

For the competent person

Installation and maintenance instructions



ecoFIT sustain

825 - 835

GB, IE

Publisher/Manufacturer

Vaillant GmbH

Berghauser Str. 40 ■ D-42859 Remscheid
Tel. +49 21 91 18-0 ■ Fax +49 21 91 18-2810
info@vaillant.de ■ www.vaillant.de



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1 Safety



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 Risk caused by inadequate qualifications

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

- Assembly
- Disassembly
- Installation
- Start-up
- Maintenance
- Repair
- Decommissioning
- ▶ Observe all instructions that are included with the product.
- ▶ Proceed in accordance with the current state of technology.
- ▶ Observe all applicable directives, standards, laws and other regulations.

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.

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.

1.4 General safety information

1.4.1 Risk of death from escaping gas

What to do if you smell gas in the building:

- ▶ Avoid rooms that smell of gas.
- ▶ If possible, open doors and windows fully and ensure adequate ventilation.
- ▶ Do not use naked flames (e.g. lighters, matches).
- ▶ Do not smoke.
- ▶ Do not use any electrical switches, mains plugs, doorbells, telephones or other communication systems in the building.
- ▶ If it is safe to do so, 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.
- ▶ Notify the gas supply company or the National Grid +44 (0) 800 111999 by telephone once you are outside of the building.

1.4.2 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.

1.4.3 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.

1.4.4 Risk of death due to explosive and flammable materials

- ▶ Do not use or store explosive or flammable materials (e.g. petrol, paper, paint) in the installation room of the product.

1.4.5 Risk of death from electric shock

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

Before commencing work on the product:

- ▶ Unplug the mains plug.
- ▶ Or disconnect the product from the power supply by switching off all power supplies (electrical partition with a contact opening of at least 3 mm, e.g. fuse or line protection switch).

- ▶ Secure against being switched back on again.
- ▶ Wait for at least 3 minutes until the condensers have discharged.

1.4.6 Risk of death due to lack of safety devices

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

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

1.4.7 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.

1.4.8 Risk of being burned or scalded by hot components

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

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

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

1.4.10 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.
- ▶ If you are installing the product in hairdressing salons, painter's or joiner's workshops, cleaning businesses or similar





1 Safety

locations, choose a separate installation room in which the room air is technically free of chemical substances.

1.4.11 Risk of material damage caused by leak detection sprays and liquids

Leak detection sprays and liquids block the filter of the mass flow sensor on the Venturi, and thus destroy the mass flow sensor.

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

1.4.12 Risk of material damage caused by frost

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

1.4.13 Risk of material damage caused by using an unsuitable tool

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

1.5 Regulations (directives, laws, standards)

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



2 Notes on the documentation

2.1 Observing other applicable documents

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

2.2 Storing documents

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

2.3 Validity of the instructions

These instructions apply only to:

Product article number

	Article number	Gas Council Number
VUW 256/6-3 (H-GB)	0010020392	47-044-71
VUW 306/6-3 (H-GB)	0010020393	47-044-72
VUW 356/6-3 (H-GB)	0010020394	47-044-73

2.4 Benchmark

Vaillant is a licensed member of the Benchmark Scheme.

Benchmark places responsibilities on both manufacturers and installers. The purpose is to ensure that customers are provided with the correct equipment for their needs, that it is installed, commissioned and serviced in accordance with the manufacturer's instructions by a competent person approved at the time by the Health and Safety Executive and that it meets the requirements of the appropriate Building Regulations. The Benchmark Checklist can be used to demonstrate compliance with Building Regulations and should be provided to the customer for future reference.

Installers are required to carry out installation, commissioning and servicing work in accordance with the Benchmark Code of Practice which is available from the Heating and Hotwater Industry Council who manage and promote the Scheme.

Benchmark is managed and promoted by the Heating and Hotwater Industry Council.



For more information visit www.centralheating.co.uk

3 Product description

3.1 Compartment Ventilation

The boilers are very high efficiency appliances.




As a consequence the heat loss from the appliance casing during operation is very low.

Compartment ventilation is not required as the products are only certified, and can only be fitted with a concentric flue system.


3.2 Information on the identification plate

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

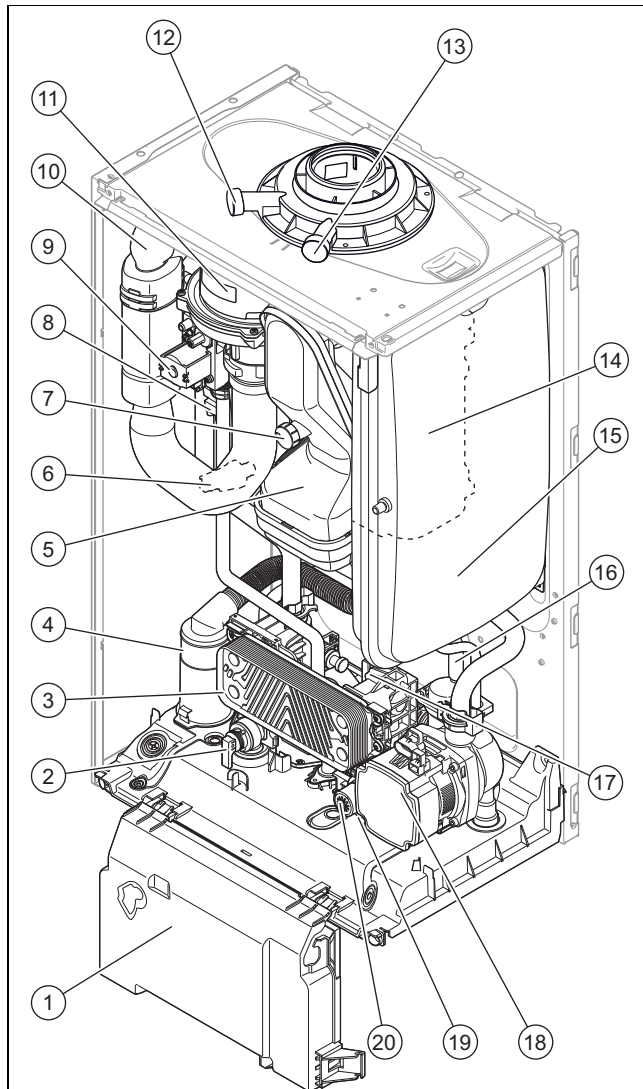
The identification plate keeps record of the country in which the product is to be installed.

Information on the identification plate	Meaning
	Barcode with serial number
Serial number	For quality control purposes; 3rd and 4th digits = year of production For quality control purposes; 5th and 6th digits = week of production For identification purposes; 7th to 16th digits = product article number For quality control purposes; 17th to 20th digits = place of manufacture
ecoFIT sustain 8..	Product designation
2H, G20 – 2 kPa (20 mbar)	Factory setting for type of gas and gas connection pressure
Cat.	Unit category
Condensing technology	Efficiency class of the boiler in accordance with EC Directive 92/42/EEC
Type: Xx3(x)	Permissible flue gas connections
PMS	Maximum water pressure in heating mode
PMW	Maximum water pressure in hot water handling mode
V/Hz	Electrical connection
W	Max. electrical power consumption
IP	Level of protection
	Heating mode
	Hot water generation
Pn	Nominal heat output range in heating mode
Pnc	Nominal heat output range in heating mode (condensing technology)
P	Nominal heat output range in hot water handling mode
Qn	Nominal heating load range in heating mode
Qnw	Nominal heating load range in hot water handling mode
T _{max.}	Max. flow temperature
NOx	NOx class for the product
Code (DSN)	Specific product code

4 Assembly

Information on the identification plate	Meaning
	Read the instructions.
GC no.	Gas council number

3.3 Functional elements: Combination unit



1 Electronics box	12 Supply air measuring stub pipe (for upper flue gas connection)
2 Heating circuit expansion relief valve	13 Flue gas analysis point (for upper flue gas connection)
3 Plate heat exchanger	14 Primary heat exchanger
4 Condensate siphon	15 Heating expansion vessel
5 Flue gas pipe	16 Purge hose
6 Pressure sensor	17 Volume flow sensor
7 Flue gas analysis point (for rear flue gas connection)	18 Heating pump
8 Ignition transformer	19 Bypass
9 Gas valve	20 3-way valve
10 Air intake pipe	
11 Fan	

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 Assembly

4.1 Transporting the unit

Important: With regard to the regulations of 1992 concerning the manual handling of loads, the unit exceeds the weight that can be lifted by a single person.

4.1.1 General

- ▶ Hold the load as close as possible to your body. Avoid rotational movements. Instead, reposition your feet.
- ▶ If the unit is being lifted by two persons, ensure your movements are coordinated during lifting.
- ▶ Avoid bending your upper body – do not lean forwards or to the side.
- ▶ Wear suitable non-slip protective gloves in order to protect your hands against sharp edges. Ensure that you are carrying the load securely.
- ▶ If required, get somebody to assist you in this.

4.1.2 Unloading the box from the delivery van

- ▶ It is recommended that two people lift the unit together.
- ▶ Lift the box using the straps provided.
- ▶ Use safe lifting techniques – keep your back straight and bend your legs at the knee.
- ▶ Hold the load as close as possible to your body.
- ▶ If the unit is being lifted by two persons, ensure your movements are coordinated during lifting.
- ▶ If required, get somebody to assist you in this.

4.2 Unpacking the product

1. Remove the product from its box.
2. Remove the protective film from all of the product's components.

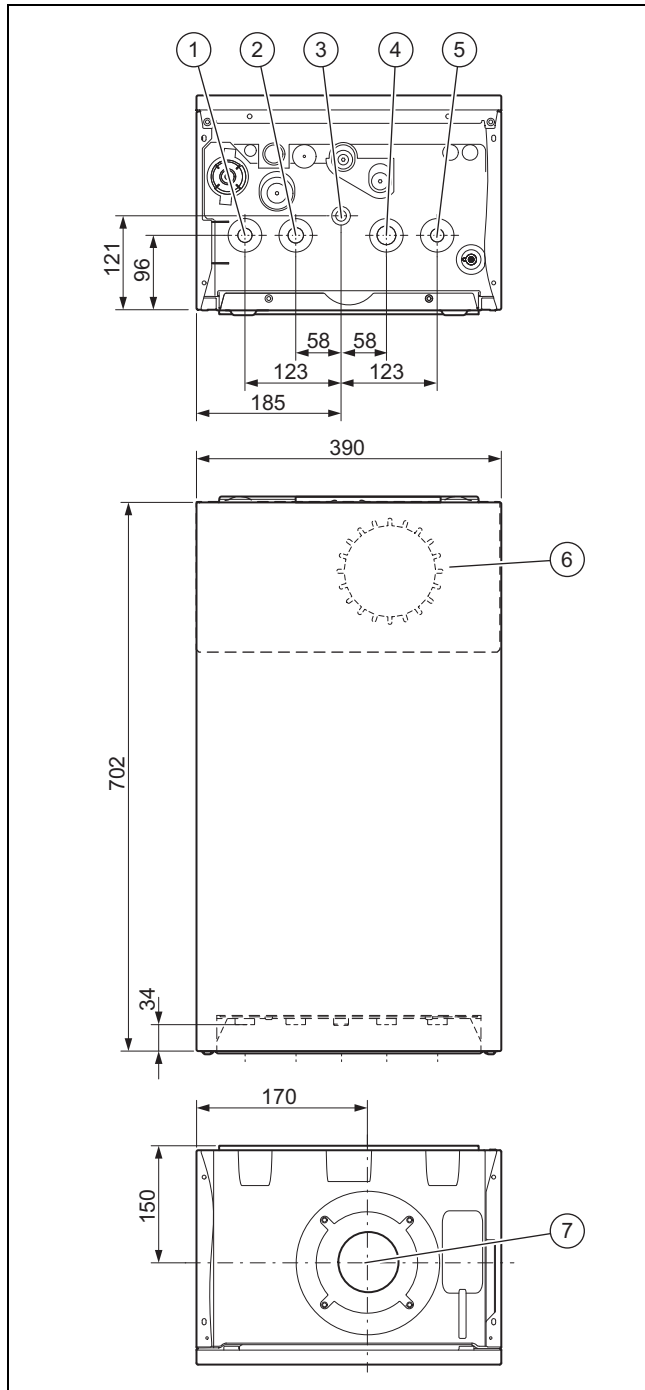
4.3 Checking the scope of delivery

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

Quantity	Description
1	Heat generator
1	Hanging bracket
1	Flexible condensate drain pipework
6	3/4" seals
4	1/2" seals
2	Service valve (heating flow and return)
1	Hot water connection service valve
1	Gas isolator cock

Quantity	Description
2	Connection pipe (heating flow and return)
1	Cold water connection pipe
1	Hot water connection pipe
1	Gas pipe
1	Expansion relief valve discharge pipe
1	Installation template
1	Enclosed documentation

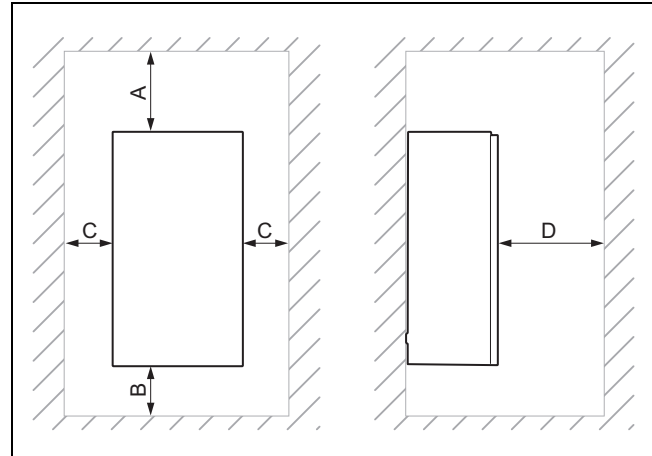
4.4 Dimensions



- | | | | |
|---|----------------------|---|-----------------------|
| 1 | Heating flow | 3 | Gas connection |
| 2 | Hot water connection | 4 | Cold water connection |

- | | | | |
|---|---|---|--|
| 5 | Heating return | 7 | Connection on the top of the air/flue pipe |
| 6 | Connection on the back of the air/flue pipe | | |

4.5 Minimum clearances



	Minimum clearance
A	150 mm (upper air/flue gas connection) 20 mm (air/flue gas connection on the rear)
B	150 mm
C	5 mm (70 mm if the side panels ought to be removed)
D	600 mm

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

4.6 Clearance from combustible components

It is not necessary to maintain a clearance between the product and components made of combustible materials that go beyond the minimum clearances (→ Page 9).

4.7 Using the installation template

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

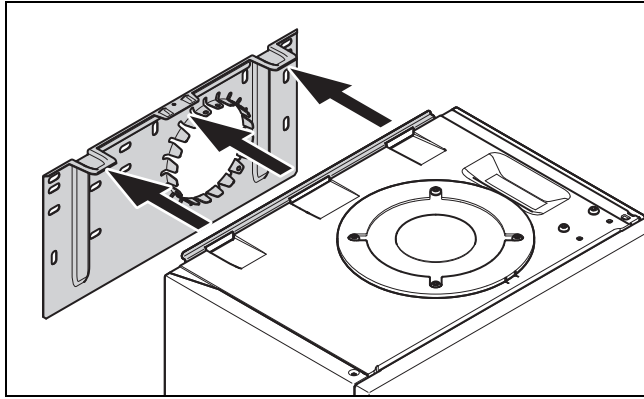
4.8 Wall-mounting the product



Note

If you are using the rear air/flue gas connection, install the air/flue pipe before you wall-mount the product.

4 Assembly



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

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

- ▶ Wall-mount the product as described.

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

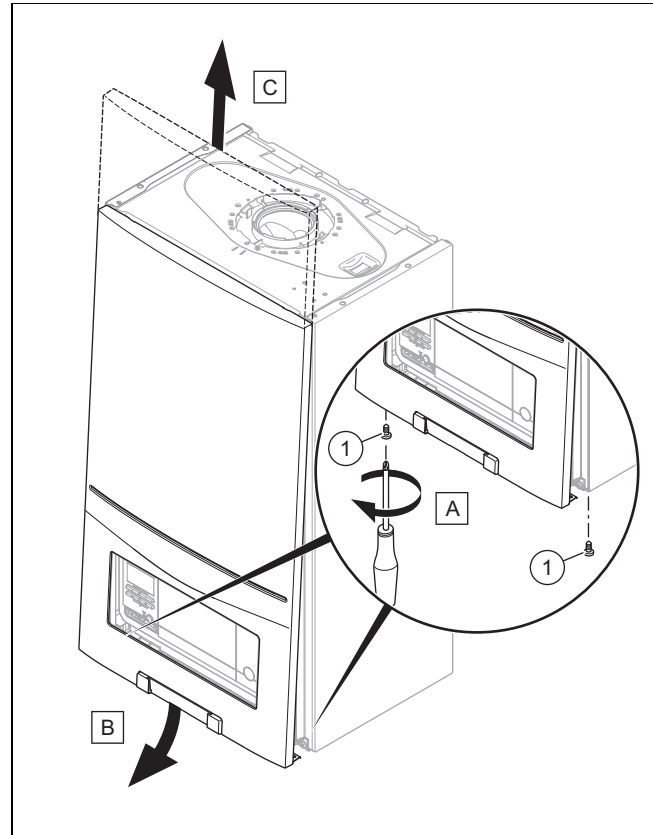
- ▶ Ensure that wall-mounting apparatus on-site has a sufficient load-bearing capacity. Use individual stands or primary walling, for example.
- ▶ Do not wall-mount the product if you cannot provide wall-mounting apparatus with a sufficient load-bearing capacity.

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

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

4.9 Removing/installing the front casing

4.9.1 Removing the front casing



1. Undo the two screws (1).
2. Gently press the front casing backwards in the centre so that the latching lug is released.
3. Pull the front casing forwards at the bottom edge.
4. Lift the front casing upwards from the bracket.

