

Installation and service instructions for contractors

VIESMANN


Vitodens 222-W
Type B2LE, 1.9 to 32 kW
Gas condensing storage combi boiler
Natural gas and LPG version




VITODENS 222-W




Safety instructions

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

Safety instructions explained

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

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

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

Target group

These instructions are exclusively intended for qualified contractors.

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

Regulations to be observed

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

Safety instructions for working on the system

Working on the system

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

Safety instructions (cont.)**Danger**

Hot surfaces and fluids can lead to burns or scalding.

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

**Please note**

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

Repair work**Please note**


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

Auxiliary components, spare and wearing parts**Please note**


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

Safety instructions for operating the system


If you smell gas


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

If you smell flue gas


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

What to do if water escapes from the appliance

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


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

Condensate

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

Flue systems and combustion air

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

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

Extractors

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

Safety instructions (cont.)**Danger**

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

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

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Disposal of packaging

Please dispose of packaging waste in line with statutory regulations.

Symbols

Symbol	Meaning
	Reference to other document containing further information
	Step in a diagram: 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
	Steps required during inspection
	Not required during inspection
	Steps required during maintenance
	Not required during maintenance

Intended use

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

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

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

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

Intended use (cont.)

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

Product information

Vitodens 222-W, type B2LE

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

- Modulating Matrix Plus burner for natural gas and LPG
- Stainless steel loading cylinder, 46 l capacity
- Hydraulics with 3-way diverter valve and variable speed high efficiency circulation pump
- Weather-compensated or constant temperature control unit
- Integral diaphragm expansion vessel (10 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-W may only be delivered to countries listed on the type plate. For deliveries to other countries, approved contractors must arrange individual approval on their own initiative and in accordance with the law of the country in question.

System examples

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

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

Spare parts lists

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



Preparing for installation

Installation

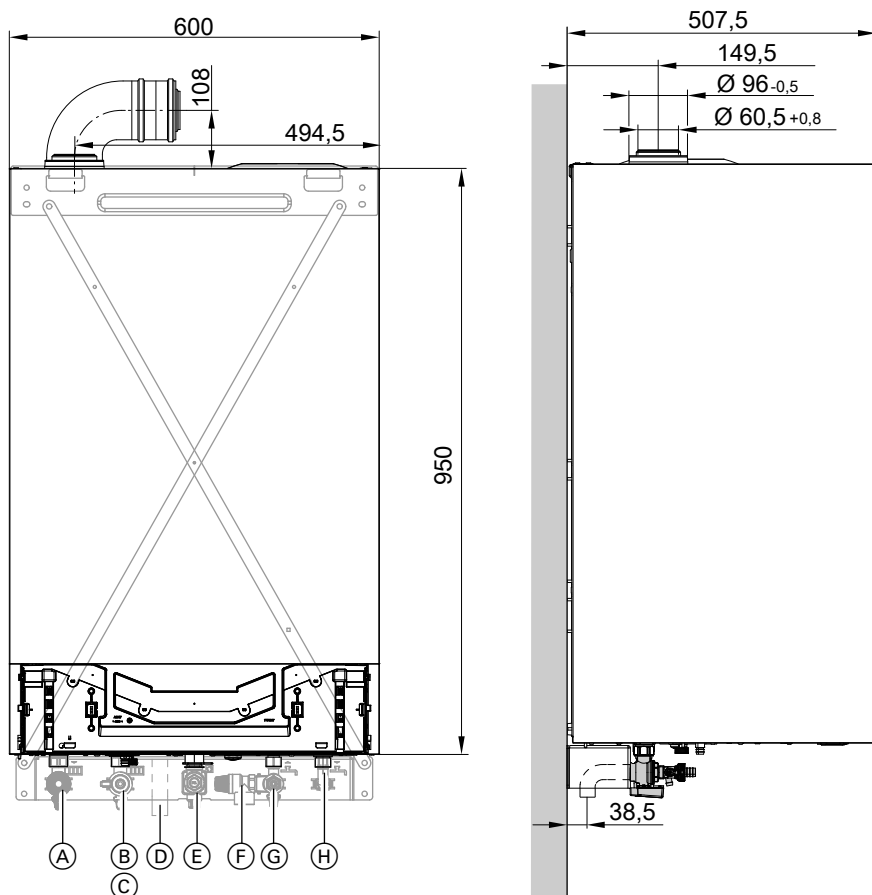


Fig. 1

- Ⓐ Heating flow
- Ⓑ Heating return
- Ⓒ Filling/draining
- Ⓓ Condensate drain

- Ⓔ Gas connection
- Ⓕ Safety valve
- Ⓖ Cold water
- Ⓗ DHW

Note

This boiler (IP rating: IP X1) is approved for installation in wet rooms inside safety zone 3, to DIN VDE 0100. Exposure to water jets and spray must be prevented. For open flue operation, the boiler may only be operated with a splash cover. Observe the requirements of DIN VDE 0100.

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



Installation instructions for pre-plumbing jig or mounting frame

Note

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

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



Please note

To prevent appliance damage, connect all pipework free of load and torque stress.

Note

To prevent dirt from entering the connections: Do not remove the protective caps until you are about to fit the boiler.

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

Preparing for installation (cont.)

4. Prepare the electrical connections.
 - The appliance is delivered fitted with a power cable (approx. 2 m long).
 - Note**
Connect the power cable to the electricity supply using a fixed connection.
 - Power supply: 230 V, 50 Hz, fuse rating max. 16 A
 - Accessory cables: 0.75 mm² flexible PVC cable with required number of cores for external connections.

Connection on the DHW side

Cold water installation

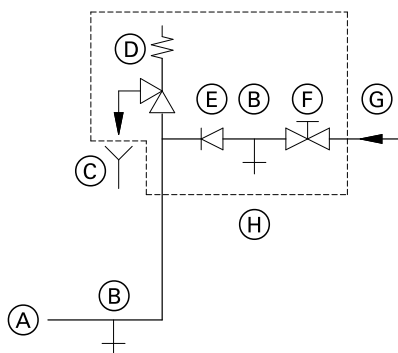


Fig. 2

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

Safety assembly (H) to DIN 1988 and EN 806 is required if it is possible that the mains water supply pressure will exceed 10 bar (1.0 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 manual shut-off.

Shock arrestor

If draw-off points likely to cause water hammer are connected to the boiler's DHW network (e.g. flush valves, washing machines, dishwashers): Shock arrestors should be installed close to the cause of the water hammer.

Installation sequence

Removing the boiler from the packaging

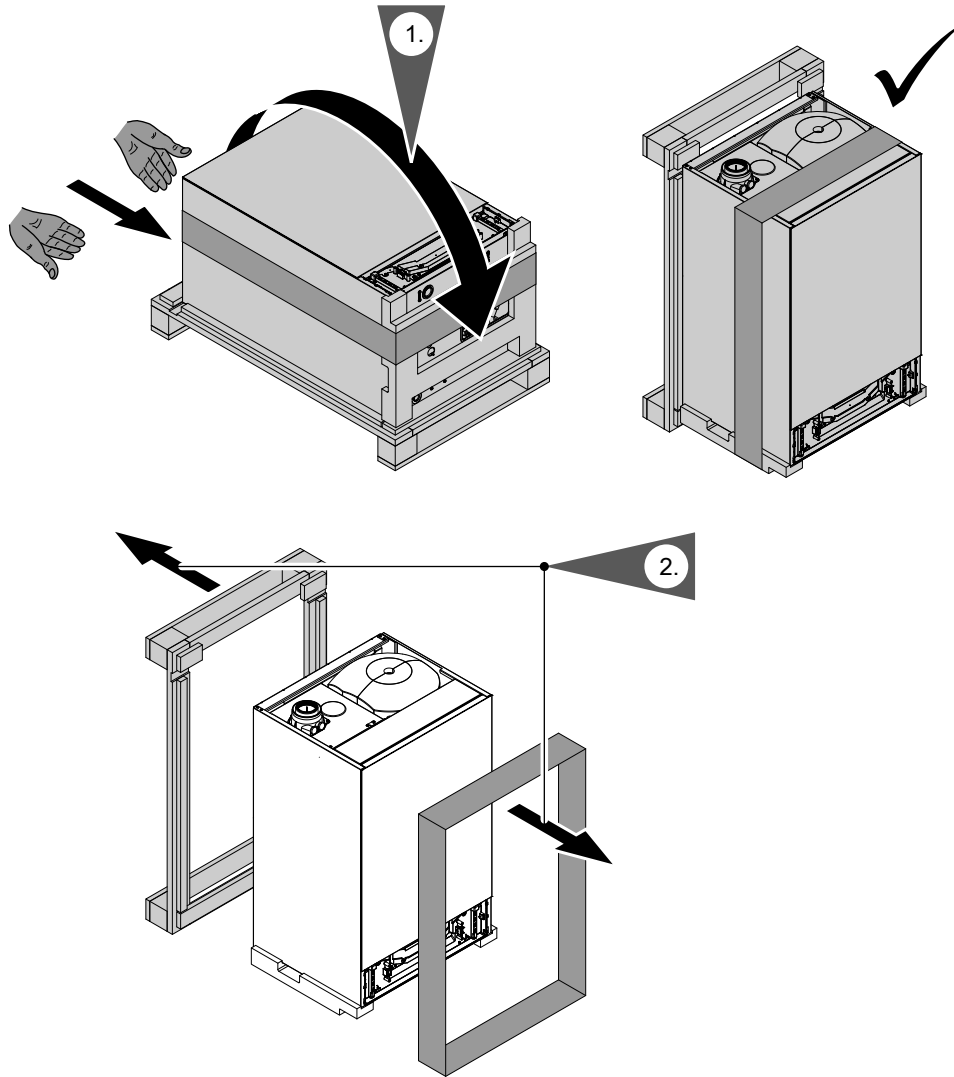


Fig. 3

Mounting the boiler and making connections

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

Note

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

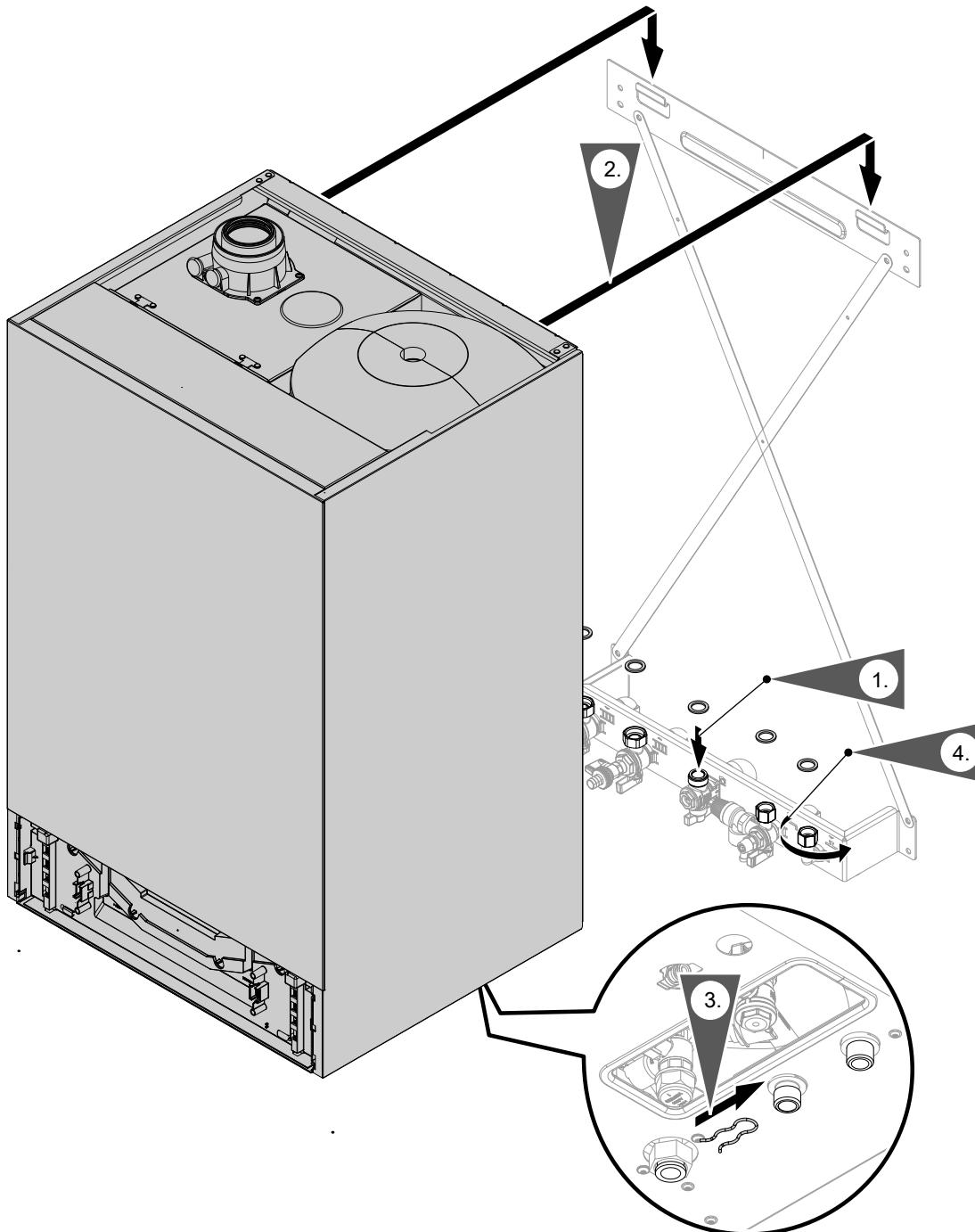


Fig. 4

Mounting the boiler and making connections (cont.)

Note

The diagram shows installation on a pre-plumbing jig.

The boiler can be installed on the following accessories:

- Pre-plumbing jig
- Pre-plumbing jig for sub-mounting kit
- Mounting frame

1. Replace gaskets.

Internal gasket diameter:

- Gas connection Ø 18.5 mm
- Connections on the heating water side Ø 17.0 mm

Note

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

2. Note

After mounting, ensure correct seating.

3. Note

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

4. Torque for union nuts

- G ½: 24 Nm
- G ¾: 30 Nm

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

Mounting the boiler and making connections (cont.)**Fitting the boiler to the wall mounting bracket****Note**

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

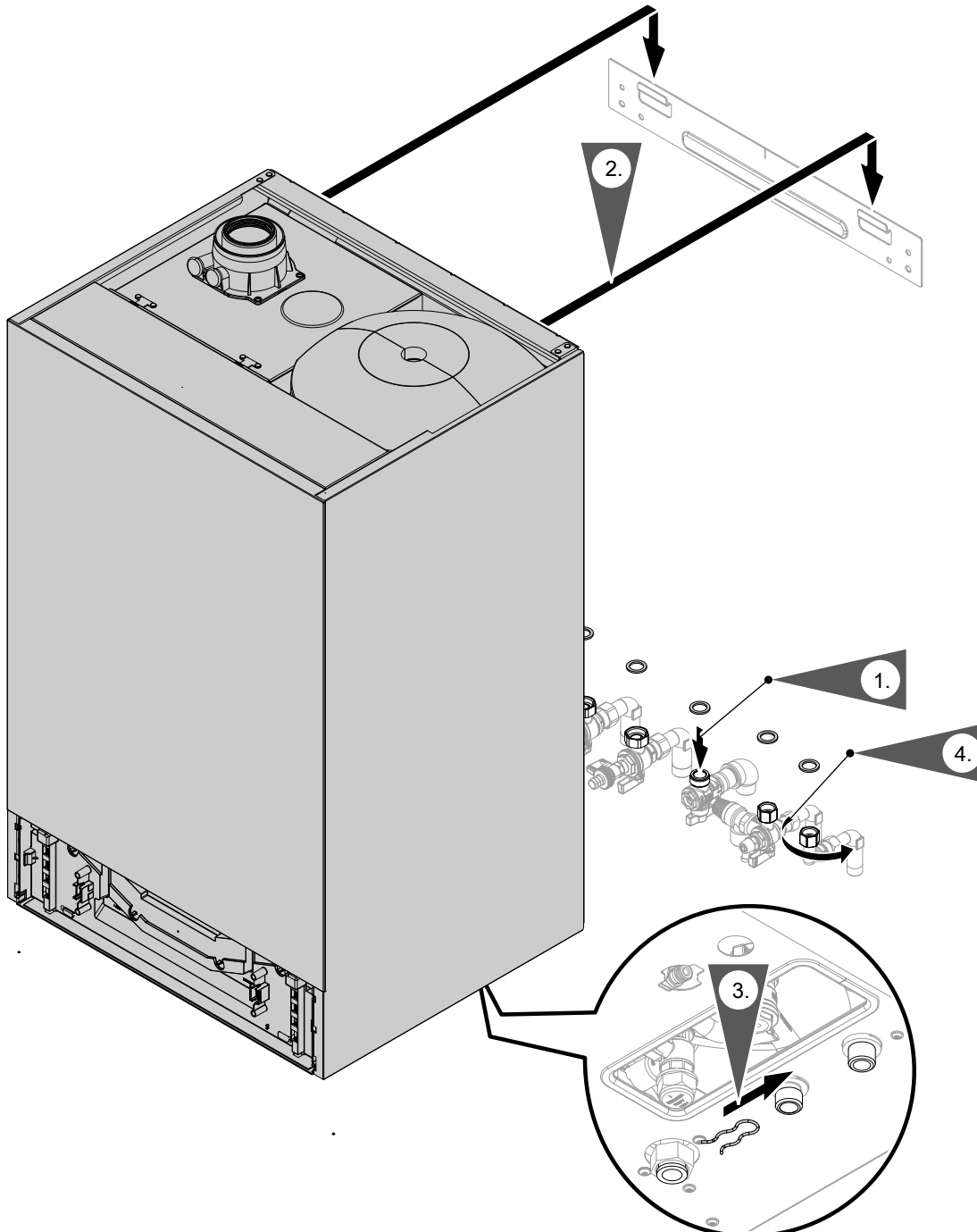


Fig. 5

Installation sequence

Mounting the boiler and making connections (cont.)

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

Internal gasket diameter:

- Gas connection $\text{\O} 18.5 \text{ mm}$
- Connections on the heating water side $\text{\O} 17.0 \text{ mm}$

Note

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

2. Suspend the Vitodens from the wall mounting bracket.

3. **Note**

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

4. Torque for union nuts

- G $\frac{1}{2}$: 24 Nm
- G $\frac{3}{4}$: 30 Nm

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

Removing the front panel

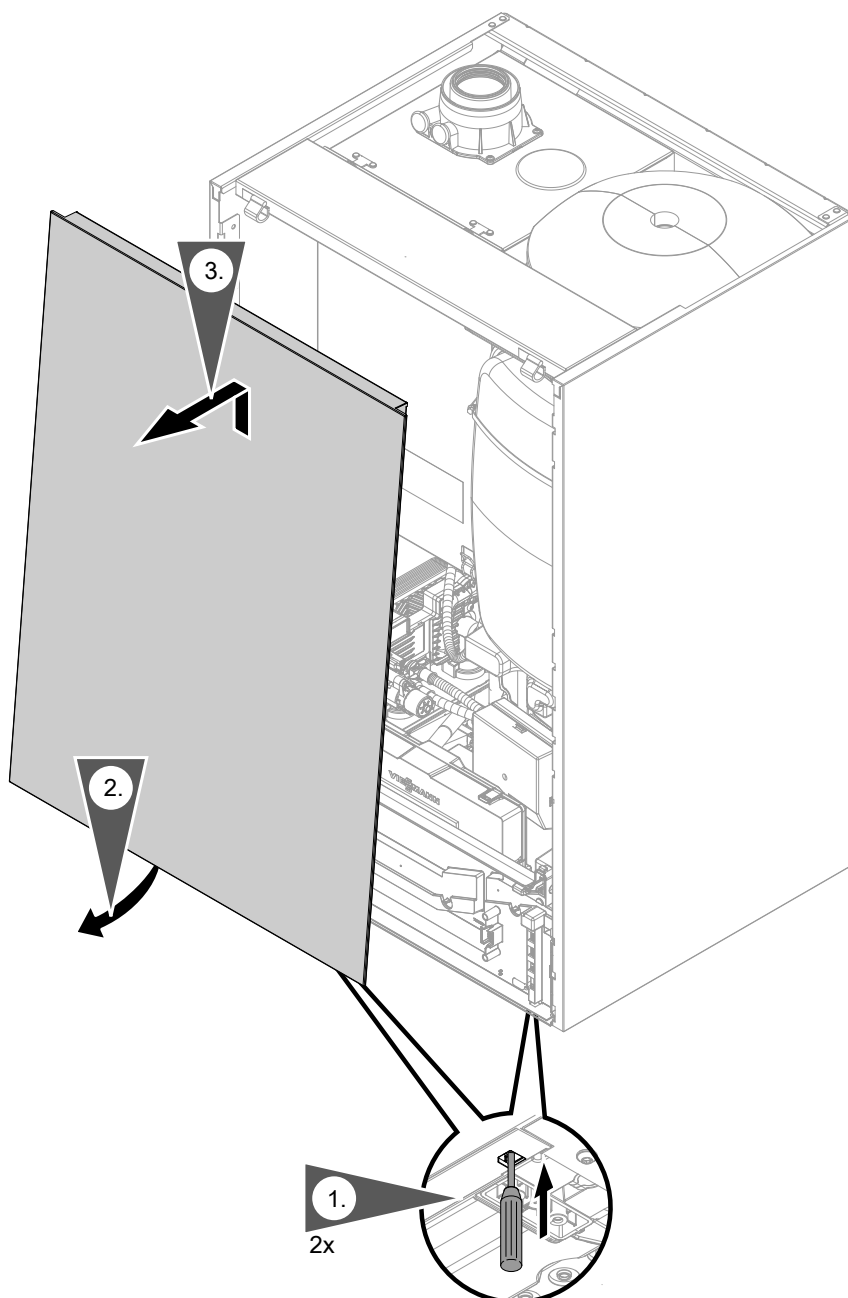


Fig. 6

Mounting the boiler and making connections (cont.)**Type plate****Note**

The type plate is attached to cover panel **A** in the appliance. See page 46.

Additional type plate with access code (QR code) marked with "i"

The type plate of the heat generator contains extensive product information and an appliance-specific QR code marked with "i" for direct access to product-specific information and product registration on the internet.

The QR code contains the credentials for the registration and product information portal, and the 16-digit serial number.

Attaching the additional type plate

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

Note

The documentation with the additional type plate and QR code marked with "i" can be found on top of the appliance.

2. In consultation with the system user, affix the additional type plate to the outside of the appliance. The additional type plate must be visible to the flue gas inspector. Affix another QR code to the installation and service instructions.

Fitting the programming unit mounting bracket on the top of the boiler

In the delivered condition, the programming unit is located on the underside of the boiler. If required for ease of operation, the programming unit can be located on the top of the boiler. To do so, reposition the bracket at the top.

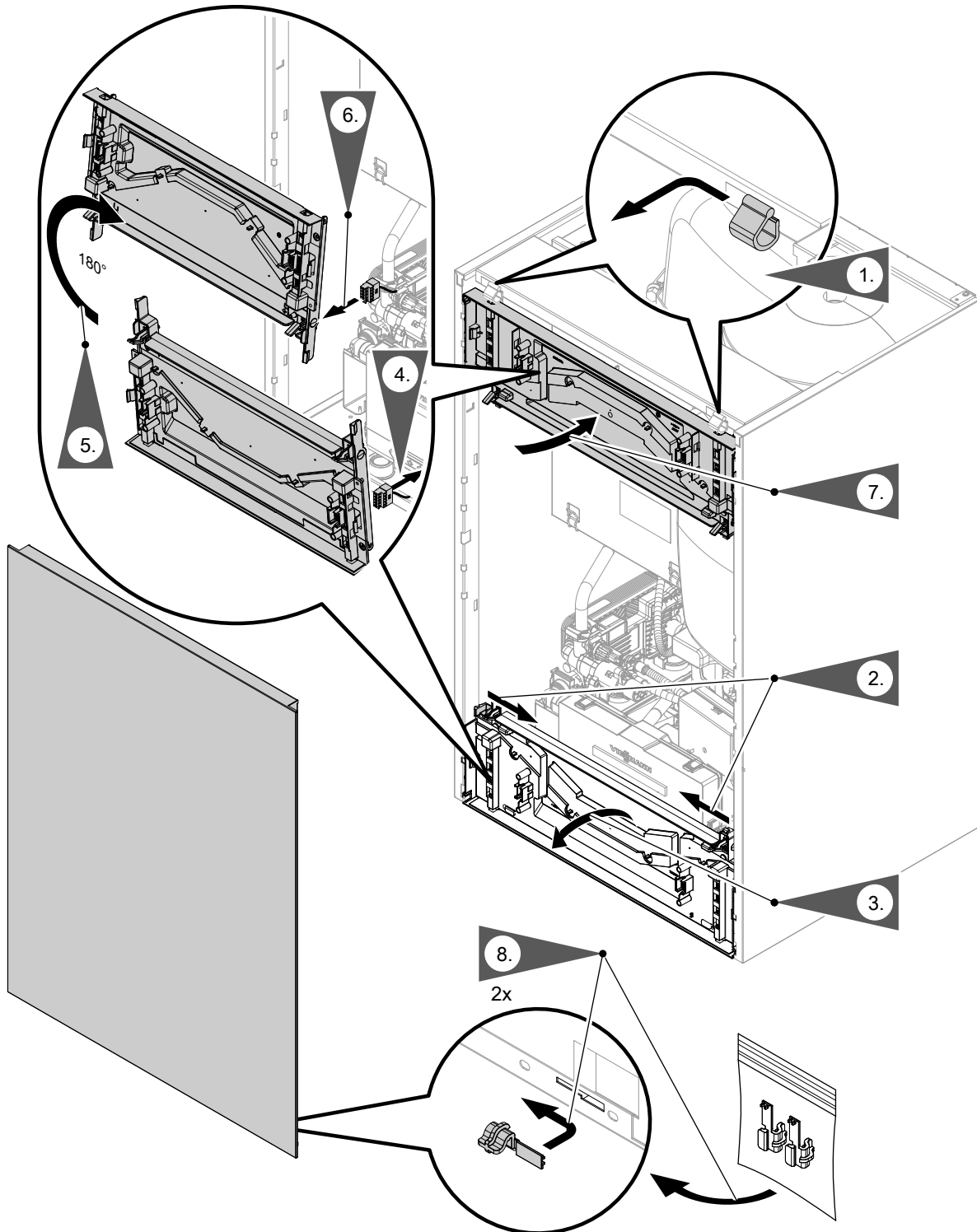


Fig. 7

Mounting the boiler and making connections (cont.)

4. Pull the plug of the connecting cable from the bracket.

6. Turn the bracket over and insert the plug on the right-hand side again.



Please note

Incorrect routing of the cable can lead to heat damage and impairment of the EMC properties.
Do not change the position of the cable or its fixture (fixing point on casing).

Connections on the heating water and DHW sides

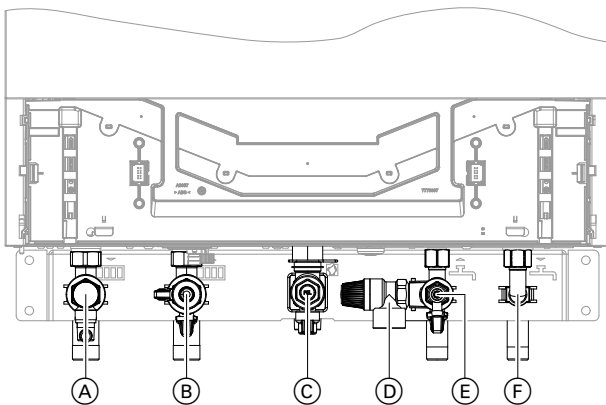


Fig. 8 Specifications for threads in conjunction with connection accessories

- (A) Heating flow R $\frac{3}{4}$ (male thread)
- (B) Heating return R $\frac{3}{4}$ (male thread) and filling/draining
- (C) Gas connection R $\frac{3}{4}$
- (D) Safety valve
- (E) Cold water G $\frac{1}{2}$
- (F) DHW G $\frac{1}{2}$

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

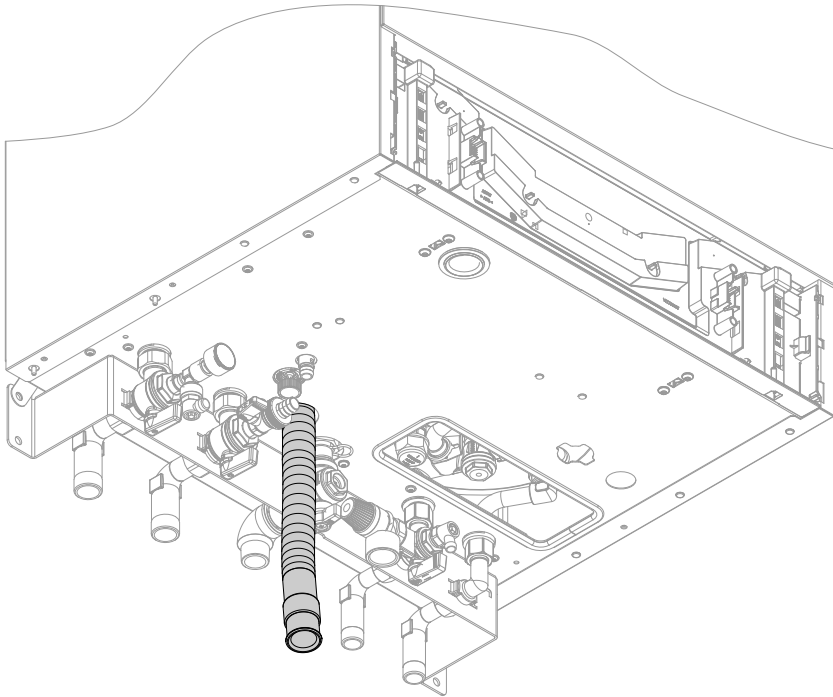


Fig. 9

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

Note

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

If the onward drain line is routed outside the building:

- Use a min. Ø 30 mm line.
- Protect the line from frost.
- Keep the line as short as possible.



