Installation and service instructions

for contractors

Vitodens 222-F
Type B2TF, 1.9 to 32 kW
Gas condensing storage combi boiler with 3.5 inch black/white screen
Natural gas and LPG version

VITODENS 222-F

5593275 GB 3/2023

Please keep safe.

Safety instructions

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

Safety instructions explained

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

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

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

Target group

These instructions are exclusively intended for qualified contractors.

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

Regulations to be observed

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

Safety instructions for working on the system

Working on the system

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

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 pipework.

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

Repair work

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

Auxiliary components, spare and wearing parts

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

Safety instructions (cont.)

Safety instructions for operating the system

If you smell gas

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

If you smell flue gas

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

What to do if water escapes from the appliance

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

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

Condensate

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

Flue systems and combustion air

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

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

Extractors

Operating appliances that extract air to the outside (extractor hoods, extractors, air conditioning units, central vacuum cleaning systems, 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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Index (cont.)

Disposal of packaging

Please dispose of packaging waste in line with statutory regulations.

Symbols

Symbol	Meaning
	Reference to other document containing further information
	Step in a diagram: The numbers correspond to the order in which the steps are carried out.
	Warning of material losses and environmental pollution
	Live electrical area
	Pay particular attention.
	▪ Component must audibly click into place. or ▪ Acoustic signal
	▪ 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 CECS 215-2017 and 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.

The appliance is intended exclusively for domestic or semi-domestic use; even users who have not had any instruction are able to operate the appliance safely.

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.

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Intended use (cont.)

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

Product information

Vitodens 222-F, type B2TF

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

- Modulating MatriX Plus burner for natural gas and LPG
- DHW loading cylinder, 100 l capacity
- Hydraulics with 3-way diverter valve and variable speed high efficiency circulation pump
- Weather-compensated control unit
- Diaphragm expansion vessel (18 l capacity)

The selected gas category in the delivered condition and the associated nominal gas pressure are given on the boiler type plate. The type plate also shows the other gas types and pressures with which the boiler can be operated. A conversion within the stated natural gas groups is not required. For conversion to LPG (without conversion kit), see "Commissioning, inspection and maintenance".
The Vitodens 222-F may only be delivered to the countries specified on the type plate. For deliveries to other countries, approved contractors must arrange individual approval on their own initiative and in accordance with the law of the country in question.

System examples

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

Detailed information regarding system examples:
www.viessmann-schemes.com

Maintenance parts and spare parts

Maintenance parts and spare parts can be identified and ordered directly online.

Viessmann Partnershop

Login:
https://shop.viessmann.com/

Viessmann spare part app

www.viessmann.com/etapp

Maintenance parts and spare parts (cont.)

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Handling

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

Siting in recesses

In the delivered condition, the ON/OFF switch and the electrical connections are located on the left-hand side of the appliance. The condensate drain can be routed out of either the right-hand or left-hand side of the appliance.

When installing in recesses, ensure that accessibility is guaranteed (recommended wall clearance 100 mm). Otherwise relocate the ON/OFF switch and electrical connections. The ON/OFF switch can be relocated to the right-hand side or the top. The electrical connections can be relocated to the right-hand side.

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

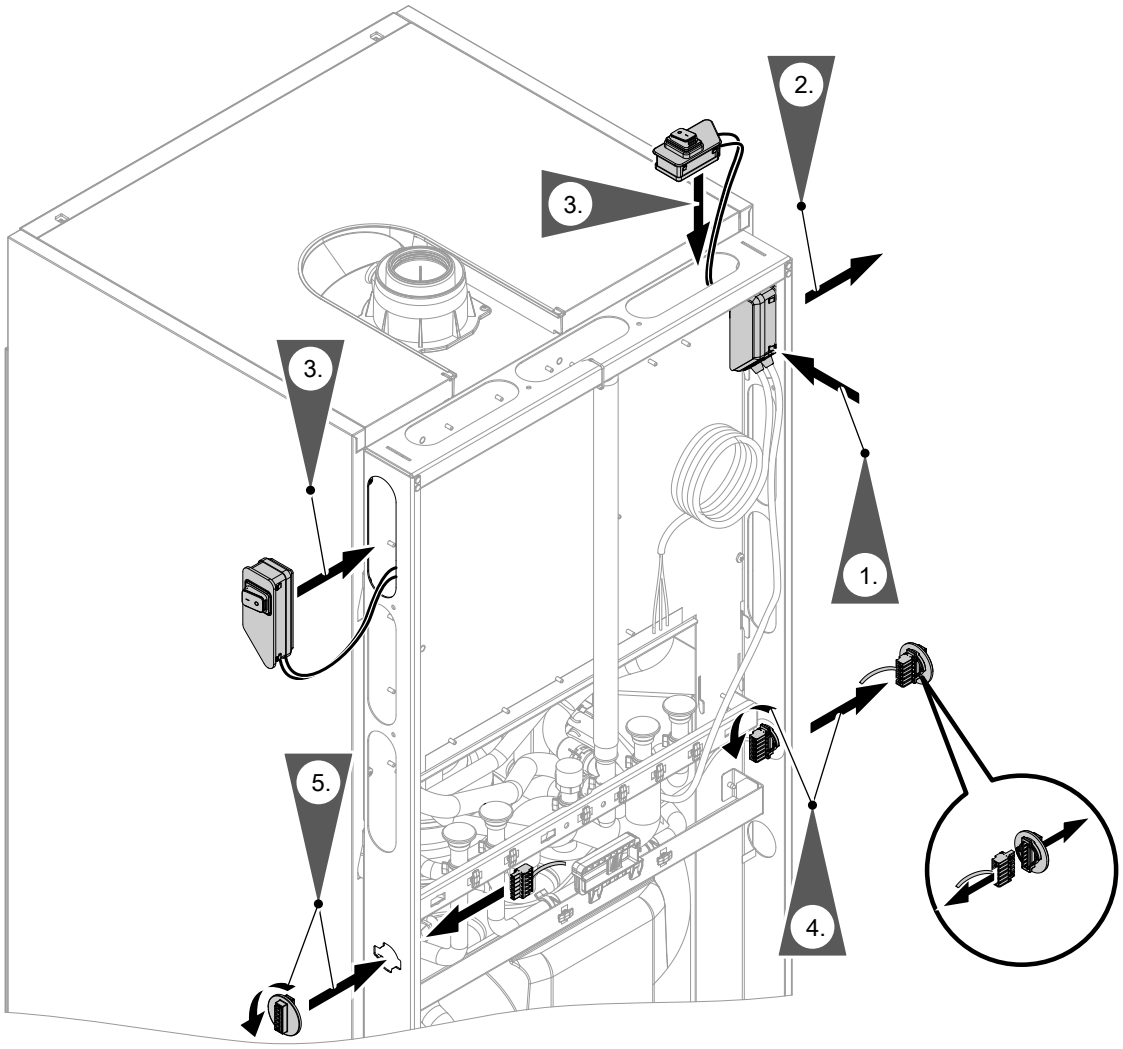

Fig. 1

Relocating the ON/OFF switch and electrical… (cont.)

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

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

Note
From 09/2021, the plug for the electrical connections is inside the appliance.

Preparing for boiler installation

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

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

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

Preparing connections on site:


Connection set installation instructions

Note
Fit safety equipment in accordance with the national regulations.

Preparing for boiler installation (cont.)

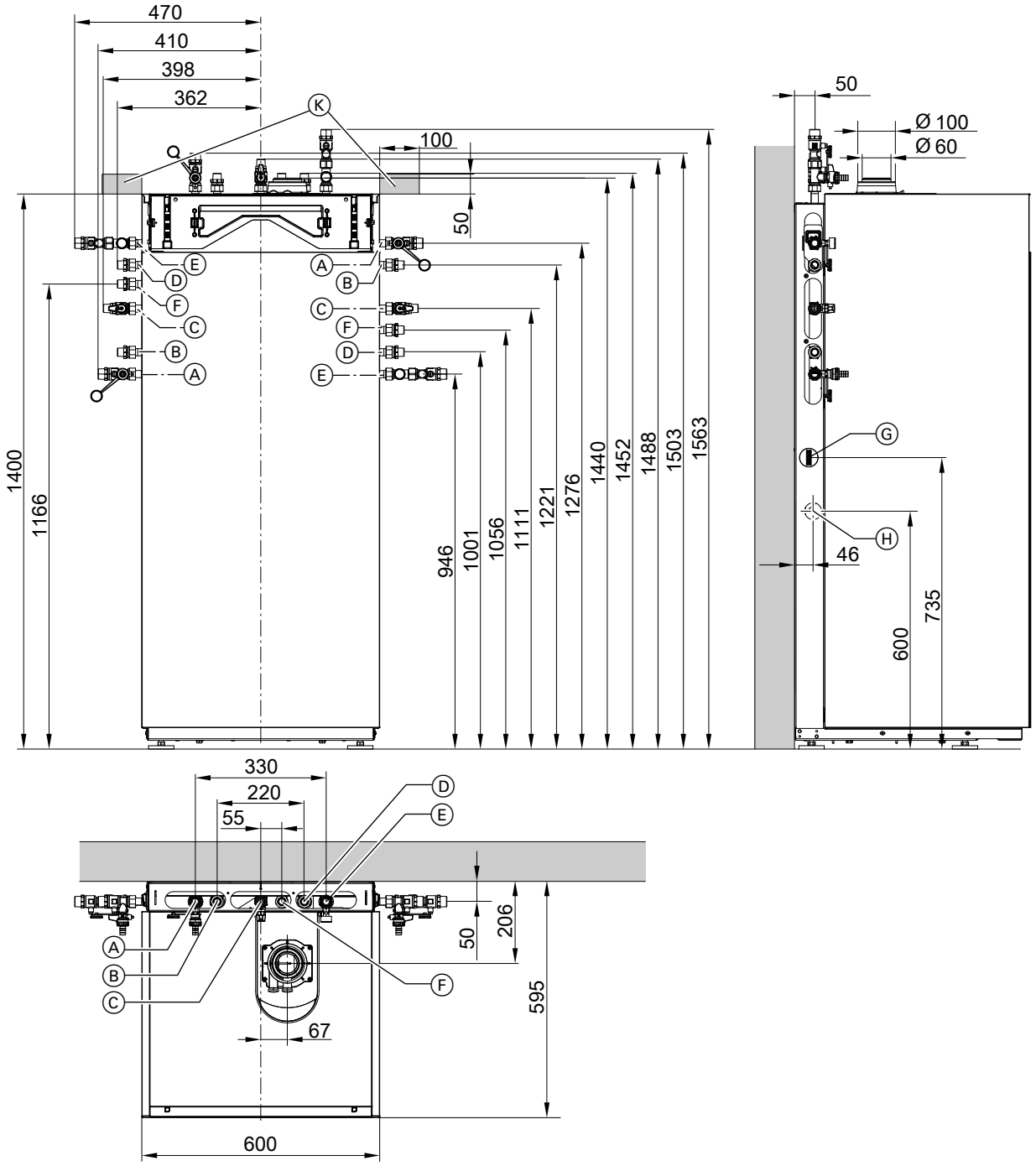

Fig. 2

Ⓐ Heating flow R ¾
Ⓑ DHW R ½
Ⓒ Gas connection R ½
Ⓓ Cold water R ½
Ⓔ Heating return R ¾
Ⓕ DHW circulation R ½ (separate accessories)
Ⓖ Plug for electrical accessories

Note
Depending on the version, the plug is inside the appliance.

Ⓗ Condensate drain to the side
Ⓚ Area for electrical cables (on-site junction box)

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

Preparing for boiler installation (cont.)

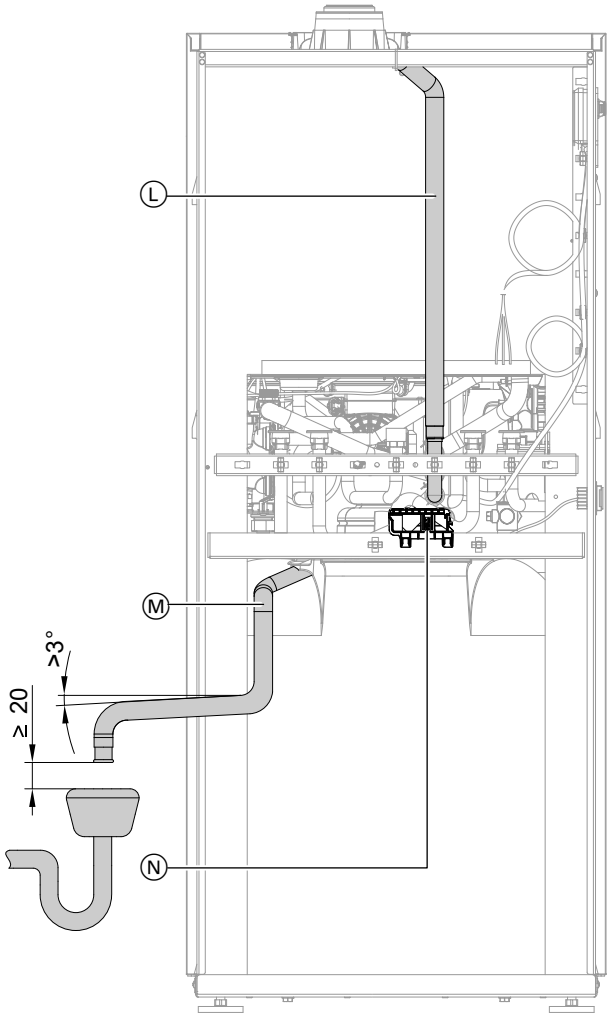

Fig. 3

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

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

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

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

3. Route condensate hose (M) to side opening (H) (see diagram on page 13).
   Connect condensate hose with a fall to the on-site waste water pipe or trap.

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

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

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

   If the onward drain line is routed outside the building:
   - *Use a min. Ø 30 mm line.*
   - *Protect the line from frost.*
   - *Keep the line as short as possible.*

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Preparing for boiler installation (cont.)

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

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

   Note
   Route external pipes through guide Ⓝ.

Safety assembly to DIN 1988 and EN 806

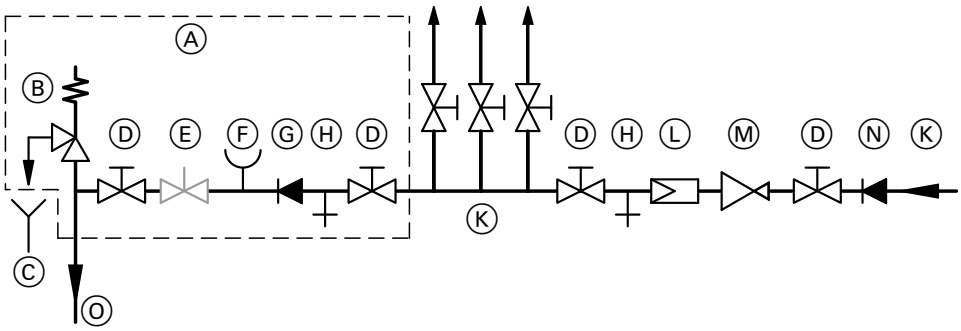

Fig. 4

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

Siting the boiler

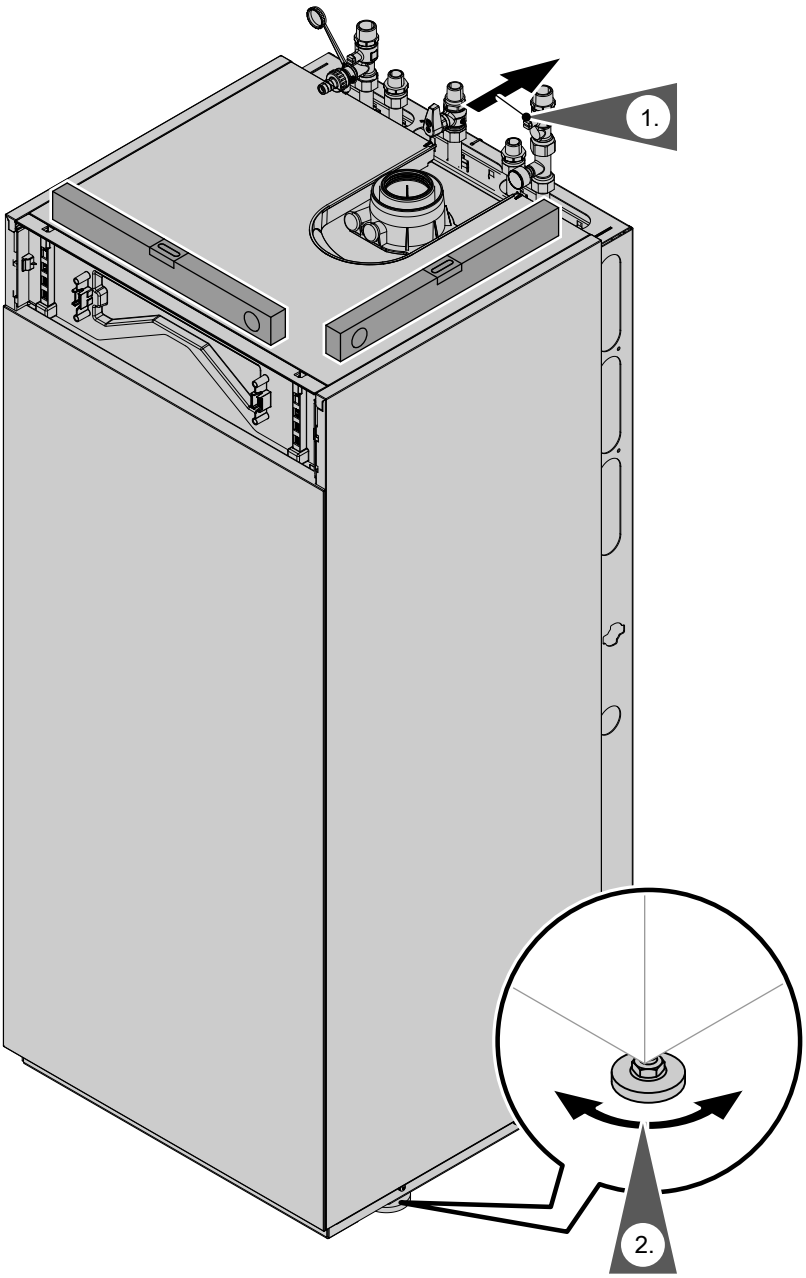

Fig. 5

Type plate

Note
The type plate is attached to cover panel Ⓐ in the appliance. See page 42.

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.

Siting the boiler (cont.)

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.

Removing the front panel

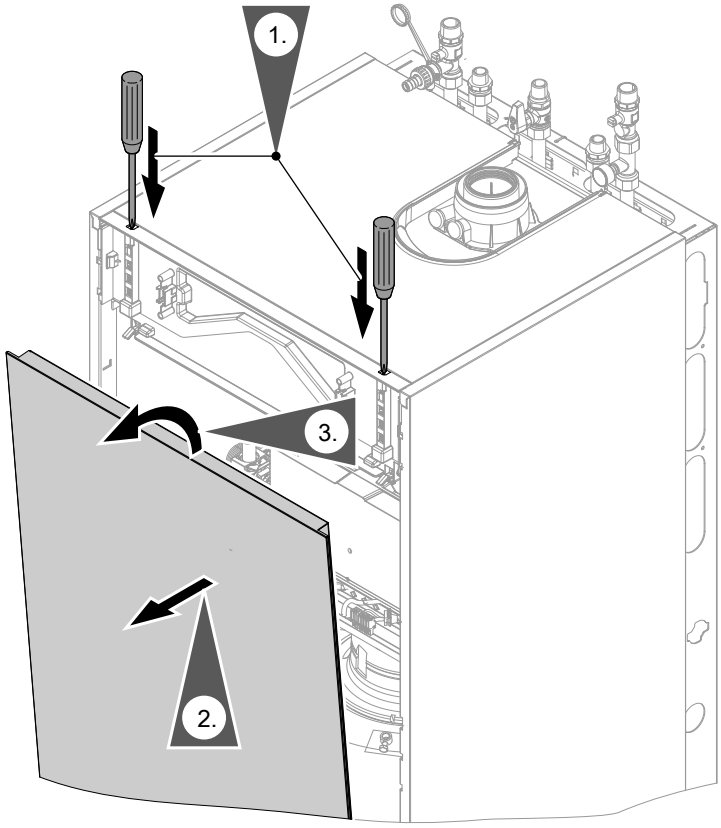

Fig. 6

Connections on the heating water and DHW sides

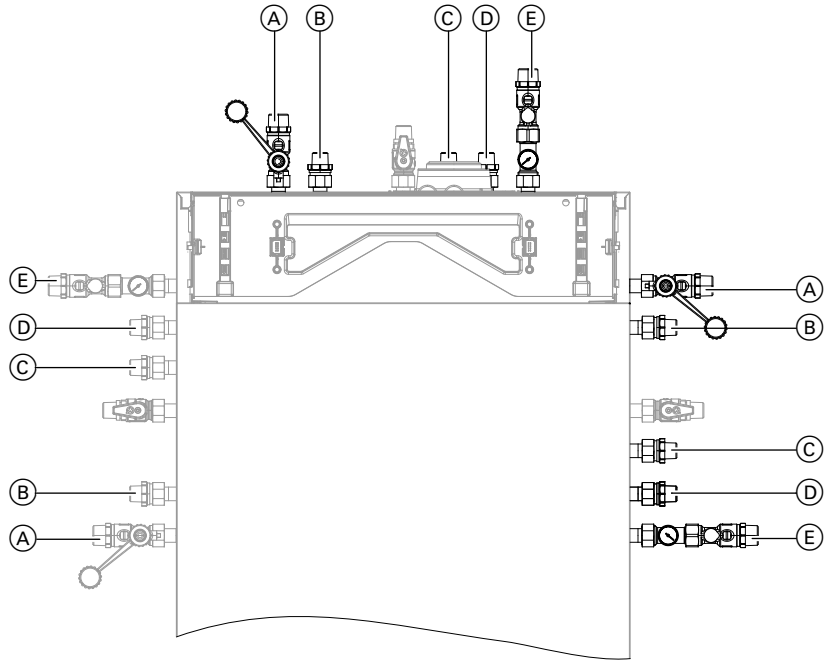

Fig. 7 Shown with connection sets for surface mounting (accessories)

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

DHW circulation connection (potable water)

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

Separate installation instructions

Filling the trap with water

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

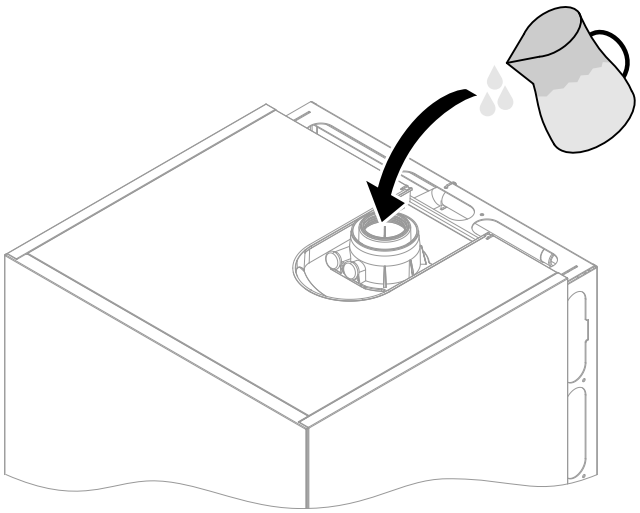

Fig. 8

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

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

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Flue gas connection

Connect the flue gas/ventilation air pipe.


Flue system installation instructions

Connecting several Vitodens to a shared flue system

If connecting multiple Vitodens to a common flue system at positive pressure using routing types C_{10}, C_{11}, C_{13}, C_{14}: Install a back draught safety device (accessories) in the flue gas connection and the mixing shaft of the burner on each boiler.
Installing the back draught safety devices:

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.
  Note
  In open flue operation, install a rodent guard grille on the supply air aperture.
- Applicable regulations on installing and commissioning flue systems have been followed.
- Visual inspection of the flue gas connection.
  Note
  The use of lubricant prevents the gasket from shifting when the flue pipe is installed.
  When using a straight flue pipe, check that the inner ventilation air pipe is correctly fitted.

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.


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"**.


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 is in good working order. Vents for interconnected combustion air supply must be non-closable in open flue operation. Prevent condensate drainage via a wind protector.

Gas connection

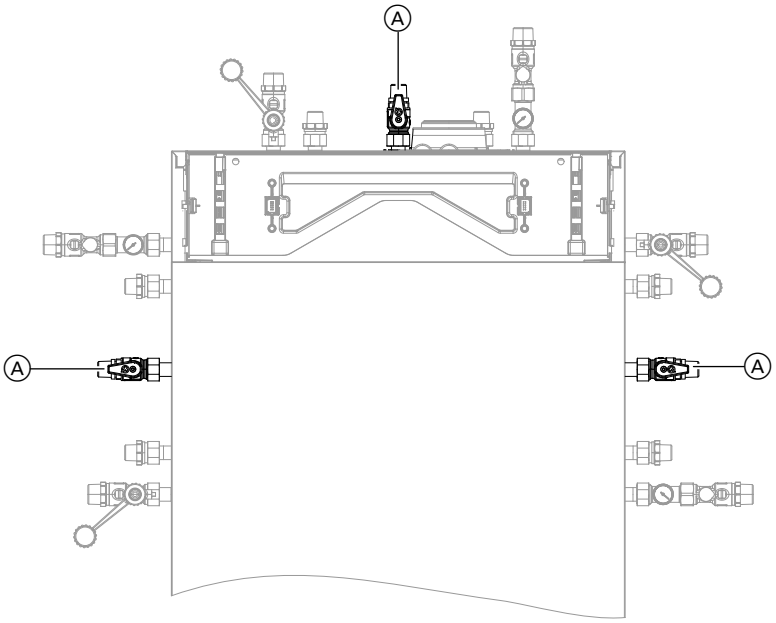

Fig. 9

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

Information on operation with LPG
Install an external safety solenoid valve if the boiler is installed below ground level.
An EM-EA1 extension (accessories) is required to connect the safety solenoid valve.

2. Check for leaks.

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

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

! **Please note**
Excessive test pressure will damage the boiler and gas solenoid valve.
Max. test pressure 150 mbar (15 kPa). If a higher pressure is required for leak tests, disconnect the boiler and the gas solenoid valve from the main supply pipe (undo the fitting).

