

Installation and maintenance instructions



eloBLOCK

VE .. /14 EU I

FI (fi)

Publisher/manufacturer

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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 Danger caused by improper operation

Improper operation may present a danger to you and others, and cause material damage.

- ▶ Carefully read the enclosed instructions and all other applicable documents, particularly the "Safety" section and the warnings.
- ▶ Only carry out the activities for which instructions are provided in these operating instructions.

1.3 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.

Intended use includes the following:

- observance of accompanying operating, installation and maintenance instructions for the product and any other system components
- installing and setting up the product in accordance with the product and system approval

- compliance with all inspection and maintenance conditions listed in the instructions.

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

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

Caution.

Improper use of any kind is prohibited.

1.4 General safety information

1.4.1 Risk caused by inadequate qualifications

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

- Set-up
- Dismantling
- Installation
- Start-up
- Inspection and maintenance
- Repair
- Decommissioning
- ▶ Proceed in accordance with current technology.

1.4.2 Risk of death due to lack of safety devices

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

- ▶ Install the necessary safety devices in the installation.
- ▶ Observe the applicable national and international laws, standards and directives.

1.4.3 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 con-



1 Safety

tact gap of at least 3 mm, e.g. fuse or circuit breaker).

- ▶ Secure against being switched back on again.
- ▶ Wait for at least 3 minutes until the capacitors have discharged.
- ▶ Check that there is no voltage.

1.4.4 Risk of being burned or scalded by hot components

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

1.4.5 Risk of scalding from hot water

There is a risk of scalding at the hot water draw-off points if the 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 operator about the risk of scalding when the anti-Legionella function is switched on.

1.4.6 Risk of material damage caused by using an unsuitable tool

- ▶ Use the correct tool.

1.4.7 Risk of damage from corrosion caused by unsuitable room air

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

- ▶ Ensure that no chemical substances are stored at the installation site.

1.4.8 Risk of material damage caused by frost

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

1.5 Regulations (directives, laws, standards)

- ▶ Observe the national regulations, standards, directives, ordinances and laws.



Notes on the documentation 2

2 Notes on the documentation

2.1 Observing other applicable documents

- ▶ Always 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 end user.

2.3 Validity of the instructions

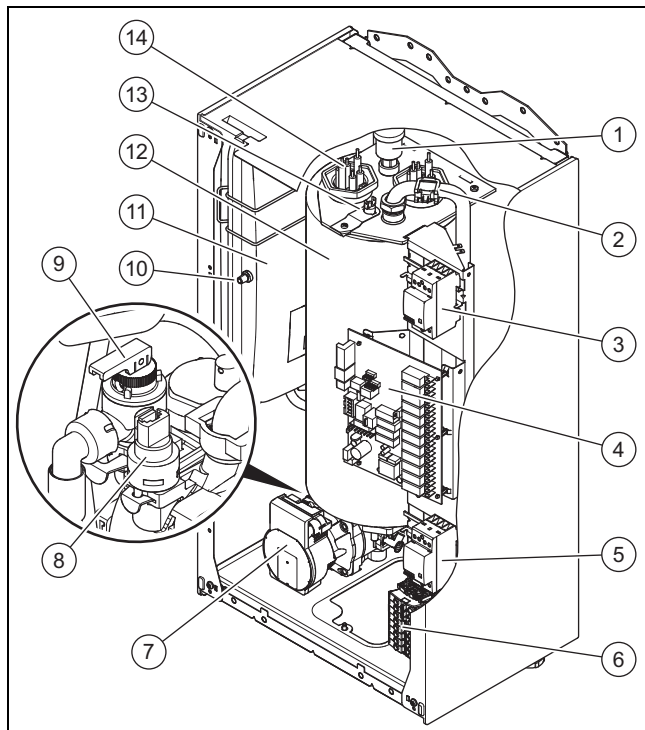
These instructions apply only to:

Product article number

	Article number
VE 6 /14 EU I	0010023690
VE 9 /14 EU I	0010023691
VE 12 /14 EU I	0010023692
VE 14 /14 EU I	0010023693
VE 18 /14 EU I	0010023694
VE 21 /14 EU I	0010023695
VE 24 /14 EU I	0010023696
VE 28 /14 EU I	0010023697

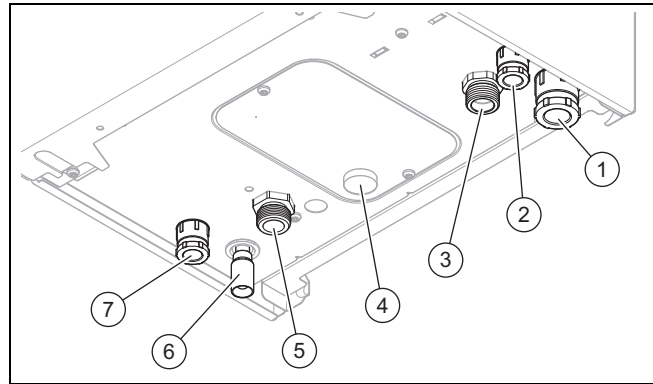
3 Product description

3.1 Product design



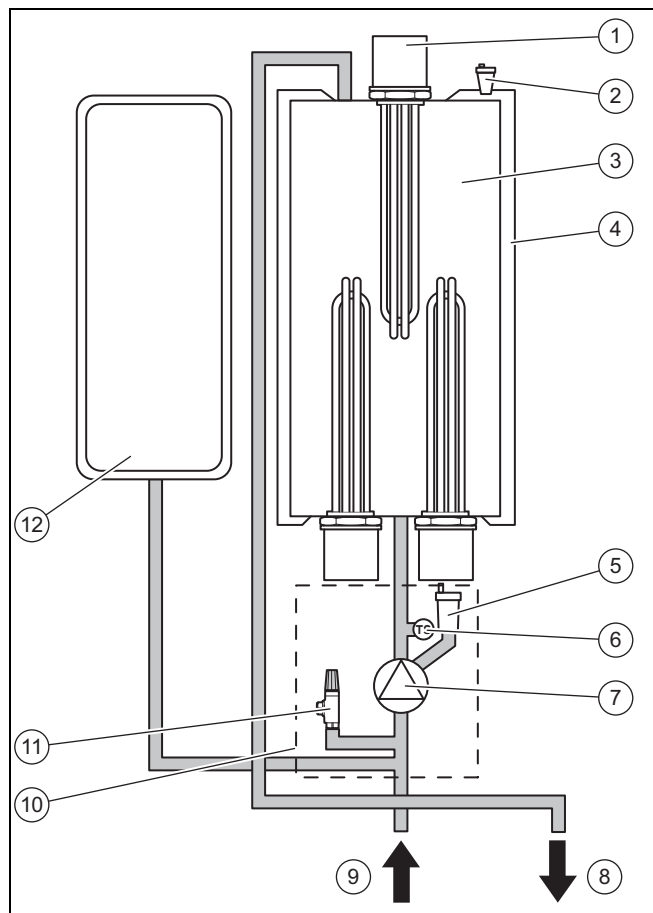
- | | |
|-------------------------|--------------------------------|
| 1 Automatic air vent | 6 Power supply |
| 2 NTC sensor | 7 Heating pump with status LED |
| 3 Contactor | 8 Pressure sensor |
| 4 Printed circuit board | 9 Expansion relief valve |
| 5 Contactor | 10 Expansion vessel valve |

- | | |
|---------------------|-------------------|
| 11 Expansion vessel | 13 Safety cut-out |
| 12 Heat exchanger | 14 Heating unit |



- | | |
|---------------------------------|---------------------------------------|
| 1 Grommet for power supply | 4 Manometer |
| 2 Grommet for accessory (230 V) | 5 3/4" heating return |
| 3 3/4" heating flow | 6 Overflow for expansion relief valve |
| | 7 Low-voltage grommet |

3.2 Functional elements



- | | |
|---------------------------|---------------------------|
| 1 Heating units | 7 Heating pump |
| 2 Automatic purging valve | 8 Heating flow |
| 3 Heat exchanger | 9 Heating return |
| 4 Insulation | 10 Pump group |
| 5 Automatic air vent | 11 Expansion relief valve |
| 6 Pressure sensor | 12 Expansion vessel |

4 Set-up

The product consists of a cylindrical heat exchanger with heating rods and a hydraulic group. The hydraulic group includes the heating pump, the pressure sensor and the expansion relief valve. A maintenance valve in the hydraulic group acts as an automatic air vent. To compensate for the expansion of the water in the heating system when it is heated, a 7-litre expansion vessel has been installed.

3.3 Functionality

The product is designed to be operated in domestic hot water heating systems with controlled water circulation. The product can be switched on and off in increments. Unwanted pulses in the power grid during switching on and off are prevented as the product is not switched on and off until after a delay of 10-70 seconds (depending on the product's output).

To save energy and reduce mechanical wear, the pump only works when required. After switching off, the pump continues to run for approx. one minute in order to make use of the energy in the water flowing back into the domestic hot water cylinder/heat exchanger.

The heat supply is guaranteed during the activation times for the most economical low tariff. If an optional domestic hot water cylinder is available, the cylinder content is then heated and is available during the anti-cycling time for heating the flat.

The product has a steel housing with integrated front plate. The inlet and outlet for the heating water and the electric connection are located on the underside of the product.



The product is designed for wall installation. To achieve a higher output, several products can be combined in a cascade operation and controlled by a single room temperature control. This is connected to the primary product.

3.4 Pump operating modes

The pump's electronics automatically control the differential pressure target value.

3.5 Information on the data plate

The data plate is located inside on the base of the casing.

Information on the data plate	Meaning
	Read the instructions.
VE.. /14	Type designation
..6..	Power
EU I	Target market
eloBLOCK	Marketing name
PMS	Permissible total excess pressure in heating mode
T _{max.} (e.g. 85 °C)	Max. flow temperature
V Hz	Mains voltage and mains frequency
IP	IP rating
P	Nominal heat output range
Q	Heat input range
	DataMatrix code with serial number, 7th to 16th digit = product article number

3.6 CE marking



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

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

3.7 Serial number

The serial number can be found on the identification plate.

4 Set-up

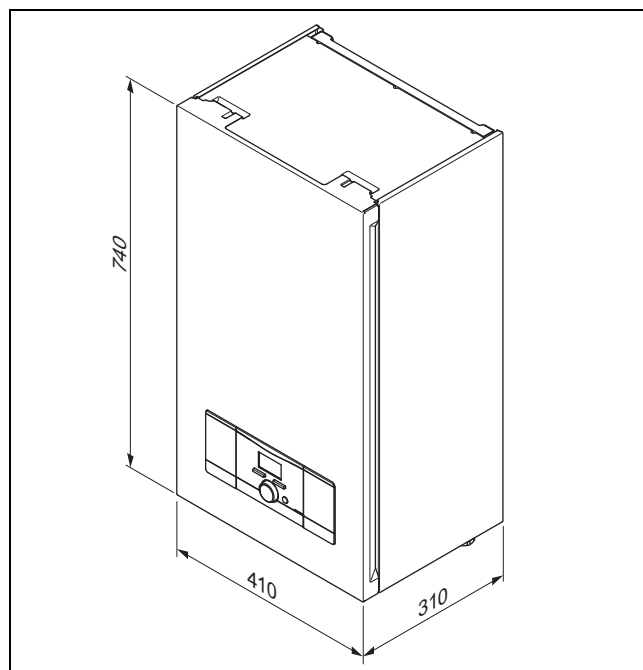
4.1 Checking the scope of delivery

1. Remove the product from its box.
2. Remove the protective film from all parts of the product.
3. Check that the scope of delivery is complete and intact.

