Installation and maintenance instructions



ecoTEC plus

VC 406/5-5 ... VC 636/5-5

DE, LU

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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 signs 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 unit 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.

The use of the product in vehicles, such as mobile homes and caravans, is not classed as intended use. Units that are not classed as vehicles are those that are installed in a fixed and permanent location (known as "fixed installation").

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 use in industrial or commercial processes 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

The following work must only be carried out by competent persons who are sufficiently qualified to do so:

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

► Proceed in accordance with current technology.

1.3.2 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.

1.3.3 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.

1.3.4 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.

1.3.5 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).

1.3.6 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.

1.3.7 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.

1.3.8 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

1.3.9 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.

1.3.10 Risk of poisoning caused by insufficient supply of combustion air

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.

1.3.11 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.

1.3.12 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 injury due to the heavy weight of the product

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

1.3.14 Risk of material damage caused by using an unsuitable tool

- Use the correct tool.

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.

1.3.17 Risk of material damage caused by leak detection sprays and fluids

Leak detection sprays and fluids block the filter for the mass flow sensor on the Venturi, thereby destroying the mass flow sensor.

- During repair work, do not apply any leak detection sprays or fluids to the covering cap on the filter for the Venturi.

1.3.18 Risk of damage to the flexible gas pipe

The corrugated gas pipe may become damaged if weight is placed on it.

- Do not suspend the compact thermal module on the flexible gas pipe, for example during maintenance work.

1.4 Regulations (directives, laws, standards)

- Observe the national regulations, standards, directives, ordinances 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:

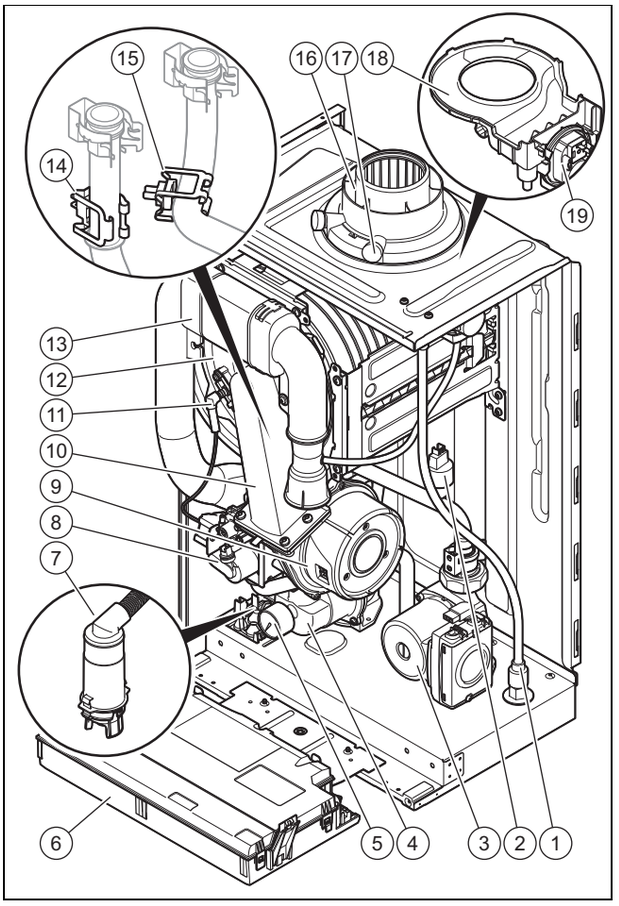
Product article number

VC 406/5-5 (E-DE) ecoTEC plus	0010021647
VC 406/5-5 (LL-DE) ecoTEC plus	0010021648
VC 476/5-5 (E-DE) ecoTEC plus	0010021516
VC 476/5-5 (LL-DE) ecoTEC plus	0010021517
VC 636/5-5 (E-DE) ecoTEC plus	0010021518
VC 636/5-5 (LL-DE) ecoTEC plus	0010021519

3 Product description

This product is a gas-fired wall-hung condensing boiler.

3.1 Product design



1	Rainwater drain hose	11	Ignition electrode
2	Hydraulic pressure sensor	12	Integrated condensation heat exchanger
3	Heating pump	13	Air intake pipe
4	Dynamic air separation system	14	Temperature sensor in the heating flow
5	Water-pressure manometer	15	Temperature sensor in the heating return
6	Electronics box	16	Connection for the air/flue pipe
7	Condensate siphon	17	Flue gas measuring stub pipe
8	Gas valve assembly	18	Rainwater collecting device
9	Fan	19	Pressure switch
10	Compact thermal module		

3.2 Data plate

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

Information on the data plate	Meaning
00 00000000000000000 00000000	Barcode with serial number

Information on the data plate	Meaning
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 Plus ...	Product designation
2H / 2E / 3P / 2L...	Gas group and gas connection pressure as set at the factory
II2H3P / I2E / I3P...	Approved gas category
Condensing technology	Efficiency class of the boiler in accordance with EC Directive 92/42/EEC
Type: Xx3(x)	Permissible flue gas connections
PMS	Maximum water pressure in heating mode
V Hz	Electrical connection – Voltage – Frequency
Hi	Lower gross calorific value
W	Max. electrical power consumption
IP	Protection class
|||	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)
Tmax	Maximum flow temperature
NOx	NOx class for the product
Code (DSN)	Specific product code
	Read the instructions.

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 the identification plate.

3.4 CE label

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 wedge and protective film from all of the product's components.

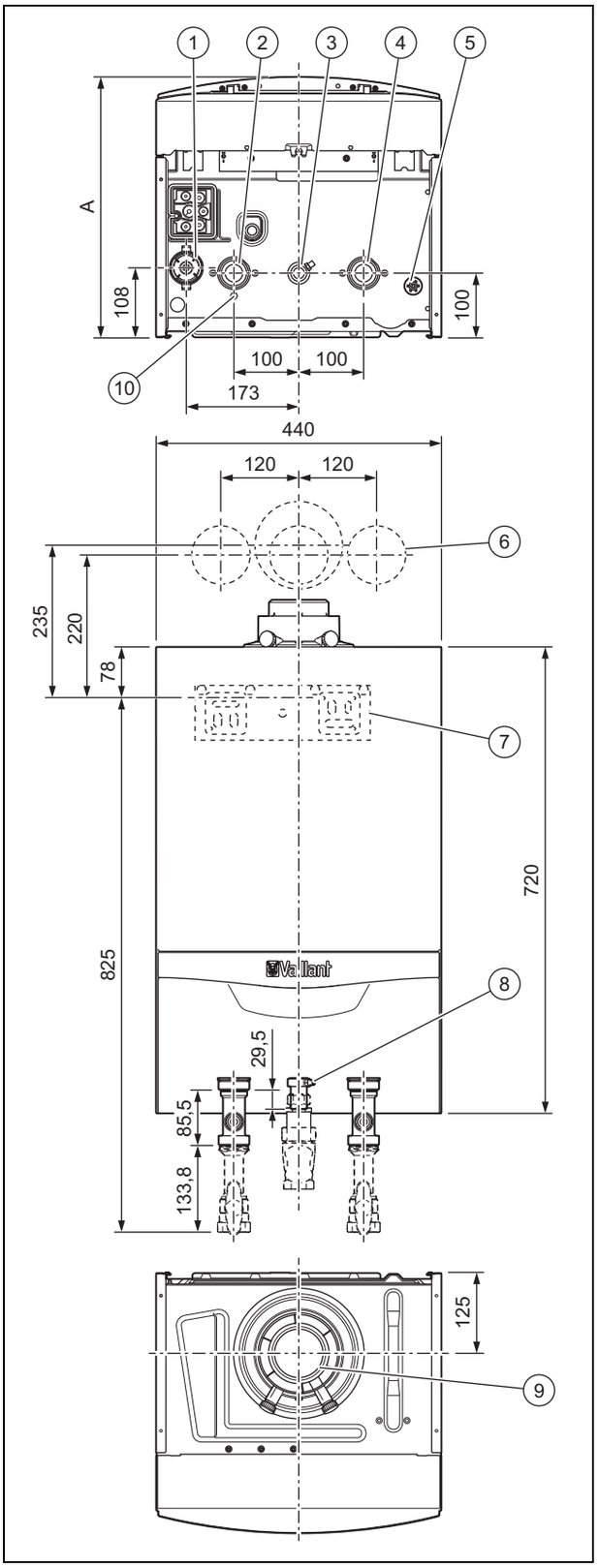
4.2 Checking the scope of delivery

Applicability: VC 476/5-5 (E-DE)
OR VC 476/5-5 (LL-DE)
OR VC 406/5-5 (E-DE)
OR VC 406/5-5 (LL-DE)
OR VC 636/5-5 (E-DE)
OR VC 636/5-5 (LL-DE)

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

Number	Designation
1	Heat generator
1	Bag of set-up parts with retainer for wall-mounting and fastening accessories
1	Bag with condensate discharge hose
1	Cardboard box for the hydraulic connection with expansion relief valve, drain cock, air separator and seals
1	Enclosed documentation

4.3 Dimensions

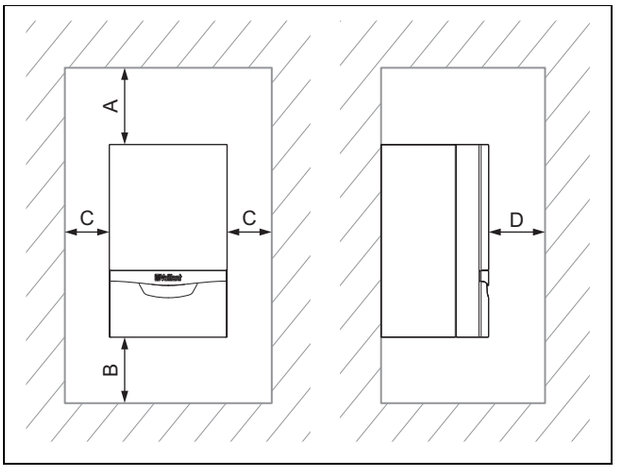


1 Condensate siphon
2 Heating flow connection
3 Gas connection
4 Heating return connection
5 Drain for the rainwater collecting device
6 Position of the holes for the flue system
7 Retainer for securing the product
8 Gas pressure connection
9 Connection for the air/flue pipe
10 Drain for the dynamic air separation system

Dimension A

VC 406/5-5 (E-DE)	405 mm
VC 406/5-5 (LL-DE)	405 mm
VC 476/5-5 (E-DE)	405 mm
VC 476/5-5 (LL-DE)	405 mm
VC 636/5-5 (E-DE)	473 mm
VC 636/5-5 (LL-DE)	473 mm

4.4 Minimum clearances



► When using the accessories, observe the minimum clearances/installation clearances.

Minimum clearances

A	B	C	D
≥ 275 mm	≥ 180 mm	≥ 5 mm	≥ 500 mm

– Optimum dimension **(B)**: ≈ 250 mm
– Optimum dimension **(C)**: ≈ 50 mm
– Dimension **(D)**: The clearance in front of the product to facilitate easy access for maintenance work can be reduced to 5 mm if there is a door in front of the product

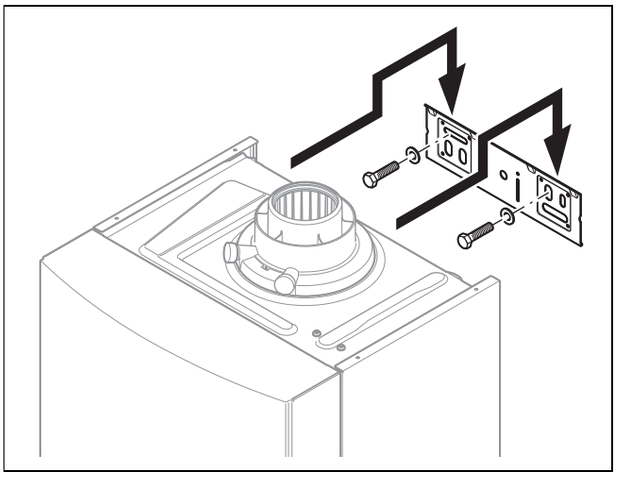
4.5 Clearance from combustible components

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

4.6 Using the mounting template

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

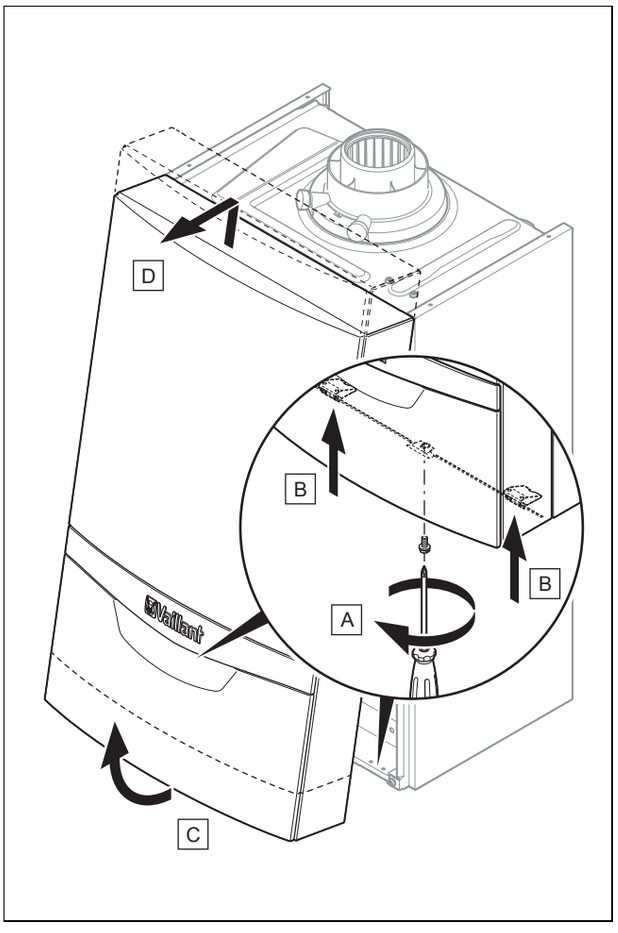
4.7 Wall-mounting the product



1. Check the load-bearing capacity of the wall.
2. Note the total weight of the product.
3. Only use fixing material that is permitted for the wall.
4. If required, ensure that mounting apparatus on-site has sufficient load-bearing capacity.
5. Wall-mount the product as described.

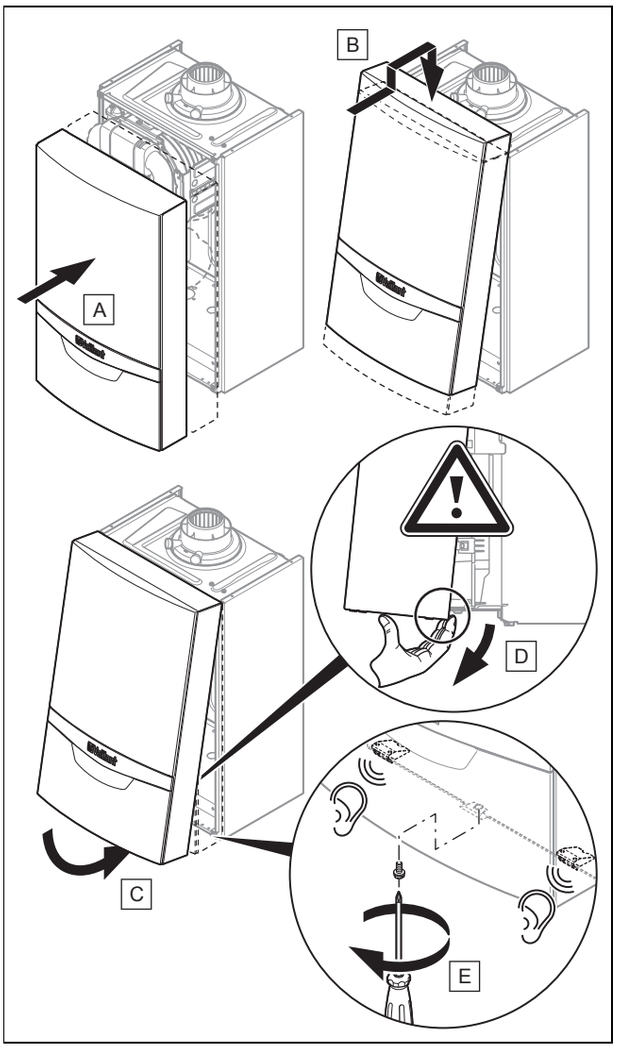
4.8 Removing/installing the front casing

4.8.1 Removing the front casing



1. Undo the screw **(A)**.
2. Push in both retaining clips **(B)** so that the front casing is released.
3. Pull the front casing forwards at the bottom edge **(C)**.
4. Lift the front casing upwards from the bracket **(D)**.

4.8.2 Installing the front casing



1. Place the front casing **(A)** on the upper retainer **(B)**.
2. Hinge the front casing down in the direction of the product **(C)**.
3. Push the front casing onto the product and, in doing so, ensure that the insulation is not damaged **(D)**.
4. Let the retaining clips on the front casing snap into place.
5. Tighten the screw **(E)** in order to secure the front casing.

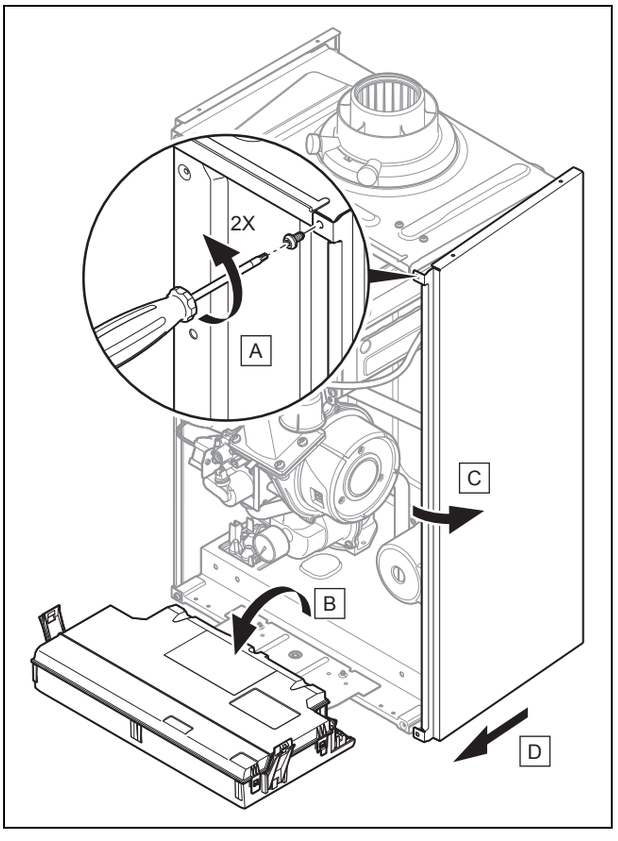
4.9 Removing/installing the side section

4.9.1 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.

4.9.2 Installing the side section

► Install the side section; to do so, proceed in reverse order to how you removed it.

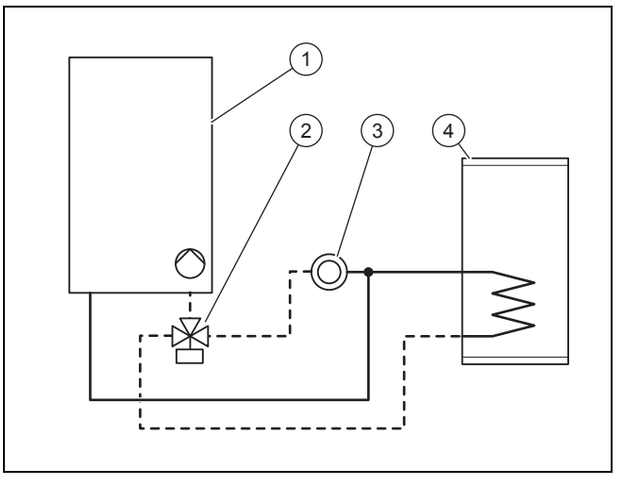
5 Installation

5.1 Sample system installations

► Use the basic installation diagrams as examples.
► Select the basic installation diagram based upon which you want to configure your installation.
► Only install the control systems that are listed in the tables for the basic system diagrams in order to ensure that all of the system's functions are available.
► Establish the connections correctly.
► Observe the applicable national and international laws, standards and directives.
► With older installations in particular, install a magnetic filter at the heating circuit return in order to protect the product against dirt from the installation.
  – Ensure that there is sufficient dimensioning in order to prevent it from blocking quickly and to prevent high pressure losses.
► Observe the information on treating heating water. (→ Page 20)
  ▽ If you cannot guarantee the conditions for treating the heating water, install an external plate heat exchanger to protect the product.
► Install the required safety devices and system components in the installation.

5.1.1 Basic system diagram type 1: One direct heating circuit with one optional domestic hot water cylinder

Note
This basic diagram type can then only be used if the product's pump is the only pump in the system.



1	Wall-hung boiler with internal pump	3	Heating circuit
2	Prioritising diverter valve	4	Domestic hot water cylinder

► To use this basic diagram type, ensure that the product works within the defined operating ranges. (→ Page 28)

Number for the basic diagram	Control system	Number of circuits	Carrying out the wiring
0020253233	Without control	1	See appendix.
0020253235	**VRC 700** system control	1	Inform Customer Service.
0020253236	**eRELAX** connected control	1	Inform Customer Service.

Note

The example of a basic installation diagram that is shown in the appendix does not replace any correct and expert system planning. (→ Page 50)

The settings for the internal pump are made at the factory.

- ► Ensure that there is sufficient dimensioning for the connections and the domestic hot water cylinder. (→ Page 13)
- ► Connect the external prioritising diverter valve to the plug *X13* on the main PCB.
- ► In order to control the cylinder's post-heating, connect a **VR 10** temperature sensor or a thermostat to the plug that is connected to the main PCB.
  Wiring diagram (→ Page 48)

To start up the prioritising diverter valve, it is not necessary to set a diagnostics code. It is directly actuated by the product's main PCB.

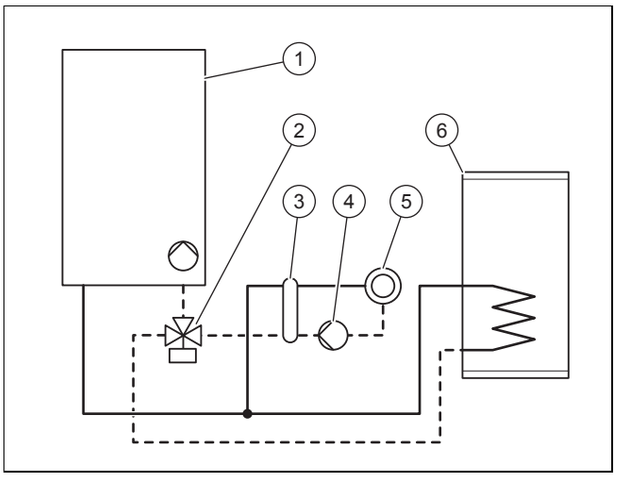
5.1.2 Basic system diagram type 2: Decoupled heating circuit plus one directly connected domestic hot water cylinder

Applicability: Germany

OR Luxemburg

Note

This basic diagram is not compatible with *proKLIMA*.