Please note

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

Note

Observe local waste water regulations.

Condensate connection (cont.)

Filling the trap with water

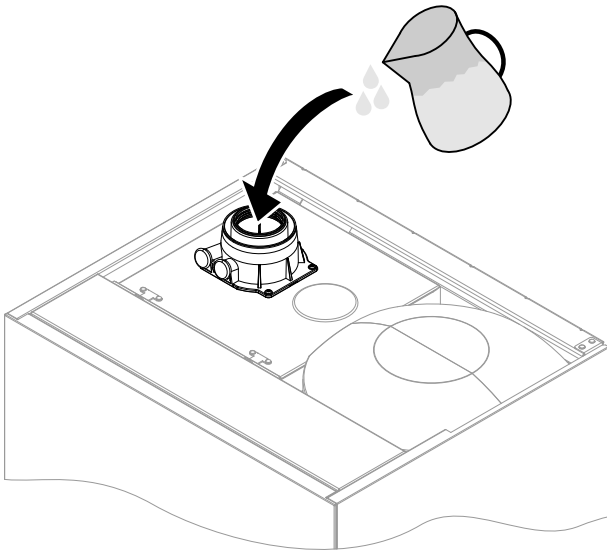


Fig. 10

Note

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

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



Please note

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

Flue gas connection

Note

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



Connecting the balanced flue pipe

Flue system installation instructions

Connecting several Vitodens to a shared flue system

If several Vitodens are connected to a common flue system: Install a back draught safety device (accessories) in the flue gas connection and in the mixing shaft of the burner on each boiler.

Installing the back draught safety devices:



Installation instructions for back draught safety device

Converting the control unit for use with a shared flue system:

- In the commissioning assistant, select the **"Multiple connections"** setting under **"Flue system type"**.

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.



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

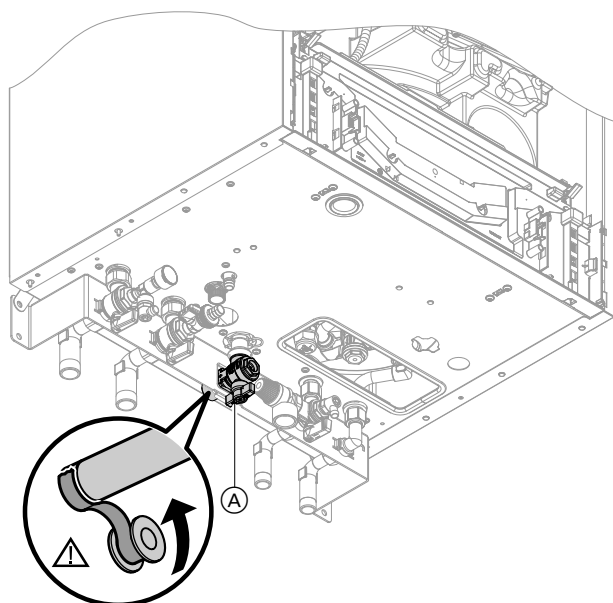


Fig. 11

1. If the gas connection has not been fitted previously, seal gas shut-off valve (A) to the gas connection.
When carrying out any work on gas connection fittings, counterhold with a suitable tool. Never transfer any forces to the internal components.
2. Check for leaks.
3. Purge the gas line.

Information on operation with LPG

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

An EM-EA1 extension (accessories) is required to connect the safety solenoid valve.



Danger

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

Note

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

Remove residues of the leak detection agent after testing.



Please note

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

Electrical connections

Opening the wiring chamber

Note

If only PlusBus and the outside temperature sensor are connected to the boiler, the wiring chamber does not need to be opened.

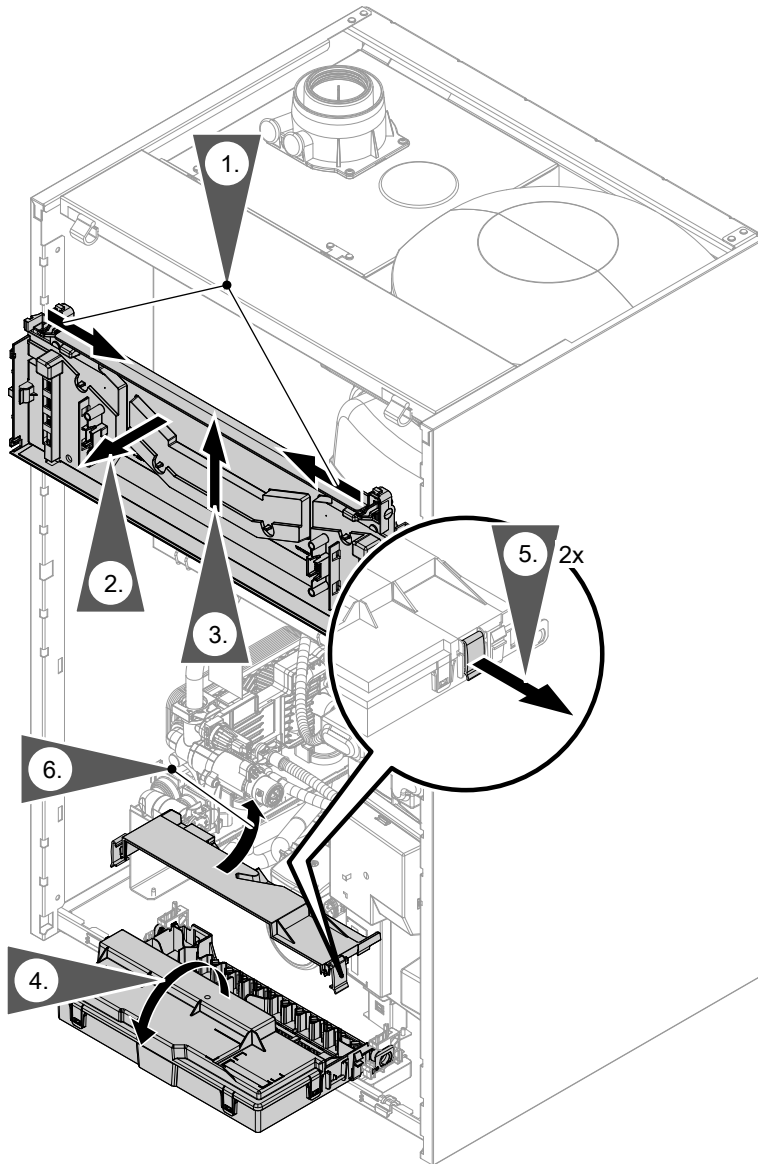


Fig. 12

Note

Steps 1 to 3 are required only if the programming unit is located at the bottom.
Do not disconnect the plug from the mounting panel.
Do not change the position of the cable or its fixture (fixing point on casing).



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.

Layout of the electrical connections

Note

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

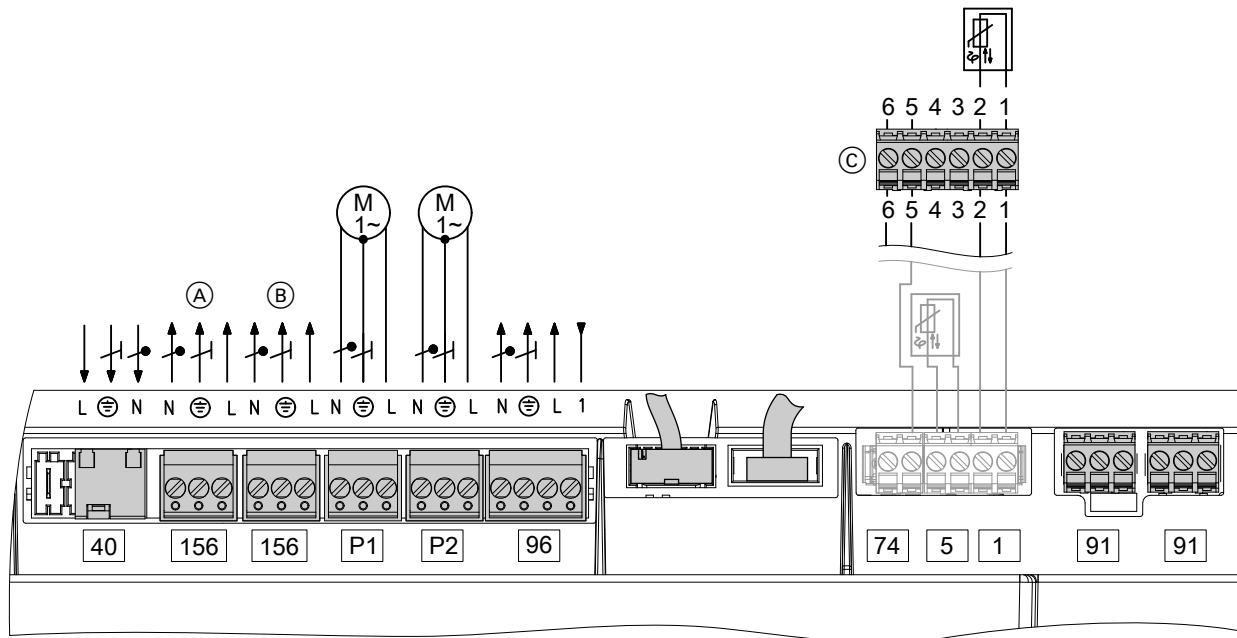


Fig. 13

Connections to 230 V~ plugs

- 40** Power supply
- 96** Configurable input 230 V, potential free
Output 230 V
- 156** Switched power outlet
- P1** Cylinder loading pump (connected in the delivered condition)
- P2** 230 V output:
Heating circuit pump for heating circuit without mixer (in systems with low loss header)
- A** BCU burner control unit power supply (connected in the delivered condition)
- B** Power supply for accessories
- C** External plug on underside of appliance (see also following diagram)

Connections to extra low voltage (ELV) plugs

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



Information on connecting accessories

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

Electrical connections (cont.)

On-site connections on HMU heat management unit

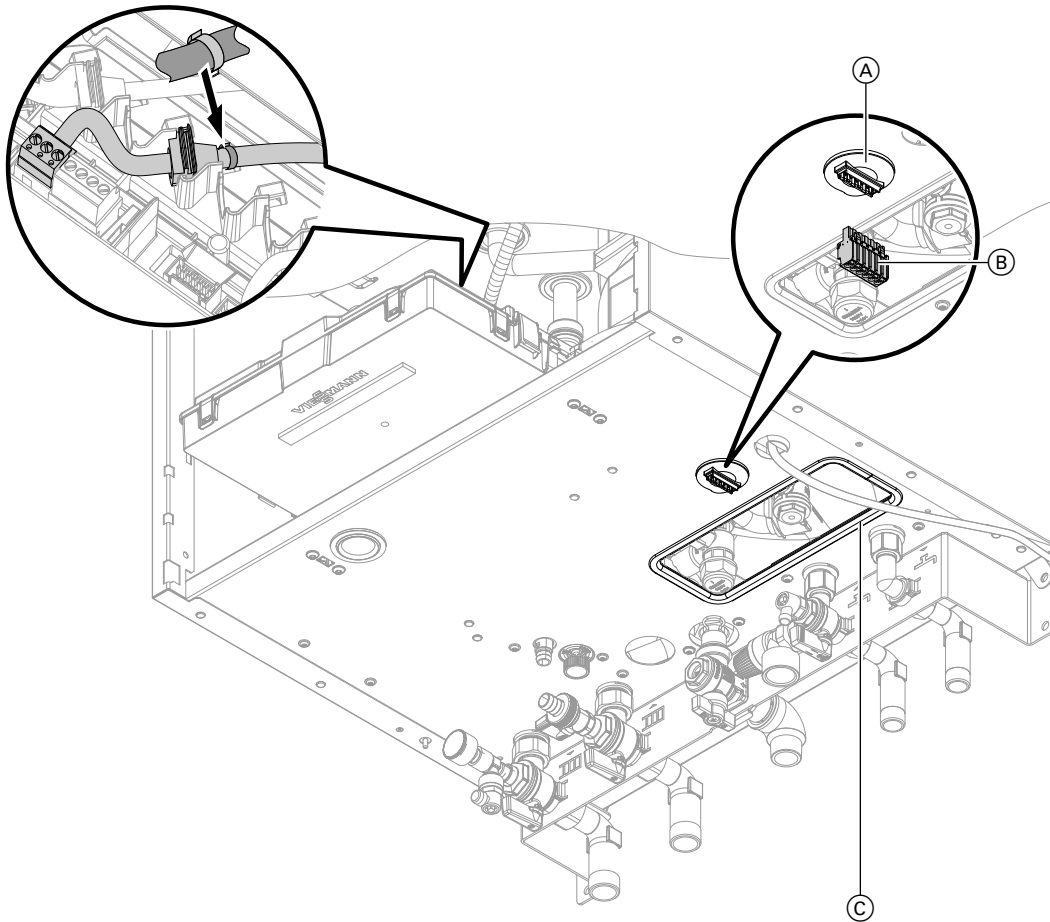


Fig. 14

- (A) Plug-in connection on underside of appliance.
- (B) Plug for connecting sensors and PlusBus
Remove plug from the pack of installation components.
- (C) Aperture for cable entry

Required plugs are supplied in separate packaging.

For cables without strain relief bushings, provide strain relief in the wiring chamber in the form of cable ties.

Outside temperature sensor 1

Fitting location for outside temperature sensor

- North or north-westerly wall, 2 to 2.5 m above ground level; in multi storey buildings, in the upper half of the second floor
- Not above windows, doors or vents

- Not immediately below balconies or gutters
- Never render over

Outside temperature sensor connection

2-core lead, length up to 35 m with a cross-section of 1.5 mm²

Connecting the circulation pump to P2

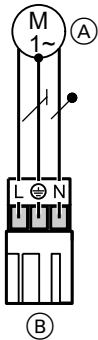


Fig. 15

- (A) Circulation pump
- (B) Plug P2 on heat management unit

Possible function:

- Heating circuit pump for heating circuit without mixer
- A1 in connection with low loss header and heating circuits with mixer

Select function in the commissioning assistant by selecting the connected component.

Specification

Rated current	1 A
Rated voltage	230 V ~

Floating switching contact connection

Connection at plug 96

One of the following functions can be connected:

- External demand
- External blocking
- DHW circulation pump external demand (pushbutton function, pump runs for 5 min). Not for Vitodens 222-W.
- Room temperature controller (room thermostat)
In conjunction with operating mode Continuous operation with room temperature controller (not for Vitodens 3xx)
- External heating circuit hook-up (if installed), see page
Not for Vitodens 3xx.

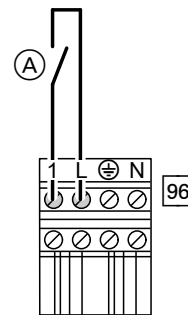


Fig. 16

- (A) Floating contact

Assigning functions in the commissioning assistant

See commissioning assistant in "Commissioning".

Information on connecting PlusBus subscribers

Only the following PlusBus subscribers can be connected to the control:

- 2 x EM-M1 or EM-MX extensions (ADIO electronics module)
- 2 Vitotrol 200-E
- 3 x EM-EA1 extensions (DIO electronics module)

- 1 x EM-S1 extension (ADIO or SDIO/SM1A electronics module)
- 1 x EM-P1 extension (ADIO electronics module)

The max. total length of the PlusBus lead is 50 m. With an unscreened lead, 2-core, 0.34 mm².

Checking the CAN bus terminator switch setting

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

Electrical connections (cont.)

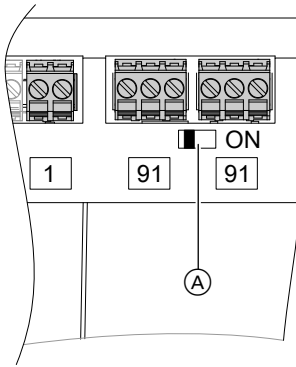


Fig. 17

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

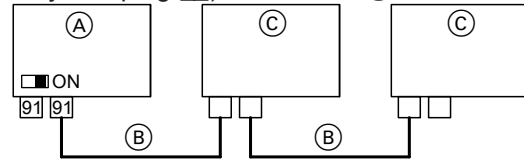


Fig. 18

- (A) Heat generator / HMU heat management unit
- (B) CAN bus cable
- (C) CAN bus other subscribers

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

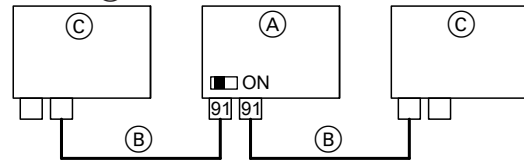


Fig. 19

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

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

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

Power supply and PlusBus connection of accessories

Power supply of all accessories at the HMU heat management unit

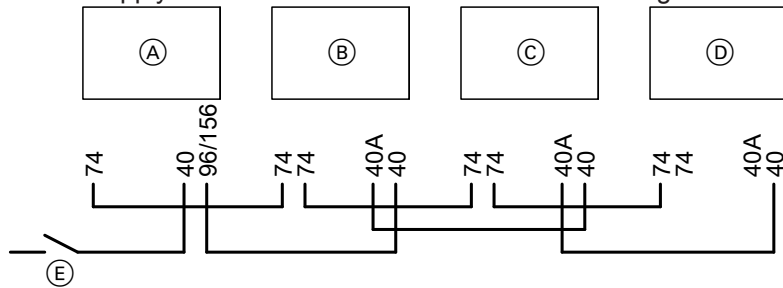


Fig. 20

Some accessories with direct power supply

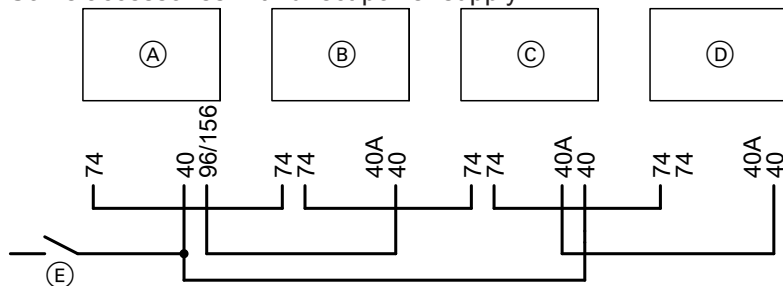


Fig. 21

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

PlusBus system length max. 50 m for 0.34 mm² cable cross-section and unshielded cable.

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

Accessories	Internal fuse protection
EM-M1, EM-MX mixer extension kit	2 A
EM-EA1 extension	2 A
EM-S1 extension (not for Vitodens 222-F, 222-W and 333-F)	2 A



Danger

Incorrect wiring can lead to serious injury from electrical current and result in appliance damage.

- Route extra low voltage (ELV) leads < 42 V separately from cables > 42 V/230 V~.
- Only strip the minimum of insulation from cables as close as possible to the terminals and bundle tightly to the corresponding terminals.
- Secure cables with cable ties.

Electrical connections (cont.)

Power supply 40



Danger

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

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

- IEC 60364-4-41
- VDE regulations
- Connection conditions of the local grid operator

- Install an isolator in the power cable to provide omnipolar separation from the mains for all active conductors, corresponding to overvoltage category III (3 mm) for complete isolation. The isolator must be fitted in the permanent electrical installation, in line with installation requirements.

We also recommend installing a pulse current-sensitive RCD (RCD class A).

- Connect the power cable to the electricity supply using a fixed connection.

- If the power supply to the appliance is connected with a flexible power cable, ensure that the live conductors are pulled taut before the earth conductor in the event of strain relief failure. The length of the earth conductor wire will depend on the design.
- Max. fuse rating 16 A.



Danger

The absence of system component earthing can lead to serious injury from electric current if an electrical fault occurs.

The appliance and pipework must be connected to the equipotential bonding of the building.

Routing connecting cables/leads

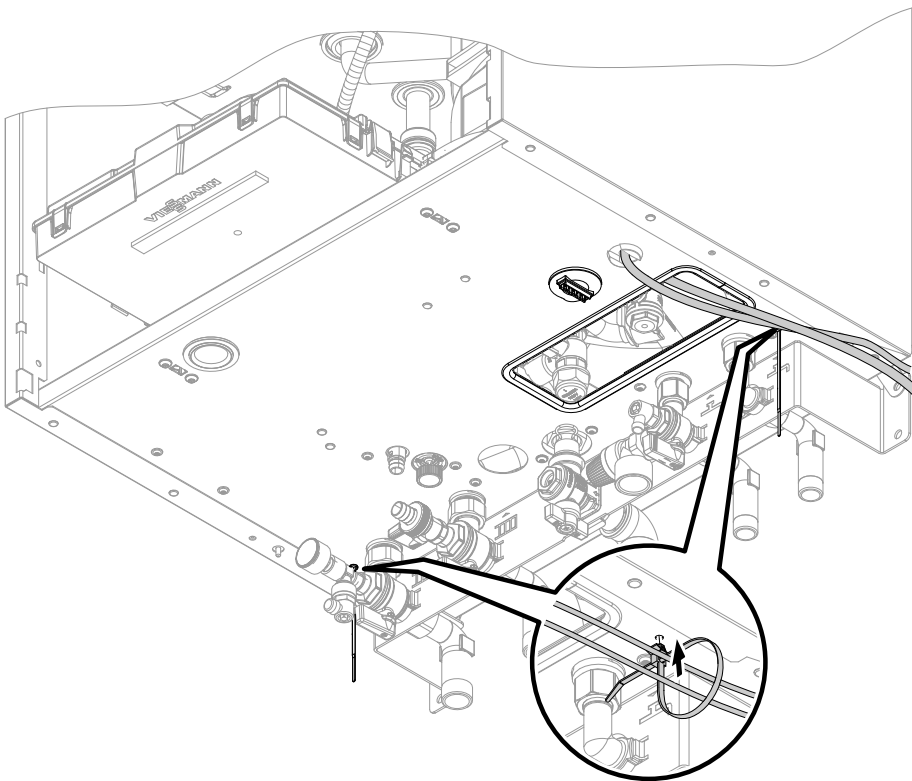


Fig. 22

Installation sequence

Electrical connections (cont.)

Bundle cables using the supplied cable ties. Secure the cable ties to the underside.

Do not route cables over sharp edges.

! Please note

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

WiFi operational reliability and system requirements

WiFi router system requirement

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

Wireless signal range of WiFi connection

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

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

Install the heat generator as close as possible to the WiFi router to ensure a good WiFi connection. The signal strength can be displayed on the heat generator (see the operating instructions).

Note

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

Angle of penetration

The reception quality remains best if radio signals hit the walls vertically.

Depending on the angle of penetration, the effective wall thickness changes and so does the extent to which the electromagnetic waves are damped.

