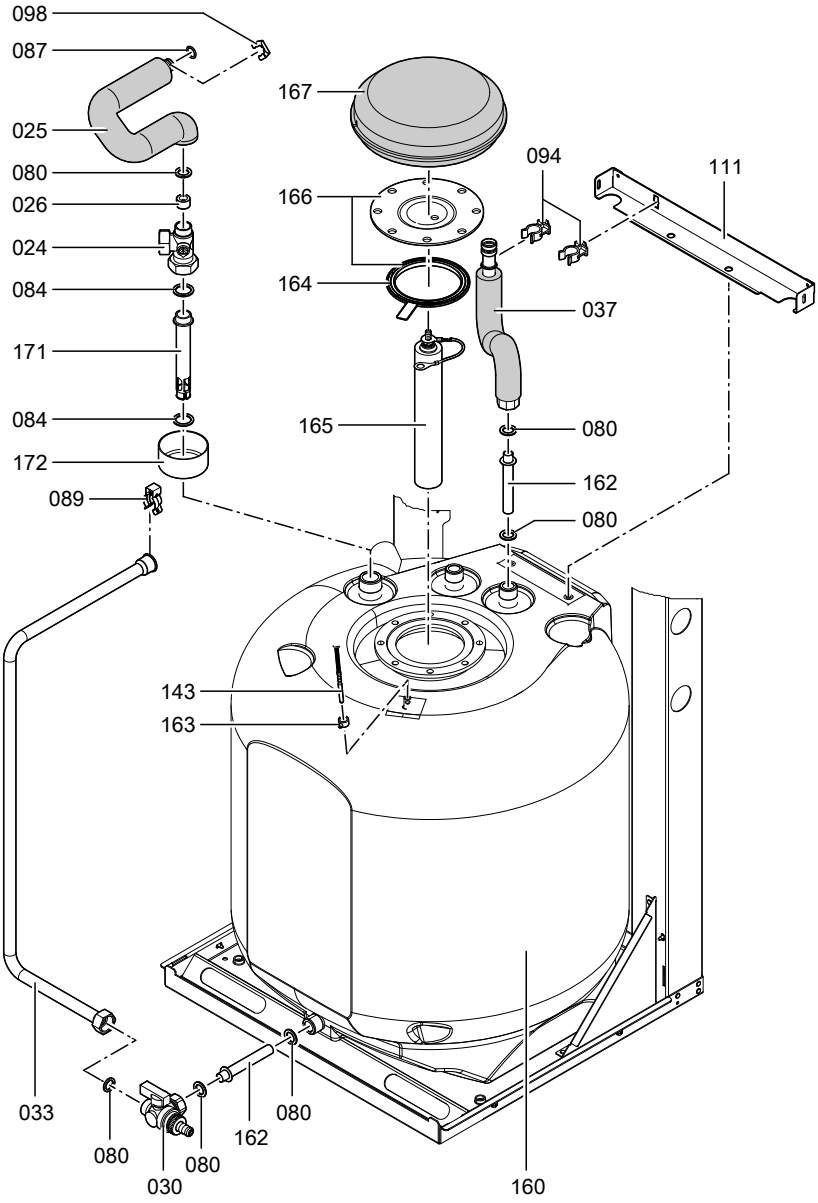

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## **Parts lists** (cont.)




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## **Parts lists** (cont.)




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## Commissioning/service reports

| Setting and test values<br>Date:<br>By: | | Set value | Commissioning | Service |
|---|---|---|---|---|
| **Static pressure** | *mbar* | max. 57.5 mbar | | |
| **Supply pressure (flow pressure)** | | | | |
| ☐ for natural gas E | *mbar* | 17.4-25 mbar | | |
| ☐ for natural gas LL | *mbar* | 17.4-25 mbar | | |
| ☐ for LPG<br>*Tick gas type* | *mbar* | 42.5-57.5 mbar | | |
| **Carbon dioxide content $CO_2$** | | | | |
| ■ at lower output | *% by vol.* | | | |
| ■ at upper output | *% by vol.* | | | |
| **Oxygen content $O_2$** | | | | |
| ■ at lower output | *% by vol.* | | | |
| ■ at upper output | *% by vol.* | | | |
| **Carbon monoxide content CO** | | | | |
| ■ at lower output | *ppm* | | | |
| ■ at upper output | *ppm* | | | |



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## Specification

| | | | |
|---|---|---|---|
| Rated voltage | 230 V | Electronic temperature limiter setting | 82 °C |
| Rated frequency | 50 Hz | | |
| Rated current | 6 A | Temperature limiter setting | 100 °C (fixed) |
| Protection class | I | | |
| IP rating | IP X 4 D to EN 60529 | Line fuse (mains) | max. 16 A– |

Permissible ambient temperature
- during operation 0 to +40 °C
- during storage and transport -20 to +65 °C

**Gas boilers**

| | | | | |
|---|---|---|---|---|
| **Rated output range** | | | | |
| at $T_V/T_R$ 50/30 °C | kW | 4.8 to 19 | 6.5 to 26 | 8.8 to 35 |
| for DHW heating | kW | 4.3 to 17.2 | 5.9 to 29.3 | 7.9 to 31.7 |
| **Rated thermal load range** | | | | |
| for central heating | kW | 4.5 to 17.9 | 6.2 to 30.5 | 8.3 to 34.9 |
| **Power consumption (max.)** | | | | |
| with two-stage pump | W | 150 | 150 | 160 |
| with variable speed, high efficiency pump | W | 110 | 110 | 120 |
| **Connection values** in relation to the max. load | | | | |
| Natural gas E | $m^3/h$ | 1.89 | 3.23 | 3.86 |
| Natural gas LL | $m^3/h$ | 2.20 | 3.75 | 4.48 |
| LPG | kg/h | 1.40 | 2.39 | 2.85 |
| **Product ID** | | CE-0085BU0051 | | |

***Note***

*The supply values are only for documentation purposes (e.g. in the gas contract application) or to estimate the supplementary volumetric settings. Because of factory settings, the gas pressure must not be altered from these settings. Reference: 15°C, 1013 mbar.*

## Declaration of conformity

### Declaration of conformity for the Vitodens 222-F

We, Viessmann Werke GmbH & Co KG, D-35107 Allendorf, confirm as sole responsible body that the product **Vitodens 222-F** complies with the following standards:

| | |
|---|---|
| DIN 4702–6 | EN 55 014 |
| DIN 4753 | EN 60 335-1 |
| EN 483 | EN 60 335–2–102 |
| EN 625 | EN 61 000-3-2 |
| EN 677 | EN 61 000-3-3 |
| EN 806 | EN 62 233 |

In accordance with the following Directives, this product is designated **CE-0085**:

| | |
|---|---|
| 97/23/EC | 2004/108/EC |
| 90/396/EEC | 2006/ 95/EC |
| 92/42/EEC | |

This product meets the requirements of the Efficiency Directive (92/42/EEC) for **condensing boilers**.

Allendorf, 1 June 2009

Viessmann Werke GmbH & Co KG

pp. Manfred Sommer

## 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 7 (2) [Germany].

Allendorf, 1 June 2009

Viessmann Werke GmbH&Co KG



pp. Manfred Sommer

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## Applicability

**Compact gas condensing boiler**

| Type FS2A | from serial no. |
|---|---|
| 4.8 to 19 kW | 7419 985 ... , 7419 986 ... , 7418 159 ... |
| 6.5 to 26 kW | 7374 965 ... , 7418 160 ... |
| 8.8 to 35 kW | 7374 966 .../ |


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