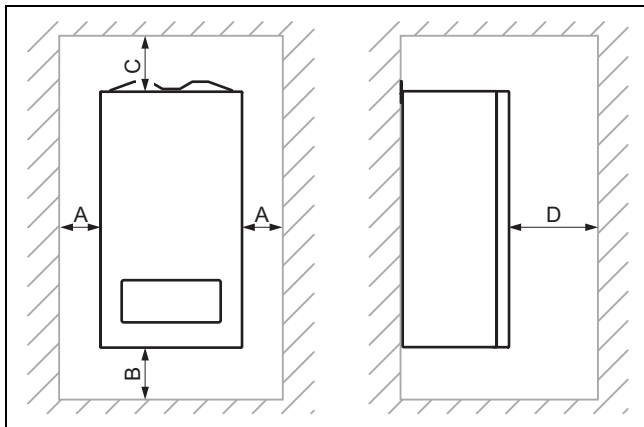
4.1.1 Scope of delivery

Number	Description
1	eloBLOCK
1	Product holder
1	Enclosed documentation
1	Enclosed fastening material: – 3 x rawl plug 10 x 60 – 3 x screw M6 x 60

4.2 Dimensions



4.3 Minimum clearances

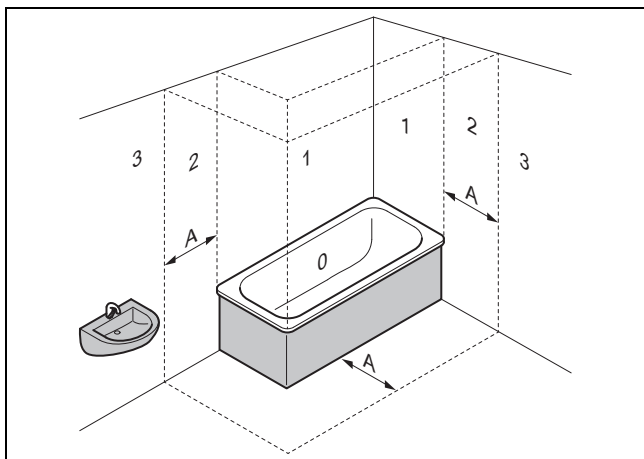


- | | | | |
|---|--------|---|--------|
| A | 50 mm | C | 800 mm |
| B | 500 mm | D | 700 mm |

4.4 Requirements for the installation site

- ▶ Only install the product indoors.
- ▶ Select the installation site so that the pipes can be routed appropriately (water supply and drain).
- ▶ Do not install the product close to stairways, emergency exits or air-conditioning systems.
- ▶ Do not install the product above an appliance the use of which may damage the product (e.g. above a cooker that may emit grease vapours).
- ▶ Do not install the product in areas in which water can penetrate the product.
- ▶ Do not install the product in rooms prone to frost.

4.4.1 Observing the restrictions in damp rooms



- | | | | |
|---|--------|---|--------|
| 0 | Zone 0 | 3 | Zone 3 |
| 1 | Zone 1 | A | 60 cm |
| 2 | Zone 2 | | |

- ▶ Install the product in bathrooms, washrooms and shower rooms outside of zones 0, 1 and 2.
- ▶ If water can penetrate the product, do not install the product in zone 3 either.

4.5 Wall-mounting the product

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

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

- ▶ Wall-mount the product.

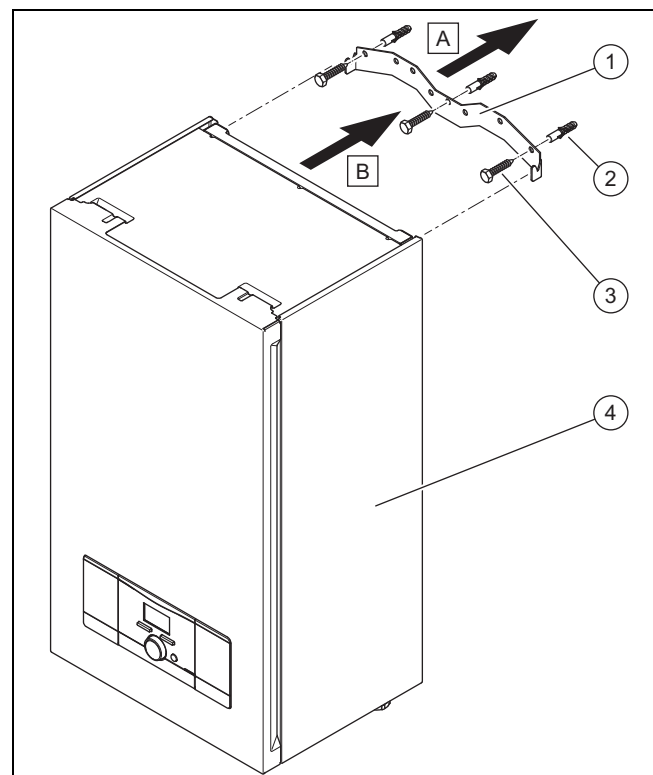
Condition: The load-bearing capacity of the wall is not sufficient

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

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

- ▶ Wall-mount the product using the permitted fixing material provided on-site.

4.5.1 Wall-mounting the product with the product bracket

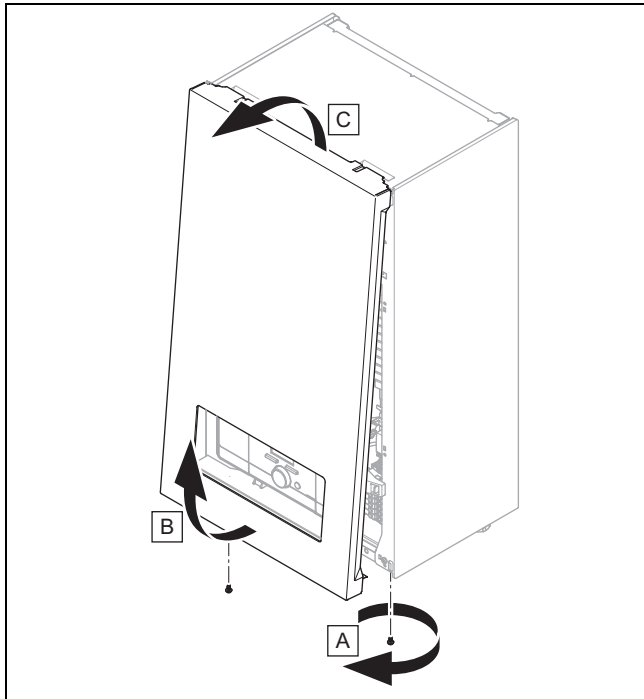


1. Place the product bracket (1) on the wall and mark the three holes.
2. Put the product bracket to one side and drill the holes in the wall.
3. Use the enclosed rawl plugs and screws (2) to fix the product bracket to the wall.
4. Hang the product in the product bracket from above.

4 Set-up

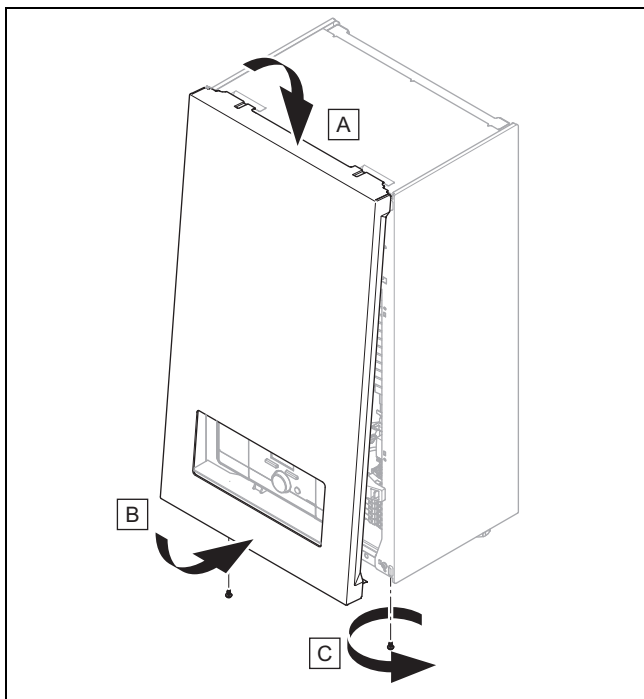
4.6 Removing and installing the front casing

4.6.1 Removing the front casing



- ▶ Remove the front casing as shown in the above illustration.

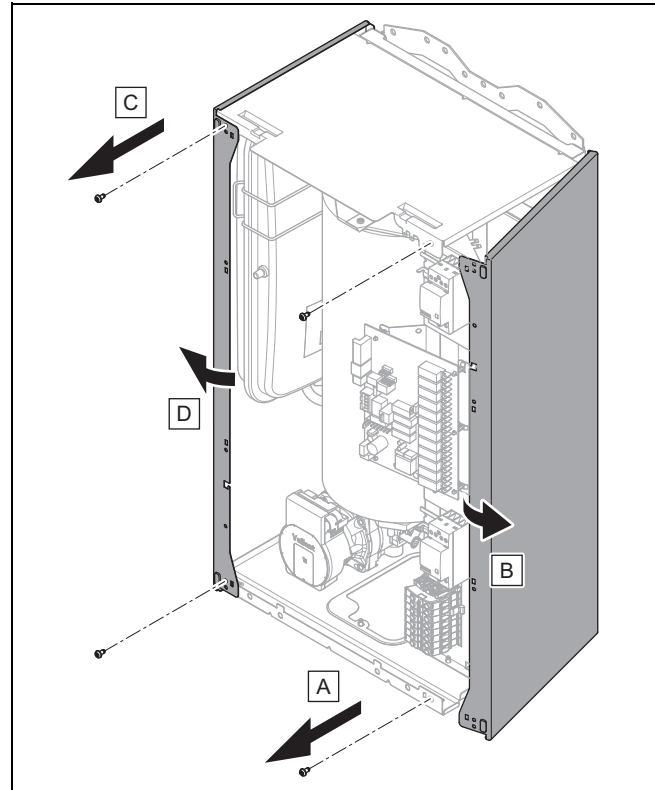
4.6.2 Installing the front casing



- ▶ Install the front casing as shown in the above illustration.

4.7 Installing and removing the side casing

4.7.1 Removing the side casing



Caution.

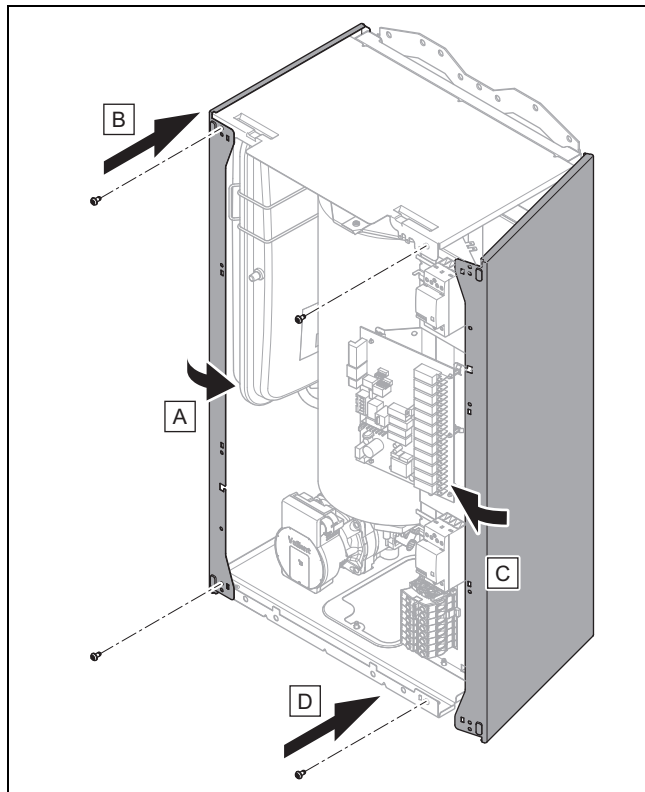
Risk of material damage caused by mechanical deformation.

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

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

1. Undo the screws.
2. Slide the side casing approx. 1–2 cm upwards and pull it forwards to remove it.

4.7.2 Installing the side casing



- ▶ Install the side casing as shown in the figure above.

5 Installation



Danger!
Risk of scalding and/or damage due to incorrect installation leading to escaping water.

Stresses in the supply line can cause leaks.

- ▶ Make sure there is no voltage in the supply lines when they are installed.



Caution.
Risk of material damage due to heat transfer during soldering.

