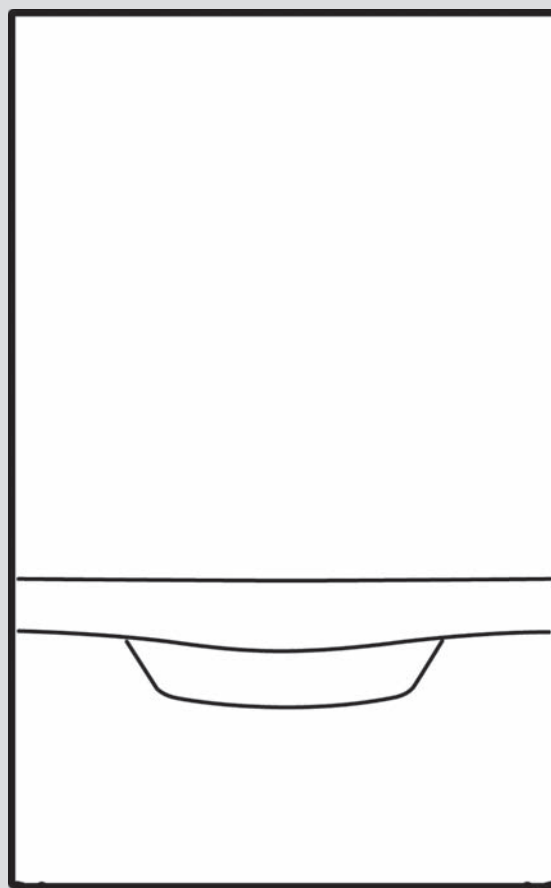




ecoTEC exclusive

VUW 356/5-7 (H-GB) ecoTEC exclusive 835

VUW 436/5-7 (H-GB) ecoTEC exclusive 843



Installation and maintenance instructions

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1 Safety

1.1 Intended use

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

Improper use of any kind is prohibited.

Intended use also includes the following:

- use of the product only in mobile homes that are made, transported once and permanently situated in Great Britain and Ireland. After the transportation of the mobile home to its destination the complete product must be checked for leak-tightness again
- validity of the product only for Great Britain and Ireland and for the gas types in Great Britain and Ireland as listed on the data plate
- Installing and operating the product only in conjunction with accessories for the air/flue pipe which are listed in the other applicable documents and comply with the type of unit
- Using the product while observing the accompanying operating, installation and maintenance instructions for the product along with all other components of the installation
- Installing and setting up the product while observing the product and system approval
- Observing all inspection and maintenance conditions listed in the instructions
- Installing while observing the IP code

The following is classed as improper use:

- Using the product in vehicles, such as mobile homes or caravans. Units that are not classed as vehicles are those that are installed in a fixed and permanent location (known as "fixed installation").
- Any direct use in industrial or commercial processes
- Any use other than those described in these instructions and any use that goes beyond what is described here

1.2 Qualification

The person carrying out the work described here must have completed professional training. The competent person must demonstrably have all of the knowledge, skills and capabilities that are required in order to carry out the work mentioned below.

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

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

The above-mentioned work must always only be carried out by persons with sufficient qualifications.

This product can be used by children over eight years old and also by persons with limited physical, sensory or mental capabilities or insufficient experience and/or knowledge if they are supervised or have been provided with instructions on how to safely use the product, and they understand the risks resulting from using the product. Children must not play with the product. Cleaning and user maintenance work must not be carried out by children unless they are supervised.

1.3 General safety information

The following sections convey important safety information. It is essential to read and observe this information in order to prevent risk of death, risk of injury, material damage or environmental damage.

1.3.1 Gas

If you smell gas:

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





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

1.3.2 Flue gas

Flue gases may cause poisoning, while hot flue gases may also cause burns. Flue gases must therefore never be allowed to escape uncontrollably.

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.

To prevent flue gas exit:

- ▶ 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.
- ▶ In order to operate the product, ensure that the condensate siphon is always full.
 - Water seal level for units with condensate siphon (third-party accessory):
≥ 200 mm

To ensure that the seals are not damaged:

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

1.3.3 Air supply

Unsuitable or insufficient combustion and room air may lead to material damage, but also to life-threatening situations.

To ensure that the combustion air supply is sufficient during open-flued operation:

- ▶ Ensure that the air supply to the product's installation room is permanently unobstructed and sufficient in accordance with the relevant ventilation requirements. This also applies, in particular, for cupboard installations.

To prevent corrosion on the product and in the flue system:

- ▶ Ensure that the combustion air supply is free from sprays, solvents, chlorinated cleaning agents, paint, adhesives, ammonia compounds, dust or similar substances.
- ▶ Ensure that no chemical substances are stored at the installation site.
- ▶ If you are installing the product in hairdressing salons, painter's or joiner's workshops, cleaning businesses or similar locations, choose a separate installation room in which the room air is technically free of chemical substances.

1.3.4 Electricity

The power supply terminals L and N remain live.

To prevent electric shocks, proceed as follows before working on the product:

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

1.3.5 Weight

To prevent injuries when transporting the product:

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

To prevent material damage to the flexible gas pipe:

- ▶ Never suspend the compact thermal module on the flexible gas pipe.





1.3.6 Explosive and flammable substances

To prevent explosions and fire:

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

1.3.7 High temperatures

To prevent burns:

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

To prevent material damage that is caused by heat transfer:

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

1.3.8 Heating water

Both unsuitable heating water and air in the heating water may cause material damage to the product and in the heat generator circuit.

- ▶ Check the quality of the heating water. (→ Page 27)
- ▶ If you use non-diffusion-tight plastic pipes in the heating installation, ensure that no air gets into the heat generator circuit.

1.3.9 Neutralisation device

To prevent contamination of the waste water:

- ▶ Check whether a neutralising unit must be installed in accordance with national regulations.
- ▶ Observe local regulations on neutralising condensate.

1.3.10 Frost

To prevent material damage:

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

1.3.11 Safety devices

- ▶ Install the necessary safety devices in the installation.

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

Liquid gas accumulates at floor level. If the product is installed below ground level, liquid gas may accumulate at floor level if there

are any leaks. In this case, there is a risk of explosion.

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

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

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

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

1.3.14 Risk of damage to the flexible gas pipe

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

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

1.4 Regulations (directives, laws, standards)

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

1.5 List of relevant standards for Great Britain and Ireland

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



You can find a list of relevant standards at:
<https://www.vaillant.co.uk/standards>



Guarantee Registration

Thank you for installing a new Vaillant appliance in your home.
Vaillant appliances are manufactured to the very highest standard so we are pleased to offer our customers a comprehensive guarantee.

To maintain your guarantee, the boiler must be serviced annually by a competent person who holds the required qualifications in accordance with the rules in force of the country where the product is installed and in accordance with the manufactures recommendations.

We recommend you complete your guarantee registration as soon as possible.

Sales Support:

Telephone: 0345 602 0262

Technical Enquiries:

Telephone: 0344 693 3133

Email: technical@vaillant.co.uk

General Enquiries:

Telephone: 0345 602 2922

Training Enquiries:

Telephone: 0345 601 8885

Email: training.enquiriesuk@vaillant-group.com

Spares Enquiries:

Telephone: 01773 596 615

To register your Vaillant appliance visit:

<https://self-service.vaillant.co.uk/warranty-registration>



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.



3 Technical data

Technical data – General

	VUW 356/5-7 (H-GB) ecoTEC exclusive 835	VUW 436/5-7 (H-GB) ecoTEC exclusive 843
Designated country (designation in accordance with ISO 3166)	GB (United Kingdom)	GB (United Kingdom)
Approved unit categories	II _{2H3P}	II _{2H3P}
Gas connection, boiler side	15 x 1.0 mm	20 x 2.0 mm
Flow/return heating connections, boiler side	22 x 1.5 mm	22 x 1.5 mm
Hot and cold water connection, boiler side	15 x 1.5 mm	15 x 1.5 mm
Expansion relief valve connector (min.)	15 mm	15 mm
Air/flue gas connection	60/100 mm	60/100 mm
Condensate drain pipe-work (min.)	19 mm	19 mm
Gas connection pressure, G20 natural gas	2.0 kPa (20.0 mbar)	2.0 kPa (20.0 mbar)
Gas connection pressure, G31 propane	3.7 kPa (37.0 mbar)	3.7 kPa (37.0 mbar)
Gas flow rate at 15 °C and 1013 mbar (based on hot water generation, if applicable), G20	3.5 m³/h	4.3 m³/h
Gas flow rate at 15 °C and 1013 mbar (based on hot water generation, if applicable), G31	2.54 kg/h	3.12 kg/h
Min. flue gas mass rate (G20)	1.62 g/s	2.02 g/s
Min. flue gas mass rate (G31)	3.62 g/s	3.62 g/s
Max. flue gas mass rate	14.68 g/s	18.04 g/s
Min. flue gas temperature	40 °C	40 °C
Max. flue gas temperature	65 °C	65 °C
Approved gas-fired units	C13, C33, C53	C13, C33, C53
30% efficiency	109.7 %	109.8 %
NOx class	6	6
Test symbol/registration no.	CE-0085CM0320	CE-0085CM0320
Device Specific Number (DSN)	211	212
SAP 2009/2012 annual efficiency (G20)	89.7 %	89.6 %
SAP 2009/2012 annual efficiency (G31)	90.2 %	90.4 %
Boiler dimension, width	440 mm	440 mm
Boiler dimension, height	720 mm	720 mm
Boiler dimension, depth	406 mm	474 mm
Mounting weight	47.5 kg	55.0 kg
Operating weight (with water)	48.7 kg	57.0 kg

Technical data – G20 power/loading G20

* The lowest nominal heat output may be higher than the value in the technical data, depending on the design of the system and the current operating status.

	VUW 356/5-7 (H-GB) ecoTEC exclusive 835	VUW 436/5-7 (H-GB) ecoTEC exclusive 843
Nominal heat output range P at 50/30 °C *	3.9 to 26.4 kW	4.8 to 36.0 kW
Nominal heat output range P at 80/60 °C *	3.4 to 24.6 kW	4.3 to 33.4 kW
Maximum heat output for hot water generation	35.3 kW	43.4 kW
Maximum heat input for hot water generation	32.7 kW	40.2 kW
Maximum heat input, heating side	24.8 kW	33.7 kW
Minimum heat input	3.6 kW	4.5 kW
Heating adjustment range	4 to 25 kW	5 to 34 kW

Technical data – Power/loading G31

* The lowest nominal heat output may be higher than the value in the technical data, depending on the design of the system and the current operating status.

	VUW 356/5-7 (H-GB) ecoTEC exclusive 835	VUW 436/5-7 (H-GB) ecoTEC exclusive 843
Nominal heat output range P at 50/30 °C *	8.6 to 26.4 kW	8.5 to 36.0 kW
Nominal heat output range P at 80/60 °C *	7.6 to 24.6 kW	7.6 to 33.4 kW
Maximum heat output for hot water generation	35.3 kW	43.4 kW
Maximum heat input for hot water generation	32.7 kW	40.2 kW
Maximum heat input, heating side	24.8 kW	33.7 kW
Minimum heat input	8.0 kW	8.0 kW

Technical data – Heating

	VUW 356/5-7 (H-GB) ecoTEC exclusive 835	VUW 436/5-7 (H-GB) ecoTEC exclusive 843
Maximum flow temperature	85 °C	85 °C
Max. flow temperature adjustment range (default setting: 75 °C)	30 to 80 °C	30 to 80 °C
Permissible total over-pressure	0.25 MPa (2.50 bar)	0.25 MPa (2.50 bar)
Minimum pressure for full operation	0.08 MPa (0.80 bar)	0.08 MPa (0.80 bar)
Expansion vessel capacity	10 l	10 l
Circulation water volume (with reference to ΔT= 20 K)	1,058 l/h	1,436 l/h

	VUW 356/5-7 (H-GB) ecoTEC exclusive 835	VUW 436/5-7 (H-GB) ecoTEC exclusive 843
Approx. condensate rate (pH value 3.5 to 4.0) in 50/30 °C heating mode	2.48 l/h	3.37 l/h
Remaining feed head of pump (at nominal circula- tion water volume)	0.025 MPa (0.250 bar)	0.024 MPa (0.240 bar)

Technical data – Hot water handling mode

	VUW 356/5-7 (H-GB) ecoTEC exclusive 835	VUW 436/5-7 (H-GB) ecoTEC exclusive 843
Lowest water volume	1.5 l/min	1.5 l/min
Water volume (at $\Delta T = 30$ K)	16.9 l/min	20.7 l/min
Water volume (at $\Delta T = 35$ K)	14.5 l/min	17.8 l/min
Water volume (at $\Delta T = 45$ K)	11.2 l/min	13.8 l/min
Permitted overpressure	1.0 MPa (10.0 bar)	1.0 MPa (10.0 bar)
Required connection pressure	0.035 MPa (0.350 bar)	0.035 MPa (0.350 bar)
Hot water output temper- ature range	35 to 65 °C	35 to 65 °C

Technical data – Electrics

	VUW 356/5-7 (H-GB) ecoTEC exclusive 835	VUW 436/5-7 (H-GB) ecoTEC exclusive 843
Electric connection	230 V/50 Hz	230 V/50 Hz
Permissible connected voltage	190 to 253 V	190 to 253 V
Built-in fuse (slow-blow)	2 A	2 A
Min. electrical power con- sumption	47 W	46 W
Max. electrical power consumption for heat- ing mode (nominal heat loading)	79 W	78 W
Max. electrical power consumption for cylinder charging	89 W	121 W
Standby electrical power consumption	< 1.9 W	< 1.9 W
Level of protection	IP X4 D	IP X4 D

4 Notes on the documentation

- Always observe all operating instructions enclosed with the installation components.
- Store these instructions and all other applicable documents for further use.

These instructions apply only to:

Product article number

	Article num- ber	Gas Council Number
VUW 356/5-7 (H-GB) ecoTEC exclusive 835	0010017064	47-044-66
VUW 436/5-7 (H-GB) ecoTEC exclusive 843	0010017065	47-044-67

5 Product description

5.1 CE marking



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

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

5.2 Energy Saving Trust Endorsed Products



Only the most energy efficient products can carry the 'Energy Saving Trust Endorsed Product' brandmark making it easy for consumers to choose products that have met strict energy performance criteria.

Available for: Boilers, Heating controls and chemical inhibitors, the Energy Saving Trust endorsed product brandmark gives consumers confidence that a product will cost less to run, help lower energy bills and reduce carbon emissions.




About the Energy Saving Trust

Energy Saving Trust is an independent and impartial organisation that provides trusted energy saving advice to empower millions of people to lead affordable, low energy lifestyles. For more information visit energysavingtrust.org.uk

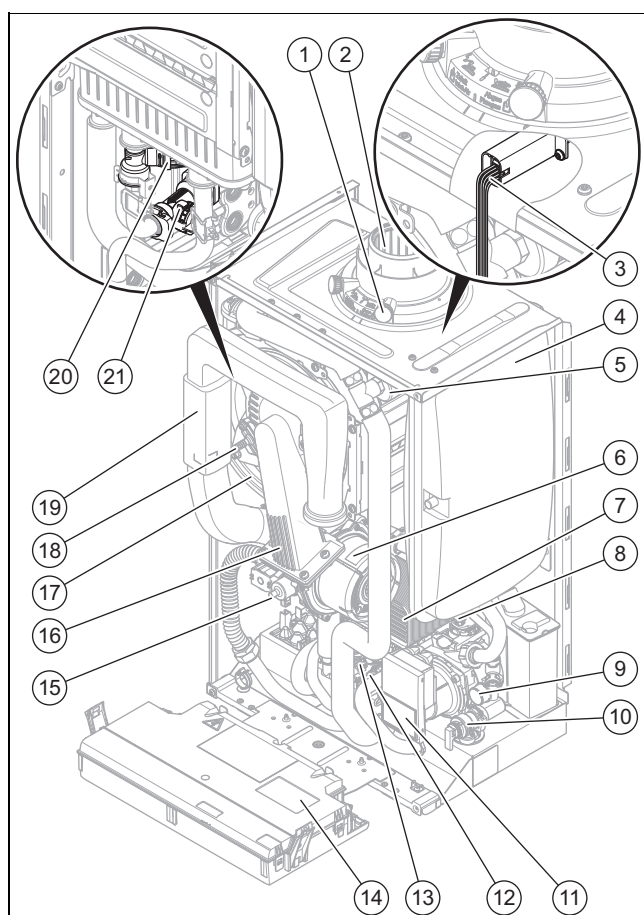
5.3 Information on the identification plate

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

Information on the identification plate	Meaning
	Read the instructions.
VU(W) ...	Type designation
..6/5-7	Calorific value power/product generation equipment
ecoTEC exclusive	Product description

Information on the identification plate	Meaning
2H, G20 – 20 mbar (2.0 kPa)	Gas group and gas connection pressure as set at the factory
ww/yyyy	Date of manufacture: Week/year
Cat.	Approved unit categories
Types	Approved gas-fired units
PMS	Permissible total overpressure in heating mode
PMW	Permissible total overpressure during hot water generation
T _{max.}	Max. flow temperature
ED 92/42	Current efficiency directive fulfilled with 4* rating
V Hz	Mains voltage and mains frequency
W	Max. electrical power consumption
IP	Level of protection
	Heating mode
	Hot water generation
P	Nominal heat output range
Q	Heat input range
D	Nominal hot water draw-off rate
	Bar code with serial number, 7th to 16th digit = product article number

5.4 Product design



- | | |
|--------------------------------|-------------------------|
| 1 Flue gas measuring stub pipe | 3 All-gas sensor |
| 2 Connection for the flue pipe | 4 Expansion vessel |
| | 5 Water hammer arrester |

- | | |
|----------------------------|---------------------------|
| 6 Fan | 14 Electronics box |
| 7 Secondary heat exchanger | 15 Gas valve |
| 8 Automatic air vent | 16 Compact thermal module |
| 9 Pressure gauge | 17 Heat exchanger |
| 10 Expansion relief valve | 18 Ignition electrode |
| 11 High-efficiency pump | 19 Air intake pipe |
| 12 Diverter valve | 20 Water pressure sensor |
| 13 Bypass valve | 21 Volume flow sensor |

5.5 Serial number

The serial number can be found on a plastic label behind the front flap and on the identification plate.



Note

The serial number can also be shown on the display of the product (→ Operating instructions).

5.6 Safety Devices

5.6.1 Electrical Supply Failure

The boiler will not work without an electrical supply. Normal operation of the boiler should resume when the electrical supply is restored.

Reset any external controls, to resume normal operation of the central heating.

If the boiler does not resume normal operation press the reset button. If the boiler does not resume normal operation after this call your Installation/ Servicing company or Vaillant service.

5.6.2 Overheating Safety

The boiler software is designed to recognise the potential for an overheat lockout and will shutdown before this happens. To restart the boiler, press the reset button on the boiler interface.

If the boiler fails to resume normal operation and all external controls are calling for heat, then call your Installation/ Servicing company or Vaillant service.

5.6.3 Frost protection

The appliance has a built in frost protection device that protects the boiler from freezing. With the gas and electric supplies ON and irrespective of any room thermostat setting, the frost protection device will operate the pump when the temperature of the boiler water falls below 12 °C.

A timer is used so that the temperature can be checked periodically. After 10 minutes the pump will be stopped if the temperature is higher than 10 °C or has already reached 35 °C. The burner will activate if the boiler temperature does not reach 10 °C after 30 minutes or at any time if the temperature drops to 5 °C.

The burner will switch off when the temperature reaches 35 °C.

5.6.4 Condensate Drain Blockage

As a safety feature the boiler will stop working if the condensate drain becomes blocked. During freezing conditions this may be due to the forming of ice in the condensate drain external to the house. Release an ice blockage by the use

of warm cloths on the pipe. After pressing reset the boiler should restart.

