

Installation and service instructions

for contractors

VIESSMANN

Vitodens 222-F

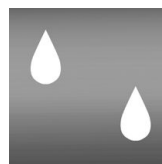
Type FS2A

Compact gas condensing boiler

4.8 to 35 kW natural gas and LPG version

GC No 47-819-15 (19kW); 47-819-16 (26kW); 47-819-17 (35kW)

For applicability, see the last page



VITODENS 222-F



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).

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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Preparing for installation

Product information

Vitodens 222-F, FS2A

Set up for operation with natural gas H.

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

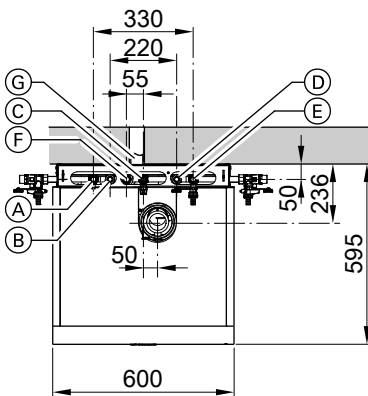
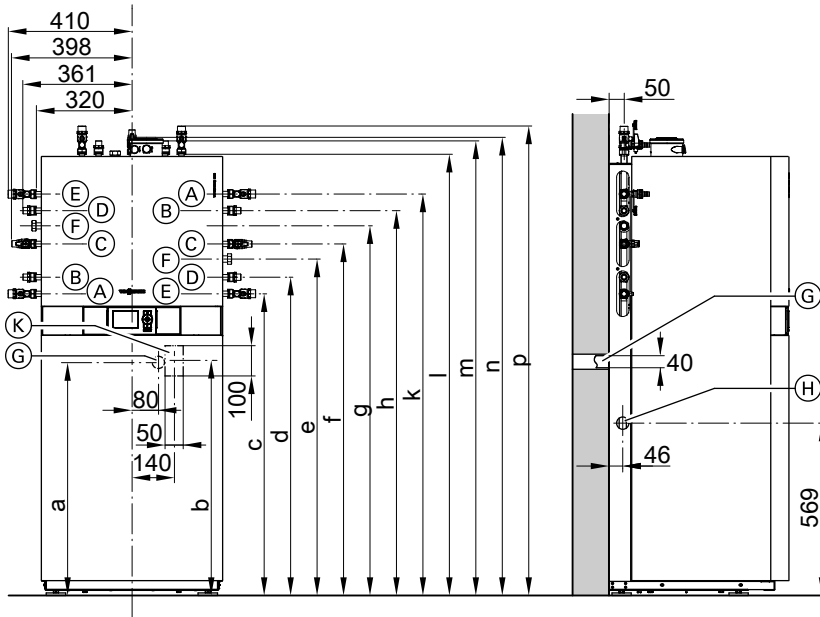
Use a connection set, available as an accessory, to make the connection on the gas and water sides. The following overview shows sample connection sets for installation on finished walls to the top or side.

Preparing the connections on site:



Connection set installation instructions

Preparing for installation (cont.)



- (A) Heating flow R $\frac{3}{4}$ "
- (B) DHW R $\frac{1}{2}$ "
- (C) Gas connection R $\frac{3}{4}$ "
- (D) Cold water R $\frac{1}{2}$ "
- (E) Heating return R $\frac{3}{4}$ "
- (F) DHW circulation R $\frac{1}{2}$ " (separate accessory)
- (G) Condensate drain to the back into the wall
- (H) Side condensate drain
- (K) 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)	1477	1477	1677
p (mm)	1526	1526	1726

Note

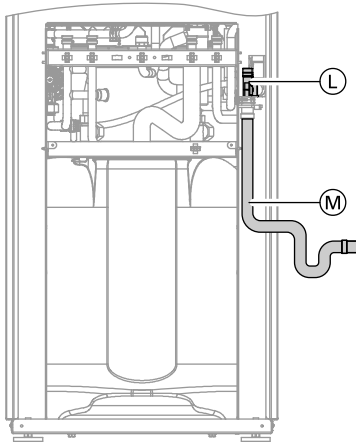
The adjustable feet give all height measurements a tolerance of +15 mm.

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. The DHW expansion vessel is supplied as standard and will be fitted inside the appliance.

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 (L). Remove plug from condensate collector.

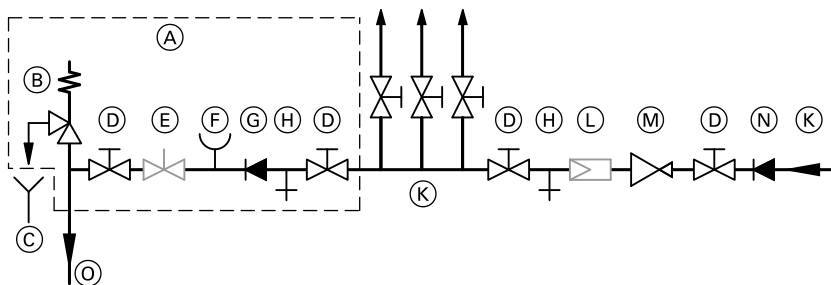
3. Route condensate hose (M) to the back (drain in wall (G)) or to the side aperture (H) (see page 6).
Route condensate hose with a U-bend and connect to on-site drain line or siphon.

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

5. Prepare the electrical connections.
 - Power cable: NYM-J 3 x 1.5 mm², 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 "(K)" (see page 7) to protrude 2000 mm from the wall.

Preparing for installation (cont.)

Safety assembly to DIN 1988



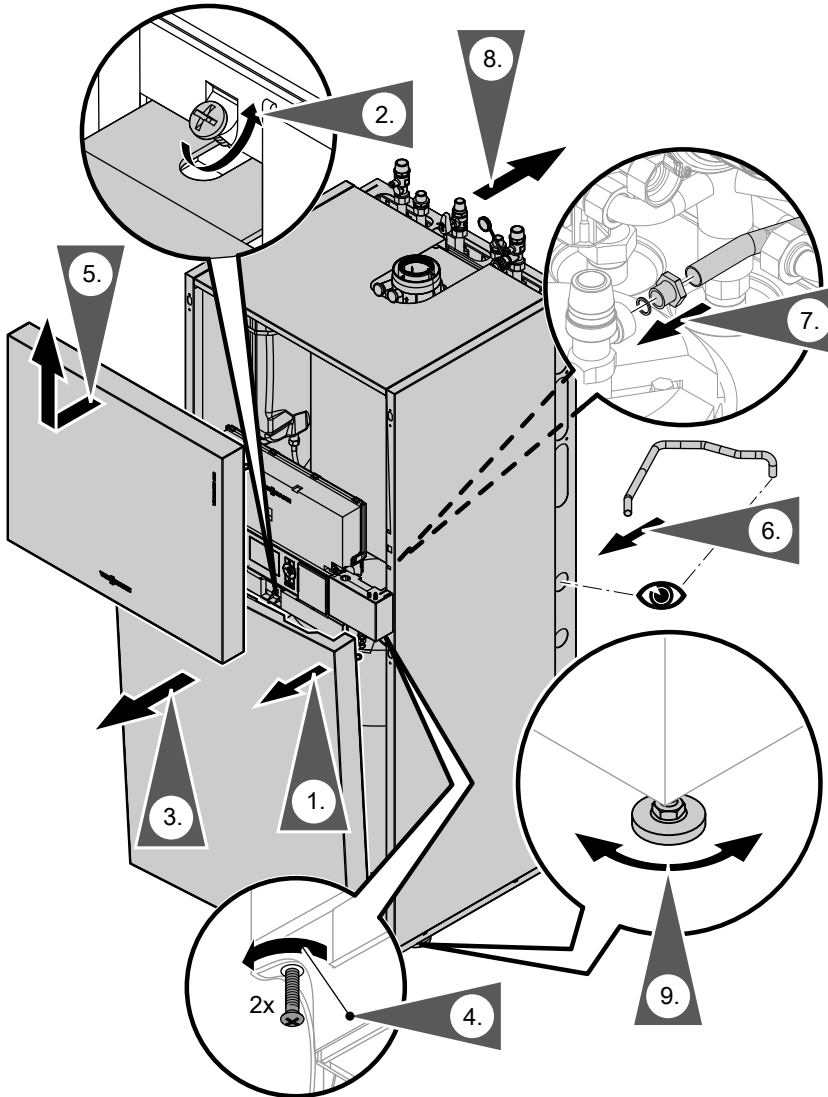
- | | |
|---|---|
| Ⓐ Safety assembly (accessory to connection sets for unfinished walls) | Ⓒ Non-return valve |
| Ⓑ Safety valve | Ⓓ Drain |
| Ⓒ Visible blow-off line outlet | Ⓕ Cold water |
| Ⓓ Shut-off valve | Ⓖ Drinking water filter |
| Ⓔ Flow regulating valve (installation recommended) | Ⓜ Pressure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

Note

Please read the additional mandatory installation and maintenance instructions to comply with G3 Building regulation and the requirements of the UK Water Supply (Water Fittings) Regulations/ Scottish Water Bylaws.

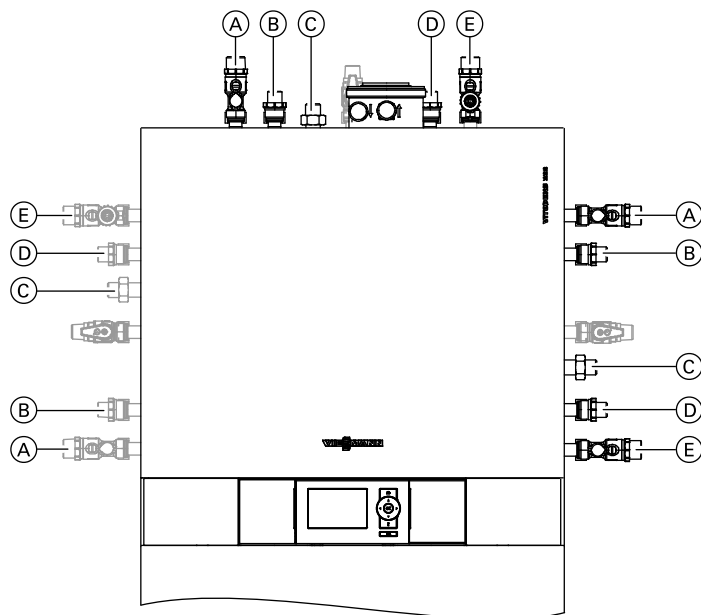
Installing the boiler

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

DHW connection

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



Separate installation instructions

Fitting the drain outlet and drain line to the T&P valve



Separate installation instructions

Installing the boiler (cont.)

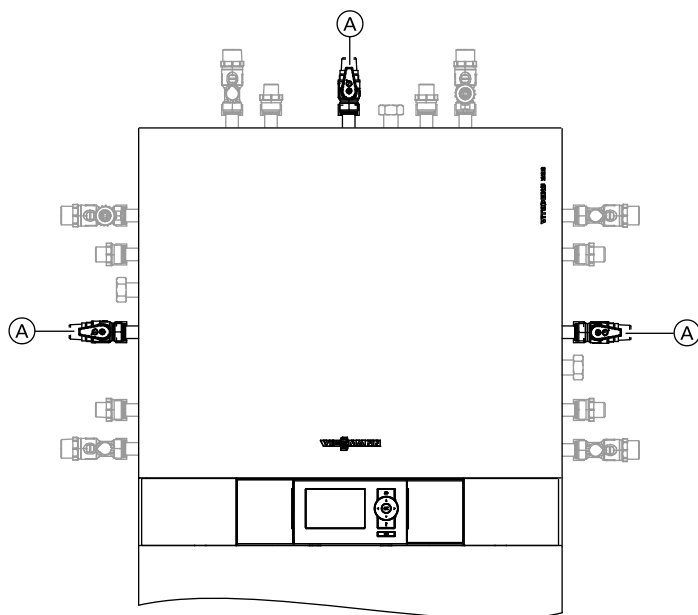
DHW circulation connection

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



Separate installation instructions

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.

2. Carry out a leak/tightness test.

1. Secure gas shut-off valve (A) at the gas connection.

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

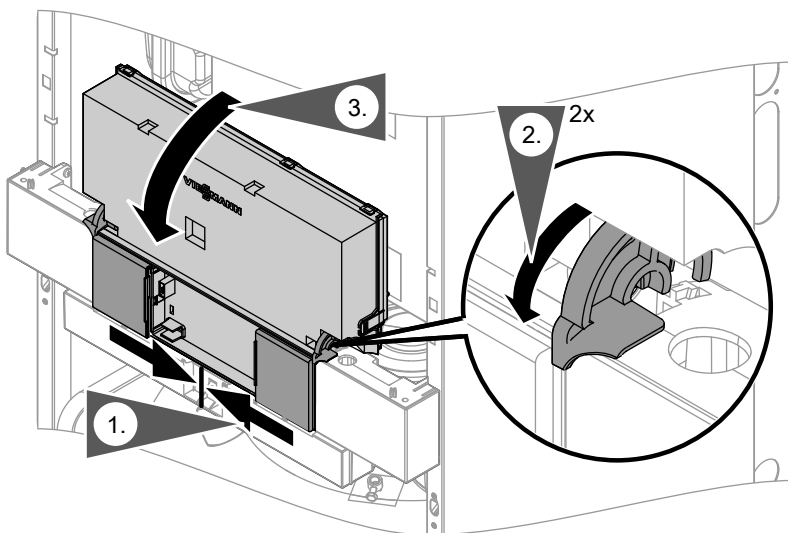
Flue gas connection

Connect the balanced flue.

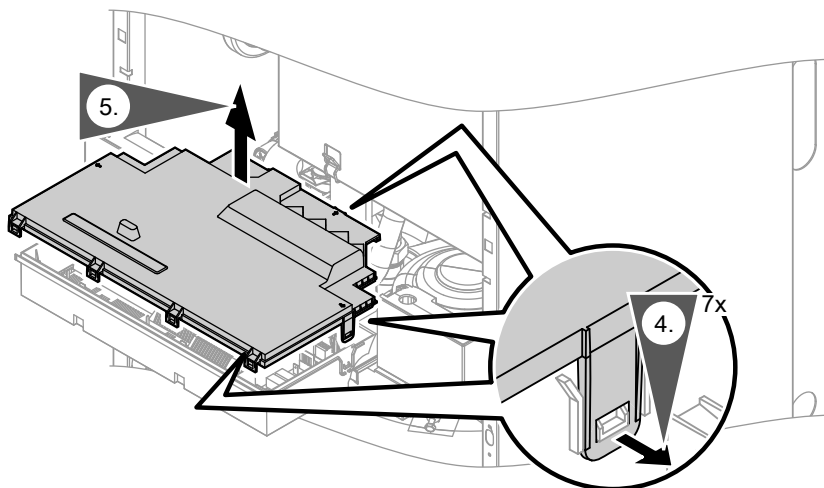


Flue gas system installation instructions.

Opening the control unit casing



Opening the control unit casing (cont.)



Electrical connections



Information regarding the connection of accessories

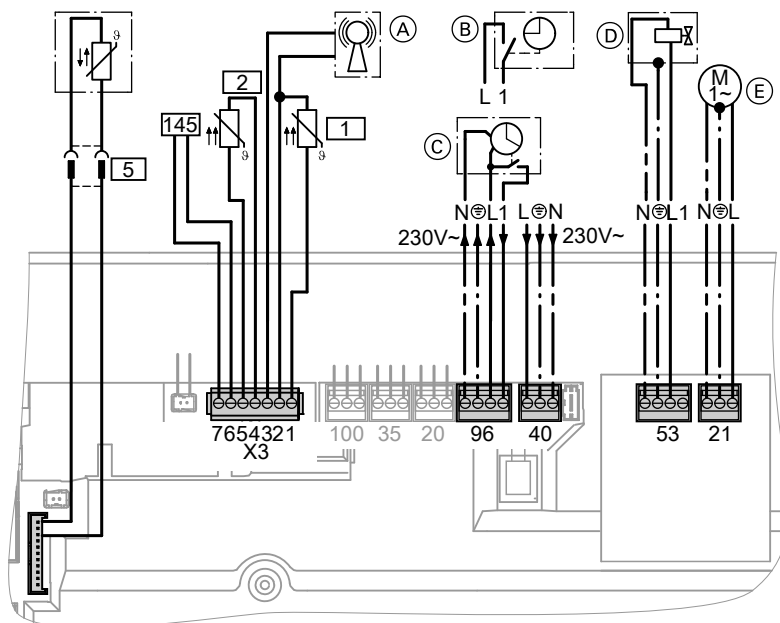
For the connection, observe the separate installation instructions provided with the accessory components.



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.)



- (A) Radio clock connection
- (B) Vitotrol 100 UTD (only for constant temperature control units or third party 230V programmers)
- (C) Vitotrol 100 UTA (only for constant temperature control units) or Vitotrol 100 UTD-RF wireless receiver (only for constant temperature control units or third party 230V programmers)

Plug 230 V~

- [21] Cylinder primary pump (E) (fitted and connected)

[40] Power supply

- Remove any existing individual cores.

Electrical connections (cont.)



Danger

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

Take care **not** to 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 $\varnothing 14$ mm). Secure the cable with cable grommet (F) (see page 18) integrated into the casing base.

- Max. fuse rating 16 A.

