

Installation and maintenance instructions



ecoVIT exclusiv

VKK 226/4 – VKK 656/4

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-  Komplettpakete
-  Über 15 Jahre Erfahrung
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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 gas-fired boiler type, the products referred to in these instructions must only be installed and operated in conjunction with the air/flue pipe accessories listed in the other applicable documents.

Intended use includes the following:

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

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

Any other use that is not specified in these instructions, or use beyond that specified in

this document shall be considered improper use. Any direct commercial or industrial use is also deemed to be improper.

Caution.

Improper use of any kind is prohibited.

1.3 General safety information

1.3.1 Risk caused by inadequate qualifications

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

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

The product weighs over 50 kg.

- ▶ Make sure that the product is carried by at least two people.
- ▶ Use suitable transport and lifting equipment, in accordance with your risk assessment.
- ▶ Use suitable personal protective equipment: Gloves, safety footwear, protective goggles, protective helmet.

1.3.3 Risk of death from escaping gas

What to do if you smell gas in the building:

- ▶ Avoid rooms that smell of gas.
- ▶ If possible, open doors and windows fully and ensure adequate ventilation.
- ▶ Do not use naked flames (e.g. lighters, matches).
- ▶ Do not smoke.



1 Safety



- ▶ Do not use any electrical switches, mains plugs, doorbells, telephones or other communication systems in the building.
- ▶ Close the emergency control valve or the main isolator.
- ▶ If possible, close the gas isolator cock on the product.
- ▶ Warn other occupants in the building by yelling or banging on doors or walls.
- ▶ Leave the building immediately and ensure that others do not enter the building.
- ▶ Alert the police and fire brigade as soon as you are outside the building.
- ▶ Use a telephone outside the building to inform the emergency service department of the gas supply company.

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

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

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

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

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

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

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

1.3.6 Risk of 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).

1.3.7 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.

1.3.8 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 gas guiding.

- ▶ 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.
- ▶ 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.
- ▶ 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.

1.3.9 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:

- ▶ Disconnect the product from the power supply by switching off all power supplies at all poles (electrical partition with a contact gap of at least 3 mm, e.g. fuse or circuit breaker).
- ▶ Secure against being switched back on again.
- ▶ Check that there is no voltage.





1.3.10 Risk of material damage caused by frost

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

1.3.11 Risk of material damage caused by using an unsuitable tool

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

1.3.12 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.

1.3.13 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.

1.3.14 Risk of being burned or scalded by hot components

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

1.3.15 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 type units with condensate siphon (third-party accessory)

- Water seal level: ≥ 200 mm

1.3.16 Risk of scalding from hot potable water

There is a risk of scalding at the domestic hot water draw-off points if the domestic hot water temperatures are greater than 60 °C. Young children and elderly persons are particularly at risk, even at lower temperatures.

- ▶ Select a moderate set target temperature.
- ▶ Inform the end user about the risk of scalding when the **Anti-legionella** function is switched on.

1.4 Regulations (directives, laws, standards)

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



2 Notes on the documentation

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:

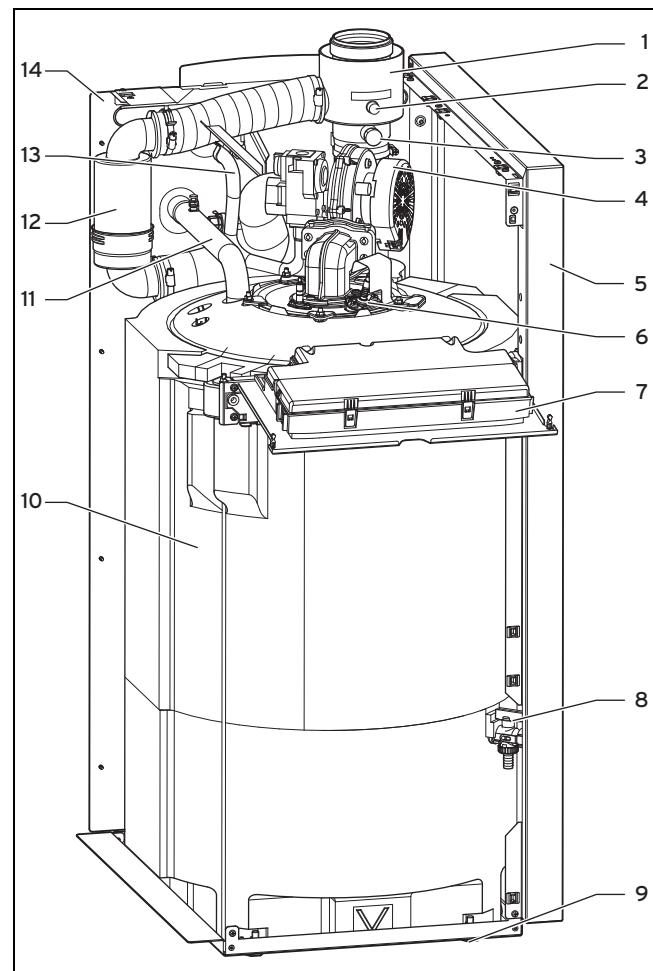
Product article number

VKK 226/4-H	0010007508
VKK 226/4-L	0010007688
VKK 286/4-H	0010007512
VKK 286/4-L	0010007692
VKK 366/4-H	0010007516
VKK 366/4-L	0010007696
VKK 476/4-H	0010007520
VKK 476/4-L	0010007700
VKK 656/4-H	0010007524
VKK 656/4-L	0010007704

3 Product description

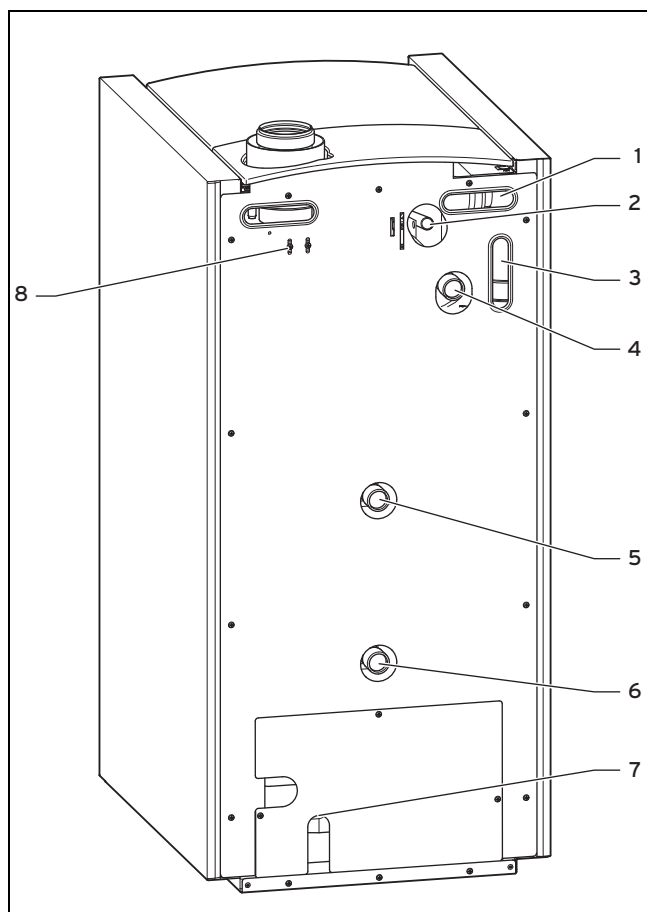
3.1 Product design

3.1.1 Functional elements



- | | | | |
|---|---------------------------------------|----|--|
| 1 | Air/flue connection | 8 | Boiler filling and draining device |
| 2 | Fresh air test point | 9 | Adjustable feet |
| 3 | Flue gas test point | 10 | Boiler body with insulation jackets |
| 4 | Fanned burner with gas valve assembly | 11 | Heating flow pipe |
| 5 | Side panel | 12 | Intake silencer (for VKK 656/4 supply hose only) |
| 6 | Ignition and monitoring electrode | 13 | Gas pipe |
| 7 | Electronics box | 14 | Back panel |

3.1.2 Rear connections



- | | |
|--|---|
| 1 Recessed handles | 6 Heating return connection |
| 2 Gas connection | 7 Opening for the condensate discharge connection |
| 3 Grommet | 8 Fastening for the flue pipe retainer |
| 4 Heating flow connection | |
| 5 Cylinder return connection (when connecting a domestic hot water cylinder) | |

3.2 Data plate

The data plate is mounted on the rear of the electronics box at the factory.

Information on the data plate	Meaning
Serial number	for identification; 7th to 16th digits = product article number
VKK...	Vaillant gas-fired floor-standing condensing boiler
36	Power in kW
6	with condensing technology
/4	Product series
ecoVIT	Product designation
exclusive	Comfort fittings
G20 20 mbar	Gas group and gas connection pressure as set at the factory
Cat. (e.g. II _{2H3P})	Approved gas category
Types (e.g. C ₃₃)	Approved gas-fired units

Information on the data plate	Meaning
PMS (e.g. 3 bar (0.3 MPa))	Permissible total overpressure
T _{max.} (e.g. 85 °C)	Max. flow temperature
230 V 50 Hz	Electric connection
(e.g. 110) W	Max. electrical power consumption
Class I	Electrical protection class
IP (e.g. X4D)	IP rating
	Heating mode
P	Nominal heat output range
Q	Heat input range



Note

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

3.3 Serial number

The serial number can be found on a sticker behind the front flap on the front below the control panel and on the data 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 Transporting the product



Warning.

The high product weight poses a risk of injury during transport.

Excessive load bearing may lead to injuries.

- Transport the product using a suitable carrying aid or a suitable sack truck.



Caution.

Risk of material damage caused by incorrect use of the mode of transport.

A sack truck that is attached incorrectly may damage the product's casing.

- Attach a sack truck only to the rear of the product.

1. Secure the product to a suitable carrying aid or a suitable sack truck.

4 Set-up

- Transport the product to the installation site.



Note

Recessed handles are also located in the lower front floor plate.

4.2 Checking the scope of delivery

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

4.2.1 Scope of delivery

Number	Designation
1	Heat generator
1	The bag of small parts for the installation consists of: - Compression fitting, gas, R 3/4" - Sealing plugs for second return connection that is not required
1	Enclosed documentation

4.3 Installation site



Note

Gas-fired heat production sources with a total nominal heat capacity in excess of 50 kW must be installed in separate rooms which are not used for any other purpose, i.e. not lounges, common rooms or other similar areas where people congregate.

The product can be operated at environmental temperatures of approx. 4 °C to approx. 50 °C.



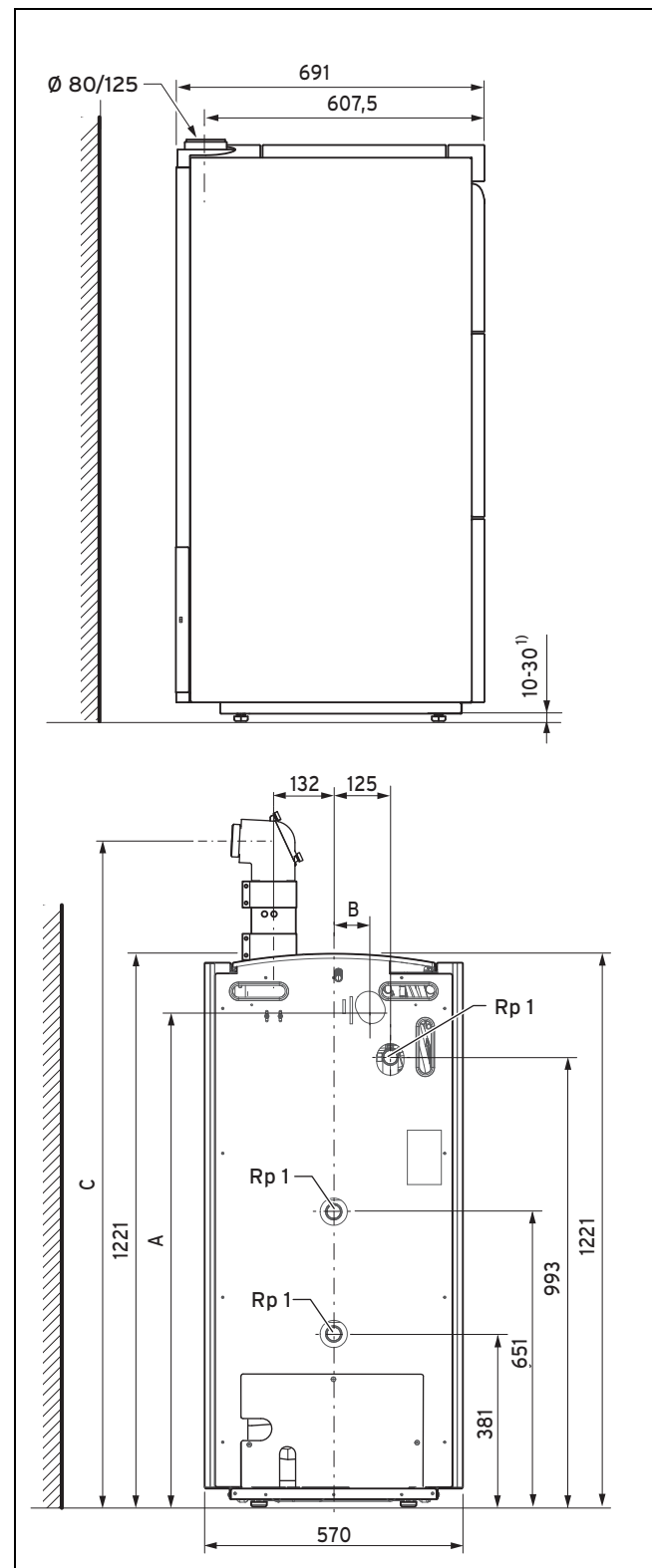
Note

When selecting the installation site, take into consideration the product's weight when it is ready for operation, including the water content in accordance with the Technical data (→ Page 38).

For noise insulation, you can use a (noise-insulating) boiler platform or similar equipment; we recommend setting the product up on boiler foundations of 5 cm to 10 cm in height.

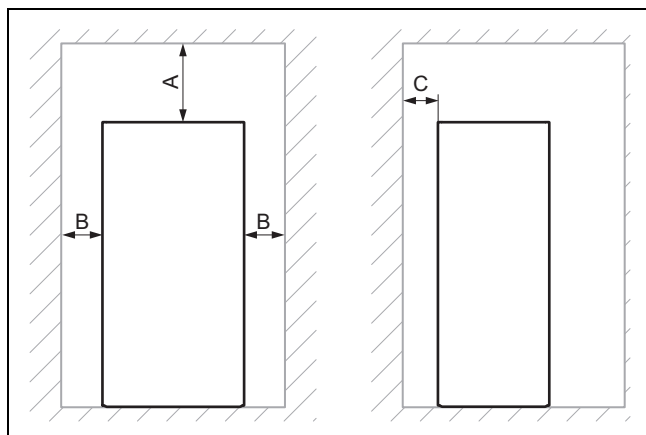
- A separate room with ventilation and aeration may be required as the installation site. When selecting the installation site and its ventilation, observe the relevant national regulations.
- Set up the product in a frost-free room.

4.4 Dimensions



A	VKK 226/4; VKK 286/4; VKK 366/4: 1117 mm VKK 476/4; VKK 656/4: 1085 mm	C	VKK 226/4; VKK 286/4; VKK 366/4: At least 1350 mm (without ad- apter)
B	VKK 226/4; VKK 286/4; VKK 366/4: 75 mm VKK 476/4; VKK 656/4: 86 mm		VKK 476/4; VKK 656/4: At least 1451 mm (with adapter)
		1)	Feet, height-adjustable by 20 mm

4.5 Minimum clearances



	Minimum clearance
A	500 mm
B	At least 500 mm, only required on one side
C	300 mm for the pipe group and condensate pump accessories, 400 mm for the cylinder charging connection set accessory in the case of a flush combination with an actoSTOR

4.6 Clearance from combustible components

It is not necessary to maintain a clearance between the product and components made of combustible materials that goes beyond the minimum clearances (→ Page 8).