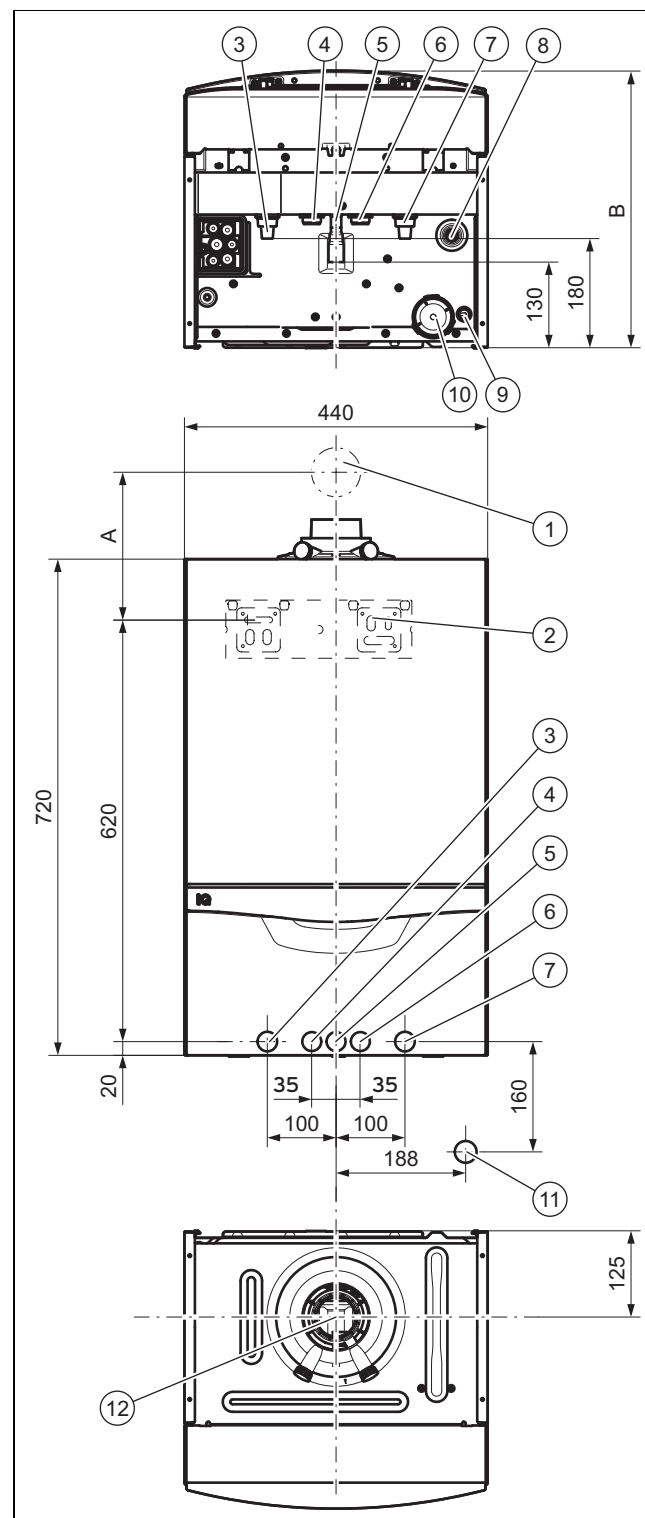
6 Set-up

6.1 Scope of delivery

Check that the scope of delivery is complete and intact.

Number	Designation
1	Heat generator
1	Installation set containing the following:
1	- Unit mounting bracket
1	- Expansion relief valve connection pipe
1	- Gas stopcock
1	- Gas connection pipe, dia. 20 mm
1	- Domestic hot water connection pipe
1	- Cold water connection pipe
3	- Service valve
2	- Heating flow/return connection pipe
3	- Bag with small parts
1	- Gas family coding resistor
1	- Double Check Valve
1	Mounting template
1	Enclosed documentation

6.2 Dimensions



- | | | | |
|---|-----------------------|----|--|
| 1 | Flue pipe wall duct | 8 | Connection for the heating expansion relief valve drain line |
| 2 | Product holder | 9 | Condensate trap connection |
| 3 | Heating flow | 10 | Condensate trap |
| 4 | Hot water connection | 11 | R1 tundish/condensate trap connection |
| 5 | Gas connection | 12 | Flue pipe connection |
| 6 | Cold water connection | | |
| 7 | Heating return | | |

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

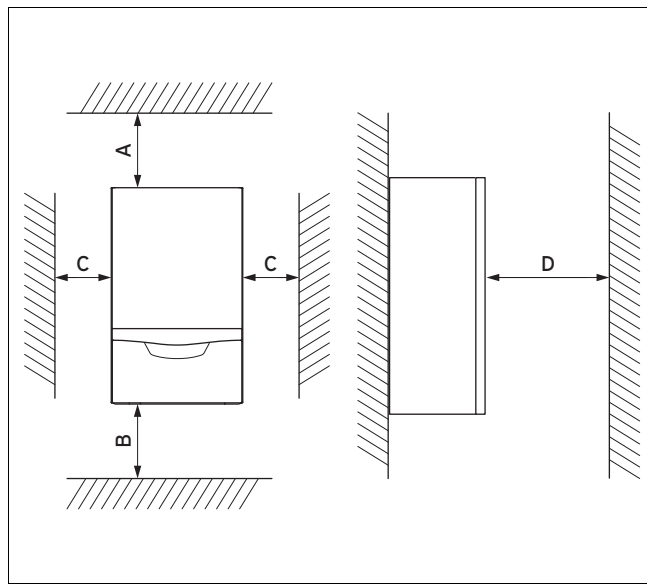
The product's installation depth B can be found in the technical data in the appendix.

6.3 Installation site

This boiler is not suitable for outdoor installation. This boiler may be installed in any room. However if the boiler is being installed in a room containing a bath or shower it must only be installed in zones 2 or 3. In GB this is the current I.E.E. WIRING REGULATIONS and BUILDING REGULATIONS. In IE reference should be made to the current edition of I.S.813 "Domestic Gas Installations" and the current ETCI rules.

If the boiler is to be installed in a timber frame building it should be fitted in accordance with the current version of the Institute of Gas Engineers document IGE/UP/7. If in doubt seek advice from local gas undertaking or the manufacturer.

6.4 Minimum clearances



	Minimum clearance
A	165 mm: Air/flue pipe, 60/100 mm diameter 275 mm: Air/flue pipe, 80/125 mm diameter
B	VUW 356/5-7: 180 mm; optimum approx. 250 mm VUW 436/5-7: 300 mm; optimum approx. 340 mm
C	5 mm; optimum approx. 50 mm
D	500 mm in front of the heat generator to enable easy access for maintenance work (may be provided by an opening door).

6.5 Chamber aeration

The boilers are very high efficiency appliances.

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

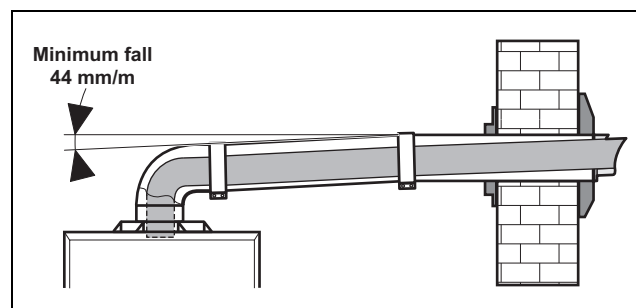
Compartment ventilation is not required if the product is fitted with a concentric flue system.

6.6 Air/flue pipe

6.6.1 Regulation

Different flue outlet configurations can be carried out.

- Consult the installation manual for air/flue gas systems for more information about the other possibilities and associated accessories.



- Standard flue terminal kits have an in-built fall back to the boiler to drain the condensate. These can be fitted level between the appliance and the termination position. All other extended flues must have a fall of at least 44 mm/m.

The maximum length of the flue outlet is defined according to its type (for example C13).

- Whatever the kind of flue system chosen, observe the minimum distances to position the flue terminals.
- To install the flue, refer to the separate flue instruction supplied with your appliance.
- Explain these requirements to the user of the appliance.

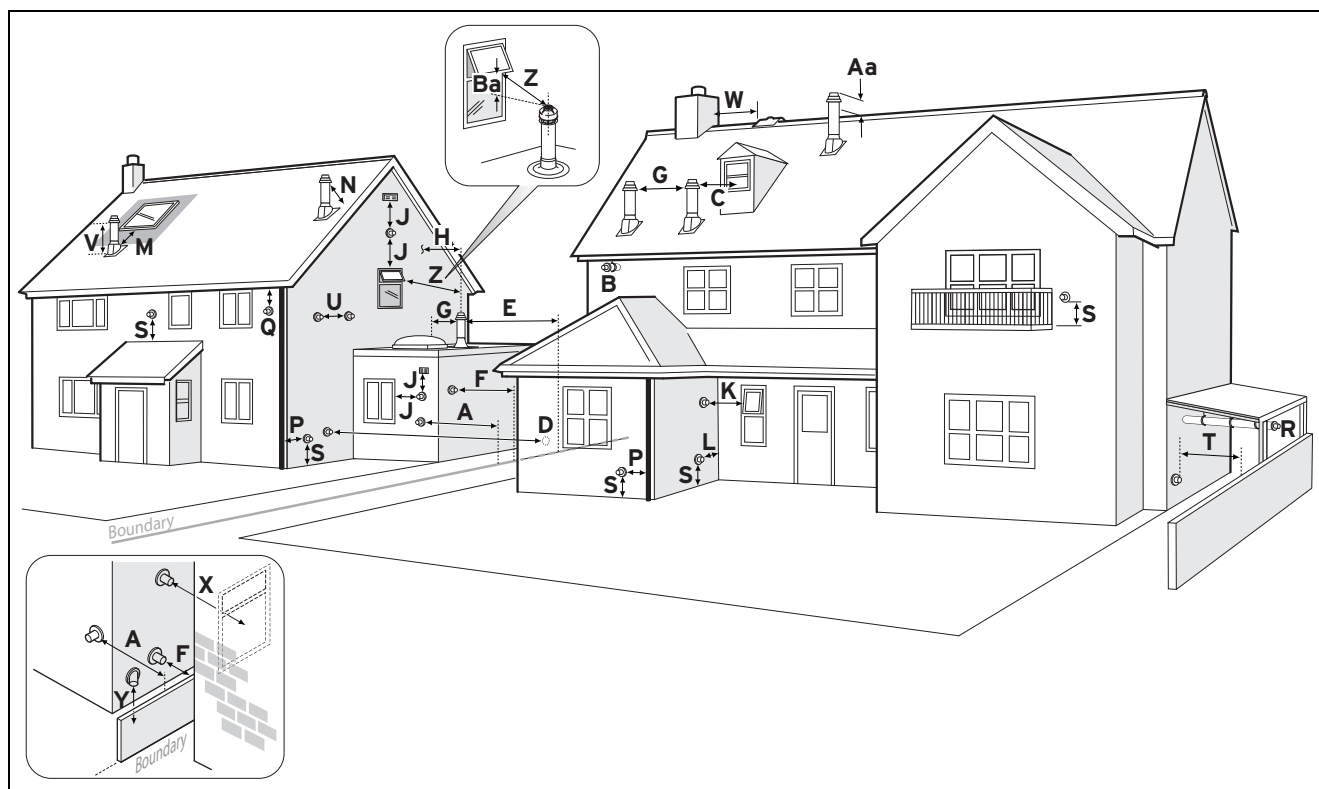
In GB the minimum acceptable siting dimensions for the terminal from obstructions, other terminals and ventilation openings are shown in diagram overleaf.

In IE the minimum distances for flue terminal positioning must be those detailed in I.S. 813 "Domestic Gas Installations".

The terminal must be exposed to the external air, allowing free passage of air across it at all times.

Being a condensing boiler some plumbing may occur from the flue outlet. This should be taken into consideration when selecting the position for the terminal.

6.6.2 Position of the air/flue terminal



6.6.2.1 Positioning the terminal of a fan-supported flue system

	Installation site	Dimensions
A	Adjacent to a boundary.	300 mm
B ¹⁾	The dimension below eaves, balconies and car ports can be reduced to this value, as long as the flue terminal is extended to clear any overhang. External flue joints must be sealed with a suitable silicon sealant.	25 mm
C	Between a vertical flue terminal and a window or dormer window on a roof.	1,500 mm
D	Between terminals facing each other.	1,200 mm
E	Vertical flue clearance, adjacent to a boundary line.	300 mm
F ²⁾	Distance to a boundary line, unless it will cause a nuisance. BS 5440:Part 1 recommends that care is taken when siting terminal in relation to boundary lines.	600 mm
G	Minimum clearance from a skylight to a vertical flue or to another vertical flue.	Min. 300 mm
H	Vertical flue clearance, to noncombustible building material. Vertical flue clearance to combustible building material.	500 mm 1,500 mm
J	Above, below and either side of an opening door, air vent or opening window.	300 mm
K	Diagonally to an opening door, air vent or opening window.	600 mm
L ²⁾	To an internal or external corner.	200 mm
M	Below a Velux window. Above or to either side of the Velux window.	2,000 mm 600 mm
N	From a pitched roof. In regions with heavy snowfall.	400 mm 500 mm
P	From vertical drain pipes and soil pipes.	25 mm
Q	Below eaves. Below gutters, pipe and drains.	200 mm 75 mm
	<p>1) There should be no ventilation/opening in the eaves within 300 mm distance of the terminal.</p> <p>2) These dimensions comply with the building regulations, but they may need to be increased to avoid wall staining and nuisance from pluming depending on site conditions.</p> <ul style="list-style-type: none"> Terminals must be positioned so to avoid combustion products entering the building. Support the flue at approximately one metre intervals and at a change of direction, use suitable brackets and fixings. Installations in car ports are not recommended. The flue cannot be lower than 1 metre from the top of a lightwell due to the build up of combustion products. Dimensions from a flue terminal to a fanned air inlet to be determined by the ventilation equipment. 	

	Installation site	Dimensions
R	The dimension below eaves, balconies and car ports can be reduced to this value, as long as the flue terminal is extended to clear any overhang. External flue joints must be sealed with suitable silicon sealant.	25 mm
S	Above adjacent ground or balcony.	300 mm
T ²⁾	Distance to a surface facing a terminal, unless it will cause a nuisance. BS 5440: Part 1 recommends that care is taken when siting terminals in relation to surfaces facing a terminal.	600 mm
U	Clearance alongside another terminal.	300 mm
V	Above roof level.	300 mm
W	Minimum to vertical structure on roof, roof vent.	Min. 300 mm
X	Minimum to opening in adjacent building.	Min. 2000 mm
Y	Minimum at an angle to a boundary which is not less than 300 mm to the terminal	Min. 600 mm
Z	Minimum measured to the nearest corner of the OPEN window	Min. 600 mm
Aa	No more than this value above ridge.	Max. 300 mm
Ba	Not less than this value below the opening window	Min. 300 mm
	1) There should be no ventilation/opening in the eaves within 300 mm distance of the terminal. 2) These dimensions comply with the building regulations, but they may need to be increased to avoid wall staining and nuisance from pluming depending on site conditions. <ul style="list-style-type: none"> – Terminals must be positioned so to avoid combustion products entering the building. – Support the flue at approximately one metre intervals and at a change of direction, use suitable brackets and fixings. – Installations in car ports are not recommended. – The flue cannot be lower than 1 metre from the top of a lightwell due to the build up of combustion products. – Dimensions from a flue terminal to a fanned air inlet to be determined by the ventilation equipment. 	

6.6.2.2 Horizontal terminal positioning

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

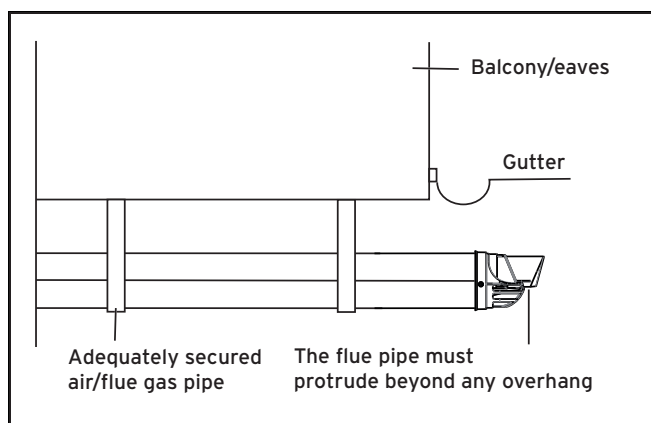
- at least 2 m from an opening in the building directly opposite, and
- so that the products of combustion are not directed to discharge directly across a boundary if the products are likely to cause a nuisance to a neighbour or discharge over a walkway or patio.

For IE see current issue of IS 813.

For boilers covered within this manual.

Dimensions B and R:

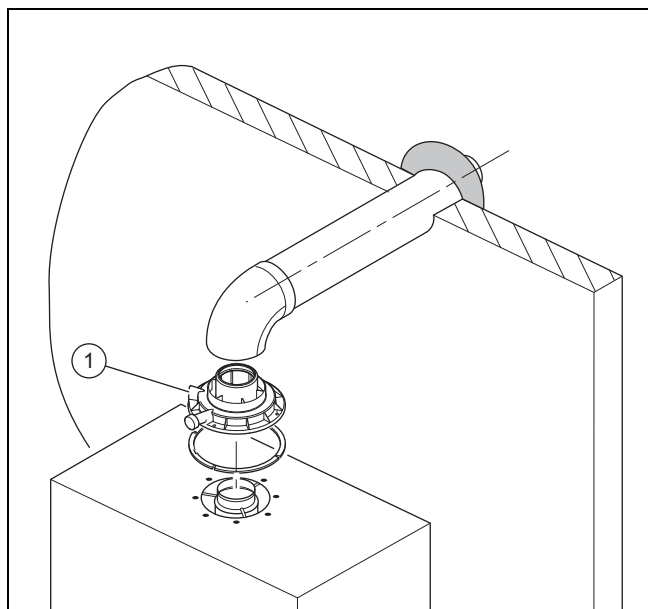
These clearances may be reduced to 25 mm without affecting the performance of the boiler. In order to ensure that the condensate plume does not affect adjacent surfaces the terminal should be extended as shown below.



Under no circumstances must a deflector set be fitted to this appliance. You can use a Variable Termination Kit to enable the termination point to be positioned and directed away from the building fabric.

6.6.3 Flue Configuration Description

6.6.3.1 Horizontal Concentric Flue \varnothing 60/100 mm or \varnothing 80/125 mm (C13 type installation)



1 Gasket (fitted)

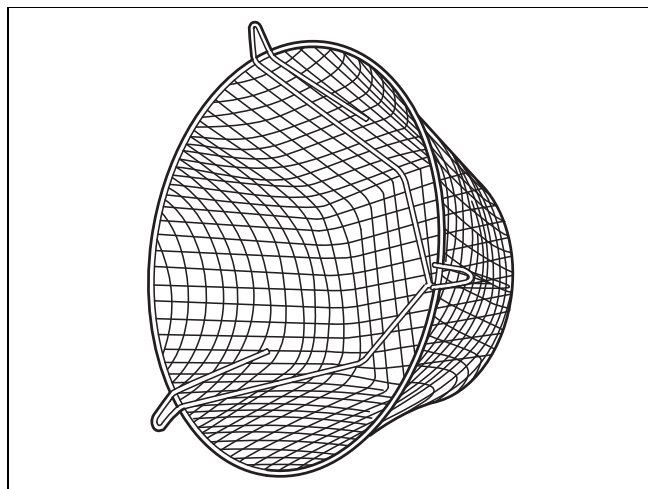


Note

If the terminal is at less than 1.80 m from the ground, you must install a terminal protection kit.

Consult the separate installation manual for air/flue gas systems supplied with your appliance for all possibilities and associated accessories and how to install the flue system.