- [53] External safety solenoid valve (LPG) (D)

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)

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 mm²

- [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)
- Vitocom 100
- Extension kit for one heating circuit with mixer (only for weather-compensated control)
- External extension H1 or H2
- Open Therm extension

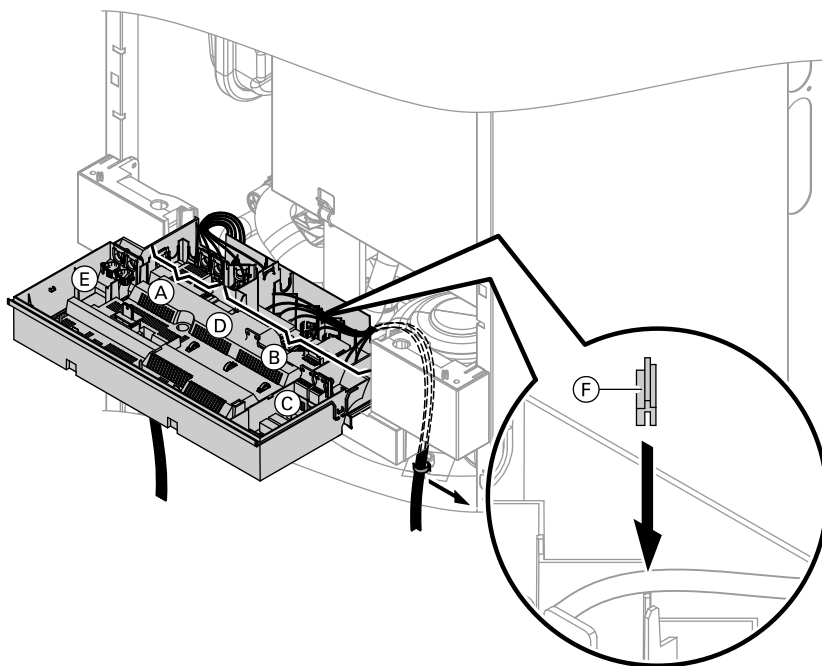
Electrical connections (cont.)

Routing the connecting cables



Please note

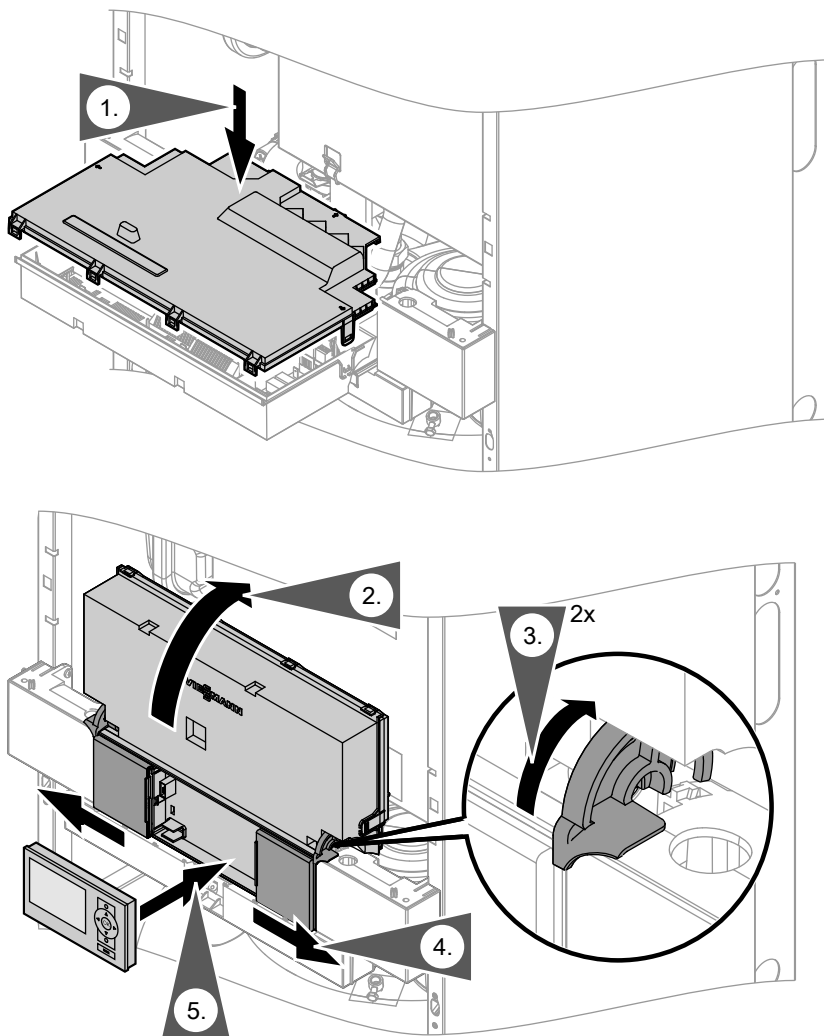
Connecting cables will be damaged if they touch hot parts.
When routing and securing power cables on site, ensure that the maximum permissible temperatures for these cables are not exceeded.



- (A) Low voltage connections
- (B) 230 V connections
- (C) Internal extension
- (D) Main PCB

- (E) Communication module (accessories)
- (F) Cable grommet for power 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.

Installation sequence

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

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•				4. Setting the time and date (if required) – only for weather-compensated control.....	25
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Steps - commissioning, inspection and... (cont.)

					Page
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				Inspection steps	
				Maintenance steps	
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Further details regarding the individual steps

Removing the front panel

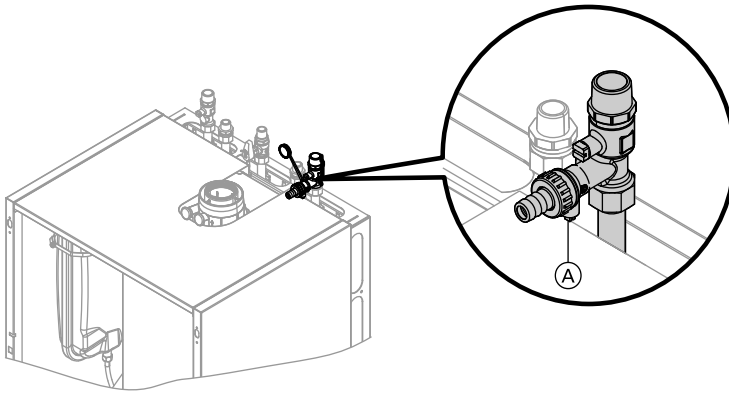
See page 11, steps 1 to 5.

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. by means of 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 (A) in the heating return (at the connection set on the side or above the boiler). (minimum system pressure > 1.0 bar).

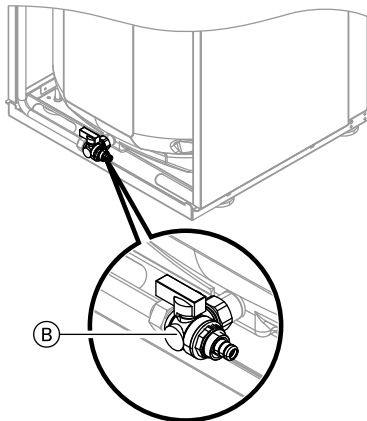
Further details regarding the individual steps (cont.)

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 (B) must be on the "LHS" (left hand side).



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 121.

5. Close boiler fill & drain valve (A).

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

Note

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



Extended menu:

1. 

2. "Settings"

3. "Language DE"

Sprache	
Deutsch	DE <input checked="" type="checkbox"/>
Cesky	CZ <input type="checkbox"/>
Dansk	DK <input type="checkbox"/>
English	GB <input type="checkbox"/>
Wählen mit 	

4. Set the required language with /.

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

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

Extended menu:

1. 

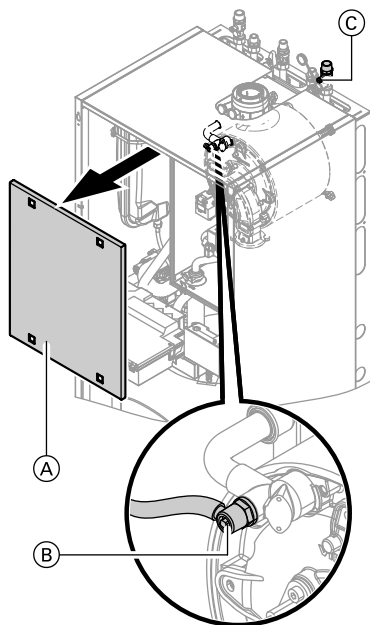
2. "Settings"

3. "Time / Date"

4. Set current time and date.

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 (A).
3. Connect the drain hose on valve (B) with a drain.
4. Open air vent valve (B) and fill valve (C) in the heating return and vent using mains pressure (flush) until no more air noise can be heard.
5. Close valve (B) and fill valve (C) 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 121.

3. Check the system pressure.

Activating venting function with weather-compensated control unit:

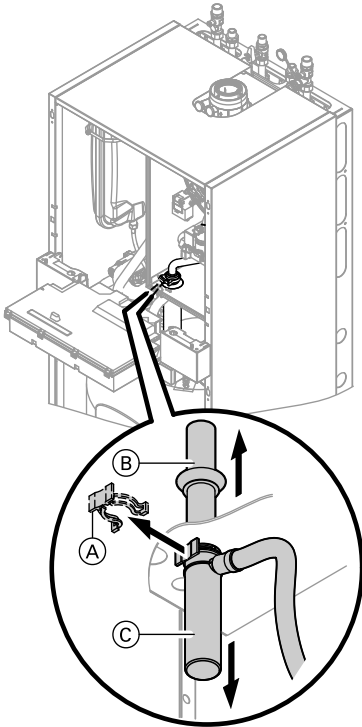
1. Press **OK** and **≡** simultaneously for approx. 4 s.
2. **"Service functions"**
3. **"Air vent valve"**
4. Ending venting function:
Press **OK** or **↶**.

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 (A) off.
3. Pull filler pipe (B) upwards.
4. Pull off trap (C) downwards.
5. Fill siphon with water and reassemble.
6. Refit cover panel.

Further details regarding the individual steps (cont.)

7. Secure control unit back in operating position.

Designating heating circuits - only for weather-compensated control

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.

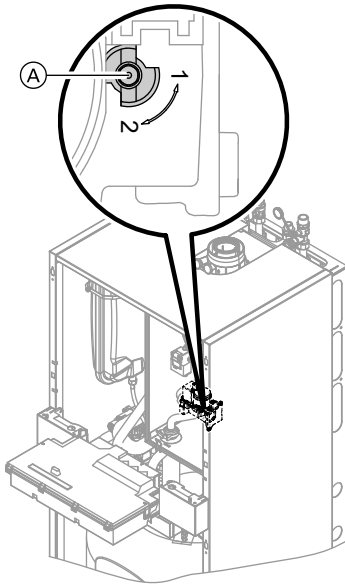
- Consequently, for natural gas there is no adjustment required across the entire Wobbe range.

The boiler can be operated in the Wobbe index range 9.5 to 15.2 kWh/m³ (34.2 to 54.7 MJ/m³).

- 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 140.

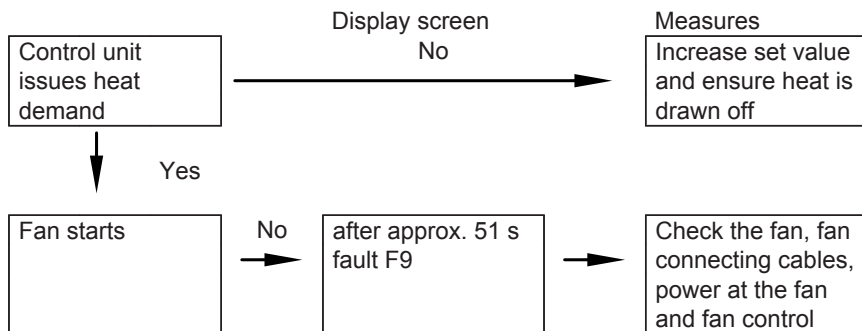
Further details regarding the individual steps (cont.)

Gas type conversion (only for operation with LPG)

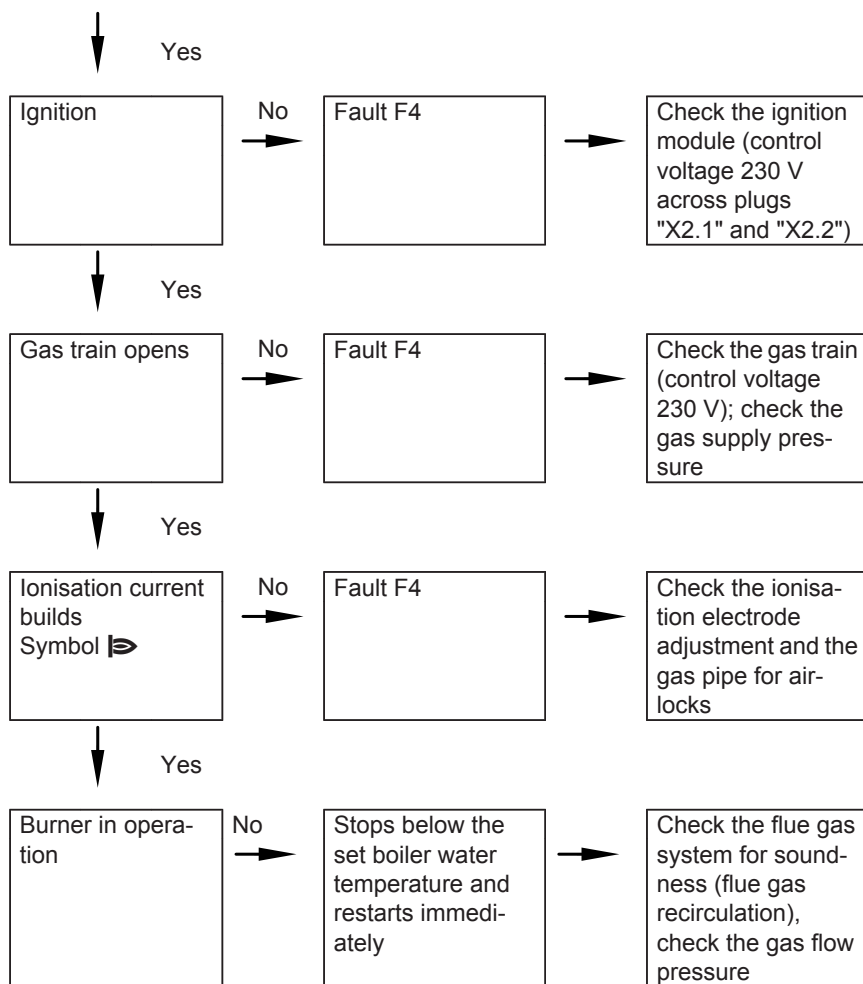


1. Set adjusting screw (A) at the gas train to "2".
2. Switch ON/OFF switch (I) ON.
3. Select the gas type in coding address "82":
 - Call up code 2.
 - Generally, call up group 1.
 - In coding address "11", select value "9".
 - In coding address "82", select value "1" (operation with LPG).
 - In code "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.

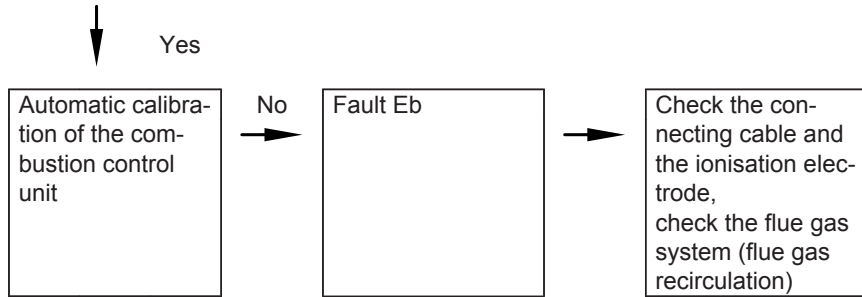
Function sequence and possible faults



Further details regarding the individual steps (cont.)



Further details regarding the individual steps (cont.)



For further details regarding faults, see page 90.

Checking the static and supply pressure



Danger

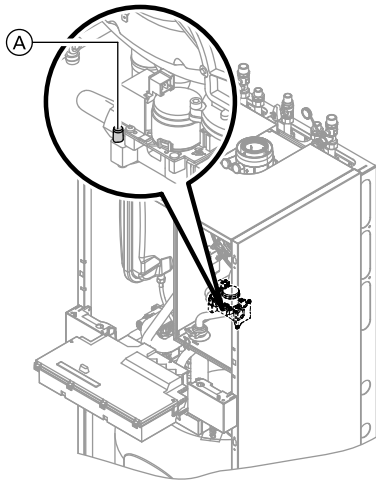
CO build-up as a result of an incorrect burner setup can have serious health implications.

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" (A) 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 140.
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: 20mbar
- LPG: 37 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 140.
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 (A) 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 (A) for tightness.


Further details regarding the individual steps (cont.)

Supply (flow) pressure for natural gas	Supply (flow) pressure for LPG	Measures
below 15 mbar	below 25 mbar	Do not start the boiler. Notify your mains gas or LPG supplier.
15 to 25 mbar	25 to 45 mbar	Start the boiler.
above 25 mbar	above 45 mbar	Install a separate gas pressure governor upstream of the system and regulate the pre-charge pressure to 20 mbar for natural gas or 37 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:

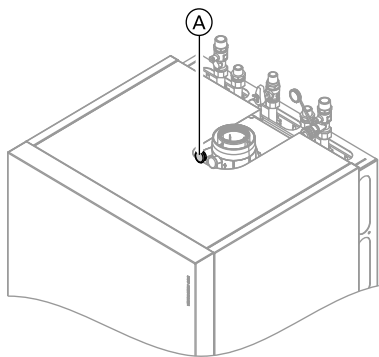
1. Press **OK** and  simultaneously for approx. 4 s.
2. **"Service functions"**
3. **"Max. output"**
4. **"Change?"** Select **"Yes"**.
A value flashes on the display (e.g. "85"). In the delivered condition, this value represents 100 % of rated output.
5. Select required value.

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.