Note

However, you must ensure that there is sufficient clearance behind and beside the product in order to position the condensate discharge pipe safely above a drain or, if required, to connect a condensate pump. The drain must be visible.

4.7 Aligning the product

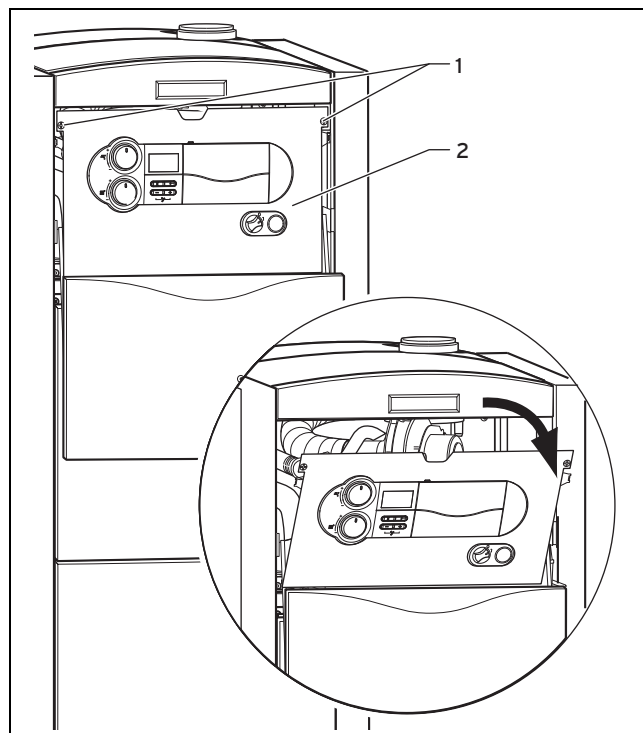
- Use the height-adjustable feet to adjust the product horizontally in order to ensure that the condensate drains from the flue gas collector.

4.8 Opening the front flap

- Take hold of the recessed handle in the front flap and lift the panel up slightly.
 - ◁ The front flap automatically swivels downwards and the control panel becomes accessible.

4.9 Hinging the electronics box down and up

4.9.1 Hinging down the electronics box



1. Turn both screws (1) by 90°.
2. Hinge the electronics box (2) down.

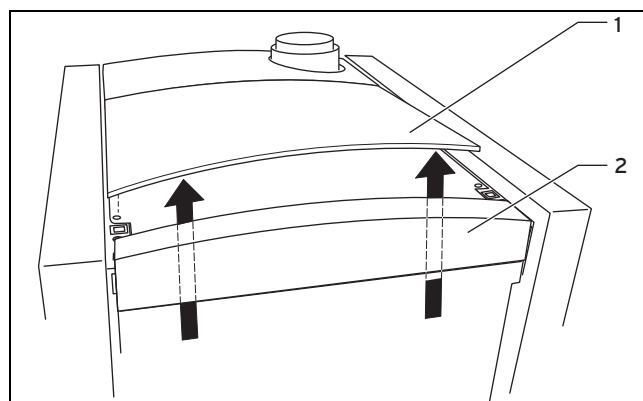
4.9.2 Hinging up the electronics box

1. Hinge the electronics box (2) up.
2. Turn both screws (1) by 90°.

4.10 Removing and installing the upper casing

4.10.1 Removing the upper casing

1. Open the front flap. (→ Page 9)
2. Hinge the electronics box down. (→ Page 9)



3. Reach through behind the panel (2) from below and push the upper casing (1) upwards.
4. Remove the upper casing.

5 Installation

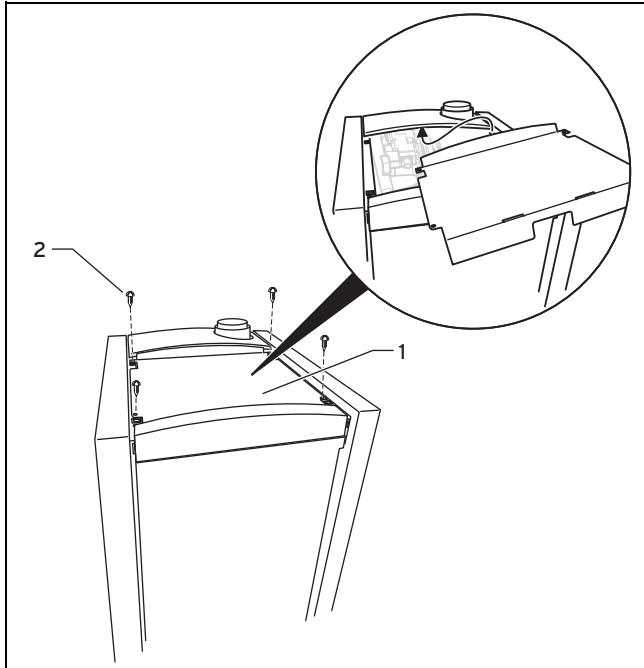
4.10.2 Installing the upper casing

1. Place the upper casing into the clip retainers.
2. Push the upper casing down until it clicks into place.

4.11 Removing and installing the cover plate

4.11.1 Removing the cover plate

Applicability: VKK 476/4, VKK 656/4



1. Unscrew the screws (2).
2. Lift the cover plate and pull it forwards and out.

4.11.2 Installing the cover plate

Applicability: VKK 476/4, VKK 656/4

1. Slide the cover plate below the rear upper casing and place it there.
2. Screw in the screws.

4.12 Removing and installing the front casing

4.12.1 Removing the front casings

1. If the front flap is open, swivel the front flap upwards.
2. Remove each of the front casings by pulling them forwards.

4.12.2 Installing the front casings

- Place each piece of front casing with the locking bolts on both sides into the grooves in the side sections and press them onto the product until the locking bolts audibly click into place.

5 Installation

5.1 Requirements



Danger!

Risk of scalding and/or risk of material damage due to incorrect installation leading to escaping water.

Stresses in connection cables can cause leaks.

- Install the connection cables so that they are free from mechanical stress.



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 corrosion

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

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



Caution.

Risk of material damage 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 connected pipes.

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

- Install an expansion relief valve on-site.
- A discharge pipe with inlet funnel and siphon must be routed on-site from the discharge line of the expansion relief valve to a suitable drain in the installation room. The drain must be visible.
- Install a purging device at the highest point in the heating installation.
- Install a filling/draining device in the heating installation.

- ▶ Make sure that the existing gas meter is capable of passing the rate of gas supply required.
- ▶ Check that the volumetric capacity of the expansion vessel is sufficient for the system volume.

The safety cut-out installed in the product offers additional low-water pressure protection to that provided by the water pressure sensor.

The switch-off temperature for the product that arises as a result of the fault is approx. 107 °C (nominal switch-off temperature 107 °C, tolerance -6 K).

If plastic pipes are used in the heating installation, you must install a suitable thermostat on-site on the heating flow. This is required in order to protect the heating installation against temperature-related damage. The thermostat can be connected to the terminals for the surface-mounted thermostat (blue Pro-E plug).

If non-diffusion-tight plastic pipes are used in the heating installation, you must connect a plate heat exchanger for system separation downstream in order to prevent corrosion in the product.

Seals made of rubber-like materials may be subject to plastic deformation, which can lead to pressure losses. We recommend using seals made of a paste-like fibre material.

5.2 Required accessories (on-site)

The following required accessories (to be provided on-site) are necessary for the installation:

- Gas stopcock with fire protection device
- Expansion relief valve, heating side
- Service valves (heating flow and return)
- Heating pump
- Expansion vessel
- Automatic air vent
- Control
- Air/flue pipe

On the VKK 476/4 and VKK 656/4 products, the 80/125 mm adapter (with test opening to measure the air/flue gas) must be used.



Note

We recommend also using the 80/125 mm adapter for the VKK 226/4 VKK 286/4 and VKK 366/4 products to increase accessibility of the measuring points.

5.3 Information on liquid gas operation

In the as-delivered condition, the product is preset for operation with the gas group indicated on the identification 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 kit for this. The conversion procedure is described in the manual supplied with the conversion kit.

5.4 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.

5.5 Using the correct type of gas

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

- ▶ Only use the gas type listed on the identification plate.

5.6 Establishing the gas and water connections

5.6.1 Establishing the gas connection

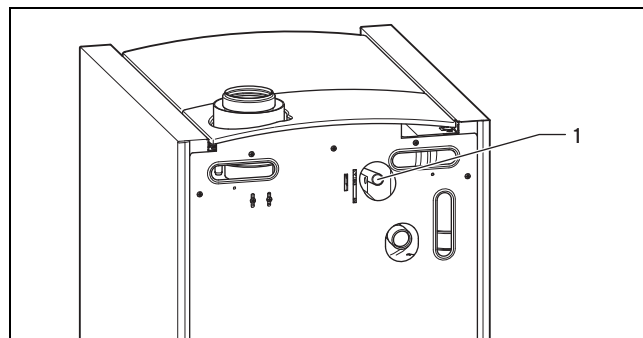


Caution.

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

At a test pressure of >1.1 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 1.1 kPa (110 mbar).
- ▶ If you cannot limit the test pressure to 1.1 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 pipe pressure before you open this gas stopcock.



- ▶ Remove the upper casing. (→ Page 9)
- ▶ Install the gas pipe on the connection in the product (1) such that it is free from mechanical stress in accordance with the generally recognised rules of good engineering practice. To do this, use the compression fitting provided.
- ▶ Remove the residues from the gas pipe by blowing through the gas pipe beforehand.

5 Installation

- ▶ Install a gas stopcock with fire protection device in the gas pipe, upstream from the product, at an easily accessible location.
- ▶ Purge the gas pipe before start-up.

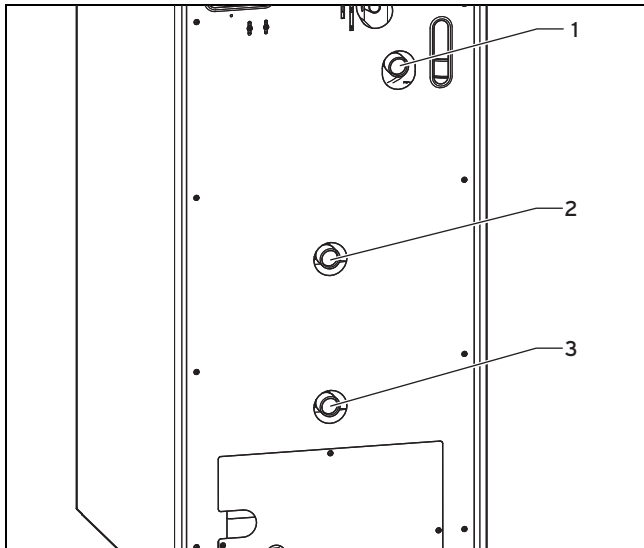
5.6.2 Checking the gas line for leak-tightness

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

5.7 Establishing water connections

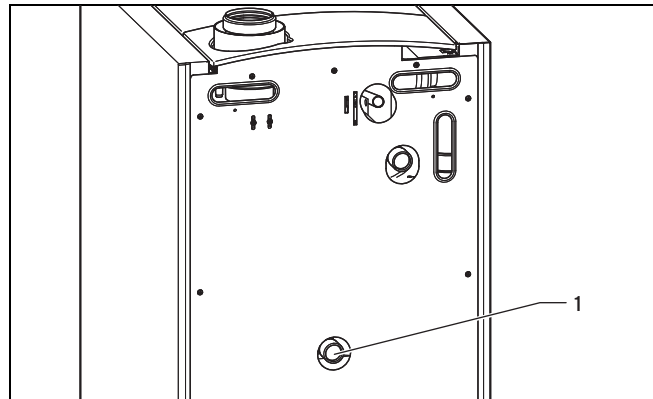
- ▶ Install the connections in accordance with the relevant standards and the generally recognised rules of good engineering practice.

5.7.1 Connecting the heating flow and heating return



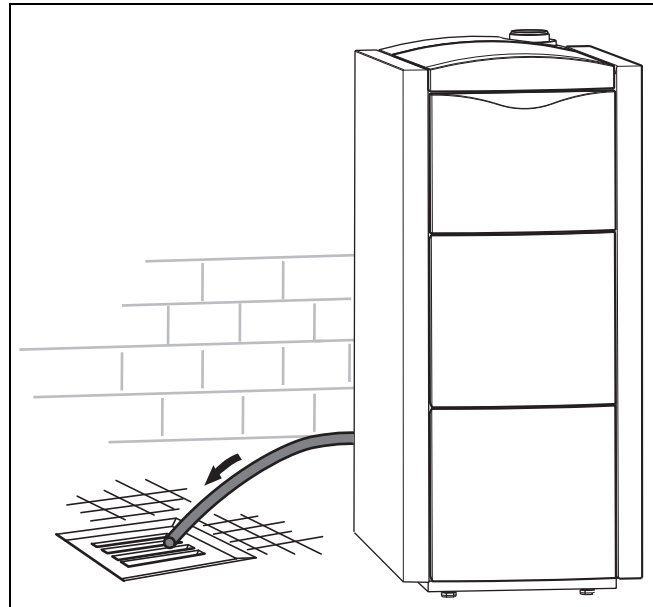
1. Between the heating installation and the product, install the required safety devices and isolators that are to be set on-site, along with a filling/draining cock in the return.
2. Connect the heating flow to the heating flow connection (1).
3. Connect the heating return to the heating return connection (3).
4. If you do not connect a domestic hot water cylinder, use the enclosed sealing plug to seal the connection (2).

5.7.2 Connecting the domestic hot water cylinder return



- ▶ Connect the return for a domestic hot water cylinder to the heating return connection for a high return temperature (1).

5.7.3 Connecting the condensate discharge pipe



Danger!

Risk of death from escaping flue gases!

The siphon's condensate discharge pipe must not be connected to waste-water pipework or a tundish because, otherwise, the internal condensate siphon may be drained fully and flue gas may escape.

- ▶ Do not connect the condensate drain pipework tightly to the waste-water piping.

- ▶ Route the condensate discharge pipe to a tundish or to a floor drain at the installation site.
- ▶ Route the condensate discharge pipe from the product's condensate discharge with a downward gradient and without any kinks. Otherwise, the condensate in the siphon increases and leads to a fault.
- ▶ Check whether the condensate has been discharged correctly.



Note

If the condensate discharge pipe that is installed on site needs to be extended during installation, you must only use condensate-resistant drain pipes.



Note

You can purchase a condensate pump as an accessory.

5.8 Installing and connecting the air/flue system

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: VKK 476/4; VKK 656/4

- Remove the upper casing. (→ Page 9)
- Remove the cover plate. (→ Page 10)
- Install the 80/125 mm adapter with test openings for air/flue gas measurement.



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 assist with the installation.

2. Install the air/flue pipe using the set-up instructions.

5.9 Electrical installation

Only qualified electricians may carry out the electrical installation.



Danger!

Risk of death from electric shock!

Touching live connections may cause serious personal injury because continuous voltage is present at the power supply terminals L and N even if the main switch is switched off.

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



Caution.

Risk of material damage caused by malfunction.

If cables are routed directly beside each other, interfering impulses from power supply cables may cause crosstalk to sensor cables in the low-voltage range.

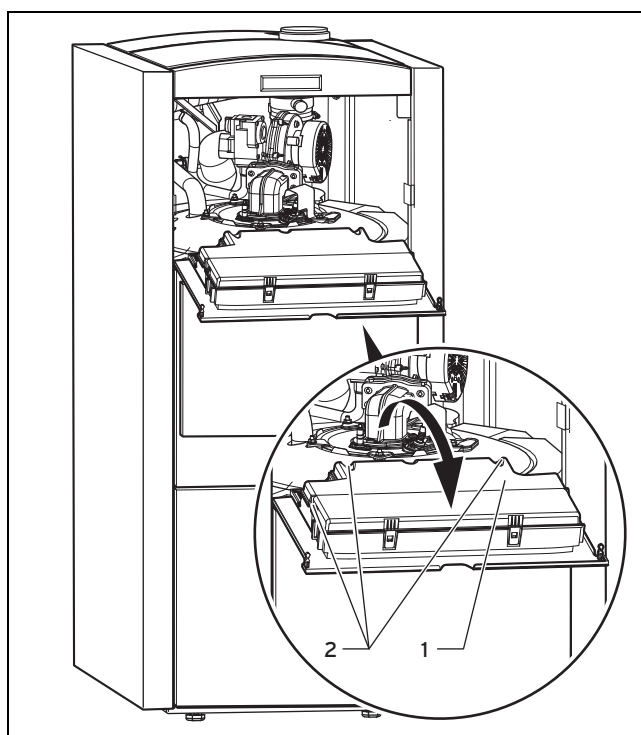
- Route the mains cable and low-voltage cable (e.g. sensor cable) with sufficient space between them.