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



Caution.
Risk of material damage caused by 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.



Warning.
Risk of adverse health effects caused by impurities in the potable water.

Sealing residues, dirt or other residues in the pipelines may adversely affect the quality of the potable water.

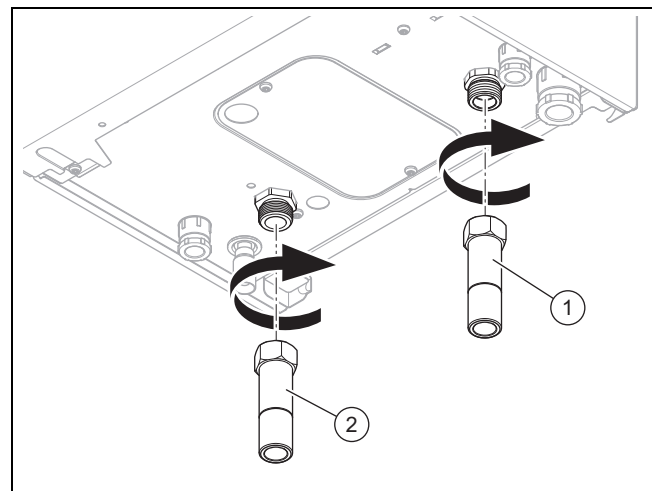
- ▶ Flush all of the hot and cold water pipes thoroughly before you install the product.



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

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

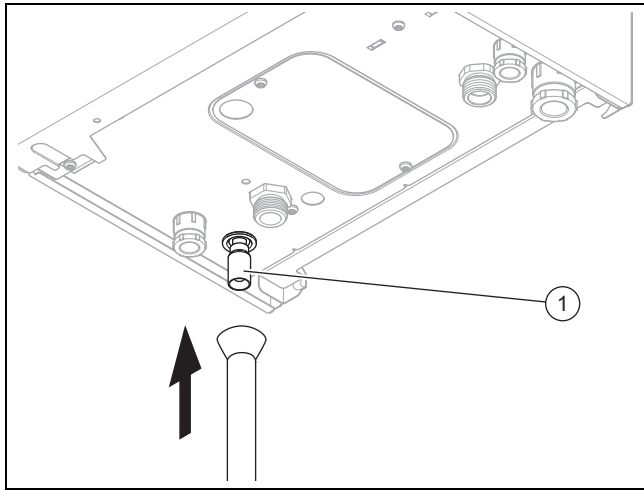
5.1 Connecting the heating flow and heating return



1. Connect the line for the heating flow (1) to the connection for the heating flow in accordance with the relevant standards.
2. Connect the line for the heating return (2) to the connection for the heating return in accordance with the relevant standards.
3. Install a bypass valve on-site in order to switch the product off when the radiator valves are closed.
4. In regions with a high level of water hardness, use a water-softening device.

5 Installation

5.2 Connecting the expansion relief valve



1. Use an intake funnel to connect a drain line to the outlet **(1)** of the expansion relief valve.
2. Route as short a drain line as possible at a downward gradient away from the product.
3. Connect the drain line to an odour trap on an outflow or route the drain line to the outside.
4. Terminate the drain line in such a way that escaping water or steam cannot cause injury to persons or damage to cables and electronic components.
5. When the drain is routed to the outside, ensure that the end of the line is visible.

5.3 Electrical installation

Only qualified electricians are allowed to carry out the electrical installation.

The cross-section of the connection wires is calculated by the planner based on the installation conditions (e.g. cable length, total input power for the product, etc.).

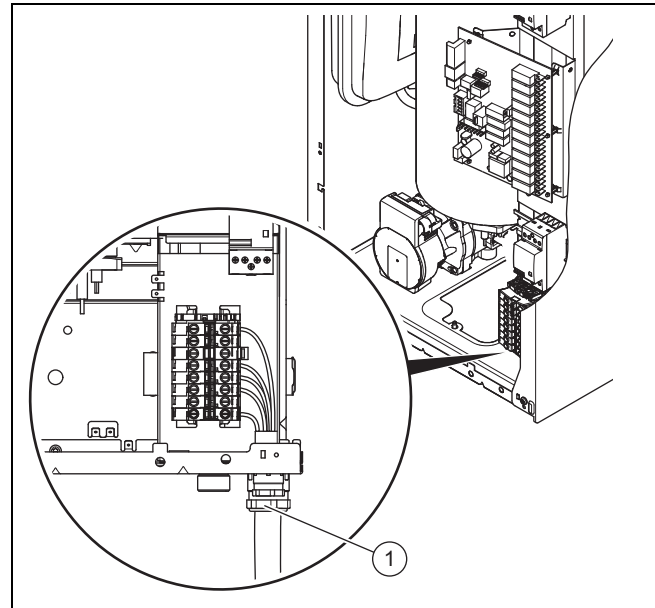


Danger! **Risk of death from electric shock!**

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

- ▶ Ensure that the nominal mains voltage complies with the technical data and that the power supply is sinusoidal.
- ▶ 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) (→ Page 24).
- ▶ Route a three-phase power supply cable that complies with the relevant standards through the grommet and into the product.
 - Power supply cable: Flexible line
- ▶ In addition, install an on/off switch (on-site) in the power supply adjacent to the product.
 - Clearance: 10 cm
- ▶ Ensure that the on/off switch completely disconnects the L and N lines.

5.3.1 Connecting the power supply cable



1. Install the enclosed duct screw connection for the power supply's grommet **(1)**.
2. Route the mains feed line through the grommet on the rear right of the underside of the product. (→ Page 5)
3. Strip approx. 2-3 cm of the mains feed line and strip the insulation from the conductors.
4. Connect the connection cable to the relevant screw terminals. (→ Page 24)
5. Ensure that the connection cable is mechanically fixed in place in the screw terminals.

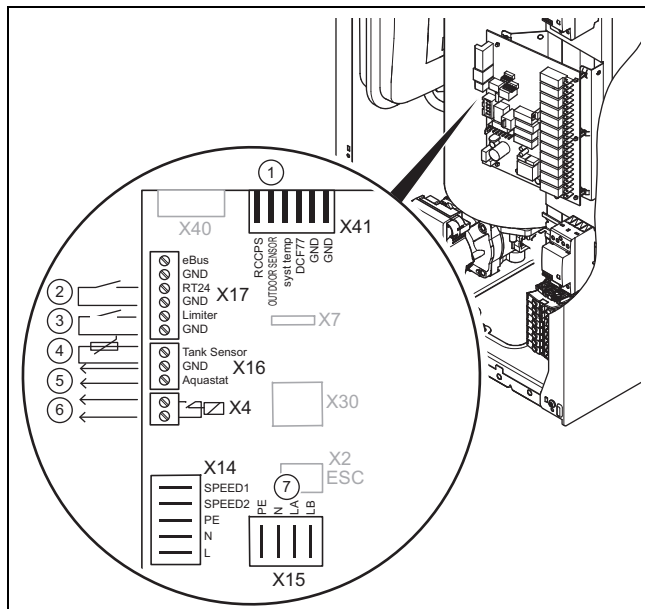
5.3.2 Setting operation with two electricity tariffs

1. Remove the bridge at terminal X2 (ESC). (→ Page 24)
2. Connect the contact on the ripple control signal receiver to terminal X2 (ESC).

5.3.3 Connecting the earth cable

1. Connect the earth cable to the earth connection on the product and to a suitable earth connection on the house installation in order to prevent short circuits in the product (e.g. caused by the penetration of water).
2. Connect the earth cable to the earth connection on the product's front cover.

5.3.4 Connecting the control and external components



- | | |
|---|--|
| 1 Outdoor temperature sensor connection, X41 | 5 Thermostat connection (domestic hot water cylinder), X16 (GND, Aquastat) – use the accessories kit |
| 2 Room temperature control connection, X17 (RT24, GND) | 6 X4 cascade system connection |
| 3 Connection for the on-site load-shedding relay contact, X17 (Limiter, GND) – limiter | 7 Connection for the domestic hot water cylinder or external signal transmitter, X15 |
| 4 NTC sensor connection (domestic hot water cylinder), X16 (Tank Sensor, GND) – use the accessories kit | |

1. Observe the documentation for the relevant component.
2. Route the connection cables for the components to be connected through the grommets on the left or right of the underside of the product. (→ Page 5)
3. Strip approx. 2 -3 cm of the relevant connection cable and strip the insulation from the conductors.
4. Connect the connection cable to the relevant screw terminals. (→ Page 24)
5. Ensure that the connection cable is mechanically fixed in place in the screw terminals.

5.3.5 Connecting the load-shedding relay

An external load-shedding relay can control the product's power, depending on the mains load in the building.

If the mains supply is under an excessive load, the product's power automatically decreases.

- ▶ Connect the on-site load-shedding relay to the output limiter connection at contact X17.

5.3.6 Connecting an external signaller

If no domestic hot water cylinder is connected, you can connect an external signal transmitter for indicating faults with the product to plug connection X15.

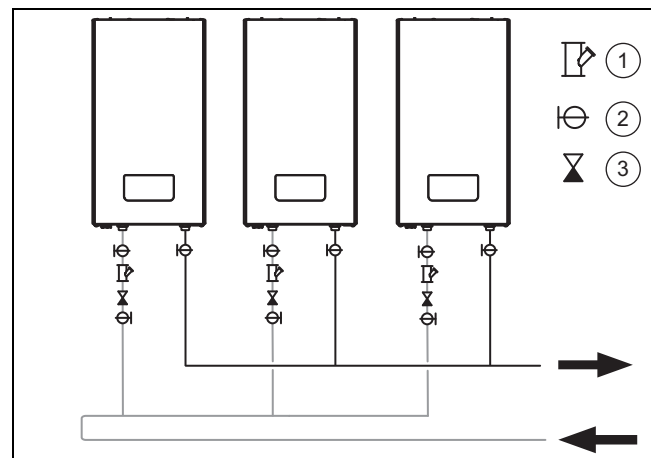
Condition: No domestic hot water cylinder connected

- ▶ Connect an external signal transmitter via a screw terminal (AKZ 950/3 or similar) to connections **LA** and **N** on plug connection X15 (→ Page 24).
- ▶ Set parameter **d.26** to the value **6**.
 - ◁ If there is a fault **F.xx** with the product, the signal is triggered.

5.3.7 Connecting an external pump

- ▶ Use the original accessory kit or connect the external pump cable to connection X15.

5.3.8 Setting up a cascade system



- | | |
|-------------|--------------------|
| 1 Filter | 3 Non-return valve |
| 2 Stop cock | |

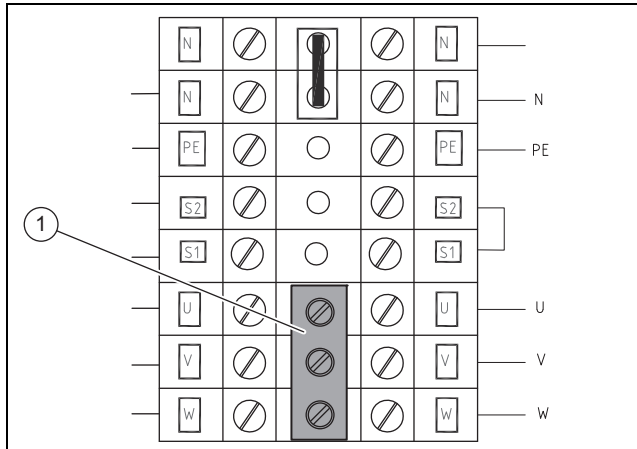
If a product's power cannot offset the heat loss in the building, connect an additional product from the series that has 24 kW or 28 kW.

- ▶ Connect the connections for screw terminal X4 on the product that is to be controlled to connections RT24 and GND for screw terminal X17 on the additional product.
- ▶ If the cascade system is controlled by a room temperature control, you must also connect the room temperature control's control line to connections RT24 and GND for screw terminal X17 on the product that is to be controlled.

6 Start-up

5.3.9 Connecting the product to a single-phase power grid

Condition: Product with 6 or 9 kW output



- ▶ If a three-phase connection is not available, connect the product to a single-phase power grid.
- ▶ To do this, place the supplied bridge (1) on the main connection block in order to connect the phase terminals on the main connection block.