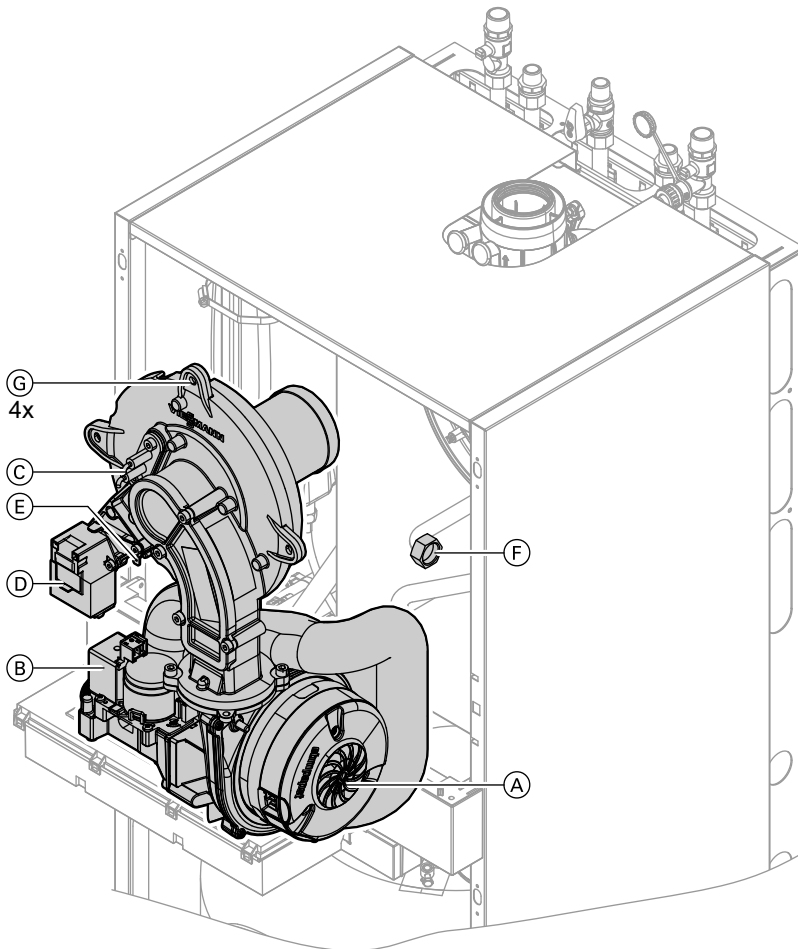
We recommend that your heating engineer carries out a simple leak/tightness test during the commissioning of your system. For this, it would be sufficient to check the CO_2 or O_2 concentration in the combustion air at the annular gap of the balanced flue pipe.

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

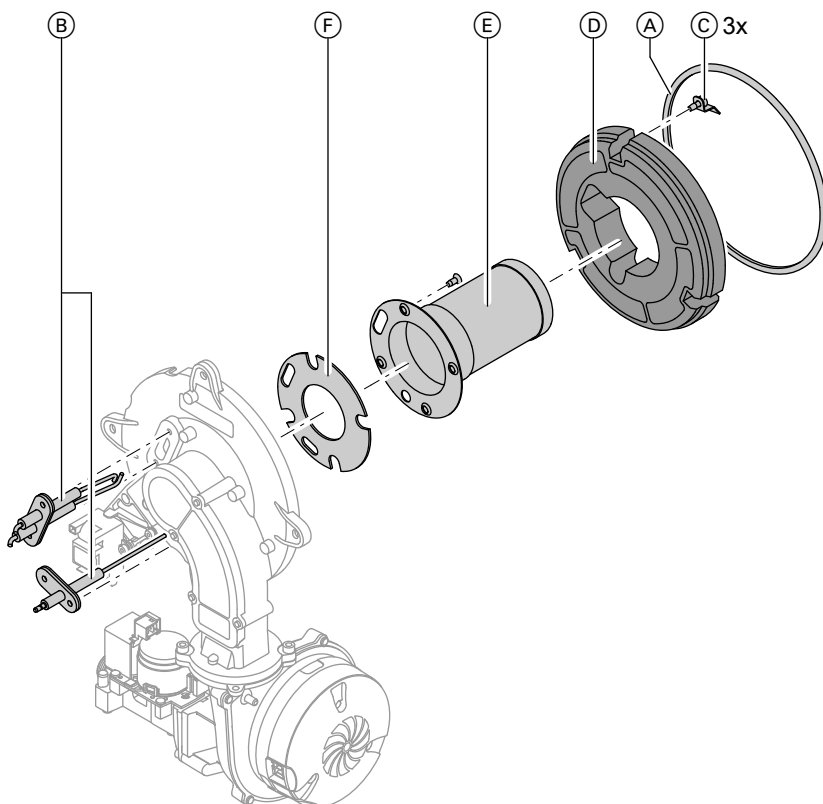
Further details regarding the individual steps (cont.)

3. Pull electrical cables from fan motor (A), gas valve (B), ionisation electrode (C), ignition unit (D) and earth tab (E).
 4. Undo gas supply pipe fitting (F).
 5. Release four nuts (G) 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 (A) and burner gauze assembly (E) for damage and replace, if required.

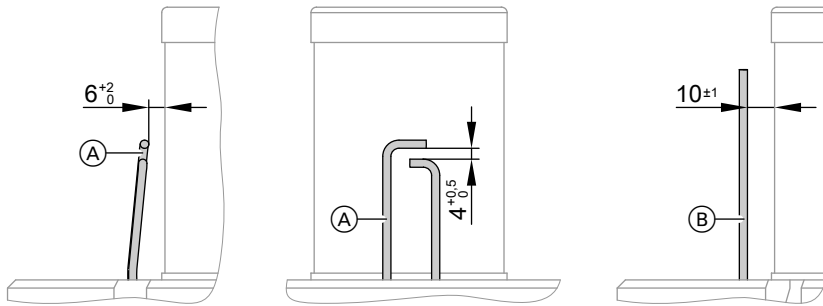
Further details regarding the individual steps (cont.)



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

Further details regarding the individual steps (cont.)

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 gas-kets. Tighten the electrode fixing screws with 2.5 Nm.

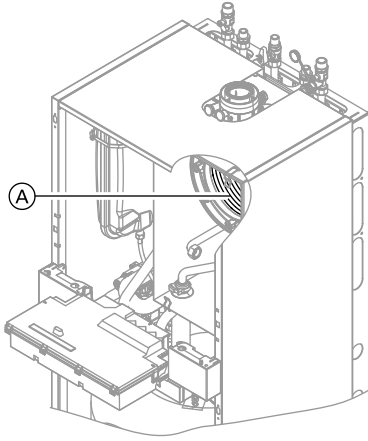
Cleaning the heat exchanger and fitting the burner



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 (A) inside the combustion chamber.
2. If required, spray slightly acidic, chloride-free cleaning agents based on phosphoric acid onto heat exchanger (A) and let the solution soak in for approx. 20 min.
3. Thoroughly flush the heat exchanger (A) 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

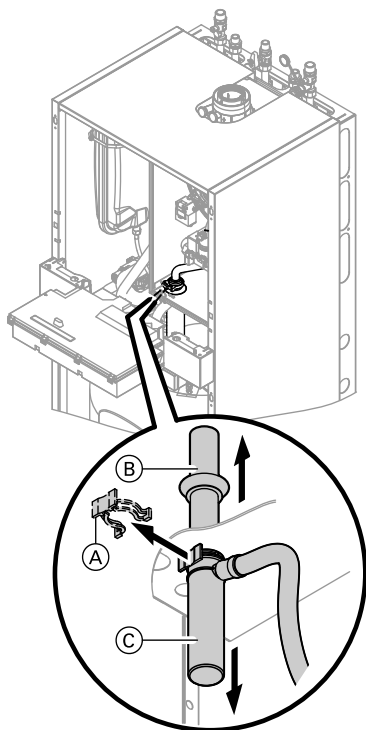
Escaping gas leads to a risk of explosion.

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

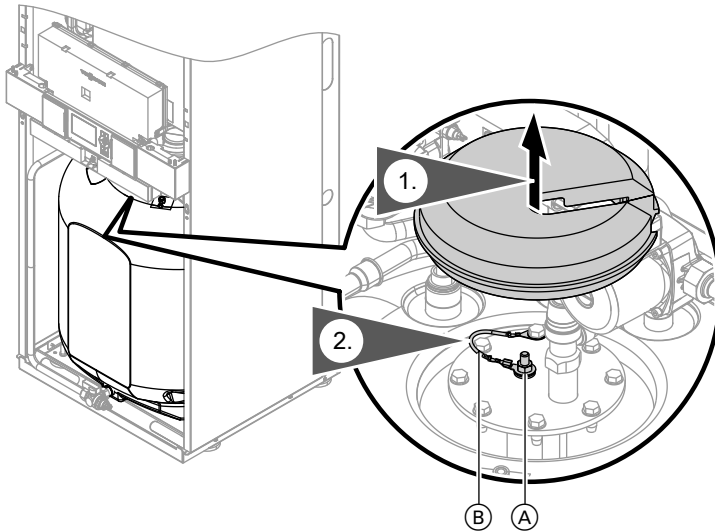


1. Check that the condensate can drain freely at the siphon.
2. Pull retaining clip (A) off.
3. Pull filler pipe (B) upwards.
4. Pull off trap (C) downwards.
5. Pull the condensate hose from the siphon.
6. Clean the siphon.
7. Fill siphon with water and reassemble.

Checking the anode connection

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

Further details regarding the individual steps (cont.)



Ⓐ Magnesium anode

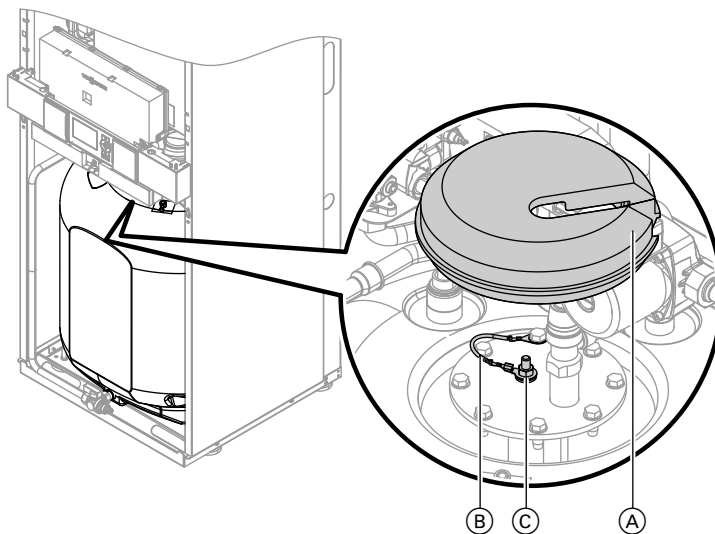
Ⓑ Earth cable

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.

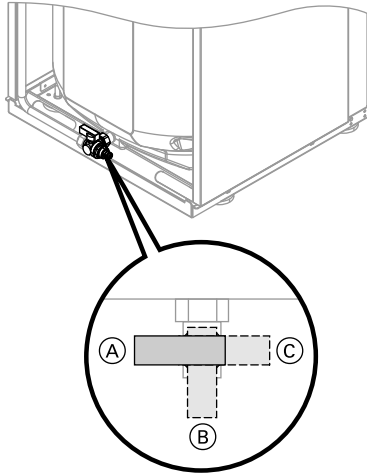
Further details regarding the individual steps (cont.)



1. Remove cover (A).
2. Pull earth lead (B) from tab (C).
3. Connect the tester (up to 5 mA) in series between tab (C) and earth cable (B).
 - The anode is OK if the indicated current is $> 0.3 \text{ mA}$.
 - Visually inspect the anode, if the current measures $< 0.3 \text{ mA}$ or if there is no current at all (see page 45).

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.

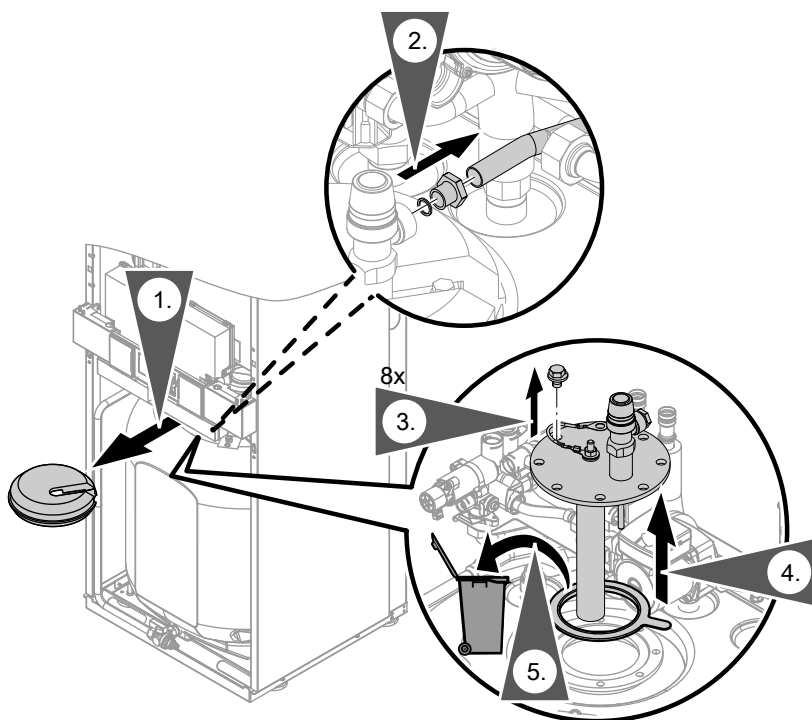
2. Turn drain valve from lever position (A) to lever position (B) or (C) as required.
 - Lever position (B): Drain heating system **excluding** cylinder via the cold water connection.
 - Lever position (C): Drain heating system **and** cylinder via the DHW connection. Cold water connection remains filled.

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.

Further details regarding the individual steps (cont.)

5. Use a chemical cleaning agent to remove hard deposits that cannot be removed by a high pressure cleaner.
6. Thoroughly flush the primary cylinder after cleaning.



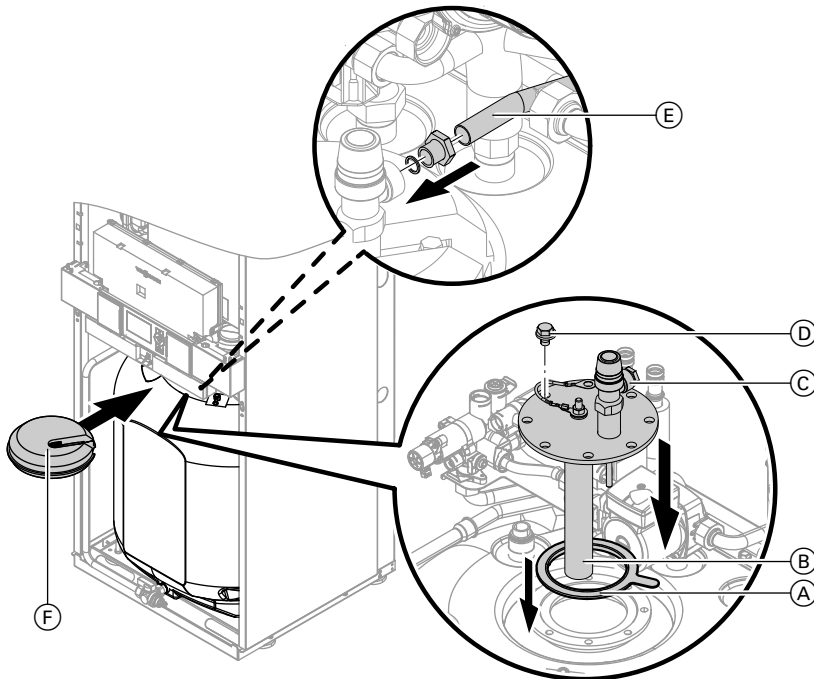
Please note

Never use hydrochloric acid based cleaning agents.

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



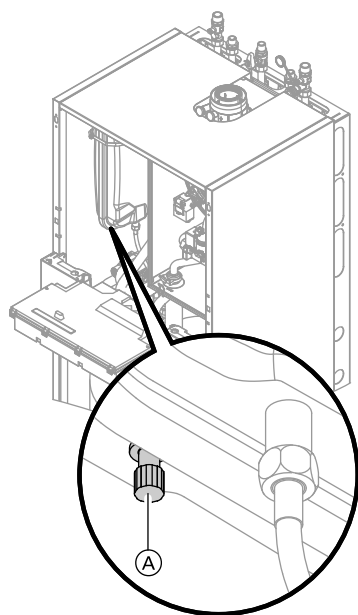
1. Reconnect the primary cylinder to the pipework.
2. Insert new gasket (A) underneath flange lid (B).



Further details regarding the individual steps (cont.)

3. Fit flange lid (B) and tighten eight screws (D) with up to 25 Nm.
4. Push earth cable (C) onto tab.
5. Install the drain line of the T&P valve (E).
6. Fit cover (F).
7. Fill the primary cylinder with drinking water.

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 (A), 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

Checking gas equipment for tightness at operating pressure



Danger

Escaping gas leads to a risk of explosion.

Check gas equipment for tightness.

Further details regarding the individual steps (cont.)

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 CO₂ or O₂ content. For a function description of the electronic combustion control unit, see page 127.

CO₂ or O₂ content

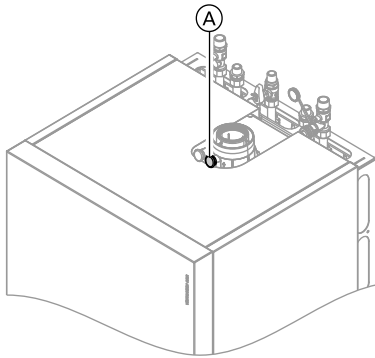
- The CO₂ content must be within the following ranges (upper and lower output):
 - 7.7 to 9.2% for natural gas H
 - 9.3 to 10.9% for LPG
- For all gas types, the O₂ content must be between 4.4% and 6.9%.