4.9.2 Installing the front casing

- ▶ Refit the components in the reverse order.

4.10 Removing/installing the side section

4.10.1 Removing the side section



Caution.

Risk of material damage caused by mechanical deformation.

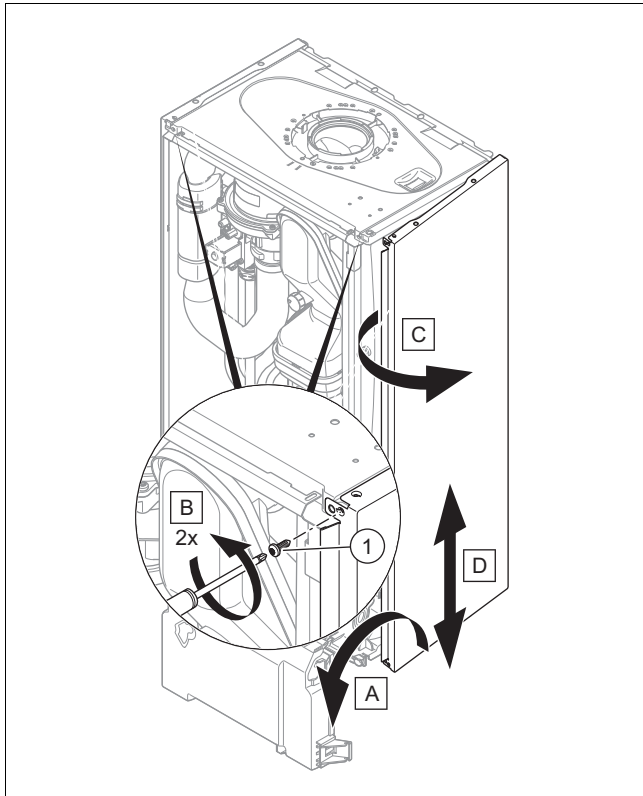
Removing **both** side sections may cause mechanical distortion in the product, which may cause damage to the piping, for example, and potentially result in leaks.

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



Note

If there is sufficient lateral clearance (at least 70 mm), you can remove the side section to facilitate maintenance or repair work.



1. Tilt the electronics box forward.
2. Hold on to the side section so that it cannot fall and unscrew both screws (1), one from the top and one from the bottom.
3. Tilt the side section to the outside and move it downwards and out.

4.10.2 Installing the side section

- ▶ Refit the components in the reverse order.

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 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.

5.1 Checking the gas meter

- ▶ Make sure that the existing gas meter is capable of passing the rate of gas supply required.

5.2 Gas and water connections



Caution.
Risk of damage caused by incorrect gas connection installation.

Excess test pressure or operating pressure may cause damage to the gas valve.

- ▶ Check the leak-tightness of the gas valve using a maximum pressure of 11 kPa (110 mbar).



Caution.
Risk of material damage caused by corrosion

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

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



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

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

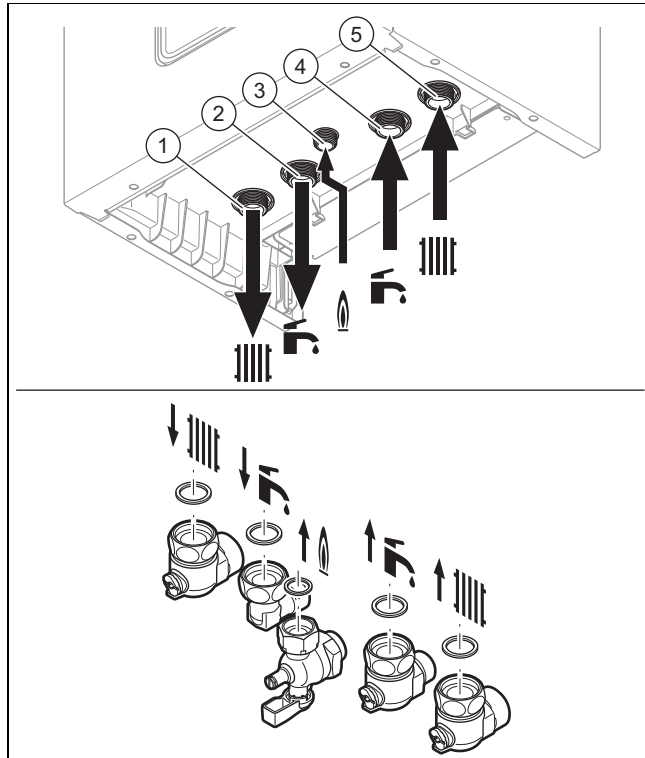


Note
Apply thermal insulation to the water pipes to the boiler outlet and to the system.

Preliminary work

1. Check that the system volume and the volumetric capacity of the expansion vessel are compatible.
 - ▽ If the volume of the expansion vessel is insufficient for the system.
 - ▶ Install an additional expansion vessel in the heating return, as close to the product as possible.
 - ▶ Install a non-return flap at the product's outlet (heating flow).
2. Ensure that the system has the following components:
 - A cold water stop cock for the unit
 - A gas stopcock for the unit
 - A filling and draining device in the heating installation

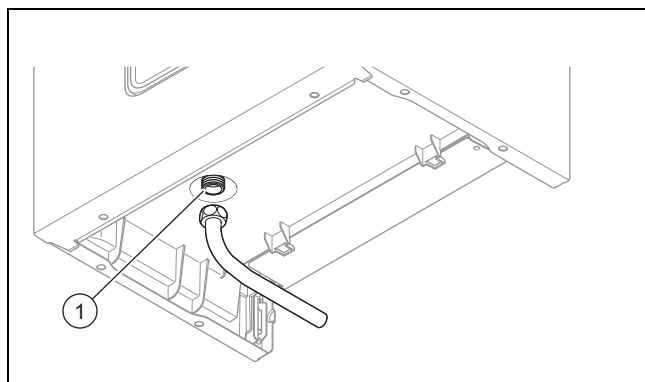
5 Installation



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

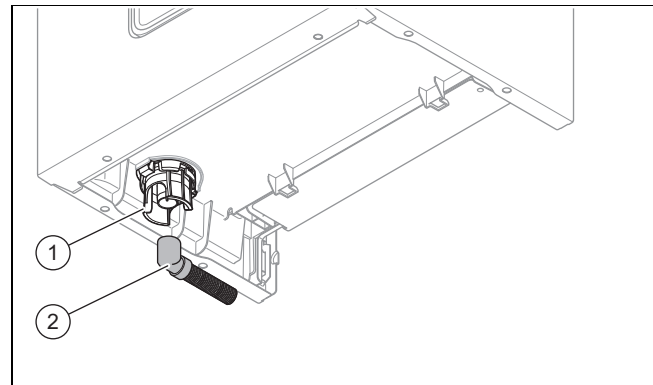
1. Connect the water and gas connections in accordance with the applicable standards.
2. Purge the gas line before start-up.
3. Check whether the connections (→ Page 19) are leak-tight.

5.3 Connecting the drain line for the expansion relief valve



- ▶ Ensure that the pipeline is visible.
- ▶ The pipe must have a continuous fall and be routed to a position so that any discharge of water, possibly boiling, or steam cannot create any danger to persons, damage to property or external electrical components and wiring.
- ◀ The components must be set up in such a way that you can see the water flowing out.

5.4 Connecting the condensate drain pipework



- ▶ Follow the instructions listed here and observe directives and local regulations on condensed water discharge.
- ▶ Use PVC or another material that is suitable for draining the non-neutralised condensed water.
- ▶ If you cannot guarantee that the materials from which the drain lines are made are suitable, install a system for neutralising the condensate.



Note

The condensate drain pipework must have a continuous fall (45 mm per metre) and should whenever possible terminate at a suitable drain point within the heated envelope of the building that will remain frost free under long periods of low external temperatures.

- ▶ Connect the condensate siphon (1). Use the supplied drain hose (2) for this.
- ▶ Connect a condensate discharge pipe (21.5 mm, not included in the scope of delivery) to the drain hose (2).
- ▶ During installation remove all burrs from inside of cut pipe work and avoid excessive adhesive which may trap small pockets of water close to the pipe wall which can freeze and build into a larger ice plug.
- ▶ As with other pipe work insulate the condensate discharge pipe to minimise any risk of freezing and beware when crossing cavities that the fall is maintained and the pipe sleeved.

You can find further information in specification "BS 6798" for installing and maintaining gas-fired boilers with a nominal heat loading under 70 kW.

5.5 Electrical installation



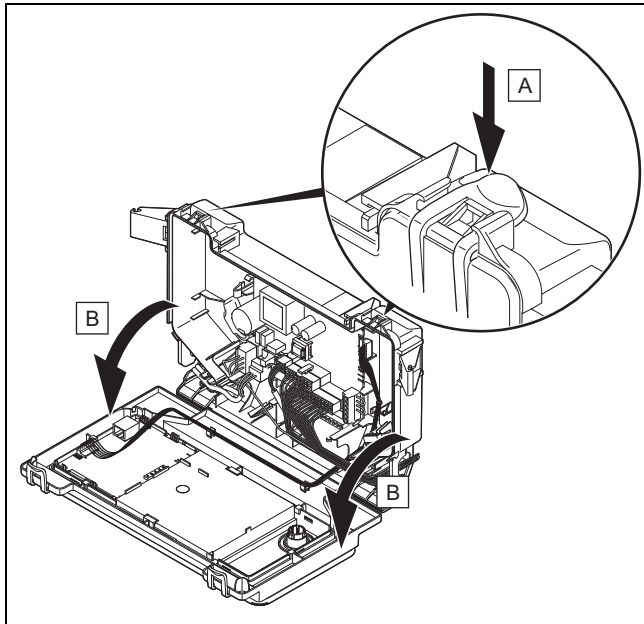
Danger!

Risk of death from electric shock!

The power supply terminals L and N remain live even if the product is switched off:

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

5.5.1 Opening the electronics box

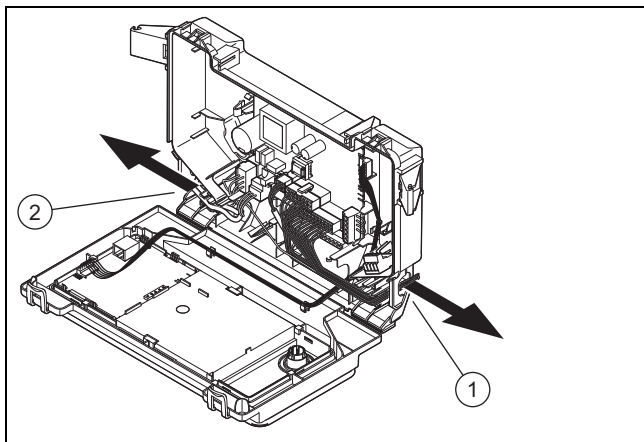


► Follow the instructions in the specified sequence.

5.5.2 Closing the electronics box

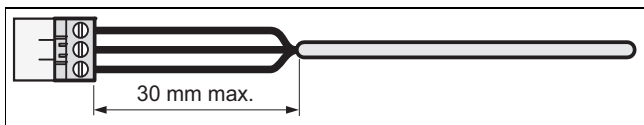
► Follow the instructions in the reverse order.

5.5.3 Cable route



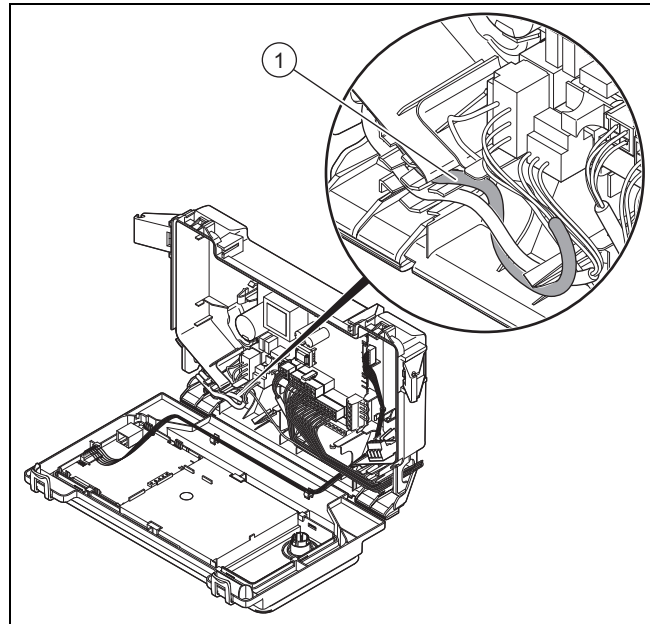
1 24-V eBUS cable route 2 230-V eBUS cable route

5.5.4 Carrying out the wiring

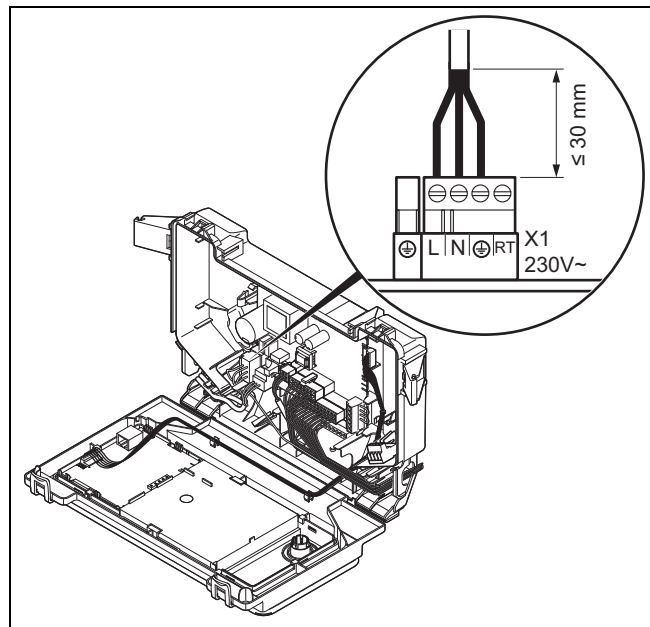


1. Shorten the connection cables to the appropriate lengths to prevent them from causing damage inside the electronics box.
2. Screw the plug to the connection cable.
3. Plug the plug into the slot provided on the PCB.

5.5.5 Establishing the power supply



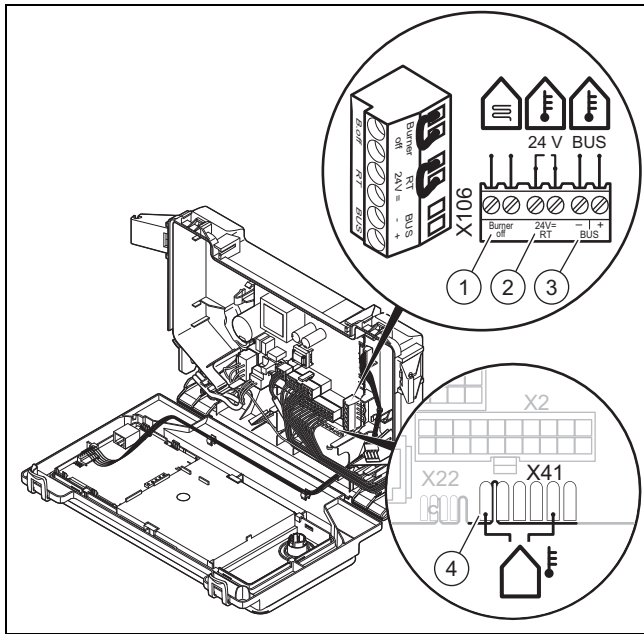
1. Observe all valid regulations.
2. Ensure that the rated mains voltage is 230 V.
3. Set up a fixed connection and install a partition with a contact opening of at least 3 mm (e.g. fuses or power switches).
4. Provide one common electricity supply for the boiler and for the corresponding controller:
 - Power supply: Single-phase, 230 V, 50 Hz
 - Fuse protection: ≤ 3 A
5. Open the electronics box. (→ Page 13)
6. Observe the routing of the power supply cable (1) in the electronics box in order to guarantee that there is no strain.



7. Carry out the wiring. (→ Page 13)
8. Close the electronics box.
9. Make sure that access to the mains connection is always available and is not covered or blocked.

6 Operation

5.5.6 Connecting controllers to the electronic system



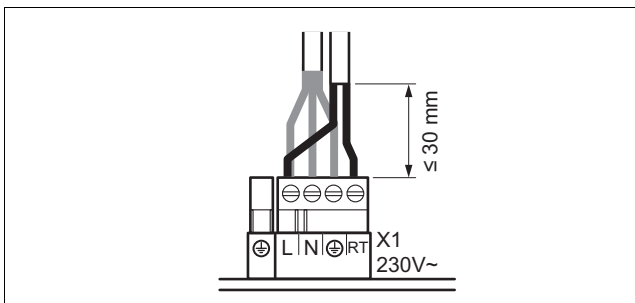
- | | | | |
|---|--|---|--|
| 1 | Safety thermostat for floor-standing heating | 3 | eBUS controller or radio receiver unit |
| 2 | 24 V controller | 4 | Outside temperature sensor, wired |

1. Open the electronics box. (→ Page 13)
2. Carry out the wiring. (→ Page 13)
3. Connect the individual components depending on the type of installation.

Conditions: If installing a multi-circuit controller.

- Change the pump's operating mode **d.18** from Eco (intermittently operating pump) to Comfort (continuously operating pump).

Conditions: When connecting a controller (230 V).



- Connect the controller to the main plug.
- Remove the bridge from the plug **24V=RT**.

Conditions: 230 V 3-wire connection

- Ensure that the controller is designed for a maximum rated current of 7 A.
- Connect the controller to the main plug X1.
 - Terminal assignment: L - line, N - neutral conductor, ⊕ - earth
- Draw the operator's attention to the fact that the following features are present with this type of installation.
 - ◁ The frost protection function is deactivated. If the product is installed in a room where there is a risk of frost and it has not been protected by a room ther-

mostat, install an additional frost protection thermostat.