- Install a mains power switch on-site in the product's power supply.

The product is equipped with connection plugs and is wired ready for connection. The power supply cable and all other connection cables can be connected to the corresponding ProE system plugs that are provided; see the wiring diagram in the appendix.

5.9.1 Opening and closing the electronics box

5.9.1.1 Opening the electronics box



1. Open the front flap. (→ Page 9)
2. Hinge the electronics box down. (→ Page 9)
3. Remove the clips (2) from the retainers.
4. Hinge the cover (1) up.

5.9.1.2 Closing the electronics box

1. Close the cover (2) by pressing it down onto the electronics box.
2. Ensure that all of the clips (1) audibly click into the retainers.
3. Hinge the electronics box up. (→ Page 9)

5.9.2 Wiring the cables



Caution.

Risk of material damage caused by incorrect installation.

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

- Do not connect any mains voltage to the eBUS terminals (+/-).

5 Installation

- Only connect the power supply cable to the terminals marked for the purpose.

1. Route the connection cables of the components to be connected through the grommet to the electronics box.
2. Use the strain reliefs provided.
3. Shorten the connection cables as necessary.
4. To prevent short circuits if a strand accidentally comes loose, only strip the outer sheathing of flexible lines to a maximum of 30 mm.
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 respective plug to the connection cable.
9. Check whether all conductors are sitting mechanically securely in the terminals of the plug. Remedy this if necessary.
10. Plug the plug into the associated PCB slot.
11. Use the strain reliefs to secure the cable in the electronics box.

5.9.3 Establishing the power supply



Caution.

Risk of material damage due to high connected voltage.

At mains voltages greater than 253 V, electronic components may be damaged.

- Make sure that the rated voltage of the mains is 220 V.

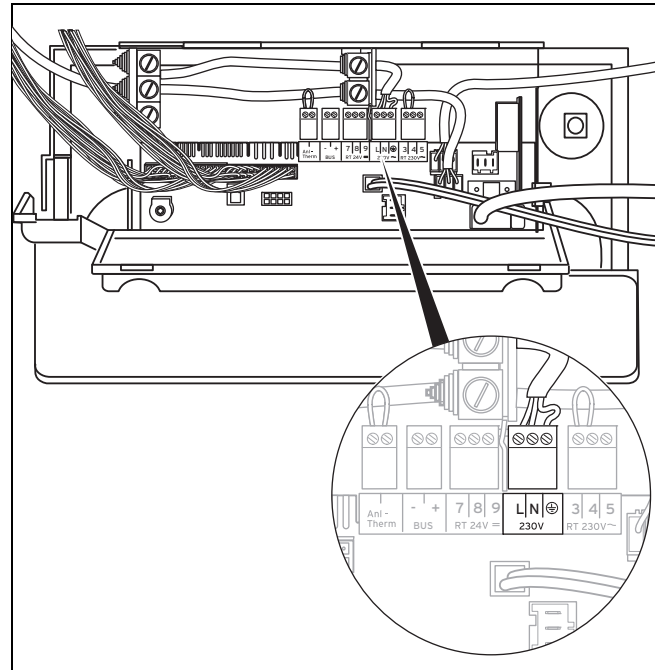


Caution.

Risk of malfunctions due to line interruption and signal interference.

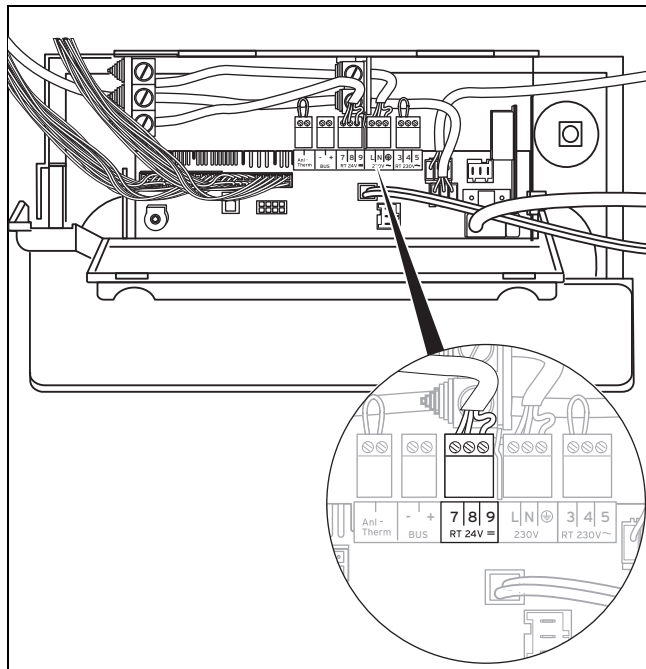
If there is insufficient strain relief, electrical contacts may be loosened. Power supply cables may cause faults in signal-carrying cables.

- Do not use the same strain relief for the low-voltage cable as for the power supply cable.



1. Observe all valid regulations.
2. Open the electronics box. (→ Page 13)
3. Connect the product using a fixed connection and a partition with a contact gap of at least 3 mm (e.g. fuses or power switches).
4. Use a flexible line for the power supply cable, which is routed through the grommet into the product.
5. Route the power supply cable to the connection level in the electronics box, as shown.
6. Wire the cables. (→ Page 13)
7. Screw the turquoise plug, which is installed in the right of the electronics box, to a suitable, flexible, three-core power supply cable that complies with the relevant standards.
8. Connect the plug to the slot of the same colour on the PCB.
9. Close the electronics box. (→ Page 13)
10. Ensure that access to the partition is always available, and that it is not covered or blocked.

5.9.4 Connecting electrical components



- ▶ Open the electronics box. (→ Page 13)
- ▶ Wire the cables. (→ Page 13)
- ▶ Connect the connection cables to the corresponding terminals or slots in the electronics system.
- ▶ If you connect a VRT 332 room thermostat (continuous control connection terminals 7-8-9, white ProE plug) or a weather-compensated temperature control or room temperature control (bus terminals, red ProE plug) to the product, you must leave the bridge in place between terminals 3 and 4 (purple ProE plug).
- ▶ If no 230 V room/timer thermostat is used, you must leave the bridge in place between terminals 3 and 4 (purple ProE plug).
- ▶ If required, connect accessories in the same way.

Connecting the heating pump

- ▶ Connect the heating pump to the green ProE plug (X18) on the terminal block.

Connecting an external flow thermostat

- ▶ Connect an external flow thermostat (e.g. to protect underfloor heating) to the terminals for the surface-mounted thermostat (blue ProE plug).

Connecting a condensate pump

- ▶ Connect the alarm output for a condensate pump to the terminals for the surface-mounted thermostat (blue ProE plug).

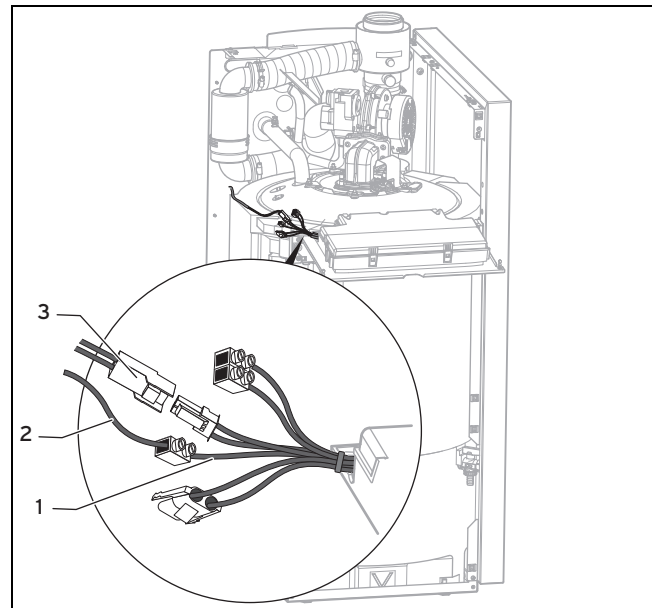


Note

If several contacts are connected to the terminals for the surface-mounted thermostat (blue ProE plug), connect the contacts in series and not in parallel.

- ▶ Close the electronics box. (→ Page 13)

5.9.5 Connecting the domestic hot water cylinder



1. Connect the cylinder temperature sensor (3) and, if required, the charge temperature sensor (2) (actoSTOR only, electronics box connection cable, purple (1)) on the cable harness.
2. For the electrical connection, observe the set-up instructions for the domestic hot water cylinder and the accessory.

5.9.6 Connecting the control

To control the heating installation, you can use a weather-compensated outdoor temperature control or room temperature control with modulating burner control, e.g. VRC 450 or 700, VRC 630 or 620. The wiring diagram for the electrical connection to the heating control can be found in the appendix.

- ▶ Observe the information in the control's installation instructions.
- ▶ Before opening the electronics box, switch off the power supply to the product and protect this against being unintentionally switched on again.
- ▶ Connect the "Bus" connections (red ProE plug, two-wire) to the connections with the same names in the control (VRC 700: Only if the control is attached externally). Leave the bridge between terminals 3 and 4 (purple ProE plug). When connecting a VRC 630/VRS 620, make sure the bus line is connected the right way round (+ to +, - to -).
- ▶ Alternatively, insert the VRC 700 control into the product's control panel fascia (internal installation).
- ▶ Connect sensors and the system assemblies that are not listed in the section "Connecting electrical components" to the control.

6 Operation

5.10 Checking leak-tightness

Before you hand the product over to the operator:

- ▶ Check the gas pipe and the heating circuit for tightness.
- ▶ Check that the air/flue pipe has been installed correctly.

6 Operation

6.1 Operating concept of the product

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

You can access the installer level with the parameters and system-relevant settings after entering the service code.

6.2 Calling up the installer level

1. Press the **i** and **+** buttons at the same time to activate diagnostics mode.
2. Use the **-** or **+** buttons to select diagnostics code **D.97**.
3. Press the **i** button.
4. Use the **-** or **+** button to set the value to 17.
5. Press and hold the **i** button for 5 seconds (until the display stops flashing) to save the value.



Note

The system automatically exits the installer level after 15 minutes. Pressing the **+**, **-** or **i** button will extend this time by 15 minutes.

7 Start-up

7.1 Carrying out the initial start-up

Initial start-up must be carried out by a customer service technician or an authorised competent person.

Any further start-up/operation work is carried out by the operator as described in the operating instructions.



Danger!

Risk of death due to escaping gas!

An improper gas installation or a defect may impair the operational safety of the product and lead to personal injury and material damage.

- ▶ Check the gas tightness of the product before starting it up and after each inspection, maintenance or repair.

The product is operated and the various parameters or operating statuses are set via the operator control panel on the electronics box. You can access the installer level with parameters and system-relevant settings after entering the service code.

- ▶ When starting up the unit, proceed in accordance with the attached checklist.

Commissioning checklist (→ Page 37)

7.2 Calling up the check programmes

1. Press and hold the **+** button and, at the same time, briefly press the **Reset** button. Only release the **+** button once **P.00** is shown in the display.
Check programmes – Overview (→ Page 26)
2. Press the **+** or **-** button to switch to the next check programme.
3. Press the **i** button to start the check programme.

7.3 Reading off the filling pressure

The product comes with a digital pressure indicator.

- ▶ To read off the digital value for the filling pressure, press the **-** button briefly.
 - ◀ The display will show the filling pressure for approximately 5 seconds.

If the heating installation is full, the filling pressure must be between 0.1 MPa and 0.2 MPa (1.0 bar and 2.0 bar) to ensure it operates properly.

If the heating installation extends over several storeys, higher filling pressures may be required to avoid air entering the heating installation.

7.4 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 0.06 MPa (0.6 bar), the product indicates low pressure by displaying a flashing pressure value. If the filling pressure falls below 0.03 MPa (0.3 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 in the display until a pressure of 0.06 MPa (0.6 bar) or higher has been reached.

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

7.5 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 magnet filter.
- ▶ Check the pH value of the removed water at 25 °C.
- ▶ If the value is below 8.2 or above 10.0, clean the installation and treat the heating water.
- ▶ Ensure that oxygen cannot get into the heating water.

Checking the filling and supplementary water

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

Treating the filling and supplementary water

- ▶ Observe all applicable national regulations and technical standards when treating the filling and supplementary water.
- ▶ In particular, observe VDI directive 2035, sheets 1 and 2.

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

You must treat the heating water in the following cases:

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

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

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



Caution.

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

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

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

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

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

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

Additives for cleaning measures (subsequent flushing required)

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

Additives intended to remain permanently in the installation

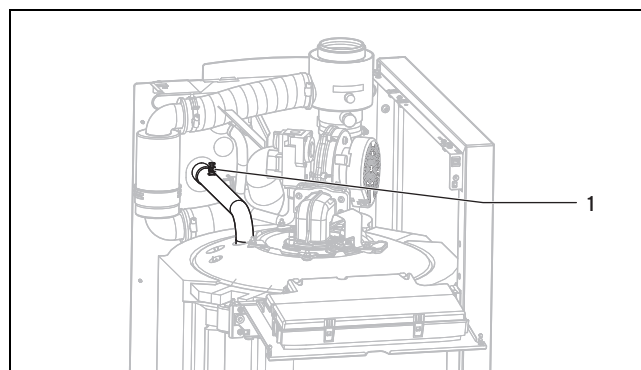
- Adey MC1+
- Fernox F1
- Fernox F2
- Sentinel X 100
- Sentinel X 200

Additives for frost protection intended to remain permanently in the installation

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

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

7.6 Filling the heating installation



1. Flush the heating installation thoroughly before filling it.
2. Observe the information on the topic of treating (→ Page 16) heating water.
3. Open all thermostatic radiator valves.
4. Undo the cap on the product's purging valve (1) by one or two turns.
5. Connect the filling/draining cock (to be provided on-site) in the heating installation to a heating water supply in accordance with the relevant standards.



Note

Do not fill the heating installation via the product's filling/draining cock.

6. Open the heating water supply.
7. If necessary, check that both service valves on the product are open.
8. Slowly open the heating installation's filling/draining cock to fill the heating installation.
9. Close the purging valve on the product as soon as water escapes.

7 Start-up

10. Fill the installation up to a system pressure of 0.2 MPa (2.0 bar).



Note

In a heating installation over several storeys, a higher system pressure may be required.

11. Shut off the heating water supply.

7.7 Purging the heating installation

1. Purge the lowest radiator until water flows out of the purging valve without bubbles.
2. Purge all other radiators until the heating installation is completely filled with water.
3. To purge the heating or cylinder charging circuit, select check programme (→ Page 16) **P.00**.
 - ◁ The product does not start up and the on-site heating pump runs intermittently. The check programme runs for approx. 6.5 minutes.
4. Press the **i** button again to purge the cylinder charging circuit.
5. Top up with water if, while the check programme is running, the system pressure drops below 0.08 MPa (0.8 bar).
6. Read off the system pressure on the display at the end of the check programme. If the system pressure has dropped, fill and purge the installation again.
7. Close the heating installation's filling/draining cock and the heating water supply, and remove the hose.
8. Check all of the connections and the entire heating installation for leak-tightness.

