Installation and maintenance instructions

ecoTEC pure

VC 146/7-2 (E-DE)

VCW 206/7-2 (E-DE)

DE

Publisher/manufacturer
Vaillant GmbH
Berghauser Str. 40 ▮ D-42859 Remscheid
Tel. +49 21 91 18-0 ▮ Fax +49 21 91 18-2810
info@vaillant.de ▮ www.vaillant.de

UNIDOMO®

Web: www.unidomo.de

Telefon: 04621- 30 60 89 0

Mail: info@unidomo.com

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Contents

1 Safety

1.1 Action-related warnings

Classification of action-related warnings

The action-related warnings are classified in accordance with the severity of the possible danger using the following warning symbols and signal words:

Warning symbols and signal words

Danger!
Imminent danger to life or risk of severe personal injury

Danger!
Risk of death from electric shock

Warning.
Risk of minor personal injury

Caution.
Risk of material or environmental damage

1.2 Intended use

There is a risk of injury or death to the user or others, or of damage to the product and other property in the event of improper use or use for which it is not intended.

The product is intended as a heat generator for closed heating installations and for hot water generation.

Depending on the gas-fired boiler type, the products referred to in these instructions must only be installed and operated in conjunction with the air/flue pipe accessories listed in the other applicable documents.

Intended use includes the following:

– observance of accompanying operating, installation and servicing instructions for the product and any other system components
– installing and fitting the product in accordance with the product and system approval
– compliance with all inspection and maintenance conditions listed in the instructions.

Intended use also covers installation in accordance with the IP code.

Any other use that is not specified in these instructions, or use beyond that specified in this document shall be considered improper use. Any direct commercial or industrial use is also deemed to be improper.

Caution.

Improper use of any kind is prohibited.

1.3 General safety information

1.3.1 Risk caused by inadequate qualifications

– Set-up
– Dismantling
– Installation
– Start-up
– Inspection and maintenance
– Repair
– Decommissioning

- ▸ Observe all instructions that are included with the product.
- ▸ Proceed in accordance with current technology.
- ▸ Observe all applicable directives, standards, laws and other regulations.

1.3.2 Risk of injury due to the heavy weight of the product

- ▸ Make sure that the product is transported by at least two people.

1.3.3 Risk of death from escaping gas

What to do if you smell gas in the building:

- ▸ Avoid rooms that smell of gas.
- ▸ If possible, open doors and windows fully and ensure adequate ventilation.
- ▸ Do not use naked flames (e.g. lighters, matches).
- ▸ Do not smoke.
- ▸ Do not use any electrical switches, mains plugs, doorbells, telephones or other communication systems in the building.
- ▸ Close the emergency control valve or the main isolator.
- ▸ If possible, close the gas isolator cock on the product.
- ▸ Warn other occupants in the building by yelling or banging on doors or walls.
- ▸ Leave the building immediately and ensure that others do not enter the building.

- ▸ Alert the police and fire brigade as soon as you are outside the building.
- ▸ Use a telephone outside the building to inform the emergency service department of the gas supply company.

1.3.4 Risk of death from leaks if the product is installed below ground level

Liquid gas accumulates at floor level. If the product is installed below ground level, liquid gas may accumulate at floor level if there are any leaks. In this case, there is a risk of explosion.

- ▸ Make sure that liquid gas cannot escape from the product or the gas line under any circumstance.

1.3.5 Risk of death due to blocked or leaking flue gas routes

Installation errors, damage, tampering, unauthorised installation sites or similar can cause flue gas to escape and result in a risk of poisoning.

What to do if you smell flue gas in the property:

- ▸ Open all accessible doors and windows fully to provide ventilation.
- ▸ Switch off the product.
- ▸ Check the flue gas routes in the product and the flue gas diversions.

1.3.6 Risk of poisoning and burns caused by escaping hot flue gases

- ▸ Only operate the product if the air/flue pipe has been completely installed.
- ▸ With the exception of short periods for testing purposes, only operate the product when the front casing is installed and closed.

1.3.7 Risk of death due to explosive and flammable materials

- ▸ Do not use the product in storage rooms that contain explosive or flammable substances (such as petrol, paper or paint).

1.3.8 Risk of death due to cabinet-type casing

Cabinet-type casing can give rise to dangerous situations when used on a product which is operated with an open flue.

- ▸ Ensure that the product is supplied with sufficient combustion air.

1.3.9 Risk of poisoning caused by insufficient combustion air supply

Conditions: Open-flued operation

- ▸ Ensure that the air supply to the product's installation room is permanently unobstructed and sufficient in accordance with the relevant ventilation requirements.

1.3.10 Risk of death due to lack of safety devices

The schematic drawings included in this document do not show all safety devices required for correct installation.

- ▸ Install the necessary safety devices in the system.
- ▸ Observe the applicable national and international laws, standards and guidelines.

1.3.11 Risk of death from electric shock

There is a risk of death from electric shock if you touch live components.

Before commencing work on the product:

- ▸ Unplug the mains plug.
- ▸ Or disconnect the product from the power supply by switching off all power supplies (electrical partition with a contact gap of at least 3 mm, e.g. fuse or circuit breaker).
- ▸ Secure against being switched back on again.
- ▸ Wait for at least 3 minutes until the capacitors have discharged.
- ▸ Check that there is no voltage.

1.3.12 Risk of being burned or scalded by hot components

- ▸ Only carry out work on these components once they have cooled down.

1.3.13 Risk of death from escaping flue gas

If you operate the product with an empty condensate siphon, flue gas may escape into the room air.

- In order to operate the product, ensure that the condensate siphon is always full.

  Conditions: Permitted B23 or B23P unit types with condensate siphon (third-party accessory)

  – Water seal level: ≥ 200 mm

1.3.14 Risk of material damage caused by using an unsuitable tool

- Use the correct tool to tighten or loosen threaded connections.

1.3.15 Risk of material damage caused by frost

- Do not install the product in rooms prone to frost.

1.3.16 Risk of corrosion damage due to unsuitable combustion and room air

Sprays, solvents, chlorinated cleaning agents, paint, adhesives, ammonia compounds, dust or similar substances may lead to corrosion on the product and in the flue system.

- Ensure that the supply of combustion air is always free of fluorine, chlorine, sulphur, dust, etc.
- Ensure that no chemical substances are stored at the installation site.
- If you are installing the product in hairdressing salons, painter's or joiner's workshops, cleaning businesses or similar locations, choose a separate installation room in which the room air is technically free of chemical substances.
- Ensure that the combustion air is not routed through chimneys which have previously been used with floor-standing oil-fired boilers, or with other boilers, which could cause soot to build up in the chimney.

1.4 Regulations (directives, laws, standards)

- Observe the national regulations, standards, guidelines and laws.

2 Notes on the documentation

2.1 Observing other applicable documents

► You must observe all the operating and installation instructions included with the system components.

2.2 Storing documents

► Pass these instructions and all other applicable documents on to the system operator.

2.3 Validity of the instructions

These instructions apply only to:

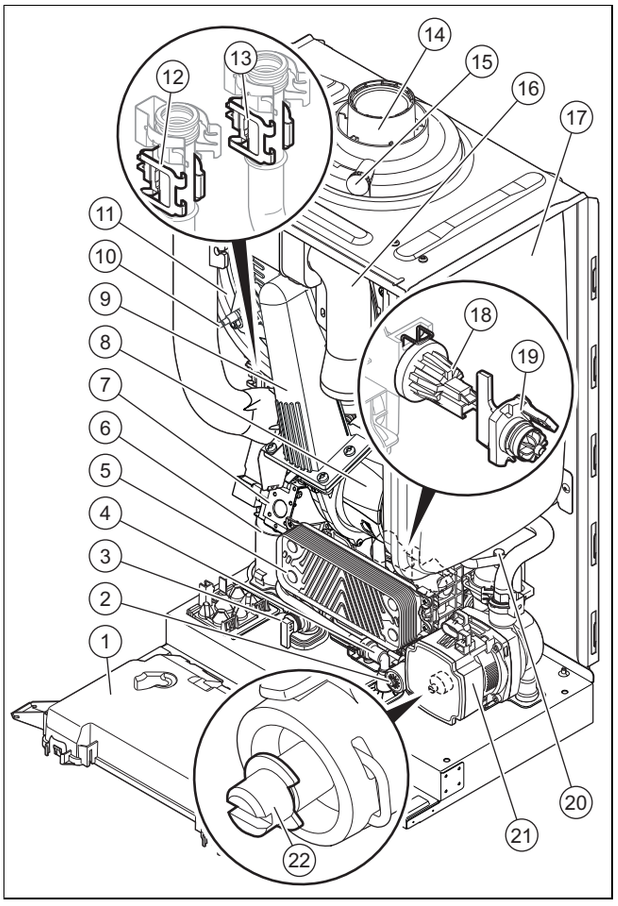
Product article number

ecoTEC pure	**VC 146/7-2 (E-DE)**	0010023439
	VCW 206/7-2 (E-DE)	0010023440

3 Product description

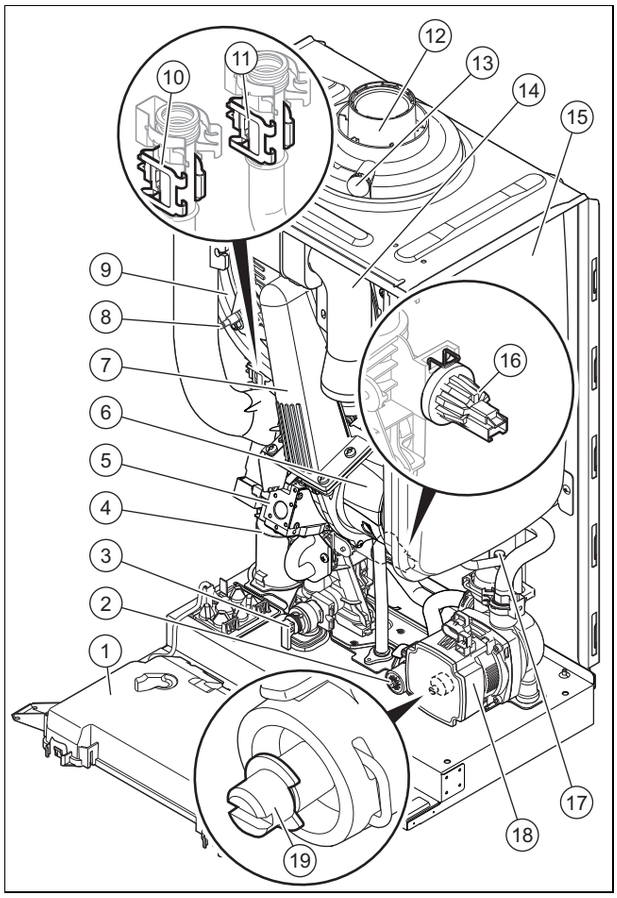
3.1 Product design

3.1.1 Functional elements, product with integrated hot water generation



1	Electronics box	5	Plate heat exchanger
2	Diverter valve	6	Condensate siphon
3	Expansion relief valve	7	Gas valve
4	Filling device	8	Fan
9	Compact thermal module	15	Flue gas measuring stub pipe
10	Ionisation and ignition electrode	16	Air intake pipe
11	Primary heat exchanger	17	Expansion vessel
12	Temperature sensor in the heating flow	18	Pressure sensor
13	Temperature sensor in the heating return	19	Impeller sensor (hot water)
14	Connection for the flue pipe	20	Automatic air vent
		21	Heating pump
		22	Bypass

3.1.2 Functional elements, product for heating mode only



1	Electronics box	11	Temperature sensor in the heating return
2	Diverter valve	12	Connection for the flue pipe
3	Expansion relief valve	13	Flue gas measuring stub pipe
4	Condensate siphon	14	Air intake pipe
5	Gas valve	15	Expansion vessel
6	Fan	16	Pressure sensor
7	Compact thermal module	17	Automatic air vent
8	Ionisation and ignition electrode	18	Heating pump
9	Primary heat exchanger	19	Bypass
10	Temperature sensor in the heating flow		

3.2 Information on the identification plate

The identification plate is mounted on the underside of the product in the factory.

The identification plate keeps record of the country in which the product is to be installed.

Information on the data plate	Meaning
Condensing technology	Efficiency class of the boiler in accordance with EC Directive 92/42/EEC
Serial number	For quality control purposes; 3rd and 4th digits = year of production For quality control purposes; 5th and 6th digits = week of production For identification purposes; 7th to 16th digits = product article number For quality control purposes; 17th to 20th digits = place of manufacture
... ecoTEC ...	Product designation
Cat.	Approved gas category
Type: Xx3(x)	Permissible flue gas connections
2H / 2E / 3P / 2K...	Gas group and gas connection pressure as set at the factory
Tmax	Max. flow temperature
PMS	Maximum water pressure in heating mode
NOx	NOx class for the product
V Hz	Electric connection
W	Max. electrical power consumption
IP	Protection class
Code (DSN)	Specific product code
	Heating mode
*Q*n	Nominal heating load range in heating mode
*P*n	Nominal heat output range in heating mode
*P*nc	Nominal heat output range in heating mode (condensing technology)
	Hot water generation
*Q*nw	Nominal heating load range in domestic hot water mode
*P*nw	Nominal heat output range in domestic hot water mode
D	Specific flow rate
PMW	Maximum water pressure in domestic hot water mode
	Barcode with serial number

Note

Make absolutely sure that the product is compatible with the gas group at the installation site.

3.3 Serial number

The serial number can be found on a plastic label at the bottom of the front casing and on the identification plate.

3.4 CE label

CE

The CE label shows that the products comply with the basic requirements of the applicable directives as stated on the identification plate.

The declaration of conformity can be viewed at the manufacturer's site.

4 Set-up

4.1 Unpacking the product

1. Remove the product from its box.
2. Remove the protective film from all parts of the product.

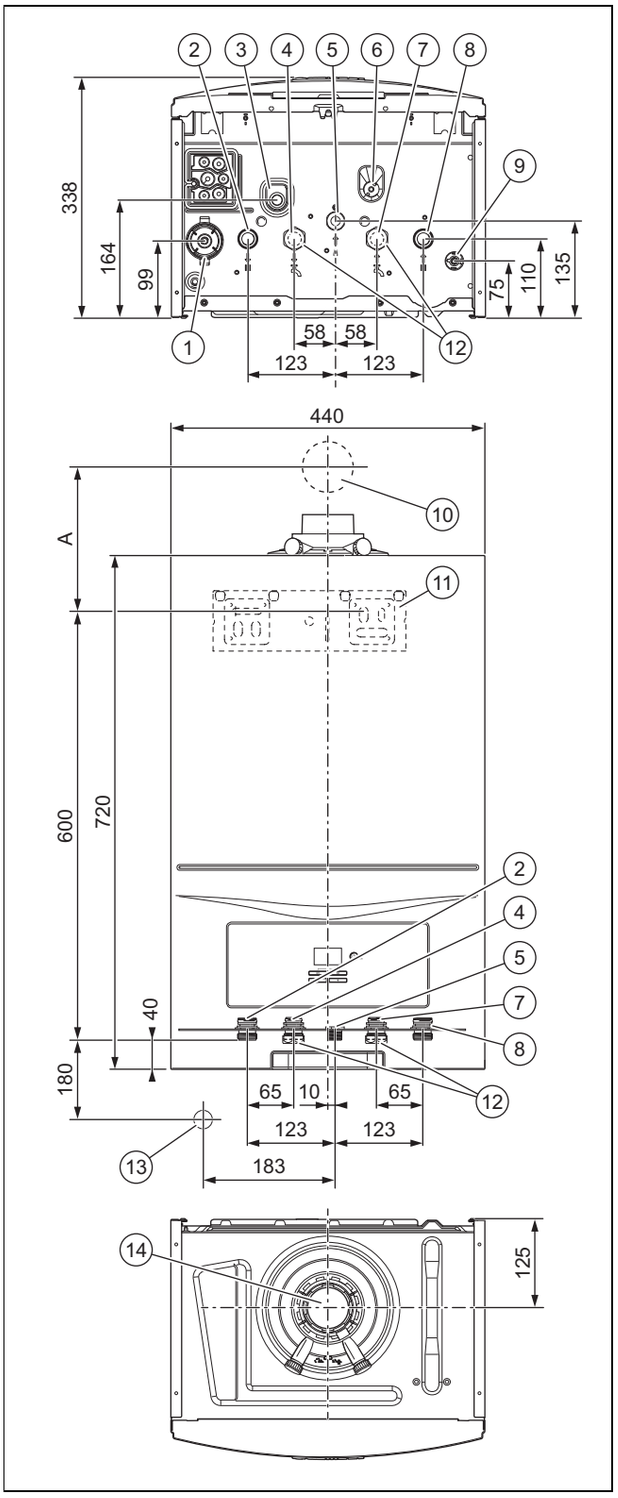
4.2 Checking the scope of delivery

► Check that the scope of delivery is complete and intact.

4.2.1 Scope of delivery

Number	Designation
1	Heat generator
1	Bag with accessories: – Unit mounting bracket – Bag with seals – Bag with bolts and rawl plugs – Mounting template – Flexible condensate discharge pipe – Hose set – Gas cock
1	Enclosed documentation

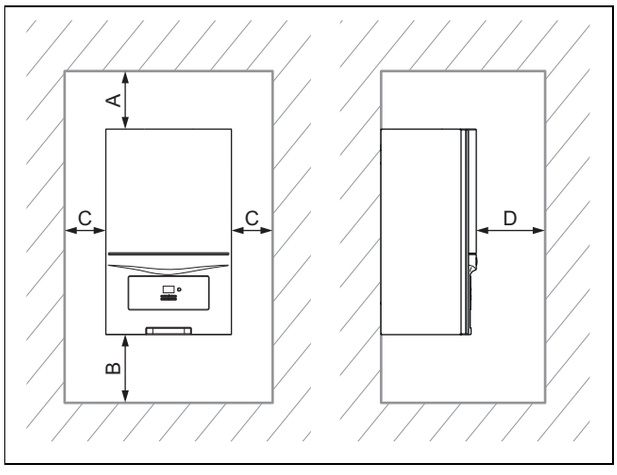
4.3 Dimensions



1 Condensate siphon (condensate discharge connection, 21.5 mm diameter)
2 Heating flow connection, G3/4
3 Heating expansion relief valve drain pipework connection, 15 mm diameter
4 Hot water connection, G3/4
5 Gas connection, G1/2
6 Filling tap, for products with integrated hot water generation
7 Cold water connection, G3/4
8 Heating return connection, G3/4
9 Drain cock
10 Flue pipe wall duct
A = see installation template (60/100 mm diameter air/flue pipe)
A = 235 mm (80/125 mm diameter air/flue pipe)
A = 220 mm (80/80 mm diameter air/flue pipe)
11 Product bracket
12 Plug (unused connection), only for products that have heating mode
13 R1 tundish/condensate siphon connection
14 Flue pipe connection

Consult the installation template that is supplied to find the dimension A.