- ◁ The pump programmes are not active.
- ◁ If the product is switched off, the display is switched off.
- ◁ Each time the unit is started, the fan runs for 20 seconds.
- ◁ Residual heat in the heating return may result in the product blocking the burner for 10 minutes.

4. Close the electronics box.

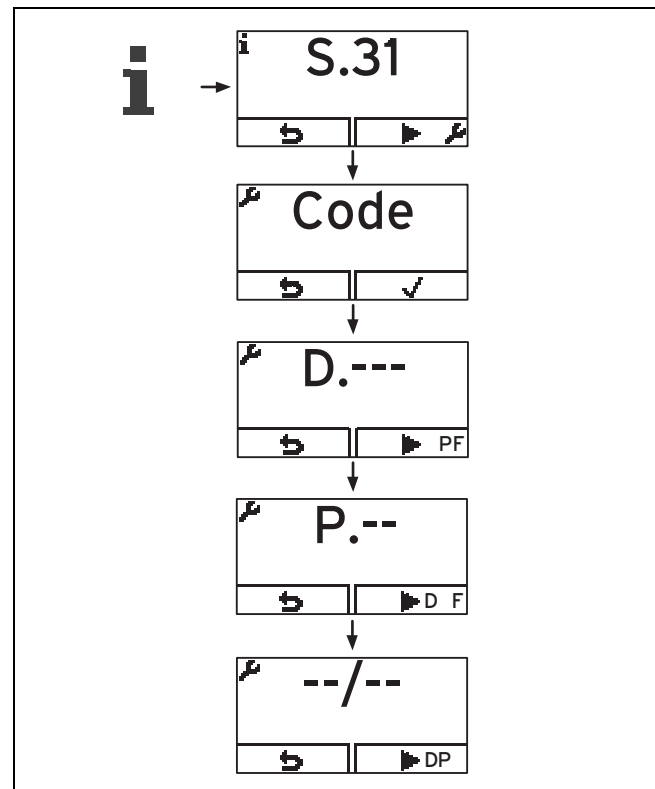
6 Operation

6.1 Operating concept

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

An overview of the display and setting options in the installer level can be found in the section "Overview of the installer level". (→ Page 14)

6.2 Installer level overview



6.3 Calling up the installer level

1. Only call up the installer level if you are a competent person.
2. Press and ("I") at the same time.
 - ◀ **S.xx** appears in the display (current unit status).
3. Press to access the installer level.
 - ◀ **Code** and **--** appear in the display.
4. Set the value **17** (code) and confirm by pressing .
5. Press to access the check programmes (**P**) and the fault codes (**F**) and to return to the diagnostics codes (**D**).
6. Use or to set the required value and confirm by pressing .
7. Confirm by pressing .
8. Press to cancel a setting or exit the installer level.

6.4 Live Monitor (status codes)

Menu → Live monitor

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

Status codes – Overview (→ Page 32)

6.5 Using check programmes

Call up the installer level + 1x

Display	Meaning
P.00	<p>Purging check programme: The internal pump is cyclically actuated. The heating circuit and the hot water circuit are purged via the automatic air vent (the cap of the automatic air vent must be released).</p> <p>1 x : Start heating circuit purging 2 x (): Start hot water circuit purging 3 x (): Restart heating circuit purging 1 x (Cancel): End purge programme</p> <p>Note The purge programme runs for 7.5 min per circuit and then terminates. Purging the heating circuit: Diverter valve in heating position, actuation of internal pump for 9 cycles: 30 sec. on, 20 sec. off. Display: Active heating circuit. Purging the hot water circuit: After the above-mentioned cycles have run or the right-hand selection button has been pressed again: Diverter valve in the hot water position, actuation of the internal pump as above. Display: Active hot water circuit.</p>
P.01	<p>Maximum load check programme: After successful ignition, the product is operated at maximum heat input.</p>
P.02	<p>Minimum load check programme: After successful ignition, the product is operated at minimum heat input.</p>
P.06	<p>Filling mode check programme: The diverter valve is moved to the mid-position. The burner and pump are switched off (to fill or drain the product).</p>

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 using the first-commissioning-checklist. The first-commissioning-checklist in the appendix (→ Page 41) of the installation instructions must be filled out and stored carefully along with the unit's documentation.

- ▶ Carry out the initial start-up using the first-commissioning-checklist in the appendix.
- ▶ Fill out and sign the first-commissioning-checklist.

7.2 Checking the type of gas

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

- ▶ Check the type of gas as part of routine product maintenance work when replacing components or carrying out work on the gas route.

7.3 Checking the factory setting

The product's combustion has been factory tested and is preset for operation with the gas group indicated on the identification plate.

The product is only authorised to be operated with natural gas.

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

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

- ▶ Do not start up the product.

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

- ▶ Proceed as described below.

7.4 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 system, 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 system.
- ▶ Use a magnetic rod to check whether it contains magnetite (iron oxide).
- ▶ If you ascertain that it contains magnetite, clean the system and apply suitable corrosion-protection measures, or fit a magnet filter.
- ▶ Check the pH value of the removed water at 25 °C.

7 Start-up

- ▶ If the value is below 6.5 or above 8.5, clean the system and treat the heating water.
- ▶ Ensure that oxygen cannot get into the heating water.

Checking the filling and supplementary water

- ▶ Before filling the system, 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.

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 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	ppm CaCO ₃	mol/m ³	ppm CaCO ₃	mol/m ³	ppm CaCO ₃	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 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 system

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

Additives for frost protection intended to remain permanently in the system

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

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

7.5 Avoiding danger arising from insufficient water pressure

The filling pressure must be between 0.10 and 0.15 MPa (1.0 and 1.5 bar).

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

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

If the water pressure falls below 0.03 MPa (0.3 bar), the product switches off. The display shows 0.0 MPa (0.0 bar). Fault **F.22** is stored in the fault list.

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

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

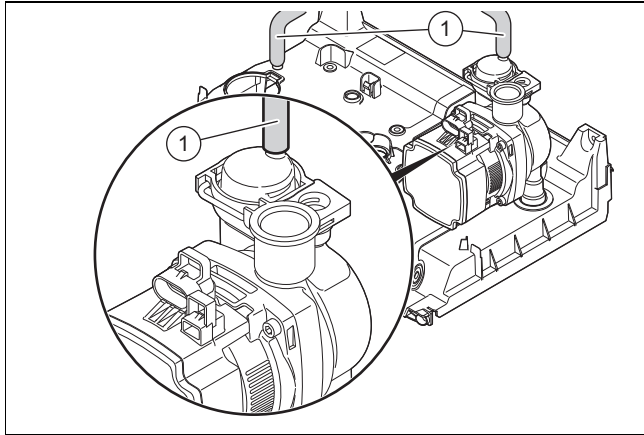
7.6 Switching on the product

- ▶ Switch on the product via the main switch installed on-site.

7.7 Filling and purging the heating installation

Preliminary work

- ▶ Flush the heating installation through.

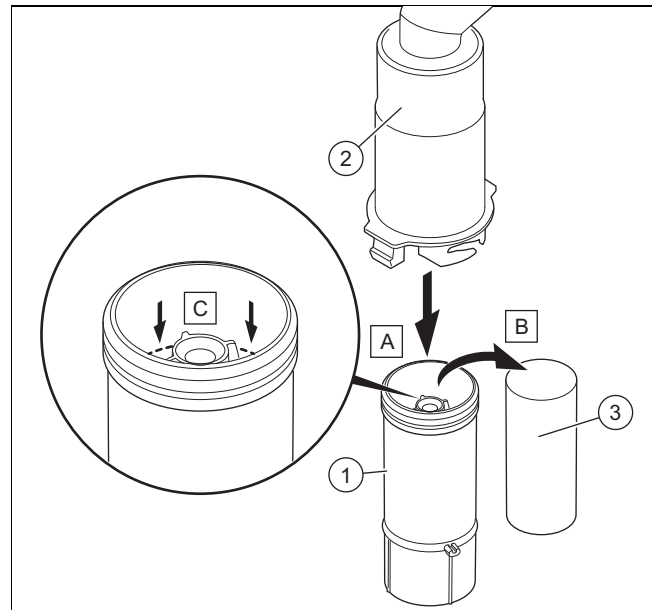


1. Check the silicone hose connection (1) between the pump's automatic air vent and the hydraulic console.
2. Remove the caps from the automatic air vents.
3. Fill with water until the required filling pressure is reached.
 - Recommended filling pressure: 1 ... 1.5 bar
 - ◁ The heating and hot water functions cannot be activated.
 - ◁ The pressure value flashes in the display until a pressure of 0.05 MPa (0.5 bar) or higher has been reached.
 - ◁ An automatic air vent function is activated if the pressure exceeds 0.05 MPa (0.5 bar) for longer than 15 seconds.
4. Purge each radiator until the water escapes normally, and then retighten the system's purging valves.
5. Check that all connections are leak-tight.

Conditions: If the noise persists in the boiler

- ▶ Purge the product again by activating check programme **P.00**.

7.8 Filling the condensate siphon



1. Unclip the lower section of the siphon (1) from the upper section of the siphon (2).
2. Remove the float (3).
3. Fill the lower section of the siphon with water up to 10 mm below the upper edge of the condensate drain pipe-work.
4. Re-insert the float (3).



Note

Check that the float is present in the condensate siphon.

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

7.9 Filling the hot water circuit

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

7.10 Checking the gas flow rate

The gas flow rate has been set during production and does not require adjustment. With the front casing fitted check the gas flow rate of the boiler as follows:

- ▶ Start up the product with the check programme **P.01**.
- ▶ In addition, ensure that maximum heat can be dissipated into the heating system by turning up the room thermostat.
- ▶ Wait at least 5 minutes until the boiler has reached its operating temperature.
- ▶ Ensure that all other gas appliances in the property are turned off.
- ▶ Measure the gas flow rate at the gas meter.
- ▶ Compare the measured values with the corresponding values in the table.

7 Start-up

Qnw from the data plate	H gas in m ³ /h		
	Nom.	+5%	-10%
15.3	1.62	1.70	1.46
18.4	1.95	2.05	1.76
24.7	2.61	2.74	2.35
25.7	2.72	2.86	2.45
28.6	3.03	3.18	2.73
30.6	3.24	3.40	2.92
35.7	3.78	3.97	3.40

Conditions: Gas flow rate not in the permissible range

- ▶ Check all of the piping and ensure that the gas flow rates are correct.
- ▶ Only put the product into operation once the gas flow rates have been corrected.

Conditions: Gas flow rate in the permissible range

- ▶ End the check programme **P.01**.
- ▶ Allow the boiler to cool down by allowing pump overrun to operate for a minimum of 2 minutes.
- ▶ Record the boiler maximum gas flow rate onto the Benchmark gas boiler commissioning checklist.

7.11 Checking and adjusting the gas settings

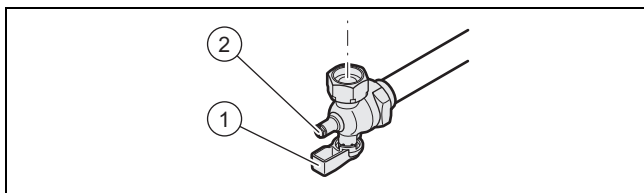
Only a qualified competent person is authorised to implement the settings on the gas valve.

Each destroyed tamper-proof seal must be replaced.

The CO₂ adjusting screw must be sealed.

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

7.11.1 Checking the gas connection pressure (gas flow pressure)



1. Ensure that the gas inlet working pressure can be obtained with all other gas appliances in the property working.
2. Close the gas isolator cock **(1)**.
3. Undo the sealing screw on the measuring nipple **(2)**.
4. Connect a pressure gauge to the measuring nipple **(2)**.
5. Open the gas isolator cock **(1)**.
6. Start up the product with check programme **P.01** (system with eBUS controller) or **P.03** (system without eBUS controller).
7. In addition, ensure that maximum heat can be dissipated into the heating system by turning up the room thermostat.
8. With the boiler operating at full load check that the gas inlet working pressure at the reference test point **(2)** complies with the requirements.

Permissible connection pressure

Great Britain	Natural gas	G20	1.7 ... 2 kPa (17.0 ... 20 mbar)
---------------	-------------	-----	-------------------------------------

9. Should the pressure recorded at the reference test point in the boiler be lower than indicated check if there is any blockage in the pipework or if the pipework is undersized.

Conditions: Gas flow pressure **not** in the permissible range



Caution.

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

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

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

- ▶ If you cannot correct the failure, notify the gas supply company and proceed as follows:
 - ▶ End check programme P.01.
 - ▶ Allow the boiler to cool down by allowing pump overrun to operate for a minimum of two minutes.
 - ▶ Close the gas isolator cock.
 - ▶ Remove the pressure gauge and retighten the sealing screw **(2)** for the measuring nipple.
 - ▶ Open the gas isolator cock **(1)**.
 - ▶ Check the measuring nipple for gas tightness.
 - ▶ Close the gas isolator cock **(1)**.
 - ▶ Install the front casing. (→ Page 10)
 - ▶ Disconnect the product from the power mains.
 - ▶ You must not start up the boiler.

Conditions: Gas flow pressure **in** the permissible range

- ▶ End the check programme **P.01**.
- ▶ Allow the boiler to cool down allowing pump overrun to operate for a minimum of two minutes.
- ▶ Close the gas isolator cock **(1)**.
- ▶ Remove the pressure gauge and retighten the sealing screw **(2)** for the measuring nipple.
- ▶ Open the gas isolator cock **(1)**.
- ▶ Check the measuring nipple for gas tightness.
- ▶ Install the front casing. (→ Page 10)
- ▶ Reset boiler controls for normal operation.
- ▶ Record the appliance gas inlet working pressure (kPa resp. mbar) in the Benchmark gas boiler commissioning checklist.

7.11.2 Checking the leak-tightness of the flue gas installation and flue gas recirculation

1. Check the flue gas installation is intact in accordance with the latest gas safe technical bulletin and information supplied in the installation instructions.
2. For extended flue gas installations check for flue gas recirculation using the air analysis point.
3. Use a flue gas analyser.
4. If you discover CO or CO₂ in the supply air, search for the leak in the flue gas installation or for signs of flue gas recirculation.
5. Eliminate the damage properly.
6. Check again whether the supply air contains any CO or CO₂.
7. If you cannot eliminate the damage, do not start up the product.

7.11.3 Thoroughly flushing the heating installation ("hot")

1. Operate the appliance until the boiler and the heating system are up to temperature.
2. Check the heating system for leaks.
3. Connect a hose to the drain valve located at the lowest position of the heating system.
4. Shut off the boiler, open the drain valve and all purge valves on the radiators and allow the water to flow out of the heating system and the boiler quickly and fully.
5. Close the drain valve.
6. Fill and purge the heating installation. (→ Page 17)
7. Re-fill the system until the system design pressure of 0,1 MPa (1,0 bar) is attained.



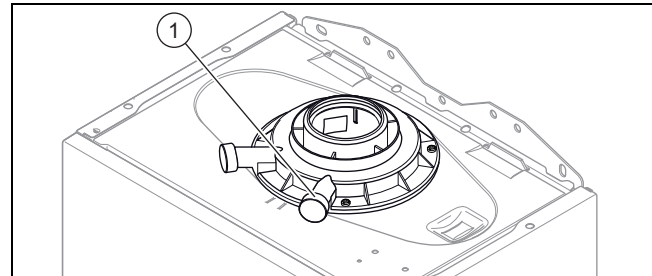
Note

The actual reading on the digital pressure gauge should ideally be 0,05 MPa (0,5 bar) plus an additional pressure corresponding to the highest point of the system above the base of the boiler – 10 m head equals an additional 1 bar reading on the pressure gauge. The minimum pressure should not be less than 0,1 MPa (1 bar) in any installation. If the system is to be treated with an inhibitor it should be applied at this stage in accordance with the manufacturer's instructions. Further information can be obtained from Sentinel, Betz Dearborn Ltd., Tel: 0151 420 9595, or Fernox, Alpha– Fry technologies. Tel: 0870 8700362.

8. Install the front casing. (→ Page 10)

7.11.4 Checking the CO₂ content

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



3. Unscrew the cover from the flue gas analysis point (1).
4. Measure the CO₂ content at the flue gas analysis point (1).
5. Compare the measured value with the corresponding value in the table.

Checking the CO₂ content

Great Britain
Removed front casing/installed front casing
Natural gas
G20
9.2 ±1 %

- ◁ The value is OK.
- ▽ The value is not OK; you cannot start up the product.
 - ▶ Inform Customer Service.

7.12 Checking leak-tightness

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

Conditions: Room-sealed operation

- ▶ Check whether the vacuum chamber has been sealed so that it is leak-tight.

7.12.1 Checking the heating mode

1. Activate the heating mode on the user interface.
2. Turn all thermostatic radiator valves on the radiators until they are fully open.
3. Allow the product to operate for at least 15 minutes.
4. Fill and purge the heating installation. (→ Page 17)
5. Call up the status codes. (→ Page 15)
Status codes – Overview (→ Page 32)

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

7.12.2 Checking the hot water generation

1. Activate the hot water handling mode on the user interface.
2. Open a hot water valve completely.
3. Call up the status codes. (→ Page 15)

8 Adapting the unit to the heating installation

Status codes – Overview (→ Page 32)

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

8 Adapting the unit to the heating installation



You can reset/change the system parameters.

Overview of diagnostics codes (→ Page 29)

8.1 Burner anti-cycling time

To prevent frequent switching on and off of the burner and thus prevent energy losses, an electronic restart lockout is activated for a specific period each time the burner is switched off. The burner anti-cycling time is only active for the heating mode. Hot water handling mode during a burner anti-cycling time does not affect the time function element.

8.1.1 Setting the burner anti-cycling time

1. Navigate to diagnostics code **D.002** in the installer level and confirm by pressing .
2. Set the burner anti-cycling time and confirm by pressing .