1 Wall-hung boiler with internal pump
2 Prioritising diverter valve
3 Low loss header or plate heat exchanger
4 External pump for the decoupled heating circuit
5 Heating circuit
6 Domestic hot water cylinder

- ► In order to use this basic diagram type, ensure that the minimum flow volumes are guaranteed for the operation. (→ Page 54)

The product can control a decoupled heating circuit and a directly connected domestic hot water cylinder.

Number for the basic diagram	Control system	Number of circuits	Carrying out the wiring
0020253238	**VRC 700** system control	1	Inform Customer Service.
0020253239	**VRC 700** system control **VR 70** multifunctional module	2	Inform Customer Service.
0020259027	**VRC 700** system control **VR 71** multifunctional module	>3	Inform Customer Service.

The settings for the internal pump are made at the factory.

- ► Ensure that there is sufficient dimensioning for the connections and the domestic hot water cylinder. (→ Page 13)
- ► Downstream of the low loss header, select a heating pump that is appropriate for the installation.
- ► Connect the external pump for the decoupled heating circuit to the plug *X16* for the main PCB.
- ► Connect the external prioritising diverter valve to the plug *X13* on the main PCB.
- ► Connect the temperature sensor for the low loss header to plug *X41* on the main PCB. Observe the instructions for the low loss header.
- ► In order to control the cylinder's post-heating, connect a **VR 10** temperature sensor or a thermostat to the plug that is connected to the main PCB.
  Wiring diagram (→ Page 48)
- ► Set diagnostics code **D.026** to 2.
  Overview of diagnostics codes (→ Page 39)

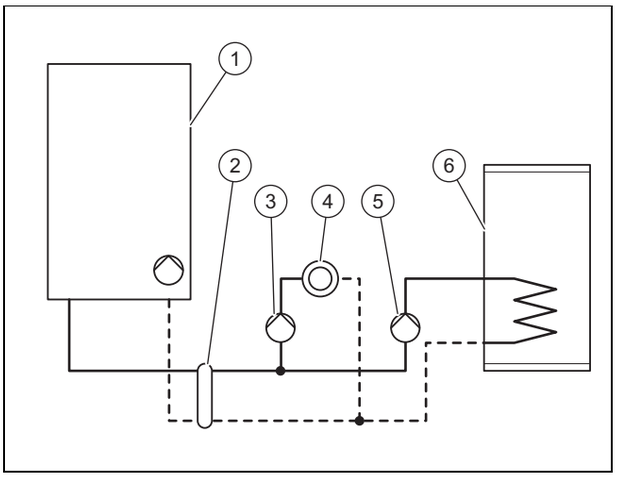
5.1.3 Basic system diagram type 3: Decoupled heating circuit plus one decoupled domestic hot water cylinder

Applicability: Germany

OR Luxemburg

Note

This basic diagram is not compatible with *proKLIMA*.



1 Wall-hung boiler with internal pump
2 Low loss header or plate heat exchanger
3 External pump for the decoupled heating circuit
4 Heating circuit
5 External pump for the decoupled domestic hot water circuit
6 Domestic hot water cylinder

The product can control a decoupled heating circuit and a decoupled domestic hot water cylinder.

Number for the basic diagram	Control system	Number of circuits	Carrying out the wiring
0020259029	**VRC 700** system control	1	Inform Customer Service.
0020259030	**VRC 700** system control **VR 70** multi-functional module	2	See appendix.
0020259031	**VRC 700** system control **VR 71** multi-functional module	>3	Inform Customer Service.

Note

The example of a basic installation diagram that is shown in the appendix does not replace any correct and expert system planning. (→ Page 50)

The settings for the internal pump are made at the factory.

- ► Ensure that there is sufficient dimensioning for the connections and the domestic hot water cylinder. (→ Page 13)
- ► Downstream of the low loss header, select a heating pump that is appropriate for the installation.
- ► Downstream of the low loss header, select a domestic hot water pump that is suitable for the domestic hot water cylinder.
- ► Connect the external pump for the decoupled heating circuit to the plug *X16* for the main PCB.
- ► Connect the pump for the decoupled domestic hot water circuit to the plug *X13* for the main PCB.
- ► Connect the temperature sensor for the low loss header to plug *X41* on the main PCB. Observe the instructions for the low loss header.
- ► In order to control the cylinder's post-heating, connect a **VR 10** temperature sensor or a thermostat to the plug that is connected to the main PCB.
  Wiring diagram (→ Page 48)
- ► Set diagnostics code **D.026** to 2.
  Overview of diagnostics codes (→ Page 39)

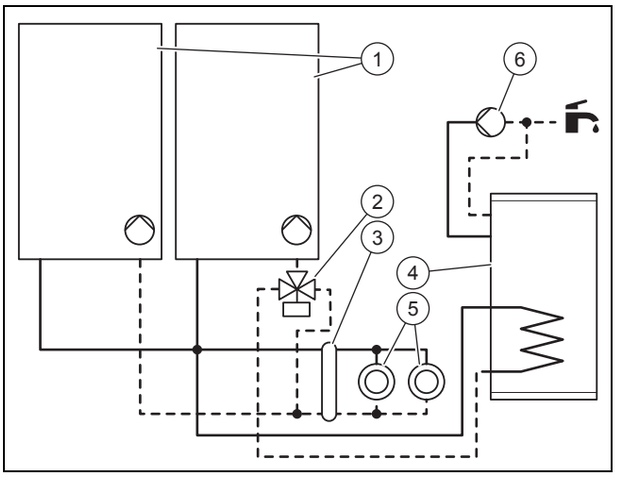
5.1.4 Basic system diagram type 4: Cascade with two boilers plus one cylinder that is connected to the boiler

Applicability: Germany

OR Luxemburg

Note

This basic diagram is not compatible with *proK-LIMA*.



1 Wall-hung boiler with internal pump
2 Prioritising diverter valve
3 Low loss header or plate heat exchanger
4 Domestic hot water cylinder
5 Heating circuits
6 External domestic hot water circulation pump

The product can control a cascade system.

Number for the basic diagram	Control system	Number of circuits	Carrying out the wiring
0020259032	**VRC 700** system control **VR 70** multi-functional module	2	Inform Customer Service.

The settings for the internal pump are made at the factory.

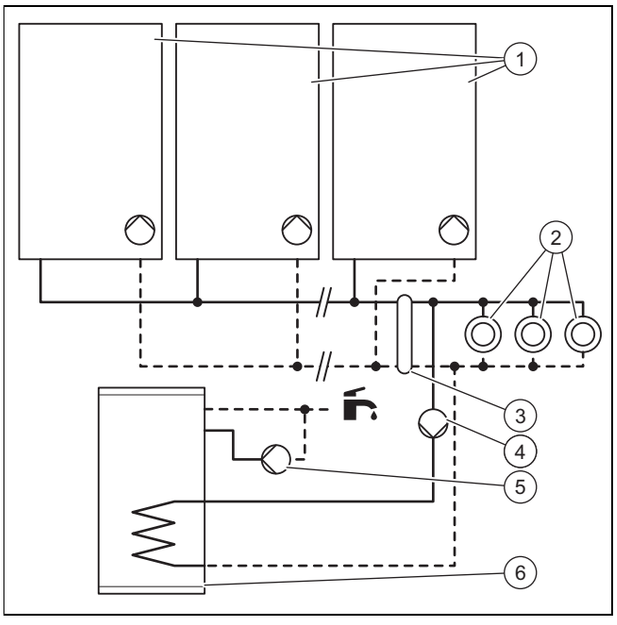
- ► Ensure that there is sufficient dimensioning for the connections and the domestic hot water cylinder. (→ Page 13)
- ► Connect the domestic hot water circulation pump to the plug *X16* on the main PCB.
- ► Connect the external prioritising diverter valve to the plug *X13* on the main PCB.

- ► Connect the temperature sensor for the low loss header to plug *X41* on the main PCB. Observe the instructions for the low loss header.
- ► In order to control the cylinder's post-heating, connect a **VR 10** temperature sensor or a thermostat to the plug that is connected to the main PCB.
  Wiring diagram (→ Page 48)
- ► Set diagnostics code **D.026** to 1.
  Overview of diagnostics codes (→ Page 39)

5.1.5 Basic system diagram type 5: Cascade with two to seven boilers + a cylinder that is connected to the heating circuit

Applicability: Germany
OR Luxemburg

Note
This basic diagram is not compatible with *proK-LIMA*.



1	Wall-hung boiler with internal pump	4	External pump for the decoupled domestic hot water circuit
2	Heating circuits	5	External domestic hot water circulation pump
3	Low loss header or plate heat exchanger	6	Domestic hot water cylinder

The product can control a cascade system.

Number for the basic diagram	Control system	Number of circuits	Carrying out the wiring
0020259033	**VRC 700** system control **VR 71** multi-functional module	>3	Inform Customer Service.

The settings for the internal pump are made at the factory.

- ► Ensure that there is sufficient dimensioning for the connections and the domestic hot water cylinder. (→ Page 13)
- ► Downstream of the low loss header, select a domestic hot water pump that is suitable for the domestic hot water cylinder.
- ► Connect the pump for the decoupled domestic hot water circuit to the plug *X13* for the main PCB.
- ► Connect the temperature sensor for the low loss header to plug *X41* on the main PCB. Observe the instructions for the low loss header.
- ► In order to control the cylinder's post-heating, connect a **VR 10** temperature sensor or a thermostat to the plug that is connected to the main PCB.
  Wiring diagram (→ Page 48)
- ► Set diagnostics code **D.026** to 1.
  Overview of diagnostics codes (→ Page 39)

5.2 Selecting the domestic hot water cylinder

The product can control an optional domestic hot water cylinder (recommended option for products with an output below 50 kW).

- ► Use a low loss header for products that are connected to a domestic hot water cylinder and have a domestic hot water output requirement of over 50 kW, . (→ Page 13)
- ► Use the following components to connect the domestic hot water cylinder:

Domestic hot water cylinder

	Cylinder	Internal diameter of the connection
VC 406/5-5 (E-DE)	**VIH R 300**	20 mm
VC 406/5-5 (LL-DE)	**VIH R 300**	20 mm
VC 476/5-5 (E-DE)	**VIH R 300**	20 mm
VC 476/5-5 (LL-DE)	**VIH R 300**	20 mm
VC 636/5-5 (E-DE)	**VIH R 500**	25 mm
VC 636/5-5 (LL-DE)	**VIH R 500**	25 mm

5.3 Selecting a low loss header

Applicability: Germany
OR Luxemburg

Note
Low loss headers are not compatible with *proK-LIMA*.

The low loss header disconnects the heat generator hydraulically from the heating system. This prevents feed head interactions between the individual circulation pumps. Furthermore, the low loss header ensures that a sufficient minimum volume of water continuously circulates through the heat generator.

- ► Observe the information on treating heating water. (→ Page 20)
  - ▽ If you cannot guarantee the conditions for treating the heating water, install an external plate heat exchanger to protect the product.

Low loss header

	Heating system spread		
	10 K	15 K	20 K
VC 406/5-5 (E-DE)	WH 95	WH 40-2	WH 40-2
VC 406/5-5 (LL-DE)	WH 95	WH 40-2	WH 40-2
VC 476/5-5 (E-DE)	WH 95	WH 40-2	WH 40-2
VC 476/5-5 (LL-DE)	WH 95	WH 40-2	WH 40-2
VC 636/5-5 (E-DE)	WH 160	WH 95	WH 40-2
VC 636/5-5 (LL-DE)	WH 160	WH 95	WH 40-2

► Observe the instructions for the low loss header.

You do not require any electronic accessories when using a low loss header. You can connect simple installations directly inside the electronics box.

► Observe the wiring diagram.
Wiring diagram (→ Page 48)

5.4 Requirements

Applicability: Germany
OR Luxemburg

Note
Low loss headers are not compatible with *proKLIMA*.

► Make sure that the existing gas meter is capable of passing the rate of gas supply required. (→ Page 54)
► If the hydraulic circuit contains a pump other than the one for the product, only start up the product if a sufficiently dimensioned low loss header is installed between the heat generator circuit and the heating circuit or the cylinder charging circuit.
Low loss header (→ Page 14)
► If the product's pump is the only circulation pump in the hydraulic circuit, check whether the product's feed head is sufficient for the installation. (→ Page 28)
▽ If this is not the case, use an appropriately designed low loss header and circulation pump.
► Ensure that the installation has the following components:
– A gas stopcock for the unit
– A filling/draining device in the heating installation
► With older installations in particular, install a magnetic filter at the heating circuit return in order to protect the product against dirt from the installation.
– Ensure that there is sufficient dimensioning in order to prevent it from blocking quickly and to prevent high pressure losses.

5.4.1 Information on liquid gas operation

In the as-supplied 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 instructions supplied with the conversion set.

5.4.2 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.

5.4.3 Using the correct gas type

Using the incorrect gas type 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.

5.5 Connecting gas and water

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 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 residues in the pipelines.
Welding remnants, sealing residues, dirt or other residues in the pipelines may damage the product.
► Flush the heating installation thoroughly before installing the product.

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.

Seals made of rubber-like materials may be subject to plastic deformation, which can lead to pressure losses.

► Use fibre seals.

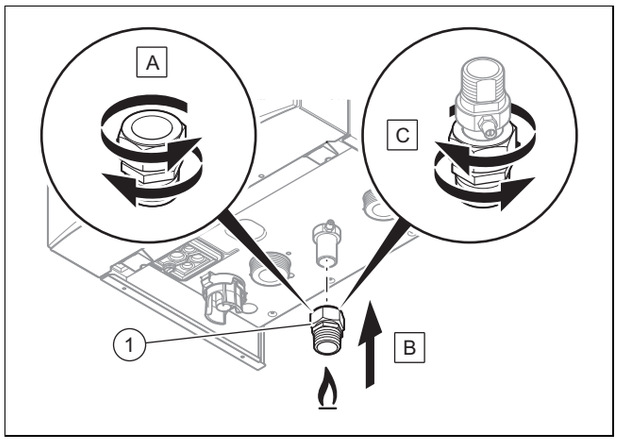
5.5.1 Gas connection

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 assembly.

- ► If, during gas leak-tightness tests, you also place the gas pipes and the gas valve assembly 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 stopcocks 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 stopcock that is installed upstream of the product, relieve the gas line pressure before you open this gas stopcock.

- ► Do not reduce the gas pipe dimension downstream of the gas meter.
- ► Maintain the dimension right up to the product.
- ► Select the correct gas stopcock.
- ► Remove the residues from the gas pipe by blowing through the gas pipe beforehand.



- ► Undo the press connection **(A)**.
- ► Install an approved gas stopcock at the connection **(1)**.
- ► Install the unit on the gas pipe at the product's outlet **(B)** by tightening the compression fitting **(C)**.
- ► Install the gas pipe such that it is free from mechanical stress in accordance with the recognised rules of technology.
- ► Purge the gas pipe before start-up.

5.5.2 Checking the gas line for leak-tightness

- ► Check the entire gas line properly for leak-tightness.

5.5.3 Hydraulic connection

Caution.
Risk of material damage caused by corrosion

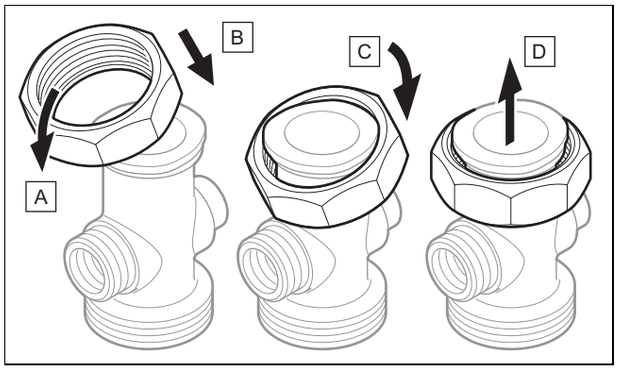
Due to non-diffusion-tight plastic pipes in the heating installation, air gets into the heating water. Air in the heating water causes corrosion in the heat generator circuit and in the product.

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

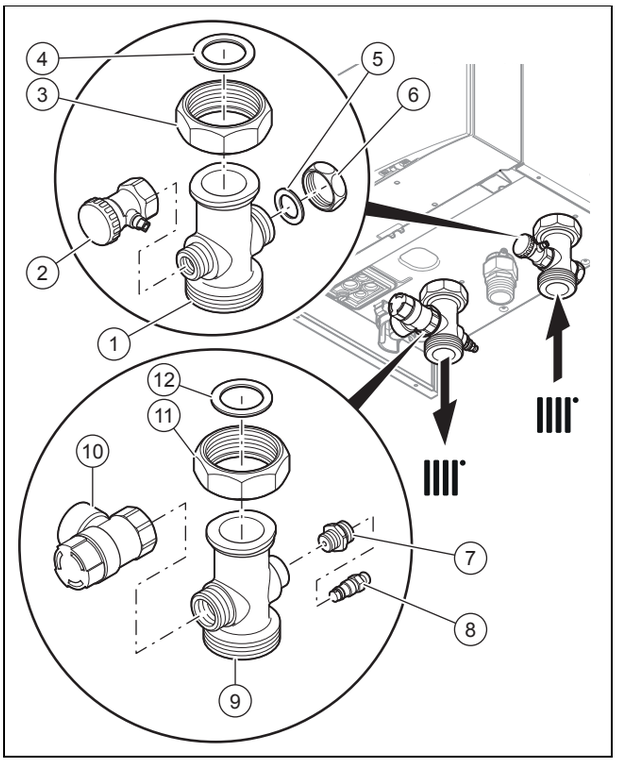
Note
In order to keep heat losses to a minimum, we recommend that you provide heat insulation for the water pipe spigots on the product's outlet and on the installation.

- ► If you are using plastic pipes in the heating installation, install a safety cut-out in the heating flow.
  - – The safety cut-out is required to protect the heating installation against temperature-related damage if a fault occurs.
- ► Connect a control or a safety cut-out to the electronics. (→ Page 19)

5.5.3.1 Connecting the heating flow and heating return



1. Attach the nut to the connection in accordance with steps **(A)** to **(D)**.



2. Assemble the heating return connection as shown by numbers **(1)** to **(6)**.
3. Assemble the heating flow connection as shown by numbers **(7)** to **(12)**.
4. Connect the heating circuit to the connections for the heating flow and return.
5. Install an expansion vessel in the heating return **(6)**, as close to the product as possible.
   – Ensure that the volumetric capacity of the expansion vessel is sufficient for the system volume.

5.5.4 Connecting the drainage devices

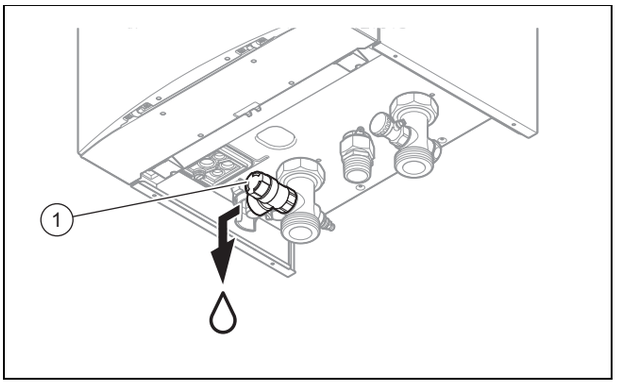
Caution.

Risk of water flowing out below the product

The water drains for the rainwater collecting device and the dynamic air separation system are not connected to the waste-water outflow, but water may escape.

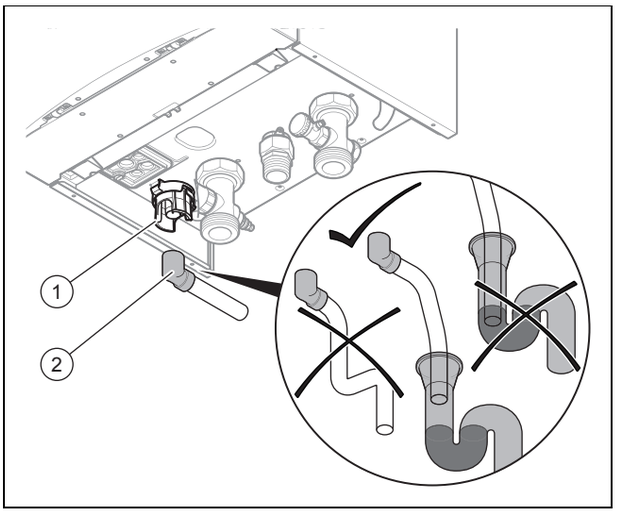
► Do not place any electrical units or objects that may be damaged by water below the product.

5.5.4.1 Connecting the drain pipework for the expansion relief valve



1. Connect the expansion relief valve **(1)** to a suitable draining circuit. Make sure that the drain hose remains open to the surrounding air.
2. Lay drain pipework for the expansion relief valve that is as short as possible, at a downward gradient.
3. Terminate the drain pipework in such a way that escaping water or steam cannot cause injury to persons or damage to electronic components.
4. Make sure that the line end is visible.

5.5.4.2 Connecting the condensate discharge pipe.



► Follow the instructions listed here and observe the legal and local regulations on condensate discharge.
► Use PVC or any other material that is suitable for draining the non-neutralised condensate.
► 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 condensate discharge pipe has a continuous downward gradient (45 mm per metre) and that a drain is possible at a suitable location in a heated room in the building.
► Ensure that the connection between the condensate discharge pipe and the condensate discharge hose is not air-tight.
► Connect the condensate siphon **(1)**. Use the supplied condensate discharge hose **(2)** to do this.

► Connect a condensate discharge pipe (not included in the scope of delivery) to the condensate discharge hose **(2)**.

5.6 Installing and connecting the air pipe and flue pipe

5.6.1 Installing and connecting the air/flue pipe

1. You can find out which air/flue pipes may be used by consulting the enclosed set-up instructions for the air/flue system.

Conditions: Installation in damp rooms

► Connect the product to a room-sealed air/flue system.
  – 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 air/flue pipe using the set-up instructions.

5.6.2 B23 installation

A flue system for permitted unit type B23 (atmospheric gas-fired wall-hung boilers) requires careful planning and implementation.

► Observe the product's technical data when planning.
► Use the recognised rules of technology.

5.6.3 Information and specifications for installing the B23P

Applicability: B23P

The flue system must at least correspond to the classification T 120 P1 W 1 in accordance with EN 1443. The maximum pipe length must be calculated based on the permissible pressure difference in the technical data.

The maximum pipe length (straight pipe only) corresponds to the maximum permitted flue pipe length without any elbows. If elbows are used, the maximum pipe length must be reduced in accordance with the dynamic flow characteristics of the elbows. Elbows must not be connected directly after one another as this method dramatically increases pressure losses.

In particular, if the flue pipe is installed in cold rooms or outside of the building, the freezing point on the surface of the inside of the pipe may be reached. Since the product is designed in accordance with EN 13384-1, this problem should not occur with the minimum boiler load at a flue gas temperature of 40 °C. The product must not be connected to a cascade flue system that is being used by other products.

► Observe the applicable international, national and local regulations for flue systems, in particular for installations in living rooms. Inform the end user how to correctly operate the product.

5.6.4 Installation with flue non-return flap

When installing a flue non-return flap, you must set the minimum output in order to prevent ignition problems.