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

Flat (unfavourable) angle of penetration

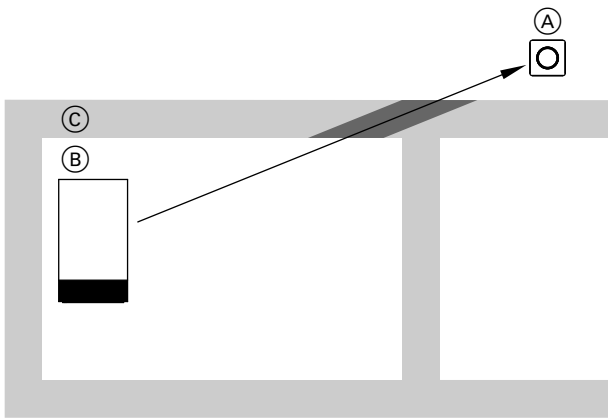


Fig. 23

- (A) WiFi router
- (B) Heat generator
- (C) Wall

Ideal angle of penetration

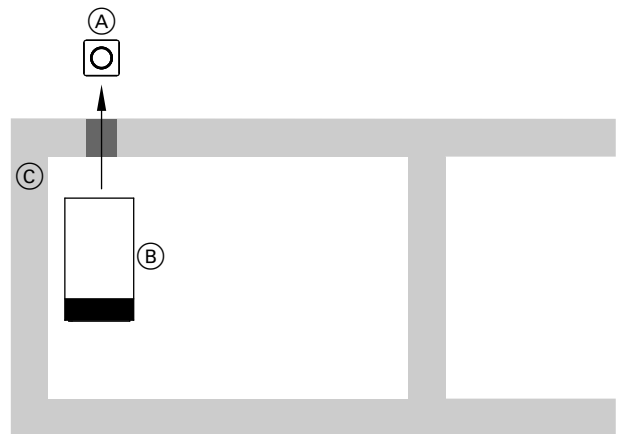


Fig. 24

- (A) WiFi router
- (B) Heat generator
- (C) Wall

Closing the wiring chamber

Installation

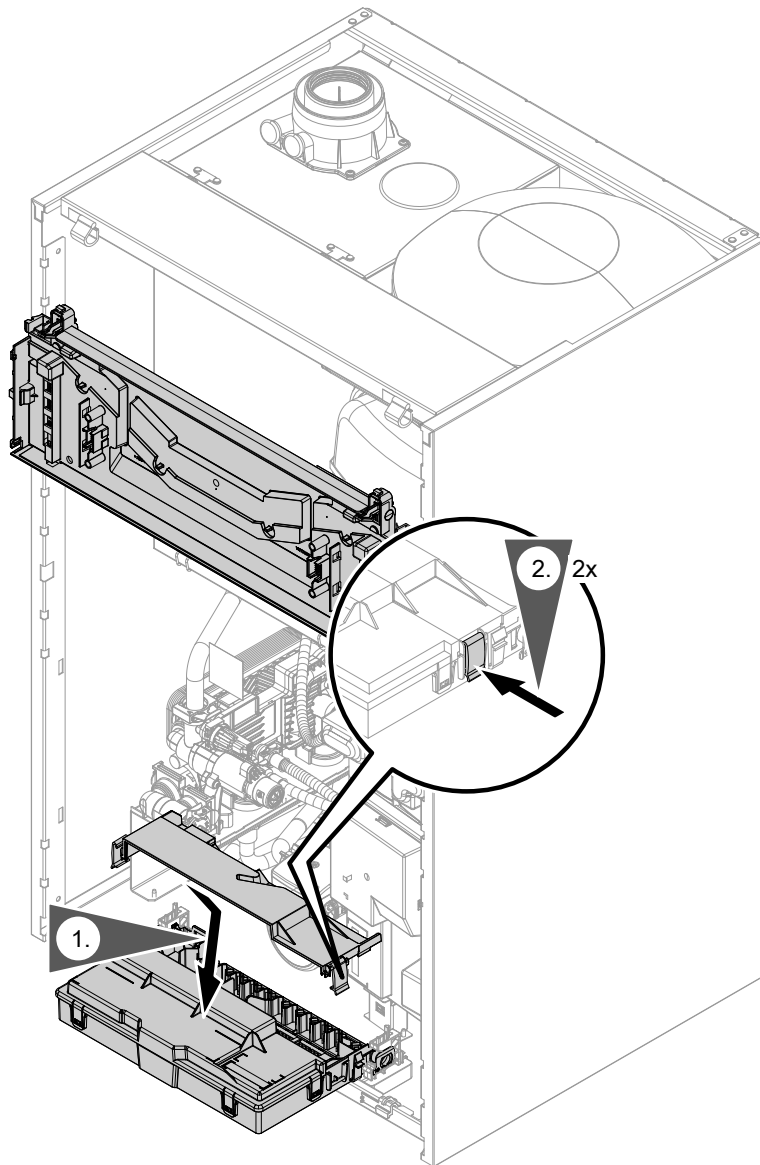


Fig. 25

Fitting the programming unit and front panel

Programming unit located at the bottom

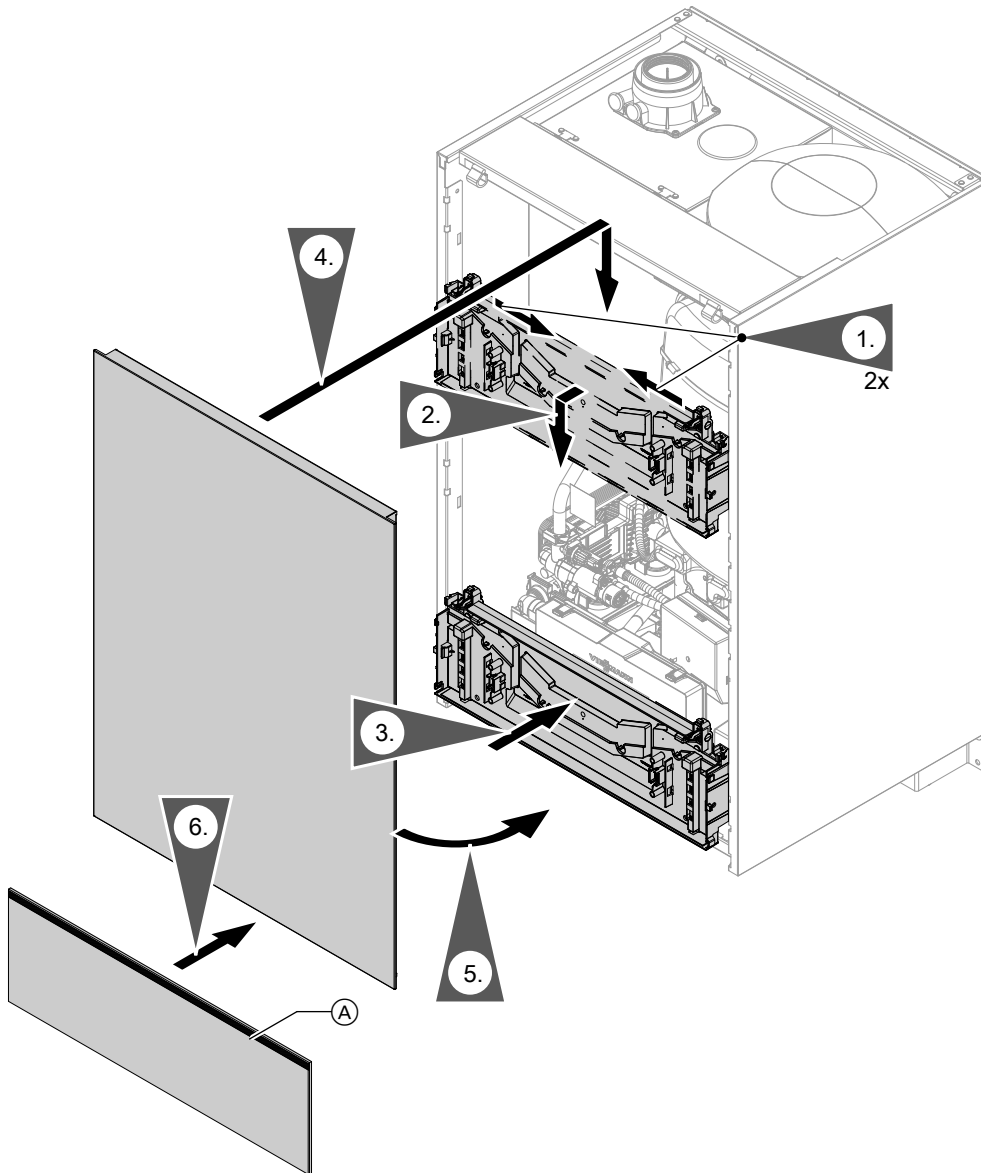


Fig. 26

Lightguide (A) at the top

Programming unit located at the top

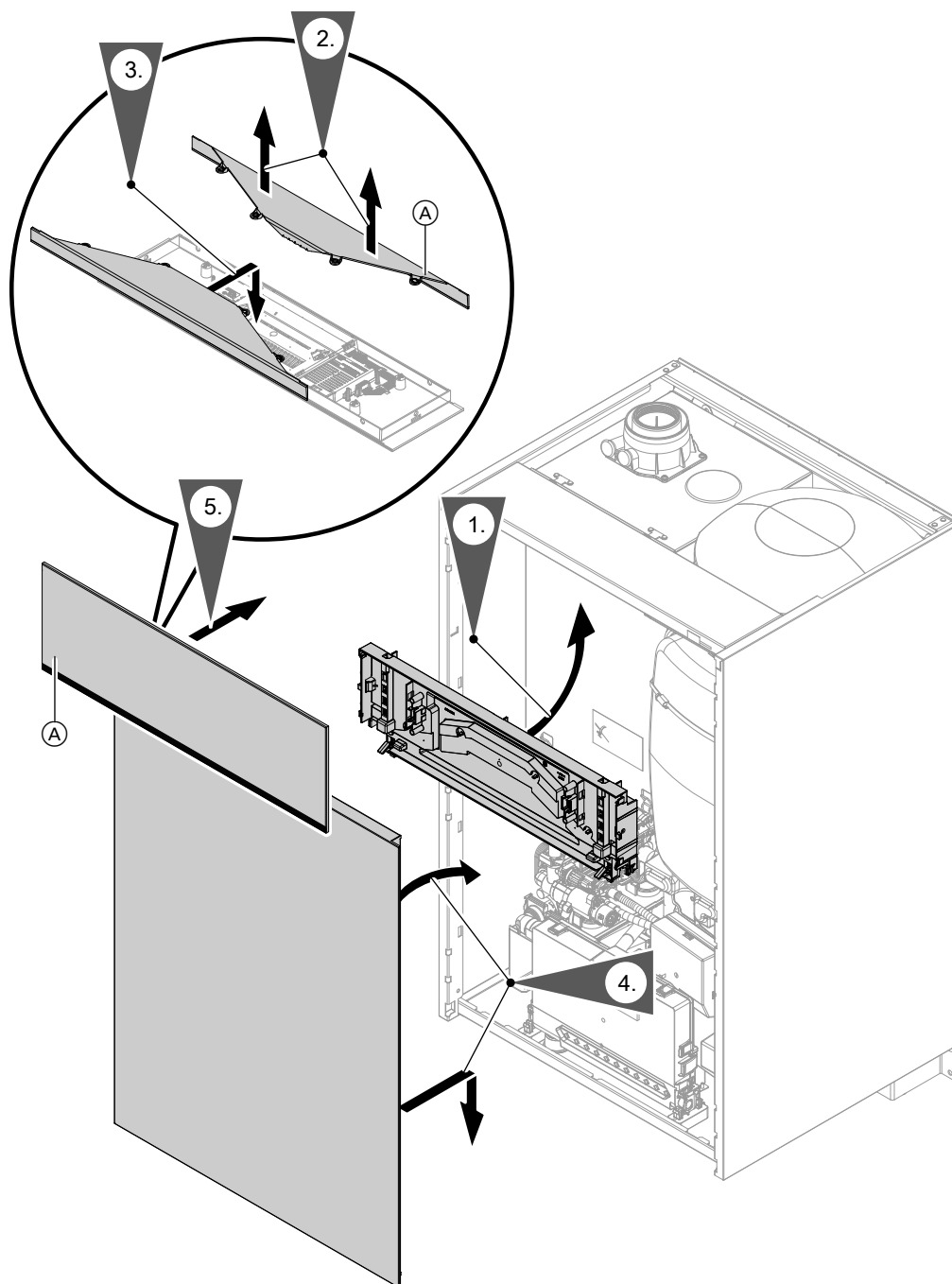


Fig. 27

1. Install the mounting panel for the programming unit at the top.
Reconnect the plugs to the mounting panel on the right. Do not alter where and how the cable is secured (fixing point of the cable tie).
2. Pull Lightguide (A) out of all 4 detents at once and remove. As you do so, pull it upwards between 2 detents, in the middle and at the same time. Ensure that the locking tabs do not break off.
3. Turn Lightguide (A) around and clip it into place at the bottom of the programming unit.
4. Fit the front panel.
5. Fit the programming unit with Lightguide (A) at the bottom.



Steps - commissioning, inspection and maintenance

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

Commissioning assistant

- Open the gas shut-off valve.
- If the appliance has not been switched on yet: Turn on the ON/OFF switch. The commissioning assistant starts automatically.
 - If the appliance has already been switched on: See chapter "Calling up the commissioning assistant at a later point", page 40.
- Commission the heat generator and follow the commissioning assistant. See the overview below.

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

Commissioning assistant sequence	Explanations and references
Commissioning	
Language	
With app	<p>The appliance automatically switches on the WiFi Access Point. Further commissioning steps according to the instructions of the software tool used (e.g. "ViStart app")</p> <p>Note <i>Apps for commissioning and service are available for iOS and Android devices.</i></p>  
With programming unit	If commissioning is to be carried out at the programming unit of the heat generator.
Trade fair mode <ul style="list-style-type: none"> Off On 	Only for demonstration purposes. Do not select for normal heating mode.
Units <ul style="list-style-type: none"> Temperature Length Pressure 	Select the required units of measurement (e.g. °C or °F)
Date <ul style="list-style-type: none"> Format 	
Time <ul style="list-style-type: none"> Format Time changeover 	
System pressure	






Commissioning assistant sequence	Explanations and references
<ul style="list-style-type: none"> ▪ Set value ▪ Range 	<p>Select the set system pressure, e.g. 1.5 bar.</p> <p>Select the range within which the system pressure can fluctuate around the set value, e.g. +/-0.5 bar.</p> <p>Example: When the value falls below the set range for a certain period of time (set value [1.5 bar] - range [0.5 bar] = 1.0 bar), fault message F.74 or warning message A.11 is displayed.</p> <p>Filling: See chapters "Filling the heating system" and "Venting the heating system".</p>
Gas type	If operating with LPG, switch to " LPG "
Flue system	
<ul style="list-style-type: none"> ▪ Single connection ▪ Multiple connections 	<p>Only one heat generator is connected to the flue system (factory setting).</p> <p>Several heat generators are connected to the flue system.</p>
After confirmation with OK , an automatic test of the flue gas temperature sensor is carried out. See the following chapter.	
Building type	
<ul style="list-style-type: none"> ▪ Detached house ▪ Apartment building 	<p>One shared holiday program and time program for DHW heating</p> <p>Holiday program is set separately</p>
Continue in the commissioning assistant with Yes or end commissioning with No.	
Operating mode	
<ul style="list-style-type: none"> ▪ Weather-compensated ▪ Constant mode ▪ Room temperature-dependent 	<p>The outside temperature sensor must be connected</p> <p>Operation with constant flow temperature</p> <p>A room temperature controller/room thermostat (accessories) must be connected to plug 96. Only one heating circuit without mixer in the system.</p>
System scheme	
Heating circuit 1	Heating circuit without mixer or heating circuit without mixer with external hook-up (if installed)
Heating circuit 2, 3	Heating circuits with mixer or heating circuits with mixer with external hook-up (if installed)
DHW	Settings for DHW heating according to the system components
<ul style="list-style-type: none"> ▪ Not installed ▪ Cylinder with one sensor ▪ Cylinder with one sensor and DHW circulation pump ▪ DHW comfort function ▪ Loading cylinder with one sensor ▪ Loading cylinder with one sensor and DHW circulation pump ▪ Loading cylinder with two sensors ▪ Loading cylinder with two sensors and DHW circulation pump 	<p>System without DHW heating</p> <p>System with DHW cylinder with 1 cylinder temperature sensor</p> <p>System with DHW cylinder with 1 DHW cylinder temperature sensor and DHW circulation pump</p> <p>Only for gas condensing combi boilers (not adjustable)</p> <p>Gas condensing storage combi boiler with integral loading cylinder</p> <p>Gas condensing storage combi boiler with integral loading cylinder and DHW circulation pump</p> <p>Gas condensing storage combi boiler or gas/solar condensing storage combi boiler with integral loading cylinder</p> <p>Gas condensing storage combi boiler or gas/solar condensing storage combi boiler with integral loading cylinder and DHW circulation pump</p>
Low loss header/buffer cylinder	Settings for the consumer circuits according to the system components
<ul style="list-style-type: none"> ▪ Not installed 	There is no low loss header or heating water buffer cylinder in the system.





Commissioning assistant sequence	Explanations and references
<ul style="list-style-type: none"> ▪ Low loss header, heating only ▪ DHW heating upstream of low loss header ▪ DHW heating downstream of low loss header ▪ Buffer cylinder, heating only ▪ DHW heating upstream of buffer cylinder ▪ DHW heating downstream of buffer cylinder 	<p>System with low loss header, without DHW heating</p> <p>DHW heating with e.g. separate DHW cylinder connected upstream of the low loss header</p> <p>DHW heating with e.g. separate DHW cylinder connected downstream of the low loss header</p> <p>System with heating water buffer cylinder, without DHW heating</p> <p>DHW heating with e.g. separate DHW cylinder connected upstream of the heating water buffer cylinder</p> <p>DHW heating with e.g. separate DHW cylinder connected downstream of the heating water buffer cylinder</p>
<p>Solar</p> <ul style="list-style-type: none"> ▪ No solar function ▪ With DHW heating ▪ With central heating backup ▪ With 2nd cylinder pre-heating ▪ With thermostat function 	<p>Solar thermal system connected to heat generator via solar extension (ADIO, SDIO/SM1A electronics module) Setting subject to the design of the solar thermal system</p> <p> Solar extension installation and service instructions</p> <p>Only adjustable for SDIO/SM1A electronics module (not for Vitodens 242-F)</p> <p>Only adjustable for SDIO/SM1A electronics module (not for Vitodens 242-F)</p> <p>Only adjustable for SDIO/SM1A electronics module (not for Vitodens 242-F)</p>



Commissioning assistant sequence	Explanations and references
Plug 96	Function selection if a contact has been connected to plug 96 of the HMU heat management unit
<ul style="list-style-type: none"> ▪ No function ▪ External demand, DHW circulation pump ▪ External demand ▪ External blocking 	<p>Pushbutton function, DHW circulation pump runs for 5 min.</p> <p>Heat generator demand with adjustable set flow temperature (parameter 528.0) and set primary circuit pump speed (parameter 1100.2)</p>
EM-EA1 (DIO) function	<p>If an EM-EA1 extension (DIO electronics module) is connected as a function extension</p> <p>Selection of the connected function according to the table in the installation instructions for the EM-EA1 extension</p>
Remote control	Set the type of remote control and subscriber no. as assignment to the respective heating circuit. Up to 3 heating circuits can be assigned to one remote control unit. It is not possible for several remote control units to act on one heating circuit.
Maintenance	
Interval in burner hours run until next maintenance	Interval adjustable in steps of 100 h.
Interval until next maintenance	Interval adjustable to 3, 6, 12, 18 or 24 months.
The system carries out a restart.	

Automatic flue gas sensor check

The display shows: **"Testing, flue gas temperature sensor"** and **"Enabled, please wait ..."**.

If the flue gas temperature sensor is not positioned correctly, fault message F.416 appears on the display. For further details regarding the flue gas temperature sensor test, see "Repairs".

If fault message F.416 appears, reposition the flue gas temperature sensor in the flue gas connection. Check for leaks on the flue gas side.

Note

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

When the fault has been remedied, turn the ON/OFF switch off and back on again. Confirm the message with **OK**.

Switching WiFi ON/OFF

The appliance is equipped with an integrated WiFi communication module with extended type plate. The internal communication module supports the heat generator commissioning with the "ViStart app", the connectivity with the "ViCare app" and the connection to the digital service centre "Vitoguide".

The access details required for establishing a connection are recorded in the form of an access code with **"WiFi symbol"**. Three copies of this code are located on the rear of the programming unit.

Before installing the programming unit, remove the access code labels from the rear. For commissioning, affix one label to the marked out space on the type plate.

Switch on the WiFi connection and establish a connection to the router. See also page 30.

Activating the internet connection:



Operating instructions

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

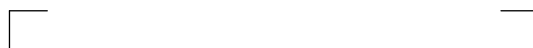


Fig. 28

Affix a label in the operating instructions.



Commissioning the system with the commissioning... (cont.)

Calling up the commissioning assistant at a later point

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

Tap the following buttons:

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

2. Use to select "**Basic settings**".
3. **OK**
4. Use to select "**Commissioning assistant**".
5. **OK**



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)



Filling the heating system (cont.)

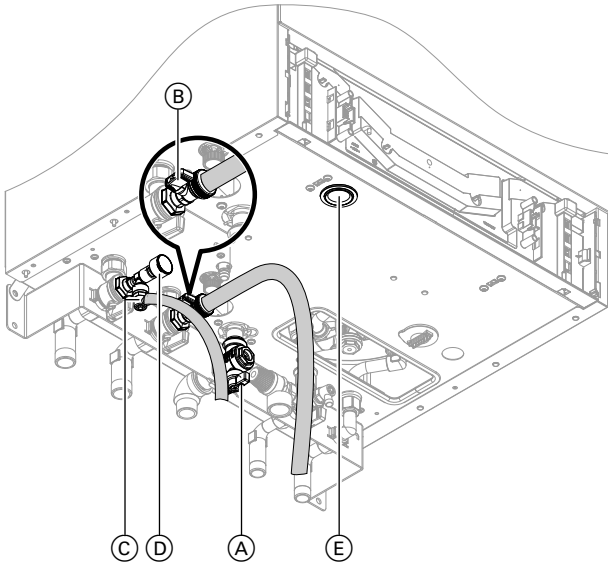


Fig. 29

(E) ON/OFF switch

1. Check the pre-charge pressure of the expansion vessel.
2. Close gas shut-off valve (A).
3. Activate the filling function (see commissioning assistant or following chapter).
4. Fill the heating system at boiler drain & fill valve (B) in the heating return (on the connection set or on site). Minimum system pressure > 1.0 bar (0.1 MPa). Check the system pressure at pressure gauge (D). The indicator must be in the green band. If necessary, open the on-site air vent valves.
5. Fit hose to air vent valve (C). Route the hose into a suitable container or drain outlet.
6. Close the shut-off valves on the heating water side.
7. Open air vent valve (C) and fill valve (B) in the heating return. Vent (flush) under mains pressure until no more air noise is audible.
8. Close air vent valve (C) and boiler drain & fill valve (B). Check the system pressure at pressure gauge (D). The indicator must be in the green band.
9. Open the shut-off valves on the heating water side.

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

If the filling function is to be activated after commissioning.

Tap the following buttons:

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



Filling the loading cylinder on the DHW side

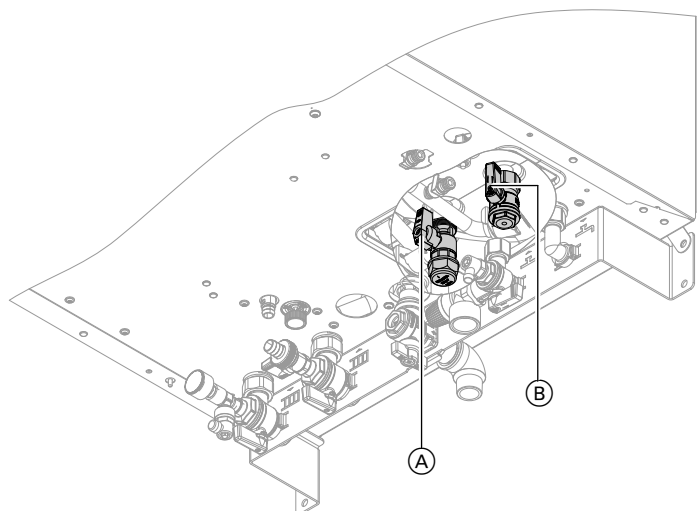


Fig. 30

1. Valves (A) and (B) must be in the "top" position.
2. Open the cold water line and a DHW draw-off point.
3. Once air stops coming out of the DHW draw-off point, the loading cylinder is completely filled.



Topping up the heating water

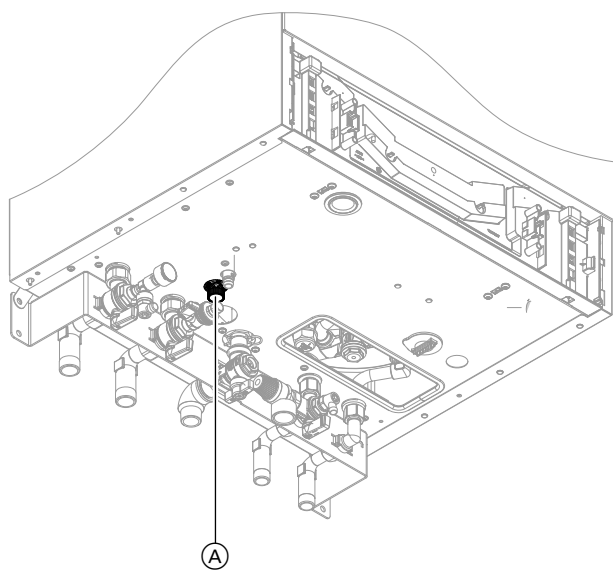


Fig. 31

1. Open top-up valve (A). Top up heating water.
2. Adjust system pressure.
3. Close top-up valve (A).



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



Danger

Risk of electric shock from escaping heating water or DHW.

When commissioning and after carrying out maintenance work, check all water side connections for leaks.



Venting the heating system

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

Activating the venting function

If the venting function is to be activated after commissioning.

Tap the following buttons:

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



Checking the gas type

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

- For operation with natural gas, no adjustment is therefore required across the entire Wobbe index range. The boiler can be operated within the Wobbe index range 9.5 to 15.2 kWh/m³ (34.2 to 54.7 MJ/m³).
 - For operation with LPG, the gas type needs to be changed on the control unit (see following chapter).
1. Determine the gas type and Wobbe index by asking your local gas supply utility or LPG supplier.
 2. Record the gas type in the service report.



Converting the gas type for operation with LPG and natural gas M

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



Removing the front panel

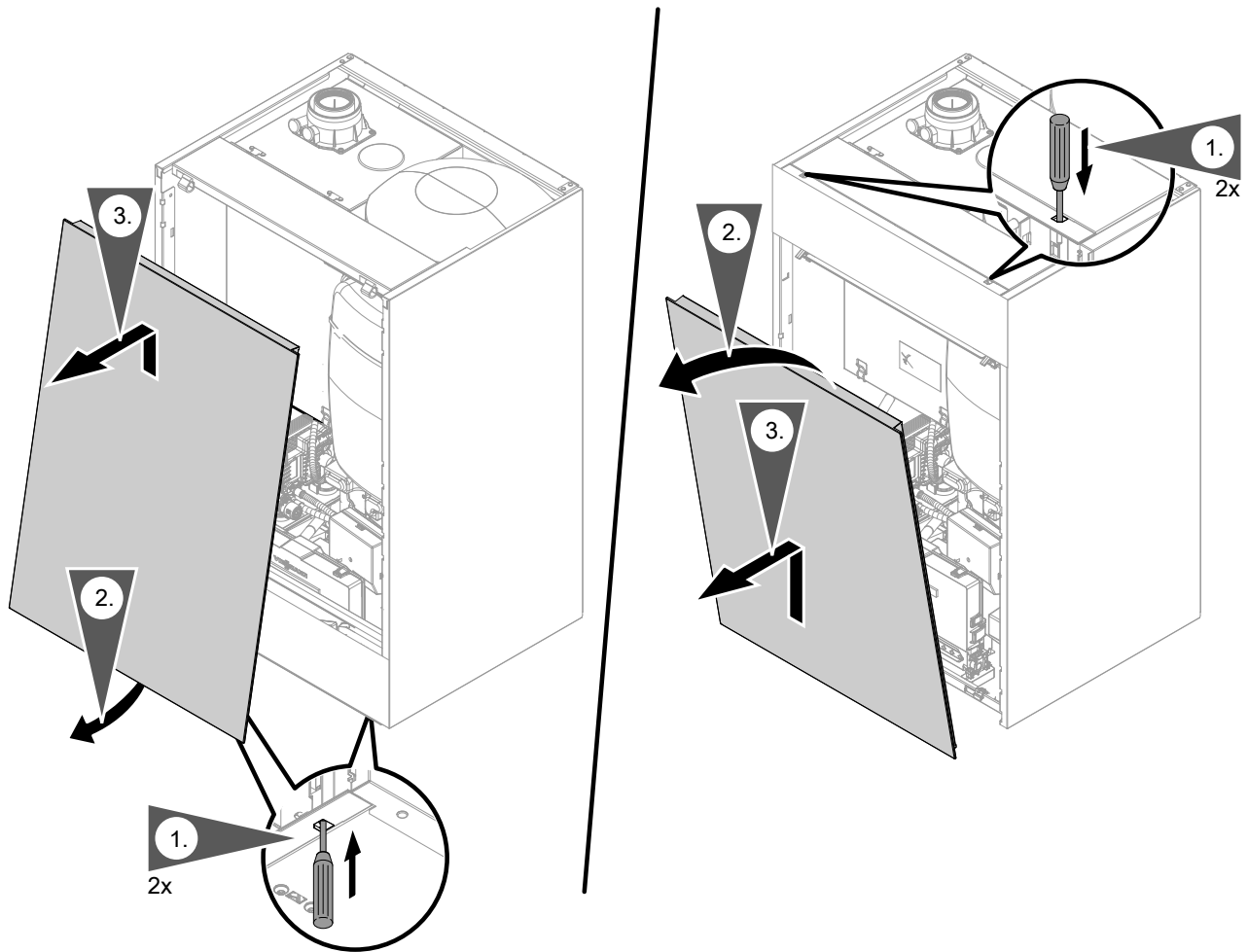


Fig. 32



Moving the programming unit to the maintenance position

To facilitate certain maintenance tasks, move the programming unit up or down, depending where it is located.

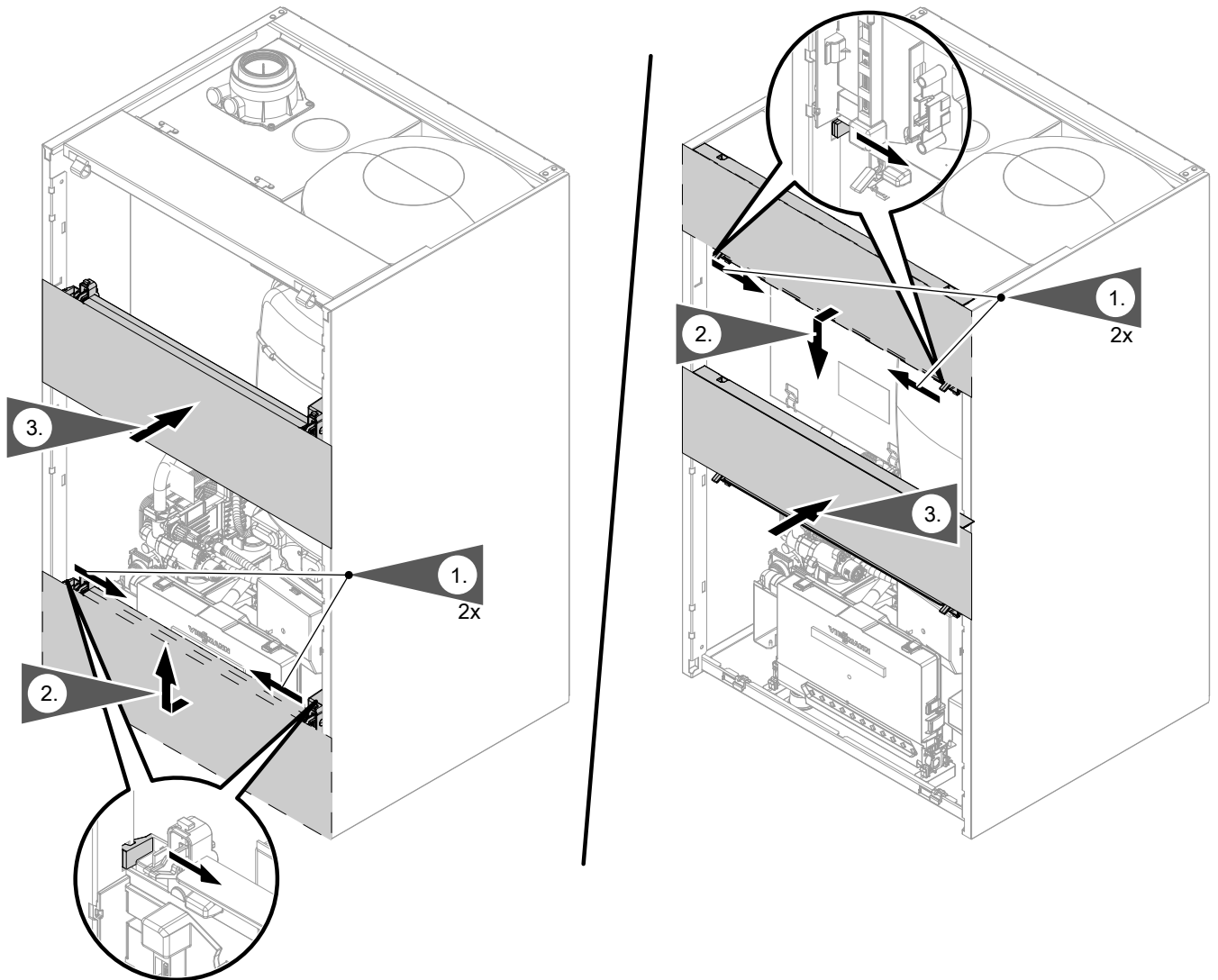


Fig. 33

Do not disconnect the plug from the mounting panel.
Do not alter where and how the cable is secured (fixing point of the cable tie).