6.6.3.2 Terminal protection

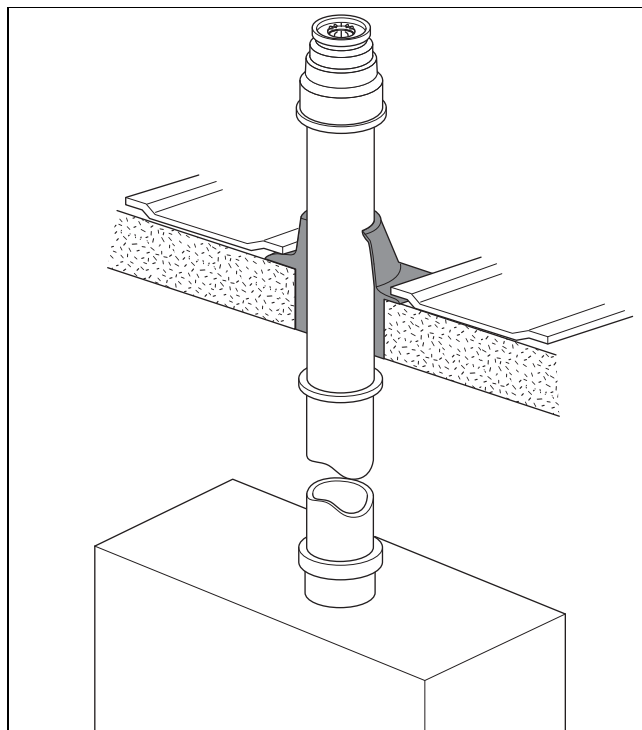


A terminal guard is required if persons could come into contact with the terminal or the terminal could be subject to damage.

If a terminal guard is required, it must be positioned to provide minimum of 50 mm clearance from any part of the terminal and be central over the terminal.

The guard should be similar to that shown in the figure.

6.6.3.3 Vertical Concentric Flue \varnothing 60/100 mm or \varnothing 80/125 mm (C33 type installation)

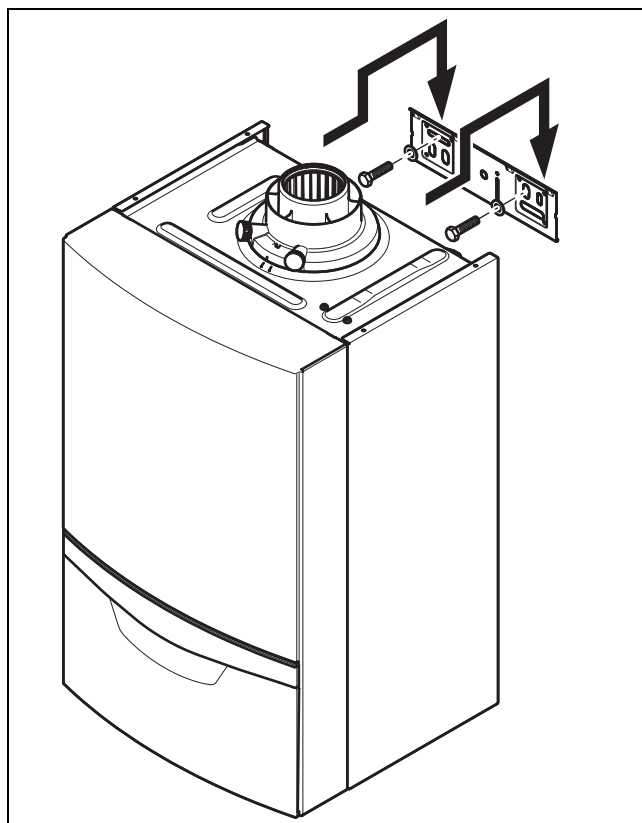


Consult the separate installation manual for air/flue gas systems supplied with your appliance for all possibilities and associated accessories and how to install the flue system.

6.7 Using the installation template

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

6.8 Wall-mounting the product

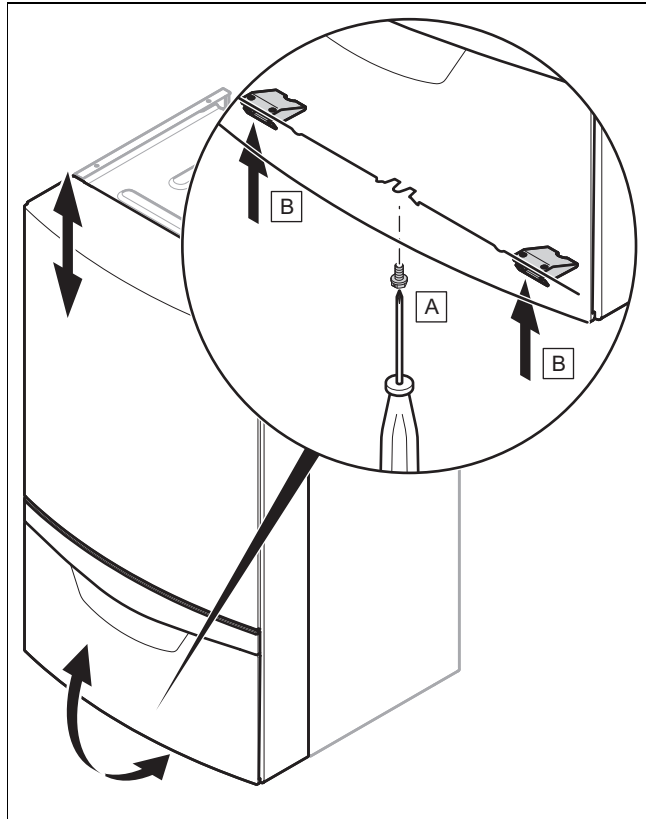


1. Check the load-bearing capacity of the wall.

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

6.9 Removing/installing the front casing

6.9.1 Removing the front casing



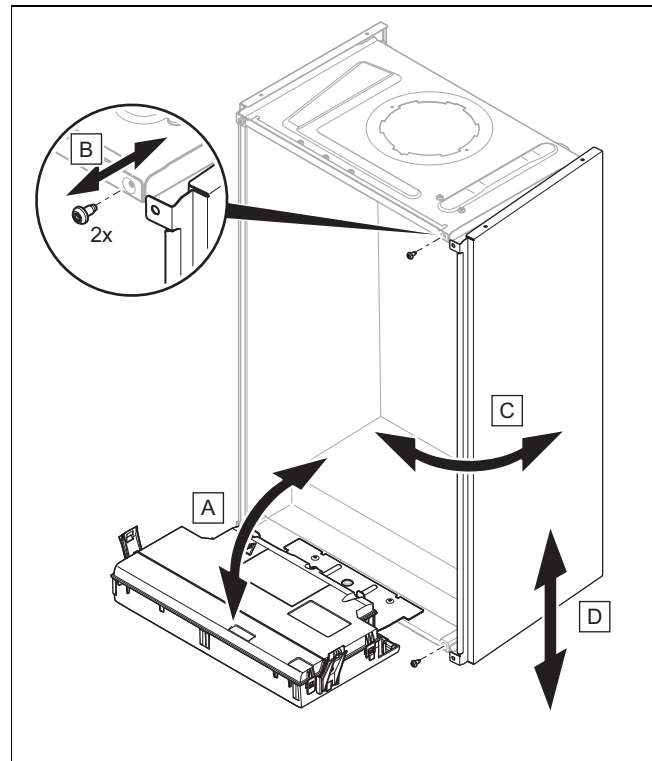
- Remove the front casing as shown in the illustration.

6.9.2 Installing the front casing

- Refit the components in the reverse order.

6.10 Removing/installing the side section

6.10.1 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.

- Depressurise the product on the water side.
- Always remove **only one** side section – never both side sections at the same time.

- Remove the side section as shown in the illustration.

6.10.2 Installing the side section

- Refit the components in the reverse order.

7 Installation

7.1 Installation requirements

7.1.1 Information on liquefied petroleum gas operation

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

If you have a product that is preset for operation with natural gas, you must replace the gas family coding resistor with the enclosed coding resistor for liquefied petroleum gas during the installation. During start-up, the product must be converted for operation with liquefied petroleum gas in the installation assistant. You do not require a conversion set, because the product has a gas-adaptive heat cell, which is set independently to the relevant gas type within the gas family. The gas type can also be changed at a later point using diagnostics code **D.087**.

Furthermore, for operating with liquefied petroleum gas, the differential pressure sensor must be replaced with a bypass since, otherwise, this may lead to fault messages. The bypass is available as an accessory.

If you have selected the "liquefied petroleum gas" gas type, after the start-up process is complete, affix the enclosed "Liquefied petroleum gas" conversion sticker onto the data plate and affix the enclosed tank sticker (propane quality) so that it is clearly visible on the tank or the cylinder cabinet, if possible close to the filler nozzle.

7.1.2 Purging the liquid gas tank

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

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

7.1.3 Using the correct gas type

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

- ▶ Only use a gas type from the gas group that is defined on the data plate.
- ▶ Check whether the gas type that is available at the installation site and the gas type that is set in the product are the same.
- ▶ To do this, check the setting for diagnostics code **D.087**. (→ Page 33)

7.2 Preparing for installation

1. Make sure that the existing gas meter is capable of passing the rate of gas supply required.
2. Consider the maximum heat output given in DHW mode.
3. Install a system separator (to be provided on-site) directly on the cold water connection for the combi boiler.
4. Install the following components:

- Draining cocks at the lowest points in the heating installation (→ current version of "BS 2879")
 - A stopcock on the cold water connection
 - A stopcock in the gas pipe
5. Check that the volumetric capacity of the expansion vessel is sufficient for the system volume.

Condition: The volume of the installed expansion vessel is insufficient

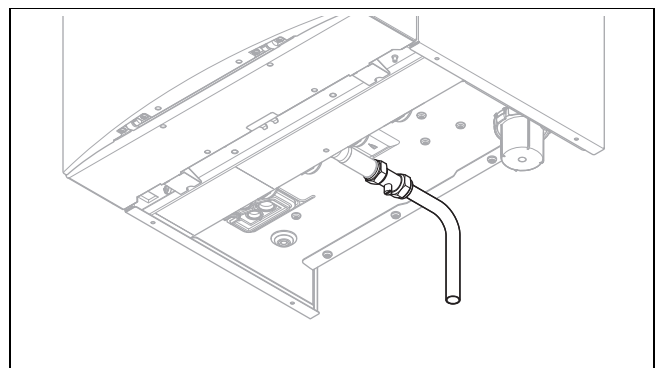
- ▶ Install an additional expansion vessel, connected as close to the product as possible, in the heating return.

Condition: External expansion vessel installed and warm start active

- ▶ Install a non-return valve in the product outlet (heating flow) or decommission the internal expansion vessel in order to prevent the warm start function from being increasingly activated due to backflow.

6. Install the connection pipes such that they are free from mechanical stress.
7. If you use non-diffusion-tight plastic pipes in the heating installation, ensure that no air gets into the heat generator circuit.
8. Only solder connectors if the connectors are not yet screwed to the service valves.
9. Only bend connection pipes if they have not yet been connected to the product.
10. Flush the heating installation thoroughly before installing the product.
11. If, during gas leak-tightness tests, you also place the gas pipes and the gas valve assembly in the product under pressure, use a max. test pressure of ≤ 11 kPa (110 mbar).
12. If you cannot limit the test pressure to 11 kPa (110 mbar), close any gas stopcocks that are installed upstream from the product before you carry out the gas leak-tightness test.
13. If, during gas leak-tightness tests, you have closed the gas stopcock that is installed upstream of the product, relieve the gas line pressure before you open this gas stopcock.
14. Install a tundish with condensate siphon for the condensate discharge and the exhaust pipe on the expansion relief valve. Route drain pipework that is as short as possible, at a downward gradient away from the tundish.
15. Insulate bare pipes exposed to environmental influences to protect them from frost using suitable insulation material.

7.3 Installing the gas connection



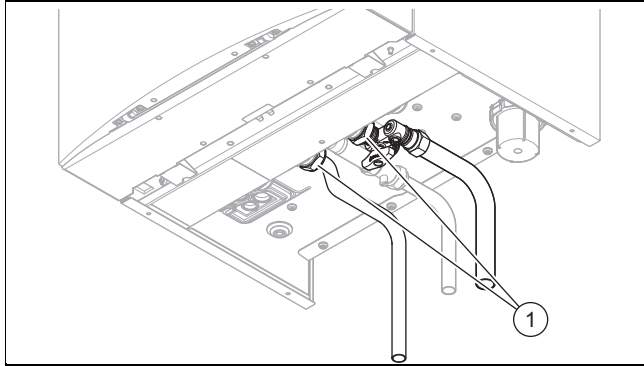
1. Install the gas line in accordance with the recognised rules of technology.

2. Connect the product to the gas line in accordance with the recognised rules of technology.
3. Remove the residues from the gas line by blowing through the gas line beforehand.
4. Purge the gas line before start-up.

7.4 Checking the gas line for leak-tightness

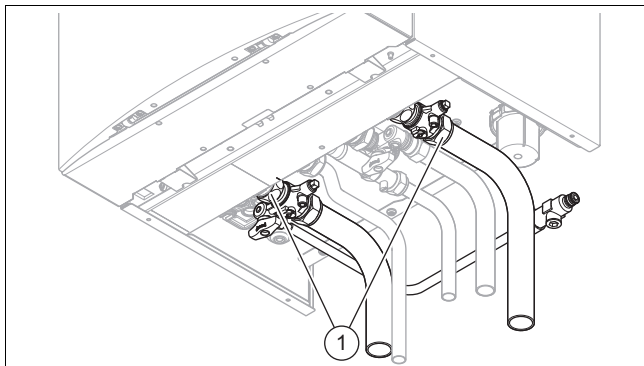
- Check the entire gas line properly for leak-tightness.

7.5 Installing the hot and cold water connection



1. Make the water connections (1) in accordance with the relevant standards.
2. Ensure correct water pressure and flow requirements and that any expansion can be accommodated with the cold supply pipe work.

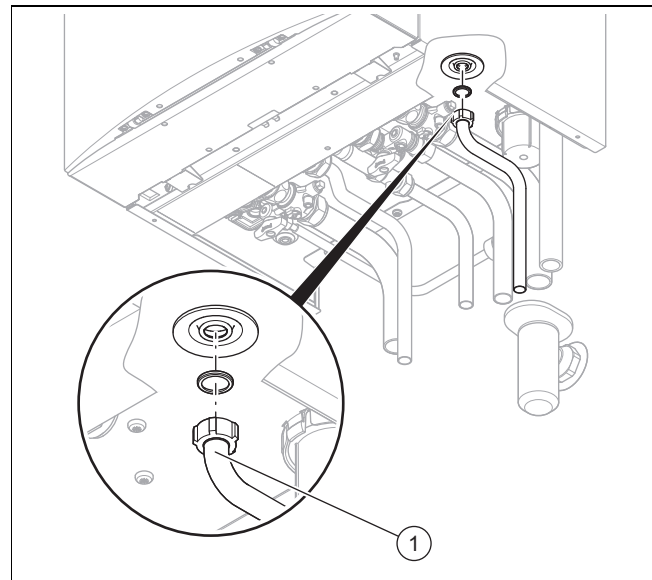
7.6 Connecting the heating flow and heating return



- Establish the heating connections (1) in accordance with the relevant standards.

7.7 Installing the discharge pipe on the expansion relief valve

1. Install the discharge pipe for the expansion relief valve so that it does not interfere with the removal and fitting of the lower section of the condensate trap.



2. Install the discharge pipe as shown (do not shorten).
3. Make sure that the end of the pipe is visible.
4. Ensure that discharged water or steam cannot cause injury to persons or damage to electronic components.
5. Ensure the discharge pipe work is installed, routed and terminated correctly to minimise the risk of freezing up.

7.8 Connecting the condensate discharge pipe

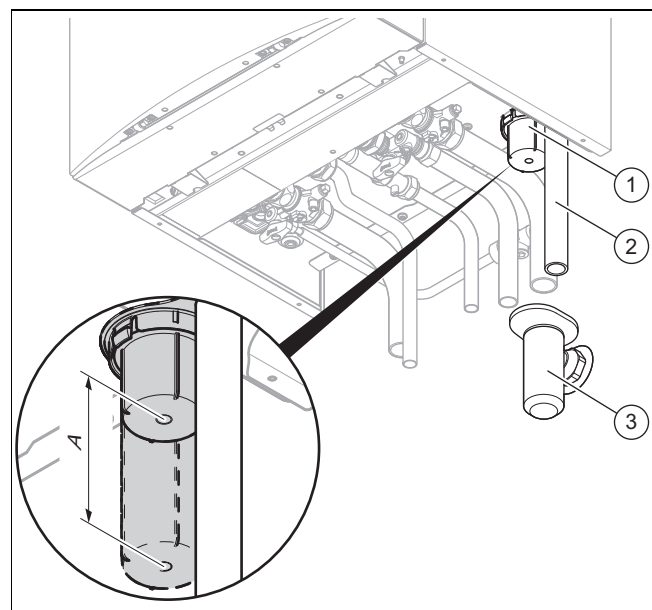


Danger!

Risk of death from escaping flue gases!

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

- Do not connect the condensate discharge pipe tightly to the waste-water pipework.



The product is equipped with a condensate siphon (1). (The filling height is 145 mm). The condensate siphon collects the condensate that has formed in a vessel with a volumetric capacity of approx. 200 ml and allows the contents to intermittently drain into the drain pipe. This minimises the risk of the

drain pipe freezing. Fitting an extra trap may cause the boiler siphon to work incorrectly.

- ▶ Follow the instructions listed here and observe directives and local regulations on condensed water discharge.
- ▶ If you cannot guarantee that the materials from which the condensate discharge pipe is made are suitable, install a system to neutralise the condensate.
- ▶ Fit the condensate discharge (2).
- ▶ Connect the condensate discharge (2) to a condensate discharge pipe (3) that has a minimum internal diameter of 19 mm (30 mm internal diameter for all externally installed pipes) and is made from an acid-resistant material (e.g. plastic overflow pipe).
 - The condensate discharge pipework must have a continuous fall (45 mm per metre) and should whenever possible terminate at a suitable discharge point within the heated envelope of the building that will remain frost free under long periods of low external temperatures.



Note

Ensure that the connection between the condensate discharge pipe and the drain hose is not air-tight.

- ▶ 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.
- ▶ Ensure that the condensate discharge pipe terminates in a suitable location. Further information can be obtained from BS 6798 Specification for installation of gas-fired boilers of rated input not exceeding 70 kW net.
- ▶ Leave the following installation space beneath the condensate trap:

Condition: VUW 356/5-7 (H-GB) ecoTEC exclusive

- A = at least 180 mm

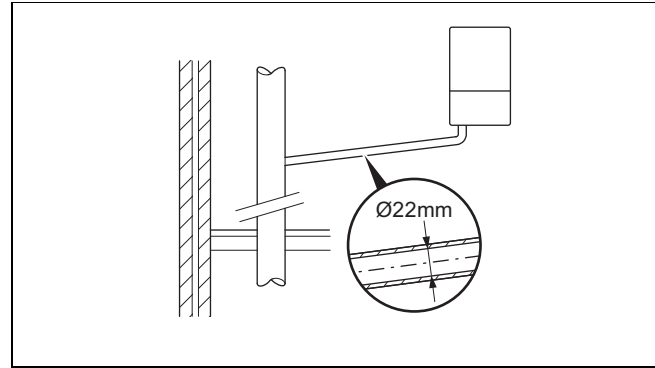
Condition: VUW 436/5-7 (H-GB) ecoTEC exclusive

- A = at least 340 mm

7.8.1 Condensate discharge systems

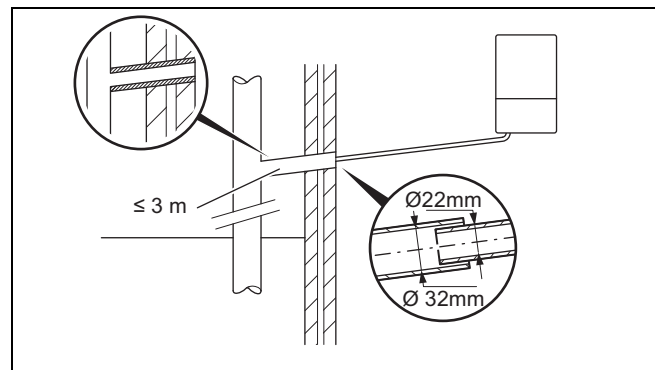
The condensate is discharged periodically in 'slugs' by siphonic action. It is not necessary to provide extra traps in the discharge pipe as there is already a trap inside the boiler. Fitting an extra trap may cause the boiler siphon to work incorrectly. Refer to BS5546 or BS6798 for further advice on disposal of boiler condensate.