► Use diagnostics code **D.085** to set the minimum output. (→ Page 26)

Setting the minimum output of the product

	D.085 (factory setting)	Setting D.085 for the flue non-return flap
VC 406/5-5 (E-DE)	8 kW	13 kW
VC 406/5-5 (LL-DE)	8 kW	13 kW
VC 476/5-5 (E-DE)	8 kW	13 kW
VC 476/5-5 (LL-DE)	8 kW	13 kW
VC 636/5-5 (E-DE)	11 kW	16 kW
VC 636/5-5 (LL-DE)	11 kW	16 kW

5.6.5 Air/flue pipe in long lengths

Applicability: Germany
OR Luxemburg

► If the length of the air/flue pipe is between 15 and 18 metres, adjust the setting for the product code **D.093** in accordance with the following table.

Changing the product code

VC 406/5-5 (E-DE)	171
VC 406/5-5 (LL-DE)	171
VC 476/5-5 (E-DE)	174
VC 476/5-5 (LL-DE)	174

► Specify the new product code on the sticker on the rear of the electronics box.

5.7 Electrical installation

Danger!

Risk of death from electric shock!

Power supply terminals *L* and *N* remain live even if the on/off button is turned off:

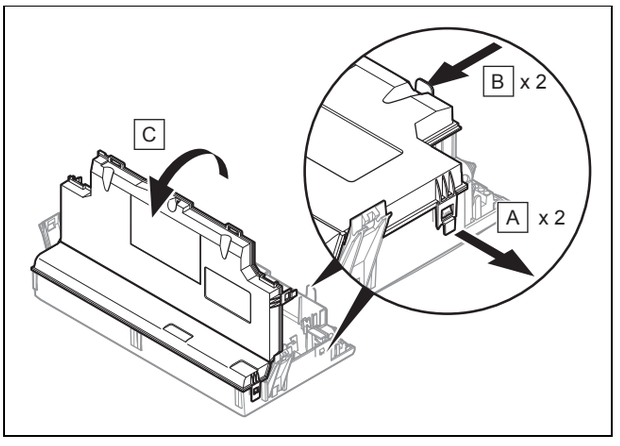
► Switch off the power supply.
► Secure the power supply against being switched back on again.

Only qualified electricians may carry out the electrical installation.

5.7.1 Opening/closing the electronics box

5.7.1.1 Opening the electronics box

1. Remove the front casing. (→ Page 9)



2. Tilt the electronics box forward.
3. Loosen the four clips from the retainers **(A)** and **(B)** on the electronics box.
4. Hinge the cover **(C)** up.

5.7.1.2 Closing the electronics box

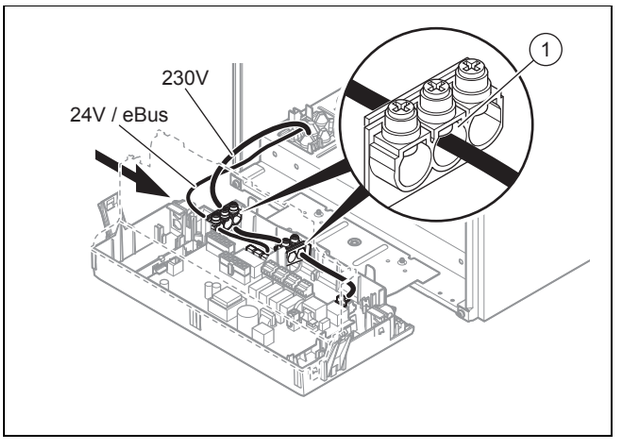
1. Close the cover by pushing it downwards onto the electronics box.
2. Ensure that all of the clips audibly click into the retainers.
3. Tilt the electronics box upwards.

5.7.2 Carrying out the wiring

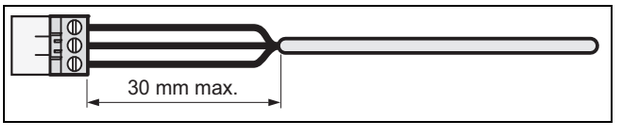
Caution.
Risk of material damage caused by incorrect installation.

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

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



1. Route the connection cables for the components to be connected in the cable trunking on the left of the underside of the product.
2. Use the strain reliefs **(1)**.
3. Shorten the connection cables as necessary.

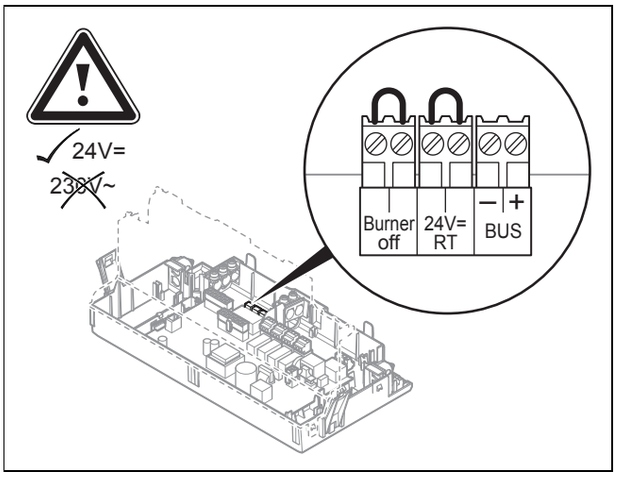


4. Only strip the outer sheathing of flexible lines to a maximum of 30 mm to prevent short circuits if a strand accidentally comes loose.
5. Ensure the inner conductor insulation is not damaged when stripping the outer sheathing.
6. Only strip inner conductors just enough to establish good, sound connections.
7. To avoid short circuits resulting from loose individual wires, fit conductor end sleeves on the stripped ends of the conductors.
8. Screw the plug to the connection cable.
9. Check whether all conductors are properly fastened to the connection terminals of the plug. Remedy this if necessary.
10. Plug the plug into the slot provided on the PCB in accordance with the wiring diagram in the appendix.

5.7.3 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 gap of at least 3 mm at each pole.
2. Plug the plug for the power supply cable into a suitable plug socket.
3. Make sure that access to the power supply is always available and is not covered or blocked.

5.7.4 Connecting controls to the electronics



1. Open the electronics box. (→ Page 18)
2. Carry out the wiring. (→ Page 18)
3. **Alternatives 1 – Connecting the weather-compensated *eBUS* control or *eBUS* room temperature control:**
   - ► Connect the control to the *BUS* plug.
   - ► Bridge the *24V=RT* plug if it is not already bridged.
3. **Alternatives 2 – Connecting a *24 V* extra low voltage room temperature control:**
   - ► Instead of the bridge, connect the control to the *24 V* plug.
3. **Alternatives 3 – Connecting limit thermostats for the underfloor heating:**
   - ► Connect the limit thermostat to the *Burner off* plug instead of the bridge.
4. Close the electronics box.
5. To trigger the **Comfort** pump operating mode (pump runs permanently) using a multi-circuit control, change the diagnostics code **D.018** pump operating mode from **Eco** (pump runs intermittently) to **Comfort**. (→ Page 27)

5.7.5 Connecting the hydraulic accessory

- ► Connect the hydraulic accessory in accordance with the selected basic system diagram. (→ Page 10)

5.7.6 Connecting additional components

You can use the integrated additional relay to actuate an additional component.

You can use the optional multi-functional module to actuate two further additional components.

5.7.6.1 Using the additional relay

1. Connect an additional component directly to the integrated additional relay using the grey plug on the PCB.
2. Carry out the wiring. (→ Page 18)
3. Select **D.026** to actuate the connected component. (→ Page 26)

5.7.6.2 Using the VR 40 (2 in 7 multi-functional module)

1. Install the components in accordance with the respective instructions.
2. Select **D.027** to actuate relay 1 on the multi-functional module. (→ Page 26)
3. Select **D.028** to actuate relay 2 on the multi-functional module. (→ Page 26)

6 Operation

6.1 Operating concept

The operating concept and the display and setting options of the end user level are described in the operating instructions.

6.2 Calling up the installer level

Caution.

Risk of material damage caused by incorrect handling.

Incorrect settings at installer level may cause damage and operating faults to the heating installation.

- ► You must only access the installer level if you are an approved competent person.

Note

The installer level is protected against unauthorised access using an access code.

1. Press the ⊟ and ⊟ ("i") buttons at the same time.
   - ◁ The following menu appears in the display.
2. Use the ⊟ or ⊞ button to scroll until the **Installer level** menu item appears.
3. Confirm by pressing (**OK**).
   - ◁ The text **Enter code** and the value 00 appear in the display.
4. Use ⊟ or ⊞ to set the value 17 (access code).
5. Confirm by pressing (**OK**).
   - ◁ The installer level appears with a selection of menu items.

6.3 Live Monitor (status codes)

Menu → Live monitor

Status codes in the display provide information on the product's current operating mode.

Status codes – Overview (→ Page 42)

6.4 Calling up appliance config. and diagnostics menu

To recheck and reset the most important system parameters, call up the **Appliance config.** menu item.

Menu → Installer level → Appliance config.

The setting options for more complex installations can be found in the **Diagnostics menu**.

Menu → Installer level → Diagnostics menu

Overview of diagnostics codes (→ Page 39)

6.5 Using test programmes

As well as the installation assistants, you can also call up the test programmes for start-up, service and troubleshooting.

Menu → Installer level → Test programs

In addition to the **Function menu**, the product comprises an **Electronics self-test** but also **Check programs** (→ Page 23).

7 Start-up

7.1 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.

Applicability: Germany

► 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.

Applicability: Germany

OR Luxemburg

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.						

Applicability: Germany

OR Luxemburg



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

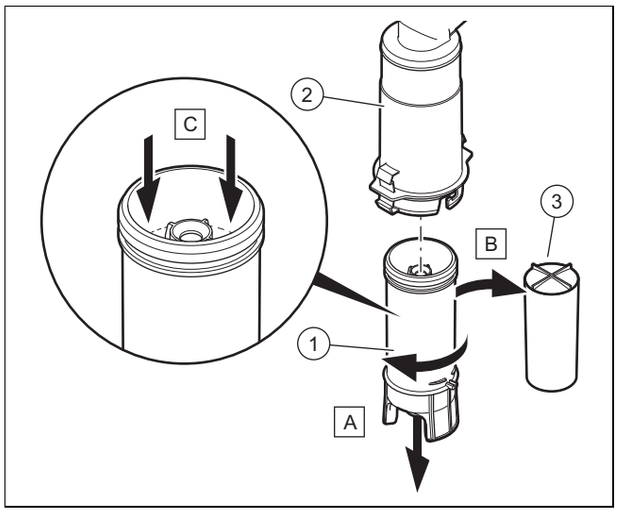
– Adey MC1+
– Fernox F1
– Fernox F2
– Sentinel X 100
– Sentinel X 200

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.

7.2 Filling the condensate siphon



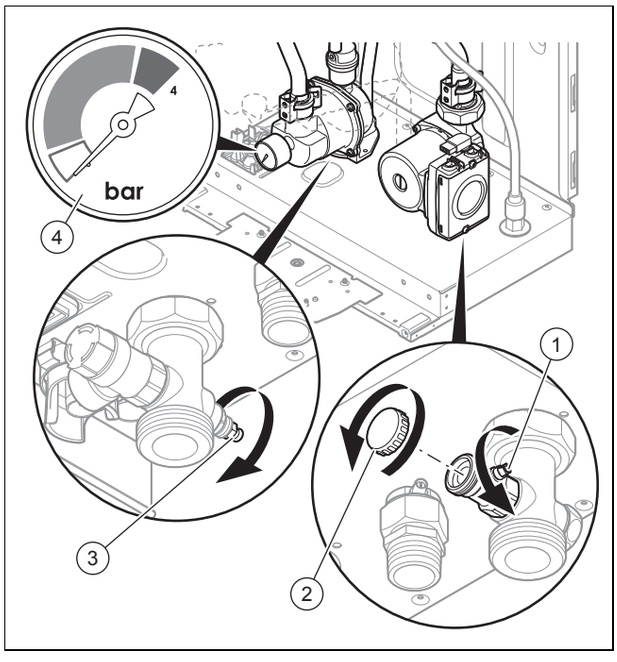
1. Unclip the lower section of the siphon **(1)** from the upper section of the siphon **(2)** without removing the product's front casing.
2. Remove the float **(3)**.
3. Fill the lower section of the siphon with water up to 10 mm below the upper edge of the condensate discharge pipe.
4. Re-insert the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

Note
Check whether 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)**.

7.3 Filling the heating installation

1. Flush the heating installation thoroughly before filling it.
2. Observe the information on treating heating water. (→ Page 20)
   ▽ If you cannot guarantee the conditions for treating the heating water, install an external plate heat exchanger to protect the product.



3. Open the plugs **(2)** and then connect the filling/draining cock connection to a heating water supply in accordance with the relevant standards.
4. Open the heating water supply.
5. Open all thermostatic radiator valves.
6. If necessary, check that both service valves on the product are open.
7. Slowly open the filling/draining cock **(1)** so that the water flows into the heating installation.
8. Open the air separator **(3)** and wait until the water flows out of the air separator without bubbles.
9. Purge all of the radiators until the entire heating installation is filled with water.
10. Close all purging valves.
11. Use the manometer **(4)** to monitor the rising filling pressure in the heating installation.
    – To optimise the purging, the pressure should be limited in such a way that it lies in the first third of the grey display field on the manometer. Once the purging procedure is complete, the digital manometer can be used to set the hydraulic pressure depending on the distribution network (required feed head, multilevel installation, etc.).
12. Fill it with water until the required filling pressure is reached.

Filling pressure

	Recommended filling pressure	Maximum filling pressure
VC 406/5-5 (E-DE)	0.15 … 0.25 MPa (1.50 … 2.50 bar)	< 0.40 MPa (< 4.00 bar)
VC 406/5-5 (LL-DE)	0.15 … 0.25 MPa (1.50 … 2.50 bar)	< 0.40 MPa (< 4.00 bar)
VC 476/5-5 (E-DE)	0.15 … 0.25 MPa (1.50 … 2.50 bar)	< 0.40 MPa (< 4.00 bar)
VC 476/5-5 (LL-DE)	0.15 … 0.25 MPa (1.50 … 2.50 bar)	< 0.40 MPa (< 4.00 bar)
VC 636/5-5 (E-DE)	0.15 … 0.25 MPa (1.50 … 2.50 bar)	< 0.40 MPa (< 4.00 bar)
VC 636/5-5 (LL-DE)	0.15 … 0.25 MPa (1.50 … 2.50 bar)	< 0.40 MPa (< 4.00 bar)

13. Close the filling/draining cock and the heating water supply.
14. Check all of the connections and the entire circuit for leaks.

7.4 Starting up the product

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

7.5 Running the installation assistants

The installation assistant is displayed whenever the product is switched on until it has been successfully completed. It provides direct access to the most important check programmes and configuration settings for starting up the product.

► Confirm the launch of the installation assistant.
◁ All heating demands are blocked whilst the installation assistant is active.
► To access the next item, confirm by pressing **Next** in each case.
▽ If you do not confirm the launch of the installation assistant, it is closed 10 seconds after you switch on the unit and the basic display then appears.

7.5.1 Language

► Set the required language.
► Press **OK** twice to confirm the set language and to avoid unintentionally changing it.

If you have unintentionally set a language that you do not understand, proceed as follows to change it:

► Press and hold the ⊟ and ⊞ buttons at the same time.
► Also press the reset button for a short time.
► Press and hold ⊟ and ⊞ until the display shows the language setting option.
► Select the required language.
► Press **OK** twice to confirm this change.

7.5.2 Filling the heating circuit

This function is displayed but it is not yet active for this product type.

7.5.3 Purging the heating installation

Purging (corresponds to check programme **P.00**) is activated automatically by the installation assistant and remains in the display for as long as the purging is active. Without the installation assistant, purging also occurs automatically.

The programme must be carried out once or else the product will not start.

► If the radiators in the house are equipped with thermostatic valves, ensure that all thermostatic valves are open so that the circuit can be purged effectively.
► To ensure that the purging takes place correctly, the filling pressure of the heating installation must not fall below the minimum filling pressure.
– Minimum heating installation filling pressure: 0.08 MPa (0.80 bar)

Note

Check programme **P.00** runs for approx. 6.5 minutes for each circuit.

At the end of the filling procedure, the filling pressure of the heating installation must be at least 0.02 MPa (0.2 bar) above the counter-pressure of the expansion vessel ("Exp") ($P_{Installation} \geq P_{Exp}$ + 0.02 MPa (0.2 bar)).

If, at the end of the purge programme, the flow rate that is achieved is insufficient, fault code **F75** appears in conjunction with diagnostics code **D.149** = 8. The purge programme is considered to have failed and is repeated.

► Ensure that all of the stopcocks in the hydraulic installation are open.
► Ensure that the thermostatic valves on the radiators are open.
► Press the product's reset button to restart an automatic purge programme.
► Check all connections for tightness.

7.5.4 Setting the target heating temperature

You can use this setting to adjust the required target heating temperature.

7.5.5 Setting the target hot water temperature

This setting is only possible if a domestic hot water cylinder (optional) is installed in the system. This means that the required target hot water temperature can be adjusted (by post-heating the cylinder).

7.5.6 Setting the maximum heating output

The product's maximum heating output can be adjusted to the installation's heat demand. Use diagnostics code **D.000** to set a value that corresponds to the unit output in kW.

7.5.7 Additional relay and multi-functional module

Additional components that are connected to the installation can be adjusted in these menu items. You can use diagnostics codes **D.026**, **D.027** and **D.028** to change the setting.

7.5.8 Telephone: Competent person

You can store your telephone number in the product menu. The end user can view the telephone number. The telephone number can be up to 16 digits long and must not contain any spaces.

7.5.9 Ending the installation assistant

Once the installation assistant has been completed and confirmed, it will not start up automatically next time the unit is switched on.

7.5.10 Restarting the installation assistants

You can restart the installation assistant at any time by calling it up in the menu.

Menu → Installer level → Start inst. assistant

7.6 Preventing low water pressure

To prevent damage to the heating installation that is caused by low filling pressure, the product is fitted with a water pressure sensor. If the filling pressure falls below 0.1 MPa (1.0 bar), the product indicates low pressure by displaying a flashing pressure value. If the filling pressure falls below 0.05 MPa (0.5 bar), the product switches off. The display shows **F.22**.

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

The pressure value flashes on the display until a pressure of 0.11 MPa (1.1 bar) or higher has been reached.

► If you notice frequent drops in pressure, determine and eliminate the cause.

The purging function is automatically active after a filling procedure.

7.7 Using check programmes

Menu → Installer level → Test programs → Check programs

You can activate various special functions in the product by using various check programmes.

Display	Meaning
P.00	Purging check programme: The internal pump is cyclically actuated. The heating circuit and the domestic hot water circuit are purged via the air separation system. 1 x ⊡: Start the heating circuit purging 2 x ⊡ (→): Start the domestic hot water circuit purging 3 x ⊡ (→): Restart the heating circuit purging 1 x ⊡ (**Cancel**): End the purge programme **Note** The purging programme runs for 6.5 minutes per circuit and then terminates.
P.01	Maximum load check programme: After successful ignition, the product is operated at maximum heat input if the flow rate in the heating circuit permits this. Otherwise, the power is reduced in order to adapt to the flow rate.
P.02	Minimum load check programme: After successful ignition, the product is operated at minimum heat input if the flow rate in the heating circuit permits this. Otherwise, the product does not ignite and it remains in waiting mode (status code **S.85**).

Note

If the product is in error condition, you cannot start any check programmes. You can detect an error condition by the fault symbol shown in the left bottom corner of the display. You must first reset.

To terminate the check programmes, you can select (**Cancel**) at any time; this does not apply for initial start-up, however. The purging cycle must be completely carried out once so that the burner can ignite.

7.8 Check and gas setting

7.8.1 Checking the factory setting

Caution.

An incorrect gas type setting may cause malfunctions or a reduction in the service life of the product.

If the product design does not match the local gas type, this may lead to malfunctions or to some components wearing prematurely.

► Before you start up the product, compare the gas type information on the data plate with the gas type group available at the installation site.

The product's combustion has been factory tested and is preset for operation with the gas type indicated on the data plate. In some supply areas, these settings may need to be adjusted at the installation site.

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

► Do not start up the product.

► Carry out a gas conversion in accordance with your installation.

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

► Proceed as described below.

7.8.2 Checking the gas flow pressure

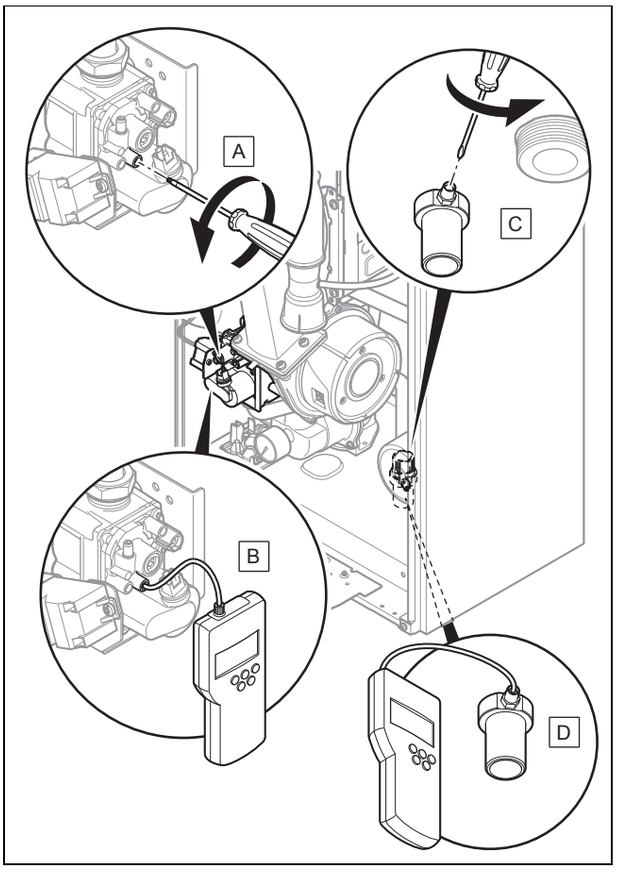
Caution.

Risk of material damage and operating faults caused by incorrect gas flow pressure.

If the gas flow pressure lies outside the permissible range, this can cause operating faults in and damage to the product.

► Do not make any adjustments to the product.

► Do not start up the product.



1. Close the gas stopcock.
2. **Alternatives 1 – Measuring the gas pressure at the gas valve assembly::**
   - ► Undo the test nipple screw **(A)** on the gas valve assembly.
   - ► Connect a digital manometer or U-tube manometer **(B)**.
2. **Alternatives 2 – Measuring the gas pressure at the gas connection::**
   - ► Undo the test nipple screw **(C)** at the gas connection.
   - ► Connect a digital manometer or U-tube manometer **(D)**.
3. Open the gas stopcock.
4. Open the hydraulic circuit's valves.
5. Start up the product with the check programme **P.01**.
6. Measure the gas flow pressure in comparison with the atmospheric pressure.