If the actual CO₂ or O₂ 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 38.

Note

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



1. Connect a flue gas analyser at flue gas port (A) 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 CO₂ content. Should the actual value deviate from the above ranges by more than 1%, implement steps from page 47 (from 'proceed with the following steps', above).
5. Enter actual values into the service report.
6. Select the upper output (see page 48).
7. Check the CO₂ content. Should the actual value deviate from the above ranges by more than 1%, implement steps from page 47 (from 'proceed with the following steps', above).



Further details regarding the individual steps (cont.)

8. After testing, press **OK**.

9. Enter actual values into the service report.

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 **▶ "I"** 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

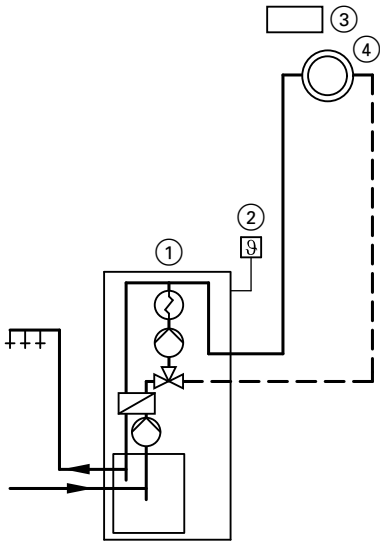
Subject to the equipment level, the control unit must be matched to the system. Various system components are recognised automatically by the control unit and the relevant codes are adjusted automatically.

- For the selection of an appropriate design, see the following diagrams.
- For coding steps, see page 62.

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)

- ③ Vitotrol 100 (only for constant temperature control units)
- ④ Heating circuit without mixer A1

Required code

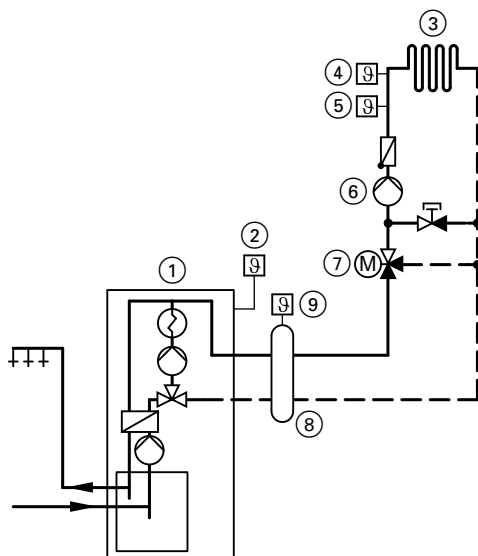
Operation with LPG

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

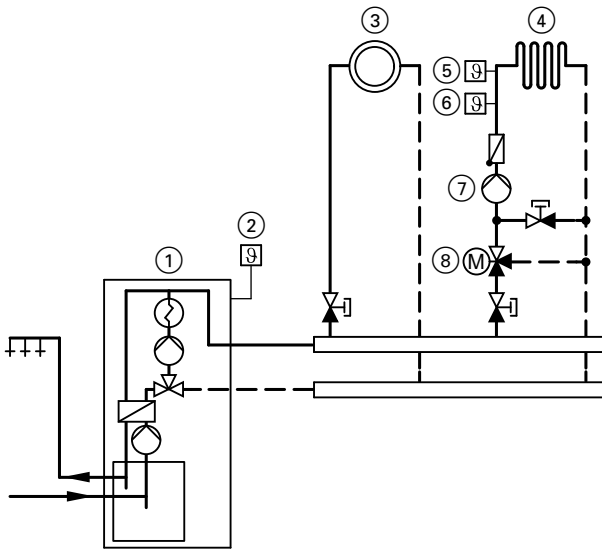
Required coding

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

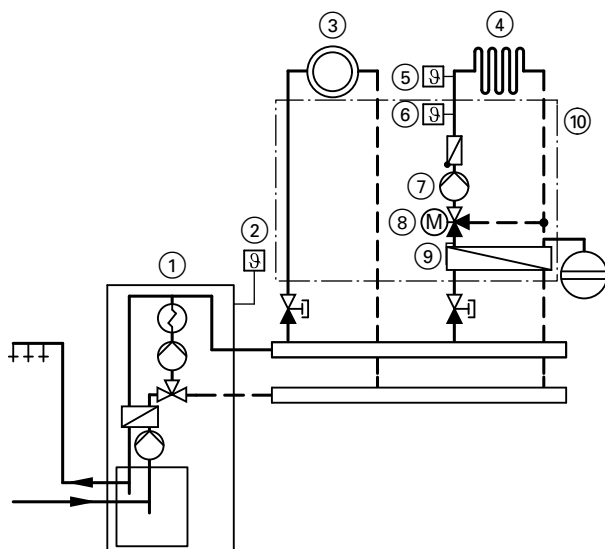
Operation with LPG

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

Required coding

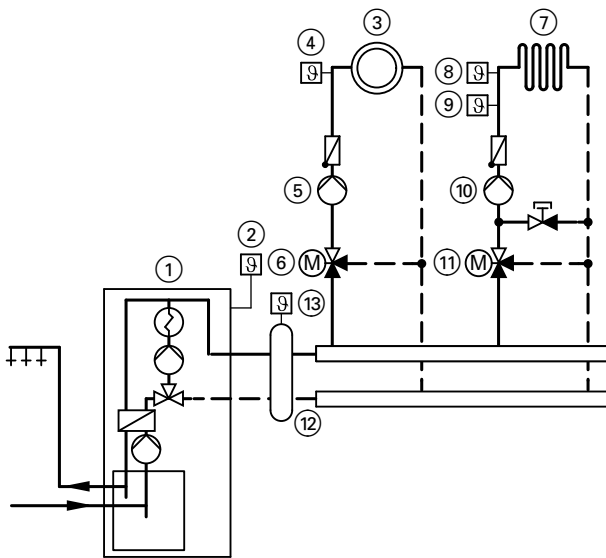
Operation with LPG

82:1

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

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)

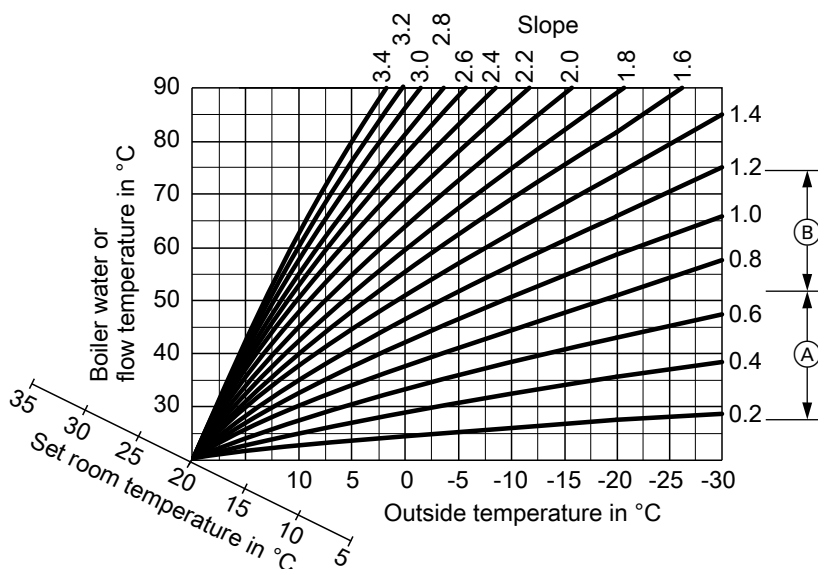
The heating curves illustrate the relationship between the outside temperature and the boiler water or flow temperature.

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:

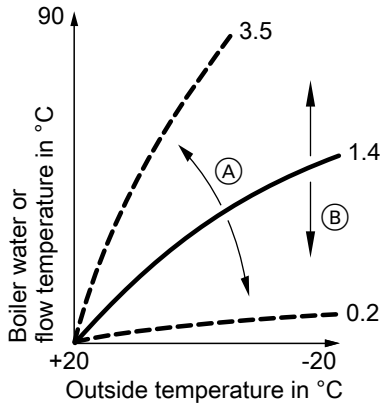
- Slope = 1.4
- Level = 0



- (A) Heating curve slope for underfloor heating systems
- (B) 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



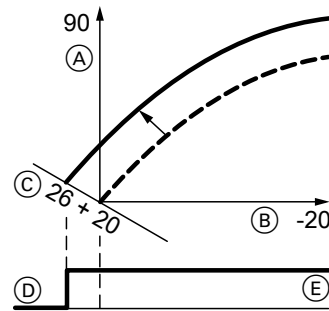
- (A) Changing the slope
- (B) Changing the level (vertical parallel offset of the heating curve)

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

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

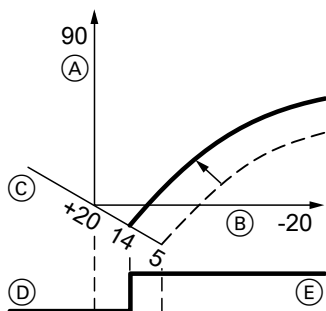
Adjustment of the standard room temperature:



Operating instructions

Further details regarding the individual steps (cont.)

Reduced room temperature



- Ⓒ Set room temperature in °C
- Ⓓ Heating circuit pump "OFF"
- Ⓔ Heating circuit pump "ON"

Adjustment of the reduced room temperature:



Operating instructions

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

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

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



Installation instructions
LON communication module

Note

*In the same LON system, the same number **cannot** be allocated twice.*

Only one Vitotronic may be programmed as fault manager.





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).

Further details regarding the individual steps (cont.)

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

2. "Service functions"**3. "Subscriber check"****Carrying out a subscriber check:**

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

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.

Further details regarding the individual steps (cont.)

Constant temperature control unit

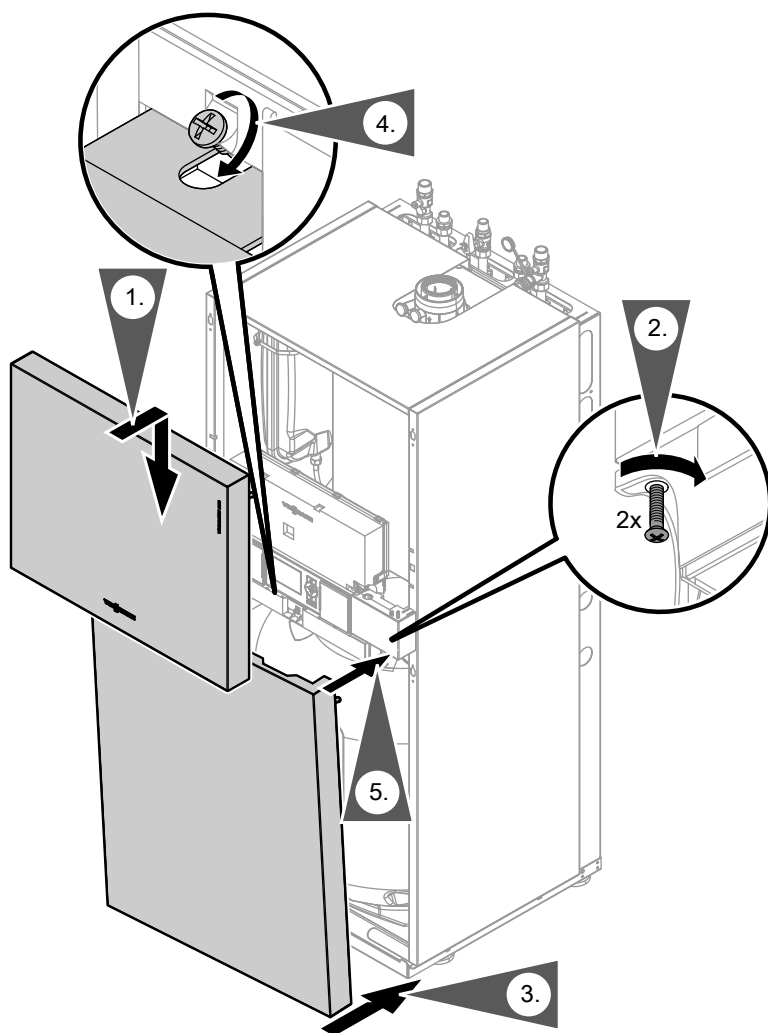
Reset code 24:1 to 24:0.

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



Further details regarding the individual steps (cont.)

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 (see following section):
For example **"General"**.
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"**.

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**.

General – Group 1

Coding

Coding in the delivered condition		Possible change	
System design			
00:2	System version 1: One heating circuit without mixer A1, with DHW heating	00:4	System version 2, 5: One heating circuit with mixer M2, with DHW heating
		00:6	System version 3, 4: 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.
User no.			
77:1	LON subscriber number (only for weather-compensated control)	77:2 to 77:99	LON subscriber number, adjustable from 1 to 99: 1 - 4 = Boiler 5 = Cascade 10 - 98 = Vitotronic 200-H 99 = Vitocom Note <i>Allocate each number only once.</i>
Detached house/apartment building			
7F:1	Detached house (only for weather-compensated control)	7F:0	Apartment building 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 Only setting test mode possible
		8F:2	Standard menu and test mode enabled 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)	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 ext. demand			
9b:0	No minimum flow temperature in case of external demand	9b:1 to 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**Coding**

Coding in the delivered condition		Possible change	
Single/multi-boiler system			
01:1	Never adjust		

Boiler – Group 2 (cont.)

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 adjusting step $\hat{=}$ 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.
7	Control funct.	OFF	OFF	OFF

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
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
16	ON	Control funct.	Control funct.	Control funct.

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
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

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)	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

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}) $AT > RT_{set} + 1\text{ K}$ (only for weather-compensated control)	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	$AT > RT_{set} + 5\text{ K}$
2	$AT > RT_{set} + 4\text{ K}$
3	$AT > RT_{set} + 3\text{ K}$
4	$AT > RT_{set} + 2\text{ K}$
5	$AT > RT_{set} + 1\text{ K}$
6	$AT > RT_{set}$
7	$AT > RT_{set} - 1\text{ K}$
to	
15	$AT > RT_{set} - 9\text{ K}$

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)	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 adjustable value 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): Heating circuit pump also "OFF": ■ If the mixer has been closed for longer than 20 min. Heating pump "ON": ■ If the mixer changes to control function ■ 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)	A9:0 to A9:15	Without pump idle time With pump idle time; adjustable from 1 to 15



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; change the coding only for the heating circuit with mixer M2)	b0:1	Heating mode: weather-compensated Reduc. mode: with room temperature hook-up
		b0:2	Heating mode: with room temperature hook-up 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; change the coding only for the heating circuit with mixer M2)	b5:1 to 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	$RT_{actual} > RT_{set} + 5\text{ K}$	$RT_{actual} < RT_{set} + 4\text{ K}$
2	$RT_{actual} > RT_{set} + 4\text{ K}$	$RT_{actual} < RT_{set} + 3\text{ K}$
3	$RT_{actual} > RT_{set} + 3\text{ K}$	$RT_{actual} < RT_{set} + 2\text{ K}$
4	$RT_{actual} > RT_{set} + 2\text{ K}$	$RT_{actual} < RT_{set} + 1\text{ K}$
5	$RT_{actual} > RT_{set} + 1\text{ K}$	$RT_{actual} < RT_{set}$
6	$RT_{actual} > RT_{set}$	$RT_{actual} < RT_{set} - 1\text{ K}$
7	$RT_{actual} > RT_{set} - 1\text{ K}$	$RT_{actual} < RT_{set} - 2\text{ K}$
8	$RT_{actual} > RT_{set} - 2\text{ K}$	$RT_{actual} < RT_{set} - 3\text{ K}$

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)	C5:1 to 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 limited to 74 °C (only for weather-compensated control)	C6:10 to C6:127	Minimum 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)	d5:1	The external heating program changeover changes to "Constant operation with standard room temperature"
Screed function			
F1:0	Screed drying function disabled (only for weather-compensated control)	F1:1 to F1:6	Screed drying function adjustable in accordance with 6 optional temperature/time profiles (see page 122)
		F1:15	Constant flow temperature 20 °C
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)* 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.

*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	
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 °C, see example on page 124. Observe the setting of coding address "A3" (only for weather-compensated control)	F8:+10 to F8:-60	Temperature limit adjustable from +10 to -60 °C
		F8:-61	Function disabled
End temperature raising			
F9:-14	Temperature limit for raising the reduced set room temp. -14 °C, see example on page 124. (only for weather-compensated control)	F9:+10 to F9:-60	Temperature limit for raising the set room temperature to the value selected for standard mode adjustable from +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 125 (only for weather-compensated control)	FA:0 to FA:50	Temperature rise adjustable from 0 to 50 %

Heating circuit 1/Heating circuit 2 – Group 5 (cont.)

Coding in the delivered condition		Possible change	
Duration set flow 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 125 (only for weather-compensated control)	Fb:0 to Fb:150	Duration adjustable from 0 to 300 min; 1 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 (see following section):
For example **"General"**.
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**.
7. **If you want to reset all codes to the delivered condition:**
Select **▶ "⑥"** and confirm with **OK**.

Note

This also resets the codes from coding level 1.

General – Group 1

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)
53:3	Never adjust		
54:0	Never adjust		
6E:50	Never adjust		
76:0	Without LON communication module (only for weather-compensated control)	76:1	With LON communication module (automatic recognition)
79:1	With LON communication module: Control unit is fault manager (only for weather-compensated control)	79:0	Control unit is not fault manager
7b:1	With LON communication module: The control unit transmits the time (only for weather-compensated control)	7b:0	Do not transmit time
80:1	A fault message is displayed, providing a fault is active for at least 5 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; 1 step \triangleq 5 s

General – Group 1 (cont.)