7.8.1.1 Direct Connection to internal soil and vent stack

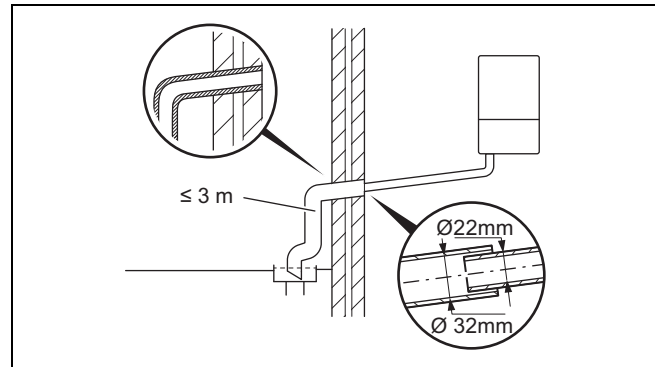


Preferred option

7.8.1.2 Direct connection to external soil and vent stack

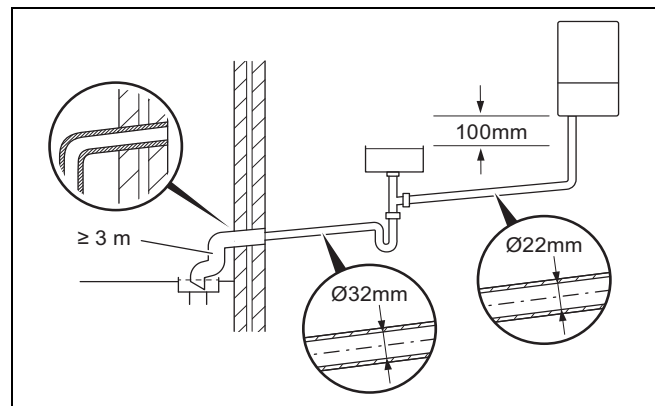


7.8.1.3 External termination to gulley or hopper



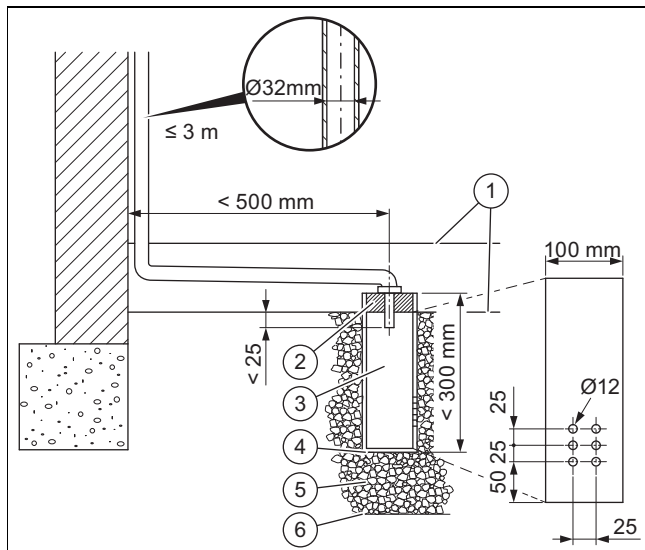
Best practice

7.8.1.4 Internal termination into combined sink waste



Preferred option for external termination

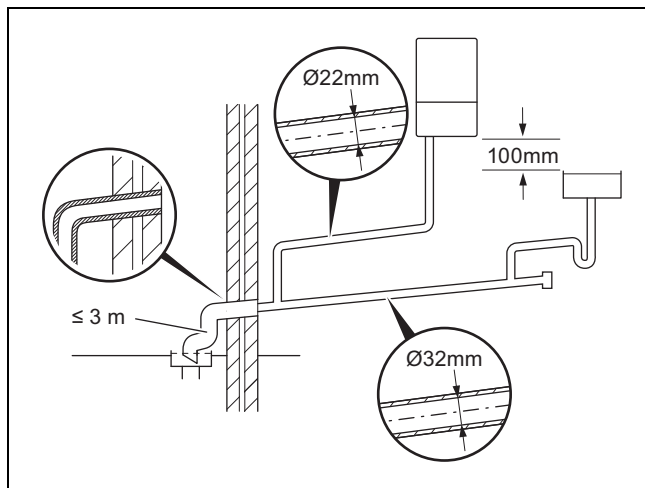
7.8.1.5 External termination into soakaway



- | | | | |
|---|----------------------------------|---|------------------------------|
| 1 | Ground (either/or) | 4 | Bottom of sealed tube |
| 2 | Seal | 5 | Limestone chippings |
| 3 | Plastic tube,
100 mm diameter | 6 | Hole depth 400 mm
minimum |

Least preferred option, must not terminate in rain water drain

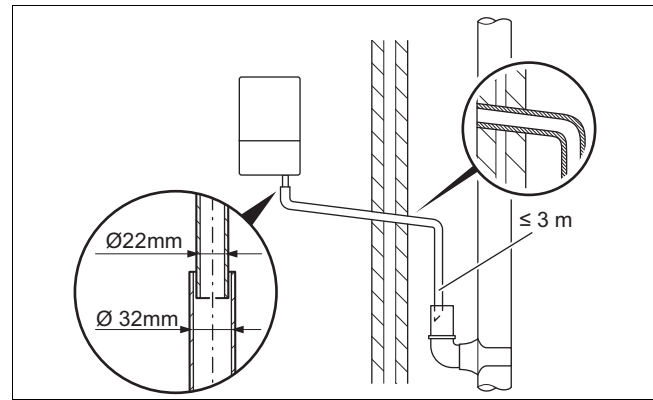
7.8.1.6 Internal termination downstream of sink waste



Open end of pipe direct into gulley below ground level but above water level

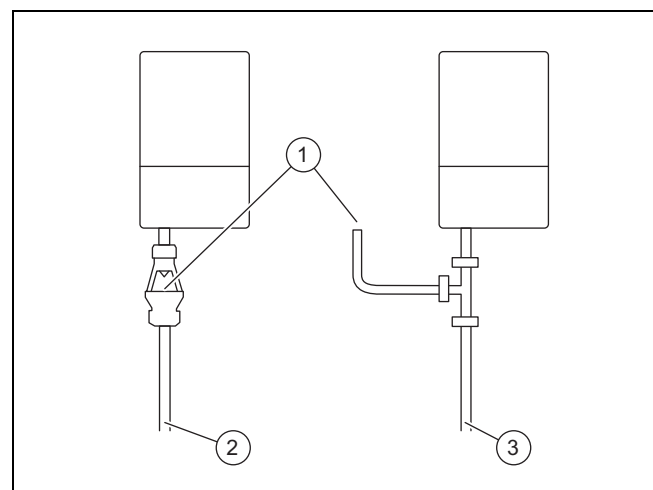
Susceptible to siphonage, must terminate in a gulley

7.8.1.7 External termination into rain water down pipe



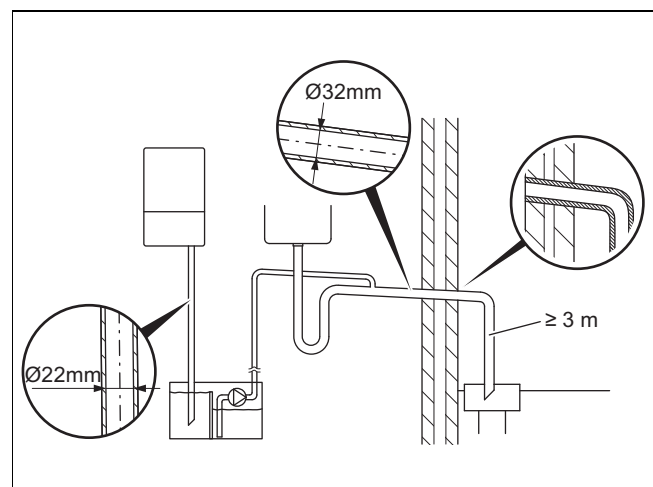
NB only combined foul/rainwater drain

7.8.1.8 Additional methods of introducing air breaks



- | | | | |
|---|-----------------|---|--------------|
| 1 | Air break | 3 | Using a pipe |
| 2 | Using a tundish | | |

7.8.1.9 Connection of condensate pump



Preferred option for external connection

7.9 Flue installation

7.9.1 Installing and connecting the air/flue pipe

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

Condition: Installation in damp rooms

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



Caution.

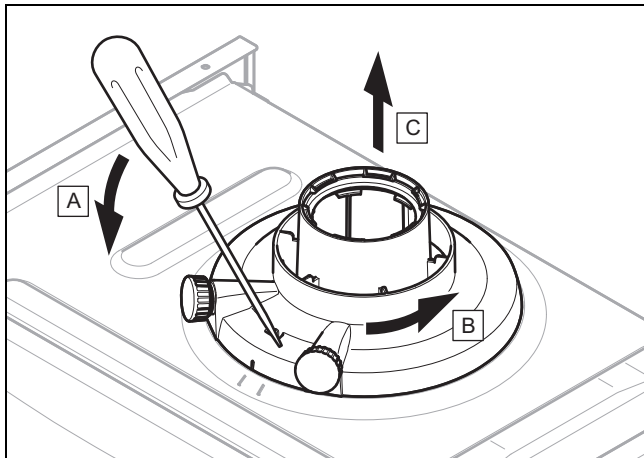
Risk of poisoning due to escaping flue gas.

Mineral-oil-based greases can damage the seals.

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

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

7.9.2 Removing the connection piece for the air/flue pipe



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

7.10 Electrical installation

Only qualified electricians may carry out the electrical installation.



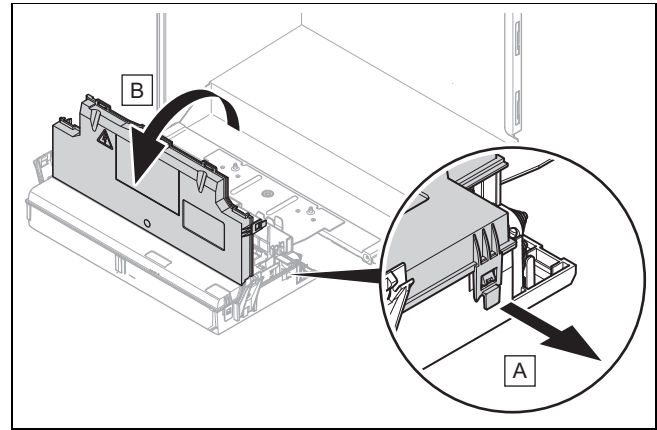
Danger!

Risk of death from electric shock!

Mains connection terminals L and N remain live even if the on/off switch is turned off.

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

7.10.1 Opening the electronics box



- ▶ Open the electronics box as shown in the illustration.

7.10.2 Carrying out the wiring



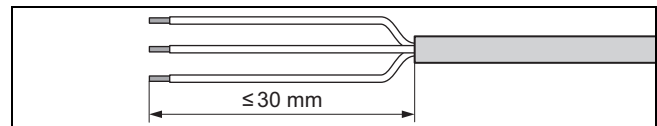
Caution.

Risk of material damage caused by incorrect installation.

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

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

1. Route the connection cables of the components to be connected through the grommet provided on the underside of the product on the left.
2. Use strain reliefs.
3. If required, shorten the connection cables.



4. Strip the flexible line as shown in the figure. In doing so, ensure that the insulation on the individual conductors is not damaged.
5. Only strip inner conductors just enough to establish good, sound connections.
6. To avoid short circuits resulting from loose individual wires, fit conductor end sleeves on the stripped ends of the conductors.
7. Screw the respective plug to the connection cable.
8. Check whether all conductors are sitting mechanically securely in the terminals of the plug. Remedy this if necessary.
9. Plug the plug into the associated PCB slot; see the wiring diagram in the appendix.

7.10.3 Establishing the power supply



Caution.

Risk of material damage due to high connected voltage.

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

- Make sure that the rated voltage of the mains is 230 V.

1. Observe all valid regulations.
2. Make sure that the nominal mains voltage is 230 V.
3. Provide one common power supply for the boiler and for the corresponding control:
 - Power supply: Single-phase, 230 V, 50 Hz
 - Fuse protection: ≤ 3 A
4. Do not interrupt the mains supply with a time switch or programmer.
5. Open the electronics box. (→ Page 22)
6. Connect the product using a fixed connection and an electrical partition with a contact gap of at least 3 mm (e.g. fuses or power switches).
7. Isolation should preferably be by a double pole switched fused spur box having a minimum contact separation of 3 mm on each pole. The fused spur box should be readily accessible and preferably adjacent to the boiler. It should be identified as to its use.
8. Route a three-core power supply cable that complies with the relevant standards through the grommet and into the product.
 - Power supply cable: Flexible duct
9. Carry out the wiring. (→ Page 22)
10. Remove the supplied plug from the bracket in the electronics box and screw the plug onto the power supply cable.
11. Close the electronics box.
12. Make sure that access to the power supply is always available and is not covered or blocked.

7.10.4 Installing the product in a wet room



Danger!

Risk of death from electric shock!

If you install the product in a room with high levels of moisture, e.g. a bathroom, observe the nationally recognised technical standards for electrical installations. If you use the factory-installed connection cable, if installed, with an earthed plug, there is a risk of death from electric shock.

- Never use the factory-installed connection cable with earthed plug when installing the product in a moist environment.
- Connect the product using a fixed connection and an electrical partition with a contact opening of at least 3 mm (e.g. fuses or power switches).
- Use a flexible line for the mains connection line, which is routed through the cable duct into the product.

1. Open the electronics box. (→ Page 22)
2. Detach the ProE plug from the PCB slot for the mains connection (X1).
3. Unscrew the ProE plug for the factory-installed power supply cable, if installed.
4. Instead of the factory-installed power supply cable, if installed, use a suitable three-core power supply cable which complies with the relevant standards.

5. Carry out the wiring. (→ Page 22)
6. Close the electronics box.
7. Observe the flue-gas connection that is required on a room-sealed air/flue system. (→ Page 22)

7.10.5 Connecting controls to the electronics

1. Install the control if necessary.
2. Open the electronics box. (→ Page 22)
3. Carry out the wiring. (→ Page 22)
4. Observe the wiring diagram in the appendix.

Condition: Connecting a weather-compensated control or a room temperature control via eBUS

- Connect the control to the eBUS connection.
- Bridge the 24 V = RT connection (X100 or X106), if there is not already a bridge.

Condition: Connecting a low-voltage control (24 V)

- Remove the bridge and connect the control to the 24 V = RT connection (X100 or X106).

Condition: Connecting 230 volt controller

- Connect the switched live supply of your 230V RT to the RT marked X1 position (besides PE L N). Do NOT connect the 230V to any other terminal e.g. not to X100.

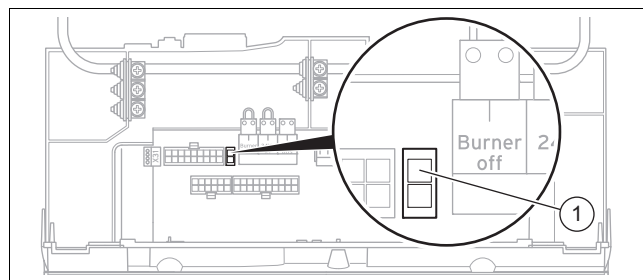
Condition: Connecting a limit thermostat for underfloor heating

- Remove the bridge and connect the limit thermostat to the **Burner off** connection.

5. Close the electronics box.
6. For multi-circuit controls, change **D.018** from **Eco** (intermittently operating pump) to **Comfort** (continuously operating pump). (→ Page 33)

7.10.6 Replacing the gas family coding resistor, if required

1. Open the electronics box. (→ Page 22)



2. Remove the gas family coding resistor (1) (plug X24) (factory setting: natural gas = yellow) and plug in the coding resistor from the bag of small parts (liquefied petroleum gas = grey).
3. Close the electronics box.
4. When starting up in the installation assistant or retroactively via diagnostics code **D.087**, set the correct gas type.

7.10.7 Connecting additional components

You can actuate an additional component with the aid of the auxiliary relay that is installed, and you can actuate two other components with the multi-functional module.

7.10.7.1 Using the auxiliary relay

1. Connect an additional component directly to the integrated auxiliary relay using the grey plug on the PCB.
2. Carry out the wiring.
3. Activate the component via **D.026**, see section "Adapting to the heating installation".

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

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

Condition: Components connected to relay 1

- Activate **D.027**, see section "Adapting to the heating installation".

Condition: Components connected to relay 2

- Activate **D.028**, see section "Adapting to the heating installation".

8 Operation





8.1 Operating concept

The operating concept and the read-off and setting facilities of the operator level are described in the operating instructions.

An overview of the reading and setting options for the installer level is included in the table in the appendix.

Installer level – Overview (→ Page 45)

8.2 Calling up the installer level

1. Only call up the installer level if you are a competent person.
2. Press  and  at the same time.
3. Navigate to **Menu** → **Installer level** and confirm by pressing .
4. Set the value **17** (code) and confirm by pressing .

8.3 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 53)

8.4 Setting the domestic hot water temperature

Condition: Water hardness: > 3.57 mol/m³

- Set the domestic hot water temperature to a maximum of 50 °C.

9 Start-up

9.1 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 Benchmark Checklist. The Benchmark Checklist in the appendix (→ Page 63) of the installation instructions must be filled in and stored carefully along with the unit's documentation.

- ▶ Carry out the start-up procedure using the Benchmark Checklist in the appendix.
- ▶ Fill out and sign the Benchmark Checklist.

9.2 Switching the product on/off

- ▶ Press the on/off button on the product.
 - ◀ The basic display appears on the display.

9.3 Running the installation assistants


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

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

Menu → Installer level → Appliance config.

The settings options for more complex systems can be found in the **Diagnostics menu**.


Menu → Installer level → Diagnostics menu

- ▶ Press  to confirm the start of the installation assistant.
 - ◀ All heating and hot water requests are blocked whilst the installation assistant is active.




Note







If you do not confirm the launch of the installation assistant within 10 seconds of switching the system on, the basic display reappears.

- ▶ To access the next point, confirm by pressing  in each case.

9.3.1 Language

- ▶ Set the required language.
- ▶ To confirm the set language and to avoid unintentionally changing it, press  to confirm this twice.

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




- ▶ Press and hold  and  **at the same time**.
- ▶ Also briefly press .
- ▶ Press and hold  and  until the display shows the language setting option.
- ▶ Select the required language.
- ▶ Confirm twice by pressing .

9.3.2 Filling mode




Filling mode (check programme **P.06**) is activated automatically in the installation assistant for as long as the filling mode appears on the display.

- ▶ Fill the heating installation. (→ Page 29)

9.3.3 Purging

1. Unlike in the **Check programs** menu, to purge the system, start check programme **P.00** by pressing  or .
2. If you need to change the circuit that is to be purged, press .

9.3.4 Target feed temperature, hot water temperature, Comfort mode

1. To set the target flow temperature, hot water temperature and comfort mode, press  and  in each case.
2. In each case, confirm by pressing .

9.3.5 Heating partial load

The heating partial load of the product is set to **Auto** at the factory. The product independently determines the optimum heating output depending on the current heat demand of the system. You can retroactively adjust the setting in the **Diagnostics menu** under **D.000**.

9.3.6 Green iQ


- ▶ Set **Green iQ** mode (energy-saving mode for hot water generation with cylinder and heating mode) (default setting: On).