Gas connection pressure/gas flow pressure difference for G20

	Permitted gas flow pressure that is measured at point (D)	Permitted gas flow pressure that is measured at point (B)
VC 406/5-5 (E-DE)	1.70 … 2.50 kPa (17.00 … 25.00 mbar)	1.60 … 2.40 kPa (16.00 … 24.00 mbar)
VC 476/5-5 (E-DE)	1.70 … 2.50 kPa (17.00 … 25.00 mbar)	1.60 … 2.40 kPa (16.00 … 24.00 mbar)
VC 636/5-5 (E-DE)	1.70 … 2.50 kPa (17.00 … 25.00 mbar)	1.55 … 2.35 kPa (15.50 … 23.50 mbar)

Gas connection pressure/gas flow pressure difference for G25

	Permitted gas flow pressure that is measured at point (D)	Permitted gas flow pressure that is measured at point (B)
VC 406/5-5 (E-DE)	2.00 … 3.00 kPa (20.00 … 30.00 mbar)	1.85 … 2.85 kPa (18.50 … 28.50 mbar)
VC 406/5-5 (LL-DE)	2.00 … 3.00 kPa (20.00 … 30.00 mbar)	1.85 … 2.85 kPa (18.50 … 28.50 mbar)
VC 476/5-5 (E-DE)	2.00 … 3.00 kPa (20.00 … 30.00 mbar)	1.85 … 2.85 kPa (18.50 … 28.50 mbar)
VC 476/5-5 (LL-DE)	2.00 … 3.00 kPa (20.00 … 30.00 mbar)	1.85 … 2.85 kPa (18.50 … 28.50 mbar)
VC 636/5-5 (E-DE)	2.00 … 3.00 kPa (20.00 … 30.00 mbar)	1.75 … 2.75 kPa (17.50 … 27.50 mbar)
VC 636/5-5 (LL-DE)	2.00 … 3.00 kPa (20.00 … 30.00 mbar)	1.75 … 2.75 kPa (17.50 … 27.50 mbar)

Gas connection pressure/gas flow pressure difference for G31

	Permitted gas flow pressure that is measured at point (D)	Permitted gas flow pressure that is measured at point (B)
VC 406/5-5 (E-DE)	2.50 … 4.50 kPa (25.00 … 45.00 mbar)	2.45 … 4.45 kPa (24.50 … 44.50 mbar)
VC 406/5-5 (LL-DE)	2.50 … 4.50 kPa (25.00 … 45.00 mbar)	2.45 … 4.45 kPa (24.50 … 44.50 mbar)
VC 476/5-5 (E-DE)	2.50 … 4.50 kPa (25.00 … 45.00 mbar)	2.45 … 4.45 kPa (24.50 … 44.50 mbar)
VC 476/5-5 (LL-DE)	2.50 … 4.50 kPa (25.00 … 45.00 mbar)	2.45 … 4.45 kPa (24.50 … 44.50 mbar)

	Permitted gas flow pressure that is measured at point (D)	Permitted gas flow pressure that is measured at point (B)
VC 636/5-5 (E-DE)	2.50 … 4.50 kPa (25.00 … 45.00 mbar)	2.35 … 4.35 kPa (23.50 … 43.50 mbar)
VC 636/5-5 (LL-DE)	2.50 … 4.50 kPa (25.00 … 45.00 mbar)	2.35 … 4.35 kPa (23.50 … 43.50 mbar)

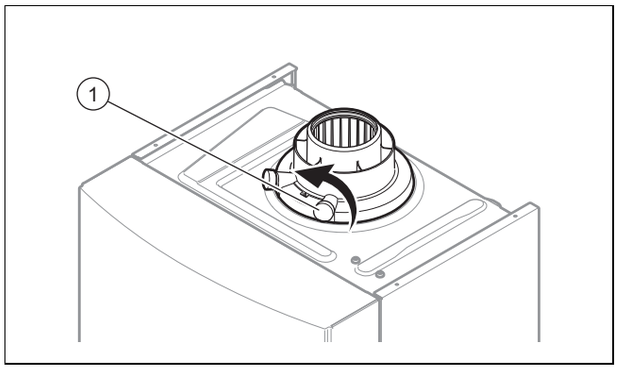
7. Switch off the product.
8. Close the gas stopcock.
9. Remove the manometer.
10. Tighten the test nipple screw **(A)** or **(C)**.
11. Open the gas stopcock.
12. Check the test nipple for gas tightness.

Conditions: Gas flow pressure not in the permissible range

- ► If you are unable to eliminate the fault, contact the gas supply company.
- ► Close the gas stopcock.

7.8.3 Checking the CO_2 content and, if necessary, adjusting it (air ratio setting)

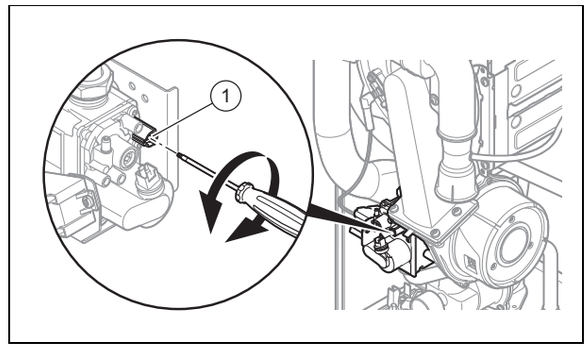
1. Ensure that the heating circuit valves are open.
2. Start up the product with the check programme **P.01**.
3. Wait at least five minutes until the product reaches its operating temperature.



4. Measure the CO_2 content at the flue gas analysis point **(1)**.
5. Compare the measured value with the corresponding value in the table.
   Set values, G20 natural gas (→ Page 53)
   Set values, G25 natural gas (→ Page 53)
   Set values, G31 liquefied petroleum gas (→ Page 54)
6. Remove the front casing. (→ Page 9)

Applicability: VC 406/5-5 (E-DE)
OR VC 406/5-5 (LL-DE)
OR VC 476/5-5 (E-DE)
OR VC 476/5-5 (LL-DE)

Conditions: The CO_2 content must be adjusted

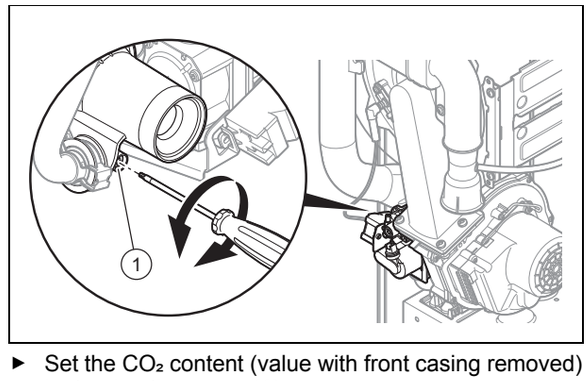


- ► Set the CO_2 content (value with front casing removed) by turning the screw **(1)**.
- ► Only carry out the adjustment in increments of 1/8 turn and wait approximately 1 minute after each adjustment until the value stabilises.

Note
Turn anti-clockwise: Lower CO_2 content
Turn to clockwise: Higher CO_2 content

Applicability: VC 636/5-5 (E-DE)
OR VC 636/5-5 (LL-DE)

Conditions: The CO_2 content must be adjusted



- ► Set the CO_2 content (value with front casing removed) by turning the screw **(1)**.
- ► Only carry out the adjustment in increments of 1/8 turn and wait approximately 1 minute after each adjustment until the value stabilises.

Note
Turn to the left: Higher CO_2 content
Turn to the right: Lower CO_2 content

7. Once the setting is finished, lock the check programme.
8. If an adjustment is not possible in the specified adjustment range, do not start up the product.

– Inform Customer Service.

9. Install the front casing. (→ Page 9)

7.8.4 Gas conversion procedure

Note

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

The conversion procedure is described in the instructions supplied with the conversion set.

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

7.9 Checking leak-tightness

► Check the gas pipe, the heating circuit and the 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.

7.9.1 Checking the heating mode

1. Ensure that there is a heating demand at the product.
2. Call up **Live monitor**.

   Status codes – Overview (→ Page 42)

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

7.9.2 Checking the hot water generation

Conditions: Cylinder connected

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.

► Make sure that the cylinder thermostat is requesting heat.

1. Call up **Live monitor**.

   Status codes – Overview (→ Page 42)

   ◁ If the cylinder charging is carried out correctly, **S.24** appears in the display.
2. If you have connected a control to the installation and you can set the domestic hot water temperature on this control, set the domestic hot water temperature on the boiler to the maximum possible temperature.
3. Adjust the target temperature for the connected domestic hot water cylinder to the control.

   ◁ The boiler adopts the set target temperature which is set on the control.

8 Adapting the unit to the heating installation

To reset the most important system parameters, call up the **Appliance config.** menu item.

Menu → Installer level → Appliance config.

Or manually relaunch the installation assistant.

Menu → Installer level → Start inst. assistant

8.1 Activating diagnostics codes

The setting options for more complex installations can be found in the diagnostics codes.

Menu → Installer level → Diagnostics menu

You can use the parameters that are marked as adjustable in the overview of diagnostics codes to adapt the product to the heating installation and the needs of the customer.

► Press ⊖ or ⊕ to change the diagnostics code.

► Press ⊡ (**Select**) to select the parameter to change.

► Press ⊖ or ⊕ to change the current setting.

► Confirm by pressing (**OK**).

8.2 Adapting the heating settings

8.2.1 Setting the maximum heating output

The maximum heating output for the product is set to **Auto** at the factory. If you want to set a fixed maximum heat output, you can use diagnostics code **D.000** to define a value that corresponds to the product output in kW.

8.2.2 Setting the 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. You can adjust the burner anti-cycling time to the conditions of the heating installation. 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. You can use diagnostics code **D.002** to set the maximum burner anti-cycling time (factory setting: 20 min.). The effective burner anti-cycling times with respect to the target flow temperature and the maximum set burner anti-cycling time can be found in the following table:

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
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

Note

The remaining burner anti-cycling time following a regular shutdown in heating mode can be called up under diagnostics code **D.067**.

8.2.3 Resetting the remaining burner anti-cycling time

1st option

Menu → Reset anti-cycl. time

The current burner anti-cycling time appears in the display.

► Confirm the burner anti-cycling time reset by pressing (**Select**).

2nd option

► Press the reset button.

8.2.4 Setting the pump overrun and pump mode

You can set the pump overrun under **D.001** (factory setting: 5 min.).

You can use diagnostics code **D.018** to set the pump mode **Comfort** or **Eco**.

In the **Comfort** operating mode, the internal pump is switched on when the heating flow temperature is not at **Heating off** (→ Operating instructions) and the heat demand is enabled via an external control.

The **Eco** operating mode (factory setting) is useful for removing residual heat after hot water generation when the heat demand is extremely low and large target temperature spreads exist between the hot water generation and heating mode target values. This prevents living rooms from being under-supplied. If there is a heat demand, the pump is switched on every 25 minutes for 5 minutes once the overrun time has elapsed.

8.2.5 Setting the heating pump

8.2.5.1 Pump mode setting

The product is equipped with a stage-controlled high-efficiency pump. In the automatic operating mode (**D.014** = 0), the pump stage is controlled in such a way that a constantly available pressure is guaranteed. The target values for the available pressure in mbar can be called up via the diagnostics codes:

– **D.122** for the heating circuit
– **D.148** for the domestic hot water circuit

If required, you can manually set the pump mode to five fixed, selectable stages based on the maximum possible output. This switches the speed regulation off.

► To change the pump output, change **D.014** to the desired value.

Note

If a low loss header is installed in the heating installation, we recommend switching off the speed regulation and setting the pump output to a fixed value.

Applicability: Germany

► For compatibility with *proKLIMA* without using a low loss header, set **D.014** = 0.

The pump operating mode is set to **Auto** at the factory in accordance with the most recent Energy Saving Ordinance.

8.2.5.2 Help when adjusting a heating installation or when checking the flow rate

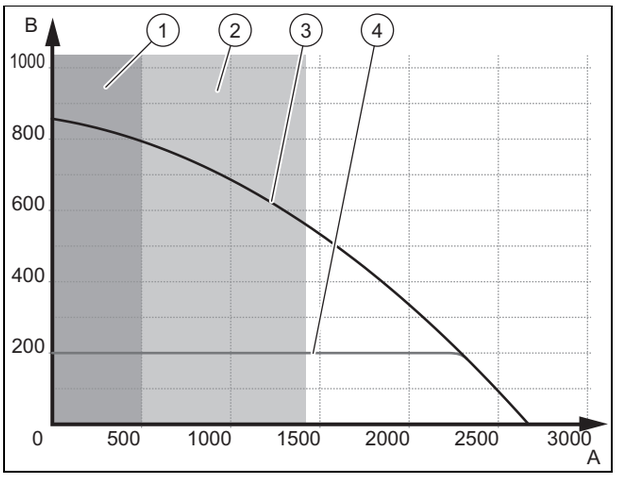
You can use diagnostics code **D.029** to display the flow rate in real time (in l/min).

By setting the automatic pump mode (**D.014** = 0) and defining a target value for the available pressure (e.g. **D.122** = 200 mbar), it is possible to adjust the balancing valves for the various radiators.

► To guarantee that the pump operates, set a permanent heat demand (using the control or the room thermostat).
► Insulate each radiator and/or each radiator group, one after the other.
► Adjust the balancing valve for the circuit by displaying the flow rate via diagnostics code **D.029** in order to achieve the flow rate that is recommended for the properties of the radiator and/or radiator group.

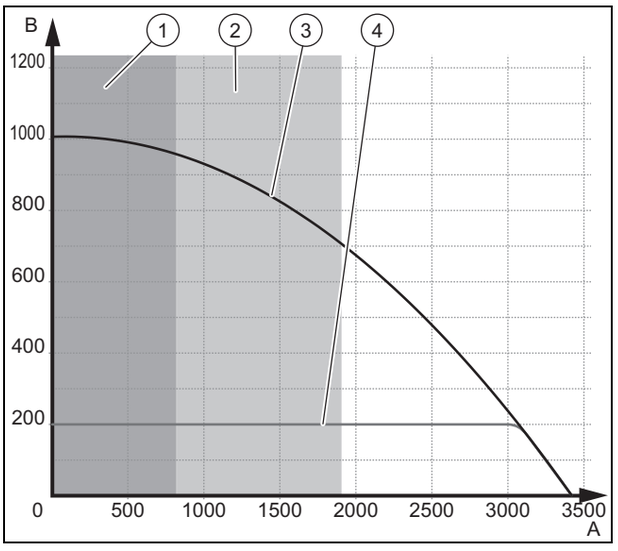
8.2.5.3 Product pump curve and operating range

Applicability: VC 406/5-5 (E-DE)
OR VC 406/5-5 (LL-DE)
OR VC 476/5-5 (E-DE)
OR VC 476/5-5 (LL-DE)



1	Flow range without operating the product	4	ΔP constant
2	Operating range with limited flow temperature and power	A	Installation volume flow in l/h
3	Pump curve at 100% PWM	B	Remaining pump head in hPa (mbar)

Applicability: VC 636/5-5 (E-DE)
OR VC 636/5-5 (LL-DE)



1	Flow range without operating the product	4	ΔP constant
2	Operating range with limited flow temperature and power	A	Installation volume flow in l/h
3	Pump curve at 100% PWM	B	Remaining pump head in hPa (mbar)

In order to guarantee that the product works without any problems, the flow rate is permanently monitored to determine the operating range.

8.2.6 Setting the maximum flow temperature

You can use diagnostics code **D.071** to set the required maximum flow temperature for the heating mode (factory setting: 75 °C).

8.2.7 Setting the return temperature control

If the product is connected to an underfloor heating system, the temperature control setting can be changed from flow temperature control (factory setting) to return temperature control using diagnostics code **D.017**.

8.3 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.084** to set the operating hours until the next maintenance work is due.

You can set the operating hours in increments of ten from 0 to 3010 h (hours).

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

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

9 Handing over to the end user

1. When you have finished the installation, attach the sticker supplied in the end user's language to the front of the product.
2. Explain to the end user how the safety devices work and where they are located.
3. Inform the end user how to handle the product. Answer any questions the end user may have. In particular, draw attention to the safety warnings which the end user must follow.
4. Inform the end user that they must have the product maintained in accordance with the specified intervals.
5. Pass all of the instructions and documentation for the product to the end user for safe-keeping.
6. Instruct the end user about measures taken to ensure the combustion air supply and flue system. Point out, in particular, that the end user must not make any changes, however minor.

10 Troubleshooting

You can find an overview of the fault codes in the appendix.

Fault messages – Overview (→ Page 43)

10.1 Contacting your service partner

If you contact your service partner, if possible, please mention

– The fault code that is displayed (**F.xx**),
– The product status that is displayed (**S.xx**).

10.2 Calling up service messages

If the maintenance symbol appears in the display, there is a service message that has to be called up.

The maintenance symbol appears if you have set a maintenance interval, for example, and it has elapsed. The product is not in fault mode.

► To obtain more information about the service message, call up the **Live Monitor**. (→ Page 20)

10.3 Reading off the fault codes

If a fault occurs in the unit or in the system, the display shows an **F.xx** code.

Fault messages – Overview (→ Page 43)

Fault codes have priority over all other displays.

If multiple faults occur at the same time, the display shows the corresponding fault codes for two seconds each in sequence.

► Eliminate the fault.
► To restart the product, press the reset button (Operating instructions).
► If you are unable to remedy the fault and the fault recurs despite reset attempts, contact customer service.

10.4 Querying the fault memory

Menu → Installer level → Fault list

The product has a fault memory. You can use this to query the last ten faults that occurred in chronological order.

The display shows:

– Number of faults that occurred
– The fault that is currently selected with fault number **F.xx**
– A plain text display explaining the fault.

► Use the or button to display the last ten faults that occurred.
Fault messages – Overview (→ Page 43)

10.5 Resetting the fault memory

► To delete the fault memory, press (**Delete**, **OK**) twice.

10.6 Performing diagnostics

► You can use the diagnostics codes during fault diagnostics to change individual parameters or to display further information. (→ Page 26)

10.7 Using check programmes

► You can also use the check programmes for troubleshooting. (→ Page 23)

10.8 Resetting parameters to factory settings

► To simultaneously reset all parameters to the factory settings, set diagnostics code **D.096** to 1.

10.9 Replacing defective components

1. Carry out the preparatory work before undertaking any repair work. (→ Page 29)
2. Carry out the work required to finish the task before undertaking any repair work. (→ Page 34)

10.9.1 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.

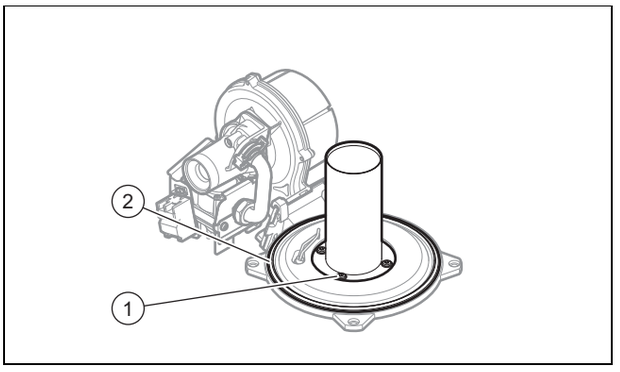
► If you require spare parts for maintenance or repair work, use only the spare parts that are permitted for the product.

10.9.2 Preparing the repair work

1. Decommission the product.
2. Disconnect the product from the power grid.
   – Take all necessary precautions to ensure that it cannot be switched back on again.
3. Remove the front casing. (→ Page 9)
4. Close the gas stopcock.
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 38)
8. Ensure that water does not drip on live components (e.g. the electronics box).
9. Use only new seals.

10.9.3 Replacing the burner

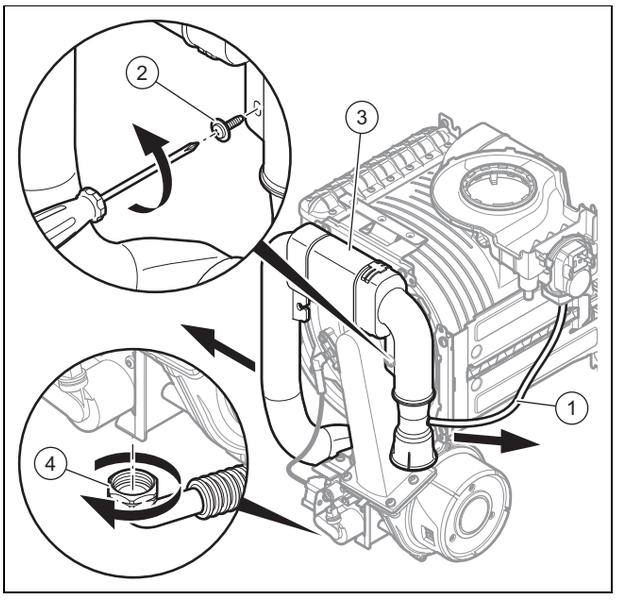
1. Remove the compact thermal module. (→ Page 34)



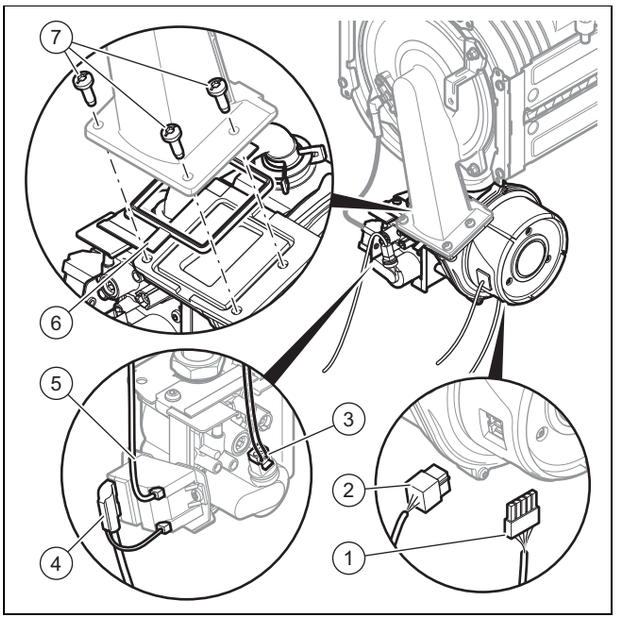
2. Undo the four screws **(1)** on the burner.
3. Remove the burner.
4. Fit the new burner with a new seal.
5. Replace the burner flange seal **(2)**.
6. Install the compact thermal module. (→ Page 36)

10.9.4 Replacing the gas valve assembly, Venturi or fan

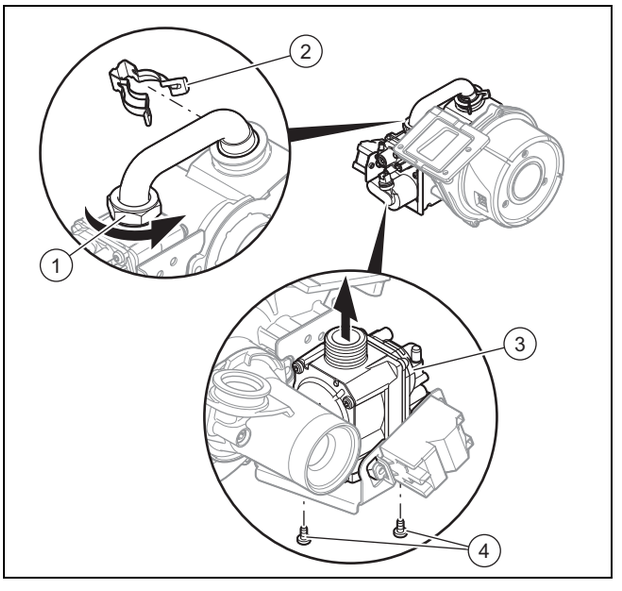
Note
Each destroyed seal must be restored.