6 Start-up

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



Caution.

Risk of material damage due to poor-quality heating water

- ▶ Ensure that the heating water is of sufficient quality.

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

Checking the quality of the heating water

- ▶ Remove a little water from the heating circuit.
- ▶ Check the appearance of the heating water.
- ▶ If you ascertain that it contains sedimentary materials, you must desludge the installation.
- ▶ Use a magnetic rod to check whether it contains magnetite (iron oxide).
- ▶ If you ascertain that it contains magnetite, clean the installation and apply suitable corrosion-inhibition measures, or fit a magnetic filter.
- ▶ Check the pH value of the removed water at 25 °C.
- ▶ If the value is below 6.5 or above 8.5, 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 rules when treating the filling and supplementary water.

Provided the national regulations and technical rules 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 6.5 or more than 8.5.

Total heating output	Water hardness at specific system volume ¹⁾					
	≤ 20 l/kW		> 20 l/kW ≤ 50 l/kW		> 50 l/kW	
kW	mg CaCO ₃ /l	mol/m ³	mg CaCO ₃ /l	mol/m ³	mg CaCO ₃ /l	mol/m ³
< 50	< 300	< 3	200	2	2	0.02
> 50 to ≤ 200	200	2	150	1.5	2	0.02
> 200 to ≤ 600	150	1.5	2	0.02	2	0.02
> 600	2	0.02	2	0.02	2	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.

The use of unsuitable heating water may cause aluminium corrosion and a resulting lack of leak-tightness.

In contrast to steel, grey cast iron or copper, for example, aluminium reacts with alkaline heating water (pH value > 8.5) to produce substantial corrosion.

- ▶ When using aluminium, make sure that the pH value of the heating water is between 6.5 and a maximum of 8.5.



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 antifreeze and corrosion inhibitors, 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

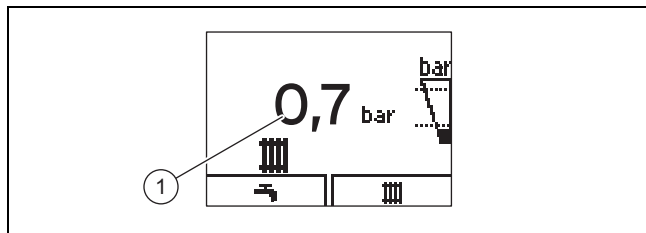
- Adey MC1+
- Fernox F1
- Fernox F2
- Sentinel X 100
- Sentinel X 200

Additives for frost protection intended to remain permanently in the installation

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

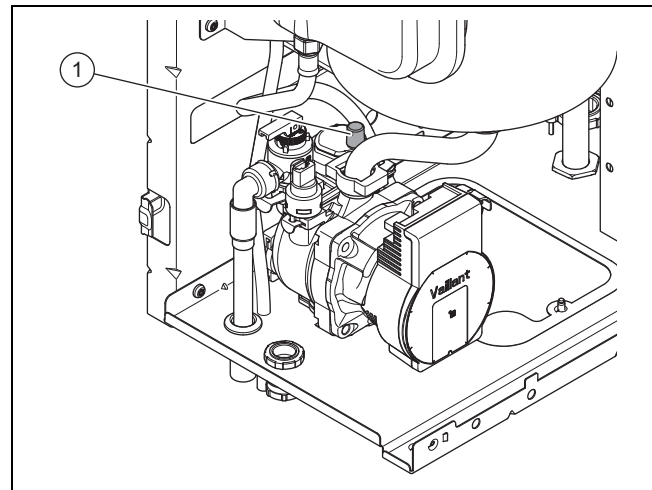
- ▶ If you have used the above-mentioned additives, inform the end user about the measures that are required.
- ▶ Inform the end user about the measures required for frost protection.

6.2 Checking the filling pressure of the heating installation

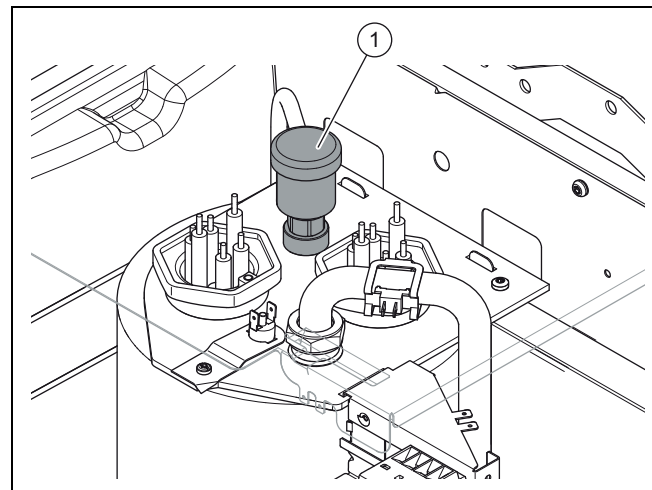


1. Read off the filling pressure of the heating installation on the display (1).
2. Alternatively, read off the filling pressure of the heating installation on the manometer.
 - Even if the product is switched off, you can read off the heating installation's filling pressure on the manometer.
3. When the heating installation is cold and the pump is deactivated, ensure that a filling pressure of 0.1-0.2 MPa (1.0-2.0 bar) is displayed.
 - If the heating installation is to supply several storeys, a higher filling pressure may be required.
 - If the pressure falls short by 0.08 MPa (0.8 bar), a pressure sensor signals that the pressure is low by making the pressure display flash.

6.3 Filling and purging the heating installation



1. Undo the automatic air vent cap (1) on the pump by one or two rotations.
 - During operation, the product purges itself via the automatic air vent.
2. Open all thermostatic valves in the heating installation.
3. Use a hose to connect the filling/drainage cock on the heating installation to a cold-water draw-off valve.
4. Slowly open the cold-water draw-off valve and the filling tap on the heating installation and top up with water until the required system pressure is shown on the manometer.
5. Close the filling tap.



6. Hold a receptacle under the end of the hose that comes from the purging valve (1).
7. Open the purging valve (1) until the boiler has been completely purged.
8. Purge all radiators.
9. Then re-check the filling pressure of the heating installation and, if required, repeat the filling procedure.
10. Close the cold-water draw-off valve and remove the filling hose.
11. Check all connections for tightness.

7 Adapting the product to the heating installation

6.4 Checking function and leak-tightness

1. Check that the product functions correctly and check the leak-tightness.
2. Start up the product.
3. Check that all of the monitoring and safety devices are functioning properly.
4. Make sure that the front casing is properly installed.

7 Adapting the product to the heating installation

1. In the installer level, navigate to the Diagnostics menu item.
2. Set all further system parameters there in order to adjust the product to the heating installation.
3. Observe the overview of diagnostics codes in the appendix.
Overview of diagnostics codes (→ Page 19)

8 Handing the product over to the end user

1. Explain to the end user how the safety devices work and where they are located.
2. Inform the end user how to handle the product. Answer any questions the end user may have.
3. Draw special attention to the safety warnings that the end user must follow.
4. Inform the end user of the necessity to have the product maintained according to the specified intervals.
5. Pass all of the instructions and documentation for the product to the end user for safe-keeping.

9 Troubleshooting

You can find an overview of the fault codes in the appendix.
Overview of fault codes (→ Page 22)

9.1 Eliminating faults

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.

- ▶ Use the table in the appendix to eliminate the fault.
Overview of fault codes (→ Page 22)
- ▶ If you are unable to eliminate the fault, contact Customer Service.

9.2 Eliminating faults in the pump

If a fault occurs in the pump, this is shown by the pump's status LED.

- ▶ Use the table in the appendix to eliminate the fault.
Pump status LED (→ Page 23)
- ▶ If you are unable to eliminate the fault, contact Customer Service.
 - ◀ The pump status can be viewed under diagnostics code D.149.

9.3 Eliminating a fault caused by a sticking relay

If the relay jams and can no longer be triggered, the display shows fault message **F.180**. The product continues to work for five days. The product is then blocked.

- ▶ Inform Customer Service.

10 Inspection and maintenance

- ▶ Carry out inspection and maintenance on an annual basis. The inspection may require maintenance to be carried out earlier, depending on the results.
Inspection and maintenance work – Overview (→ Page 27)

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 back page of these instructions.

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

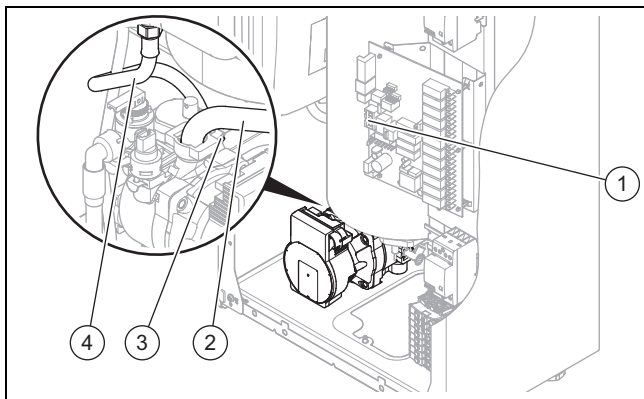
10.2 Preparing for maintenance

1. Decommission the product.
2. Remove the front casing. (→ Page 8)
3. Close all of the stop valves at the cold water connection and hot water connection.
4. Drain the product. (→ Page 15)
5. Disconnect the product from the power mains.
6. Make sure that water does not drip on live components (e.g. the electronics box).
7. Only use new seals and ensure the seals are seated correctly.
8. Carry out the work in the specified sequence.
9. Do not bend the components when fitting or removing them.

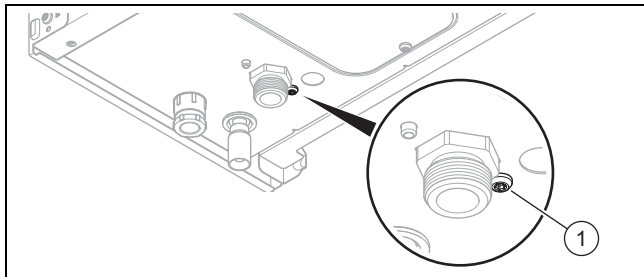
10.3 Drain the product and heating installation

1. Secure a hose to the heating installation's draining device.
2. Route the free end of the hose to a suitable drainage point.
3. Open all service valves in the heating flow and heating return.
4. Open the drain cock.
5. Open the purging valves on the radiators. Start from the highest radiator and then work from the top to the bottom.
6. Once the water has drained, close the purging valves on the radiators, the service valves in the heating flow, heating return and in the cold water supply, and the drain cock again.

10.4 Replacing the pump



1. Disconnect the connection cable to the pump from the PCB **(1)**.
2. Undo the screwed connection for the return **(2)** to the heat exchanger.
3. Undo the screwed connection for the line **(4)** to the expansion vessel.
4. Remove the safety clip **(3)**.

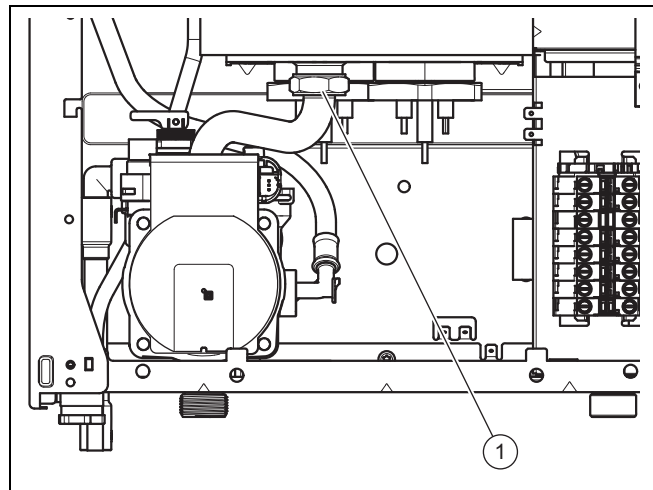


5. Undo the pump's fixing screw **(1)** on the underside of the product.
6. Carefully turn the pump clockwise so that it can be removed from the product.
7. When you install the new pump, use new seals (O-rings coated with a water-based lubricant).
8. Check all water-bearing connections for leak-tightness and check that the plug connections are firmly seated.