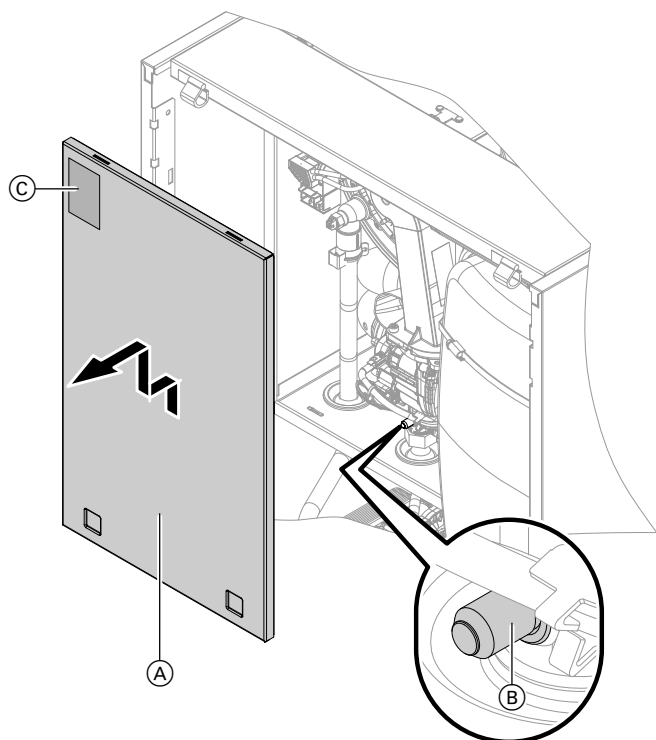


Fig. 34



Danger

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

Operation with LPG

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

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

Note

During commissioning, the appliance can enter a fault state if there are airlocks in the gas line. Reset the appliance after approx. 5 s (see operating instructions).

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

Note

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

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



Danger

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

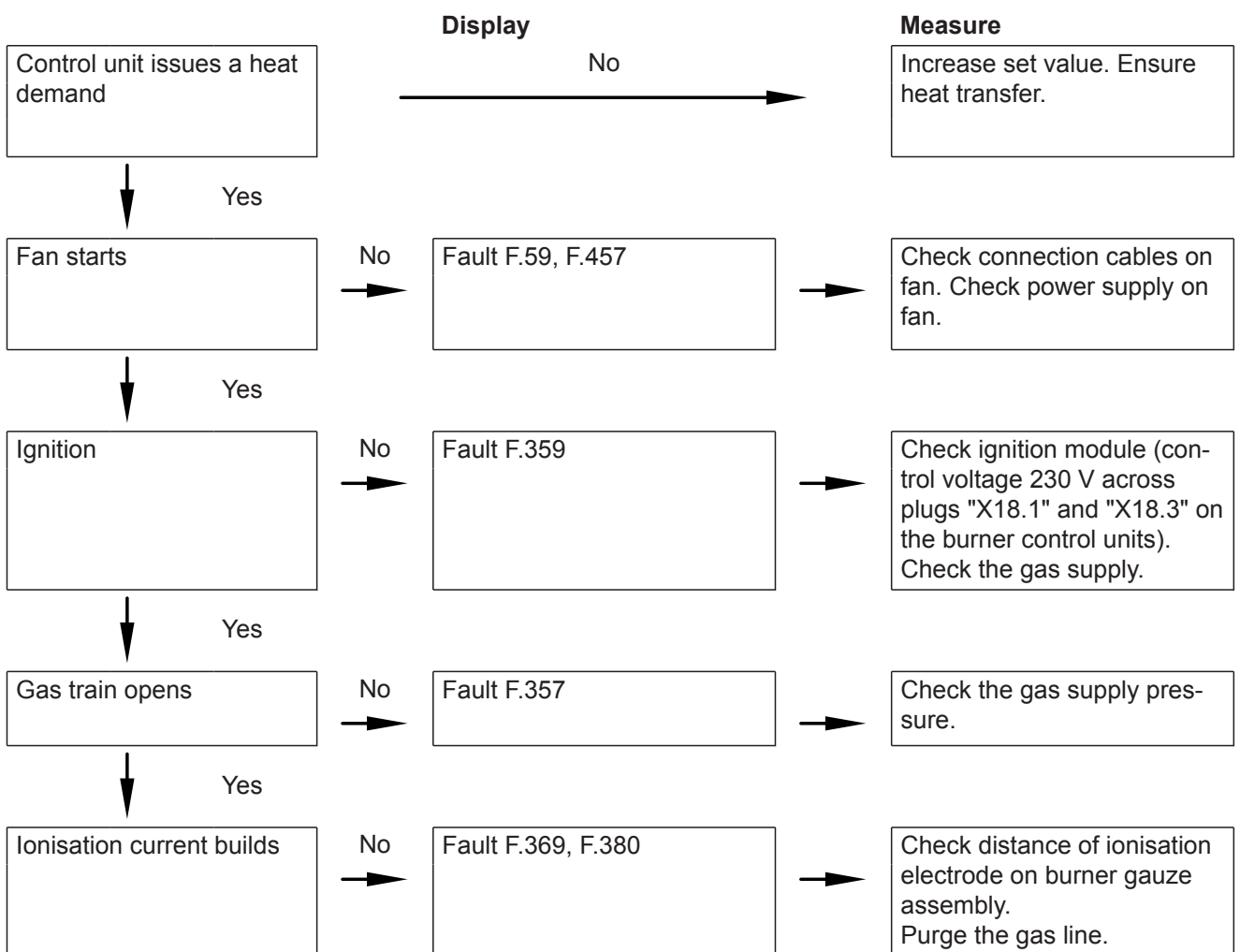


Checking the static pressure and supply pressure (cont.)

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 start the boiler. Notify your gas supply utility or LPG supplier.
13 to 33 mbar (1.3 to 3.3 kPa)	17 to 33 mbar (1.7 to 3.3 kPa)	18 to 33 mbar (1.8 to 3.3 kPa)	16 to 33 mbar (1.6 to 3.3 kPa)	25 to 57.5 mbar (2.5 to 5.75 kPa)	Start the boiler.
Above 33 mbar (3.3 kPa)	Above 33 mbar (3.3 kPa)	Above 33 mbar (3.3 kPa)	Above 33 mbar (3.3 kPa)	Above 57.5 mbar (5.75 kPa)	Install a separate gas pressure governor upstream of the system. Set the pre-charge pressure to 20 mbar (2.0 kPa) for natural gas and 50 mbar (5.0 kPa) for LPG. Notify your gas supply utility or LPG supplier.

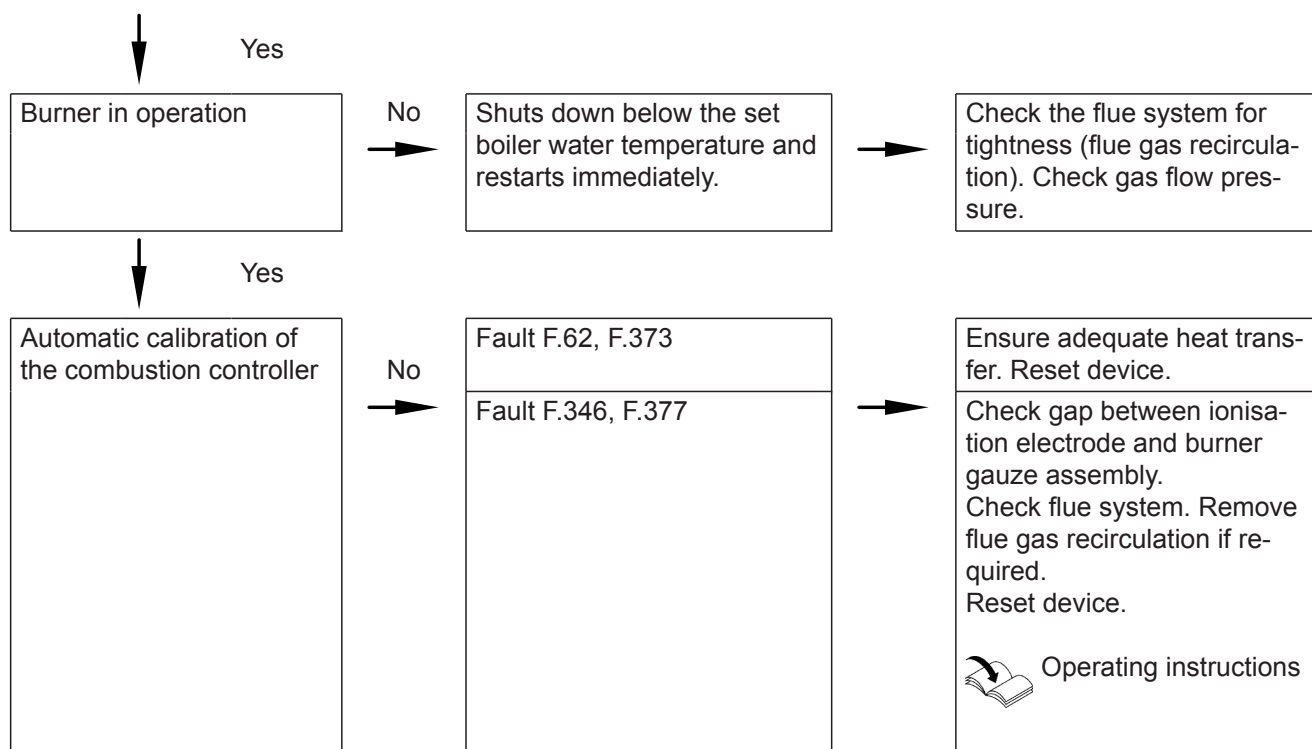


Function sequence and possible faults





Function sequence and possible faults (cont.)



For further details regarding faults, see page "Troubleshooting".



Setting the max. heating output

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

Note

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

Tap the following buttons:

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



Adjusting the pump rate of the integral circulation pump

Operation of the integral circulation pump as heating circuit pump for heating circuit 1

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



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

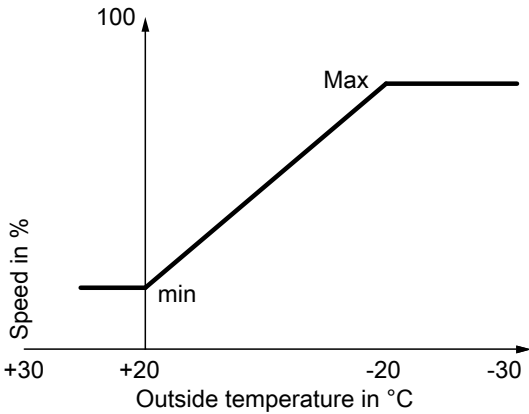


Fig. 35

Setting (%) in Heating circuit 1 group:

- Min. speed: Parameter 1102.0
- Max. speed: Parameter 1102.1

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

Rated heating output in kW	Speed settings in the delivered condition in %	
	Min. pump rate	Max. pump rate
11	65	65
19	65	75
25	65	90
32	65	100

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

Residual head of integral circulation pump

Vitodens 222-W to 25 kW

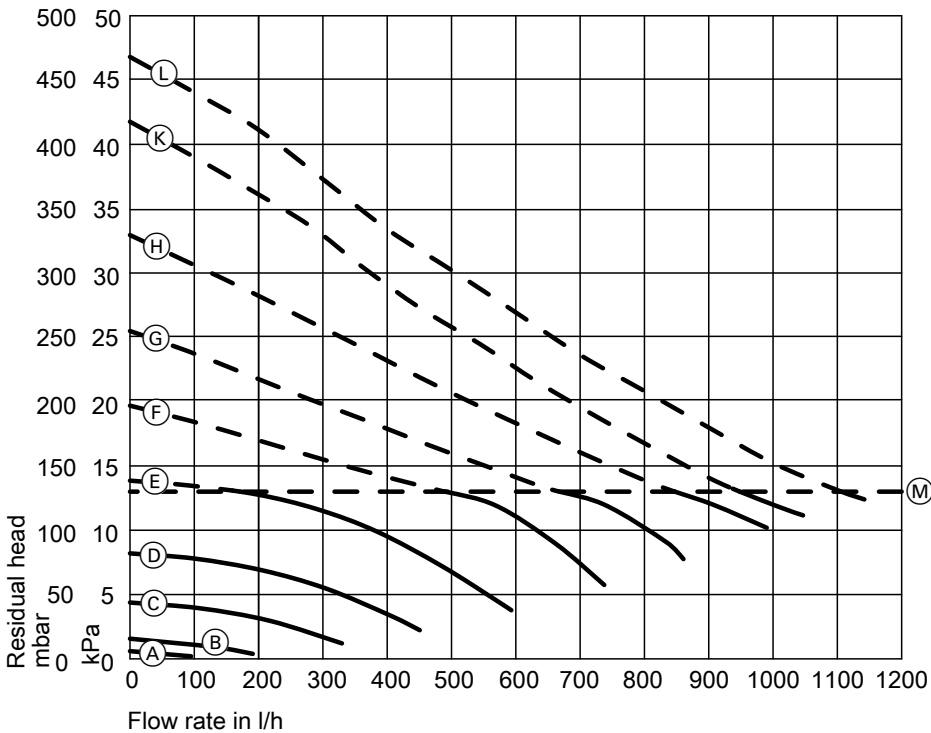


Fig. 36

Ⓜ Upper operational limit





Vitodens 222-W with 32 kW

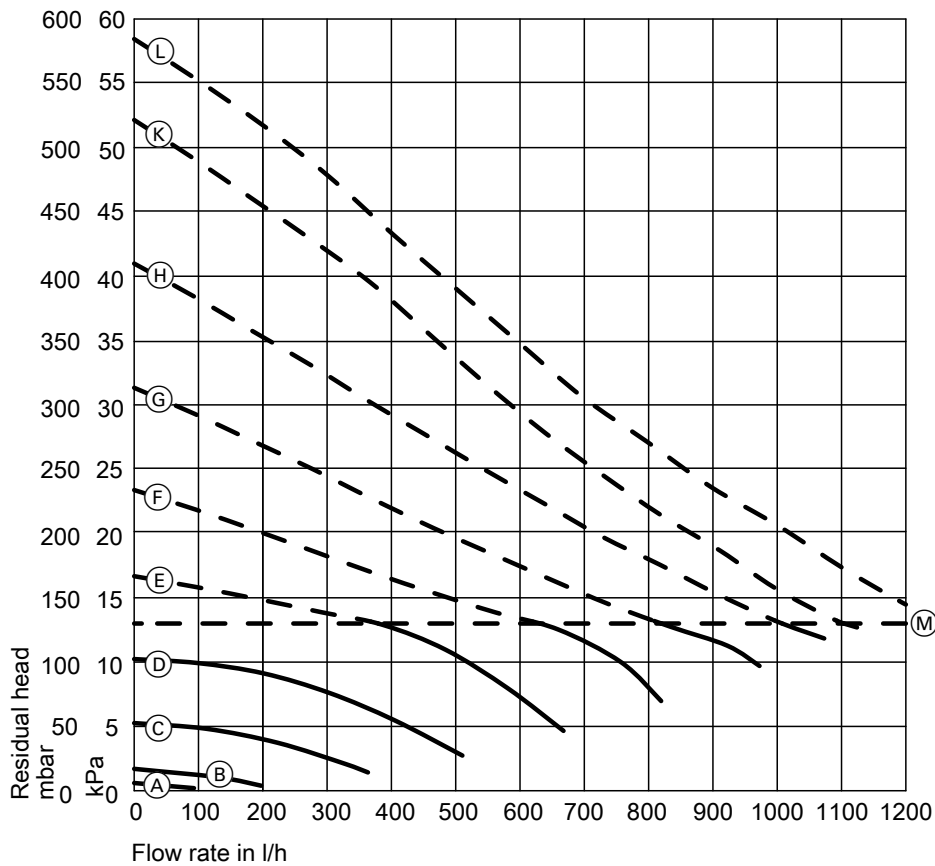


Fig. 37

(M) Upper operational limit

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



Screed drying

6 different temperature profiles can be set for screed drying:
 Preset temperature profiles can be adjusted via parameter **897.0 "Screed drying"** in the General group.
 For further details, see "Function description".

Note

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



Tightness test on balanced flue system (annular gap check)

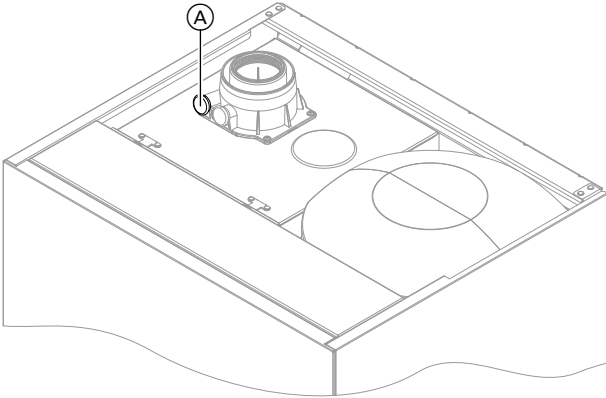


Fig. 38

Ⓐ Combustion air aperture

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

In this case, we recommend that a simple tightness test is carried out during system commissioning. For this, check the 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 greater or O₂ values are lower, then pressure test the flue pipe with a static pressure of 200 Pa.



Please note

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



Removing the burner

Note

- If the programming unit is located at the top: Move the programming unit down into the maintenance position. See page 45.
- Remove the cover panel; see page 46.

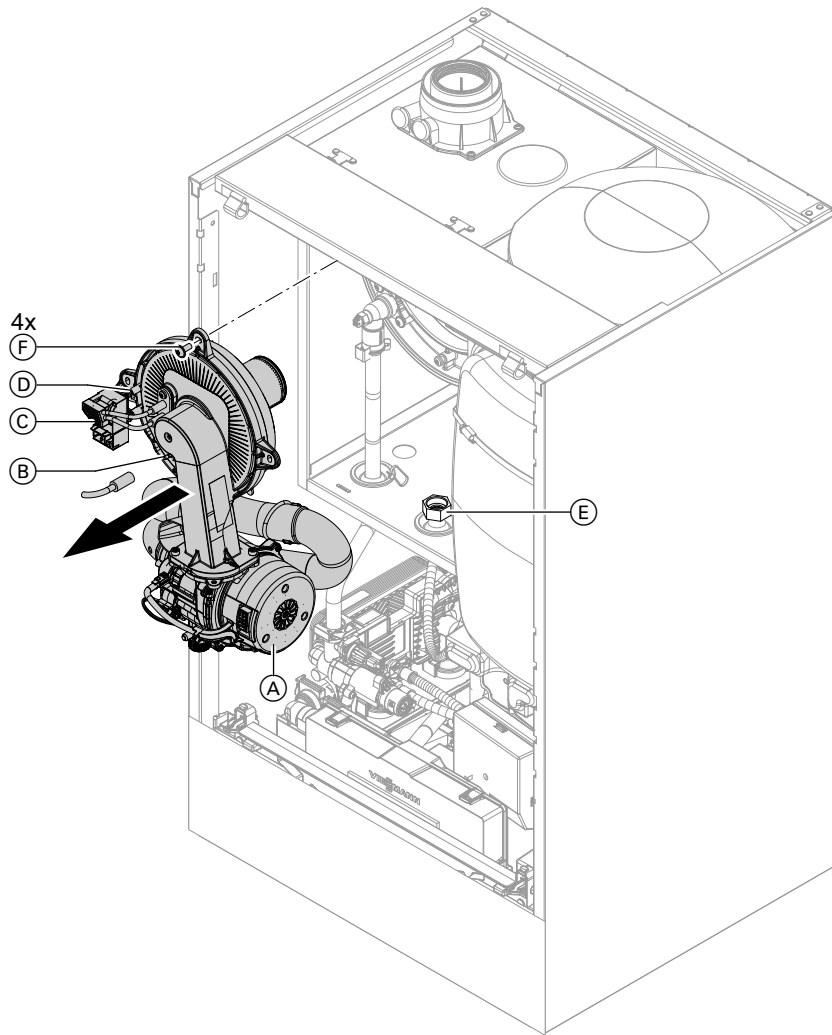


Fig. 39

1. Turn off the ON/OFF switch.
2. Close the gas shut-off valve and safeguard against reopening.
3. Disconnect cables and leads from:
 - Fan motor (A) (2 plugs)
 - Ionisation electrode (B)
 - Ignition unit (C)
 - Earth (D)
4. Undo gas supply pipe fitting (E).
5. Undo four screws (F) and remove the burner.

Note

Cover gas connection (E) so that no small parts can fall into it.



Checking the burner gasket and burner gauze assembly

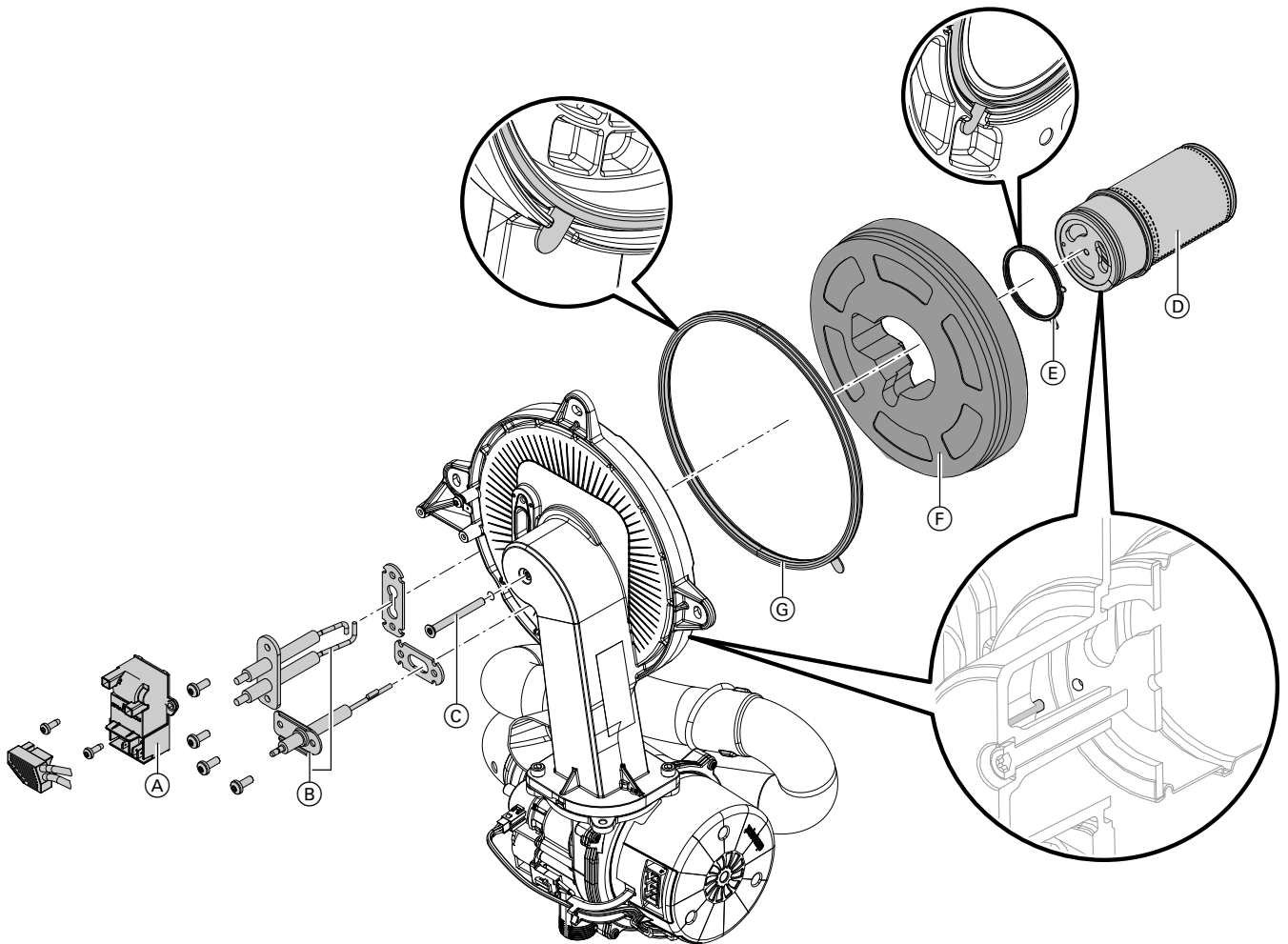


Fig. 40

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

Note

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

1. Disconnect plug with ignition electrode leads from ignition unit (A).
2. Remove electrodes (B).
3. Undo Torx screw (C). Hold onto burner gauze assembly (D) when undoing the screw.
4. Remove burner gauze assembly (D) with gasket (E) and thermal insulation ring (F). Check components for damage.
5. Install new burner gasket (G). Observe correct installation position. Align the tab as per the diagram.
6. Insert thermal insulation ring (F) and burner gauze assembly (D) with gasket (E). Observe correct installation position. Align the tab as per the diagram.
7. Align the hole in burner gauze assembly (D) with the burner door pin. Secure burner gauze assembly (D) and gasket (E) with Torx screw (C). Torque: 3.0 Nm.
8. Check thermal insulation ring (F) for firm seating.
9. Fit electrodes (B). Check clearances, see following chapter. Torque: 4.5 Nm.



Checking and adjusting the ignition and ionisation electrodes

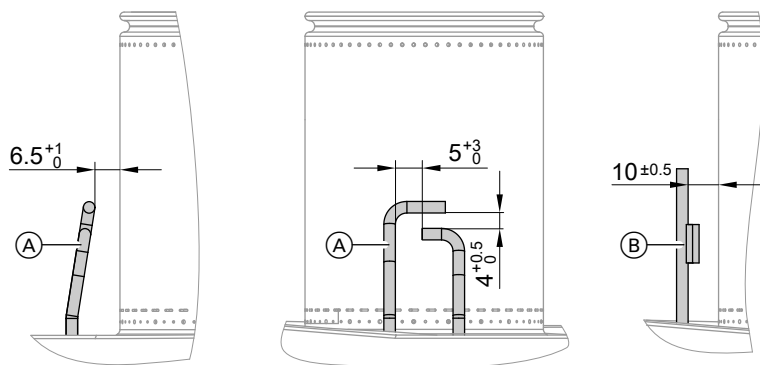


Fig. 41

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

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



Checking the back draught safety devices

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

Back draught safety device in the mixing shaft of the burner

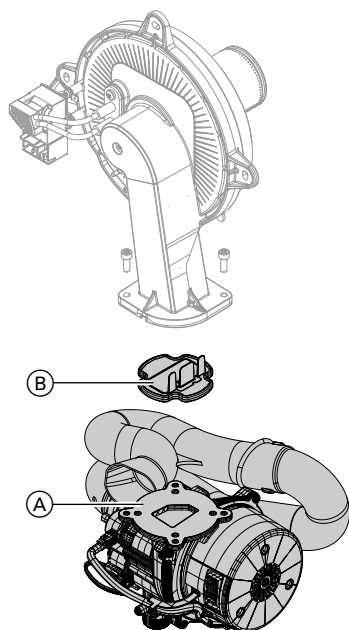


Fig. 42

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).

Note

Observe correct installation position.

