

Installation and service instructions for contractors

VIESSMANN

Vitodens 222-F
Type B2TB, 1.8 to 35.0 kW
Gas condensing storage combi boiler
Natural gas and LPG version

For applicability, see the last page



VITODENS 222-F



Safety instructions

Safety instructions



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

Safety instructions explained



Danger

This symbol warns against the risk of injury.



Please note

This symbol warns against the risk of material losses and environmental pollution.

Note

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

Target group

These instructions are exclusively intended for qualified contractors.

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

Regulations to be observed

- National installation regulations
- Statutory regulations for the prevention of accidents
- Statutory regulations for environmental protection
- Codes of practice of the relevant trade associations
- All current safety regulations as defined by DIN, EN, DVGW, TRGI, TRF, VDE and all locally applicable standards
 - Ⓐ ÖNORM, EN, ÖVGW G K directives, ÖVGW-TRF and ÖVE
 - Ⓒ SEV, SUVA, SVGW, SVTI, SWKI, VKF and EKAS guideline 1942: LPG, part 2

Safety instructions for working on the system

Working on the system

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



Danger

Hot surfaces can cause burns.

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



Please note

Electronic assemblies can be damaged by electrostatic discharge.

Prior to commencing work, touch earthed objects such as heating or water pipes to discharge static loads.

Repair work



Please note

Repairing components that fulfil a safety function can compromise the safe operation of the system.

Replace faulty components only with genuine Viessmann spare parts.

Safety instructions (cont.)**Auxiliary components, spare and wearing parts****Please note**

Spare and wearing parts that have not been tested together with the system can compromise its function. Installing non-authorized components and making non-approved modifications or conversions can compromise safety and may invalidate our warranty.

For replacements, use only original spare parts supplied or approved by Viessmann.

Safety instructions for operating the system**If you smell gas****Danger**

Escaping gas can lead to explosions which may result in serious injury.

- Do not smoke. Prevent naked flames and sparks. Never switch lights or electrical appliances on or off.
- Close the gas shut-off valve.
- Open windows and doors.
- Evacuate any people from the danger zone.
- Notify your gas or electricity supply utility from outside the building.
- Have the power supply to the building shut off from a safe place (outside the building).

If you smell flue gas**Danger**

Flue gas can lead to life threatening poisoning.

- Shut down the heating system.
- Ventilate the installation site.
- Close doors to living spaces to prevent flue gases from spreading.

What to do if water escapes from the appliance**Danger**

If water escapes from the appliance there is a risk of electrocution.

Switch OFF the heating system at the external isolator (e.g. fuse box, domestic distribution board).

**Danger**

If water escapes from the appliance there is a risk of scalding.

Never touch hot heating water.

Condensate**Danger**

Contact with condensate can be harmful to health.

Never let condensate touch your skin or eyes and do not swallow it.

Flue systems and combustion air

Ensure that flue systems are clear and cannot be sealed, for instance due to accumulation of condensate or other external causes.

Avoid continuous condensate disposal with a wind protector.

Ensure an adequate supply of combustion air.

Inform system users that subsequent modifications to the building characteristics are not permissible (e.g. cable/pipework routing, cladding or partitions).

**Danger**

Leaking or blocked flue systems, or an inadequate supply of combustion air can cause life threatening poisoning from carbon monoxide in the flue gas.

Ensure the flue system is in good working order. Vents for supplying combustion air must be non-sealable.



Extractors

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

**Danger**

The simultaneous operation of the boiler and appliances that exhausts air to the outside can result in life threatening poisoning due to a reverse flow of flue gas.

Fit an interlock circuit or take suitable steps to ensure an adequate supply of combustion air.

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Disposal of packaging










Please dispose of packaging waste in line with statutory regulations.

DE: Use the disposal system organised by Viessmann.



AT: Use the ARA statutory disposal system (Altstoff Recycling Austria AG, licence number 5766).





CH: Packaging waste is disposed of by the HVAC contractor.

Symbols

Symbol	Meaning
	Reference to other document containing further information
	Step in a diagram: The numbers correspond to the order in which the steps are carried out.
	Warning of material losses and environmental pollution
	Live electrical area
	Pay particular attention.
	<ul style="list-style-type: none"> ▪ Component must audibly click into place. or ▪ Acoustic signal
	<ul style="list-style-type: none"> ▪ Fit new component. or ▪ In conjunction with a tool: Clean the surface.
	Dispose of component correctly.
	Dispose of component at a suitable collection point. Do not dispose of component in domestic waste.

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

Symbol	Meaning
	Steps required during commissioning
	Not required during commissioning

Symbol	Meaning
	Steps required during inspection
	Not required during inspection
	Steps required during maintenance
	Not required during maintenance

Intended use

The appliance is intended solely for installation and operation in sealed unvented heating systems that comply with EN 12828, with due attention paid to the associated installation, service and operating instructions. It is only designed for heating up heating water that is of potable water quality.

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

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

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

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

Product information

Vitodens 222-F, type B2TB

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

- Modulating Matrix cylinder burner for natural gas and LPG
- Integral loading cylinder, capacity
 - 100 l (13 to 26 kW)
 - 130 l (35 kW)
- Hydraulics with 3-way diverter valve and variable speed high efficiency circulation pump
- Vitotronic 100 for constant temperature operation
- Integral diaphragm expansion vessel (12 l capacity)

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

The Vitodens 222-F may only be delivered to countries listed on the type plate. For deliveries to other countries, approved contractors must arrange individual approval on their own initiative and in accordance with the law of the country in question.

Preparing for installation

Preparing for boiler installation

Use a connection set or connection kit, available as an accessory, to make the connection on the gas and water sides.

Note

Fit safety equipment in accordance with the national regulations.

Fitting accessories

Fit all accessories that are installed at the back of the boiler (e.g. connection sets).



Please note

Avoid damaging the appliance.
Connect all pipework free of load and torque stress.



Preparing connections on site:

Connection set installation instructions
or
Assembly kit installation instructions

The following diagram shows sample connection sets for surface mounting, with connection to the top or side.

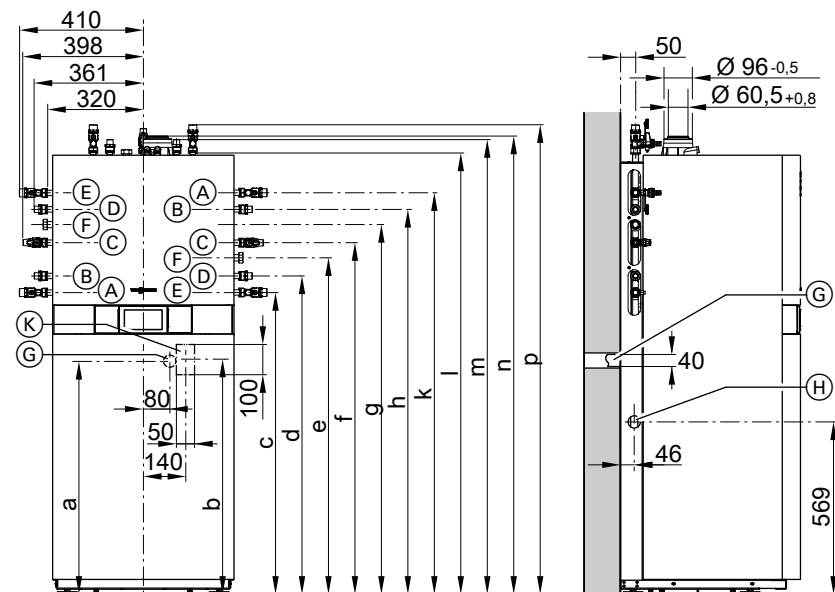


Fig. 1

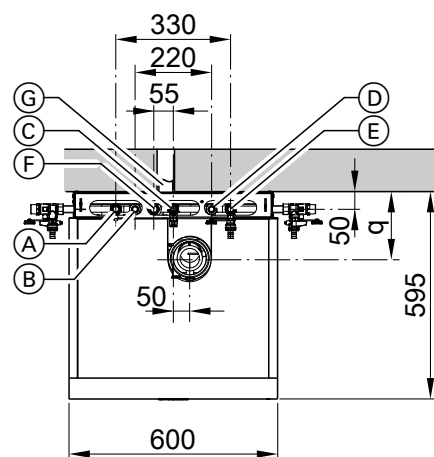


Fig. 2

- (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 facing backwards into the wall
- (H) Condensate drain to the side
- (K) Wiring area

Rated heating output	13 - 19 kW	26 kW	35 kW
a (mm)	745	745	945
b (mm)	750	750	950
c (mm)	972	972	1172
d (mm)	1027	1027	1227
e (mm)	1082	1082	1302
f (mm)	1137	1137	1337
g (mm)	1191	1191	1391
h (mm)	1247	1247	1447
k (mm)	1302	1302	1562
l (mm)	1437	1437	1637
m (mm)	1466	1466	1666
n (mm)	1465	1465	1665
p (mm)	1526	1526	1726
q (mm)	201	224	224

Note

All height dimensions have a tolerance of +7 mm on account of the adjustable feet.

Preparing for boiler installation (cont.)

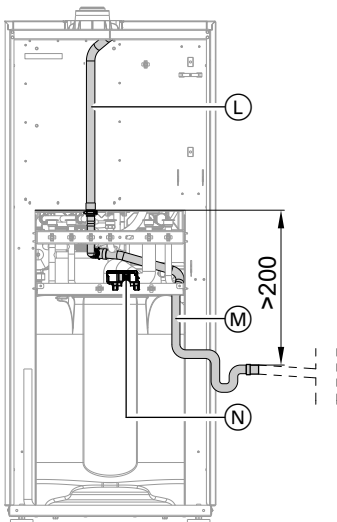


Fig. 3

- Ⓛ Trap air vent valve
- Ⓜ Condensate drain hose
- Ⓝ Cable retainer

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

Note

If an on-site expansion vessel also has to be installed: Install this expansion vessel in the heating return, as the 3-way diverter valve is located in the heating flow.

2. Prepare the connections on the DHW side. Install the safety assembly (accessories or on-site provision) in the cold water line to DIN 1988 and EN 806. See the following chapter.

Recommendation:

Install the safety valve above the DHW cylinder to protect it against contamination, scaling and high temperatures.

ⓄH: According to W3 "Principles for creating potable water installations", safety valves must be drained directly via a visible unrestricted drain or via a short outlet line to the drain network.

3. Prepare the condensate connection to the on-site waste water pipe or trap:

- Drain towards the back:
See dimensions for condensate hose Ⓜ and position Ⓞ in the previous diagrams.
- Drain towards the side aperture:
See position Ⓞ in the previous diagram.

Note

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

Route the condensate hose with a U-bend. Connect it with a fall to the on-site waste water pipe or trap.

4. Prepare the gas connection according to TRGI or TRF [or local regulations].
5. Prepare the electrical connections.
 - The appliance is delivered fitted with an approx. 1.5 m long power cable. Route the cable outwards through the cable holder in area Ⓝ. Max. fuse rating 16 A, 230 V~, 50 Hz (for cable routing, see chapter "Electrical connections").
 - Accessory cables: 0.75 mm² flexible cable with required number of cores for external connections

Safety assembly to DIN 1988 and EN 806 on the cold water connection

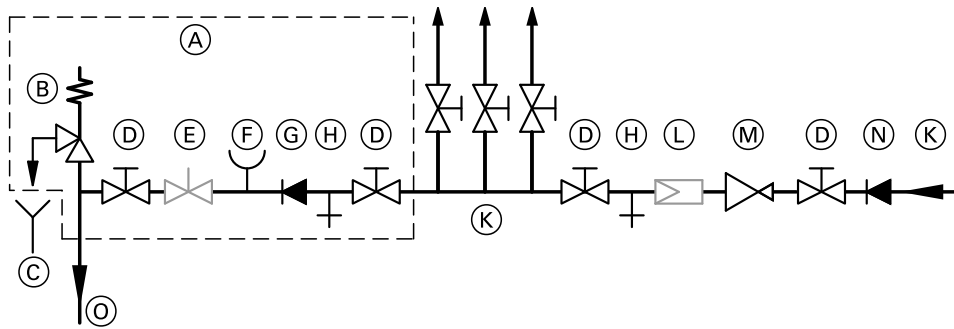


Fig. 4

- | | |
|--|--|
| <ul style="list-style-type: none"> Ⓐ Safety assembly (accessories for connection sets for unfinished walls) Ⓑ Safety valve Ⓒ Visible discharge pipe outlet point Ⓓ Shut-off valve Ⓔ Flow regulating valve (installation recommended) Ⓕ Pressure gauge connection Ⓖ Non-return valve | <ul style="list-style-type: none"> Ⓗ Drain outlet Ⓚ Cold water Ⓛ Drinking water filter Ⓜ Pressure reducer to DIN 1988-2, Dec. 1988 issue Ⓝ Non-return valve/pipe separator Ⓞ Cold water connection at connection set (accessories) |
|--|--|

A safety assembly Ⓐ to DIN 1988 and EN 806 is required if the mains water supply pressure exceeds 10 bar (1 MPa), and no DHW pressure reducing valve is installed (to DIN 4753).

Only use a non-return valve or a combined shut-off and non-return valve in conjunction with a safety valve.

If the safety valve is used, the cold water shut-off valve on the boiler must not be shut off.

Remove the toggle on the cold water shut-off valve (if installed) to prevent it being shut off manually.

Removing the front panels

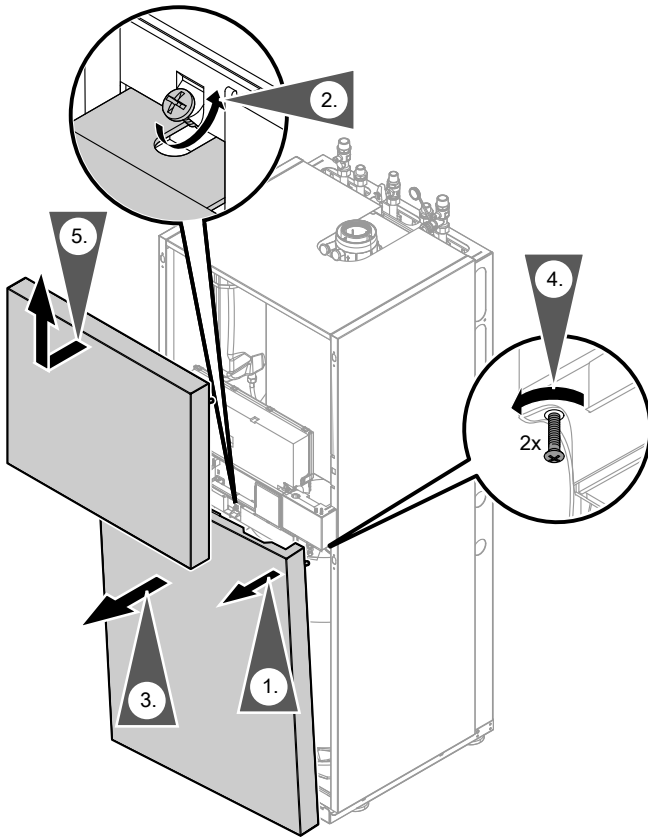
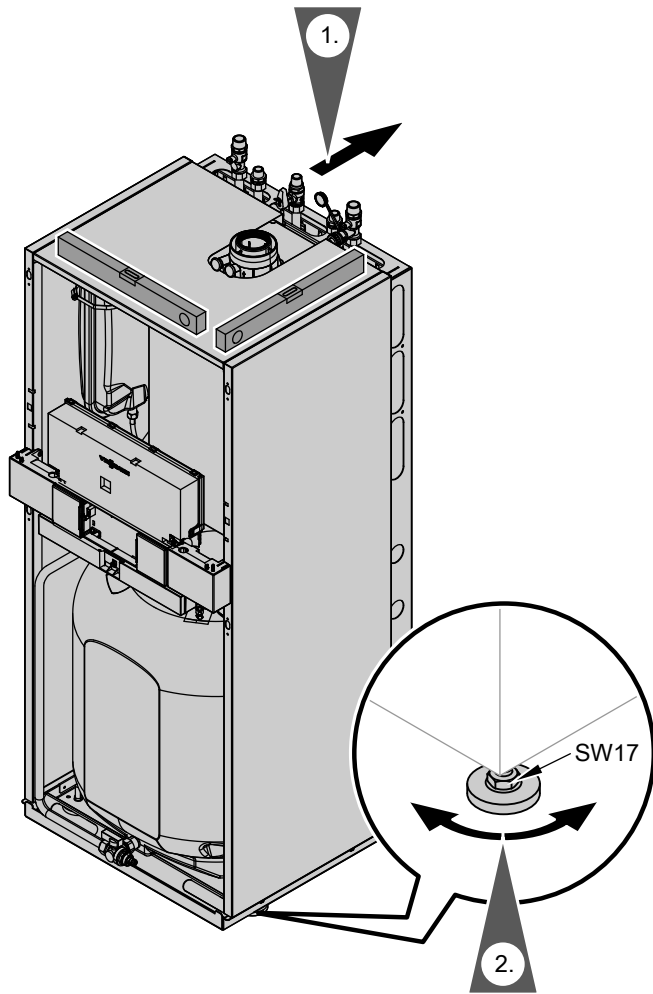


Fig. 5

Siting and levelling the boiler



Note

Position the appliance and accessories so that they are flush with the wall.

Fig. 6

Fitting the additional type plate

1. Take the additional type plate from the documentation supplied with the boiler.
2. In consultation with the system user, attach the additional type plate to the outside of the appliance in a position visible to the flue gas inspector.

Connections on the heating water and DHW side

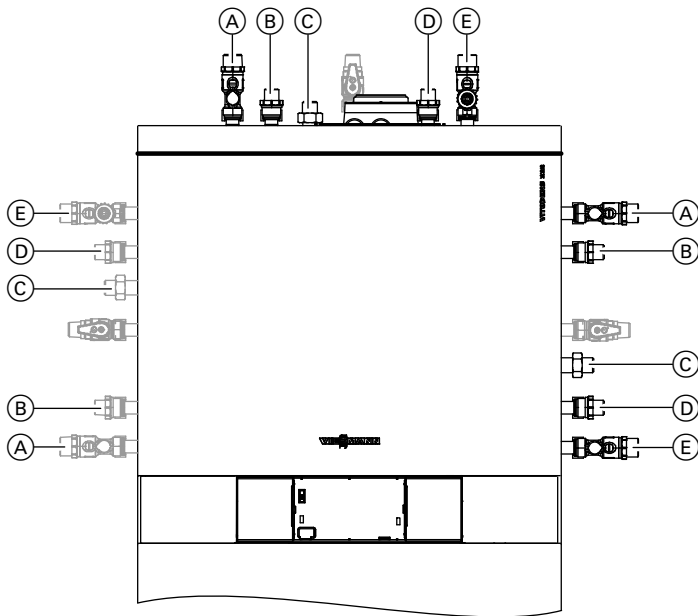


Fig. 7 Shown with connection sets for finished walls (accessories)

- | | |
|--|------------------------------------|
| (A) Heating flow R $\frac{3}{4}$ | (D) Cold water R $\frac{1}{2}$ |
| (B) DHW R $\frac{1}{2}$ | (E) Heating return R $\frac{3}{4}$ |
| (C) DHW circulation R $\frac{1}{2}$ (separate accessories) | |

Connection on the DHW side

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



Separate installation instructions

Condensate connection

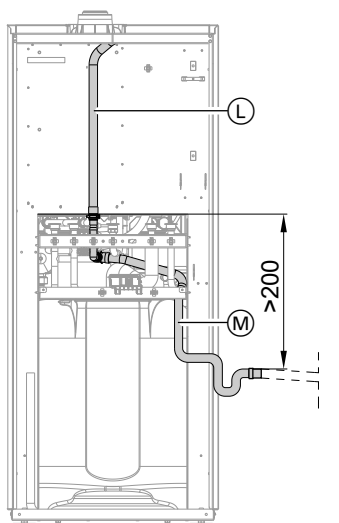


Fig. 8

1. Route condensate hose (M) to the back (drain in wall (G)) or to side aperture (H) (see page 8).

Note

Pull the condensate hose far enough out of the boiler so that no unnecessary bends are created inside the boiler.

2. Route condensate hose (M) as a U-bend and connect with a constant fall and a pipe vent to the public sewage system or to a neutralising system. If necessary, connect to an on-site trap. Ensure this connection is secure. Observe local waste water regulations.

Note

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

Condensate connection (cont.)

- The condensate pipe is connected to the discharge pipe of the safety valve. The condensate hose supplied meets the temperature requirements that are part of the CE certification.
- We recommend connecting the condensate pipe internally to the domestic waste water system, either directly or via a tundish.
- If the condensate pipe is routed outside the building, use a pipe with min. \varnothing 30 mm and protect the pipe from frost. Avoid long external pipe runs.



Please note

A frozen condensate pipe can result in faults and damage to the boiler.
Always protect condensate pipes against frost.

- Observe local building regulations.

Observe local waste water regulations.

Note

Fill the trap with water before commissioning.

Flue gas connection

Note

- *The labels "System certificate" and "Skoberne GmbH flue system" enclosed with the technical documentation may only be used in conjunction with the Viessmann flue system made by Skoberne.*
- *During installation and positioning of the flue system, observe Building Regulations Part L and BS 5440 [GB only].*

Connecting several Vitodens to a shared flue system

If connecting several Vitodens to a shared flue system, install a back draught safety device in each boiler.

- Multiple vertical connections:
Back draught safety device available as separate accessory
 - Flue gas cascade:
Back draught safety device in standard delivery for the flue gas cascade (accessories)
- Install the back draught safety device:

Do not carry out **commissioning** until the following conditions are met:

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



Connecting the balanced flue pipe

Flue system installation instructions.



Back draught safety device installation instructions

Change control unit to operation with a shared flue system:

- In the commissioning assistant, select the **"Multiple connections"** setting under **"Flue system"** or
- Set parameter/code 7E:1



Danger

Leaking or blocked flue systems or an insufficient supply of combustion air cause life threatening poisoning due to carbon monoxide in the flue gas.

Ensure the flue system functions correctly. Apertures for combustion air supply must not be able to be closed off.

Prevent condensate drainage via a wind protector.

Gas connection

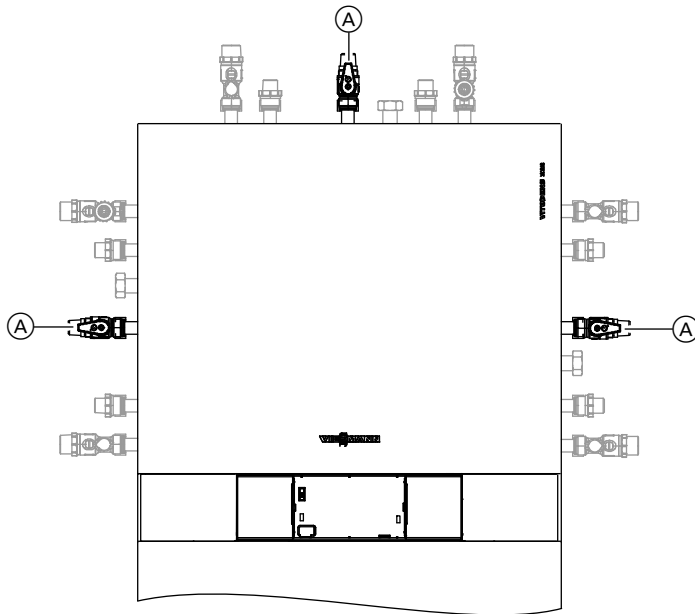



Fig. 9

1. If the gas connection has not been fitted previously, seal gas shut-off valve (A) to the gas connection.

Information on operation with LPG

Install an external safety solenoid valve if the boiler is installed below ground level.

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

Note

Only use suitable and approved leak detection agents (EN 14291) and devices for the tightness test. Leak detection agents with unsuitable constituents (e.g. nitrides, sulphides) can cause material damage.

Remove residues of the leak detection agent after testing.

**Please note**

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

3. Purge the gas line.

**Conversion to alternative gas types:**

See "Commissioning, inspection and maintenance".

Opening the control unit enclosure

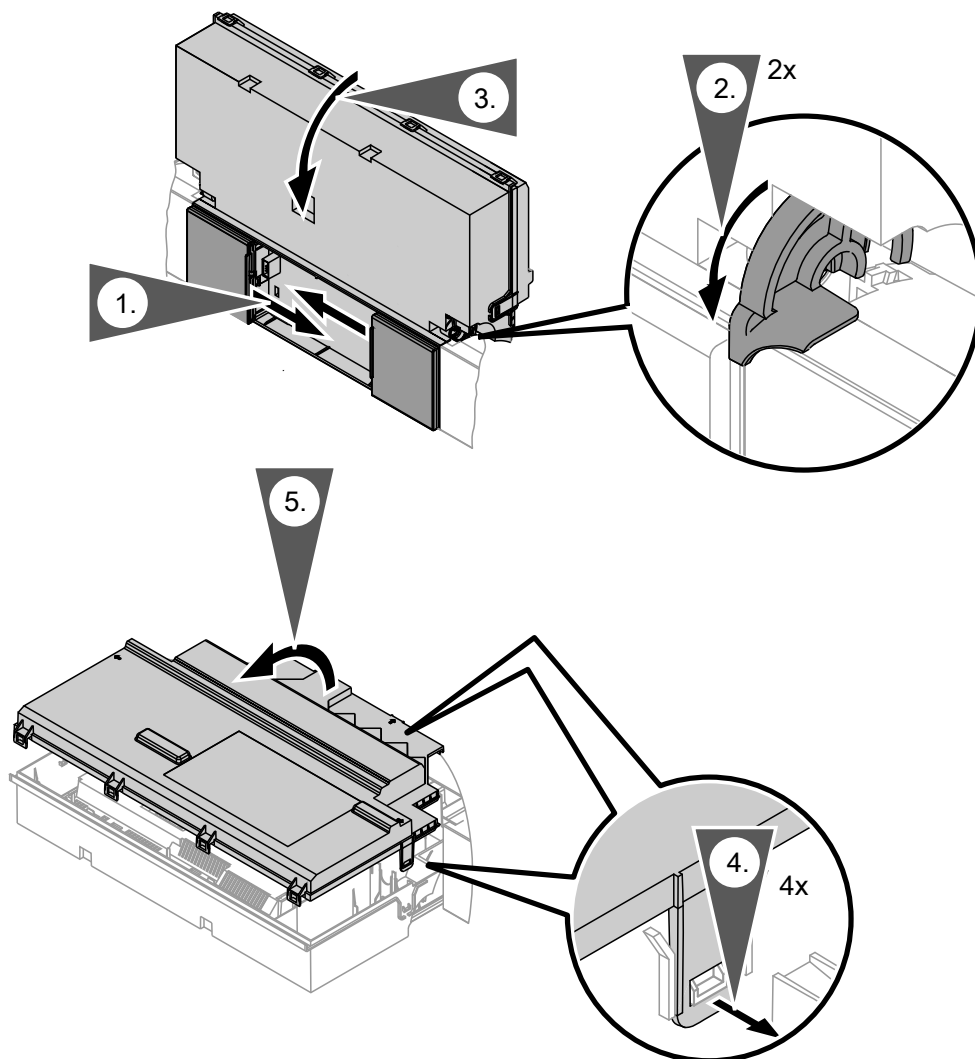


Fig. 10

Electrical connections

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

Electrical connections (cont.)