Coding in the delivered condition		Possible change	
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; 1 step $\hat{=}$ 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)
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)	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

General – Group 1 (cont.)

Coding in the delivered condition		Possible change	
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)	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)	9F:0 to 9F:40	Differential temperature adjustable from 0 to 40 K

Boiler – Group 2**Coding**

Coding in the delivered condition		Possible change	
06:...	Maximum limit of the boiler water temperature, defaulted 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	Special OFF function	12:1	Special ON function: During calibration, heat is transferred into the heating circuit (adjust if fault "Eb" occurs)
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)

Boiler – Group 2 (cont.)

Coding in the delivered condition		Possible change	
30:0	Internal fixed speed circulation pump (automatic adjustment, do not modify)		
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 % (not available for Vitodens 222-F)
38:0	Status burner control unit: Operational (no fault)	38:≠0	Status burner control unit: Error

DHW – Group 3**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 Note <i>Maximum value subject to boiler coding card. Observe the max. permissible DHW temperature.</i>
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: Starting point -2.5 K Stopping point +2.5 K	59:1 to 59:10	Starting point adjustable from 1 to 10 K below the set value

DHW – Group 3 (cont.)

Coding in the delivered condition		Possible change	
60:20	During DHW heating, the boiler water temperature is max. 20 K higher than the set DHW temperature	60:5 to 60:25	The difference between the boiler water temperature and the set DHW temperature is adjustable from 5 to 25 K
62:2	Circulation pump with 2 min run-on time after cylinder heating	62:0	Circulation pump without run-on
		62:1 to 62:15	Run-on time adjustable from 1 to 15 min
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.	65:0	Without diverter valve
		65:1	Diverter valve by Viessmann
		65:2	Diverter valve by Wilo
		65:3	Diverter valve by Grundfos
6C:100	Set speed; internal primary pump for DHW heating 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)	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)	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

Coding

Coding in the delivered condition		Possible change	
A0:0	Without remote control (only for weather-compensated control)	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" 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

When selecting a value below 1 °C, there is a risk of pipes outside the thermal envelope of the building being damaged by frost.

The standby mode, in particular, should be taken into consideration, e.g. during holidays.

Parameters 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	1 °C	3 °C
to	to	to
15	14 °C	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)	A4:1	No frost protection; this setting is only possible if code "A3:-9" has been selected. Note <i>"Caution" when setting this code, also observe "A3"</i>
A8:1	Heating circuit with mixer creates a demand for the internal circulation pump (only for weather-compensated control)	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; 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)	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)	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)	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

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)	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)	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)	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)	E9:0 to E9:100	Speed adjustable from 0 to 100% of the maximum speed during operation with reduced room temperature (not adjustable on Vitodens 222-F)
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
 - Brief scan (for further information, see page 84)
 - Reset data (see page)
- Constant temperature control unit:
Operating data can be scanned in the brief scan (see page 84).

Note

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

Calling up operating data

Weather-compensated control unit

Constant temperature control unit

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



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

3. "Reset data"

1. Press **OK** and **≡** simultaneously for approx. 4 s.
2. "Diagnosis"

Constant temperature control unit



Operating instructions

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.

Diagnose Kurzabfrage						
1:	1	F	0	A	1	2
2:	0	0	0	0	0	0
3:	0	0	0	0	0	0
4:	0	0	0	0	0	0
Wählen mit 						

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 users	Maximum demand temperature		





Diagnosis (cont.)

Line (brief scan)	Field					
	1	2	3	4	5	6
3:	0	Software version Program- ming unit	Software version Mixer exten- sion 0: no mixer exten- sion	0	Software version LON module	Software version External extension 0: no external exten- sion
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 block- ing	0	External 0 to 10 V hook-up Display in °C 0: no external hook-up		
6:	Number of LON sub- scribers		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:	0	0	Variable speed pump 0 w/o 1 Wilo 2 Grundfos	Software version Variable speed pump 0: no variable speed pump	Variable speed pump 0 w/o 1 Wilo 2 Grundfos	Software version Variable speed pump 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 0: no external extension	0

Diagnosis (cont.)

Brief scan	Display				
					
E	0: no external demand 1: external demand	0: no external blocking 1: external blocking	External 0 to 10 V hook-up Display in °C 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 Device		Version Burner control unit	
d	0	0	0	Variable speed pump 0 w/o 1 Wilo 2 Grundfos	Software version Variable speed pump 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 (cylinder primary pump ON)
Heating circ pump A1 ON	Connection to external extension H1
Cylinder 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

Constant temperature control unit

- Press **OK** and  simultaneously for approx. 4 s.
"P" flashes on the display.
- Select  and confirm with **OK**.
- Select required actuator (output) with / (see following table):
- 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"
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 (cylinder primary pump ON)

Checking outputs (relay test) (cont.)

Display	Explanation
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

In case of a fault, "△" 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 those remedied) 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

In case of a fault, the two-digit fault code and (subject to the type of fault) "△" or "⚡" flash on the programming unit display.

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.

Note

"△" or "⚡" continues to be shown on the display.

A fault messaging facility (if installed) is switched off.

If an acknowledged fault is not remedied, the fault message will be re-displayed the following day.

Fault display (cont.)

Calling up acknowledged faults

Press **OK** for approx. 4 s.
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 "**Δ**" and select fault history with **OK**.
3. Select fault message with **▲/▼**.

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

The 10 most recent faults (including those remedied) are saved and can be scanned.

Fault codes

Fault code on the display	Const.	Weath.-comp.	System characteristics	Cause	Measures
0F	X	X	Control mode	Maintenance	Service the appliance. After servicing, set coding address "24:0".
10	X	X	Regulates as if the outside temperature was 0 °C	Short circuit, outside temperature sensor	Check the outside temperature sensor (see page 102)
18	X	X	Regulates as if the outside temperature was 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)

Fault codes (cont.)

Fault code on the display	Const.	Weath.-comp.	System characteristics	Cause	Measures
28	X	X	Regulates with-out 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
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	Outlet temperature sensor shorted out	Check sensors (see page 104)
58	X	X	No DHW heating	Break, cylinder temperature sensor	Check sensors (see page 104)
59	X	X	No DHW heating	Outlet temperature sensor lead broken	Check sensors (see page 104)

Fault codes (cont.)

Fault code on the display	Const.	Weath.-comp.	System characteristics	Cause	Measures
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 62)	Air lock in the internal circulation pump or minimum flow rate not achieved	Vent the system if the fault message continues to be displayed
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	Regulates as if the outside temperature was 0 °C	Internal fault	Replacing the control unit
b5	X	X	Control mode as per delivered condition	Internal fault	Replacing the control unit

Fault codes (cont.)

Fault code on the display	Const.	Weath.-comp.	System characteristics	Cause	Measures
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
bA		X	Mixer M2 regulates to a flow temperature of 20 °C.	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 126).
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 126).
bE		X	Control mode	Vitotrol remote control incorrectly programmed	Check remote control DIP switch setting (see page 126)
bF		X	Control mode	Incorrect LON communication module	Replace the LON communication module

Fault codes (cont.)

Fault code on the display	Const.	Weath.-comp.	System characteristics	Cause	Measures
C4	X	X	Control mode	Communication error, Open Therm extension	Check Open Therm extension
C5	X	X	Control mode, max. pump speed	Communication error, variable speed internal pump	Check the setting of coding address "30"
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 error, Vitocom 100 (KM BUS)	Check connections, Vitocom 100 and coding address "95"
CE	X	X	Control mode	Communication error, ext. extension	Check connections and coding address "2E"
CF		X	Control mode	Communication error, LON communication module	Replace the LON communication module



Fault codes (cont.)

Fault code on the display	Const.	Weath.-comp.	System characteristics	Cause	Measures
dA		X	Control mode without room influence	Short circuit, room temperature sensor, heating circuit 1 (without mixer)	Check room temperature sensor, heating circuit 1
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 126)
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 126)
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. Press reset button R .

Fault codes (cont.)

Fault code on the display	Const.	Weath.-comp.	System characteristics	Cause	Measures
E9	X	X	Burner in a fault state	The ionisation current lies outside the permissible range during calibration	Check the ionisation electrode and cable. Check the flue gas system for tightness. Press reset button R .
EA	X	X	Burner in a fault state	The ionisation current lies outside the permissible range during calibration	Check the ionisation electrode and cable. Press reset button R .
Eb	X	X	Burner in a fault state	Heat draw-off repeatedly too low during calibration	Initiate a heat draw-off. Switch the boiler OFF and ON again. Press reset button R . Set coding address 12:1. This special function leads to heat being transferred to the heating circuit during calibration.
EC	X	X	Burner in a fault state	The ionisation current lies outside the permissible range during calibration	Check the ionisation electrode and cable. Press reset button R .
Ed	X	X	Burner in a fault state	Internal fault	Replace the control unit.

Fault codes (cont.)

Fault code on the display	Const.	Weath.-comp.	System characteristics	Cause	Measures
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 .
F4	X	X	Burner in a fault state	No flame signal	Check the ionisation electrode and connecting cable, measure the ionisation current, check the gas pressure, check the gas train, ignition, ignition module, ignition electrodes and the condensate drain. 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 gas 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	Burner control unit fault	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.)

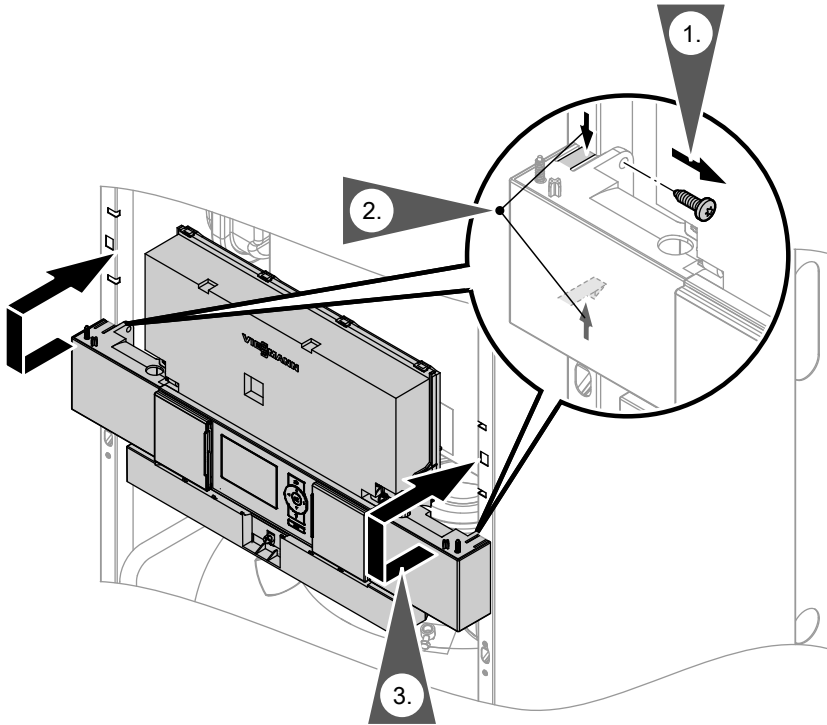
Fault code on the display	Const.	Weath.-comp.	System characteristics	Cause	Measures
FE	X	X	Burner blocked or in a fault state	Boiler coding card or main PCB faulty	Press reset button R . Replace boiler coding card or control unit if the fault persists.
FF	X	X	Burner blocked or in a fault state	Internal 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

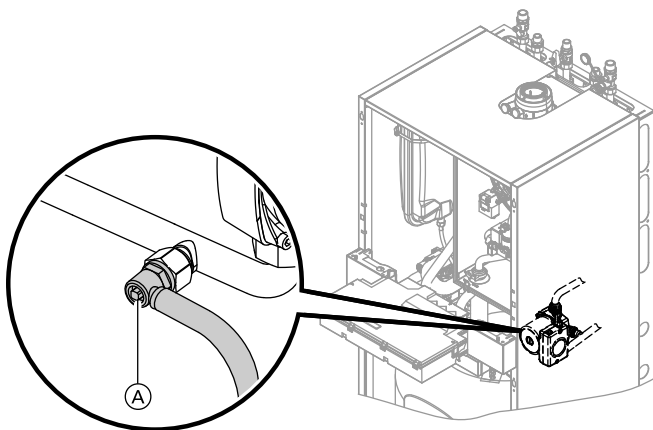
If required for commissioning and servicing, the control unit can be put in a different position.

Repairs (cont.)



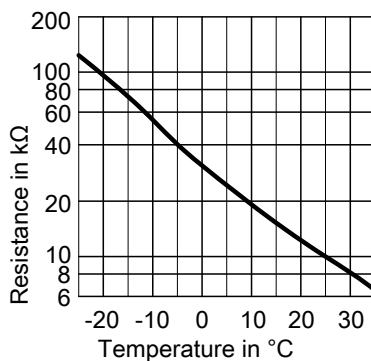
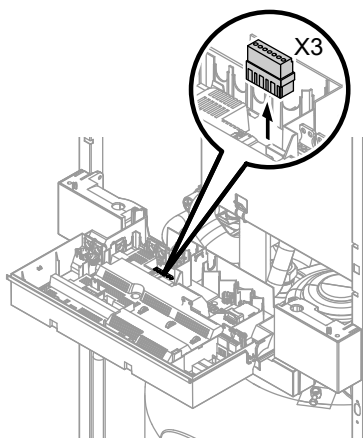
Repairs (cont.)

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 (A) into a suitable container or drain outlet.
3. Open drain valve (A) and drain the boiler as far as required.

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



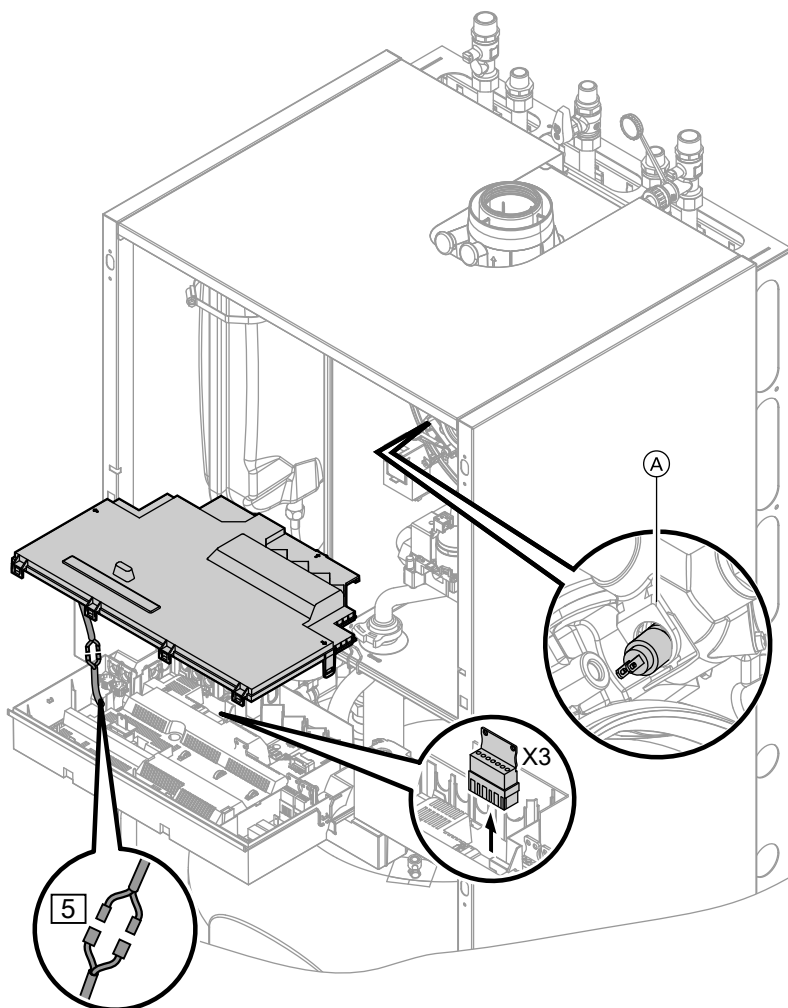
1. Pull plug "X3" from the control unit.

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.

Repairs (cont.)

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



Repairs (cont.)

1. ■ **Boiler water temperature sensor**

Pull the leads from boiler water temperature sensor (A) and check the resistance.

■ **Cylinder temperature sensor**

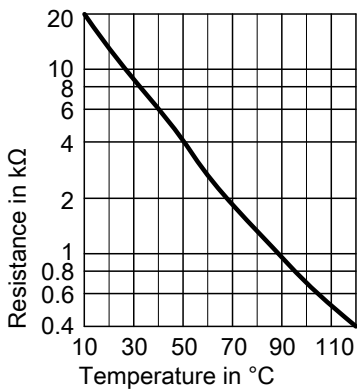
Pull plug [5] from the cable harness at the control unit and check the resistance.

■ **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.



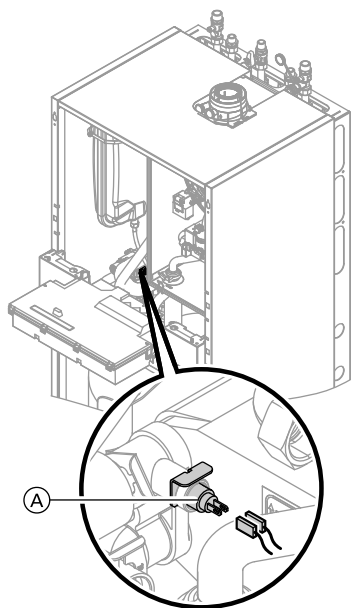
Danger

The boiler water temperature sensor is immersed in the heating water (risk of scalding).