5. Refit fan (A) and secure with 2 screws. Torque: 4.0 Nm

Back draught safety device in the flue gas connection

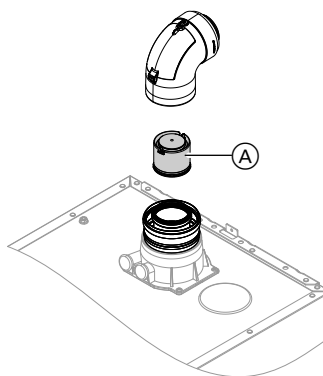


Fig. 43



Checking the back draught safety devices (cont.)

1. Remove the balanced flue system.

Note

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

2. Check back draught safety device (A) for dirt, ease of movement and function.

3. Refit the balanced flue system.

4. Pour a small amount of water through the inspection port to ensure the back draught safety device is working.



Cleaning the heating surfaces



Please note

Scratches to the surfaces of the heat exchanger that come into contact with hot gas can result in corrosion damage. Brushing can cause deposits to become lodged in the gaps between the coils.

Never use brushes to clean the heating surfaces.



Please note

Prevent damage due to cleaning water. Cover electronic components with suitable watertight material.

Note

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

The use of chemical cleaning agents is not required.

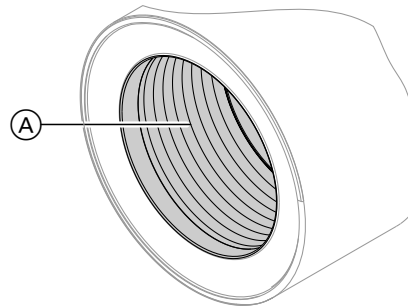


Fig. 44

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. Clean the trap: See the following chapter.



Checking the condensate drain and cleaning the trap



Please note

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

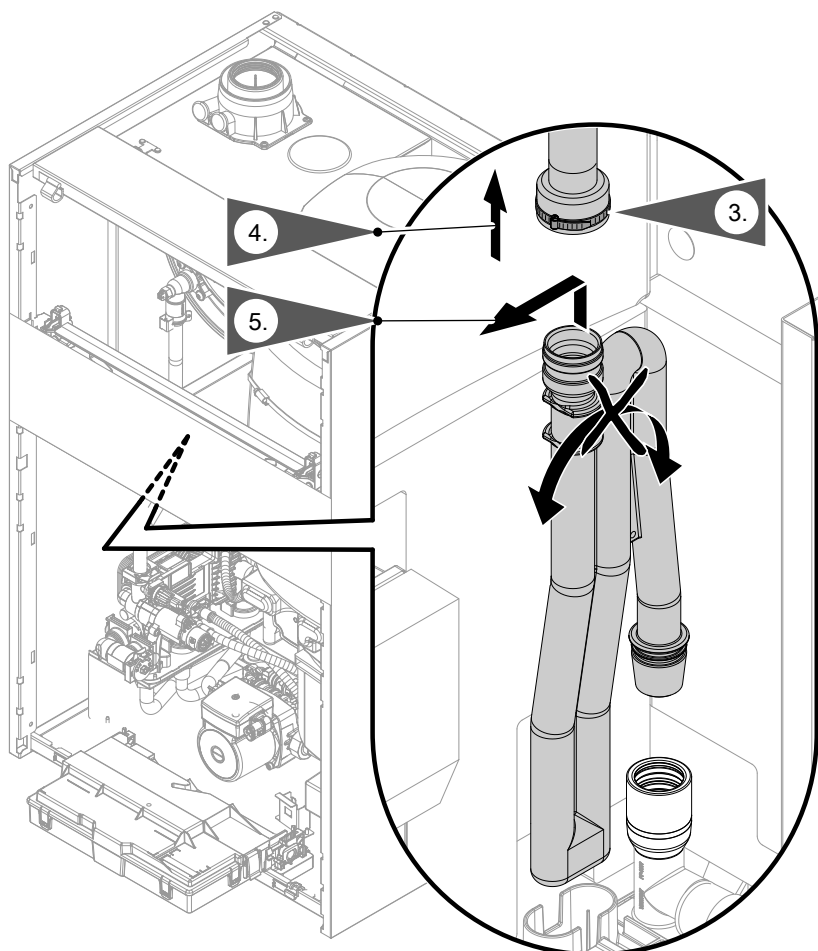


Fig. 45

1. Move the bracket together with the programming unit upwards. See "Moving the programming unit to the maintenance position".
2. Pivot the HMU heat management unit forwards.
3. Remove the cable ties.
4. Remove the black supply hose.
5. Pull trap upwards out of the drain connection.
6. Hold trap as straight as possible and remove. Ensure that no condensate runs out.
7. Clean the trap.
8. Fill the trap with water and reattach it to the drain connection.

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

9. Reconnect the supply hose and secure in place with cable ties.
10. **!** **Danger**
 Risk of electric shock from escaping condensate and risk of poisoning from escaping flue gas.
 Check the connections for leaks and check that the trap is seated correctly.

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

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



Installing the burner

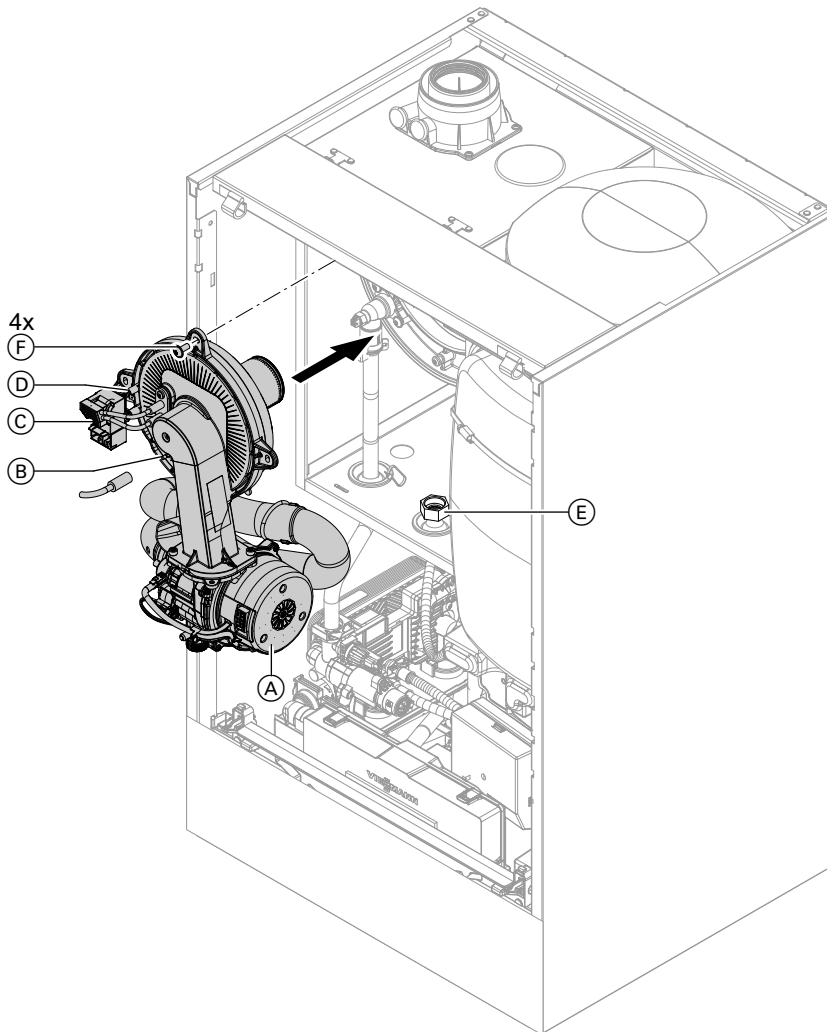


Fig. 46

1. If necessary, move the programming unit.
2. Insert the burner. Tighten screws (F) diagonally.
Torque: 6.5 Nm
3. Fit gas supply pipe (E) with a new gasket.
Torque: 30 Nm
4. Check the gas connections for leaks.
5. Connect the cables/leads:
 - Fan motor (A) (2 plugs)
 - Ionisation electrode (B)
 - Ignition unit (C)
 - Earth (D)



Danger

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



Checking the neutralising system (if installed)



Checking the expansion vessel and system pressure

Note

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

Therefore check the expansion vessel pre-charge pressure annually.

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

Carry out this test on a cold system.

1. Drain the system until "0" is shown on the pressure indicator.
2. If the pre-charge pressure of the expansion vessel is lower than the static system pressure: Top up with nitrogen at the valve of the diaphragm expansion vessel until the pre-charge pressure is 0.1 to 0.2 bar (10 to 20 kPa) higher than the static system pressure.

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

Note

The expansion vessel is supplied from the factory with a pre-charge pressure of 0.7 bar.

Do not allow the pre-charge pressure to fall below this value (boiling noises). This also applies to single floor heating systems or attic heating centres (no static pressure).

Top up with water until the charge pressure is 0.1 to 0.2 bar above the pre-charge pressure.





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

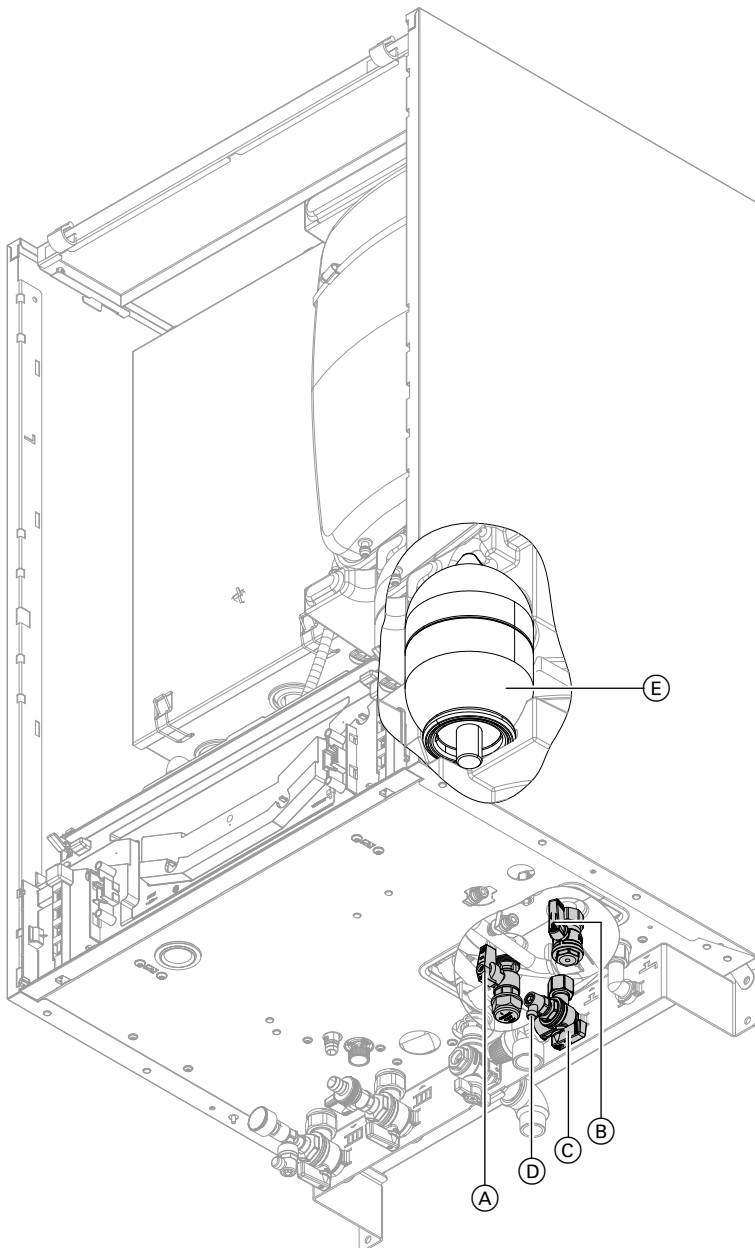


Fig. 47

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 levers on valves (A) and (B) to the "right-hand" position.
4. Close cold water supply (C).
5. Drain the pipe via air vent valve (D).
6. Check the pre-charge pressure of DHW expansion vessel (E) and adjust if necessary. Set value: Static pressure minus 0.2 bar (20 kPa)
7. Return the levers of valves (A) and (B) to the "top" position. Open cold water supply (C) and the on-site shut-off valve in the cold water line.



Checking the safety valve function



Checking the electrical connections for firm seating



Checking all gas equipment for tightness at operating pressure



Danger

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

Note

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



Fitting the front panel

See page 33.



Checking the combustion quality

The electronic combustion controller automatically ensures optimum combustion quality. During commissioning/maintenance, only the combustion values need to be checked. To do this, test the CO content and CO₂ or O₂ content, and record these in the report on page 117.

Note

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

Permissible CO content

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

Permissible CO₂ or O₂ content

Operation with natural gas

Rated heating output (kW)	CO ₂ content (%)		O ₂ content (%)	
	Upper heating output	Lower heating output	Upper heating output	Lower heating output
11	7.3 - 10.5	7.5 - 10.5	2.1 - 7.9	2.1 - 7.6
19	7.5 - 10.5	7.5 - 10.5	2.1 - 7.6	2.1 - 7.6
25	7.5 - 10.5	7.5 - 10.5	2.1 - 7.6	2.1 - 7.6
32	7.3 - 10.0	7.5 - 10.5	3.1 - 7.9	2.1 - 7.6

Operation with LPG

- CO₂ content: 8.4 - 11.8 %
- O₂ content: 3.1 - 8.1 %

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

- Check the balanced flue system for tightness; see page 51.
- Check the ionisation electrode and connecting cable; see page 54.

Note

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



Checking the combustion quality (cont.)

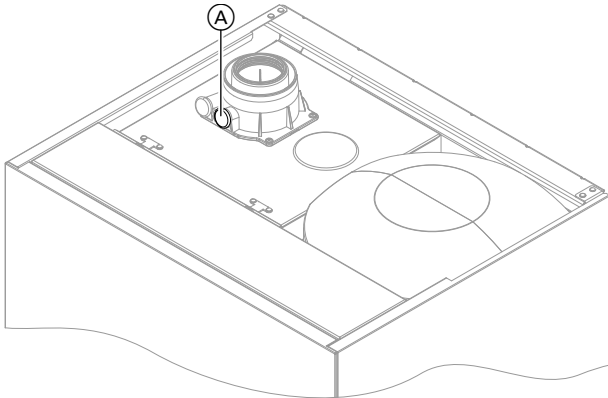


Fig. 48

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. Create a heat demand.
3. Adjust the lower heating output. See the following chapter.
4. Check the CO₂ content. If the actual value deviates from the permissible ranges, implement steps listed above.
5. Enter the actual value into the report.
6. Adjust the upper heating output. See the following chapter.
7. Check the CO₂ content. If the actual value deviates from the permissible ranges by more than 1 %, implement steps listed above.
8. Enter the actual value into the report.
9. Re-seal test port (A).



Danger

Escaping flue gas can damage your health. Check test port (A) for leaks.

Setting the upper/lower heating output

Note

Ensure adequate heat transfer.

Tap the following buttons:

1. and **OK** – press simultaneously for approx. 4 s, then release.
2. Use to select "**Actuator test**".
3. **OK**
4. Use to select the "**Heating**" group.
5. **OK**
6. Use to select "**Primary circuit pump, speed**".
7. **OK**
8. Use to set the max. value.
9. **OK**
- 10.
11. Use to select the "**Boiler**" group.
12. **OK**
13. Use to select "**Burner modulation, set value**".
14. **OK**
15. Set the lower heating output:
Select "**Minimum heating output**".
Confirm with "**OK**".
The burner now operates at the lower heating output.
16. Set the upper heating output:
Select "**Maximum heating output**".
Confirm with "**OK**".
The burner now operates at the upper heating output.



Checking the flue system for unrestricted flow and leaks



Checking the external LPG safety valve (if installed)



Matching the control unit to the heating system

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

Set the parameters according to the accessories fitted:



Accessories installation and service instructions



Adjusting heating curves

Tap the following buttons:

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



Calling up and resetting the service display

Checking service messages

- 1.
2. Use to select "Active messages".
3. **OK**
4. Use to select "Service".
5. **OK**
Existing messages are displayed.

Service reset (after service has been carried out)

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



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.

**Instructing the system user** (cont.)**DHW hygiene**

For optimum DHW hygiene, avoid DHW temperatures that are $< 50\text{ }^{\circ}\text{C}$. For larger systems and systems with low water exchange, the temperature should not drop below $< 60\text{ }^{\circ}\text{C}$.

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

Hygiene function

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



Calling up parameters

Calling up parameters

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

Note

The display and setting of some parameters is dependent on:

- Heat generator
- Connected accessories and the functions associated with them

Tap the following buttons:

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

2. Use to select "**System configuration**".
3. **OK**
4. Use to select the required group.
5. **OK**
6. Use to select the parameter to be set. See tables below.
7. **OK**
8. for the required value.
9. **OK**

General

Note

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

508.0 "UTC time zone"

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

528.0 "Set flow temperature for external demand"

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

896.0 "Display correction for outside temperature"

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

General (cont.)**897.0 "Screed drying"**

Setting		Explanations
Not active	0	Screed drying can be set in accordance with selectable temperature/time profiles. For individual profile curves, see chapter "Function description".
Diagram 1	2	
Diagram 2	3	
Diagram 3	4	
Diagram 4	5	
Diagram 5	6	
Diagram 6	7	

912.0 "Automatic summer/wintertime changeover"

Setting		Explanations
No	0	Automatic changeover disabled
Yes	1	Automatic changeover enabled

912.1 "Earliest day of changeover from winter to summertime"

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

912.2 "Month of changeover from winter to summertime"

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

912.3 "Earliest day of changeover from summer to wintertime"

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

912.4 "Month of changeover from summer to wintertime"

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

1098.4 "Gas volume correction factor"

Setting		Explanations
	1.0000	Value is provided on the gas supplier's bill. Used for gas consumption data.
	0.7000 to 1.0000	Gas volume correction factor adjustable from 0.7000 to 1.0000 in increments of 0.0001.

System configuration (parameters)

General (cont.)

1098.5 "Calorific value"

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

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

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

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

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

1504.0 "Source for date and time"

Setting		Explanations
Local	0	Selection of source for date and time The setting depends on the heat generator and accessories. Factory setting: The date and time are adopted from the control unit.
	1	Internet protocol (see parameter "508.0")

Boiler

Note

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

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

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

Boiler (cont.)**522.3 "Interval until the next service"**

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

596.0 "Maximum heating output"

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

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

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

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

Setting		Explanations
	...	Set speed of internal circulation pump <ul style="list-style-type: none"> ▪ In heating mode ▪ With external demand ▪ With demand in conjunction with a low loss header
	20 to 100	Delivered condition specified by settings specific to the appliance Set speed adjustable from 20 to 100 %

1411.0 "Clear maintenance messages"

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

1503.0 "Minimum heating output"

Setting		Explanations
	...	A limit can be set on the minimum heating output for heating mode.
	5 to 100	Delivered condition specified by settings specific to the appliance Adjustable from 5 to 100 %

System configuration (parameters)

Boiler (cont.)

1606.0 "Minimum burner pause time"

Setting		Explanations
	0	The minimum burner pause time can be set subject to boiler load.
	1	Fixed setting for minimum burner pause time
		Delivered condition, integral method (see parameter 1606.4)

1606.4 "Integral threshold for burner switch-off"


Setting		Explanations
	50	Only effective if parameter 1606.0 has been set to 1. Factory setting 50 K x min
	5 to 255	Adjustable from 5 to 255 K x min The higher the value, the later the burner switches off.

DHW (domestic hot water)

Note

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

503.0 "Scald protection"

Setting		Explanations
OFF	0	The adjustable water temperature is limited to a maximum value. Scald protection OFF
		 Danger Risk of injury due to increased DHW temperature. Inform the system user of the risk from the higher outlet temperature at the taps.
ON	1	Scald protection ON (maximum DHW temperature 60 °C)
		Note <i>Even with the scald protection switched on, higher outlet temperatures may occur at the draw-off points in the following cases:</i> <ul style="list-style-type: none"> ▪ With active hygiene function ▪ While the appliance is being calibrated

1087.0 "Max. duration, DHW heating"

Setting		Explanations
	60	After a set period of time has elapsed, DHW heating ends even though the set DHW temperature has not yet been reached. Not adjustable on gas condensing combi boilers Factory setting 60 min
	0	No time limit for DHW heating
	1 to 240	Duration of DHW heating adjustable from 1 to 240 min in 1 min increments

Heating circuit 1, Heating circuit 2, Heating circuit 3

Note

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

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

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

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

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

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

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

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

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

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

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

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

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

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

933.3 "Priority, DHW heating, heating circuit 1"

Setting		Explanations
		Priority of DHW heating over the heating circuit Note <i>If several heating circuits are connected, only adjust in conjunction with low loss header.</i>
Off	0	Without DHW heating priority
DHW	1	With DHW heating priority

933.6 "Operating mode of heating circuit 1"

Setting		Explanations
Weather-compensated without room temperature hook-up	4	Only adjust for systems with one heating circuit. Heating mode: Weather-compensated without room temperature influence
Weather-compensated with room temperature hook-up	7	Weather-compensated with room temperature influence (see also parameter 933.7)

933.7 "Room influence factor, heating circuit 1"

Setting		Explanations
	8 0 to 64	The higher the value, the greater the influence of the room temperature on the set flow temperature of the heating circuit (heating curve). Operation with room temperature hook-up must be set for the heating circuit (parameter 933.6). Only change the value for systems with one heating circuit. For a sample calculation, see chapter "Heating curve" in the "Function description" Room influence factor Room influence adjustable from 0 to 64

934.3 "Priority, DHW heating, heating circuit 2"

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

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

934.5 "Differential temperature, heating circuit 2"

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

934.6 "Operating mode of heating circuit 2"

Setting		Explanations
Weather-compensated without room temperature hook-up	4	Heating mode: Weather-compensated without room temperature influence
Weather-compensated with room temperature hook-up	7	Weather-compensated with room temperature influence See also parameter 934.7

934.7 "Room influence factor, heating circuit 2"

Setting		Explanations
	8 0 to 64	The higher the value, the greater the influence of the room temperature on the set flow temperature of the heating circuit (heating curve). Operation with room temperature hook-up must be set for the heating circuit (parameter 934.6). Change value for heating circuit with mixer only. For a sample calculation, see chapter "Heating curve" in the "Function description" Room influence factor Room influence adjustable from 0 to 64

935.3 "Priority, DHW heating, heating circuit 3"

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

935.5 "Differential temperature, heating circuit 3"

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

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

935.6 "Operating mode of heating circuit 3"

Setting		Explanations
Weather-compensated without room temperature hook-up	4	Heating mode: Weather-compensated without room temperature influence Weather-compensated with room temperature influence See also parameter 935.7
Weather-compensated with room temperature hook-up	7	

935.7 "Room influence factor, heating circuit 3"

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

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

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

1102.1 "Max. speed of speed-controlled primary/heating circuit pump in standard mode, heating circuit 1"

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

1192.0 "Minimum flow temperature limit, heating circuit 1"

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

1192.1 "Maximum flow temperature limit, heating circuit 1"

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

Heating circuit 1, Heating circuit 2, Heating... (cont.)**1193.0 "Minimum flow temperature limit, heating circuit 2"**

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

1193.1 "Maximum flow temperature limit, heating circuit 2"

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

1194.0 "Minimum flow temperature limit, heating circuit 3"

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

1194.1 "Maximum flow temperature limit, heating circuit 3"

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

1395.1 "Heating limit: Economy function, outside temperature, heating circuit 1"

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

1396.1 "Heating limit: Economy function, outside temperature, heating circuit 2"

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

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

1397.1 "Heating limit: Economy function, outside temperature, heating circuit 3"

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

Subscriber numbers of connected extensions

All extensions connected to the heat generator (except the SDIO/SM1A electronics module) must have a subscriber number. The subscriber number is set on rotary switch S1 at each extension.

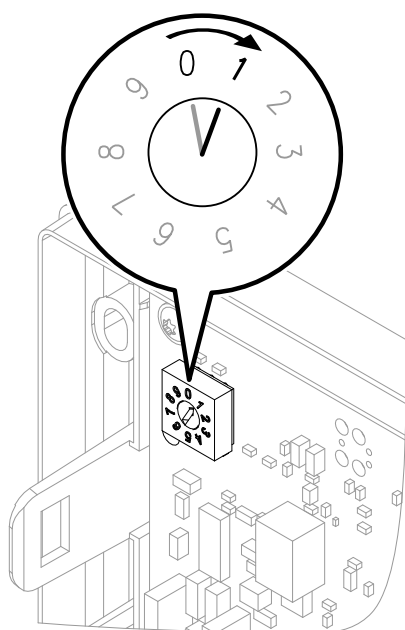


Fig. 49

Rotary switch S1 settings:

- EM-S1 extension (system with solar collectors): **0**
- EM-EA1 extension (max. 3 extensions in one system)
Consecutive no. (any sequence): **1** up to **3**
- EM-P1 extension
 - If no heating circuits with mixer are available in the system: **1**
 - If heating circuits with mixer (EM-M1 or EM-MX extensions) are present in the system: Always set subscriber number for EM-P1 extension to the consecutive number after EM-M1 or EM-MX extensions.
- EM-M1 or EM-MX extensions
 - Heating circuit 2 with mixer: Rotary switch on extension kit to **1**
 - Heating circuit 3 with mixer: Rotary switch on extension kit to **2**

Note


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

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

Service menu

Calling up the service menu

Tap the following buttons:

1.  and **OK** – press simultaneously for approx. 4 s, then release.
2. Select the required menu section.

Note

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

Note

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

Service menu overview

Service	
Active messages	
Reset service messages	
Connect to app	
Diagnostics	
	General
	Burner
	Heating circuit 1
	Heating circuit 2
	Heating circuit 3
	DHW
	Solar
	WiFi
Actuator test	
System configuration	
Message history	
Basic settings	
	Factory settings
	Commissioning assistant
Recognised devices	
Exit trade fair mode	

Exiting the service menu

Tap the following buttons:

 for 4 s.

Note

The system exits the service menu automatically after 30 min.

Diagnosis

Checking operating data

Operating data can be checked in various areas. See **"Diagnosis"** in the service menu overview.

Diagnosis (cont.)

Operating data on heating circuits with mixer can only be called up if such components are installed in the system.

Note

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

Calling up operating data

Tap the following buttons:

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

2. Use to select **"Diagnosis"**.
3. **OK**
4. Use to select the required group.
5. **OK**
6. Select the required information with .

Checking outputs (actuator test)

Note

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

Tap the following buttons:

1. and **OK** – press simultaneously for approx. 4 s, then release.
2. **"Actuator test"**
3. **OK**
4. **OK** to confirm the message.
5. Use to select the required group.

6. **OK**
7. Use to select the actuator. See the table below.
8. **OK**
9. for the required value.
10. **OK**

Note

The function is active for 30 min.

11. Use to end the Actuator test.

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

Display	Explanation
Boiler group	
Fan speed	Set value Burner fan speed in rpm (rotations/minute)
Burner modulation, set value	<ul style="list-style-type: none"> ▪ Off ▪ Minimum heating output ▪ Maximum heating output ▪ Maximum DHW output Modulation level (in accordance with specific heat generator settings)
3-way valve target position	Heating 3-way diverter valve set to heating mode Middle 3-way diverter valve in central position (filling/draining) DHW 3-way diverter valve set to DHW heating
Heating group	

Checking outputs (actuator test) (cont.)

Display		Explanation
Primary circuit pump speed	Set value	Internal circulation pump speed in %
3-way valve target position	Heating	3-way diverter valve set to heating mode
	Middle	3-way diverter valve in central position (filling/draining)
	DHW	3-way diverter valve set to DHW heating
Heating circuit 1 pump speed	Set value	Speed, heating circuit pump, heating circuit 1 without mixer in %
Heating circuit 2 pump speed	Set value	Speed, heating circuit pump, heating circuit 2 with mixer in %
Heating circuit 3 pump speed	Set value	Speed, heating circuit pump, heating circuit 3 with mixer in %
Mixer, heating circuit 2	Open	Output for "Mixer open" enabled (mixer extension kit)
	Stop	Current position is maintained
	Close	Output for "Mixer close" enabled
Mixer, heating circuit 3	Open	Output for "Mixer open" enabled (mixer extension kit)
	Stop	Current position is maintained
	Close	Output for "Mixer close" enabled
DHW group (domestic hot water)		
Primary circuit pump, set speed	Set value	Internal circulation pump in %
3-way valve target position	Heating	3-way diverter valve set to heating mode
	Middle	3-way diverter valve in central position (filling/draining)
	DHW	3-way diverter valve set to DHW heating
Cylinder loading pump	On	
	Off	
DHW circulation pump	On	
	Off	
Transfer pump hygiene function	On	
	Off	
Circulation pump for cylinder heating	On	
	Off	
Solar group		
Solar circuit pump, set speed	Set value	Speed, solar circuit pump in %
Transfer pump hygiene function	On	
	Off	
Solar circulation pump	On	
	Off	
Solar 3-way valve, target position	Open	
	Close	
	Stop	

Fault display on the programming unit

Fault display on the programming unit

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

Note







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

If "Connection error" appears on the display:





Check connecting cable and plug between HMI programming unit and HMI heat management unit.