4.4 Minimum clearances



	Minimum clearance
A	165 mm: Flue pipe, 60/100 mm diameter 275 mm: Flue pipe, 80/125 mm diameter 300 mm: Air/flue pipe 80/80 mm diameter
B	180 mm; optimum approx. 250 mm
C	5 mm; optimum approx. 50 mm
D	500 mm clearance in front of the heat generator to enable easy access for maintenance work (the same as a door opening).

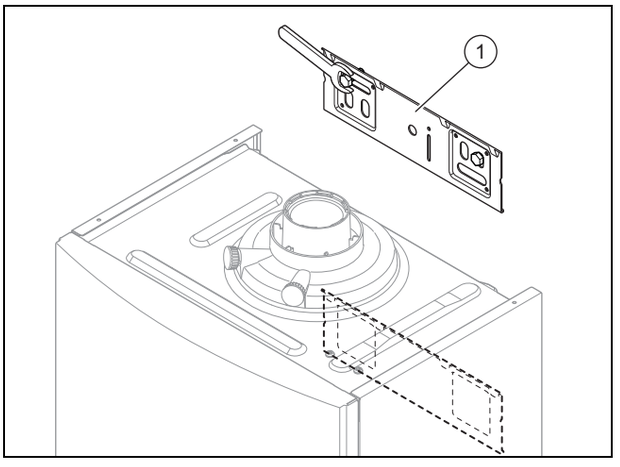
4.5 Clearance from combustible components

It is not necessary to maintain a clearance between the product and components made of combustible materials that go beyond the minimum clearances (see page).

4.6 Using the installation template

► Use the installation template to ascertain the locations at which you need to drill holes and make breakthroughs.

4.7 Wall-mounting the product



1. Check whether the wall has sufficient load-bearing capacity to bear the operational weight of the product.
2. Check if the supplied fixing material may be used for the wall.

Conditions: The load-bearing capacity of the wall is sufficient, The fixing material may be used for the wall

- ► Wall-mount the product as described.
- ► Install the hanging bracket **(1)** on the wall.
- ► Hang the product on the product bracket from above using the suspension bracket.

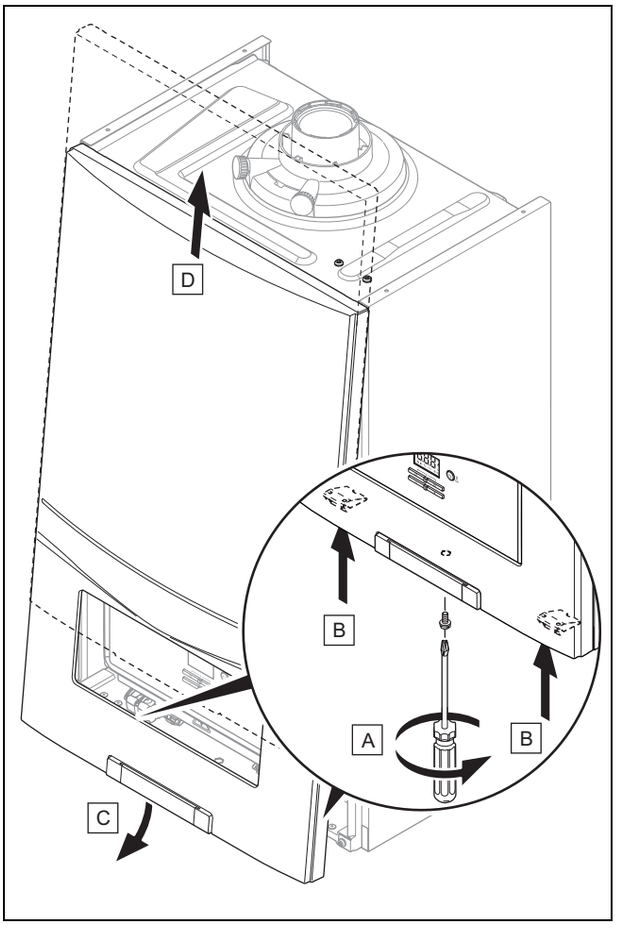
Conditions: The load-bearing capacity of the wall is not sufficient

- ► Ensure that wall-mounting apparatus on-site has a sufficient load-bearing capacity. Use individual stands or primary walling, for example.
- ► Do not wall-mount the product if you cannot provide wall-mounting apparatus with a sufficient load-bearing capacity.

Conditions: The fixing material may not be used for the wall

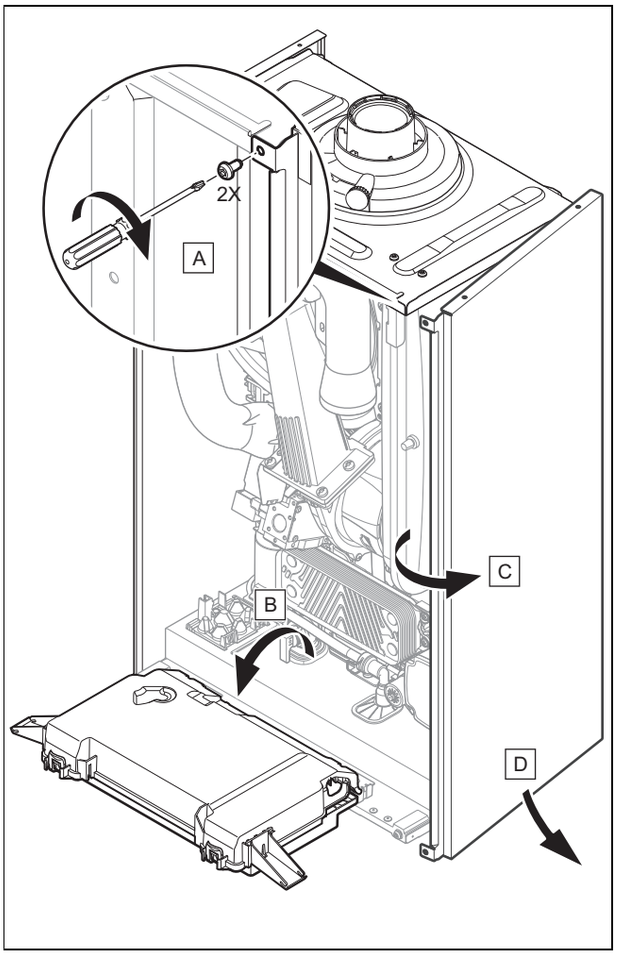
- ► Wall-mount the product as described using the adapted fixing material provided on-site.

4.8 Removing the front casing



- ► Remove the front casing as shown in the illustration.

4.9 Removing the side section



Caution.

Risk of material damage caused by mechanical deformation.

Removing both side sections may cause mechanical distortion in the product, which may cause damage to the piping, for example, and potentially result in leaks.

- ► Always only remove one side section – never both side sections at the same time.

- ► Remove the side section as shown in the illustration.

5 Installation

Danger!

Risk of explosion or scalding caused by incorrect installation.

Mechanical stresses in the connection pipes may lead to leaks.

- ► Make sure that the connection pipes are free from mechanical stress when they are installed.

Caution.

Risk of material damage due to the gas leak-tightness test.

At a test pressure of >11 kPa (110 mbar), gas leak-tightness tests may cause damage to the gas valve.

- ► If, during gas leak-tightness tests, you also place the gas lines and the gas valve in the product under pressure, use a max. test pressure of 11 kPa (110 mbar).
- ► If you cannot limit the test pressure to 11 kPa (110 mbar), close any gas isolator cocks that are installed upstream from the product before you carry out the gas leak-tightness test.
- ► If, during gas leak-tightness tests, you have closed the gas isolator cock that is installed upstream of the product, relieve the gas line pressure before you open this gas isolator cock.

Caution.

Risk of material damage caused by corrosion

Due to non-diffusion-tight plastic pipes in the heating installation, air gets into the heating water. Air in the heating water causes corrosion in the heat generator circuit and in the product.

- ► If you use non-diffusion-tight plastic pipes in the heating installation, ensure that no air gets into the heat generator circuit.

Caution.

Risk of material damage due to heat transfer during soldering.

- ► Only solder connectors if the connectors are not yet screwed to the service valves.

Caution.

Risk of material damage caused by changes to the pipes that have already been connected.

- ► Only bend connection pipes if they have not yet been connected to the product.

5.1 Installation requirements

5.1.1 Information on liquefied petroleum gas operation

In the as-delivered condition, the product is preset for operation with the gas group indicated on the data plate.

If you have a product that has been preset for operation with natural gas, you must convert it to run on liquid gas. You will need a conversion set for this. The conversion procedure is described in the manual supplied with the conversion set.

5.1.2 Purging the liquid gas tank

If the liquid gas tank is not purged properly, this may result in ignition problems.

- ► Ensure that the liquid gas tank has been purged properly before installing the product.
- ► If required, contact the filler or the liquid gas supplier.

5.1.3 Using the correct type of gas

Using the incorrect type of gas may cause fault shutdowns in the product. Ignition and combustion noise may occur in the product.

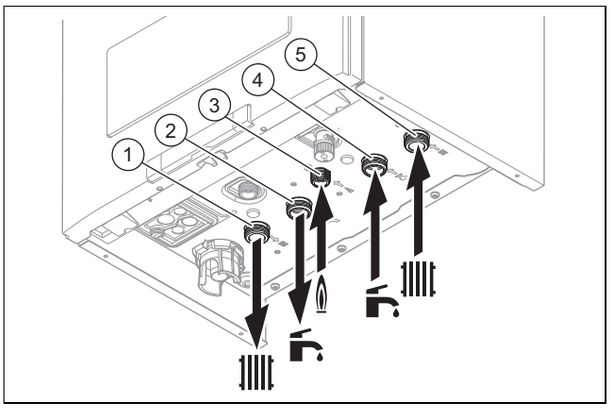
- ► Only use the gas type listed on the data plate.

5.1.4 Required preliminary work

1. Make sure that the existing gas meter is capable of passing the rate of gas supply required.
2. Install a system separator (to be provided on-site) directly on the cold water connection for the combination unit.
3. Check that the volumetric capacity of the expansion vessel is sufficient for the system volume.
   - ▽ If the volume of the expansion vessel is insufficient for the system.
     - ► Install an additional expansion vessel in the heating return, as close to the product as possible.
     - ► Install a non-return flap at the product's outlet (heating flow).
4. Ensure that the system has the following components:
   - A cold water stop cock for the unit
   - A gas stopcock for the unit
   - A filling and draining device in the heating installation

5.2 Gas and water connections

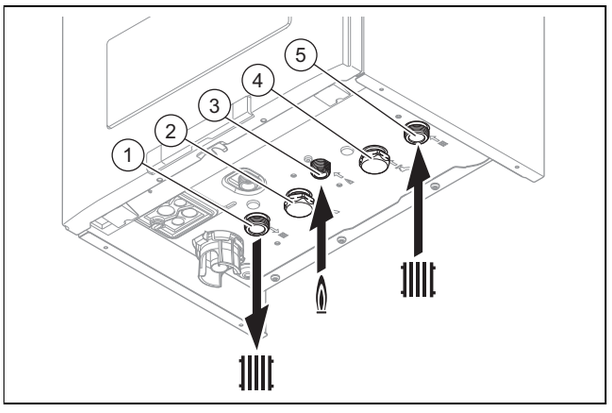
Conditions: Product with integrated domestic hot water generation



1	Heating flow connection, G3/4	4	Connection for the cold water supply line, G3/4
2	Hot water connection, G3/4	5	Heating return connection, G3/4
3	Gas connection, G1/2		

- ► Connect the water and gas connections in accordance with the applicable standards.

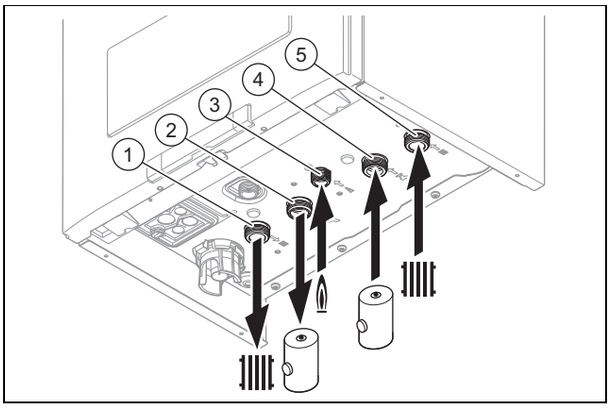
Conditions: Product with heating mode only



1	Heating flow connection, G3/4	4	Unused connection, G3/4
2	Unused connection, G3/4	5	Heating return connection, G3/4
3	Gas connection, G1/2		

- ► Connect the water and gas connections in accordance with the applicable standards.

Conditions: Product with heating mode only and connected domestic hot water cylinder

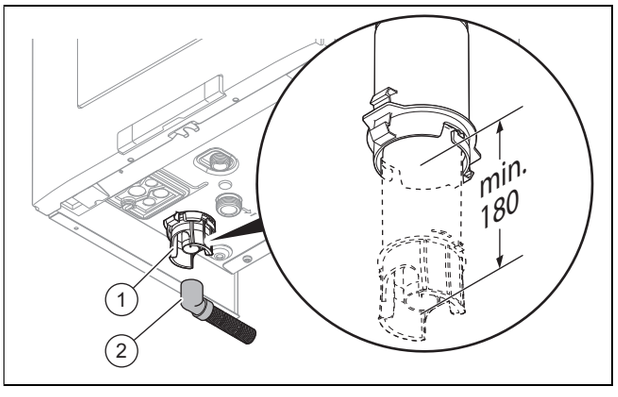


1	Heating flow connection, G3/4	4	Return connection to the domestic hot water cylinder, G3/4
2	Flow connection to the domestic hot water cylinder, G3/4	5	Heating return connection, G3/4
3	Gas connection, G1/2		

► Connect the water and gas connections in accordance with the applicable standards.

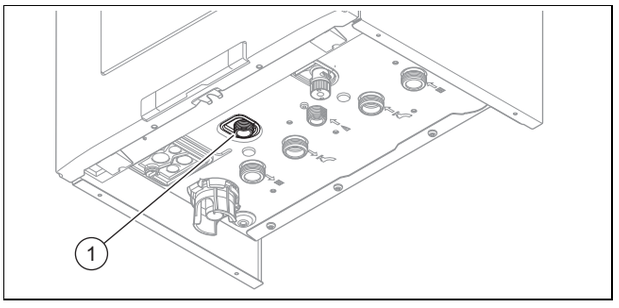
1. Purge the gas line before start-up.
2. Check whether the connections (→ Page 21) are leak-tight.
3. Check the entire gas line properly for leak-tightness.

5.3 Connecting the condensate drain pipework



► Follow the instructions listed here and observe directives and local regulations on condensed water discharge.
► Use PVC or another material that is suitable for draining the non-neutralised condensed water.
► If you cannot guarantee that the materials from which the condensate discharge pipe is made are suitable, install a system to neutralise the condensate.
► Ensure that the connection between the condensate discharge pipe and the condensate drain hose is not air-tight.
► Connect the condensate siphon **(1)**. Use the supplied condensate drain hose **(2)** to do this.
► Connect a condensate discharge pipe (not included in the scope of delivery) to the condensate discharge hose **(2)**.

5.4 Installing the discharge pipe on the expansion relief valve



1. Ensure that the pipeline is visible.
2. Connect the expansion relief valve **(1)**.
   ◁ The components must be set up in such a way that you can see the water flowing out.
3. If water or steam is escaping or if there is a flood, ensure that nobody can be injured and that no electrical components can be damaged.

5.5 Flue installation

5.5.1 Installing and connecting the flue pipe

1. You can find out which flue pipes may be used by consulting the enclosed flue pipe installation manual.

Conditions: Installation in damp rooms

► You must connect the product to a room-sealed air/flue gas installation. The combustion air must not be taken from the installation site.

Caution.
Risk of poisoning due to escaping flue gas.

Mineral-oil-based greases can damage the seals.

► Instead of grease, use only water or commercially available soft soap to aid installation.

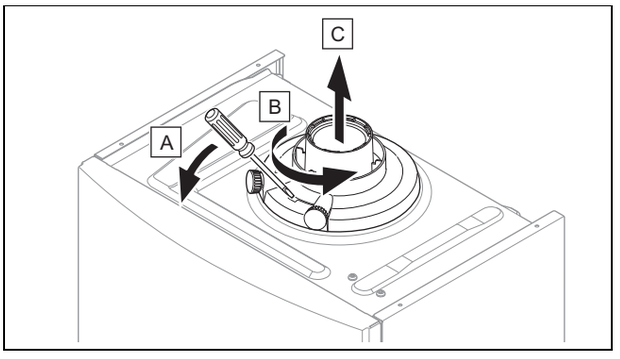
2. Install the flue pipe using the installation manual.

5.5.2 Replacing the connection piece for the air/flue pipe as required

1. Replace the connection piece for the air/flue pipe as required. The product-specific standard equipment is listed under Technical data.
2. Remove the connection piece for the air/flue pipe – this is installed at the factory. (→ Page 14)
3. **Alternatives 1 / 3**
   ► If required, install the connection piece for the air/flue pipe, 80/125 mm diameter. (→ Page 14)
3. **Alternatives 2 / 3**
   ► If required, install the connection piece with offset for the air/flue pipe, 60/100 mm diameter. (→ Page 14)

3. **Alternatives 3 / 3**
   ► If required, install the connection piece for the separate air/flue gas ducting, 80/80 mm diameter. (→ Page 14)

5.5.2.1 Removing the connection piece for the air/flue pipe



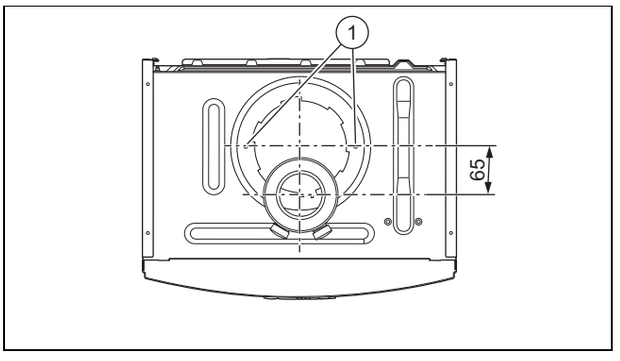
1. Insert a screwdriver into the gap between the measuring points.
2. Press the screwdriver carefully down.
3. Turn the connection piece anticlockwise as far as it will go and then remove it by pulling it upwards.

5.5.2.2 Installing the connection piece for the air/flue pipe, 80/125 mm diameter

1. Remove the connection piece for the air/flue pipe – this is installed at the factory. (→ Page 14)
2. Insert the alternative connection piece. Pay attention to the lugs.
3. Turn the connection piece clockwise until it clicks into position.