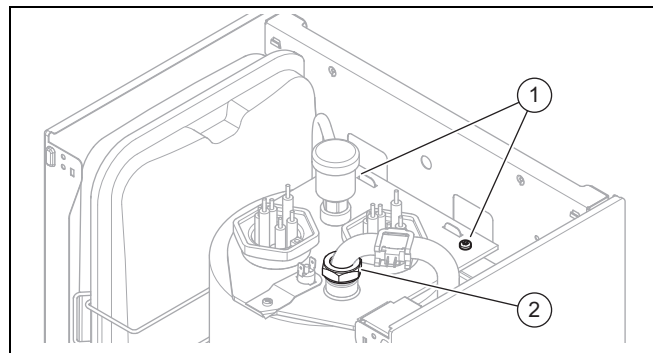
10.4.1 Checking that the pump works correctly

1. Check that the pump status LED is functioning correctly.
Pump status LED (→ Page 23)
2. Loosen the cap on the automatic air vent.
3. Clean the rotor and the housing.
4. Reinstall the motor.
5. Screw the cap onto the automatic air vent.

10.5 Replacing the heat exchanger



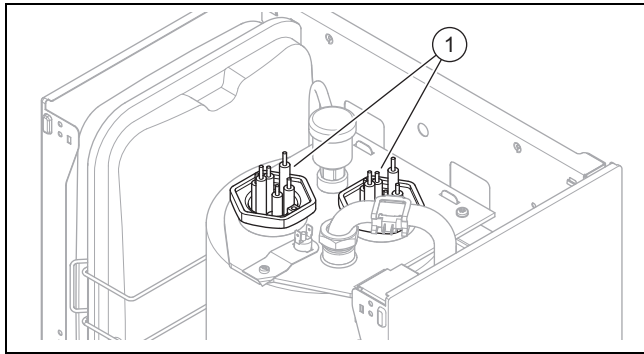
1. Remove the side casing (→ Page 8) and the casing from the top of the product.
2. Disconnect the immersion heater cable connection to the PCB and to the mains terminal block (N, blue).
3. Unscrew the earth wire.
4. Undo the heating return's fixing screw **(1)** on the base of the heat exchanger.



5. Undo the heating flow's fixing screw **(2)** on the upper side of the heat exchanger.
6. Remove both screws **(1)** from the upper side of the heat exchanger.
7. Remove the complete heat exchanger upwards from the product.

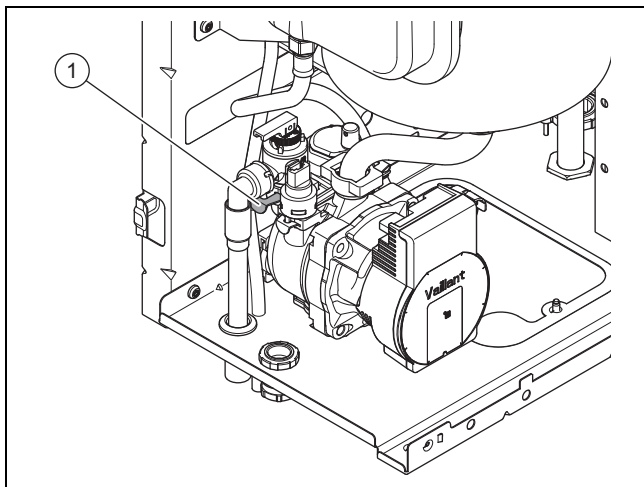
10 Inspection and maintenance

10.6 Replacing the heating rods



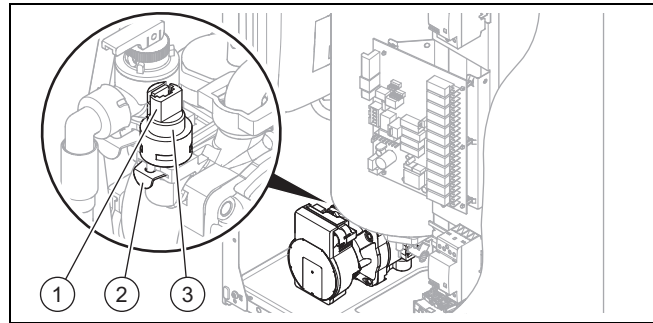
1. Disconnect the heating rod cable connections (1) to the PCB and to the mains terminal block (N, blue).
2. Unscrew the earth line.
3. Use a suitable open-ended spanner to unscrew the heating rod from the heat exchanger in an anti-clockwise direction.
4. Use a suitable open-ended spanner to screw in a new heating rod in the heat exchanger in a clockwise direction.
5. Check all water-bearing connections for leak-tightness and check that the plug connections are firmly seated.
6. Ensure that the contactors and relays do not jam.

10.7 Replacing the expansion relief valve



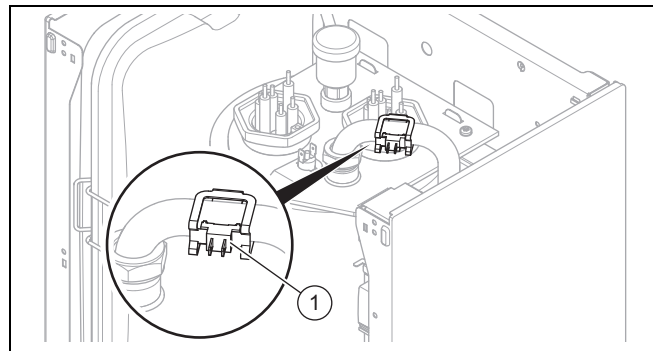
1. Remove the safety clip (1) and remove the expansion relief valve from the product.
2. Insert a new expansion relief valve and use the safety clip to secure it in place.
3. Check that the new expansion relief valve is seated firmly and check it for tightness.

10.8 Replace the pressure sensor



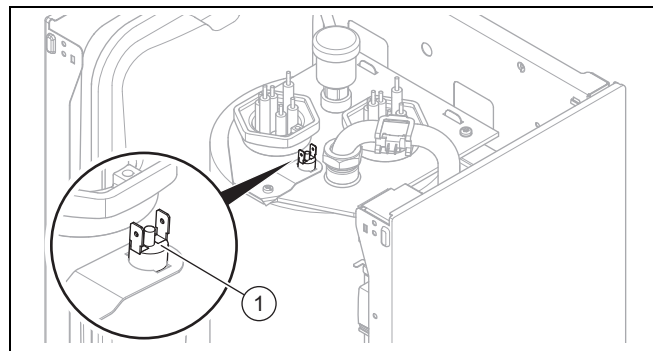
1. Remove the plug (1).
2. Use a screwdriver to remove the safety clamp (2).
3. Remove the pressure sensor (3).
4. Insert a new pressure sensor.
5. Place the safety clamp on the pressure sensor.
6. Place the plug on the pressure sensor.
7. Check that the safety clamp and plug are seated firmly.

10.9 Replacing the NTC sensor



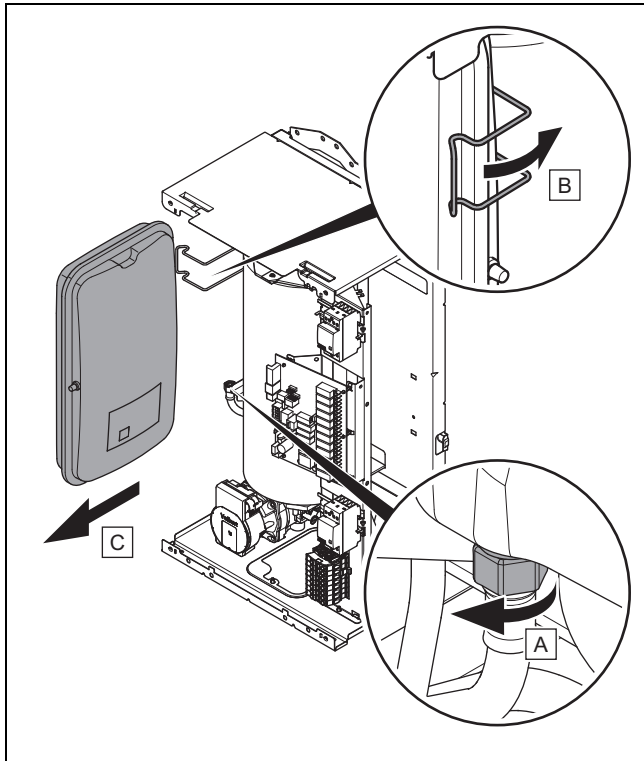
1. Remove the two plugs from the NTC sensor (1).
2. Completely remove the NTC sensor along with the retainer.
3. Install a new NTC sensor.
4. Position both plugs.
5. Check that the retainer and the plugs are seated firmly.

10.10 Replace the safety cut-out

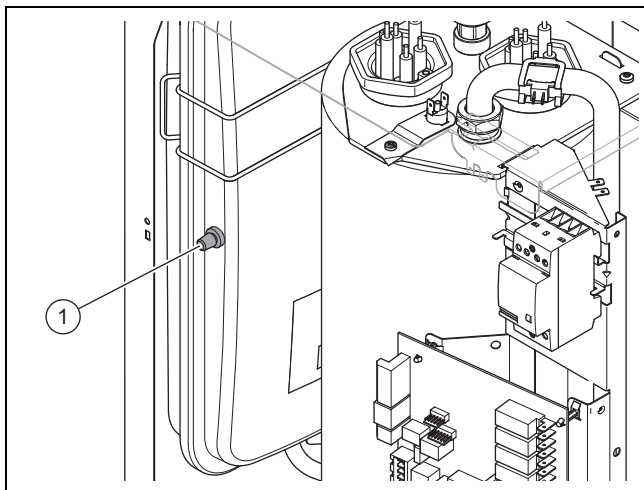


1. Remove the two plugs from the safety cut-out (1).
2. Remove the screw from the retainer and remove the safety cut-out from the retainer.
3. Install a new safety cut-out.
4. Position both plugs.
5. Check that the safety cut-out is firmly against the heat exchanger.

10.11 Replacing the expansion vessel



1. Remove the left-hand side section.
2. Undo the screwed connection for the water connection on the underside of the expansion vessel.
3. Undo the retaining clips on the expansion vessel.
4. Remove the expansion vessel from the product by pulling it forwards.
5. Insert a new expansion vessel from the front into the product.
6. Use new seals.
7. Tighten the screwed connection for the water connection on the underside of the expansion vessel.



8. Before filling the heating installation, measure the pre-charge pressure of the expansion vessel at measuring stub pipe (1) of the expansion vessel with the boiler depressurised.

- The pre-charge pressure must be 0.02 MPa (0.2 bar) higher than the static height of the heating installation.
9. Fill and purge the heating installation.
 - The water pressure must be 0.02 MPa to 0.03 MPa (0.2 bar to 0.3 bar) higher than the pre-charge pressure of the expansion vessel.
 10. Check the water connection for tightness after you have filled the expansion vessel.

10.12 Replacing the PCB and the display

1. Disconnect all of the connection cables from the PCB and the display.
2. Replace the PCB and the display.
3. Plug all of the connection cables into their original slots.
4. Check all of the connections using the connection diagram. (→ Page 24).
5. Connect the product to the power mains.
6. Switch on the product.
7. Check the set product variant (→ parameter **d.93**).
8. Set the correct product variant, if necessary.
9. Exit the diagnostics level.
10. After approximately one minute, switch the product off and on again.
 - ◁ The electronics are now set to the product variant and the parameters of all diagnostic codes are set to the default settings. If the electronics detect an incorrect product variant when the product is switched on, switch the product off and check the connections to the display.
11. Make the system-specific settings.

10.13 Completing inspection and maintenance work

1. Install all of the components in reverse order.
2. Install the front casing. (→ Page 8)
3. Open all of the isolation valves.
4. Re-establish the power supply.
5. Start up the product.
6. Check that the product functions correctly and check the tightness.
7. Log all maintenance work that is carried out.