Calling up fault messages

Tap the following buttons:

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

Acknowledging the fault display

1. 
2.  for "Active message"
3. OK
4.  for "Error" to display all fault messages.
5. OK
6.  for "Acknowledge" to acknowledge all fault messages.

Note

Service messages are also acknowledged.




Note

Any connected central fault message facility is switched off.

If an acknowledged fault is not remedied, the fault message will be redisplayed the following day at 07:00 h, and the fault message facility restarts.

Calling up acknowledged fault messages

Tap the following buttons:

1. 
2.  for "Active messages".
3. OK
4.  for "Error"
5. OK

Note

When troubleshooting, always observe the subscriber number of the component.

Check the component displayed. Remedy fault if applicable. The subscriber number of the component depends on the position of rotary switch S1 on the corresponding extension module. The rotary switch position was set during installation.

To identify the affected module, check the position of rotary switch S1 on the module if required.

The following is displayed:

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

Fault display on the programming unit (cont.)

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

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

Faults are sorted by date.

Tap the following buttons:

1. and **OK** – press simultaneously for approx. 4 s, then release.
2. for **"Message history"**
3. **OK**
4. Use to select the required category.
 - **"Faults"** to call up saved fault messages.
 - **"Service"** to call up saved service messages.
 - P.1 Interval until the next service
 - P.8 Interval in burner hours until the next service
 - **"Status"**, to call up the saved status messages.
 - S.60 Summer mode active (outside temperature economy function)
 - S.74 Heating suppression, heating
 - S.75 DHW circulation pump active
 - **"Warnings"** to call up saved warning messages.
 - A.11 System pressure has fallen below the standard range
Measure: Check system pressure and diaphragm expansion vessel.
Check settings for set system pressure and range in the commissioning assistant.
 - A.12 Real time clock battery flat.
Measure: Replace the battery (type CR2032) in the HMU heat management unit.
 - A.18 Possible condensate backup in the heat cell
Measure: Check the combustion chamber and condensate drain.
 - A.20 Service interval could not be activated.
Measure: Check the time and date settings.
 - A.21 System pressure has exceeded maximum pressure.
Measure: Check safety valve and diaphragm expansion vessel.
On combi boilers: Check plate heat exchanger
 - **"Information"**, to call up saved service information.
 - I.56 External demand active
 - I.57 External blocking active
 - I.59 Parameters were restored (parameter set was flashed to BCU electronics module).

5. **OK**

6. for the required message

7. **OK**

Deleting the message list

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

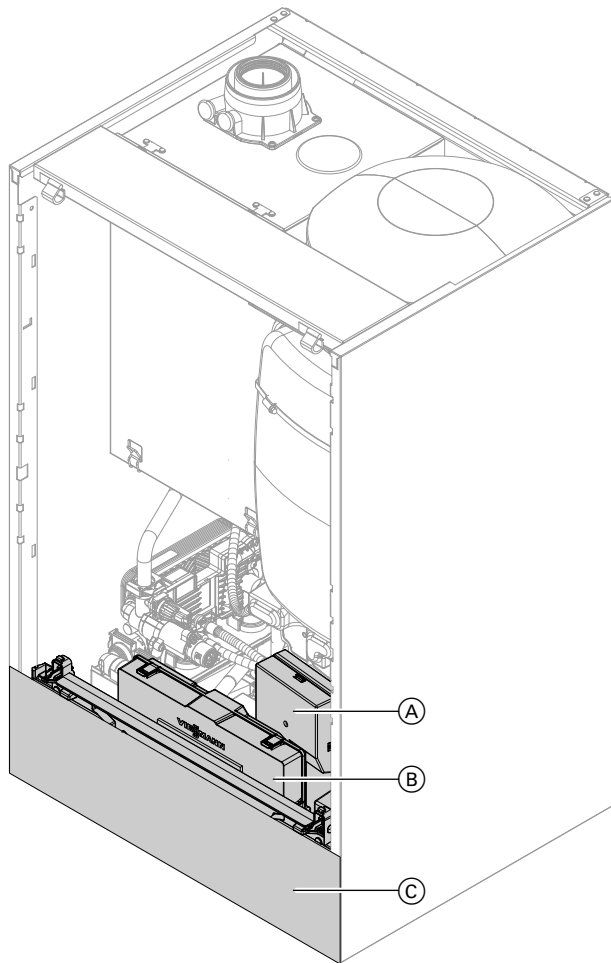


Fig. 50

- Ⓐ BCU burner control unit
- Ⓑ HMU heat management unit
- Ⓒ HMI programming unit with RF module

Fault messages

Note

For diagnosis and troubleshooting, see chapter "Repairs".

Fault messages are dependent on appliance equipment level.

Displayed fault code	System characteristics	Cause	Measures
F.5	Flow rate not being monitored. System continues operating in normal mode with replacement value.	Lead break or short circuit, flow sensor	<p>Check plug 33/X6 and cable between BCU burner control unit and flow sensor:</p> <ul style="list-style-type: none"> ▪ Check voltage level, to see if 5 V present at plug 33, pin 1 and 2. ▪ Turn the gas condensing boiler ON/OFF switch off and back on again.
F.7	No DHW heating	Lead break, cylinder temperature sensor	<ul style="list-style-type: none"> ▪ Check DHW setting in the commissioning assistant and correct if required. ▪ Check cylinder temperature sensor (plug 5, wires 3 and 4). ▪ Measure voltage at sensor input on electronics module. Set value: 3.3 V– with sensor disconnected. Replace faulty component if required.
F.8	No DHW heating	Short circuit, cylinder temperature sensor	<p>Check cylinder temperature sensor (plug 5, wires 3 and 4). Replace faulty component if required.</p>
F.9	No DHW heating	Lead break, outlet/flow sensor	<p>Check cable between BCU and sensor.</p>
F.10	No DHW heating	Short circuit, outlet/flow sensor	<p>Check cable between BCU and sensor.</p>
F.11	No solar DHW heating or central heating backup	Lead break, collector temperature sensor	<ul style="list-style-type: none"> ▪ Check collector temperature sensor. ▪ Measure voltage at sensor input on electronics module. Set value: 3.3 V– with sensor disconnected.
F.12	No solar DHW heating	Short circuit, collector temperature sensor	<ul style="list-style-type: none"> ▪ Check collector temperature sensor. ▪ Measure voltage at sensor input on electronics module. Set value: 3.3 V– with sensor disconnected.
F.13	Regulates as if the outside temperature were 0 °C.	Lead break, outside temperature sensor	<ul style="list-style-type: none"> ▪ Check operating mode setting in commissioning assistant and remedy if required. ▪ Check outside temperature sensor. ▪ Measure voltage at sensor input on electronics module. Set value: 3.3 V– with sensor disconnected. Replace faulty component if required.
F.14	Regulates as if the outside temperature were 0 °C.	Short circuit, outside temperature sensor	<p>Check outside temperature sensor.</p>



Fault messages (cont.)

Displayed fault code	System characteristics	Cause	Measures
F.15	No solar DHW heating or central heating backup	Lead break, cylinder temperature sensor	Check cylinder temperature sensor. Measure voltage at sensor input on electronics module. Set value: 3.3 V– with sensor disconnected.
F.16	No solar DHW heating	Short circuit, cylinder temperature sensor	Check cylinder temperature sensor. Measure voltage at sensor input on electronics module. Set value: 3.3 V– with sensor disconnected.
F.29	Regulates without flow temperature sensor for low loss header.	Lead break, low loss header sensor	<ul style="list-style-type: none"> ▪ Check commissioning assistant setting, low loss header. ▪ Check flow temperature sensor, low loss header. ▪ Measure voltage at sensor input on electronics module. Set value: 3.3 V– with sensor disconnected.
F.30	Regulates without flow temperature sensor for low loss header.	Short circuit, low loss header sensor	Check flow temperature sensor, low loss header. Measure voltage at sensor input on electronics module. Set value: 3.3 V– with sensor disconnected.
F.49	Burner in a fault state	Lead break, flue gas temperature sensor	Check flue gas temperature sensor. Reset the appliance.
F.50	Burner in a fault state	Short circuit, flue gas temperature sensor	Check flue gas temperature sensor. Reset the appliance.
F.57	Control mode without room influence	Lead break, room temperature sensor	<ul style="list-style-type: none"> ▪ Check commissioning setting of remote control. ▪ Check plug and cable of external room temperature sensor, heating circuit. ▪ If no external room temperature sensor installed, replace Vitotrol programming unit.
F.58	Control mode without room influence	Short circuit, room temperature sensor	Check plug and cable of external room temperature sensor, heating circuit. If no external room temperature sensor installed, replace Vitotrol programming unit.
F.59	Burner locked out	Power supply, low voltage	Check mains voltage. If voltage is correct and the fault occurs repeatedly, replace the fan unit.

Fault messages (cont.)

Displayed fault code	System characteristics	Cause	Measures
F.62	Burner in a fault state	High limit safety cut-out has responded.	<ul style="list-style-type: none"> ▪ Check heating system fill level. ▪ Check pre-charge pressure in diaphragm expansion vessel. Adjust to required system pressure. ▪ Check whether flow rate is sufficient (flow sensor and circulation pump). ▪ Check 3-way diverter valve function in actuator test. Vent the system. Reset the appliance.
F.63	Burner in a fault state	Flue gas temperature limiter has responded.	<ul style="list-style-type: none"> ▪ Check heating system fill level. ▪ Check pre-charge pressure in diaphragm expansion vessel. Adjust to required system pressure. ▪ Check whether flow rate is sufficient (flow sensor and circulation pump). ▪ Check 3-way diverter valve function in actuator test. Vent the system. Reset the appliance once the flue system has cooled down.
F.67	Burner in a fault state	Ionisation current lies outside the permissible range	Check gas supply (gas pressure and gas flow switch), check gas solenoid valve and inlet strainer. Check ionisation electrode for the following: <ul style="list-style-type: none"> ▪ Clearance to burner gauze assembly ▪ Check electrode/burner gauze assembly for contamination. If specified measures don't help, replace fan unit. Reset the appliance.
F.68	Burner in a fault state	Flame signal is already present at burner start.	Close the gas shut-off valve. Remove connecting cable of the ionisation electrode. Reset the appliance. If the fault continues to persist, replace BCU burner control unit (see page 102)



Fault messages (cont.)

Displayed fault code	System characteristics	Cause	Measures
F.69	Burner in a fault state	Ionisation current lies outside the permissible range	<p>Check ionisation electrode for the following:</p> <ul style="list-style-type: none"> ▪ Check whether insulation block is touching electrode ceramic. ▪ Check gas train: Activate "Minimum heating output" for approx. 4 min in actuator test. If this causes a fault to occur, replace BCU burner control unit. ▪ In the actuator test, switch from "Minimum heating output" to "Maximum heating output". If this fault occurs during modulation, check the intake screen for contamination. Replace the fan unit if necessary.
F.70	Burner in a fault state	Internal burner control unit fault	Replace BCU burner control unit (see page 102).
F.71	Burner in a fault state	Fan speed too low	<ul style="list-style-type: none"> ▪ Check fan for blockage. ▪ Check setting for gas type and flue system. Reset the appliance.
F.72	Burner in a fault state	Fan idle state not reached	Reset the appliance. If fault occurs repeatedly, replace fan unit.
F.73	Burner in a fault state	Internal communication error	Reset the appliance. If fault occurs repeatedly, replace BCU burner control unit (see page 102).
F.74	Burner locked out. Internal circulation pump off. No central heating and no DHW heating.	System pressure too low	Top up with water. Vent the system. If the fault occurs repeatedly: <ul style="list-style-type: none"> ▪ Check system pressure sensor with external pressure gauge. ▪ Check diaphragm expansion vessel pre-charge pressure. ▪ Check settings for set system pressure and range.
F.77	Burner in a fault state	Data memory burner control unit	Reset the appliance. If fault occurs repeatedly, replace BCU burner control unit (see page 102).
F.89	No central heating and no DHW heating	Internal circulation pump blocked	Check circulation pump. Replace if necessary.
F.91	Function of affected extension in emergency mode	DIO electronics module communication error	Check connections to DIO electronics module and connection to heat management unit.

Fault messages (cont.)

Displayed fault code	System characteristics	Cause	Measures
F.92	Function of the relevant electronics module in emergency mode	ADIO electronics module communication error	<ul style="list-style-type: none"> ▪ Check setting in the commissioning assistant and correct if required. ▪ Check connections and leads to the ADIO electronics module. ▪ Check PlusBus voltage level (24 to 28 V). ▪ Check subscriber number on rotary switch S1 and correct if required.
F.94	Function of the relevant electronics module in emergency mode. No solar central heating backup.	SDIO electronics module communication error	<ul style="list-style-type: none"> ▪ Check setting in the commissioning assistant and correct if required. ▪ Check connections and leads to the SDIO electronics module. ▪ Check PlusBus voltage level (24 to 28 V).
F.100	Electronics modules connected to PlusBus not functioning	Voltage error PlusBus	<p>Check whether the PlusBus power supply on the HMU heat management unit is OK: Remove all connected PlusBus components and reconnect one by one.</p> <p>Check that there aren't more than 2 Vitotrol 200-E connected to the HMU.</p> <p>Check whether there is a short circuit at the PlusBus cable.</p>
F.104	Depending on configuration of EM-EA1 extension (DIO electronics module)	External fault message input active	Check connected external device.
F.142	Burner in a fault state	Communication error, CAN bus	<ul style="list-style-type: none"> ▪ Check the fan unit for correct function. For this, check the stepper motor of the fan unit (reference run with mains ON). ▪ If the fault still persists, visually check the plug-in connections and cables of the CAN bus. ▪ Check further CAN bus subscribers. <p>If fault still persists, replace the fan unit.</p>
F.160	Burner in a fault state	Communication error, CAN bus	<ul style="list-style-type: none"> ▪ If "Connection error" is displayed, check the internal CAN bus subscriber connections. ▪ If only F.160 is displayed, check the connections of the external CAN bus subscribers. ▪ Check the connecting cables for secure seating and corrosion. <p>Reset the appliance.</p>
F.161	Burner in a fault state	BCU data memory access error	<p>Reset the appliance.</p> <p>If fault occurs repeatedly, replace BCU burner control unit (see page 102).</p>



Fault messages (cont.)

Displayed fault code	System characteristics	Cause	Measures
F.163	Burner in a fault state	Memory access checksum error BCU	Reset the appliance. If fault occurs repeatedly, replace BCU burner control unit (see page 102).
F.182	No DHW heating	Short circuit, outlet temperature sensor (if installed)	Check the outlet temperature sensor.
F.183	No DHW heating	Lead break, outlet temperature sensor (if installed)	Check the outlet temperature sensor.
F.184	Burner in a fault state	Short circuit, flow temperature sensor/high limit safety cut-out	Check the flow temperature sensor/high limit safety cut-out. Check sensor lead. Replace faulty component if required. Reset the appliance.
F.185	Burner in a fault state	Lead break, flow temperature sensor/high limit safety cut-out	Check the flow temperature sensor/high limit safety cut-out. Replace faulty component if required. Reset the appliance.
F.299	Time/date incorrect	Real time clock setting incorrect	Set the time and date.
F.342	No central heating, no DHW heating	Communication error, burner control unit BCU	<ul style="list-style-type: none"> ▪ Check connecting cable to the burner control unit plug X4 on BCU. ▪ Check all plug-in connections and cables of the internal CAN. ▪ Remove all plugs except X4, X2, X16 and X18 from the BCU burner control unit. Check whether fault persists. <p>Note <i>Several other fault messages will be added due to the removed plugs. Ignore these. If fault message F.342 is no longer shown, re-insert the plugs one by one and establish which component is faulty.</i></p> <p>Reset the appliance.</p>
F.345	Burner locked out, automatic enabling after appliance cool-down. Independent restart.	Temperature limiter has responded. See heat generator specification.	<ul style="list-style-type: none"> ▪ Ensure adequate heat transfer. ▪ Check heating system fill level. ▪ Check pre-charge pressure in diaphragm expansion vessel. Adjust to required system pressure. ▪ Check whether flow rate is sufficient (flow sensor and pump). ▪ Check 3-way diverter valve function in actuator test. Vent the system. <p>If the fault occurs during DHW heating: Check DHW cylinder or plate heat exchanger for contamination and scaling.</p>

Fault messages (cont.)

Displayed fault code	System characteristics	Cause	Measures
F.346	Burner in a fault state	Ionisation current calibration error	<ul style="list-style-type: none"> ▪ Check the gas supply pressure. ▪ Check gas solenoid valve strainer on the inlet side for contamination. ▪ Check ionisation electrode for contamination. ▪ Check flue system. Remove flue gas recirculation if required. ▪ Check the connecting cable to the fan unit. ▪ Check impeller for ease of operation. Reset the appliance.
F.348	Burner in a fault state	Gas modulation valve	If several heat generators are connected to a common flue system: Check whether " Multiple connections " is set in the commissioning assistant. Check the flue system for unrestricted flow. If fault remains, replace gas fan unit.
F.349	Burner in a fault state	Air mass rate flow not detected correctly in fan unit.	<ul style="list-style-type: none"> ▪ Check for dust contamination in the supply air. ▪ Check burner gauze assembly for contamination. Reset the appliance. If the fault occurs repeatedly, replace the gas fan unit.
F.350, F.351	Burner in a fault state	Ionisation current lies outside the permissible range	Replace BCU burner control unit (see page 102).
F.352	Burner in a fault state	CO limit within appliance exceeded	Check entire flue gas path for the following: <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 Repair flue system if necessary. Reset the appliance.
F.353	Burner shutdown with restart if demand exists	Insufficient gas supply, burner output reduced	Check the gas supply. Optically check input-side screen in the gas solenoid valve for contamination. Reset the appliance.
F.354	Burner in a fault state	Gas modulation valve tolerance outside permissible range	Replace gas fan unit.
F.355	Burner in a fault state	Analogue signal reference check: Flame signal is already present at burner start.	Replace BCU burner control unit (see page 102).



Fault messages (cont.)

Displayed fault code	System characteristics	Cause	Measures
F.357	Burner in a fault state	Insufficient gas supply	<ul style="list-style-type: none"> ▪ Check that the gas shut-off valve is open. ▪ Optically check input-side screen in the gas solenoid valve for contamination. ▪ Test static gas pressure and gas flow pressure. ▪ Check that on-site gas line and gas flow switch are correctly sized. <p>Note <i>If the building pressure regulator has a leak, you may notice rising pressure when the burner is idle. When the system is restarted, the gas flow switch may trip. If the static pressure doesn't drop, check cable to the fan unit. Check whether the coil resistance at the fuel valve is approx. 4 kΩ (plug 35, contact 2 and 4). Check the ignition electrode for damaged insulation.</i></p> <p>Reset the appliance.</p>
F.359	Burner in a fault state	No ignition spark	<ul style="list-style-type: none"> ▪ Check whether the ignition electrode insulation is damaged. ▪ Check for a voltage of 230 V~ at the ignition module during the ignition phase. If not, replace the BCU burner control unit. ▪ If 230 V~ is present at the ignition module but there is still a fault, replace the ignition module. ▪ Check connection cables and leads from ignition module and ignition electrode. <p>Reset the appliance.</p>
F.361	Burner in a fault state	Flame signal is not present or insufficient at burner start.	<p>Check ionisation electrode and connecting cable. Check plug-in connections for loose contacts.</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, toilet-ries, deposits in the ventilation air supply (chimney).</i></p> <p>Reset the appliance.</p>

Fault messages (cont.)

Displayed fault code	System characteristics	Cause	Measures
F.365	Burner in a fault state	Relay contact gas valve feedback implausible. Relay contact is sticking.	Replace BCU burner control unit (see page 102).
F.366, F.367	Burner in a fault state	Gas valve electricity supply does not turn off.	Replace BCU burner control unit (see page 102).
F.369	Burner in a fault state	Flame is lost immediately after flame formation (during safety time)	<p>Check gas supply (gas pressure and gas flow switch). Check balanced flue system for flue gas recirculation.</p> <p>Check ionisation electrode for the following:</p> <ul style="list-style-type: none"> ▪ Clearance to burner gauze assembly. ▪ Contamination on electrode. <p>Reset the appliance.</p>
F.370	Burner in a fault state	Fuel valve or modulation valve will not close.	<p>Reset the appliance. If fault occurs repeatedly, replace fan unit.</p>
F.372	Burner in a fault state	Repeated flame loss during calibration	<ul style="list-style-type: none"> ▪ Check ionisation electrode and connecting cable. ▪ Check plug-in connections for loose contacts. ▪ Check flue system. Remove flue gas recirculation if required. ▪ Check system for condensate backup. ▪ Visually inspect gas solenoid valve inlet and strainer on the inlet side for contamination. <p>Note <i>To prevent water damage, detach fan unit before removing the burner. Deposits on the electrodes indicate foreign bodies in the combustion air.</i></p> <p>Check the installation room and flue system for causes of the deposits. For example: Laundry detergents, cleaning agents, toilet-ries, 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. Reset the appliance.</p>



Fault messages (cont.)

Displayed fault code	System characteristics	Cause	Measures
F.373	Burner in a fault state	Heat transfer too low during calibration Temperature limiter has shut down.	<ul style="list-style-type: none"> ▪ Ensure adequate heat transfer. ▪ Check circulation pump for faults, scale or blockages. ▪ Check 3-way diverter valve function in actuator test. Vent the system. ▪ Check function of flow sensor. Reset the appliance.
F.377	Burner in a fault state	Post-processing ionisation current calibration: Stabilisation conditions for post-calibration not reached	Check gas type setting. If fault recurs, replace BCU burner control unit (see page 102). Reset the appliance.
F.378	Burner in a fault state	Flame loss during stabilisation or operating phase	<ul style="list-style-type: none"> ▪ Check gas supply (gas pressure and gas flow switch). ▪ Check flue gas recirculation. ▪ Check for contamination of ionisation electrode and burner gauze assembly. Reset the appliance.
F.379	Burner in a fault state	Flame signal not present or insufficient	<ul style="list-style-type: none"> ▪ Check ionisation electrode connecting cable for damage and ensure it is secure. ▪ Check ionisation electrode, replace if necessary. Reset the appliance.
F.380	Burner in a fault state	Flame is lost immediately after flame formation (during safety time)	Check gas supply (gas pressure and gas flow switch). Check balanced flue system for flue gas recirculation. Check ionisation electrode, burner gauze assembly: <ul style="list-style-type: none"> ▪ Clearance to burner gauze assembly ▪ Contamination on electrode Reset the appliance.
F.381	Burner in a fault state	Flame loss during operating phase	Check gas supply (gas pressure and gas flow switch). Check balanced flue system for flue gas recirculation. Check ionisation electrode, burner gauze assembly: <ul style="list-style-type: none"> ▪ Clearance to burner gauze assembly. ▪ Contamination on electrode Reset the appliance.
F.382	Burner in a fault state	Fault counter has exceeded limit.	Reset the appliance. Work through fault analysis using fault history.
F.383	Burner in a fault state	Possible contamination of gas line	<ul style="list-style-type: none"> ▪ Check gas line for contamination. ▪ Check the gas supply pressure. ▪ Replace gas fan if required. Reset the appliance.


Fault messages (cont.)

Displayed fault code	System characteristics	Cause	Measures
F.384	Burner in a fault state	Possible contamination of gas line	<ul style="list-style-type: none"> ▪ Check gas line for contamination. ▪ Check the gas supply pressure. ▪ Replace gas fan if required. Reset the appliance.
F.385	Burner in a fault state	Short circuit, signal 1, ionisation current. BCU burner control unit faulty.	Check IO electrode for earth fault. If fault continues to persist, replace BCU burner control unit (see page 102). Reset the appliance.
F.386	Burner in a fault state	BCU burner control unit faulty	Replace BCU burner control unit (see page 102). Reset the appliance.
F.387	Burner in a fault state	Earth fault, ionisation current. BCU burner control unit faulty.	Check ionisation electrode and connecting cable. If fault continues to persist, replace BCU burner control unit (see page 102). Reset the appliance.
F.388	Burner in a fault state	BCU burner control unit faulty	Replace BCU burner control unit (see page 102). Reset the appliance.
F.395	Burner in a fault state	IO electrode earth fault, BCU burner control unit faulty	Check ignition electrode for earth fault. If fault continues to persist, replace BCU burner control unit (see page 102). Reset the appliance.
F.396	Burner in a fault state	BCU burner control unit faulty	Replace BCU burner control unit (see page 102). Reset the appliance.
F.399	Burner in a fault state	IO electrode earth fault, BCU burner control unit faulty	Check IO electrode for earth fault. If fault continues to persist, replace BCU burner control unit (see page 102). Reset the appliance.
F.400	Burner in a fault state	BCU burner control unit faulty	Replace BCU burner control unit (see page 102). Reset the appliance.
F.401	Burner in a fault state	IO electrode earth fault, BCU burner control unit faulty	Check IO electrode for earth fault. If fault continues to persist, replace BCU burner control unit (see page 102). Reset the appliance.
F.402	Burner in a fault state	BCU burner control unit faulty	Replace BCU burner control unit (see page 102). Reset the appliance.
F.403	Burner in a fault state	Ionisation electrode earth fault, BCU burner control unit faulty	Check IO electrode for earth fault. If fault continues to persist, replace BCU burner control unit (see page 102). Reset the appliance.
F.404	Burner in a fault state	BCU burner control unit faulty	Replace BCU burner control unit (see page 102). Reset the appliance.

Fault messages (cont.)

Displayed fault code	System characteristics	Cause	Measures
F.405	Burner in a fault state	Ionisation electrode earth fault, BCU burner control unit faulty	Check IO electrode for earth fault. If fault continues to persist, replace BCU burner control unit (see page 102). Reset the appliance.
F.406, F.408, F.410	Burner in a fault state	BCU burner control unit faulty	Replace BCU burner control unit (see page 102). Reset the appliance.
F.416	Burner locked out	Flue gas temperature sensor incorrectly positioned	Fit flue gas temperature sensor correctly. See "Repairs". Carry out mains reset after fault has been remedied.
F.417, F.418	Burner in a fault state	BCU burner control unit faulty	Replace BCU burner control unit (see page 102). Reset the appliance.
F.425	System in control mode, calculation out of operation	Time synchronisation failed	Set the time. If external time is used, check parameters 1504 and 508.
F.430	Control mode operation in line with set values of heat generator	Communication error, gateway	Check gateway module connecting cable and power supply.
F.446	Burner in a fault state	Deviation, heat generator flow temperature sensor/ high limit safety cut-out	Check the flow temperature sensor/high limit safety cut-out. Check plug-in connection and lead to sensor. Reset the appliance.
F.447, F.448	Burner in a fault state	Deviation, ionisation voltage signal	Replace BCU burner control unit (see page 102). Reset the appliance.
F.449, F.450, F.451, F.452	Burner in a fault state	Error in scheduled program run monitoring	Reset the appliance. If fault recurs, replace BCU burner control unit (see page 102).
F.453	Burner in a fault state	Synchronisation error, sequence	Reset the appliance. If fault recurs, replace BCU burner control unit (see page 102).
F.454	Burner in a fault state	Incorrect software version	Flash the correct software version for the BCU burner control unit.
F.455	Burner in a fault state	Error in program run monitoring	Reset the appliance. If fault recurs, replace BCU burner control unit (see page 102).
F.456	Burner in a fault state	Error in program run monitoring	Reset the appliance. If fault recurs, replace BCU burner control unit (see page 102).
F.457	Burner in a fault state	Fan sluggish or blocked.	Reset the appliance. Check fan for sluggishness. In the case of severe contamination or grinding noises, replace fan unit.
F.458	Burner locked out	Internal error	Restart the heat generator. If necessary, reset the appliance.
F.462	Burner in a fault state	LPG safety valve (solenoid valve) at EM-EA1 extension does not open (DIO electronics module).	Check solenoid valve connection at EM-EA1 extension (DIO electronics module). Reset the appliance.


Fault messages (cont.)