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

T _{Flow} (target) [°C]	Set maximum burner anti-cycling time [min]					
	35	40	45	50	55	60
30	29.0	33.0	37.0	41.0	45.0	49.5
35	25.5	29.5	33.0	36.5	40.5	44.0
40	22.5	26.0	29.0	32.0	35.5	38.5
45	19.5	22.5	25.0	27.5	30.5	33.0
50	16.5	18.5	21.0	23.5	25.5	28.0
55	13.5	15.0	17.0	19.0	20.5	22.5
60	10.5	11.5	13.0	14.5	15.5	17.0
65	7.0	8.0	9.0	10.0	11.0	11.5
70	4.0	4.5	5.0	5.5	6.0	6.5
75	1.0	1.0	1.0	1.0	1.0	1.0

8.1.2 Resetting the remaining burner anti-cycling time

- ▶ Press .

8.2 Setting the pump output

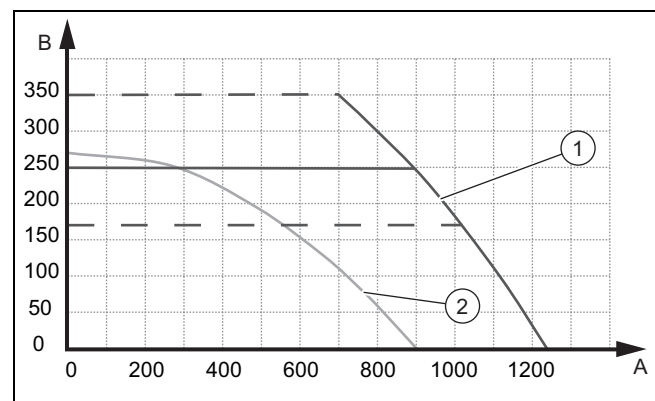
The product is equipped with a speed-regulated high-efficiency pump, which adjusts independently to the hydraulic conditions of the heating installation.

If you have installed a low loss header in the heating installation, you should switch off the speed regulation and set the pump output to a fixed value.

- ▶ If required, change the setting of the pump speed, which depends on the operating mode, under diagnostics code **d.14**.

Overview of diagnostics codes (→ Page 29)

8.2.1 Pump diagram



- A Remaining feed head [mbar]
- B Flow rate [l/h]
- 1 Max. PWM
- 2 Min. PWM

8.3 Setting the bypass valve



Caution.

Risk of material damage caused by incorrect setting of the high-efficiency pump

If the pressure at the bypass valve is increased (by turning it clockwise) and the pump output is set to less than 100%, the product may not operate correctly.

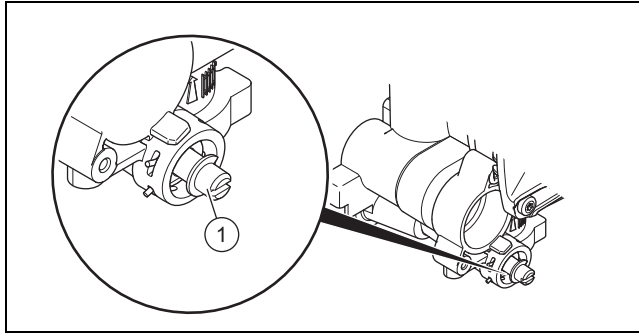
- ▶ In this case, set the pump output to 5 = 100% using diagnostics parameter **d.14**.

Conditions: **d.14** is set to 0 = auto

- ▶ Do not change the factory settings.

Conditions: **d.14** is set to 1 - 5

- ▶ Remove the front casing. (→ Page 10)



- ▶ Regulate the pressure using the adjusting screw (1).

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

- ▶ Install the front casing. (→ Page 10)

8.4 Setting the hot water temperature



Danger!

Risk of death from Legionella.

Legionella multiply at temperatures below 60 °C.

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

- ▶ Set the hot water temperature.

Conditions: Water hardness: > 3.57 mol/m³

- Hot water temperature: ≤ 50 °C

9 Handing the product over to the operator

- ▶ When you have finished the installation, attach the sticker supplied (in the operator's language) to the product cover.
- ▶ Explain to the operator how the safety devices work and where they are located.
- ▶ Inform the operator how to handle the product.
- ▶ In particular, draw attention to the safety information which the operator must follow.
- ▶ Inform the operator that they must have the product maintained in accordance with the specified intervals.
- ▶ Instruct the operator about measures taken to ensure the supply of combustion air and flue gas pipe.

10 Troubleshooting

10.1 Rectifying faults

- ▶ If fault messages (F.xx) appear, rectify the fault after referring to the table in the appendix or using the check programmes. (→ Page 15)
Overview of fault codes (→ Page 33)

If several faults occur at the same time, the display shows the corresponding fault messages for two seconds each in alternation.

- ▶ Press (max. three times) to restart the product.
- ▶ If you are unable to remedy the fault and the fault recurs despite reset attempts, contact customer service.

10.2 Calling up and clearing the fault memory

The last 10 fault messages are stored in the fault memory.

- ▶ Call up the installer level. (→ Page 15)
- ▶ Navigate to the **fault codes**.
 - ◁ The number of faults that have occurred is shown in the display and the faults that are currently called up are displayed with their fault numbers **F.xx**.
- ▶ Press or to call up individual fault messages.
- ▶ To delete the entire fault list, navigate to diagnostics code **D.094** in the installer level.
- ▶ Set the diagnostics code to **1**, and confirm by pressing .

10.3 Resetting parameters to factory settings

1. Navigate to diagnostics code **D.096** in the installer level.
2. Set the diagnostics code to 1, and confirm by pressing .

10.4 Preparing the repair work

1. Switch off the product.
2. Disconnect the product from the power mains.
3. Remove the front casing.
4. Close the gas isolator cock.
5. Close the service valves in the heating flow and in the heating return.
6. Close the service valve in the cold water pipe.
7. Drain the product if you want to replace water-bearing components of the product.
8. Ensure that water does not drip on live components (e.g. the electronics box).
9. Use only new seals and O-rings. Do not use any additional sealing materials.

10 Troubleshooting

10.5 Replacing defective components

10.5.1 Replacing the burner

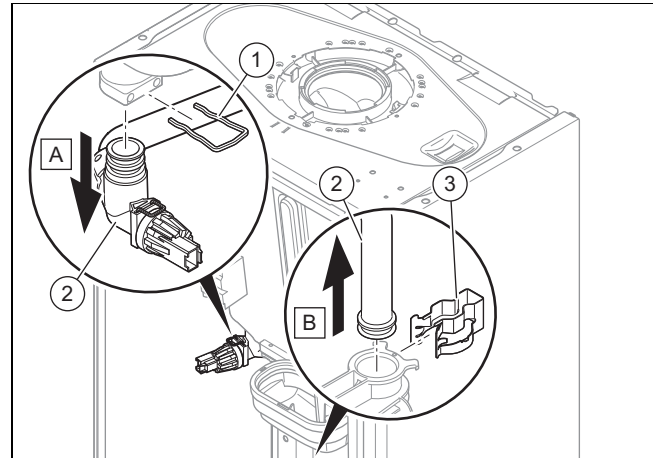
1. Remove the gas-air mixture unit. (→ Page 25)
2. Remove the two burner seals.
3. Remove the burner.
4. Insert the new burner.
5. Insert two new burner seals in the burner cover.
6. Install the gas-air mixture unit. (→ Page 27)

10.5.2 Replacing the gas-air mixture unit

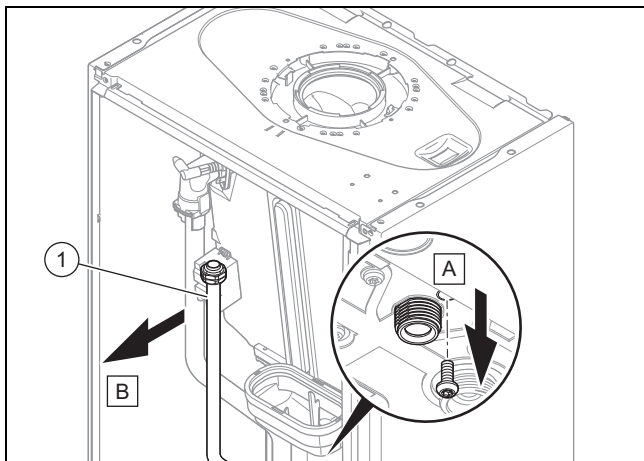
1. Remove the gas-air mixture unit. (→ Page 25)
2. Install the new gas-air mixture (→ Page 27).

10.5.3 Replacing the heat exchanger

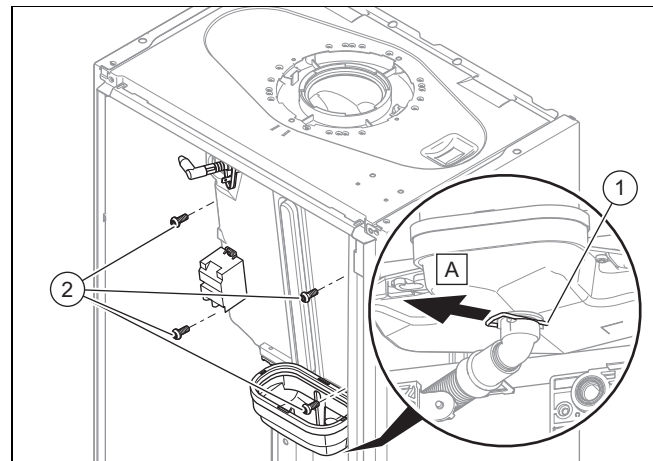
1. Remove the front casing. (→ Page 10)
2. Remove the gas-air mixture unit. (→ Page 25)



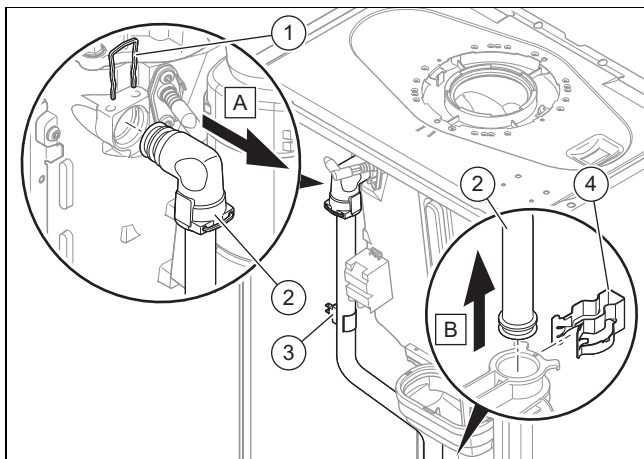
8. Remove the upper clip (1).
9. Remove the lower clip (3).
10. Remove the return pipe (2).



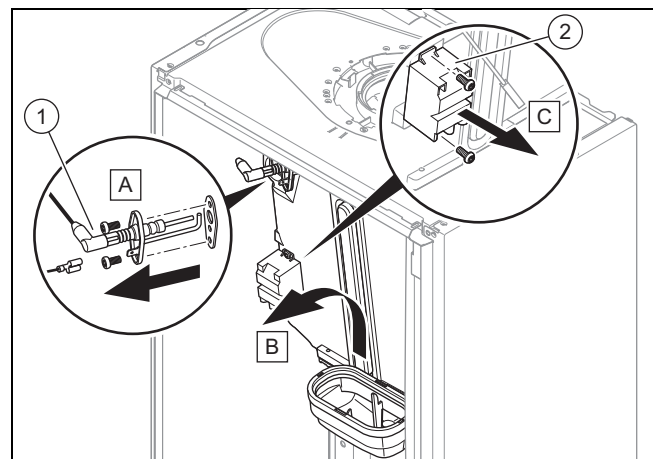
3. Remove the gas pipe (1).



11. Remove the clip underneath the condensate tray (1).
12. Undo the four screws (2).

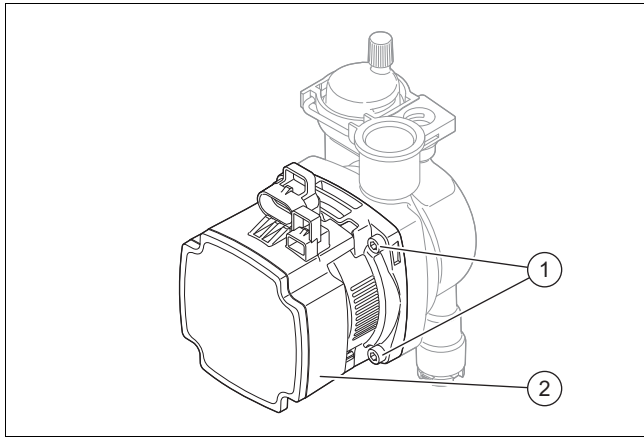


4. Remove the temperature sensor (3).
5. Remove the upper clip (1).
6. Remove the lower clip (4).
7. Remove the supply pipe (2).



13. Remove the ignition electrode (1).
14. Lift the heat exchanger up slightly and remove it together with the condensate tray.
15. Remove the ignition transformer (2).
16. Install the new heat exchanger in reverse order.

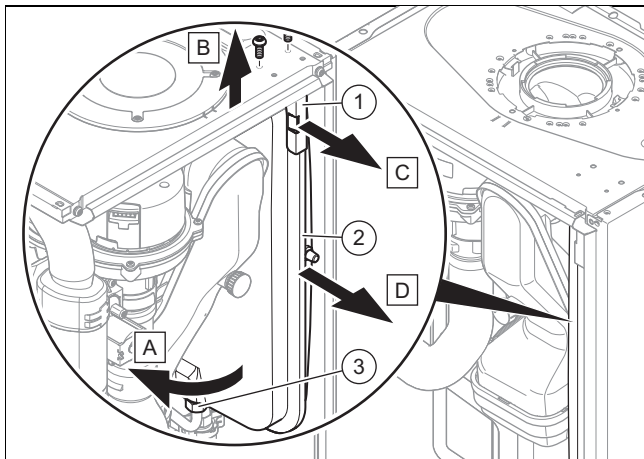
10.5.4 Replacing the pump head



1. Disconnect the pump cable from the electronics box.
2. Undo the four bolts (1).
3. Remove the pump head (2).
4. Replace the O-ring.
5. Use four screws to secure the new pump head.
6. Connect the pump cable to the electronics box.

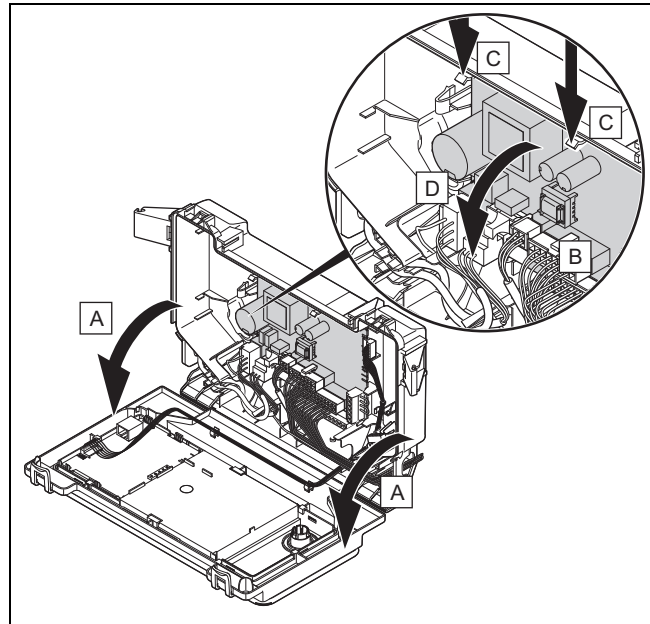
10.5.5 Replacing the expansion vessel

1. Drain the product. (→ Page 28)



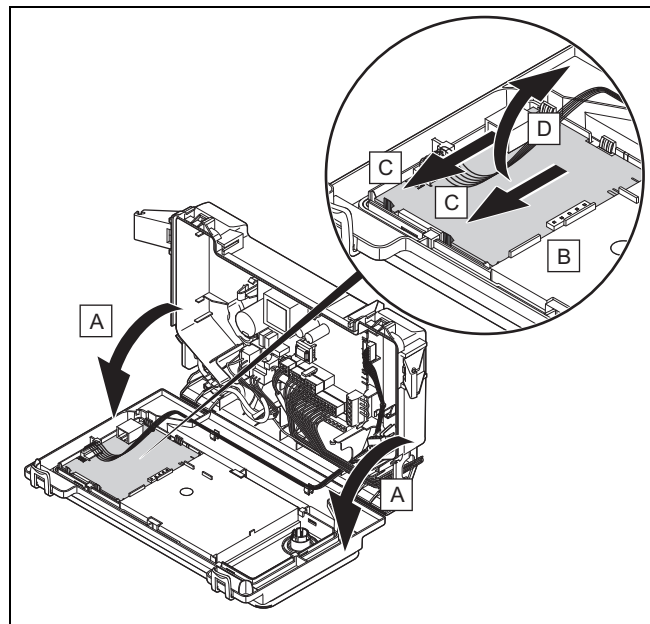
2. Undo the nut (3).
3. Remove both screws on the support plate (1).
4. Remove the support plate.
5. Pull out the expansion vessel (2) towards the front.
6. Insert the new expansion vessel into the product.
7. Screw the new expansion vessel to the water connection. To do this, use a new seal.
8. Attach the support plate using both screws.
9. Fill and purge the product (→ Page 17) and, if required, the heating installation.

10.5.6 Replacing the main PCB



1. Open the electronics box. (→ Page 13)
2. Pull all of the plugs out from the PCB.
3. Undo the clips on the PCB.
4. Remove the PCB.
5. Install the new PCB in such a way that it clicks into the groove at the bottom and into the clip at the top.
6. Plug in the PCB plugs.
7. Close the electronics box.