3. Purge the gas line.

Electrical connections

Opening the HMU wiring chamber

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

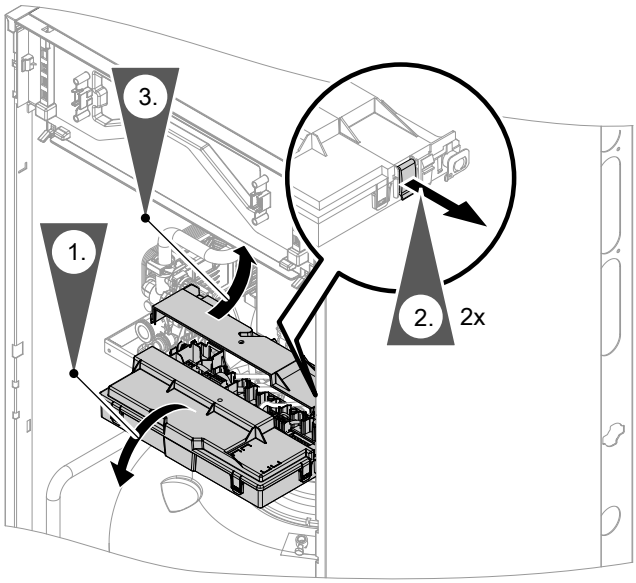

Fig. 10

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

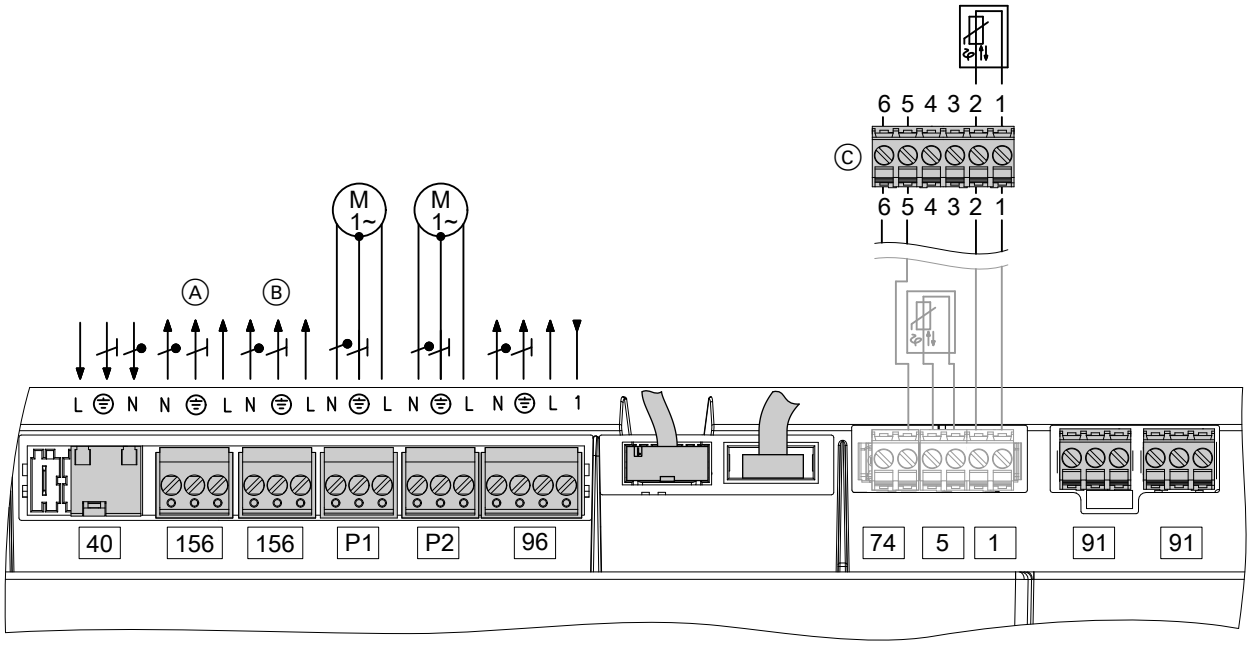

Fig. 11

Connections to 230 V~ plugs

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

P1 Cylinder loading pump (connected in the delivered condition)

Electrical connections (cont.)

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

Connections to extra low voltage (ELV) plugs
1 Outside temperature sensor
Terminals 1 and 2 on plug Ⓒ
5 Cylinder temperature sensor (connected in the delivered condition)
74 PlusBus
Terminals 5 and 6 on plug Ⓒ
91 CAN bus

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

On-site connections on the heat management unit

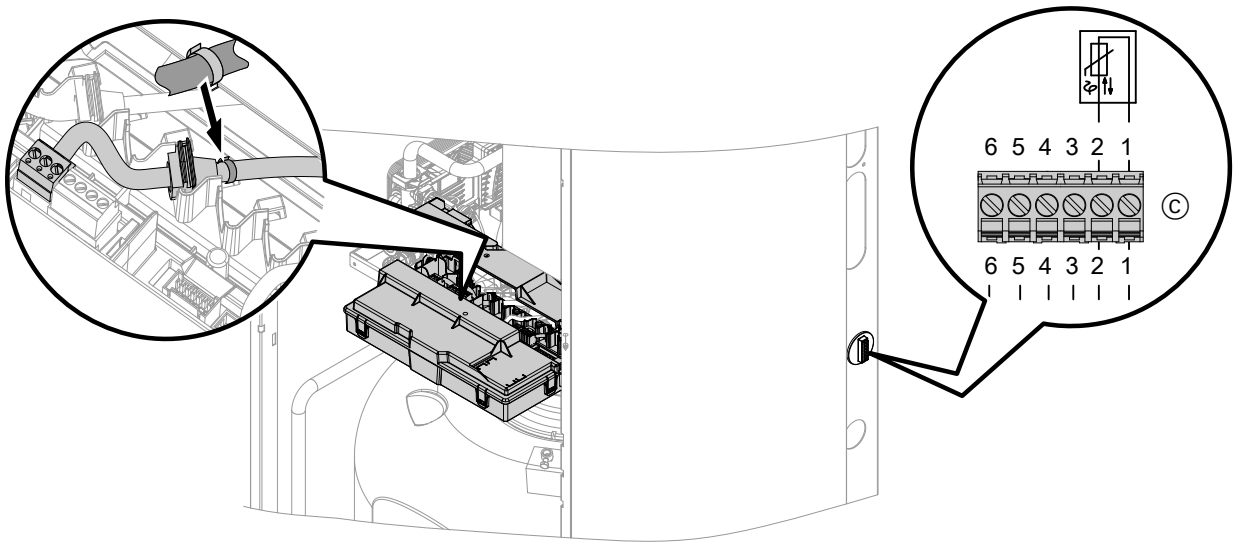

Fig. 12

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

Required plugs are supplied in separate packaging.
Provide strain relief for cables in the wiring chamber of the HMU heat management unit using cable ties.

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Electrical connections (cont.)

From 09/2021, plug for electrical connections inside the appliance

1.

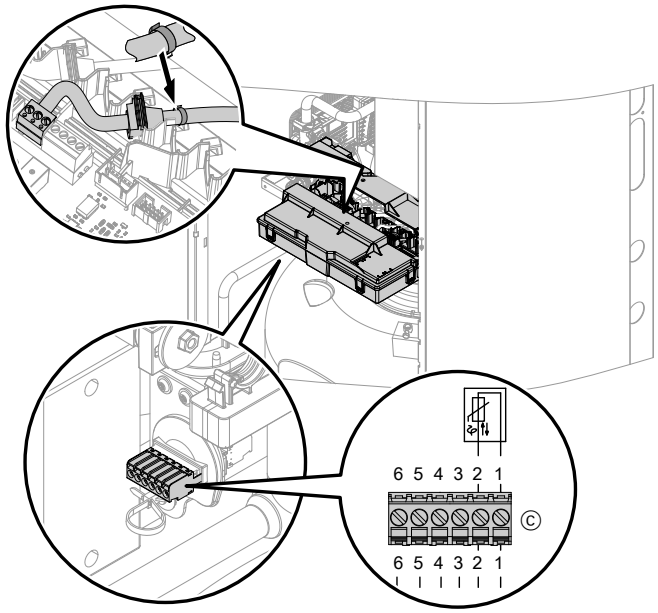

Fig. 13

Route the plug with power cable (required plugs are supplied in separate packaging) through the cable guide on the back of the appliance.

2.

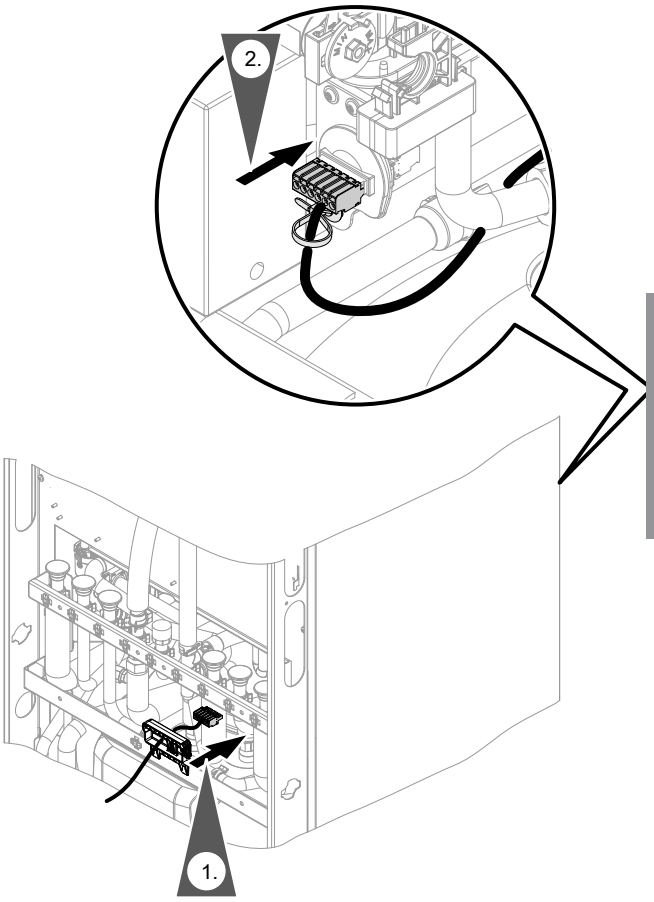

Fig. 14

Use cable ties to apply strain relief to cables in the heat management unit wiring chamber.

Note
Insert the cable ties with body-bound rivet (packaged separately) into the mounting plate on the plug.

Outside temperature sensor 1

Fitting location for outside temperature sensor

- North or north-westerly wall, 2 to 2.5 m above ground level; in multi storey buildings, in the upper half of the second floor
- Not above windows, doors or vents
- Not immediately below balconies or gutters
- Never render over

Outside temperature sensor connection

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

Connecting low loss header sensor 9

The low loss header sensor is connected to accessory extension EM-P1 or EM-M1/MX (ADIO electronics module).

Installation instructions for extension EM-P1 or EM-M1/MX

Electrical connections (cont.)

Connecting the circulation pump to P2

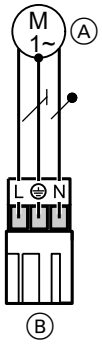

Fig. 15

Ⓐ Circulation pump
Ⓑ Plug P2 on HMU heat management unit

Possible functions:
- Heating circuit pump for heating circuit without mixer A1 in connection with low loss header and heating circuits with mixer
- Heating circuit pump for heating circuit without mixer A1, without low loss header and with no other heating circuits (max. 1 heating circuit in the system).
- DHW circulation pump
  Connect DHW circulation pumps with standalone functions directly to the 230 V~ supply.

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

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

Specification

Rated current	1 A
Rated voltage	230 V ~

Floating switching contact connection

Connection at plug 96

One of the following functions can be connected:
- External demand
- External blocking
- DHW circulation pump external demand (pushbutton function, pump runs for 5 min). 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)
- For external heating circuit hook-up (if installed), see chapter "External heating circuit hook-up".
  Not for Vitodens 3xx.

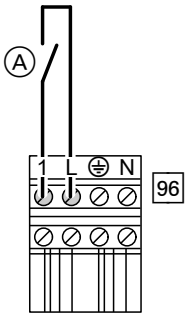

Fig. 16

Ⓐ Floating contact

Assigning functions in the commissioning assistant

See commissioning assistant in "Commissioning".

Checking the CAN bus terminator switch setting

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

Electrical connections (cont.)

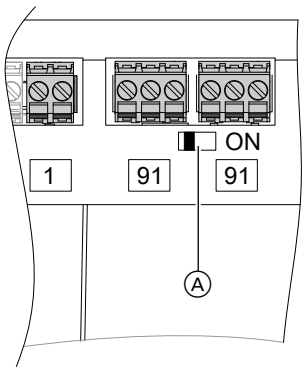

Fig. 17

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

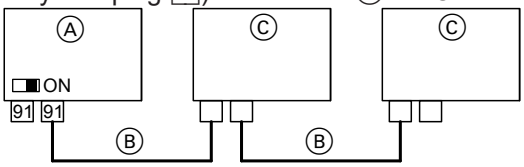

Fig. 18

Ⓐ Heat generator / HMU heat management unit
Ⓑ CAN bus cable
Ⓒ 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 Ⓐ to "ON".

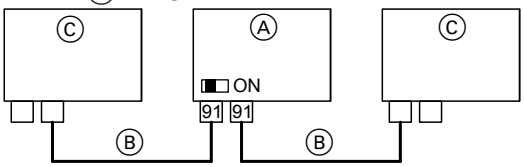

Fig. 19

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).

Electrical connections (cont.)

Power supply and PlusBus connection of accessories

Power supply of all accessories at the HMU heat management unit

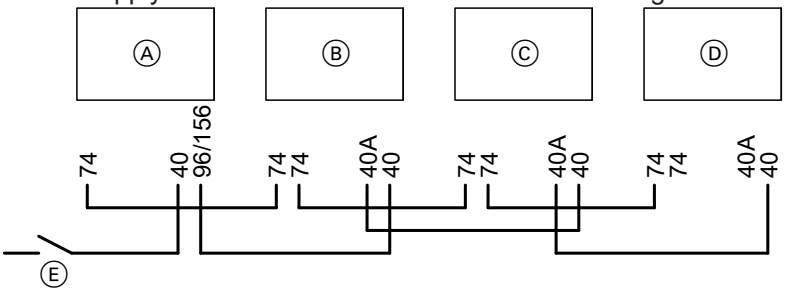

Fig. 20

Some accessories with direct power supply

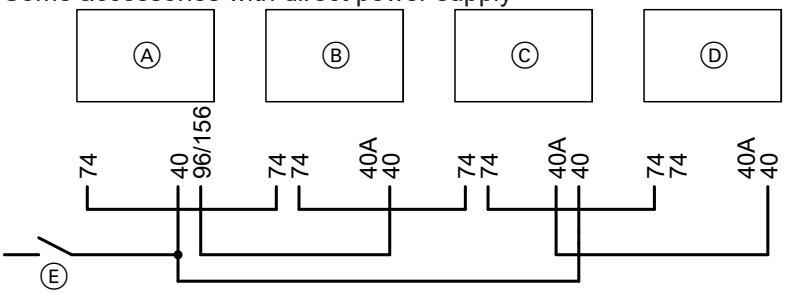

Fig. 21

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

PlusBus system length max. 50 m for 0.34 mm² cable cross-section and unshielded cable.
If the current flowing to the connected working parts (e.g. circulation pumps) is higher than the fuse rating of the relevant accessory, only use the output concerned to control an on-site relay.

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

Danger
Incorrect wiring can lead to serious injury from electrical current and result in appliance damage.
- Route extra low voltage (ELV) leads < 42 V separately from cables > 42 V/230 V~.
- Only strip the minimum of insulation from cables as close as possible to the terminals and bundle tightly to the corresponding terminals.
- Secure cables with cable ties.

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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
- IEEE Wiring Regulation; BS 7671:2018
- 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.

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 by an IT expert **prior** to commissioning. Arrange for set up if required.
- Set routing and security parameters in the IP network (LAN).
  Enable the following ports for direct outgoing connections:
  - Port 80
  - Port 123
  - Port 443
  - Port 8883

  Have this checked on site by an IT expert **prior** to commissioning. Set up enabling if required.

Wireless signal range of WiFi connection

The range of wireless signals may be reduced by walls, ceilings and interior fixtures. These weaken the wireless signal, causing poor reception due to the following circumstances.
- On their way between transmitter and receiver, wireless signals are **damped**, e.g. by air or when penetrating walls.
- Wireless signals are **reflected** by metallic objects, e.g. reinforcements embedded in walls, metal foil of thermal insulation and thermal glazing with metallised thermal vapour deposit.
- Wireless signals are **isolated** by service ducts and lift shafts.
- Wireless signals are **disrupted** by devices that also operate with high frequency signals. Maintain a distance of **at least 2 m** from these devices:
  - Computers
  - Audio and video systems
  - Devices with active WiFi connection
  - Electronic transformers
  - Pre-ballasts

Install the heat generator as close as possible to the WiFi router to ensure a good WiFi connection. The signal strength can be displayed on the programming unit: See operating instructions.

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

Electrical connections (cont.)

Angle of penetration

The reception quality remains best if radio signals hit the walls vertically.
Depending on the angle of penetration, the effective wall thickness changes and so does the extent to which the electromagnetic waves are damped.

Flat (unfavourable) angle of penetration

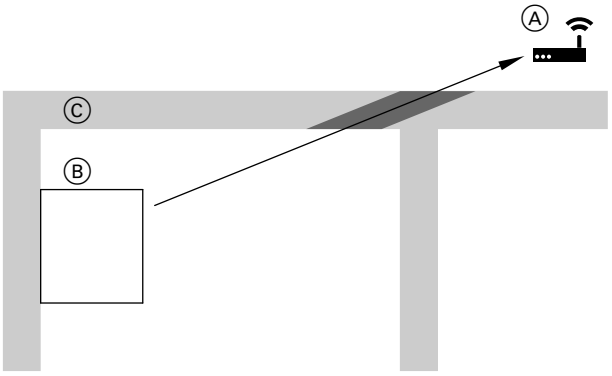

Fig. 22

Ⓐ WiFi router
Ⓑ Heat generator
Ⓒ Wall

Ideal angle of penetration

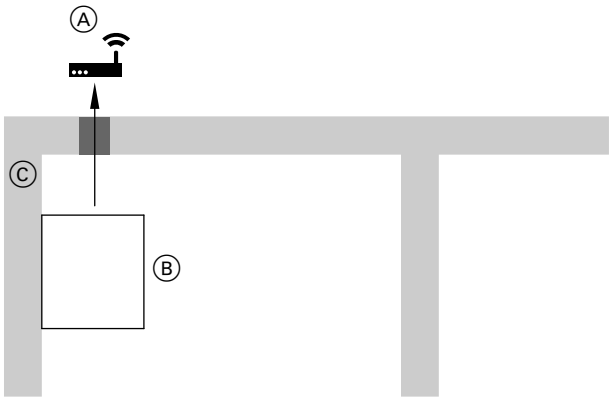

Fig. 23

Ⓐ WiFi router
Ⓑ Heat generator
Ⓒ Wall

Routing connecting cables/leads

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

Closing the wiring chamber

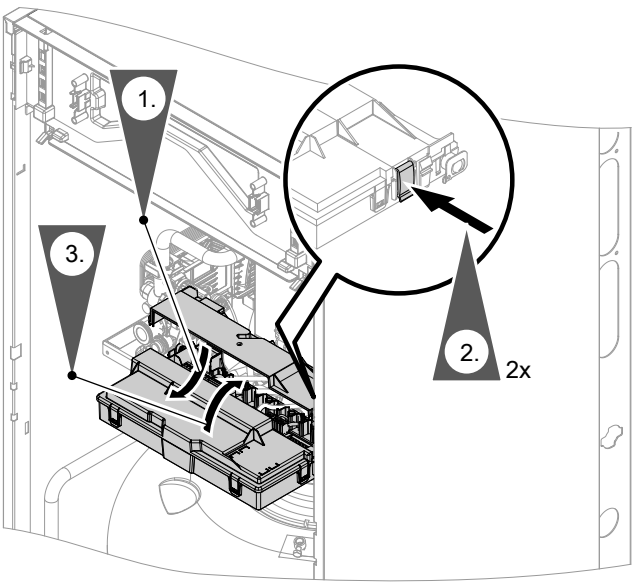

Fig. 24

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Fitting the front panel and programming unit

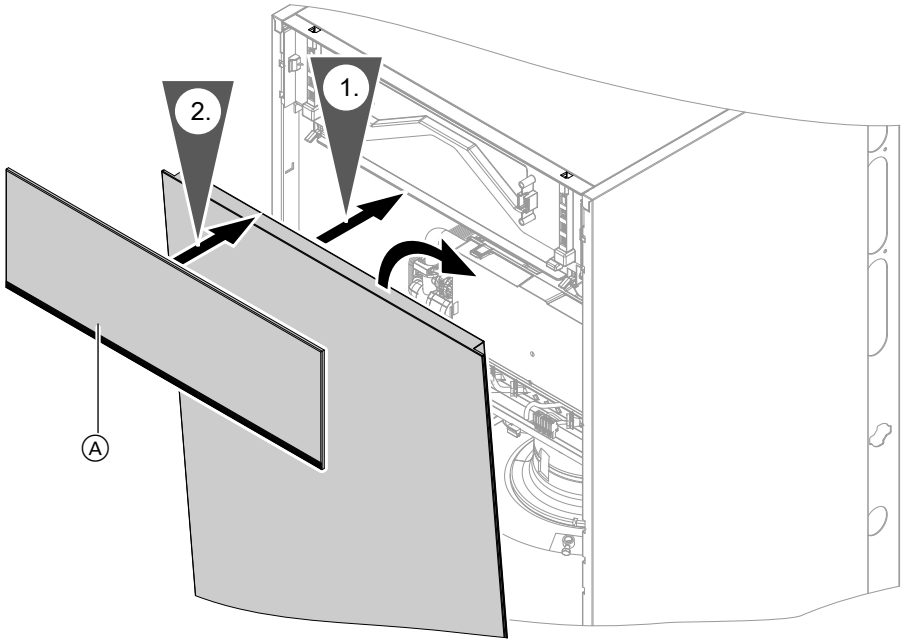

Fig. 25

Lightguide Ⓐ at the bottom

Steps - commissioning, inspection and maintenance

Commissioning steps
Inspection steps
Maintenance steps

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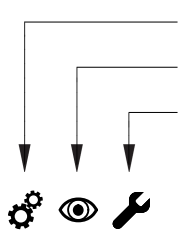
Steps - commissioning, inspection and… (cont.)



Page

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Filling the trap with water

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

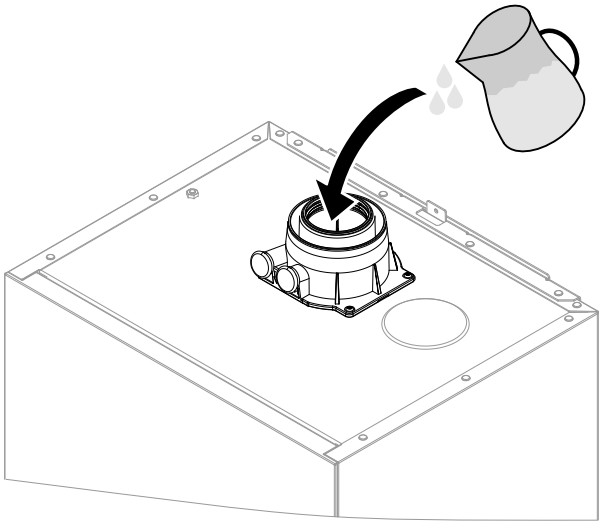

Fig. 26

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.

Removing the front panels

See page 17, steps 1 to 5

Moving the programming unit to the maintenance position

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

Moving the programming unit to the maintenance… (cont.)

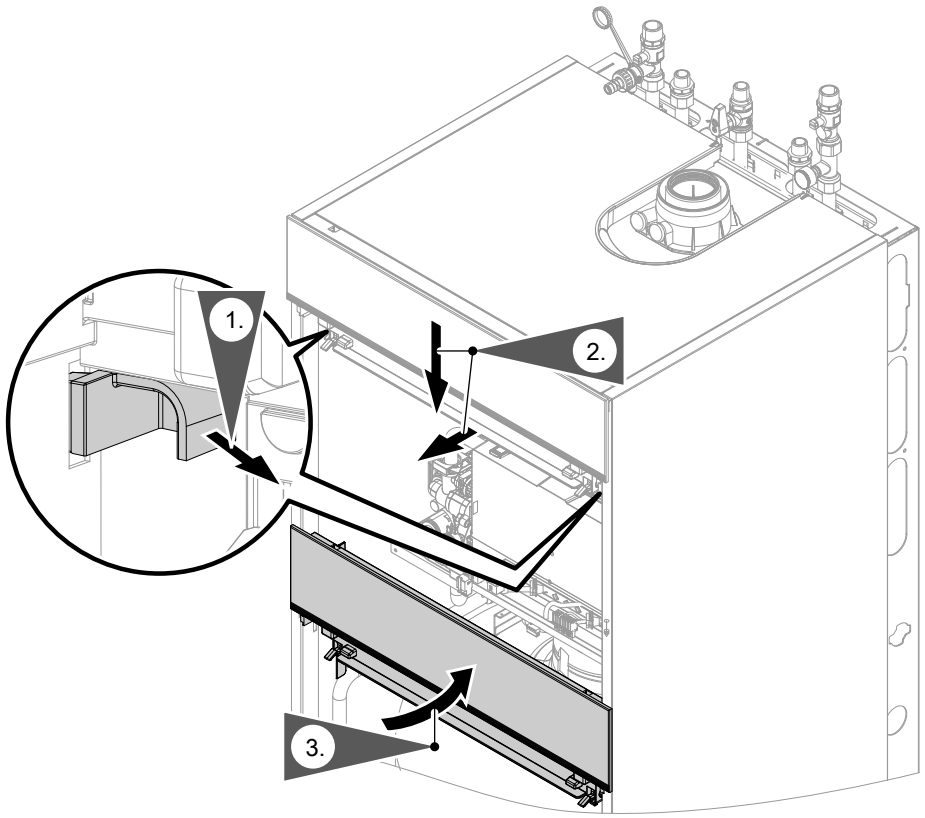

Fig. 27

Commissioning the system

Commissioning assistant

1. Open the gas shut-off valve.

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

3. For further steps, see commissioning assistant in the following overview.

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

   Note
   Depending on the type of heat generator, connected accessories and other settings, not all menu points will be displayed and not all functions are available.
   See the technical guide or hydraulic scheme browser.

Commissioning via software tool

Note
Apps for commissioning and service are available for iOS and Android devices.

Download on the App Store

GET IT ON Google Play

The appliance automatically switches on the WiFi access point.

1. Open the gas shut-off valve.

2. ☰ and **OK** should be pressed simultaneously for approx. 4 s.

3. Use ∧/∨ to select **"Connect with software tool"** and confirm with **OK**.

4. Follow the instructions in the app.

Commissioning the system (cont.)

Commissioning assistant sequence	Explanations and references
Commissioning	
Language	
With programming unit	If commissioning is to be carried out at the programming unit of the heat generator.
Trade fair mode ▪ Off ▪ On	Only for demonstration purposes. Do not select for normal heating mode.
Units ▪ Temperature ▪ Length ▪ Pressure	Select the required units of measurement (e.g. °C or °F)
Date ▪ Format	
Time ▪ Format ▪ Time changeover	
System pressure ▪ Set value ▪ Area	Select the set system pressure, e.g. 1.5 bar. Select the range within which the system pressure can fluctuate around the set value, e.g. +/-0.5 bar. Example: If 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.
Filling Venting	Filling: See chapters "Filling the heating system" and "Venting the heating system".
Gas type	If operating with LPG, switch to **"LPG"**
Flue system ▪ Single connection ▪ Multiple connections	 Only **one** heat generator is connected to the flue system (factory setting). **Several** heat generators are connected to the flue system at positive pressure (only suitable for systems that run on natural gas).
After confirmation with **OK**, an automatic test of the flue gas temperature sensor is carried out. See the following chapter.	
Building type ▪ Detached house ▪ Apartment building	 One shared holiday program and time program for DHW heating Holiday program is set separately (room temperature-dependent operation not possible)
Continue in the commissioning assistant with Yes or end commissioning with No.	
Operating mode	
▪ Weather-compensated ▪ Constant mode ▪ Room temperature-dependent	The outside temperature sensor must be connected. Operation with constant flow temperature A room temperature controller/room thermostat (accessories) must be connected to plug 96. Only one heating circuit without mixer in the system (only available for detached houses).

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Commissioning the system (cont.)