11 Decommissioning

- ▶ Use the on/off button to switch off the product.
- ▶ Disconnect the product from the power grid.
- ▶ Close the stopcock on the cold water connection.
- ▶ Drain the product.

12 Recycling and disposal

Disposing of the packaging

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

13 Customer service

13 Customer service

Validity: Finland, Vaillant

Asiakaspalvelumme yhteystiedot löytyvät takapuolella mainitun osoitteen alta tai WWW-sivulta osoitteesta www.vaillant.fi.

Appendix

A Status codes – Overview

Status codes are displayed in the Live Monitor.

Status code	Meaning
Displays in heating mode	
S.00	Heating: No heat demand
S.04	Heating mode
S.07	Heating mode: Pump overrun
Displays in domestic hot water mode	
S.20	Domestic hot water demand via cylinder temperature sensor
S.24	DHW mode
S.27	DHW mode: Pump overrun
Special status codes	
S.30	Room thermostat (RT) blocks heating mode (terminal contacts 3–4 open)
S.31	Summer mode active or no heat requirement from eBUS control
S.34	Frost protection mode active
S.85	Maintenance message: Check the minimum circulation water volume
S.91	Demo trade fair mode is active
S.174	Energy saving active (ESCO contact)

B Overview of diagnostics codes



Note

The diagnostics menu is located on the installer level and can only be accessed after entering a password. In the diagnostics mode, you can change various parameters to adapt the product to the heating installation.

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

Code	Parameter	Values or explanations	Factory setting	Own setting
D.000	Partial heat load VE 6 VE 9 VE 12 VE 14 VE 18 VE 21 VE 24 VE 28	Adjustable partial heat load in kW/Auto 1-6 1-9 2-12 2-14 2-18 2-21 2-24 2-28	Auto	
D.001	Overrun time of internal heating pump for heating mode	1 to 60 min	5 min	
D.004	Measured value for the cylinder temperature sensor	In °C		Not adjustable
D.005	Flow temperature target value (or return target value)	in °C, maximum of the value set in D.071, limited where applicable by a heat curve and a room temperature control, if connected		Not adjustable
D.007	Set value for cylinder charging temperature or thermostat (for optional external domestic hot water cylinder only)			Not adjustable
D.009	Current flow temperature via the external eBUS control	In °C		Not adjustable

Appendix

Code	Parameter	Values or explanations	Factory setting	Own setting
D.010	Status of the internal heating pump	0 = Pump does not run 1 = Pump runs		Not adjustable
D.011	Status of the external pump	0 = Pump does not run 1 = Pump runs		Not adjustable
D.013	Status of the circulation pump (via the wiring centre)	0 = Pump does not run 1 = Pump runs		Not adjustable
D.014	Pump speed target value	Target value for the high-efficiency pump. Possible settings: 0 = Auto (modulating pump control with constant pressure regulation) 1 to 5 = fixed value control 1 = 53% 2 = 60% 3 = 70% 4 = 85% 5 = 100%		
D.015	Pump speed actual value	15 – 100 %		Not adjustable
D.016	24 V DC room thermostat open/closed	0 = Room thermostat open (no heating mode) 1 = Room thermostat closed (heating mode)		Not adjustable
D.018	Pump mode	3 = Eco = intermittent 1 = Comfort = continuous	Eco	
D.019	Pump mode: 2-stage pump	Setting for two-stage pump mode 0: Burner mode stage 2, pump prerun/overrun stage 1 1: Heating mode and pump prerun/overrun stage 1, domestic hot water mode stage 2 2: Automatic heating mode, pump prerun/overrun stage 1, domestic hot water mode stage 2 3: Always stage 2 4: Automatic heating mode, pump prerun/overrun stage 1, domestic hot water mode stage 1	2	
D.020	Max. DHW temperature target value	Adjustment range: 50 – 70 °C	70 °C	
D.022	Hot water requirement (for optional external domestic hot water cylinder only)	0 = Off 1 = on		Not adjustable
D.023	Heating mode status	0: Blocked 1: Released		Not adjustable
D.025	Ext. eBUS signal: Cylinder charging	0: Off 1: On		Not adjustable
D.026	Additional relay actuation	1 = Circulation pump 2 = External pump 6 = External fault message 11 = 3-port diverter valve	11	
D.027	Actuation of accessory relay 1 (VR 40 2 in 7 multi-functional module)	1 = Circulation pump 2 = External pump 6 = External fault message		
D.028	Actuation of accessory relay 2 (VR 40 2 in 7 multi-functional module)	1 = Circulation pump 2 = External pump 6 = External fault message		
D.029	Water circulation vol. actual value	l/min calculated		Not adjustable
D.035	3-port valve position	0 = Heating mode 100 = Domestic hot water mode		Not adjustable
D.040	Flow temperature	Actual value in °C		Not adjustable
D.047	Outdoor temperature (with connected outdoor temperature sensor)	Actual value in °C		Not adjustable

Code	Parameter	Values or explanations	Factory setting	Own setting
D.071	Target value maximum heating flow temperature	45 to 85 °C	80 °C	
D.072	Internal pump overrun time after cylinder charging	Adjustable from 1 to 10 minutes in increments of 1 minute	2 min	
D.075	Max. cylinder charging time (domestic hot water cylinder without separate control)	Adjustable from 20 to -90 minutes in increments of 1 minute	45 minutes	
D.076	Device specific number	Device specific number = DSN, set		
D.077	DHW partial load	Adjustable cylinder charging output in kW		
D.078	Cylinder charging temperature exceeded when heating (for optional external domestic hot water cylinder only)	The set value must be at least 15 K or 15 °C above the set target cylinder temperature.	80 °C	
D.080	Operating hours, heating	In hours (h)		Not adjustable
D.081	Operating hours, domestic hot water generation	In hours (h)		Not adjustable
D.082	Number of heating cycles in heating mode x 100 (3 corresponds to 300)	Number of heating cycles		Not adjustable
D.083	Number of heating cycles in domestic hot water mode x 100 (3 corresponds to 300)	Number of heating cycles		Not adjustable
D.084	Maintenance in (number of hours until next service)	Adjustment range: 0 to 3000 hrs and --- (for deactivated)		
D.090	Status of the eBUS control	Status of the digital control (1) detected, (0) not detected		Not adjustable
D.091	Status DCF77	(0) no reception, (1) reception, (2) synchronised, (3) valid		Not adjustable
D.093	Product variant	Current Device Specific Number (DSN offset) Products with high-efficiency pump 0 = 6 kW 1 = 9 kW 2 = 12 kW 3 = 14 kW 4 = 18 kW 5 = 21 kW 6 = 24 kW 7 = 28 kW Products with two-stage pump 8 = 6 kW 9 = 9 kW 10 = 12 kW 11 = 14 kW 12 = 18 kW 13 = 21 kW 14 = 24 kW 15 = 28 kW		
D.094	Deleting the fault memory	0 = No 1 = Yes		
D.095	Software version: PeBUS participant	BMU/AI		Not adjustable
D.096	Factory setting	Reset all adjustable parameters to factory setting 0 = No 1 = Yes		

Appendix

Code	Parameter	Values or explanations	Factory setting	Own setting
D.149	Explanation for fault F.75	Defined displays for the fault analysis 0 = No fault 1 = Pump blocked 2 = Electrical pump fault 3 = Dry fire 4 = Alarm, voltage at pump is too low 5 = Pressure sensor fault 6 = No signal from the pump (PWM)		
D.152	Type of output limiter	Defines the phase for which the output has to be limited. 0 = No limit 1 = Phase 1 2 = Phase 2 3 = Phase 3 4 = All phases		
D.153	Output limiter value	Only effective if D.152 has been set. The value for the output limit in kW. This value is subtracted from the current product output in the phase(s).		
D.154	Frost protection function	Deactivation of the frost protection function (frozen component)		
D.155	Current power	The product's current output (continuously updated information)		Not adjustable

C Overview of fault codes

If a fault occurs, the display for the fault code replaces all of the other displays. "F" and the fault code appear alternately in the display.

Code	Meaning	Remedy
F.000	Interruption: Temperature sensor (NTC)	Temperature sensor (NTC) defective Temperature sensor cable (NTC) defective Plug connection at the NTC defective Plug connection at the electronics defective
F.010	Short circuit: Temperature sensor (NTC)	Plug-on sensor has a short to earth at the housing
F.013	Short circuit: Cylinder temperature sensor (NTC)	Short circuit in the cable harness Sensor defective
F.020	Safety shutdown: Safety cut-out	<ul style="list-style-type: none"> – Switch the product back on. – Bypass the safety cut-out. When the product is started up again, replace the safety cut-out. – Bypass the temperature control. When the product is started up again, replace the temperature control. – Replace the PCB. – Replace the cable harness.
F.022	Dry fire	<ul style="list-style-type: none"> – Check the product for low water pressure (< 0.06 MPa (0.6 bar)). <ul style="list-style-type: none"> – Check all of the heating system's connections for leaks. – Check that the expansion vessel works correctly. – Purge all radiators. – Increase the filling pressure of the heating installation.
F.024	Safety shutdown: Temp. incr. too fast	Pump blocked, insufficient pump output, air in product, system pressure too low, non-return valve blocked/incorrectly installed
F.049	Fault: eBUS	Short circuit on eBUS, eBUS overload or two power supplies with different polarities on the eBUS
F.063	Fault: EEPROM	Electronics defective <ul style="list-style-type: none"> – Reset the product to its factory settings (D.096).
F.070	Fault: Invalid Device Specific Number (no valid Device Specific Number detected for the display and/or electronics)	Scenario for replacing parts: Display and electronics were replaced at the same time and the Device Specific Number was not reset. Incorrect or missing coding resistor for the output range

Code	Meaning	Remedy
F.073	Fault: Water pressure sensor	Interruption/short circuit of water pressure sensor, interruption/short circuit to GND in supply line to water pressure sensor or water pressure sensor defective
F.074	Fault: Water pressure sensor Water pressure sensor signal outside correct range (too high)	Line to water pressure sensor has a short circuit to 5 V/24 V or internal fault in the water pressure sensor
F.075	Fault: Pump/water deficiency	Water pressure sensor and/or pump defective, air in the heating installation, insufficient water in the product, adjustable bypass
F.159	Short circuit: Outdoor temperature NTC sensor	Short circuit: Outdoor temperature sensor
F.161	Product frozen	Flow rate sensor measures < 3 °C. The fault is automatically reset if T °C > 4 °C. No fault is displayed if the sensor is defective.
F.162	Domestic hot water cylinder frozen	Cylinder temperature sensor measures < 3 °C. The fault is automatically reset if T °C > 4 °C. No fault is displayed if the sensor is defective.
F.180	Welded relay	The fault is displayed if a welded relay has been detected five times in a row. The fault can be deleted by switching the unit on/off. The electronics saves the fault report in the EEPROM (max. 1–5 counter). A blockage can be eliminated by resetting to factory settings (D.96).
F.181	Contactors completely welded	Welded contactors detected

D Pump status LED

LED display	Meaning	Cause	Remedy
Lighting up green	Normal operating mode	–	–
Flashing alternately red and green	Fault	Power supply too low/too high Overheating	Pump resets automatically once the fault has been eliminated.
Flashing red	Pump blocked	Pump cannot automatically reset	Manually reset the pump. Check the LED.
No display	No power supply	No power supply	Check the power supply.