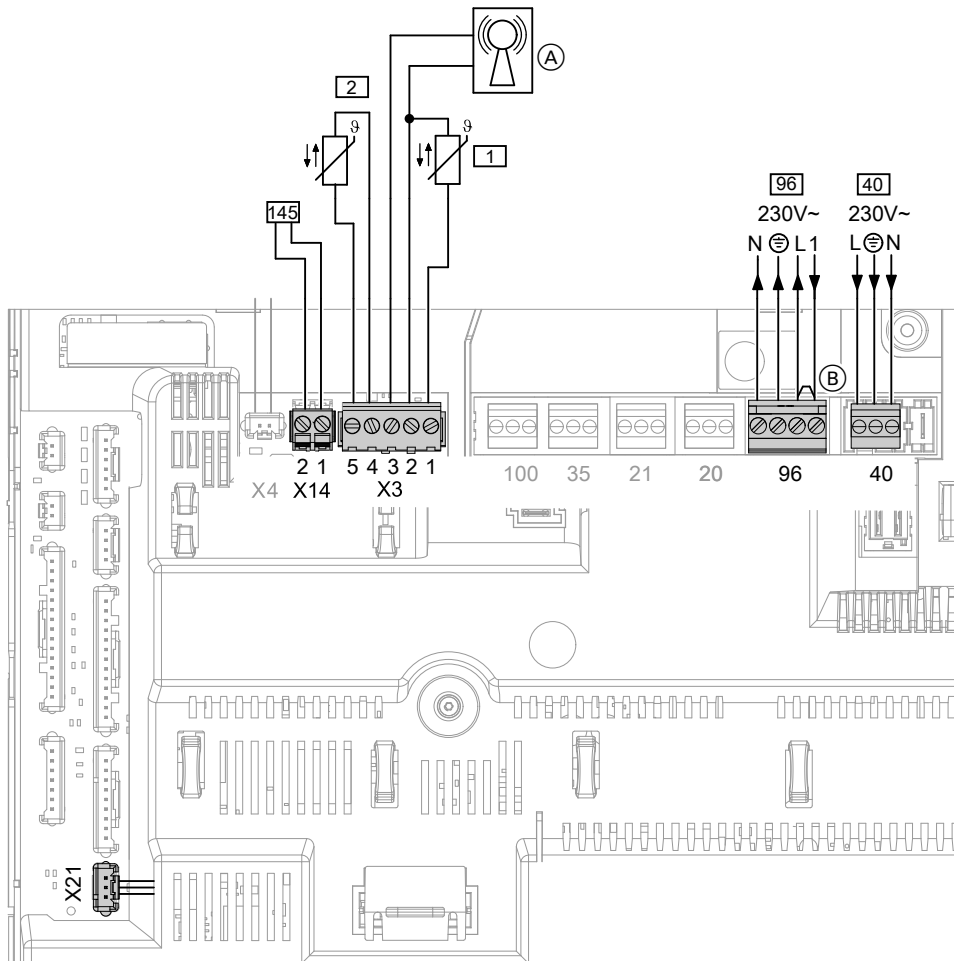


Fig. 11

Connections to 230 V~ plugs

- 40** Power supply
The power cable is connected in the delivered condition.
- 96**
 - Power supply for accessories
 - External demand/blocking

Connections to LV plugs

- X3** Remove for easier installation.
 - 1** Outside temperature sensor
 - 2** Flow temperature sensor for low loss header (accessories)
 - (A)** Radio clock receiver
- X14** **145** KM-BUS subscriber (accessories)
 - Vitotrol 200-A or Vitotrol 300-A remote control
 - Vitocom 100, type GSM
 - Mixer extension kit
 - AM1 extension
 - EA1 extension
 - Wireless base station
 - KM-BUS distributor
- X21** CO limiter (accessories)



Information on connecting accessories

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

Routing the power cable

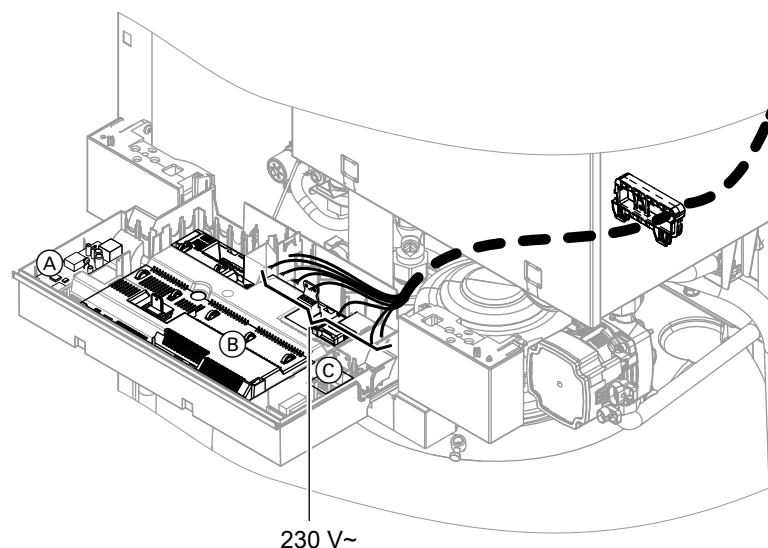


Fig. 12

Note

The power cable (already connected to the control unit) is packed in the appliance behind the control unit.

- (A)** LON communication module (accessories)
- (B)** Main PCB
- (C)** Internal extension (accessories)

Electrical connections (cont.)

External demand via switching contact

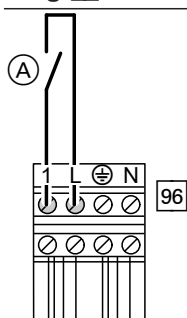
Connection options:

- EA1 extension (accessory, see separate installation instructions)
- Plug [96](#)

When the contact is closed, burner operation is load-dependent. The boiler water is heated to the set value selected in parameter/coding address "9b" in the **"General"/1** group. The boiler water temperature is limited by this set value and by the electronic maximum limit (coding address "06" in the **"Boiler"/2** group).

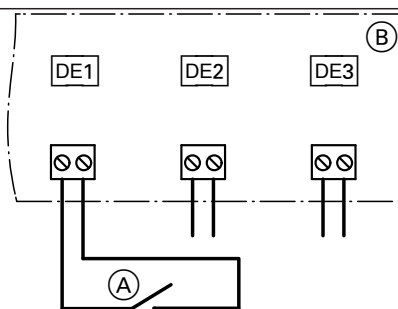
! Please note
Live contacts lead to short circuits or phase failure.
The external connection **must be floating** and meet the requirements of protection class II.

Plug [96](#)



(A) Floating contact (when connecting, remove jumper between L and 1)

EA1 extension



(A) Floating contact
(B) EA1 extension

Parameters/codes

- "4b:1" in the **"General"/1** group
- Effect of the function on the relevant heating circuit pump:
Parameter/coding address "d7" in the **"Heating circuit"** group (only for weather-compensated control units)
- Effect of the function on the circulation pump for cylinder heating:
Parameter/coding address "5F" in the **"DHW"/3** group

Parameters/codes

- Set "3A" (DE1), "3b" (DE2) or "3C" (DE3) to 2 in the **"General"/1** group
- Effect of the function on the relevant heating circuit pump:
Parameter/coding address "d7" in the **"Heating circuit"** group (only for weather-compensated control units)
- Effect of the function on the circulation pump for cylinder heating:
Parameter/coding address "5F" in the **"DHW"/3** group

External demand via 0 – 10 V input

Connection at 0 – 10 V input at **EA1 extension**.
Ensure DC separation between the earth conductor and the negative pole of the on-site power source.

Electrical connections (cont.)

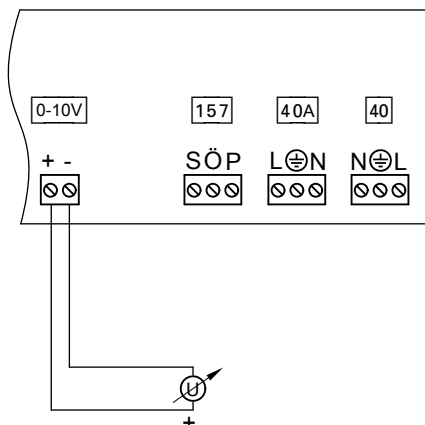


Fig. 13

0 to 1 V	No specification for set boiler water temperature
1 V	Set value 10 °C
10 V	Set value 100 °C

External blocking via switching contact

Connection options:

- Plug [96](#)
- EA1 extension (accessory, see separate installation instructions)

When the contact is closed, the burner is switched off. The heating circuit pump and (if installed) the circulation pump for cylinder heating are switched according to the set parameter/code (see the following table "Parameters/codes").



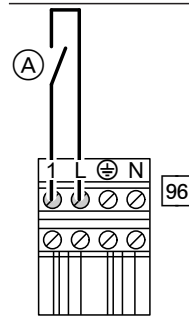
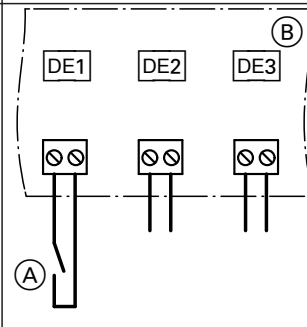
Please note

Live contacts lead to short circuits or phase failure.

The external connection **must be floating** and meet the requirements of protection class II.

Electrical connections (cont.)

Installation

Plug 96	EA1 extension
 <p>(A) Floating contact (when connecting, remove jumper between L and 1)</p>	 <p>(A) Floating contact (B) EA1 extension</p>
<p>Parameters/codes</p> <ul style="list-style-type: none"> ▪ "4b:2" in the "General"/1 group ▪ Effect of the function on the heating circuit pump: Parameter/coding address "d6" in the "Heating circuit" group (only for weather-compensated control units) ▪ Effect of the function on the circulation pump for cylinder heating: Parameter/coding address "5E" in the "DHW"/3 group 	<p>Parameters/codes</p> <ul style="list-style-type: none"> ▪ Set "3A" (DE1), "3b" (DE2) or "3C" (DE3) to 3 or 4 in the "General"/1 group ▪ Effect of the function on the heating circuit pump: Parameter/coding address "d6" in the "Heating circuit" group (only for weather-compensated control units) ▪ Effect of the function on the circulation pump for cylinder heating: Parameter/coding address "5E" in the "DHW"/3 group

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

Where the boiler is sited in a wet room, accessories outside the wet area must not be connected to the power supply at the control unit. If the boiler is not sited in a wet room, the power supply for accessories can be connected at the control unit. This connection is switched directly with the ON/OFF switch of the control unit.

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

Note

Connect all accessories to the power supply with flexible cables.

Electrical connections (cont.)

Power supply to all accessories via heat source control unit

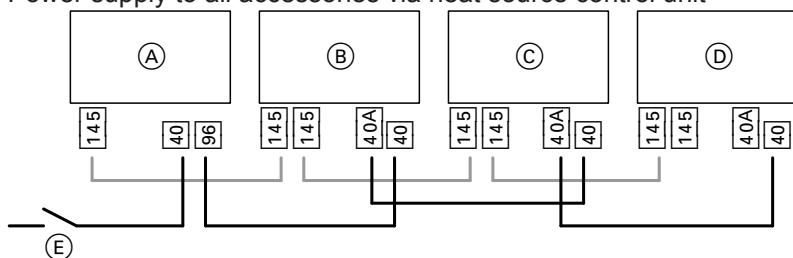


Fig. 14

Some accessories with direct power supply

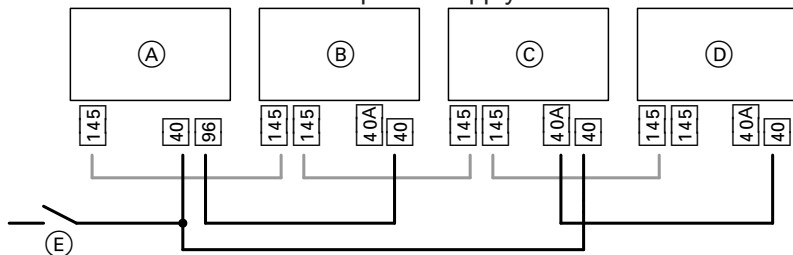


Fig. 15

- (A) Heat source control unit
- (B) Extension kit for heating circuit with mixer M2 (control unit for weather-compensated operation only)
- (C) Extension kit for heating circuit with mixer M3 (control unit for weather-compensated operation only)
- (D) AM1 extension or EA1 extension
- (E) On-site ON/OFF switch
- 40 Mains input
- 40A Power outlet
- 96 Power outlet at the control unit
- 145 KM BUS connection

If the current flowing to the connected working parts (e.g. circulation pumps) is higher than the fuse rating of the relevant accessory, only use the output concerned to control an on-site relay.


Accessories	Internal fuse protection
Extension kit for heating circuit with mixer	2 A
AM1 extension	4 A
EA1 extension	2 A

Power supply 40

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

Connect the power supply and implement all safety measures (e.g. RCD circuit) in accordance with the following regulations:

- IEC 60364-4-41
- VDE regulations
- Connection requirements specified by your local power supply utility

- Install an isolator in the power cable to provide omnipolar separation from the mains for all active conductors, corresponding to overvoltage category III (3 mm) for full isolation. This isolator must be fitted in the permanent electrical installation, in line with the installation requirements. In addition, we recommend installing an AC/DC-sensitive RCD (RCD class B ) for DC (fault) currents that can occur with energy efficient equipment.
- Max. fuse rating 16 A.

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

Routing connecting cables

- !** **Please note**
Connecting cables/leads will be damaged if they touch hot components.
When routing and securing cables/leads on site, ensure that the maximum permissible temperature for these is not exceeded.

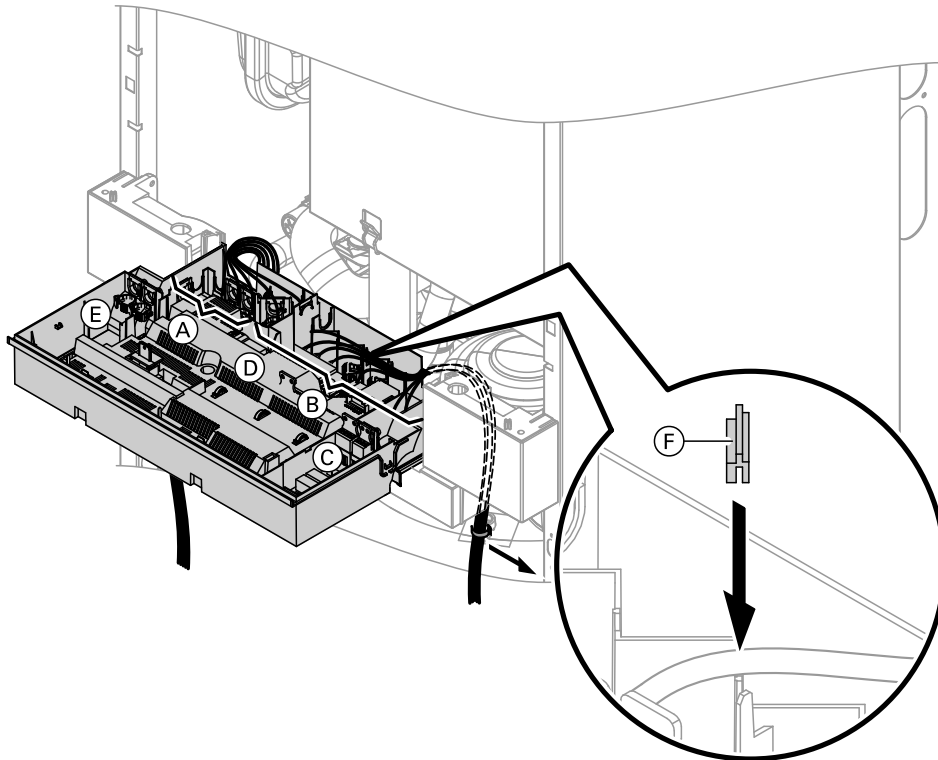


Fig. 16

- | | |
|----------------------|--------------------------------------|
| Ⓐ LV terminals | Ⓓ Main PCB |
| Ⓑ 230 V terminals | Ⓔ Communication module (accessories) |
| Ⓒ Internal extension | Ⓕ Cable grommet for power cable |

Closing the control unit enclosure

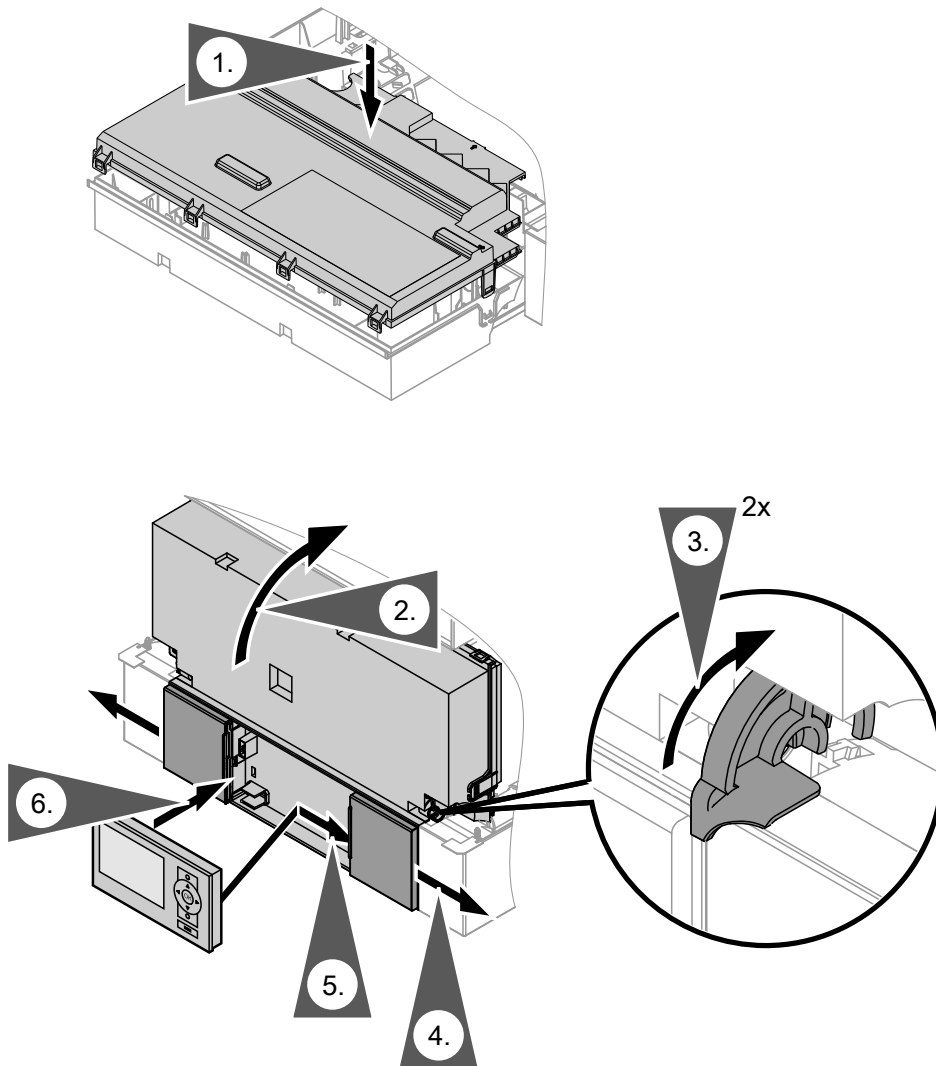


Fig. 17

Insert the programming unit (packed separately) into the control unit support.

Note

The programming unit can also be inserted into a wall mounting base (accessories) near the boiler.



Wall mounting base installation instructions

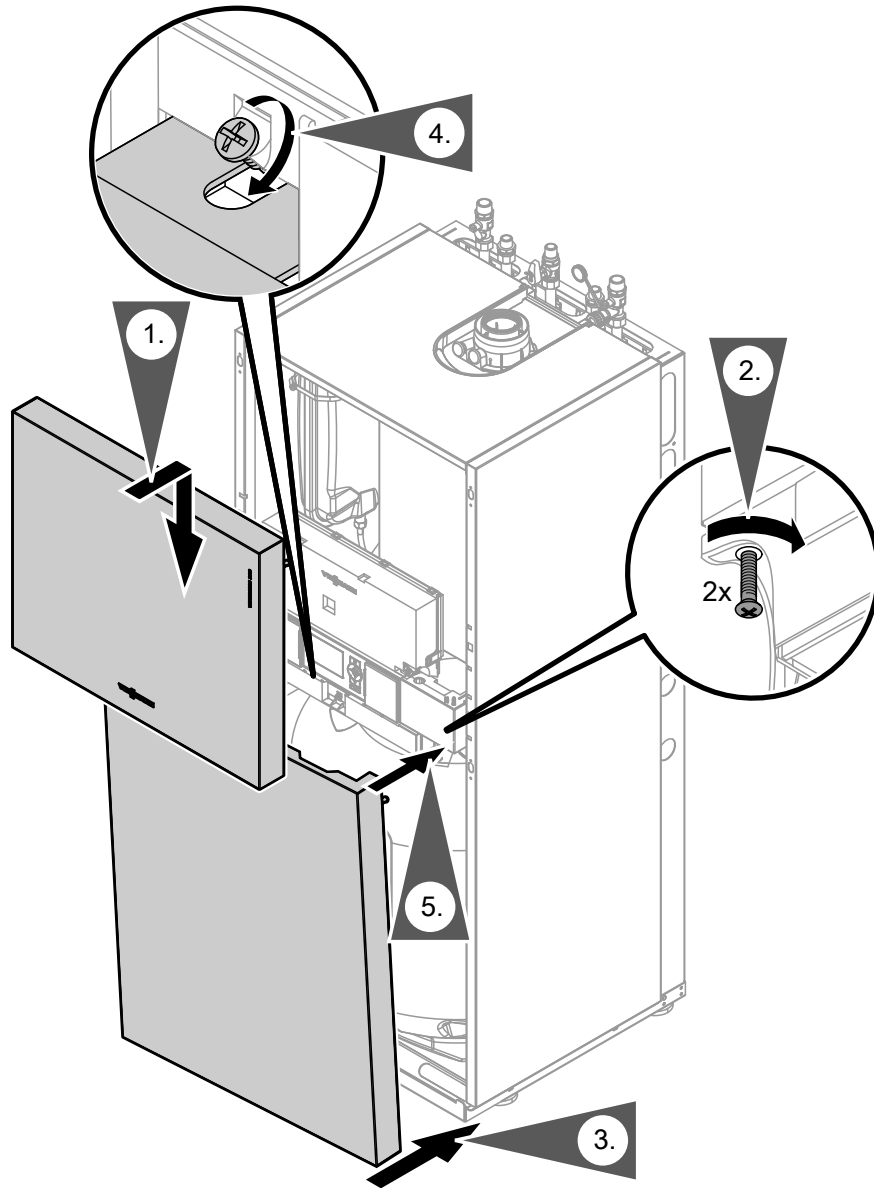


Fig. 18



Steps - commissioning, inspection and maintenance

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•			2. Filling the heating system..... 26
•			3. Filling the DHW cylinder on the DHW side..... 27
•			4. Venting the boiler..... 28
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•			9. Checking the gas type..... 30
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Removing the front panels

See page 11



Filling the heating system

Fill water

According to EN 1717 with DIN 1988-100, as a heat transfer medium for DHW heating, the heating water must meet fluid category ≤ 3 . This requirement is met if water of potable quality is used as heating water. For example, if additives are used, the additive manufacturer must specify which category the treated heating water comes under.



Please note

Unsuitable fill water increases the level of deposits and corrosion and may lead to appliance damage.

- Flush the heating system thoroughly before filling.
- Only use fill water of potable water quality.
- Special antifreeze suitable for heating systems can be added to the fill water. The antifreeze manufacturer must verify its suitability.
- Fill and top-up water with a water hardness in excess of the following values must be softened, e.g. with a small softening system for heating water.

Total permissible hardness of the fill and top-up water

Total heating output kW	Specific system volume		
	< 20 l/kW	≥ 20 l/kW to < 50 l/kW	≥ 50 l/kW
≤ 50	≤ 3.0 mol/m ³ (16.8 °dH)	≤ 2.0 mol/m ³ (11.2 °dH)	< 0.02 mol/m ³ (0.11 °dH)
> 50 to ≤ 200	≤ 2.0 mol/m ³ (11.2 °dH)	≤ 1.5 mol/m ³ (8.4 °dH)	< 0.02 mol/m ³ (0.11 °dH)
> 200 to ≤ 600	≤ 1.5 mol/m ³ (8.4 °dH)	≤ 0.02 mol/m ³ (0.11 °dH)	< 0.02 mol/m ³ (0.11 °dH)
> 600	< 0.02 mol/m ³ (0.11 °dH)	< 0.02 mol/m ³ (0.11 °dH)	< 0.02 mol/m ³ (0.11 °dH)

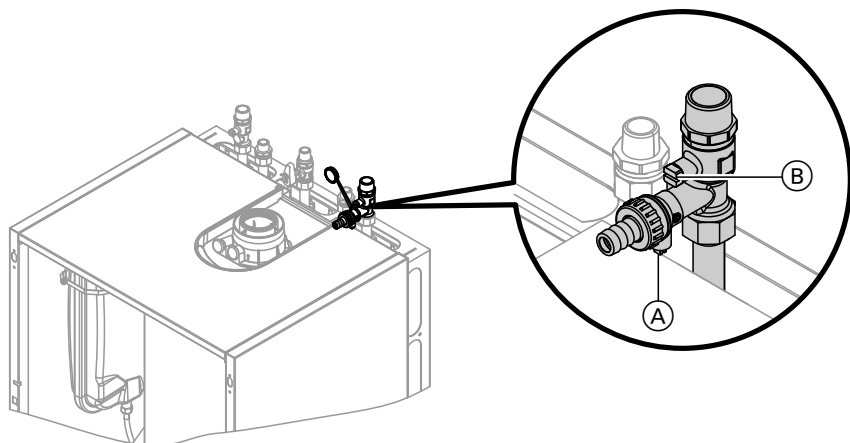


Fig. 19 Shown with connection set for finished walls (accessories)

1. Check the pre-charge pressure of the diaphragm expansion vessel (see page 43).
2. Close the gas shut-off valve.
3. Open shut-off valves (B) on the heating water side.



Filling the heating system (cont.)

4. Fill the heating system via boiler drain & fill valve (A) in the heating return (depending on the connection set either on the side or above the boiler). Minimum system pressure > 1.0 bar (0.1 MPa).
5. If the control unit was already on before filling: Switch the control unit ON and activate the filling program (see next chapter). Then switch the control unit OFF again.
6. Close boiler drain & fill valve (A).

Note

If the control unit was not 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

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

Activating the filling function

Service menu

1. Press **OK** and **≡** simultaneously for approx. 4 s.
2. Select "④" and confirm with **OK**.
"ON" flashes.
3. Activate the filling function with **OK**.
"bF on" is shown constantly.
4. Ending filling function:
press **↩**.



Filling the DHW cylinder on the DHW side

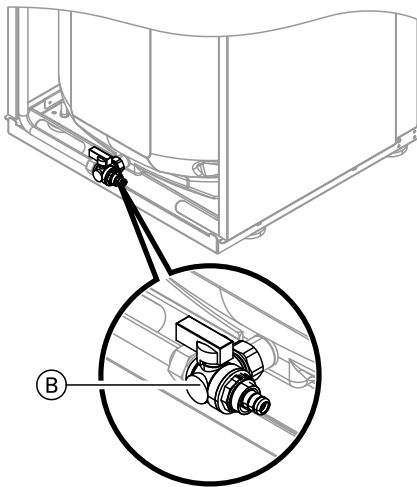


Fig. 20

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



Venting the boiler

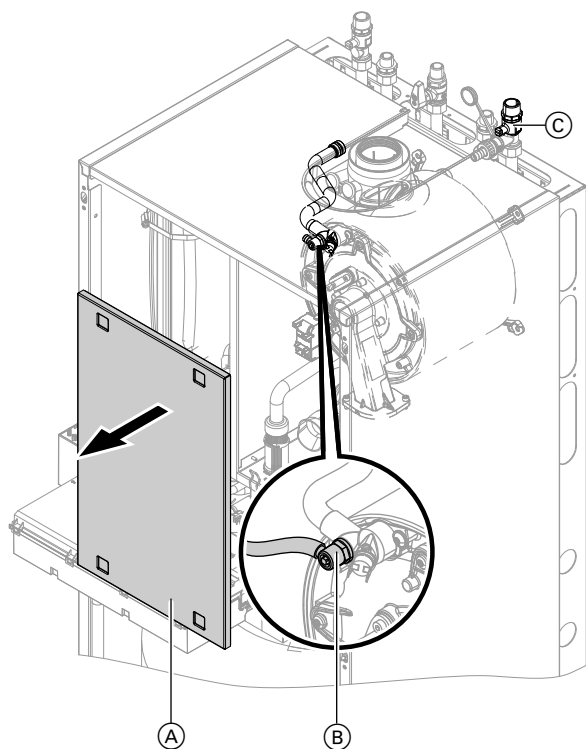


Fig. 21

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

Note

Only carry out the following tasks with the control unit switched off.

2. Pivot the control unit forwards. Remove cover panel (A).
3. Connect drain hose to air vent valve (B). Connect the drain hose to a drain outlet.
4. Open air vent valve (B) and fill valve (C) in the heating return and vent (flush) using mains pressure until no more air noise can be heard.
5. First close air vent valve (B).
6. When the required operating pressure has built up, close fill valve (C). Open the shut-off valves on the heating water side.
7. Remove the drain hose again from air vent valve (B) and retain outside the boiler.



Filling the trap with water

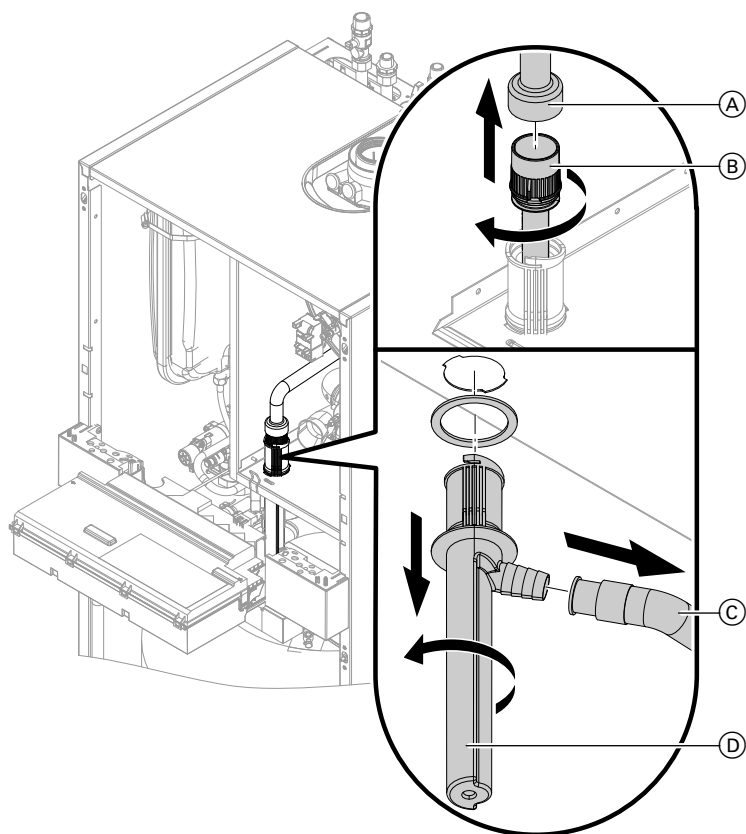


Fig. 22

1. Disconnect condensate hose (A) from the trap.
2. Turn internal pipe (B) and pull upwards.



Filling the trap with water (cont.)

3. Disconnect corrugated hose ③ from lute ④.
4. Turn the lute, tilt slightly and pull downwards.
5. Fill the lute with water.
6. Refit lute ④. Connect corrugated hose ③.