5.5.2.3 Installing the connection piece with offset for the air/flue pipe, 60/100 mm diameter

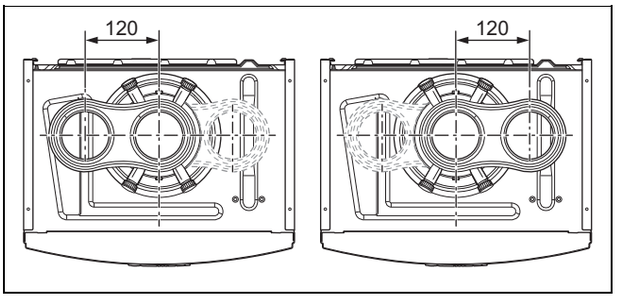
1. Remove the connection piece for the air/flue pipe – this is installed at the factory. (→ Page 14)



2. Insert the alternative connection piece with offset towards the front.
3. Use two screws **(1)** to secure the connection piece to the product.

5.5.2.4 Installing the connection piece for the separate air/flue pipe, 80/80 mm diameter

1. Remove the connection piece for the air/flue pipe – this is installed at the factory. (→ Page 14)



2. Insert the alternative connection piece. The connection for the air supply can point to the left- or the right-hand side. Pay attention to the lugs.
3. Turn the connection piece clockwise until it clicks into position.

5.6 Electrical installation

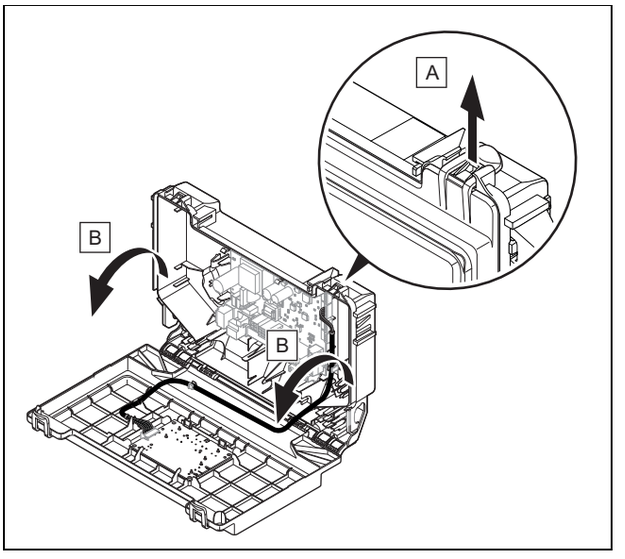
The electrical installation must only be carried out by a qualified electrician.

Danger!
Risk of death from electric shock!

Since mains connection terminals L and N remain live even if the on/off button is switched off:

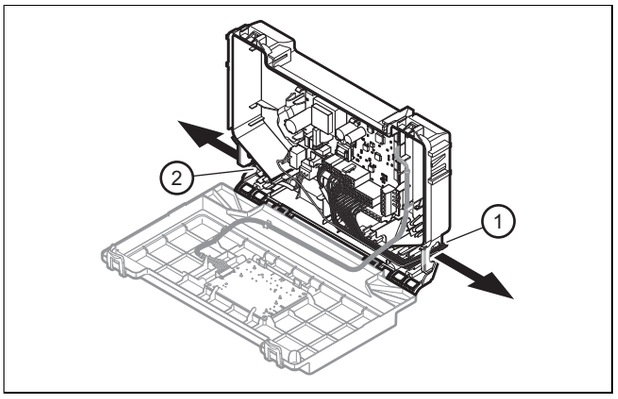
► Switch off the power supply.
► Secure the power supply against being switched on again.

5.6.1 Opening the electronics box



► Open the electronics box as shown in the illustration.

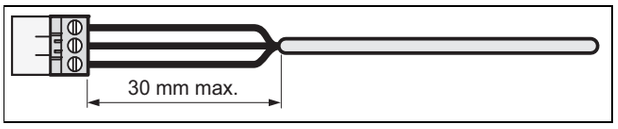
5.6.2 Cable route



1 24-V eBUS cable route

2 230-V eBUS cable route

5.6.3 Wiring



Caution.

Risk of material damage caused by incorrect installation.

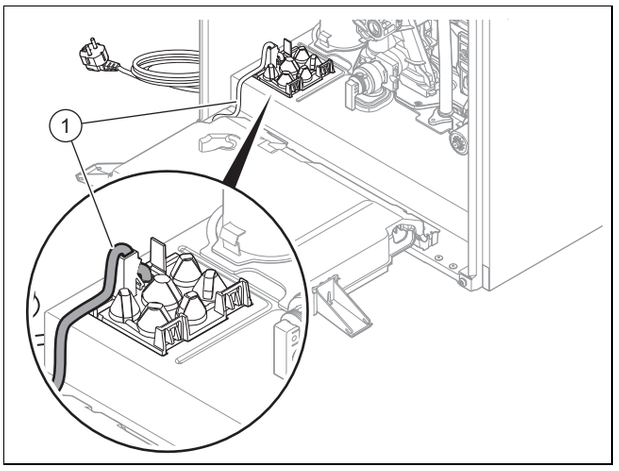
Mains voltage at incorrect terminals and plug terminals may destroy the electronics.

- ► Do not connect any mains voltage to the eBUS terminals (+/-).
- ► Only connect the mains connection cable to the terminals marked for the purpose.

1. Shorten the connection cables to the appropriate lengths to prevent them from causing damage inside the electronics box.
2. Screw the plug to the connection cable.
3. Plug the plug into the slot provided on the PCB.

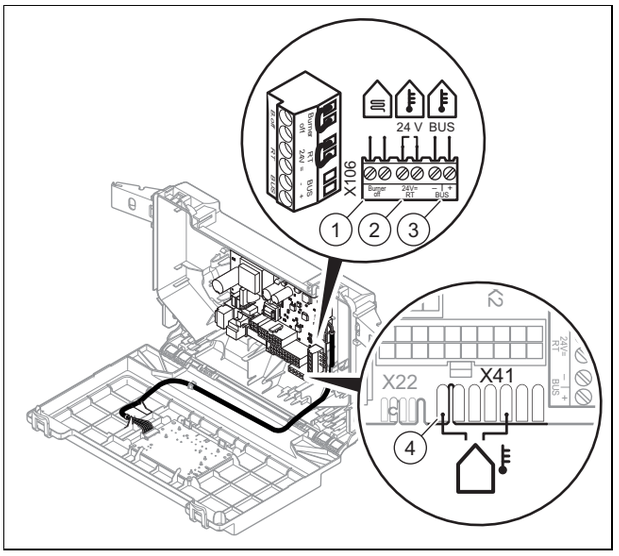
5.6.4 Establishing the power supply

1. Observe all valid regulations.
   - – The applicable regulations state that the connection must be made via an electrical partition with a contact opening of at least 3 mm at each pole.
   - – Power supply cable: Flexible line
2. Make sure that the rated voltage of the mains is 230 V.



3. Route a three-core power supply cable that complies with the relevant standards through the grommet and into the product.
4. Observe the routing of the power supply cable **(1)** in the grommet in order to guarantee that there is no strain.
5. Open the electronics box. (→ Page 14)
6. Screw the supplied plug **(1)** to a three-core power supply cable that complies with the relevant standards.
7. Plug the plug for the power supply cable into a suitable plug socket.
8. Make sure that access to the power supply is always available and is not covered or blocked.
9. Close the electronics box.

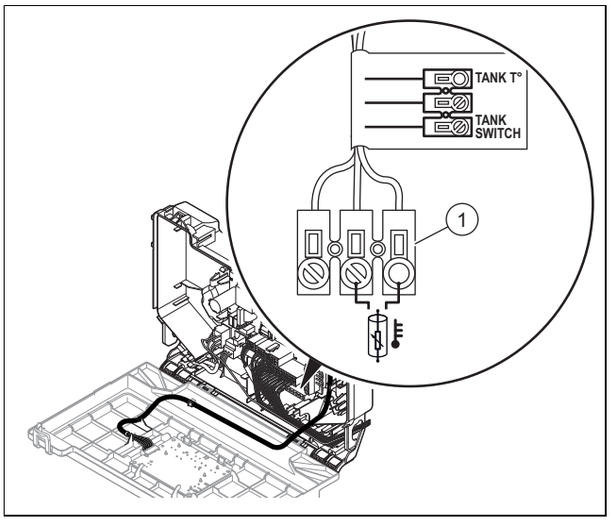
5.6.5 Connecting controllers to the electronic system



1	Safety thermostat for underfloor heating	3	eBUS controller or radio receiver unit
2	24 V (ON/OFF) control	4	Outside temperature sensor, wired

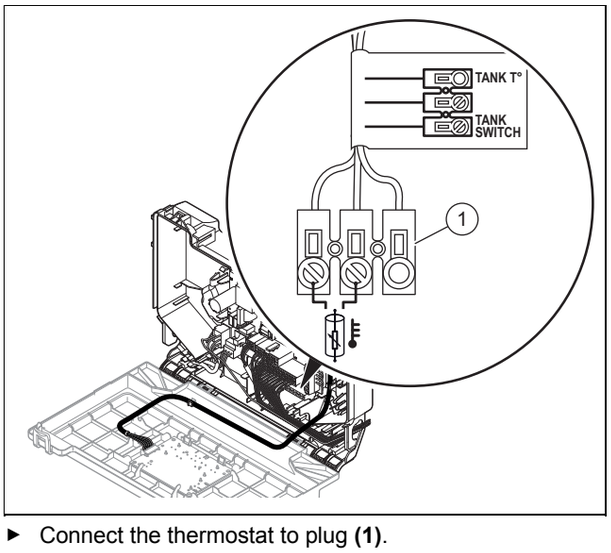
1. Open the electronics box (→ Page 14).
2. Wire the unit. (→ Page 15)
3. Connect the individual components depending on the type of installation.

Conditions: If installing a domestic hot water cylinder, which is controlled by a temperature sensor.



► Connect the temperature sensor to plug **(1)**.

Conditions: If installing a domestic hot water cylinder, which is controlled by a thermostat.



► Connect the thermostat to plug **(1)**.

4. Close the electronics box.

Conditions: Connecting a limit thermostat for underfloor heating

► Remove the bridge and connect the limit thermostat to the Burner off connection.
► Close the electronics box.
► For multi-circuit controllers (→ Page 17), change the parameter d.18 from Eco (intermittently operating pump) to Confort (continuously operating pump).

5.6.6 Connecting additional components via VR 40 ("2 in 7" multi-functional module)

1. Install the components in accordance with the respective instructions.

Conditions: Components connected to relay 1

► Activate (→ Page 17) D.27.

Conditions: Components connected to relay 2

► Activate (→ Page 17) D.28.

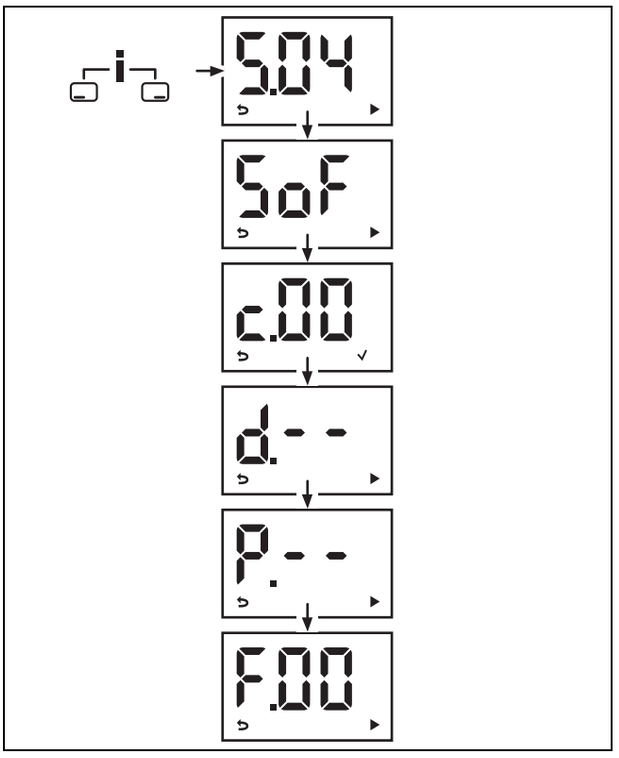
6 Operation

6.1 Operating concept

The operating concept and the display and setting facilities of the operator level are described in the operating instructions.

An overview of the display and setting options in the installer level can be found in the section "Overview of the installer level". (→ Page 16)

6.2 Installer level overview



6.3 Calling up the installer level

1. Only call up the installer level if you are a competent person.
2. Press ▭ and ▭ ("i") at the same time.
   ◁ S.xx (current unit status) appears in the display, followed by the heating flow temperature and the heating installation pressure.
   ◁ S.xx (current unit status) appears in the display, followed by the heating flow temperature, the heating installation pressure and the domestic hot water cylinder temperature.
3. Press ▭ to access the installer level.
   ◁ SoF and the software version appear in the display.
4. Press ▭.
   ◁ c.00 appears in the display.
5. Press the ▭ or ▭ button to change the installer code.

– Installer code: 17

6. Confirm by pressing ⊡.
7. Press ⊡ to access the diagnostics codes (d.), the check programmes (P.) and the fault codes (F.) and to return to the diagnostics codes (d.).
8. Use ⊞ or ⊟ to set the required value .
   ◁ ✓ appears in the display.
9. Confirm by pressing ⊡.
10. Use ⊞ or ⊟ to set the required value .
    ◁ ✓ appears in the display if the value can be set.
    ◁ "no" appears in the display if the value cannot be set.
11. Confirm by pressing ⊡.
12. Press ⊡ to cancel a setting or exit the installer level.

6.4 Using diagnostics codes

You can use the parameters marked as adjustable in the table of diagnostics codes to adapt the product to the system and customer requirements.

Overview of diagnostics codes (→ Page 33)

6.4.1 Setting a diagnostics code

1. Call up the installer level. (→ Page 16)
   ◁ d.-- is shown in the display.
2. Press the ⊟ or ⊞ button to select the diagnostics code.
3. Press ⊡ to confirm.
4. Press the ⊟ or ⊞ button to set the value of the diagnostic code.
5. Press ⊡ to confirm.
6. Press ⊡ to return to the sequence.
   ◁ The diagnostics codes are shown in the display once again.
7. Proceed accordingly for all parameters that need to be changed.
8. Press the ⊡ button 2 times to exit the diagnostics code configuration.
   ◁ The display switches to the basic display.

6.5 Displaying the status codes

The status codes display the product's current operating status.

Status codes – Overview (→ Page 37)

6.5.1 Live Monitor (status codes)

1. Press ⊡ and ⊡ ("i") at the same time.
   ◁ The S.xx message appears in the display, followed by information about the installation (→ Activating access for the competent person).
2. Press ⊡.
   ◁ The display switches to the basic display.

6.6 Using check programmes

By activating various check programmes, you can trigger various special functions on the product.

6.6.1 Calling up the check programmes

1. Call up the installer level. (→ Page 16)
   ◁ d.-- is shown in the display.
2. Press ⊡.
   ◁ P.-- is shown in the display.
3. Press the ⊟ or ⊞ button to select the check programme.
4. Press ⊡ to confirm.
   ◁ The check programme starts.
5. Press ⊡.
   ◁ The heating water temperature and the filling pressure for the heating installation are shown alternately in the display.
6. Press ⊡ to return to the check programme.
   ◁ The display shows the check programme.
7. Press ⊡ to exit the check programme.
   ◁ OFF is shown in the display.
   ◁ The display changes to show the check programmes.
8. Press the ⊡ button 2 times to exit the check programme.
   ◁ The End message appears in the display.
   ◁ The display switches to the basic display.

7 Start-up

7.1 Gas type check

Make sure that the product is set up correctly by checking the type of gas. This ensures optimum combustion quality.

► Check the type of gas as part of routine product maintenance work when replacing components, carrying out work on the gas route and carrying out a gas conversion.

7.2 Checking the factory setting

The product combustion is checked on-site and pre-set to the type of gas specified on the identification plate.

► Check the information about the type of gas indicated on the identification plate and compare this with the type of gas available at the installation location.

Conditions: The product design is not compatible with the local type of gas

You will require the conversion kit for the gas conversion; this kit also contains the required conversion instructions.

► Follow the instructions in the manual for the conversion kit to carry out the gas conversion on the product.

Conditions: The product design is compatible with the local type of gas

► Proceed in accordance with the description in these instructions.

7.3 Checking and treating the heating water/filling and supplementary water

Caution.

Risk of material damage due to poor-quality heating water

► Ensure that the heating water is of sufficient quality.

► Before filling or topping up the installation, check the quality of the heating water.

Checking the quality of the heating water

► Remove a little water from the heating circuit.
► Check the appearance of the heating water.
► If you ascertain that it contains sedimentary materials, you must desludge the installation.
► Use a magnetic rod to check whether it contains magnetite (iron oxide).
► If you ascertain that it contains magnetite, clean the installation and apply suitable corrosion-protection measures, or fit a magnetic filter.
► Check the pH value of the removed water at 25 °C.
► If the value is below 8.2 or above 10.0, clean the installation and treat the heating water.
► Ensure that oxygen cannot get into the heating water.

Checking the filling and supplementary water

► Before filling the installation, measure the hardness of the filling and supplementary water.

Treating the filling and supplementary water

► Observe all applicable national regulations and technical standards when treating the filling and supplementary water.

► In particular, observe VDI directive 2035, sheets 1 and 2.

Provided the national regulations and technical standards do not stipulate more stringent requirements, the following applies:

You must treat the heating water in the following cases:

– If the entire filling and supplementary water quantity during the operating life of the system exceeds three times the nominal volume of the heating installation, or
– If the guideline values listed in the following table are not met, or
– If the pH value of the heating water is less than 8.2 or more than 10.0.

Total heating output	Water hardness at specific system volume[1]					
	≤ 20 l/kW		> 20 l/kW ≤ 50 l/kW		> 50 l/kW	
kW	°dH	mol/m³	°dH	mol/m³	°dH	mol/m³
< 50	< 16.8	< 3	11.2	2	0.11	0.02
> 50 to ≤ 200	11.2	2	8.4	1.5	0.11	0.02
> 200 to ≤ 600	8.4	1.5	0.11	0.02	0.11	0.02
> 600	0.11	0.02	0.11	0.02	0.11	0.02

1) Nominal capacity in litres/heating output; in the case of multi-boiler systems, the smallest single heating output is to be used.

Caution.

Risk of material damage if the heating water is treated with unsuitable additives.

Unsuitable additives may cause changes in the components, noises in heating mode and possibly subsequent damage.

► Do not use any unsuitable frost and corrosion protection agents, biocides or sealants.

No incompatibility with our products has been detected to date with proper use of the following additives.

► When using additives, follow the manufacturer's instructions without exception.

We accept no liability for the compatibility of any additive or its effectiveness in the rest of the heating system.