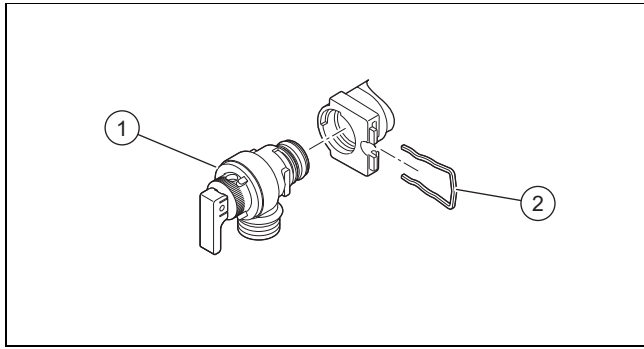
10.5.7 Replacing the PCB for the user interface



1. Open the electronics box. (→ Page 13)
2. Pull the plug out of the PCB.
3. Undo the clips on the PCB.
4. Remove the PCB.
5. Install the new PCB in such a way that it clicks into the groove at the bottom and into the clip at the top.
6. Plug in the PCB plug.
7. Close the electronics box.

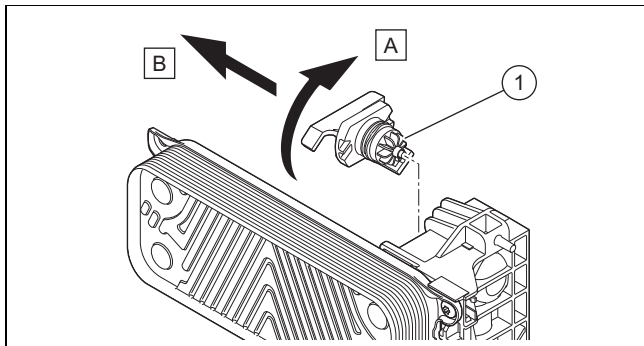
11 Inspection and maintenance

10.5.8 Replacing the expansion relief valve



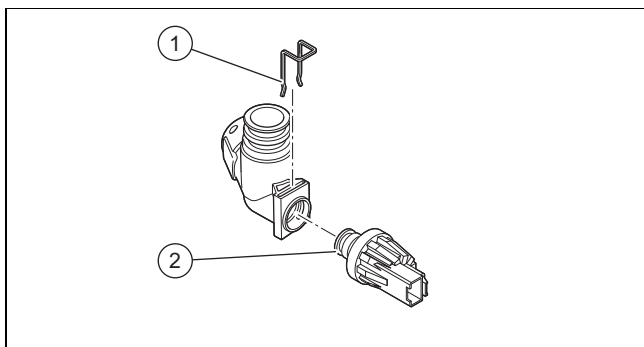
1. Remove the clip (2).
2. Remove the expansion relief valve.
3. Fit the new expansion relief valve with a new O-ring.
4. Reattach the clip (2).

10.5.9 Replacing the flow sensor



1. Push the volume flow sensor's handle towards the rear of the boiler.
2. Pull the volume flow sensor (1) out of its holder.
3. Remove the plug from the volume flow sensor.
4. Connect the plug to the new volume flow sensor.
5. Insert the volume flow sensor into its holder and ensure that the plug cable is not damaged.
6. Lock the volume flow sensor into its position as soon as it is positioned correctly.

10.5.10 Replace the pressure sensor



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

10.6 Checking the product for leak-tightness

- ▶ Check that the product is leak-tight. (→ Page 19)

11 Inspection and maintenance

11.1 Using original seals

If you replace components, use only the enclosed original seals; additional sealing materials are not required.

11.2 Observing inspection and maintenance intervals

- ▶ Adhere to the minimum inspection and maintenance intervals. The inspection may require maintenance to be carried out earlier, depending on the results.
Inspection and maintenance work – Overview (→ Page 38)

11.3 Procuring spare parts

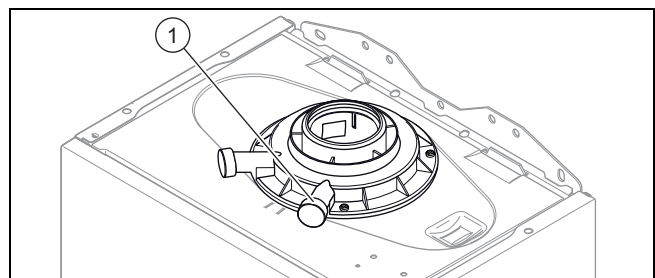
The original components of the product were also certified by the manufacturer as part of the declaration of conformity. If you use other, non-certified or unauthorised parts during maintenance or repair work, this may void the conformity of the product and it will therefore no longer comply with the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

11.4 Checking the CO₂ content

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



3. Unscrew the cover from the flue gas analysis point (1).
4. Measure the CO₂ content at the flue gas analysis point (1).
5. Compare the measured value with the corresponding value in the table.

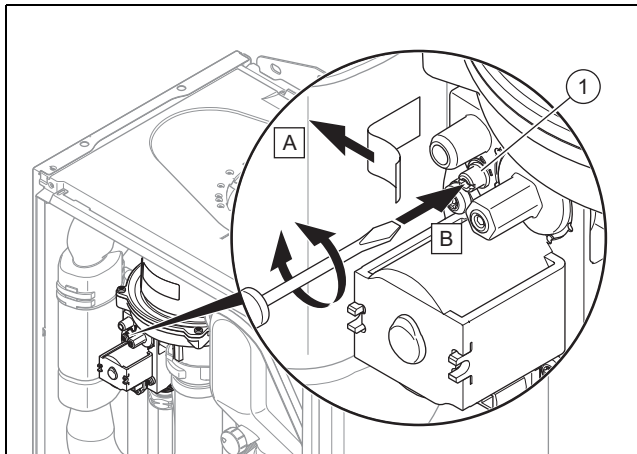
Checking the CO₂ content

Great Britain
Removed front casing/installed front casing
Natural gas
G20
9.2 ± 1 %

- ◁ The value is OK.
- ▽ The value is not OK; you cannot start up the product.
 - ▶ Set the CO₂ content. (→ Page 25)

11.5 Setting the CO₂ content

Conditions: The CO₂ content must be adjusted



- ▶ Remove the sticker.
- ▶ Turn the screw (1) to set the CO₂ content (value with front casing removed).
 - ◁ To increase the CO₂ content: Turn anti-clockwise
 - ◁ To decrease the CO₂ content: Turn clockwise
- ▶ Only carry out the adjustment in increments of 1/8 turn and wait approximately 1 minute after each adjustment until the value has stabilised.
- ▶ Compare the measured value with the corresponding value in the table.

Setting the CO₂ value

	Great Britain
	Removed front casing/installed front casing
	Natural gas
	G20
CO ₂ at full load	9.2 ± 0.2 %
Set for Wobbe index W ₀	14.09 kW-h/m ³
O ₂ at full load	4.5 ± 1.8 vol. %

	Great Britain
	Removed front casing/installed front casing
	Natural gas
	G20
CO at full load	≤ 250 ppm
CO/CO ₂	≤ 0.0027

- ▽ If the setting is not in the specified adjustment range, you must not start up the product.
 - ▶ Inform Customer Service.
- ▶ Check whether the air-quality requirements with regard to carbon monoxide are fulfilled.
- ▶ Fit the front panel.

11.6 Removing the gas-air mixture unit

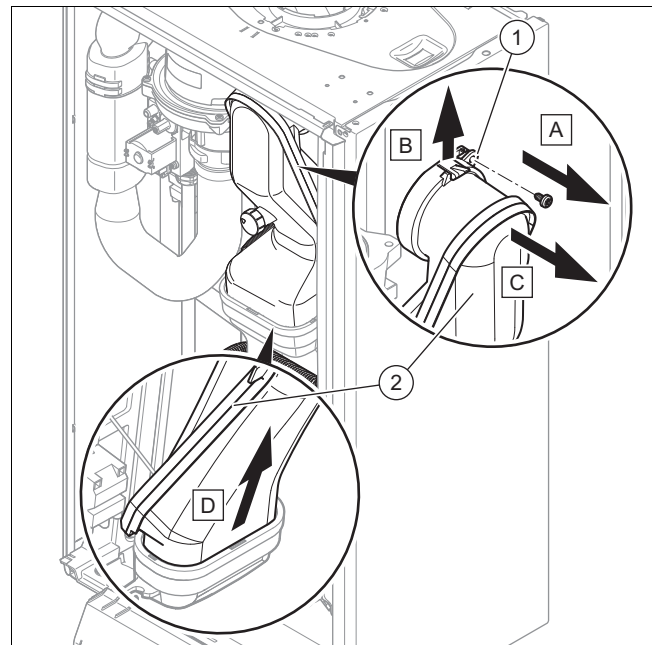


Note

The gas-air mixture unit consists of three main components:

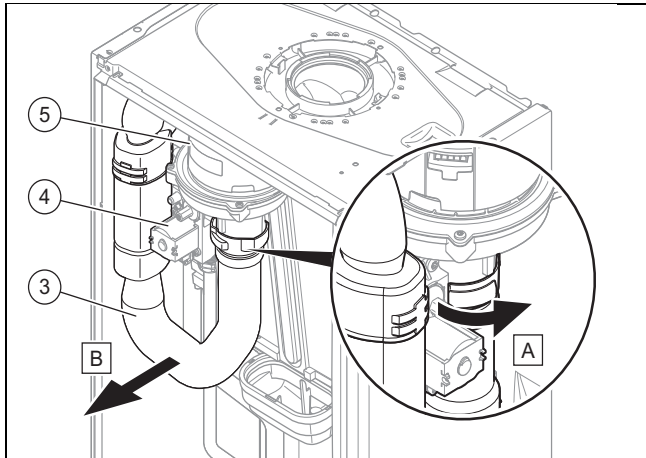
- Ventilator
- Gas valve,
- Burner cover

1. Switch off the product via the main switch.
2. Close the gas isolator cock.
3. Remove the front casing. (→ Page 10)

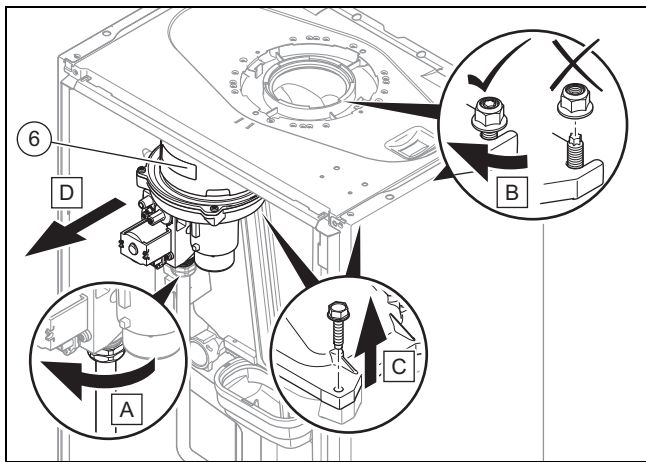


4. Remove the screw (1).
5. Push the clip upwards.
6. Remove the flue gas pipe (2).

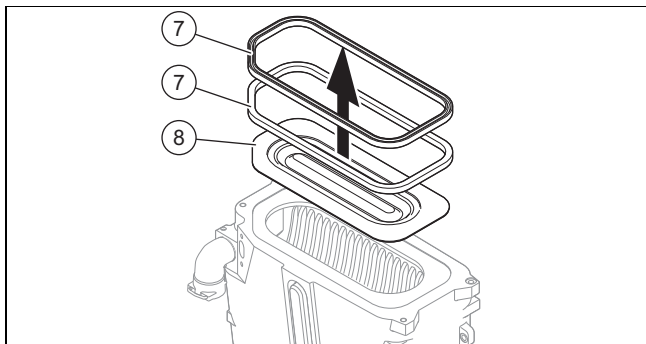
11 Inspection and maintenance



7. Remove the air intake pipe (3).
8. Remove the plugs from the gas valve (4) and from the fan (5).

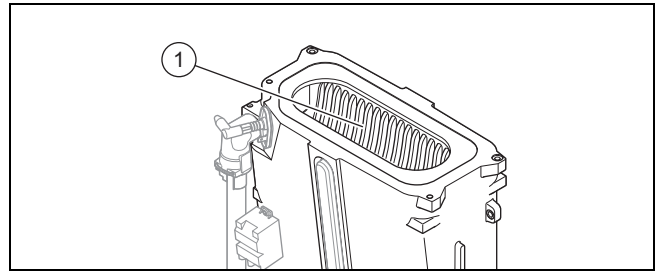


9. Remove the gas-air mixture unit (6).



10. Remove the burner seals (7) and the burner (8).
11. Check the burner and the heat exchanger for damage and dirt.
12. If necessary, clean or replace the components according to the following sections.
13. Install the two new burner seals.

11.7 Cleaning the heat exchanger

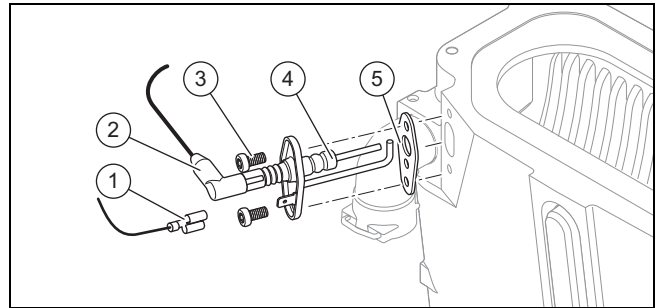


1. Protect the folded down electronics box against sprayed water.
2. Clean the ribs of the heat exchanger (1) with water.
 - ◁ The water runs out into the condensate tray.

11.8 Checking the burner

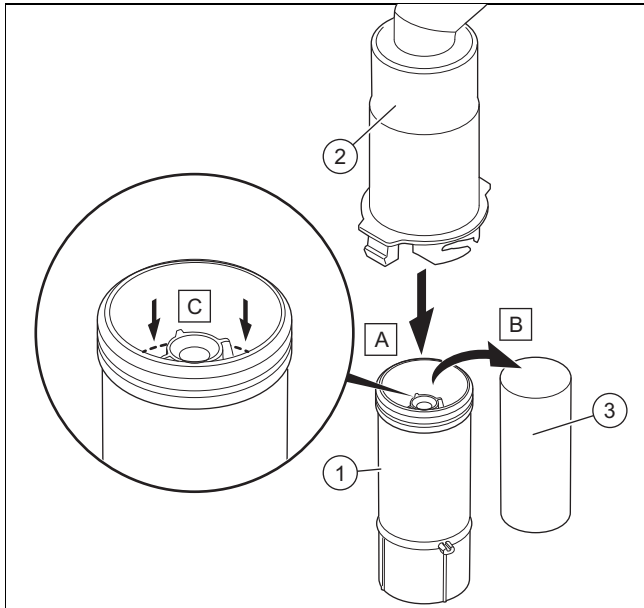
1. Search the surface of the burner for possible damage. If you see any damage, replace the burner.
2. Install the two new burner seals.

11.9 Checking the ignition electrode



1. Disconnect the connection (2) and the earthing cable (1).
2. Remove the fixing screws (3).
3. Carefully remove the electrode from the combustion chamber.
4. Check that the electrode ends (4) are undamaged.
5. Check the electrode distance.
 - Clearance for the ignition electrodes: 3.5 ... 4.5 mm
6. Make sure that the seal (5) is free from damage.
 - ▽ If necessary, replace the seal.

11.10 Cleaning the condensate siphon



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



Note

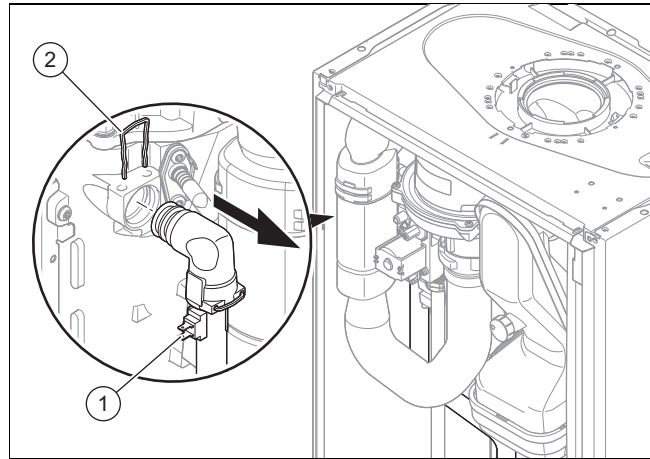
Check whether the float is present in the condensate siphon.

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

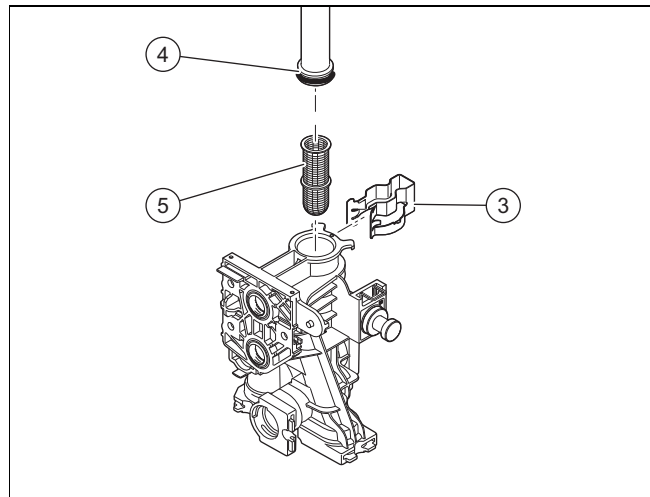
11.11 Cleaning the filter in the cold water inlet

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

11.12 Cleaning the heating filter



1. Drain the product. (→ Page 28)
2. Remove the temperature sensor (1).
3. Remove the upper clip (2).



4. Remove the lower clip (3).
5. Remove the flow pipe (4).
6. Remove the heating filter (5) and clean it.
7. Reinstall the components in the reverse order.

11.13 Installing the gas-air mixture unit

1. Install the burner.
2. Install two new burner seals in the burner cover.
3. Install the gas-air mixture unit.
4. Tighten the screws on the gas-air mixture unit to 7 Nm.
5. Install the flue gas pipe.
6. Install the air intake pipe.