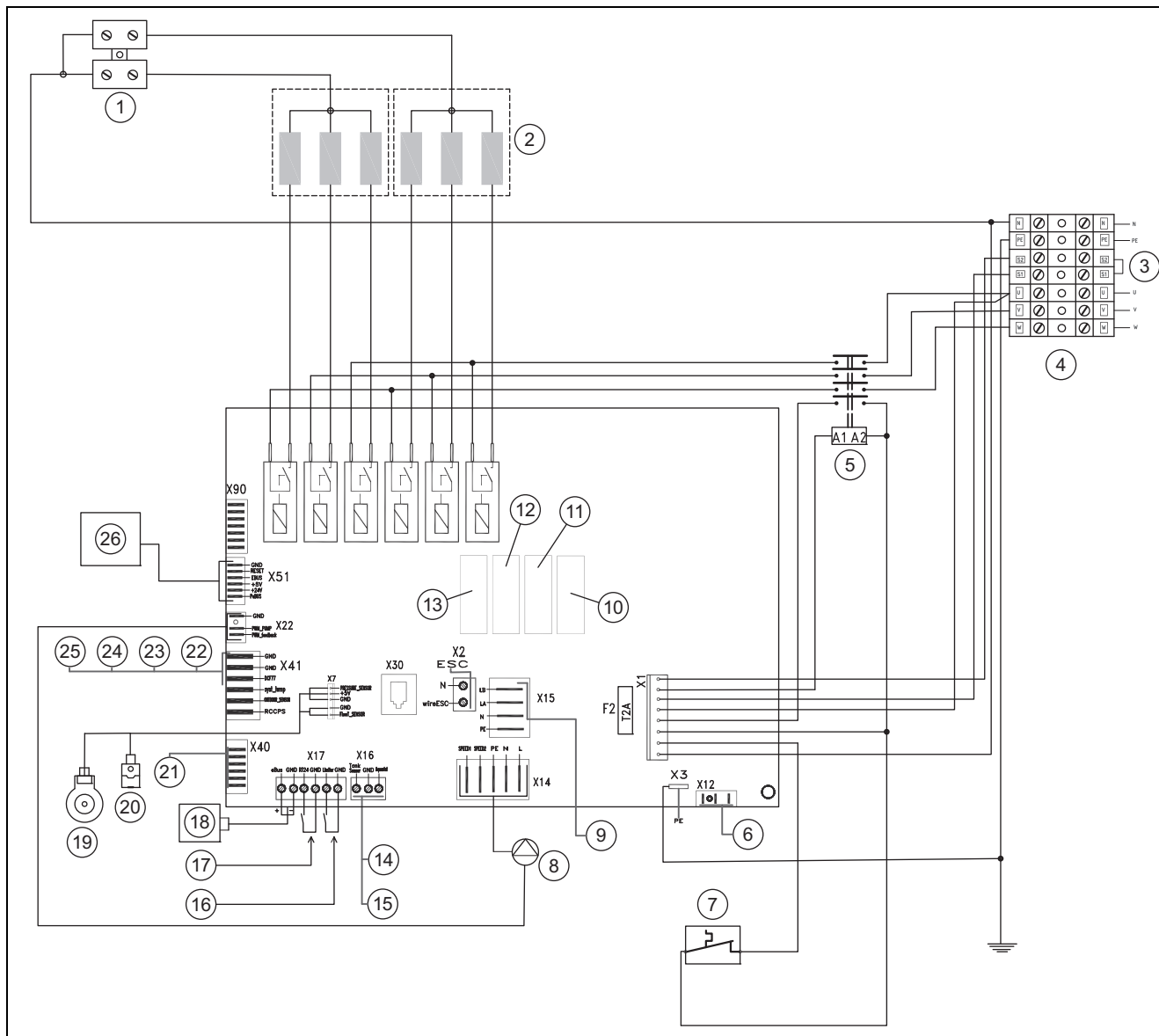
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Code	Meaning	Description
1159	Fault: Outdoor temperature sensor	The outdoor temperature sensor is defective.
1162	Frost: Domestic hot water cylinder	The temperature of the domestic hot water cylinder is too low.
1180	Product limp home mode	The product is in limp home mode. Welded relay

Appendix

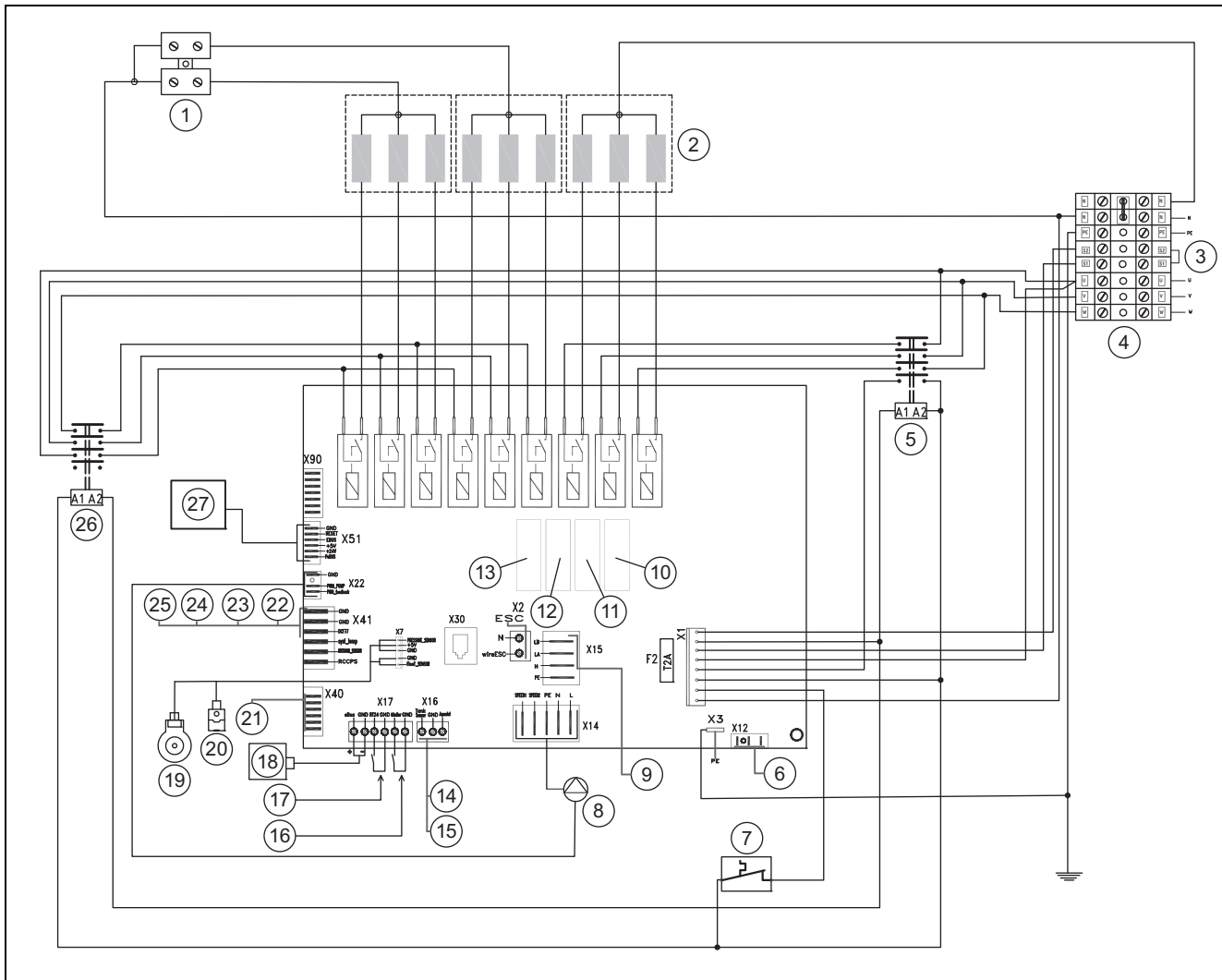
F Wiring diagrams

F.1 VE6 /14 EU I, VE9 /14 EU I, VE12 /14 EU I, VE14 /14 EU I wiring diagram



- | | | | |
|----|---|----|---|
| 1 | Connection terminal N | 14 | Cylinder temperature sensor |
| 2 | Immersion heaters 6 kW (2 x 3 kW), 9 kW (3 kW + 6 kW), 12 kW (2 x 6 kW), 14 kW (2 x 7 kW) | 15 | Cylinder thermostat |
| 3 | Limit thermostat for underfloor heating (remove the bridge when connecting) | 16 | Output limiter |
| 4 | Power supply – main connection block | 17 | Room temperature control |
| 5 | Contactor 1 | 18 | eBUS connection |
| 6 | Power supply for external VR 40 module | 19 | Pressure sensor |
| 7 | Safety cut-out | 20 | Temperature sensor |
| 8 | Heating pump | 21 | Signal connection for external VR 40 module |
| 9 | Connection for 3-port diverter valve | 22 | DCF 77 |
| 10 | RE 14 – relay for heating pump | 23 | System temperature sensor |
| 11 | RE 15 – 3-port diverter valve | 24 | Outdoor temperature sensor |
| 12 | RE 16 – relay for contactor | 25 | Circulation pump remote control |
| 13 | RE 13 – relay for two-stage pump (non-EU) | 26 | User interface connection |

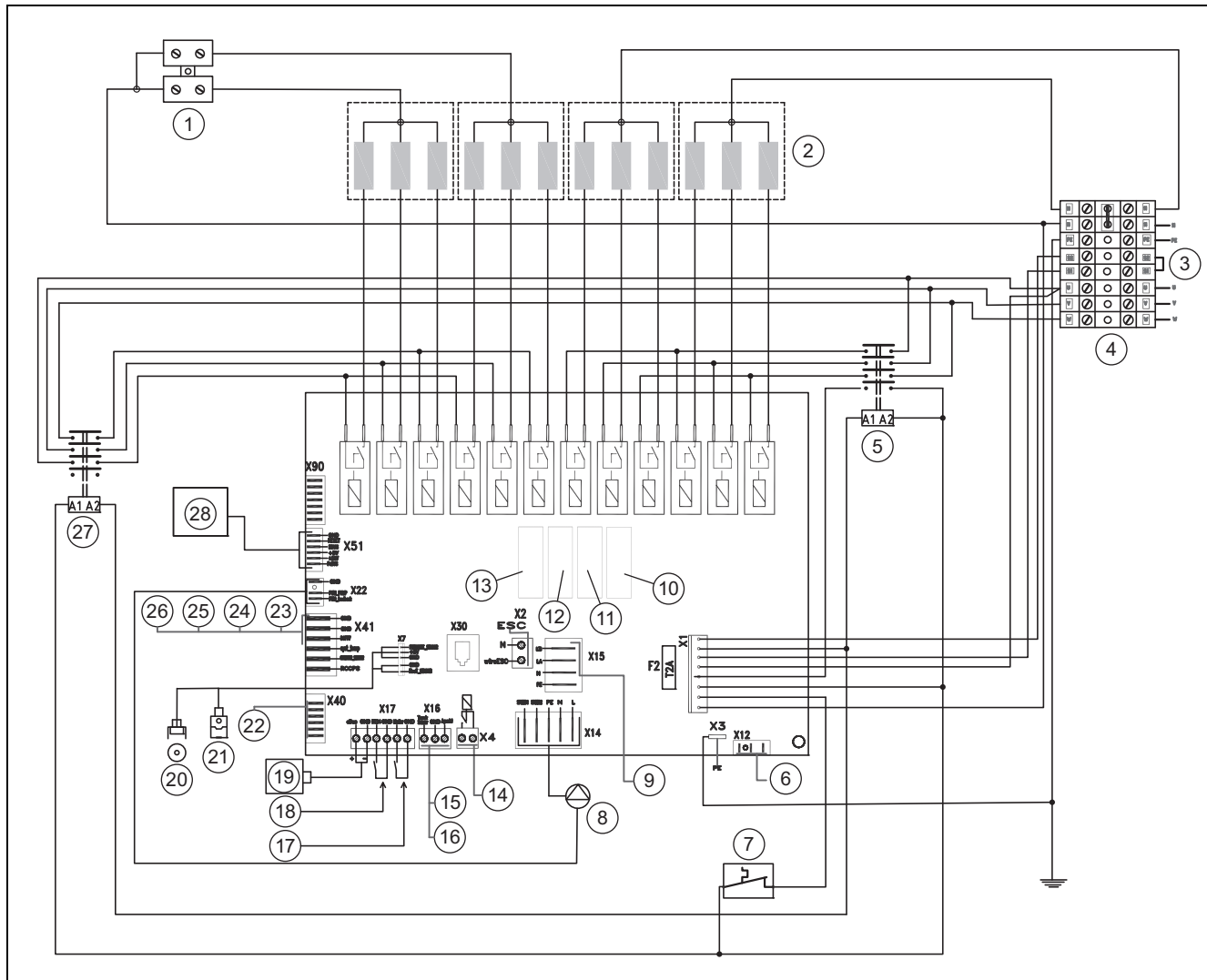
F.2 VE18 /14 EU I, VE21 /14 EU I wiring diagram