7.8 Filling the condensate siphon

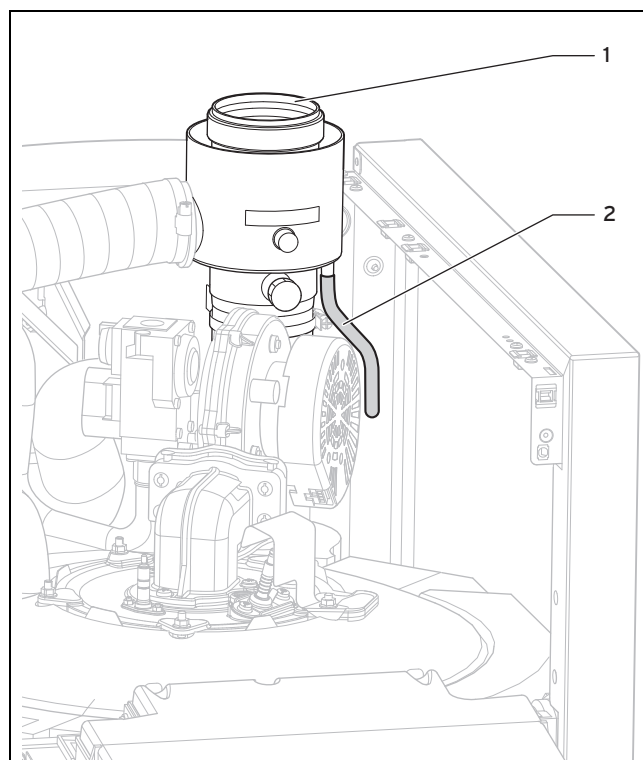


Danger!

Risk of poisoning from escaping flue gas!

An empty or insufficiently filled condensate siphon may allow flue gas to escape into the room air.

- Fill the condensate siphon with water before starting up the product.



1. Before filling the siphon, connect the condensate drain pipework to the rear of the product. Refer to the information on routing the condensate discharge pipe in the section entitled "Connecting the condensate discharge pipe (→ Page 12)".

Conditions: Air/flue pipe not yet connected

- Fill the condensate siphon via the flue gas spigot **(1)** (fill quantity approx. 1.5 l).

Conditions: Air/flue pipe already connected

- Fill the condensate siphon via the flushing line **(2)** using a funnel (fill quantity approx. 1.5 l).

7.9 Checking the gas setting

7.9.1 Checking the factory setting



Caution.

Risk of operating faults or a reduction in the product's service life caused by the gas group being set incorrectly.

If the product design does not match the local gas group, malfunctions will occur or you will have to replace product components prematurely.

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

The combustion setting has been factory tested and is preset for operation with the gas group indicated on the identification 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 group

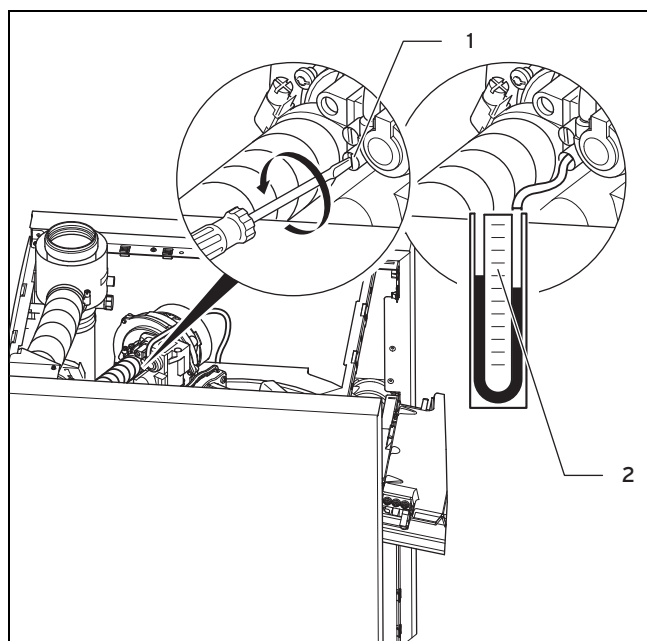
- Do not start up the product.

Conditions: The product design **is compatible** with the local gas group

- Proceed as described below.

7.9.2 Checking the gas connection pressure (gas flow pressure)

1. Close the gas stopcock.
2. Remove the upper casing. (→ Page 9)



3. Undo the sealing screw marked "in" (1) on the gas valve assembly.
4. Connect a manometer (2).
5. Open the gas stopcock.
6. Start up the product with check programme **P.01** or the chimney sweep function.
7. Measure the gas connection pressure against atmospheric pressure.
 - Permissible gas connection pressure for operation with G20 natural gas: 1.7 ... 2.5 kPa (17.0 ... 25.0 mbar)
 - Permissible gas connection pressure for operation with G25 natural gas: 1.7 ... 2.5 kPa (17.0 ... 25.0 mbar)
 - Permissible gas connection pressure for operation with G31 natural gas: 4.25 ... 5.75 kPa (42.50 ... 57.50 mbar)
8. Decommission the product.
9. Close the gas stopcock.
10. Remove the manometer.
11. Tighten the sealing screw (1).
12. Open the gas stopcock.
13. Check the test nipple for gas tightness.
14. Install the upper casing. (→ Page 10)

Conditions: Gas connection pressure **not** in permissible range or stagnation pressure differs from gas flow pressure by more than 1.0 kPa (10 mbar)



Caution.

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

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

- Do not make any adjustments to the product.
- Do not start up the product.

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

7.9.3 Checking the CO₂ content and, if necessary, adjusting it (air ratio setting)

1. Remove the upper casing. (→ Page 9)
2. Start up the product with check programme (→ Page 16) **P.01**.
3. Wait at least three minutes until the product reaches its operating temperature.



Note

During the adjustment, the air hose must not be removed from the gas valve assembly. The measurement must be carried out with the air/flue pipe installed to ensure that the measured values are not distorted.

Conditions: VKK 226/4; VKK 286/4; VKK 366/4

- Measure the CO₂ and CO content at the flue gas test point.

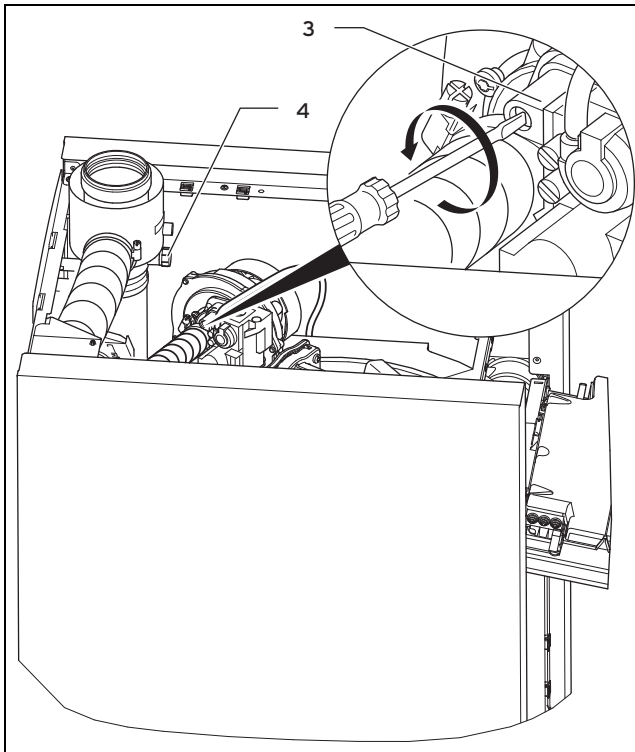
Conditions: VKK 476/4; VKK 656/4

- Measure the CO₂ and CO content at the adapter with test openings on top of the product.
4. Compare the measured values with the corresponding values in the table.

Set values	Unit	Natural gas (G20)	Natural gas (G25)	(G31) liquid gas
CO ₂ after 5 minutes in full load mode	Vol.-%	9.2 ± 0.3	9.0 ± 0.3	10.0 ± 0.3
Set for Wobbe index W _s	kWh/m³	15.0	12.4	22.5
O ₂ after 5 minutes in full load mode	Vol.-%	4.1 ± 1.80	4.2 ± 1.80	5.3 ± 1.80
CO content	ppm	≤ 50	≤ 50	≤ 50

8 Adapting the unit to the installation

Conditions: The CO₂ content must be adjusted



- Set the CO₂ content by turning the screw (3).



Note

Turn to the left: Higher CO₂ content
Turn to the right: Lower CO₂ content

- Only carry out the adjustment in increments of 1/8 turn and wait approximately 1 minute after each adjustment until the value stabilises.
- If an adjustment is not possible in the specified adjustment range, you must not start up the product.
- If this is the case, inform Customer Service.
- Use the plastic screw cap to close off the flue gas test point.
- Check that there are no leaks in the gas pipe, the flue system, the product or the heating installation.
- Press the **i** and **+** buttons simultaneously or press the **Reset** button to end check programme **P.01**.
- Install the upper casing. (→ Page 10)

7.10 Checking the heating mode

- Ensure that there is a heat requirement, e.g. by setting the control to a higher required temperature.
 - ◁ If the product is working correctly, the heating pump for the heating circuit must start running.

7.11 Checking the hot water generation

Applicability: Product with connected domestic hot water cylinder

- Make sure that the cylinder thermostat is requesting heat. Check that the domestic hot water generation is working correctly by establishing a heat requirement using a connected domestic hot water cylinder.
- If you have connected a control which can be used to set the domestic hot water temperature, set the domestic hot water temperature on the boiler to the maximum possible temperature.
- Adjust the target temperature for the connected domestic hot water cylinder to the control.

7.12 Checking that the product functions correctly and checking the leak-tightness

1. Check that the product functions correctly and check the leak-tightness before you hand the product over to the end user.
2. Start up the product.
3. Check the gas pipe, the flue system, the heating installation and the domestic hot water pipes for leaks.
4. Check that all control, regulation and monitoring devices are functioning properly.
5. Check the air/flue pipe and the condensate discharge pipe to ensure that they are installed correctly and securely fastened.
6. Check the over-ignition and that the flame on the burner is burning evenly (diagnostics code **D.44**: < 250 = excellent flame, > 700 no flame).
7. Ensure that all of the casing sections have been installed correctly.

8 Adapting the unit to the installation

8.1 Calling up diagnostics codes

1. 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 end user.

Overview of diagnostics codes (→ Page 27)
2. Call up the installer level. (→ Page 16)
3. Press the **i** and **+** buttons simultaneously.
 - ◁ **d.00** will appear on the display.
4. Use the **-** or **+** button to select the required diagnostics code.
5. Press the **i** button.
 - ◁ The display will show the associated diagnostic information.
6. If required, use the **-** or **+** buttons to set the required value (display flashes).
7. Save the changed value by pressing and holding the **i** button for five seconds (display stops flashing).

8.2 Exiting diagnostics mode

- ▶ Press the **i** and **+** buttons simultaneously or wait 4 minutes before pressing any buttons.
 - ◁ The current heating flow temperature or (if this option has been selected) heating installation filling pressure will reappear on the display.

8.3 Setting the maximum flow temperature

1. Set the maximum flow temperature for heating mode under **D.71**.
2. Set the maximum flow temperature for cylinder charging mode under **D.78**.

8.4 Setting the burner anti-cycling time

- ▶ Set the maximum burner anti-cycling time under **D.02**.



Note

To prevent frequent switching on and off of the burner and thus prevent energy losses, an electronic restart lockout is activated for a specific period each time the burner is switched off. The burner anti-cycling time is only active for the heating mode.

8.5 Setting the partial heating load

- ▶ Set the partial heat load under **D.00**.



Note

If the diagnostics code is at the maximum value, the partial load is continuously optimised by the automatic partial heat load control based on the current burner load. After an interruption in the mains voltage supply or after the reset button is pressed, the value that is currently determined is reset to the maximum output. If you set a value that is smaller than the maximum value, the automatic function will not activate.

8.6 Setting cylinder charging partial load

- ▶ Set cylinder charging partial load under **D.77**.



Note

If the diagnostics code is at the maximum value, the partial load is continuously optimised by the automatic cylinder charging partial load control based on the current burner load. After an interruption in the mains voltage supply or after the reset button is pressed, the value that is currently determined is reset to the maximum output. If you set a value that is smaller than the maximum value, the automatic function will not activate.

8.7 Setting the pump overrun and pump mode

You can set the pump overrun under **D.01**.

You can set the pump overrun for a cylinder charging pump that is directly connected to the product under **D.72**.

If the cylinder charging pump is connected to a VRC 630 or auroMATIC 620 control, set the overrun time on the control.

You can set the **Eco** (intermittent) or **Comfort** (continuous) pump modes under **D.18**.

In **Comfort** mode, the external heating pump is switched on if:

- The room temperature control requests heat via terminal 3-4-5 **and**
- The room temperature control or built-in control specify a target value for the flow temperature via terminal 7-8-9 that is greater than 30 °C or via eBUS that is greater than 20 °C **and**
- The product is in winter mode (the rotary knob for the heating flow temperature is not at the anti-clockwise end stop) **and**
- The surface-mounted thermostat is closed.

The pump is switched off if:

- One of the above-mentioned conditions is no longer being met **and**
- The pump overrun has ended.

The burner anti-cycling time has no effect on the pump. If one of these conditions is missing during the overrun time, this time ends regardless.

Eco is useful for removing residual heat after domestic hot water generation when the heat demand is extremely low and there are large target temperature spreads between the domestic hot water generation target value and the heating mode target value. This prevents living rooms from being under-supplied. If there is a heat demand, the pump is switched on for five minutes within 30 minutes in each case once the overrun time has elapsed.

If a temperature sensor is connected in the return:

If the return temperature for the heating water drops rapidly, the pump runs (within those 30 minutes) for longer than the minimum running time of five minutes. The "intermittent" operating mode can be interrupted at any time by starting the burner, and the pump runs in the normal heating mode.

8.8 Start-up behaviour

When there is a heat requirement, the product goes into the status **S.02** (pump prerun) for approx. 15 seconds and then the fan is started (**S.01**).

After reaching the start-up speed, the gas valve is opened and the burner starts (**S.04**).

The product is now operated at minimum output for 30 to 60 seconds, depending on the boiler temperature. Depending on the target value deviation, the calculated target speed is then set.

9 Troubleshooting

8.9 Handing the product over to the end user

1. When you have finished the installation, attach the sticker supplied (835593) to the front of the product in the user's language.
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. Draw special attention to the safety information which the end user must follow.
4. Draw the end user's attention to the safety and warning information on the product.
5. Inform the end user that they must have the product maintained in accordance with the specified intervals.
6. Pass all of the instructions and documentation for the product to the end user for safe-keeping.
7. Inform the end user about measures taken to ensure the combustion air supply and flue system, and instruct the end user that he must not make any changes.
8. Make the end user aware of the need to keep the instructions near the product.
9. Explain to the end user how to check the required system pressure and the measures for filling and purging the heating installation, where required.
10. Inform the end user of the correct (efficient) settings for temperatures, controls, and thermostatic valves.

9 Troubleshooting

9.1 Reading off the fault codes

If a fault develops in the product, the display shows a fault code **F.xx**.

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.

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

Overview of fault codes (→ Page 32)

- ▶ Eliminate the fault.
- ▶ To restart the product, press the reset button (→ Operating instructions).
- ▶ If you are unable to eliminate the fault and the fault recurs despite several reset attempts, contact Vaillant customer service.

9.2 Eliminating faults

- ▶ Eliminate faults after checking the table in the appendix or by using the function menu (→ Page 23) or check programmes (→ Page 16) as an aid.
Troubleshooting (→ Page 33)
- ▶ Press  (max. three times) to restart the product.
- ▶ If you are unable to eliminate the fault and the fault recurs despite reset attempts, contact customer service.

9.3 Checking the status codes

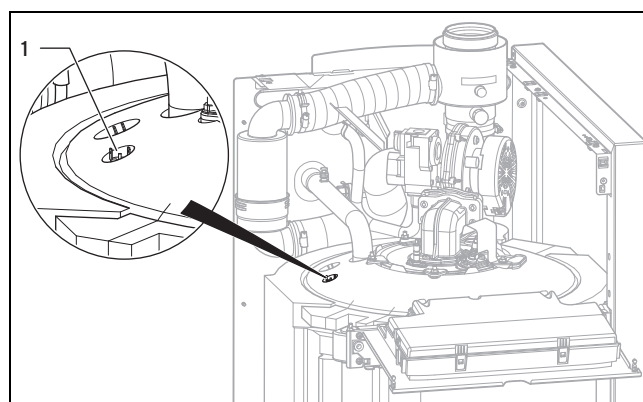
You can call up the status codes in the display. The status codes provide information about the current operating status of the product.