Commissioning assistant sequence	Explanations and references
System scheme	
Heating circuit 1	Heating circuit without mixer or heating circuit without mixer with external hook-up or Heating circuit without mixer with pump (without low loss header and without further heating circuits, max. 1 heating circuit in the system) for e.g. fixed value control station.
Heating circuit 2, 3, 4	Heating circuits with mixer or heating circuit with mixer with external hook-up
DHW	Settings for DHW heating according to the system components
▪ Not installed	System without DHW heating
▪ Cylinder with one sensor	System with DHW cylinder with 1 cylinder temperature sensor
▪ Cylinder with one sensor and DHW circulation pump	System with DHW cylinder with 1 DHW cylinder temperature sensor and DHW circulation pump
▪ DHW comfort function	Only for gas condensing combi boilers (not adjustable)
▪ Loading cylinder with one sensor	Gas condensing storage combi boiler with integral loading cylinder
▪ Loading cylinder with one sensor and DHW circulation pump	Gas condensing storage combi boiler with integral loading cylinder and DHW circulation pump
▪ Loading cylinder with 2 sensors	Gas condensing storage combi boiler or gas/solar condensing storage combi boiler with integral loading cylinder
▪ Loading cylinder with 2 sensors and DHW circulation pump	Gas condensing storage combi boiler or gas/solar condensing storage combi boiler with integral loading cylinder and DHW circulation pump ***Note*** *DHW circulation pump not possible with Vitodens 222-W.*
Low loss header/buffer cylinder	Settings for the consumer circuits according to the system components
▪ Not installed	There is no low loss header or heating water buffer cylinder in the system.
▪ Low loss header, heating only	System with low loss header, without DHW heating
▪ DHW heating upstream of low loss header	DHW heating with e.g. separate DHW cylinder connected upstream of the low loss header
▪ DHW heating downstream of low loss header	DHW heating with e.g. separate DHW cylinder connected downstream of the low loss header
▪ Buffer cylinder, heating only	System with heating water buffer cylinder, without DHW heating
▪ DHW heating upstream of buffer cylinder	DHW heating with e.g. separate DHW cylinder connected upstream of the heating water buffer cylinder
▪ DHW heating downstream of buffer cylinder	DHW heating with e.g. separate DHW cylinder connected downstream of the heating water buffer cylinder
Solar ***Note*** *Not for Vitodens 222-W, type B2LF and Vitodens 222-F, type B2SF*	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 Solar extension installation and service instructions

Commissioning the system (cont.)

Commissioning assistant sequence	Explanations and references
▪ No solar function ▪ With DHW heating	
▪ With central heating backup	Only adjustable for SDIO/SM1A electronics module (not for Vitodens 242-F)
▪ With 2nd cylinder pre-heating	Only adjustable for SDIO/SM1A electronics module (not for Vitodens 242-F)
▪ With thermostat function	Only adjustable for SDIO/SM1A electronics module (not for Vitodens 242-F)
Plug 96	Function selection if a contact has been connected to plug 96 of the HMU heat management unit
▪ No function	
▪ External demand, DHW circulation pump	Pushbutton function, DHW circulation pump runs for 5 min.
▪ External demand	Heat generator demand with adjustable set flow temperature (parameter 528.0) and set primary circuit pump speed (parameter 1100.2)
▪ External blocking	
EM-EA1 (DIO) function	If an EM-EA1 extension (DIO electronics module) is connected as a function extension Selection of the connected function according to the table in the installation instructions for the EM-EA1 extension
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 commissioning, maintenance and servicing with "ViGuide" online/the "ViGuide" app as well as operation via the "ViCare" app.
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 front of the programming unit.
Remove the access code label and for commissioning, affix one label to the space marked out on the type plate.
Switch on the WiFi connection and establish a connection to the router. See also page 27.
Activating the internet connection:

 Operating instructions

Commissioning the system (cont.)

Affix a further label here so you can find it again for use at a later time:

Fig. 28

Affix a label in the operating instructions.

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

Entering contact details

The system operator can call up contact details when required and notify the heating contractor.

1. ☰ and **OK** simultaneously for approx. 4 s, then release.
2. Use ∧/∨ to select **"Connect with software tool"**.
3. Follow the instructions on the programming unit display.

Filling the heating system

Fill water

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 above 300 ppm must be softened, e.g. with a small softening system for heating water.

Filling the heating system (cont.)

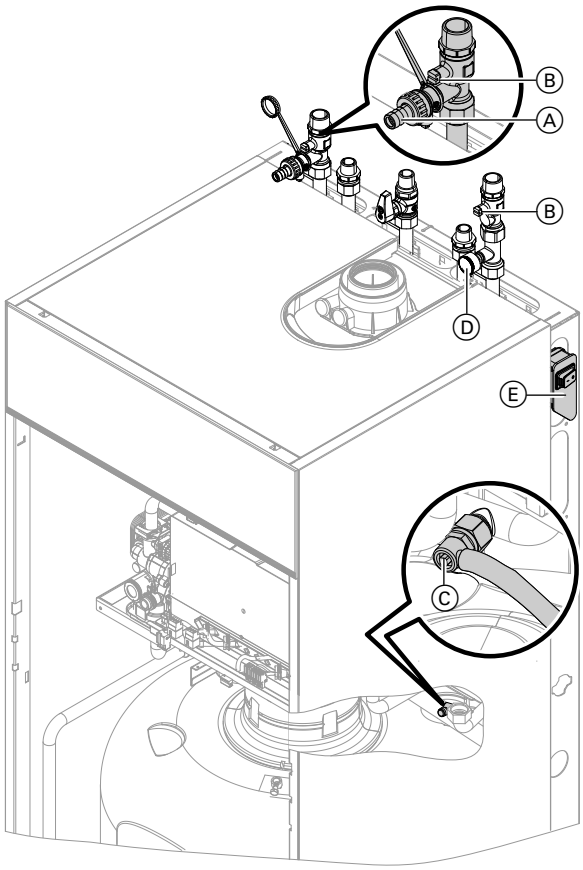

Fig. 29 Shown with the connections at the top

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

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

Activating the filling function

If the filling function is to be activated after commissioning.

Tap the following buttons:

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

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Venting the boiler

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

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

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

Venting the heating system

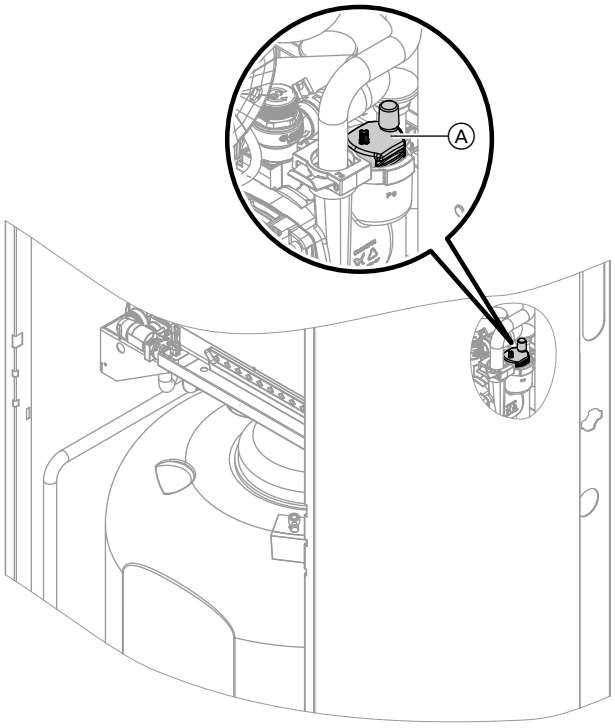


Fig. 30

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

Activating the venting function

If the venting function is to be activated after commissioning.

Tap the following buttons:

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

Venting the heating system (cont.)

6. ∧/∨ for **"Next"** and **OK** until **"Venting"** appears.
7. **OK**
   The venting function is activated. The display shows the system pressure.
   The venting function ends automatically after 20 min or when you tap **OK**.

Filling the DHW cylinder on the DHW side

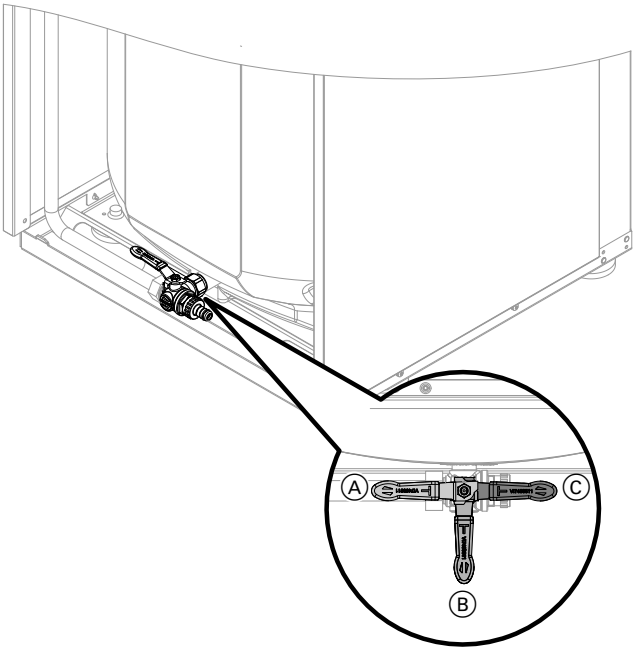


Fig. 31

1. The lever on the valve must be in position Ⓐ.
2. Open the on-site DHW supply and a DHW draw-off point.
3. Once air stops coming out of the DHW draw-off point, the DHW cylinder is completely filled.
4. If there is still air in the cylinder loading circuit, it can be released via air vent screw Ⓓ on the cylinder loading pump.

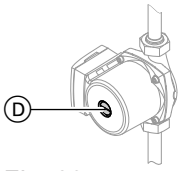


Fig. 32

Checking the connections on the heating water and DHW sides

⚠ **Danger**
There is a 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.

! **Please note**
Leaking hydraulic connections lead to appliance damage.
- Check the internal and on-site hydraulic connections for leaks.
- In the event of leaks, switch off the appliance immediately. Drain the heating water. Check the seating of seal rings. **Always** replace displaced seal rings.

Naming the heating circuits

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

To enter names for heating circuits:

Operating instructions

Checking the gas type

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

- For operation with natural gas, no adjustment is therefore required across the entire Wobbe index range. The boiler can be operated within the Wobbe index range 9.5 to 15.2 kWh/m^3 (34.2 to 54.7 MJ/m^3).
- For operation with LPG, the gas type needs to be changed on the control unit (see following chapter).

1. Determine the gas type and Wobbe index by asking your local gas supply utility or LPG supplier.
2. Record the gas type in the service report.

Converting the gas type (only for operation with LPG)

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

   Note
   No mechanical adjustments are made to the gas solenoid valve.

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

Checking the static pressure and supply pressure

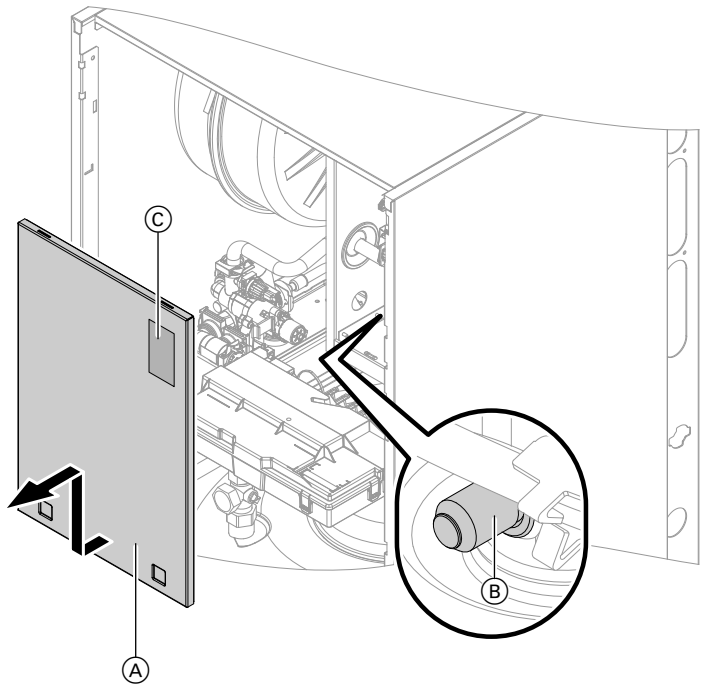


Fig. 33

Ⓐ Cover panel
Ⓑ Test connector
Ⓒ Type plate

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

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

1. Close the gas shut-off valve.
2. Undo clips and remove cover panel Ⓐ.
3. Undo screw in test connector Ⓑ on the gas train, but do not remove it. Connect the pressure gauge.
4. Open the gas shut-off valve.
5. Test the static pressure and record it in the report. 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.

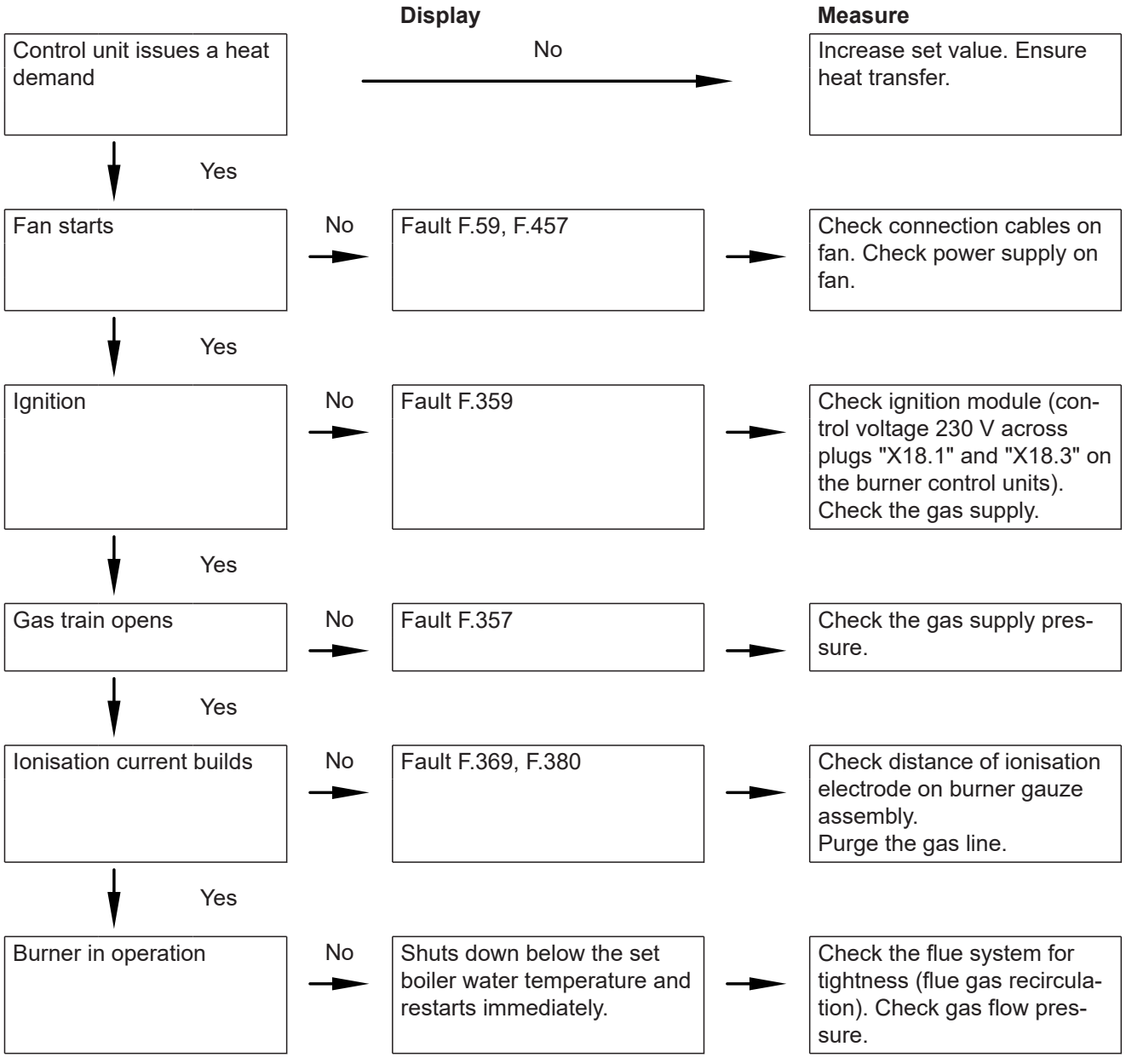
   Note
   Use a suitable measuring device with a resolution of at least 0.1 mbar (0.01 kPa) to check the supply pressure.
8. Record the actual value in the report. Implement measures as indicated in the table below.
9. Shut down the boiler. Close the gas shut-off valve.
10. Remove the pressure gauge. Tighten the screw in test connector Ⓑ.
11. Open the gas shut-off valve and start the appliance.

    Danger
    Gas escaping from the test connector leads to a risk of explosion.
    Check gas tightness at test connector Ⓑ.
12. Fit cover panel Ⓐ.

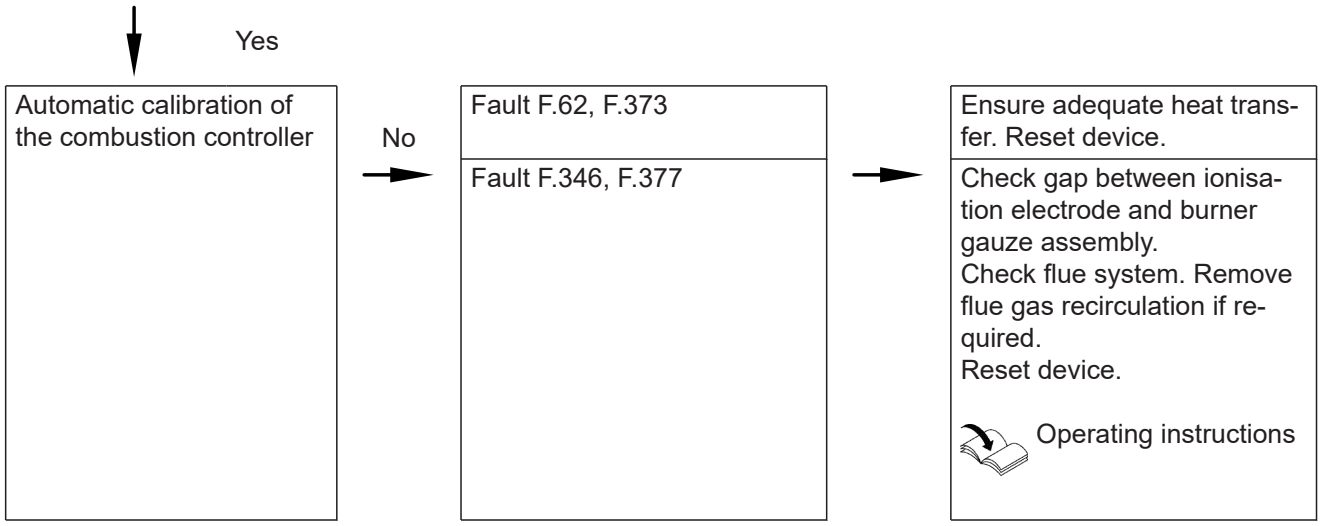
Checking the static pressure and supply pressure (cont.)

Supply pressure (flow pressure)		Measures
For natural gas	For LPG	
< 13 mbar (1.3 kPa)	< 25 mbar (2.5 kPa)	Do not start the boiler. Notify the gas supply utility or LPG supplier.
13 to 25 mbar (1.3 to 2.5 kPa)	25 to 57.5 mbar (2.5 to 5.75 kPa)	Start the boiler.
> 25 mbar (2.5 kPa)	> 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 the gas supply utility or LPG supplier.

Function sequence and possible faults



Function sequence and possible faults (cont.)



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

Setting the max. heating output

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

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

Tap the following buttons:

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

Activating screed drying

Screed drying

6 different temperature profiles can be set for screed drying:
Preset temperature profiles can be 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.
With a combi boiler, DHW heating is not possible during screed drying. With a system boiler or storage combi boiler, after 30 minutes DHW heating is suspended for an hour (parameter 1087.1) in order to run the screed drying program.

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Adjusting the pump rate of the integral circulation pump

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

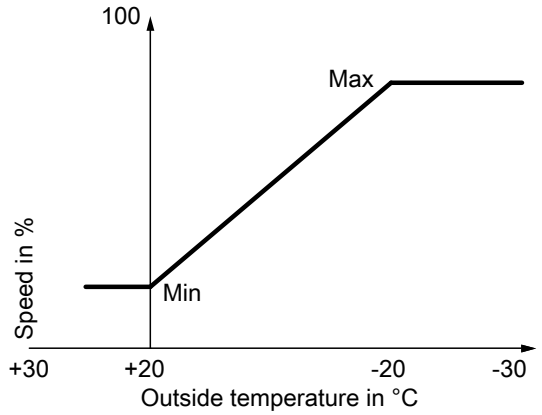

Fig. 34

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

- In the delivered condition, the minimum pump rate and the maximum pump rate are set to the following values:
  Note
  The minimum speed of 60 % is not undershot, in order to ensure the required flow rate via the internal overflow valve. Having the minimum pump rate set to 40 % ensures that the pump works more energy efficiently in weather-compensated mode.

Rated heating output in kW	**Speed settings in the delivered condition in %**	
	Min. pump rate	**Max. pump rate**
11	40	60
19	40	70
25	40	85
32	40	100

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

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

Residual head of integral circulation pump

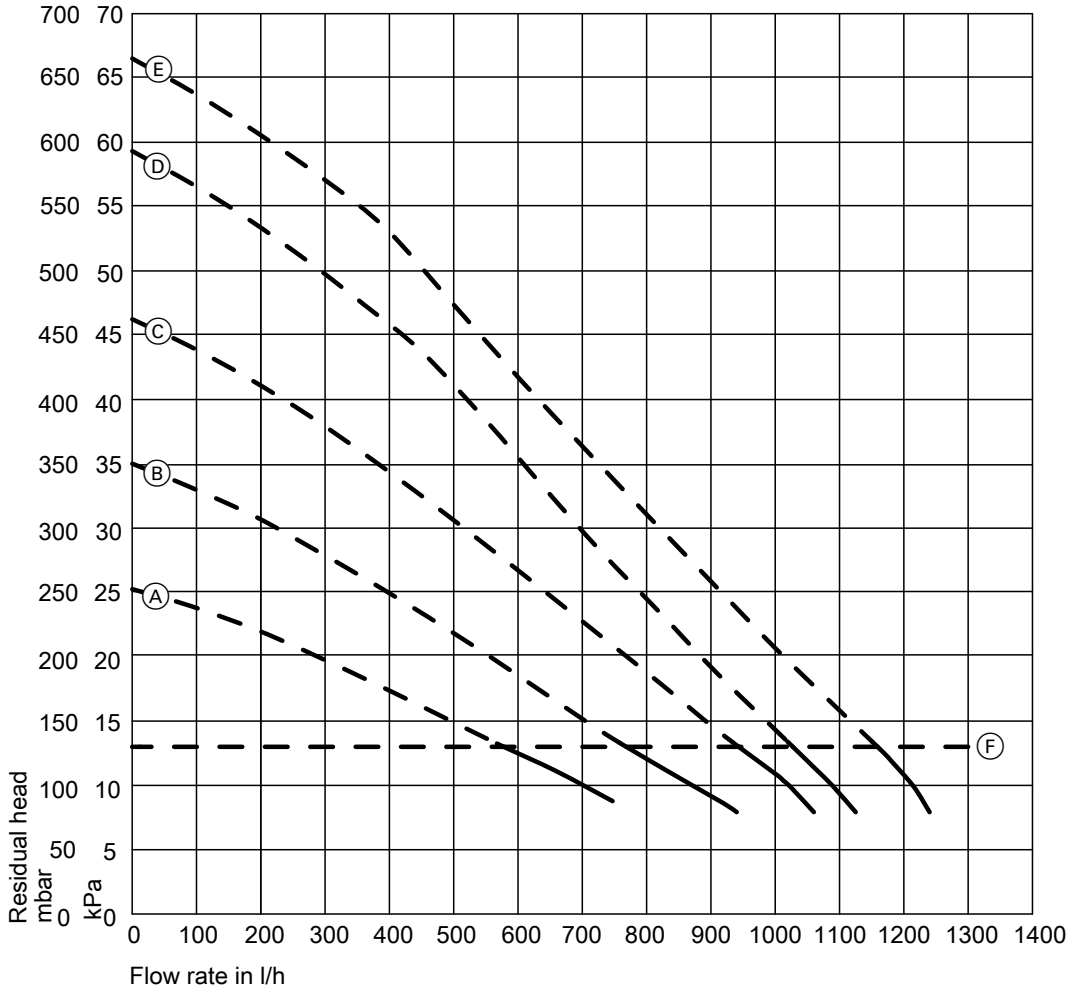

Fig. 35

Ⓕ Upper operational limit (integral bypass opens)

Curve	Pump rate of circulation pump
Ⓐ	60 %
Ⓑ	70 %
Ⓒ	80 %
Ⓓ	90 %
Ⓔ	100 %

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Checking the balanced flue system for leaks (annular gap check)

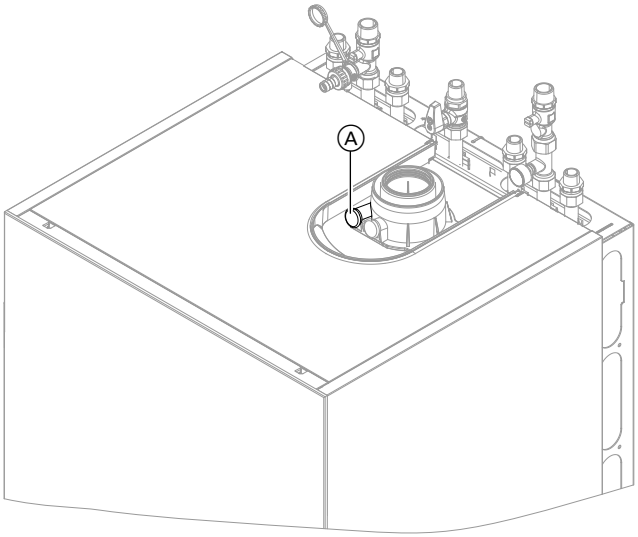

Fig. 36

Ⓐ Combustion air aperture (ventilation air)

For balanced flue systems tested together with the heat generator, there is no requirement for a tightness test (overpressure test) during commissioning by the flue gas inspector.
In this case, we recommend that a simple tightness test is carried out during system commissioning. For this, check the CO_2 or O_2 concentration in the combustion air at the annular gap of the balanced flue pipe.
If the CO_2 concentration is less than 0.2 % or the O_2 concentration is greater than 20.6 %, the flue pipe is deemed to be sufficiently gas-tight.

If actual CO_2 values are greater or O_2 values are lower, then pressure test the flue pipe with a static pressure of 200 Pa.

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

Removing the burner

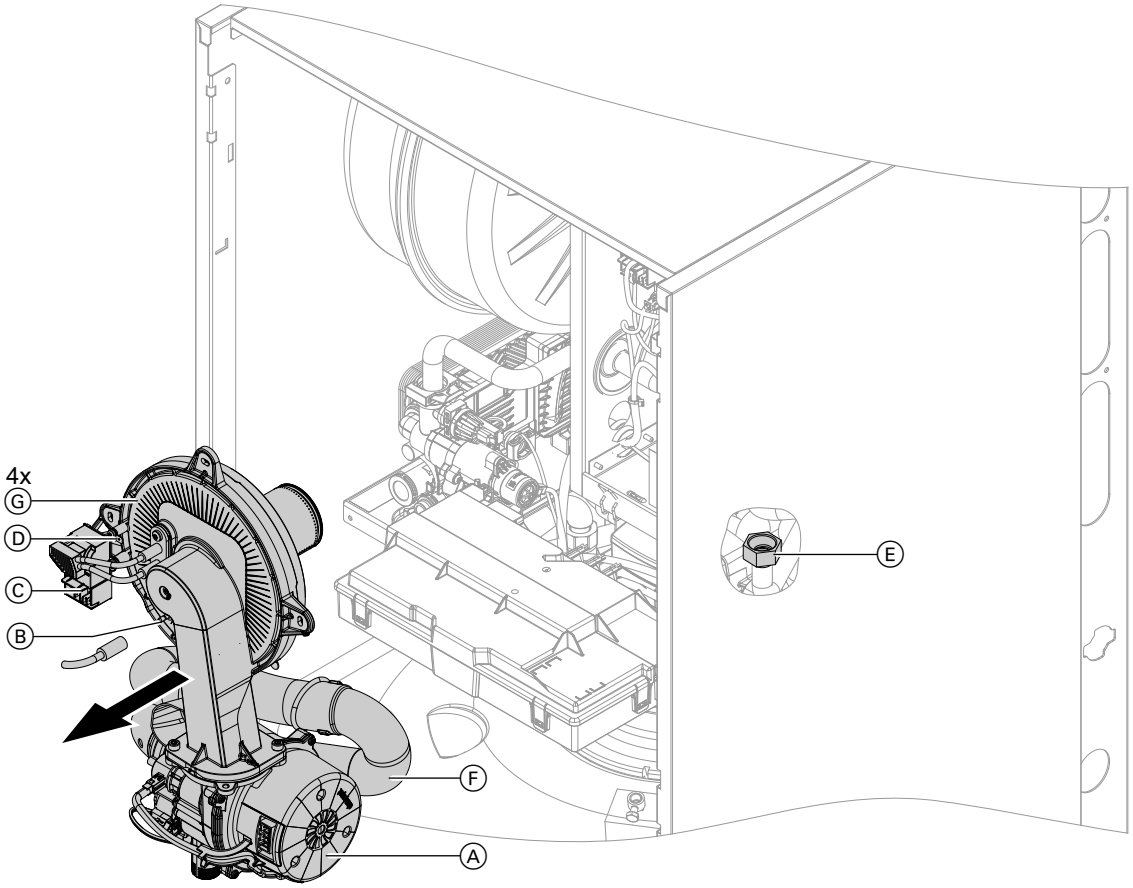

Fig. 37

1. Turn off the ON/OFF switch.
2. Close the gas shut-off valve and safeguard against reopening.
3. Release the clips and remove the cover panel.
4. Disconnect cables and leads from:
   - Fan motor Ⓐ
     Adaptor, CAN bus fan
   - Ionisation electrode Ⓑ
   - Ignition unit Ⓒ
   - Earth Ⓓ
5. Undo gas supply pipe fitting Ⓔ.
6. Detach Venturi extension Ⓕ from fan unit.
7. Undo 4 screws Ⓖ and remove the burner.