12 Decommissioning the product

11.14 Draining the product

1. Close the service valves of the product.
2. Start check programme **P.05**.
Overview of the check programmes (→ Page 15)
3. Open the drain valves.

11.15 Checking the admission pressure of the expansion vessel

1. Drain the product. (→ Page 28)
2. Measure the pre-charge pressure of the expansion vessel at the vessel valve.

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

- ▶ Top up the expansion vessel in accordance with the static height of the heating installation, ideally with nitrogen, otherwise with air. Ensure that the drain valve is open when topping up.
3. If water escapes from the valve of the expansion vessel, you must replace the expansion vessel (→ Page 23).
 4. Fill and purge the heating installation. (→ Page 17)

11.16 Completing inspection and maintenance work

1. Check the gas connection pressure (gas flow pressure). (→ Page 18)
2. Check the CO₂ content. (→ Page 19)

11.17 Checking the product for leak-tightness

- ▶ Check that the product is leak-tight. (→ Page 19)

12 Decommissioning the product

- ▶ Switch off the product.
- ▶ Disconnect the product from the power mains.
- ▶ Close the gas isolator cock.
- ▶ Close the cold water stop valve.
- ▶ Drain the product. (→ Page 28)

13 Customer service

To ensure regular servicing, it is strongly recommended that arrangements are made for a Maintenance Agreement. Please contact Vaillant Service Solutions for further details:

Telephone: 0330 100 3461

Appendix

A 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.

Dia- gnostics code	Parameter	Values		Unit	Increment, select, explanation	Default set- ting	Own setting
		Min.	Max.				
d.00	Heating maximum output	–	–	kW	The maximum heating output varies depending on the product. → Section "Technical data" Automatic: Unit automatically adjusts the maximum output to the current system demand	→ Section "Technical data"	Adjustable
d.01	Pump overrun in heating mode	1	60	min	1	5	Adjustable
d.02	Maximum burner anti-cycling time in heating mode	2	60	min	1	20	Adjustable
d.04	Water temperature in the cylinder	Current value		°C	–	–	Not adjustable
d.05	Determined heating flow set target temperature	Current value		°C	–	–	Not adjustable
d.06	Hot water set target temperature	Current value		°C	(Combination unit only)	–	Not adjustable
d.07	Set target temperature for the domestic hot water cylinder	Current value		°C	–	–	Not adjustable
d.08	Status of the 230 V thermostat	Current value		–	0 = Room thermostat open (no heat requirement) 1 = Room thermostat closed (heat requirement)	–	Not adjustable
d.09	Heating flow set target temperature that is set on the eBUS room thermostat	Current value		°C	–	–	Not adjustable
d.10	Status of the internal pump in the heating circuit	Current value		–	off / on	–	Not adjustable
d.11	Status of the heating circuit's shunt pump	Current value		–	off / on	–	Not adjustable
d.13	Status of the hot water circuit's circulation pump	Current value		–	off / on	–	Not adjustable
d.14	Operating mode of the modulating pump	0	5	–	0 = variable rotational speed (auto) 1; 2; 3; 4; 5 = Fixed rotational speeds → Section "Setting the pump output"	0	Adjustable
d.15	Pump speed	Current value		%	–	–	Not adjustable
d.16	Status of the 24 V room thermostat	Current value		–	off = Heating off on = Heating on	–	Not adjustable
d.17	Heating control	–	–	–	off = Flow temperature on = Return temperature (adjustment for underfloor heating. If you have activated the return temperature control, the automatic heating output determination function is not active.)	0	Adjustable

Appendix

Dia- gnostics code	Parameter	Values		Unit	Increment, select, explanation	Default set- ting	Own setting
		Min.	Max.				
d.18	Pump overrun operating mode	1	3	–	1 = Continuous (pump runs permanently) 3 = Eco (intermittent pump mode – for the dissipation of the residual heat after hot water generation at an extremely low heat demand)	1	Adjustable
d.19	Pump operating mode, 2 stage pump	0	3	–	0 = Burner mode stage 2, pump flow/overrun stage 1 1 = Heating mode and pump flow/overrun stage 1, hot water handling mode stage 2 2 = Automatic heating mode, pump flow/overrun stage 1, hot water handling mode stage 2 3 = Stage 2	3	Adjustable
d.20	Maximum hot water set target temperature	50	60	°C	1	60	Adjustable
d.21	Status of the warm start for hot water	Current value		–	off = Function deactivated on = Function activated and available	–	Not adjustable
d.22	Status of the hot water request	Current value		–	off = No current requirement on = Current requirement	–	Not adjustable
d.23	Status of the heating demand	Current value		–	off = Heating off (Summer mode) on = Heating on	–	Not adjustable
d.24	Status of the pressure monitor	0	1	–	off = Not switched on = Switched	–	Not adjustable
d.25	Status of the requirement to reheat the cylinder or for the hot water warm start from the eBUS thermostat	Current value		–	off = Function deactivated on = Function activated	–	Not adjustable
d.27	Function of relay 1 (multi-functional module)	1	10	–	1 = Circulation pump 2 = External pump 3 = Cylinder charging pump 4 = Extractor hood 5 = External solenoid valve 6 = Fault display 7 = Solar pump (omitted) 8 = eBUS remote control 9 = Legionella protection pump 10 = Solar valve	1	Adjustable
d.28	Function of relay 2 (multi-functional module)	1	10	–	1 = Circulation pump 2 = External pump 3 = Cylinder charging pump 4 = Extractor hood 5 = External solenoid valve 6 = Fault display 7 = Solar pump (omitted) 8 = eBUS remote control 9 = Legionella protection pump 10 = Solar valve	2	Adjustable
d.31	Automatic filling device	0	2	–	0 = Manual 1 = Semi-automatic 2 = Automatic	0	Adjustable
d.33	Fan speed target value	Current value		rpm	Fan speed = Display value x 100	–	Not adjustable
d.34	Value for the fan speed	Current value		rpm	Fan speed = Display value x 100	–	Not adjustable

Dia- gnostics code	Parameter	Values		Unit	Increment, select, explanation	Default set- ting	Own setting
		Min.	Max.				
d.35	Position of the diverter valve	Current value		–	0 = Heating 40 = Mid-position (parallel operation) 100 = Domestic hot water	–	Not adjustable
d.36	Value for the hot water flow	Current value		l/min	–	–	Not adjustable
d.39	Water temperature in the solar circuit	Current value		°C	–	–	Not adjustable
d.40	Heating flow temperature	Current value		°C	–	–	Not adjustable
d.41	Heating return temperature	Current value		°C	–	–	Not adjustable
d.43	Heating curve	0.2	4	–	0.1	1.2	Adjustable
d.45	Value for the base point of the heating curve	15	30	–	1	20	Adjustable
d.47	Outside temperature	Current value		°C	–	–	Not adjustable
d.50	Correction of the minimum fan speed	0	3000	rpm	1 Fan speed = Display value x 10	600	Adjustable
d.51	Correction of the maximum fan speed	-2500	0	rpm	1 Fan speed = Display value x 10	-1000	Adjustable
d.58	Solar circuit reheating	0	3	–	0 = Boiler's Legionella protection function deactivated 3 = Hot water activated (min. target value 60 °C)	0	Adjustable
d.60	Number of blocks by the temperature limiter	Current value		–	–	–	Not adjustable
d.61	Number of unsuccessful ignitions	Current value		–	–	–	Not adjustable
d.62	Night set-back	0	30	–	1	0	Adjustable
d.64	Average burner ignition time	Current value		s	–	–	Not adjustable
d.65	Maximum burner ignition time	Current value		s	–	–	Not adjustable
d.66	Activation of the warm start function for hot water	–	–	–	off = Function deactivated on = Function activated	1	Adjustable
d.67	Remaining burner anti-cycling time (setting under d.02)	Current value		min	–	–	Not adjustable
d.68	Number of unsuccessful ignitions at 1st attempt	Current value		–	–	–	Not adjustable
d.69	Number of unsuccessful ignitions at 2nd attempt	Current value		–	–	–	Not adjustable
d.70	Operation of the diverter valve	0	2	–	0 = Normal operating mode (DHW and heating mode) 1 = Mid-position (parallel operation) 2 = Permanent heating mode position	0	Adjustable
d.71	Maximum heating flow set target temperature	45	80	°C	1	→ Section "Technical data"	Adjustable
d.73	Correction of the hot water warm start temperature	-15	5	K	1	0	Adjustable
d.75	Maximum cylinder reheating time	20	90	min	1	45	Adjustable
d.77	Max. cylinder reheating	–	–	kW	1 → Section "Technical data"	–	Adjustable

Appendix

Dia- gnostics code	Parameter	Values		Unit	Increment, select, explanation	Default set- ting	Own setting
		Min.	Max.				
d.80	Running time in heating mode	Current value		h	Running time = Display value x 100	–	Not adjustable
d.81	Running time in hot water handling mode	Current value		h	Running time = Display value x 100	–	Not adjustable
d.82	Number of burner ignitions in heating mode	Current value		–	Number of ignitions = Display value x 100	–	Not adjustable
d.83	Number of burner ignitions in hot water handling mode	Current value		–	Number of ignitions = Display value x 100	–	Not adjustable
d.84	Maintenance in	0	3000	h	Number of hours = Display value x 10	300	Not adjustable
d.85	Increase in the min. output (heating and hot water handling mode)	–	–	kW	1	–	Adjustable
d.88	Flow rate limit value for ignition in hot water handling mode	0	1	–	0 = 1.7 l/min (no delay) 1 = 3.7 l/min (2 s delay)	0	Adjustable
d.90	Status of the eBUS room thermostat	Current value		–	off = Not connected on = Connected	–	Not adjustable
d.91	Status DCF77	Current value		–	–	–	Not adjustable
d.93	Setting the product code	0	99	–	1 The Device Specific Number (DSN) can be found on the identification plate.	–	Adjustable
d.94	Delete fault list	0	1	–	off = No on = Yes	–	Adjustable
d.95	Software versions	–	–	–	1 = Main PCB 2 = Interface PCB	–	Adjustable
d.96	Default setting (reset)	–	–	–	0 = No 1 = Yes	–	Adjustable

B Status codes – Overview



Note

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

Status code	Meaning
Displays in heating mode	
S.0	Heating mode: No requirement
S.01	Heating mode: Advance fan operation
S.02	Heating mode: Pump pre-run
S.03	Heating mode: Burner ignition
S.04	Heating mode: Burner on
S.05	Heating mode: Pump/fan overrun
S.06	Heating mode: Fan overrun
S.07	Heating mode: Pump overrun
S.08	Heating mode: Temporary shutdown after heating procedure
Displays in hot water handling mode	
S.10	Hot water handling mode: Requirement
S.11	Hot water handling mode: Advance fan operation
S.13	Hot water handling mode: Burner ignition
S.14	DHW mode: Burner on
S.15	DHW mode: Pump/fan overrun

Status code	Meaning
S.16	DHW mode: Fan overrun
S.17	DHW mode: Pump overrun
Display in Comfort mode with warm start or hot water handling mode with cylinder	
S.20	Hot water handling mode: Requirement
S.21	Hot water handling mode: Advance fan operation
S.22	Hot water handling mode: Pump pre-run
S.23	Hot water handling mode: Burner ignition
S.24	DHW mode: Burner on
S.25	DHW mode: Pump/fan overrun
S.26	DHW mode: Fan overrun
S.27	DHW mode: Pump overrun
S.28	Hot water handling mode: Temporary shutdown of the burner
Other displays	
S.30	Room thermostat is blocking heating mode.
S.31	No heating demand: Summer mode, eBUS controller, waiting period
S.32	Fan waiting time: Fan speed outside of the tolerance values
S.33	Forced fan operation until the pressure monitor is switched
S.34	Frost protection active
S.39	Underfloor heating contact open
S.41	Water pressure too high
S.42	Flue non-return flap closed
S.46	Frost protection mode (Comfort): Minimum load
S.53	Product in waiting period/operation block function due to low water pressure (flow/return spread too large)
S.54	Waiting period: Low water pressure in the circuit (flow/return spread too large)
S.76	Maintenance message: Check the water pressure
S.88	Product purging active
S.91	Maintenance: Demo mode
S.96	Automatic test programme: Return temperature sensor, heating demands blocked.
S.97	Automatic test programme: Water pressure sensor, heating demands blocked.
S.98	Automatic test programme: Return temperature sensor, heating demands blocked.
S.99	Internal automatic test programmes
S.108	Purging the combustion chamber, fan in operation
S.109	Product's standby mode activated

C 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.

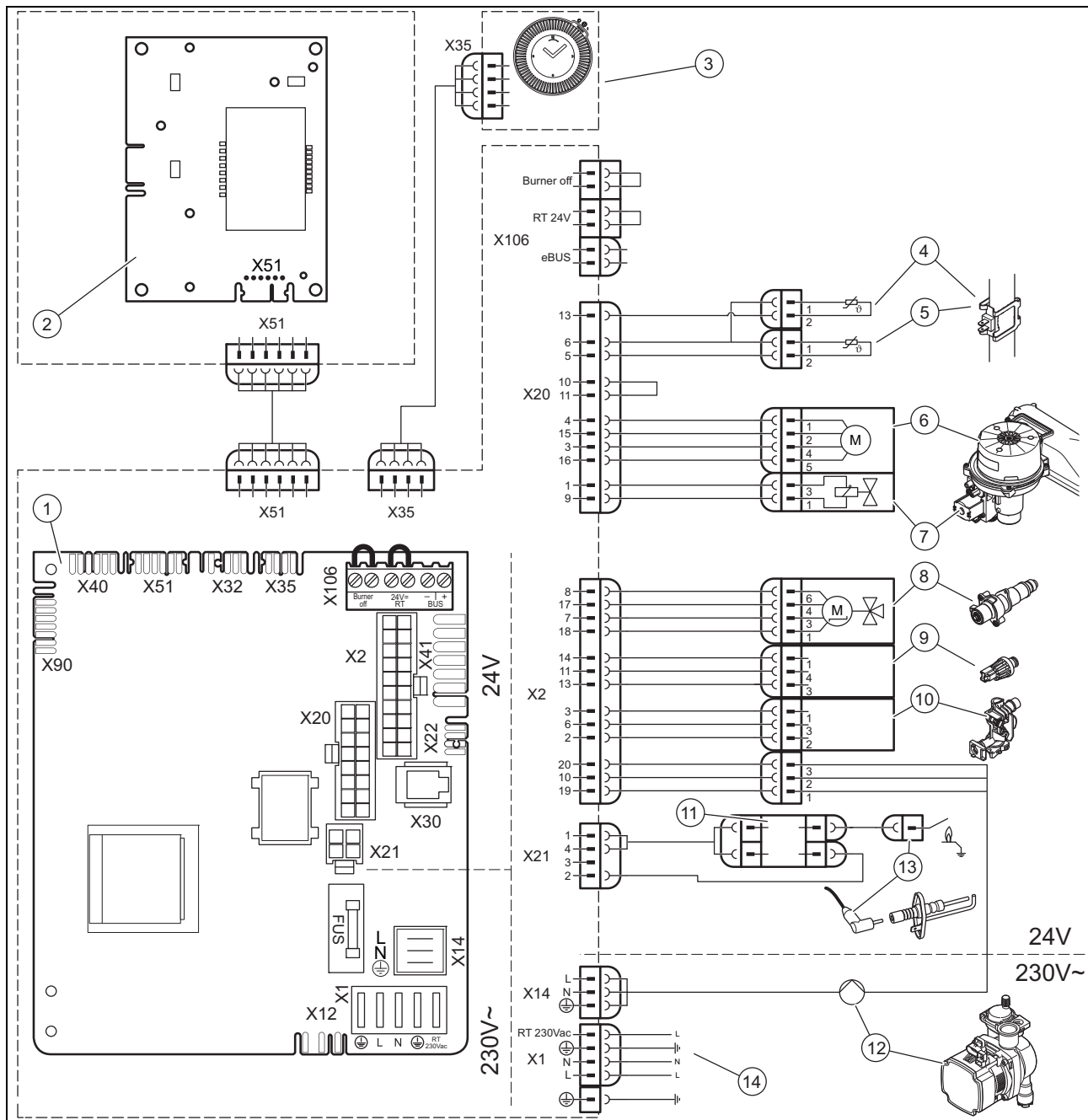
Fault code	Meaning	Possible cause
F.00	Fault: Flow temperature sensor	NTC plug not plugged in or has come loose, multiple plug on the PCB not plugged in correctly, interruption in cable harness, NTC sensor defective
F.01	Fault: Return temperature sensor	NTC plug not plugged in or has come loose, multiple plug on the PCB not plugged in correctly, interruption in cable harness, NTC sensor defective
F.10	Short circuit: Flow temperature sensor	NTC sensor defective, short circuit in the cable harness, cable/casing
F.11	Short circuit: Return temperature sensor	NTC sensor defective, short circuit in the cable harness, cable/casing
F.12 and F.91	Short circuit: Cylinder temperature sensor	NTC sensor defective, short circuit in the cable harness, cable/casing
F.13	Short circuit: Domestic hot water cylinder temperature sensor	NTC sensor defective, short circuit in the cable harness, cable/casing