Displayed fault code	System characteristics	Cause	Measures
F.463	Burner in a fault state	Contaminated combustion air, flue gas recirculation	 Heat generator installation and service instructions Check flue system for contamination and flue gas recirculation. Clean flue system if required. Reset the burner. 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, toilet-ries, 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. Reset the appliance.</i>

Fault messages (cont.)

Displayed fault code	System characteristics	Cause	Measures
F.464	Burner in a fault state	Ionisation current too low during calibration. Differential compared to previous value not plausible.	<ul style="list-style-type: none"> ▪ 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>Reset the appliance.</p> <p>Note To prevent water damage, detach fan unit before removing the burner.</p> <p>If fault permanently persists, replace BCU burner control unit (see page 102).</p> <p>Note 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, toilet-ries, 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.</p>
F.467	Burner in a fault state	Gas supply insufficient during calibration Contaminated or insufficiently sized gas line.	<ul style="list-style-type: none"> ▪ Test static gas pressure and gas flow pressure. ▪ Check that on-site gas line and gas flow switch are correctly sized. ▪ Visually inspect gas solenoid valve inlet and strainer on the inlet side for contamination. <p>Reset the appliance.</p> <p>Note Contamination from a brazed gas line, for example, can block up the gas solenoid valve strainer on the inlet side.</p>

Fault messages (cont.)

Displayed fault code	System characteristics	Cause	Measures
F.468	Burner in a fault state	Ionisation current too high during calibration	<p>Check gap between ionisation electrode and burner gauze assembly.</p> <p> Heat generator installation and service instructions</p> <p>Check whether there is a lot of dust in the ventilation air (e.g. from construction work). Reset the appliance.</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, toilet-ries, 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>
F.471	No heat demand	System pressure sensor not available, lead break or short circuit	<ul style="list-style-type: none"> ▪ Check system pressure sensor (plug 163). ▪ Check lead and plug-in connection. ▪ Measure, to see if supply voltage to sensor is 5 V–.
F.473	No heat demand	HMU heat management unit communication error	Check connecting cable between burner control unit and HMU heat management unit.
F.474	Burner in a fault state	Error in scheduled program run monitoring	Reset the appliance. If fault occurs repeatedly, replace BCU burner control unit (see page 102).
F.517	Control mode, remote control unit not functioning	Lead break, PlusBus cable, incorrect appliance address set, remote control faulty	<ul style="list-style-type: none"> ▪ Check setting in commissioning assistant. ▪ Check remote control cable. ▪ Check remote control subscriber number. Replace faulty remote control if applicable.
F.527	Burner in a fault state	Incorrect parameter set, HMU heat management unit	Overwrite (flash) the HMU heat management unit with the correct parameter set, see page 102.
F.528	Burner in a fault state	Incorrect parameter set, BCU burner control unit	Overwrite (flash) the BCU burner control unit with the correct parameter set, see page 102.
F.530	Solar function limited	Sensor value not available or lead break of one or more sensors/missing sensor(s)	Check sensor(s), or connect missing sensor(s) to SDIO electronics module.



Fault messages (cont.)

Displayed fault code	System characteristics	Cause	Measures
F.540	Burner in a fault state	Condensate backup in the heat cell	<ul style="list-style-type: none"> ▪ Check system for condensate backup. ▪ Check the condensate drain and trap. ▪ Replace insulation blocks, electrodes and burner gauze assembly if required. <p>Note To prevent water damage, detach fan unit before removing the burner.</p> <p>Reset the appliance.</p>
F.544	Mixer closes. Heating circuit pump is operational.	Lead break, flow temperature sensor, heating circuit 2 with mixer Incorrect setting during commissioning	Check flow temperature sensor, mixer 2. Measure voltage at sensor input on electronics module. Set value: 3.3 V– with sensor disconnected. Check commissioning assistant setting. Checking setting of ADIO rotary switch.
F.545	Mixer closes. Heating circuit pump is operational.	Short circuit, flow temperature sensor for heating circuit 2 with mixer	Check flow temperature sensor, mixer 2. Measure voltage at sensor input on electronics module. Set value: 3.3 V– with sensor disconnected.
F.546	Mixer closes. Heating circuit pump is operational.	Lead break, flow temperature sensor, heating circuit 3 with mixer	Check flow temperature sensor, mixer 3. Measure voltage at sensor input on electronics module. Set value: 3.3 V– with sensor disconnected. Check commissioning assistant setting. Checking setting of ADIO rotary switch.
F.547	Mixer closes. Heating circuit pump is operational.	Short circuit, flow temperature sensor for heating circuit 3 with mixer	Check flow temperature sensor, mixer 3. Measure voltage at sensor input on electronics module. Set value: 3.3 V– with sensor disconnected.

Fault messages (cont.)

Displayed fault code	System characteristics	Cause	Measures
F.548	Mixer closes. Heating circuit pump is operational.	Short circuit, flow temperature sensor for heating circuit 4 with mixer	<ul style="list-style-type: none"> ▪ Check flow temperature sensor, mixer 4. ▪ Measure voltage at sensor input on electronics module. Set value: 3.3 V– with sensor disconnected. ▪ Check commissioning assistant setting. ▪ Checking setting of ADIO rotary switch.
F.549	Mixer closes. Heating circuit pump is operational.	Short circuit, flow temperature sensor for heating circuit 4 with mixer	<p>Check flow temperature sensor, mixer 4.</p> <p>Measure voltage at sensor input on electronics module. Set value: 3.3 V– with sensor disconnected.</p>

Note

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

Repairs

Draining the boiler on the heating water side



Please note

Risk of scalding
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 (especially in the service position)
- Electrical components
- Plug-in connections
- Electrical cables/leads

Only drain the boiler or heating system when the boiler water or cylinder temperature has dropped below 40 °C.

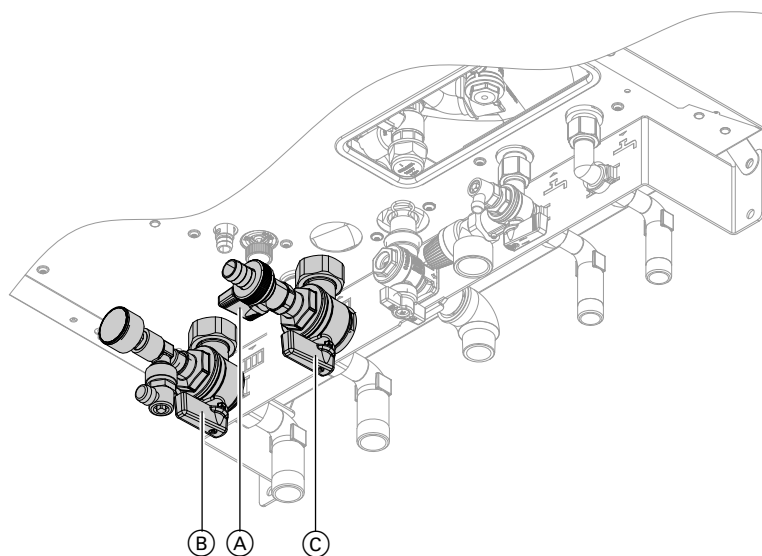


Fig. 51

1. Switch on the control unit. Call up the actuator test and put the diverter valve into its central position (see "Actuator and sensor test").
2. Wait until the valve has moved into its central position (approx. 5 s), then turn off the ON/OFF switch "Ⓞ" on the control unit.
3. Route hose at drain valve (A) into a suitable container or drain outlet.
4. Close heating flow shut-off valve (B) and heating return shut-off valve (C).
5. Open drain valve (A). Drain the boiler as much as necessary.

Note
Residual water will remain in the boiler.

Draining the boiler on the DHW side

- !** **Please note**
Risk of scalding
Only drain the boiler or heating system when the boiler water or cylinder temperature has dropped below 40 °C.

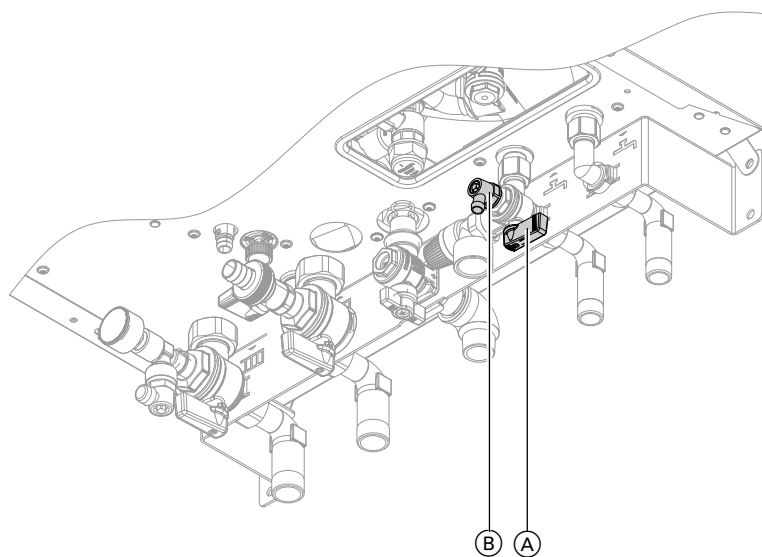


Fig. 52

1. Close cold water shut-off valve (A).
2. Connect hose to drain valve (B) and route it into a suitable container or drain outlet.

Repairs (cont.)

3. Open drain valve (B).

Note

Ensure adequate ventilation in the DHW pipework.
Open hot water draw-off point.

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

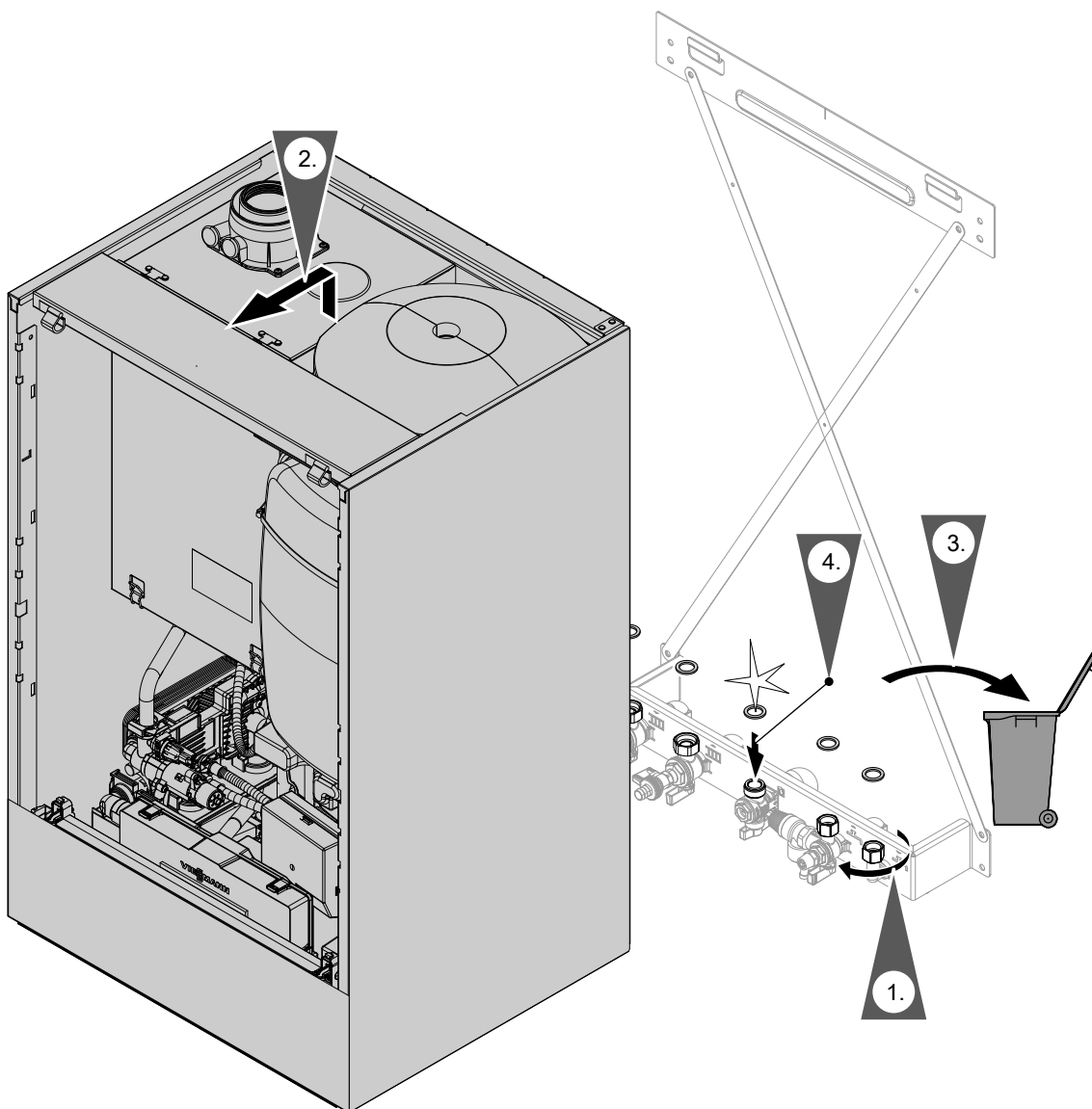


Fig. 53

Note

Use new gaskets when assembling.

Internal gasket diameter:

- Gas connection \varnothing 18.5 mm
- Connections on the heating water side \varnothing 17 mm
- Connections on the DHW side \varnothing 12 mm

Note

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



Danger

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

Checking the temperature sensors

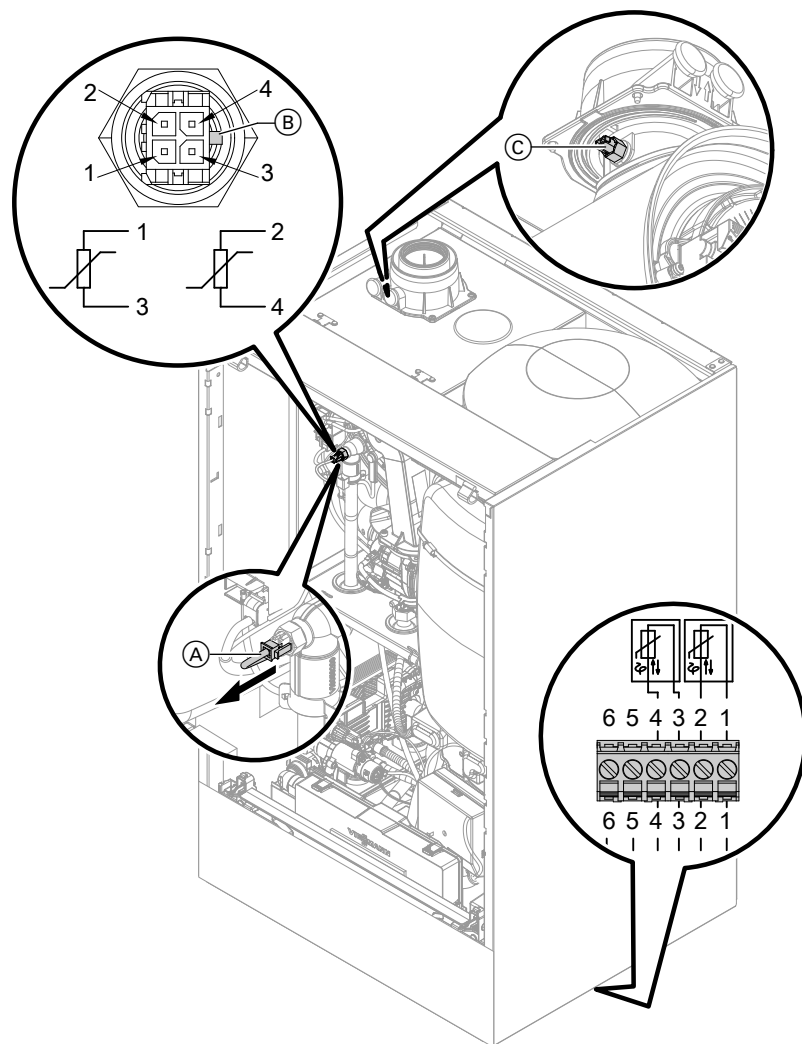


Fig. 54

Heat generator circuit flow temperature sensor (dual sensor)

1. Check the leads and plugs of flow temperature sensors (A).
2. Disconnect the leads from flow temperature sensors (A).

3. Check the sensor resistance. Note position of guide lug (B).
 - Sensor 1: Connections 1 and 3
 - Sensor 2: Connections 2 and 4

Compare the resistances with the value for the current temperature from the following diagram. In the event of severe deviation (> 10 %), replace the dual sensor.



Danger

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



Danger

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

Repairs (cont.)

Cylinder temperature sensor/outlet temperature sensor

1. Check lead and plug of cylinder temperature sensor [5] or outlet temperature sensor [4].
2. Disconnect wires of sensor plug.
3. Check the sensor resistance. Compare the resistance with the value for the current temperature from the following diagram.
In the event of severe deviation (> 10 %), replace the sensor.

Low loss header sensor

1. Check lead and plug of temperature sensor [9] on the ADIO electronics module (mixer extension kit).
2. Disconnect wires of sensor plug.
3. Check the sensor resistance. Compare the resistance with the value for the current temperature from the following diagram.
In the event of severe deviation (> 10 %), replace the sensor.

Outside temperature sensor

1. Check the lead and plug of the outside temperature sensor.
2. Disconnect wires 1 and 2 from the external plug.
3. Check the sensor resistance. Compare the resistance with the value for the current temperature from the following diagram.
If the results are very different from the curve (> 10 %), disconnect the wires from the sensor. Repeat the test directly on the sensor.
Check the on-site lead. 2-core lead, length up to 35 m with a cross-section of 1.5 mm²
Depending on the test result, replace the lead or the outside temperature sensor.

Flue gas temperature sensor

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



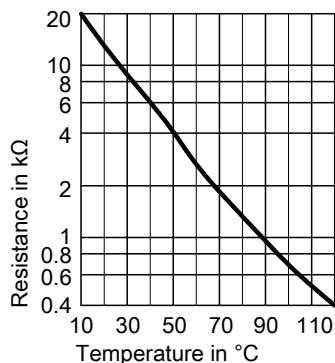
Danger

Escaping flue gas can cause poisoning. When restarting, check for leaks on the flue gas side.

6. Reconnect leads, flue gas temperature sensor ©.
7. If the permissible flue gas temperature has been exceeded, the flue gas temperature sensor locks out the appliance. Reset the burner on the programming unit once the flue system has cooled down.

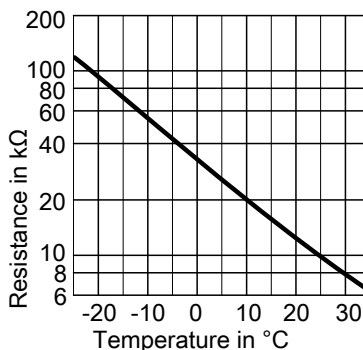
Repairs (cont.)

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



Sensor type: NTC 10 kΩ

- Outside temperature sensor



Sensor type: NTC 10 kΩ

Fault during commissioning (fault message F.416)

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

1. Check whether the flue gas temperature sensor is correctly installed (bayonet fitting). See previous diagram.
2. If required, correct the position of the flue gas temperature sensor.
3. Check the flue gas temperature sensor resistance. See previous chapter. Replace faulty flue gas temperature sensor if required.

4. Turn off the ON/OFF switch.
5. Turn the ON/OFF switch back on. Restart the commissioning assistant.
6. Check for leaks on the flue gas side.

Note

If fault message F.416 continues to be displayed although the flue gas temperature sensor has been correctly positioned: Initial commissioning may result in burner faults e.g. caused by air in the gas line. Eliminate the fault and unlock the device.

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

If BCU burner control units and/or HMU heat management unit are replaced, the replacement must be carried out with the help of the "service assistant".



See spare part installation instructions and internet address: "www.service-assistent.info"

Replacing the power cable

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

Replacing the HMI connecting cable

! Please note

- Incorrect routing of the cable can lead to heat damage and impairment of the EMC properties. For positioning and securing of the cable (fixing point of the cable tie) see connecting cable installation instructions.

Repairs (cont.)

Checking the plate heat exchanger

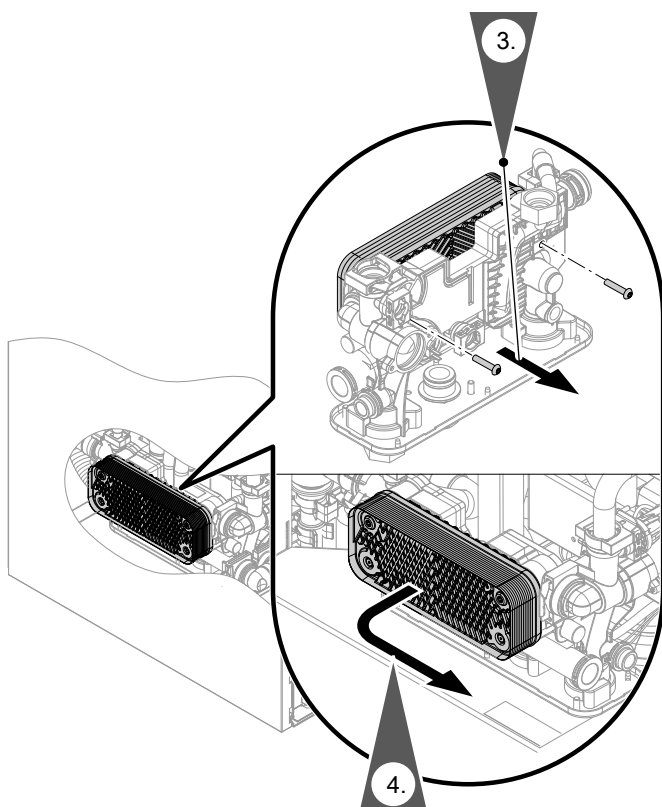


Fig. 55

1. Drain the boiler on the heating water and DHW sides.
2. Move the programming unit to the service position.
3. Undo the fixing screws.
4. Detach the plate heat exchanger and remove towards the front.
5. Check connections on the heating water and DHW sides for contamination and scaling. Replace plate heat exchanger if necessary.
6. Install in reverse order using new gaskets. Torque for fixing screws 3.2 Nm



Danger

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

Removing the hydraulic unit

In case hydraulic unit components have to be replaced.



Danger

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

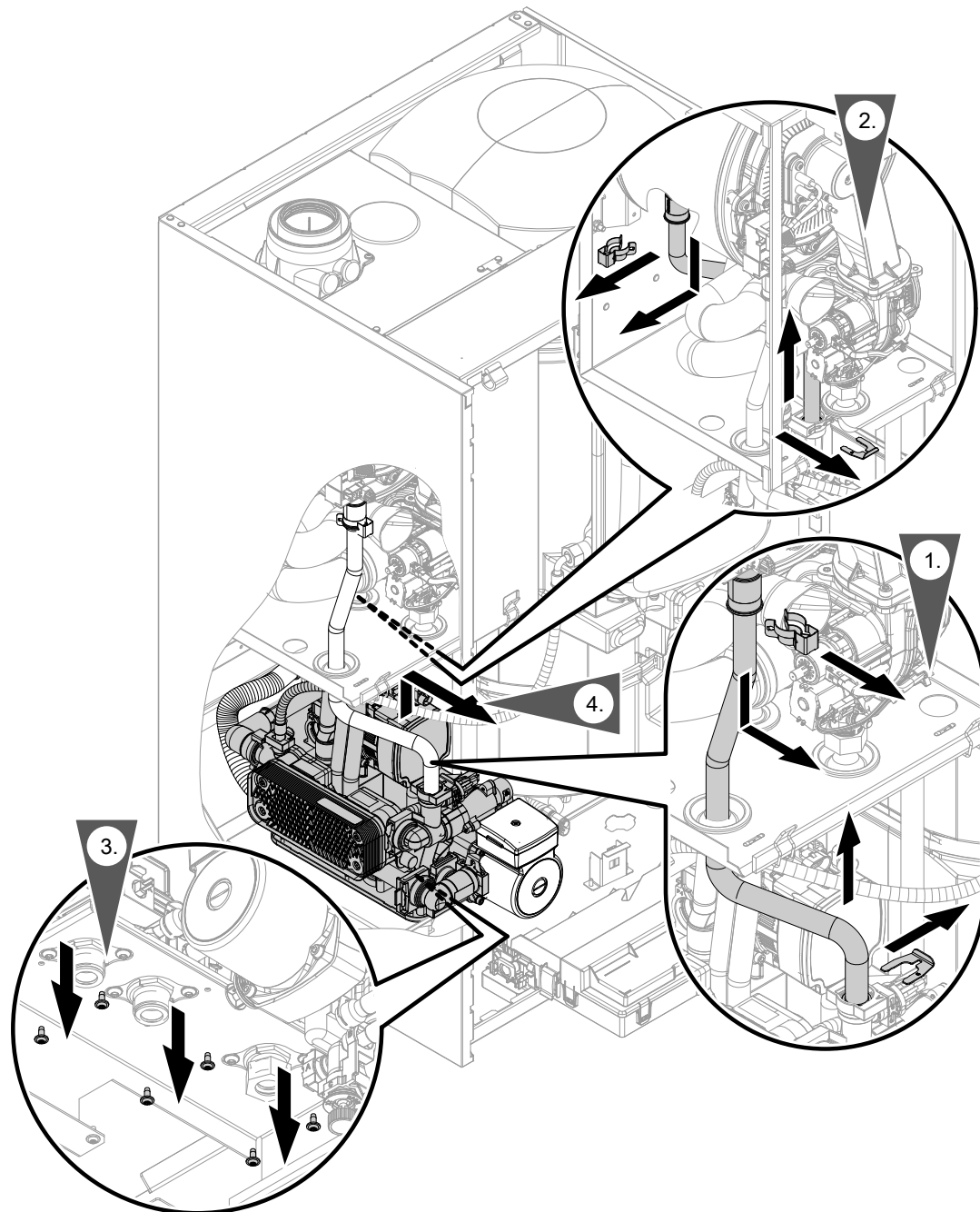


Fig. 56

Diagnosis

Repairs (cont.)

Checking the fuse

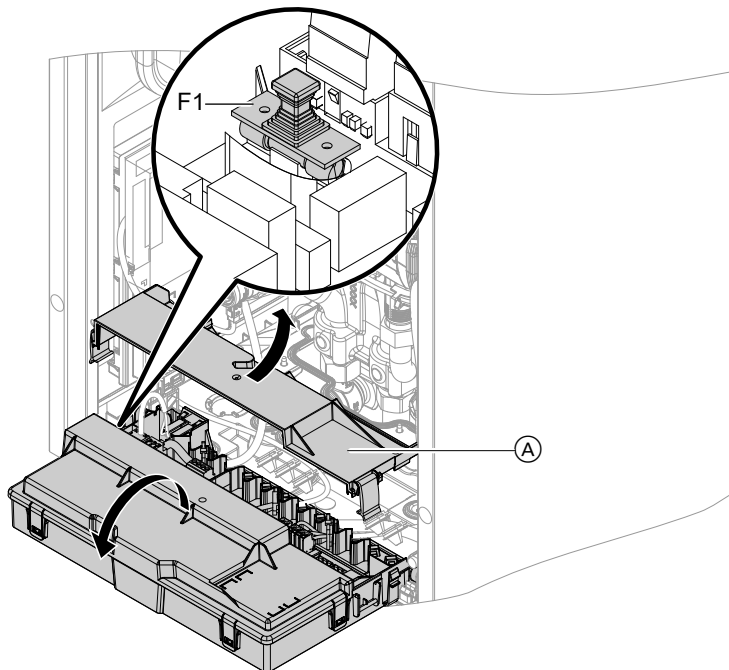


Fig. 57

1. Turn off the ON/OFF switch.
2. Depending on the configuration: Move programming unit together with bracket to service position.
3. Pivot the HMU heat management unit down.
4. Remove cover (A).
5. Check fuse F1 (see connection and wiring diagram).



Danger

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

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

Appliance functions

Heating mode

■ Weather-compensated operation:

The rooms are heated in accordance with the room temperature and time program settings.

The control unit determines a set flow temperature for the heat generator, subject to the outside temperature, the room temperature and the slope/level of the heating curve.

■ Room temperature-dependent operation:

System with one heating circuit without mixer. The rooms are heated in accordance with the settings of the room temperature controller/room thermostat (accessories).

If the room temperature controller/room thermostat issues a demand, the standard set flow temperature is maintained. If there is no demand present, the reduced set flow temperature is maintained.

■ Continuous operation without room thermostat:

The rooms are heated according to the time program settings.