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

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Checking the burner gasket and burner gauze assembly

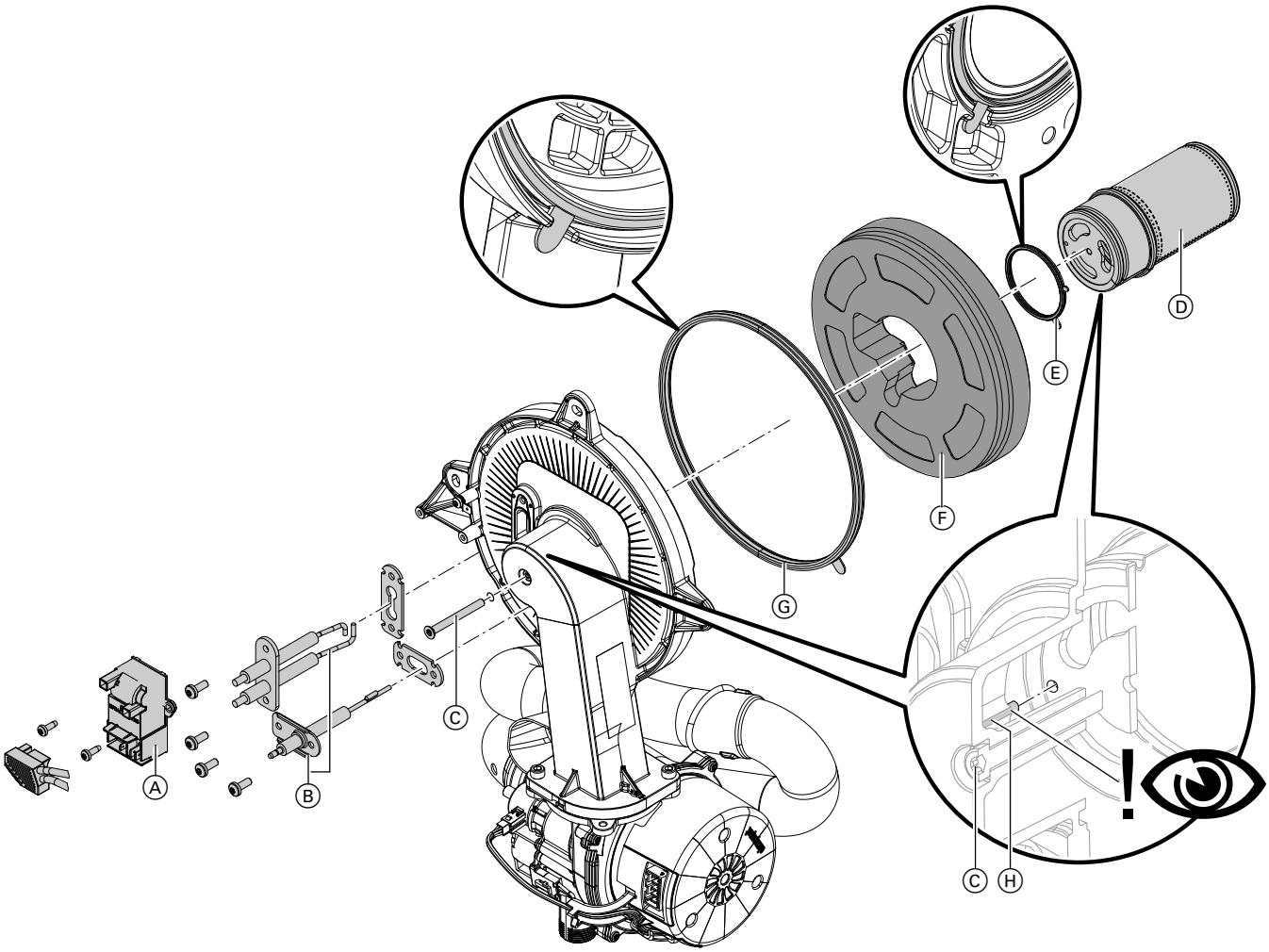

Fig. 38

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

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

1. Disconnect plug with ignition electrode leads from ignition unit Ⓐ.
2. Remove electrodes Ⓑ.
3. Undo Torx screw Ⓒ. Hold onto burner gauze assembly Ⓓ when undoing the screw.
4. Remove burner gauze assembly Ⓓ with gasket Ⓔ and thermal insulation ring Ⓕ. Check components for damage.
5. Install new burner gasket Ⓖ. Observe correct installation position. Align the tab as per the diagram.
6. Insert thermal insulation ring Ⓕ and burner gauze assembly Ⓓ with gasket Ⓔ. Observe correct installation position. Align the tab as per the diagram.
7. Align the hole in burner gauze assembly Ⓓ with burner door pin Ⓗ.

   ! **Please note**
   Incorrect positioning of the burner gauze assembly on the burner door will cause damage to the burner door.
   Insert the burner door pin into the hole in the burner gauze assembly.

   Secure burner gauze assembly Ⓓ and gasket Ⓔ with Torx screw Ⓒ.
   Tighten screws as tightly as necessary and ensure that the components are undamaged and are functioning correctly throughout service life.
   Observe torque settings if a torque wrench is available.
   Torque: 3.0 Nm.
8. Check thermal insulation ring Ⓕ for firm seating.

Checking the burner gasket and burner gauze… (cont.)

9. Fit electrodes Ⓑ. Check clearances, see following chapter.
Tighten screws as tightly as necessary and ensure that the components are undamaged and are functioning correctly throughout service life.
Observe torque settings if a torque wrench is available.
Torque: 4.5 Nm.

Checking and adjusting the ignition and ionisation electrodes

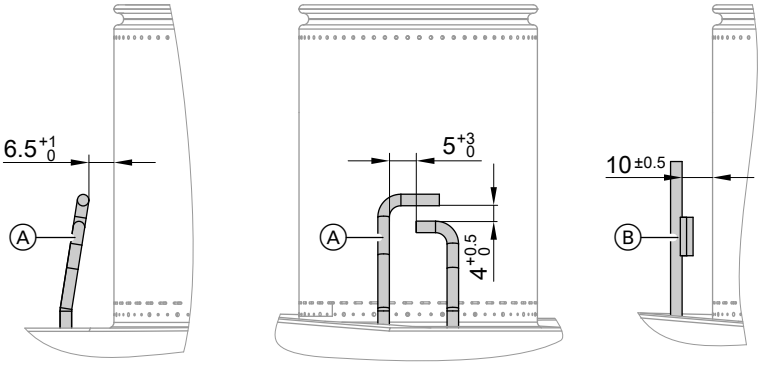

Fig. 39

Ⓐ Ignition electrodes
Ⓑ Ionisation electrode

1. Check the electrodes for wear and contamination.

2. Clean the electrodes with a small brush (not a wire brush) or sandpaper.

3. Check the electrode gaps. If the gaps are not as specified or the electrodes are damaged, replace the electrodes and gaskets and adjust them as required.
Tighten screws as tightly as necessary and ensure that the components are undamaged and are functioning correctly throughout service life.
Observe torque settings if a torque wrench is available.
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.

Checking the back draught safety devices (cont.)

Back draught safety device in the mixing shaft of the burner

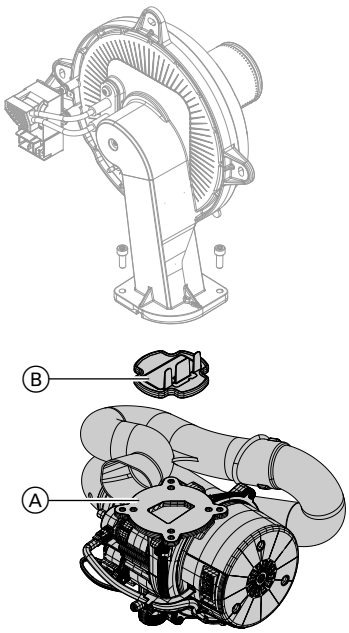

Fig. 40

1. Undo 2 screws and remove fan Ⓐ.
2. Remove back draught safety device Ⓑ.
3. Check the damper and gasket for dirt and damage. Replace if necessary.
4. Refit back draught safety device Ⓑ.

   Note
   Observe correct installation position.

5. Refit fan Ⓐ and secure with 2 screws.
   Tighten screws as tightly as necessary and ensure that the components are undamaged and are functioning correctly throughout service life.
   Observe torque settings if a torque wrench is available.
   Torque: 4.0 Nm

Back draught safety device in the flue gas connection

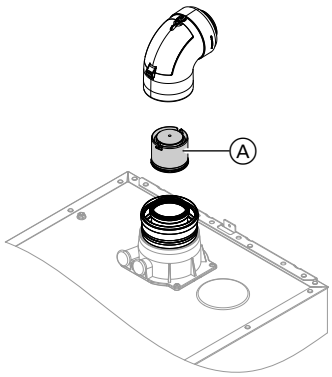

Fig. 41

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 Ⓐ 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.

Cleaning the heating surfaces (cont.)

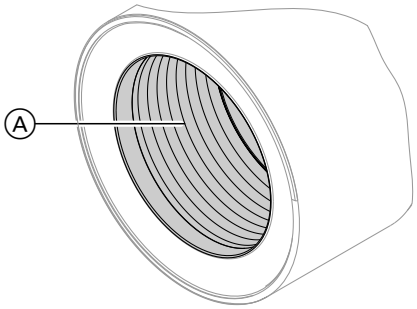

Fig. 42

1. Use a vacuum cleaner to remove combustion residues from heating surface Ⓐ of the heat exchanger.
2. Flush heating surface Ⓐ with water.
3. Check condensate drain. Clean the trap: See the following chapter.
4. Check the thermal insulation mat (if installed) in the heat exchanger for damage, replace if necessary.

Checking the condensate drain and cleaning the trap

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

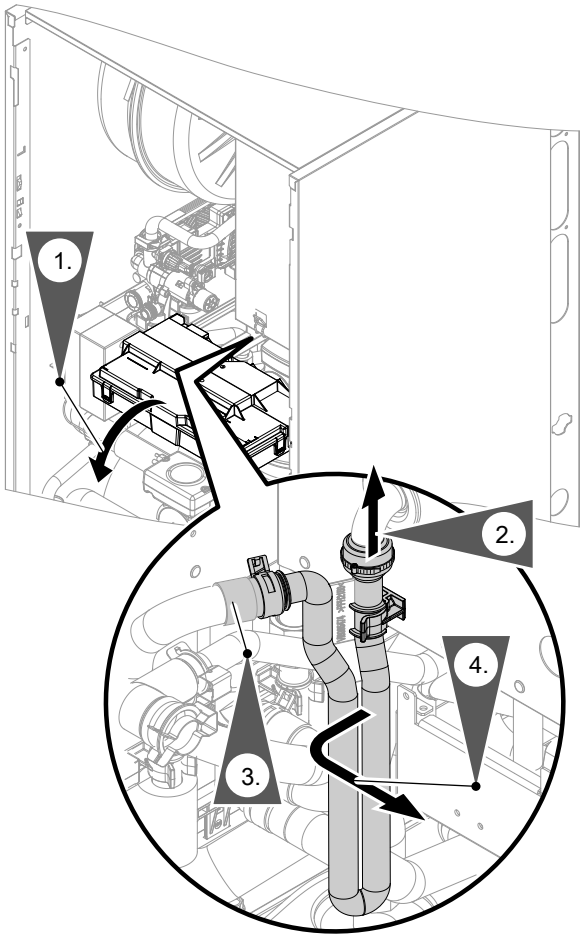

Fig. 43

1. Pivot the HMU heat management unit forwards.
2. Undo the hose retainer. Remove the supply hose.

Please note
Do not undo using a sharp object. This can damage the condensate hose.
The hose retainer is detachable.

3. Undo hose clip and pull off drain hose.
4. Release trap from retaining clip.
Hold trap as straight as possible and remove.
Ensure that no condensate runs out.
5. Clean the trap.

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

6. Refit the trap.

7. Refit the hoses. Secure the drain hose with the hose clip and attach the supply hose with the retainer.

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

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

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

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

   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.

Installing the burner

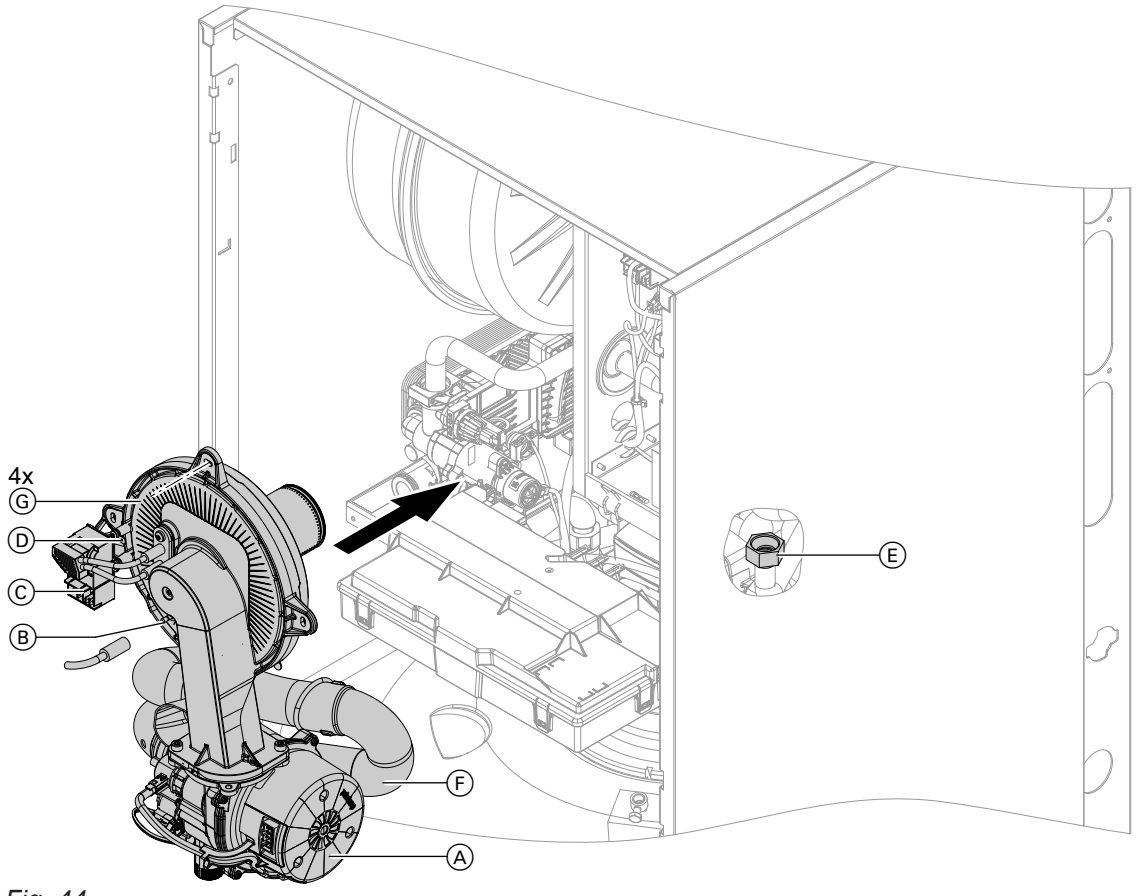

Fig. 44

1. If necessary, move the programming unit.

Installing the burner (cont.)

2. Insert the burner and tighten screws Ⓖ diagonally. Tighten the screws as much as necessary to ensure that the components are not damaged and function correctly throughout their service life. Observe torque settings if a torque wrench is available.
   Torque: **6.5 Nm**

   Note
   Before installation, check burner gasket for damage.

3. Attach Venturi extension Ⓕ to fan unit.

4. Fit gas supply pipe Ⓔ with a new gasket. Tighten the screws as much as necessary to ensure that the components are not damaged and function correctly throughout their service life. Observe torque settings if a torque wrench is available.
   Torque: 30 Nm

5. Check the gas connections for leaks.

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

6. Connect the cables/leads:
   - Fan motor Ⓐ
     Connect CAN bus fan to adaptor.
   - Ionisation electrode Ⓑ
   - Ignition unit Ⓒ
   - Earth Ⓓ

7. Fit cover panel.

Checking the neutralising system (if installed)

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

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

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

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Checking the anode connection and anode earth… (cont.)

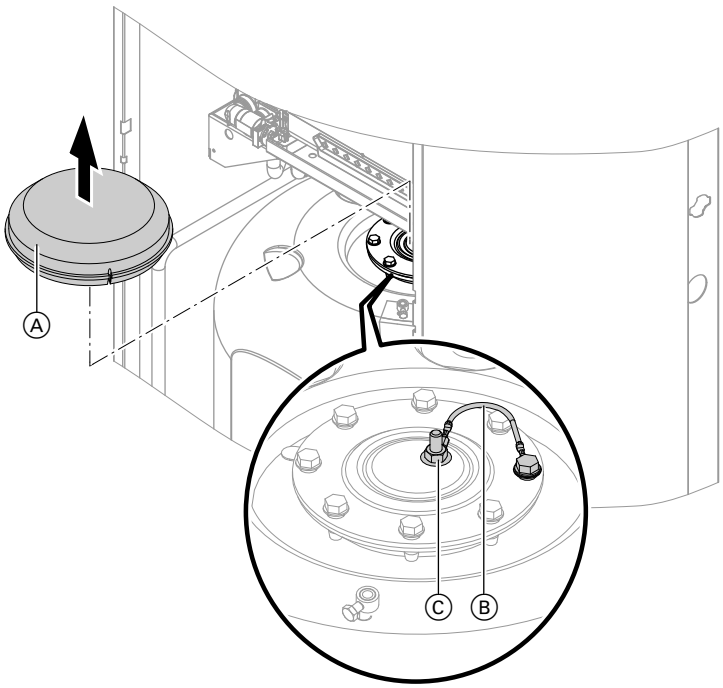

Fig. 45

1. Remove cover Ⓐ (two-part design up to 26 kW).
2. Remove earth cable Ⓑ from tab Ⓒ.
3. Connect tester (up to 5 mA) in series between tab Ⓒ and earth cable Ⓑ.
   - If the current measures > 0.3 mA the protective magnesium anode is OK.
   - If the current measures < 0.3 mA or if there is no current at all, inspect the protective magnesium anode visually (see page 57).

Draining the boiler on the DHW side

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

Draining the boiler on the DHW side (cont.)

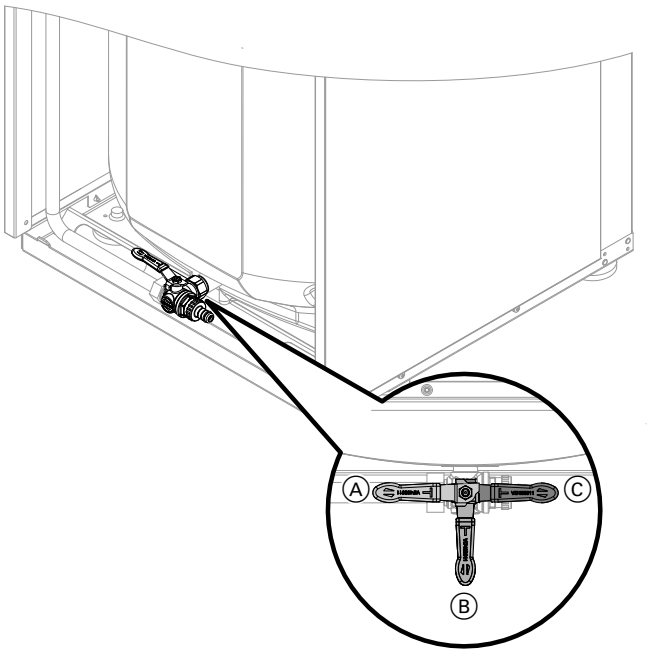

Fig. 46

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

   Note
   Ensure adequate ventilation in the DHW pipework.

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

Cleaning the loading cylinder

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

Cleaning the loading cylinder (cont.)

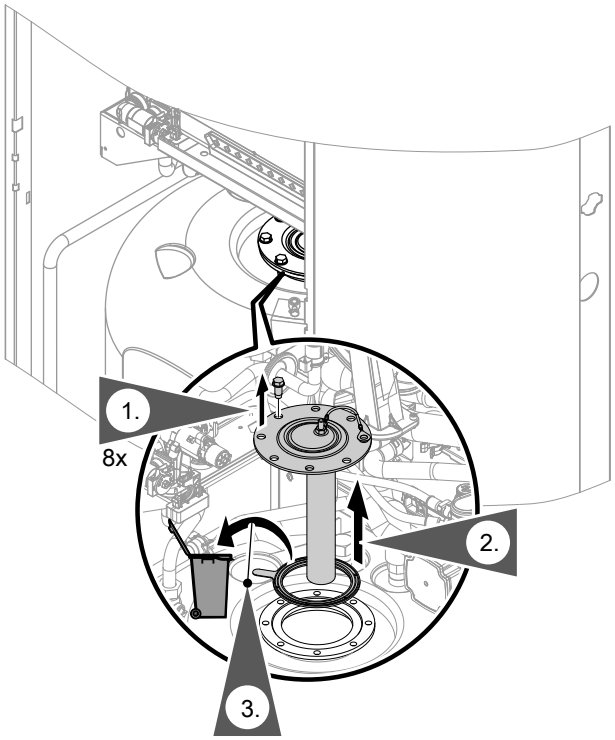

Fig. 47

1. Drain the loading cylinder.

2. Remove flange cover Ⓐ.

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

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

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

5. Thoroughly flush the loading cylinder after cleaning.

Checking and replacing the protective magnesium anode (if necessary)

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

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Re-assembling and filling the loading cylinder

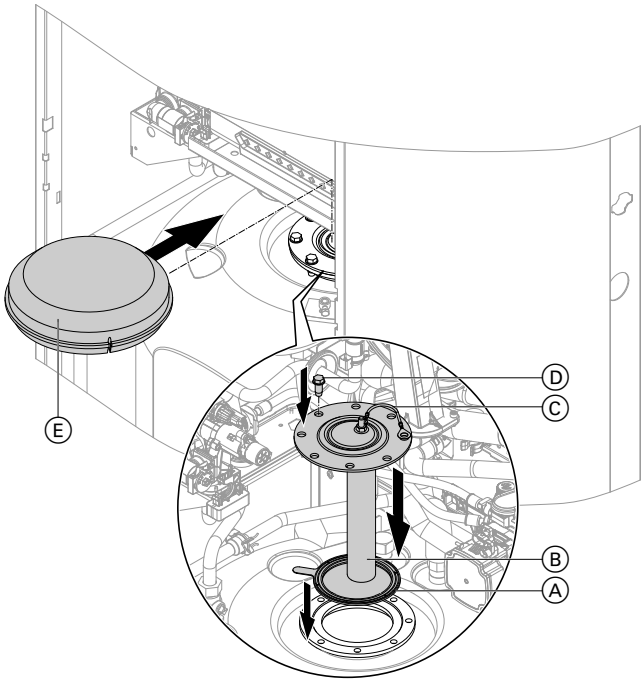

Fig. 48

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

Checking the diaphragm expansion vessel and system pressure

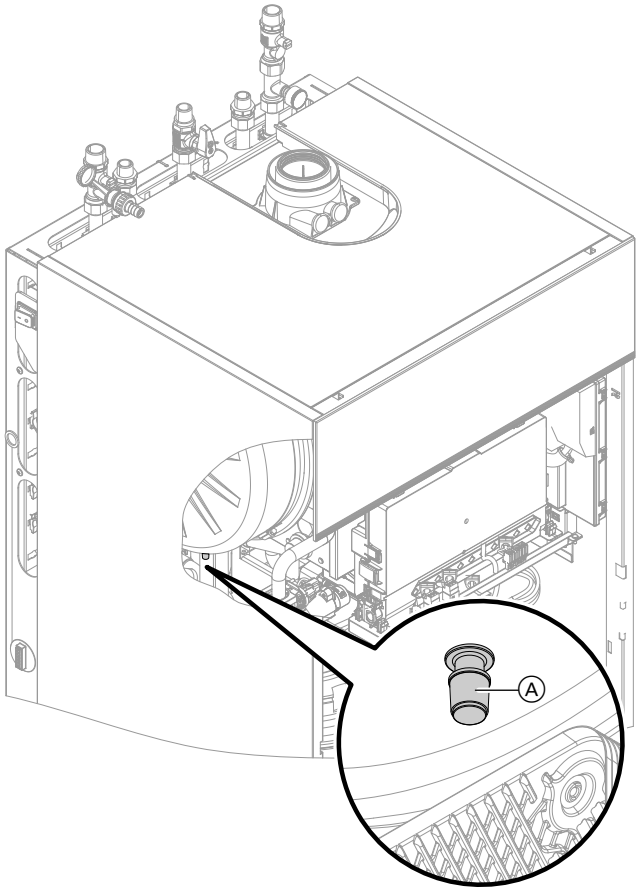

Fig. 49

Ⓐ Diaphragm expansion vessel valve

Note
The expansion vessel can lose some of its charge pressure over time. If 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 (70 kPa).
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 (10 to 20 kPa) above the pre-charge pressure.

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

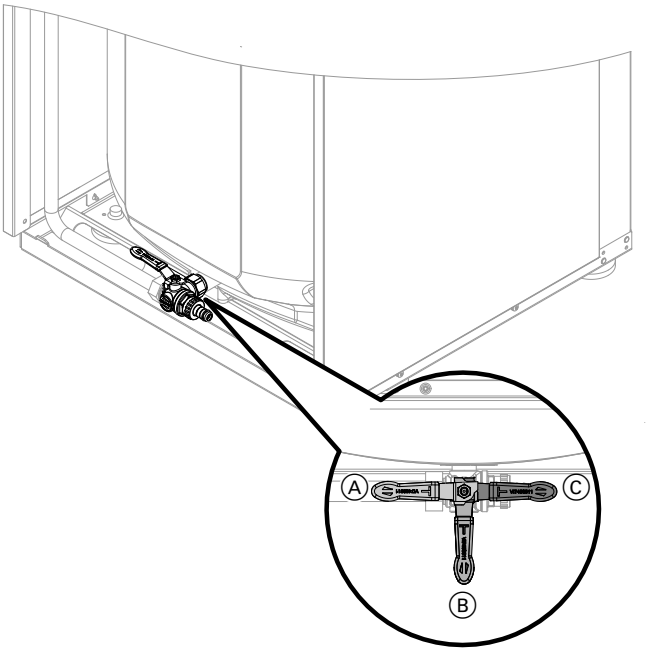

Fig. 50

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

Checking the safety valve function

Checking the electrical connections for firm seating

Checking gas equipment for leaks at operating pressure

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

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

Checking the combustion quality

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

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

Permissible CO content

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

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Checking the combustion quality (cont.)