Appendix

Fault code	Meaning	Possible cause
F.20	Safety switch-off: Overheating temperature reached	Incorrect earth connection between cable harness and product, flow or return NTC defective (loose connection), stray spark via ignition cable, ignition plug or ignition electrode
F.22	Safety switch-off: Low water pressure in the boiler	No or insufficient water in the product, water pressure sensor defective, cable to the pump or to the water pressure sensor loose/not connected/defective
F.23	Safety switch-off: Temperature difference too great (NTC1/NTC2)	Pump blocked, insufficient pump output, air in product, flow and return NTC sensors connected the wrong way round
F.24	Safety switch-off: Temperature rise too fast	Pump blocked, insufficient pump output, air in product, system pressure too low, non-return valve blocked/incorrectly installed
F.25	Safety switch-off: Flue gas temperature too high	Break in plug connection for optional flue gas safety cut-out (STB), break in cable harness
F.27	Safety switch-off: Fault in flame detection	Moisture on the electronics, electronics (flame monitor) defective, gas solenoid valve leaking
F.28	Fault: Ignition unsuccessful when starting up	Gas meter defective or gas pressure monitor has triggered, air in gas, gas flow pressure too low, thermal isolator device (TAE) has triggered, incorrect gas restrictor, incorrect spare gas valve, fault on the gas valve, multiple plug on PCB incorrectly plugged in, break in cable harness, ignition system (ignition transformer, ignition cable, ignition plug, ignition electrode) defective, ionisation current interrupted (cable, electrode), incorrect earthing of product, electronics defective
F.29	Fault: Flame loss	Gas supply temporarily stopped, flue gas recirculation, incorrect earthing of product, ignition transformer has spark failure
F.32	Fan frost protection function active: Fan speed outside the tolerance values	Plug on fan not correctly plugged in, multiple plug on PCB not correctly plugged in, break in cable harness, fan blocked, Hall sensor defective, electronics defective
F.49	eBUS fault: Voltage too low	Short circuit on eBUS, eBUS overload or two power supplies with different polarities on the eBUS
F.61	Fault: Gas valve control system	Short circuit/short to earth in cable harness for the gas valve, gas valve defective (coils shorted to earth), electronics defective
F.62	Fault: Gas valve switch-off control	Delayed switch-off of gas valve, delayed extinguishing of flame signal, gas valve leaking, electronics defective
F.63	Fault: EEPROM	Electronics defective
F.64	Fault: Electronics/sensor/analogue-to-digital converter	Flow or return NTC short circuited, electronics defective
F.65	Fault: Electronics temperature too high	Electronics overheating due to external influences, electronics defective
F.67	Value sent back by ASIC is incorrect (flame signal)	Implausible flame signal, electronics defective
F.68	Fault: Unstable flame (analogue input)	Air in gas, gas flow pressure too low, incorrect air ratio, incorrect gas restrictor, ionisation flow interruption (cable, electrode)
F.70	Invalid product code (DSN)	Display and PCB replaced at same time and Device Specific Number not reset, wrong or missing output range coding resistance
F.71	Fault: Flow/return temperature sensor	Flow temperature sensor signalling constant value: Flow temperature sensor incorrectly positioned on supply pipe, flow temperature sensor defective
F.72	Fault: Deviation in the water pressure sensor/return temperature sensor	Flow/return NTC temperature difference too great → flow and/or return temperature sensor defective
F.73	Fault: Water pressure sensor not connected or has short-circuited	Interruption/short circuit of water pressure sensor, interruption/short circuit to GND in supply line to water pressure sensor or water pressure sensor defective
F.74	Fault: Electrical problem in the water pressure sensor	Line to water pressure sensor has a short circuit to 5 V/24 V or internal fault in the water pressure sensor
F.75	Fault: Pressure sensor	Pressure switch defective
F.76	The safety cut-out in the primary heat exchanger is defective	Safety cut-out feedback does not match the gas valve feedback
F.77	Fault: Condensate or smoke	No response, flue non-return flap defective
F.78	Interruption to DHW outlet sensor at external controller	UK link box is connected, but hot water NTC not bridged
F.83	Fault: Dry fire	When the burner starts, the temperature change registered at the flow or return temperature sensor is non-existent or too small: Insufficient water in the product, the flow or return temperature sensor is not in the correct position on the pipe

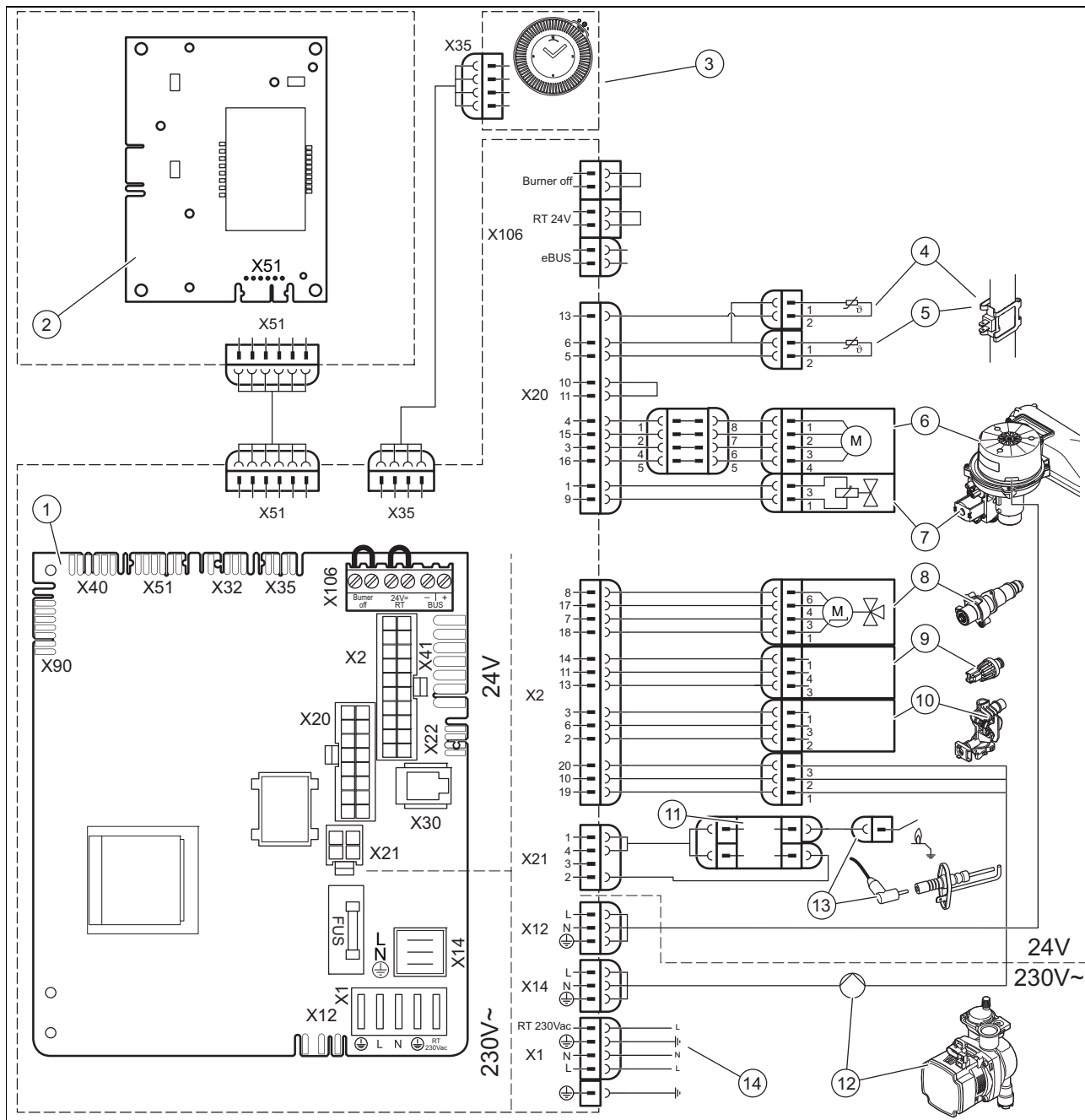
Fault code	Meaning	Possible cause
F.84	Fault: Flow/return temperature sensor	Values not consistent, difference < -6 K Flow and return temperature sensors signalling implausible values: Flow and return temperature sensors have been inverted, flow and return temperature sensors have not been correctly installed
F.85	Fault: Temperature sensor	The flow and/or return temperature sensors have been installed on the same pipe/incorrect pipe Temperature sensor not connected or is connected incorrectly
F.86	Fault: Underfloor heating contact	Underfloor heating contact open, sensor disconnected or defective
F.87	Fault: Electrodes	Electrodes not connected or they are connected incorrectly, short circuit in the cable harness
F.88	Fault: Gas valve	Gas valve not connected or it is connected incorrectly, short circuit in the cable harness
F.89	Fault: Pump	Pump not connected or it is connected incorrectly, incorrect pump connected, short circuit in the cable harness
Connection	No communication between the PCB and the user interface	Electronics defective

D Connection diagram: Combination unit



- | | | | |
|---|--|----|-----------------------------------|
| 1 | Main PCB | 8 | 3-way valve |
| 2 | Interface PCB | 9 | Pressure sensor |
| 3 | Timer | 10 | Flow rate sensor |
| 4 | Temperature sensor in the heating flow | 11 | External ignition device |
| 5 | Temperature sensor in the heating return | 12 | Heating pump |
| 6 | Fan | 13 | Ionisation and ignition electrode |
| 7 | Gas valve | 14 | Main power supply |

E Connection diagram: Combination unit (35 kW)



- | | | | |
|---|--|----|-----------------------------------|
| 1 | Main PCB | 8 | 3-way valve |
| 2 | Interface PCB | 9 | Pressure sensor |
| 3 | Timer | 10 | Flow rate sensor |
| 4 | Temperature sensor in the heating flow | 11 | External ignition device |
| 5 | Temperature sensor in the heating return | 12 | Heating pump |
| 6 | Fan | 13 | Ionisation and ignition electrode |
| 7 | Gas valve | 14 | Main power supply |

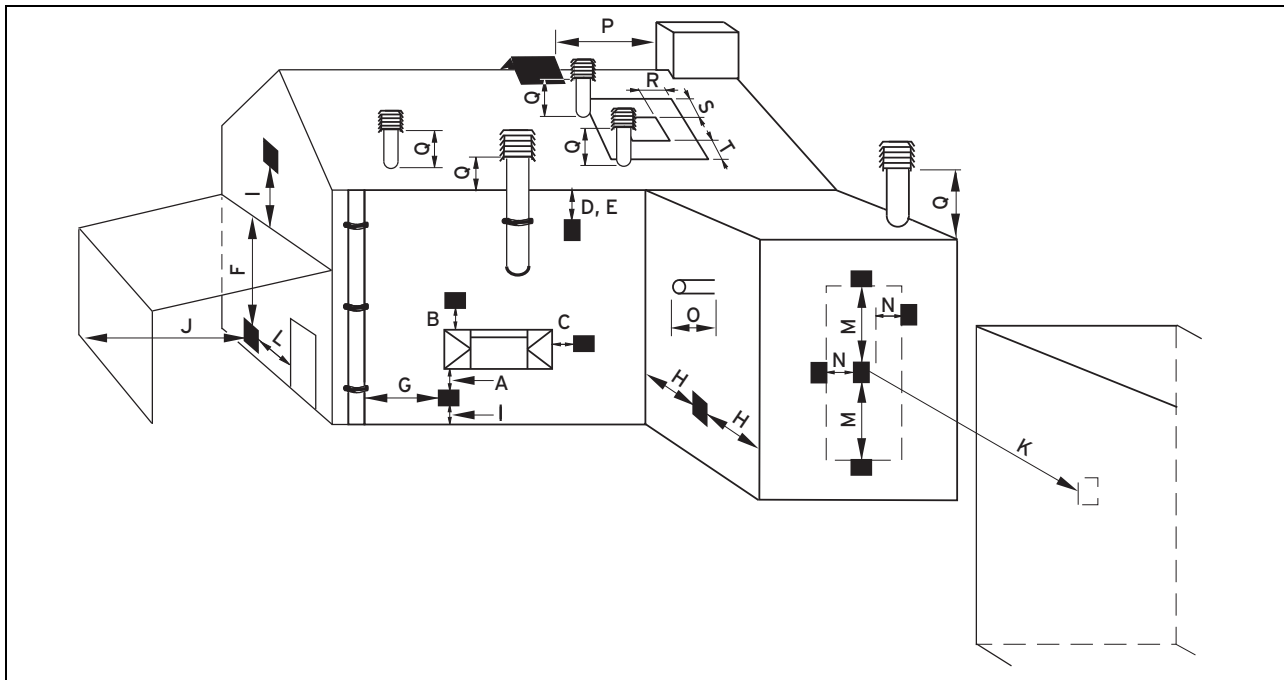
Appendix

F Inspection and maintenance work – Overview

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

No.	Work	Inspection (annual)	Maintenance (must be carried out at regular intervals)*
1	Check the air/flue pipe for leak-tightness and to ensure that it is fastened correctly. Make sure that it is not blocked or damaged and has been installed in accordance with the relevant Installation Manual.	X	X
2	Check the general condition of the product. Remove dirt from the product and from the vacuum chamber.	X	X
3	Visually inspect the general condition of the heat exchanger. In doing so, pay particular attention to signs of corrosion, rust and other defects. If you notice any damage, carry out maintenance work.	X	X
4	Check the gas connection pressure at maximum heat input. If the gas connection pressure is not within the correct range, carry out maintenance work.	X	X
5	Check the CO ₂ content (the air ratio) of the product and, if necessary, adjust it. Keep a record of this.	X	X
6	Disconnect the product from the power mains. Check that the electrical plug connections and other connections are seated correctly and correct these if necessary.	X	X
7	Close the gas isolator cock and the service valves.	X	X
8	Drain the product on the water side. Check the admission pressure of the expansion vessel and top the vessel up if necessary (approx. 0.03 MPa/0.3 bar below the system filling pressure).		X
9	Remove the gas-air mixture unit.		X
10	Check the seals in the combustion area. If you see any damage, replace the seals. Replace both burner seals each time it is opened and accordingly each time maintenance work is carried out.		X
11	Clean the heat exchanger.		X
12	Check the burner for damage and replace it if necessary.		X
13	Check the condensate siphon in the product, clean and fill if necessary.	X	X
14	Install the gas-air mixture unit. Caution: Replace the seals.		X
15	If the volume of water is insufficient or the outlet temperature is not reached, replace the secondary heat exchanger if necessary.		X
16	Clean the filter in the cold water inlet. Replace the filter if impurities can no longer be removed or if the filter is damaged. In this case, also check the impeller sensor for dirt and damage, clean the sensor (do not use compressed air for this) and replace the sensor if it is damaged.		X
17	Open the gas isolator cock, reconnect the product to the power mains and switch the product on.	X	X
18	Open the service valves, fill up the product/heating installation to 0.05-0.3 MPa/0.5-3.0 bar (depending on the static height of the heating installation) and start purging programme P.XX .		X
19	Perform a test operation of the product and heating installation, including hot water generation, and purge the system once more if necessary.	X	X
20	Visually inspect the ignition and burner behaviour.	X	X
21	Check the CO ₂ content (the air ratio) of the product again.		X
22	Check the product for gas, flue gas, hot water and condensate leaks, and repair if necessary.	X	X
23	Record the inspection/maintenance work carried out.	X	X
*Note: For those appliances which are not part of an annual service agreement/policy, maintenance must be carried out at least every 5 years.			

G Opening in the flue pipe



G.1 Positioning of the opening of a fan-supported flue gas pipe

	Installation site	Minimum dimensions
A	Directly below an opening, air bricks, opening windows, etc., that can be opened.	300 mm
B	Above an opening, air bricks, opening windows, etc., that can be opened.	300 mm
C	Horizontally to an opening, air bricks, opening windows, etc., that can be opened.	300 mm
D	Below temperature-sensitive building components, e.g. plastic gutters, down pipes or wastewater pipes	75 mm
E	Below eaves	200 mm
F	Below balconies or car port roofs	200 mm
G	From vertical wastewater pipes or down pipes	150 mm
H	From external or internal corners	200 mm
I	Above floors, roofs or balconies	300 mm
J	From a surface facing a terminal	600 mm
K	From a terminal facing a terminal	1,200 mm
L	From an opening in the car port (e.g. door, window) which leads into the dwelling	1,200 mm
M	Vertical from a terminal on the same wall	1,500 mm
N	Horizontal from a terminal on the same wall	300 mm
O	From the wall on which the terminal has been installed	0 mm
P	From a vertical structure on the roof	300 mm
Q	Above the roof area	300 mm
R	Horizontal from adjacent windows on pitched or flat roofs	600 mm
S	Above adjacent windows on pitched or flat roofs	600 mm
T	Below adjacent windows on pitched or flat roofs	2,000 mm

Appendix

G.2 Horizontal terminal positioning

BS 5440-1 recommends that fanned flue chimney terminals should be positioned as follows:

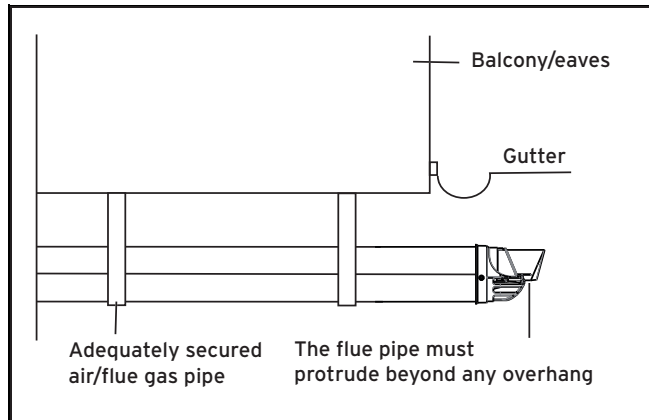
- a) at least 2 m from an opening in the building directly opposite, and
- b) so that the products of combustion are not directed to discharge directly across a boundary if the products are likely to cause a nuisance to a neighbour or discharge over a walkway or patio.

For IE see current issue of IS 813.

For boilers covered within this manual.

1) Dimensions D, E, F and G:

These clearances may be reduced to 25 mm without affecting the performance of the boiler. In order to ensure that the condensate plume does not affect adjacent surfaces the terminal should be extended as shown below.



2) Dimension H:

This clearance may be reduced to 25 mm without affecting the performance of the boiler. However, in order to ensure that the condensate plume does not affect adjacent surfaces a clearance of 300 mm is preferred.

For 1 and 2 above you can use a flue gas management kit to enable the termination point to be positioned and directed away from the building fabric.