Additives for cleaning measures (subsequent flushing required)

– Adey MC3+
– Adey MC5
– Fernox F3
– Sentinel X 300
– Sentinel X 400

Additives intended to remain permanently in the installation

– Adey MC1+
– Fernox F1
– Fernox F2
– Sentinel X 100
– Sentinel X 200

Additives for frost protection intended to remain permanently in the installation

– Adey MC ZERO
– Fernox Antifreeze Alphi 11
– Sentinel X 500

► If you have used the above-mentioned additives, inform the end user about the measures that are required.
► Inform the end user about the measures required for frost protection.

7.4 Preventing low water pressure

The required filling pressure is between 0.08 and 0.2 MPa (0.8 and 2 bar).

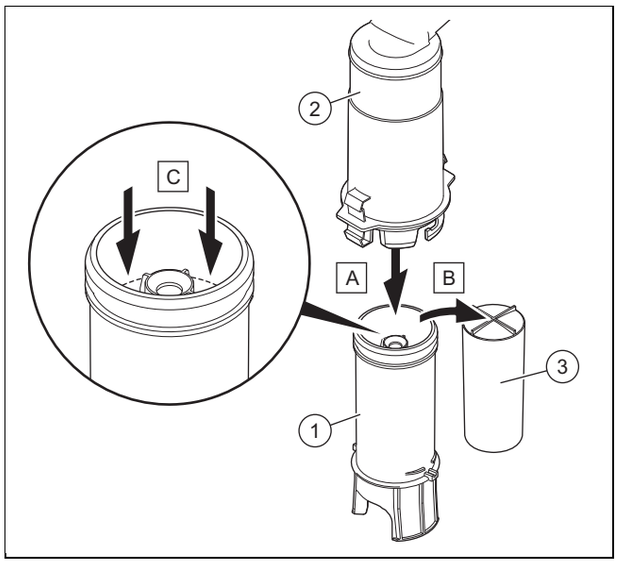
If the water pressure falls below 0.05 MPa (0.5 bar), the value flashes in the display.

If the water pressure falls below 0.03 MPa (0.3 bar), the product switches off. The display shows 0.0 bar (0.0 MPa). Fault F22 is stored in the fault list.

► Top up the water in the heating installation to start up the product again.

◁ The pressure value flashes in the display until a pressure of 0.05 MPa (0.5 bar) or higher has been reached.

7.5 Filling the condensate siphon



1. Unclip the lower section of the siphon **(1)** from the upper section of the siphon **(2)** without removing the product's front casing.
2. Remove the float **(3)**.
3. Fill the lower section of the siphon with water up to 10 mm below the upper edge of the condensate discharge pipe.
4. Reinsert the float **(3)**.

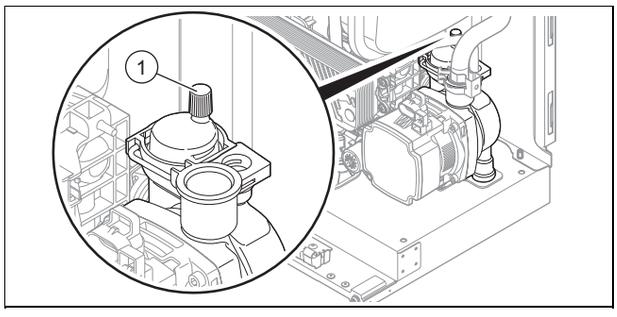
Note
Check that the float is present in the condensate siphon.

5. Clip the lower section of the siphon **(1)** into the upper section of the siphon **(2)**.

7.6 Filling and purging the heating installation

Preliminary work

1. Flush the heating installation through.
2. Observe the information on the topic of treating (→ Page 18) heating water.



1. Loosen the cap on the automatic air vent **(1)** by one or two rotations.
2. Open all thermostatic radiator valves.
3. Supply the heating circuit with water.
4. Check whether the stop cocks for the heating flow and return are open.
5. Start filling programme P.06.

◁ The diverter valve is moved to the mid-position.

6. Fill with water until the required filling pressure is reached.

– Recommended filling pressure: 0.8 … 2 bar

◁ The heating and hot water function cannot be activated.

◁ The pressure value flashes in the display until a pressure of 0.05 MPa (0.5 bar) or higher has been reached.

◁ An automatic air vent function is activated if the pressure exceeds 0.07 MPa (0.7 bar) for longer than 15 seconds.

7. Purge each radiator until the water escapes normally, and then close the system's purging valves.

Note
Leave the cap on the pump's air vent valve unscrewed.

8. Check whether all connections are leak-tight.

Conditions: If the noise persists in the boiler

► Purge the product again by activating check programme P.00.

7.7 Filling the hot water circuit

1. Open the taps to fill the hot water circuit.
2. Close the taps once the required volume of water has flowed into the circuit.
   ◁ The hot water circuit is filled.
3. Check all connections and the entire system for leak-tightness.

7.8 Switching the product on and off

► Press the on/off button on the product.
◁ The basic display appears on the display.

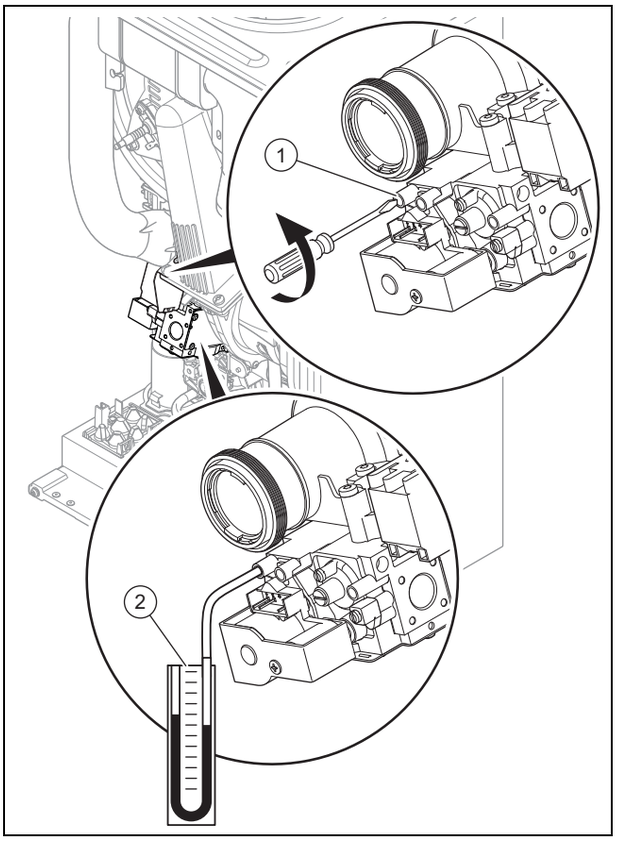
7.9 Checking the gas settings

Only a qualified competent person is authorised to implement the CO2 setting on the gas valve assembly.

Never modify the factory setting of the gas pressure regulator of the gas valve.

7.9.1 Checking the gas connection pressure (gas flow pressure)

1. Close the gas isolator cock.



2. Use a screwdriver to undo the sealing screw on the measuring nipple **(1)** of the gas valve.
3. Connect a pressure gauge **(2)** to the measuring connection **(1)**.
4. Open the gas isolator cock.
5. Start up the product with check programme P.01 and set the value.
   – Setting value for the programme P.01: 100
6. Measure the gas connection pressure against atmospheric pressure.

Permissible connection pressure

Germany	**Natural gas**	**G20**	1.7 … 2.5 kPa (17.0 … 25.0 mbar)
		G25	1.7 … 3.0 kPa (17.0 … 30.0 mbar)
	Liquid gas	**G31**	2.5 … 4.5 kPa (25.0 … 45.0 mbar)

Note
The connection pressure is measured at the gas valve, meaning that the permissible minimum value may be 0.1 kPa (1 mbar) lower than the minimum value specified in the table.

7. Decommission the product.
8. Close the gas isolator cock.
9. Remove the pressure gauge.
10. Turn the screw on the measuring connection **(1)** as far as it will go.
11. Open the gas isolator cock.
12. Check the measuring nipple for gas tightness.

Conditions: Gas connection pressure not in the permissible range

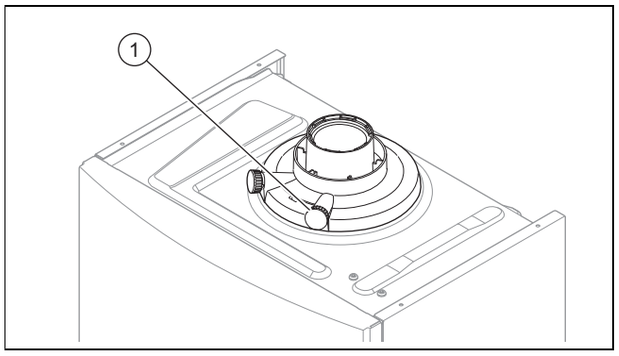
Caution.
Risk of material damage and operating faults caused by incorrect gas connection pressure.
If the gas connection pressure lies outside the permissible range, this can cause malfunctions and damage to the product.
► Do not make any adjustments to the product.
► Do not start up the product.

► If you are unable to remedy the fault, contact the gas supply company.
► Close the gas isolator cock.

7.9.2 Checking the CO_2 content

1. Start up the product with the check programme and set the value.
   – Setting value for the programme P.01: 100
2. Wait until the value that is read is stable.

– Waiting period for reading a stable value: 5 min



3. Unscrew the cover from the flue gas analysis point **(1)**.
4. Measure the CO_2 content at the flue gas analysis point.
5. Compare the measured value with the corresponding value in the table.

Checking the CO_2 content

Germany		
Fitted front casing		
Natural gas		Liquid gas
G20	G25	G31
9.4 ±1 %	9.0 ±1 %	10.4 ±0.5 %

◁ The value is OK.

▽ The value is not OK; you cannot start up the product.

► Contact customer service.

7.9.3 Performing gas conversion:

Note

You will need a conversion kit, which is available separately.

The conversion procedure is described in the manual supplied with the conversion kit.

► Follow the instructions in the manual for the conversion kit to carry out the gas conversion on the product.

7.10 Checking leak-tightness

► Check the gas pipe, the heating circuit and the domestic hot water circuit for leak-tightness.

► Check that the air/flue pipe has been installed correctly.

Conditions: Room-sealed operation

► Check whether the vacuum chamber has been closed tightly.

7.10.1 Checking the hot water generation

1. Activate the hot water handling mode on the user interface.
2. Open a hot water valve completely.
3. Call up the status codes. (→ Page 17)

   Status codes – Overview (→ Page 37)

   ◁ If the product is working correctly, the display shows S.14.

7.10.2 Checking the heating mode

1. Activate the heating mode on the user interface.
2. Turn all thermostatic radiator valves on the radiators until they are fully open.
3. Allow the product to operate for at least 15 minutes.
4. Fill and purge the heating installation. (→ Page 19)
5. Call up the status codes. (→ Page 17)

   Status codes – Overview (→ Page 37)

   ◁ If the product is working correctly, the display shows S.04.

8 Adapting the unit to the installation

8.1 Activating diagnostics codes

You can find the setting options in the diagnostics codes in the installer level.

Overview of diagnostics codes (→ Page 33)

► Set a diagnostics code. (→ Page 17)

8.2 Burner anti-cycling time

To prevent frequent switching on and off of the burner and thus prevent energy losses, an electronic restart lockout is activated for a specific period each time the burner is switched off. The burner anti-cycling time is only active for the heating mode. Switching on domestic hot water mode during the burner anti-cycling time has no effect.

8.2.1 Setting the maximum burner anti-cycling time

1. Set a diagnostics code. (→ Page 17)

T_{Flow} (target) [°C]	Set maximum burner anti-cycling time [min]						
	1	5	10	15	20	25	30
30	2.0	4.0	8.5	12.5	16.5	20.5	25.0
35	2.0	4.0	7.5	11.0	15.0	18.5	22.0
40	2.0	3.5	6.5	10.0	13.0	16.5	19.5
45	2.0	3.0	6.0	8.5	11.5	14.0	17.0
50	2.0	3.0	5.0	7.5	9.5	12.0	14.0
55	2.0	2.5	4.5	6.0	8.0	10.0	11.5
60	2.0	2.0	3.5	5.0	6.0	7.5	9.0
65	2.0	1.5	2.5	3.5	4.5	5.5	6.5
70	2.0	1.5	2.0	2.5	2.5	3.0	3.5
75	2.0	1.0	1.0	1.0	1.0	1.0	1.0

T_{Flow} (target) [°C]	Set maximum burner anti-cycling time [min]					
	35	40	45	50	55	60
30	29.0	33.0	37.0	41.0	45.0	49.5
35	25.5	29.5	33.0	36.5	40.5	44.0
40	22.5	26.0	29.0	32.0	35.5	38.5

T_{Flow} (target) [°C]	Set maximum burner anti-cycling time [min]					
	35	40	45	50	55	60
45	19.5	22.5	25.0	27.5	30.5	33.0
50	16.5	18.5	21.0	23.5	25.5	28.0
55	13.5	15.0	17.0	19.0	20.5	22.5
60	10.5	11.5	13.0	14.5	15.5	17.0
65	7.0	8.0	9.0	10.0	11.0	11.5
70	4.0	4.5	5.0	5.5	6.0	6.5
75	1.0	1.0	1.0	1.0	1.0	1.0

2. If required, adjust the maximum burner anti-cycling time using diagnostics code d.02.
   Overview of diagnostics codes (→ Page 33)

8.2.2 Resetting the remaining burner anti-cycling time

► Press and hold the ⏻ button for more than three seconds.

◁ All symbols are shown in the display.

8.3 Setting the maximum heating output

The product's maximum heating output is set to automatic mode at the factory. If you want to set your own fixed maximum heating output, however, you can specify a value under d.00 which equates to the product output in kW.

8.4 Setting the maintenance interval

If you set the maintenance interval, after a configurable number of burner operating hours, the message that the product must be serviced appears in the display, together with the maintenance symbol 🔧.

► Use diagnostics code d.84 to set the number of operating hours until the next maintenance is due (number of operating hours = display value x 10). Guideline values can be found in the following table.

Heat demand	Number of persons	Guideline value for burner operating hours until the next inspection/maintenance work is due for an average operating time of one year (dependent upon the system type)
5.0 kW	1 - 2	1050 h
	2 - 3	1150 h
10.0 kW	1 - 2	1500 h
	2 - 3	1600 h
15.0 kW	2 - 3	1800 h
	3 - 4	1900 h
20.0 kW	3 - 4	2600 h
	4 - 5	2700 h
25.0 kW	3 - 4	2800 h
	4 - 6	2900 h
> 27.0 kW	3 - 4	3000 h
	4 - 6	3000 h

The values stated correspond to an average operating time of one year.

If you do not set a numerical value but do set the symbol "– – –", the function is not active.

Note
On completion of the set operating hours, you must set the maintenance interval again.

8.5 Setting the bypass

Conditions: D.14 is set to 0 = auto

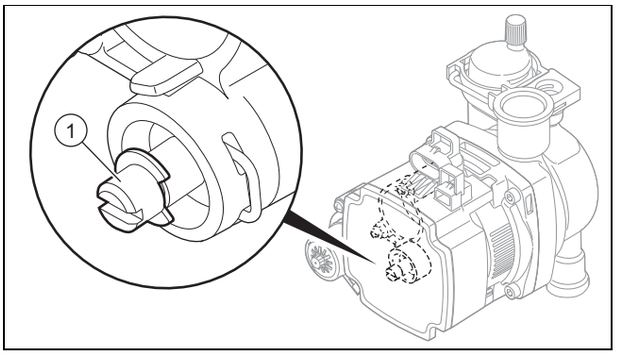
Caution.
Risk of material damage caused by incorrect setting of the high-efficiency pump
When the pressure at the bypass is increased (turning clockwise), malfunctions may occur if the pump output is set below 95%.

► In this case, set the pump output to 5 = 95 to 100% using diagnostics parameter D.14.

► Do not change the factory settings.

Conditions: D.14 is set to 1–5

► Remove the front casing. (→ Page 10)



► Regulate the pressure using the adjusting screw **(1)**.

Position of the adjusting screw	Pressure in MPa (mbar)	Notes/application
Right-hand stop (turned all the way down)	0.035 (350)	If the radiators do not heat up sufficiently at the default setting. In this case, you must set the pump to the maximum speed.
Mid-position (six anti-clockwise rotations)	0.025 (250)	Default setting
Five further anti-clockwise rotations starting from the mid-position	0.017 (170)	If noises are produced in the radiators or radiator valves

► Fit the front panel.

8.6 Setting solar drinking water post-heating

1. Navigate to parameter d.058 in the installer level and set the value to 3 to perform legionella treatment.
2. Ensure that the temperature at the product's cold water connection does not exceed 70 °C.

8.7 Setting the hot water temperature

Danger!
Risk of death from legionella.

Legionella multiply at temperatures below 60 °C.

► Ensure that the end user is familiar with all of the Anti-legionella measures in order to comply with the applicable regulations regarding legionella prevention.

► Set the hot water temperature.

Conditions: Water hardness: > 3.57 mol/m³

– Hot water temperature: ≤ 50 °C

8.8 Handing the product over to the operator

► When you have finished the installation, affix the enclosed sticker (which requests that the user reads the instructions) to the front of the product in the operator's language.
► Explain to the operator how the safety devices work and where they are located.
► Inform the operator how to handle the product.
► In particular, draw attention to the safety information which the operator must follow.
► Inform the operator of the necessity to have the product maintained according to the specified intervals.
► Pass all of the instructions and documentation for the product to the operator for safe-keeping.
► Instruct the operator about measures taken to ensure the supply of combustion air and flue gas pipe. Point out, in particular, that the operator must not make any changes, however minor.
► Inform the operator that they must not store or use explosive or highly flammable substances (such as petrol, paper or paint) in the installation room of the product.

9 Troubleshooting

9.1 Checking service messages

🔧 appears, for example, if you have set a maintenance interval and this has passed or if a service message has been issued. The product is not in fault mode.

► Call up the Live Monitor. (→ Page 17)

Conditions: S.46 is displayed.

The product is in Comfort protection mode. The product continues to run with restricted comfort after it has detected a fault.

► To establish whether or not a component is defective, read the fault memory. (→ Page 23)

Note
If no fault message is present, the product will automatically switch back to normal operating mode after a certain time.

9.2 Rectifying faults

► If fault codes (F.XX) are present, refer to the table in the appendix for advice or use the check programme(s).
Overview of fault codes (→ Page 38)

If several faults occur at the same time, the fault codes are shown alternately on the display.

Resetting the product:

► Press and hold the ⏻ button for more than three seconds.
◁ The product restarts.

► If you are unable to clear the fault code and it reappears despite several fault clearance attempts, contact customer service.

9.3 Calling up the fault memory

The last ten fault codes are stored in the fault memory.

► Call up the installer level. (→ Page 16)
◁ d.-- is shown in the display.

► Press the ⊟ button 2 times.
◁ F.XX is shown in the display.

► Press the ⊖ and ⊕ buttons to call up the fault codes.
Overview of fault codes (→ Page 38)
◁ The fault code and the time of occurrence are shown alternately on the display.