Note

Green iQ mode is a special operating mode that can be used to save energy. If this mode is activated, the product operates in the heating and cylinder charging mode in such a way that the maximum benefits associated with condensing technology are achieved. Under certain circumstances, this may result in comfort bottlenecks because, in this operating mode, the cylinder charging time may be extended, for example.

9.3.7 Auxiliary relay and multi-functional module

1. If you have connected additional components to the product, assign these components to the individual relays.
2. In each case, confirm by pressing .



Note

This setting can be retroactively changed in the **Diagnostics menu** using **D.026**, **D.027** and **D.028**.

9.3.8 Gas type

1. Select the gas type that is available at the installation site (default setting: Natural gas). If required, retroactively change the gas type using diagnostics code **D.087** and plug the correct coding resistor (plug X24: Natural gas = yellow, liquefied petroleum gas = grey) into the PCB; see the wiring diagram in the appendix.


Condition: Liquid gas set

- If you have selected the "liquid gas" gas type, after the start-up process is complete, affix the enclosed "Liquid gas" conversion sticker onto the data plate and affix the enclosed tank sticker (propane quality) so that it is clearly visible on the tank or the cylinder cabinet, if possible close to the filler nozzle.

9.3.9 Contact data

- If required, store your telephone number in the **Appliance config.** (max. 16 digits/no blank spaces). The operator can view the telephone number.

9.3.10 Ending the installation assistant

- Once you have run through the installation assistant successfully, confirm by pressing .
 - ◄ The installation assistant will close and will not launch again when the product is next switched on.

9.4 Restarting the installation assistants

Menu → Installer level → Start inst. assistant

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

9.5 Test programmes



Menu → Installer level → Test programs

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

- **Check programs**
- **Function menu**
- **Electronics self-test**

9.6 Using check programmes

Menu → Installer level → Test programs → Check programs

Display	Meaning
P.00	Purging check programme: The internal pump is cyclically actuated. The heating circuit and hot water circuit are purged adaptively by automatically switching the circuits via the automatic air vent (the cap for the automatic air vent is loosened at the factory). Hot water circuit active or Heating circuit active display. 1 x  : Start purging 1 x  (Cancel): End purge programme Note The duration of the purge programme is displayed by a countdown timer. The programme then ends.
P.01	Maximum load check programme: After successful ignition, the product is operated at maximum heat input.
P.02	Minimum load check programme: After successful ignition, the product is operated at minimum heat input.

Display	Meaning
P.04	Reset eGas CH (Central Heating) check programme: Calling up the programme deletes all of the CH correction values that have been saved from previous calibration processes. The products then starts by fully calibrating the combustion regulation (status S.09).
P.06	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.14	Reset eGas DHW (Domestic Hot Water) check programme: Calling up the programme deletes all of the DHW correction values that have been saved from previous calibration processes. The products then starts by fully calibrating the combustion regulation (status S.19).

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



Caution.

Risk of material damage due to poor-quality heating water

- Ensure that the heating water is of sufficient quality.

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

Checking the quality of the heating water

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

Checking the filling and supplementary water

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

Treating the filling and supplementary water

- Observe all applicable national regulations and technical rules when treating the filling and supplementary water.

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

You must treat the heating water in the following cases

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

Total heating output	Water hardness at specific system volume ¹⁾					
	≤ 20 l/kW		> 20 l/kW ≤ 50 l/kW		> 50 l/kW	
kW	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.

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

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

- Do not use any unsuitable antifreeze and corrosion inhibitors, biocides or sealants.

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

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

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

Additives for cleaning measures (subsequent flushing required)

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

Additives intended to remain permanently in the installation

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

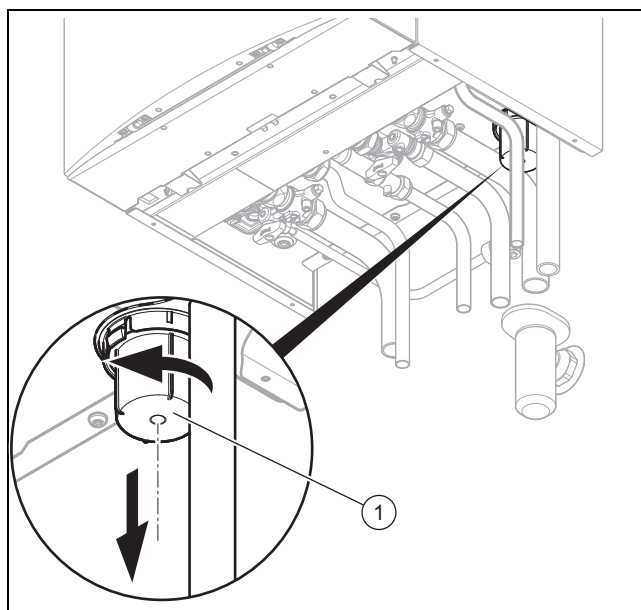
Additives for frost protection intended to remain permanently in the installation

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

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

9.8 Filling the condensate siphon

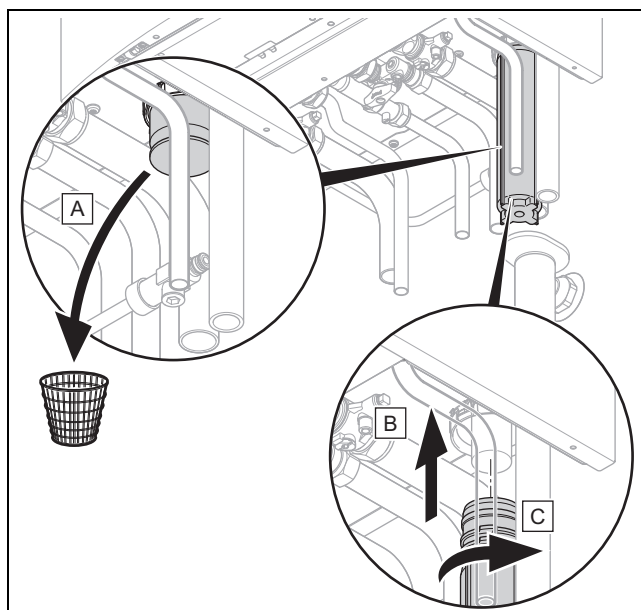
Validity: VUW 356/5-7 (H-GB) ecoTEC exclusive 835



1. Remove and, if required, clean the lower section of the condensate siphon (1).
2. Fill the lower section with water up to 10 mm below the upper edge.
3. Secure the lower section to the condensate siphon.

9.9 Filling the condensate siphon

Validity: VUW 436/5-7 (H-GB) ecoTEC exclusive 843



1. Remove the plug from the condensate siphon connection.
2. Take the lower section of the condensate siphon out of the bag of small parts.
3. Lubricate the O-ring on the lower section using the grease that is supplied in the bag of small parts.
4. Fill the lower section with water up to two thirds.
5. Set up the lower section of the condensate siphon by placing the lower section in position and turning it clockwise until it clicks into place.

9.10 Preventing low water pressure

To ensure that the heating installation operates smoothly, the indicator on the pressure gauge must point to the upper half of the grey area or to the middle of the bar graph display in the display (marked by the dashed limit values) when the heating installation is cold. This corresponds to a filling pressure of between 0.1 MPa and 0.2 MPa (1.0 bar and 2.0 bar).

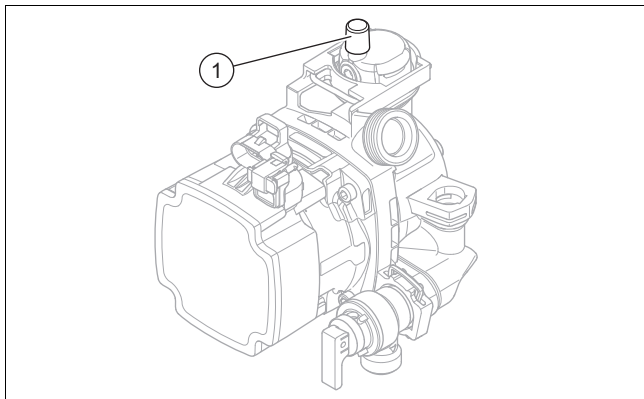
If the heating installation extends over several storeys, higher filling pressures may be required to avoid air entering the heating installation.

If the filling pressure falls below 0.08 MPa (0.8 bar), the product indicates low pressure by displaying a flashing pressure value. If the filling pressure falls below 0.05 MPa (0.5 bar), the product switches off. The display shows **F.22**.

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

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

9.11 Filling the heating installation



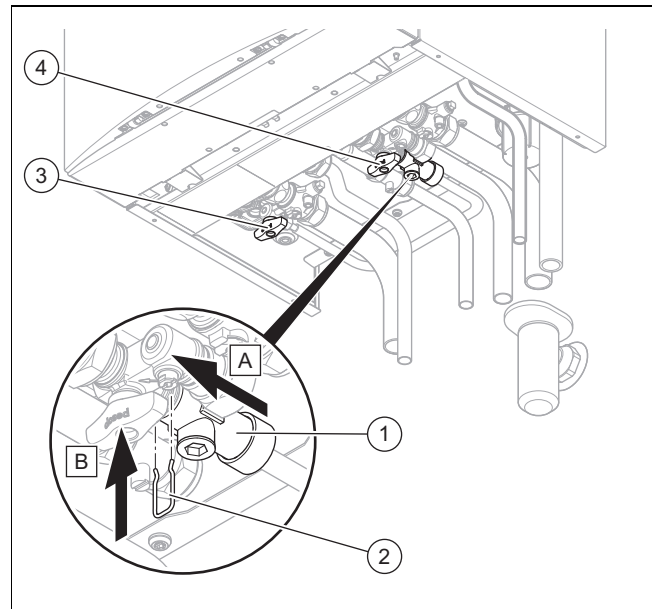
1. Flush the heating installation through.
2. Select the check programme **P.06**.
 - ◁ The prioritising diverter valve moves to the mid-position, the pumps do not run and the product does not switch to heating mode.



Note

The cap on the automatic air vent (1) has already been opened at the factory.

3. Observe the information on treating heating water. (→ Page 27)



4. Open all radiator valves (thermostatic valves) of the heating installation.
5. Fit the double non-return valve (1) of the filling line to the cold-water isolation valve and secure the valve with the spring clip (2).
6. To fill, first open the isolation valve (3).
7. Open the isolation valve (4) so that the water flows into the heating system. Fill the heating system.
8. Purge the lowest radiator until water flows out of the purging valve without bubbles.
9. Purge all other radiators until the entire heating system has been filled with water.
10. Close all purging valves.
11. Monitor the rising filling pressure in the heating installation.
12. Fill with water until the required filling pressure is reached.
13. After filling, close both isolation valves and disconnect the filling device by removing the double non-return valve from the cold-water isolation valve.



Note

Both isolation valves must be closed while the heating system is operating and the filling line must be removed from the double non-return valve again.

14. Check all connections and the entire system for leaks.

9.12 Flushing the heating installation for the first time ("cold")



Note

The complete heating system must be flushed at least twice: Once with cold water and once with hot water in accordance with the following instructions.

1. Check whether all thermostatic radiator valves and both service valves on the product are open.
2. Connect a hose to the drain valve that is located at the lowest position in the heating system.
3. Open the radiator valves and the drain valves so that the water can drain quickly. Start at the next point in the installation and open the purging valves on the radiators so that the contaminated water can completely drain.
4. Close the draining cocks.
5. Refill the heating system with water.
6. Check that the expansion relief valve of the heating system is functioning correctly by turning the handle on the valve.
7. Check the pressure in the heating system and top up with water if necessary.
8. Close the filling valve and the cold water tap.

9.13 Purging the heating installation

1. Select the check programme **P.00**.
 - ◁ The product does not start up, the internal pump operates intermittently and purges either the heating circuit or the hot water circuit.
 - ◁ The display shows the filling pressure of the heating installation.
2. Make sure that the filling pressure of the heating installation does not fall below the minimum filling pressure.
 - $\geq 0.08 \text{ MPa}$ ($\geq 0.80 \text{ bar}$)
 - ◁ At the end of the filling procedure, the filling pressure of the heating installation should be at least 0.02 MPa (0.2 bar) above the counter-pressure of the expansion vessel ("Exp") ($P_{\text{Installation}} \geq P_{\text{Exp}} + 0.02 \text{ MPa}$ (0.2 bar)).
3. If there is still too much air in the heating installation at the end of the check programme **P.00**, repeat the check programme.

9.14 Filling and purging the hot water system

1. Open the cold water stop valve on the product.
2. Fill the hot water system by opening all the hot water draw-off valves until water escapes.

9.15 Gas inspection

9.15.1 Checking the air/flue pipe/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 unusual levels of CO or CO₂ in the supply air, search for the leak in the flue system or for signs of flue gas recirculation.
5. Eliminate the damage properly.
6. Check again whether the supply air contains any unusual levels of CO or CO₂.
7. If you cannot eliminate the damage, do not start up the product.

9.15.2 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.

Qnw from the data plate	H gas in m³/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

Condition: Gas flow rate not in the permissible range

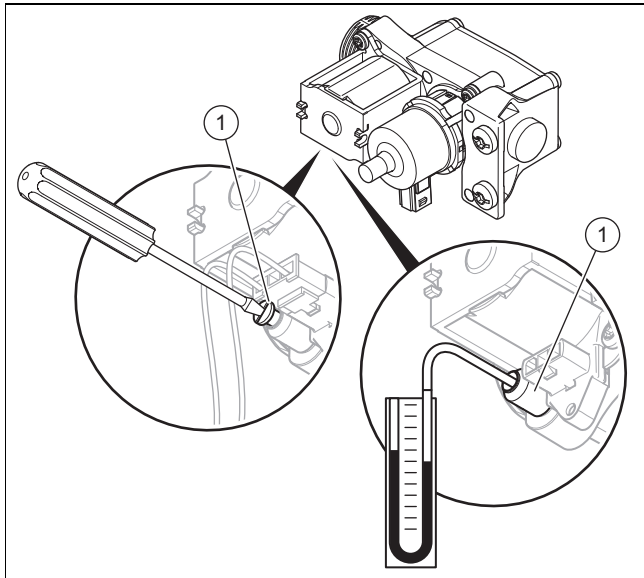
- ▶ Check all of the piping and ensure that the gas flow rates are correct.
- ▶ Only put the product into operation once the gas flow rates have been corrected.

Condition: 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.

9.15.3 Checking the 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 stopcock.



3. Use a screwdriver to undo the sealing screw of the test nipple (1) at the gas valve assembly.
4. Connect a manometer (2) to the test nipple (1).
5. Open the gas stopcock.
6. Start up the product with the check programme **P.01**.
 - ◁ **S.93** is briefly displayed.
 - ◁ If the display switches to **S.04**, the product is ready for the measurement.
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 complies with the requirements.
9. Measure the gas flow pressure in comparison with the atmospheric pressure.
 - Permissible gas flow pressure for operation with G20 natural gas: 1.3 to 2.3 kPa (13.0 to 23.0 mbar)
 - Permissible gas flow pressure for operation with G31 liquid gas: 2.3 to 4.3 kPa (23.0 to 43.0 mbar)
10. 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.
11. Decommission the product.
12. Close the gas stopcock.
13. Remove the manometer.
14. Tighten the screw on the test nipple (1).
15. Open the gas stopcock.
16. Check the test nipple for gas tightness.

Condition: 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 the 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 stopcock.
- Remove the pressure gauge and retighten the sealing screw (1) for the measuring nipple.
- Open the gas stopcock.
- Check the test nipple for gas tightness.
- Close the gas stopcock.
- Install the front casing.
- Disconnect the product from the power grid.
- You must not start up the boiler.

Condition: 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 stopcock.
- Remove the pressure gauge and retighten the sealing screw (1) for the measuring nipple.
- Open the gas stopcock.
- Check the test nipple for gas tightness.
- Install the front casing.
- Reset boiler controls for normal operation.
- Record the appliance gas inlet working pressure (kPa resp. mbar) in the Benchmark gas boiler commissioning checklist.

9.15.4 Calibrating the heat generator and measuring the CO/CO₂ content and gas flow in heating mode



Caution.

Risk of operating faults caused by the corruption of the measured values during the calibration.

Operating the product with the front casing open or not completely installed, or with the flue pipe open, may negatively influence the calibration of the gas-air mixture.

- During the calibration and when measuring the CO₂ content, you must operate the product with the front casing installed and closed, and with the flue pipe completely installed.

1. Start up the product.



Note

Since the combustion can be continuously monitored by the product, you do not need to check the combustion.

2. Ensure that the maximum heat volume can be transferred to the heating installation by opening the radiator thermostats.

**Note**

All radiators should be cold before you start calibration. This ensures that the heat volume can be transferred to the heating installation.

**Note**

If there is an excessive air temperature at the radiators, calibration may not be possible.

3. Start check programme **P.01**.
 - ◁ The heat generator starts in heating mode.
 - ◁ The heat generator first switches between status **S.01** and status **S.02**.
 - ◁ The heat generator switches to status **S.93** after approximately two minutes for calibration.
 - ◁ Do not measure the CO/CO₂ content or the gas flow during calibration (status **S.93**).

Condition: The flow temperature increases to above 80 °C in the next five to six minutes.

- ▶ The heat generator does not switch to status **S.04**.

**Note**

Calibration is not complete and the CO/CO₂ content and gas flow cannot be measured.

- ▶ Use to end check programme **P.01**.

4. **Alternatives 1:**
 - ▶ If required, carry out calibration and measurement again.
4. **Alternatives 2:**
 - ▶ Calibrate the heat generator and measure the CO/CO₂ content and the gas flow in domestic hot water mode. (→ Page 32)

Condition: The flow temperature remains below 80 °C in the next five to six minutes.

- ▶ If the heat generator switches from status **S.93** to status **S.04** after approximately five to six minutes, calibration at maximum heat input is complete.
- ▶ In the next few minutes, measure the CO/CO₂ content and the gas flow at maximum load.
- ▶ Use to end check programme **P.01**.
- ▶ Start check programme **P.02**.
 - ◁ The heat generator starts in heating mode.
 - ◁ The heat generator switches to status **S.93** after approximately two minutes for calibration.
 - ◁ Do not measure the CO/CO₂ content or the gas flow during calibration (status **S.93**).
 - ◁ If the heat generator permanently switches from status **S.93** to status **S.04** after approximately two to five minutes, calibration at minimum load is complete.
- ▶ In the next few minutes, measure the CO/CO₂ content and the gas flow at minimum load.
- ▶ Use to end check programme **P.02**.
 - ◁ Calibration and measurement in heating mode are complete.
- ▶ Log the CO₂ content (air ratio) and CO/CO₂ ratio in the Benchmark gas boiler commissioning checklist.

9.15.4.1 Calibrating the heat generator and measuring the CO/CO₂ content and gas flow in domestic hot water mode

1. The following steps are only required if calibration and measurement in heating mode (→ Page 31) could not be completed successfully.
2. If required, open all of the draw-off points.
3. Set the domestic hot water temperature at the heat generator to the maximum.

**Danger!****Risk of burns and scalding!**

There is a risk of scalding at the domestic hot water draw-off points if the water temperature is set to the maximum.

- ▶ Avoid contact with the water that escapes from the domestic hot water draw-off point.

4. Open check programme **P.01**.
 - ◁ The heat generator starts in domestic hot water mode.
 - ◁ The heat generator first switches between status **S.11** and status **S.13**.
 - ◁ The heat generator switches to status **S.93** after approximately two minutes for calibration.
 - ◁ Do not measure the CO/CO₂ content or the gas flow during calibration (status **S.93**).
5. If the heat generator switches from status **S.93** to status **S.14** after approximately five to six minutes, calibration at maximum heat input is complete.
6. In the next few minutes, measure the CO/CO₂ content and the gas flow at maximum load.
7. Use to end check programme **P.01**.
8. Open check programme **P.02**.
 - ◁ If the heat generator permanently switches from status **S.93** to status **S.14** after five to six minutes, calibration at minimum load is complete.
9. In the next few minutes, measure the CO/CO₂ content and the gas flow at minimum heat input.
10. Use to end check programme **P.02**.
 - ◁ Measurement and calibration in domestic hot water mode are complete.