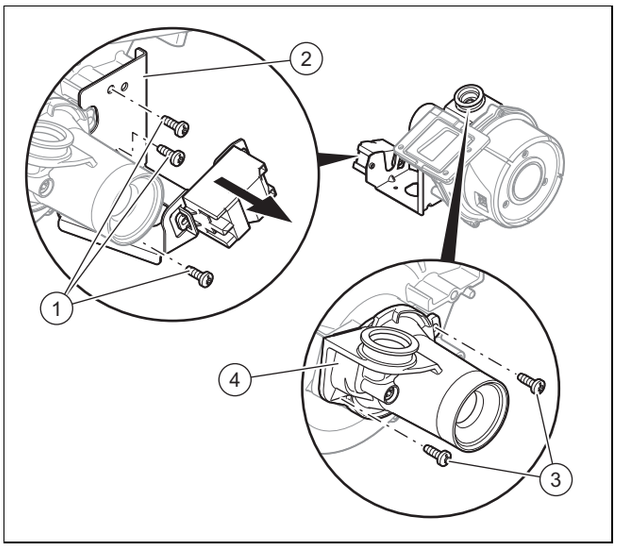
1. Disconnect the test system's silicone pipe for checking the airflow rate **(1)**.
2. Undo the fixing screw **(2)** and remove the air intake pipe **(3)** from the intake stub.
3. Unscrew the union nut **(4)** from the gas valve assembly.



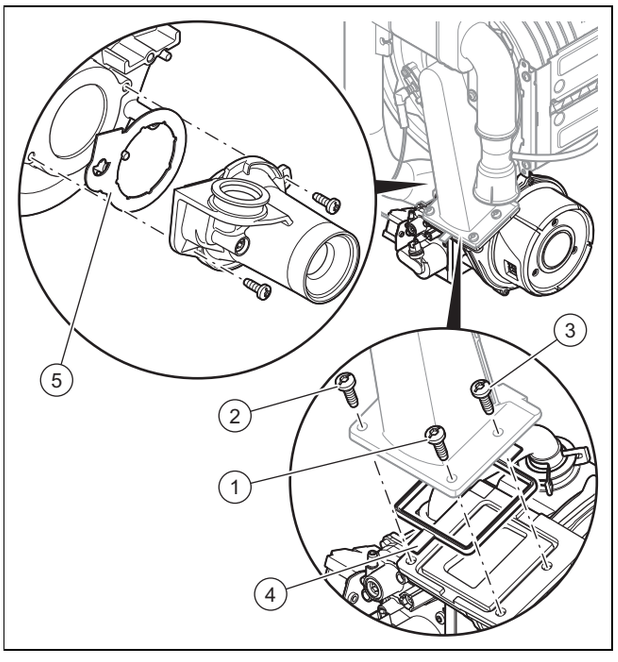
4. Pull out the plugs **(1)**, **(2)**, **(3)**, **(4)** and **(5)**.
5. Undo the three screws **(7)** between the mixture pipe and the fan flange.
6. Replace the seal **(6)**.



7. Remove the entire unit from the fan, Venturi and gas valve assembly.
8. Undo the nuts **(1)** on the gas valve assembly.
9. Remove the clip **(2)**.
10. Undo the fixing screws **(4)** on the gas valve assembly's retainer.
11. Remove the gas valve assembly **(3)** from the retainer.
12. Replace the gas valve assembly if it is defective.



13. Remove the retainer **(2)** for the gas valve assembly. To do this, undo the three screws **(1)**.
14. Undo the fixing screws **(3)** for the Venturi.
15. Remove the Venturi **(4)**.
16. Replace the Venturi if it is defective.
17. Replace the fan if it is defective.



18. Reinstall the components in the reverse order. You must use new seals at position **(4)** and **(5)**. Follow the tightening sequence for the three screws that connect the fan to the mixture pipe by following the numbering **(1)**, **(2)** and **(3)**.
19. Screw the gas pipe onto the gas valve assembly. Use new seals for this.
20. Hold on to the gas valve assembly when tightening the union nuts.
21. Once the new components have been installed, carry out the following steps.

Conditions: Gas valve assembly

– Carry out a leak-tightness check, check the CO2 content and adjust this, if required.

Conditions: Venturi

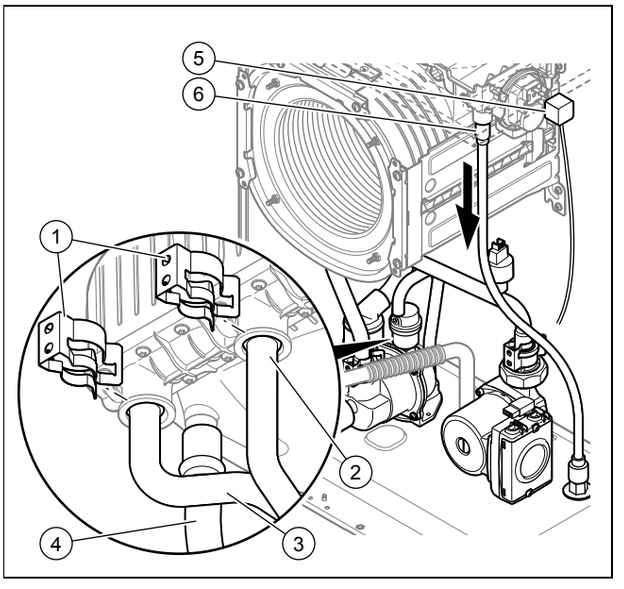
– Check the CO_2 content and adjust this, if required.

Conditions: Fan

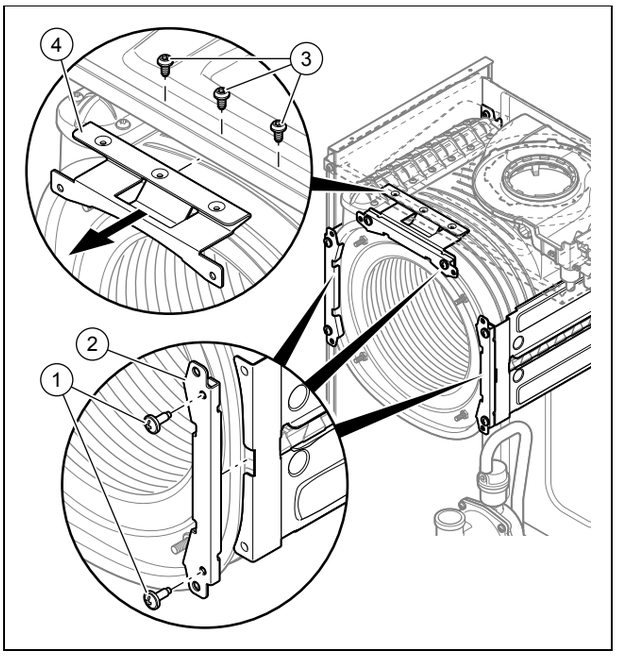
– Check the CO_2 content and adjust this, if required.

10.9.5 Replacing the heat exchanger

1. Remove the adapter for the flue system.
2. Remove the compact thermal module. (→ Page 34)



3. Remove the clips **(1)**.
4. Loosen the flow **(2)** and return pipe **(3)**.
5. Remove the condensate discharge hose **(4)** from the heat exchanger.
6. Remove the rainwater drain hose **(6)** from the heat exchanger.
7. Remove the plug **(5)**.



8. Remove the screws **(1)** and **(3)**.
9. Remove the retainer for the heat exchanger **(2)** and **(4)**.
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.

Caution.

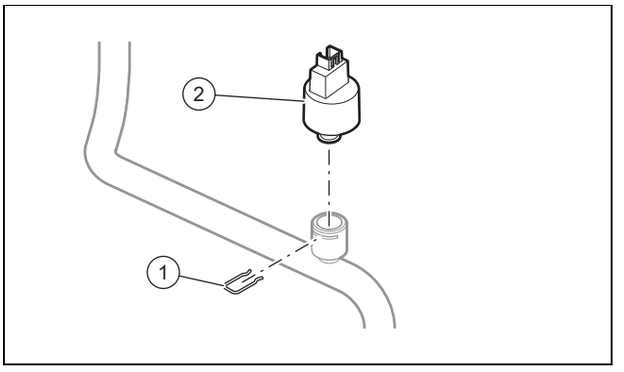
Risk of poisoning due to escaping flue gas.

Mineral-oil-based greases can damage the seals.

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

12. Replace the seals.
13. Insert the flow and return pipes into the heat exchanger as far as they will go.
14. Ensure that the clips on the flow and return connection have been attached correctly.
15. Install the compact thermal module. (→ Page 36)
16. Fill and purge the product and, if necessary, the heating installation.

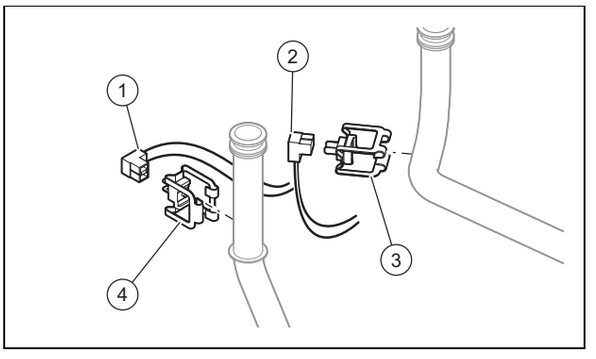
10.9.6 Replace the pressure sensor



1. Pull out the plug for the pressure sensor.
2. Remove the fastening clip **(1)**.
3. Remove the defective pressure sensor **(2)**.
4. Replace the pressure sensor.
5. Fill and purge the product and, if necessary, the heating installation.

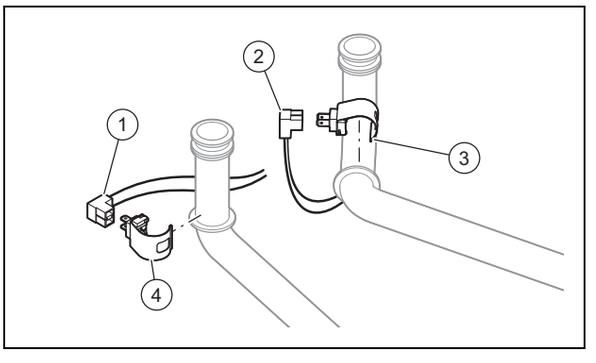
10.9.7 Replacing the heating flow and return temperature sensor

Applicability: VC 406/5-5 (E-DE)
OR VC 406/5-5 (LL-DE)
OR VC 476/5-5 (E-DE)
OR VC 476/5-5 (LL-DE)



► Pull out the heating flow **(4)** and return temperature sensor **(3)**.

Applicability: VC 636/5-5 (E-DE)
OR VC 636/5-5 (LL-DE)

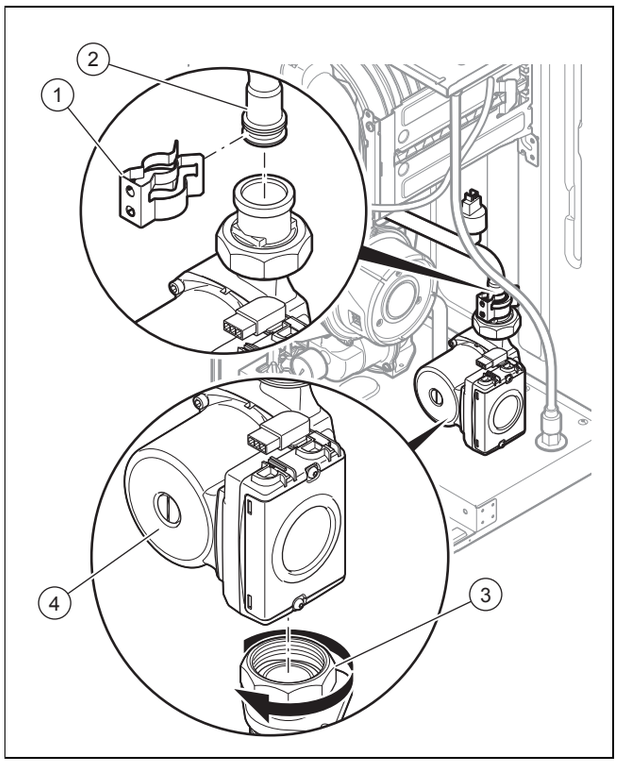


► Pull out the heating flow **(4)** and return temperature sensor **(3)**.

1. Remove the heating flow **(1)** and return plug **(2)**.

2. Install the new temperature sensor.
3. When reinstalling, note the colour of the conductors.
   – Blue conductor: Heating return
   – Red conductor: Heating flow

10.9.8 Replacing the pump



1. Pull out the plug **(5)** for the pump.
2. Remove the clip **(1)** from the pipe **(2)**.
3. Detach the connection **(3)** from below the pump.
4. Remove the defective pump **(4)**.
5. Detach the connection **(5)** from the pump.
6. Replace the seals.
7. Install the new pump. To do this, proceed in reverse order.

10.9.9 Replace the main PCB and/or the control element's PCB

Caution.

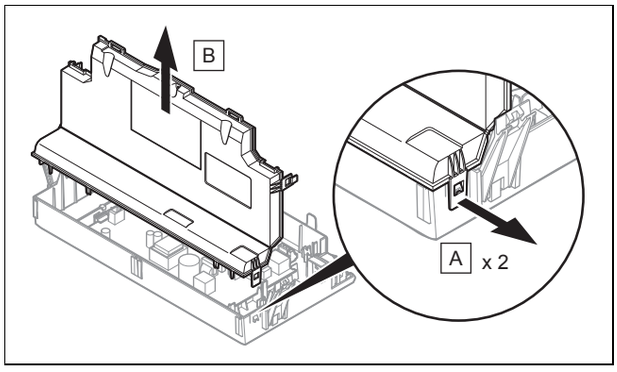
Risk of material damage caused by incorrect repairs.

Using an incorrect PCB may lead to damage to the electronics.

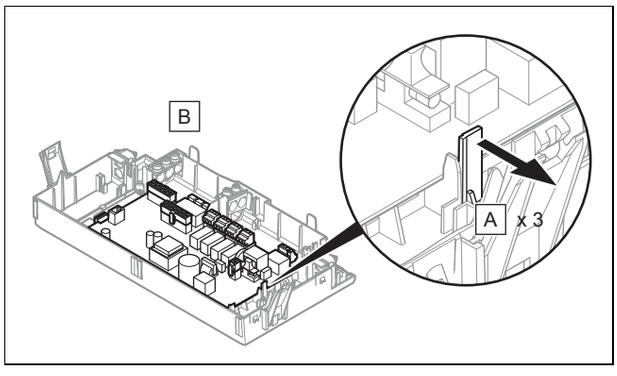
- ► Before replacing, check that the correct PCB is available.
- ► Never use a different PCB when replacing it.

If you are replacing only one component, the set parameters are transferred automatically. When the product is switched on, the new component adopts the previously set parameters from the unreplaced component.

10.9.9.1 Replacing the main PCB

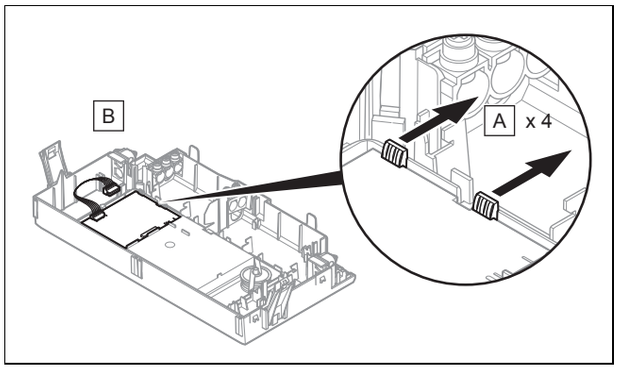


1. Open the electronics box. (→ Page 18)
2. Undo the two clips **(A)** on the electronics box.
3. Remove the cover **(B)** from the electronics box.



4. Remove the PCB in accordance with the installation instructions that are enclosed with the spare part.
5. Pull all of the plugs out from the PCB.
6. Force the fixing tabs **(A)** apart in order to loosen the PCB.
7. Remove the PCB **(B)**.
8. Install the new PCB.
9. Plug the plug into the new PCB.

10.9.9.2 Replacing the PCB for the user interface



1. Remove the main PCB.
2. Disconnect all of the plugs from the PCB for the user interface.
3. Force the fixing tabs **(A)** apart in order to loosen the PCB for the user interface.
4. Remove the PCB for the user interface **(B)**.
5. Install the new PCB for the user interface.
6. Plug the plug into the new PCB for the user interface.

7. Reinstall the main PCB.

10.9.9.3 Replacing the main PCB and control element's PCB at the same time

1. If you are replacing both components at the same time, the product switches directly to the menu to select the language after switching on. The default language setting is English.
2. Select the required language.
3. Press **OK** to confirm this setting.
4. Set the product code **D.093** that is on the data plate.
5. Confirm your setting.
   ◁ The electronics are now set to the product type (model) and the parameters for all diagnostics codes are set to the default settings.
   ◁ The display automatically restarts with the installation assistant.
6. Make the system-specific settings.

10.9.10 Completing repair work

1. Open the service valve in the cold water pipe.
2. Open all service valves and the gas stopcock.
3. Check the leak-tightness of the gas pipe and the hydraulic circuits.
4. Install the front casing. (→ Page 9)
5. Switch on the product. (→ Page 22)
6. Check that the product works correctly.
7. Check that the product is leak-tight. (→ Page 26)

11 Inspection and maintenance

► Comply with the minimum intervals for the inspection and maintenance (Table in the appendix).
► Carry out maintenance work on the product at an earlier point if the results of the inspection that was carried out during previous maintenance make this necessary.

11.1 Using the function menu

The function menu allows you to actuate and test individual components in the heating installation.

Menu → Installer level → Test programs → Function menu

► Choose the heating installation components.
► Confirm by pressing (**Select**).

Display	Test programme	Action
T.01	Check internal pump	The internal heating pump is switched on and off.
T.02	Checking the domestic hot water cylinder charging pump	The domestic hot water cylinder charging pump is switched on and off.
T.03	Check fan	The fan is switched on and off; it runs at maximum speed.
T.04	Not active	
T.05	Domestic hot water circulation pump check	The domestic hot water circulation pump is switched on and off.
T.06	Check external pump	The external heating pump (if present) is switched on and off.
T.08	Checking the burner	Product starts up and switches to minimum load. The flow temperature is shown in the display.

► To terminate the function menu, select (**Cancel**).

11.2 Carrying out electronics self-tests

Menu → Installer level → Test programs → Electronics self-test

The electronic self-test allows for pre-monitoring of the PCBs.

11.3 Cleaning/checking the components

1. Carry out the preparatory work before cleaning/checking any of the components. (→ Page 34)
2. Carry out the work required to finish the task after cleaning/checking any of the components. (→ Page 38)

11.3.1 Preparing the cleaning and inspection work

1. Decommission the product.
2. Disconnect the product from the power grid.
   – Take all necessary precautions to ensure that it cannot be switched back on again.
3. Remove the front casing. (→ Page 9)
4. Close the gas stopcock.
5. Close the service valves in the heating flow and return.
6. Close the service valve in the cold water pipe.
7. Drain the product when you are carrying out work on hydraulic components. (→ Page 38)
8. Ensure that water does not drip on live components (e.g. the electronics box).
9. Use only new seals.

11.3.2 Removing the compact thermal module



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

The seal, heat insulation 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 heat insulation on the burner flange or on the back panel of the heat exchanger shows signs of damage, replace the heat insulation.

Note

The compact thermal module consists of five main components:

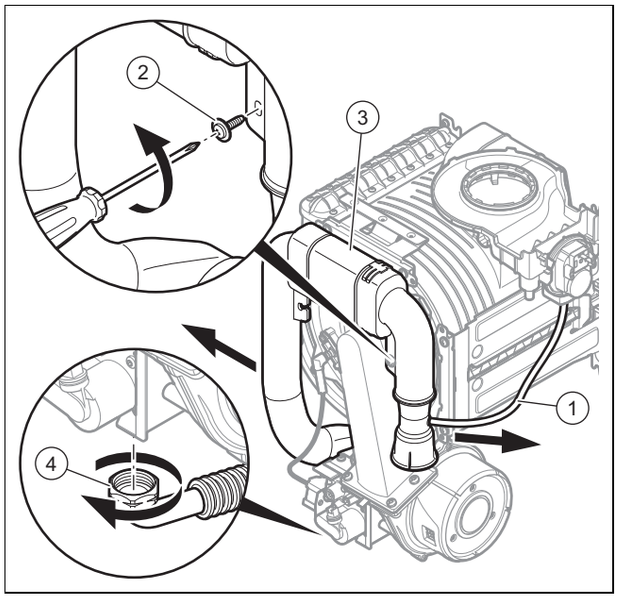
– Speed-regulated fan,

– Gas valve assembly including support plate,

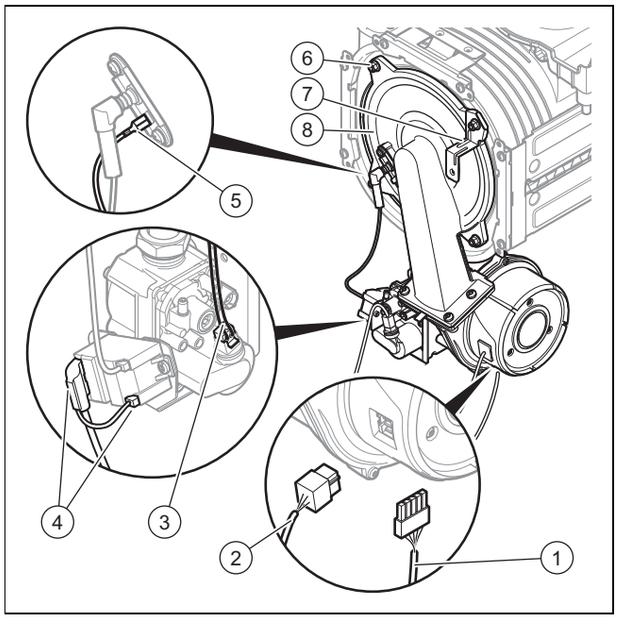
– Venturi including mass flow sensor and gas connection pipe,

– Burner flange,

– Premix burner.

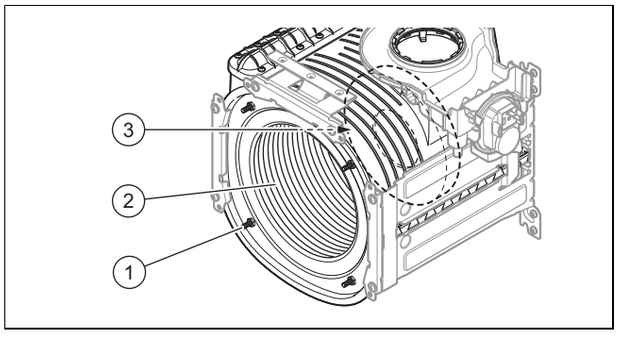


1. Disconnect the test system's silicone pipe for checking the airflow rate **(1)**.
2. Undo the fixing screw **(2)** and remove the air intake pipe **(3)** from the intake stub.
3. Unscrew the union nut **(4)** from the gas valve assembly.