Permissible CO_2 or O_2 content

Operation with natural gas

Rated heating output (kW)	CO_2 content (%)		O_2 content (%)	
	Upper heating output	Lower heating output	Upper heating output	Lower heating output
11	7.3 to 10.5	7.5 to 10.5	2.1 to 7.9	2.1 to 7.6
19	7.3 to 10.5	7.5 to 10.5	2.1 to 7.9	2.1 to 7.6
25	7.3 to 10.5	7.5 to 10.5	2.1 to 7.9	2.1 to 7.6
32	7.3 to 10.5	7.5 to 10.5	2.1 to 7.9	2.1 to 7.6

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

If the actual CO_2 or O_2 values lie outside their respective ranges, proceed as follows:
- Check the balanced flue system for leaks; see page 47.
- Check ionisation electrode and connecting cable.

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

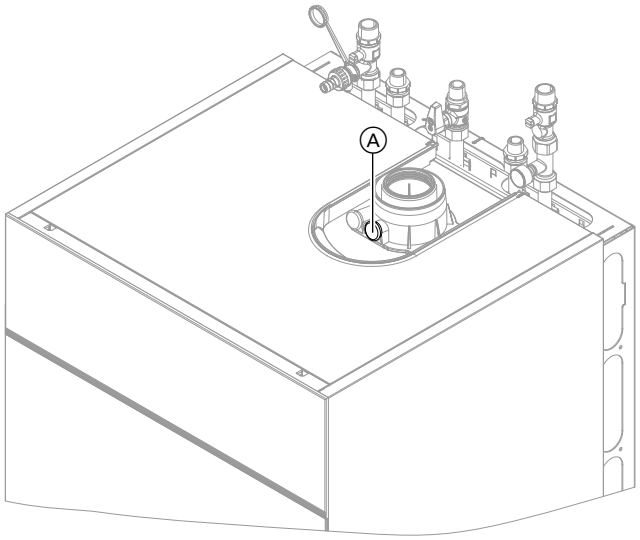

Fig. 51

1. Connect a flue gas analyser at flue gas port Ⓐ on the boiler flue connection.
2. Open the gas shut-off valve. Start the boiler. Create a heat demand.
3. Adjust the lower heating output. See the following chapter.
4. Check the CO_2 content. If the actual value deviates from the permissible ranges, implement steps listed above.
5. Enter the actual value into the report.
6. Adjust the upper heating output. See the following chapter.
7. Check the CO_2 content. If the actual value deviates from the permissible ranges by more than 1 %, implement steps listed above.
8. Enter the actual value into the report.
9. Re-seal test port Ⓐ.

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

Setting the upper/lower heating output

Note
Ensure adequate heat transfer.

Tap the following buttons:

1. ☰ and **OK** 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 set the max. value.
   Primary circuit pump running at 100 %

Checking the combustion quality (cont.)

7. **OK**
8. ☰
9. Use ∧/∨ to select the **"Boiler"** group.
10. **OK**
11. Use ∧/∨ to select the **"Burner modulation target"**.
12. **OK**
13. Set the lower heating output:
    Select **"Minimum heating output"**.
    Confirm with **"OK"**.
    The burner now operates at the lower heating output.
14. 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:

Accessory installation instructions

Adjusting heating curves

Tap the following buttons:

1. ☰ (press for 3 sec if the display shows a house)
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 adjust the value according to the system requirements.
11. **OK** to confirm

Calling up and resetting the maintenance display

Checking service messages

1. ☰ (press for 3 sec if the display shows a house)
2. Use ∧/∨ to select **"Active messages"**.
3. **OK**
4. Use ∧/∨ to select **"Maintenance"**.
5. **OK**
   Existing messages are displayed.

Calling up and resetting the maintenance display (cont.)

Service reset (after service has been carried out)

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

Fitting the front panel

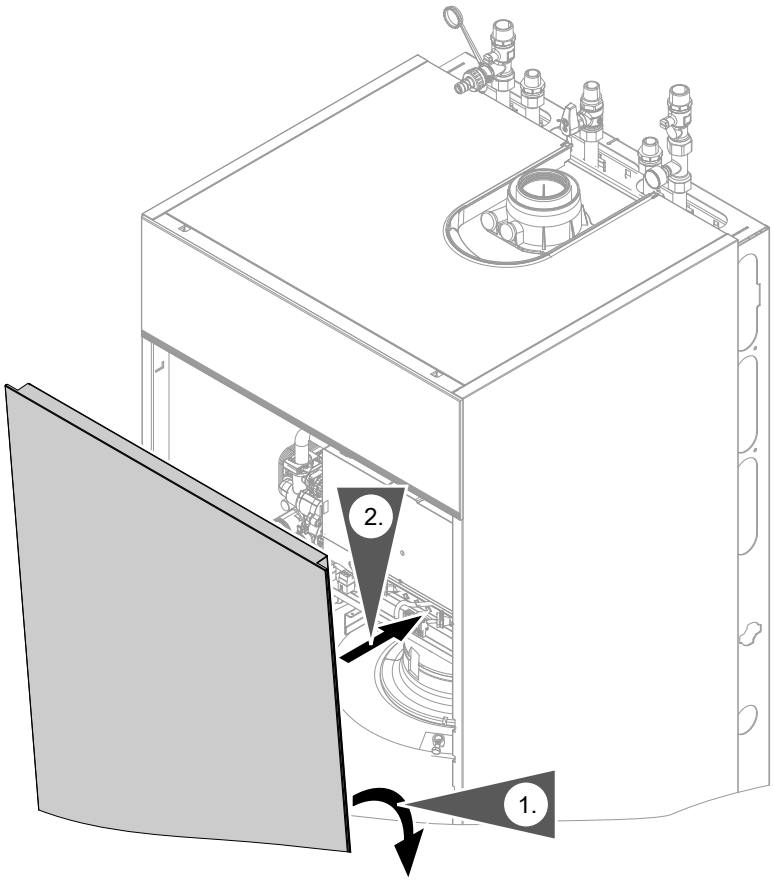

Fig. 52

Instructing the system user

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

DHW hygiene

For optimum DHW hygiene, avoid DHW temperatures that are < 50 °C. For larger systems and systems with low water exchange, the temperature should not drop below < 60 °C.

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

Hygiene function

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

Calling up parameters

- Parameters are split into the following groups:
  - **"General"**
  - **"Boiler"**
  - **"DHW"** (domestic hot water)
  - **"Heating circuit 1/2/3/4"**
  - **"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"**, **"Heating circuit 3"** or **"Heating circuit 4"**.
  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** 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 for adjustment. See tables below.
7. **OK**
8. ∧/∨ for the required value.
9. **OK**

General

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

508.0 "UTC time zone"

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

528.0 "Set flow temperature for external demand"

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

896.0 "Display correction for outside temperature"

Setting		Explanations
		Correction of measured outside temperature
	0	No correction
	–10 to +10	Correction adjustable from –10 to +10 K

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".
Chart A	2	
Chart B	3	
Chart C	4	
Chart D	5	
Chart E	6	
Chart F	7	

912.0 "Automatic summer/wintertime changeover"

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

912.1 "Earliest day of changeover from winter to summertime"

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

912.2 "Month of changeover from winter to summertime"

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

912.3 "Earliest day of changeover from summer to wintertime"

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

912.4 "Month of changeover from summer to wintertime"

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

1098.4 "Gas volume correction factor"

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

General (cont.)

1098.5 "Calorific value"

Setting		Explanations
		Value is provided on the gas supplier's bill. Used for gas consumption data.
	10.0000	
	5.0000 to 40.0000	Calorific value adjustable from 5.0000 to 40.0000 kWh/m³ in increments of 0.0001

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

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

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

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

1504.0 "Source for date and time"

Setting		Explanations
		Selection of source for date and time The setting depends on the heat generator and accessories.
Local	**0**	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
		Number of burner hours to run until next service
	0	
	0 to 25500	Burner hours until next service adjustable from 0 to 25500

Boiler (cont.)

522.3 "Interval until the next service"

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

596.0 "Maximum heating output"

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

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

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

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

Setting		Explanations
		Target speed of internal circulation pump ▪ In heating operation ▪ With external demand ▪ With demand in conjunction with a low loss header
	...	Factory settings defined by settings specific to the appliance The setting range depends on the appliance

1240.0 "Operating mode of primary circuit pump"

Setting		Explanations
	1	"Automatic" Switched on regardless of current temperature level
	7	Shutdown in reduced mode (in conjunction with continuous operation or when no demand via room thermostat)

1411.0 "Clear maintenance messages"

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

Boiler (cont.)

1432.1 "Residual head control of primary circuit pump"

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

1432.2 "Operating mode of primary circuit pump"

Setting		Explanations
	0	Internal circulation pump is operated with constant differential pressure.
	1 to 20	Internal circulation pump is operated with rising differential pressure. Adjustable from 1 to 20 mbar

1503.0 "Minimum heating output"

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

1606.0 "Minimum burner pause time"

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

1606.4 "Integral threshold for burner switch-off"

Setting		Explanations
		Only effective if parameter 1606.0 has been set to 1.
	50	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

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

DHW (cont.)

497.0 " Operating mode of DHW circulation pump"

Setting		Explanations
		DHW circulation pump:
	0	Time program
	4	Selected cycle (see parameter 497.3)

497.1 "DHW circulation pump for hygiene function"

Setting		Explanations
		Activation criterion for the DHW circulation pump when the function "Increased DHW hygiene" is active
OFF	**0**	According to time program
ON	1	Switched on if function "Increased DHW hygiene" is active ⚠ **Danger** High DHW temperatures may cause scalding. ▪ Where necessary implement on-site measures. E.g. install automatic thermostatic mixing valves in the DHW pipe. ▪ Inform the system operator. ▪ Admix cold water at the draw-off points.

497.2 "DHW circulation pump for DHW heating"

Setting		Explanations
		Activation criterion for DHW circulation pump
OFF	**0**	According to time program
ON	1	ON during DHW heating to set cylinder temperature

497.3 "Number of cycles DHW circulation pump"

Setting		Explanations
		Within the time phase, the DHW circulation pump is switched on cyclically for 5 min at a time. Number of switching cycles per hour:
	0	1 switching cycle
	1	2 switching cycles
	2	3 switching cycles
	3	4 switching cycles
	4	5 switching cycles
	5	6 switching cycles

DHW (cont.)

503.0 "Scald protection"

Setting		Explanations
		The adjustable water temperature is limited to a maximum value.
OFF	0	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*** *Even with the scald protection switched on, higher outlet temperatures may occur at the draw-off points in the following cases:* ▪ *With active hygiene function* ▪ *While the appliance is being calibrated*

1087.0 "Max. duration, DHW heating"

Setting		Explanations
		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
	240	Factory setting 240 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

1087.1 "Min. delay until next DHW heating"

Setting		Explanations
		Minimum delay before DHW heating starts again, even though there is a demand. ***Note*** *Function becomes effective when the set "Max. duration, DHW heating" (1087.0) is exceeded.* Cannot be adjusted on gas condensing combi boilers
	60	Delivered condition, delay of 60 min
	60 to 240	Delay adjustable from 60 to 240 min in 1 min increments

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

Setting		Explanations
		Target speed of the internal circulation pump when operated as a DHW pump
	...	Factory settings defined by settings specific to the appliance
		The setting range depends on the appliance.

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

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

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

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

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

Setting		Explanations
		Duration for set flow temperature increase See also chapter "Function description"
60 min	**60**	Delivered condition 60 min
	0 to 120	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
		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"
0 K	**0**	Delivered condition increase 0 K
	0 to 20	Temperature rise adjustable from 0 to 20 K

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

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

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

Setting		Explanations
		Set flow temperature increased when changing from operation at reduced room temperature to operation at standard room temperature or comfort room temperature. See also chapter "Function description"
0 K	**0**	Delivered condition increase 0 K
	0 to 20	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
		Duration for set flow temperature increase See also chapter "Function description"
60 min	**60**	Delivered condition 60 min
	0 to 120	Temperature rise adjustable from 0 to 120 min

430.3 "Set flow temperature increased when switching from operation with reduced room temperature to operation with standard/comfort room temperature, heating circuit 4"

Setting		Explanations
		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"
0 K	**0**	Delivered condition increase 0 K
	0 to 20	Temperature rise adjustable from 0 to 20 K

430.4 "Duration for set flow temperature increase, heating circuit 4"

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

933.3 "Priority, DHW heating, heating circuit 1"

Setting		Explanations
		Priority of DHW heating over the heating circuit
Off	0	No priority for DHW heating (only if the DHW cylinder is installed downstream of the low loss header)
DHW	**1**	With DHW heating priority

933.6 "Operating mode of heating circuit 1"

Setting		Explanations
		Only adjust for systems with one heating circuit. Heating mode:
Weather-compensated without room temperature hook-up	**4**	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
		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"
	8	Room influence factor
	0 to 64	Room influence adjustable from 0 to 64

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

934.3 "Priority, DHW heating, heating circuit 2"

Setting		Explanations
		Priority of DHW heating over heating circuit pump and mixer
OFF	0	No priority for DHW heating (only if the DHW cylinder is installed downstream of the low loss header)
DHW	**1**	With DHW heating priority

934.5 "Differential temperature, heating circuit 2"

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

934.6 "Operating mode of heating circuit 2"

Setting		Explanations
		Heating mode:
Weather-compensated without room temperature hook-up	**4**	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
		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"
	8	Room influence factor
	0 to 64	Room influence adjustable from 0 to 64

935.3 "Priority, DHW heating, heating circuit 3"

Setting		Explanations
		Priority of DHW heating over heating circuit pump and mixer
OFF	0	No priority for DHW heating (only if the DHW cylinder is installed downstream of the low loss header)
DHW	**1**	With DHW heating priority

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

935.5 "Differential temperature, heating circuit 3"

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

935.6 "Operating mode of heating circuit 3"

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

935.7 "Room influence factor, heating circuit 3"

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

936.3 "Priority, DHW heating, heating circuit 4"

Setting		Explanations
		Priority of DHW heating over heating circuit pump and mixer
Off	0	No priority for DHW heating (only if the DHW cylinder is installed downstream of the low loss header)
DHW	**1**	With DHW heating priority

936.5 "Differential temperature, heating circuit 4"

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

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

936.6 "Operating mode heating circuit 4"

Setting		Explanations
		See also parameter 936.7 Heating mode:
Weather-compensated without room temperature hook-up	**4**	Weather-compensated **without** room temperature influence
Weather-compensated with room temperature hook-up	7	Weather-compensated **with** room temperature influence

936.7 "Room influence factor, heating circuit 4"

Setting		Explanations
		The higher the value, the greater the influence of the room temperature on the set flow temperature of the heating circuit (heating curve). Operation with room temperature hook-up must be set for the heating circuit (parameter 936.6). Change value for heating circuit with mixer only. For a sample calculation, see chapter "Heating curve" in the "Function description"
	8	Room influence factor
	0 to 64	Room influence adjustable from 0 to 64

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

Setting		Explanations
		Minimum speed of the internal circulation pump in heating mode with standard room temperature
	...	Delivered condition specified by settings specific to the heat generator Setting range depends on the appliance.

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 Setting range depends on the appliance.

1192.0 "Minimum flow temperature limit, heating circuit 1"

Setting		Explanations
		Minimum flow temperature limit for the heating circuit
20 °C	**20**	Min flow temperature 20 °C
	1 to 90	Setting range limited by parameters, depending on appliance variant

1192.1 "Maximum flow temperature limit, heating circuit 1"

Setting		Explanations
		Maximum flow temperature limit for the heating circuit
74 °C	**74**	Max. flow temperature 74 °C
	10 to 100	Setting range limited by parameters, depending on appliance variant

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 Min flow temperature 20 °C Setting range limited by parameters, depending on appliance variant

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 Max. flow temperature 74 °C Setting range limited by parameters, depending on appliance variant

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 Min flow temperature 20 °C Setting range limited by parameters, depending on appliance variant

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 Max. flow temperature 74 °C Setting range limited by parameters, depending on appliance variant

1195.0 "Minimum flow temperature limit, heating circuit 4"

Setting		Explanations
20 °C	**20** 1 to 90	Minimum flow temperature limit for the heating circuit Min flow temperature 20 °C Setting range limited by parameters, depending on appliance variant

1195.1 "Maximum flow temperature limit, heating circuit 4"

Setting		Explanations
74 °C	**74** 10 to 100	Maximum flow temperature limit for the heating circuit Max. flow temperature 74 °C Setting range limited by parameters, depending on appliance variant

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

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

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

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

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

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

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

1398.1 "Heating limit: Economy function, outside temperature, heating circuit 4"

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

Energy saving functions (setting only via software tool)

1791.0 "3-way valve target position"

Setting		Explanations
1. Heating 2. Central position 3. DHW		The 3-way valve assumes the set position when there is no demand from heating operation or DHW heating.

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

2426.1 "Weather-compensated heating circuit pump logic for heating circuit 1" (only for weather-compensated control units)

Setting		Explanations
	Setting range -9 to +5 °C	If the outside temperature rises above the threshold value (set room temperature plus offset in K), the heating circuit pump is switched off. If the outside temperature falls below the threshold value (set room temperature plus offset in K), the heating circuit pump is switched on.

2426.3 "Room temperature-dependent heating circuit pump logic for heating circuit 1" (only for weather-compensated control units with room temperature hook-up).

Setting		Explanations
Only activate this function for the heating circuit with mixer or if there is only one direct heating circuit in the system.	Setting range -2 to +5 °C	If the actual room temperature rises above the threshold value (set room temperature plus offset in K), the heating circuit pump is switched off. If the actual room temperature falls below the threshold value (set room temperature plus offset in K), the heating circuit pump is switched on.

2427.1 "Weather-compensated heating circuit pump logic for heating circuit 2" (only for weather-compensated control units).

Setting		Explanations
	Setting range -9 to +5 °C	If the outside temperature rises above the threshold value (set room temperature plus offset in K), the heating circuit pump is switched off. If the outside temperature falls below the threshold value (set room temperature plus offset in K), the heating circuit pump is switched on.

2427.3 "Room temperature-dependent heating circuit pump logic for heating circuit 2" (only for weather-compensated control units with room temperature hook-up).

Setting		Explanations
Only activate this function for the heating circuit with mixer or if there is only one direct heating circuit in the system.	Setting range -2 to +5 °C	If the actual room temperature rises above the threshold value (set room temperature plus offset in K), the heating circuit pump is switched off. If the actual room temperature falls below the threshold value (set room temperature plus offset in K), the heating circuit pump is switched on.

2428.1 "Weather-compensated heating circuit pump logic for heating circuit 3" (only for weather-compensated control units).

Setting		Explanations
	Setting range -9 to +5 °C	If the outside temperature rises above the threshold value (set room temperature plus offset in K), the heating circuit pump is switched off. If the outside temperature falls below the threshold value (set room temperature plus offset in K), the heating circuit pump is switched on.

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

2428.3 "Room temperature-dependent heating circuit pump logic for heating circuit 3" (only for weather-compensated control units with room temperature hook-up).

Setting		Explanations
Only activate this function for the heating circuit with mixer or if there is only one direct heating circuit in the system.	Setting range -2 to +5 °C	If the actual room temperature rises above the threshold value (set room temperature plus offset in K), the heating circuit pump is switched off. If the actual room temperature falls below the threshold value (set room temperature plus offset in K), the heating circuit pump is switched on.

2429.1 "Weather-compensated heating circuit pump logic for heating circuit 4" (only for weather-compensated control units).

Setting		Explanations
	Setting range -9 to +5 °C	If the outside temperature rises above the threshold value (set room temperature plus offset in K), the heating circuit pump is switched off. If the outside temperature falls below the threshold value (set room temperature plus offset in K), the heating circuit pump is switched on.

2429.3 "Room temperature-dependent heating circuit pump logic for heating circuit 4" (only for weather-compensated control units with room temperature hook-up).

Setting		Explanations
Only activate this function for the heating circuit with mixer or if there is only one direct heating circuit in the system.	Setting range -2 to +5 °C	If the actual room temperature rises above the threshold value (set room temperature plus offset in K), the heating circuit pump is switched off. If the actual room temperature falls below the threshold value (set room temperature plus offset in K), the heating circuit pump is switched on.

Frost protection configuration (setting only via software tool)

2855.1 "Additional (passive) frost protection configuration, heating circuit 1"

Setting		Explanations
	1	= 1 °C Setting range: -9 °C to +3 °C If the outside temperature falls below the set outside temperature limit, the corresponding heating circuit pump switches on (applies only to weather-compensated operation).

2856.1 "Additional (passive) frost protection configuration, heating circuit 2"

Setting		Explanations
	1	= 1 °C Setting range: -9 °C to +3 °C If the outside temperature falls below the set outside temperature limit, the corresponding heating circuit pump switches on (applies only to weather-compensated operation).

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

2857.1 "Additional (passive) frost protection configuration, heating circuit 3"

Setting		Explanations
	1	= 1 °C Setting range: -9 °C to +3 °C If the outside temperature falls below the set outside temperature limit, the corresponding heating circuit pump switches on (applies only to weather-compensated operation).

2858.1 "Additional (passive) frost protection configuration, heating circuit 4"

Setting		Explanations
	1	= 1 °C Setting range: -9 °C to +3 °C If the outside temperature falls below the set outside temperature limit, the corresponding heating circuit pump switches on (applies only to weather-compensated operation).

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.

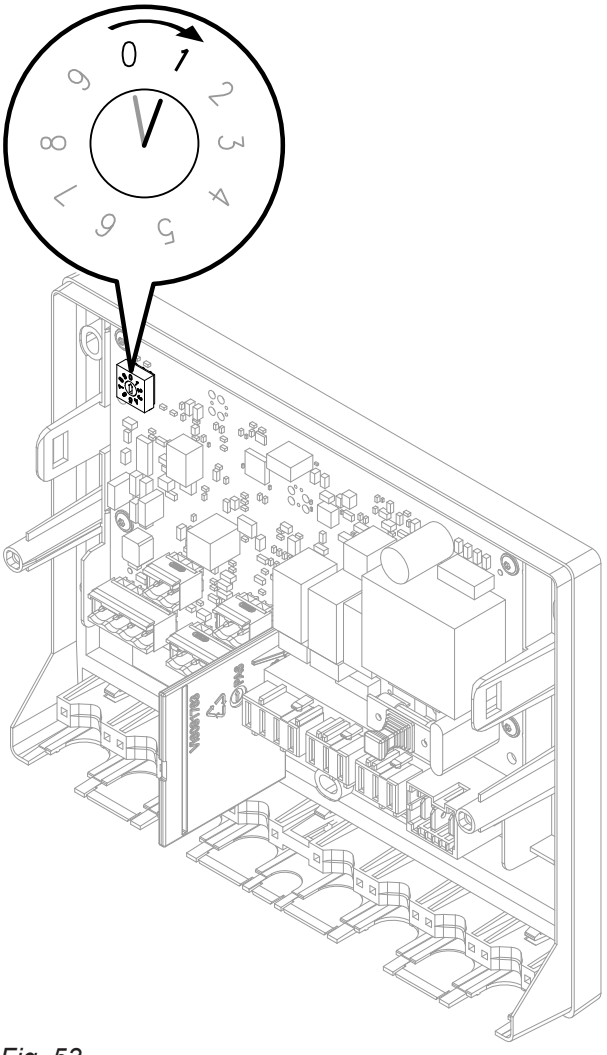

Fig. 53

Subscriber numbers of connected extensions (cont.)

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 4 with mixer	ADIO	EM-M1/EM-MX	**3**
Heating circuit 1 without mixer (circulation pump downstream of low loss header)	ADIO	EM-P1	**4**
Function extensions (e.g.): ▪ Fault message input	DIO	EM-EA1	**1**
▪ Fault message output	DIO	EM-EA1	**2**
▪ Operating mode changeover	DIO	EM-EA1	**3**

Service menu

Calling up the service menu

Tap the following buttons:

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

2. Select the required menu section, e.g. **"Connect with software tool"**.

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

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

Service menu overview

Service
Active messages
Reset service messages
Connect with software tool
Diagnostics
— General
— Burner
— Heating circuit 1
— Heating circuit 2
— Heating circuit 3
— Heating circuit 4
— DHW
— Solar
— WiFi
Actuator test
System configuration
Message history
Basic settings
— Factory settings
— Commissioning assistant
Recognised devices
Exit trade fair mode

Diagnosis

Checking operating data

Operating data can be checked in various areas. See **"Diagnosis"** in the service menu overview.
Operating data on heating circuits with mixer can only be called up if such components are installed in the system.

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

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Diagnosis (cont.)

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** 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	▪ 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		
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 %

Checking outputs (actuator test) (cont.)

Display		Explanation
Heating circuit 3 pump speed	Set value	Speed, heating circuit pump, heating circuit 3 with mixer in %
Heating circuit 4 pump speed	Set value	Speed, heating circuit pump, heating circuit 4 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
Mixer, heating circuit 4	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

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

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

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

Calling up fault messages

Tap the following buttons:

1. "☰" (press for 3 sec if the display shows a house)
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. "☰" (press for 3 sec if the display shows a house)
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

Fault display on the programming unit (cont.)

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

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

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

Tap the following buttons:

1. ☰ and **OK** 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.
   - **"Status"**, to call up the saved status messages.
   - **"Warnings"** to call up saved warning messages.
   - **"Information"**, to call up saved service information.

   For messages, see chapter "Further messages".
5. **OK**
6. ∧/∨ for the required message
7. **OK**

Deleting the message list

1. ☰ and **OK** 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 prompt.

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Overview of electronics modules

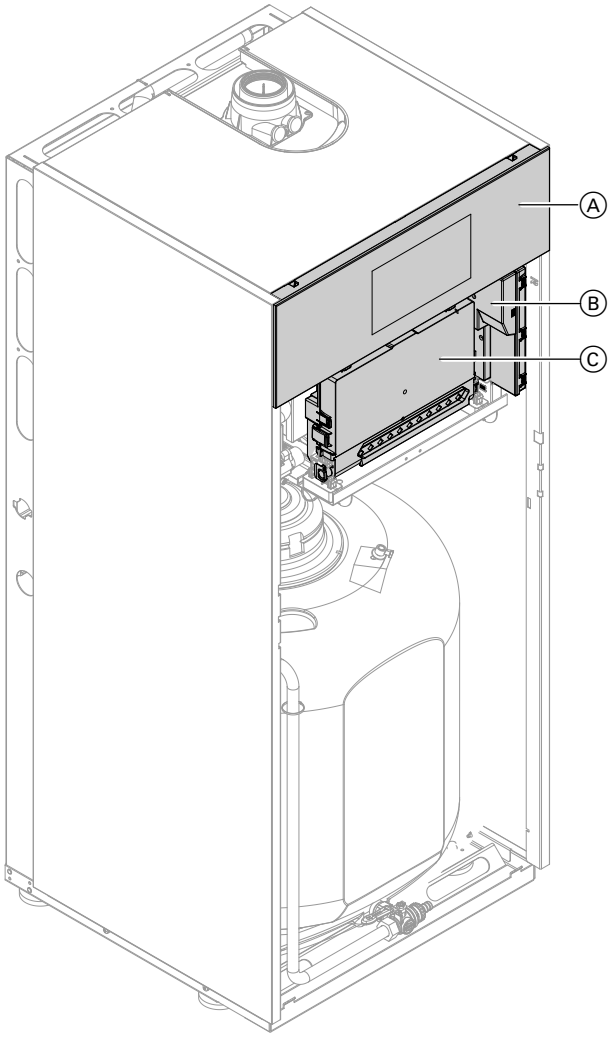

Fig. 54

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

Fault messages

Note
Diagnostics and troubleshooting: See chapter "Repairs".
Fault messages dependent on appliance equipment level

Fault messages (cont.)