In the time phases at standard room temperature, the standard set flow temperature or the set comfort flow temperature is maintained. Outside the set time phases, the reduced set flow temperature is maintained.

Heating circuit pump connection for heating circuit without mixer

Only for systems with several heating circuits.

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



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

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

Venting program

During the venting program, the circulation pump will be alternately switched on and off for 30 s over a period of 20 min.

The 3-way diverter valve alternates between central heating and DHW heating for a certain period of time. The burner is switched off during the venting program.



Activate venting program: See "Commissioning, inspection and maintenance".

Filling program

In the delivered condition, the 3-way diverter valve is set to its central position, so the system can be filled completely. After the control unit has been switched on, the 3-way diverter valve no longer goes into its central position.

If the system is to be filled with the control unit switched on, the 3-way diverter valve is moved to its central position in the filling program and the pump is started.



Activate filling program: See "Commissioning, inspection and maintenance".

In this position, the control unit can be switched off and the system can be filled completely. When the function is enabled, the burner shuts down. The program automatically becomes inactive after 20 min.

Heating curve

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

Factory settings:

- Slope = 1.4
- Level = 0

Appliance functions (cont.)

Note

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

The differential temperature is adjustable using the following parameters:

- Heating circuit 2: Parameter 934.5
- Heating circuit 3: Parameter 935.5
- Heating circuit 4 (if installed): Parameter 936.5

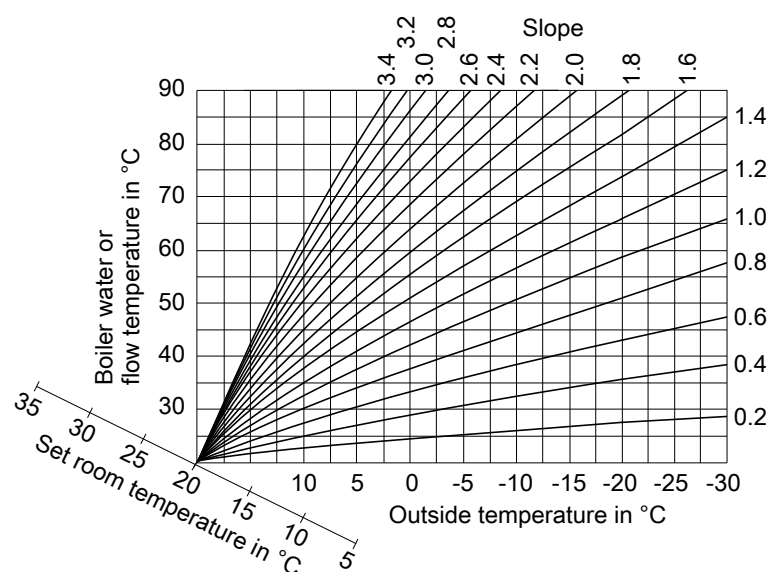


Fig. 58

Slope setting ranges:

- Underfloor heating systems: 0.2 to 0.8
- Low temperature heating systems: 0.8 to 1.6

Set room temperature

Standard room temperature or comfort room temperature

Individually adjustable for each heating circuit.

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

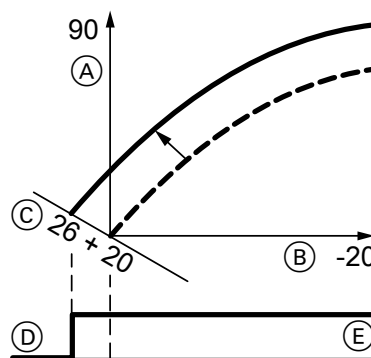



Fig. 59 Example 1: Adjusting the set room temperature from 20 to 26 °C

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

Changing the set room temperature

 Operating instructions

Reduced room temperature

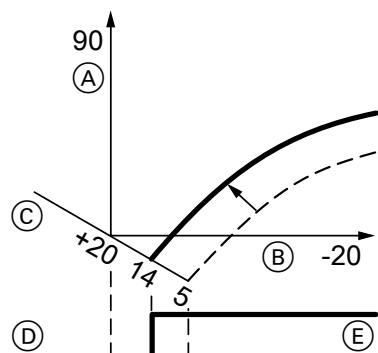
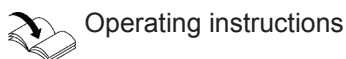


Fig. 60 Example 2: Adjusting the reduced set room temperature from 5 °C to 14 °C

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

Changing the reduced set room temperature



Operating instructions

Changing the slope and level

Individually adjustable for each heating circuit.

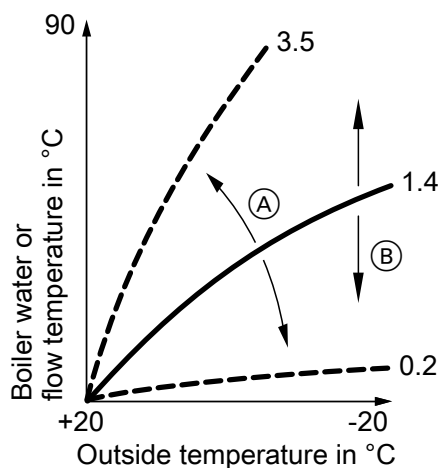


Fig. 61

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

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

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

Room influence factor parameter

Heating circuit	Parameter
1 (without mixer)	933.7 (only set if just one heating circuit is installed)
2 (with mixer)	934.7
3 (with mixer)	935.7
4 (with mixer)	936.7

Example for determining the increase in the flow temperature using the value of the heating curve when the actual room temperature deviates from the set room temperature:

- Set room temperature = 20.0 °C (RT set)
- Actual room temperature = 18.0 °C (RT actual)
- Heating curve slope = 1.4
- Room influence factor = 8 (delivered condition)

Determining the increase in flow temperature

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

Screed drying

When enabling screed drying, observe the information provided by the screed manufacturer.

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

Appliance functions (cont.)

Note

During screed drying, DHW heating is not available.

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

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

Different temperature profiles can be set via parameter 897.0.

Parameter 897.0 "Screed drying":

Temperature profile 1 (EN 1264-4)

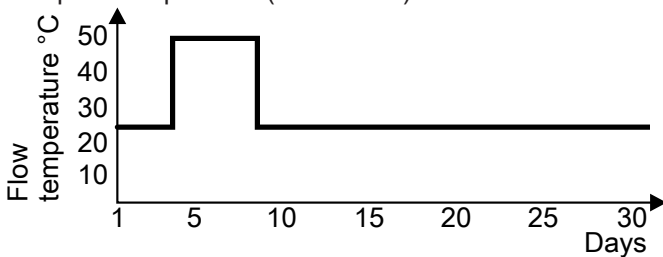


Fig. 62

Temperature profile 2 (ZV parquet and flooring technology)

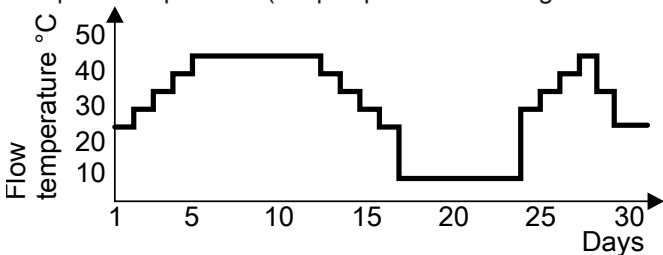


Fig. 63

Temperature profile 3

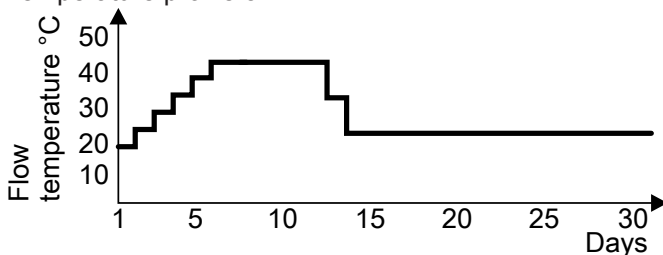


Fig. 64

Temperature profile 4

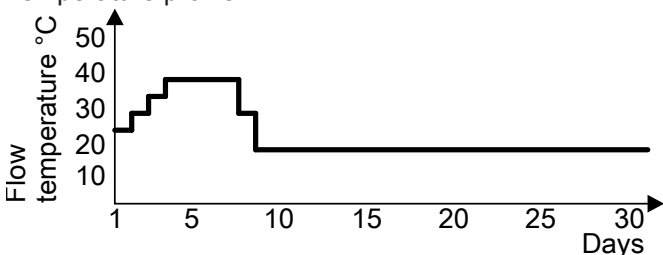


Fig. 65

Note

Temperature profile 6 ends after 21 days.

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

Temperature profile 5

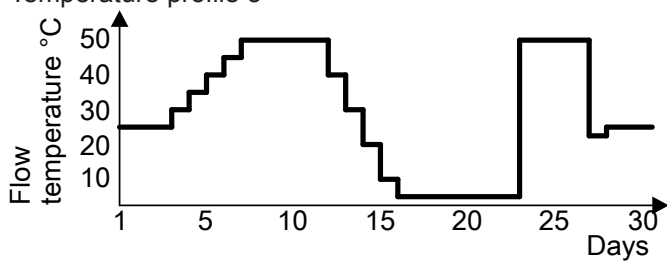


Fig. 66

Temperature profile 6

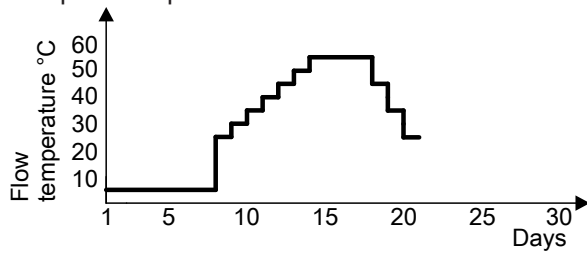


Fig. 67 Ends after 21 days.

Raising the reduced room temperature

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

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

Appliance functions (cont.)

Example using the settings in the delivered condition

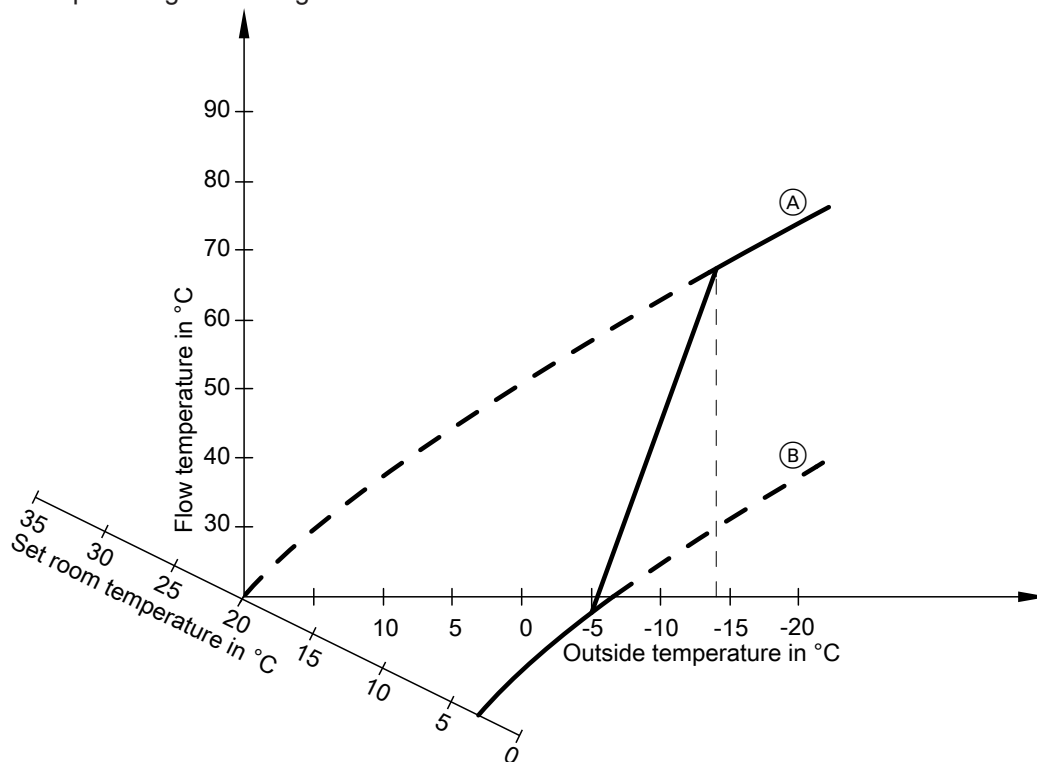


Fig. 68

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

Reducing the heat-up time

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

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

Function description

Appliance functions (cont.)

Example

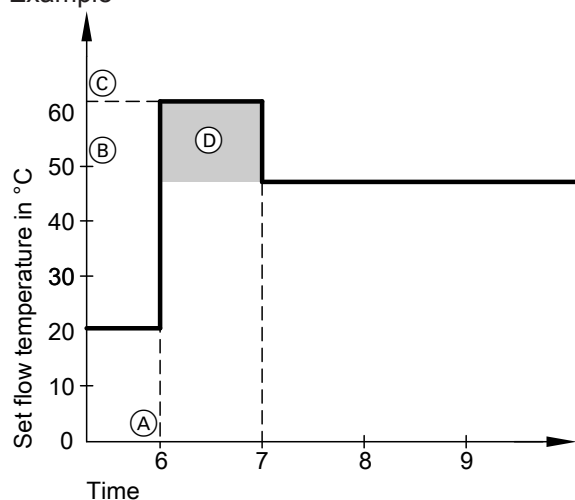


Fig. 69

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

DHW heating

Heating the DHW loading cylinder from cold

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

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

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

Reheating when DHW is drawn off

When DHW is drawn off, cold water enters the lower section of the loading cylinder.

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

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

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

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

DHW heating (cont.)**Increased DHW hygiene**

The DHW can be heated to a specified (higher) set DHW temperature (approx. 65 °C) for a period of one hour.

**Danger**

Risk of injury due to increased DHW temperature.

Inform the system user of the risk from the raised outlet temperature at the draw-off points. If required, provide on-site scald protection measures.

HMU heat management unit

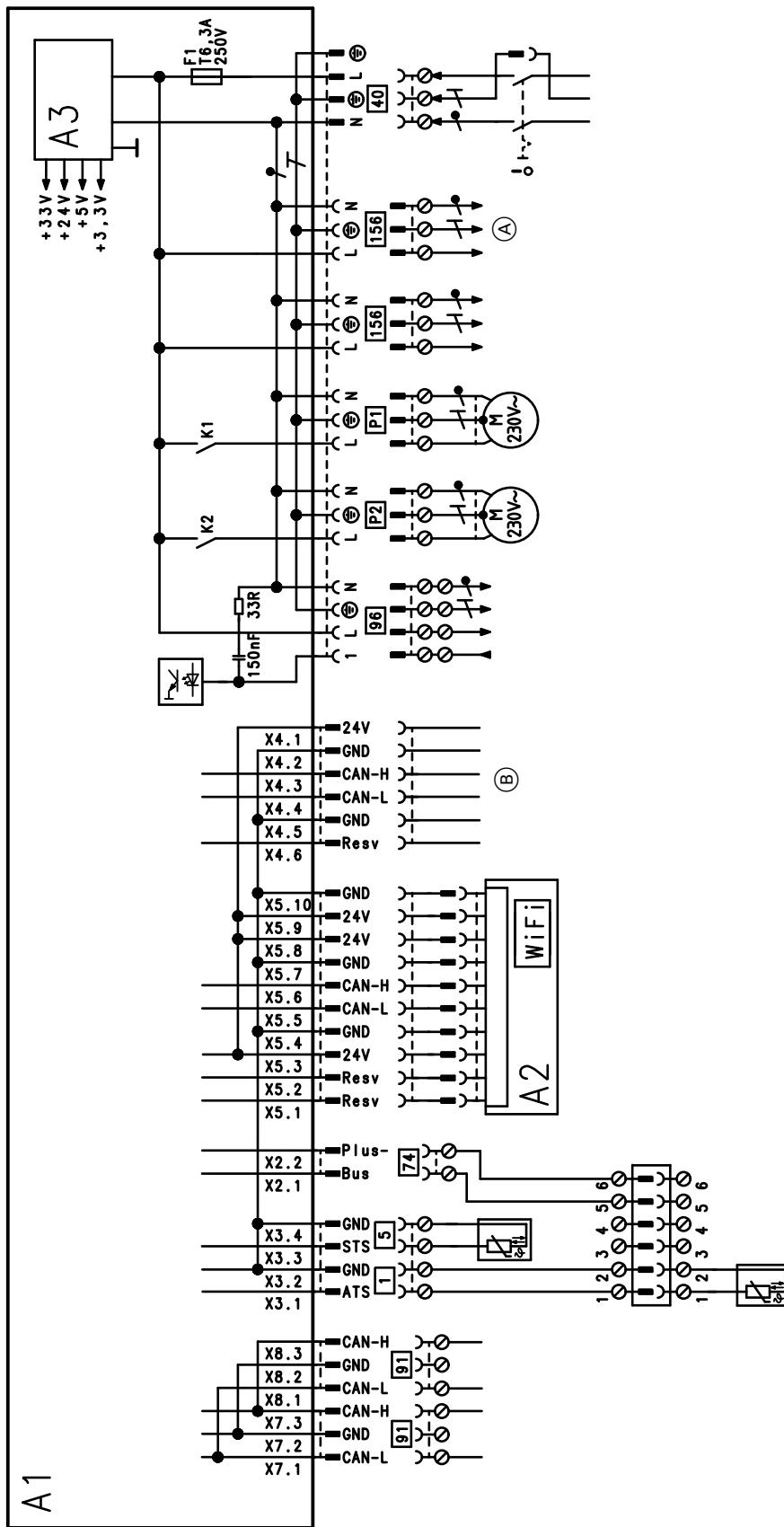


Fig. 70

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

- 1 Outside temperature sensor (for weather-compensated operation)
- 5 Cylinder temperature sensor
- 40 Power supply
- 74 PlusBus

HMU heat management unit (cont.)

- | | |
|---|--|
| <ul style="list-style-type: none"> 91 CAN bus 96 Floating input 230 V, output 230 V 156 Mains voltage output P1 Cylinder loading pump | <ul style="list-style-type: none"> P2 230 V output for circulation pump for heating circuit without mixer Ⓐ To BCU burner control unit Ⓑ To BCU burner control unit |
|---|--|

BCU burner control unit

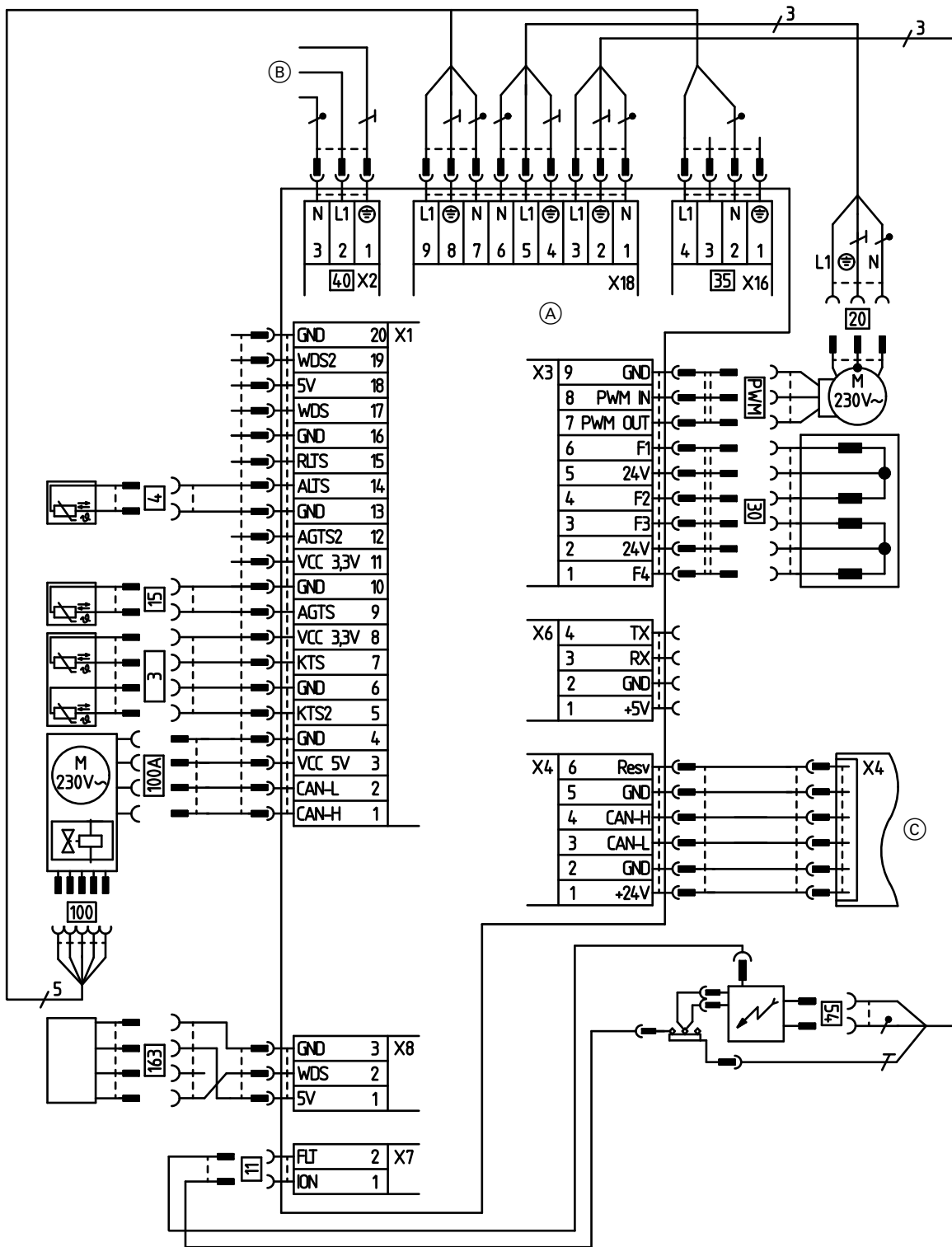


Fig. 71

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

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 table "Supply pressure" (Commissioning ...)			
<input type="checkbox"/> For LPG	mbar kPa				
<input type="checkbox"/> <i>Enter gas type</i>					
Carbon dioxide content CO₂					
For natural gas					
▪ At lower heating output	% by vol.	See "Checking the combustion quality" (Commissioning ...)			
▪ At upper heating output	% by vol.				
For LPG					
▪ At lower heating output	% by vol.				
▪ At upper heating output	% by vol.				
Oxygen content O₂					
▪ At lower heating output	% by vol.				
▪ At upper heating output	% by vol.				
Carbon monoxide content CO					
▪ At lower heating output	ppm	< 1000			
▪ At upper heating output	ppm	< 1000			

Specification

Rated heating output range (details to EN 15502)					
$T_F/T_R = 50/30 \text{ }^\circ\text{C}$ (P(50/30))					
Natural gas	kW	1.9 - 11.0	1.9 - 19.0	1.9 - 25.0	1.9 - 32.0
LPG	kW	2.5 - 11.0	2.5 - 19.0	2.5 - 25.0	2.5 - 32.0
$T_F/T_R = 80/60 \text{ }^\circ\text{C}$ (Pn(80/60))					
Natural gas	kW	1.7 - 10.1	1.7 - 17.4	1.7 - 22.9	1.7 - 29.3
LPG	kW	2.2 - 10.1	2.2 - 17.4	2.2 - 22.9	2.2 - 29.3
Rated heating output for DHW heating					
Natural gas	kW	1.7 - 21.8	1.7 - 26.2	1.7 - 30.4	1.7 - 33.5
LPG	kW	2.2 - 21.8	2.2 - 26.2	2.2 - 30.4	2.2 - 33.5
Rated heat input (Qn)					
Natural gas	kW	1.8 - 10.3	1.8 - 17.8	1.8 - 23.4	1.8 - 29.9
LPG	kW	2.3 - 10.3	2.3 - 17.8	2.3 - 23.4	2.3 - 29.9
Rated heat input for DHW heating (Qnw)					
	kW	22.7	27.3	31.7	34.9
Product ID		CE-0085CT0017			
IP rating		IP X1 to EN 60529			
NO_x	Category	6	6	6	6
Gas supply pressure		See type plate			
Max. permissible gas supply pressure^{*1}		See table "Supply pressure" (Commissioning ...)			
Rated voltage	V	230			
Rated frequency	Hz	50			
Appliance protection	A	6.3			
Backup fuse (power supply)	A	16			
RF module (integral)					
WiFi frequency band	MHz	2400 - 2483.5			
Max. transmitting power	dBm	20			
Zigbee frequency band	MHz	2400 - 2483.5			
Max. transmitting power	dBm	10			
Supply voltage	V \equiv	24			
Power consumption	W	4			
Power consumption (delivered condition)	W	37	47	68	110
Permissible ambient temperature					
▪ During operation	$^\circ\text{C}$	+5 to +35			
▪ During storage and transport	$^\circ\text{C}$	-5 to +60			
Electronic temperature limiter setting (TN)	$^\circ\text{C}$	91			
Setting of electronic temperature limiter	$^\circ\text{C}$	110			
DHW heating					
Cylinder capacity	l	46	46	46	46
Permiss. operating pressure (PMW)	bar	10	10	10	10
	MPa	0.1	0.1	0.1	0.1
Specific flow rate (D)	l/min	16.21	18.61	19.54	21.13
Max. DHW temperature (TS)	$^\circ\text{C}$	60	60	60	60

^{*1} If the gas supply pressure is higher than the maximum permissible value, install a separate gas pressure governor upstream of the system.

Specification (cont.)

Rated heating output range (details to EN 15502)					
T_F/T_R = 50/30 °C (P(50/30))					
Natural gas	kW	1.9 - 11.0	1.9 - 19.0	1.9 - 25.0	1.9 - 32.0
LPG	kW	2.5 - 11.0	2.5 - 19.0	2.5 - 25.0	2.5 - 32.0
T_F/T_R = 80/60 °C (Pn(80/60))					
Natural gas	kW	1.7 - 10.1	1.7 - 17.4	1.7 - 22.9	1.7 - 29.3
LPG	kW	2.2 - 10.1	2.2 - 17.4	2.2 - 22.9	2.2 - 29.3
Weight					
▪ Without heating water and DHW	kg	67.8	67.8	67.8	67.8
▪ With heating water and DHW	kg	120.0	120.0	120.0	120.0
Permiss. operating pressure (PMS)					
	bar	3	3	3	3
	MPa	0.3	0.3	0.3	0.3
Dimensions					
Length	mm	500	500	500	500
Width	mm	600	600	600	600
Height	mm	950	950	950	950
Gas connection	R	¾	¾	¾	¾
Flue gas connection	Ø mm	60	60	60	60
Ventilation air connection					
▪ Coaxial	Ø mm	100	100	100	100
▪ Parallel	Ø mm	60	60	60	60
Connection values relative to max. load					
With gas					
Natural gas E	m ³ /h	2.40	2.89	3.35	3.69
Natural gas LL	m ³ /h	2.79	3.36	3.90	4.29
LPG	kg/h	1.76	2.12	2.46	2.71
Flue gas values					
Mass flow rate (for DHW heating)					
▪ For natural gas	kg/h	40.4	49.3	57.3	62.1
▪ For LPG	kg/h	39.8	49.2	57.1	61.1
Temperature (for DHW heating)	°C	67	70	74	77
Max. temperature	°C	120	120	120	120

Note

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

Specification

Flue system types

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

Gas categories

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

Electronic combustion control unit

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

To check the combustion quality, the CO₂ content or the O₂ content of the flue gas is measured. The prevailing air ratio is determined using the actual values.

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

Final decommissioning and disposal

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

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

Certificates

Declaration of conformity

We, Viessmann Werke GmbH & Co. KG, D-35107 Allendorf, declare as sole responsible body that the named product complies with the European directives and supplementary national requirements in terms of its design and operational characteristics. Viessmann Werke GmbH & Co. KG, D-35107 Allendorf hereby declares that the radio equipment type of the named product is in compliance with Directive 2014/53/EU.

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

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

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

Allendorf, 1 May 2018

Viessmann Werke GmbH & Co. KG



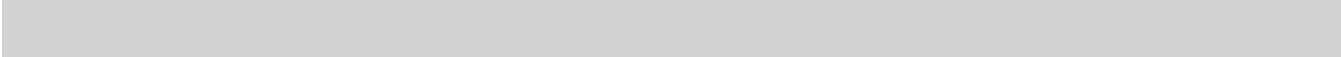
Authorised signatory Reiner Jansen
Head of Strategic Quality Management

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