H Commissioning Checklist

Benchmark Commissioning and Servicing Section

It is a requirement that the boiler is installed and commissioned to the manufacturers instructions and the data fields on the commissioning checklist completed in full.

To instigate the boiler guarantee the boiler needs to be registered with the manufacturer within one month of the installation.

To maintain the boiler guarantee it is essential that the boiler is serviced annually by a Gas Safe registered engineer who has been trained on the boiler installed. The service details should be recorded on the Benchmark Service Interval Record and left with the householder.



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Appendix

GAS BOILER SYSTEM COMMISSIONING CHECKLIST

This Commissioning Checklist is to be completed in full by the competent person who commissioned the boiler as a means of demonstrating compliance with the appropriate Building Regulations and then handed to the customer to keep for future reference.

Failure to install and commission according to the manufacturer's instructions and complete this Benchmark Commissioning Checklist will invalidate the warranty. This does not affect the customer's statutory rights.

Customer name:				Telephone number:				
Address:								
Boiler make and model:								
Boiler serial number:								
Commissioned by (PRINT NAME):				Gas Safe register number:				
Company name:				Telephone number:				
Company address:								
Commissioning date:								
To be completed by the customer on receipt of a Building Regulations Compliance Certificate*								
Building Regulations Notification Number (if applicable):								
CONTROLS (tick the appropriate boxes)								
Time and temperature control to heating	Room thermostat and programmer/timer		Programmable room thermostat					
	Load/weather compensation		Optimum start control					
Time and temperature control to hot water	Cylinder thermostat and programmer/timer		Combination Boiler					
Heating zone valves	Fitted		Not required					
Hot water zone valves	Fitted		Not required					
Thermostatic radiator valves	Fitted		Not required					
Automatic bypass to system	Fitted		Not required					
Boiler interlock			Provided					
ALL SYSTEMS								
The system has been flushed and cleaned in accordance with BS7593 and boiler manufacturer's instructions							Yes	
What system cleaner was used?								
What inhibitor was used?							Quantity	litres
Has a primary water system filter been installed?							Yes	No
CENTRAL HEATING MODE measure and record:								
Gas rate	m ³ /hr		OR		ft ³ /hr			
Burner operating pressure (if applicable)	mbar		OR Gas inlet pressure		mbar			
Central heating flow temperature					°C			
Central heating return temperature					°C			
COMBINATION BOILERS ONLY								
Is the installation in a hard water area (above 200ppm)?							Yes	No
If yes, and if required by the manufacturer, has a water scale reducer been fitted?							Yes	No
What type of scale reducer has been fitted?								
DOMESTIC HOT WATER MODE Measure and Record:								
Gas rate	m ³ /hr		OR		ft ³ /hr			
Burner operating pressure (at maximum rate)	mbar		OR Gas inlet pressure at maximum rate		mbar			
Cold water inlet temperature					°C			
Hot water has been checked at all outlets							Yes	Temperature °C
Water flow rate					l/min			
CONDENSING BOILERS ONLY								
The condensate drain has been installed in accordance with the manufacturer's instructions and/or BS5546/BS6798							Yes	
ALL INSTALLATIONS								
Record the following:	At max. rate:	CO	ppm	AND	CO/CO ₂	Ratio		
	At min. rate: (where possible)	CO	ppm	AND	CO/CO ₂	Ratio		
The heating and hot water system complies with the appropriate Building Regulations							Yes	
The boiler and associated products have been installed and commissioned in accordance with the manufacturer's instructions							Yes	
The operation of the boiler and system controls have been demonstrated to and understood by the customer							Yes	
The manufacturer's literature, including Benchmark Checklist and Service Record, has been explained and left with the customer							Yes	
Commissioning Engineer's Signature								
Customer's Signature								
(To confirm satisfactory demonstration and receipt of manufacturer's literature)								

*All installations in England and Wales must be notified to Local Authority Building Control (LABC) either directly or through a Competent Persons Scheme. A Building Regulations Compliance Certificate will then be issued to the customer.



SERVICE RECORD

It is recommended that your heating system is serviced regularly and that the appropriate Service Interval Record is completed.

Service Provider

Before completing the appropriate Service Record below, please ensure you have carried out the service as described in the manufacturer's instructions. Always use the manufacturer's specified spare part when replacing controls.

SERVICE 01				Date:			
Engineer name:							
Company name:							
Telephone No:							
Gas safe register No:							
Record:	At max. rate:	CO	ppm	AND	CO ₂ %		
	At min. rate: (Where Possible)	CO	ppm	AND	CO ₂ %		
Comments:							
Signature							

SERVICE 02				Date:			
Engineer name:							
Company name:							
Telephone No:							
Gas safe register No:							
Record:	At max. rate:	CO	ppm	AND	CO ₂ %		
	At min. rate: (Where Possible)	CO	ppm	AND	CO ₂ %		
Comments:							
Signature							

SERVICE 03				Date:			
Engineer name:							
Company name:							
Telephone No:							
Gas safe register No:							
Record:	At max. rate:	CO	ppm	AND	CO ₂ %		
	At min. rate: (Where Possible)	CO	ppm	AND	CO ₂ %		
Comments:							
Signature							

SERVICE 04				Date:			
Engineer name:							
Company name:							
Telephone No:							
Gas safe register No:							
Record:	At max. rate:	CO	ppm	AND	CO ₂ %		
	At min. rate: (Where Possible)	CO	ppm	AND	CO ₂ %		
Comments:							
Signature							

SERVICE 05				Date:			
Engineer name:							
Company name:							
Telephone No:							
Gas safe register No:							
Record:	At max. rate:	CO	ppm	AND	CO ₂ %		
	At min. rate: (Where Possible)	CO	ppm	AND	CO ₂ %		
Comments:							
Signature							

SERVICE 06				Date:			
Engineer name:							
Company name:							
Telephone No:							
Gas safe register No:							
Record:	At max. rate:	CO	ppm	AND	CO ₂ %		
	At min. rate: (Where Possible)	CO	ppm	AND	CO ₂ %		
Comments:							
Signature							

SERVICE 07				Date:			
Engineer name:							
Company name:							
Telephone No:							
Gas safe register No:							
Record:	At max. rate:	CO	ppm	AND	CO ₂ %		
	At min. rate: (Where Possible)	CO	ppm	AND	CO ₂ %		
Comments:							
Signature							

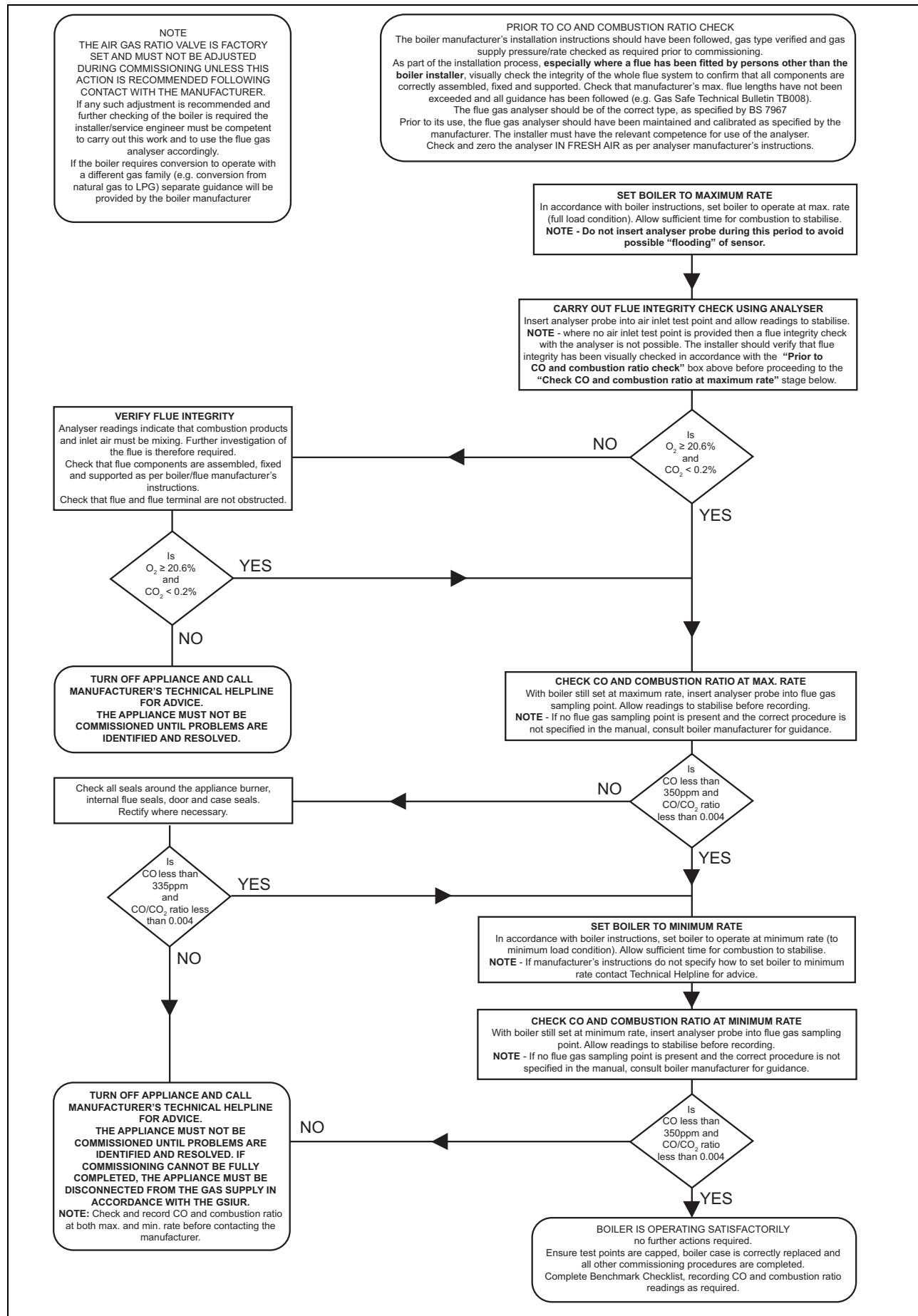
SERVICE 08				Date:			
Engineer name:							
Company name:							
Telephone No:							
Gas safe register No:							
Record:	At max. rate:	CO	ppm	AND	CO ₂ %		
	At min. rate: (Where Possible)	CO	ppm	AND	CO ₂ %		
Comments:							
Signature							

SERVICE 09				Date:			
Engineer name:							
Company name:							
Telephone No:							
Gas safe register No:							
Record:	At max. rate:	CO	ppm	AND	CO ₂ %		
	At min. rate: (Where Possible)	CO	ppm	AND	CO ₂ %		
Comments:							
Signature							

SERVICE 10				Date:			
Engineer name:							
Company name:							
Telephone No:							
Gas safe register No:							
Record:	At max. rate:	CO	ppm	AND	CO ₂ %		
	At min. rate: (Where Possible)	CO	ppm	AND	CO ₂ %		
Comments:							
Signature							

*All installations in England and Wales must be notified to Local Authority Building Control (LABC) either directly or through a Competent Persons Scheme. A Building Regulations Compliance Certificate will then be issued to the customer.





I Technical data

Technical data – Heating

	VUW 256/6-3 (H-GB)	VUW 306/6-3 (H-GB)	VUW 356/6-3 (H-GB)
Max. flow temperature adjustment range (default setting: 75 °C)	10 ... 80 °C	10 ... 80 °C	10 ... 80 °C
Maximum permissible pressure	0.3 MPa (3.0 bar)	0.3 MPa (3.0 bar)	0.3 MPa (3.0 bar)
Nominal water flow ($\Delta T = 20$ K)	788 l/h	788 l/h	788 l/h
Nominal water flow ($\Delta T = 30$ K)	525 l/h	525 l/h	525 l/h
Approximate value for the condensate volume (pH value between 3.5 and 4.0) at 50/30 °C	1.84 l/h	1.84 l/h	1.84 l/h
ΔP heating at nominal flow ($\Delta T = 20$ K)	0.025 MPa (0.250 bar)	0.025 MPa (0.250 bar)	0.018 MPa (0.180 bar)

Technical data – G20 power/loading G20

	VUW 256/6-3 (H-GB)	VUW 306/6-3 (H-GB)	VUW 356/6-3 (H-GB)
Maximum heat output	18 kW	25 kW	25 kW
Effective output range (P) at 40/30 °C	5.4 ... 19.5 kW	6.5 ... 19.5 kW	7.6 ... 19.5 kW
Effective output range (P) at 50/30 °C	5.3 ... 19.1 kW	6.3 ... 19.1 kW	7.5 ... 19.1 kW
Effective output range (P) at 80/60 °C	5.1 ... 18.3 kW	6.1 ... 18.3 kW	7.2 ... 18.3 kW
Domestic hot water heat output (P)	5.0 ... 25.2 kW	6.0 ... 30.0 kW	7.1 ... 35.0 kW
Maximum heat input – heating (Q max.)	18.4 kW	18.4 kW	18.4 kW
Minimum heat input – heating (Q min.)	5.1 kW	6.1 kW	7.2 kW
Maximum heat input – hot water (Q max.)	25.7 kW	30.6 kW	35.7 kW
Minimum heat input – hot water (Q min.)	5.1 kW	6.1 kW	7.2 kW

Technical data – Domestic hot water

	VUW 256/6-3 (H-GB)	VUW 306/6-3 (H-GB)	VUW 356/6-3 (H-GB)
Specific flow rate (D) ($\Delta T = 30$ K) in accordance with EN 13203	12.1 l/min	14.2 l/min	16.5 l/min
Continuous flow rate ($\Delta T = 35$ K)	622 l/h	730 l/h	849 l/h
Specific flow rate ($\Delta T = 35$ K)	10.4 l/min	12.2 l/min	14.1 l/min
Minimum permissible pressure	0.03 MPa (0.30 bar)	0.03 MPa (0.30 bar)	0.03 MPa (0.30 bar)
Maximum permissible pressure	1 MPa (10 bar)	1 MPa (10 bar)	1 MPa (10 bar)
Recommended pressure	0.2 MPa (2.0 bar)	0.2 MPa (2.0 bar)	0.2 MPa (2.0 bar)
Temperature range	35 ... 60 °C	35 ... 60 °C	35 ... 60 °C
Flow rate limiter	8.0 l/min	10.0 l/min	12.0 l/min

Technical data – General

	VUW 256/6-3 (H-GB)	VUW 306/6-3 (H-GB)	VUW 356/6-3 (H-GB)
Gas category	I _{2H}	I _{2H}	I _{2H}
Diameter of the gas pipe	1/2 inch	1/2 inch	1/2 inch

Appendix

	VUW 256/6-3 (H-GB)	VUW 306/6-3 (H-GB)	VUW 356/6-3 (H-GB)
Diameter of the heating connections	3/4 inch	3/4 inch	3/4 inch
Expansion relief valve connector (min.)	15 mm	15 mm	15 mm
Condensate drain pipework (min.)	21.5 mm	21.5 mm	21.5 mm
G20 gas supply pressure	2.0 kPa (20.0 mbar)	2.0 kPa (20.0 mbar)	2.0 kPa (20.0 mbar)
Gas flow at P max. – hot water (G20)	2.7 m³/h	3.2 m³/h	3.8 m³/h
Gas flow at P max. – heating mode (G20)	1.9 m³/h	1.9 m³/h	1.9 m³/h
Gas flow at P min. (G20)	0.540 m³/h	0.646 m³/h	0.762 m³/h
CE number (PIN)	CE-0063CP3646	CE-0063CP3646	CE-0063CP3646
Flue gas mass rate in heating mode at P min.	2.34 g/s	2.80 g/s	3.30 g/s
Flue gas mass rate in heating mode at P max.	8.3 g/s	8.3 g/s	8.3 g/s
Flue gas mass rate in hot water handling mode at P max.	11.6 g/s	13.8 g/s	16.1 g/s
Flue gas temperature (80 °C/60 °C) at P max.	60 °C	77 °C	86 °C
Flue gas temperature (80 °C/60 °C) at P min.	55 °C	55 °C	56 °C
Flue gas temperature (50 °C/30 °C) at P max.	51 °C	62 °C	60 °C
Flue gas temperature (50 °C/30 °C) at P min.	34 °C	35 °C	37 °C
Flue gas temperature in hot water handling mode	69 °C	68 °C	75 °C
Flue gas temperature when overheating	105 °C	95 °C	104 °C
Released system types	C13, C33, C43, C53	C13, C33, C43, C53	C13, C33, C43, C53
Nominal efficiency at 80/60 °C	99.6 %	99.6 %	99.6 %
Nominal efficiency at 50/30 °C	104.0 %	104.0 %	104.0 %
Nominal efficiency at 40/30 °C	106.0 %	106.0 %	106.0 %
NOx class	5	5	5
Product dimensions, width	390 mm	390 mm	390 mm
Product dimensions, depth	295 mm	295 mm	295 mm
Product dimensions, height	702 mm	702 mm	702 mm
Net weight	32 kg	33 kg	33 kg
Weight when filled with water	36 kg	37 kg	37 kg

Technical data – Electrics

	VUW 256/6-3 (H-GB)	VUW 306/6-3 (H-GB)	VUW 356/6-3 (H-GB)
Electric connection	230 V / 50 Hz	230 V / 50 Hz	230 V / 50 Hz
Built-in fuse (slow-blow)	T2/2A, 250V	T2/2A, 250V	T2/2A, 250V
Max. electrical power consumption	87 W	87 W	98 W
Standby electrical power consumption	2 W	2 W	3 W
Level of protection	IPX4D	IPX4D	IPX4D

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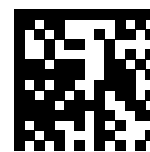
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0020230529_02

0020230529_02 ■ 21.12.2016

Supplier

Vaillant Ltd.

Nottingham Road ■ Belper ■ Derbyshire ■ DE56 1JT

Telephone 0330 100 3461

info@vaillant.co.uk ■ www.vaillant.co.uk

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