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.	Check plug 33/X6 and cable between BCU burner control unit and flow sensor: ▪ Check voltage level, to see if 5 V present at plug 33, pins 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.	▪ 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. Setpoint: 3.3 V⎓ with sensor disconnected Replace faulty component if required.
F.8	No DHW heating.	Short circuit, cylinder temperature sensor.	Check cylinder temperature sensor (plug 5, wires 3 and 4). Replace faulty component if required.
F.11	No solar DHW heating or central heating backup.	Lead break, collector temperature sensor.	▪ Check collector temperature sensor. ▪ Measure voltage at sensor input on electronics module. Setpoint: 3.3 V⎓ with sensor disconnected
F.12	No solar DHW heating or central heating backup.	Short circuit, collector temperature sensor.	▪ Check collector temperature sensor. ▪ Measure voltage at sensor input on electronics module. Setpoint: 3.3 V⎓ with sensor disconnected
F.13	Regulates as if the outside temperature were 0 °C.	Lead break, outside temperature sensor.	▪ Check the operating mode setting in the commissioning assistant. Correct if necessary. ▪ Check outside temperature sensor and connection to sensor (external plug, contacts 1 and 2). ***Note*** *Depending on appliance version, on floorstanding compact appliances the plug is located inside the appliance.* ▪ Measure voltage at sensor input on electronics module. Setpoint: 3.3 V⎓ with sensor disconnected Replace faulty component if required.

Fault messages (cont.)

Displayed fault code	System characteristics	Cause	Measures
F.14	Regulates as if the outside temperature were 0 °C.	Short circuit, outside temperature sensor.	Check outside temperature sensor and connection to sensor (external plug and contacts 1 and 2). Replace faulty components if necessary. ***Note*** *Depending on appliance version, on floorstanding compact appliances the plug is located inside the appliance.*
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. Setpoint: 3.3 V⎓ with sensor disconnected
F.16	No solar DHW heating or central heating backup.	Short circuit, cylinder temperature sensor.	Check cylinder temperature sensor. Measure voltage at sensor input on electronics module. Setpoint: 3.3 V⎓ with sensor disconnected
F.19	No DHW heating.	Lead break, bottom cylinder temperature sensor.	Check bottom cylinder temperature sensor.
F.29	Regulates without flow temperature sensor for low loss header.	Lead break, low loss header sensor.	▪ Check commissioning assistant setting, low loss header. ▪ Check flow temperature sensor, low loss header. ▪ Measure voltage at sensor input on electronics module. Setpoint: 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. Setpoint: 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	Normal operation without room influence.	Lead break, room temperature sensor.	▪ Check commissioning setting of remote control. ▪ Check plug and cable of external room temperature sensor, heating circuit. ▪ If no external room temperature sensor is installed, replace Vitotrol programming unit.

Fault messages (cont.)

Displayed fault code	System characteristics	Cause	Measures
F.58	Normal operation 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 is installed, replace Vitotrol programming unit.
F.59	Burner locked out. Internal circulation pump off. No central heating, no DHW heating.	Power supply, low voltage	Check mains voltage. If voltage is correct and the fault occurs repeatedly, replace the fan unit.
F.62	Burner in a fault state.	High limit safety cut-out has responded.	▪ 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.	▪ 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.64	Normal operation Burner restarts.	Flame loss during stabilisation or operating phase	▪ Check gas supply (gas pressure and gas flow switch). ▪ Check balanced flue system for flue gas recirculation. ▪ Check ionisation electrode. ▪ Check distance to burner gauze assembly. ▪ Check electrode/burner gauze assembly for contamination.

Fault messages (cont.)

Displayed fault code	System characteristics	Cause	Measures
F.65	Burner in a fault state.	Flame signal is not present or insufficient at burner start.	▪ Check gas supply (gas pressure and gas flow switch). ▪ Check gas solenoid valve. ▪ Check system for condensate backup. Check condensate drain. ***Note*** *Prevent water damage.* *Detach fan unit before removing the burner.* ▪ Check ionisation electrode and connecting cable. ▪ Check ignition: Connecting cables to ignition module and ignition electrode. ▪ Check distance from ignition electrode to burner gauze assembly. ▪ Check the electrode/burner gauze assembly for dirt. ▪ Check ignition electrode for broken insulation.
F.67	Burner in a fault state.	Ionisation current 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: ▪ 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 persists, replace the BCU burner control unit.

Fault messages (cont.)

Displayed fault code	System characteristics	Cause	Measures
F.69	Normal operation Fault is entered in fault history.	Ionisation current outside the permissible range.	Check ionisation electrode for the following: ▪ Check whether insulation block is touching electrode ceramic. ▪ Check gas solenoid valve: 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 error, burner control unit.	Replace the BCU burner control unit.
F.71	Burner in a fault state.	Fan speed too low.	▪ 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 the fault recurs, replace the BCU burner control unit.
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: ▪ Check system pressure sensor with external pressure gauge. ▪ Check diaphragm expansion vessel pre-charge pressure. ▪ Check settings for set system pressure and range.
F.75	Burner in a fault state. Internal circulation pump off. No central heating and no DHW heating.	No flow rate	Open BDF valves. Top up with water. If the fault occurs repeatedly: ▪ Replace the flow sensor (if installed). ▪ Check pump. Replace if necessary.
F.77	Burner in a fault state.	Data memory burner control unit.	Reset the appliance. If the fault recurs, replace the BCU burner control unit.
F.78	Normal operation	Communication between heat management unit and programming unit faulty.	Check cables and plug-in connections between heat management unit and programming unit. Check cables for correct routing and positioning.

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Fault messages (cont.)

Displayed fault code	System characteristics	Cause	Measures
F.80	Normal operation	Short circuit, analogue sensor input 2 on ADIO.	Check/replace sensor.
F.87	Burner in a fault state.	Water pressure too high.	Open BDF valves. Check expansion vessel function. Correct the amount of water in the system. Replace water pressure sensor. Replace safety assembly.
F.89	No central heating and no DHW heating. Internal pump not functioning.	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 on DIO electronics module and connection to heat management unit.
F.92	Function of the relevant electronics module in emergency mode.	ADIO electronics module communication error.	▪ 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.93	Function of affected extension in emergency mode.	M2IO electronics module communication error.	Check connections on M2IO electronics module and connection to HMU heat management unit.
F.94	Function of the relevant electronics module in emergency mode. No solar central heating backup.	SDIO electronics module communication error.	▪ 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 working.	Voltage error PlusBus.	Check whether the PlusBus power supply on the HMU heat management unit is OK: Remove all connected PlusBus components and reconnect one by one. Check that there aren't more than 2 Vitotrol 200-E connected to the HMU. Check whether there is a short circuit at the PlusBus cable.
F.104	Depending on configuration of EM-EA1 extension (DIO electronics module). If "block system" is configured, the burner switches/ remains off. If "fault message output" is configured, the fault message output is switched on.	External fault message input active.	Check connected external device.

Fault messages (cont.)

Displayed fault code	System characteristics	Cause	Measures
F.142	Burner in a fault state.	Communication error, CAN bus.	▪ 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. If fault still persists, replace the fan unit.
F.160	Burner in a fault state.	Communication error, CAN bus.	▪ 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. Reset the appliance.
F.161	Burner in a fault state.	BCU data memory access error.	Reset the appliance. If the fault recurs, replace the BCU burner control unit.
F.162	Burner in a fault state.	Processor low voltage.	Turn the appliance off and on again. Check the connecting cable. Reset the appliance.
F.163	Burner in a fault state.	Memory access checksum error BCU.	Reset the appliance. If the fault recurs, replace the BCU burner control unit.
F.180	Burner in a fault state.	Gas pressure too low.	Check gas pressure. Inform the gas supplier if necessary. If the fault occurs repeatedly: Check the gas pressure switch and replace the gas valve if necessary. Direct replacement of the gas pressure switch is not permissible!
F.182	No DHW heating.	Short circuit, outlet temperature sensor (if installed).	Check outlet temperature sensor (plug X1, wires 13 and 14). Measure sensor input on electronics module. Setpoint: 3.3 V⎓ with sensor disconnected.
F.183	No DHW heating.	Lead break, outlet temperature sensor (if installed).	Check outlet temperature sensor (plug X1, wires 13 and 14).
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.

Fault messages (cont.)

Displayed fault code	System characteristics	Cause	Measures
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, BCU burner control unit.	▪ 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. ***Note*** *Several other fault messages will be added due to the removed plugs. Ignore these. If fault message F.342 is no longer shown, reinsert the plugs one by one and establish which component is faulty.* Reset the appliance.
F.345	Burner locked out, automatic enabling after appliance cooldown. Independent restart.	Temperature limiter has responded. See heat generator specification.	▪ 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. If the fault occurs during DHW heating: Check DHW cylinder or plate heat exchanger for contamination and scaling.
F.346	Burner in a fault state.	Ionisation current calibration error.	▪ 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.

Fault messages (cont.)

Displayed fault code	System characteristics	Cause	Measures
F.348	Burner in a fault state.	Gas modulation valve calibration failed.	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.	▪ 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 outside the permissible range.	Replace BCU burner control unit.
F.352	Burner in a fault state.	CO limit within appliance exceeded.	Check entire flue gas path for the following: ▪ 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.	Condensate backed up or analogue signal reference check: Flame signal is already present at burner start. Function of ignition transformer.	If condensate is backed up: Replace insulation blocks, electrodes and burner gauze assembly. ***Note*** *Remove the fan unit before opening the burner. Protect the PCB from water damage.* Replace the BCU burner control unit. Check ignition transformer and ignition cable. Replace if necessary.

Fault messages (cont.)

Displayed fault code	System characteristics	Cause	Measures
F.357	Burner in a fault state.	Insufficient gas supply.	▪ 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. ***Note*** *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 does not drop, check the cable to the fan unit. Check that the coil resistance at the fuel valve is approx. 4 kΩ. Check the ignition electrode for damaged insulation.* Reset the appliance.
F.359	Burner in a fault state.	No ignition spark.	▪ Check whether the ignition electrode insulation is damaged. ▪ Check whether 230 V~ is present 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 input but there is still a fault, replace the ignition module. ▪ Check connection cables and leads from ignition module and ignition electrode. Reset the appliance.
F.361	Burner in a fault state.	Flame signal is not present or insufficient at burner start.	Check ionisation electrode and connecting cable. Check plug-in connections for loose contacts. ***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, toiletries, deposits in the ventilation air supply (chimney).* Reset the appliance.
F.365, F.366, F.367	Burner in a fault state.	Gas valve electricity supply does not turn off.	Replace BCU burner control unit.

Fault messages (cont.)

Displayed fault code	System characteristics	Cause	Measures
F.368	Burner in a fault state.	Gas pressure switch fault. Forced ventilation time expired.	Check gas supply (gas pressure). Check gas pressure switch (if installed). If necessary, disconnect the gas pressure switch connector and check whether the burner starts. Reset the appliance.
F.369	Burner in a fault state.	Flame loss 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 for the following: ▪ Clearance to burner gauze assembly. ▪ Contamination on electrode. Reset the appliance.
F.370	Burner in a fault state.	Fuel valve or modulation valve will not close.	Reset the appliance. If fault occurs repeatedly, replace fan unit.
F.371	Burner in a fault state.	Fan speed too low.	▪ Check the fan. ▪ Check the fan connecting cables. ▪ Check the fan power supply. Reset the appliance.
F.372	Burner in a fault state.	Repeated flame loss during calibration.	▪ 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. ***Note*** *To prevent water damage, detach fan unit before removing the burner. Deposits on the electrodes indicate foreign bodies in the combustion air.* Check the installation room and flue system for causes of the deposits. For example laundry detergents, cleaning agents, toiletries, deposits in the ventilation air supply (chimney). If burner gauze assembly and ionisation electrode have been replaced, also clean fan unit, gas/air channel and Venturi extension. Reset the appliance.

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.	▪ 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.375	Burner in a fault state.	Ionisation current calibration error.	▪ Check gas flow pressure. ▪ Check gas solenoid valve inlet strainer for dirt. ▪ Check ionisation electrode for contamination. ▪ Check flue system; remove flue gas recirculation if required. Reset the appliance.
F.377	Burner in a fault state.	Post-processing of ionisation current calibration: Stabilisation conditions for post-calibration not met.	Check gas type setting. If fault recurs, replace BCU burner control unit. Reset the appliance.
F.378	Burner in a fault state.	Flame loss in the stabilisation or operating phase.	▪ 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.	▪ 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 loss 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: ▪ Clearance to burner gauze assembly ▪ Contamination on electrode Reset the appliance.

Fault messages (cont.)

Displayed fault code	System characteristics	Cause	Measures
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: ▪ 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.	▪ Check gas line for contamination. ▪ Check the gas supply pressure. ▪ Replace gas fan if required. Reset the appliance.
F.384	Burner in a fault state.	Possible contamination of gas line.	▪ 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 the fault persists, replace the BCU burner control unit. Reset the appliance.
F.386	Burner in a fault state.	BCU burner control unit faulty.	Replace the BCU burner control unit. 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 the fault persists, replace the BCU burner control unit. Reset the appliance.
F.388	Burner in a fault state.	BCU burner control unit faulty.	Replace the BCU burner control unit. Reset the appliance.
F.394	Burner in a fault state.	Lead break, flue gas temperature sensor 2.	Check sensor and connecting cable. Replace sensor if necessary. 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 the fault persists, replace the BCU burner control unit. Reset the appliance.
F.396	Burner in a fault state.	BCU burner control unit faulty.	Replace the BCU burner control unit. 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 the fault persists, replace the BCU burner control unit. Reset the appliance.
F.400	Burner in a fault state.	BCU burner control unit faulty.	Replace the BCU burner control unit. Reset the appliance.

Fault messages (cont.)

Displayed fault code	System characteristics	Cause	Measures
F.401	Burner in a fault state.	IO electrode earth fault, BCU burner control unit faulty.	Check IO electrode for earth fault. If the fault persists, replace the BCU burner control unit. Reset the appliance.
F.402	Burner in a fault state.	BCU burner control unit faulty.	Replace the BCU burner control unit. 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 the fault persists, replace the BCU burner control unit. Reset the appliance.
F.404	Burner in a fault state.	BCU burner control unit faulty.	Replace the BCU burner control unit. Reset the appliance.
F.405	Burner in a fault state.	Ionisation electrode earth fault, BCU burner control unit faulty.	Check IO electrode for earth fault. If the fault persists, replace the BCU burner control unit. Reset the appliance.
F.406, F.408, F.410	Burner in a fault state.	BCU burner control unit faulty.	Replace the BCU burner control unit. Reset the appliance.
F.416	Burner locked out.	Flue gas temperature sensor incorrectly positioned.	Install 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 the BCU burner control unit. Reset the appliance.
F.425	System in normal operation, calculation out of operation.	Time synchronisation failed.	Set the time. If external time is used, check parameters 1504 and 508.
F.430	Normal operation in line with set values of heat generator.	Communication error gateway.	Check gateway module connecting cable and power supply.
F.431	Normal operation in line with set values of heat generator.	Communication error KNX gateway.	Check gateway module connecting cable and power supply.
F.436	Normal operation	Short circuit, flow sensor.	Check flow sensor.
F.437	Flow rate not being monitored. System continues operating in normal mode with replacement value.	Lead break or short circuit, flow sensor.	Check connecting cable between BCU and flow sensor. Check voltage level to see if 5 V is present. Turn the ON/OFF switch on the gas condensing boiler off and back on again.
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 the BCU burner control unit. 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 the fault recurs, replace the BCU burner control unit.

Fault messages (cont.)

Displayed fault code	System characteristics	Cause	Measures
F.453	Burner in a fault state.	Synchronisation error, sequence.	Reset the appliance. If the fault recurs, replace the BCU burner control unit.
F.454	Burner in a fault state.	Incorrect software version, BCU.	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 the fault recurs, replace the BCU burner control unit.
F.456	Burner in a fault state.	Error in program run monitoring.	Reset the appliance. If the fault recurs, replace the BCU burner control unit.
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 in a fault state.	Incorrect reset sequence.	Check connections between HMU heat management unit and HMI programming unit. Reset the appliance.
F.463	Burner in a fault state.	Contaminated combustion air, flue gas recirculation.	Check flue system for contamination and flue gas recirculation. Clean flue system if required. Reset the burner. ***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, toiletries, deposits in the ventilation air supply (chimney).* *If burner gauze assembly and ionisation electrode have been replaced, also clean fan unit, gas/air channel and Venturi extension.* *Reset the appliance.*

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.	▪ 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. Reset the appliance. ***Note*** *To prevent water damage, detach fan unit before removing the burner.* If the fault is permanently present, replace the BCU burner control unit. ***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, toiletries, deposits in the ventilation air supply (chimney).* *If burner gauze assembly and ionisation electrode have been replaced, also clean fan unit, gas/air channel and Venturi extension.*
F.467	Burner in a fault state.	Gas supply insufficient during calibration Contaminated or insufficiently sized gas line.	▪ 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. Reset the appliance. ***Note*** *Contamination, for example from a brazed gas line, can block up the inlet strainer of the gas solenoid valve.*

Fault messages (cont.)

Displayed fault code	System characteristics	Cause	Measures
F.468	Burner in a fault state.	Ionisation current too high during calibration.	Check gap between ionisation electrode and burner gauze assembly. Check whether there is a lot of dust in the ventilation air (e.g. from construction work). Reset the appliance. ***Note*** *Deposits on the electrodes indicate foreign bodies in the ventilation air. Check the installation room and flue system for causes of the deposits. For example laundry detergents, cleaning agents, toiletries, deposits in the ventilation air supply (chimney).* *If burner gauze assembly and ionisation electrode have been replaced, also clean fan unit, gas/air channel and Venturi extension.*
F.471	No heat demand.	System pressure sensor not available, lead break or short circuit.	▪ Check system pressure sensor (plug 163). ▪ Check lead and plug-in connection. ▪ Check whether the supply voltage to the 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 the fault recurs, replace the BCU burner control unit.
F.477	Limited solar thermal system functionality. No solar yield.	Fault, differential temperature monitor solar collector/cylinder differential exceeds tolerance. Air in the solar circuit. Sensor not positioned correctly. Pump faulty.	Check solar circuit, solar circuit pump, sensors. ***Note*** *Fault can be reset by performing a network reset. If the system is OK, the fault is cleared automatically after 36 hours.*
F.517	Remote control not functioning. Weather-compensated operation: Normal operation. Constant operation: Weather-compensated operation.	Lead break, PlusBus cable, incorrect appliance address set, remote control faulty.	▪ Check commissioning assistant setting. ▪ Check remote control cable. ▪ Check remote control subscriber number. Replace faulty remote control if necessary.
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.
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.

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Fault messages (cont.)

Displayed fault code	System characteristics	Cause	Measures
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.
F.538	No solar central heating backup with SDIO.	Lead break, temperature sensor in system return.	Check sensor or connect missing sensor on the SDIO electronics module.
F.539	No solar central heating backup with SDIO.	Short circuit, temperature sensor in system return.	Check sensor or connect missing sensor on the SDIO electronics module.
F.540	Burner in a fault state.	Condensate backup in the heat cell.	▪ Check system for condensate backup. ▪ Check the condensate drain and trap. ▪ Replace insulation blocks, electrodes and burner gauze assembly if required. ***Note*** *To prevent water damage, detach fan unit before removing the burner.* Reset the appliance.
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. Setpoint: 3.3 V⎓ with sensor disconnected ▪ Check commissioning assistant setting. ▪ Check setting of ADIO rotary switch.
F.545	Mixer closes. Heating circuit pump is operational.	Short circuit, flow temperature sensor, heating circuit 2 with mixer.	Check flow temperature sensor, mixer 2. Measure voltage at sensor input on electronics module. Setpoint: 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. Setpoint: 3.3 V⎓ with sensor disconnected ▪ Check commissioning assistant setting. ▪ Check setting of ADIO rotary switch.
F.547	Mixer closes. Heating circuit pump is operational.	Short circuit, flow temperature sensor, heating circuit 3 with mixer.	Check flow temperature sensor, mixer 3. Measure voltage at sensor input on electronics module. Setpoint: 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, heating circuit 4 with mixer	▪ Check flow temperature sensor, mixer 4. ▪ Measure voltage at sensor input on electronics module. Setpoint: 3.3 V⎓ with sensor disconnected ▪ Check commissioning assistant setting. ▪ Check setting of ADIO rotary switch.
F.549	Mixer closes. Heating circuit pump is operational.	Short circuit, flow temperature sensor, heating circuit 4 with mixer.	Check flow temperature sensor, mixer 4. Measure voltage at sensor input on electronics module. Setpoint: 3.3 V⎓ with sensor disconnected
F.574	Normal operation without room influence.	Room temperature sensor in heating circuit 1 not available.	Check external room temperature sensor in heating circuit or room temperature sensor for remote control unit. Check setting of parameter 933.6.
F.575	Normal operation without room influence.	Lead break, room temperature sensor, heating circuit 1.	Check external room temperature sensor in heating circuit or room temperature sensor for remote control unit.
F.576	Normal operation without room influence.	Short circuit, room temperature sensor, heating circuit 1.	Check external room temperature sensor in heating circuit or room temperature sensor for remote control unit.
F.577	Normal operation without room influence.	Room temperature sensor in heating circuit 2 not available.	Check external room temperature sensor in heating circuit or room temperature sensor for remote control unit. Check setting of parameter 934.6.
F.578	Normal operation without room influence.	Lead break, room temperature sensor, heating circuit 2.	Check external room temperature sensor in heating circuit or room temperature sensor for remote control unit.
F.579	Normal operation without room influence.	Short circuit, room temperature sensor, heating circuit 2.	Check external room temperature sensor in heating circuit or room temperature sensor for remote control unit.
F.580	Normal operation without room influence.	Room temperature sensor, heating circuit 3 not available.	Check external room temperature sensor in heating circuit or room temperature sensor for remote control unit. Check setting of parameter 935.6.
F.581	Normal operation without room influence.	Lead break, room temperature sensor in heating circuit 3.	Check external room temperature sensor in heating circuit or room temperature sensor for remote control unit.
F.582	Normal operation without room influence.	Short circuit, room temperature sensor in heating circuit 3.	Check external room temperature sensor in heating circuit or room temperature sensor for remote control unit.

Fault messages (cont.)

Displayed fault code	System characteristics	Cause	Measures
F.583	Normal operation without room influence.	Room temperature sensor in heating circuit 4 not available.	Check external room temperature sensor in heating circuit or room temperature sensor for remote control unit. Check setting of parameter 936.6.
F.584	Normal operation without room influence.	Lead break, room temperature sensor, heating circuit 4.	Check external room temperature sensor in heating circuit or room temperature sensor for remote control unit.
F.585	Normal operation without room influence.	Short circuit, room temperature sensor, heating circuit 4.	Check external room temperature sensor in heating circuit or room temperature sensor for remote control unit.
F.666	No solar function with preheating active. Second cylinder and solar transfer pump not working.	Lead break, DHW preheating sensor TS3.	Check temperature sensor TS3.
F.667	No solar function with preheating active. 2nd DHW cylinder and solar transfer pump not working.	Short circuit, sensor for DHW preheating TS3.	Check temperature sensor TS3.
F.668	No solar function with preheating active. 2nd DHW cylinder and solar transfer pump not working.	Lead break, DHW reheating sensor TS4.	Check temperature sensor TS4.
F.669	No solar function with preheating active. Second cylinder and solar transfer pump not working.	Short circuit, DHW preheating sensor TS4.	Check temperature sensor TS4.
F.670	No solar central heating backup.	Lead break, buffer temperature sensor TS3.	Check temperature sensor TS3.
F.671	No solar central heating backup.	Short circuit, buffer temperature sensor TS3.	Check temperature sensor TS3.
F.672	No solar function with thermostat function and solar transfer pump not working.	Lead break, thermostat function temperature sensor TS3.	Check temperature sensor TS3.
F.673	No solar function with thermostat function and solar transfer pump not working.	Short circuit, thermostat function temperature sensor TS3.	Check temperature sensor TS3.
F.682	Burner in a fault state.	Air mass flow rate sensor not available.	Check air mass flow rate sensor.
F.683	Burner in a fault state.	Air mass flow rate sensor faulty.	Check air mass flow rate sensor.
F.684	Burner in a fault state.	Back draught safety device faulty.	Check back draught safety device.
F.688	MZIO electronics module in emergency mode.	MZIO electronics module communication error.	Check setting in the commissioning assistant and correct if required. Check connections and leads to the MZIO electronics module. Check PlusBus voltage level (24 to 28 V).

Fault messages (cont.)

Displayed fault code	System characteristics	Cause	Measures
F.693	Burner in a fault state.	Lead break, flue gas temperature sensor.	Check flue gas temperature sensor. Reset the appliance.
F.694	Burner in a fault state.	Signal comparison, deviation, flue gas high limit safety cut-out.	▪ Check plug-in connection and sensor lead. ▪ Check sensor. Replace sensor if required. ▪ Reset the appliance.
F.696	Burner in a fault state.	Short circuit, flue gas temperature sensor.	Check flue gas temperature sensor. Reset the appliance.
F.762	System in a fault state.	System pressure too low.	Top up with water. Vent the system. If the fault occurs repeatedly: Check the diaphragm expansion vessel.
F.763	System in a fault state.	Gas pressure too high.	Check gas pressure. Inform the gas supplier if necessary.
F.764	System in a fault state.	Lag appliance reports a fault.	Check lag appliance fault. Reset the appliance.
F.765	System in a fault state.	Lag appliance communication error.	Check lag appliance communication. Reset the appliance.
F.797	No DHW heating, no heating operation.	Mechanical fault, heating circuit pump.	Check pump, replace if required. Reset the appliance.
F.799	No DHW heating, no heating operation.	Central heating circuit pump reports an electrical fault. Heating system cannot be operated as no flow rate is available.	Switch appliance off and on again at the appliance switch. If this occurs repeatedly, replace the heating circuit pump.

Fault messages (cont.)

Displayed fault code	System characteristics	Cause	Measures
F.980	No DHW heating.	Minimum system pressure before the start of DHW heating is too low. Possible causes: ▪ Shut-off or too much constriction ▪ Scaling, sludge ▪ Incorrect hydraulic configuration ▪ Faulty circulation pump, air in the heating circuit ▪ Unstable or excessively low system pressure	▪ Check that the cylinder flow and return are open. ▪ Ensure that all quick-action air vent valves on the appliance side are permanently open. ▪ Restart the venting program of the heating circuit (selection via service menu). ***Note*** *Quick-action air vent valves in the boiler circuit must be permanently open!* ▪ Check the set hydraulic scheme and correct if necessary. ▪ Check the size and pre-charge pressure of the external DEV (diaphragm expansion vessel). ▪ Check the set system pressure (this fault is more likely if the system pressure is too low). ▪ Check the quick-action air vent valves for leaks and replace if faulty. ▪ Check the pump and replace if faulty. ▪ Pause time for DHW heating can be terminated by a mains reset of the HMU. Switch the appliance off and on again at the appliance switch.

Fault messages (cont.)

Displayed fault code	System characteristics	Cause	Measures
F.981	No DHW heating.	Minimum system pressure is too low during DHW heating. Possible causes: ▪ Shut-off or too much constriction ▪ Scaling, sludge ▪ Incorrect hydraulic configuration ▪ Faulty circulation pump, air in the heating circuit ▪ Unstable or excessively low system pressure	▪ Restart the venting program of the heating circuit (selection via service menu). ***Note*** *Quick-action air vent valves in the boiler circuit must be permanently open!* ▪ Check the set hydraulic scheme and correct if necessary. ▪ Check the size and pre-charge pressure of the external DEV (diaphragm expansion vessel). ▪ Check the set system pressure (this fault is more likely if the system pressure is too low). ▪ Check the quick-action air vent valves for leaks; replace if faulty. ▪ Check the pump and replace if faulty. ▪ Pause time for DHW heating can be terminated by a mains reset of the HMU. Switch the appliance off and on again at the appliance switch.
F.982	No DHW heating, no heating operation.	Heating circuit pump, heating circuit 1 running dry.	Check pump and diaphragm expansion vessel. Check water pressure.

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

Further messages

Service messages

Message on the display	Meaning
P.1	Service due after interval.
P.4	Top up heating water.
P.8	Service due after burner hours run.