Please note

Prevent water escaping.
Seal off the drain opening when installing the lute.

7. Reassemble the trap in reverse order.
8. Check that the condensate hose is connected correctly to the trap and heat exchanger.

Note

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

9. Fit the cover panel. Secure the control unit back in the operating position.



Venting the heating system

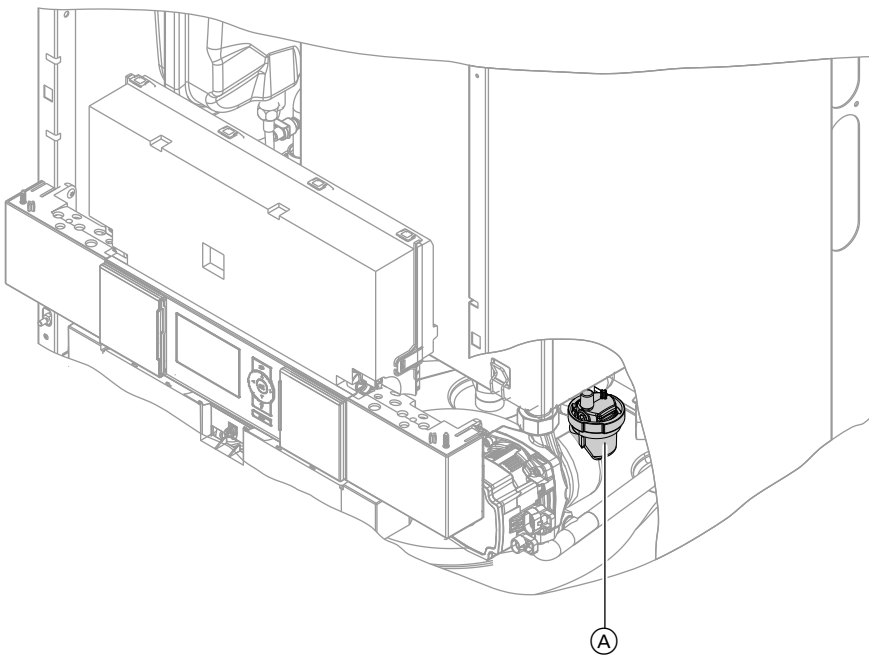


Fig. 23

1. Close the gas shut-off valve and switch the control unit ON.
2. Check whether the air vent screw in quick-action air vent valve ① of the heating circuit pump is open.
3. Activate the venting program (see following steps).

Note

For function and sequence of the venting program, see page 106.

4. Check the system pressure.
5. Open the gas shut-off valve.

Activating the venting function

Service menu

1. Press **OK** and **≡** simultaneously for approx. 4 s.
2. Select "5" with **▶** and confirm with **OK**.
"ON" flashes.
3. Activate the venting function with **OK**.
"EL on" is shown constantly.
4. Ending venting function:
press **↶**.



Information on automatic testing of the flue gas temperature sensor

Immediately after being switched on, the control unit automatically checks the function of the flue gas temperature sensor.
The display shows: "A".

Note

If the flue gas temperature sensor is positioned incorrectly, commissioning is cancelled and fault message A3 is displayed (see page 79).



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



Checking the gas type

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

- For operation with natural gas, no adjustment is therefore required across the entire Wobbe index range.

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

- For operation with LPG, the burner must be converted (see next chapter "Gas type conversion").

1. Determine the gas type and Wobbe index by asking your local gas supply utility or LPG supplier.
2. For operation with LPG, convert the burner.
3. Record the gas type in the report on page 112.



Gas type conversion (only for operation with LPG)

1. Select the gas type in coding address "82":
 - Calling up code 2
 - **"General"**
 - Select coding address "11" and set value "9". Confirm with **OK**. The display shows "11:0".
 - Select coding address "82" and set value "1" (LPG operation). Confirm with **OK**.
 - Select coding address "11" and set value "0". Confirm with **OK**. The display shows "11:0".
 - End service functions.
2. Affix label "G31" (supplied with the technical documentation) adjacent to the type plate on the cover panel.

Note

Mechanical conversion on the gas train is not possible.



Checking the static pressure and supply pressure



Danger

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

Operation with LPG

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



Checking the static pressure and supply pressure (cont.)

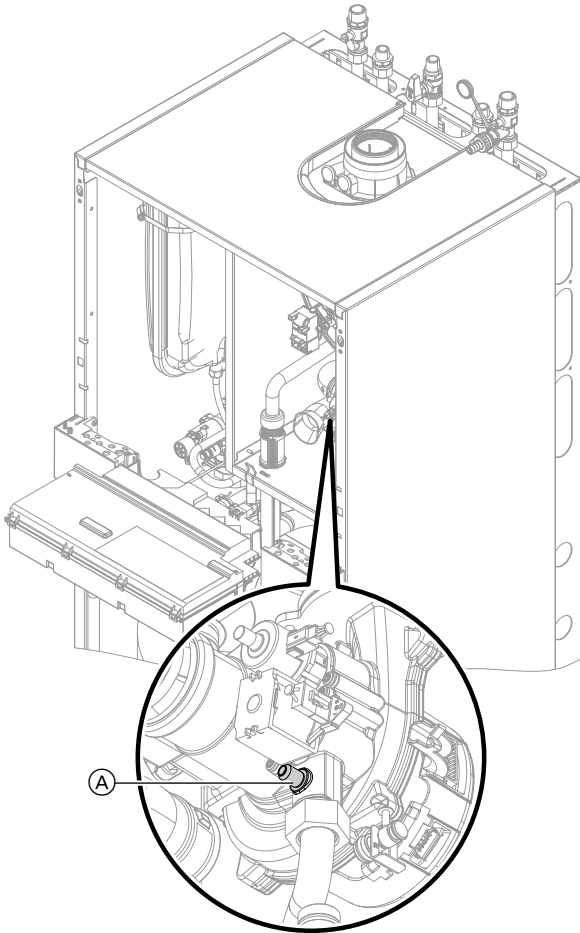


Fig. 24

1. Close the gas shut-off valve.
2. Pivot control unit forwards and remove cover panel; see page 28.
3. Undo screw (A) inside test connector "PE" on the gas train, but do not remove it, and connect the pressure gauge.

4. Open the gas shut-off valve.
5. Check the static pressure and record the actual value in the report on page 112.
Set value: max. 57.5 mbar (5.75 kPa).

6. Start the boiler.

Note

During commissioning, the boiler can enter a fault state (fault EE is displayed) because of air in the gas line. After approx. 5 s, press reset button R to reset the burner.

7. Check the supply (flow) pressure. For set values, see the following table.

Note

Use a suitable measuring device with a resolution of at least 0.1 mbar (0.01 kPa) to check the supply pressure.

8. Record the actual value in the report on page 112.
Implement measures as indicated in the table below.
9. Shut down the boiler, close the gas shut-off valve, remove the pressure gauge and close test connector (A) with the screw.
10. Open the gas shut-off valve and start the appliance.



Danger

Gas escaping from the test connector leads to a risk of explosion.

Check gas tightness at test connector (A).

11. Fit cover panel.

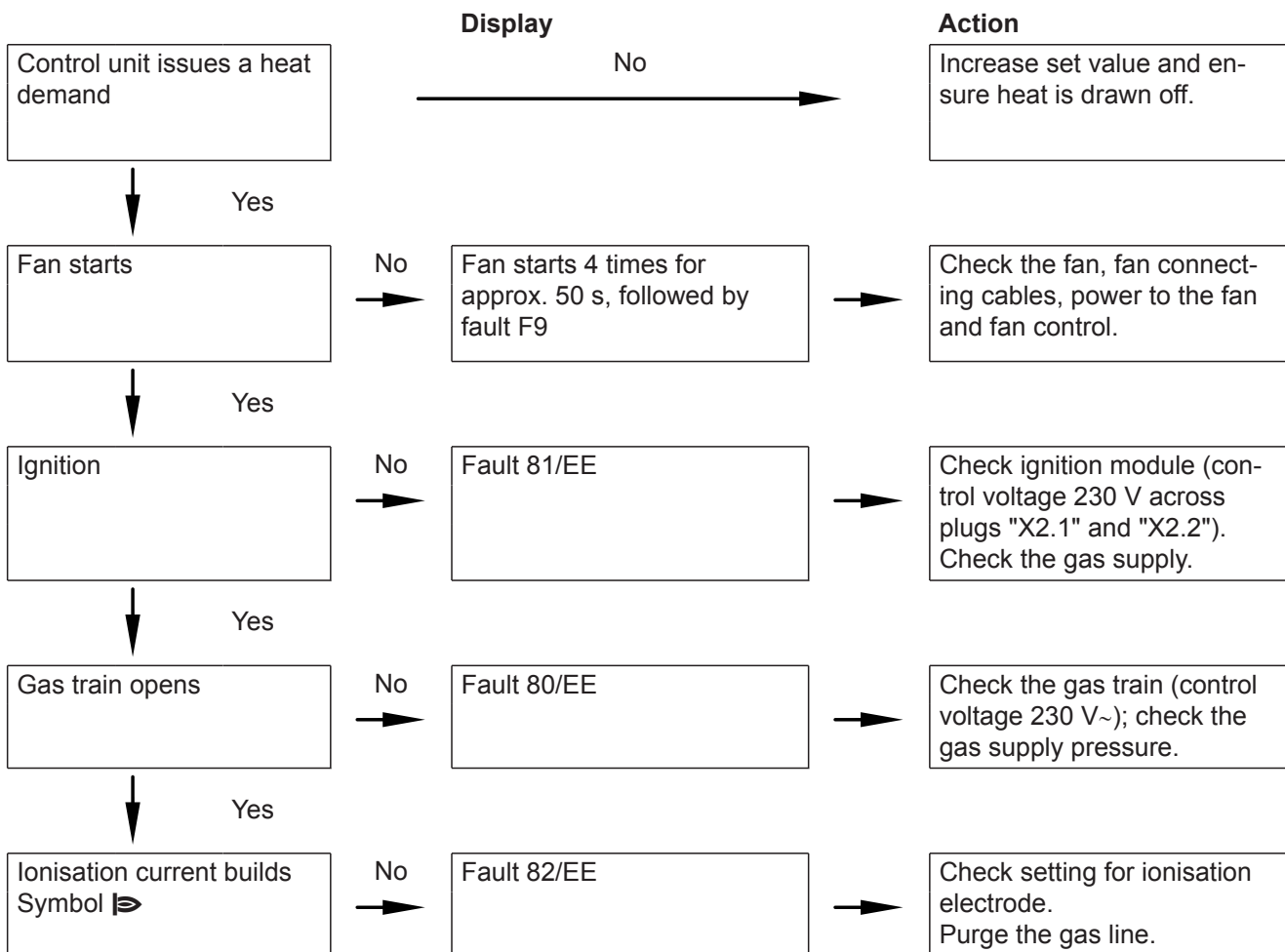


Checking the static pressure and supply pressure (cont.)

Supply pressure (flow pressure)					Measures
For natural gas				For LPG	
H	E, E+, M	L, LL, S, K	Lw		
Below 13 mbar (1.3 kPa)	Below 17 mbar (1.7 kPa)	Below 18 mbar (1.8 kPa)	Below 16 mbar (1.6 kPa)	Below 25 mbar (2.5 kPa)	Do not commission the boiler. Notify your gas supply utility or LPG supplier.
13 to 33 mbar (1.3 to 3.3 kPa)	17 to 33 mbar (1.7 to 3.3 kPa)	18 to 33 mbar (1.8 to 3.3 kPa)	16 to 33 mbar (1.6 to 3.3 kPa)	25 to 57.5 mbar (2.5 to 5.75 kPa)	Start the boiler.
Above 33 mbar (3.3 kPa)	Above 33 mbar (3.3 kPa)	Above 33 mbar (3.3 kPa)	Above 33 mbar (3.3 kPa)	Above 57.5 mbar (5.75 kPa)	Install a separate gas pressure governor upstream of the system. Set the pre-charge pressure to 20 mbar (2.0 kPa) for natural gas and 50 mbar (5.0 kPa) for LPG. Notify your gas supply utility or LPG supplier.

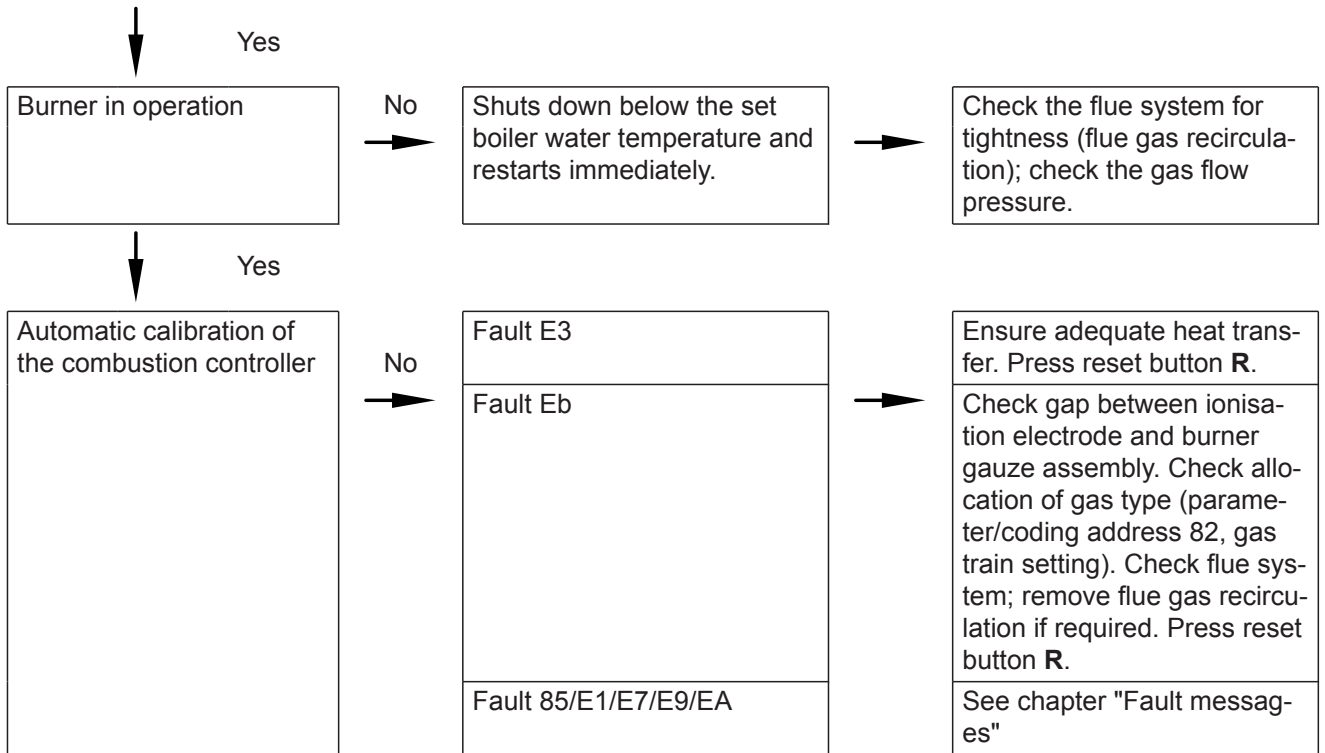


Function sequence and possible faults





Function sequence and possible faults (cont.)



For further details regarding faults, see page 64.



Setting the max. heating output

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

Service menu

1. Press **OK** and **≡** simultaneously for approx. 4 s.
2. Select "③" with **▶** 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 heating output.
3. Select required value and confirm with **OK**.



Tightness test on balanced flue system (annular gap check)

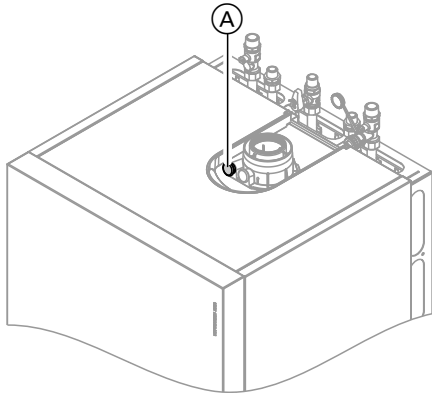


Fig. 25

Ⓐ Combustion air aperture (ventilation air)

For balanced flue systems tested together with the heat source, there is no requirement for a tightness test (overpressure test) during commissioning by the flue gas inspector.

In this case, we recommend that your heating contractor carries out a simple tightness test during the commissioning of your system. For this it would be sufficient to check the CO₂ or O₂ concentration in the combustion air at the annular gap of the balanced flue pipe.

If the CO₂ concentration is less than 0.2 % or the O₂ concentration is greater than 20.6 %, the flue pipe is deemed to be sufficiently gas tight.

If actual CO₂ values are higher or actual O₂ values are lower, a pressure test with a static pressure of 200 Pa will need to be carried out on the flue pipe.



Removing the burner



Please note

Escaping flue gas poses a risk to health.
Only for multiple connections to a flue system or multi boiler systems with a flue gas cascade:
Shut down all connected boilers.



Removing the burner (cont.)

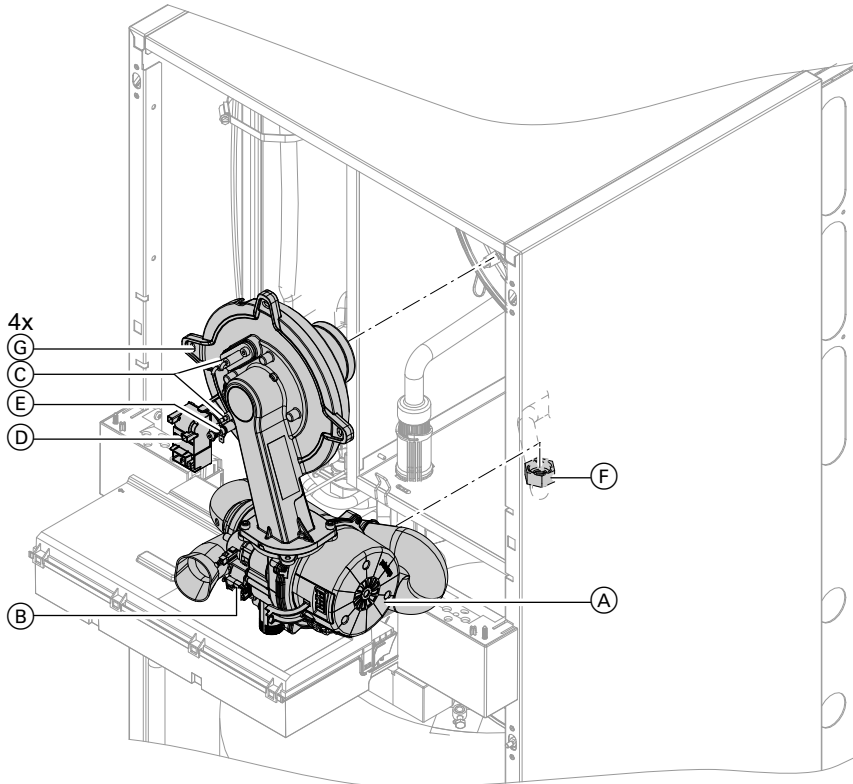


Fig. 26

1. Switch OFF the power supply and the ON/OFF switch at the control unit.
2. Close the gas shut-off valve and safeguard against reopening.
3. Remove cables from fan motor (A), gas train (B), ignition and ionisation electrode (C), ignition unit (D) and earth tab (E).
4. Undo gas supply pipe fitting (F).
5. Undo four screws (G) and remove the burner.



Please note

Prevent damage to the burner.
Never rest the burner on the burner gauze assembly.



Checking the burner gasket and burner gauze assembly

Check burner gasket (A) and burner gauze assembly (E) for possible damage and replace if required.

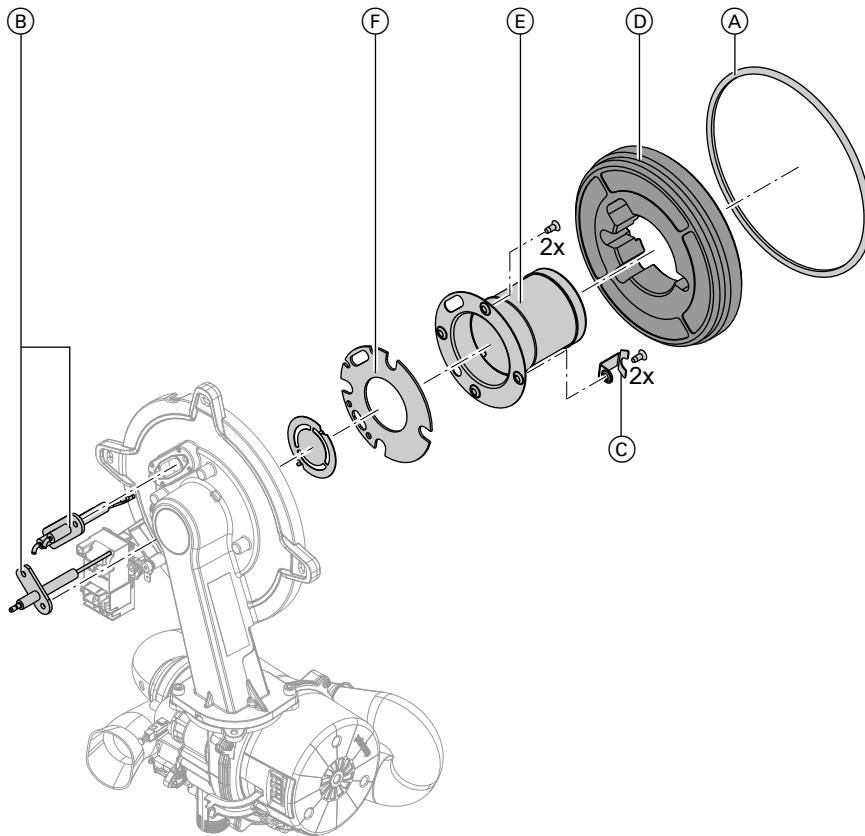


Fig. 27

1. Remove electrodes (B).
2. Undo 2 retaining clips (C) on thermal insulation ring (D) and then remove thermal insulation ring (D).
3. Undo 2 Torx screws and remove burner gauze assembly (E) with gasket (F).
4. Insert new burner gauze assembly (E) with new gasket (F) and secure.
Torque: 5.0 Nm.
5. Fit thermal insulation ring (D).
6. Fit electrodes (B).
Torque: 4.5 Nm.



Checking and adjusting the ignition and ionisation electrodes

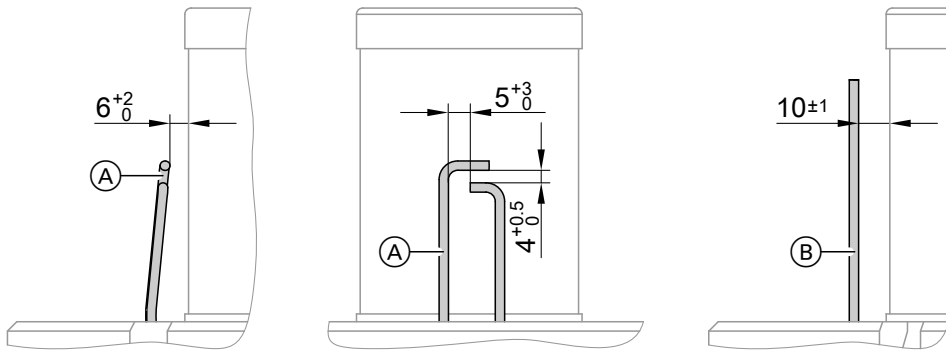


Fig. 28

- (A) Ignition electrodes
- (B) Ionisation electrode

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



Checking the back draught safety device

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

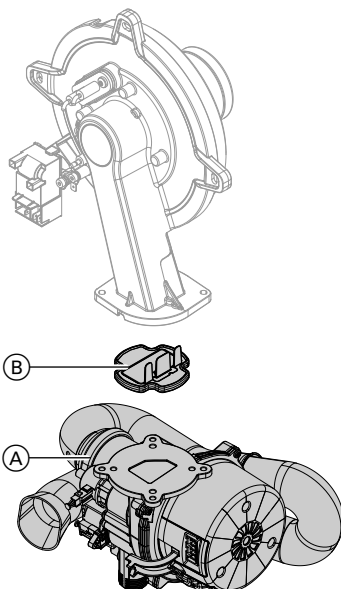


Fig. 29

1. Undo 2 screws and remove fan (A).
2. Remove back draught safety device (B).
3. Check the damper and gasket for dirt and damage. Replace if necessary.
4. Refit back draught safety device (B).
5. Refit fan (A) and secure with 2 screws. Torque: 4.0 Nm



Cleaning the heating surfaces

! **Please note**
Scratches to the surfaces of the heat exchanger that come into contact with hot gas can result in corrosion damage.
Never use brushes to clean the heating surfaces.

! **Please note**
Brushing can cause deposits to become lodged in the gaps between the coils.
Never use brushes to clean the heating surfaces.



Cleaning the heating surfaces (cont.)

Note

Discolouration on the heat exchanger surface is a normal sign of use. It has no bearing on the function and service life of the heat exchanger.

The use of chemical cleaning agents is not required.

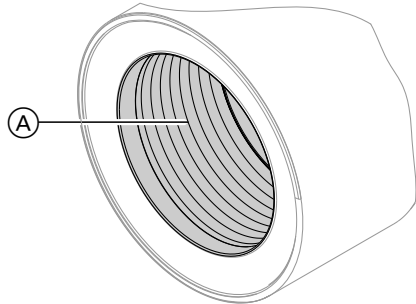


Fig. 30

1. Use a vacuum cleaner to remove combustion residues from heating surface (A) of the heat exchanger.
2. Flush heating surface (A) with water.
3. Check condensate drain and clean trap. See the following chapter.
4. Flush the heating surface again with water. This will also fill the trap with water.



Checking the condensate drain and cleaning the trap

Flue gas cascade:

Clean the trap in the flue gas header as well.

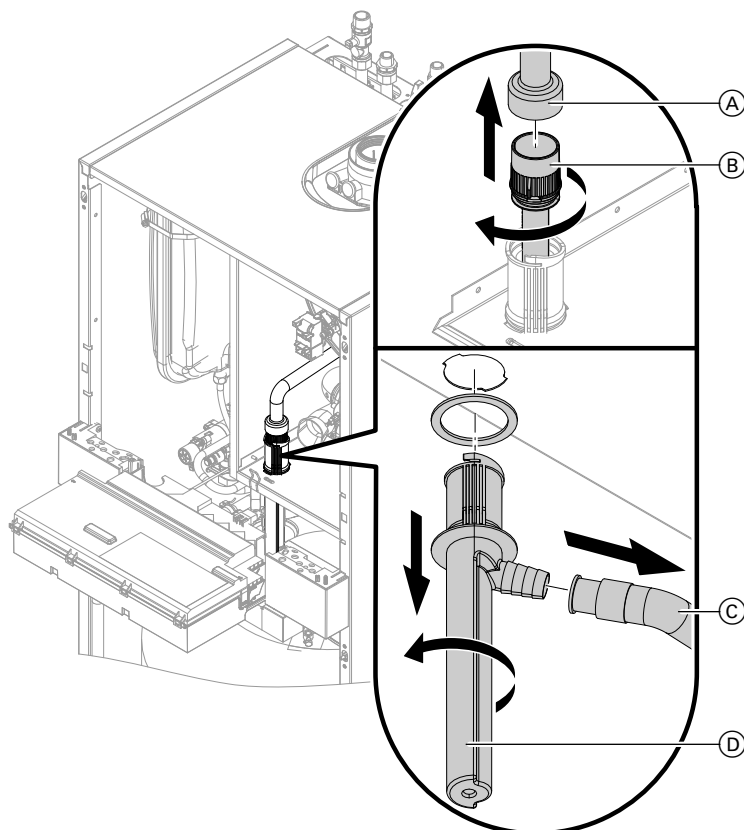


Fig. 31

1. Pivot the control unit forwards. Remove the insulating cover from the DHW cylinder.
2. Disconnect condensate hose (A) from the trap.
3. Turn internal pipe (B) and pull upwards.
4. Disconnect corrugated hose (C) from lute (D).



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

5. Turn lute, tilt slightly and pull downwards.

! **Please note**
Prevent water escaping.
Seal off the drain opening when removing the lute.