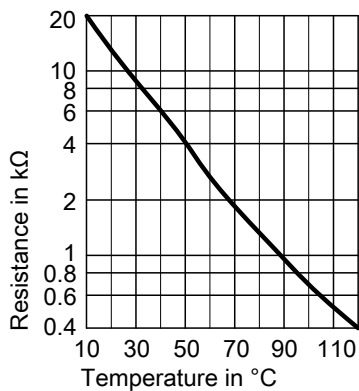
Drain the boiler on the heating water side before replacing the sensor.

Repairs (cont.)

Checking the outlet temperature sensor



1. Pull the leads from outlet temperature sensor (A).



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



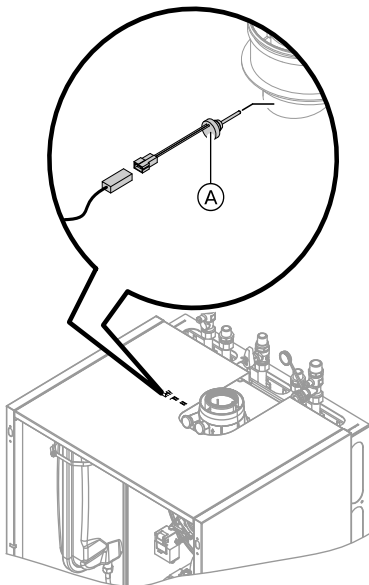
Danger

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

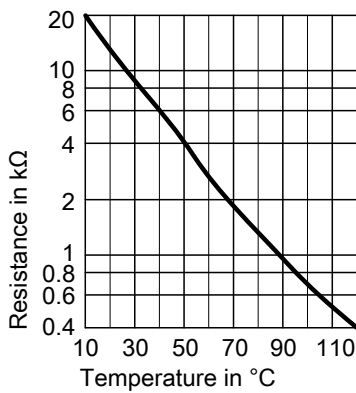
Repairs (cont.)

Check 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 (A).



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

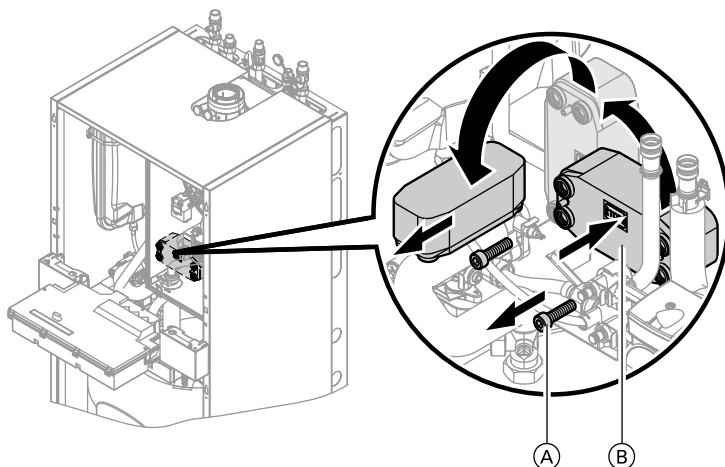
Repairs (cont.)

Checking the plate-type 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 removed plate-type heat exchanger.

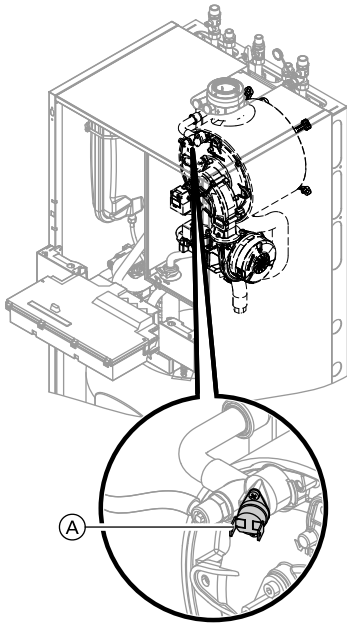


1. Shut off and drain the boiler on its heating water and DHW side.
2. Release the side closures and pivot the control unit forward.
3. Remove the siphon (see page 27).
4. Undo two screws (A) and pull out plate-type heat exchanger (B) to the front.
5. Check the connections on the heating water and DHW side for contamination and scaling; if required, replace the plate-type heat exchanger.
6. 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:

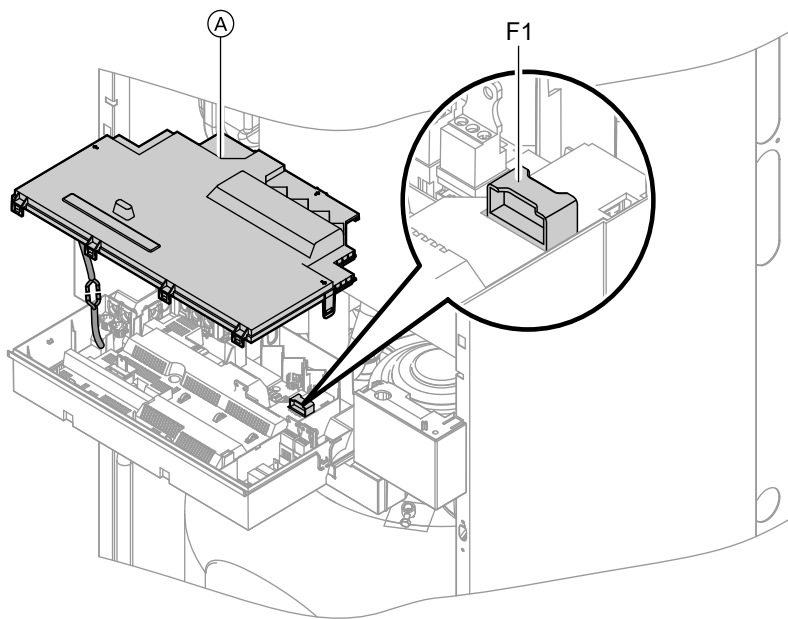
Repairs (cont.)



1. Pull the leads from temperature limiter **A**.
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 **A**.
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.

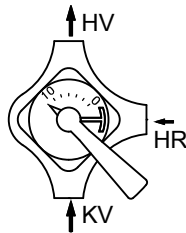
Repairs (cont.)

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

Note

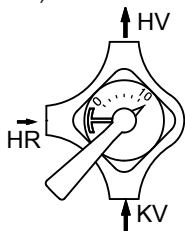
The flow temperature sensor must now capture a higher temperature. If the temperature drops, either the motor is turning in the wrong direction or the mixer set is incorrectly fitted.

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



Mixer installation instructions

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



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



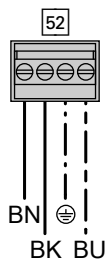
Danger

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.

1. Remove the upper casing cover of the extension kit.
2. Change the rotational direction by switching wires BN and BK at plug 52.

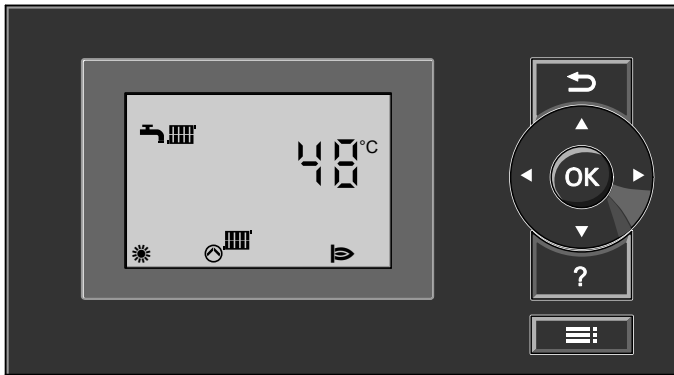
Repairs (cont.)



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 \geq set DHW temperature.
- The burner is switched ON if the boiler water temperature \leq 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.

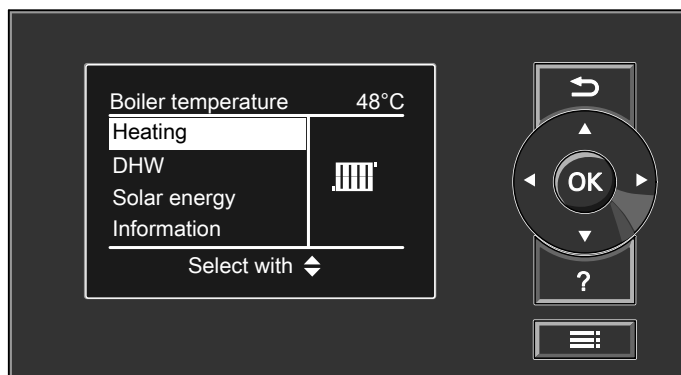
- The cylinder primary pump is switched ON if the boiler water temperature \geq set DHW temperature.
- The burner is switched ON if the boiler water temperature \leq set DHW temperature, and the cylinder primary pump is switched ON when the required boiler water temperature is reached.

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

Function description

Weather-compensated control unit (cont.)

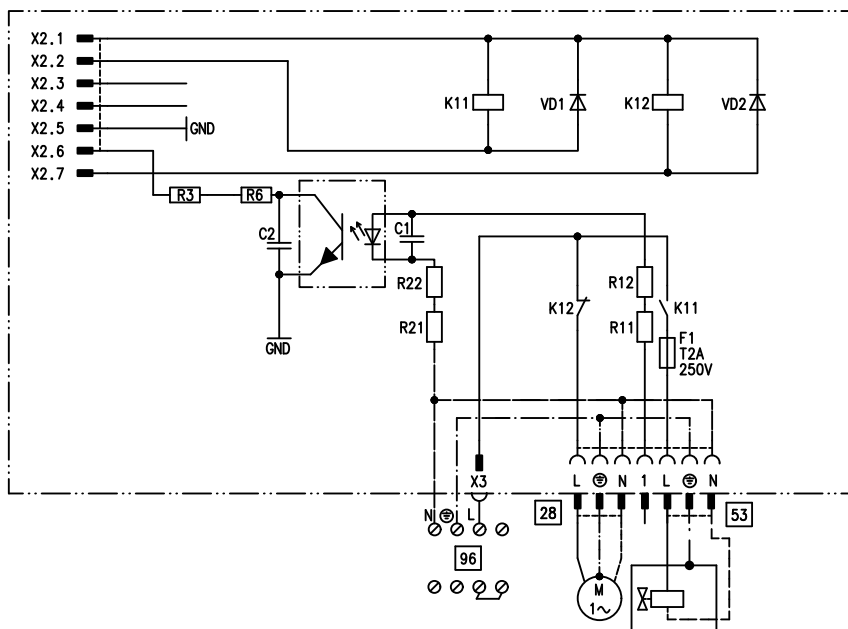
The DHW is controlled to the specified temperature via the cylinder temperature sensor.

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.

Internal extensions

Internal extension H1

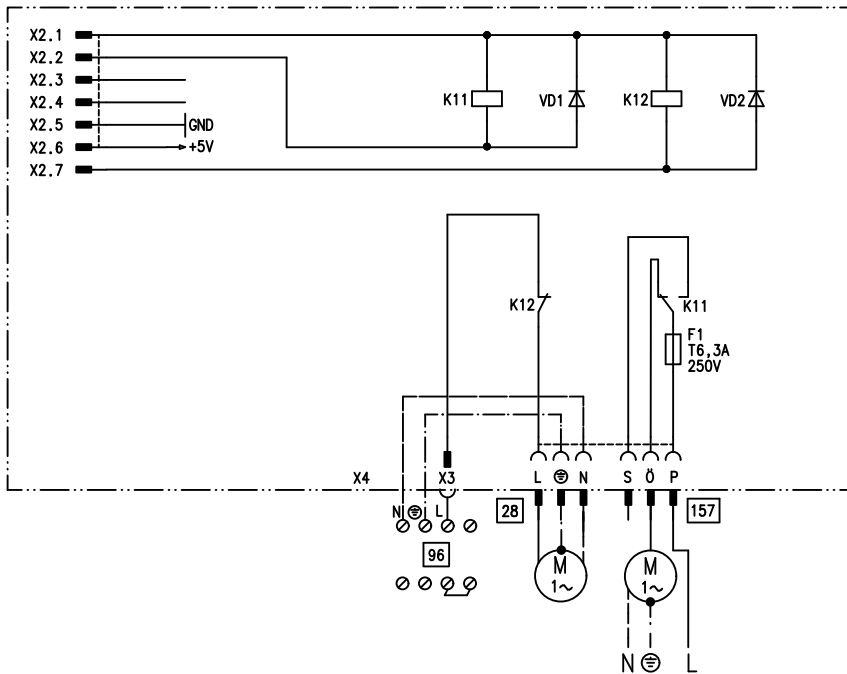


The internal extension H1 is integrated into the control unit casing. The cylinder primary pump is connected to relay output **28**.

An external safety valve can be connected to **53**.

Internal extensions (cont.)

Internal extension H2 (accessory)

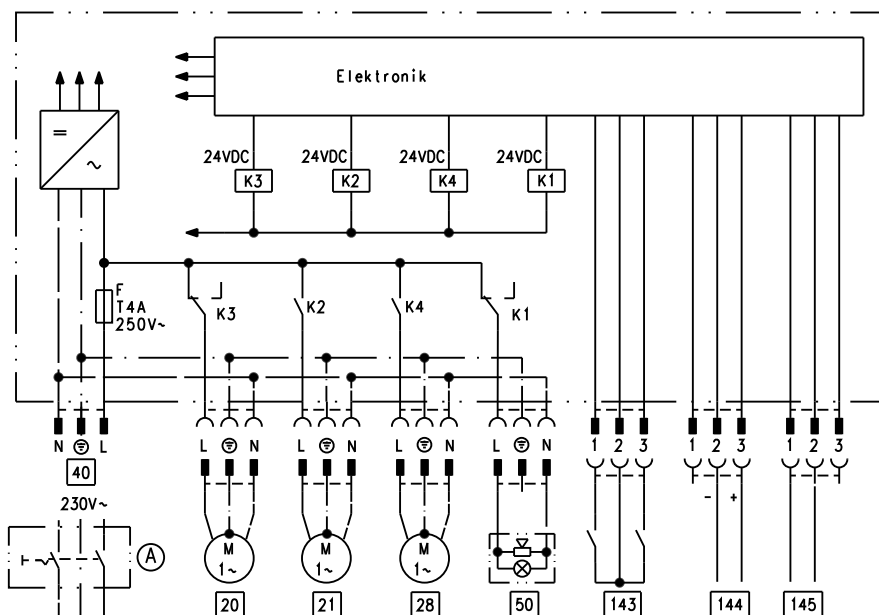


The internal extension H2 is integrated into the control unit casing instead of the internal extension H1. The cylinder primary pump is connected to relay output **28**.

An external extractor interlock can be connected to **157**.

External extensions (accessories)

External extension H1



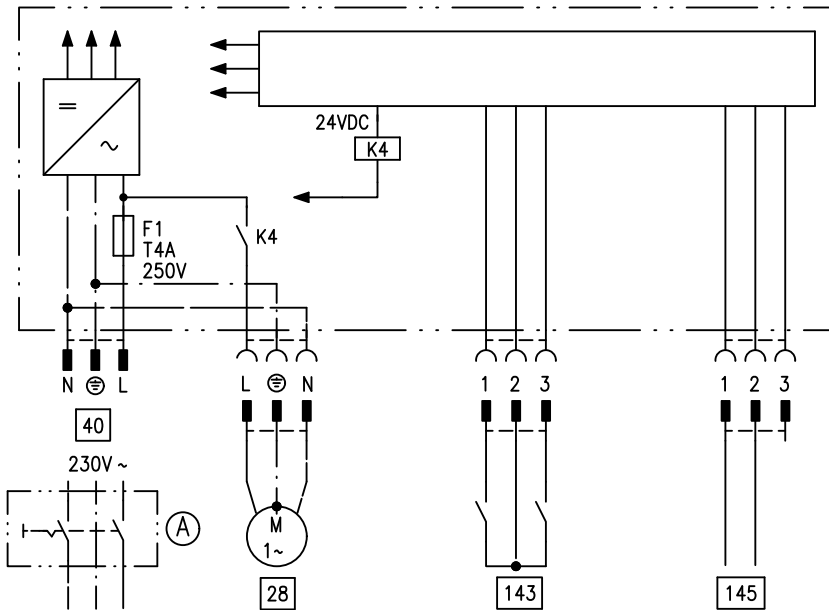
The external extension is connected to the boiler control unit via the KM BUS. The following functions can be controlled or processed simultaneously via the extension:

- Ⓐ 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:

- (A) 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

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".

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.

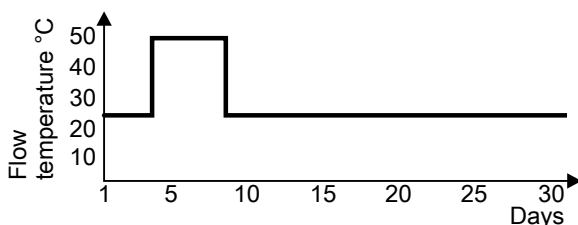
When the screed drying function is activated, the heating circuit pump of the mixer circuit is switched ON and the flow temperature will be held at the selected profile. After completion (30 days), the mixer circuit will again be regulated automatically via the set parameters.