- ▶ Press the **i** button to display the current product status. The status code is displayed: **S.xx**.
- ▶ Press the **i** button again to hide the status code.
Status codes – Overview (→ Page 31)

9.4 Resetting parameters to factory settings

- ▶ To simultaneously reset all parameters to the default settings, set **d.96** to 1.

9.5 Resetting the safety cut-out



1. Remove the upper casing. (→ Page 9)
2. Push the pin (**1**) to reset the safety cut-out.



Note

You can only press down on the pin once the temperature of the product is < 80 °C.

3. After the safety cut-out is triggered, always carry out troubleshooting and eliminate the cause of the fault.

10 Carrying out inspection and maintenance work

1. Disconnect the product from the power grid.
2. Close the gas stopcock.



Note

If inspection and maintenance work is necessary when the mains power switch is switched on, this is indicated in the description of the maintenance work.

3. Adhere to the minimum inspection and maintenance intervals. The inspection may require maintenance to be carried out earlier, depending on the results.
4. Carry out all inspection and maintenance work in the order shown in the "Inspection and maintenance work" table in the appendix.

10.1 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.

10.2 Function menu

The function menu in the DIA system allows you to control how individual actuators work. The function menu can always be started after switching on the product or after pressing the reset button. The product's electronics switch to normal operating mode if you do not operate the product for five seconds or if you press the – button.

Function menu – Overview (→ Page 26)

10.3 Removing the burner assembly



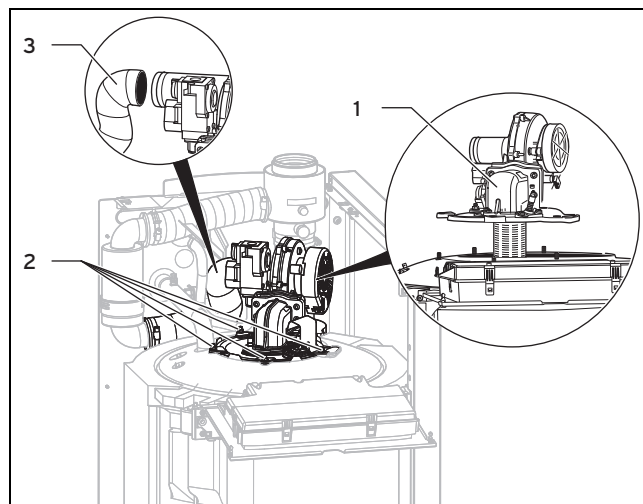
Danger!

Risk of being burned or scalded by hot components!

The burner assembly and all water-carrying components present a risk of burns and scalding.

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

1. Disconnect the product from the power grid.
2. Close the gas stopcock.
3. Hinge the electronics box down. (→ Page 9)
4. Remove the upper casing. (→ Page 9)
5. Unscrew the locking plate from the ignition electrode and pull out the ignition line and the earth wire.
6. Remove the ignition line from the monitoring electrode.
7. Remove the cables from the fan motor and the gas valve assembly.
8. Detach the gas pipe on the underside of the gas valve assembly and the pressure measuring hose on its upper side.



9. Pull the air suction hose (3) out of the fan connection.
10. Unscrew the nuts (2).
11. Remove the burner assembly (1) from the heat exchanger.
12. Check the components of the burner assembly and the heat exchanger for damage and dirt.
13. If necessary, clean or replace the components in accordance with the following sections.

10.4 Cleaning the combustion chamber

1. Protect the electronics box from splashed water.
2. Use vinegar (max. 5% acid) to clean the combustion chamber. Allow the vinegar to act on the combustion chamber for 20 minutes.
3. Use water to rinse off the dirt that has softened up.
 - ◁ The water drains out via the flue gas collector and the condensate discharge pipe.

10.5 Checking the burner



Note

The burner is maintenance-free and does not need to be cleaned.

- Check the surface of the burner for damage. If you notice any damage, replace the burner, incl. seal.

10.6 Installing the burner assembly



Danger!

Risk of death caused by escaping flue gas!

A defective combustion chamber seal may impair the operational safety of the product and lead to personal injury and material damage.

- Replace the combustion chamber seal after any inspection and maintenance work.
- Reinsert the circlip that tightly surrounds the seal after any inspection and maintenance work.

10 Carrying out inspection and maintenance work

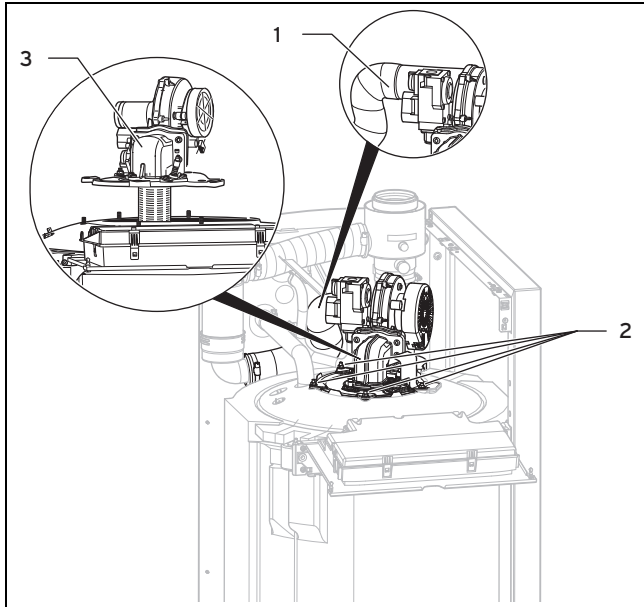


Danger!

Risk of death due to escaping gas!

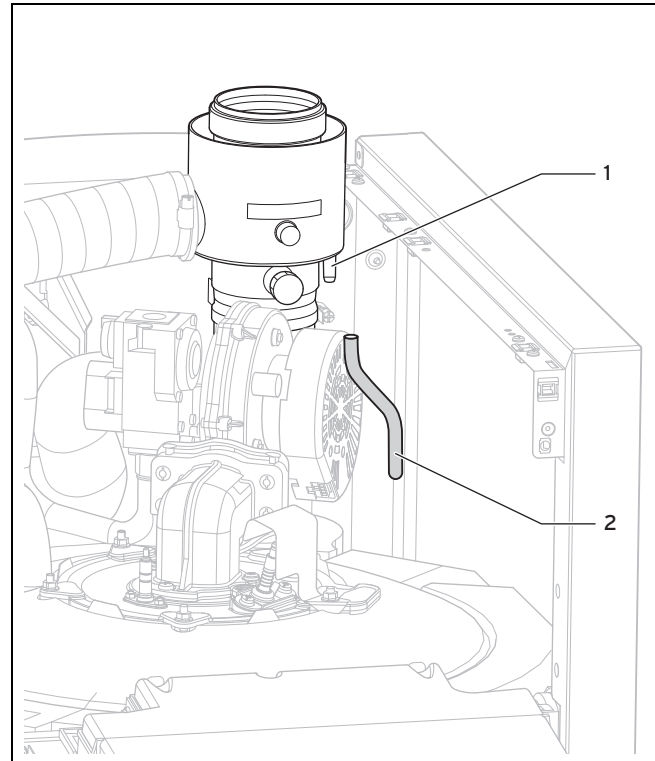
An improper gas installation or a defect may impair the operational safety of the product and lead to personal injury and material damage.

- Check the gas tightness of the product before starting up and after each instance of inspection, maintenance and repair work.



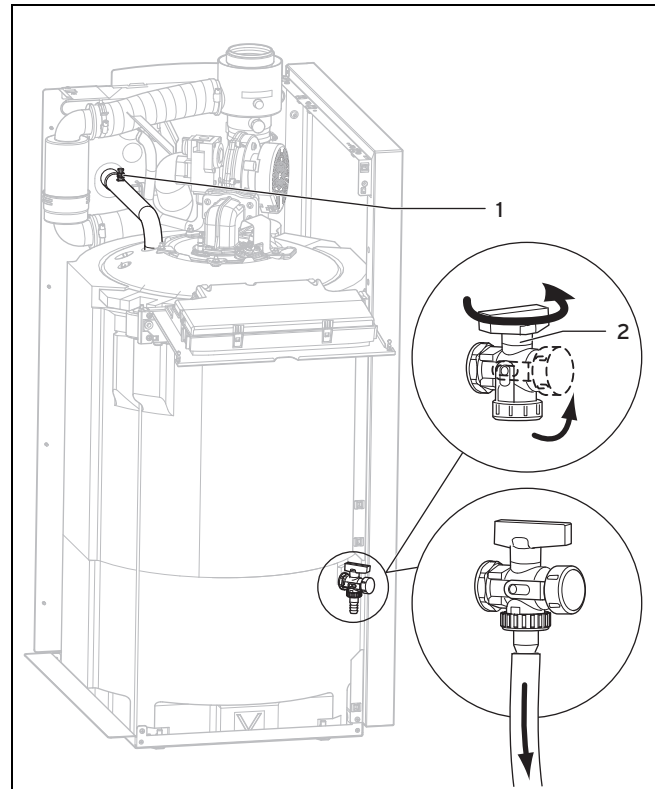
1. Replace the combustion chamber seal.
2. Fit the burner assembly (3) to the body of the floor-standing boiler.
3. Tighten the nuts (2) in a cross-wise pattern.
 - Torque: 9 Nm
4. Connect the ignition line and the earth wire to the ignition and monitoring electrode.
5. Place a new seal into the brass nipple on the underside of the gas valve assembly.
6. Screw the gas pipe to the underside of the gas valve assembly again.
 - Torque: 25 Nm
7. Plug the pressure-measuring hose into the upper side of the gas valve assembly again.
8. Making sure it is not twisted, fit the air intake hose (1) to the fan connection and use the clamp to secure it in place.
9. Plug in the cables to the fan motor and to the gas valve assembly again.
10. Open the gas stopcock.
11. Check for gas tightness.

10.7 Cleaning the condensate siphon



1. Pull the flushing line (2) out of the air/flue gas connection (1).
2. Connect a hose to the flushing line and flush out the siphon.

10.8 Draining the product



1. Close the service valves of the product.
2. Remove the lower section of the front casing.
3. Connect a hose to the product's filling and drainage tap.
4. Route the hose to a suitable outflow location.

5. Open the filling and drainage tap.
6. Open the purging valve **(1)** so that the product is completely drained.
7. Once the water has drained out, close the purging valve and the drain cock.

10.9 Draining the heating installation

1. Remove the lower section of the front casing.
2. Connect a hose to the filling and drainage tap in the heating flow.
3. Route the hose to a suitable outflow location.
4. Make sure that the product's service valves are open.
5. Open the filling and drainage tap.
6. Open the purging valves on the radiators. Start from the highest radiator and then work from the top to the bottom.
7. Once the water has drained out, close the purging valves of the radiators and the filling and drainage tap.

10.10 Completing inspection and maintenance work

1. Fill the heating installation. (→ Page 17)
2. Purge the heating installation. (→ Page 18)
3. Check that all control, regulation and monitoring devices are functioning properly.
4. Check the gas pipe and the heating circuit for tightness.
5. Check that the air/flue pipe has been installed correctly.
6. Check the over-ignition and that the flame on the burner is burning evenly (diagnostics code **d.44**: < 250 = excellent flame, > 700 no flame).
7. Check the gas connection pressure (gas flow pressure). (→ Page 19)
8. Check the CO₂ content and, if necessary, adjust it (air ratio setting). (→ Page 19)
9. Log all maintenance work that is carried out.

11 Decommissioning

11.1 Decommissioning the product

1. Switch off the product.
2. Disconnect the product from the power grid.
3. Close the gas stopcock.
4. Close the cold-water isolation valve.
5. Drain the product via the filling/draining cock (→ Page 24).

12 Recycling and disposal

Disposing of the packaging

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

13 Customer service

The contact details for our customer service are provided on the back page or on our website.

Appendix

Appendix

A Check programmes – Overview

Prüfprogramme	Meaning
P.00 Purging	Purge the product, heating circuit and cylinder charging circuit. The product does not start up. The heating pump runs intermittently. After approx. 6.5 minutes, the product switches to the cylinder charging pump (alternatively, by pressing the i button).
P.01 Maximum load	Start up the burner at maximum load. The product works at maximum load after a successful ignition.
P.02 Minimum load	Start up the burner at minimum load. The product works at minimum load after a successful ignition.
P.05 ST test	Test function for the safety cut-out (SCO): The burner is switched on at maximum power and the pumps are switched off; the temperature control is switched off so that the burner heats up until the safety cut-out is triggered by reaching the safety cut-out temperature.

B Function menu – Overview

Display	Action	Result	Option
Activating the function menu	→ + button: Yes → – button: No	Function menu activated End, normal operating mode starts	
Check heating pump?	→ i button: Yes + button: Next – button: Back	Pump test started	+ button: Pump on – button: Pump off → i button: Back
Check fan?	→ i button: Yes + button: Next – button: Back	Fan is actuated at max. rotational speed.	+ button: Fan on – button: Fan off → i button: Back
Check charging pump?	→ i button: Yes + button: Next – button: Back	All connections that are defined as the cylinder charging pump receive mains voltage. - 2 in 7 module if D.27 or D.28 = 3	+ button: Cylinder charging pump on – button: Cylinder charging pump off → i button: Back
Check circ. pump?	→ i button: Yes + button: Next – button: Back	All connections that are defined as the circulation pump receive mains voltage. - PCB if D.26 = 1 - 2 in 7 module if D.27 or D.28 = 1	+ button: Circulation pump on – button: Circulation pump off → i button: Back
Check external pump?	→ i button: Yes + button: Next – button: Back	All connections that are defined as the external pump receive mains voltage. - 2 in 7 module if D.27 or D.28 = 2	+ button: External pump on – button: External pump off → i button: Back
Purge hydraulics?	→ i button: Yes + button: Next – button: Back	Water pressure is displayed.	+ button: DHW circuit – button: Heating circuit → i button: Back
Test burner?	→ i button: Yes + button: Next – button: Back	The heating pump is actuated at the same time as the burner Flow target temperature = maximum flow temperature target value	+ button: Burner on – button: Burner off, function menu ends
End function menu?	→ i button: Yes + button: Next – button: Back	Normal operating mode starts Restart the function menu Back	

C Overview of diagnostics codes



Note

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

Code	Parameter	Values		Unit	Explanation, selection, increment	Default setting	Own setting
		Min.	Max.				
D.000	Heating partial load	Output-range-specific		kW	Adjustable partial heat load Maximum value = automatic partial heat load Product automatically adjusts the max. partial load to the current system demand	Maximum value	
D.001	Pump overrun: Heating	2	60	min	Overrun time of internal heating pump for heating mode 1	5	
D.002	Max. anti-cycl. time: Heating	2	60	min	Max. burner anti-cycling time heating at 20 °C flow temperature 1	20	
D.004	Cylinder temperature actual value	Current value		°C	Measured value for the domestic hot water sensor if a domestic hot water cylinder with sensor is connected	–	Not adjustable
D.005	Heating target flow temperature	Current value		°C	Flow temperature target value (or return target value) Current target value, calculated from the set value, control, control type, etc.	–	Not adjustable
D.007	Cylinder temperature target value	Current value		°C	Only products with no integrated hot water generation and with a connected cylinder 15 °C = frost protection, 40 °C up to D.020 (max. 70 °C)	–	Not adjustable
D.008	Controller 3-4	Current value		–	Room thermostat at terminal 3-4 0: RT input terminals 3-4 interrupted, no heating mode 1: RT input terminals 3-4 closed, no heating mode	–	Not adjustable
D.009	eBUS controller target value	Current value		°C	Target flow temperature from the external eBus control Minimum from the external eBUS target value and the target value for terminal 7	–	Not adjustable
D.010	Internal pump	Current value		–	Heating pump status 0: Off 1: On	–	Not adjustable
D.011	External pump	Current value		–	Status of additional external heating pump 0: Off 1-100: On Connection via 2 in 7 multi-functional module or X6	–	Not adjustable
D.012	Cyl. charging pump	Current value		–	Status of cylinder charging pump 0: Off 1-100: On	–	Not adjustable
D.013	Circulation pump	Current value		–	Status of circulation pump 0: Off 1-100: On Connection via 2 in 7 multi-functional module or X6	–	Not adjustable