6. Clean internal pipe (B) and lute (D).

7. Fill lute (D) with water.

8. Refit lute (D). Connect corrugated hose (C).

9. Reassemble the trap in reverse order.

10. Check that the condensate hose is connected correctly to the trap and heat exchanger.

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

11. Fit the cover panel and insulating cover. Secure the control unit back in the operating position.



Installing the burner

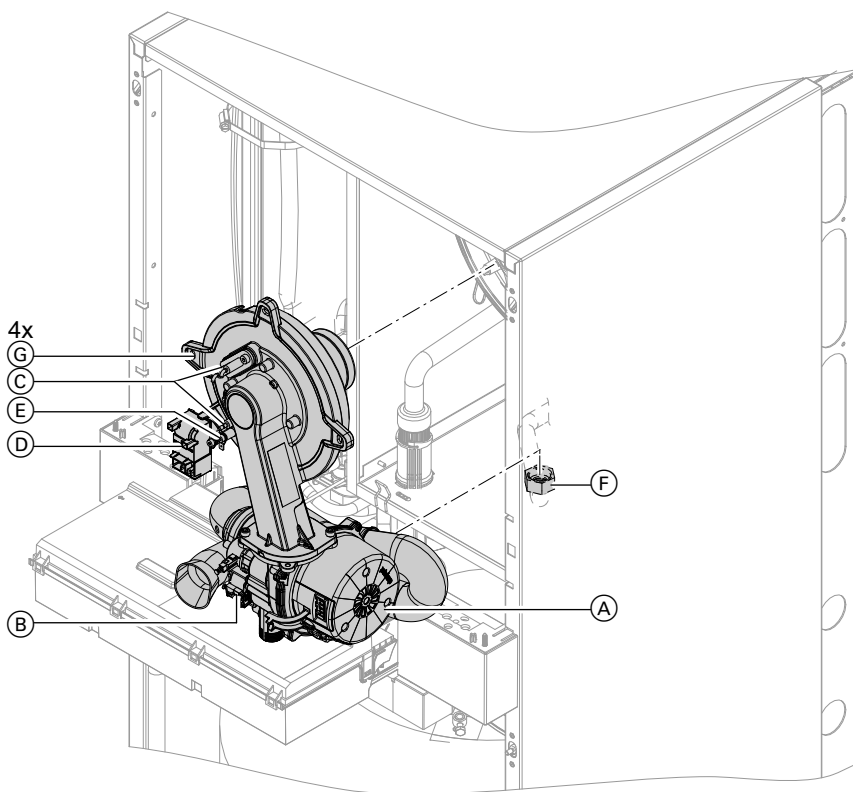


Fig. 32

1. Insert the burner and tighten screws (G) crosswise.
Torque: 8.5 Nm

2. Fit gas supply pipe (F) with a new gasket.
Torque: 30 Nm

3. Check gas connections for tightness.

4. Connect the electrical cables/leads:

- Fan motor (A)
- Ionisation electrode (C)
- Gas train (B)
- Ignition unit (D)
- Earth (E)

! **Danger**
Escaping gas leads to a risk of explosion.
Check the fitting for gas tightness.



Checking the neutralising system (if installed)



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

Note

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

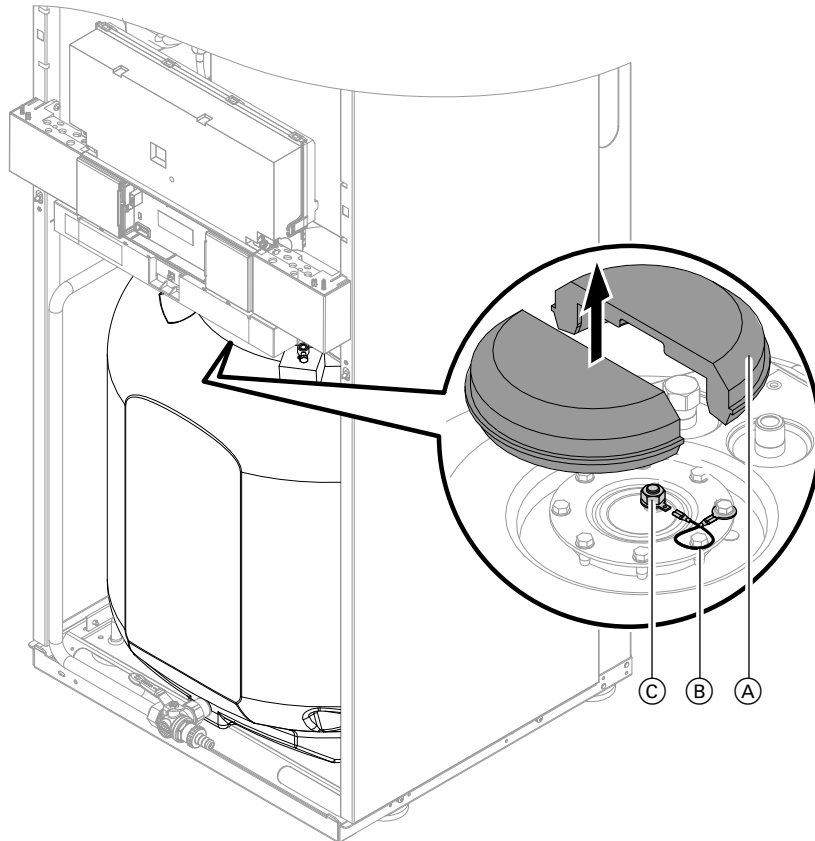


Fig. 33

1. Remove cover (A) (two-part design up to 26 kW).
2. Remove earth cable (B) from tab (C).
3. Connect tester (up to 5 mA) in series between tab (C) and earth cable (B).
 - If the current measures > 0.3 mA the protective magnesium anode is OK.
 - If the current measures < 0.3 mA or if there is no current at all, inspect the protective magnesium anode visually (see page 42).



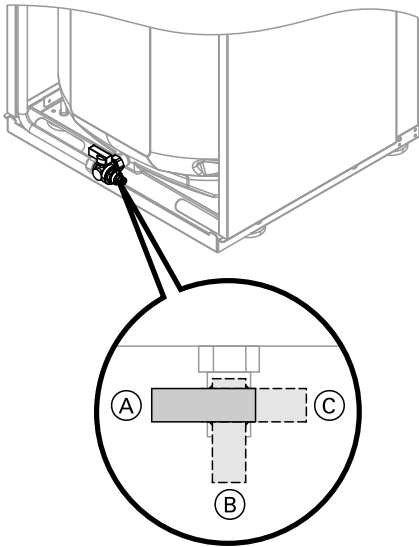

Draining the boiler on the DHW side



Fig. 34


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

Note

Ensure adequate ventilation in the DHW pipework.

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




Cleaning the loading cylinder
Note

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

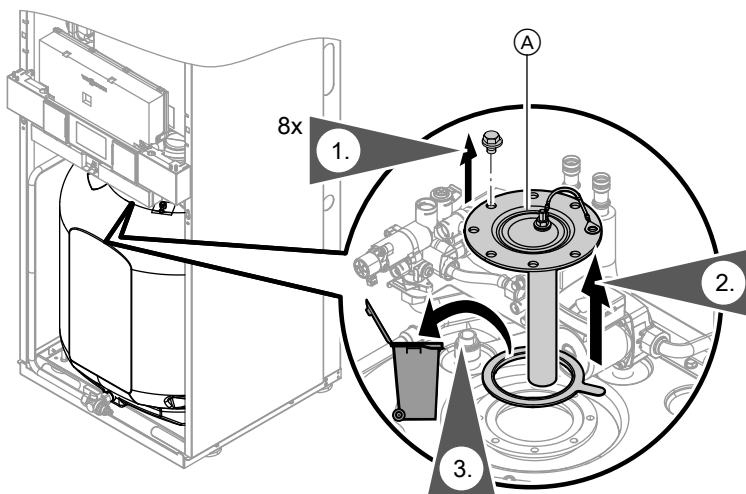


Fig. 35

1. Drain the loading cylinder.
2. Remove flange cover (A).
3. Disconnect the loading cylinder from the pipework to prevent contamination from entering the pipework.
4. Remove loose deposits with a pressure cleaner. Use a chemical cleaning agent to remove hard deposits that cannot be removed with a pressure cleaner.
 - ! **Please note**
 - Do not damage the cylinder:
 - Only use plastic tools to clean the inside.
 - Never use cleaning agents containing hydrochloric acid.
5. Thoroughly flush the loading cylinder after cleaning.



Checking and replacing the protective magnesium anode (if required)

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



Re-assembling and filling the loading cylinder

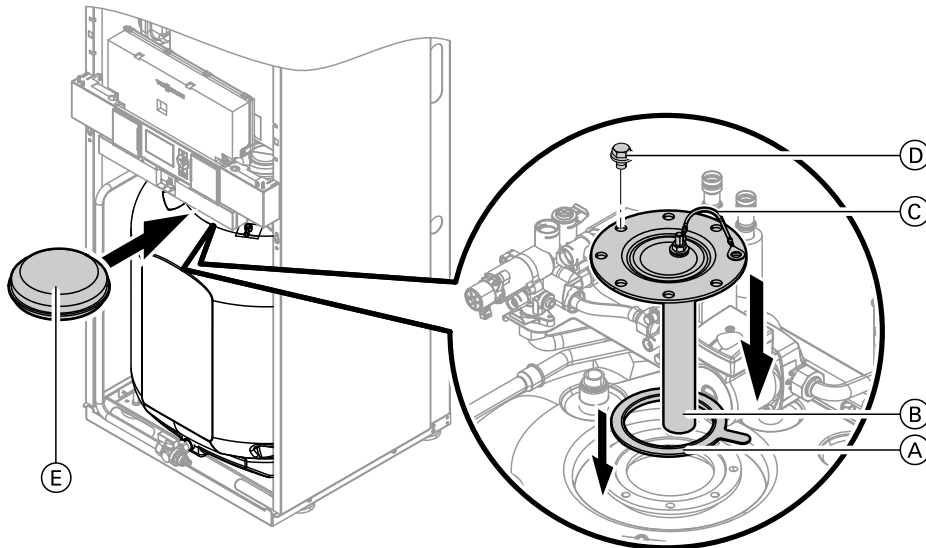


Fig. 36

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



Checking the expansion vessel and system pressure

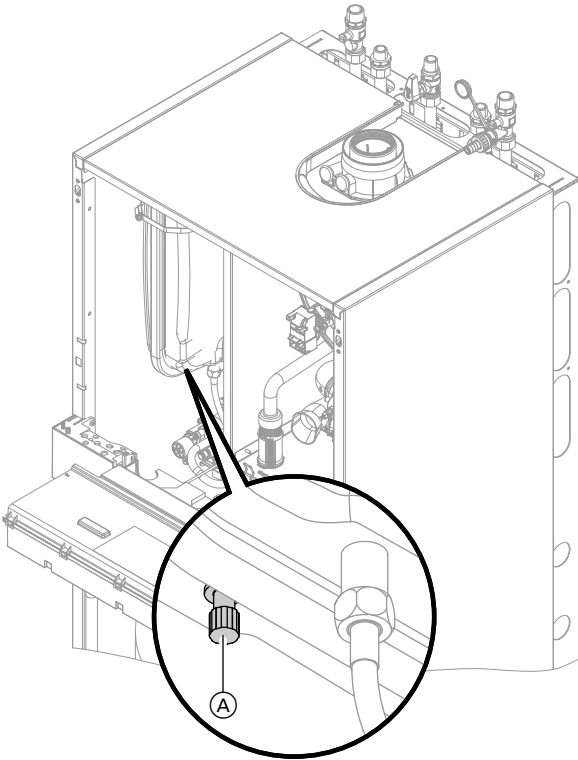


Fig. 37

Note

The diaphragm expansion vessel can lose some charge pressure over time. When the boiler heats up, the pressure gauge indicator may rise to 2 or 3 bar (0.2 or 0.3 MPa). The safety valve may also respond and discharge the excess pressure.

Note

Carry out this test on a cold system.

1. Drain the system until the pressure gauge shows "0".
2. If the expansion vessel pre-charge pressure is lower than the static system pressure: top up with nitrogen at connection **A** until the pre-charge pressure is 0.1 to 0.2 bar (10 to 20 kPa) higher than the static system pressure.

Check whether the installed diaphragm expansion vessel is adequate for the system water volume.

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

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

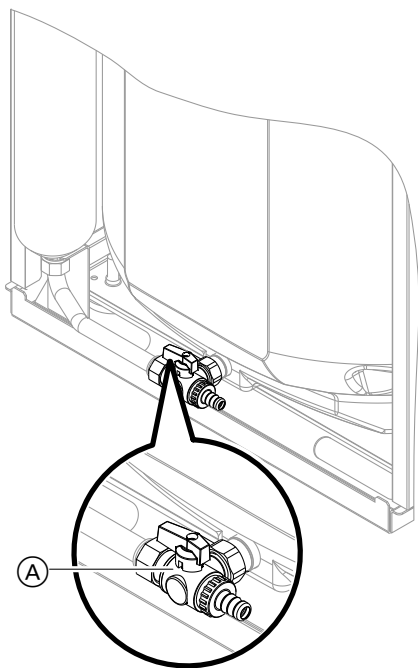



Fig. 38

1. Check the static pressure of the DHW line downstream of the pressure reducer and adjust if required. Set value: max. 3.0 bar (0.3 MPa).
2. Close the on-site shut-off valve in the cold water line.
3. Turn operating lever of valve (A) to the "front" position.
4. Check the pre-charge pressure of the DHW expansion vessel and adjust if required. Set value: Static pressure minus 0.2 bar (0.02 MPa).
5. Turn operating lever of valve (A) back to the "left" position and open the on-site shut-off valve in the cold water line.

   **Checking the safety valve function**

   **Checking the firm seating of electrical connections**

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

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

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

   **Checking the combustion quality**

The electronic combustion controller automatically ensures optimum combustion quality. During commissioning/maintenance, only the combustion values need to be checked. For this, measure the CO content and the CO₂ or O₂ content. For a description of the electronic combustion controller functions, see page 108.

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

CO content

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

CO₂ or O₂ content

- The CO₂ content must be within the following limits for the lower and upper heating output respectively:
 - 7.5 to 9.5 % for natural gas E and LL
 - 8.8 to 11.1 % for LPG P
- The O₂ content must be between 4.0 and 7.6 % for all gas types.



Checking the combustion quality (cont.)

If the actual CO₂ or O₂ values lie outside their respective ranges, proceed as follows:

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

Note

During commissioning, the combustion controller carries out an automatic calibration. Allow approx. 30 s after the burner has started before testing the emissions.

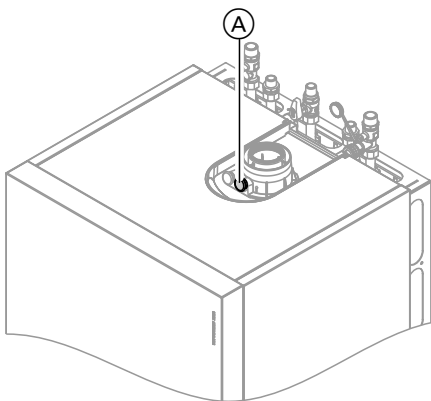


Fig. 39

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 heating output (see page 45).
4. Check the CO₂ or O₂ content. If the value varies by more than 1 % (CO₂) or 1.5 % (O₂) from the ranges given above, carry out the steps on page 44.
5. Enter the actual value into the report.
6. Select the upper heating output (see page 45).
7. Check the CO₂ or O₂ content. If the value varies by more than 1 % (CO₂) or 1.5 % (O₂) from the ranges given above, carry out the steps on page 44.
8. After testing, press **OK**.
9. Enter the actual value into the report.

Selecting higher/lower heating output

Service menu

1. Press **OK** and **≡** simultaneously for approx. 4 s.
2. Select "0" with **▶** and confirm with **OK**.
The display shows "1" and "ON" flashes.
3. Selecting the lower heating output:
press **OK**, "ON" will be displayed constantly.
4. Selecting the upper heating output:
press **↶**.
5. Select "2" with **▶**, "ON" flashes.
6. Press **OK**, "ON" will be displayed constantly.
7. Ending output selection:
press **↶**.



Checking the flue system for unrestricted flow and tightness




Checking the external LPG safety valve (if installed)



Matching the control unit to the heating system

The control unit must be matched to the system equipment level.

- To do this, select the relevant system scheme (see "System examples" in the technical guide).
- Set the codes according to the accessories fitted:
 Accessories installation and service instructions

Note

Various system components are recognised automatically by the control unit and the relevant codes are set automatically.

For individual coding steps, see page 48.



Scanning and resetting the "Service" display

The red fault indicator flashes when the limits set in coding address "21" and "23" have been reached. (Coding address in Group 2)

Display

The specified hours run or the specified time interval with calendar symbol "📅" (subject to setting) and "🔧"

Acknowledging a service

Press **OK**.
Service the appliance.

Note

An acknowledged service message that has not been reset reappears after 7 days.

After maintenance has been carried out, reset the codes

Reset code "24:1" in group 2 to "24:0".

Note

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



Fitting the front panels

Fitting the cover panel and front panels

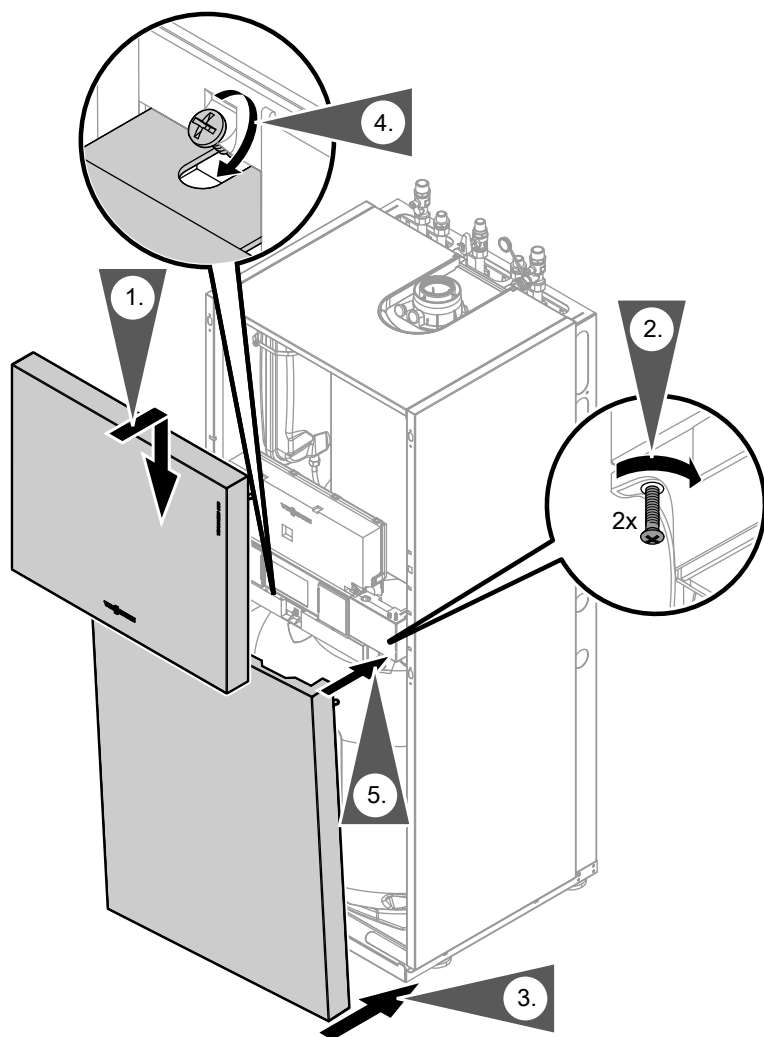


Fig. 40



Instructing the system user

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

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



Calling up coding level 1

- Codes that are not assigned, due to the heating system equipment level or the setting of other codes, are not displayed.

The codes are divided into groups

1: "General"

2: "Boiler"

3: "DHW"

5: "Heating circuit 1"

6: "All codes std device"

In this group, all coding addresses from coding level 1 are displayed in ascending order.

7: "Standard setting"

Calling up code 1

Service menu:

- Press **OK** and **≡** simultaneously for approx. 4 s.
- Select "①" with **▶** for coding level 1 and confirm with **OK**.
- "I" flashes on the display for the coding addresses in group 1.
- Select the group of the required coding address with **▲/▼** and confirm with **OK**.
- Select coding address with **▲/▼**.
- Set value according to the following tables with **▲/▼** and confirm with **OK**.

Resetting all codes to their delivered condition

Select "7" with **▶** and confirm with **OK**.
When "I" flashes, confirm with **OK**.

Note

This also resets codes at coding level 2.

"General"/Group 1

Select group "1" (see page 48).

Coding

Coding in the delivered condition		Possible change	
System design			
00:2	One heating circuit (Heating circuit 1), with DHW heating		
00:1	One heating circuit (Heating circuit 1), without DHW heating (automatic recognition)		
Internal circulation pump function			
51:0	When there is a heat demand, the internal circulation pump always starts	51:1	System with low loss header: The internal circulation pump only starts upon heat demand if the burner is running. The circulation pump stops on expiry of the run-on time.

"General"/Group 1 (cont.)

Coding in the delivered condition		Possible change	
Subscriber no.			
77:1	LON subscriber number (only for weather-compensated control unit)	77:2 to 77:99	LON subscriber number, adjustable from 1 to 99: 1 - 4 = Boiler 5 = Cascade 10 - 90 = Vitotronic 200-H 97 = Vitogate 300, type BN/MB 98 = Vitogate ... 99 = Vitocom
Detached house/apartment building			
7F:1	Detached house (only for weather-compensated control unit)	7F:0	Apartment building Holiday program and time program for DHW heating can be set separately
Lock out controls			
8F:0	Operation enabled in standard menu and extended menu. Note <i>The relevant code is only activated when you exit the service menu (see page 61).</i>	8F:1	Operation locked out in standard menu and extended menu. Emissions test mode can be enabled.
		8F:2	Operation enabled in standard menu, but locked out in extended menu. Emissions test mode can be enabled.
Set flow temperature for external demand			
9b:70	Set flow temperature for external demand 70 °C	9b:0 to 9b:127	Set value adjustable from 0 to 127 °C (limited by boiler-specific parameters)

"Boiler"/Group 2

Select group "2" (see page 48).

Coding

Coding in the delivered condition		Possible change	
Single/multi-boiler system			
01:1	Never adjust (only for constant temperature control units)		
Burner service in 100 hours			
21:0	No service interval set (in hours run)	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 set for burner service interval	23:1 to 23:24	Interval adjustable from 1 to 24 months

"Boiler"/Group 2 (cont.)

Coding in the delivered condition		Possible change	
Service status			
24:0	"Service" not shown on the display	24:1	"Service" is shown on the display (address is automatically set and must be manually reset after a service has been carried out)
Filling/venting			
2F:0	Venting program/filling program disabled	2F:1	Venting program enabled
		2F:2	Filling program enabled

"DHW"/Group 3

Select group "3" (see page 48).

Coding

Coding in the delivered condition		Possible change	
Enable DHW circulation pump			
73:0	DHW circulation pump: "ON" according to time program (only for weather-compensated control unit)	73:1 to 73:6	During time program "ON" from once per hour for 5 min to "ON" 6 times per hour for 5 min
		73:7	Constantly "ON"

"Heating circuit ..."/Group 5

Select group "5" (see page 48).

Coding

Coding in the delivered condition		Possible change	
Ext. operating program changeover to heating circuit			
d8:0	With EA1 extension: No operating program changeover.	d8:1	Operating program changeover via input DE1.
		d8:2	Operating program changeover via input DE2.
		d8:3	Operating program changeover via input DE3.
Max. pump speed in standard mode			
E6:...	Only for heating systems without mixer heating circuit and low loss header: Maximum speed of the internal speed-controlled heating circuit pump in % of the max. speed in standard mode. Value is specified by boiler-specific parameters (only for weather-compensated control units).	E6:0 to E6:100	Maximum speed adjustable from 0 to 100 %

"Heating circuit ..."/Group 5 (cont.)

Coding in the delivered condition		Possible change	
Min. pump speed			
E7:30	Only for heating systems without mixer heating circuit and low loss header: Minimum speed of the internal speed-controlled heating circuit pump: 30 % of the max. speed (value is specified by boiler-specific parameters, only for weather-compensated control unit)	E7:0 to E7:100	Minimum speed adjustable from 0 to 100 % of maximum speed
Pump control in "Only DHW"			
F6:25	In "Only DHW" operating mode, the internal circulation pump is permanently on (only for constant temperature control units)	F6:0	In "Only DHW" operating mode, the internal circulation pump is permanently off
		F6:1 to F6:24	In "Only DHW" operating mode, the internal circulation pump is started 1 to 24 times per day for 10 minutes each time.
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 is started 1 to 24 times per day for 10 min each time.

Calling up coding level 2

- In coding level 2 **all** codes are accessible.
- Codes that are not assigned, due to the heating system equipment level or the setting of other codes, are not displayed.

The codes are divided into groups

1: "General"

2: "Boiler"

3: "DHW"

4: "Heating circuit"










5: "All codes std device"

In this group, all coding addresses are displayed in ascending order.


6: "Standard setting"

Calling up code 2

Service menu:

1. Press **OK** and  simultaneously for approx. 4 s.
2. Press **OK** and  simultaneously for approx. 4 s.
3. Select "2" with  for coding level 2 and confirm with **OK**.
4. "I" flashes on the display for the coding addresses in group 1.
5. Select the group of the required coding address with / and confirm with **OK**.
6. Select coding address with /.
7. Set value according to the following tables with / and confirm with **OK**.

Resetting all codes to their delivered condition

Select "7" with  and confirm with **OK**.
When "I" flashes, confirm with **OK**.

Note

This also resets codes at coding level 1.

"General"/Group 1

Select group "1" (see page 52).

Coding

Coding in the delivered condition		Possible change	
00:2	One heating circuit (Heating circuit 1), with DHW heating		
00:1	One heating circuit (Heating circuit 1), without DHW heating (automatic recognition)		
11:0	No access to the coding addresses for the parameters of the combustion controller	11:9	Access to the coding addresses for the parameters of the combustion controller open
25:0	Without outside temperature sensor (for constant temperature control units)	25:1	With outside temperature sensor (automatic recognition)
2A:0	Never adjust		
2D:0	Never adjust		
32:0	Without AM1 extension	32:1	With AM1 extension (automatic recognition)
33:1	Function of output A1 at AM1 extension:	33:0	DHW circulation pump
		33:2	Circulation pump for cylinder heating

"General"/Group 1 (cont.)

Coding in the delivered condition		Possible change	
	Heating circuit pump		
34:0	Function of output A2 at AM1 extension: DHW circulation pump (in the case of DHW circulation pumps with standalone functions, the pump must be connected directly to the 230 V~ supply)	34:1	Heating circuit pump
		34:2	Circulation pump for cylinder heating
35:0	Without EA1 extension	35:1	With EA1 extension (automatic recognition)
36:0	Function of output 157 at EA1 extension: Fault message	36:1	Feed pump
		36:2	DHW circulation pump (in the case of DHW circulation pumps with standalone functions, the pump must be connected directly to the 230 V supply)
3A:0	Function of input DE1 at EA1 extension: No function	3A:1	Heating program - changeover
		3A:2	External demand with set flow temperature. Set temperature selection: coding address "9b" in this group. Internal circulation pump function: coding address "3F" in this group.
		3A:3	External blocking. Internal circulation pump function: coding address "3E" in this group.
		3A:4	External blocking with fault message input. Internal circulation pump function: coding address "3E" in this group.
		3A:5	Fault message input
		3A:6	Brief operation, DHW circulation pump (pushbutton function). DHW circulation pump runtime setting: coding address "3d" in this group. In the case of DHW circulation pumps with standalone functions, the pump must be connected directly to the 230 V~ supply.
3B:0	Function of input DE2 at EA1 extension: No function	3B:1	Heating program - changeover
		3B:2	External demand with set flow temperature. Set temperature selection: coding address "9b" in this group. Internal circulation pump function: coding address "3F" in this group.
		3B:3	Function of input DE2: external blocking. Internal circulation pump function: coding address "3E" in this group.
		3B:4	Function of input DE2: external blocking with fault message input

"General"/Group 1 (cont.)

Coding in the delivered condition		Possible change	
			Internal circulation pump function: coding address 3E
		3B:5	Function of input DE2: fault message input
		3B:6	Function of input DE2: brief operation of the DHW circulation pump (pushbutton function). DHW circulation pump runtime setting: coding address 3d In the case of DHW circulation pumps with standalone functions, the pump must be connected directly to the 230 V~ supply.
3C:0	Function of input DE3 at EA1 extension: No function	3C:1	Heating program - changeover
		3C:2	External demand with set flow temperature. Set temperature selection: coding address "9b" in this group. Internal circulation pump function: coding address "3F" in this group.
		3C:3	External blocking. Internal circulation pump function: coding address "3E" in this group.
		3C:4	External blocking with fault message input Internal circulation pump function: coding address "3E" in this group.
		3C:5	Fault message input
		3C:6	Brief operation, DHW circulation pump (pushbutton function). DHW circulation pump runtime setting: coding address "3d" in this group. In the case of DHW circulation pumps with standalone functions, the pump must be connected directly to the 230 V~ supply.
3d:5	DHW circulation pump runtime for brief operation: 5 min	3d:1 to 3d:60	Runtime of DHW circulation pump adjustable from 1 to 60 min In the case of DHW circulation pumps with standalone functions, the pump must be connected directly to the 230 V~ supply.
3E:0	Internal circulation pump remains in control mode at "External blocking" signal	3E:1	Internal circulation pump is switched off at "External blocking" signal
		3E:2	Internal circulation pump is switched on at "External blocking" signal
3F:0	Internal circulation pump remains in control mode at "External demand" signal	3F:1	Internal circulation pump is switched off at "External demand" signal
		3F:2	Internal circulation pump is switched on at "External demand" signal
4B:0	Function of input 96 : no function	4B:1	External demand
		4B:2	External blocking

"General"/Group 1 (cont.)

Coding in the delivered condition		Possible change	
51:0	When there is a heat demand, the internal circulation pump always starts	51:1	System with low loss header: The internal circulation pump only starts upon heat demand if the burner is running. The circulation pump stops on expiry of the run-on time.
52:0	Without flow temperature sensor for low loss header	52:1	With flow temperature sensor for low loss header (automatic recognition)
53:1	Function of terminal 28 of internal extension: DHW circulation pump (in the case of DHW circulation pumps with standalone functions, the pump must be connected directly to the 230 V~ supply)	53:0	Central fault
		53:2	External heating circuit pump (heating circuit 1)
		53:3	External circulation pump for cylinder heating
54:0	Never adjust		
6E:50	No display correction for outside temperature.	6E:0 to 6E:49	Display correction -5 K to Display correction -0.1 K
		6E:51 to 6E:99	Display correction +0.1 K to Display correction +4.9 K
76:0	Never adjust		
80:6	A fault message appears if a fault is active for at least 30 s	80:0	Immediate fault message
		80:2 to 80:199	Minimum fault duration before a fault message is issued, adjustable from 10 to 995 s. 1 step \pm 5 s
81:1	Automatic summer/wintertime changeover	81:0	Manual summer/wintertime changeover
		81:2	Use of the radio clock receiver (automatic recognition)
		81:3	With LON communication module: Control unit receives the time
82:0	Never adjust		
86:...	Never adjust		
87:...	Never adjust		
88:0	Temperature displayed in °C (Celsius)	88:1	Temperature displayed in °F (Fahrenheit)
8A:175	Never adjust		
8F:0	Operation enabled in standard menu and extended menu. Note <i>The relevant code is only activated when you exit the service menu (see page 61).</i>	8F:1	Operation locked out in standard menu and extended menu. Emissions test mode can be enabled.
		8F:2	Operation enabled in standard menu, but locked out in extended menu. Emissions test mode can be enabled.