- | | | | |
|----|---|----|---|
| 1 | Connection terminal N | 14 | Cylinder temperature sensor |
| 2 | 18 kW (3 x 6 kW), 21 kW (3 x 7 kW) immersion heaters | 15 | Cylinder thermostat |
| 3 | Limit thermostat for underfloor heating (remove the bridge when connecting) | 16 | Output limiter |
| 4 | Power supply – main connection block | 17 | Room temperature control |
| 5 | Contactor 1 | 18 | eBUS connection |
| 6 | Power supply for external VR 40 module | 19 | Pressure sensor |
| 7 | Safety cut-out | 20 | Temperature sensor |
| 8 | Heating pump | 21 | Signal connection for external VR 40 module |
| 9 | Connection for 3-port diverter valve | 22 | DCF 77 |
| 10 | RE 14 – relay for heating pump | 23 | System temperature sensor |
| 11 | RE 15 – 3-port diverter valve | 24 | Outdoor temperature sensor |
| 12 | RE 16 – relay for contactor | 25 | Circulation pump remote control |
| 13 | RE 13 – relay for two-stage pump (non-EU) | 26 | Contactor 2 |
| | | 27 | User interface connection |

Appendix

F.3 VE24 /14 EU I, VE28 /14 EU I wiring diagram

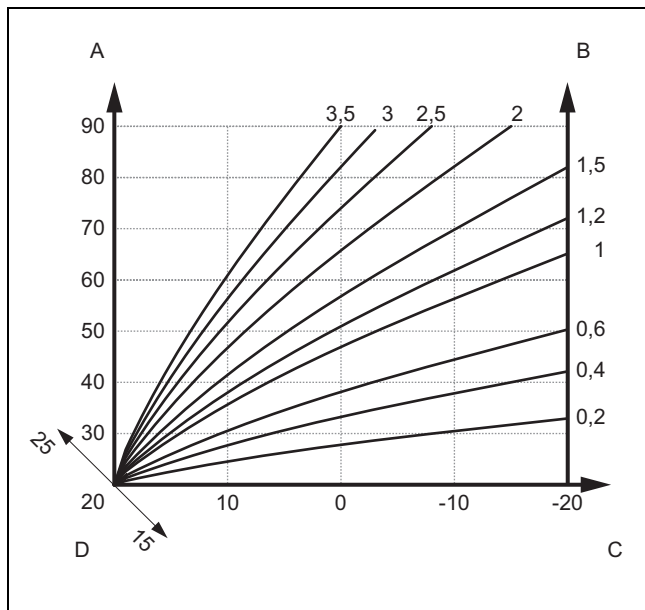


- | | | | |
|----|---|----|---|
| 1 | Connection terminal N | 15 | Cylinder temperature sensor |
| 2 | 24 kW (4 x 6 kW), 28 kW (4 x 7 kW) immersion heaters | 16 | Cylinder thermostat |
| 3 | Limit thermostat for underfloor heating (remove the bridge when connecting) | 17 | Output limiter |
| 4 | Power supply – main connection block | 18 | Room temperature control |
| 5 | Contactors 1 | 19 | eBUS connection |
| 6 | Power supply for external VR 40 module | 20 | Pressure sensor |
| 7 | Safety cut-out | 21 | Temperature sensor |
| 8 | Heating pump | 22 | Signal connection for external VR 40 module |
| 9 | Connection for 3-port diverter valve | 23 | DCF 77 |
| 10 | RE 14 – relay for heating pump | 24 | System temperature sensor |
| 11 | RE 15 – 3-port diverter valve | 25 | Outdoor temperature sensor |
| 12 | RE 16 – relay for contactor | 26 | Circulation pump remote control |
| 13 | RE 13 – relay for two-stage pump (non-EU) | 27 | Contactors 2 |
| 14 | Cascade connection | 28 | User interface connection |

G Inspection and maintenance work – Overview

Work	To be carried out in general	To be carried out as required
Function check		
Check that the product is functioning correctly and check the technical parameters.	X	
Checking the hydraulics		
Check the filling pressure of the heating installation and top up with water, if necessary.	X	X
Check the pre-charge pressure of the expansion vessel and increase the pressure, if necessary.	X	
Check the purging valve, the expansion relief valve, the 3-way diverter valve, the heat exchanger and all of the hydraulic components.	X	
Safety test		
Check all of the sensors, thermostats and safety components.	X	
Checking the construction		
Check that all of the screws and connections are seated firmly.	X	
Checking the electrical installation		
Check the electrical components, the wiring and the connection cable. Tighten the screw terminals, if necessary.	X	
Rectify any faults discovered.		X

H Heat curves



A: Flow temperature in °C

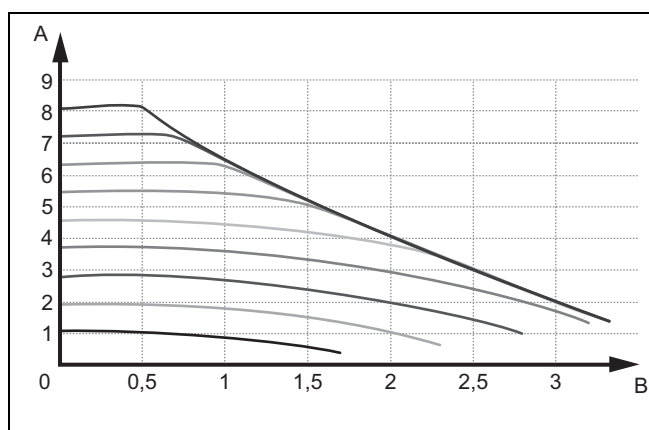
B: Heat curves

C: Outdoor temperature in °C

D: Target room temperature

Appendix

I Remaining feed head



A Remaining feed head [mCe] [98.07 mbar]

B Flow rate quantity [m³/h]

J Characteristic values of the VRC DCF outdoor temperature sensor

Temperature (°C)	Resistance (ohms)
-25	2167
-20	2067
-15	1976
-10	1862
-5	1745
0	1619
5	1494
10	1387
15	1246
20	1128
25	1020
30	920
35	831
40	740

K Characteristic values of internal temperature sensors

Temperature (°C)	Resistance (ohms)
-40	327344
-35	237193
-30	173657
-25	128410
-20	95862
-15	72222
-10	54892
-5	42073
0	32510
5	25316
10	19862
15	15694
20	12486
25	10000
30	8060

Temperature (°C)	Resistance (ohms)
35	6535
40	5330
45	4372
50	3605
55	2989
60	2490
65	2084
70	1753
75	1481
80	1256
85	1070
90	916
95	786
100	678
105	586
110	509
115	443
120	387
125	339
130	298
135	263
140	232
145	206
150	183
155	163

L Technical data

Technical data – General

	VE 6 /14 EU I	VE 9 /14 EU I	VE 12 /14 EU I	VE 14 /14 EU I
Operating pressure, max.	300 kPa (3,000 mbar)	300 kPa (3,000 mbar)	300 kPa (3,000 mbar)	300 kPa (3,000 mbar)
Expansion vessel capacity	8 l	8 l	8 l	8 l
Flow/return heating connections	G 3/4	G 3/4	G 3/4	G 3/4
Boiler dimension, width	410 mm	410 mm	410 mm	410 mm
Boiler dimension, height	740 mm	740 mm	740 mm	740 mm
Unit dimensions, depth	315 mm	315 mm	315 mm	315 mm
Approx. net weight	24.0 kg	24.0 kg	24.0 kg	25.0 kg

	VE 18 /14 EU I	VE 21 /14 EU I	VE 24 /14 EU I	VE 28 /14 EU I
Operating pressure, max.	300 kPa (3,000 mbar)	300 kPa (3,000 mbar)	300 kPa (3,000 mbar)	300 kPa (3,000 mbar)
Expansion vessel capacity	8 l	8 l	8 l	8 l
Flow/return heating connections	G 3/4	G 3/4	G 3/4	G 3/4
Boiler dimension, width	410 mm	410 mm	410 mm	410 mm
Boiler dimension, height	740 mm	740 mm	740 mm	740 mm
Unit dimensions, depth	315 mm	315 mm	315 mm	315 mm
Approx. net weight	25.0 kg	26.0 kg	27.0 kg	27.0 kg

Appendix

Technical data – Heating

	VE 6 /14 EU I	VE 9 /14 EU I	VE 12 /14 EU I	VE 14 /14 EU I
Heating adjustment range	25 to 85 °C	25 to 85 °C	25 to 85 °C	25 to 85 °C
Domestic hot water adjustment range (with external cylinder)	35 to 70 °C	35 to 70 °C	35 to 70 °C	35 to 70 °C
Safety overheat cut-off device	95 °C	95 °C	95 °C	95 °C
Nominal volume flow (at $\Delta T = 10$ K)	516 l/h	774 l/h	1,032 l/h	1,204 l/h
Pump remaining feed head (at $\Delta T = 10$ K)	45 kPa (450 mbar)	40 kPa (400 mbar)	34.5 kPa (345.0 mbar)	30 kPa (300 mbar)
Number of immersion heaters (pcs x kW)	2 x 3	1 x 3 and 1 x 6	2 x 6	2 x 7

	VE 18 /14 EU I	VE 21 /14 EU I	VE 24 /14 EU I	VE 28 /14 EU I
Heating adjustment range	25 to 85 °C	25 to 85 °C	25 to 85 °C	25 to 85 °C
Domestic hot water adjustment range (with external cylinder)	35 to 70 °C	35 to 70 °C	35 to 70 °C	35 to 70 °C
Safety overheat cut-off device	95 °C	95 °C	95 °C	95 °C
Nominal volume flow (at $\Delta T = 10$ K)	1,548 l/h	1,806 l/h	2,064 l/h	2,408 l/h
Pump remaining feed head (at $\Delta T = 10$ K)	24 kPa (240 mbar)	20 kPa (200 mbar)	16.5 kPa (165.0 mbar)	11 kPa (110 mbar)
Number of immersion heaters (pcs x kW)	3 x 6	3 x 7	4 x 6	4 x 7

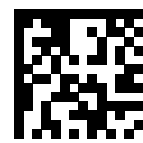
Technical data – Electrics

	VE 6 /14 EU I	VE 9 /14 EU I	VE 12 /14 EU I	VE 14 /14 EU I
Electrical connection	3 x 230 V/400 V + N + PE, 50 Hz	3 x 230 V/400 V + N + PE, 50 Hz	3 x 230 V/400 V + N + PE, 50 Hz	3 x 230 V/400 V + N + PE, 50 Hz
Protection class	IP40	IP40	IP40	IP40
Heating output	6 kW	9 kW	12 kW	14 kW
Power consumption, max.	3 x 9.5 A	3 x 14 A	3 x 18.5 A	3 x 23 A
Circuit stage	1.0 kW	1.0 kW	2.0 kW	2.3 kW
Nominal current rating for the fuse	10 A	16 A	20 A	25 A

	VE 18 /14 EU I	VE 21 /14 EU I	VE 24 /14 EU I	VE 28 /14 EU I
Electrical connection	3 x 230 V/400 V + N + PE, 50 Hz	3 x 230 V/400 V + N + PE, 50 Hz	3 x 230 V/400 V + N + PE, 50 Hz	3 x 230 V/400 V + N + PE, 50 Hz
Protection class	IP40	IP40	IP40	IP40
Heating output	18 kW	21 kW	24 kW	28 kW
Power consumption, max.	3 x 27.5 A	3 x 32 A	3 x 36.5 A	3 x 43 A
Circuit stage	2.0 kW	2.3 kW	2.0 kW	2.3 kW
Nominal current rating for the fuse	32 A	40 A	40 A	50 A

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