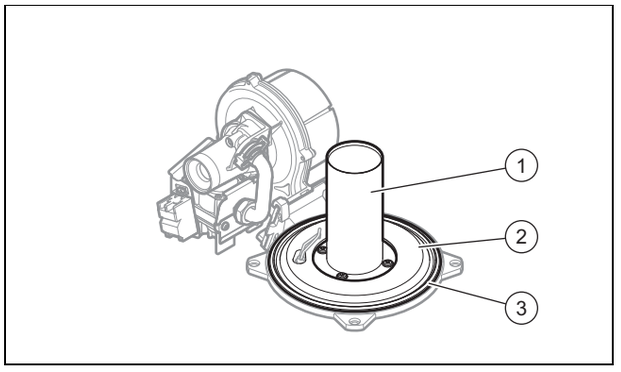
4. Remove the plug for the earth cable **(5)** from the ignition electrode.
5. Remove the plug **(4)** from the ignition device.
6. Remove the plugs **(1)** and **(2)** from the fan motor by pushing in the latching lug.
7. Remove the plug from the gas valve assembly **(3)**.
8. Unscrew the four nuts **(6)**.
9. Remove the fixing tab **(7)** for the air intake pipe.
10. Pull the assembly group for the compact thermal module **(8)** out of the heat exchanger.
11. Check the burner and the heat exchanger for damage and dirt.
12. If necessary, clean or replace the components according to the following sections.
13. Fit a new burner flange seal.
14. Check the insulating mat on the back panel of the heat exchanger.
    – If you notice any signs of damage, replace the insulating mat.
15. Check the insulating material on the burner flange.
    – If you notice any signs of damage, replace the insulating mat.

11.3.3 Cleaning the heat exchanger



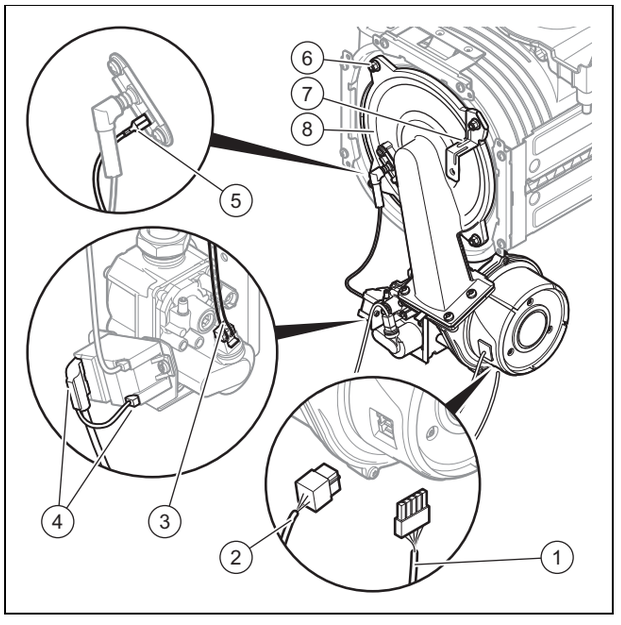
1. Never undo the four nuts on the threaded pin **(1)** or tighten them.
2. Clean the spiral immersion heater **(2)** of the heat exchanger using water or, if required, vinegar (up to a maximum acid content of 5%). Allow the vinegar to act on the heat exchanger for 20 minutes.
3. Use a plastic brush or sufficiently strong jet of water to remove the loosened dirt. In doing so, ensure that no spraying water reaches the other components. Do not point the jet of water directly at the insulating mat **(3)** on the back of the heat exchanger.
   ◁ The water flows via the condensate siphon and out of the heat exchanger.
4. Check the insulating mat on the heat exchanger for damage.
   ▽ Insulating mat is damaged:
   ► Replace the insulating mat.

11.3.4 Checking the burner

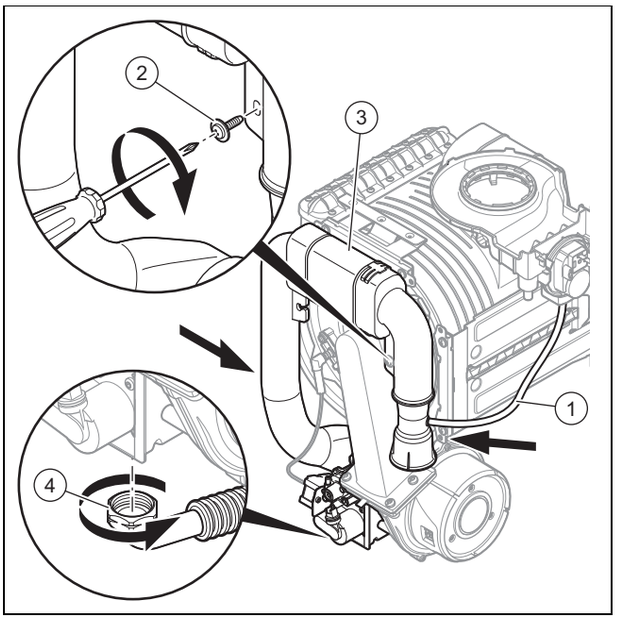


1. Check the surface of the burner **(1)** for damage. If you see any damage, replace the burner.
2. Check the burner's insulation **(2)**. If required, replace the burner's insulation.
3. Fit a new burner flange seal **(3)**.

11.3.5 Installing the compact thermal module

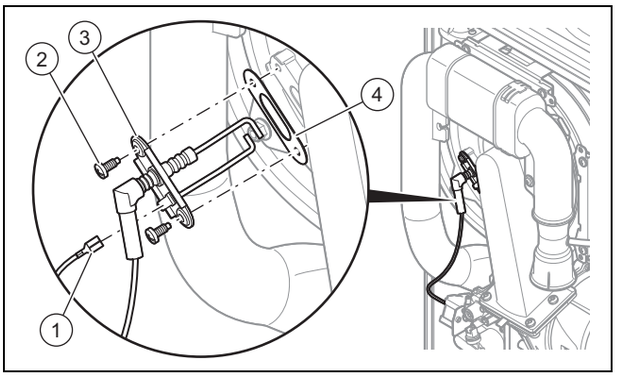


1. Fit the compact thermal module **(8)** onto the heat exchanger.
2. Attach the fixing tab **(7)** for the air intake pipe.
3. Tighten the four new nuts **(6)** across the diagonal until the burner flange fits closely and uniformly onto the mating surfaces.
   – Tightening torque: 6 Nm
4. Reconnect the plugs **(1)**, **(2)**, **(3)**, **(4)** and **(5)**.



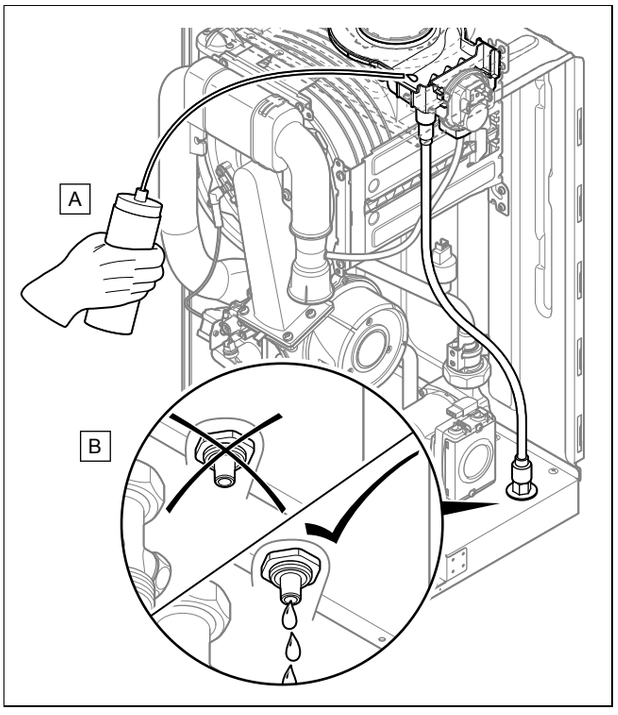
5. Connect the gas pipe **(4)** using a new seal.
6. Open the gas stopcock.
7. Make sure that there are no leaks.
8. Check that the sealing ring in the air intake pipe **(3)** is positioned correctly in the seal seat.
9. Reconnect the air intake pipe to the intake stub.
10. Secure the air intake pipe using the retaining screw **(2)**.
11. Reconnect the test system's silicone pipe for checking the airflow rate **(1)**.
12. Check the gas flow pressure. (→ Page 23)

11.3.6 Checking the ignition electrode



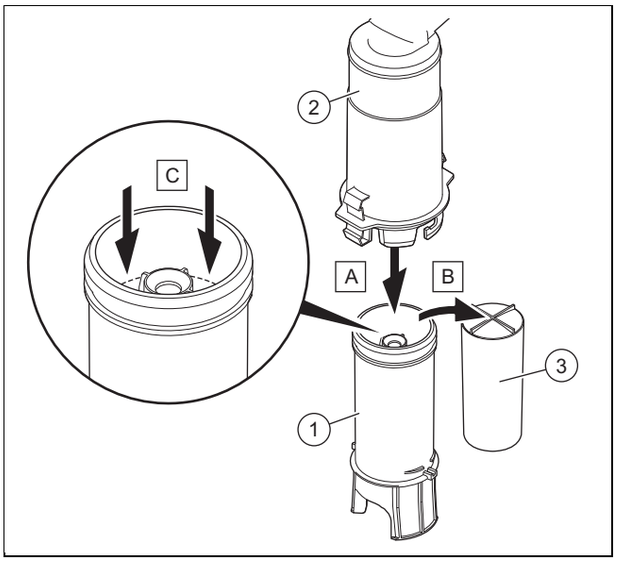
1. Disconnect the earth cable **(1)**.
2. Remove the fixing screws **(2)**.
3. Carefully remove the electrode **(3)** from the combustion chamber.
4. Ensure that the electrode ends are undamaged.
5. Clean and check the gap between the electrodes.
   – Clearance for the ignition electrodes: 4.5 ± 0.5 mm
6. Replace the seal **(4)**.
7. Install the electrode. To do this, proceed in reverse order.

11.3.7 Cleaning the rainwater collector's draining circuit



1. Ensure that the rainwater collector is not dirty or blocked and, if required, clean it.
2. Pour water into the rainwater collector **(A)**.
3. Check whether the water drains correctly via the drain **(B)**.
   ▽ If the water does not drain correctly, clear out the draining circuit.

11.3.8 Cleaning the condensate siphon

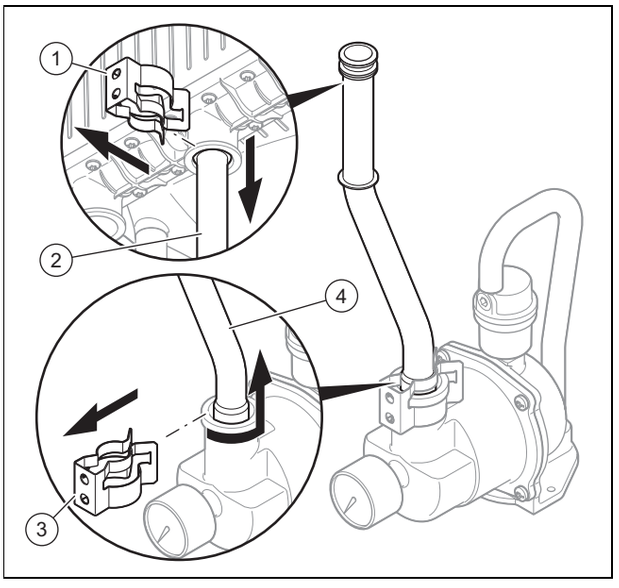


1. Unclip the lower section of the siphon **(1)** from the upper section of the siphon **(2)**.
2. Remove the float **(3)**.
3. Flush out the float and lower section of the siphon with water.
4. Fill the lower section of the siphon with water up to 10 mm below the upper edge of the condensate discharge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

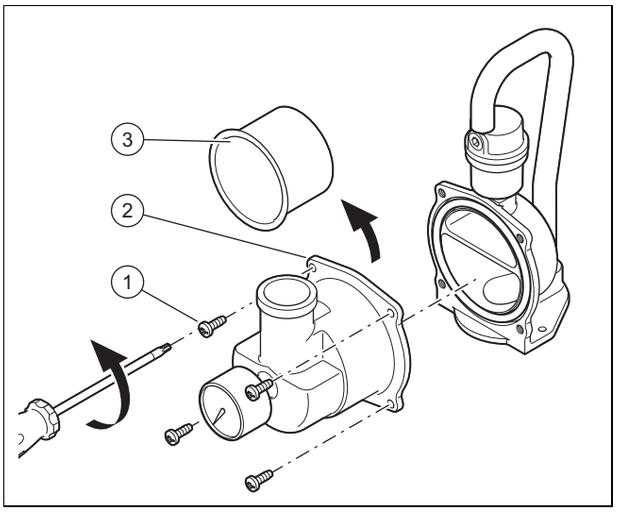
Note
Check that the float is present in the condensate siphon.

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

11.3.9 Cleaning the filter in the dynamic air separation system



1. Remove the clips **(1)** and **(3)**.
2. Loosen the upper section of the pipe **(2)**.
3. Then turn and loosen the lower section of the pipe **(4)**.



4. Remove the screws **(1)**.
5. Remove the housing **(2)** from the air separation system.
6. Clean the filter **(3)** using hot water.
   ▽ If the filter is damaged, replace it.
7. Insert the filter into the air separation system.

8. Replace the seal on the air separation system's housing.
9. Reattach the housing for the air separation system and use the screws to secure it in place.
   – Tightening torque: 7.5 Nm
10. Reinsert the pipe and insert the clip.

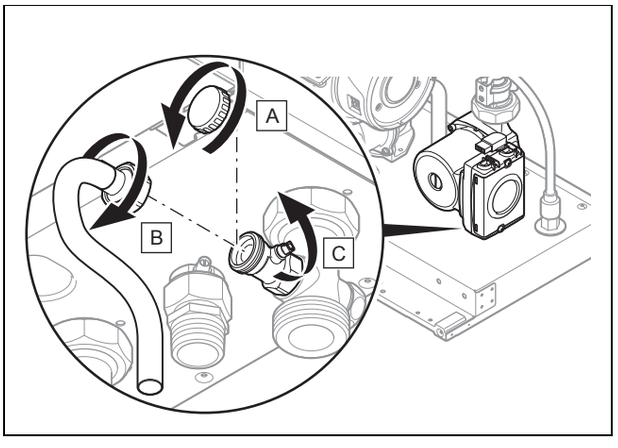
11.3.10 Checking the pre-charge pressure of the external expansion vessel

1. Depressurise the heating installation.
2. Measure the pre-charge pressure of the expansion vessel at the vessel valve.
   ▽ Expansion vessel pre-charge pressure
   – ≥ 0.075 MPa (≥ 0.750 bar)
   ► Fill the expansion vessel with air at a lower pre-charge pressure (in relation to the static height of the heating installation).
3. If water escapes from the valve of the expansion vessel, replace the expansion vessel.
4. Fill the heating installation. (→ Page 21)

11.3.11 Completing cleaning and inspection work

1. Tilt the electronics box upwards.
2. Install the front casing. (→ Page 9)
3. Establish the power supply if this has not yet been done.
4. Open the gas stopcock.
5. Switch the product back on if this has not yet been done. (→ Page 22)
6. Open all service valves and the gas stopcock if this has not yet been done.

11.4 Draining the product



1. Close the service valves of the product.
2. Remove the cap **(A)** from the drain cock.
3. Connect a drain hose **(B)** to the connection on the drain cock.
4. Open the drain cock **(C)**.
5. Use the air separator on the heating flow connection so that the product can be completely drained.

11.5 Completing inspection and maintenance work

► Check the gas flow pressure. (→ Page 23)
► Check the CO_2 content and, if necessary, adjust it (air ratio setting). (→ Page 25)
► Check that the product is leak-tight. (→ Page 26)
► If required, reset the maintenance interval. (→ Page 28)
► Log the inspection/maintenance work.

12 Decommissioning

12.1 Permanently decommissioning

► Decommission the product.
► Disconnect the product from the power grid.
► Close the gas stopcock.
► Close the heating stopcocks.
► Drain the product. (→ Page 38)

13 Recycling and disposal

Disposing of the packaging

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

14 Customer service

Applicability: Germany

Auftragsannahme Vaillant Kundendienst: 02191 5767901

Applicability: Luxemburg

Kontaktdaten für unseren Kundendienst finden Sie unter der auf der Rückseite angegebenen Adresse oder unter www.vaillant.de.

Appendix

A Diagnostics code – overview

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

Code	Parameter	Values or explanations	Default setting	User-specific setting
D.000	Partial heating load	Adjustable partial heating load in kW Auto: The product automatically adjusts the maximum partial load to the current system demand.	Auto	
D.001	Overrun time for the internal pump after a heat demand	2 … 60 min	5 min	
D.002	Max. burner anti-cycling time in heating mode at 20 °C flow temperature	2 … 60 min	20 min	
D.003	Domestic hot water temperature	Not connect.		
D.004	Measured value for the cylinder temperature in °C	If a domestic hot water cylinder with sensor is connected		Not adjustable
D.005	Target value for the heating flow temperature (or target value for the return) in °C	The current target value, maximum value of the parameter that is set for **D.071**, limitation by an eBUS control, if connected		Not adjustable
D.007	Target value for the domestic hot water cylinder temperature in °C	(15 °C = frost protection, 40 °C up to **D.020** (max. 70 °C))		Not adjustable
D.009	Heating flow temperature, target value from external eBUS controller	°C		
D.010	Status of the internal heating pump	0 = Off 1 = On		Not adjustable
D.011	Status of additional external heating pump	0 = Off 1-100 = On		Not adjustable
D.012	Status of cylinder charging pump	0 = Off 1-100 = On		Not adjustable
D.013	Status of circulation pump	0 = Off 1-100 = On		Not adjustable
D.014	Setting for speed-controlled internal heating pump	0 = auto (pump modulates in accordance with the control, with constant pressure) From 1 to 5 = Fixed pump setting – 1 = 53% – 2 = 60% – 3 = 70% – 4 = 85% – 5 = 100%	0	
D.015	Current speed of the internal heating pump in %			Not adjustable
D.016	24 V DC room thermostat open/closed	Heating mode off/on		Not adjustable
D.017	Heating control type	0 = Flow temperature control 1 = Return temperature control	0	
D.018	Pump mode setting	1 = Comfort (continuously operating pump) 3 = Eco (intermittently operating pump)	3	
D.020	Max. set value for target cylinder value	50 … 65 °C	65 °C	
D.022	Domestic hot water demand	0 = Off 1 = on		Not adjustable
D.023	Heating demand	0 = Off 1 = on		Not adjustable
D.024	Status of the air pressure monitor	0 = open 1 = closed		Not adjustable

Code	Parameter	Values or explanations	Default setting	User-specific setting
D.025	Domestic hot water generation enabled by eBUS control	0 = No 1 = Yes		
D.026	Control of the optional grey relay *X16*	1 = Circulation pump 2 = External pump 3 = Cylinder charging pump 4 = Smoke flap 5 = External solenoid valve 6 = External fault message 7 = Solar pump (not active) 8 = eBUS remote control (not active) 9 = Anti-legionella pump (not activated) 10 = Solar valve (not active)	2	
D.027	Switching accessory relay 1 for 2 in 7 multi-functional module accessory	1 = Circulation pump 2 = External pump 3 = Cylinder charging pump (not activated) 4 = Smoke flap 5 = External solenoid valve 6 = External fault message 7 = Solar pump (not active) 8 = eBUS remote control (not active) 9 = Anti-legionella pump (not activated)	1	
D.028	Switching accessory relay 2 for 2 in 7 multi-functional module accessory	1 = Circulation pump 2 = External pump 3 = Cylinder charging pump (not activated) 4 = Smoke flap 5 = External solenoid valve 6 = External fault message 7 = Solar pump (not active) 8 = eBUS remote control (not active) 9 = Anti-legionella pump (not activated)	2	
D.029	Heating flow (heating circuit or cylinder charging)	l/min		Not adjustable
D.033	Fan speed target value	rpm		Not adjustable
D.034	Fan speed actual value	rpm		Not adjustable
D.035	Position of the prioritising diverter valve	Not connect.		Not adjustable
D.040	Flow temperature	Actual value in °C		Not adjustable
D.041	Return temperature	Actual value in °C		Not adjustable
D.044	Digitised ionisation value	0 … 1,020 Good flame < 400 No flame > 800		Not adjustable
D.047	Outdoor temperature (with weather-compensated control)	Actual value in °C if an outdoor temperature sensor is connected to *X41*		Not adjustable
D.050	Offset for minimum speed	0 … 3,000 rpm	30	
D.051	Offset for maximum speed	−990 … 0 rpm	-45	
D.060	Number of switch-off sequences for the safety cut-out	Number of shutdowns		Not adjustable
D.061	Number of flame sequence control faults	Number of unsuccessful ignitions in the last attempt		Not adjustable
D.064	Average ignition time	s		Not adjustable
D.065	Maximum ignition time	s		Not adjustable
D.067	Remaining burner anti-cycling time	min		Not adjustable

Code	Parameter	Values or explanations	Default setting	User-specific setting
D.068	Unsuccessful ignitions at 1st attempt	Number of unsuccessful ignitions		Not adjustable
D.069	Unsuccessful ignitions at 2nd attempt	Number of unsuccessful ignitions		Not adjustable
D.071	Target value maximum heating flow temperature	30 … 80 °C	75 °C	
D.072	Overrun time for the heating pump after cylinder post-heating	0 … 600 s	120 s	
D.074	Anti-legionella function	Thermal disinfection is carried out every 24 hours 0 = Inactive 1 = Active	0	
D.075	Maximum charging time for the domestic hot water cylinder	20 … 90 min	45 min	
D.076	Product-specific number	Unit variant display (DSN)		Not adjustable
D.077	Limit on cylinder charging output	Adjustable cylinder charging output in kW	Maximum output	
D.078	Cylinder charging temperature limit (target flow temperature in cylinder charging mode) in °C	55 … 85 °C	80 °C	
D.080	Operating hours of the burner in heating mode	h		Not adjustable
D.081	Operating hours of the burner for domestic hot water generation	h		Not adjustable
D.082	Number of burner start-ups in heating mode	Number of burner start-ups (x 100)		Not adjustable
D.083	Number of burner starts in domestic hot water mode	Number of burner start-ups (x 100)		Not adjustable
D.084	Maintenance indicator: Number of hours until the next maintenance	0 … 3,000 h "-" to deactivate the function	„-”	
D.085	Minimum output of the product	kW		
D.090	Status of the eBUS control	1 = Detected 2 = Not detected		Not adjustable
D.091	Status of DCF with outdoor temperature sensor connected	0 = No reception 1 = Reception 2 = Synchronised 3 = Valid		Not adjustable
D.093	Unit variant setting (DSN)	Adjustment range: 170 to 199 The three-digit DSN code is located on the product's data plate.		
D.094	Delete fault history	Delete fault list 0 = No 1 = Yes		
D.095	Software version of PeBUS components	Main PCB (BMU) PCB for the control element (AI)		Not adjustable
D.096	Default setting	Reset all adjustable parameters to factory setting 0 = No 1 = Yes	0	
D.122	Target value for the available pressure in the heating circuit	100 … 400 mbar	200 mbar	
D.123	Duration of last cylinder charging	min		
D.124	Domestic hot water cylinder in ECO mode	Not connect.		
D.125	Domestic hot water temperature at the cylinder outlet	Not connect.		
D.126	Back-up heater delay when there is sunlight	Not connect.		
D.148	Target value for the available pressure in the cylinder charging circuit	100 … 400 mbar	200 mbar	

Code	Parameter	Values or explanations	Default setting	User-specific setting
D.149	Precise information about circulation fault **F.75**	If fault **F.75** occurs, read the explanation below for the relevant value of the diagnostics code in order to analyse the problem. 0 = No fault 1 = Pump blocked 2 = Electrical pump fault 3 = Pump dry run 5 = Pressure sensor fault 6 = No feedback from the pump 7 = Incorrect pump detected 8 = Flow rate at the end of the purge programme is insufficient		

B Status codes – Overview

Status code	Meaning
Heating mode	
S.0	Heating demand
S.1	Heating mode: Fan start-up
S.2	Heating mode: Pump start-up
S.3	Heating mode: Ignition
S.4	Heating mode: Burner on
S.5	Heating mode: Pump/fan overrun
S.6	Heating mode: Fan reduction
S.7	Heating mode: Pump overrun
S.8	Heating mode, burner anti-cycling time
Cylinder charging mode	
S.20	Domestic hot water requirement
S.21	DHW mode: Fan start-up
S.22	Domestic hot water mode: Pump running
S.23	DHW mode: 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	Domestic hot water burner anti-cycling time
Special cases	
S.30	Room thermostat (RT) is blocking heating mode
S.31	Summer mode active or no heat requirement from eBUS control
S.32	Waiting period: Deviation in fan speed
S.33	Air pressure switch calibration
S.34	Frost protection mode active
S.36	Reference setting for the continuous control 7-8-9 or eBUS control is < 20 °C and blocks the heating mode
S.39	Limit thermostat for the underfloor heating triggered
S.41	Water pressure too high
S.42	Return signal for the flue non-return flap (only if an accessory) blocks burner operation or condensate pump faulty, heat demand blocked
S.53	Modulation blocked by operating block function due to water deficiency (flow and return spread too great)
S.54	Product in standby caused by operating blocking function as a result of water deficiency (temperature gradient)
S.85	Service message "Insufficient water flow rate, product in standby mode for 10 minutes"
S.96	Return sensor test running, heating demands are blocked.
S.97	Water pressure sensor test running, heating demands are blocked.