"General"/Group 1 (cont.)

Coding in the delivered condition		Possible change	
90:128	Time constant for calculating the adjusted outside temperature 21.3 h	90:1 to 90:199	Subject to the set value, the flow temperature is adjusted quickly (lower values) or slowly (higher values) when the outside temperature changes. 1 step \cong 10 min
93:0	Never adjust		
94:0	Without OpenTherm extension	94:1	With OpenTherm extension (automatic recognition)
95:0	Without Vitocom 100, type GSM communication interface	95:1	With Vitocom 100 communication interface (automatic recognition)
96:....	Minimum burner output (specified by the boiler coding card)	96:.... to 96:100	Minimum burner output adjustable from ... to 100 %.
99:0	Never adjust		
9A:0	Never adjust		
9B:70	Set flow temperature for external demand 70 °C	9B:0 to 9B:127	Set value adjustable from 0 to 127 °C (limited by boiler-specific parameters)

"Boiler"/Group 2

Select group "2" (see page 52).

Coding

Coding in the delivered condition		Possible change	
04:2	Integral pause time	04:0	Minimum burner pause time subject to the boiler load, taking into account a threshold value (specified by boiler coding card)
		04:1	For systems with low loss header: pause time subject to boiler load (specified by boiler coding card)
06:....	Maximum limit of the boiler water temperature, specified in °C by boiler coding card	06:20 to 06:....	Maximum limit adjustable within the ranges specified by the boiler
0d:0	Never adjust		
0E:0	Never adjust		
10:....	Threshold for burner shutdown (if 04:2 is set)	10:5 to 10:100	Threshold adjustable from 5 to 100. The higher the value, the later the burner switches off
13:1	Never adjust		
14:1	Never adjust		
15:1	Never adjust		
21:0	No service 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 \cong 100 h
23:0	No time set for burner service interval	23:1 to	Interval adjustable from 1 to 24 months

"Boiler"/Group 2 (cont.)

Coding in the delivered condition		Possible change	
		23:24	
24:0	"Service" not shown on the display	24:1	"Service" is shown on the display (address is automatically set and must be manually reset after a service has been carried out)
28:0	No burner interval ignition	28:1 to 28:24	Time interval adjustable from 1 h to 24 h. Burner is force-started for 30 s every time
2E:0	Never adjust		
2F:0	Venting program/filling program disabled	2F:1	Venting program enabled
		2F:2	Filling program enabled
30:1	Internal variable speed circulation pump (set automatically)	30:0	Internal circulation pump not speed-controlled (e.g. temporarily for service)
31:...	Set speed of the internal circulation pump when operated as boiler circuit pump in %, specified by the boiler coding card	31:0 to 31:100	Set speed adjustable from 0 to 100 %
38:0	Burner control unit status: operational (no fault)	38:9	Burner control unit status: fault
49:0	No CO limiter installed. Must be set if the CO limiter is to be connected and automatically activated.	49:1	CO limiter with sensor monitoring and fault message active. Is set automatically during commissioning if the CO limiter is connected.
		49:2	CO limiter active If the CO limit is exceeded: <ul style="list-style-type: none"> ▪ CO limiter sounds an alarm ▪ Alarm signal is not transmitted to the control unit ▪ The burner is not switched off ▪ No fault message to the control unit

"DHW"/Group 3

Select group "3" (see page 52).

Coding

Coding in the delivered condition		Possible change	
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>Max. value subject to boiler coding card. Observe the maximum permissible DHW temperature.</i>
57:0	Never adjust		

"DHW"/Group 3 (cont.)

Coding in the delivered condition		Possible change	
58:0	Without auxiliary function for DHW heating	58:10 to 58:60	Input of a 2nd set DHW temperature, adjustable from 10 to 60 °C (observe coding addresses "56" and "63" in this group)
5A:0	Connection of the cylinder loading pump to output 28 on the main PCB (delivered condition)	5A:1	Connection of the cylinder loading pump to the int. H1 extension
5E:0	Never adjust		
5F:0	Never adjust		
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:...	Never adjust (Information on the type of diverter valve, specified by the boiler coding card)		
6C:100	Set speed of internal circulation pump for DHW heating 100 %	6C:0 to 6C:100	Set speed adjustable from 0 to 100 %
6F:...	Max. heating output for DHW heating in %; specified by boiler coding card	6F:0 to 6F:100	Max. heating output for DHW heating adjustable from min. heating output to 100 %

"Heating circuit ..."/Group 5

Select group "5" (see page 52).

Coding

Coding in the delivered condition		Possible change	
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**
With settings below 1 °C there is a risk that pipes outside the thermal envelope of the building could freeze up.
Standby mode in particular must be taken into consideration, e.g. during holidays.

Parameter address A3:...	Heating circuit pump	
	"ON"	"OFF"
-9	-10 °C	-8 °C
-8	-9 °C	-7 °C
-7	-8 °C	-6 °C
-6	-7 °C	-5 °C
-5	-6 °C	-4 °C
-4	-5 °C	-3 °C
-3	-4 °C	-2 °C

"Heating circuit ..."/Group 5 (cont.)

Parameter address A3:...	Heating circuit pump	
	"ON"	"OFF"
-2	-3 °C	-1 °C
-1	-2 °C	0 °C
0	-1 °C	+1 °C
1	0 °C	+2 °C
2 to 15	+1 °C to +14 °C	+3 °C to +16 °C


Coding in the delivered condition		Possible change	
C5:20	Electronic minimum flow temperature limit 20 °C	C5:1 to C5:127	Minimum limit adjustable from 1 to 127 °C (limited by boiler-specific parameters)
C6:74	Electronic maximum flow temperature limit set to 74 °C	C6:10 to C6:127	Maximum limit adjustable from 10 to 127 °C (limited by boiler-specific parameters)
d6:0	Heating circuit pump remains in control mode at "External blocking" signal	d6:1	Heating circuit pump is switched off at "External blocking" signal (subject to coding addresses "3A", "3b" and "3C")
		d6:2	Heating circuit pump is switched on at "External blocking" signal (subject to coding addresses "3A", "3b" and "3C")
d7:0	Heating circuit pump remains in control mode at "External demand" signal	d7:1	Heating circuit pump is switched off at "External demand" signal (depending on to coding addresses "3A", "3b" and "3C")
		d7:2	Heating circuit pump is switched on at "External demand" signal (depending on to coding addresses "3A", "3b" and "3C")
F2:8	Time limit for party mode or external operating mode changeover via key 8 h (only for weather-compensated control unit) Note <i>Observe settings in coding addresses "3A", 3b and "3C" in the "General" group, and "d5" and "d8" in the "Heating circuit..." group.</i>	F2:0	No time limit for party mode
		F2:1 to F2:12	Time limit adjustable from 1 to 12 h
F5:12	Run-on time of the internal circulation pump in heating mode: 12 min (only for constant temperature control unit)	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
F6:25	In "Only DHW" operating mode, the internal circulation pump is permanently on (only for constant temperature control units)	F6:0	In "Only DHW" operating mode, the internal circulation pump is permanently off

"Heating circuit ..."/Group 5 (cont.)



Coding in the delivered condition		Possible change	
		F6:1 to F6:24	In "Only DHW" operating mode, the internal circulation pump is started 1 to 24 times per day for 10 minutes each time.
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 is started 1 to 24 times per day for 10 min each time.

Service menu

Calling up the service menu

1. Press **OK** and  simultaneously for approx. 4 s.
"P" flashes on the display.
2. Select required function. See following pages.

Exiting the service menu

1. Select "Serv"  with .
2. Confirm with **OK**.
"OFF" flashes.
3. Confirm with **OK**.

Note

The system exits the service level automatically after 30 min.

Diagnosis




Operating data

Calling up operating data

- Operating data can be called up in the "i" menu.
- For further information on operating data, see chapter "Brief scan".

Calling up operating data

Service menu:

1. Press **OK** and  simultaneously for approx. 4 s.
2. Select the required information with /.




Note

If a scanned sensor is faulty, "- - -" appears on the display.

Resetting operating data

Saved operating data (e.g. hours run) can be reset to "0".


Service menu:



1. Press **OK** and  simultaneously for approx. 4 s.
2. Select the required information with /.
3. Confirm with **OK**, "P" flashes.
4. Confirm with **OK**, the value is reset.

Brief scan







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

Service menu:

1. Press **OK** and  simultaneously for approx. 4 s.
"P" flashes on the display.
2. Confirm with **OK**.

3. Select the required scan with /. For example, "A" 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		System scheme	Software version Control unit		Software version Programming unit
1			Adjusted outside temperature		
3			Set boiler water temperature		
4			Common demand temperature		
5			Set cylinder temperature		
6		Number of KM BUS subscribers		Number of LON subscribers	

Diagnosis (cont.)

Brief scan	Display				
7	SNVT or SBVT configuration 0: Auto 1: Tool	Software version Communication coprocessor		Software version LON module	
8		Subnet address/system number		Node address	
9		Burner control unit type		Device type	
A	Diverter valve status 1: Heating 2: Central position 3: DHW heating	0	Max. heating output in %		
b		Boiler coding card (hexadecimal)			
C		Version Device		Version Burner control unit	
d				Speed-controlled pump 1 Wilo 2 Grundfos	Software version Speed-controlled pump 0: No speed-controlled pump
E ①		Software version Burner control unit			
F ①	Setting of coding address "53"	Internal details for calibration			
	AM1 extension				
F ②	Software version	Output A1 configuration (value corresponds to coding address "33" setting)	Output A1 switching state 0: OFF 1: ON	Output A2 configuration (value corresponds to coding address "34" setting)	Output A2 switching state 0: OFF 1: ON
	EA1 extension				
F ③	Output 157 configuration (value corresponds to setting of coding address "36" in group 1 "General")	Output 157 switching state 0: OFF 1: ON	Input DE1 switching state 0: Open 1: Closed	Input DE2 switching state 0: Open 1: Closed	Input DE3 switching state 0: Open 1: Closed
F ④	Software version		External hook-up 0 – 10 V Display in %		
	OpenTherm extension (if installed)				
F ⑨	Software version	DHW heating status	External hook-up 0 – 10 V Display in %		

Checking outputs (actuator test)

1. Press **OK** and simultaneously for approx. 4 s.
"⚙" flashes on the display.
2. Select "⚙" with and confirm with **OK**.

Diagnosis (cont.)

3. Select required actuator (output) with ▲/▼ (see following table):
4. Confirm selected actuator with **OK**.
The display shows the number for the activated actuator and **"ON"**.

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

Display	Explanation
0	All actuators have been switched off.
1	Burner operates at minimum output; internal pump starts.
2	Burner operates at maximum output; internal pump starts.
3	Internal output 20 active (internal circulation pump)
4	Diverter valve set to heating mode
5	Diverter valve in central position (filling/draining)
6	Diverter valve set to DHW heating
10	Output 20 / 28 at internal H1/H2 extension enabled
19	Contact P - S at plug 157 of EA1 extension closed
20	Output A1 at AM1 extension active
21	Output A2 at AM1 extension active
22	Internal output 21 active (circulation pump for cylinder heating)

Fault display

In the event of a fault, the red fault indicator (A) flashes. The two-digit fault code and (subject to the type of fault) "△" or "⚡" flash on the programming unit display.

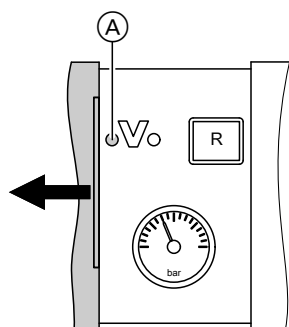


Fig. 41

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



Fig. 42 Example: Fault message "50"

Acknowledging fault

Press **OK**; the default display is shown again. Any fault message facility connected will be switched off.

If an acknowledged fault is not remedied, the fault message will be redisplayed the following day and the fault message facility restarted.

Calling up acknowledged faults

Hold down **OK** for approx. 4 s. The 10 most recent faults (including those remedied) are saved and can be called up.

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

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

1. Press **OK** and **≡** simultaneously for approx. 4 s.
2. Select "△" and activate fault history with **OK**.
3. Select fault messages with ▲/▼.

Deleting fault history

While the list is displayed, press **OK** until ⚡ flashes. Confirm with **OK**.

Fault codes

Fault code displayed	System characteristics	Cause	Measures
0F	Control mode	Maintenance "0F" is only displayed in the fault history	Service required Note After servicing, set code "24:0".
18	Controls as if the outside temperature were 0 °C	Lead break, outside temperature sensor	Check outside temperature sensor
20	Regulates without flow temperature sensor (low loss header)	Short circuit, system flow temperature sensor	Check low loss header sensor (see page 76)
28	Regulates without flow temperature sensor (low loss header)	Lead break, system flow temperature sensor	Check low loss header sensor (see page 76) If no low loss header sensor is connected, set code "52:0".
30	Burner blocked	Short circuit, boiler water temperature sensor	Check boiler water temperature sensor (see page 76)
38	Burner blocked	Lead break, boiler water temperature sensor	Check boiler water temperature sensor (see page 76)

Fault codes (cont.)


Fault code displayed	System characteristics	Cause	Measures
3D	Burner in a fault state or blocked		Check the connecting cable to the fan unit. Press reset button R . If the fault recurs, replace the fan unit.
50	No DHW heating	Short circuit, cylinder temperature sensor or comfort sensor	Check cylinder temperature sensor (see page 76) or comfort sensor (see page 76)
51	No DHW heating	Short circuit, outlet temperature sensor	Check sensor (see page 76)
58	No DHW heating	Lead break, cylinder temperature sensor or comfort sensor	Check cylinder temperature sensor (see page 76) or comfort sensor (see page 76)
59	No DHW heating	Lead break, outlet temperature sensor	Check sensor (see page 76)
71	Burner blocked	Mains voltage too low	Check the power supply.
73	Burner blocked	Feedback input from internal H1 extension prevents burner start.	Check that internal H1 extension and any devices connected to it are correctly connected and working properly (internal: plug 53/96 power interruption)
74	Burner blocked or in a fault state	Temperature limiter earth fault	Check temperature limiter, connecting cables and plug-in connection for connection (contact) to earthed components. Remove contact if necessary. Press reset button R .
75	Burner blocked or in a fault state	Internal H1/H2 extension earth fault	Check internal H1/H2 extension, connecting cables and plug-in connection for connection (contact) to earthed components. Remove contact if necessary. Press reset button R .
76	Burner blocked or in a fault state	Gas pressure switch earth connection	Check gas pressure switch, connecting cables and plug-in connection for connection (contact) to earthed components. Remove contact if necessary. Press reset button R .
80	Burner in a fault state	Insufficient gas supply	Test static gas pressure and gas flow pressure. Check that on-site gas line and gas flow switch are correctly sized. Note <i>If the building pressure regulator has a leak, you may notice rising pressure when the burner is idle. The gas flow switch may respond if the system is restarted.</i>



Fault codes (cont.)

Fault code displayed	System characteristics	Cause	Measures
81	Burner in a fault state	No ignition spark	<p>Check connecting cables and leads from ignition module and ignition electrode (see page 37). Check for a voltage of 230 V~ at plug 54 on the ignition module during the ignition phase. Check whether the ignition electrode insulation is damaged.</p>
82	Burner in a fault state	Flame signal at burner start not present or insufficient.	<p>Check the ionisation electrode and connecting lead (see page 37). Check plug-in connections for loose contacts.</p> <p>Note <i>Deposits on the electrodes indicate foreign bodies in the ventilation air. Check the installation room and flue system for causes of the deposits. For example: laundry detergents, cleaning agents, toiletries, deposits in the ventilation air supply (chimney).</i></p>
83	Burner in a fault state	Flame signal is already present at burner start.	<p>Check system for condensate backup.</p> <p>Note <i>To prevent water damage, detach fan unit before removing the burner.</i></p> <p>Check ionisation and ignition electrode for damage and earth faults (e.g. contact with the thermal insulation ring). Check connecting leads from ionisation and ignition electrode. Replace control unit if fault is permanent. Press reset button R.</p>
84	Burner in a fault state	CO limit within appliance exceeded	<p>Check entire flue gas path for the following:</p> <ul style="list-style-type: none"> ▪ Flue gas recirculation ▪ Leaks ▪ Flue gas back pressure caused by water pocket (if flue system fall is insufficient) ▪ Constrictions ▪ Blockages <p>Repair flue system if necessary. Press reset button R.</p>

Fault codes (cont.)

Fault code displayed	System characteristics	Cause	Measures
85	Burner in a fault state	Gas supply insufficient during calibration	<p>Test static gas pressure and gas flow pressure. Check that on-site gas line and gas flow switch are correctly sized. Visually inspect gas train inlet and strainer on the inlet side for contamination.</p> <p>Note <i>Contamination from a brazed gas line, for example, can block up the gas train strainer on the inlet side.</i></p> <p>Press reset button R.</p>
95	Burner blocked The burner starts again once the CO level is below the CO limit.	CO limit exceeded	<p> Danger An increased concentration of carbon monoxide can cause potentially fatal carbon monoxide poisoning. Observe the safety instructions at the beginning of this manual.</p> <p>Determine the cause of the increased CO level. Remedy the fault. Press Test on the CO limiter. The alarm is switched off.</p>
96	Burner blocked	CO limiter sensor fault	<p>Replace the CO limiter.</p> <p>If the system is to be temporarily operated without a CO limiter:</p> <ul style="list-style-type: none"> ▪ Disconnect plug X21 from the control unit. ▪ Set parameter 49:0.
97	Burner in a fault state	CO limiter failed	<p>Check connection and cable. Replace CO limiter. Press reset R (the system can continue to be operated without CO limiter, provided code 49:0 is set).</p>
A7	Control mode as per delivered condition	Programming unit faulty	Replace programming unit
A9	Burner blocked	Internal circulation pump blocked	Check circulation pump
B0	Burner in a fault state	Short circuit, flue gas temperature sensor	Check flue gas temperature sensor and connecting lead.
B1	Control mode as per delivered condition	Communication error, programming unit	Check connections and replace programming unit if required
B4	Controls as if the outside temperature were 0 °C	Internal fault	Replace the control unit
B5	Control mode as per delivered condition	Internal fault	Replace the control unit
B7	Burner blocked	Boiler coding card fault	Plug in boiler coding card or replace if faulty

Fault codes (cont.)

Fault code displayed	System characteristics	Cause	Measures
B8	Burner in a fault state	Lead break, flue gas temperature sensor	Check flue gas temperature sensor and connecting lead.
BC	Control mode without remote control	Communication error, Vitotrol remote control	Check connections, cable, coding address "A0" in the " Heating circuit " group and remote control settings (see page 105). For wireless remote control units: check connection; place remote control close to the boiler.
BF	Control mode	Incorrect LON communication module	Replace LON communication module
C1	Control mode	Communication error, EA1 extension	Check connections
C3	Control mode	Communication error, AM1 extension	Check connections
C4	Control mode	Communication error, OpenTherm extension	Check OpenTherm extension
C5	Control mode, max. pump speed	Communication error, internal variable speed pump	Check setting for coding address "30" in the " Boiler " group
CD	Control mode	Communication error, Vitocom 100 (KM-BUS)	Checking connections, Vitocom 100 and coding address "95" in the " General " group
CF	Control mode	Communication error, LON communication module	Replace LON communication module
D3	Burner in a fault state or blocked		Check the connecting cable to the fan unit. Press reset button R . If the fault recurs, replace the fan unit.
D4	Control mode	Burner is operating with a limited modulation range	Check fan mass flow sensor for contamination. Check the flue system for flue gas back pressure.
D5	Burner in a fault state	Fan blocked	Press reset button R . Check fan impeller movement. If necessary, replace fan.
D6	Control mode	Input DE1 at EA1 extension reports a fault	Remove fault at appliance concerned
D7	Control mode	Input DE2 at EA1 extension reports a fault	Remove fault at appliance concerned
D8	Control mode	Input DE3 at EA1 extension reports a fault	Remove fault at appliance concerned
E0	Control mode	External LON subscriber error	Check connections and LON subscribers

Fault codes (cont.)

Fault code displayed	System characteristics	Cause	Measures
E1	Burner in a fault state	Ionisation current too high during calibration	<p>Check gap between ionisation electrode and burner gauze assembly (see page 37). Check whether there is a lot of dust in the ventilation air (e.g. from construction work).</p> <p>Note <i>Deposits on the electrodes indicate foreign bodies in the ventilation air. Check the installation room and flue system for causes of the deposits. For example: laundry detergents, cleaning agents, toiletries, deposits in the ventilation air supply (chimney). If burner gauze assembly and ionisation electrode have been replaced, also clean fan unit, gas/air channel and Venturi extension.</i></p>
E2	Burner in a fault state	Flow rate too low during calibration	<p>Ensure adequate heat transfer. Press reset button R.</p>
E3	Burner in a fault state	Heat transfer too low during calibration Temperature limiter has shut down.	<p>Ensure adequate heat transfer. Check circulation pump for faults, scale or blockages. Press reset button R.</p>
E4	Burner blocked	24 V power supply fault	<p>Replace control unit.</p>
E5	Burner blocked or in a fault state	Flame amplifier fault	<p>Press reset button R. Replace control unit if fault is permanent.</p>
E7	Burner in a fault state	Ionisation current too low during calibration	<p>Check the ionisation electrode and connecting lead (see page 37). Check plug-in connections for loose contacts. Check flue system; remove flue gas recirculation if required. Press reset button R.</p> <p>Note <i>Deposits on the electrodes indicate foreign bodies in the combustion air. Check the installation room and flue system for causes of the deposits. For example: laundry detergents, cleaning agents, toiletries, deposits in the ventilation air supply (chimney). If burner gauze assembly and ionisation electrode have been replaced, also clean fan unit, gas/air channel and Venturi extension.</i></p>



Fault codes (cont.)

Fault code displayed	System characteristics	Cause	Measures
E8	Burner in a fault state	Ionisation current lies outside the permissible range	<p>Check gas supply (gas pressure and gas flow switch), gas train and connecting cable. Check assignment of gas type (see page 76).</p> <p>Check ionisation electrode:</p> <ul style="list-style-type: none"> ▪ Distance to burner gauze assembly (see page 37) ▪ Electrode contaminated <p>Press reset button R.</p>
E9	Burner in a fault state	Repeated flame loss during calibration	<p>Check the ionisation electrode and connecting lead (see page 37). Check plug-in connections for loose contacts. Check flue system; remove flue gas recirculation if required. Check system for condensate backup. Visually inspect gas train inlet and strainer on the inlet side for contamination.</p> <p>Note <i>To prevent water damage, detach fan unit before removing the burner.</i></p> <p>Note <i>Deposits on the electrodes indicate foreign bodies in the combustion air. Check the installation room and flue system for causes of the deposits. For example: laundry detergents, cleaning agents, toiletries, deposits in the ventilation air supply (chimney). If burner gauze assembly and ionisation electrode have been replaced, also clean fan unit, gas/air channel and Venturi extension.</i></p> <p>Press reset button R.</p>

Fault codes (cont.)

Fault code displayed	System characteristics	Cause	Measures
EA	Burner in a fault state	Ionisation current too low during calibration. Difference compared to previous value not plausible.	<p>Check ionisation electrode and connecting cable. Check plug-in connections for loose contacts. Check whether there is a lot of dust in the ventilation air (e.g. from construction work). Check flue system; remove flue gas recirculation if required. Check system for condensate backup.</p> <p>Note <i>To prevent water damage, detach fan unit before removing the burner.</i></p> <p>Replace coding card if fault is permanent.</p> <p>Note <i>Deposits on the electrodes indicate foreign bodies in the combustion air. Check the installation room and flue system for causes of the deposits. For example: laundry detergents, cleaning agents, toiletries, deposits in the ventilation air supply (chimney). If burner gauze assembly and ionisation electrode have been replaced, also clean fan unit, gas/air channel and Venturi extension.</i></p> <p>Press reset button R.</p>



Fault codes (cont.)

Fault code displayed	System characteristics	Cause	Measures
EB	Burner in a fault state	Process fault: shutdown during calibration.	<ul style="list-style-type: none"> ▪ Check system for condensate backup. Note <i>To prevent water damage, detach fan unit before removing the burner.</i> Remove the condensate backup. Press reset button R. ▪ Check the gas supply pressure. Check gas train strainer on the inlet side for contamination. ▪ Check ionisation electrode for contamination. Check gap between ionisation electrode and burner gauze assembly (see page 37). Press reset button R. ▪ Check flue system; remove flue gas recirculation if required. Press reset button R. ▪ Check that internal H1 extension and any devices connected to it are correctly connected and working properly (internal: plug 53/96 power interruption) ▪ Check the connecting cable to the fan unit. Check impeller for ease of operation.
EC	Burner in a fault state	Parameter error during calibration	Press reset button R or Replace boiler coding card and press reset button R .
ED	Burner in a fault state	Internal fault at control unit	Press reset button R . Replace control unit if fault is permanent.
EE	Burner in a fault state	Flame signal at burner start not present or insufficient.	<ul style="list-style-type: none"> ▪ Check gas supply (gas pressure and gas flow switch). ▪ Check gas train. ▪ Check system for condensate backup. Note <i>To prevent water damage, detach fan unit before removing the burner.</i> ▪ Check ionisation electrode and connecting cable. <p>Check ignition:</p> <ul style="list-style-type: none"> ▪ Connecting cables to ignition module and ignition electrode ▪ Ignition electrode gap and contamination (see page 37). ▪ Check ignition electrode for broken insulation. <p>Press reset button R.</p>

Fault codes (cont.)

Fault code displayed	System characteristics	Cause	Measures
EF	Burner in a fault state	Flame is lost immediately after it has built (during safety time).	Check gas supply (gas pressure and gas flow switch). Check balanced flue system for flue gas recirculation. Check ionisation electrode: <ul style="list-style-type: none"> ▪ Distance to burner gauze assembly (see page 37) ▪ Electrode contaminated Press reset button R .
F0	Burner blocked or in a fault state	Internal fault	Press reset button R . Replace control unit if fault is permanent.
F1	Burner in a fault state	Flue gas temperature limiter has responded.	Check heating system fill level. Vent the system. Press reset button R after flue system has cooled down.
F2	Burner in a fault state	Temperature limiter has responded.	Check heating system fill level. Check circulation pump. Vent the system. Check temperature limiter and connecting cables. Press reset button R .
F3	Burner in a fault state	Flame signal is already present at burner start.	Check ionisation electrode and connecting cable. Check system for condensate backup. Note <i>To prevent water damage, detach fan unit before removing the burner.</i> Press reset button R .
F8	Burner in a fault state	Fuel valve or modulation valve will not close.	Check the gas train and replace if required. Press reset button R .
F9	Burner in a fault state	Fan speed too low	Check fan, fan connecting cables and fan power supply. Press reset button R .
FA	Burner in a fault state	Fan idle state or set speed not reached	Check fan, check connecting cables to fan. Press reset button R .
FB	Burner in a fault state	Flame loss in the stabilisation or operating phase	Check gas supply (gas pressure and gas flow switch). Check balanced flue system for flue gas recirculation. Check ionisation electrode: <ul style="list-style-type: none"> ▪ Distance to burner gauze assembly (see page 37) ▪ Electrode contaminated Press reset button R .

Fault codes (cont.)

Fault code displayed	System characteristics	Cause	Measures
FC	Burner in a fault state	Gas train faulty, modulation valve control faulty or flue gas path blocked	Check connecting cables to the gas train for damage. Check gas train. Check flue system for blockages or constrictions. Press reset button R .
Fd	Burner in a fault state	Burner control unit fault	Check ignition electrode, ionisation electrode and connecting cables. Check whether a strong interference (EMC) field exists near the appliance. Press reset button R . If the fault occurs sporadically, replace the coding card. Replace control unit if fault is permanent.
FE	Burner blocked or in a fault state	EEPROM error, PCB	Press reset button R . Replace control unit if fault persists.
FE	Burner in a fault state and additional fault B7 is displayed	Boiler coding card missing	Insert the boiler coding card. Press reset button R . Replace control unit if fault persists.
FF	Burner blocked or in a fault state	Internal fault or reset button R disabled	Restart the appliance. Replace the control unit if the appliance will not restart.

Maintenance

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

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

Water ingress can result in damage to other components.

Protect the following components against ingress of water:

- Control unit (in particular in the service position)
- Electrical components
- Plug-in connections
- Cables and leads

Putting the control unit into the service position

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

Maintenance (cont.)