9.16 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.

Condition: Room-sealed operation

- ▶ Check whether the vacuum chamber has been closed tightly.

9.16.1 Checking the heating mode

1. Make sure that there is a heat requirement.
2. Call up **Live monitor**.
 - ◁ If the product is working correctly, the display shows **S.04**.

9.16.2 Checking the domestic hot water generation

1. Open a hot water tap all the way.
2. Call up the **Live Monitor**.
 - ◁ If the domestic hot water generation is working correctly, **S.14** appears in the display.

9.17 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 the heating system again with water as described in Filling the heating installation (→ Page 29) and Purging the heating installation (→ Page 30).
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.

8. Install the front casing.

10 Adapting the unit to the heating installation

To reset the most important system parameters, use the **Appliance config.** menu point.

Menu → Installer level → Appliance config.

Or manually relaunch the installation assistant.

Menu → Installer level → Start inst. assistant

10.1 Calling up diagnostics codes

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

Menu → Installer level → Diagnostics menu

Overview of diagnostics codes (→ Page 47)

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

10.2 Burner anti-cycling time

To prevent frequent switching on and off of the burner and thus prevent energy losses, an electronic restart lockout is activated for a specific period each time the burner is switched off. The burner anti-cycling time is only active for the heating mode. Hot water handling during a burner anti-cycling time does not affect the time function element (default setting: 20 mins).

10.2.1 Setting the burner anti-cycling time


1. Navigate to **Menu → Installer level → Diagnostics menu → D.002 Max. anti-cycl. time: Heating** 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	

10.2.2 Resetting the remaining burner anti-cycling time



1. Alternatives 1:

- ▶ Navigate to **Menu** → **Reset anti-cycl. time**.
 - ◁ The current burner anti-cycling time appears in the display.
- ▶ Press  to reset the burner anti-cycling time.

1. Alternatives 2:


- ▶ Press the **Fault clearance**  button.

10.3 Setting the maintenance interval

1. Navigate to **Menu** → **Installer level** → **Diagnostics menu** → **D.084 Maintenance in** and confirm by pressing .
2. Set the maintenance interval (operating hours) until the next maintenance work is due and confirm by pressing .

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

10.4 Setting the pump output

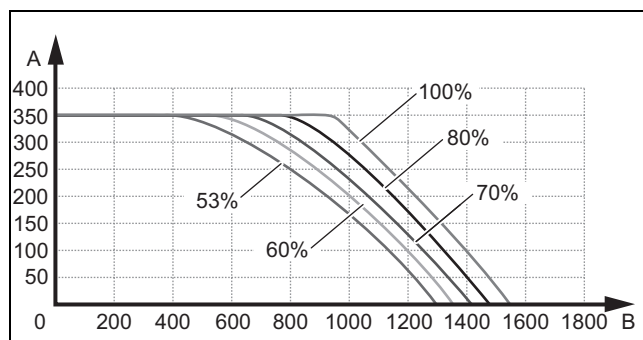
1. Navigate to **Menu** → **Installer level** → **Diagnostics menu** → **D.014 Pump speed target value** and confirm by pressing .
2. Set the required pump output.

Condition: Low loss header installed

- ▶ Switch off the speed regulation and set the pump output to a fixed value.

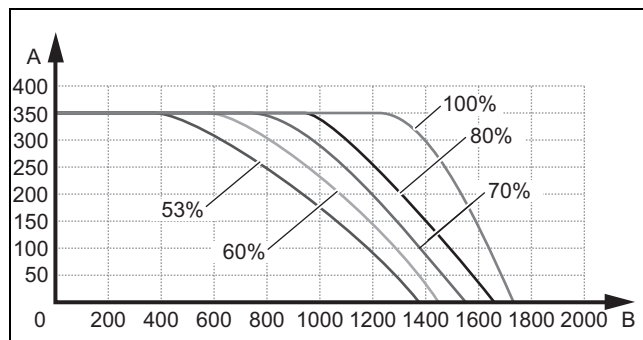
10.4.1 Remaining feed head of the pump

10.4.1.1 Pump characteristic line 835 (VUW 356/5-7)



A Remaining feed head [hPa (mbar)] B System volume flow [l/h]

10.4.1.2 Pump characteristic line 843 (VUW 436/5-7)



A Remaining feed head [hPa (mbar)] B System volume flow [l/h]

10.5 Setting the bypass valve



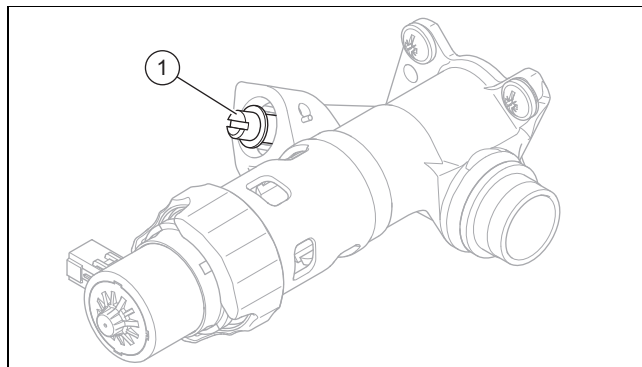
Caution.

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 code D.014.

- ▶ Remove the front casing. (→ Page 17)



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

Position of the adjusting screw	Pressure in MPa (mbar)	Notes/application
Right-hand stop (turned all the way down)	0.035 (350)	If the radiators do not heat up sufficiently at the default setting. In this case, you must set the pump to the maximum speed.
Mid-position (5 turns to the left)	0.025 (250)	Default setting
5 further turns to the left from the mid-position	0.017 (170)	If noises are produced in the radiators or radiator valves

- Install the front casing.

11 Handing over to the end user

- At the time of commissioning complete all relevant sections of the Benchmark commissioning checklist, located at the rear of this document.
- For IE: Complete a "Declaration of Conformity" to indicate compliance to I.S. 813. An example of this is given in the current edition of I.S. 813.
- When you have finished the installation, affix the enclosed sticker (which requests that the user reads the instructions) to the front of the product in the end user's language.
- Draw attention, to the current issue of the Gas Safety (Installation and Use) Regulations, Section 35, which imposes a duty of care on all persons who let out any property containing a gas appliance in the UK.
- Explain to the end user how the safety devices work and where they are located.
- Inform the end user how to handle the product.
- In particular, draw attention to the safety warnings that the end user must follow.
- Inform the end user that they must have the product maintained in accordance with the specified intervals.
- Pass all of the instructions and documentation for the product to the end user for safe-keeping.
- Inform the end user about measures taken to ensure the supply of combustion air and flue gas guiding, and instruct the operator that he must not make any changes.
- Inform the end user that they must not store or use explosive or highly flammable substances (such as petrol, paper or paint) in the installation room of the product.
- Complete and sign off the Benchmark commissioning check list.
- Complete and sign off the guarantee documentation.

12 Inspection and maintenance

12.1 Complete Service Interval Record section

- ▶ After servicing, complete the relevant Service Interval Record section of the Benchmark Checklist located on the inside back pages of this document.

12.2 Using original seals

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

12.3 Inspection and maintenance

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

12.4 Preparing the maintenance work

1. Switch off the product.
2. Disconnect the product from the power grid.
3. Remove the front casing. (→ Page 17)
4. Close the gas stopcock.
5. Close the service valves in the heating flow and in the heating return.
6. Close the service valve in the cold water pipe.
7. Drain the product to clean hydraulic components (→ Page 38).
8. Ensure that water does not drip on live components (e.g. the electronics box).
9. Use only new seals and o'ring. Do not use additional compounds.

12.5 Function menu

Menu → Installer level → Test programs → Function menu

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

Display	Test programme	Action
T.01	Check internal pump	Switch the internal pump on and off.
T.02	Check 3-way valve	Move the diverter valve to the heating position or to the hot water position.
T.03	Check fan	Switch the fan on and off. The fan runs at maximum rotational speed.
T.04	Check cylinder charge pump	Switch the cylinder charging pump on and off.
T.05	Check circulation pump	Switch the circulation pump on and off.
T.06	Check external pump	Switch the external pump on and off.
T.08	Checking the burner	Product starts up and switches to minimum load. The flow temperature is shown in the display.

12.6 Electronics self-test

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

You can use the electronics self-test to check the PCB.

12.7 Checking the electrical plug connections

1. Use the main switch to switch off the product.
2. Disconnect the product from the power supply by either removing the plug for the power supply cable from the plug socket or, in the case of a fixed connection, by switching off the circuit breaker.

Condition: Product disconnected from the power supply

- ▶ Check that the electrical plug connections and connections are working correctly and are connected correctly.

12.8 Working on the compact thermal module

12.8.1 Removing the compact thermal module



Note

The compact thermal module consists of four main components:

- Speed-regulated fan,
- Gas valve,
- Burner flange,
- Premix burner.



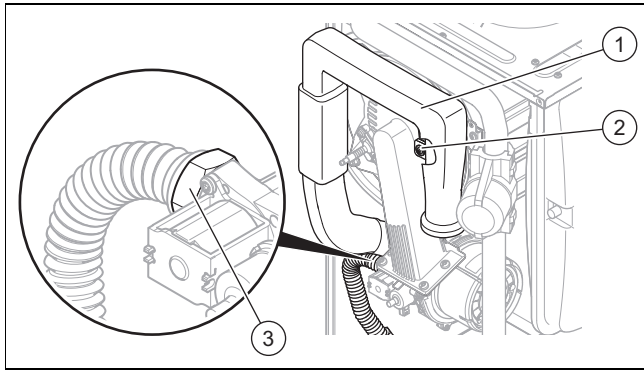
Danger!

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

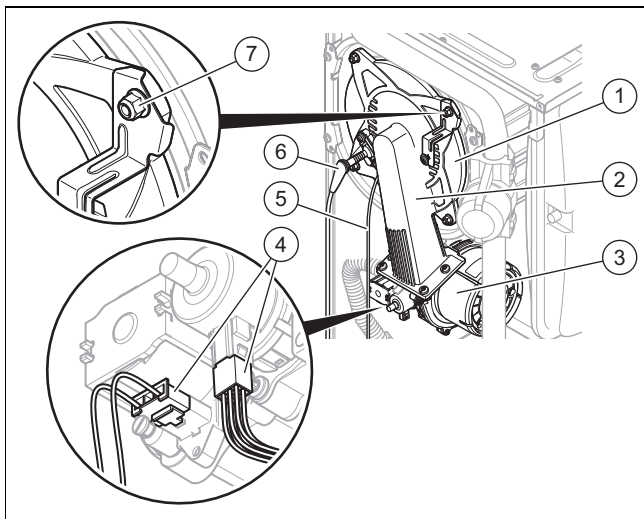
The seal, insulating mat and self-locking nuts on the burner flange must not be damaged. Otherwise, hot flue gases may escape and cause personal injury and material damage.

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

1. Disconnect the product from the power supply.
2. Close the gas isolator cock.
3. Remove the front casing. (→ Page 17)
4. Tilt the electronics box forward.



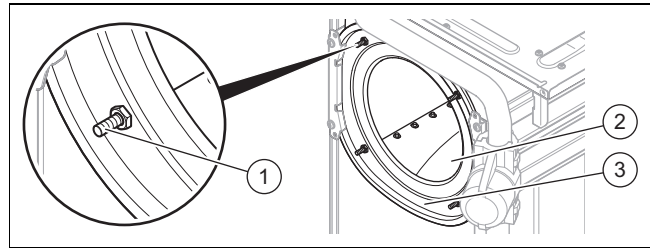
5. Unscrew the retaining screw (2) and remove the air intake pipe (1) from the intake stub.
6. Unscrew the cap nut from the gas valve (3).



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

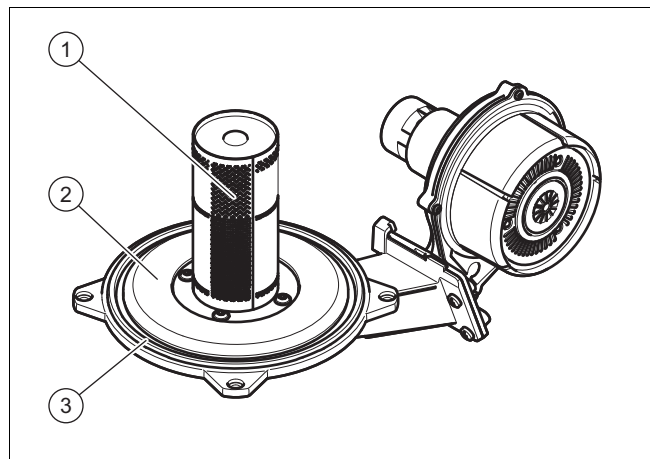
12.8.2 Cleaning the heat exchanger

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



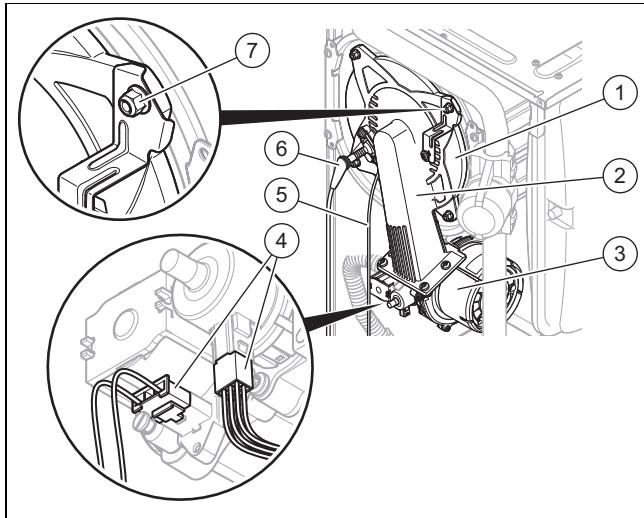
2. Never undo the four nuts on the stud bolt (1) or tighten them.
3. Clean the heating coil (2) of the heat exchanger (3) using water or, if required, vinegar (to a maximum of 5% acid). Allow the vinegar to act on the heat exchanger for 20 minutes.
4. Rinse away any loose dirt with a sharp jet of water or use a plastic brush. Do not point the water jet directly at the insulating mat on the rear of the heat exchanger.
 - ◁ The water flows out of the heat exchanger through the condensate trap.

12.8.3 Checking the burner



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

12.8.4 Installing the compact thermal module



1. Connect the compact thermal module (2) to the heat exchanger (1).
2. Tighten the nuts (7) in a cross-wise pattern until the burner flange fits closely and uniformly onto the mating surfaces.
 - Tightening torque: 6 Nm, if a torque spanner is available
3. Reconnect the plug (4) to the gas valve assembly.
4. Reconnect the plug (5) for the earth wire and the plug (6) for the ignition line.
5. Reconnect all of the plugs to the fan motor (3).
6. Connect the gas pipe using a new seal. In the process, secure the gas pipe against twisting.
7. Open the gas stopcock.
8. Make sure that there are no leaks.
9. Check that the sealing ring in the air intake pipe is positioned correctly in the seal seat.
10. Reconnect the air intake pipe to the intake stub.
11. Secure the air intake pipe with the retaining screw.
12. Check the gas flow pressure. (→ Page 30)

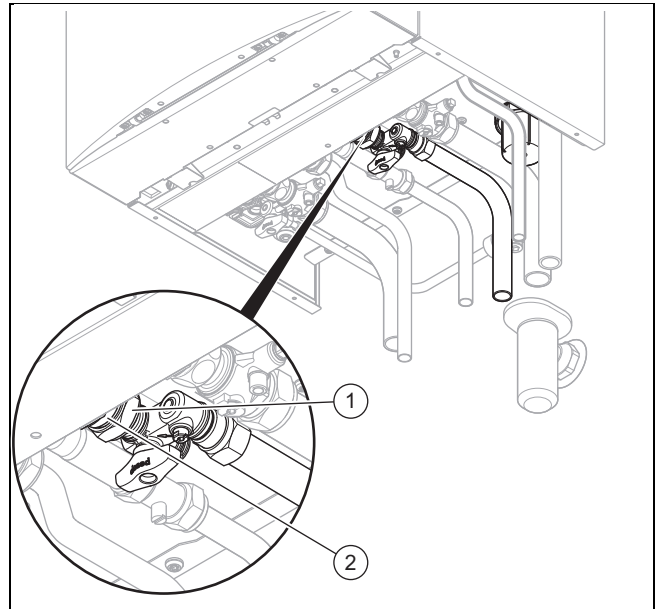
12.9 Clean the condensate siphon and check the condensate discharge pipe

1. Remove the lower section of the condensate siphon.
2. Flush out the lower section with water.
3. Fill the lower section:
 - VUW 356/5-7: With water until around 10 mm below the upper edge
 - VUW 436/5-7: With water until two-thirds full
4. Secure the lower section to the condensate siphon.
5. Check that the condensate discharge pipe is in good condition, check it for tightness and that it drains correctly.
6. Check whether all of the externally routed condensate discharge pipes are dimensioned correctly and have been insulated sufficiently (frost protection).

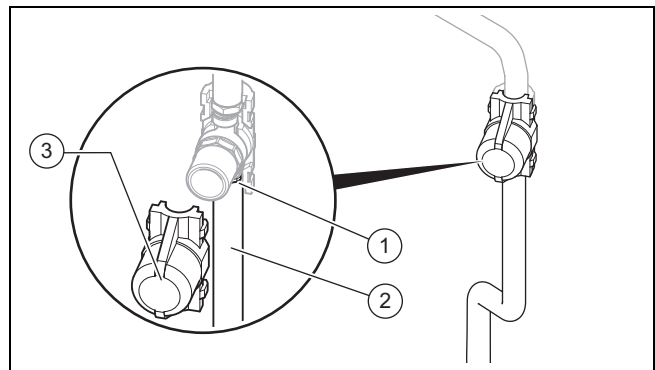
12.10 Draining the product

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

12.11 Cleaning the filter in the cold water inlet



1. Close the cold water stop valve.
2. Drain the product on the hot water side.
3. Unscrew the cap nut (1) and the lock nut (2) from the product's casing.
4. Tilt the electronics box forward.



5. Remove the water hammer arrester's casing (3).
6. Unscrew the cap nut (1) underneath the water hammer arrester.
7. Remove the pipe (2) from the product.
8. Ensure that you do not damage the heat insulation on the pipe.
9. Rinse the filter under a jet of water, holding it against the direction of flow.
10. If the filter is damaged or it can no longer be cleaned sufficiently, you must replace the filter.
11. Refit the pipe.
12. Always use new seals.
13. Retighten the cap nut on the water hammer arrester and fit the casing.

14. Retighten the cap nuts and the lock nuts on the cold water inlet.
15. Open the cold water stop valve.

12.12 Checking the impeller sensor

- ▶ Check the impeller sensor for dirt/damage.

12.13 Checking the pre-charge pressure for the internal expansion vessel

1. Close the service valves and drain the product.
2. Measure the pre-charge pressure of the expansion vessel at the vessel valve.

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

- ▶ Ideally, you should top up the expansion vessel with nitrogen. Otherwise, top it up 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 42).
 4. Fill the heating installation. (→ Page 29)
 5. Purge the heating installation. (→ Page 30)

12.14 Checking the filling pressure of the heating installation

1. Check the filling pressure of the heating installation and top up with heating water, if necessary.
2. Fill the heating installation. (→ Page 29)
3. Purge the heating installation. (→ Page 30)

12.15 Checking the water flow rate (domestic hot water)

1. Check the water flow rate (domestic hot water).

Condition: Insufficient water flow rate

- ▶ Check the incoming water supply.

Condition: Sufficient incoming water supply

- ▶ Clean the filter in the cold water inlet. (→ Page 38)

12.16 Checking the quality of the heating water

- ▶ Check the quality of the heating water. (→ Page 27)

12.17 Completing inspection and maintenance work

- ▶ Start a test operation after the maintenance.
- ▶ Check the heating mode and domestic hot water generation.
- ▶ Check the gas type. (→ Page 18)
- ▶ Check the gas flow pressure. (→ Page 30)
- ▶ Calibrate the heat generator and measure the CO/CO₂ content and the gas flow in heating mode. (→ Page 31)
- ▶ If required, reset the maintenance interval. (→ Page 36)
- ▶ Check the product for tightness. (→ Page 32)
- ▶ Install the front casing.
- ▶ Fill out the relevant Service Record section in the Benchmark Checklist.