Status messages

Message on the display	Meaning
S.9	Fan pre-purge for heating mode
S.29	Standard mode for heating
S.36	Comfort mode for DHW draw-off
S.59	Flue gas temperature sensor test active
S.60	Summer mode active (outside temperature economy function)
S.74	Heating suppression, heating
S.75	DHW circulation pump active

Further messages (cont.)

Message on the display	Meaning
S.94	No demand, external hook-up, heating circuit 1
S.95	No demand, external hook-up, heating circuit 2
S.96	No demand, external hook-up, heating circuit 3
S.154	Due to insufficient heat transfer in heating system, burner operation not required

Warning messages

Messages on the display	Meaning	Measure
A.11	System pressure has fallen below normal limit.	Top up with water or notify heating contractor.
A.12	Real time clock battery flat.	Replace the battery (type CR2032) in the HMU heat management unit.
A.18	Possible condensate backup in the heat cell	Check combustion chamber and condensate drain. Condensate may escape when the burner door is removed. Take appropriate precautions to protect the electronic components. If there is condensate backup as far as the combustion chamber, replace the insulation ring, insulation block, insulation mats, ionisation electrode, ignition electrode, burner gauze assembly and burner gauze assembly gasket.
A.19	Temperature limiter has responded	
A.20	Service interval could not be activated.	Check the time and date settings.

Information

Message on the display	Meaning
I.56	External demand active
I.57	External blocking active
I.59	Parameters were restored (parameter set was flashed to BCU electronics module).
I.93	Can occur along with fault messages F.89, F.797, F.799. F.982, see chapter "Fault messages"

Repairs

! **Please note**
Residual water will escape when the boiler or one of the following components is fitted or removed:
- Water-filled pipework
- Heat exchanger
- Circulation pumps
- Plate heat exchanger
- Components fitted in the heating water or DHW circuit.

Water ingress can result in damage to other components.

Protect the following components against ingress of water:
- Control unit components (especially in the service position)
- Electrical components
- Plug-in connections
- Cables and leads

Shutting down the boiler

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

Repairs (cont.)

Draining the boiler on the heating water side

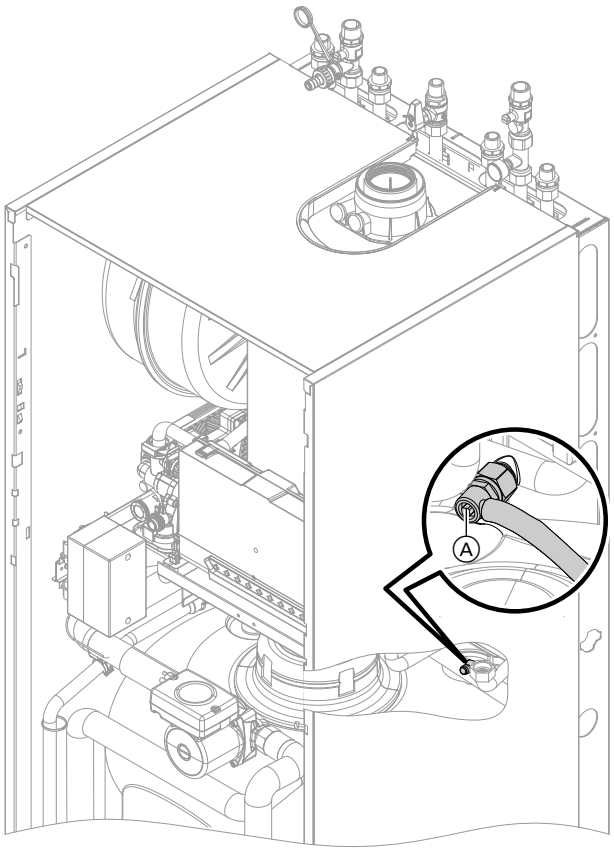


Fig. 55

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

Status/checking/diagnosing the internal circulation pump

The internal circulation pump is fitted with two status LEDs.

Repairs (cont.)

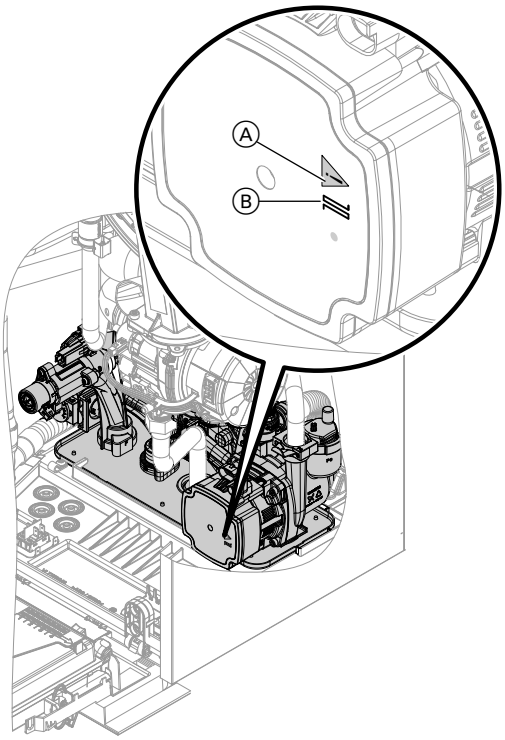


Fig. 56

- Ⓑ LED constant green:
  No communication (pump is running without external control from the boiler controller).
- Ⓑ LED flashing green:
  Pump is running with external control (PWM signal) from the boiler controller
- Ⓐ LED constant red:
  Pump failure

Note

The pump is controlled by a PWM signal. A lead break in the data line will not generate a fault message.
The pump is operating at 100 % of its maximum output.

Repairs (cont.)

Checking the temperature sensors

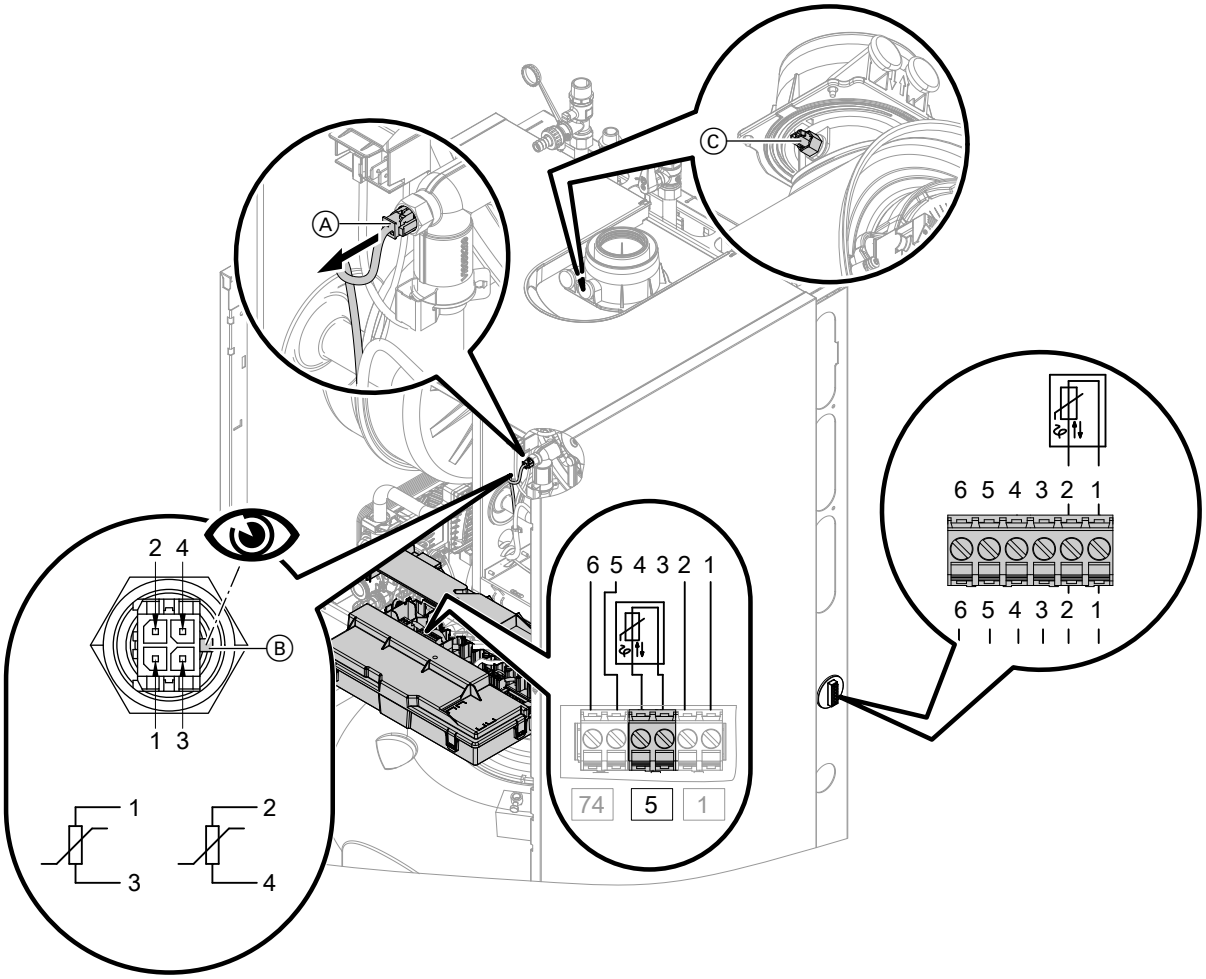


Fig. 57

Heat generator circuit flow temperature sensor (dual sensor)

1. Check the leads and plugs of flow temperature sensors Ⓐ.
2. Disconnect the leads from flow temperature sensors Ⓐ.
3. Check the sensor resistance. Note position of guide lug Ⓑ.
   - Sensor 1: Connections 1 and 3
   - Sensor 2: Connections 2 and 4

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

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

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

Repairs (cont.)

Cylinder temperature sensor/outlet temperature sensor

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

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.

   Note
   Depending on appliance version, on floorstanding compact appliances the plug is located inside the appliance.

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

Flue gas temperature sensor

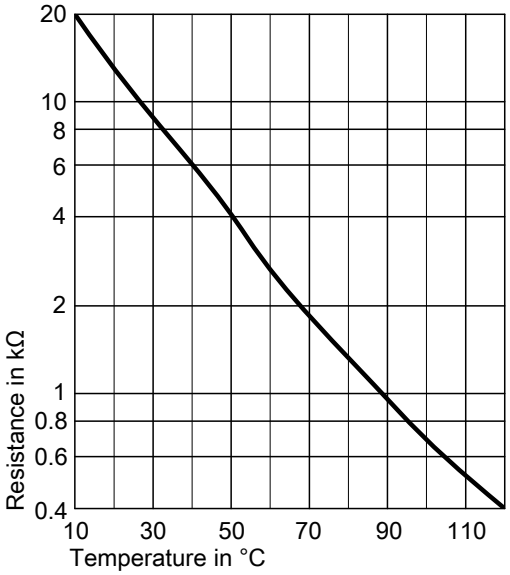
1. Check the lead and plug of flue gas temperature sensor Ⓒ.
2. Disconnect leads, flue gas temperature sensor Ⓒ.
3. Rotate sensor (anti-clockwise) by ¼ turn to remove it (bayonet fitting).
4. Check the sensor resistance. Compare the resistance with the value for the currently recorded temperature from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

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

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

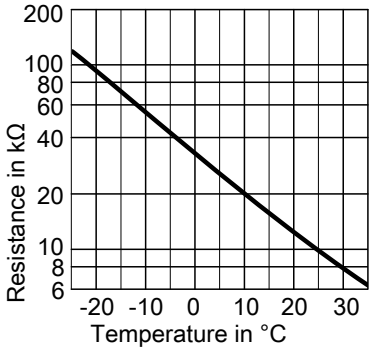
Repairs (cont.)

- Flue gas temperature sensor
- 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 the BCU burner control unit and/or HMU heat management unit are replaced, the replacement must be carried out with the help of "ViGuide".

See spare part installation instructions and internet address: www.viguide.info

Repairs (cont.)

Checking the plate heat exchanger

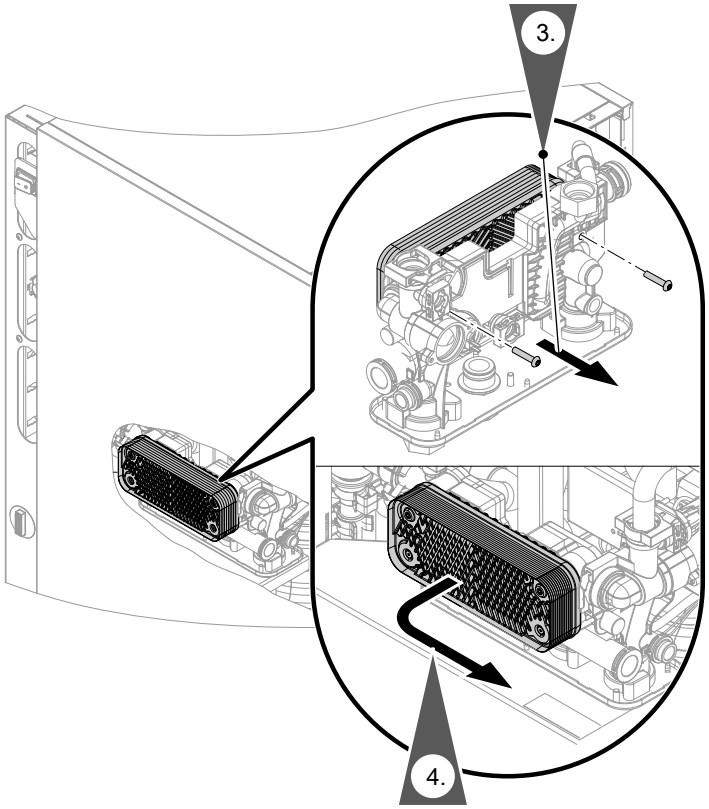


Fig. 58

1. Drain the boiler:
   - On the heating water side, see page 113
   - On the DHW side, see page 55
2. Move programming unit to maintenance position (see page 32).
3. Undo the fixing screws.
4. Detach the plate heat exchanger and remove towards the front.
5. Check the connections on the heating water and DHW sides for contamination and scaling; replace the plate heat exchanger if necessary.
6. Install in reverse order using new gaskets. Torque for fixing screws 3.2 Nm

Repairs (cont.)

Removing the hydraulic unit and return pipe

In case hydraulic unit components have to be replaced.

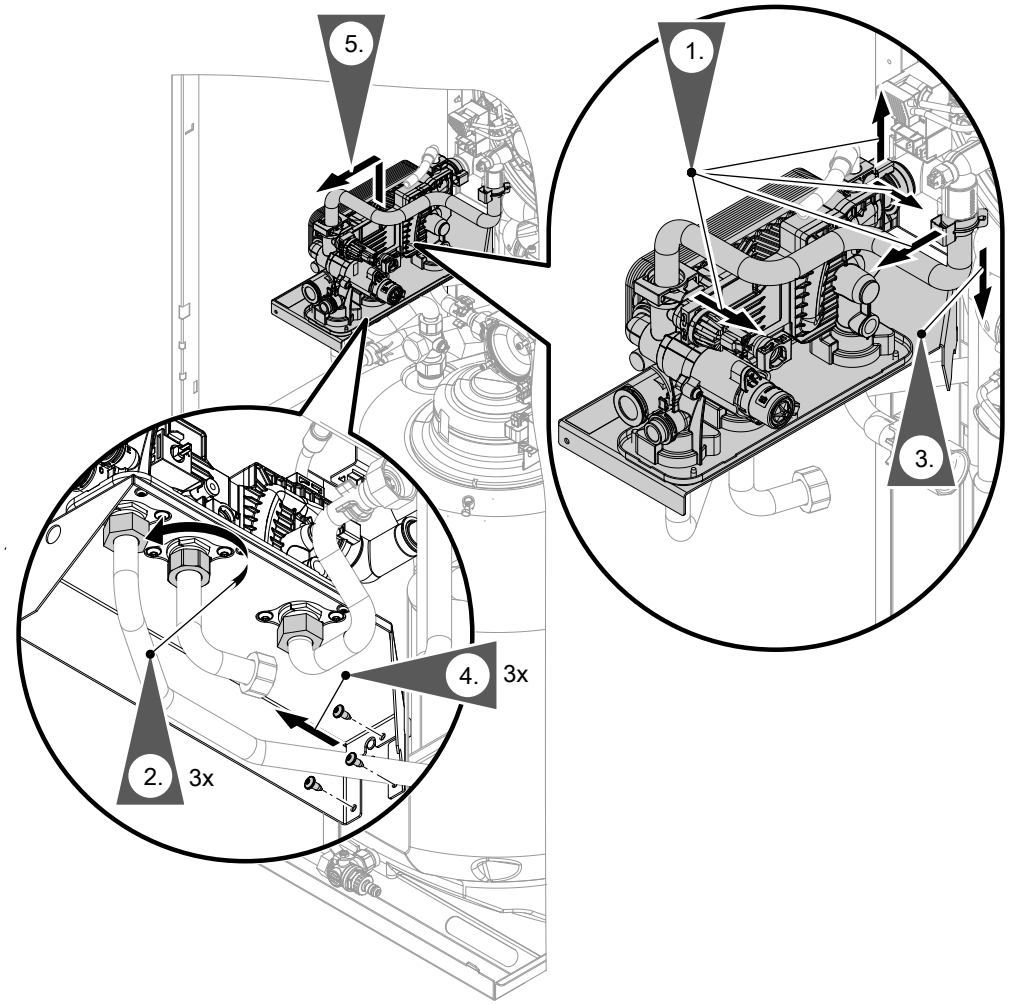


Fig. 59

Repairs (cont.)

Remove the return pipe:

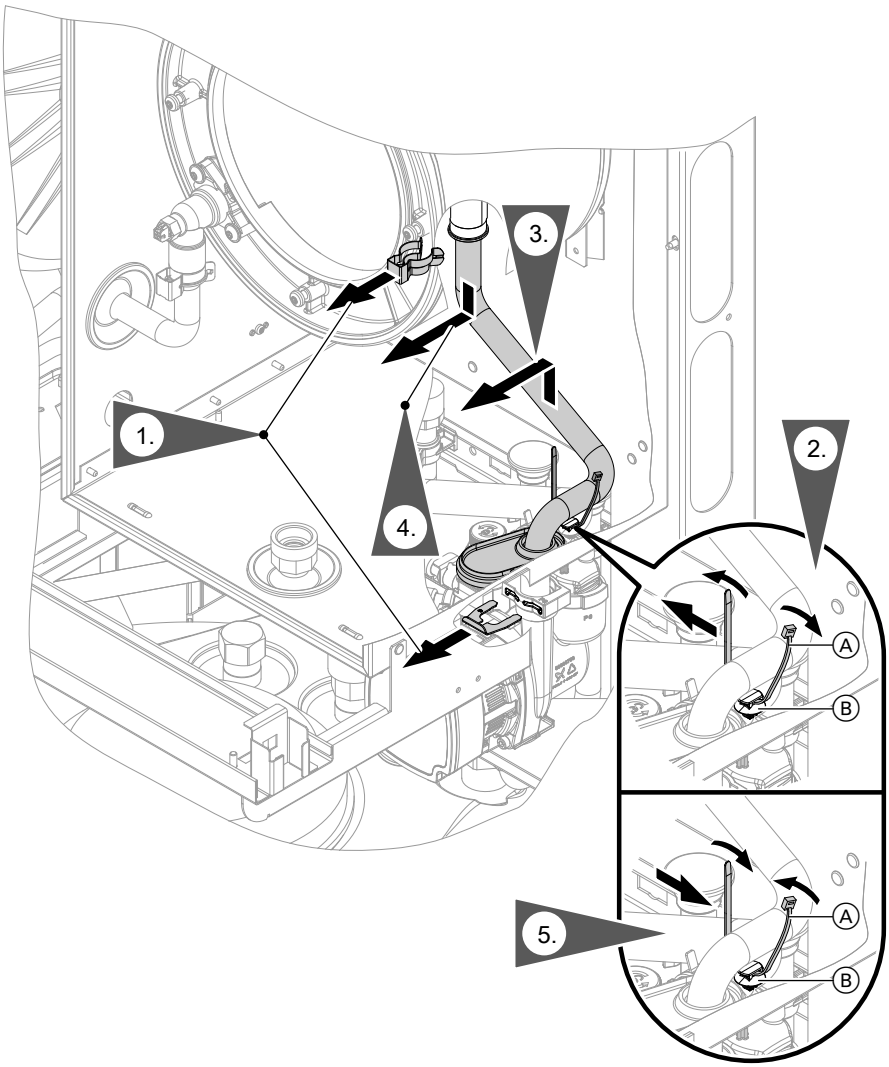


Fig. 60

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

Replacing the power cable

When replacing the power cable: Only use the power cable available as a spare part from Viessmann.

Repairs (cont.)

Checking the fuse

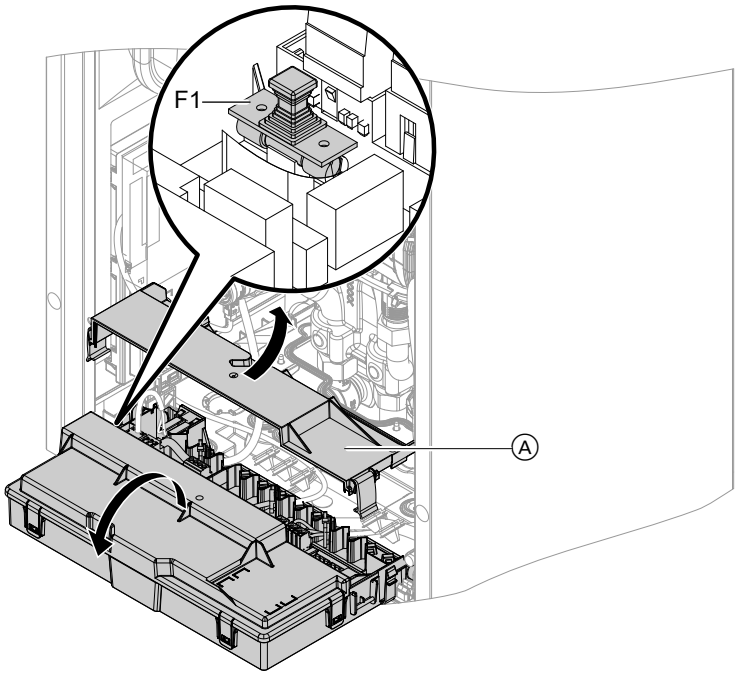


Fig. 61

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

Danger
Incorrect or improperly fitted fuses can lead to an increased risk of fire.
- Insert fuses without using any force. Position fuses correctly.
- Only use structurally identical types with the specified response characteristics.

Control functions

Heating mode

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

Heating circuit pump connection for heating circuit without mixer

Only for systems with several heating circuits.

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

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

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

Venting program

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

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: Parameter 936.5*

Control functions (cont.)

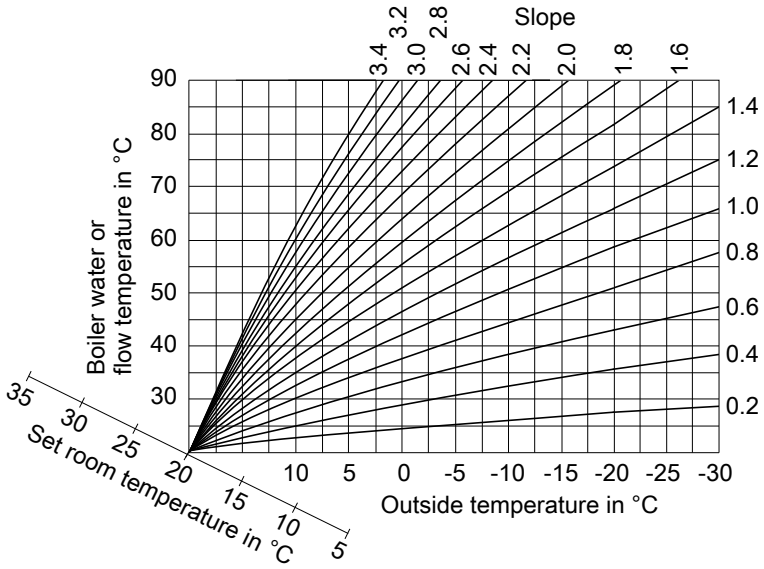


Fig. 62

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.

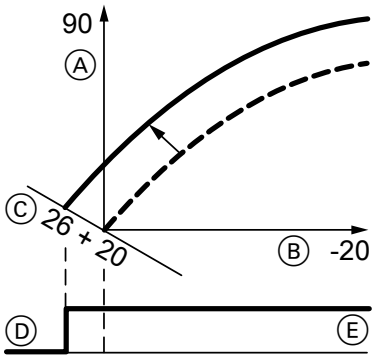


Fig. 63 Example 1: Adjusting the set room temperature from 20 to 26 °C

Ⓐ 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

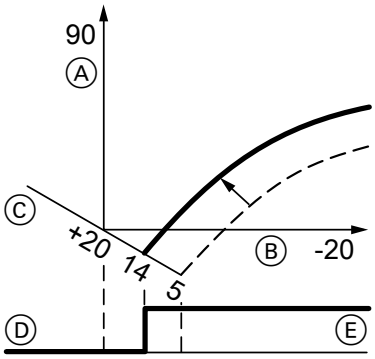


Fig. 64 Example 2: Adjusting the reduced set room temperature from 5 °C to 14 °C

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

Changing the reduced set room temperature

Operating instructions

Changing the slope and level

Individually adjustable for each heating circuit.

Control functions (cont.)

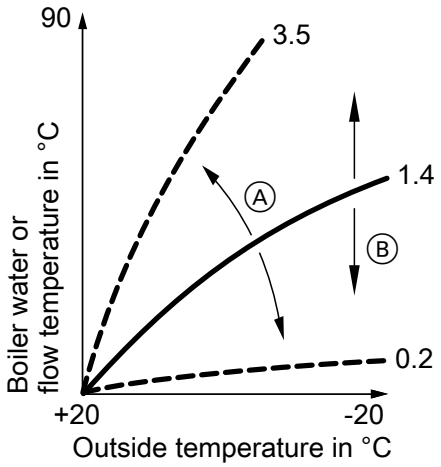


Fig. 65

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

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

The higher the value, the greater the influence of the room temperature on the 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) x (1 + slope) x room influence factor/4 = raising the flow temperature via heating curve value
(20 - 18) x (1 + 1.4) x 8/4 = 9.6
Increase in flow temperature via heating curve value = 9.6 K

Screed drying

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

Note
With a combi boiler, DHW heating is not possible during screed drying. With a system boiler or storage combi boiler, after 30 minutes DHW heating is suspended for an hour (parameter 1087.1) in order to run the screed drying program.

Observe EN 1264. The report to be provided by the heating contractor must contain the following details regarding heat-up:
- Heat-up data with the relevant set flow temperatures
- Max. flow temperature achieved.
- Operating state and outside temperature at handover

Different temperature profiles can be set via parameter 897.0.

Note
Temperature profile 6 ends after 21 days.

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

Control functions (cont.)