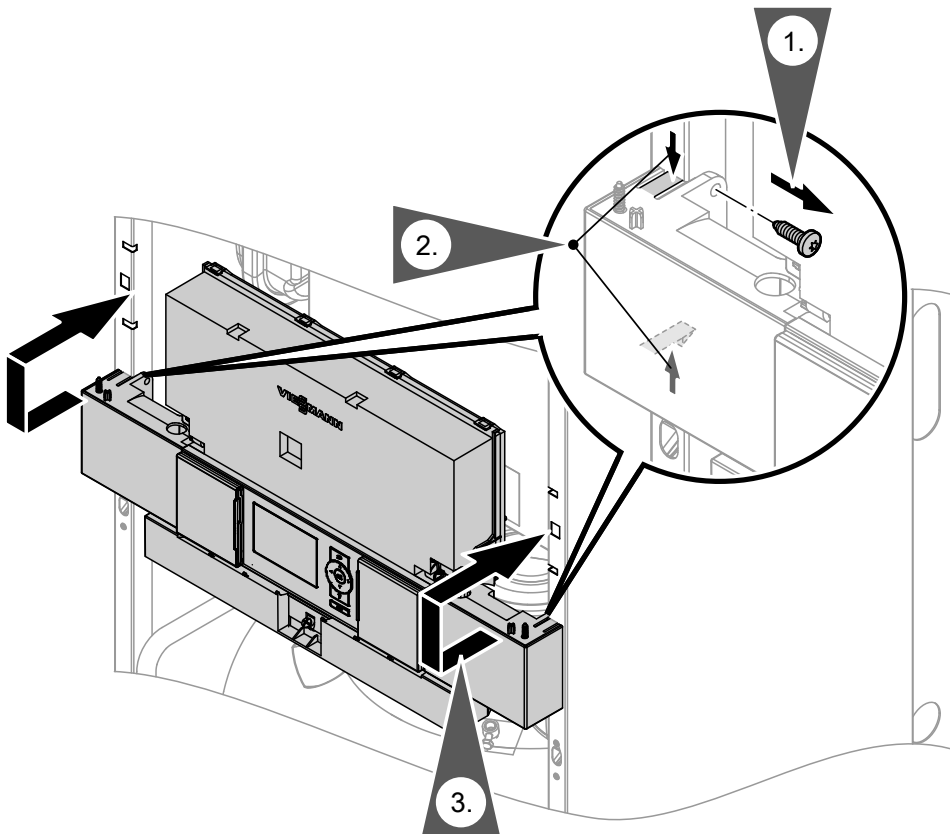


Fig. 43

Draining the boiler on the heating water side

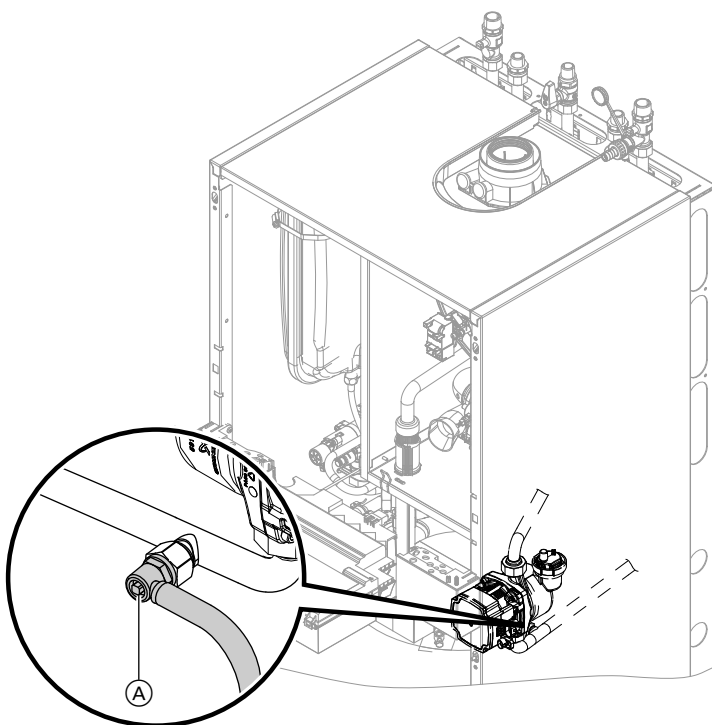


Fig. 44

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 much as required.

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

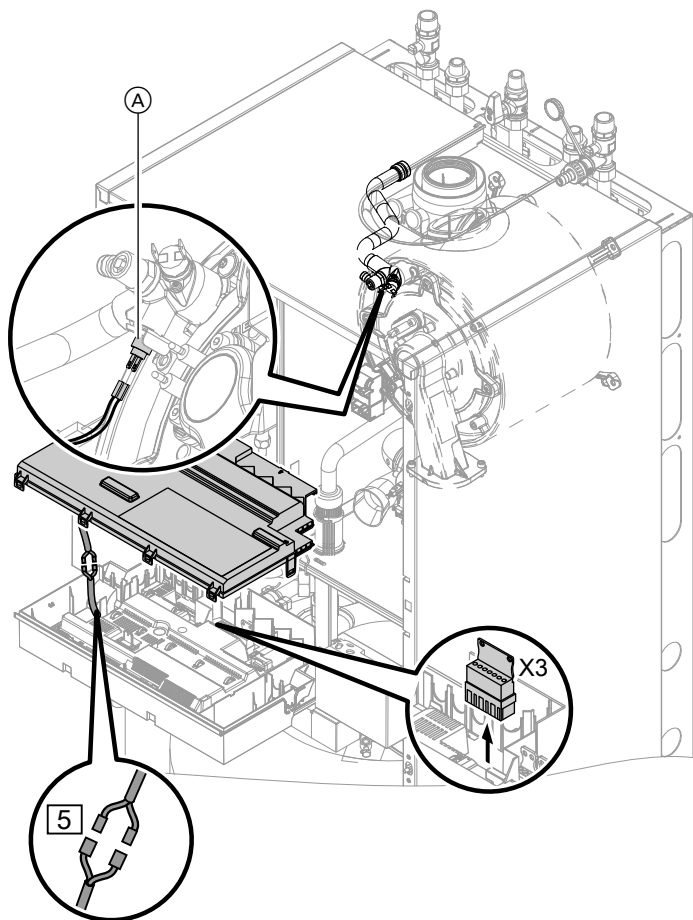


Fig. 45

Diagnosis

1. ■ **Boiler water temperature sensor**
Disconnect leads from boiler water temperature sensor A and check resistance.
- **Cylinder temperature sensor**
Pull plug 5 from the cable harness at the control unit and check resistance.
- **Flow temperature sensor**
Disconnect plug "X3" at the control unit and check the resistance across terminals "X3.4" and "X3.5".
2. Check the sensor resistance and compare it with the curve.
3. In the event of severe deviation replace the sensor.

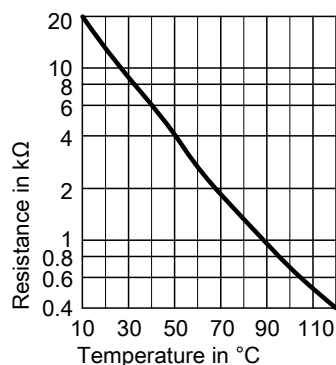


Fig. 46 Sensor type: NTC 10 kΩ



Danger

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

Maintenance (cont.)

Checking the outlet temperature sensor

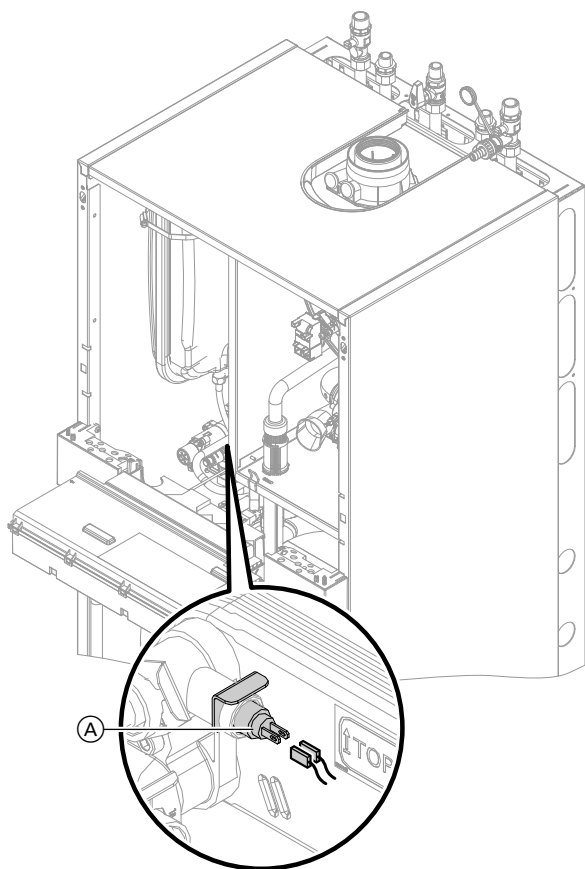


Fig. 47

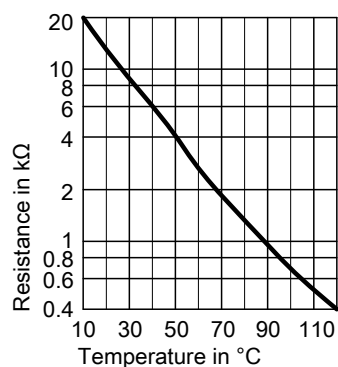


Fig. 48 Sensor type: NTC 10 kΩ

1. Pull leads from outlet temperature sensor (A).
2. Check sensor resistance and compare it to the curve.
3. In the event of severe deviation replace the sensor.



Danger

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

Checking the plate heat exchanger

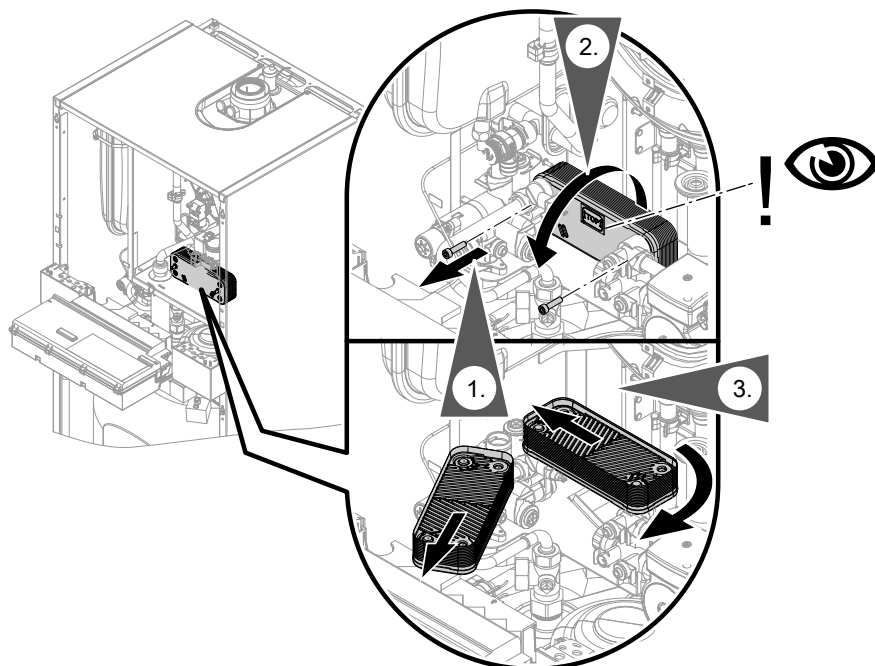


Fig. 49

1. Shut off and drain the boiler on the heating water and DHW sides.
2. Release side fasteners and pivot control unit forward.
3. Remove the trap (see page 38).
4. Undo two fixing screws; pull the plate heat exchanger towards the back, turn and remove towards the front.
5. Check the connections on the heating water and DHW side for contamination and scaling; if required, replace the plate heat exchanger.
6. Install in reverse order using new gaskets.

Checking the flue gas temperature sensor

The flue gas temperature sensor locks out the boiler if the permissible flue gas temperature is exceeded. After the flue system has cooled down, press reset button **R** to cancel the lock.

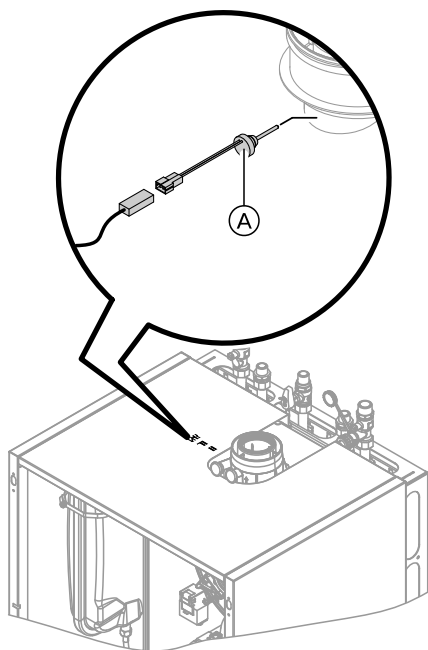


Fig. 50

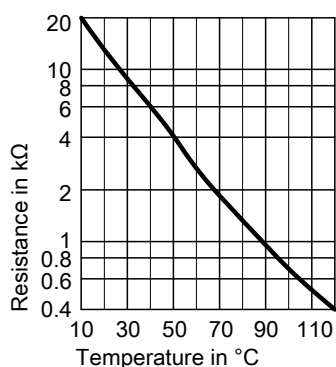


Fig. 51 Sensor type: NTC 10 kΩ

1. Disconnect leads from flue gas temperature sensor **(A)**.
2. Check sensor resistance and compare it to the curve.
3. In the event of severe deviation replace the sensor.

Fault "A3" during commissioning

During commissioning, the control unit checks whether the flue gas temperature sensor is correctly positioned. If the flue gas temperature sensor is not positioned correctly, commissioning is cancelled and fault message A3 is displayed.

1. Check whether the flue gas temperature sensor is correctly inserted. See previous diagram.
2. If necessary, correct the position of the flue gas temperature sensor or replace faulty flue gas temperature sensor.
3. Press reset button **R** and repeat commissioning. The check is repeated until it is completed successfully.

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:

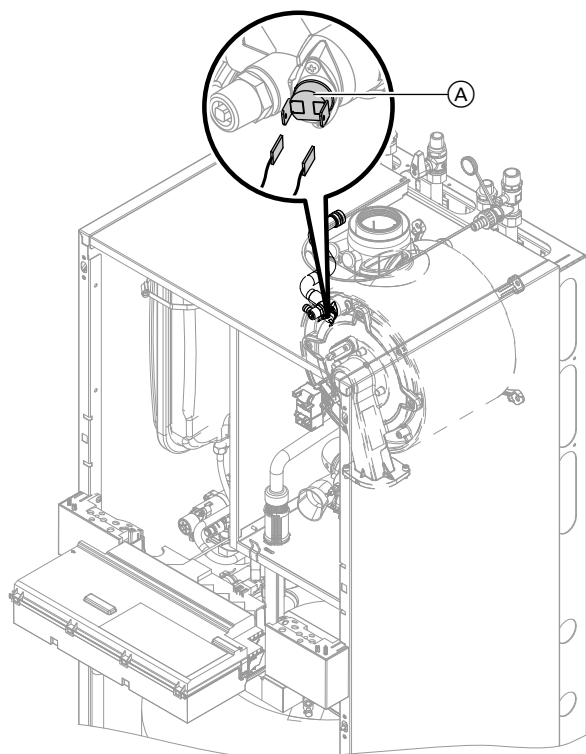


Fig. 52

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

Checking the fuse

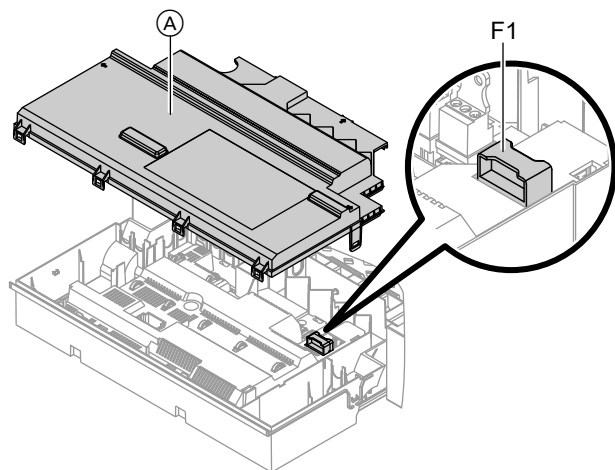


Fig. 53

1. Switch OFF the power supply.

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



Danger

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

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

Overview of assemblies

Ordering parts

The following information is required:

- Serial no. (see type plate (A))
- Assembly (from the parts list)
- Position number of the individual part within the assembly (from this parts list)

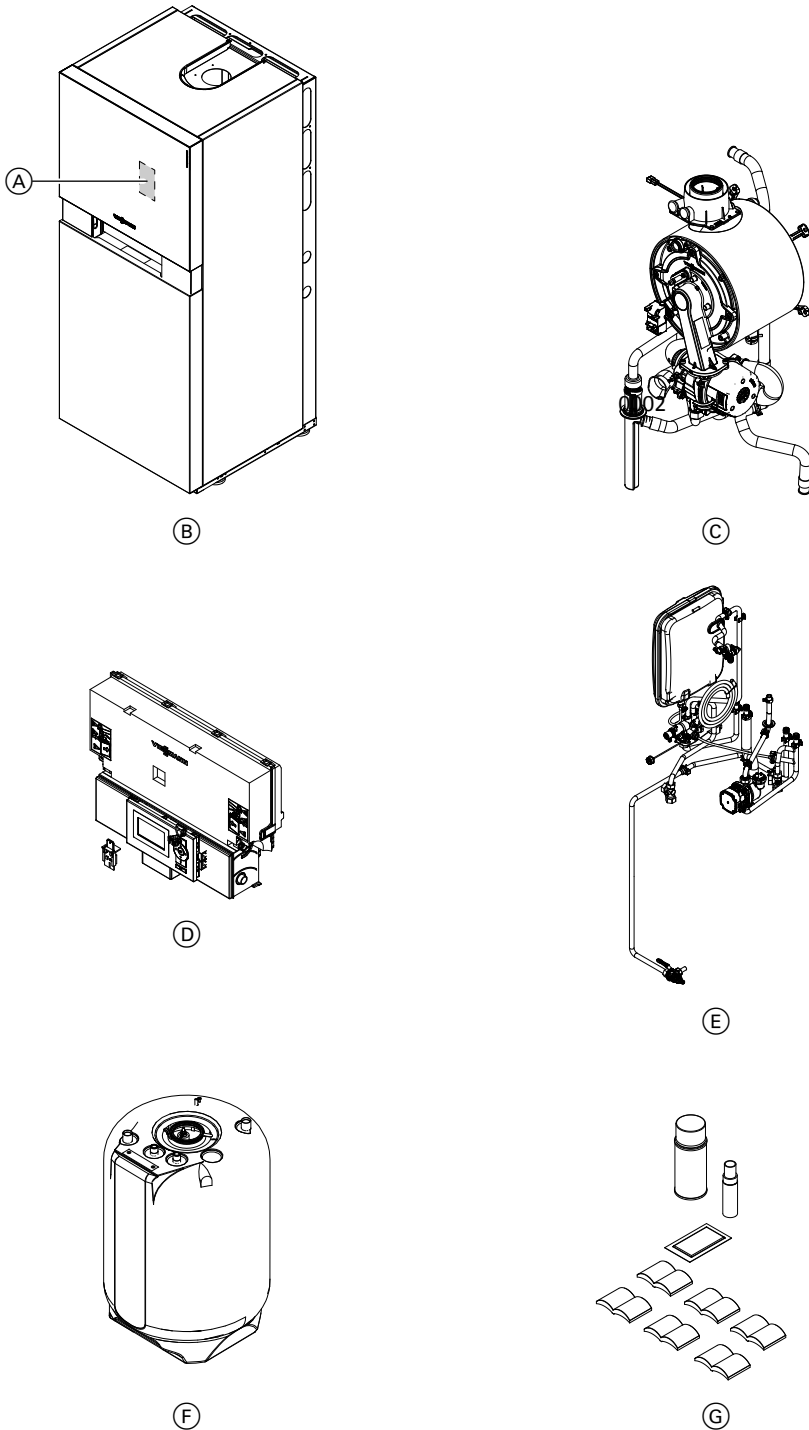


Fig. 54

- | | |
|--|---|
| (A) Type plate | (E) Hydraulic assembly with hydraulic block |
| (B) Casing assembly | (F) Loading cylinder assembly |
| (C) Heat cell assembly with Matrix cylinder burner | (G) Miscellaneous assembly |
| (D) Control unit assembly | |



Casing

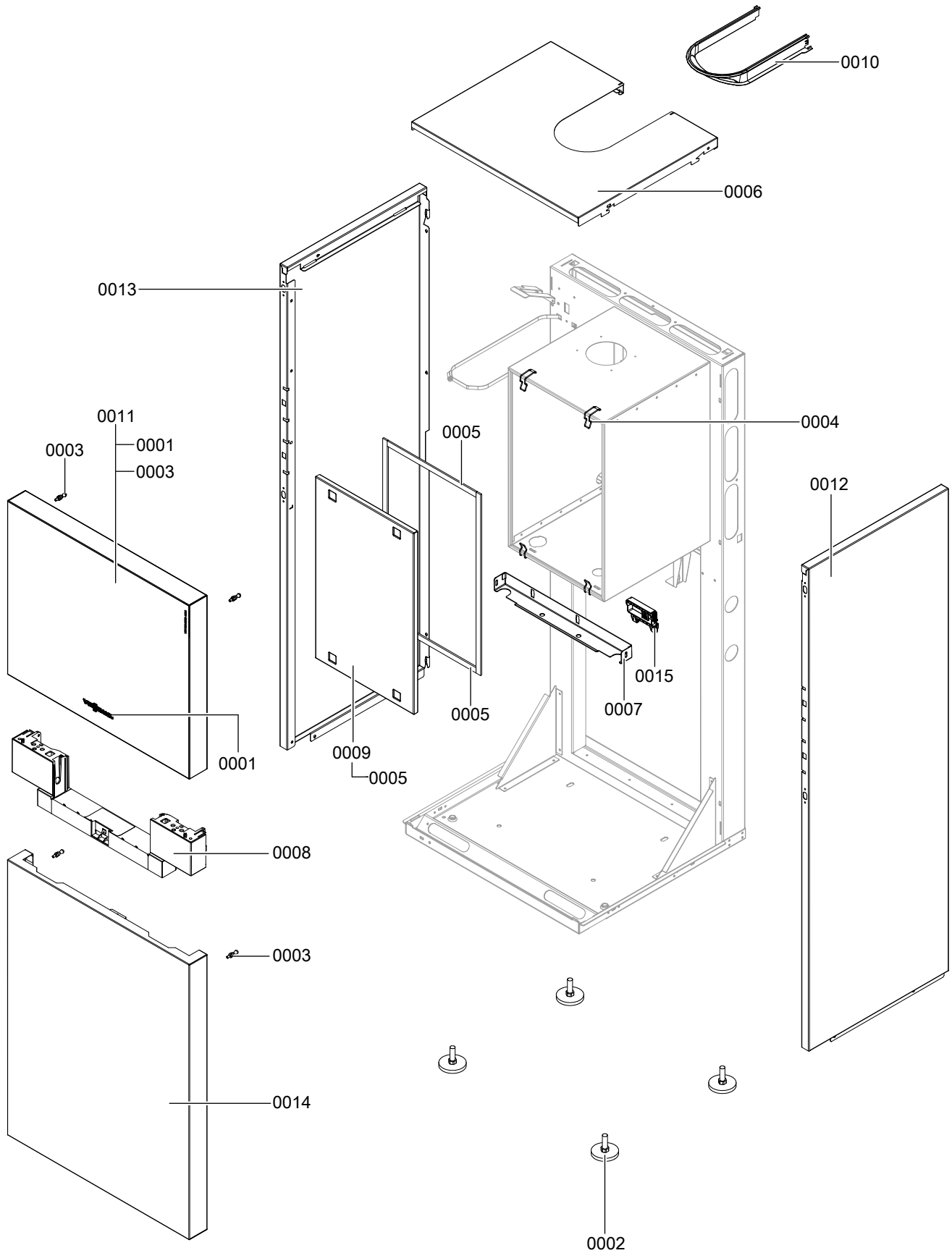


Fig. 55

Casing (cont.)

Pos.	Part
0001	VISSMANN logo
0002	Adjustable foot
0003	Fixings for location stud (2 pce)
0004	Toggle fastener set (4 pce)
0005	Profiled seal 15 l=520
0006	Top panel
0007	Mounting bracket for DHW cylinder
0008	Control unit support
0009	Cover panel with gaskets
0010	Top panel insert
0011	Front panel, top
0012	Side panel, right
0013	Side panel, left
0014	Front panel, bottom
0015	Cable holder

Hydraulics

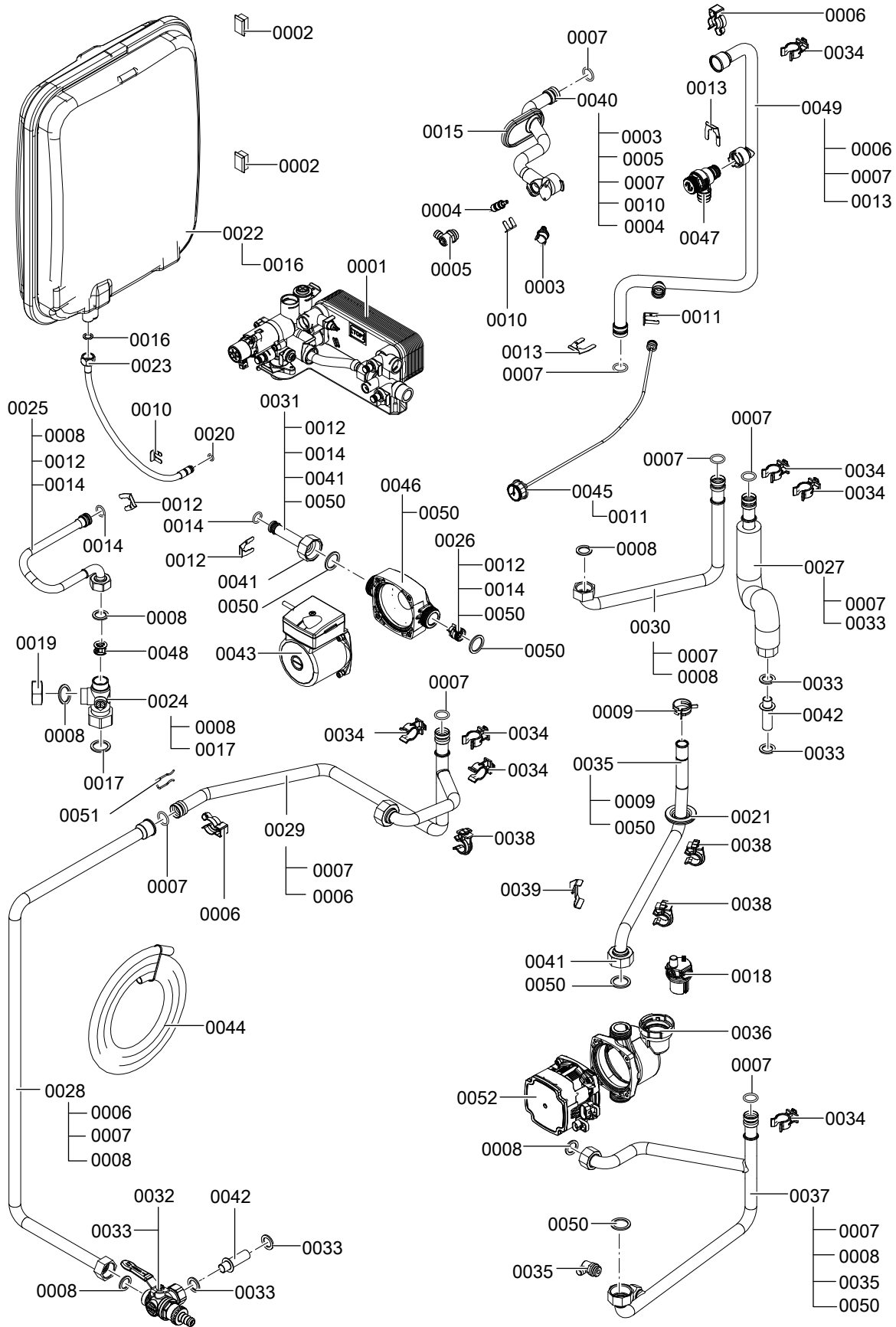


Fig. 56

Hydraulics (cont.)

Pos.	Part
0001	Hydraulic block
0002	Plug, oil preheater
0003	Thermal circuit breaker
0004	Temperature sensor
0005	Air vent valve G3/8
0006	Set of pipe clips (2 pce)
0007	O-ring set 17.86 x 2.62 (5 pce)
0008	Gasket set A 17 x 24 x 2 (5 pce)
0009	Spring clip DN 25 (5 pce)
0010	Clip $\varnothing = 8$ (5 pce)
0011	Clip $\varnothing = 10$ (5 pce)
0012	Clip $\varnothing = 15$ (5 pce)
0013	Clip $\varnothing = 18$ (5 pce)
0014	O-ring 14.3 x 2.4 (5 pce)
0015	Diaphragm grommet (5 pce)
0016	Gasket set A 10 x 15 x 1.5 (5 pce)
0017	Gasket 23 x 30 x 2 (5 pce)
0018	Air vent valve for HK (heating circuit) pump
0019	Cap G 3/4" SW 30
0020	Circular seal ring 8 x 2 (5 pce)
0021	Diaphragm grommet (5 pce)
0022	Diaphragm expansion vessel 12 l
0023	Connection pipe, expansion vessel G3/8
0024	Right-angle shut-off valve, DHW cylinder heating
0025	Connection line, DHW heating
0026	RV cartridge (non-return valve) OV 20/DN 20
0027	Connection pipe, DHW
0028	Connection pipe, cold water, cylinder (100 l)
0029	Connection pipe, cold water
0030	Connection pipe, heating flow
0031	Cold water connection
0032	Right-angle shut-off valve, DHW cylinder, cold water
0033	Gasket set A 16 x 24 x 2 (5 pce)
0034	Pipe clip $\varnothing = 18 / 1.5$
0035	Connection pipe, heating return
0036	CIAO2 casing
0037	Connection pipework, heating return
0038	Pipe clip $\varnothing = 18$
0039	Spring clip (5 pce)
0040	Flow pipe
0041	Union nut G1"
0042	Sleeve
0043	Circulation pump motor VIUPM2 50
0044	Hose 10 x 1.5 x 1500
0045	Pressure gauge, 0-4 bar

Parts lists

Hydraulics (cont.)