► Press ⊟.
◁ The display switches to the basic display.

9.4 Deleting the fault memory

1. Clear the fault memory using diagnostics code d.94.
2. Set a diagnostics code. (→ Page 17)
Overview of diagnostics codes (→ Page 33)

9.5 Resetting parameters to factory settings

1. Reset all parameters to the factory settings using diagnostics code d.96.
2. Set a diagnostics code. (→ Page 17)
Overview of diagnostics codes (→ Page 33)

9.6 Preparing the repair work

1. Decommission the product.
2. Disconnect the product from the power mains.
3. Remove the front casing. (→ Page 10)
4. Close the gas isolator cock.
5. Close the service valves in the heating flow and in the heating return.
6. Close the service valve in the cold water pipe.
7. Drain the product to replace hydraulic components (→ Page 29).
8. Ensure that water does not drip on live components (e.g. the electronics box).
9. Use only new seals.

9.6.1 Procuring spare parts

The original components of the product were also certified by the manufacturer as part of the declaration of conformity. If you use other, non-certified or unauthorised parts during maintenance or repair work, this may void the conformity of the product and it will therefore no longer comply with the applicable standards.

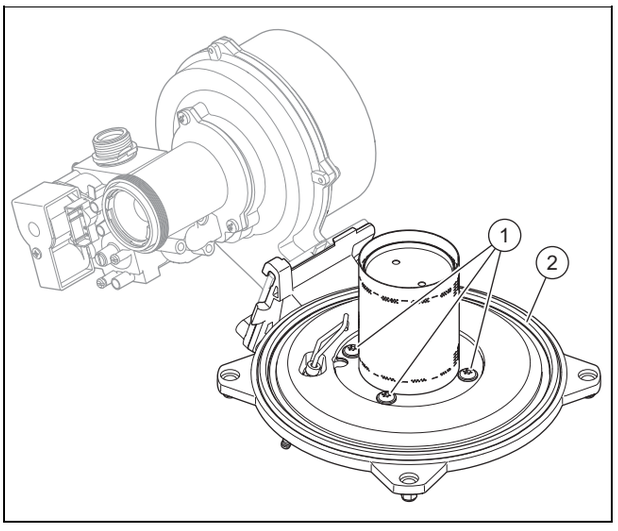
We strongly recommend that you use original spare parts from the manufacturer as this guarantees fault-free and safe operation of the product. To receive information about the available original spare parts, contact the contact address provided on the reverse of these instructions.

► If you require spare parts for maintenance or repair work, use only the spare parts that are permitted for the product.

9.7 Replacing defective components

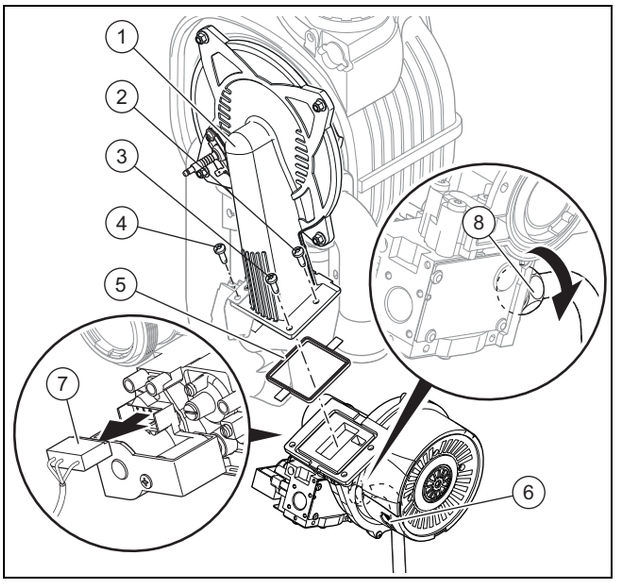
9.7.1 Replacing the burner

1. Remove the compact thermal module. (→ Page 29)

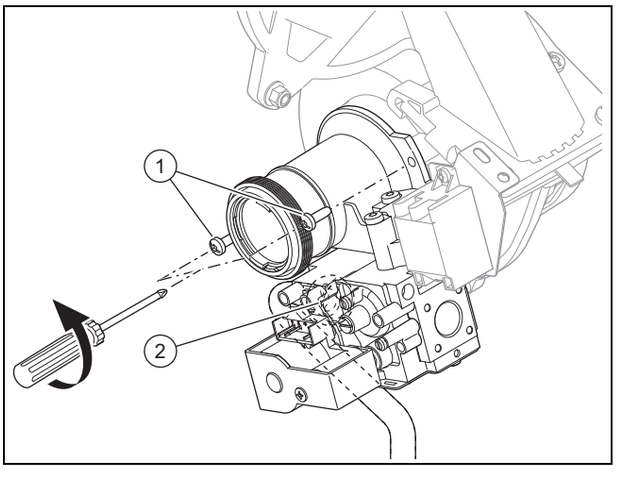


2. Undo the four screws **(1)** on the burner.
3. Remove the burner.
4. Install a new seal **(2)** on the new burner.
5. Install the compact thermal module. (→ Page 31)

9.7.2 Replacing the fan or gas valve



1. Remove the air intake pipe.
2. Remove the plug from the gas valve **(7)**.
3. Remove the plug from the fan motor **(6)** by pushing in the latching lug.
4. Unscrew the connection from the gas valve **(8)**.
5. Unscrew the three screws **(2)**-**(4)** between the mixture pipe **(1)** and the fan flange.

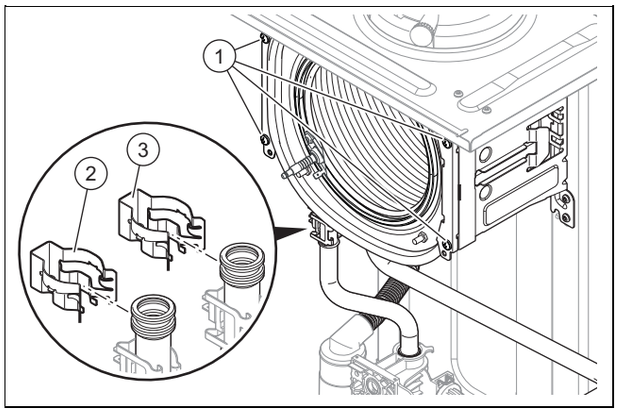


6. Remove the entire fan/gas valve unit from the product.
7. Unscrew both fixing screws **(1)** on the gas valve and remove the fan from the gas valve.
8. Replace the defective fan or the defective gas valve.
9. Install the gas valve and the fan in the same position as before. Use new seals for this.
10. Screw the fan to the gas valve.
11. If you had removed the gas pipe, screw the cap nut of the gas pipe **(2)** only loosely to the gas valve. Only tighten the cap nut on the gas valve after the installation work has been completed.
12. Refit the entire fan/gas valve unit in reverse order. You must use a new seal **(5)** for this.
13. Ensure that the order in which the three screws are screwed in between the fan and the mixture pipe corresponds to the numbering **(3)**, **(2)** and **(4)**.

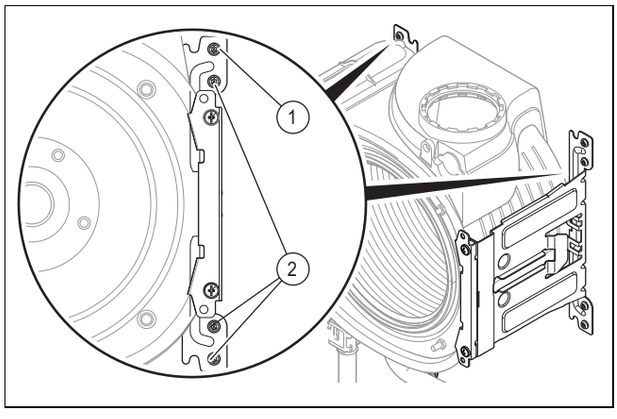
14. Tighten the cap nut **(2)** on the gas valve and the cap nut **(8)** between the gas pipes. In the process, secure the gas pipe against twisting. Use new seals for this.
15. After you have completed this work, carry out a leak-tightness test (function check). (→ Page 21)
16. If you have installed a new gas valve, adjust the gas ratio setting. (→ Page 17)

9.7.3 Replacing the heat exchanger

1. Drain the product. (→ Page 29)
2. Remove the compact thermal module. (→ Page 29)
3. Detach the condensate drain hose from the heat exchanger.



4. Remove the clamps **(2)** and **(3)** from the area of the flow and return connection.
5. Disconnect the flow connection.
6. Disconnect the return connection.
7. Remove both screws **(1)** from both brackets.

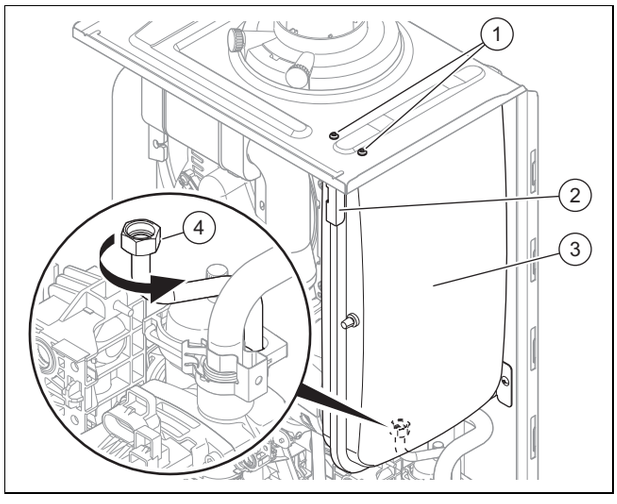


8. Remove the lower three screws **(2)** on the rear section of the retainer.
9. Move the bracket round to the opposite side and attach the upper screw **(1)** to the side.
10. Pull the heat exchanger downwards and to the right, and remove it from the product.
11. Install the new heat exchanger in reverse order.
12. Replace the seals.

Note
Instead of grease, use only water or commercially available soft soap to aid installation.

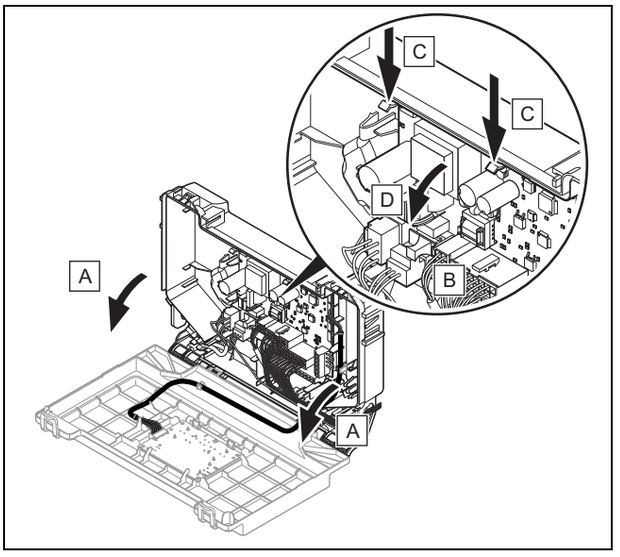
13. Insert the flow and return connections into the heat exchanger as far as they will go.
14. Ensure that the clamps are correctly fitted to the flow and return connections.
15. Install the compact thermal module. (→ Page 31)
16. Fill and purge the unit and, if required, the heating system. (→ Page 19)

9.7.4 Replacing the expansion vessel



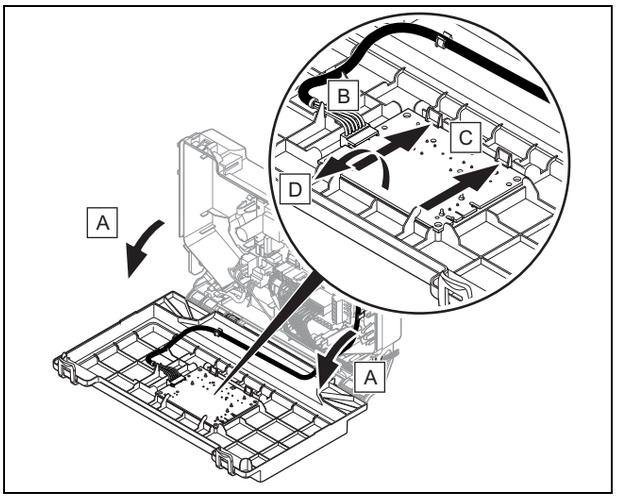
1. Prepare the repair work. (→ Page 24)
2. Undo the screwed connection **(4)**.
3. Remove both screws **(1)** on the support plate **(2)**.
4. Remove the support plate **(2)**.
5. Pull out the expansion vessel **(3)** towards the front.
6. Insert the new expansion vessel into the product.
7. Screw the new expansion vessel to the water connection. Use a new seal for this.
8. Attach the support plate using both screws **(1)**.
9. Fill and purge the product and, if required, the heating installation (→ Page 19).
10. If necessary, adjust the pressure to the static height of the heating installation.
11. Complete the repair work. (→ Page 27)

9.7.5 Replacing the main PCB



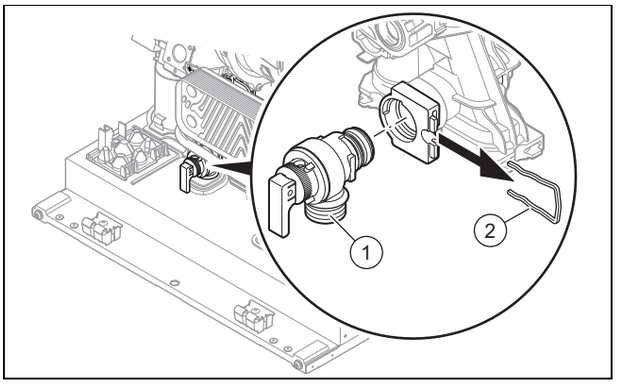
1. Prepare the repair work. (→ Page 24)
2. Open the electronics box. (→ Page 14)
3. Pull all of the plugs out from the PCB.
4. Undo the clips on the PCB.
5. Remove the PCB.
6. Install the new PCB in such a way that it clicks into the groove at the bottom and into the clip at the top.
7. Plug in the PCB plugs.
8. Close the electronics box.
9. Complete the repair work. (→ Page 27)

9.7.6 Replacing the PCB for the user interface



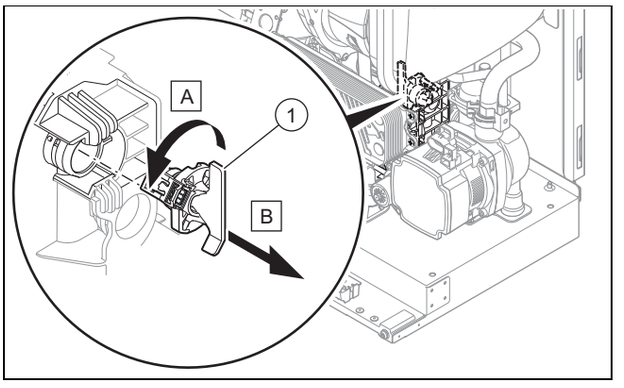
1. Prepare the repair work. (→ Page 24)
2. Open the electronics box. (→ Page 14)
3. Pull the plug out of the PCB.
4. Undo the clips on the PCB.
5. Remove the PCB.
6. Install the new PCB in such a way that it clicks into the groove at the bottom and into the clip at the top.
7. Plug in the PCB plug.
8. Close the electronics box.
9. Complete the repair work. (→ Page 27)

9.7.7 Replacing the expansion relief valve



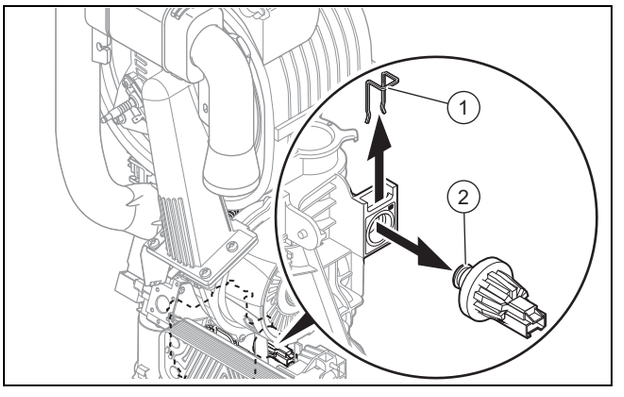
1. Remove the clip **(2)**.
2. Remove the expansion relief valve.
3. Fit the new expansion relief valve with a new O-ring.
4. Reattach the clip **(2)**.

9.7.8 Replacing the flow sensor



1. Pull out the plug.
2. Remove the flow sensor **(1)**.
3. Install the new flow sensor.
4. Plug in the plug.

9.7.9 Replace the pressure sensor



1. Pull out the plug.
2. Remove the clip **(1)**.
3. Remove the pressure sensor **(2)**.
4. Install the new pressure sensor.
5. Reattach the clip **(1)**.

9.7.10 Replacing the power supply cable

Note
The cable must be replaced by the manufacturer, its customer service or suitably qualified persons in order to avoid danger.

► If the power supply cable is damaged, replace it in accordance with the recommendations for the power supply connection (→ Page 15).
  – Section of the mains power cable: 3 G 0,75mm²

9.8 Completing repair work

1. Establish the power supply.
2. Switch the product back on if this has not yet been done. (→ Page 20)
3. Install the front casing.
4. Open all service valves and the gas isolator cock.

10 Inspection and maintenance

10.1 Observing inspection and maintenance intervals

Danger!
Risk of poisoning due to escaping flue gases in overpressurised, multi-occupancy air/flue gas installations.

► Only perform maintenance and repair work after you have shut down all of the heat generators connected to the air/flue gas installation.
► Use suitable means to seal the air/flue gas connection for the air/flue gas installation during maintenance and repair work.

► Adhere to the minimum inspection and maintenance intervals. The inspection may require maintenance to be carried out earlier, depending on the results.
  Inspection and maintenance work – Overview (→ Page 42)

10.2 Checking and adjusting the gas ratio setting

Only a qualified competent person is authorised to implement the CO2 setting on the gas valve assembly.

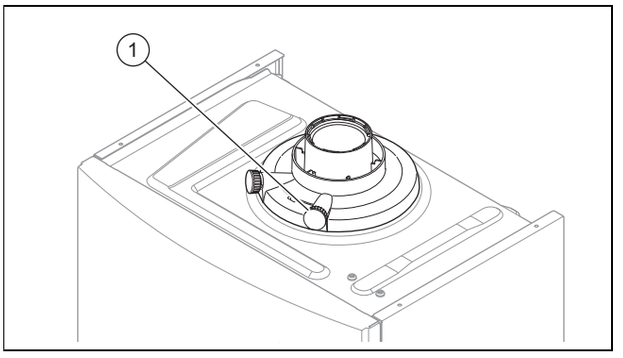
Each destroyed seal must be restored.

The CO2 adjusting screw must be sealed.

Never modify the factory setting of the gas pressure regulator of the gas valve.