Appendix

Code	Parameter	Values		Unit	Explanation, selection, increment	Default setting	Own setting
		Min.	Max.				
D.014	Pump speed target value	30	100	%	Speed-controlled heating pump setting - : Auto 30-100% fixed value setting	- = Auto	
D.015	Pump speed actual value	Current value		%	Current pump output for the speed-controlled heating pump	–	Not adjustable
D.017	Control type	0	1	–	0: Flow temperature control 1: Return temperature control	0	
D.018	Pump operating mode	1	3	–	1: Overrun (comfort) 3: Continuous (eco)	1	
D.020	Max. DHW temperature target value	50	70	°C	Max. setting for cylinder target value 1	65	
D.022	DHW demand	Current value		–	External cylinder charging, plug C1-C2 0: Off 1: On	–	Not adjustable
D.023	Heating mode status	Current value		–	Summer/winter mode (heating off/on) 0: Heating off (summer mode) 1: Heating on	–	Not adjustable
D.025	Ext. eBUS signal: Cylinder charging	Current value		–	Hot water generation enabled by eBUS control 0: Off 1: On	–	Not adjustable
D.026	Auxiliary relay	1	6	–	Internal accessory relay at X6 (pink plug) 1: Circulation pump 2: Second external pump 3: Cylinder charging pump 4: Flue non-return flap/extraction hood 5: External gas valve 6: Ext. fault message	1	
D.027	Accessory relay 1	1	6	–	Switching accessory relay 1 for 2 in 7 multi-functional module accessory 1: Circulation pump 2: Second external pump 3: Cylinder charging pump 4: Flue non-return flap/extraction hood 5: External gas valve 6: Ext. fault message	1	
D.028	Accessory relay 2	1	6	–	Switching accessory relay 2 for 2 in 7 multi-functional module accessory 1: Circulation pump 2: Second external pump 3: Cylinder charging pump 4: Flue non-return flap/extraction hood 5: External gas valve 6: Ext. fault message	2	
D.030	Fuel valve actuation	Current value		–	0: Off 1: On	–	Not adjustable
D.033	Fan speed target value	Current value		rpm	–	–	Not adjustable
D.034	Fan speed actual value	Current value		rpm	–	–	Not adjustable

Code	Parameter	Values		Unit	Explanation, selection, increment	Default setting	Own setting
		Min.	Max.				
D.040	Flow temperature actual value	Current value		°C	–	–	Not adjustable
D.041	Return temperature actual value	Current value		°C	–	–	Not adjustable
D.043	Boiler temperature	0	99	°C	Current boiler temperature	–	Not adjustable
D.044	Ionisation value actual value	0	1020	–	> 700: No flame < 450: Flame detected < 250: Excellent flame	–	Not adjustable
D.047	Current outside temperature	Current value		°C	If an outdoor temperature sensor is connected to X41 (with Vaillant weather-compensated control)	–	Not adjustable
D.050	Offset min. speed	-40	40	rpm	Nominal value set in factory 10	–	
D.051	Offset max. speed	-40	40	rpm	Nominal value set in factory 10	–	
D.054	Switch-on hysteresis offset	0	-10	K	1	-2	
D.055	Switch-off hysteresis offset	0	10	K	1	6	
D.060	Number of safety therm. shut-downs	Current value		–	Number of safety cut-out switch-off sequences	–	Not adjustable
D.061	No. of shut-downs in ign. flame controller	Current value		–	Number of unsuccessful ignitions in the last attempt	–	Not adjustable
D.063	Air-monitoring switch-off sequences	Current value		–	Number of switch-off sequences caused by the air monitoring	–	Not adjustable
D.064	Avg. ignition time	Current value		s	–	–	Not adjustable
D.065	Max. ignition time	Current value		s	–	–	Not adjustable
D.067	Remaining anti-cycl. time for heating	Current value		min	Remaining burner anti-cycling time	–	Not adjustable
D.068	Number of first start attempts	Current value		–	Number of unsuccessful ignitions at 1st attempt	–	Not adjustable
D.069	Number of second start attempts	Current value		–	Number of unsuccessful ignitions at 2nd attempt	–	Not adjustable
D.071	Max. heating target flow temp.	40	85	°C	Target value maximum heating flow temperature 1	75	
D.072	Pump overrun after cylinder charging	0	600	s	External heating pump overrun time after cylinder charging 1	300	
D.073	Offset setting for comfort mode	0	25	K	Cylinder charging offset Excess temperature between the target cylinder temperature and the target flow temperature when cylinder charging 1	25	
D.075	Max. cylinder charging time	20	90	min	Max. charging time for domestic hot water cylinder without independent control system 1	45	
D.076	Device Specific Number	Current value		–	(Device specific number = DSN) 15: ecoVIT	–	Not adjustable
D.077	DHW partial load	Output-range-specific		kW	Adjustable cylinder charging output Maximum value = automatic cylinder partial load	Maximum value	

Appendix

Code	Parameter	Values		Unit	Explanation, selection, increment	Default setting	Own setting
		Min.	Max.				
D.078	DHW max. flow temperature	55	80	°C	Limit on cylinder charging temperature (Target flow temperature in cylinder charging mode) 1 Note The chosen value must be at least 15 K above the cylinder target value.	80	
D.080	Heating operating hours	Current value		h	–	After pressing the i button once, the first three digits are displayed; after pressing the i button a second time, the second three digits of the six-digit number (burner starts x 100) are displayed.	Not adjustable
D.081	DHW operating hours	Current value		h	–		Not adjustable
D.082	Heating burner starts	Current value		–	Number of burner starts (x 100)		Not adjustable
D.083	DHW burner starts	Current value		–	Number of burner starts (x 100)		Not adjustable
D.084	Maintenance in	0	3000	h	Number of hours until the next maintenance 1 300 corresponds to 3000 hrs "– – –" = Deactivated	"– – –"	
D.087	Set the type of gas	0		–	0: Natural gas 1: Liquefied petroleum gas	–	
D.090	eBUS controller	Current value		–	0: Not recognised (eBUS address ≤ 10) 1: Recognised	–	Not adjustable
D.091	Status DCF77	Current value		–	0: No reception 1: Reception 2: Synchronised 3: Valid	–	Not adjustable
D.093	Adjust Device Specific Number	0	999	–	22 kW: 1 28 kW: 2 36 kW: 3 47 kW: 4 65 kW: 5	–	
D.095	Software version: PeBUS participant	Current value		–	1: PCB (BMU) 1: Display (AI)	–	Not adjustable
D.096	Reset to factory settings?	0	1	–	Reset all adjustable parameters to factory setting 0: No 1: Yes	–	
D.097	Installer level	Current value		–	Service code 17	–	
D.098	Tel. no. for competent person	10-digit		–	Option to enter a telephone number that is displayed in the event of product malfunction	–	
D.099	Language	–	–	–	The selected language is displayed in line 2 (line 1 and 2 in selected language)	Country-specific	

D Status codes – Overview



Note

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

Statuscode	Meaning
S.00 Heating: No heat demand	Heating has no heat demand. The burner is off.
S.01 Heating mode: Fan start-up	The fan start-up for heating mode is activated.
S.02 Heating mode: Pump pre-run	The pump prerun for heating mode is activated.
S.03 Heating mode: Ignition	The ignition for heating mode is activated.
S.04 Heating mode: Burner on	The burner for heating mode is activated.
S.06 Heating mode: Fan overrun	The fan overrun for heating mode is activated.
S.07 Heating mode: Pump overrun	The pump overrun for heating mode is activated.
S.08 Heating mode: Anti-cycling time	The anti-cycling time for heating mode is activated.
S.20 DHW demand	The domestic hot water demand is activated.
S.23 DHW mode: Ignition	The ignition for domestic hot water mode is activated.
S.24 DHW mode: Burner on	The burner for domestic hot water mode is activated.
S.26 DHW mode: Fan overrun	The fan overrun for domestic hot water mode is activated.
S.27 DHW mode: Pump overrun	The pump overrun for domestic hot water mode is activated.
S.28 DHW anti-cycling time	The anti-cycling time for domestic hot water mode is activated.
S.30 No heat demand: Controller	Room thermostat blocks heating mode.
S.31 No heat demand: Summer mode	Summer mode is activated; there is no heat demand. The external control blocks heating mode.
S.32 Waiting time deviation: Fan speed	The waiting period for the fan start-up is activated.
S.34 Heating mode: Frost protection	The frost protection function for heating mode is activated.
S.36 Target value for ext. controller lower than 20 °C	The target value on the external control is lower than 20 °C.
S.39 Contact thermostat triggered	The surface-mounted thermostat or the condensate pump has triggered.
S.40 Comfort protection active	The comfort protection mode is activated.
S.41 Water pressure too high	The system pressure is too high.
S.42 Flue non-return flap closed	Flue non-return flap return signal blocks burner operation (only in conjunction with the multi-functional module) or condensate pump defective, heat demand is blocked.
S.49 Waiting time: Flue gas pressure switch	The waiting period for the flue pressure switch is activated.
S.60 Waiting time: Flame loss	The product is within the waiting period as a result of a flame loss.

E Overview of fault codes



Note

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

Message	Possible cause	Measure
F.00 Interruption: Flow sensor	Flow temperature sensor defective or not connected	► Check: Flow temperature sensor, plug, cable harness, PCB.
F.10 Short circuit: Flow sensor	Flow temperature sensor defective or has short-circuited	► Check: NTC plug, cable harness, cable/housing, PCB, NTC sensor.
F.13 Short circuit: Cylinder sensor	Warm start sensor/cylinder temperature sensor defective or not connected	1. Check: NTC plug, earth connection, cable harness, NTC sensor, PCB. 2. Check the following on the shift-load cylinder (in conjunction with F.91): NTC plug, earth connection, cable harness, NTC sensor, connection to the PCB.
F.20 Safety switch-off: Temperature limiter	Maximum temperature at the flow/return temperature sensor is too high when the safety cut-out function is operating using the NTC	► Check: Flow temperature sensor (correct thermal connection), cable harness, sufficient purging.
F.22 Safety switch-off: Low water pressure	No/insufficient water in the product or the water pressure is too low	1. Check: Plug, cable to heating pump or water pressure sensor, water pressure sensor, heating pump. 2. Activate and purge check programme P.0.
F.27 Safety switch-off: Flame simulation	Monitoring electrode reports an incorrect flame	► Check: Gas pressure at upper test opening, monitoring electrode, PCB, gas solenoid valve.
F.28 Start-up failure: Ignit. unsuccessful	Failure during start-up or ignition unsuccessful. Gas pressure monitor or thermal cut-out has been triggered.	► Check: Gas stopcock, gas flow pressure, gas valve assembly, air intake pipe (blockage, loosened screw), condensate route (blockage), multiple plug, cable harness, ignition transformer, ignition cable, ignition plug, ignition electrode, monitoring electrode, electronics, earthing, CO ₂ setting.
F.29 Operating failure: Ignit. unsuccessful	Gas supply interrupted intermittently. Re-ignition failed.	► Check: Flue gas recirculation, condensate route (blockage), earthing, cable to the gas valve assembly and electrode (loose connection).
F.32 Fault: Fan	Fan defective or not connected	► Check: Plug, cable harness, fan (blockage, function, correct speed), Hall sensor, PCB, flue gas route (blockage).
F.37 Fault: Dev. in fan speed	Fan speed does not correspond to the target value	► Check: Plug, cable harness, pressure switch, fan, PCB.
F.42 Fault: Coding resistor	Coding resistor or gas group resistor causes a short circuit	► Check: Plug, earth connection, cable, output coding resistor (in the cable harness).
F.43 Interruption: Coding resistor	Coding resistor or gas group resistor defective or not connected	► Check: Plug, cable harness, output coding resistor (in the cable harness), PCB.
F.49 Fault: eBUS	Undervoltage on the eBUS	► Check: eBUS (overload, two power supplies with different polarities, short circuit).
F.50 Fault: Flue gas pressure switch	Flue pressure switch has been triggered	► Check: Condensate hose (too long, kinks, downward gradient too shallow, condensate pump defective), neutralisation device (dirt, blockage, downward gradient too shallow), flue gas collector (blockage, vent hole), burner (excessive start-up pressure, pulsing), flue gas route (blockage, too long, too many elbows), flue gas safety cut-out (cable, plug).
F.61 Fault: Fuel valve actuation	The gas valve assembly cannot be actuated	► Check: Cable harness, plug, gas valve assembly (rinse), PCB.
F.62 Fault: Fuel valve switch-off delay	Delayed switch-off sequence for the gas valve after the flame is extinguished	► Check: Gas valve, surface of the burner (dirt), plug, cable harness, PCB.
F.63 Fault: EEPROM	EEPROM faulty	► Replace: PCB.
F.64 Fault: Electronics/sensor	Electronics, safety-relevant sensor or cable defective	► Check: Flow sensor, cable to the sensor, flame recording sensor (e.g. ionisation electrode) for an unstable signal, electronics.
F.65 Fault: Electronics temp.	Electronics defective or too hot due to external influences	1. Check: PCB. 2. If required, reduce the environmental temperature.
F.67 Fault: Electronics/flame	Implausible flame signal	► Check: Cable harness, flame monitor, PCB.

Message	Possible cause	Measure
F.70 Fault: Invalid Device Specific Number	Incorrect/missing Device Specific Number or incorrect/missing coding resistor	► If the display and PCB have been replaced, change the Device Specific Number under D.93 .
F.73 Fault: Water press. sensor (signal too weak)	Water pressure sensor reports that the water pressure is too low	► Check: Water pressure, earth connection, cable, plug, water pressure sensor (short circuit to GDN).
F.74 Fault: Water press. sensor (signal too strong)	Water pressure too high	► Check: Water pressure (heating side, when heating pump is not active), drain water if required, cable, water pressure sensor (short circuit to 24/5 V).
F.82 Fault: Ext. current anode	External current anode defective or not connected (for actoSTOR only)	► Check: Cable harness, external current anode.