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

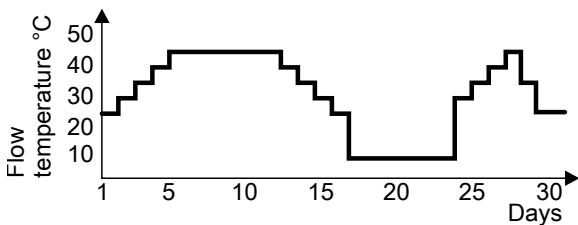
- Heat-up data with respective flow temperatures
- Max. flow temperature achieved
- Operating condition and outside temperature during handover

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"

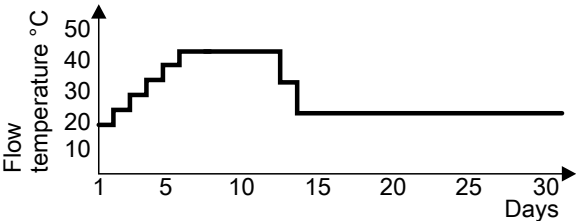


Temperature profile 2: (ZV parquet and flooring technology) code "F1:2"

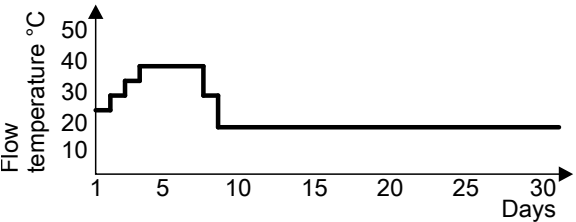


Control functions (cont.)

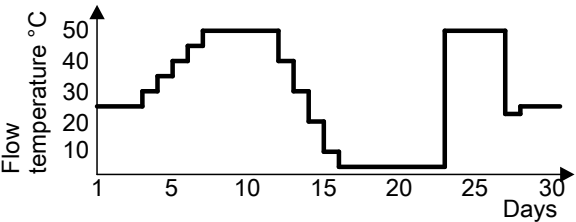
Temperature profile 3: Code "F1:3"



Temperature profile 4: Code "F1:4"

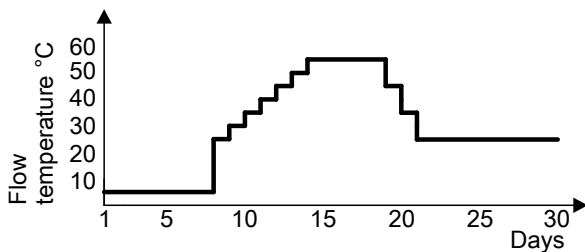


Temperature profile 5: Code "F1:5"

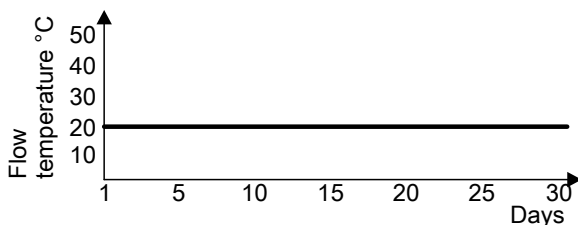


Control functions (cont.)

Temperature profile 6: Code "F1:6"



Temperature profile 7: Code "F1:15"



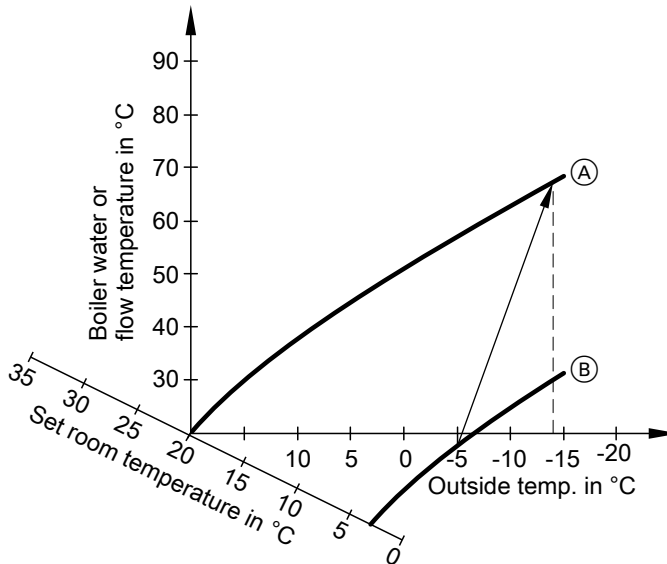
Raising the reduced room temperature

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

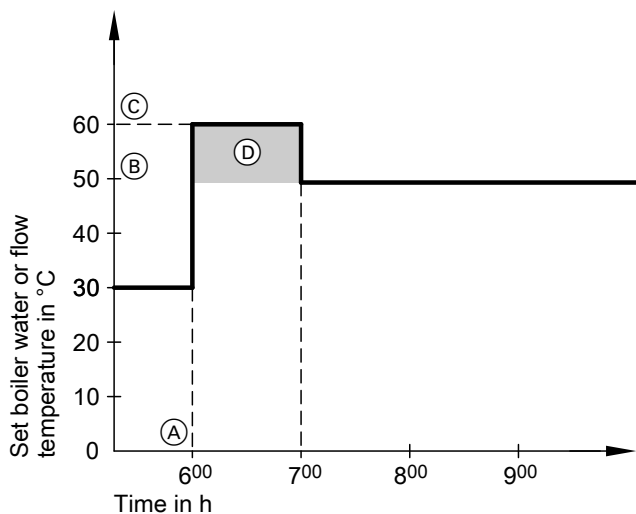
Reducing the heat-up time

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".

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":
 $50\text{ °C} + 20\% = 60\text{ °C}$
- Ⓓ 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	ON  1 2 3 4
The remote control affects the heating circuit with mixer M2	ON  1 2 3 4
When connecting a separate room temperature sensor, set DIP switch "3" to "ON".	ON  1 2 3 4

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 $\lambda=1.24$ 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.

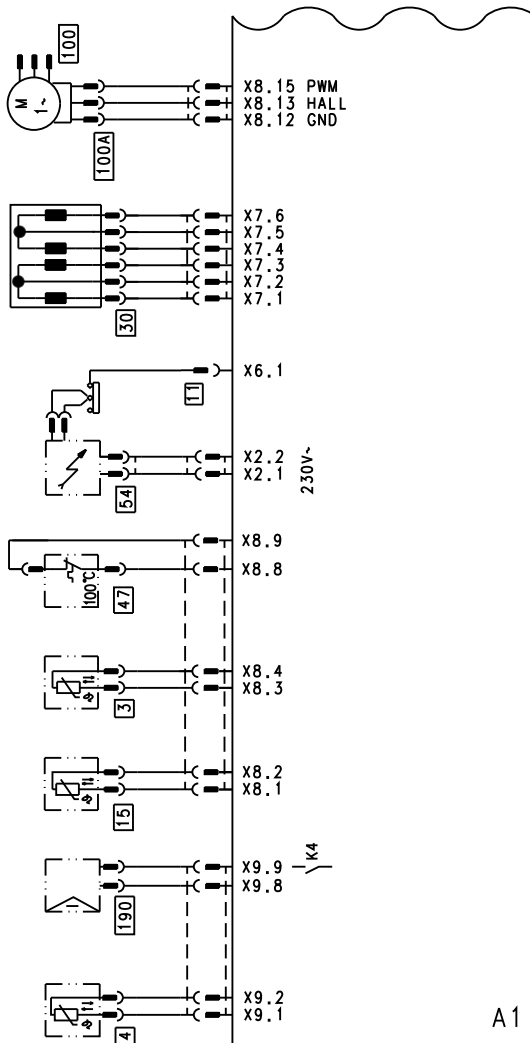
To check the combustion quality, the CO_2 content or the O_2 content of the flue gas is measured. The actual values enable the prevailing air factor to be determined. The relationship between the CO_2 or O_2 content and air factor λ is illustrated in the following table.

Electronic combustion controller (cont.)**Air factor λ – CO₂/O₂ content**

Air factor λ	O₂ content (%)	CO₂ content (%) for natural gas E	CO₂ content (%) for natural gas LL	CO₂ content (%) for LPG P LL
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 $\lambda=1$). 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.

Internal connection diagram

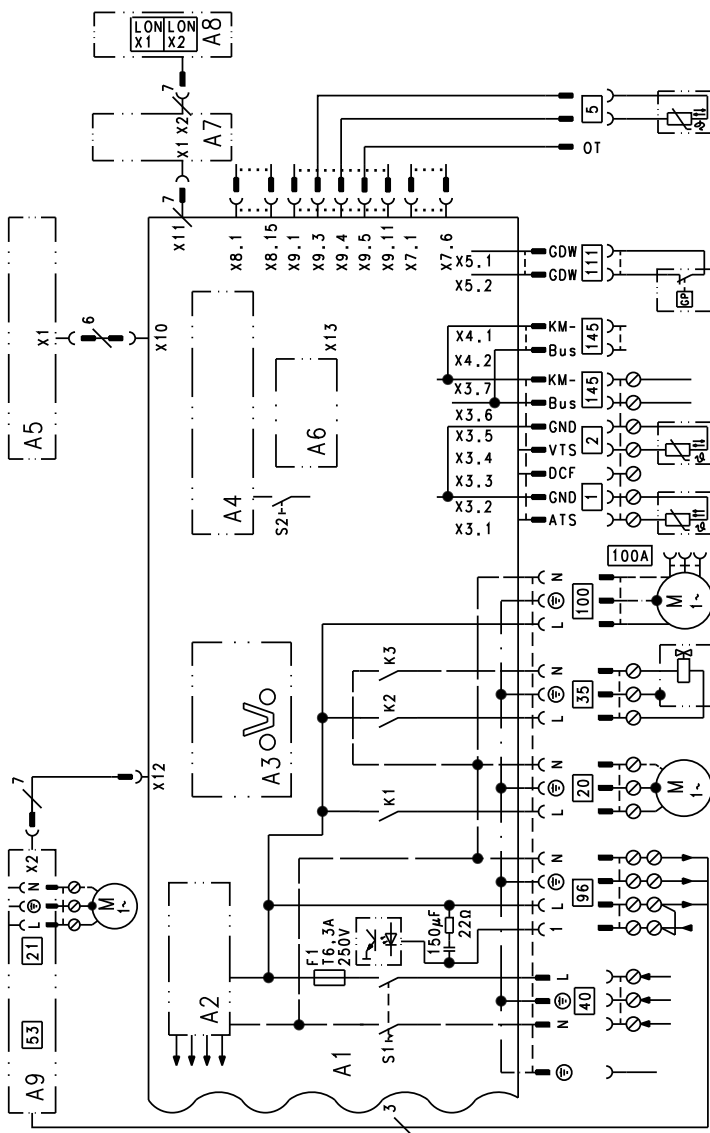


- A1 Main PCB
X... Electrical interfaces
3 Boiler water temperature sensor
4 Outlet temperature sensor
11 Ionisation electrode
15 Flue gas temperature sensor

- 30 Stepper motor for diverter valve
47 Thermocouple
54 Ignition unit
100 Fan motor
100A Fan motor control
190 Modulation coil

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External connection diagram



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

External connection diagram (cont.)

A7	Connection adaptor	20	Internal circulation pump
A8	LON communication module	35	Gas solenoid valve
A9	Internal extension H1	40	Power supply
S1	ON/OFF switch	96	Power supply accessories and Vitotrol 100
S2	Reset button		
X...	Electrical interfaces	100	Fan motor
1	Outside temperature sensor	100 A	Fan motor control
2	Flow temperature sensor, low loss header	111	Gas pressure limiter
5	Cylinder temperature sensor (plug on the cable harness)	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	037	DHW connection pipe
002	Connection line; diaphragm expansion vessel	038	Heating water flow connection pipe
003	Cap panel with gasket	039	Cold water connection
004	Profiled seal	040	Return connection pipe
005	Boiler flue connection	050	Flow unit
006	Plug	051	Return unit
007	Ventilation air gasket	052	Overflow valve
008	Flue gas gasket	053	Plug Ø 8/10
010	Heat exchanger	054	Plate-type heat exchanger
011	Moulded hose, return	055	Profiled gasket
012	Condensate hose	056	Valve insert
013	Siphon	057	Overflow pipe
015	Hose (600 mm long)	062	Burner gauze assembly
016	Condensate hose (400 mm long)	063	Burner gauze assembly gasket
017	Hose (270 mm long)	066	Gasket burner flange
019	Tee	066	Mixture damper
021	Safety valve	067	Fan
023	Hose ferrule	068	Gas train
024	Right-angle shut-off valve, DHW cylinder heating	069	Burner door
025	Connection line, DHW heating	070	Ignition unit
026	Bezel	071	Ionisation electrode gasket
027	Non-return valve	072	Ignition electrode gasket
028	Air vent valve G 3/8"	074	Gas nozzle
029	Pressure gauge	075	Venturi extension
030	Right-angle shut-off valve, cylinder cold water	080	Gasket set A 16 x 24 x 2.0
031	Gas pipe	081	Gasket set A 17 x 24 x 2.0
032	Flow pipe	082	Gasket set A 10 x 15 x 1.5
033	Connection pipe, cold water, cylinder	084	Gasket 23 x 30 x 2.0
034	Heating water flow connection pipe	085	O-ring gasket set 17.86 x 2.62
035	Connection pipework, heating water return	087	O-ring 14.3 x 2.4
036	Connection pipework, cold water	088	O-ring 35.4 x 3.6
		089	Set of plug connector retainers
		090	Toggle fastener (set)
		092	Grommet
		093	Pipe clip Ø 18
		094	Pipe clip Ø 18/1.5
		095	Hose clip DN 25
		096	Clip Ø 8
		097	Clip Ø 10
		098	Clip Ø 15
		099	Clip Ø 18
		100	Hose clip Ø 34.3 - 38.7

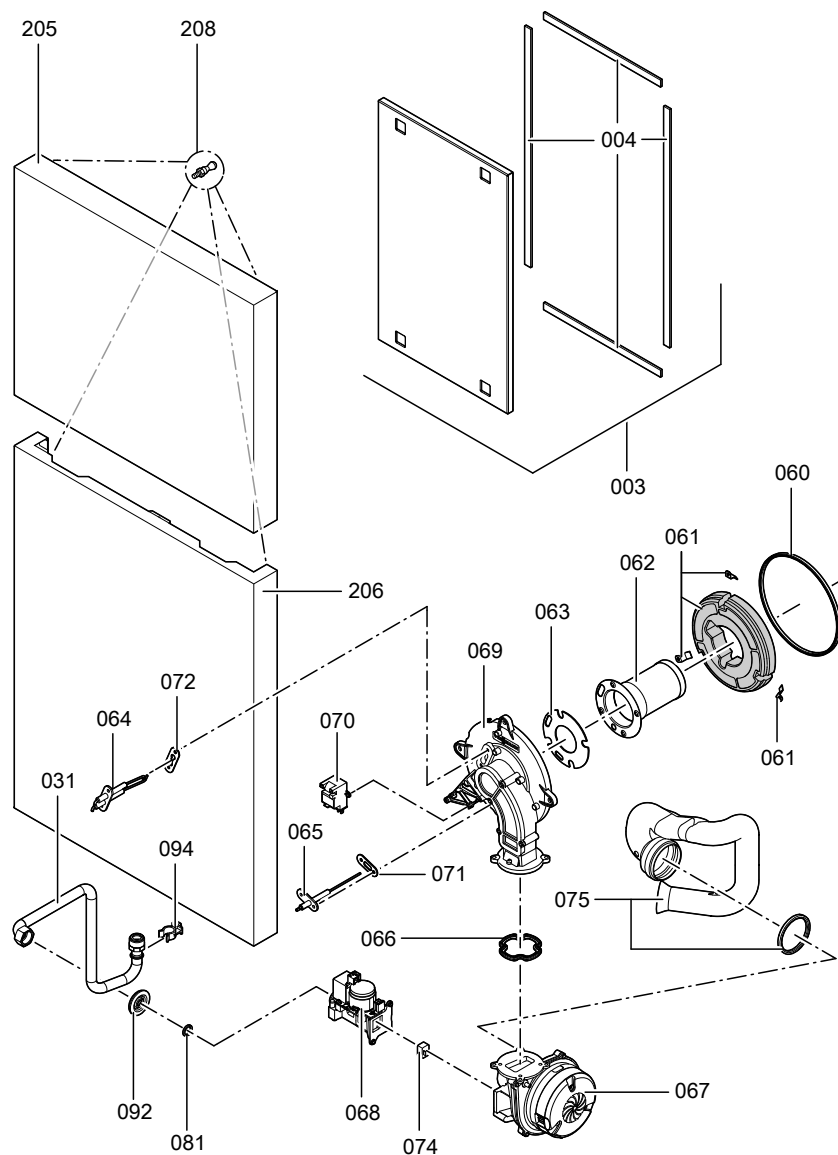
101	Worm-drive hose clip Ø 34.0 - 37.4
102	Locking clip, condensate drain
103	Drain plug (set)
104	Cap
105	Hose Ø 10 x 1.5 x 750
106	Union nut G 1"
110	Quick-acting air vent valve
111	Cylinder mounting bracket
112	Control unit support
130	Circulation pump
131	Circulation pump
133	Circulation pump motor
134	Circulation pump motor
140	Flue gas temperature sensor
141	Thermocouple
142	Temperature sensor
143	Cylinder temperature sensor
150	T&P valve connection pipe
151	T&P valve
160	Cylinder
162	Sleeve
163	Strain relief
164	Cylinder gasket
166	Anode flange with gasket
167	Flange insulation
171	Sleeve
172	Lid
200	Side panel, left
202	Side panel, right
204	Top cover
205	Front panel, top
206	Bottom front panel
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