10.3 Checking the CO_2 content

1. Start up the product with the check programme **(P.01)** and set the value.
  – Setting value for the programme P.01: 100
2. Wait until the value that is read is stable.
  – Waiting period for reading a stable value: 5 min



3. Unscrew the cover from the flue gas analysis point **(1)**.
4. Measure the CO_2 content at the flue gas analysis point.
5. Compare the measured value with the corresponding value in the table.

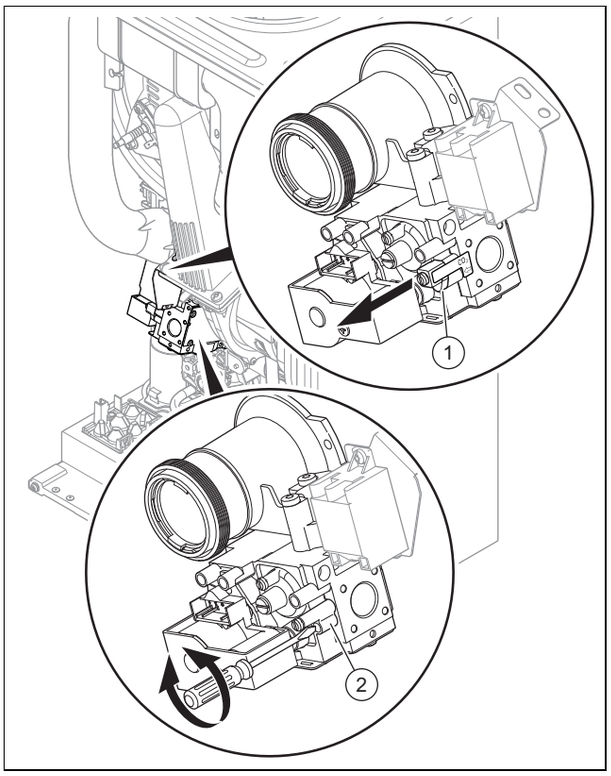
Checking the CO_2 content

Germany		
Fitted front casing		
Natural gas		Liquid gas
G20	G25	G31
9.4 ±1 %	9.0 ±1 %	10.4 ±0.5 %

◁ The value is OK.
▽ The value is not OK; you cannot start up the product.
  ► Set the CO_2 content. (→ Page 28)

10.4 Setting the CO_2 content

Conditions: The CO_2 content must be adjusted



- ► Remove the sticker.
- ► Remove the covering cap **(1)**.
- ► Turn the screw **(2)** to set the CO_2 content (value with front casing removed).
  - ◁ To increase the CO_2 content: Turn anti-clockwise
  - ◁ To decrease the CO_2 content: Turn clockwise

Note

For natural gas only: Only perform the adjustment in small increments of a 1/8 turn and wait approx. one minute after each adjustment until the value stabilises.

For liquid gas only: Only perform the adjustment in extremely small increments (approx. 1/16 turn), and wait approx. one minute after each adjustment until the value stabilises.

- ► Compare the measured value with the corresponding value in the table.

G20 – Setting the CO_2 value

	Germany	
	Natural gas	
	Removed front casing	Fitted front casing
	G20	G20
CO_2 at full load	9.2 ±0.3 %	9.4 ±0.3 %
Set for Wobbe index W_o	14.09 kW·h/m³	14.09 kW·h/m³
O_2 at full load	4.5 ±0.5 vol. %	4.2 ±0.5 vol. %
CO at full load	≤ 250 ppm	≤ 250 ppm
CO/CO_2	≤ 0.0027	≤ 0.0027

G25 – Setting the O_2 value

	Germany	
	Natural gas	
	Removed front casing	Fitted front casing
	G25	G25
CO_2 at full load	8.8 ±0.3 %	9.0 ±0.3 %
Set for Wobbe index W_o	11.54 kW·h/m³	11.54 kW·h/m³
O_2 at full load	4.9 ±0.5 vol. %	4.6 ±0.5 vol. %
CO at full load	≤ 250 ppm	≤ 250 ppm
CO/CO_2	≤ 0.0028	≤ 0.0028

G31 – Setting the CO_2 value

	Germany	
	Liquid gas	
	Removed front casing	Fitted front casing
	G31	G31
CO_2 at full load	10.2 ±0.3 %	10.4 ±0.3 %
Set for Wobbe index W_o	21.34 kW·h/m³	21.34 kW·h/m³
O_2 at full load	5.4 ±0.4 vol. %	5.1 ±0.4 vol. %
CO at full load	≤ 250 ppm	≤ 250 ppm
CO/CO_2	≤ 0.0024	≤ 0.0024

- ▽ If the setting is not in the specified adjustment range, you must not start up the product.
  - ► Contact customer service.
- ► Check whether the air-quality requirements with regard to carbon monoxide are fulfilled.
- ► Refit the covering cap.
- ► Fit the front panel.

10.5 Preparing the maintenance work

1. Decommission the product.
2. Disconnect the product from the power mains.
3. Remove the front casing. (→ Page 10)
4. Close the gas isolator cock.
5. Close the service valves in the heating flow and in the heating return.
6. Close the service valve in the cold water pipe.
7. Drain the product to clean hydraulic components (→ Page 29).
8. Ensure that water does not drip on live components (e.g. the electronics box).
9. Use only new seals.

10.6 Draining the product

1. Close the service valves of the product.
2. Start check programme P.06 (diverter valve mid-position).
3. Open the drain cock.
4. Make sure that the cap of the automatic air vent on the internal pump is open so that the product can be drained fully.

10.7 Removing the compact thermal module

Note

The compact thermal module consists of four main components:

– Speed-regulated fan,

– Gas-air mixture unit,

– Gas supply (mixture pipe) with burner flange,

– Premix burner.

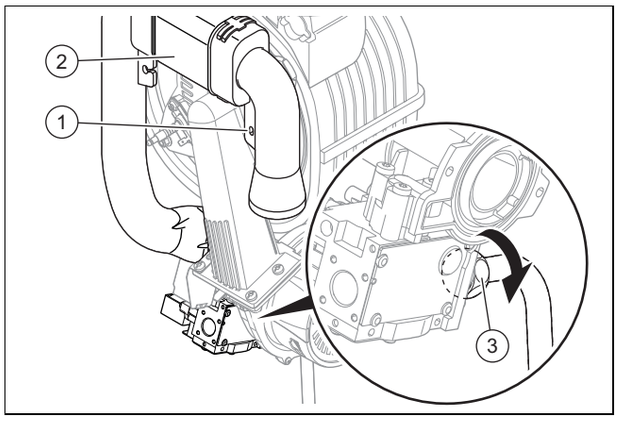
Danger!

Risk of death and risk of material damage caused by hot flue gas.

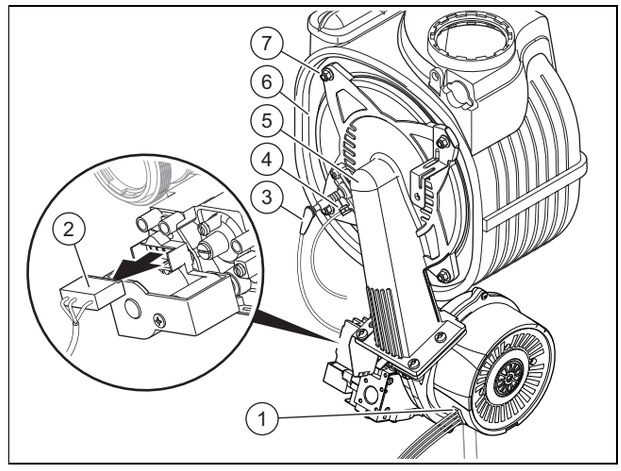
The seal, insulating mat and self-locking nuts on the burner flange must not be damaged. Otherwise, hot flue gases may escape and cause personal injury and material damage.

- ► Replace the seal each time you open the burner flange.
- ► Replace the self-locking nuts on the burner flange each time you open the burner flange.
- ► If the insulating mat on the burner flange or on the back wall of the heat exchanger shows signs of damage, replace the insulating mat.

1. Switch off the product using the on/off button.
2. Close the gas isolator cock.
3. Remove the front casing.
4. Tilt the electronics box forwards.



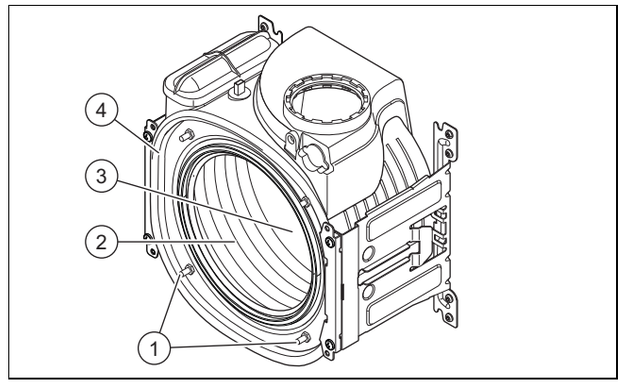
5. Unscrew the retaining screw **(1)** and remove the air intake pipe **(2)** from the intake stub.
6. Unscrew the cap nut from the gas valve **(3)**.



7. Remove the ignition line plug **(3)** and the earth line plug **(4)** from the ignition electrode.
8. Remove the plug **(1)** from the fan motor.
9. Remove the plug **(2)** from the gas valve.
10. Unscrew the four nuts **(7)**.
11. Remove the entire compact thermal module **(5)** from the heat exchanger **(6)**.
12. Check the burner and the heat exchanger for damage and dirt.
13. If necessary, clean or replace the components according to the following sections.
14. Fit a new burner flange seal.
15. Check the insulating mat on the burner flange and on the back wall of the heat exchanger. If you notice any signs of damage, replace the relevant insulating mat.

10.8 Cleaning the heat exchanger

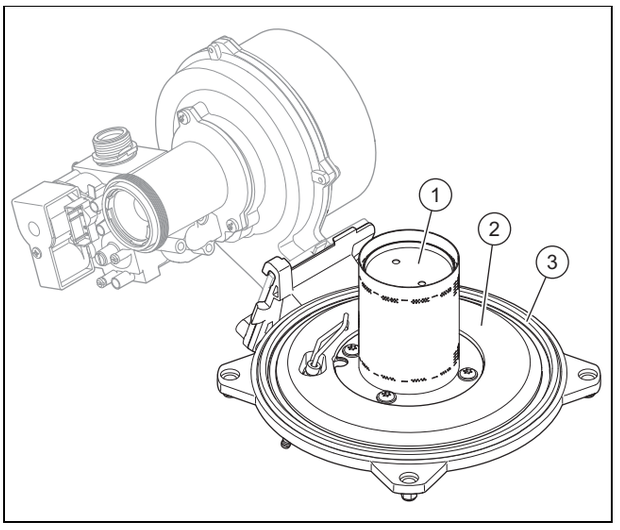
1. Protect the folded down electronics box against spraying water.



2. Do not undo the four nuts on the threaded pins **(1)**, otherwise the tightness of the burner during set-up cannot be guaranteed.
3. Clean the spiral immersion heater **(3)** of the heat exchanger **(4)** using water or, if required, vinegar (up to a maximum acid content of 5%). Allow the vinegar to act on the heat exchanger for 20 minutes.
4. Rinse away any loose dirt with a sharp jet of water or use a plastic brush. Do not point the jet of water directly at the insulating mat **(2)** on the back of the heat exchanger.

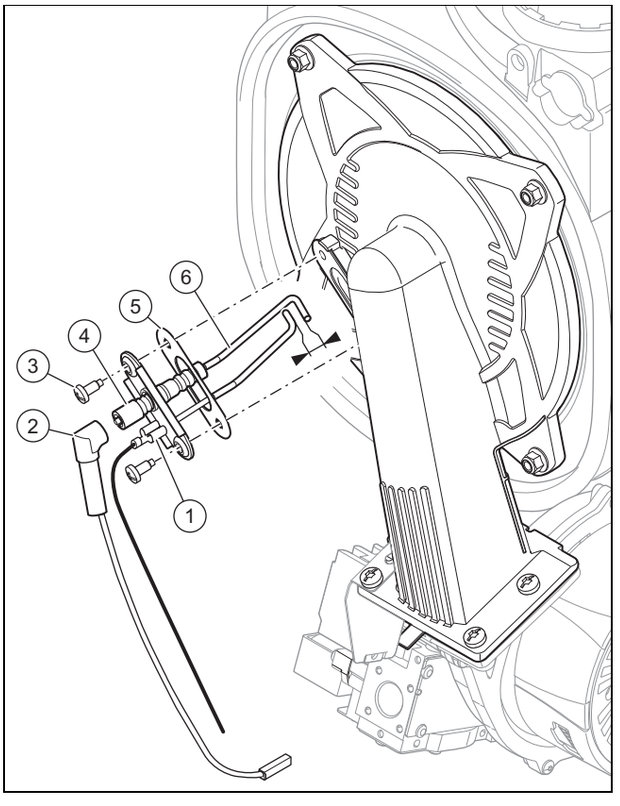
◁ The water flows out of the heat exchanger through the condensate siphon.

10.9 Checking the burner



1. Check the surface of the burner **(1)** for damage. If any damage is found, replace the burner.
2. Fit a new burner flange seal **(3)**.
3. Check the insulating mat **(2)** on the burner flange. If you discover any signs of damage, replace the insulating mat.

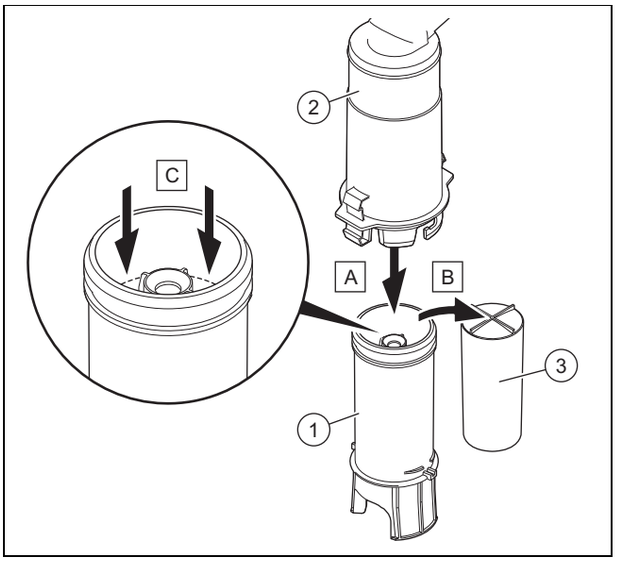
10.10 Checking the ignition electrode



1. Disconnect the connection **(2)** and the earthing cable **(1)**.
2. Remove the fixing screws **(3)**.
3. Carefully remove the electrode **(4)** from the combustion chamber.
4. Ensure that the electrode ends **(6)** are undamaged.
5. Clean and check the gap between the electrodes.
   – Distance between the ignition and flame control electrodes: 3.5 … 4.5 mm
6. Make sure that the seal **(5)** is free from damage.

   ▽ If necessary, replace the seal.

10.11 Cleaning the condensate siphon



1. Unclip the lower section of the siphon **(1)** from the upper section of the siphon **(2)**.
2. Remove the float **(3)**.
3. Flush out the float and lower section of the siphon with water.
4. Fill the lower section of the siphon with water up to 10 mm below the upper edge of the condensate drain pipework.
5. Re-insert the float **(3)**.

Note
Check that the float is present in the condensate siphon.

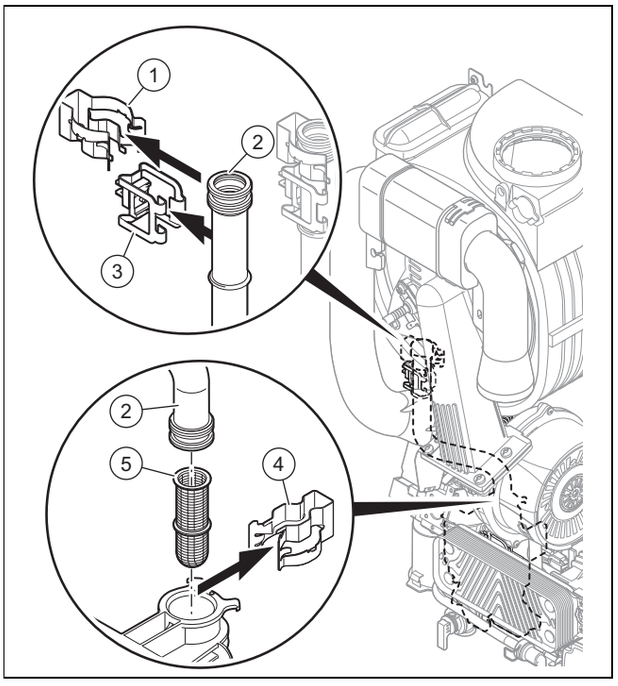
6. Clip the lower section of the siphon **(1)** into the upper section of the siphon **(2)**.

10.12 Cleaning the filter in the cold water inlet

Applicability: Product with integrated hot water generation

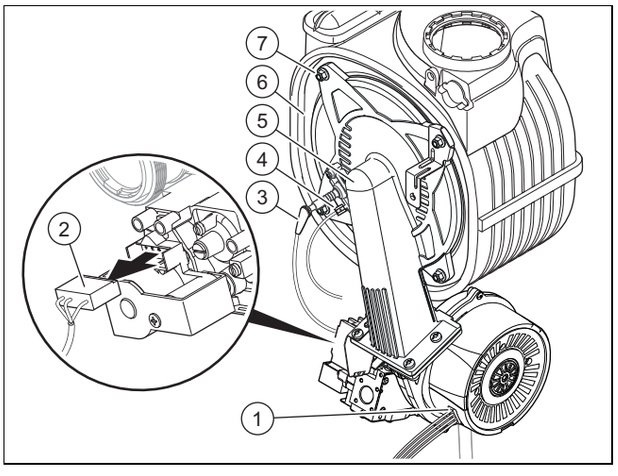
1. Close the main cold water line.
2. Drain the product on the hot water side.
3. Remove the connection piece from the connection for the product's cold water supply.
4. Clean the filter in the cold water inlet without removing it.

10.13 Cleaning the heating filter



1. Drain the product. (→ Page 29)
2. Remove the temperature sensor **(3)**.
3. Remove the upper clip **(1)**.
4. Remove the lower clip **(4)**.
5. Remove the supply pipe **(2)**.
6. Remove the heating filter **(5)** and clean it.
7. When reinstallling the components, carry out the steps described above in reverse.

10.14 Installing the compact thermal module



1. Connect the compact thermal module **(5)** to the heat exchanger **(6)**.
2. Tighten the four nuts **(7)** in a cross-wise pattern until the burner flange fits closely and uniformly onto the mating surfaces.
   – Tightening torque: 6 Nm
3. Reconnect the plugs **(1)** to **(4)**.
4. Connect the gas pipe using a new seal. In the process, secure the gas pipe against twisting.
5. Open the gas isolator cock.
6. Make sure that there are no leaks.
7. Check that the sealing ring in the air intake pipe is positioned correctly in the seal seat.
8. Reconnect the air intake pipe to the intake nozzle.
9. Secure the air intake pipe with the retaining screw.
10. Check the gas flow pressure.