F Troubleshooting

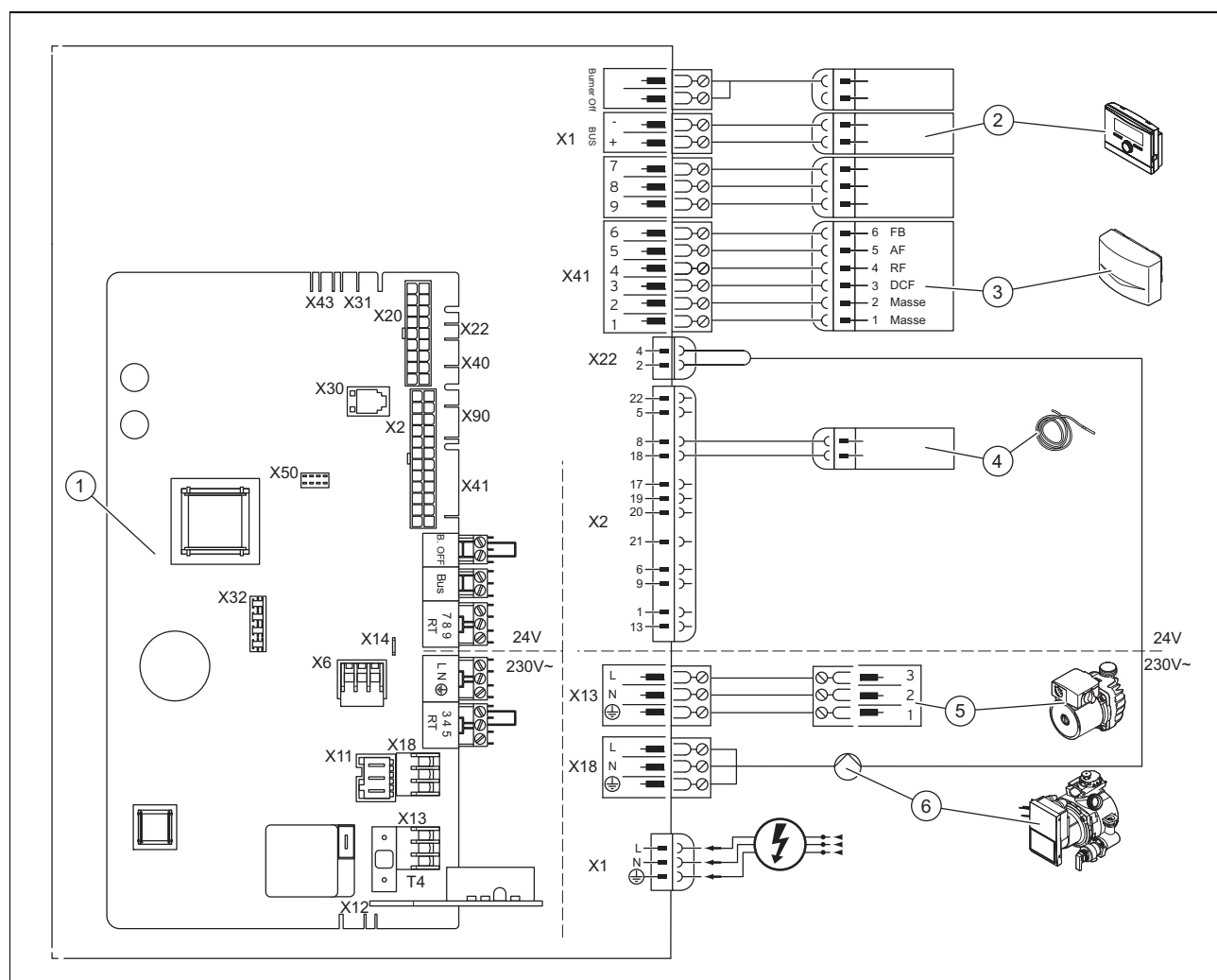
Symptom	Possible cause	Measure
Not shown in the display	No power supply	► Check whether the power supply to the building and the main switch on the product are switched on. 1. Switch on the power supply to the building and the main switch on the product.
	Edge connector X1 network (turquoise) not connected to the PCB	► Check whether there is mains voltage at the edge connector. 1. Plug edge connector X1 (turquoise) correctly into the PCB.
	The fuse on the PCB is defective	► Check the fuse on the PCB in the electronics box. 1. Replace the fuse.
No response to the control demand	No eBUS connection	► Check the connection between the BUS connections in the control and the product. 1. Establish the eBUS connection.
	The VRT room temperature control or VRC 450 or VRC 700 control do not detect heat generator eBUS participants	► Check whether the control has detected the heat generator as an eBUS participant. 1. Switch the heat generator on and off again so that the control can detect the eBUS participants again.
	The VRC 630 or VRS 620 controls do not detect heat generator eBUS participants	► Check whether the control has detected the heat generator as an eBUS participant. 1. Switch the control on and off again so that the control can read the eBUS participants again.
No response to on/off control demand	The switching contact for terminals 3 and 4 is not connected	► Place a bridge between switching contacts 3 and 4, and check whether the heat generator starts up. 1. Check that the external on/off control is working correctly.
No response to the domestic hot water demand	Incorrect control settings for domestic hot water generation	1. Check the control's domestic hot water generation settings. 2. Check the cylinder charging pump. 3. Check the cylinder target value settings on the heat generator's control panel.
	Cylinder charging pump defective	► Check the cylinder charging pump.
	Incorrect cylinder target value settings in the heat generator	► Check the cylinder target value settings on the heat generator's control panel.

G.1 Wiring diagram



1	Main PCB	15	Flue gas pressure switch
2	Control panel PCB	16	Safety cut-out
3	VRC 430 eBUS installation	17	Cylinder contact "C1/C2"
4	Surface-mounted thermostat/burner off	18	Cylinder temperature sensor, 2.7 kΩ characteristic
5	eBUS control	19	Water pressure sensor
6	Room thermostat	20	actoSTOR sensor, 2.7 kΩ characteristic
7	Circulation pump remote control	21	Coding resistor power (5110 Ω)
8	Outdoor temperature sensor, flow temperature sensor (optional, external), DCF receiver (for VRC 430)	22	Gas valve assembly
9	Signals, VR 40 accessory module; actoSTOR	23	VR 40, 230 V power supply
10	eBUS for VR 33 or VR 34	24	Cylinder charging pump
11	Fan	25	Internal accessory (selected via D.26)
12	Flow temperature sensor, 10 kΩ characteristic, screw-in version	26	Fan, 230 V power supply, VKK 476 and VKK 656 only
13	Return temperature sensor, 10 kΩ characteristic, optional	27	Heating pump
14	Flue gas safety cut-out (CH (series) and AT (accessories) only, bridged in all other countries)	28	External control/room thermostat (contact on/off)
		29	Ignition electrode, ionisation electrode

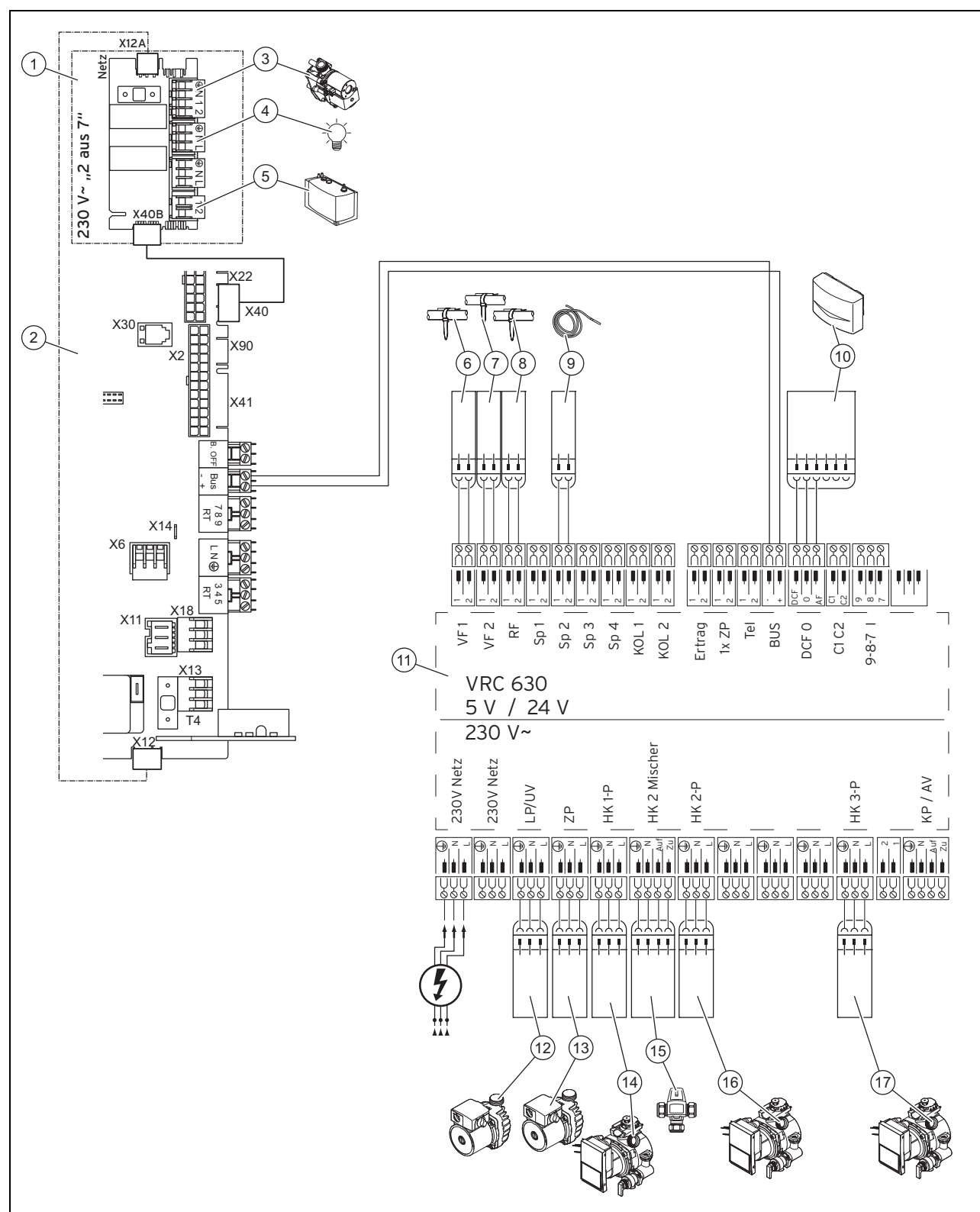
G.2 Wiring diagram for the VRC 450, VRC 470 or VRC 700 control



1	Main PCB	4	Cylinder temperature sensor, 2.7 kΩ characteristic
2	eBUS control	5	Cylinder charging pump
3	Outdoor temperature sensor, flow temperature sensor (optional, external), DCF receiver (for VRC 430)	6	Heating pump

Appendix

G.3 Wiring diagram for the VRS 620 and VRC 630 control



- | | | | |
|---|--|----|---|
| 1 | "2 in 7" VR 40 multi-functional module | 9 | Cylinder temperature sensor, flow temperature sensor (optional, external), DCF receiver (for VRC 430) |
| 2 | Main PCB | 10 | Outdoor temperature sensor, DCF receiver |
| 3 | E.g. external gas valve assembly | 11 | VRC 630 PCB |
| 4 | E.g. fault message | 12 | Cylinder charging pump |
| 5 | E.g. ecoLEVEL condensate pump | 13 | Circulation pump |
| 6 | Flow temperature sensor 1 | 14 | Heating pump |
| 7 | Flow temperature sensor 2 | | |
| 8 | Flow temperature sensor 3 | | |

15 Heating circuit 2 mixer

17 Heating pump 3

16 Heating pump

H Inspection and maintenance work

The table below lists the manufacturer requirements with respect to minimum inspection and maintenance intervals. If national regulations and directives require shorter inspection and maintenance intervals, you should observe these instead of the intervals listed. Each time inspection and maintenance work is carried out, carry out the required preparatory and completion work.

#	Maintenance work	Interval	
1	Cleaning the combustion chamber and rinsing the siphon at the same time	If required, at least every 2 years	
2	Checking the burner for dirt and damage	Annually	
3	Checking the clearance between the electrodes and to the burner	Annually	
4	Checking and correcting the system pressure (→ Operating instructions)	Annually	
5	Checking the general condition and removing any dirt	Annually	
6	Checking the condensate siphon and, if required, filling the siphon	Annually	
7	Run the test operation on the product/heating installation including hot water generation (if available) and, if required, purge the product/heating installation	Annually	
8	Checking the ignition and burning behaviour under d.44	Annually	
9	Checking and, if required, setting the CO ₂ content	Annually	
10	Checking the product for tightness in the gas, flue gas, domestic hot water and condensate pipework	Annually	
11	Checking all the safety devices	Annually	
12	Checking and, if required, resetting the (external) control	Annually	
13	Carrying out maintenance work on the domestic hot water cylinder (if installed)	Every 5 years	
14	Logging any inspection/maintenance work and flue gas measured values	Annually	

I Commissioning checklist

No.	Procedure	Comment	Required tool
1	Checking the gas connection pressure	The gas flow pressure relative to the atmospheric pressure must be 1.7-2.5 MPa (17-25 mbar) with natural gases. The resting pressure for natural gas must not deviate from the gas flow pressure by more than 1.0 MPa (10 mbar).	U-tube or digital manometer
2	Check whether the siphon has been filled	If required, fill it via the flue spigot (at least 1.5 l water)	
3	Check the electrical connection	Power supply: Terminals L, N, PE Control terminals: "Bus", or 7-8-9 or 3-4	
4	Switch on the product, the display view is active	Otherwise, check the fuses (4 OT)	
5	Activate the chimney sweep mode	Press the + and - buttons at the same time	
6	Check the entire gas route for leaks	Leak detection spray or leak detector (a leak detector is especially recommended for checking the burner seals for gas tightness) If required, tighten the burner seal.	Leak detector
7	CO ₂ measurement	Target value for nominal heat input: – 9.2 vol.% ±0.3 with natural gas H Only carry out the measurement after five minutes of normal operation	CO ₂ analyser

Appendix

No.	Procedure	Comment	Required tool
8	If the CO ₂ is not within the tolerance:	Adjust the CO ₂ and then take the measurement again	
9	After setting the CO ₂ , activate chimney sweep mode again and measure the CO ₂ content	Target value for nominal heat input: – 9.2 vol.% ±0.3 with natural gas H	CO ₂ analyser
9	CO measurement (target value < 80 ppm)		CO analyser
10	Checking the condensate tray, siphon and condensate discharge for leak-tightness	Carry out a visual check or also use CO analysers to go along the sealing points.	
11	Switching off the product and switching it back on again	End the chimney sweep mode	
12	Programme the heating control with the customer and check that the domestic hot water/heating are working correctly	Handing over the operating instructions to the customer	
13	Stick sticker 835593 "Read the operating instructions" on the front of the product, in the language spoken by the end user		

J Technical data

Technical data – General

	VKK 226/4-H	VKK 226/4-L	VKK 286/4-H	VKK 286/4-L	VKK 366/4-H	VKK 366/4-L
Designated country (designation in accordance with ISO 3166)	DE (Germany), AT (Austria)	DE (Germany), AT (Austria)	DE (Germany), AT (Austria)	DE (Germany), AT (Austria)	DE (Germany), AT (Austria)	DE (Germany), AT (Austria)
Approved unit categories	II _{2ELL3P} (DE), II _{2H3P} (AT)	II _{2ELL3P} (DE), II _{2H3P} (AT)	II _{2ELL3P} (DE), II _{2H3P} (AT)	II _{2ELL3P} (DE), II _{2H3P} (AT)	II _{2ELL3P} (DE), II _{2H3P} (AT)	II _{2ELL3P} (DE), II _{2H3P} (AT)
Gas connection, boiler side	R 3/4 inch	R 3/4 inch	R 3/4 inch	R 3/4 inch	R 3/4 inch	R 3/4 inch
Flow/return heating connections, boiler side	Rp1	Rp1	Rp1	Rp1	Rp1	Rp1
Air/flue connection	80/125 mm	80/125 mm	80/125 mm	80/125 mm	80/125 mm	80/125 mm
Condensate discharge pipe (min.)	21 mm	21 mm	21 mm	21 mm	21 mm	21 mm
G20 natural gas flow pressure	2 kPa (20 mbar)		2 kPa (20 mbar)		2 kPa (20 mbar)	
G25 natural gas flow pressure		2.5 kPa (25.0 mbar)		2.5 kPa (25.0 mbar)		2.5 kPa (25.0 mbar)
G31 liquid gas flow pressure	5 kPa (50 mbar)	5 kPa (50 mbar)	5 kPa (50 mbar)	5 kPa (50 mbar)	5 kPa (50 mbar)	5 kPa (50 mbar)
Gas flow rate at 15 °C and 1013 mbar (G20)	2.3 m³/h		2.9 m³/h		3.7 m³/h	
Gas flow rate at 15 °C and 1013 mbar (G25)		2.7 m³/h		3.3 m³/h		4.3 m³/h
Gas flow rate at 15 °C and 1013 mbar (G31)	1.7 m³/h	1.7 m³/h	2.1 m³/h	2.1 m³/h	2.7 m³/h	2.7 m³/h
Min. flue gas mass flow rate (G20)	3.9 g/s		4.2 g/s		5.3 g/s	
Max. flue gas mass flow rate (G20)	10.0 g/s		12.2 g/s		15.8 g/s	
Min. flue gas temperature (at tV/tR = 80/60 °C)	62 °C	62 °C	62 °C	62 °C	62 °C	62 °C
Max. flue gas temperature (at tV/tR = 80/60 °C)	70 °C	70 °C	75 °C	75 °C	75 °C	75 °C
Approved gas-fired units	C13x, C33x, C43x, C53x, C83x, C93x, B23, B23P, B33, B33P	C13x, C33x, C43x, C53x, C83x, C93x, B23, B23P, B33, B33P	C13x, C33x, C43x, C53x, C83x, C93x, B23, B23P, B33, B33P	C13x, C33x, C43x, C53x, C83x, C93x, B23, B23P, B33, B33P	C13x, C33x, C43x, C53x, C83x, C93x, B23, B23P, B33, B33P	C13x, C33x, C43x, C53x, C83x, C93x, B23, B23P, B33, B33P