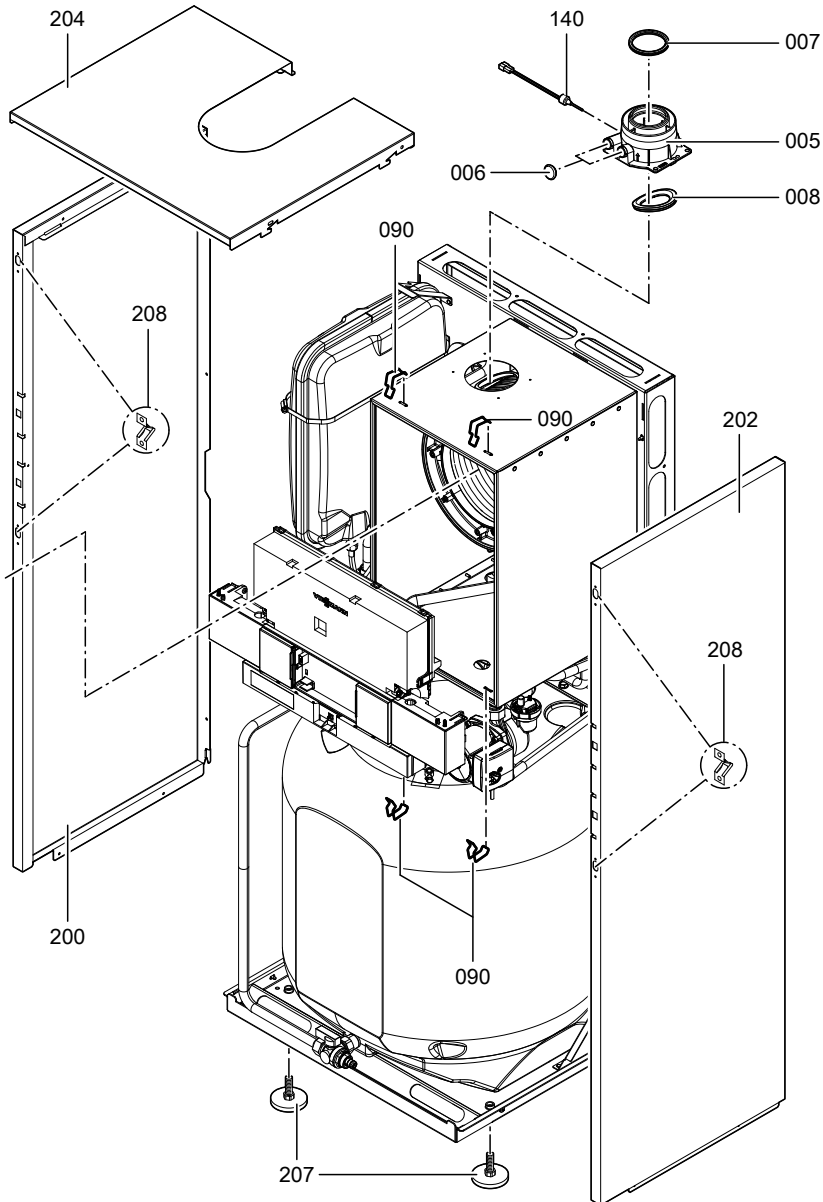
060 Burner gasket
061 Insulation ring
064 Ignition electrode with gasket
065 Ionisation electrode with gasket
165 Magnesium anode

- 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

Parts lists (cont.)

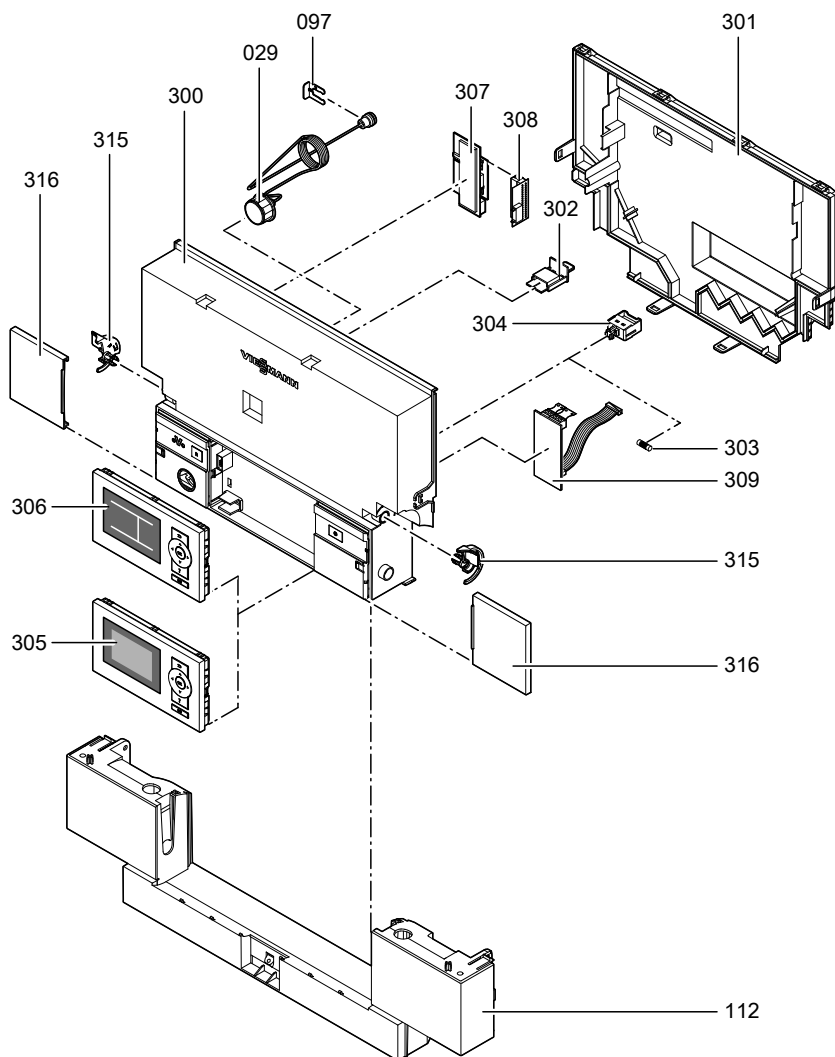


Parts lists (cont.)

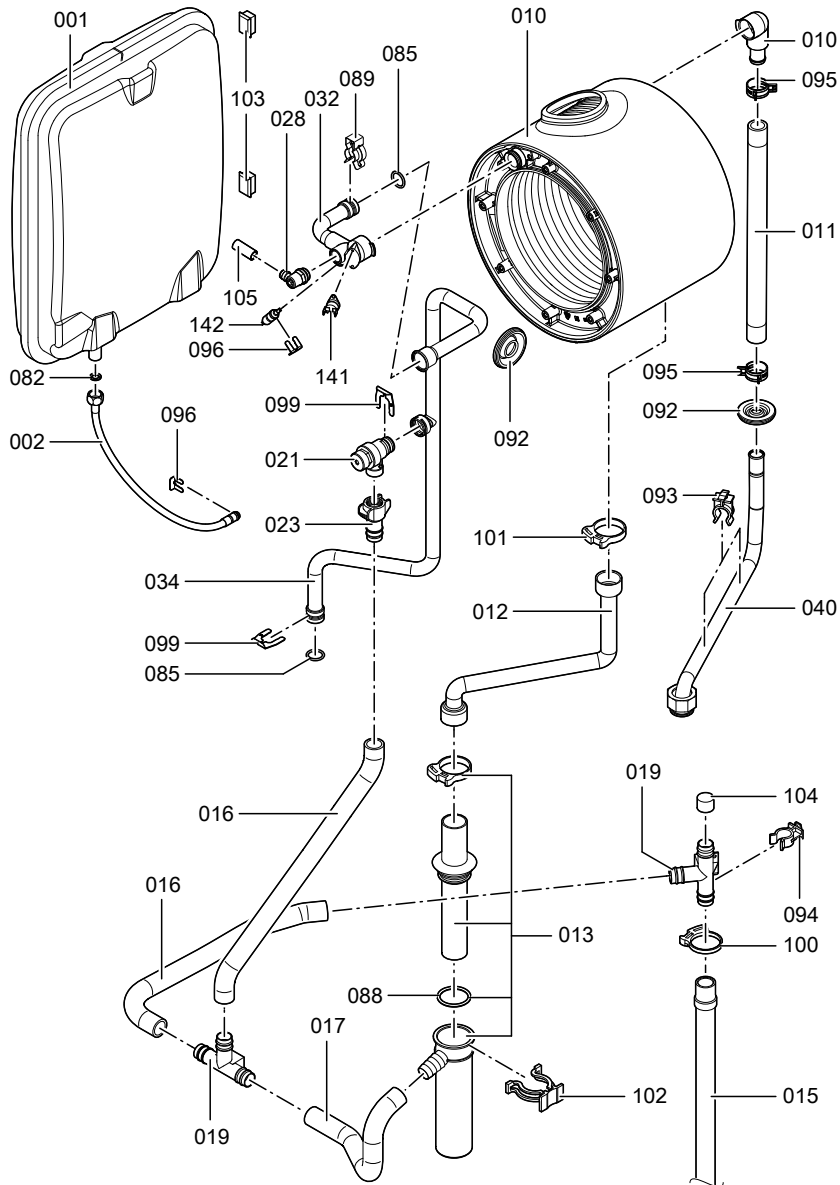


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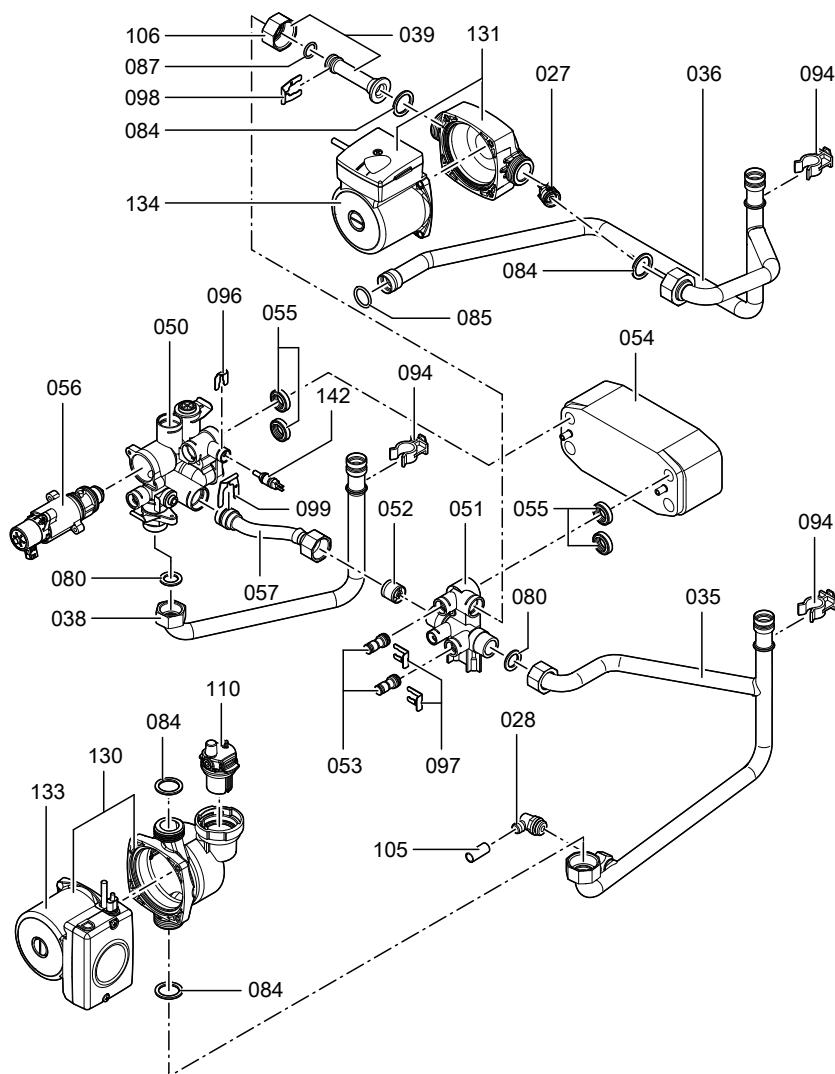
Parts lists (cont.)



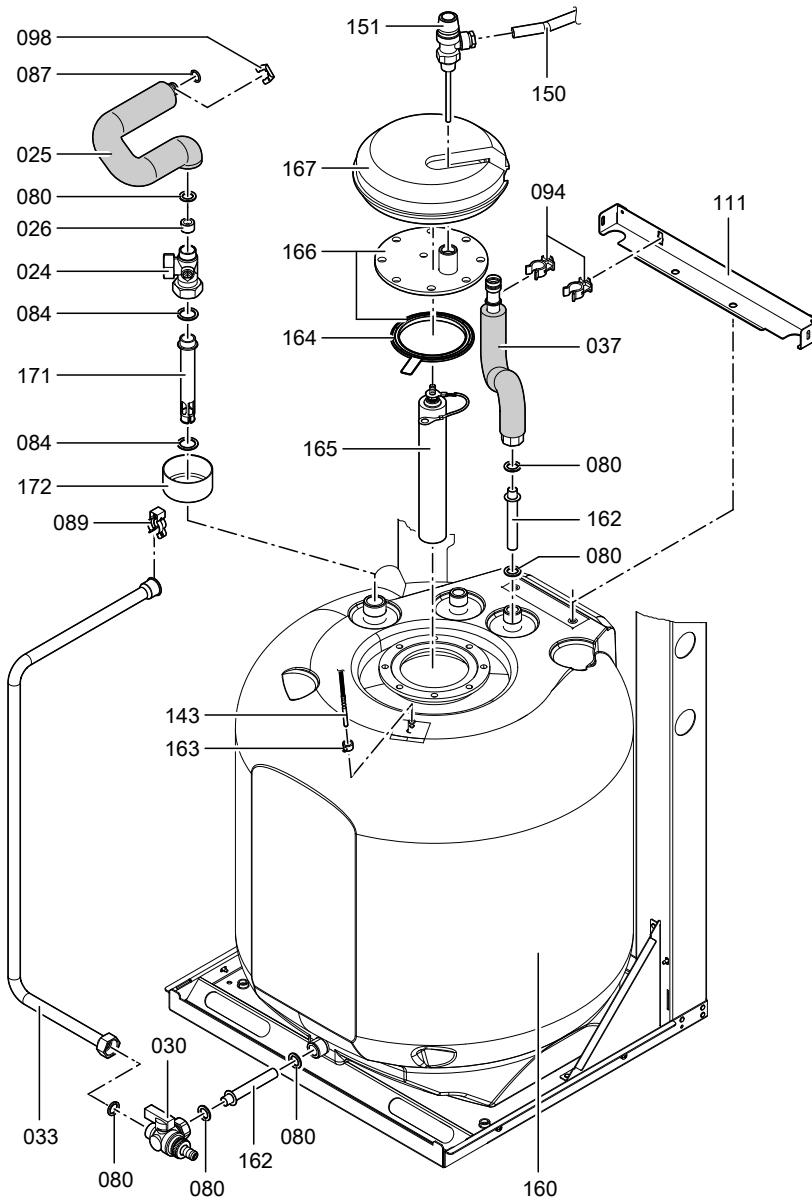
Parts lists (cont.)



Parts lists (cont.)



Parts lists (cont.)



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Service

Commissioning/service reports

Setting and test values	Date: By:	Set value	Commissioning	Service
Static pressure	<i>mbar</i>	max. 57.5 mbar		
Supply pressure (flow pressure)				
<input type="checkbox"/> for natural gas E	<i>mbar</i>	17.4-25 mbar		
<input type="checkbox"/> for natural gas LL	<i>mbar</i>	17.4-25 mbar		
<input type="checkbox"/> for LPG	<i>mbar</i>	42.5-57.5 mbar		
<i>Tick gas type</i>				
Carbon dioxide content CO₂				
■ at lower output	<i>% by vol.</i>			
■ at upper output	<i>% by vol.</i>			
Oxygen content O₂				
■ at lower output	<i>% by vol.</i>			
■ at upper output	<i>% by vol.</i>			
Carbon monoxide content CO				
■ at lower output	<i>ppm</i>			
■ at upper output	<i>ppm</i>			

Specification

Rated voltage	230 V	Electronic temperature limiter setting	82 °C
Rated frequency	50 Hz	Temperature limiter setting	100 °C (fixed)
Rated current	6 A	Line fuse (mains)	max. 16 A–
Protection class	E		
Protection	IP X 4 D to EN 60529		
Permissible ambient temperature			
■ during operation	0 to +40 °C		
■ during storage and transport	-20 to +65 °C		

Gas boilers

Rated output range				
at T _F /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.)	W	150	150	160
Connection values				
in relation to the max. load				
Natural gas H	m ³ /h	1.89	3.23	3.86
LPG	kg/h	1.40	2.39	2.85
Product ID	C€-0085 BU 0051			

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.

Certificates

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

DIN 4753

EN 483

EN 625

EN 677

EN 806

EN 55 014

EN 60 335-2-102

EN 61 000-3-2

EN 61 000-3-3

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

97/23/EC

90/396/EEC

92/42/EEC

2004/108/EC

2006/ 95/EC

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

Allendorf, 1 April 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 April 2009

Viessmann Werke GmbH&Co KG



pp. Manfred Sommer

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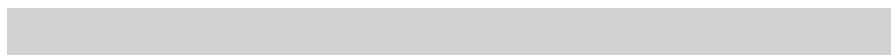
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Applicability

Compact gas condensing boiler

Type FS2A	from serial no.
4.8 to 19 kW	7419 987 ...
6.5 to 26 kW	7374 977 ...
8.8 to 35 kW	7374 978 ...

Viessmann Werke GmbH&Co KG
D-35107 Allendorf
Telephone: +49 6452 70-0
Fax: +49 6452 70-2780
www.viessmann.com

Viessmann Limited
Hortonwood 30, Telford
Shropshire, TF1 7YP, GB
Telephone: +44 1952 675000
Fax: +44 1952 675040
E-mail: info-uk@viessmann.com

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