12.18 Checking the product for leak-tightness

- ▶ Check that the product is leak-tight. (→ Page 32)

13 Troubleshooting

13.1 Comfort protection mode for the heat cell

Condition: Neither  nor a fault code **F.xx** are shown in the display

Unusual operating noises are emitted from the heat cell in the product.


- ▶ Check whether **S.40** is displayed in **Live monitor**.

If **S.40** is displayed, the product is in a temporary test mode, which it will exit again automatically.

Condition:  is displayed.

The **Live monitor** shows **S.40** and **D.118** is at 0. The heat cell is in permanent comfort protection mode. This is not caused by the all-gas sensor.

- ▶ Decommission the product and check the entire air/flue pipe.
 - ▽ Are there any blockages or leakages?
 - ▶ Eliminate the cause.
 - ▽ Are any components damaged?
 - ▶ Replace the defective components.
- ▶ If the air/flue pipe is OK, restart the product.
- ▶ Prepare the flue gas analyser for checking the recirculation.
 - ◁ The measuring probes must be rinsed and must not be contaminated by a previous measurement.
- ▶ Check for recirculation at the air test point. The following measured values are indicators of recirculation.
 - Oxygen value in the intake air: < 20 vol. %
 - Intake air CO value: > 20 ppm CO more than in the ambient air
- ▽ Recirculation is present.
 - ▶ Eliminate the deficiencies in the air/flue pipe.
- ▽ No recirculation is present.
 - ▶ Ensure that there is a heat requirement. In the Live Monitor, check whether the product has the status **S.04** or **S.14**.
- ▶ If the combustion values are not OK, carry out check programmes **P.04** and **P.14**.

Condition:  and **F.55** are displayed

The **Live monitor** shows **S.40** and **D.118** ≥ 1. The heat cell is in permanent comfort protection mode.

- ▶ Check and, if required, replace the all-gas sensor.

13.2 Checking service messages

- ▶ To obtain further information, call up the **Live monitor**. (→ Page 25)

Condition: S.40 is displayed

The product is in Comfort protection mode. The product has detected a temporary fault and continues to run with restricted comfort. The product switches back to the normal operating mode.

- ▶ To establish whether or not a component is defective, read the fault memory. (→ Page 40)




Note

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

Condition: S.86 is displayed

The product remains in comfort safety mode and does not switch back to normal operating mode.


- ▶ Check the component that is mentioned and, if required, replace it.
- ▶ To establish whether or not a component is defective, read the fault memory (→ Page 40).

 appears if you have set a maintenance interval, for example, and this has passed or a service message is issued.

13.3 Eliminating faults





- ▶ If fault messages (**F.XX**) appear, eliminate the fault by referring to the table in the appendix or using the Function menu (→ Page 36) and the Check programmes (→ Page 27).
Overview of fault codes (→ Page 54)

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 eliminate the fault and the fault recurs despite reset attempts, contact customer service.

13.4 Checking the fault memory

If faults have occurred, the last ten (max.) fault messages are available in the fault memory.

- ▶ Navigate to **Menu** → **Installer level** → **Fault list** and confirm by pressing .
 - ◁ The display shows the number of faults that have occurred, the fault numbers and the corresponding plain text display.
- ▶ Press  or  to call up individual fault messages.
- ▶ Press  twice to delete the fault list.

13.5 Resetting parameters to factory settings

1. Navigate to **Menu** → **Installer level** → **Diagnostics menu** → **D.096 Reset to factory settings?** and confirm by pressing .
2. Press  to set the value to 1 and confirm by pressing .

13.6 Preparing the repair work

1. Temporarily decommission (→ Page 43) the product.
2. Disconnect the product from the power grid.
3. Remove the front casing. (→ Page 17)
4. Close the service valves in the heating flow, in the heating return and in the cold water pipe.
5. Close the gas stopcock.
6. Drain the product (→ Page 38) if you want to replace any of the product's water-carrying components.
7. Make sure that water does not drip on live components (e.g. the electronics box).
8. Use only new seals.

13.6.1 Procuring spare parts

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

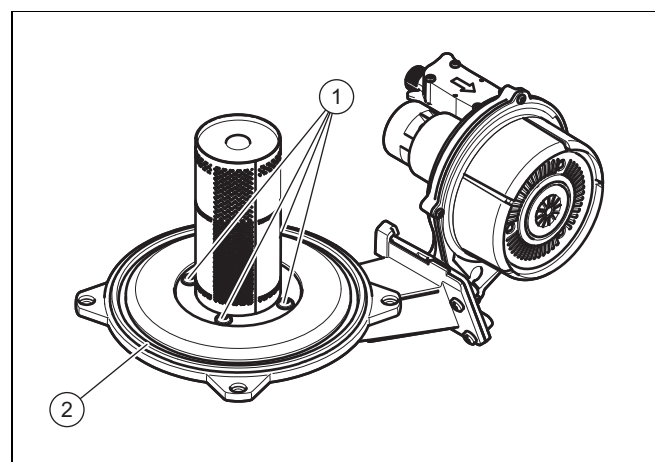
We strongly recommend that you use original spare parts from the manufacturer as this guarantees fault-free and safe operation of the product. To receive information about the available original spare parts, contact the contact address provided on the back page of these instructions.

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

13.7 Replacing defective components

13.7.1 Replacing the burner

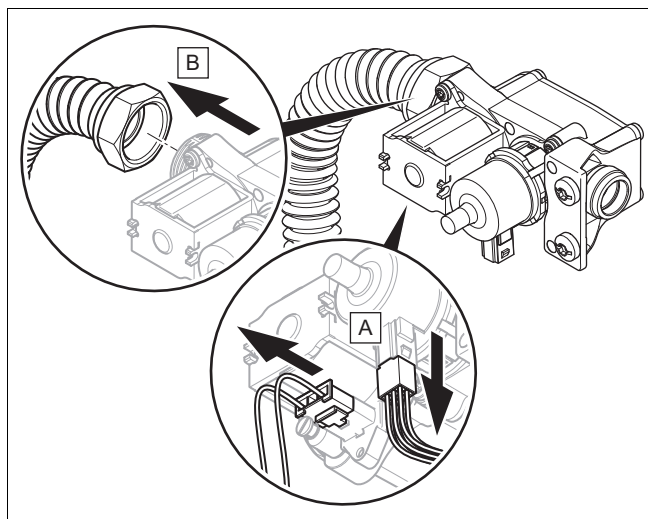
1. Remove the compact thermal module. (→ Page 36)



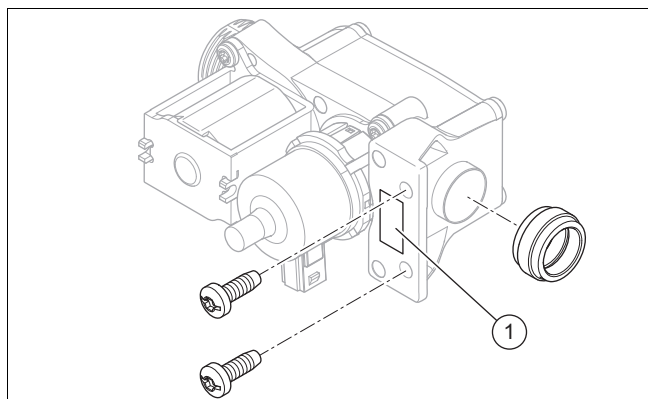
2. Undo the four screws (**1**) on the burner.
3. Remove the burner.
4. Install a new seal (**2**) on the new burner.
5. Install the compact thermal module. (→ Page 38)

13.7.2 Replacing the gas valve assembly

1. Switch off heating mode and domestic hot water generation (→ Operating instructions).



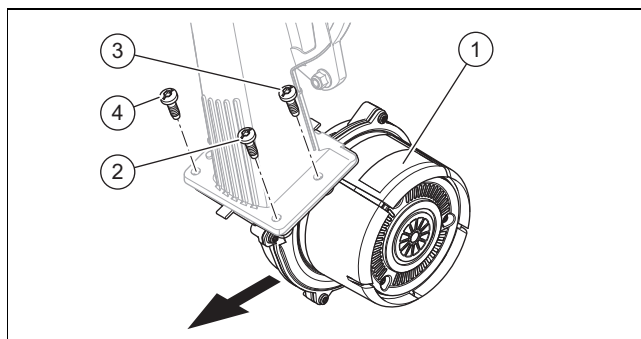
2. Remove the air intake pipe.
3. Remove the plugs from the gas valve assembly.
4. Unscrew the union nut from the gas valve assembly.



5. Unscrew both screws to secure the gas valve assembly to the fan.
6. Reinstall the new gas valve assembly in the reverse order. Use new seals for this.
7. Read the offset value (1) that is imprinted on the new gas valve assembly.
8. After installing the new gas valve assembly, carry out a leak-tightness test (→ Page 32).
9. Close the front casing.
10. Switch on the product.
11. Navigate to **Menu → Installer level → Diagnostics menu → D.052 Min. gas valve steps offset** and confirm by pressing .
12. Enter the offset value that you read off and confirm by pressing .
13. Carry out initial start-up (→ Page 26).

13.7.3 Replacing the fan

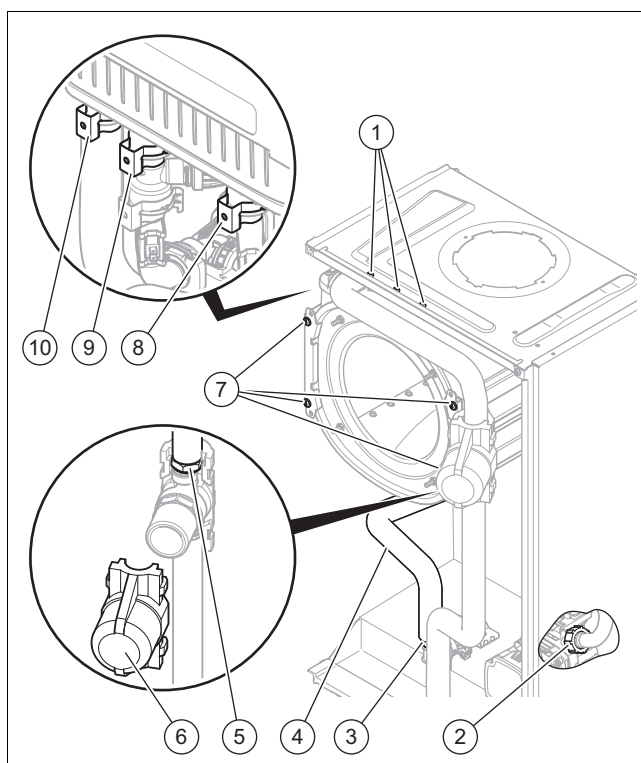
1. Remove the air intake pipe.
2. Remove the gas valve assembly (→ Page 41).



3. Remove all plugs from the fan (1).
4. Unscrew the three screws between the mixture pipe and the fan flange.
5. Replace the defective fan.
6. Reinstall the new fan in the reverse order. You must use new seals for this. Ensure that the order in which the three screws are screwed in between the fan and the mixture pipe corresponds to the numbering (2), (3) and (4).

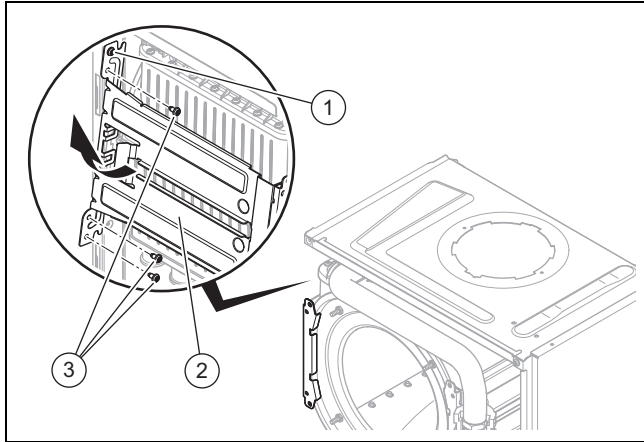
13.7.4 Replacing the heat exchanger

1. Drain the product. (→ Page 38)
2. Remove the compact thermal module. (→ Page 36)
3. Remove the left side section.
4. Detach the condensate drain hose from the heat exchanger.



5. Remove the clamps on the hot water connection (10), on the return connection (9) and on the flow connection (8).
6. Unscrew the cap nut (3) on the hot water pipe to the secondary heat exchanger. Remove the hot water pipe (4) from the connection on the heat exchanger and take it out of the product. Ensure that you do not damage the heat insulation.
7. Undo the cap nut (2) on the pump's return connection and remove the pipe from the return connection on the heat exchanger.

8. Remove the pipe from the flow connection on the heat exchanger.
9. Remove the water hammer arrester's casing (6).
10. Unscrew the cap nut (5) on the cold water pipe above the water hammer arrester.
11. Remove the screws (1) on the support plate for the heat exchanger on the casing top.
12. Remove two screws (7) on each of the two retainers.
13. Remove the all-gas sensor. (→ Page 43)



14. Remove the lower three screws (3) on the rear section of the retainer on the left.
15. Support the heat exchanger and swing the retainer (2) to the side around the top screw (1).
16. Pull the heat exchanger downwards and to the left, and remove it from the product.
17. Push the new heat exchanger into the air/flue gas connection from above.
18. Push the heat exchanger into the groove in the retainer on the right and swing the retainer on the left back into its original position.
 - ◁ The heat exchanger is now held in place by the guides in the two retainers.
19. Install the two front clamps on the retainers and then fit the screws you removed in the retainer on the left (always work in this order).
20. Install all the connections and the all-gas sensor in the reverse order.
21. Replace the seals and install the water hammer arrester's casing.



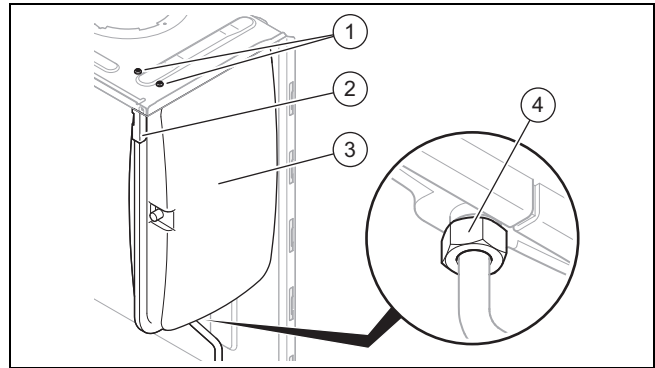
Note

To make the installation easier, use only the lubricant that may be included with the Vaillant spare part. If no lubricant is included with the Vaillant spare part, use only water or commercially available soft soap.

22. Ensure that the clamps on the heat exchanger's connections are seated correctly.
23. Install the compact thermal module. (→ Page 38)
24. Install the left-hand side section.
25. Fill (→ Page 29) and purge (→ Page 30) the product and, if required, the heating installation.

13.7.5 Replacing the expansion vessel

1. Drain the product. (→ Page 38)
2. Remove the right side section.



3. Undo the screwed connection (4).
4. Remove both screws (1) on the support plate (2).
5. Remove the support plate (2).
6. Pull out the expansion vessel (3) towards the front.
7. Insert the new expansion vessel into the product.
8. Screw the new expansion vessel to the water connection. Use a new seal for this.
9. Attach the support plate using both screws (1).
10. Install the right side section.
11. Fill (→ Page 29) and purge (→ Page 30) the product and, if required, the heating installation.

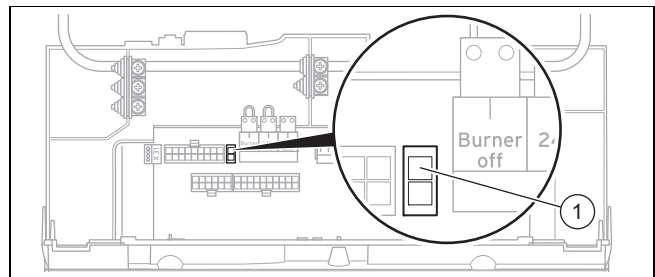
13.7.6 Replacing the PCB or the display



Note

If you only replace one component, when the product is switched on, the new component adopts the parameters that were previously set from the component that was not replaced.

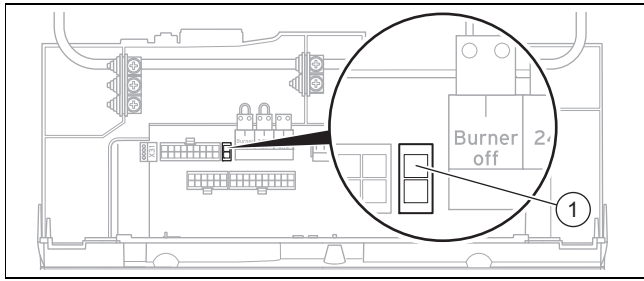
1. Open the electronics box. (→ Page 22)
2. Replace the PCB or display according to the assembly and installation instructions supplied.



3. If you are replacing the PCB, remove the coding resistance (1) (plug X24) from the old PCB and plug the plug onto the new PCB.
4. Close the electronics box.

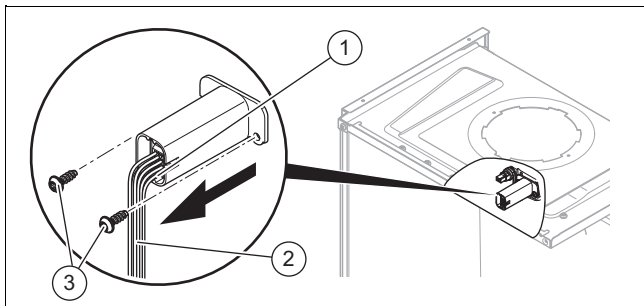
13.7.7 Replacing the PCB and the display

1. Open the electronics box. (→ Page 22)
2. Replace the PCB and display according to the assembly and installation instructions supplied.



3. Remove the coding resistance (1) (plug X24) from the old PCB and plug the plug into the new PCB.
4. Close the electronics box.
5. Press the on/off button on the product. (→ Page 26)
 - ◁ After switching on, the product switches directly to the menu to select the language. The default language setting is English.
6. Select the required language and confirm by pressing .
 - ◁ You are automatically taken to **D.093** to set the device specific number.
7. Remove the correct value for the relevant product type from the technical data in the appendix, and press to confirm.
 - ◁ The electronics are now set to the product type and the parameters of all diagnostics codes are set to default settings.
 - ◁ The installation assistant starts. (→ Page 26)
8. Make the system-specific settings.

13.7.8 Replacing the all-gas sensor



1. Remove the air intake pipe; see Removing the compact thermal module (→ Page 36).
2. Undo the screws (3) just enough so that you can pull out the all-gas sensor by the cable (2).
3. Remove the plug (1) by pushing in the latching lug.
4. Reinstall the new all-gas sensor in the reverse order.

13.8 Completing repair work

1. Establish the power supply.
2. Switch the product back on if this has not yet been done. (→ Page 26)
3. Install the front casing.
4. Open all service valves and the gas stopcock.

13.9 Checking the product for leak-tightness

- ▶ Check that the product is leak-tight. (→ Page 32)

14 Decommissioning

14.1 Temporarily decommissioning the product

- ▶ Press the on/off button.
 - ◁ The display goes out.
- ▶ Close the gas stopcock.
- ▶ For products with domestic hot water generation and products with a connected domestic hot water cylinder, you must also close the cold-water isolation valve.