Status code	Meaning
S.98	Flow/return sensor test running, heating demands are blocked.
S.108	Purging process is running

C Fault messages – Overview

Message	Possible cause	Measure
F.00 Flow temperature sensor interruption	NTC plug loose/not plugged in	► Check the NTC plug and plug connection.
	NTC sensor defective	► Replace the NTC sensor.
	Multiple plug loose/not plugged in	► Check the multiple plug and plug connection.
	Interruption in the cable harness	► Check the cable harness.
F.01 Return temperature sensor interruption	NTC plug loose/not plugged in	► Check the NTC plug and plug connection.
	NTC sensor defective	► Replace the NTC sensor.
	Multiple plug loose/not plugged in	► Check the multiple plug and plug connection.
	Interruption in the cable harness	► Check the cable harness.
F.03 Cylinder temperature sensor interruption	NTC sensor defective	► Replace the NTC sensor.
	NTC plug loose/not plugged in	► Check the NTC plug and plug connection.
	Connection to cylinder electronics defective	► Check the connection to the cylinder electronics.
F.10 Flow temperature sensor short circuit	NTC sensor defective	► Replace the NTC sensor.
	Short circuit in the cable harness	► Check the cable harness.
F.11 Return temperature sensor short circuit	NTC sensor defective	► Replace the NTC sensor.
	Short circuit in the cable harness	► Check the cable harness.
F.13 Cylinder temperature sensor short circuit	NTC sensor defective	► Replace the NTC sensor.
	Short circuit in the cable harness	► Check the cable harness.
F.20 Safety shutdown: Safety cut-out	Flow NTC defective	► Check the flow NTC.
	Return NTC defective	► Check the return NTC.
	Earth connection faulty	► Check the earth connection.
	Stray spark via the ignition cable, ignition plug or ignition electrode	► Check the ignition cable, ignition plug and ignition electrode.
F.22 Safety shutdown: Water deficiency	Insufficient/no water in the product.	► Fill the heating installation. (→ Page 21)
	Interruption in the cable harness	► Check the cable harness.
F.23 Safety shutdown: Temperature spread too great	Pump blocked	► Check that the pump is working correctly.
	Pump runs with insufficient output	► Check that the pump is working correctly.
	Flow and return NTC connected the wrong way round	► Check the connection for the flow and return NTC.
F.24 Safety shutdown: Temperature rise too fast	Pump blocked	► Check that the pump is working correctly.
	Pump runs with insufficient output	► Check that the pump is working correctly.
	Non-return valve blocked	► Check that the non-return valve is working correctly.
	Non-return valve installed incorrectly	► Check the installation position of the non-return valve.
	System pressure too low	► Check the system pressure.
F.25 Safety shutdown: Flue gas temperature too high	Flue gas safety cut-out plug is not plugged in or is loose	► Check the plug and the plug connection.
	Interruption in the cable harness	► Check the cable harness.
F.27 Safety shutdown: Flame simulation	Gas solenoid valve not leak-tight	► Check that the gas solenoid valve works correctly.

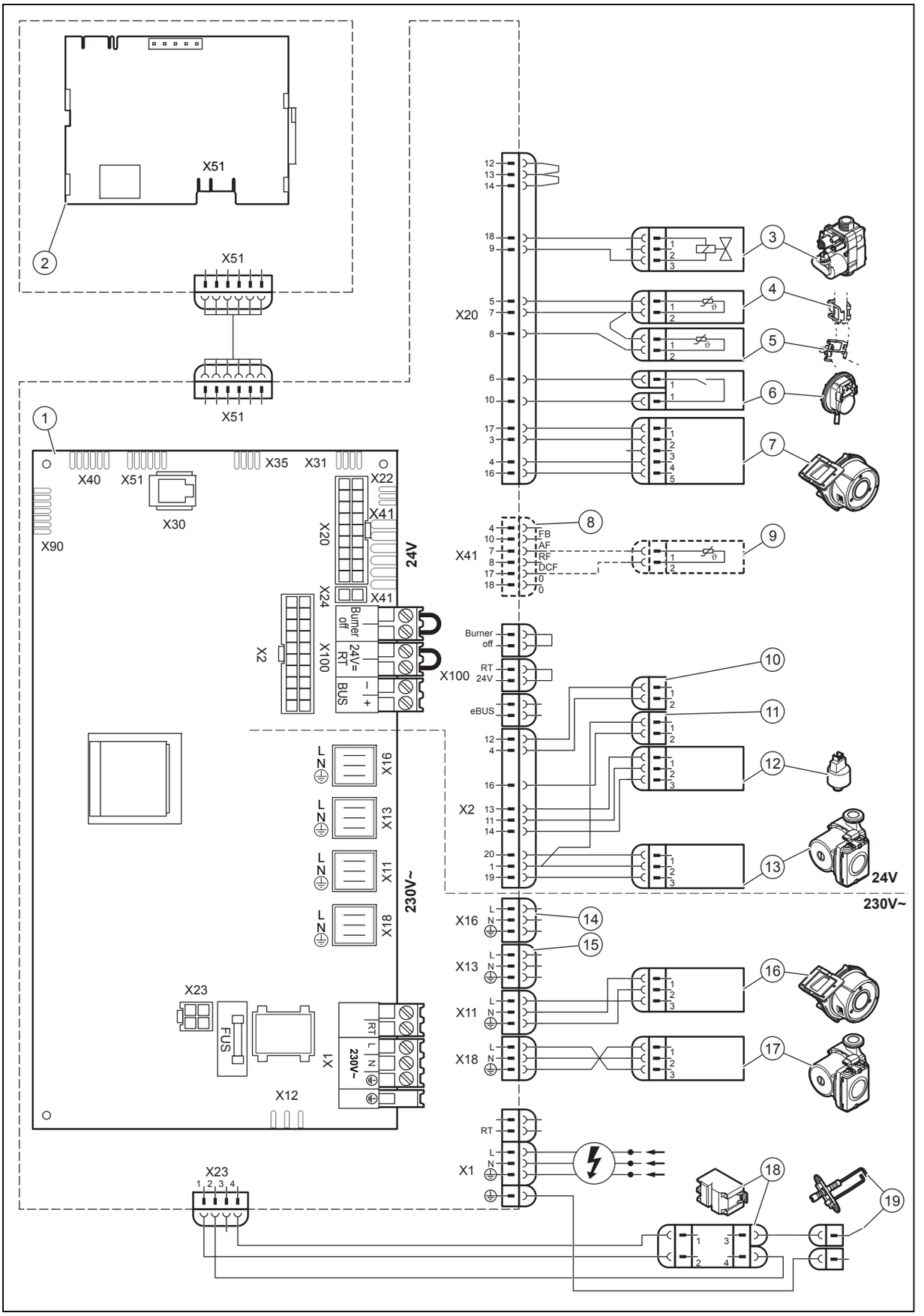
Message	Possible cause	Measure
F.27 Safety shutdown: Flame simulation	Moisture on the PCB	► Check that the PCB works correctly.
	Flame monitor defective	► Replace the flame monitor.
Applicability: Except Germany **F.28** Ignition unsuccessful	Gas stopcock closed	► Open the gas stopcock.
	Gas valve assembly defective	► Replace the gas valve assembly.
	The gas pressure monitor has been triggered	► Check the gas flow pressure.
	Gas flow pressure too low	► Check the gas flow pressure.
	The thermal isolator device has been triggered	► Check the thermal isolator device.
	Cable connections not plugged in/loose	► Check the cable connections.
	Ignition system defective	► Replace the ignition system.
	PCB defective	► Replace the PCB.
	Ionisation flow interrupted	► Check the monitoring electrodes.
	Earthing defective	► Check the product's earthing.
	Air in the gas supply	► Check the gas-air ratio.
	Gas meter defective	► Replace the gas meter.
	Gas supply is interrupted	► Check the gas supply.
	Flue gas circulation is incorrect	► Check the air/flue system.
	Ignition misfire	► Check that the ignition transformer works correctly.
	Diagnostics code **D.085** incorrectly set	► Using an installation with a flue non-return flap, check whether the diagnostics code **D.085** has been set correctly. (→ Page 17)
	Condensate siphon blocked	1. Check whether the condensate discharge is connected correctly. (→ Page 16) 2. If the drain is blocked, check whether the heat exchanger's internal insulating material is OK.
Applicability: Germany **F.28** Ignition unsuccessful	Gas stopcock closed	► Open the gas stopcock.
	Gas valve assembly defective	► Replace the gas valve assembly.
	The gas pressure monitor has been triggered	► Check the gas flow pressure.
	Gas flow pressure too low	► Check the gas flow pressure.
	The thermal isolator device has been triggered	► Check the thermal isolator device.
	Cable connections not plugged in/loose	► Check the cable connections.
	Ignition system defective	► Replace the ignition system.
	PCB defective	► Replace the PCB.
	Ionisation flow interrupted	► Check the monitoring electrodes.
	Earthing defective	► Check the product's earthing.
	Air in the gas supply	► Check the gas-air ratio.
	Gas meter defective	► Replace the gas meter.
	Gas supply is interrupted	► Check the gas supply.
	Flue gas circulation is incorrect	► Check the air/flue system.
	Ignition misfire	► Check that the ignition transformer works correctly.
	Diagnostics code **D.085** incorrectly set	► Using an installation with a flue non-return flap, check whether the diagnostics code **D.085** has been set correctly. (→ Page 17)
	Product code incorrectly set	► If the air/flue pipe is very long, check whether the product code has been adjusted correctly. (→ Page 17)
	Condensate siphon blocked	1. Check whether the condensate discharge is connected correctly. (→ Page 16) 2. If the drain is blocked, check whether the heat exchanger's internal insulating material is OK.

Message	Possible cause	Measure
F.29 Ignition and check faults during operation – flame has gone out	Gas valve assembly defective	► Replace the gas valve assembly.
	Gas meter defective	► Replace the gas meter.
	The gas pressure monitor has been triggered	► Check the gas flow pressure.
	Air in the gas supply	► Check the gas-air ratio.
	Gas flow pressure too low	► Check the gas flow pressure.
	The thermal isolator device has been triggered	► Check the thermal isolator device.
	Cable connections not plugged in/loose	► Check the cable connections.
	Ignition system defective	► Replace the ignition system.
	Ionisation flow interrupted	► Check the monitoring electrodes.
	Earthing defective	► Check the product's earthing.
	PCB defective	► Replace the PCB.
F.32 Fan fault	Plug on fan not plugged in or is loose	► Check the plug on the fan and the plug connection.
	Multiple plug loose/not plugged in	► Check the multiple plug and plug connection.
	Interruption in the cable harness	► Check the cable harness.
	Fan blocked	► Check that the fan works correctly.
	Electronics defective	► Check the PCB.
F.33 Air pressure switch fault	Air/flue pipe blocked	► Check the entire air/flue pipe.
	Defective air pressure switch	► Replace the air pressure switch.
	Cable connections not plugged in/loose	► Check the cable connections.
	Fan defective	► Check that the fan works correctly.
	PCB defective	► Replace the PCB.
	Excessive counter-pressure in the air/flue pipe	1. Ensure that there is no risk of excessive counter-pressure. 2. If required, protect the product (wind guard, cascade lines with a larger diameter, etc.).
F.49 Fault: eBUS	eBUS overload	► Check that the eBUS connection works correctly.
	Short circuit in the eBUS connection	► Check that the eBUS connection works correctly.
	Different polarities at the eBUS connection	► Check that the eBUS connection works correctly.
F.61 Gas safety valve drive fault	Short circuit in the cable harness	► Check the cable harness.
	Gas valve assembly defective	► Replace the gas valve assembly.
	PCB defective	► Replace the PCB.
F.62 Gas safety valve connection fault	PCB defective	► Replace the PCB.
	The connection to the gas valve assembly has been interrupted/broken	► Check the connection to the gas valve assembly.
F.63 Fault: EEPROM	PCB defective	► Replace the PCB.
F.64 Fault: Electronics/NTC	Flow NTC short circuit.	► Check that the flow NTC works correctly.
	Return NTC short circuit	► Check that the return NTC works correctly.
	PCB defective	► Replace the PCB.
F.65 Electronics temperature fault	Electronics overheated	► Check the external heat effects on the electronics.
	PCB defective	► Replace the PCB and the ionisation electrode.
F.67 Flame plausibility fault	PCB defective	► Replace the PCB.
F.70 Invalid device specific number (DSN)	Device Specific Number not set/is incorrect	► Set the correct Device Specific Number.
	Output range coding resistor missing or is incorrect	► Check the output range coding resistor.

Message	Possible cause	Measure
F.71 Flow temperature sensor fault	The flow NTC reports a constant value	► Check the positioning of the flow NTC.
	Incorrect position of the flow NTC	► Check the positioning of the flow NTC.
	Flow NTC defective	► Replace the flow NTC.
F.72 Flow and/or return temperature sensor fault	Flow NTC defective	► Replace the flow NTC.
	Return NTC defective	► Replace the return NTC.
F.73 Water pressure sensor signal in the wrong range (too low)	Short circuit in the cable harness	► Check the cable harness.
	Interruption in the cable harness	► Check the cable harness.
	Water pressure sensor defective	► Replace the water pressure sensor.
F.74 Water pressure sensor signal outside correct range (too high)	Short circuit in the cable harness	► Check the cable harness.
	Interruption in the cable harness	► Check the cable harness.
	Water pressure sensor defective	► Replace the water pressure sensor.
F.75 Pump fault/water deficiency	Malfunction	► Call up diagnostics code **D.149** to obtain further information about the malfunction. Overview of diagnostics codes (→ Page 39)
	D.149 = 1, pump blocked alarm	1. Remove the blockage from the pump. 2. Replace the pump.
	D.149 = 2, electrical pump fault alarm	1. Check the pump's supply voltage. 2. Replace the pump.
	D.149 = 3, pump dry running alarm	1. Check the pressure of the hydraulic circuit; ensure that there is no air in the circuit. 2. Replace the pump.
	D.149 = 5, no pressure peak detection	1. Check the system pressure. 2. Purge the heating installation (purge programme). 3. Check the water pressure sensor. 4. Replace the water pressure sensor.
	D.149 = 6, no feedback from the pump	1. Check the pump's cable harness. 2. Check the main PCB. 3. Check that the plugs are connected correctly. 4. Check the pump's supply voltage. – ≥ 195 V 5. Replace the pump. 6. Replace the main PCB.
	D.149 = 7, incorrect pump detected	1. The detected pump is not correct for the product code; check the product code. 2. Use the pump that has the correct article number.
	D.149 = 8, flow rate at the end of the purge programme is insufficient	1. Check whether the stopcocks and thermostatic valves are open. 2. Check the filling pressure; purge the circuit. – ≥ 0.15 MPa (≥ 1.50 bar)
F.77 Accessory fault (flue non-return flap, condensate pump, etc.)	No feedback from the flue non-return flap or the feedback is incorrect	► Check that the flue non-return flap works without any problems.
	Flue non-return flap defective	► Replace the flue non-return flap.
	No feedback from the condensate pump or the feedback is incorrect	► Check that the condensate pump is working correctly.
F.83 Fault: Flow and/or return temperature sensor temperature change	Water deficiency	► Fill the heating installation. (→ Page 21)
	Flow NTC: No contact	► Check whether the flow NTC is lying against the flow pipe correctly.
	Return NTC: No contact	► Check whether the return NTC is lying against the return pipe correctly.

Message	Possible cause	Measure
F.84 Fault: Temperature difference at the flow and return temperature sensors	Flow NTC installed incorrectly	► Check that the flow NTC has been installed correctly.
	Return NTC installed incorrectly	► Check that the return NTC has been installed correctly.
F.85 Flow and return temperature sensors have been installed incorrectly (inverted)	Flow/return NTC installed on the same/incorrect pipe	► Check that the flow and return NTCs have been installed on the correct pipe.

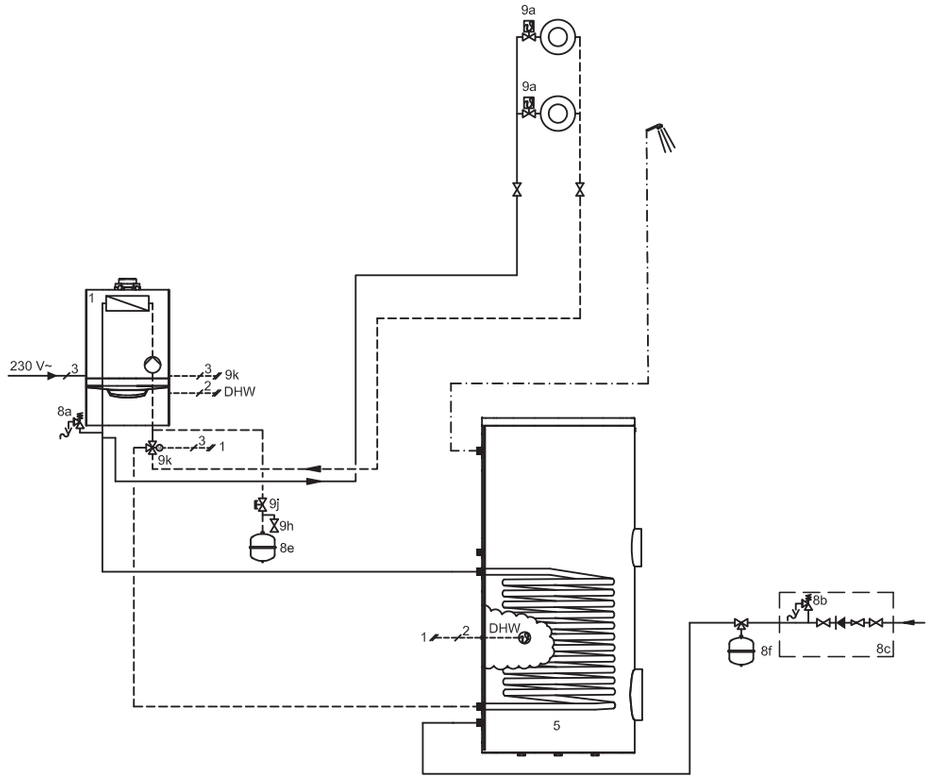
D Wiring diagram

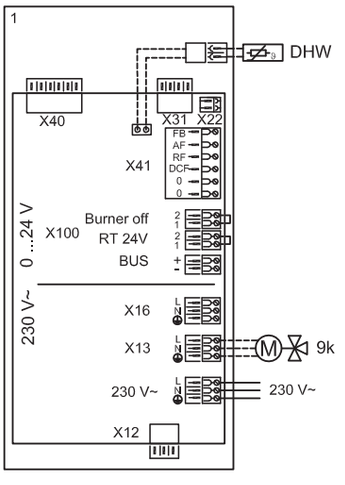


1	Main PCB (BMU)
2	PCB for the control element (AI)
3	Gas valve assembly
4	Temperature sensor in the heating flow
5	Temperature sensor in the heating return
6	Pressure switch
7	Control signal for the fan
8	Plug that is enclosed with the system control (optional)
9	Temperature sensor for the low loss header (optional)
10	Plug for the domestic hot water cylinder's temperature sensor (optional)
11	Plug for the domestic hot water cylinder's contact (optional)
12	Water pressure sensor
13	Heating pump control signal
14	Control of the optional relay **D.026**
15	Power supply for the prioritising diverter valve or domestic hot water charging pump (optional)
16	Fan power supply
17	Power supply for the heating pump
18	Igniter
19	Ignition electrode

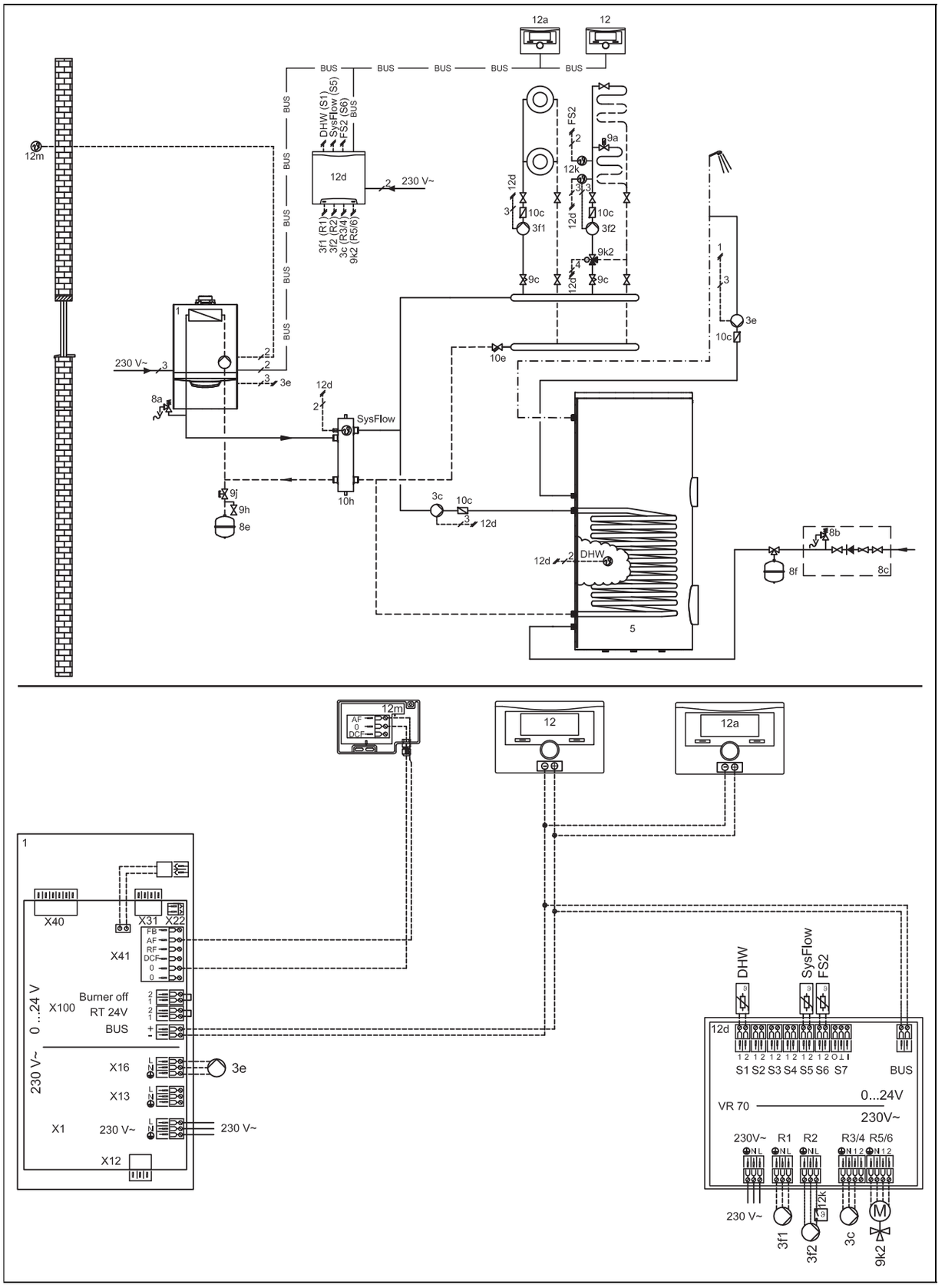
E Basic installation diagram

E.1 0020253233





E.2 0020259030



E.3 Key for the basic system diagrams

Component	Meaning
1	Heat generator
3	Heat generator circulation pump
3c	Cylinder charging pump
3e	Circulation pump
3f	Heating pump
5	Monovalent domestic hot water cylinder
8a	Expansion relief valve
8b	Potable water expansion relief valve
8c	Safety group – drinking water connection
8e	Heating diaphragm expansion vessel
8f	Diaphragm expansion vessel – potable water
9a	Single-room temperature control valve (thermostatic/motorised)
9c	Flow regulator valve
9e	Domestic hot water generation prioritising diverter valve
9h	Filling/draining cock
9j	Tamper-proof capped valve
9k	3-port mixing valve
10c	Non-return valve
10e	Line strainer with magnetite separator
10h	Low loss header
12	System control
12a	Remote control unit
12d	Expansion/wiring centre
12k	Limit thermostat
12m	Outdoor temperature sensor
DHW	Cylinder temperature sensor
FS2	Heating circuit volume temperature sensor
SysFlow	System temperature sensor
Components that have been used multiple times (x) are numbered consecutively (x1, x2, ..., xn).	