Parameter 897.0 "Screed drying":

Temperature profile A (EN 1264-4)

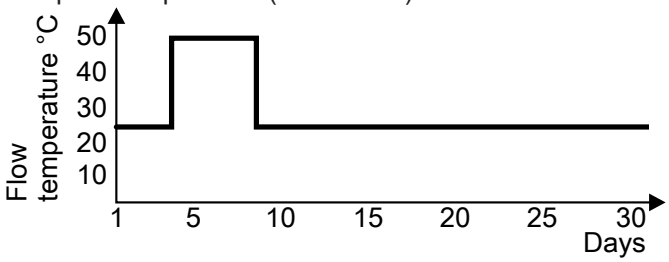


Fig. 66

Temperature profile B (ZV parquet and flooring technology)

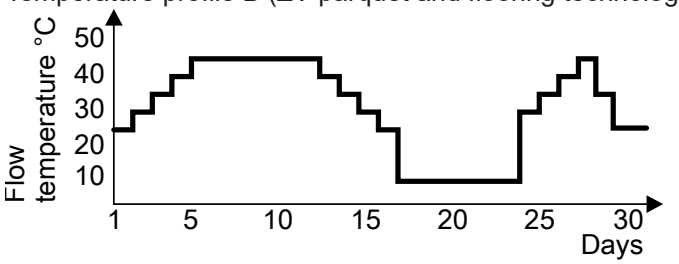


Fig. 67

Temperature profile C

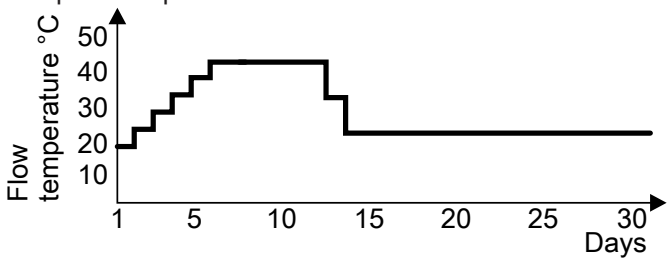


Fig. 68

Temperature profile D

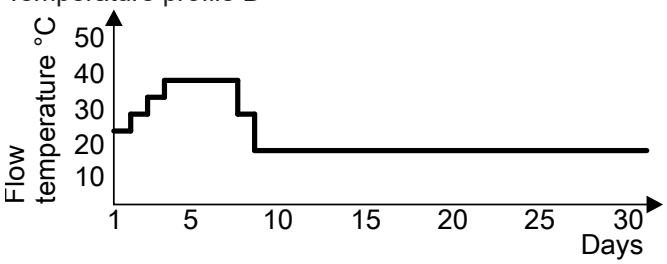


Fig. 69

Temperature profile E

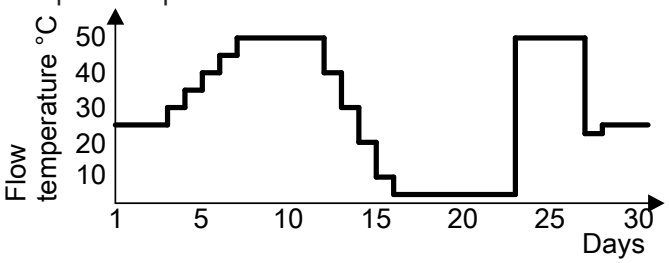


Fig. 70

Control functions (cont.)

Temperature profile F

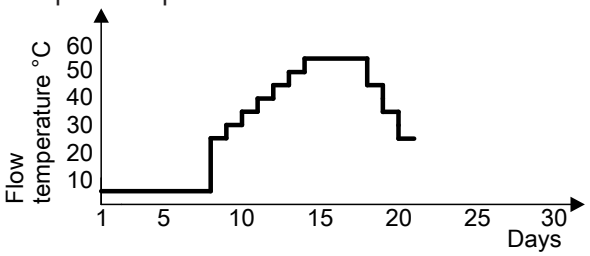


Fig. 71 Ends after 21 days.

Raising the reduced room temperature

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

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

Example using the settings in the delivered condition

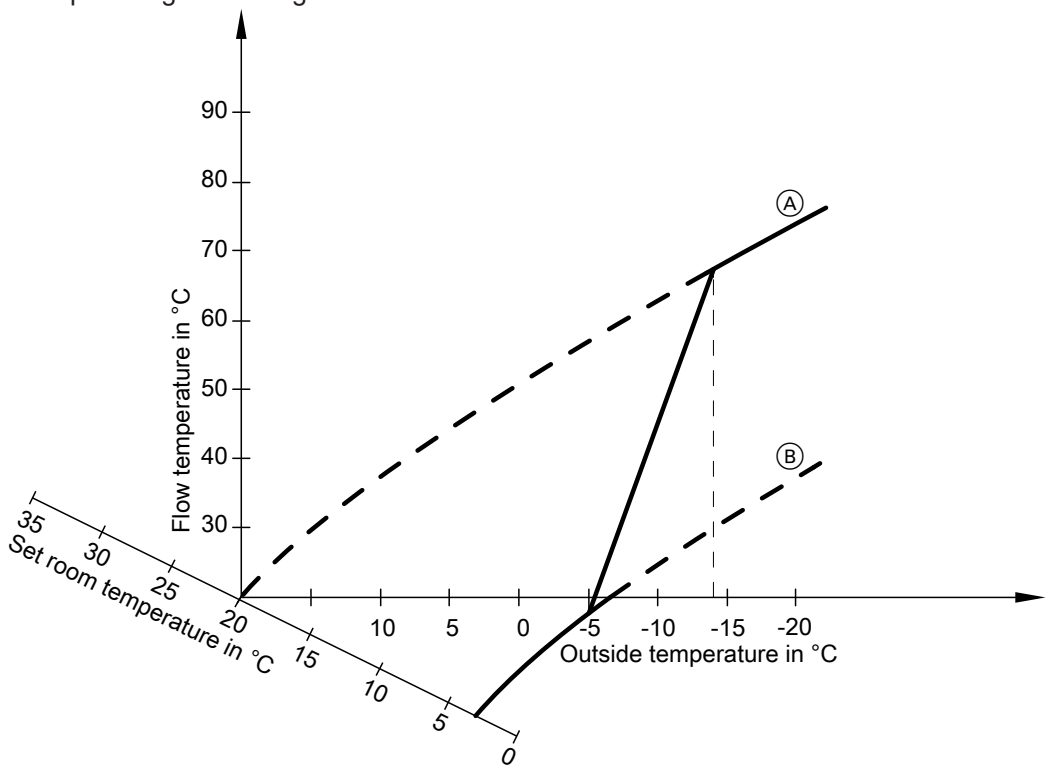


Fig. 72

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

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Control functions (cont.)

Reducing the heat-up time

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

Example

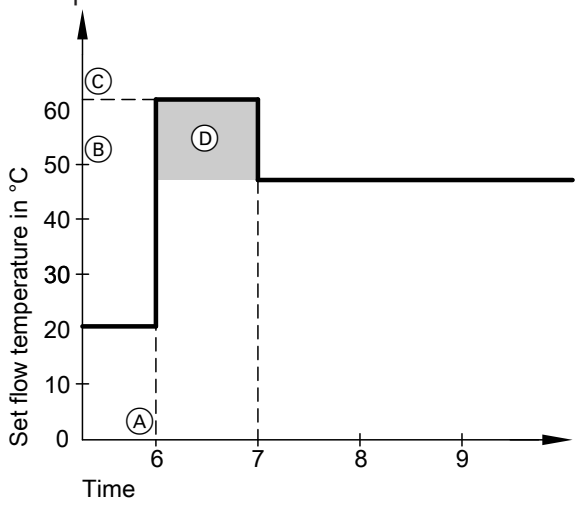

Fig. 73

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

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

DHW heating

Heating the DHW loading cylinder from cold

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

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

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

Reheating when DHW is drawn off

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

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

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

DHW heating (cont.)

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

Increased DHW hygiene

The DHW can be heated to a specified (higher) set DHW temperature (approx. 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.

External heating circuit hook-up (if installed)

Note
Only in conjunction with weather-compensated operation.

- Function:
  - If the external demand is active (plug 96 or digital input on DIO electronics module closed), the heating circuit is supplied with heat.
  - If the external demand is inactive (contact open), heat supply to the heating circuit ends (regardless of the current set room temperature or the switching time).
    The following status messages are shown on the display of the control unit:
    - S.94 (heating circuit 1)
    - S.95 (heating circuit 2)
    - S.96 (heating circuit 3)

    Please note

    There is no frost protection for the connected heating circuits.
- Connection:
  - If just one heating circuit is hooked up, use connection at plug 96: See page 24.
  - If several heating circuits (max. 3) are hooked up, connect all contacts at EM-EA1 extension (DIO electronics module) to subscriber no. 1 (rotary switch = 1).

    See EM-EA1 extension installation instructions

HMU heat management unit

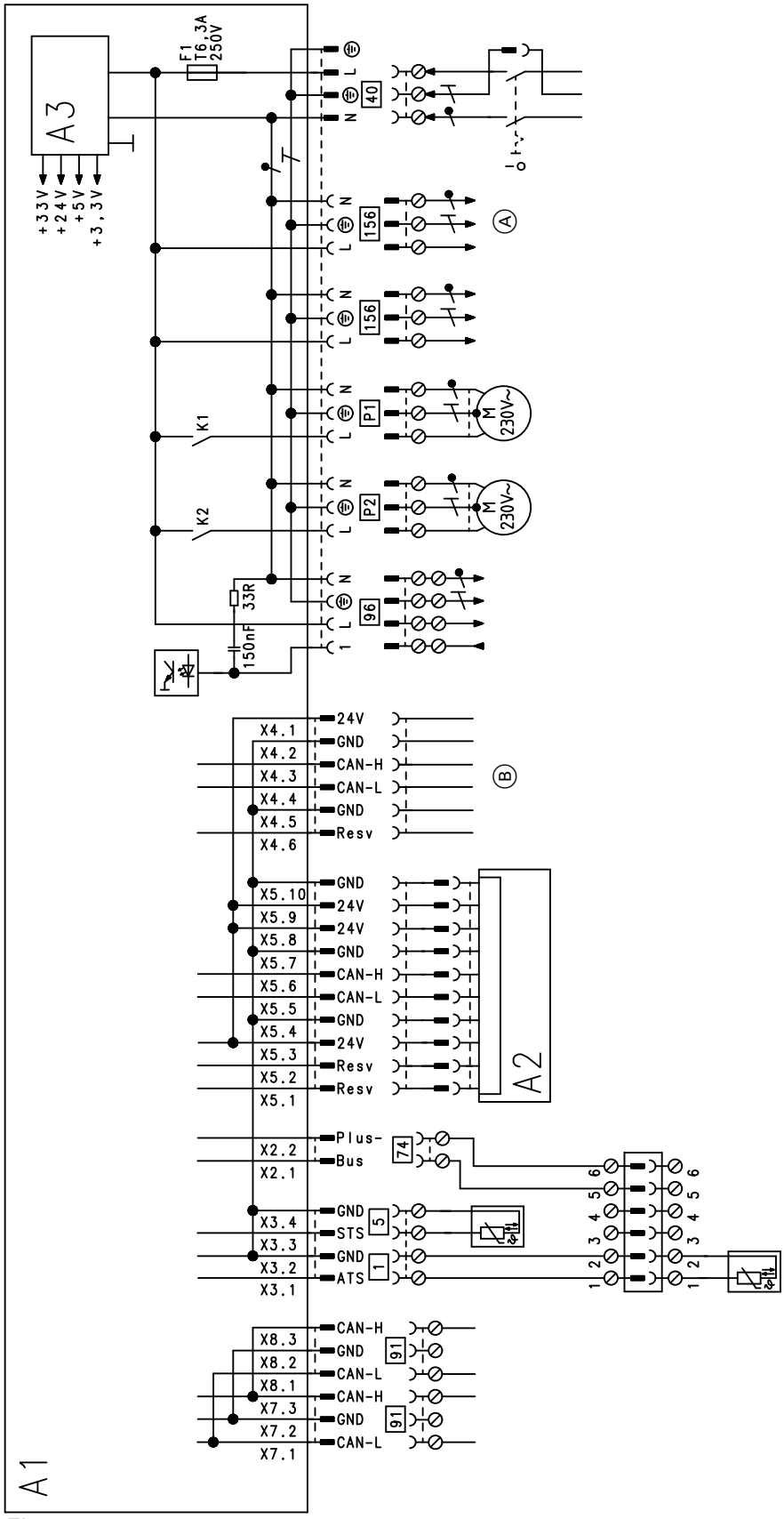

Fig. 74

A1 HMU heat management unit
A2 HMI programming unit with communication module (TCU 200)
A3 Power supply unit
X... Electrical interfaces

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

HMU heat management unit (cont.)

96 230 V floating input, 230 V output. For connection of floating switching contact, see page 24
156 Mains voltage output
P1 Cylinder loading pump
P2 Parametrisable output for:
- DHW circulation pump
  or
- Circulation pump for heating circuit without mixer

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

BCU burner control unit

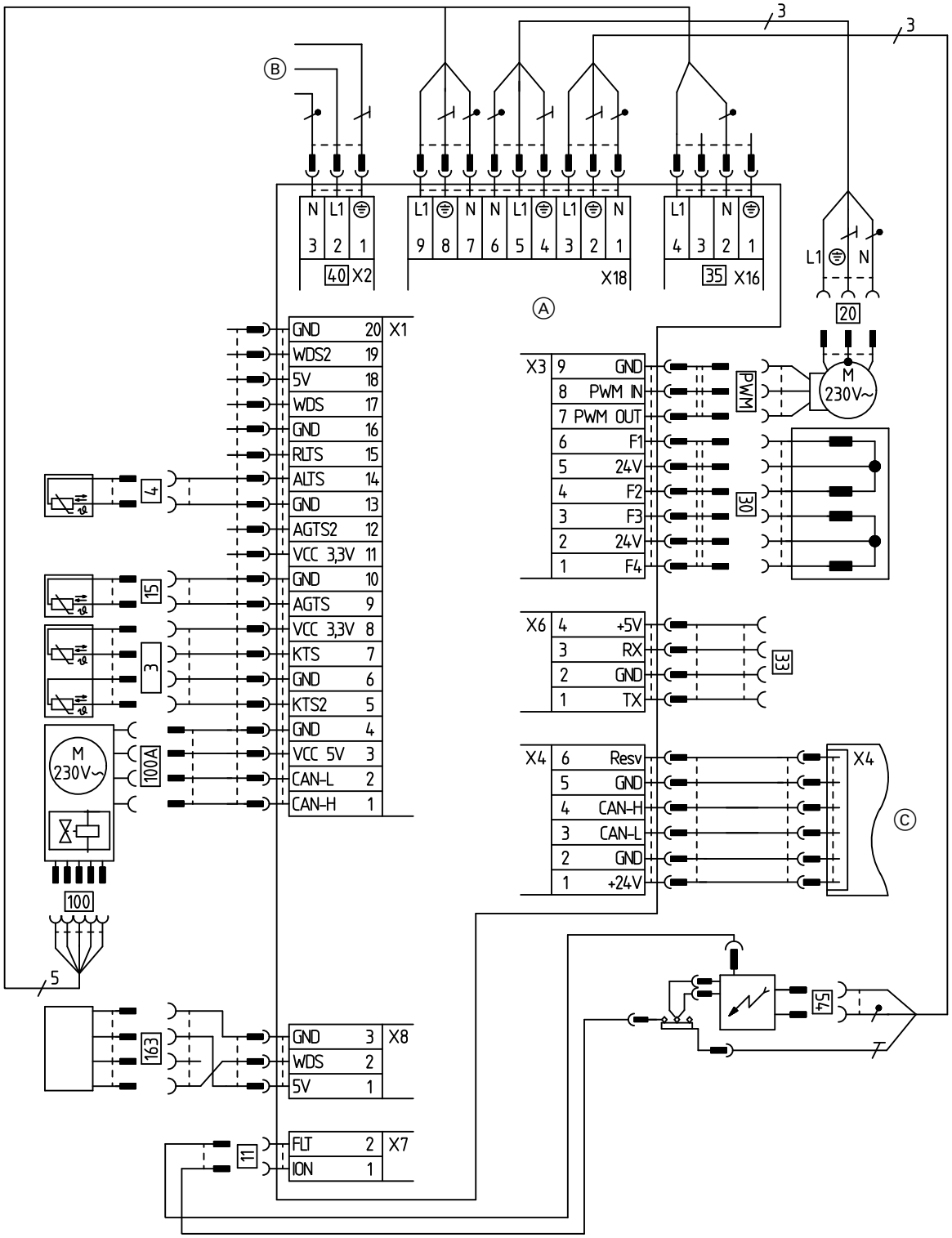

Fig. 75

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

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Commissioning/service reports

Settings and test values		Set value	Commissioning	Maintenance/ service	Maintenance/ service
Date					
Signature					
Static pressure	mbar kPa	≤ 57.5 ≤ 5.75			
Supply pressure (flow pressure)					
☐ For natural gas	mbar kPa	See table "Supply pressure" (Commissioning ...)			
☐ For LPG	mbar kPa				
☐ *Enter gas type*					
Carbon dioxide content CO_2 With natural gas					
▪ At lower heating output	% by vol.	See "Checking the combustion quality" (Commissioning ...)			
▪ At upper heating output	% by vol.				
For LPG					
▪ At lower heating output	% by vol.				
▪ At upper heating output	% by vol.				
Oxygen content O_2					
▪ At lower heating output	% by vol.				
▪ At upper heating output	% by vol.				
Carbon monoxide content CO					
▪ At lower heating output	ppm	< 1000			
▪ At upper heating output	ppm	< 1000			

Specification

Use with single connection

Gas boiler, type B and C, category II_{2N3P}				
Type			**B2TF**	
Rated heating output range (details to EN 15502)				
T_F/T_R = 50/30 °C (P(50/30))				
Natural gas	**kW**	**1.9 to 19**	**1.9 to 25**	**1.9 to 32**
LPG	**kW**	**2.5 to 19**	**2.5 to 25**	**2.5 to 32**
T_F/T_R = 80/60 °C (Pn(80/60))				
Natural gas	**kW**	**1.7 to 17.5**	**1.7 to 23**	**1.7 to 29.3**
LPG	**kW**	**2.2 to 17.5**	**2.2 to 23**	**2.2 to 29.3**
Rated heating output for DHW heating				
Natural gas	kW	1.7 to 22	1.7 to 28.6	1.7 to 33.9
LPG	kW	2.2 to 22	2.2 to 28.6	2.2 to 33.9
Rated heat input (Qn)				
Natural gas	kW	1.8 to 17.8	1.8 to 23.4	1.8 to 29.9
LPG	kW	2.3 to 17.8	2.3 to 23.4	2.3 to 29.9
Rated heat input for DHW heating (Qnw)	kW	17.8	23.4	29.9
Product ID			CE-0085CT0017	
IP rating to EN 60529			IP X4	
▪ In conjunction with assembly kit (accessories)			IP X1	
Protection class			I	
NO_X	Category		6	
Gas supply pressure				
Natural gas	mbar	20	20	20
	kPa	2	2	2
LPG	mbar	50	50	50
	kPa	5	5	5
Max. permiss. gas supply pressure[*1]				
Natural gas	mbar	25.0	25.0	25.0
	kPa	2.5	2.5	2.5
LPG	mbar	57.5	57.5	57.5
	kPa	5.75	5.75	5.75
Sound power level (to EN ISO 15036-1)				
– At partial load	dB(A)	38.8	38.8	38.8
– At rated heating output (DHW heating)	dB(A)	49.2	50.7	52.6
Power consumption in the delivered condition (incl. circulation pump)	W	53	79	113
Rated voltage	V		230	
Rated frequency	Hz		50	
Appliance fuse protection	A		6.3	
Backup fuse (power supply)	A		16	
Communication module (integral)				
WiFi frequency band	MHz		2400 to 2483.5	
Max. transmitting power	dBm		17	
Low power radio frequency band	MHz		2400 to 2483.5	

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

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Specification (cont.)

Use with single connection

Gas boiler, type B and C, category II_{2N3P}				
Type		**B2TF**		
Rated heating output range (details to EN 15502)				
T_F/T_R = 50/30 °C (P(50/30))				
Natural gas	**kW**	**1.9 to 19**	**1.9 to 25**	**1.9 to 32**
LPG	**kW**	**2.5 to 19**	**2.5 to 25**	**2.5 to 32**
T_F/T_R = 80/60 °C (Pn(80/60))				
Natural gas	**kW**	**1.7 to 17.5**	**1.7 to 23**	**1.7 to 29.3**
LPG	**kW**	**2.2 to 17.5**	**2.2 to 23**	**2.2 to 29.3**
Max. transmitting power	dBm	6		
Supply voltage	V DC	24		
Power consumption	W	4		
Permissible ambient temperature				
▪ During operation	°C	+5 to +35		
▪ During storage and transport	°C	-5 to +60		
Electronic temperature limiter setting (TN)	°C	91		
Electronic temperature cut-out setting	°C	110		
Weight excl. heating water	kg	111.5		
Permiss. operating pressure, heating water side (PMS)	bar MPa	3 0.3		
Water capacity (excl. diaphragm expansion vessel)	l	3.0	3.0	3.0
Max. flow temperature	°C	82	82	82
Max. flow rate (Limit for the use of hydraulic separation)	l/h	See residual head graphs		
Nominal circulating water volume At T_F/T_R = 80/60 °C	l/h	818	1076	1374
Expansion vessel				
Capacity	l	18	18	18
Pre-charge pressure	bar	0.75	0.75	0.75
	kPa	75	75	75
Permiss. operating pressure	bar	3	3	3
	MPa	0.3	0.3	0.3
Connections (with connection accessories)				
Boiler flow and return	R	¾	¾	¾
Cold water and DHW	R	½	½	½
DHW circulation	R	½	½	½
Dimensions				
Length	mm	595	595	595
Width	mm	600	600	600
Height	mm	1400	1400	1400
Gas connection (with connection accessories)	R	½	½	½

Specification (cont.)

Use with single connection

Gas boiler, type B and C, category II_{2N3P}				
Type		**B2TF**		
Rated heating output range (details to EN 15502)				
T_F/T_R = 50/30 °C (P(50/30))				
Natural gas	**kW**	**1.9 to 19**	**1.9 to 25**	**1.9 to 32**
LPG	**kW**	**2.5 to 19**	**2.5 to 25**	**2.5 to 32**
T_F/T_R = 80/60 °C (Pn(80/60))				
Natural gas	**kW**	**1.7 to 17.5**	**1.7 to 23**	**1.7 to 29.3**
LPG	**kW**	**2.2 to 17.5**	**2.2 to 23**	**2.2 to 29.3**
DHW loading cylinder				
Capacity	l	100	100	100
Permiss. operating pressure (DHW side)	bar	10	10	10
	MPa	1	1	1
Continuous DHW output	kW	19.74	26.53	32.50
For DHW heating from 10 to 45 °C	l/h	484.80	648.80	793.80
Performance factor N_{L*2}		1.4	2.1	2.6
Initial DHW output For DHW heating from 10 to 45 °C	l/10 min	163.70	196.20	215.50
Supply values Relative to the max. load and 1013 mbar/15 °C				
Natural gas E	m^3/h	2.40	3.12	3.69
Natural gas LL	m^3/h	2.79	3.63	4.29
LPG	kg/h	1.76	2.29	2.71
Flue gas parameters				
Temperature (at a return temperature of 30 °C)				
– At max. heating output	°C	41	46	59
– At partial load	°C	38	38	38
Temperature (at a return temperature of 60 °C)	°C	65	67	72
Mass flow rate (for DHW heating)				
Natural gas				
– At max. heating output	kg/h	31.7	41.6	54.9
– At partial load (single connection)	kg/h	3.3	3.3	3.3
LPG				
– At rated heating output	kg/h	30.1	41.0	53.9
– At partial load	kg/h	3.9	3.9	3.9
Available draught (single connection)*3	Pa	200	341	600
	mbar	2.0	3.41	6.0
Max. amount of condensate To DWA-A 251	l/h	3.2	4.1	4.9
Condensate connection (hose nozzle)	Ø mm	20 - 24	20 - 24	20 - 24
Flue gas connection	Ø mm	60	60	60
Ventilation air connection	Ø mm	100	100	100

*2 *At 70 °C average boiler water temperature and cylinder storage temperature Tcyl = 60 °C. DHW performance factor N_L depends on cylinder storage temperature Tcyl. Standard values: Tcyl = 60 °C → 1.0 × N_L Tcyl = 55 °C → 0.75 × N_L Tcyl = 50 °C → 0.55 × N_L Tcyl = 45 °C → 0.3 × N_L.*

*3 *CH: Available draught 200 Pa; 2.0 mbar*

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Specification (cont.)

Use with single connection

Gas boiler, type B and C, category II_{2N3P}				
Type		**B2TF**		
Rated heating output range (details to EN 15502)				
T_F/T_R = 50/30 °C (P(50/30))				
Natural gas	**kW**	**1.9 to 19**	**1.9 to 25**	**1.9 to 32**
LPG	**kW**	**2.5 to 19**	**2.5 to 25**	**2.5 to 32**
T_F/T_R = 80/60 °C (Pn(80/60))				
Natural gas	**kW**	**1.7 to 17.5**	**1.7 to 23**	**1.7 to 29.3**
LPG	**kW**	**2.2 to 17.5**	**2.2 to 23**	**2.2 to 29.3**
Standard seasonal efficiency [to DIN] at T_F/T_R = 40/30 °C	%	Up to 98 (H_s) [gross cv]		
Energy efficiency class				
– Heating		A	A	A
– DHW heating, draw-off profile XL		A	A	A
Seasonal central heating energy efficiency	ηs (%)	93	93	94

Note
With appliances for use in multiple connection (vertical) and cascades (horizontal), the specification in the table ***above*** *apply, with the exception of the following data – see table on appliances for multiple connection on page 136*

Use with multiple connection

Gas boiler, type B and C, category II_{2N3P}				
Type		**B2TF**		
Rated heating output range (to EN 15502)				
T_F/T_R = 50/30 °C (P(50/30))				
Natural gas	**kW**	**5.6 to 19**	**5.6 to 25**	**5.6 to 32**
T_F/T_R = 80/60 °C (Pn(80/60))				
Natural gas	**kW**	**5.1 to 17.5**	**5.1 to 23**	**5.1 to 29.3**
Rated heating output for DHW heating				
Natural gas	kW	5.1 to 22	5.1 to 28.6	5.1 to 33.9
Rated heat input (Qn)				
Natural gas	kW	5.3 to 17.8	5.3 to 23.4	5.3 to 29.9
Rated heat input for DHW heating (Qnw)	kW	17.8	23.4	29.9
Mass flow rate (for DHW heating)				
Natural gas				
– At max. heating output	kg/h	31.7	41.6	54.9
–Partial load multiple connection overpressure		9.7	9.7	9.7
Available draught C_{10} (at header system interface)	Pa	25	25	25
	mbar	0.25	0.25	0.25
Minimal permissible differential pressure between flue gas outlet and air inlet for flue system to C_{10}	Pa	-200[*4]	-200[*4]	-200[*4]

*[*4] -100 Pa reserved for wind pressure*

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Specification (cont.)

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

Flue system types

Available in the following countries	Flue system types
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, 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_{43}, C_{53}, C_{63}, C_{83}, C_{83P}, C_{93}
BE	B_{23}, B_{23P}, B_{33}, C_{13}, C_{33}, C_{43} C_{53}, C_{83}, C_{83P}, C_{93}
DE, LU, SI	B_{23}, B_{23P}, B_{33}, C_{13X}, C_{33X}, C_{43X}, C_{53X}, C_{63X}, C_{83X}, C_{83P}, C_{93X}

Gas categories

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

The gas condensing boiler is suitable for operation with natural gas containing a hydrogen blend of up to 20 % by volume.

Electronic combustion control unit

The electronic combustion controller utilises the physical correlation between the level of the ionisation current and the air ratio λ. The maximum ionisation current is achieved at an air ratio of 1 for all gas qualities. The ionisation signal is evaluated by the combustion controller. The air ratio is regulated to a value that is between λ= 1.2 and 1.5. This range provides for an optimum combustion quality. Thereafter, the electronic gas train regulates the required gas volume subject to the prevailing gas quality.
To check the combustion quality, the CO_2 content or the O_2 content of the flue gas is measured. The prevailing air ratio is determined using the actual values.

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

Final decommissioning and disposal

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

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

Ordering individual parts for accessories

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

Declaration of conformity

We, Viessmann Climate Solutions SE, D-35108 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 Climate Solutions SE, D-35108 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 Climate Solutions SE, D-35108 Allendorf, confirm that the product **Vitodens 222-F** complies with the NO_x limits specified by the 1st BImSchV, paragraph 6 [Germany].

Allendorf, 1 March 2021

Viessmann Climate Solutions SE

Authorised signatory Uwe Engel
Senior Vice President Engineering & Technology

Keyword index

Keyword index (cont.)

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