10.15 Checking the product for leak-tightness

► Check that the product is leak-tight. (→ Page 21)

10.16 Checking the admission pressure of the expansion vessel

1. Drain the product. (→ Page 29)
2. Measure the pre-charge pressure of the expansion vessel at the vessel valve.

Conditions: Pre-charge pressure < 0.075 MPa (0.75 bar)

► Fill the expansion vessel in accordance with the static height of the heating installation; ideally with nitrogen, otherwise with air.
► Ensure that the drain valve is open when filling.
3. If water escapes from the valve of the expansion vessel, replace the expansion vessel (→ Page 25).
4. Fill and purge the heating installation. (→ Page 19)

10.17 Completing inspection and maintenance work

Once you have completed all maintenance work:

► Check the gas connection pressure (gas flow pressure). (→ Page 20)
► Check the CO_2 content. (→ Page 27)
► If required, reset (→ Page 22)the maintenance interval.

11 Decommissioning

11.1 Permanently decommissioning the product

► Press the on/off button.
◁ The display goes out.
► Disconnect the product from the power mains.
► Close the gas isolator cock.
► Close the cold water stop valve.
► Drain the product. (→ Page 29)

12 Recycling and disposal

Disposing of the packaging

► Dispose of the packaging correctly.
► Observe all relevant regulations.

13 Customer service

Auftragsannahme Vaillant Kundendienst: 021 91 5767901

Appendix

A Check programmes – Overview

Display	Meaning
P.00	Purging the domestic hot water and heating circuit: The function is activated in the small domestic hot water circuit for three minutes and then in the heating circuit for one minute. The pump runs and stops at regular intervals. If required, this function can be manually switched off.
P.01	The burner operates with an adjustable heat input in heating or domestic hot water mode: The product operates after ignition with the heat input set between "0" (0% = Pmin) and "100" (100% = Pmax). The function is active for 15 minutes.
P.02	The burner operates at ignition load in heating or domestic hot water mode: After ignition, the product works at ignition load. The function is active for 15 minutes.
P.04	Chimney sweep function: If there is a domestic hot water demand, the product runs in domestic hot water mode and at maximum heat input. If there is no domestic hot water demand, the product runs with the partial heat load that is set via diagnostics code d.00 and in heating mode. The function is active for 15 minutes.
P.06	Filling the product: The prioritising diverter valve is moved to the mid-position. The burner and pump switch off (to fill or drain the product).
Automatic air vent function	Purging the product: If the pressure is lower than 0.03 MPa (0.3 bar) for longer than 15 seconds and then is above 0.07 MPa (0.7 bar), the automatic purging function is activated. The function is activated in the small hot water circuit for four minutes and then in the heating circuit for six minutes. This function cannot be manually switched off.

B Overview of diagnostics codes

Note
Since the code table is used for various products, some codes may not be visible for the product in question.

Diagnostics code	Parameter	Values		Unit	Increment, select, explanation	Default setting	Own setting
		Min.	Max.				
d.00	Maximum heating output is fixed or adjusts automatically	–	–	kW	The maximum heating output varies depending on the product. → Section "Technical data" Automatic: Unit automatically adjusts the maximum output to the current system demand	→ Section "Technical data"	Adjustable
d.01	Pump overrun in heating mode	1	60	min	1	5	Adjustable
d.02	Maximum burner anti-cycling time in heating mode	2	60	min	1	20	Adjustable
d.04	Water temperature in the cylinder	Current value		°C	Applies to: Product with heating mode only, connected to domestic hot water cylinder with temperature sensor	–	Not adjustable
d.05	Determined heating flow set target temperature	Current value		°C	–	–	Not adjustable
d.06	Hot water set target temperature	Current value		°C	Applies to: Combi boiler	–	Not adjustable

Diagnostics code	Parameter	Values		Unit	Increment, select, explanation	Default setting	Own setting
		Min.	Max.				
d.07	Set target temperature for the domestic hot water cylinder	Current value		°C	Applies to: Product with heating mode only, connected to domestic hot water cylinder with temperature sensor	–	Not adjustable
d.09	Heating flow set target temperature that is set on the eBUS room thermostat	Current value		°C	–	–	Not adjustable
d.10	Status of the internal pump in the heating circuit	Current value		–	off / on	–	Not adjustable
d.11	Status of the heating circuit's shunt pump	Current value		–	Applies to: Installed heating circuit shunt pump (optional) off / on	–	Not adjustable
d.13	Status of the hot water circuit's circulation pump	Current value		–	Applies to: Installed hot water circuit circulation pump (optional) off / on	–	Not adjustable
d.14	Operating mode of the modulating pump	0	5	–	0 = Speed-regulated (automatic pump operation in levels 1 to 5) 1 = PWM = 65 % 2 = PWM = 73 % 3 = PWM = 80 % 4 = PWM = 88 % 5 = PWM = (95 … 100 %) 1; 2; 3; 4; 5 = Fixed rotational speeds → Section "Setting the pump output"	0	Adjustable
d.15	Pump speed	Current value		%	–	–	Not adjustable
d.16	Status of the 24 V room thermostat (ON/OFF)	Current value		–	off = Heating off on = Heating activated or eBUS controller used	–	Not adjustable
d.17	Heating control	–	–	–	off = Flow temperature on = Return temperature (adjustment for underfloor heating. If you have activated the return temperature control, the automatic heating output determination function is not active.)	0	Adjustable
d.18	Pump overrun operating mode	1	3	–	1 = Comfort (continuously operating pump) 3 = Eco (pump runs intermittently)	3	Adjustable
d.20	Maximum hot water set target temperature	50	60	°C	1	60	Adjustable
d.21	Status of the warm start for hot water	Current value		–	off = Function deactivated on = Function activated and available	–	Not adjustable
d.22	Status of the hot water request	Current value		–	off = No current requirement on = Current requirement	–	Not adjustable
d.23	Status of the heating demand	Current value		–	off = Heating off (Summer mode) on = Heating on	–	Not adjustable
d.25	Status of the requirement to reheat the cylinder or for the hot water warm start from the eBUS thermostat	Current value		–	off = Function deactivated on = Function activated	–	Not adjustable

Diagnostics code	Parameter	Values		Unit	Increment, select, explanation	Default setting	Own setting
		Min.	Max.				
d.27	Function of relay 1 (multi-functional module)	1	10	–	1 = Circulation pump 2 = External pump 3 = Cylinder charging pump 4 = Extractor hood 5 = External solenoid valve 6 = External fault message 7 = Solar pump (omitted) 8 = eBUS remote control 9 = Legionella protection pump 10 = Solar valve	1	Adjustable
d.28	Function of relay 2 (multi-functional module)	1	10	–	1 = Circulation pump 2 = External pump 3 = Cylinder charging pump 4 = Extractor hood 5 = External solenoid valve 6 = External fault message 7 = Solar pump (omitted) 8 = eBUS remote control 9 = Legionella protection pump 10 = Solar valve	2	Adjustable
d.33	Fan speed target value	Current value		rpm	Fan speed = Display value x 100	–	Not adjustable
d.34	Value for the fan speed	Current value		rpm	Fan speed = Display value x 100	–	Not adjustable
d.35	Position of the diverter valve	Current value		–	0 = Heating 40 = Mid-position (frost protection or filling) 100 = Domestic hot water	–	Not adjustable
d.36	Value for the hot water flow	Current value		l/min	Applies to: Combi boiler	–	Not adjustable
d.39	Water temperature in the solar circuit	Current value		°C	Applies to: Installed solar set (optional)	–	Not adjustable
d.40	Heating flow temperature	Current value		°C	–	–	Not adjustable
d.41	Heating return temperature	Current value		°C	–	–	Not adjustable
d.47	Outside temperature	Current value		°C	–	–	Not adjustable
d.50	Correction of the minimum fan speed	300	1500	rpm	1 Fan speed = Display value x 10	600	Adjustable
d.51	Correction of the maximum fan speed	-1500	-500	rpm	1 Fan speed = Display value x 10	-1000	Adjustable
d.58	Solar circuit reheating	0	3	–	Applies to: Installed solar set (optional) 0 = Product's anti-legionella function deactivated 3 = Hot water activated (min. target value 60 °C)	0	Adjustable
d.60	Number of blocks by the temperature limiter (limit temperature)	Current value		–	–	–	Not adjustable
d.61	Number of unsuccessful ignitions	Current value		–	–	–	Not adjustable
d.64	Average burner ignition time	Current value		s	–	–	Not adjustable
d.65	Maximum burner ignition time	Current value		s	–	–	Not adjustable
d.66	Activation of the warm start function for hot water	–	–	–	off = Function deactivated on = Function activated	1	Adjustable

Diagnostics code	Parameter	Values		Unit	Increment, select, explanation	Default setting	Own setting
		Min.	Max.				
d.67	Remaining burner anti-cycling time (setting under d.02)	Current value		min	–	–	Not adjustable
d.68	Number of unsuccessful ignitions at 1st attempt	Current value		–	–	–	Not adjustable
d.69	Number of unsuccessful ignitions at 2nd attempt	Current value		–	–	–	Not adjustable
d.71	Maximum heating flow set target temperature	30	80	°C	1	→ Section "Technical data"	Adjustable
d.73	Correction of the hot water warm start temperature	-15	5	K	Applies to: Combi boiler 1	0	Adjustable
d.75	Maximum cylinder reheating time	20	90	min	Applies to: Product with heating mode only 1	45	Adjustable
d.77	Max. cylinder reheating	–	–	kW	Applies to: Product with heating mode only 1 → Section "Technical data"	–	Adjustable
d.80	Running time in heating mode	Current value		h	Running time = Display value x 100	–	Not adjustable
d.81	Running time in hot water handling mode	Current value		h	Running time = Display value x 100	–	Not adjustable
d.82	Number of burner ignitions in heating mode	Current value		–	Number of ignitions = Display value x 100	–	Not adjustable
d.83	Number of burner ignitions in hot water handling mode	Current value		–	Number of ignitions = Display value x 100	–	Not adjustable
d.84	Maintenance in	0	3000	h	Number of hours = Display value x 10	_ _ _	Not adjustable
d.85	Increase in the min. output (heating and hot water handling mode)	–	–	kW	1	–	Adjustable
d.88	Flow rate limit value for ignition in hot water handling mode	0	1	–	Applies to: Combi boiler 0 = 1.5 l/min (no delay) 1 = 3.7 l/min (2 s delay)	0	Adjustable
d.90	Status of the eBUS room thermostat	Current value		–	off = Not connected on = Connected	–	Not adjustable
d.91	Status DCF77	Current value		–	–	–	Not adjustable
d.93	Setting the product code	0	99	–	1 The Device Specific Number (DSN) can be found on the identification plate.	–	Adjustable
d.94	Delete fault list	0	1	–	0 = No 1 = Yes	–	Adjustable
d.95	Software versions	–	–	–	1 = Main PCB 2 = Interface PCB	–	Not adjustable
d.96	Default setting (reset)	0	1	–	0 = No 1 = Yes	–	Adjustable

C Status codes – Overview

Note
Since the code table is used for various products, some codes may not be visible for the product in question.

Status code	Meaning
Displays in heating mode	
S.00	Heating mode: No requirement
S.01	Heating mode: Advance fan operation
S.02	Heating mode: Pump pre-run
S.03	Heating mode: Burner ignition
S.04	Heating mode: Burner on
S.05	Heating mode: Pump/fan overrun
S.06	Heating mode: Fan overrun
S.07	Heating mode: Pump overrun
S.08	Heating mode: Temporary shutdown after heating procedure
Displays in hot water handling mode	
S.10	Hot water handling mode: Requirement
S.11	Hot water handling mode: Advance fan operation
S.13	Hot water handling mode: Burner ignition
S.14	DHW mode: Burner on
S.15	DHW mode: Pump/fan overrun
S.16	DHW mode: Fan overrun
S.17	DHW mode: Pump overrun
Display in Comfort mode with warm start or hot water handling mode with cylinder	
S.20	Hot water handling mode: Requirement
S.21	Hot water handling mode: Advance fan operation
S.22	Hot water handling mode: Pump pre-run
S.23	Hot water handling mode: Burner ignition
S.24	DHW mode: Burner on
S.25	DHW mode: Pump/fan overrun
S.26	DHW mode: Fan overrun
S.27	DHW mode: Pump overrun
S.28	Hot water handling mode: Temporary shutdown of the burner
Other displays	
S.30	Room thermostat is blocking heating mode.
S.31	No heating demand: Summer mode, eBUS controller, waiting period
S.32	Fan waiting time: Fan speed outside of the tolerance values
S.34	Frost protection active
S.39	Underfloor heating contact open
S.42	Accessory fault: Flue non-return flap closed or condensate pump fault
S.53	Product in waiting period/operation block function due to low water pressure (flow/return spread too large)
S.54	Waiting period: Low water pressure in the circuit (flow/return spread too large)
S.88	Product purging active
S.91	Maintenance: Operating display demo mode
S.96	Automatic test programme: Flow and return temperature sensors, heating and hot water requests blocked or product fault.
S.98	Automatic test programme: Return temperature sensor, heating and hot water requests blocked.
S.108	Purging the combustion chamber, fan in operation
S.109	Product's standby mode activated

D Overview of fault codes

Note

Since the code table is used for various products, some codes may not be visible for the product in question.

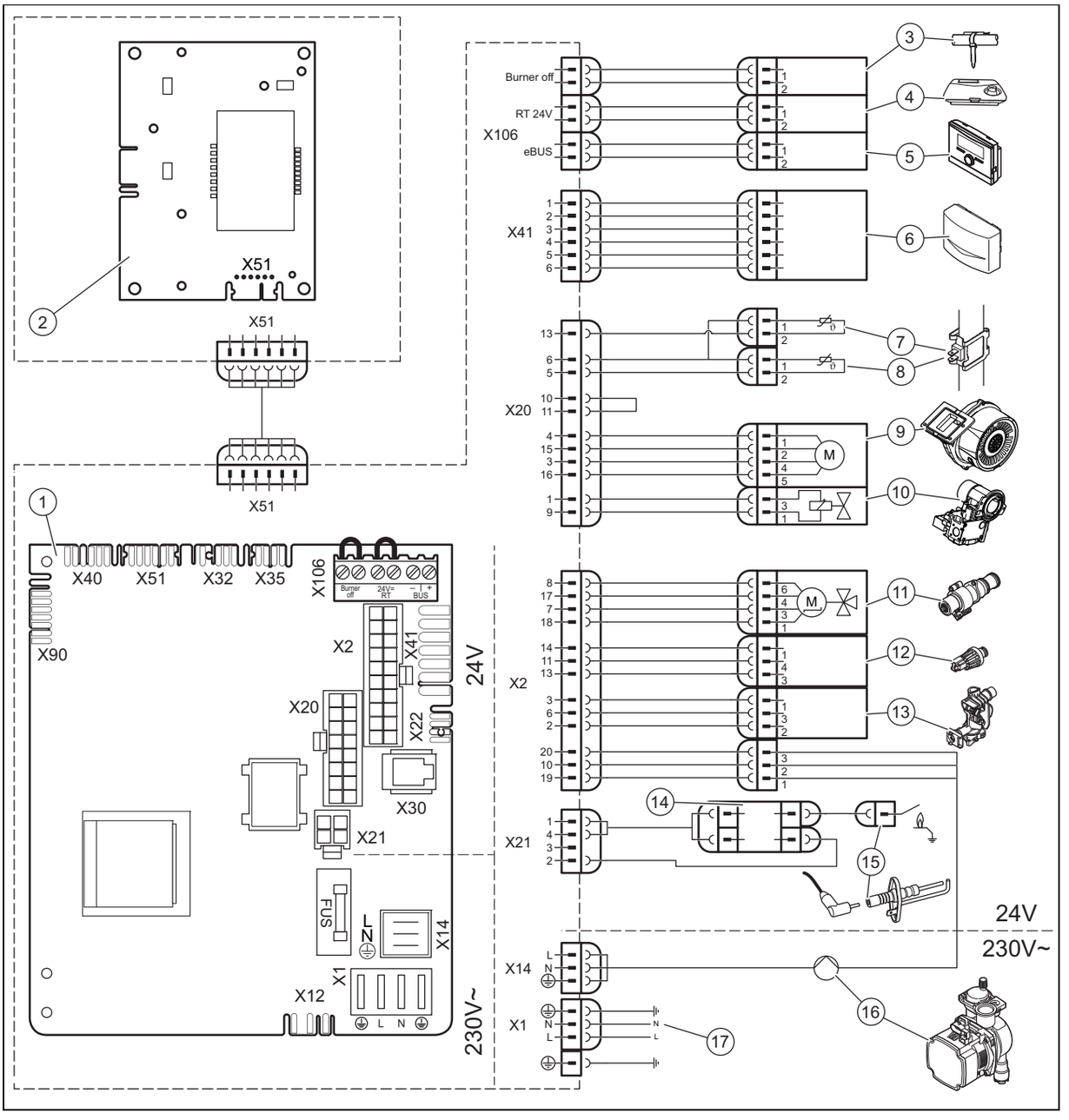
If faults occur, some of them can be reset. To do so, press and hold the ⏻ button for three seconds.