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 required intervals listed in the table. Carry out the preparatory work each time before inspection/maintenance work is carried out, and carry out the completion work each time after the inspection/maintenance work is carried out.

#	Maintenance work	Interval	
1	Checking leak-tightness	Each time maintenance work is carried out	26
2	Check the general condition of the product	Annually	
3	Remove any dirt from the product and vacuum chamber	Annually	
4	Inspect the heat cell (condition, corrosion, soot, damage) and, if required, carry out maintenance work.	Annually	
5	Checking the gas flow pressure	Annually	23
6	Checking the CO_2 content and, if necessary, adjusting it (air ratio setting)	Annually	25
7	Check that the connections/electrical plug connections have been connected correctly/function correctly	Annually	
8	Check that the gas stopcock and service valves function correctly	Annually	
9	Checking and treating the heating water/filling and supplementary water	Annually	20
10	Checking the pre-charge pressure of the external expansion vessel	At least every 2 years	38

#	Maintenance work	Interval	
11	Cleaning the heat exchanger	At least every 2 years	35
12	Checking the burner	At least every 2 years	36
13	Checking the ignition electrode	At least every 2 years	36
14	Cleaning the condensate siphon	Annually	37
15	Cleaning the filter in the dynamic air separation system	At least every 2 years	37
16	Cleaning the rainwater collector's draining circuit	Annually	37
17	Cleaning the low loss header	At least every 2 years	
18	Test that the product/heating installation and the domestic hot water generation (if required) are working correctly. If required, carry out a purging process.	Annually	
19	Check the product for gas, flue gas and water leaks	Annually	
20	Checking and, if required, correcting the position of the frost protection heating elements	Annually	
21	Completing inspection and maintenance work	Annually	38

G Gas adjustment values

Set values, G20 natural gas

		VC 406/5-5 (E-DE)	VC 476/5-5 (E-DE)	VC 636/5-5 (E-DE)
CO_2 after 5 minutes in full load mode with front casing closed	**Checking during start-up**	9.2 ± 1.0 vol. %	9.2 ± 1.0 vol. %	9.2 ± 1.0 vol. %
	Checking after resetting	9.2 ± 0.3 vol. %	9.2 ± 0.3 vol. %	9.2 ± 0.3 vol. %
CO_2 after 5 minutes in full load mode with front casing removed	**Checking during start-up**	9.0 ± 1.0 vol. %	9.0 ± 1.0 vol. %	9.0 ± 1.0 vol. %
	Checking after resetting	9.0 ± 0.3 vol. %	9.0 ± 0.3 vol. %	9.0 ± 0.3 vol. %
Set for Wobbe index W_o		14.1 kW·h/m³	14.1 kW·h/m³	14.1 kW·h/m³
O_2 after 5 minutes in full load mode with front casing closed	**Checking during start-up**	4.5 ± 1.8 vol. %	4.5 ± 1.8 vol. %	4.5 ± 1.8 vol. %
	Checking after resetting	4.5 ± 0.5 vol. %	4.5 ± 0.5 vol. %	4.5 ± 0.5 vol. %

Set values, G25 natural gas

		VC 406/5-5 (E-DE)	VC 406/5-5 (LL-DE)	VC 476/5-5 (E-DE)	VC 476/5-5 (LL-DE)	VC 636/5-5 (E-DE)	VC 636/5-5 (LL-DE)
CO_2 after 5 minutes in full load mode with front casing closed	**Checking during start-up**	9.2 ± 1.0 vol. %	9.2 ± 1.0 vol. %	9.2 ± 1.0 vol. %	9.2 ± 1.0 vol. %	9.3 ± 1.0 vol. %	9.3 ± 1.0 vol. %
	Checking after resetting	9.2 ± 0.3 vol. %	9.2 ± 0.3 vol. %	9.2 ± 0.3 vol. %	9.2 ± 0.3 vol. %	9.3 ± 0.3 vol. %	9.3 ± 0.3 vol. %
CO_2 after 5 minutes in full load mode with front casing removed	**Checking during start-up**	9.0 ± 1.0 vol. %	9.0 ± 1.0 vol. %	9.0 ± 1.0 vol. %	9.0 ± 1.0 vol. %	9.1 ± 1.0 vol. %	9.1 ± 1.0 vol. %
	Checking after resetting	9.0 ± 0.3 vol. %	9.0 ± 0.3 vol. %	9.0 ± 0.3 vol. %	9.0 ± 0.3 vol. %	9.1 ± 0.3 vol. %	9.1 ± 0.3 vol. %
Set for Wobbe index W_o		14.1 kW·h/m³	11.5 kW·h/m³	14.1 kW·h/m³	11.5 kW·h/m³	14.1 kW·h/m³	11.5 kW·h/m³

		VC 406/5-5 (E-DE)	VC 406/5-5 (LL-DE)	VC 476/5-5 (E-DE)	VC 476/5-5 (LL-DE)	VC 636/5-5 (E-DE)	VC 636/5-5 (LL-DE)
O_2 after 5 minutes in full load mode with front casing closed	**Checking during start-up**	4.5 ± 1.8 vol. %	4.2 ± 1.8 vol. %	4.5 ± 1.8 vol. %	4.2 ± 1.8 vol. %	4.0 ± 1.8 vol. %	4.0 ± 1.8 vol. %
	Checking after reset-ting	4.5 ± 0.5 vol. %	4.2 ± 0.5 vol. %	4.5 ± 0.5 vol. %	4.2 ± 0.5 vol. %	4.0 ± 0.5 vol. %	4.0 ± 0.5 vol. %

Set values, G31 liquefied petroleum gas

		VC 406/5-5 (E-DE)	VC 406/5-5 (LL-DE)	VC 476/5-5 (E-DE)	VC 476/5-5 (LL-DE)	VC 636/5-5 (E-DE)	VC 636/5-5 (LL-DE)
CO_2 after 5 minutes in full load mode with front casing closed	**Checking during start-up**	9.9 ± 1.0 vol. %	9.9 ± 1.0 vol. %	9.9 ± 1.0 vol. %	9.9 ± 1.0 vol. %	10.1 ± 1.0 vol. %	10.1 ± 1.0 vol. %
	Checking after reset-ting	9.9 ± 0.3 vol. %	9.9 ± 0.3 vol. %	9.9 ± 0.3 vol. %	9.9 ± 0.3 vol. %	10.1 ± 0.3 vol. %	10.1 ± 0.3 vol. %
CO_2 after 5 minutes in full load mode with front casing removed	**Checking during start-up**	9.7 ± 1.0 vol. %	9.7 ± 1.0 vol. %	9.7 ± 1.0 vol. %	9.7 ± 1.0 vol. %	9.9 ± 1.0 vol. %	9.9 ± 1.0 vol. %
	Checking after reset-ting	9.7 ± 0.3 vol. %	9.7 ± 0.3 vol. %	9.7 ± 0.3 vol. %	9.7 ± 0.3 vol. %	9.9 ± 0.3 vol. %	9.9 ± 0.3 vol. %
Set for Wobbe index W_o		21.3 kW·h/m³	21.3 kW·h/m³	21.3 kW·h/m³	21.3 kW·h/m³	21.3 kW·h/m³	21.3 kW·h/m³
O_2 after 5 minutes in full load mode with front casing closed	**Checking during start-up**	5.9 ± 1.8 vol. %	5.9 ± 1.8 vol. %	5.9 ± 1.8 vol. %	5.9 ± 1.8 vol. %	5.5 ± 1.8 vol. %	5.5 ± 1.8 vol. %
	Checking after reset-ting	5.9 ± 0.5 vol. %	5.9 ± 0.5 vol. %	5.9 ± 0.5 vol. %	5.9 ± 0.5 vol. %	5.5 ± 0.5 vol. %	5.5 ± 0.5 vol. %

H Technical data

Technical data – Heating

	VC 406/5-5 (E-DE)	VC 406/5-5 (LL-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)	0.4 MPa (4.0 bar)	0.4 MPa (4.0 bar)
Nominal water flow (ΔT = 20 K)	1,600 l/h	1,600 l/h
Approximate value for the condensate volume (pH value between 3.5 and 4.0) at 50/30 °C	4.0 l/h	4.0 l/h
Maximum heat output (factory setting – D.000)	Auto	Auto

	VC 476/5-5 (E-DE)	VC 476/5-5 (LL-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)	0.4 MPa (4.0 bar)	0.4 MPa (4.0 bar)
Nominal water flow (ΔT = 20 K)	1,900 l/h	1,900 l/h
Approximate value for the condensate volume (pH value between 3.5 and 4.0) at 50/30 °C	4.5 l/h	4.5 l/h
Maximum heat output (factory setting – D.000)	Auto	Auto

	VC 636/5-5 (E-DE)	VC 636/5-5 (LL-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)	0.4 MPa (4.0 bar)	0.4 MPa (4.0 bar)

	VC 636/5-5 (E-DE)	VC 636/5-5 (LL-DE)
Nominal water flow (ΔT = 20 K)	2,500 l/h	2,500 l/h
Approximate value for the condensate volume (pH value between 3.5 and 4.0) at 50/30 °C	5.6 l/h	5.6 l/h
Maximum heat output (factory setting – D.000)	Auto	Auto

Technical data – Power/heat input (G20)

	VC 406/5-5 (E-DE)	VC 476/5-5 (E-DE)
Effective output range (P) at 50/30 °C	8.7 … 40.7 kW	8.7 … 48.0 kW
Heat output range (P) at 60/40 °C	8.5 … 39.4 kW	8.5 … 46.6 kW
Effective output range (P) at 80/60 °C	7.8 … 37.3 kW	7.8 … 44.1 kW
Maximum heat input – heating (Q max.)	38.0 kW	45.2 kW
Minimum heat input – heating (Q min.)	8.1 kW	8.1 kW

	VC 636/5-5 (E-DE)
Effective output range (P) at 50/30 °C	12.2 … 63.5 kW
Heat output range (P) at 60/40 °C	11.8 … 61.7 kW
Effective output range (P) at 80/60 °C	11.0 … 58.7 kW
Maximum heat input – heating (Q max.)	60.0 kW
Minimum heat input – heating (Q min.)	11.3 kW

Technical data – Power/heat input (G25)

	VC 406/5-5 (E-DE)	VC 406/5-5 (LL-DE)
Effective output range (P) at 50/30 °C	8.8 … 40.5 kW	8.8 … 40.5 kW
Effective output range (P) at 80/60 °C	7.8 … 37.3 kW	7.8 … 37.3 kW
Maximum heat input – heating (Q max.)	38.0 kW	38.0 kW
Minimum heat input – heating (Q min.)	8.1 kW	8.1 kW

	VC 476/5-5 (E-DE)	VC 476/5-5 (LL-DE)
Effective output range (P) at 50/30 °C	8.7 … 48.0 kW	8.7 … 48.0 kW
Effective output range (P) at 80/60 °C	7.9 … 44.1 kW	7.9 … 44.1 kW
Maximum heat input – heating (Q max.)	45.2 kW	45.2 kW
Minimum heat input – heating (Q min.)	8.1 kW	8.1 kW

	VC 636/5-5 (E-DE)	VC 636/5-5 (LL-DE)
Effective output range (P) at 50/30 °C	12.2 … 63.5 kW	12.2 … 63.5 kW
Effective output range (P) at 80/60 °C	11.0 … 58.7 kW	11.0 … 58.7 kW
Maximum heat input – heating (Q max.)	60.0 kW	60.0 kW
Minimum heat input – heating (Q min.)	11.3 kW	11.3 kW

Technical data – Power/heat input (G31)

	VC 406/5-5 (E-DE)	VC 406/5-5 (LL-DE)
Effective output range (P) at 50/30 °C	8.6 … 39.5 kW	8.6 … 39.5 kW
Effective output range (P) at 80/60 °C	7.8 … 37.1 kW	7.8 … 37.1 kW
Maximum heat input – heating (Q max.)	38.0 kW	38.0 kW
Minimum heat input – heating (Q min.)	8.1 kW	8.1 kW

	VC 476/5-5 (E-DE)	VC 476/5-5 (LL-DE)
Effective output range (P) at 50/30 °C	8.6 … 46.6 kW	8.6 … 46.6 kW
Effective output range (P) at 80/60 °C	7.8 … 44.0 kW	7.8 … 44.0 kW
Maximum heat input – heating (Q max.)	45.2 kW	45.2 kW
Minimum heat input – heating (Q min.)	8.1 kW	8.1 kW

	VC 636/5-5 (E-DE)	VC 636/5-5 (LL-DE)
Effective output range (P) at 50/30 °C	12.0 … 62.1 kW	12.0 … 62.1 kW
Effective output range (P) at 80/60 °C	11.1 … 58.4 kW	11.1 … 58.4 kW
Maximum heat input – heating (Q max.)	60.0 kW	60.0 kW
Minimum heat input – heating (Q min.)	11.3 kW	11.3 kW

Technical data – General

	VC 406/5-5 (E-DE)	VC 406/5-5 (LL-DE)
Gas category	II2ELL3P, I2E	II2ELL3P
Diameter of the gas pipe at the product outlet	25 mm	25 mm
Diameter at the outlet of the gas compression fitting, outside thread	1"	1"
Diameter of the heating pipe at the product outlet, outside thread	1 1/2"	1 1/2"
Diameter at the outlet of the heating connection, outside thread	1 1/2"	1 1/2"
Connection diameter of the expansion relief valve, inside thread	1"	1"
G20 gas supply pressure	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	5.0 kPa (50.0 mbar)	5.0 kPa (50.0 mbar)
CE number (PIN)	CE-0063CS3428	CE-0063CS3428
Smoke mass flow in heating mode at P min.	3.9 g/s	3.9 g/s
Smoke mass flow in heating mode at P max.	17.0 g/s	17.1 g/s
Released system types	C13x, C33x, C43x, C53x, C93x, B23x, B23(P)x, B33x, B53x, B53(P)x	C13x, C33x, C43x, C53x, C93x, B23x, B23(P)x, B33x, B53x, B53(P)x
Flue gas temperature in heating mode (50/30 °C) at P min.	37 °C	37 °C
Flue gas temperature in heating mode at P max. 50/30 °C	53 °C	53 °C
Flue gas temperature in heating mode (80/60 °C) at P min.	61 °C	61 °C
Flue gas temperature in heating mode at P max. 80/60 °C	78 °C	78 °C
Nominal efficiency at 80/60 °C	98.2 %	98.2 %
Nominal efficiency at 50/30 °C	107.0 %	106.7 %
Nominal efficiency at 60/40 °C	103.6 %	104.2 %
Nominal efficiency in partial load mode (30%) at 40/30 °C	109.0 %	109.1 %
NOx class	6	6
Product dimensions, width	440 mm	440 mm
Product dimensions, depth	405 mm	405 mm
Product dimensions, height	720 mm	720 mm
Net weight	37.8 kg	37.8 kg

	VC 476/5-5 (E-DE)	VC 476/5-5 (LL-DE)
Gas category	II2ELL3P, I2E	II2ELL3P
Diameter of the gas pipe at the product outlet	25 mm	25 mm
Diameter at the outlet of the gas compression fitting, outside thread	1"	1"
Diameter of the heating pipe at the product outlet, outside thread	1 1/2"	1 1/2"
Diameter at the outlet of the heating connection, outside thread	1 1/2"	1 1/2"
Connection diameter of the expansion relief valve, inside thread	1"	1"
G20 gas supply pressure	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	5.0 kPa (50.0 mbar)	5.0 kPa (50.0 mbar)

	VC 476/5-5 (E-DE)	VC 476/5-5 (LL-DE)
CE number (PIN)	CE-0063CS3428	CE-0063CS3428
Smoke mass flow in heating mode at P min.	3.9 g/s	3.9 g/s
Smoke mass flow in heating mode at P max.	20.3 g/s	20.3 g/s
Released system types	C13x, C33x, C43x, C53x, C93x, B23x, B23(P)x, B33x, B53x, B53(P)x	C13x, C33x, C43x, C53x, C93x, B23x, B23(P)x, B33x, B53x, B53(P)x
Flue gas temperature in heating mode (50/30 °C) at P min.	37 °C	37 °C
Flue gas temperature in heating mode at P max. 50/30 °C	53 °C	53 °C
Flue gas temperature in heating mode (80/60 °C) at P min.	61 °C	61 °C
Flue gas temperature in heating mode at P max. 80/60 °C	78 °C	78 °C
Nominal efficiency at 80/60 °C	97.5 %	97.5 %
Nominal efficiency at 50/30 °C	106.2 %	106.2 %
Nominal efficiency at 60/40 °C	103.2 %	103.2 %
Nominal efficiency in partial load mode (30%) at 40/30 °C	109.1 %	109.1 %
NOx class	6	6
Product dimensions, width	440 mm	440 mm
Product dimensions, depth	405 mm	405 mm
Product dimensions, height	720 mm	720 mm
Net weight	37.8 kg	37.8 kg

	VC 636/5-5 (E-DE)	VC 636/5-5 (LL-DE)
Gas category	II2ELL3P, I2E	II2ELL3P
Diameter of the gas pipe at the product outlet	25 mm	25 mm
Diameter at the outlet of the gas compression fitting, outside thread	1"	1"
Diameter of the heating pipe at the product outlet, outside thread	1 1/2"	1 1/2"
Diameter at the outlet of the heating connection, outside thread	1 1/2"	1 1/2"
Connection diameter of the expansion relief valve, inside thread	1"	1"
G20 gas supply pressure	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	5.0 kPa (50.0 mbar)	5.0 kPa (50.0 mbar)
CE number (PIN)	CE-0063CS3428	CE-0063CS3428
Smoke mass flow in heating mode at P min.	5.3 g/s	5.3 g/s
Smoke mass flow in heating mode at P max.	27.0 g/s	27.0 g/s
Released system types	C13x, C33x, C43x, C53x, C93x, B23x, B23(P)x, B33x, B53x, B53(P)x	C13x, C33x, C43x, C53x, C93x, B23x, B23(P)x, B33x, B53x, B53(P)x
Flue gas temperature in heating mode (50/30 °C) at P min.	37 °C	37 °C
Flue gas temperature in heating mode at P max. 50/30 °C	61 °C	61 °C
Flue gas temperature in heating mode (80/60 °C) at P min.	65 °C	65 °C
Flue gas temperature in heating mode at P max. 80/60 °C	78 °C	78 °C
Nominal efficiency at 80/60 °C	97.8 %	97.8 %
Nominal efficiency at 50/30 °C	105.9 %	105.9 %
Nominal efficiency at 60/40 °C	102.8 %	102.8 %
Nominal efficiency in partial load mode (30%) at 40/30 °C	109.5 %	109.5 %
NOx class	6	6
Product dimensions, width	440 mm	440 mm
Product dimensions, depth	473 mm	473 mm
Product dimensions, height	720 mm	720 mm
Net weight	47.2 kg	47.2 kg

Technical data – Electrics

	VC 406/5-5 (E-DE)	VC 406/5-5 (LL-DE)
Electric connection	– 230 V – 50 Hz	– 230 V – 50 Hz
Built-in fuse (slow-blow)	T4H/4A,250V	T4H/4A,250V
Maximum electrical power consumption	≤ 162 W	≤ 162 W
Standby electrical power consumption	1.8 W	1.8 W
IP rating	IPX4D	IPX4D
Permissible connected voltage	195 … 253 V	195 … 253 V

	VC 476/5-5 (E-DE)	VC 476/5-5 (LL-DE)
Electric connection	– 230 V – 50 Hz	– 230 V – 50 Hz
Built-in fuse (slow-blow)	T4H/4A,250V	T4H/4A,250V
Maximum electrical power consumption	≤ 162 W	≤ 162 W
Standby electrical power consumption	1.8 W	1.8 W
IP rating	IPX4D	IPX4D
Permissible connected voltage	195 … 253 V	195 … 253 V

	VC 636/5-5 (E-DE)	VC 636/5-5 (LL-DE)
Electric connection	– 230 V – 50 Hz	– 230 V – 50 Hz
Built-in fuse (slow-blow)	T4H/4A,250V	T4H/4A,250V
Maximum electrical power consumption	≤ 250 W	≤ 250 W
Standby electrical power consumption	1.8 W	1.8 W
IP rating	IPX4D	IPX4D
Permissible connected voltage	195 … 253 V	195 … 253 V

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