	VKK 226/4-H	VKK 226/4-L	VKK 286/4-H	VKK 286/4-L	VKK 366/4-H	VKK 366/4-L
Nominal efficiency (stationary) at 80/60 °C	97.0 %	97.0 %	97.0 %	97.0 %	97.0 %	97.0 %
Nominal efficiency (stationary) at 60/40 °C	102.0 %	102.0 %	102.0 %	102.0 %	102.0 %	102.0 %
Nominal efficiency (stationary) at 50/30 °C	104.0 %	104.0 %	104.0 %	104.0 %	104.0 %	104.0 %
Nominal efficiency (stationary) at 40/30 °C	107.0 %	107.0 %	107.0 %	107.0 %	107.0 %	107.0 %
30% efficiency	108 %	108 %	108 %	108 %	108 %	108 %
Standard efficiency (when set to nominal heat output, DIN 4702, T8) at 75/60 °C	107.0 %	107.0 %	107.0 %	107.0 %	107.0 %	107.0 %
Standard efficiency (when set to nominal heat output, DIN 4702, T8) at 40/30 °C	109.0 %	109.0 %	109.0 %	109.0 %	109.0 %	109.0 %
NOx class	5	5	5	5	5	5
NOx emissions	42 mg/kW-h	42 mg/kW-h	34 mg/kW-h	34 mg/kW-h	51 mg/kW-h	51 mg/kW-h
CO emissions	11 mg/kW-h	11 mg/kW-h	8 mg/kW-h	8 mg/kW-h	5 mg/kW-h	5 mg/kW-h
Boiler dimensions, width	570 mm	570 mm	570 mm	570 mm	570 mm	570 mm
Boiler dimensions, height	1,257 mm	1,257 mm	1,257 mm	1,257 mm	1,257 mm	1,257 mm
Boiler dimensions, depth	691 mm	691 mm	691 mm	691 mm	691 mm	691 mm
Approx. net weight	100 kg	100 kg	100 kg	100 kg	110 kg	110 kg
Ready for operation weight approx.	210 kg	210 kg	235 kg	235 kg	255 kg	255 kg

	VKK 476/4-H	VKK 476/4-L	VKK 656/4-H	VKK 656/4-L
Designated country (designation in accordance with ISO 3166)	DE (Germany), AT (Austria)	DE (Germany), AT (Austria)	DE (Germany), AT (Austria)	DE (Germany), AT (Austria)
Approved unit categories	II _{2ELL3P} (DE), II _{2H3P} (AT)	II _{2ELL3P} (DE), II _{2H3P} (AT)	II _{2ELL3P} (DE), II _{2H3P} (AT)	II _{2ELL3P} (DE), II _{2H3P} (AT)
Gas connection, boiler side	R 3/4 inch	R 3/4 inch	R 3/4 inch	R 3/4 inch
Flow/return heating connections, boiler side	Rp1	Rp1	Rp1	Rp1
Air/flue connection	80/125 mm	80/125 mm	80/125 mm	80/125 mm
Condensate discharge pipe (min.)	21 mm	21 mm	21 mm	21 mm
G20 natural gas flow pressure	2 kPa (20 mbar)		2 kPa (20 mbar)	
G25 natural gas flow pressure		2.5 kPa (25.0 mbar)		2.5 kPa (25.0 mbar)
G31 liquid gas flow pressure	5 kPa (50 mbar)	5 kPa (50 mbar)	5 kPa (50 mbar)	5 kPa (50 mbar)
Gas flow rate at 15 °C and 1013 mbar (G20)	4.8 m³/h		6.6 m³/h	
Gas flow rate at 15 °C and 1013 mbar (G25)		5.5 m³/h		7.6 m³/h
Gas flow rate at 15 °C and 1013 mbar (G31)	3.5 m³/h	3.5 m³/h	4.8 m³/h	4.8 m³/h
Min. flue gas mass flow rate (G20)	6.9 g/s		9.2 g/s	
Max. flue gas mass flow rate (G20)	20.3 g/s		27.8 g/s	
Min. flue gas temperature (at tV/tR = 80/60 °C)	62 °C	62 °C	62 °C	62 °C
Max. flue gas temperature (at tV/tR = 80/60 °C)	75 °C	75 °C	85 °C	85 °C

Appendix

	VKK 476/4-H	VKK 476/4-L	VKK 656/4-H	VKK 656/4-L
Approved gas-fired units	C13x, C33x, C43x, C53x, C83x, C93x, B23, B23P, B33, B33P	C13x, C33x, C43x, C53x, C83x, C93x, B23, B23P, B33, B33P	C13x, C33x, C43x, C53x, C83x, C93x, B23, B23P, B33, B33P	C13x, C33x, C43x, C53x, C83x, C93x, B23, B23P, B33, B33P
Nominal efficiency (stationary) at 80/60 °C	97.0 %	97.0 %	97.0 %	97.0 %
Nominal efficiency (stationary) at 60/40 °C	102.0 %	102.0 %	102.0 %	102.0 %
Nominal efficiency (stationary) at 50/30 °C	104.0 %	104.0 %	104.0 %	104.0 %
Nominal efficiency (stationary) at 40/30 °C	107.0 %	107.0 %	107.0 %	107.0 %
30% efficiency	108 %	108 %	108 %	108 %
Standard efficiency (when set to nominal heat output, DIN 4702, T8) at 75/60 °C	107.0 %	107.0 %	107.0 %	107.0 %
Standard efficiency (when set to nominal heat output, DIN 4702, T8) at 40/30 °C	109.0 %	109.0 %	109.0 %	109.0 %
NOx class	5	5	5	5
NOx emissions	40 mg/kW-h	40 mg/kW-h	52 mg/kW-h	52 mg/kW-h
CO emissions	7 mg/kW-h	7 mg/kW-h	6 mg/kW-h	6 mg/kW-h
Boiler dimensions, width	570 mm	570 mm	570 mm	570 mm
Boiler dimensions, height	1,257 mm	1,257 mm	1,257 mm	1,257 mm
Boiler dimensions, depth	691 mm	691 mm	691 mm	691 mm
Approx. net weight	120 kg	120 kg	120 kg	120 kg
Ready for operation weight approx.	320 kg	320 kg	320 kg	320 kg

Technical data – Power/load (G20)

	VKK 226/4-H	VKK 286/4-H	VKK 366/4-H	VKK 476/4-H	VKK 656/4-H
Nominal heat output range P at 80/60 °C	6.3 ... 21.3 kW	7.7 ... 26.2 kW	10.0 ... 34.0 kW	12.8 ... 43.6 kW	17.8 ... 60.1 kW
Nominal heat output range P at 60/40 °C	6.6 ... 22.4 kW	8.1 ... 27.5 kW	10.5 ... 35.7 kW	13.5 ... 46.0 kW	18.7 ... 63.2 kW
Nominal heat output range P at 50/30 °C	6.8 ... 22.9 kW	8.2 ... 28.1 kW	10.7 ... 36.4 kW	13.7 ... 46.8 kW	19.0 ... 64.5 kW
Nominal heat output range P at 40/30 °C	7.0 ... 23.5 kW	8.5 ... 28.9 kW	11.0 ... 37.5 kW	14.1 ... 48.2 kW	19.6 ... 66.3 kW
Maximum heat input, heating side	22.0 kW	27.0 kW	35.0 kW	45.0 kW	62.0 kW
Minimum heat input	6.5 kW	7.9 kW	10.3 kW	13.2 kW	18.3 kW

Technical data – Power/load (G25)

	VKK 226/4-L	VKK 286/4-L	VKK 366/4-L	VKK 476/4-L	VKK 656/4-L
Nominal heat output range P at 80/60 °C	6.3 ... 21.3 kW	7.7 ... 26.2 kW	11.0 ... 34.0 kW	12.8 ... 43.6 kW	17.8 ... 60.1 kW
Nominal heat output range P at 60/40 °C	6.6 ... 22.4 kW	8.1 ... 27.5 kW	10.5 ... 35.7 kW	13.5 ... 46.0 kW	18.7 ... 63.2 kW
Nominal heat output range P at 50/30 °C	6.8 ... 22.9 kW	8.2 ... 28.1 kW	10.7 ... 36.4 kW	13.7 ... 46.8 kW	19.0 ... 64.5 kW
Nominal heat output range P at 40/30 °C	7.0 ... 23.5 kW	8.5 ... 28.9 kW	11.0 ... 37.5 kW	14.1 ... 48.2 kW	19.6 ... 66.3 kW
Maximum heat input, heating side	22.0 kW	27.0 kW	35.0 kW	45.0 kW	62.0 kW
Minimum heat input	6.5 kW	7.9 kW	10.3 kW	13.2 kW	18.3 kW

Technical data – Power/load (G31)

	VKK 226/4-H	VKK 226/4-L	VKK 286/4-H	VKK 286/4-L	VKK 366/4-H	VKK 366/4-L
Nominal heat output range P at 80/60 °C	9.6 ... 21.3 kW	9.6 ... 21.3 kW	13.1 ... 26.2 kW	13.1 ... 26.2 kW	15.2 ... 34.0 kW	15.2 ... 34.0 kW
Nominal heat output range P at 60/40 °C	10.1 ... 22.4 kW	10.1 ... 22.4 kW	13.8 ... 27.5 kW	13.8 ... 27.5 kW	16.0 ... 35.7 kW	16.0 ... 35.7 kW
Nominal heat output range P at 50/30 °C	10.3 ... 22.9 kW	10.3 ... 22.9 kW	14.0 ... 28.1 kW	14.0 ... 28.1 kW	16.3 ... 36.4 kW	16.3 ... 36.4 kW
Nominal heat output range P at 40/30 °C	10.6 ... 23.5 kW	10.6 ... 23.5 kW	14.4 ... 28.9 kW	14.4 ... 28.9 kW	16.8 ... 37.5 kW	16.8 ... 37.5 kW
Maximum heat input, heating side	22.0 kW	22.0 kW	27.0 kW	27.0 kW	35.0 kW	35.0 kW
Minimum heat input	9.9 kW	9.9 kW	13.5 kW	13.5 kW	15.7 kW	15.7 kW

	VKK 476/4-H	VKK 476/4-L	VKK 656/4-H	VKK 656/4-L
Nominal heat output range P at 80/60 °C	19.6 ... 43.6 kW	19.6 ... 43.6 kW	21.1 ... 60.1 kW	21.1 ... 60.1 kW
Nominal heat output range P at 60/40 °C	20.6 ... 46.0 kW	20.6 ... 46.0 kW	22.1 ... 63.2 kW	22.1 ... 63.2 kW
Nominal heat output range P at 50/30 °C	21.0 ... 46.8 kW	21.0 ... 46.8 kW	22.6 ... 64.5 kW	22.6 ... 64.5 kW
Nominal heat output range P at 40/30 °C	21.6 ... 48.2 kW	21.6 ... 48.2 kW	23.2 ... 66.3 kW	23.2 ... 66.3 kW
Maximum heat input, heating side	45.0 kW	45.0 kW	62.0 kW	62.0 kW
Minimum heat input	20.2 kW	20.2 kW	21.7 kW	21.7 kW

Technical data – Heating

	VKK 226/4-H	VKK 226/4-L	VKK 286/4-H	VKK 286/4-L	VKK 366/4-H	VKK 366/4-L
Max. flow temperature adjustment range (default setting: 75 °C)	40 ... 85 °C	40 ... 85 °C	40 ... 85 °C	40 ... 85 °C	40 ... 85 °C	40 ... 85 °C
Permissible total over-pressure	0.3 MPa (3.0 bar)	0.3 MPa (3.0 bar)	0.3 MPa (3.0 bar)	0.3 MPa (3.0 bar)	0.3 MPa (3.0 bar)	0.3 MPa (3.0 bar)
Floor-standing boiler capacity	100 l	100 l	100 l	100 l	89 l	89 l
Circulation water volume (with reference to $\Delta T = 20$ K)	860 l/h	860 l/h	1,160 l/h	1,160 l/h	1,505 l/h	1,505 l/h
Pressure loss (with reference to $\Delta T = 20$ K)	0.00035 MPa (0.00350 bar)	0.00035 MPa (0.00350 bar)	0.0006 MPa (0.0060 bar)	0.0006 MPa (0.0060 bar)	0.0010 MPa (0.0100 bar)	0.0010 MPa (0.0100 bar)
Condensate volume at heating mode 40/30 °C	2.2 l/h	2.2 l/h	3.0 l/h	3.0 l/h	3.5 l/h	3.5 l/h
Heating standby losses per day (heating 70 °C)	3.4 kWh	3.4 kWh	3.4 kWh	3.4 kWh	3.4 kWh	3.4 kWh

	VKK 476/4-H	VKK 476/4-L	VKK 656/4-H	VKK 656/4-L
Max. flow temperature adjustment range (default setting: 75 °C)	40 ... 85 °C	40 ... 85 °C	40 ... 85 °C	40 ... 85 °C
Permissible total over-pressure	0.3 MPa (3.0 bar)	0.3 MPa (3.0 bar)	0.3 MPa (3.0 bar)	0.3 MPa (3.0 bar)
Floor-standing boiler capacity	85 l	85 l	85 l	85 l
Circulation water volume (with reference to $\Delta T = 20$ K)	1,935 l/h	1,935 l/h	2,650 l/h	2,650 l/h
Pressure loss (with reference to $\Delta T = 20$ K)	0.0017 MPa (0.0170 bar)	0.0017 MPa (0.0170 bar)	0.0043 MPa (0.0430 bar)	0.0043 MPa (0.0430 bar)

Appendix

	VKK 476/4-H	VKK 476/4-L	VKK 656/4-H	VKK 656/4-L
Condensate volume at heating mode 40/30 °C	4.2 l/h	4.2 l/h	7.1 l/h	7.1 l/h
Heating standby losses per day (heating 70 °C)	3.4 kWh	3.4 kWh	3.4 kWh	3.4 kWh

Technical data – Electrics

	VKK 226/4-H	VKK 226/4-L	VKK 286/4-H	VKK 286/4-L	VKK 366/4-H	VKK 366/4-L
Rated voltage	230 V/50 Hz	230 V/50 Hz	230 V/50 Hz	230 V/50 Hz	230 V/50 Hz	230 V/50 Hz
Permissible connected voltage	190 ... 253 V	190 ... 253 V	190 ... 253 V	190 ... 253 V	190 ... 253 V	190 ... 253 V
Built-in fuse (slow-blow, H or D)	4 A	4 A	4 A	4 A	4 A	4 A
Max. electrical power consumption	45 W	45 W	45 W	45 W	45 W	45 W
Standby electrical power consumption	6 W	6 W	6 W	6 W	6 W	6 W
IP rating	IP 20	IP 20	IP 20	IP 20	IP 20	IP 20
Unit protection class	Class I	Class I	Class I	Class I	Class I	Class I
Test symbol/registration no.	CE-0085BU0038	CE-0085BU0038	CE-0085BU0038	CE-0085BU0038	CE-0085BU0038	CE-0085BU0038

	VKK 476/4-H	VKK 476/4-L	VKK 656/4-H	VKK 656/4-L
Rated voltage	230 V/50 Hz	230 V/50 Hz	230 V/50 Hz	230 V/50 Hz
Permissible connected voltage	190 ... 253 V	190 ... 253 V	190 ... 253 V	190 ... 253 V
Built-in fuse (slow-blow, H or D)	4 A	4 A	4 A	4 A
Max. electrical power consumption	90 W	90 W	110 W	110 W
Standby electrical power consumption	6 W	6 W	6 W	6 W
IP rating	IP 20	IP 20	IP 20	IP 20
Unit protection class	Class I	Class I	Class I	Class I
Test symbol/registration no.	CE-0085BU0038	CE-0085BU0038	CE-0085BU0038	CE-0085BU0038

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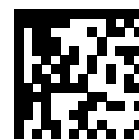
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