Fault code	Meaning	Possible cause
F.00	Fault: Flow temperature sensor	NTC plug not plugged in or has come loose, multiple plug on the PCB not plugged in correctly, interruption in cable harness, NTC sensor defective
F.01	Fault: Return temperature sensor	NTC plug not plugged in or has come loose, multiple plug on the PCB not plugged in correctly, interruption in cable harness, NTC sensor defective
F.10	Short circuit: Flow temperature sensor	NTC sensor defective, short circuit in the cable harness, cable/housing
F.11	Short circuit: Return temperature sensor	NTC sensor defective, short circuit in the cable harness, cable/housing
F.13	Short circuit: Domestic hot water cylinder temperature sensor	Applies to: Product with heating mode only NTC sensor defective, short circuit in the cable harness, cable/housing
F.20	Safety shutdown: Overheating temperature reached	Overheating temperature reached; check whether water is available and whether the flow rate is sufficient. Incorrect earth connection between cable harness and product, flow or return NTC defective (loose connection), stray spark via ignition cable, ignition plug or ignition electrode
F.22 / 0,0 bar	Safety shutdown: Low water pressure in the boiler	No water or insufficient water in the product, water pressure sensor defective, cable to water pressure sensor loose/not connected/defective
F.23	Safety shutdown: Temperature spread too great (NTC1/NTC2)	Pump blocked, insufficient pump output, air in product, flow and return NTC sensors connected the wrong way round
F.24	Safety shutdown: Temperature rise too fast	Pump blocked, insufficient pump output, air in product, system pressure too low, non-return valve blocked/incorrectly installed
F.27	Safety shutdown: Fault in flame detection	Moisture on the electronics, electronics (flame monitor) defective, gas solenoid valve leaking
F.28	Fault: Ignition unsuccessful when starting up	Gas meter defective or gas pressure monitor has triggered, air in gas, gas flow pressure too low, thermal isolator device (TAE) has triggered, incorrect gas injector, incorrect spare gas valve assembly, fault on the gas valve assembly, multiple plug on PCB incorrectly plugged in, break in cable harness, ignition system (ignition transformer, ignition cable, ignition plug, ignition electrode) defective, ionisation flow interrupted (cable, electrode), incorrect earthing of product, electronics defective
F.29	Fault: Flame loss	Gas supply temporarily stopped, flue gas recirculation, incorrect earthing of product, ignition transformer has spark failure
F.32	Fan test function active: Fan speed outside the tolerance values	Plug on fan not correctly plugged in, multiple plug on PCB not correctly plugged in, break in cable harness, fan blocked, Hall sensor defective, electronics defective
F.46	Short circuit: Temperature sensor at the solar circuit water inlet	Applies to: Installed solar set (optional) Sensor defective, short circuit in the cable harness, cable/housing
F.49	eBUS fault: Voltage too low	Short circuit on the eBUS, eBUS overload or two power supplies with different polarities on the eBUS (can only be found in the fault report)
F.61	Fault: Gas valve assembly control system	Short circuit/short to earth in cable harness for the gas valve assembly, gas valve defective assembly (coils shorted to earth), electronics defective
F.62	Fault: Gas valve switch-off control	Delayed switch-off of gas valve assembly, delayed extinguishing of flame signal, gas valve assembly leaking, electronics defective
F.63	Fault: EEPROM	Electronics defective
F.64	Fault: Electronics/sensor/analogue-to-digital converter	Flow or return NTC short circuited, electronics defective
F.65	Fault: Electronics temperature too high	Electronics overheating due to external influences, electronics defective
F.67	Value sent back by ASIC is incorrect (flame signal)	Implausible flame signal, electronics defective
F.68	Fault: Unstable flame (analogue input)	Air in gas, gas flow pressure too low, incorrect air ratio, incorrect gas injector, ionisation flow interruption (cable, electrode) Electronics defective
F.70	Invalid product code (DSN)	Replace the screen and PCB at the same time without reconfiguring the product's Device Specific Number

Fault code	Meaning	Possible cause
F.71	Fault: Flow/return temperature sensor	Flow temperature sensor specifies a constant value: Flow temperature sensor incorrectly attached to the flow pipe, flow temperature sensor defective
F.72	Fault: Deviation in the water pressure sensor/return temperature sensor	Flow/return NTC temperature difference too great → flow and/or return temperature sensor defective
F.73	Fault: Water pressure sensor not connected or has short-circuited	Interruption/short circuit of water pressure sensor, interruption/short to earth in supply line to water pressure sensor or water pressure sensor defective
F.74	Fault: Electrical problem in the water pressure sensor	Line to water pressure sensor has a short circuit to 5 V/24 V or internal fault in the water pressure sensor
F.77	Fault: Condensate or smoke	Applies to: Installed condensate pump or flue non-return flap (optional) Check the defective condensate pump or flue non-return flap
F.83	Fault: Dry fire	When the burner starts, the temperature change recorded by the flow or return temperature sensor is non-existent or too small: Insufficient water in the product, flow or return temperature sensor incorrectly attached to the pipe
F.84	Fault: Flow/return temperature sensor	Values not consistent, difference between flow and return < -6 K Flow and return temperature sensors signalling implausible values: Flow and return temperature sensors have been inverted, flow and return temperature sensors have not been correctly installed
F.85	Fault: Temperature sensor	The flow and/or return temperature sensors have been installed on the same pipe/incorrect pipe Temperature sensor not connected or is connected incorrectly
F.87	Fault: Ignition transformer cable	Ignition transformer cable harness not connected to the main PCB or it is connected incorrectly, short circuit in the cable harness or damaged ignition transformer
F.88	Fault: Gas valve assembly	Gas valve assembly not connected or it is connected incorrectly, short circuit in the cable harness
F.89	Fault: Pump	Pump not connected or it is connected incorrectly, incorrect pump connected, short circuit in the cable harness
Err	Fault: Interface communication	Interface PCB not connected or connected incorrectly, short circuit in the cable harness

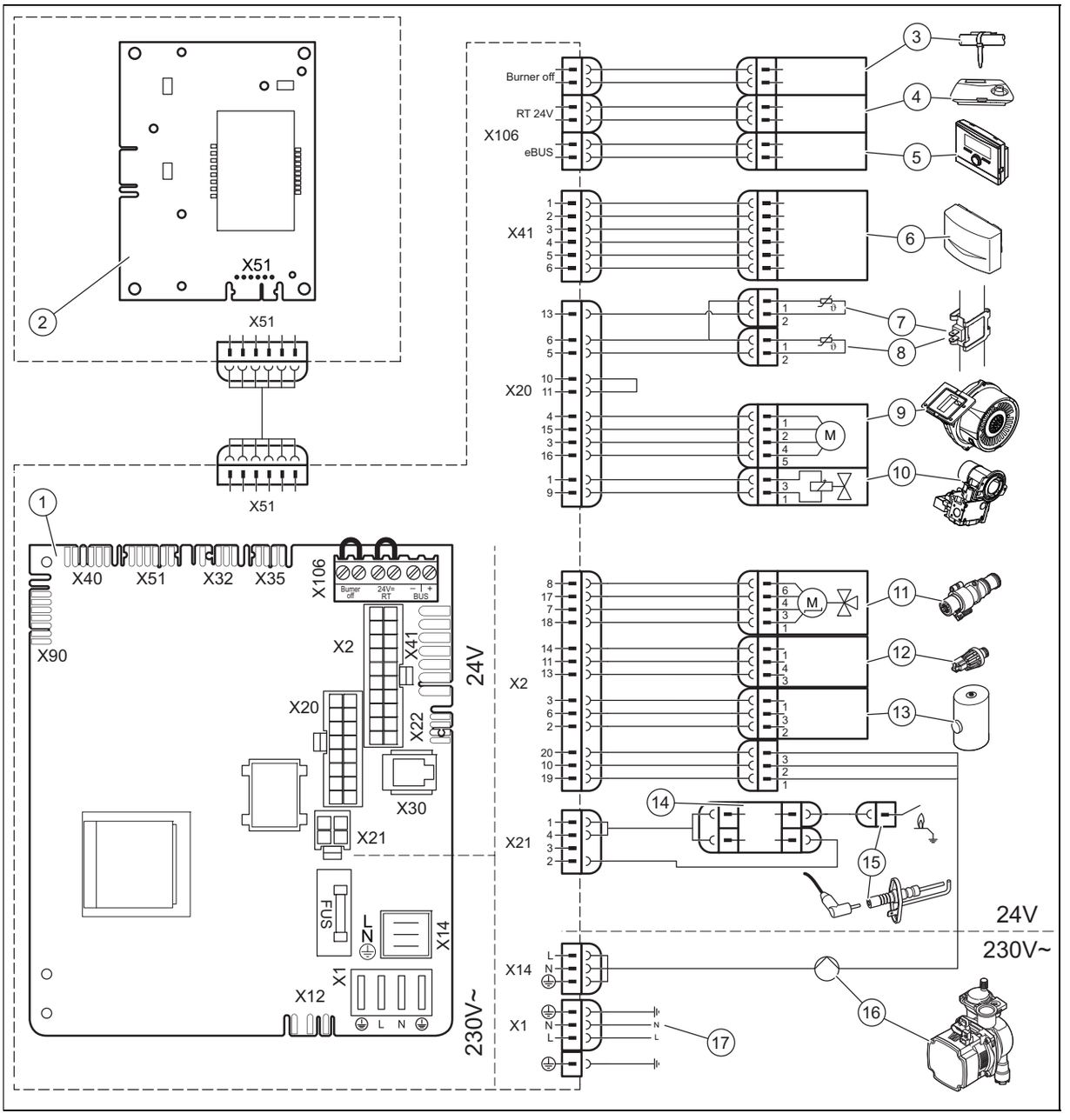
E Wiring diagrams

E.1 Product connection diagram with integrated hot water generation



1	Main PCB	10	Gas valve
2	Interface PCB	11	Diverter valve
3	Safety thermostat for underfloor heating	12	Pressure sensor
4	24 V DC room thermostat	13	Mass flow-
5	Bus connection (digital room thermostat/controller)	14	External ignition device
6	Outside temperature sensor, wired	15	Ionisation and ignition electrode
7	Temperature sensor in the heating return	16	Heating pump
8	Temperature sensor in the heating flow	17	Main power supply
9	Fan		

E.2 Connection diagram, product with heating mode only



1	Main PCB	10	Gas valve
2	Interface PCB	11	Diverter valve
3	Safety thermostat for underfloor heating	12	Pressure sensor
4	24 V DC room thermostat	13	Plug, cylinder, hot water heat exchanger
5	Bus connection (digital room thermostat/controller)	14	External ignition device
6	Outside temperature sensor, wired	15	Ionisation and ignition electrode
7	Temperature sensor in the heating return	16	Heating pump
8	Temperature sensor in the heating flow	17	Main power supply
9	Fan		

F Inspection and maintenance work – Overview

The table below lists the manufacturer requirements with respect to minimum inspection and maintenance intervals. If national regulations and directives require shorter inspection and maintenance intervals, you should observe these instead of the intervals listed in the table.

No.	Work	Inspection (annual)	Maintenance (at least every 2 years)
1	Check the air/flue pipe for leak-tightness and to ensure that it is fastened correctly. Make sure that it is not blocked or damaged and has been installed in accordance with the relevant Installation Manual.	X	X
2	Check the general condition of the product. Remove dirt from the product and from the vacuum chamber.	X	X
3	Visually inspect the general condition of the compact thermal module. In doing so, pay particular attention to signs of corrosion, rust and other defects. If you notice any damage, carry out maintenance work.	X	X
4	Check the gas connection pressure at maximum heat input. If the gas connection pressure is not within the correct range, carry out maintenance work.	X	X
5	Check the CO_2 content (the air ratio) of the product and, if necessary, adjust it. Keep a record of this.	X	X
6	Disconnect the product from the power mains. Check that the electrical plug connections and other connections are seated correctly and correct these if necessary.	X	X
7	Close the gas isolator cock and the service valves.		X
8	Drain the product on the water side. Check the pre-charge pressure of the expansion vessel, and top up the vessel if necessary (approx. 0.03 MPa/0.3 bar under the system filling pressure).		X
9	Remove the compact thermal module.		X
10	Check the insulating mats in the combustion area. If you notice any damage, replace the insulating mats. Replace the burner flange insulation each time it is opened and accordingly each time maintenance is carried out.		X
11	Clean the heat exchanger.		X
12	Check the burner for damage and replace it if necessary.		X
13	Check the condensate siphon in the product, clean and fill if necessary.	X	X
14	Install the compact thermal module. Caution: Replace the seals.		X
15	Products with integrated hot water generation only: If the volume of water is insufficient or the outlet temperature is not reached, replace the secondary heat exchanger if necessary.		X
16	Products with integrated hot water generation only: Clean the strainer in the cold water inlet. Replace the filter if impurities can no longer be removed or if the filter is damaged. In this case, also check the impeller sensor for dirt and damage, clean the sensor (do not use compressed air for this) and replace the sensor if it is damaged.		X
17	Open the gas isolator cock, reconnect the product to the power mains and switch the product on.	X	X
18	Open the service valves, fill the product or heating installation to 0.1-0.2 MPa/1.0-2.0 bar (depending on the static height of the heating installation) and start the purge programme P.00.		X
19	Perform a test operation of the product and heating installation, including hot water generation, and purge the system once more if necessary.	X	X
20	Visually inspect the ignition and burner behaviour.	X	X
21	Check the CO_2 content (the air ratio) of the product again.		X
22	Check that no gas, flue gas, hot water or condensate is leaking from the product. Restore leak-tightness if necessary.	X	X
23	Record the inspection/maintenance work carried out.	X	X

G Technical data

Note
For products with heating mode only, the technical data for the hot water is only relevant if a domestic hot water cylinder is connected to the product.

Technical data – Heating

	VC 146/7-2 (E-DE)	VCW 206/7-2 (E-DE)
Maximum heating flow temperature (default setting – D.71)	75 °C	75 °C
Range for the heating flow temperature control	30 … 80 °C	30 … 80 °C
Maximum permissible pressure (PMS)	0.3 MPa (3.0 bar)	0.3 MPa (3.0 bar)
Nominal water flow (ΔT = 20 K)	577 l/h	797 l/h
ΔP heating at nominal flow (ΔT = 20 K), bypass closed	0.032 MPa	0.024 MPa
ΔP heating at nominal flow (ΔT = 20 K), bypass in the position set at the factory	0.055 MPa	0.043 MPa
Approximate value for the condensate volume (pH value between 3.5 and 4.0) at 50/30 °C	1.38 l/h	1.87 l/h
Expansion vessel capacity	8.0 l	8.0 l
Maximum heat output (default setting – d.00)	Auto	Auto

Technical data – G20

	VC 146/7-2 (E-DE)	VCW 206/7-2 (E-DE)
Effective output range (P) at 50/30 °C	6.9 … 14.8 kW	7.0 … 20.1 kW
Effective output range (P) at 80/60 °C	6.2 … 13.4 kW	6.4 … 18.5 kW
Heat output range – domestic hot water or cylinder reheating (P)	6.5 … 18.2 kW	6.6 … 24.3 kW
Maximum heat input – heating (Q max.)	13.8 kW	18.7 kW
Minimum heat input – heating (Q min.)	6.6 kW	6.6 kW
Maximum heat input – Domestic hot water or cylinder reheating (Q max.)	18.4 kW	24.4 kW
Minimum heat input – Domestic hot water or cylinder reheating (Q min.)	6.6 kW	6.6 kW

Technical data – G25

	VC 146/7-2 (E-DE)	VCW 206/7-2 (E-DE)
Effective output range (P) at 50/30 °C	6.9 … 14.8 kW	7.0 … 20.1 kW
Effective output range (P) at 80/60 °C	6.2 … 13.4 kW	6.4 … 18.5 kW
Heat output range – domestic hot water or cylinder reheating (P)	6.5 … 18.2 kW	6.6 … 24.3 kW
Maximum heat input – heating (Q max.)	13.8 kW	18.7 kW
Minimum heat input – heating (Q min.)	6.6 kW	6.6 kW
Maximum heat input – Domestic hot water or cylinder reheating (Q max.)	18.4 kW	24.4 kW
Minimum heat input – Domestic hot water or cylinder reheating (Q min.)	6.6 kW	6.6 kW

Technical data – G31

	VC 146/7-2 (E-DE)	VCW 206/7-2 (E-DE)
Effective output range (P) at 50/30 °C	6.9 … 14.8 kW	7.0 … 20.1 kW
Effective output range (P) at 80/60 °C	6.2 … 13.4 kW	6.4 … 18.5 kW

	VC 146/7-2 (E-DE)	VCW 206/7-2 (E-DE)
Heat output range – domestic hot water or cylinder reheating (P)	6.5 … 18.2 kW	6.6 … 24.3 kW
Maximum heat input – heating (Q max.)	13.8 kW	18.7 kW
Minimum heat input – heating (Q min.)	6.6 kW	6.6 kW
Maximum heat input – Domestic hot water or cylinder reheating (Q max.)	18.4 kW	24.4 kW
Minimum heat input – Domestic hot water or cylinder reheating (Q min.)	6.6 kW	6.6 kW

Technical data – Domestic hot water

	VC 146/7-2 (E-DE)	VCW 206/7-2 (E-DE)
Minimum water flow	–	1.7 l/min
Specific flow rate (D) (ΔT = 30 K) in accordance with EN 13203	–	11.5 l/min
Specific flow rate (ΔT = 35 K)	–	9.9 l/min
Minimum permissible pressure	0.03 MPa (0.30 bar)	0.03 MPa (0.30 bar)
Maximum permissible pressure (PMW)	1 MPa (10 bar)	1 MPa (10 bar)
Temperature range	45 … 60 ℃	35 … 60 ℃
Flow rate limiter for cold water	–	8.0 l/min
Hot water comfort in accordance with the standard EN 13203	–	**

Technical data – General

	VC 146/7-2 (E-DE)	VCW 206/7-2 (E-DE)
Gas category	II2ELL3P	II2ELL3P
Diameter of the gas pipe	1/2"	1/2"
Diameter of the heating pipe	3/4"	3/4"
Diameter of the domestic hot water pipe	3/4"	3/4"
Expansion relief valve connector (min.)	15.0 mm	15.0 mm
Condensed water discharge pipe (min.)	21.5 mm	21.5 mm
G20 gas supply pressure	2.0 kPa (20.0 mbar)	2.0 kPa (20.0 mbar)
G25 gas supply pressure	2.0 kPa (20.0 mbar)	2.0 kPa (20.0 mbar)
G31 gas supply pressure	3.7 kPa (37.0 mbar)	3.7 kPa (37.0 mbar)
CE number (PIN)	CE-0063CR3775	CE-0063CR3775
Released system types	B23, B33, B53, C13(x), C33(x), C43(x), C53(x), C83(x), C93(x) , B23(P), B53(P)	B23, B33, B53, C13(x), C33(x), C43(x), C53(x), C83(x), C93(x) , B23(P), B53(P)
Min. flue gas temperature	44 ℃	44 ℃
Max. flue gas temperature	85 ℃	85 ℃
Nominal efficiency at 80/60 °C	97.2 %	98.9 %
Nominal efficiency at 50/30 °C	107.0 %	107.5 %
Partial load nominal efficiency (30%)	105.7 %	107.4 %
NOx class	6	6
Product dimensions, width	440 mm	440 mm
Product dimensions, depth	337 mm	337 mm

	VC 146/7-2 (E-DE)	VCW 206/7-2 (E-DE)
Product dimensions, height	720 mm	720 mm
Net weight	30.0 kg	30.8 kg
Weight when filled with water	32.4 kg	33.5 kg

Technical data – Electrics

	VC 146/7-2 (E-DE)	VCW 206/7-2 (E-DE)
Electric connection	– 230 V – 50 Hz	– 230 V – 50 Hz
Built-in fuse (slow-blow)	T2/2A,250V	T2/2A,250V
Max. electrical power consumption	100 W	100 W
Standby electrical power consumption	1.6 W	1.6 W
Level of protection	IPX4D	IPX4D
Permissible connected voltage	190 … 253 V	190 … 253 V

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Supplier
Vaillant Deutschland GmbH & Co.KG
Berghauser Str. 40 | D-42859 Remscheid
Telefon 021 91 18-0 | Telefax 021 91 18-2810
Auftragsannahme Vaillant Kundendienst 021 91 5767901
info@vaillant.de | www.vaillant.de