Pos.	Part
0046	Casing CIL2 PPs
0047	Safety valve 3 bar
0048	Fascia $\varnothing = 5.0$
0049	Connection pipe, heating flow WZ (heat generator)
0050	Gasket set A 23 x 30 x 2 (5 pce)
0051	Wire fuse (5 pce)
0052	Circulation pump UPM3 15-75 KM

Hydraulics (cont.)

Hydraulic block

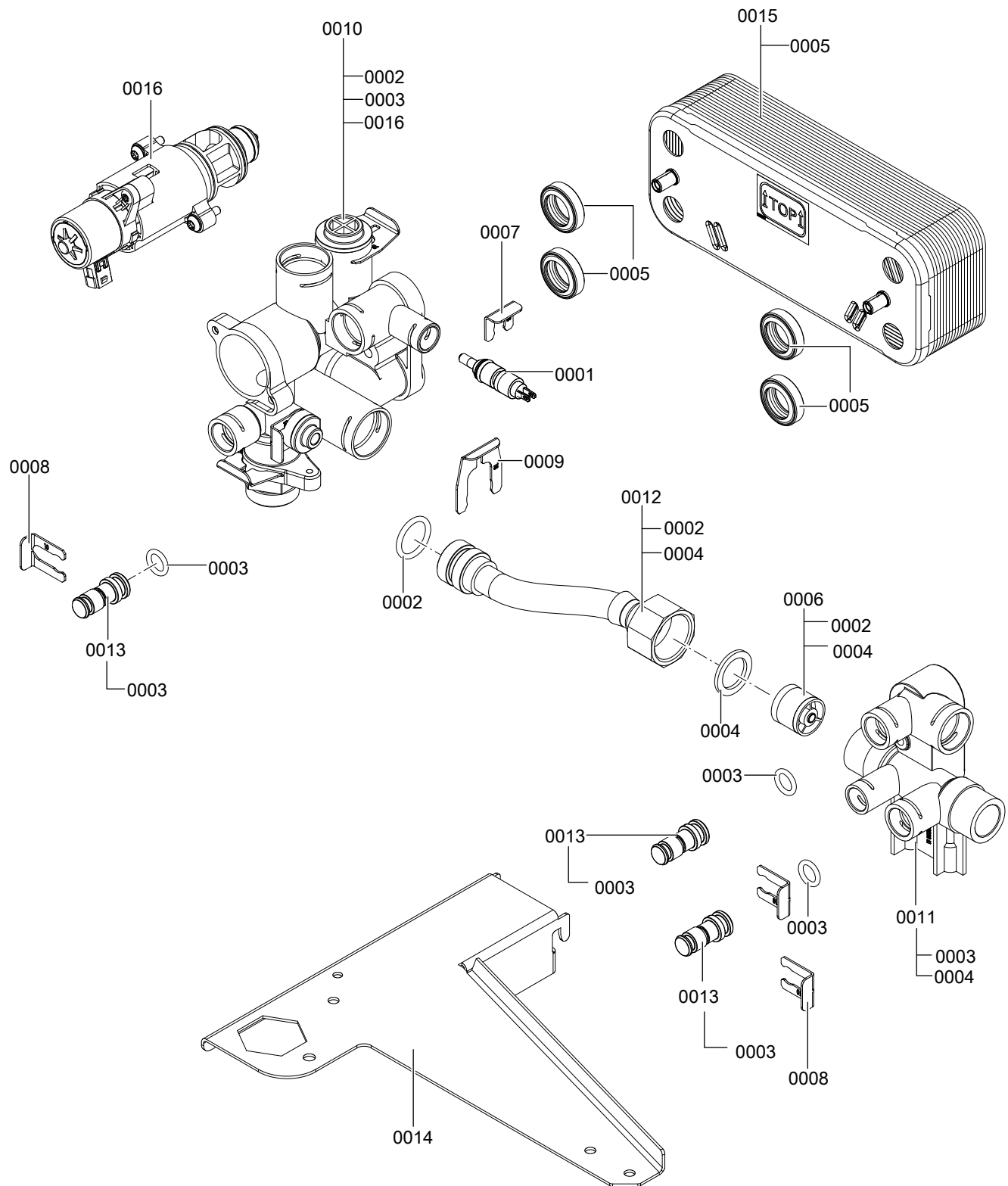


Fig. 57

Hydraulic block (cont.)

Pos.	Part
0001	Temperature sensor
0002	O-ring set 17.86 x 2.62 (5 pce)
0003	O-ring set 9.6 x 2.4 (5 pce)
0004	Gasket set A 17 x 24 x 2 (5 pce)
0005	Profile gasket (4 pce)
0006	Overflow valve HDS 20-230
0007	Clip $\varnothing = 8$ (5 pce)
0008	Clip $\varnothing = 10$ (5 pce)
0009	Clip $\varnothing = 18$ (5 pce)
0010	Flow unit
0011	Return unit
0012	Overflow line
0013	Plug $\varnothing = 8 / \varnothing = 10$
0014	Hydraulic retaining bracket
0015	Plate heat exchanger CB10-14A
0016	Valve insert

Loading cylinder

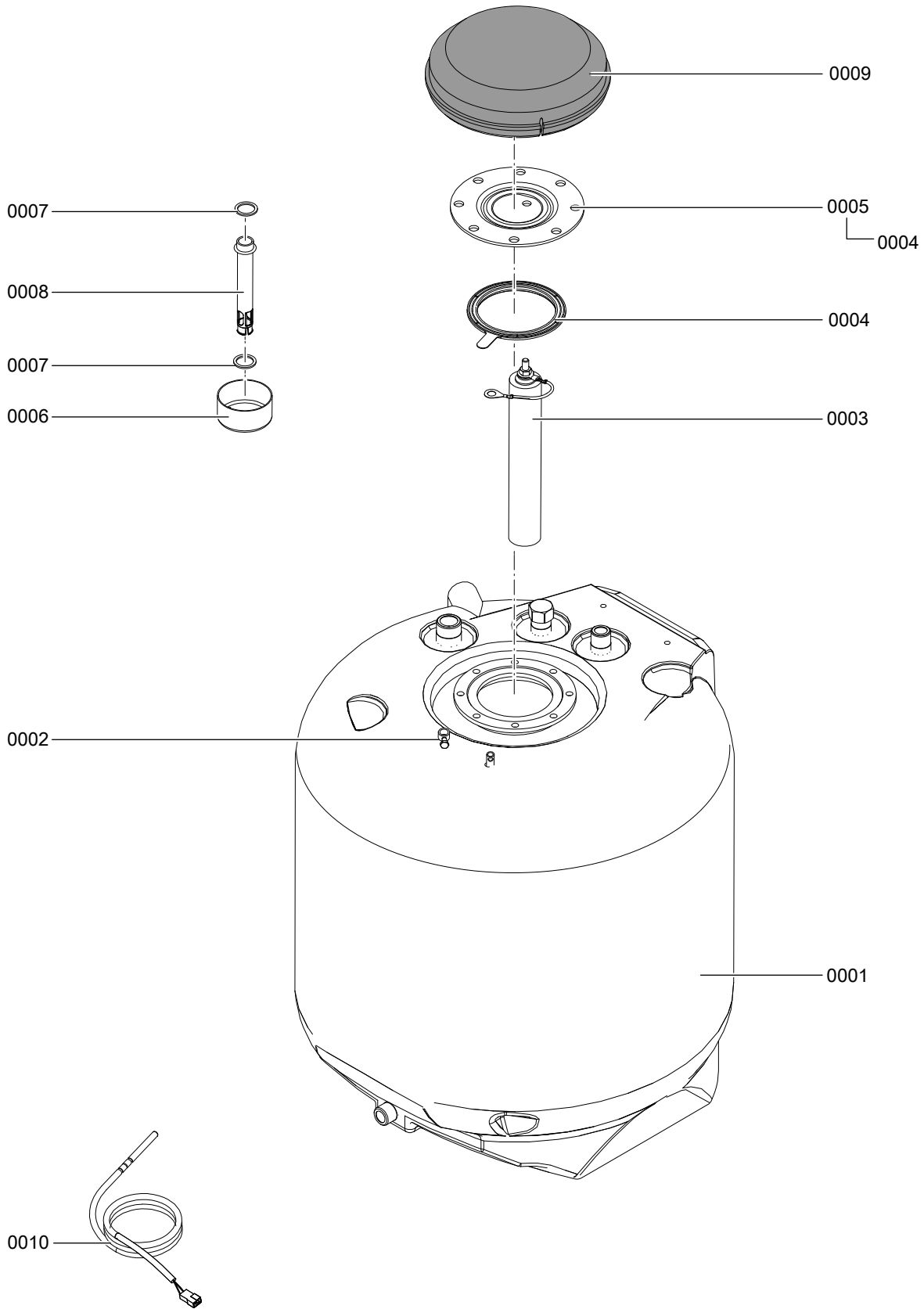


Fig. 58

Loading cylinder (cont.)

0001	Loading cylinder
0002	Strain relief
0003	Protective magnesium anode
0004	Gasket
0005	Flange with gasket
0006	Cover
0007	Gasket 23 x 30 x 2 (5 pce)
0008	Sleeve
0009	Flange insulation
0010	Cylinder temperature sensor NTC 10k Ω

Heat cell

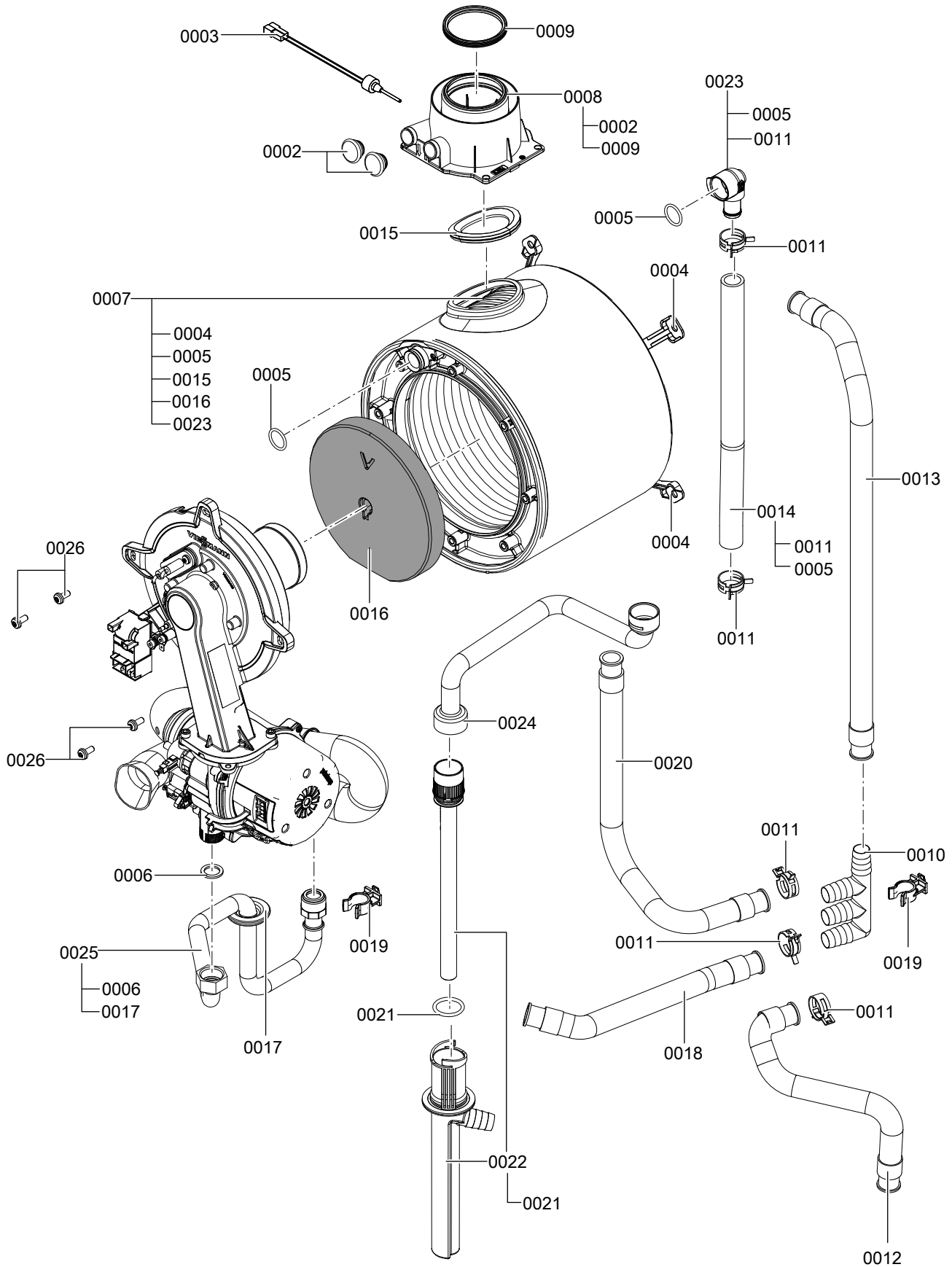


Fig. 59

Heat cell (cont.)

Pos.	Part
0001	MatriX cylinder burner
0002	Boiler flue connection plug
0003	Flue gas temperature sensor
0004	Bracket set, heat exchanger
0005	O-ring set 20.63 x 2.62 (5 pce)
0006	Gasket set A 17 x 24 x 2 (5 pce)
0007	Heat exchanger
0008	Boiler flue connection
0009	Gasket DN 60
0010	Condensate receiver
0011	Spring clip DN 25 (5 pce)
0012	Condensate hose
0013	Hose 19 x 600, corrugated
0014	Profile hose, heating return
0015	Flue gasket, single
0016	Thermal insulation block
0017	Diaphragm grommet (5 pce)
0018	Corrugated hose 19 x 290
0019	Pipe clip $\varnothing = 18 / 1.5$
0020	Hose 19 x 500, corrugated
0021	O-rings (5 pce) 25.7 x 3.5
0022	Trap
0023	Connection elbow, heating return
0024	Condensate hose
0025	Gas pipe
0026	Door screws set

MatriX cylinder burner

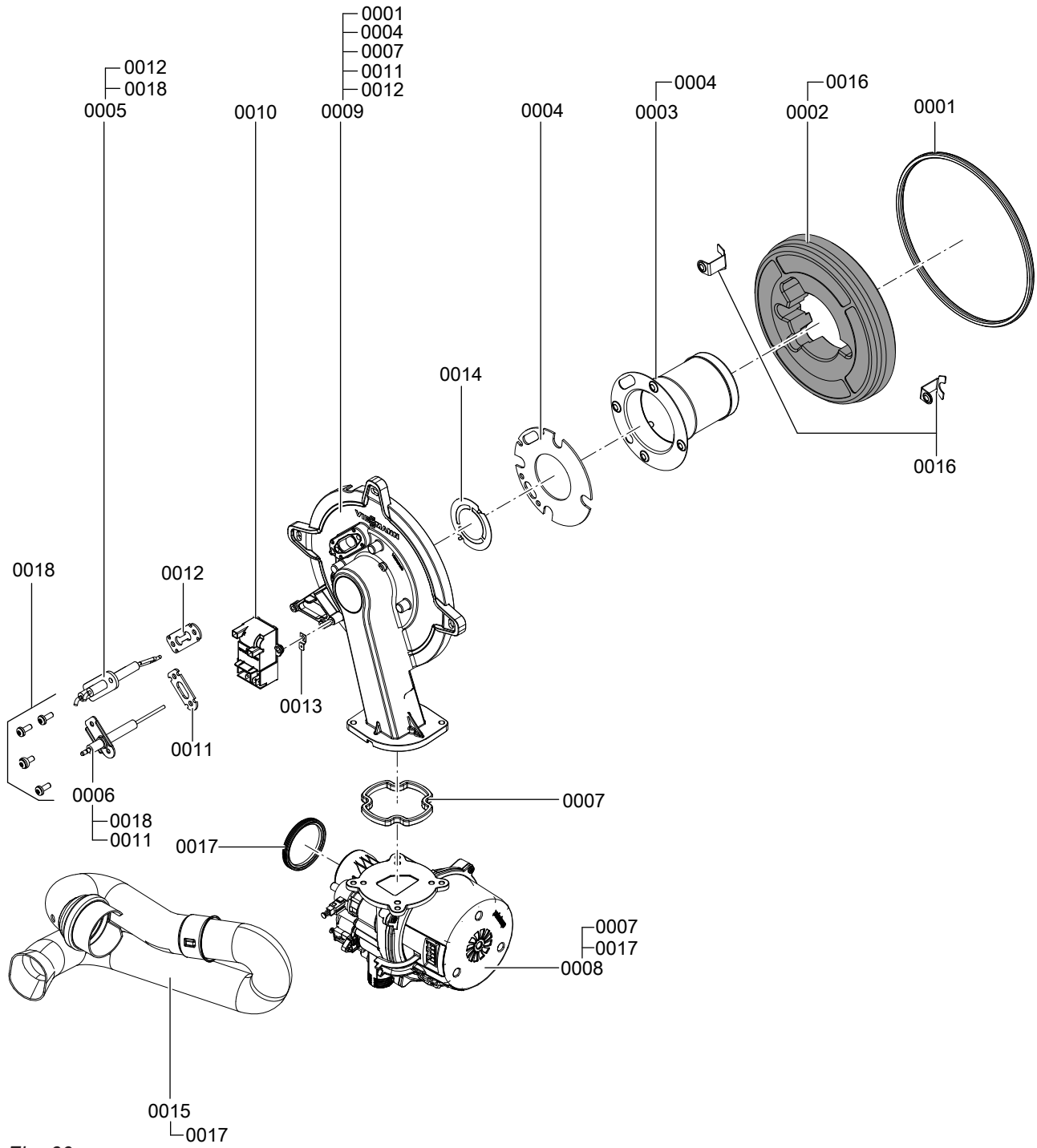


Fig. 60

MatriX cylinder burner (cont.)

Pos.	Part
0001	Burner gasket $\varnothing = 187$
0002	Thermal insulation ring
0003	Cylinder burner gauze assembly
0004	Burner gauze assembly gasket
0005	Ignition electrode (wearing part)
0006	Ionisation electrode (wearing part)
0007	Gasket, burner door flange
0008	Radial fan iNR77
0009	Burner door
0010	Ignition unit
0011	Gasket, ionisation electrode (5 pce)
0012	Gasket, ignition electrode (5 pce)
0013	Blade terminal (10 pce)
0014	Mixture restrictor
0015	Venturi extension
0016	Mounting plate, thermal insulation ring (2 pce)
0017	Gasket DN 50
0018	Fixing screws

Control unit

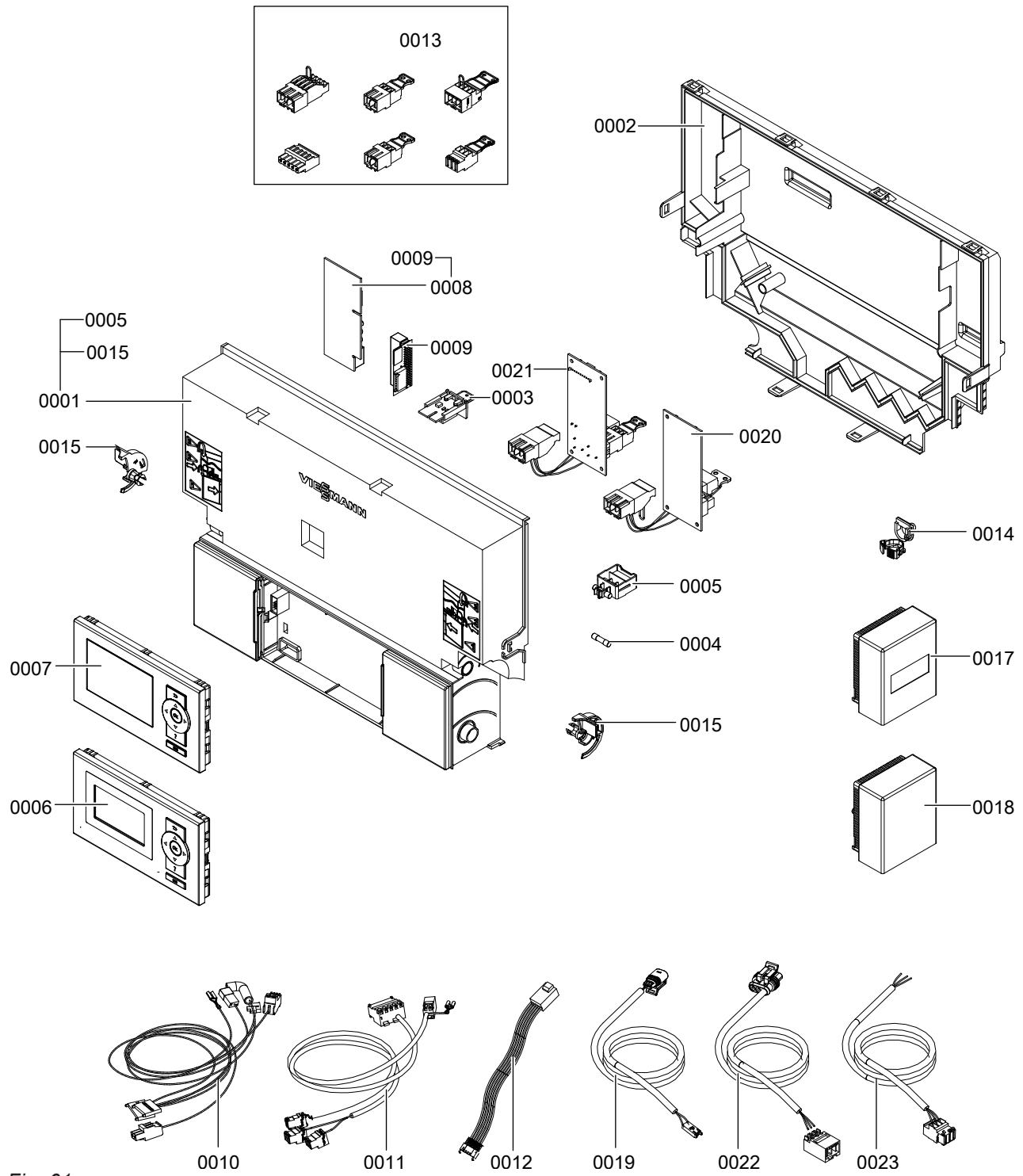


Fig. 61

Control unit (cont.)

Pos.	Part
0001	Control unit VBC138-A60.0xx
0002	Casing back panel
0004	Fuse, 6.3 A (slow), 250 V (10 pce)
0005	Fuse holder, 6.3 A (slow)
0006	Vitotronic 100 HC1B
0007	Vitotronic 200 HO1B
0008	LON HO1 communication module
0009	PCB adaptor
0010	Cable harness X8/X9/ion
0011	Cable harness 100/35/54/earth
0012	Cable harness, Molex stepper motor
0013	Mating plug, Neptun
0014	Cable ties (10 pce)
0015	Locking bolts, left and right
0017	Wireless outside temperature sensor
0018	Outside temperature sensor NTC
0019	KM-BUS connecting cable 145
0020	Internal H1 extension
0021	Internal H2 extension
0022	Heating circuit pump connecting cable 20
0023	Power cable 40

Miscellaneous

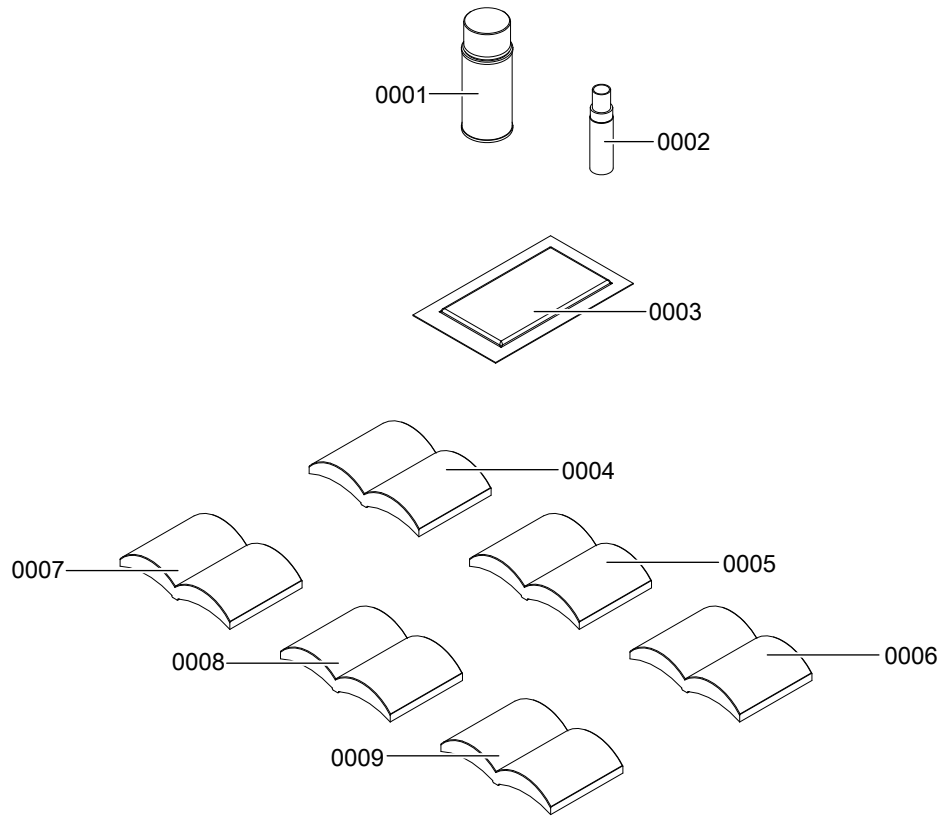


Fig. 62

Miscellaneous (cont.)

0001	Touch-up spray paint, white
0002	Touch-up paint stick, white
0003	Special grease
0004	Operating instructions for constant temperature mode
0005	Operating instructions for weather-compensated mode
0006	Operating instructions for weather-compensated operation with touchscreen
0007	Installation and service instructions with HC1B
0008	Installation and service instructions with HO1B
0009	Installation and service instructions with HO2B

Parts lists

Ordering individual parts for accessories

Please affix accessory labels with part numbers here.
Please state the relevant part no. when ordering individual parts.



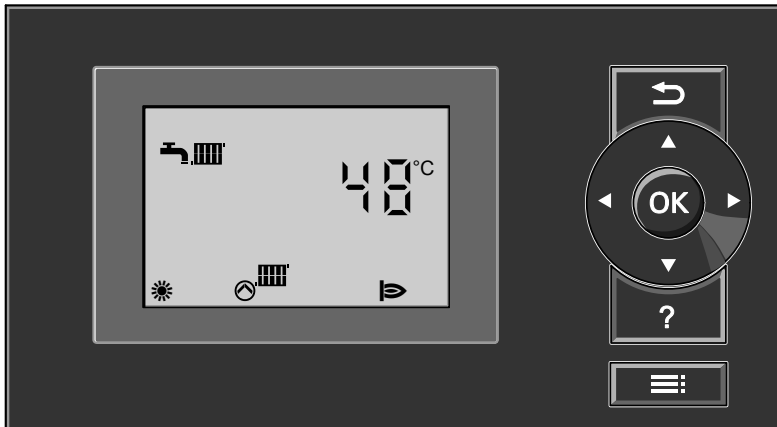


Fig. 63

Heating mode

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. Flow temperature setting range: 20 to 74 °C.

DHW heating

The burner, the circulation pump and the 3-way valve are started or changed over if the cylinder temperature lies 2.5 K below the set cylinder temperature.

In the delivered condition, the set boiler water temperature is 20 K above the set cylinder temperature (adjustable via parameter/coding address 60 in the "DHW" group). If the actual cylinder temperature exceeds the set cylinder temperature by 2.5 K, the burner shuts down and circulation pump run-on begins.

Internal H1 extension

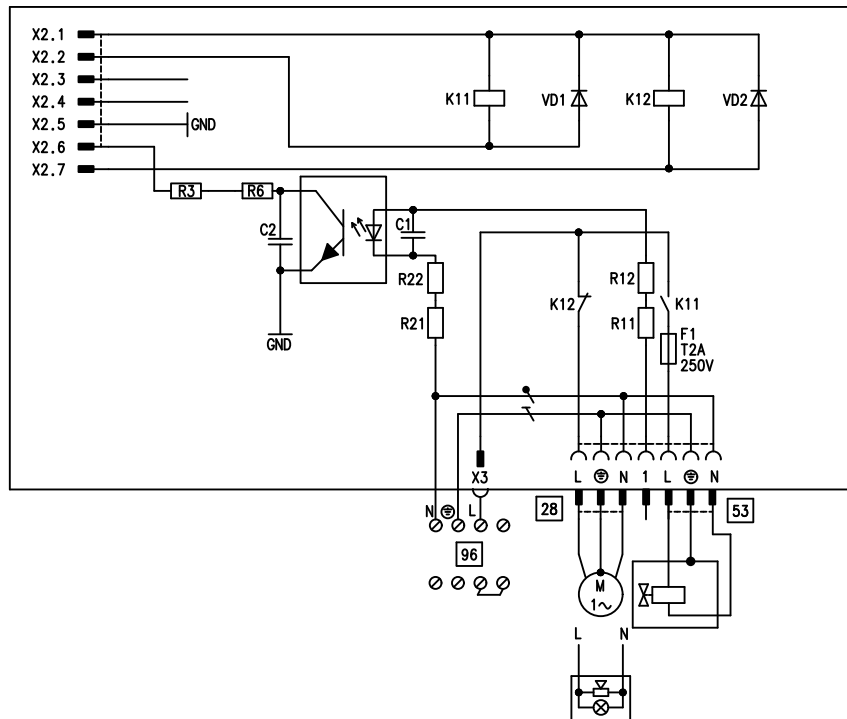


Fig. 64

The internal extension is integrated into the control unit enclosure. The following alternative functions can be connected to relay output **28**. The function is assigned via parameter/coding address "53" in the **"General"** group:

- Central fault message (parameter/code "53:0")
- DHW circulation pump (parameter/code "53:1") (only for weather-compensated operation)
Connect DHW circulation pumps with standalone functions directly to the 230 V ~ supply.

- Heating circuit pump for heating circuit without mixer (parameter/code "53:2")
- Circulation pump for cylinder heating (parameter/code "53:3")

An external safety valve can be linked to connection **53**.

Internal extensions (cont.)

Internal H2 extension

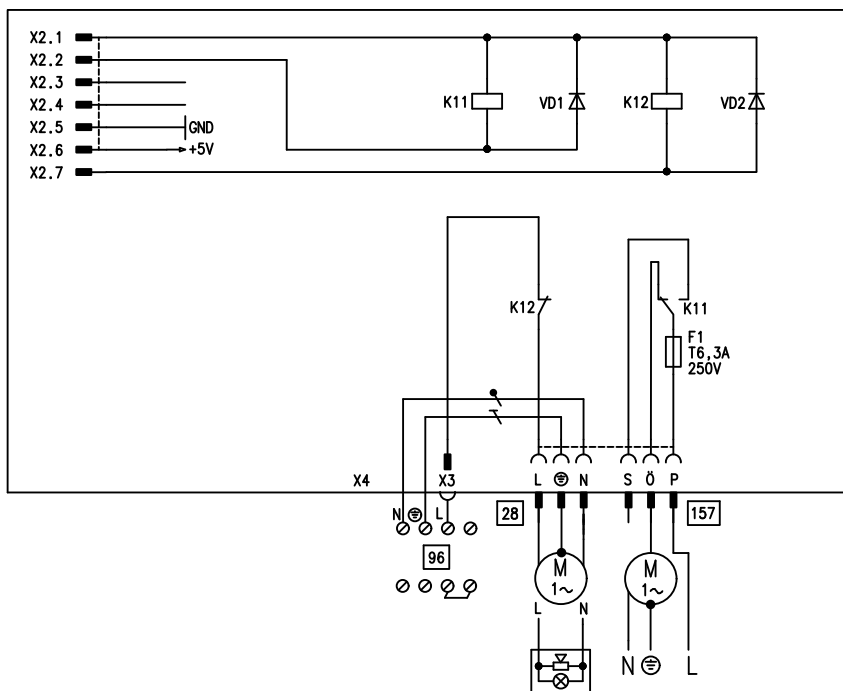


Fig. 65

The internal extension is integrated into the control unit enclosure. The following alternative functions can be connected to relay output **28**. The function is assigned via parameter/coding address "53" in the **"General"** group:

- Central fault message (parameter/code "53:0")
- DHW circulation pump (parameter/code "53:1") (only for weather-compensated operation)
Connect DHW circulation pumps with standalone functions directly to the 230 V ~ supply.

- Heating circuit pump for heating circuit without mixer (parameter/code "53:2")
- Circulation pump for cylinder heating (parameter/code "53:3")

An extractor fan can be switched off via connection **157** when the burner starts.

External extensions (accessories)

AM1 extension

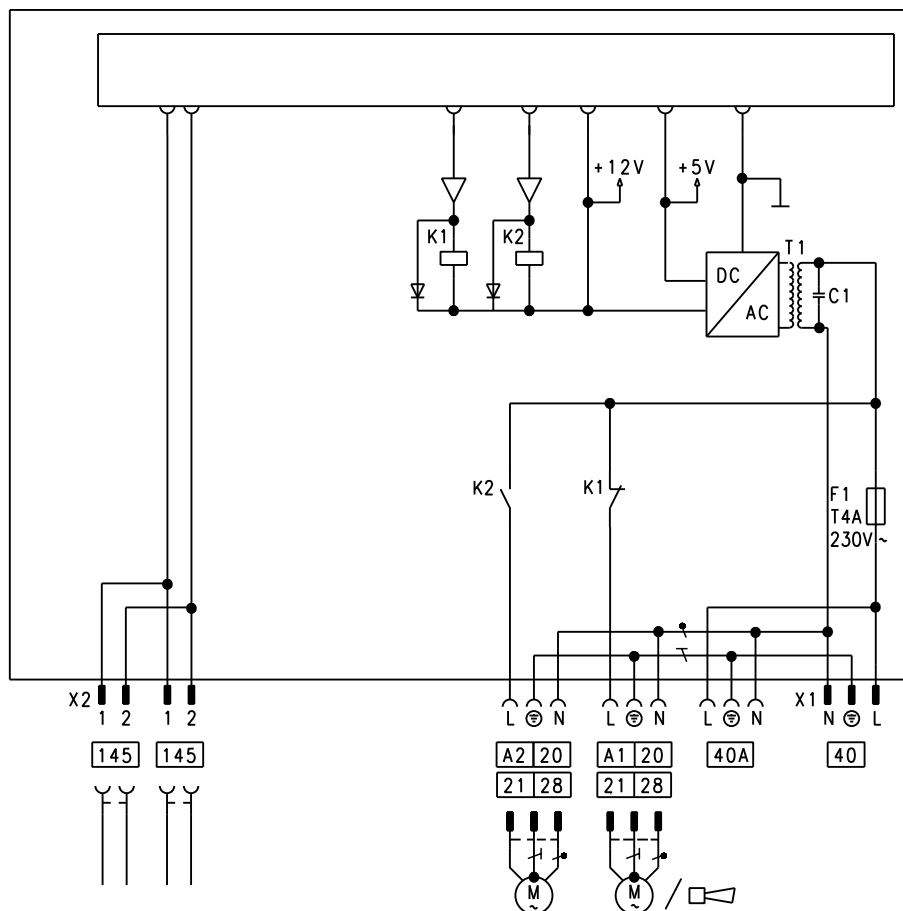


Fig. 66

- A1 Circulation pump
- A2 Circulation pump
- 40 Power supply

- 40 A Power supply for additional accessories
- 145 KM-BUS

Functions

One of the following circulation pumps can be connected to each of connections A1 and A2:

- Heating circuit pump for heating circuit without mixer
 - Circulation pump for cylinder heating
 - DHW circulation pump (only for weather-compensated control units)
- Connect DHW circulation pumps with standalone functions directly to the 230 V ~ supply.

Select the output functions via parameter changes/ codes at the boiler control unit.

Function assignment

Function	Parameter/code ("General" group)	
	Output A1	Output A2
DHW circulation pump 28	33:0	34:0 (delivered condition)
Heating circuit pump 20	33:1 (delivered condition)	34:1
Circulation pump for cylinder heating 21	33:2	34:2

External extensions (accessories) (cont.)

EA1 extension

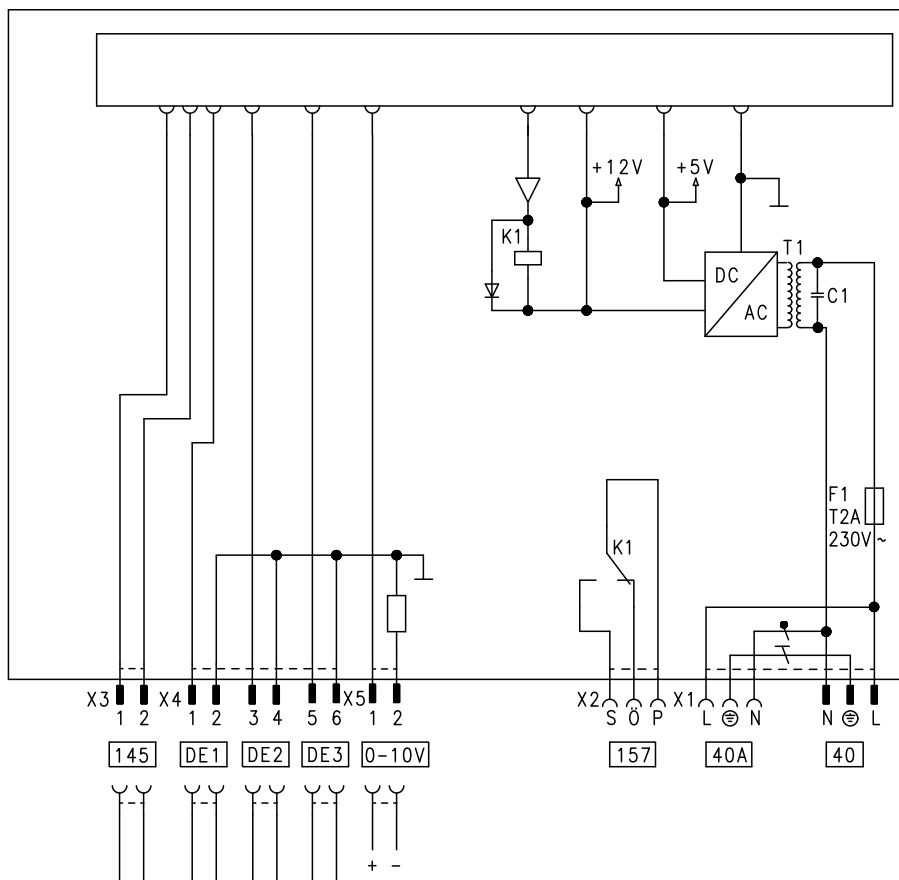


Fig. 67

F1	Fuse
DE1	Digital input 1
DE2	Digital input 2
DE3	Digital input 3
0-10 V	0 – 10 V input
40	Power supply

40 A	Power supply for additional accessories
157	Central fault message/feed pump/DHW circulation pump (potential-free) Connect DHW circulation pumps with stand-alone functions directly to the 230 V ~ supply.
145	KM-BUS

Digital data inputs DE1 to DE3

The following functions can alternatively be connected:

- External operating program changeover for each heating circuit
- External blocking
- External blocking with fault message input
- External demand with minimum boiler water temperature
- Fault message input
- Brief operation of the DHW circulation pump

External contacts must be floating. When connecting external contacts, observe the requirements of protection class II: 8.0 mm air and creep path or 2.0 mm insulation thickness to live parts.

Input function assignment

Select the input functions via the parameter changes/codes in the **"General"** group at the boiler control unit:

- DE1: Parameter/coding address 3A
- DE2: Parameter/coding address 3b
- DE3: Parameter/coding address 3C

Assigning the operating program changeover function to the heating circuits

Select the operating program changeover function for the relevant heating circuit via parameter/coding address d8 in the **"Heating circuit"** group at the boiler control unit:

- Changeover via input DE1: Parameter/code d8:1
- Changeover via input DE2: Parameter/code d8:2
- Changeover via input DE3: Parameter/code d8:3

Function description

External extensions (accessories) (cont.)

The effect of the operating program changeover is selected via parameter/coding address d5 in the **"Heating circuit"** group.

The duration of the changeover is set via parameter/coding address F2 in the **"Heating circuit"** group.

Effect of external blocking function on the pumps

The effect on the internal circulation pump is selected via parameter/coding address 3E in the **"General"** group.

The effect on the relevant heating circuit pump is selected via parameter/coding address d6 in the **"Heating circuit"** group.

The effect on a circulation pump for cylinder heating is selected via parameter/coding address 5E in the **"DHW"** group.

Effect of the external demand function on the pumps

The effect on the internal circulation pump is selected via parameter/coding address 3F in the **"General"** group.

The effect on the relevant heating circuit pump is selected via parameter/coding address d7 in the **"Heating circuit"** group.

The effect on a circulation pump for cylinder heating is selected via parameter/coding address 5F in the **"DHW"** group.

DHW circulation pump runtime for brief operation

The DHW circulation pump is started by closing the contact at DE1, DE2 or DE3 by means of a pushbutton. The runtime is set via parameter/coding address "3d" in the **"General"** group.

Analogue input 0 – 10 V

The 0 – 10 V hook-up provides an additional set boiler water temperature:

0 – 1 V is taken as "No specification for set boiler water temperature".

1 V \triangleq Set value 10 °C

10 V \triangleq Set value 100 °C

Ensure galvanic separation between the earth conductor and the negative pole of the on-site power source.

Output 157

The following functions can be connected to output 157:

- Feed pump to substation
or
- DHW circulation pump
or
- Fault message facility

Information regarding the feed pump

Function only possible in conjunction with a heating circuit control unit connected via LON.

Information on DHW circulation pumps

Connect DHW circulation pumps with standalone functions directly to the 230 V ~ supply.

Function assignment

Select the function of output 157 via coding address "36" in the **"General"** group at the boiler control unit.

Control functions

External operating program changeover

The "External operating program changeover" function is implemented via the EA1 extension. There are 3 inputs available at the EA1 extension (DE1 to DE3).

The function is selected via the following coding addresses in group 1 **"General"**:

Heating program - changeover	Code
Input DE1	3A:1
Input DE2	3b:1
Input DE3	3C:1

Select the operating program changeover function for the relevant heating circuit via coding address "d8" in group 5 **"Heating circuit"** at the boiler control unit:

Control functions (cont.)

Heating program - changeover	Code
Changeover via input DE1	d8:1
Changeover via input DE2	d8:2
Changeover via input DE3	d8:3

External blocking

The functions "External blocking" and "External blocking with fault message input" are implemented via the EA1 extension. There are 3 inputs available at the EA1 extension (DE1 to DE3).

The function is selected via the following coding addresses in group 1 **"General"**:

External blocking	Code
Input DE1	3A:3
Input DE2	3b:3
Input DE3	3C:3

External blocking and fault message input	Code
Input DE1	3A:4
Input DE2	3b:4
Input DE3	3C:4

The effect on the internal circulation pump is selected in coding address "3E" in the **"General"** group.

The effect on the relevant heating circuit pump is selected in coding address "d6" in the **"Heating circuit"** group.

External demand

The "External demand" function is implemented via the EA1 extension. There are 3 inputs available at the EA1 extension (DE1 to DE3).

The function is selected via the following coding addresses in the **"General"** group:

External demand	Code
Input DE1	3A:2
Input DE2	3b:2
Input DE3	3C:2

The effect on the internal circulation pump is selected in coding address "3F" in group 1 **"General"**.
The effect on the relevant heating circuit pump is selected in coding address "d7" in group 5 **"Heating circuit"**.

The set minimum boiler water temperature for external demand is selected in coding address "9b" in group 1 **"General"**.

Venting program

During the venting program, the circulation pump will be alternately switched on and off for 30 s over a period of 20 min.
The diverter valve alternates between heating and DHW heating for a given time. The burner is switched off during the venting program.

To activate the venting program: see "Venting the heating system".

Function description

Control functions (cont.)

Filling program

In the delivered condition, the diverter valve is set to its central position, enabling the system to be filled completely. After the control unit has been switched on, the diverter valve no longer goes into its central position. Afterwards, the diverter valve can be moved into the central position via the filling function (see "Filling the heating system"). 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 is moved to its central position in the filling program, and the pump starts. When the function is enabled, the burner shuts down. The program automatically becomes inactive after 20 min.

Electronic combustion control unit

The electronic combustion controller utilises the physical correlation between the level of the ionisation current and the air ratio λ . The maximum ionisation current is achieved at an air ratio of 1 for all gas qualities. The ionisation signal is evaluated by the combustion controller and the air ratio is adjusted to a value 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 CO₂ content or the O₂ content of the flue gas is measured. The prevailing air ratio is determined with the measured values. The relationship between the CO₂ or O₂ content and air ratio λ is illustrated in the following table.

Air ratio λ – CO₂/O₂ content

Air ratio λ	O ₂ content (%)	CO ₂ content (%) for natural gas E	CO ₂ content (%) for natural gas LL	CO ₂ content (%) for LPG P
1.20	3.8	9.6	9.2	11.3
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
1.48	7.3	7.6	7.5	9.0

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 (corresponding to air ratio $\lambda=1$). 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.

Connection and wiring diagram – internal connections

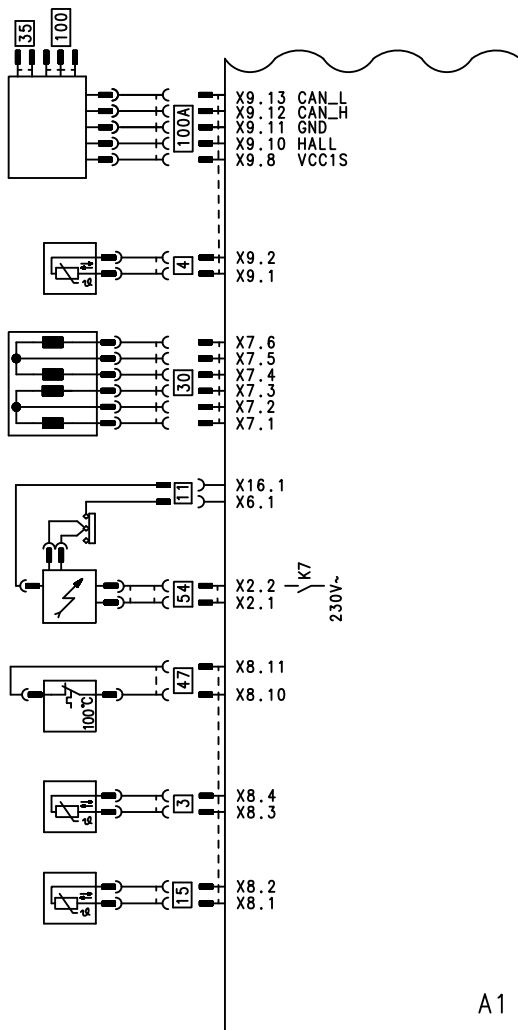


Fig. 68

- | | | | |
|--|---------------------------------|---|----------------------------------|
| A1 | Main PCB | 30 | Stepper motor for diverter valve |
| X... | Electrical interfaces | 47 | Temperature limiter |
| 3 | Boiler water temperature sensor | 54 | Ignition unit |
| 4 | Outlet temperature sensor | 100 | Fan motor |
| 11 | Ionisation electrode | 100 A | Fan motor control |
| 15 | Flue gas temperature sensor | 35 | Gas solenoid valve |

Connection and wiring diagram – external connections

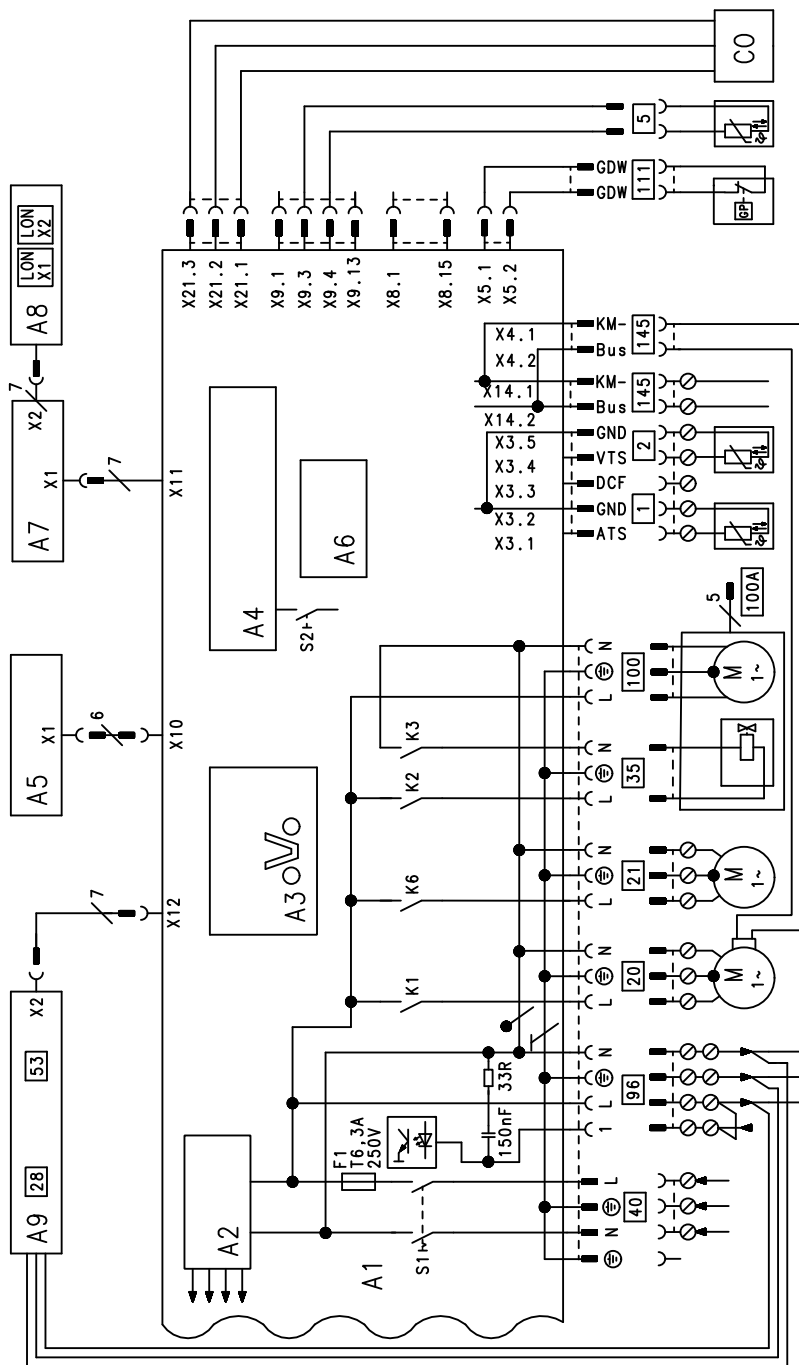


Fig. 69

- | | | | |
|------|---|------|--|
| A1 | Main PCB | 5 | Cylinder temperature sensor (plug on cable harness) |
| A2 | Switching mode power supply | 20 | Internal circulation pump |
| A3 | Optolink | 21 | Cylinder loading pump |
| A4 | Burner control unit | 28 | DHW circulation pump (connect DHW circulation pumps with standalone functions directly to the 230 V~ supply) |
| A5 | Programming unit | 35 | Gas solenoid valve |
| A6 | Coding card | 40 | Power supply |
| A7 | Connection adaptor | 53 | External safety solenoid valve |
| A8 | LON communication module (accessories) | 96 | Power supply for accessories and Vitotrol 100 |
| A9 | Internal H1 or H2 extension (accessories) | 100 | Fan motor |
| S1 | ON/OFF switch | 100A | Fan motor control |
| S2 | Reset button | 111 | Gas pressure switch |
| X... | Electrical interfaces | | |
| 1 | Outside temperature sensor | | |
| 2 | Flow temperature sensor, low loss header | | |

Connection and wiring diagram – external... (cont.)

145 KM-BUS
CO CO limiter

Commissioning/service reports

Settings and test values		Set value	Commissioning	Maintenance/service	Maintenance/service
Date					
Signature					
Static pressure	mbar kPa	≤ 57.5 ≤ 5.75			
Supply pressure (flow pressure)					
<input type="checkbox"/> For natural gas	mbar kPa	See supply pressure table (commissioning ...)			
<input type="checkbox"/> For LPG	mbar kPa				
<input type="checkbox"/> Enter gas type					
Carbon dioxide content CO₂					
For natural gas					
▪ At lower heating output	% by vol.	7.5-9.5			
▪ At upper heating output	% by vol.	7.5-9.5			
For LPG					
▪ At lower heating output	% by vol.	8.8-11.1			
▪ At upper heating output	% by vol.	8.8-11.1			
Oxygen content O₂					
▪ At lower heating output	% by vol.	4.0-7.6			
▪ At upper heating output	% by vol.	4.0-7.6			
Carbon monoxide content CO					
▪ At lower heating output	ppm	< 1000			
▪ At upper heating output	ppm	< 1000			

Specification

Rated heating output range					
At T_F/T_R 50/30 °C (P(50/30))	kW	1.9 - 13	1.9 - 19	2.6 - 26	1.8 (3.5) ^{*1} - 35
At T_F/T_R 80/60 °C (Pn(80/60))	kW	1.7 - 12.1	1.7 - 17.6	2.4 - 24.1	1.6 (3.2) - 32.5
Rated heating output for DHW heating	kW	1.7 - 17.6	1.7 - 17.6	2.4 - 30.0	1.6 (3.2) - 34.4
Rated heat input (Qn)	kW	1.8 - 12.3	1.8 - 17.9	2.5 - 24.7	1.7 (3.3) - 33.0
Rated heat input for DHW heating (Qnw)	kW	17.9	17.9	30.5	34.9
Rated voltage	V	230			
Rated frequency	Hz	50			
Rated current	A	6			
Backup fuse (power supply)	A	16			
Power consumption					
In the delivered condition	W	28	42	65	95
Maximum	W	126	126	148	163
Electronic temperature limiter setting (TN)	°C	81			
Temperature limiter setting (fixed)	°C	100			
Weight	kg	105	105	148	163
Permiss. operating pressure (PMS)	bar	3	3	3	3
	MPa	0.3	0.3	0.3	0.3
NO _x	Class	6	6	6	6
DHW heating					
Cylinder capacity	l	100	100	100	130
Permiss. operating pressure (PMW)	bar	10	10	10	10
	MPa	1.0	1.0	1.0	1.0
Specific flow rate (D)	l/min	18.2	18.2	20.7	27.3
Max. DHW temperature (TS)	°C	60	60	60	60
Comfort factor	Stars	3	3	3	3
Heating water capacity	l	4.0	4.0	4.2	5.0
Flue gas values					
▪ Mass flow rate (for DHW heating)	g/s	9	9	15	17
▪ Temperature (for DHW heating)	°C	66	67	68	77
▪ Max. temperature	°C	120	120	120	120
Supply values relative to the max. load					
Natural gas E	m ³ /h	1.89	1.89	3.23	3.69
Natural gas LL	m ³ /h	2.20	2.20	3.75	4.30
LPG P	kg/h	1.40	1.40	2.38	2.73
Permissible ambient temperature					
▪ During operation	°C	0 to +40			
▪ During storage and transport	°C	-20 to +65			
IP rating	IP X 4 to EN 60529				
Protection class	I				
Product ID	CE-0085CN0050				

Specification

Specification (cont.)

Note

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

Type of flue system

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

Gas categories

Available in the following countries	Gas categories
AE, AT, AM, BA, BG, BY, CH, CZ, DK, EE, ES, FI, GB, GR, HR, IE, IS, IT, KG, KZ, LI, LT, LU, LV, MT, NO, PT, RO, RS, RU, SE, SI, SK, TR, UA	II _{2N3P} /II _{2H3P}
AM, BY, KG, KZ, RU, UA	I _{2N} /I _{2H}
BE	I _{2N}
DE, FR	II _{2N3P}
CY	I _{3P}
FR, IT	I _{2HM}
HU	II _{2N3P} /II _{2HS3P}
NV	II _{2EK3P}
PL	II _{2N3P} /II _{2ELW3P}

Final decommissioning and disposal

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

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

Declaration of conformity

Vitodens 222-F, type B2TB

We, Viessmann Werke GmbH & Co. KG, D-35107 Allendorf, declare as sole responsible body that the named product complies with the provisions of the following directives and regulations:

92/42/EEC	Efficiency Directive
2009/125/EU	Ecodesign Framework Directive
2009/142/EC	Gas Appliances Directive ^{*2}
2016/426/EU	Gas Appliances Regulation ^{*3}
2014/30/EU	EMC Directive
2014/35/EU	Low Voltage Directive
2010/30/EU	Energy Consumption Labelling Framework Directive
811/2013	EU Regulation "Energy Efficiency Label"
813/2013	EU Regulation "Energy Efficiency Requirements"

Applied standards:

DIN 4753: 2011-11
EN 806: 2001
EN 12897: 2006
EN 15502-1: 2012+A1: 2015
EN 15502-2-1: 2012^{*2}
EN 15502-2-1: 2012 + A1: 2016^{*3}
EN 55014-1:2006 + A1:2009 + A2: 2011
EN 55014-2: 2015
EN 60335-1:2012 + AC: 2014
EN 60335-2-102: 2006 + A1: 2010
EN 61000-3-2: 2014
EN 61000-3-3: 2013
EN 62233:2008 + Corrigendum 1: 2008-11

In accordance with the listed directives, this product is designated with **CE-0085**.

Allendorf, 1 August 2017

Viessmann Werke GmbH & Co. KG



Authorised signatory Reiner Jansen
Head of Strategic Quality Management

Manufacturer's declaration

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

^{*2} Valid until 20/04/2018

^{*3} Valid from 21/04/2018

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, type B2TB**, complies with the NO_x limits specified by the 1st BImSchV Paragraph 6 [Germany].

Allendorf, 1 August 2017

Viessmann Werke GmbH & Co. KG

A handwritten signature in black ink, appearing to read 'R. Jansen', written over a horizontal line.

Authorised signatory Reiner Jansen
Head of Strategic Quality Management

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Applicability

Serial No.:

7570808	7570809	7570810	7570811
7570812	7570813	7570814	7570815

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