14.2 Permanently decommissioning the product

- ▶ Press the on/off button.
 - ◁ The display goes out.
- ▶ Disconnect the product from the power grid.
- ▶ Close the gas stopcock.
- ▶ Close the cold-water isolation valve.
- ▶ Drain the product. (→ Page 38)

15 Recycling and disposal


Disposing of the packaging


- ▶ Dispose of the packaging correctly.
- ▶ Observe all relevant regulations.
- ▶ For detailed information refer to www.vaillant.co.uk.

Appendix

A Inspection and maintenance work

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

#	Maintenance work	Interval	
1	Record all of the analysis results in the Benchmark Checklist in these instructions	Annually	
2	Ask the end user whether any significant problems occur when operating the product	Annually	
3	Use the diagnostics system to check the product's fault history	Annually	
4	Visually inspect whether the air/flue pipe and its opening have been installed correctly in accordance with the set-up instructions	Annually	
5	Check that the unit has been installed correctly and the connections have been secured	Annually	
6	Check that the condensate pipe is in good condition, that it is leak-tight and that the drain is correct	Annually	
7	Check whether all of the externally routed condensate pipes are dimensioned correctly and have been insulated sufficiently (frost protection)	Annually	
8	Check whether the gas flow rate corresponds with the specifications on the data plate and lies within the tolerances specified in these instructions	Annually	
9	If the gas flow rate lies outside of the tolerances specified in these instructions, eliminate the fault in accordance with the regulations and the current technology	Annually	
10	Check the general condition of the product and, if required, eliminate any faults that are found	Annually	
11	Calibrating the heat generator and measuring the CO/CO ₂ content and gas flow in heating mode	Annually	31
12	Logging the CO ₂ content (air ratio) and CO/CO ₂ ratio	Annually	
13	Check the product's recirculation at the supply air test point on the air/flue pipe. If required, inspect the entire air/flue system and, if necessary, correct the fault	Annually	
14	Disconnect the product from the electrical installation	Annually	
15	Checking the electrical plug connections	Annually	36
16	Removing dirt from the product and the vacuum chamber	Annually	
17	Visually check the heat cell to ascertain its condition and detect any leaks, corrosion, rust or damage, and carry out maintenance work, if required	Annually	
18	Check that the gas stopcock and service valves function correctly	Annually	
19	Checking the quality of the heating water	Annually	39
20	Removing the compact thermal module	at regular intervals	36
21	Checking the burner	at regular intervals	37
22	Checking the insulating mats in the combustion area and replacing damaged insulating mats	at regular intervals	
23	Cleaning the heat exchanger	at regular intervals	37
24	Clean the condensate siphon and check the condensate discharge pipe	Annually	38
25	Installing the compact thermal module	at regular intervals	38
26	Checking the pre-charge pressure for the internal expansion vessel	at regular intervals	39
27	Cleaning the filter in the cold water inlet	at regular intervals	38
28	Checking the impeller sensor	Annually	39
29	Checking the water flow rate (domestic hot water)	Annually	39
30	If the water volume is insufficient (domestic hot water) or the outlet temperature is insufficient, check the secondary heat exchanger	Annually	
31	Reassemble the product	After each time maintenance work is carried out	
32	Opening the service valves	Annually	

#	Maintenance work	Interval	
33	Run the test operation on the product/heating installation including hot water generation (if available) and, if required, purge the product/heating installation	Annually	
34	Completing inspection and maintenance work	Annually	39
35	Checking the gas type	Annually	
36	Checking the CO/CO ₂ content following maintenance work	Annually	
37	Checking leak-tightness	Annually	

B Installer level – Overview

Setting level	Values		Unit	Increment, select, explanation	Default setting
	Min.	Max.			
Installer level →					
Enter code	00	99	–	1 (competent person code 17)	–
Installer level → Fault list →					
F.XX – F.XX¹	Current value		–	–	–
Installer level → Test programs → Check programs →					
P.00 Purging	–	–	–	Yes, No	–
P.01 Maximum load	–	–	–	Yes, No	–
P.02 Minimum load	–	–	–	Yes, No	–
P.04 Reset eGas CH	–	–	–	Yes, No	–
P.06 Filling mode	–	–	–	Yes, No	–
P.14 Reset eGas DHW	–	–	–	Yes, No	–
Installer level → Test programs → Function menu →					
T.01 Internal pump	–	–	–	On, Off	–
T.02 3-way valve	–	–	–	On, Off	–
T.03 Fan	–	–	–	On, Off	–
T.04 Cylinder charging pump	–	–	–	On, Off	–
T.05 Circulation pump	–	–	–	On, Off	–
T.06 External pump	–	–	–	On, Off	–
T.08 Burner	–	–	–	On, Off	–
Installer level → Test programs → Electronics self-test →					
Self-test	–	–	–	Yes, No	–
Installer level → Appliance config. →					
Language	–	–	–	Languages available for selection	Country-specific
Target flow temp.	30	75	°C	1	–
DHW temperature	30	60	°C	1 Product with hot water generation or connected domestic hot water cylinder	–
Green iQ	–	–	–	On, Off	On
¹Fault lists are only displayed, and can only be deleted, if faults have occurred.					

Setting level	Values		Unit	Increment, select, explanation	Default setting
	Min.	Max.			
Auxiliary relay	1	10	–	1 = Circulation pump 2 = External pump 3 = Cylinder charging pump 4 = Extractor hood 5 = External solenoid valve 6 = External fault message 7 = Solar pump (not active) 8 = eBUS remote control (not active) 9 = Legionella protection pump (not active) 10 = Solar valve (not active)	2
Accessory relay 1	1	10	–	1 = Circulation pump 2 = External pump 3 = Cylinder charging pump 4 = Extractor hood 5 = External solenoid valve 6 = External fault message 7 = Solar pump (not active) 8 = eBUS remote control (not active) 9 = Legionella protection pump (not active) 10 = Solar valve (not active)	2
Accessory relay 2	1	10	–	1 = Circulation pump 2 = External pump 3 = Cylinder charging pump 4 = Extractor hood 5 = External solenoid valve 6 = External fault message 7 = Solar pump (not active) 8 = eBUS remote control (not active) 9 = Legionella protection pump (not active) 10 = Solar valve (not active)	2
Heating partial load	–	–	kW	Partial load only, full load only, auto	Auto
Contact details	Phone number	–	–	0 – 9	Auto
Factory setting	–	–	–	On, Off	–
Installer level → Diagnostics menu →					
D.XXX - D.XXX	Current value	–	–	–	–
Installer level → Start inst. assistant →					
Language	–	–	–	Languages available for selection	Country-specific
Filling mode: 3-way valve is in mid-position	0	2	–	0 = Normal operating mode 1 = Mid-position (parallel operation) 2 = Permanent heating mode position	–
Purge program: Select circ. using +/-	–	–	–	Automatic adaptive purging of the heating circuit and hot water circuit Not active Active	–
Target flow temp.	30	75	°C	1	–
DHW temperature	35	60	°C	1 Product with hot water generation	–
Green iQ	–	–	–	On, Off	On
Heating partial load	–	–	kW	Partial load only, full load only, auto	Auto
*Fault lists are only displayed, and can only be deleted, if faults have occurred.					

Setting level	Values		Unit	Increment, select, explanation	Default setting
	Min.	Max.			
Auxiliary relay	1	10	–	1 = Circulation pump 2 = External pump 3 = Cylinder charging pump 4 = Extractor hood 5 = External solenoid valve 6 = External fault message 7 = Solar pump (not active) 8 = eBUS remote control (not active) 9 = Legionella protection pump (not active) 10 = Solar valve (not active)	2
Accessory relay 1	1	10	–	1 = Circulation pump 2 = External pump 3 = Cylinder charging pump 4 = Extractor hood 5 = External solenoid valve 6 = External fault message 7 = Solar pump (not active) 8 = eBUS remote control (not active) 9 = Legionella protection pump (not active) 10 = Solar valve (not active)	2
Accessory relay 2	1	10	–	1 = Circulation pump 2 = External pump 3 = Cylinder charging pump 4 = Extractor hood 5 = External solenoid valve 6 = External fault message 7 = Solar pump (not active) 8 = eBUS remote control (not active) 9 = Legionella protection pump (not active) 10 = Solar valve (not active)	2
Set the type of gas	0	2	–	0: Natural gas 1: Propane 50 mbar 2: Propane 30/37 mbar	–
Contact details	Phone number		–	0-9	–
End the installation assistant?	–	–	–	Yes, No	–
*Fault lists are only displayed, and can only be deleted, if faults have occurred.					

C Overview of diagnostics codes



Note

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

Code	Parameter	Values		Unit	Increment, select, explanation	Factory setting	Own setting
		Min.	Max.				
D.000	Heating partial load	Output-range-specific		kW	Adjustable partial heat load Auto: Product automatically adjusts max. partial load to current system demand	Auto	
D.001	Pump overrun: Heating	1	60	min	Overrun time of internal heating pump for heating mode 1	5	
D.002	Max. anti-cycl. time: Heating	2	60	min	Max. burner anti-cycling time heating at 20 °C flow temperature 1	20	
D.003	Outlet temperature actual value	Current value		°C	–	–	Not adjustable
D.004	Cylinder temperature actual value	Current value		°C	Measured value of domestic hot water sensor	–	Not adjustable

Code	Parameter	Values		Unit	Increment, select, explanation	Factory setting	Own setting
		Min.	Max.				
D.005	Heating target flow temperature	Current value		°C	Target flow temperature value (or target return value)	–	Not adjustable
D.006	Outlet temperature target value	Current value		°C	Domestic hot water temperature target value (only products with integrated domestic hot water generation)	–	Not adjustable
D.007	Cylinder temperature target value Comfort mode target value	Current value		°C	Only products with integrated domestic hot water generation Only products with no integrated domestic hot water generation and with a connected cylinder	–	Not adjustable
D.008	Controller 3-4	Current value		–	0: Open (Room thermostat at terminal RT open = No heat requirement) 1: Closed (Room thermostat at terminal RT closed = Heat requirement)	–	Not adjustable
D.009	eBUS controller target value	Current value		–	Target value from external eBUS controller	–	Not adjustable
D.010	Internal pump	Current value		–	0: Off 1: On	–	Not adjustable
D.011	External pump	Current value		–	0: Off 1: On	–	Not adjustable
D.012	Cyl. charging pump	Current value		–	0: Off 1: On	–	Not adjustable
D.013	Circulation pump	Current value		–	0: Off 1: On	–	Not adjustable
D.014	Pump speed target value	Current value		%	Target value of internal high-efficiency pump. Possible settings: 0 = Auto 1 = 53 2 = 60 3 = 70 4 = 85 5 = 100	0 = Auto	
D.015	Pump speed actual value	Current value		%	High-efficiency pump	–	Not adjustable
D.016	Controller 24 V DC: Heating mode	Current value		–	Heating mode 0: Off 1: On	–	Not adjustable
D.017	Control type	0	1	–	Heating flow/return temperature control changeover 0: Flow 1: Return (conversion for underfloor heating) If you have activated the return temperature control, the function for automatically limiting the heat output using the volume flow remains active. The partial heat load that is selected under D.000 (auto = max.) continues to be the upper limit.	0	

Code	Parameter	Values		Unit	Increment, select, explanation	Factory setting	Own setting
		Min.	Max.				
D.018	Pump operating mode	1	3	–	Setting 1 = Comfort (continuously operating pump) The internal pump is switched on when the heating flow temperature is not at Heating off and the heat requirement is enabled via an external control 3 = Eco (intermittently operating pump) Internal pump is switched on every 25 minutes for 5 minutes once the overrun time has elapsed	3	
D.020	Max. DHW temperature target value	50	70	°C	Max. set value for target cylinder value 1	65	
D.022	DHW demand	Current value		–	Domestic hot water requirement via C1/C2, impeller or APC 0: Off 1: On	–	Not adjustable
D.023	Heating mode status	Current value		–	Summer/winter mode (heating off/on) 0: Blocked 1: Released	–	Not adjustable
D.024	Air pressure sensor actual value	Current value		Pa	–	–	Not adjustable
D.025	Ext. eBUS signal: Cylinder charging	Current value		–	Domestic hot water generation enabled by eBUS control 0: Off 1: On	–	Not adjustable
D.026	Auxiliary relay	1	10	–	1 = Circulation pump 2 = External pump 3 = Cylinder charging pump 4 = Extraction hood 5 = External solenoid valve 6 = External fault message 7 = Solar pump (not active) 8 = eBUS remote control (not active) 9 = Anti-legionella pump (not active) 10 = Solar valve (not active)	2	
D.027	Accessory relay 1	1	10	–	Switching of relay 1 on the VR 40 "2 in 7" multi-functional module 1 = Circulation pump 2 = External pump 3 = Cylinder charging pump 4 = Extraction hood 5 = External solenoid valve 6 = External fault message 7 = Solar pump (not active) 8 = eBUS remote control (not active) 9 = Anti-legionella pump (not active) 10 = Solar valve (not active)	2	

Code	Parameter	Values		Unit	Increment, select, explanation	Factory setting	Own setting
		Min.	Max.				
D.028	Accessory relay 2	1	10	–	Switching of relay 2 on the VR 40 "2 in 7" multi-functional module 1 = Circulation pump 2 = External pump 3 = Cylinder charging pump 4 = Extraction hood 5 = External solenoid valve 6 = External fault message 7 = Solar pump (not active) 8 = eBUS remote control (not active) 9 = Anti-legionella pump (not active) 10 = Solar valve (not active)	2	
D.029	Water circulation vol. actual value	Current value		m³/h	Actual value: Circulation water volume for flow sensor	–	Not adjustable
D.033	Fan speed target value	Current value		rpm	–	–	Not adjustable
D.034	Fan speed actual value	Current value		rpm	–	–	Not adjustable
D.035	3-way valve position	Current value		–	Position of the prioritising diverter valve 0: Heating mode 1: Parallel operation (mid-position) 2: DHW mode	–	Not adjustable
D.036	DHW flow rate	Current value		l/min	–	–	Not adjustable
D.039	Solar inlet temp. actual value	Current value		°C	–	–	Not adjustable
D.040	Flow temperature actual value	Current value		°C	–	–	Not adjustable
D.041	Return temperature actual value	Current value		°C	–	–	Not adjustable
D.044	Ionisation value actual value	Current value		–	> 800 = No flame < 400 = Good flame	–	Not adjustable
D.046	Pump mode	0	1	–	0 = Relay with disable facility 1 = PWM with disable facility	0	
D.047	Current outside temperature	Current value		°C	(with Vaillant weather-compensated control)	–	Not adjustable
D.050	Offset min. speed	0	3000	rpm	Nominal value set in factory	–	
D.051	Offset max. speed	-990	0	rpm	Nominal value set in factory	–	
D.052	Min. gas valve steps offset	0	99	–	The offset is specified at the gas valve assembly.	–	
D.058	Solar post-heating	0	3	–	Only products with integrated domestic hot water generation 0 = Solar post-heating deactivated 3 = Domestic hot water activated (min. target value 60 °C)	0	
D.060	Number of safety therm. shut-downs	Current value		–	Number of safety cut-out switch-off sequences	–	Not adjustable
D.061	No. of shut-downs in ign. flame controller	Current value		–	–	–	Not adjustable
D.064	Avg. ignition time	Current value		s	–	–	Not adjustable
D.065	Max. ignition time	Current value		s	–	–	Not adjustable
D.067	Remaining anti-cycl. time for heating	Current value		min	–	–	Not adjustable
D.068	Number of first start attempts	Current value		–	Unsuccessful ignitions at 1st attempt	–	Not adjustable

Code	Parameter	Values		Unit	Increment, select, explanation	Factory setting	Own setting
		Min.	Max.				
D.069	Number of second start attempts	Current value		–	Unsuccessful ignitions at 2nd attempt	–	Not adjustable
D.070	3-way valve operation	0	2	–	0 = Normal operating mode 1 = Mid-position (parallel operation) 2 = Permanent heating position	0	
D.071	Max. heating target flow temp.	40	80	°C	Target value maximum heating flow temperature 1	75	
D.072	Pump overrun after cylinder charging	0	10	min	Internal pump 1	2	
D.073	Offset setting for comfort mode	–15	5	K	Only products with integrated domestic hot water generation 1	0	
D.074	Anti-legionella funct. with integrated cyl.	0	1	–	0: Off 1: On	1	
D.075	Max. cylinder charging time	20	90	min	Max. charging time for domestic hot water cylinder without independent control system 1	45	
D.076	Device Specific Number	Current value		–	(Device specific number = DSN)	–	Not adjustable
D.077	DHW partial load	Output-range-specific		kW	Adjustable cylinder charging output	100 %	
D.078	DHW max. flow temperature	55	80	°C	Limit on cylinder charging temperature 1 Note The chosen value must be at least 15 K above the target cylinder value.	75	
D.080	Heating operating hours	Current value		h	–	–	Not adjustable
D.081	DHW operating hours	Current value		h	–	–	Not adjustable
D.082	Heating burner starts	Current value		–	–	–	Not adjustable
D.083	DHW burner starts	Current value		–	–	–	Not adjustable
D.084	Maintenance in	"– – –"	3000	h	Number of hours until the next maintenance 1 "– – –" = Deactivated	–	
D.086	Maintenance messages	0	1	–	0: Off 1: On	1	
D.087	Set the type of gas	0	2	–	0: Natural gas 1: Propane 50 mbar 2: Propane 30/37 mbar Fit the correct coding resistor for gas family X24: – Natural gas (factory setting): Yellow – Liquefied petroleum gas: Grey	0	
D.088	Min. DHW flow rate	0	1	–	Switch-on delay for domestic hot water draw-off detection via impeller (only products with integrated domestic hot water generation) 0 = 1.5 l/hr (no delay) 1 = 3.7 l/hr (2 s delay)	0	
D.089	Ignition gas-air ratio offset	–10	15	%	–	8	
D.090	eBUS controller	Current value		–	0: Not recognised 1: Recognised	–	Not adjustable

Code	Parameter	Values		Unit	Increment, select, explanation	Factory setting	Own setting
		Min.	Max.				
D.091	Status DCF77	Current value		–	0: No reception 1: Reception 2: Synchronised 3: Valid	–	Not adjustable
D.092	actoSTOR communication status	Current value		–	actoSTOR module detection 0: Not connected 1: Connection fault 2: Connection active	–	Not adjustable
D.093	Adjust Device Specific Number	0	999	–	VU 256/5-7 (H-GB) ecoTEC exclusive 627 = 209 VUW 356/5-7 (H-GB) ecoTEC exclusive 835 = 211 VUW 436/5-7 (H-GB) ecoTEC exclusive 843 = 212	–	
D.094	Clear fault history	0	1	–	0: No 1: Yes	–	
D.095	Software version: PeBUS participant	Current value		–	0: BMU 1: AI 2: APC 3: SMU	0	
D.096	Reset to factory settings?	0	1	–	0: No 1: Yes	–	
D.118	CO sensor fault number	Current value		–	1: Heater short circuit 2: Heater open circuit 3: Heater temperature control fault 4: Heater temperature plausibility check not OK 5: Sensor short circuit/open circuit 6: Reference resistance measurement not OK 7: Sensor impedance too high 8: Standby reference resistance not OK 9: EEPROM error 10: Sensor open circuit 11: Not used 12: Sensor plausibility test fault 13: Electrical power consumption too low 14: Electrical power consumption too high 15: Reference voltage too low 16: Reference voltage too high	–	Not adjustable
D.132	Multi-occupancy	0	1	–	0: Off 1: On	0	
D.145	Flue gas monitoring	0	1	–	0: Off 1: On	1	

D Status codes – Overview



Note

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

Status code	Parameter	Meaning
Heating mode		
S.00	Heating: No heat demand	Heating: No heat demand
S.01	Heating mode: Fan start-up	Heating mode: Fan start-up
S.02	Heating mode: Pump pre-run	Heating mode: Pump prerun
S.03	Heating mode: Ignition	Heating mode: Ignition
S.04	Heating mode: Burner on	Heating mode: Burner on
S.05	Heating mode: Pump/fan overrun	Heating mode: Pump/fan overrun
S.06	Heating mode: Fan overrun	Heating mode: Fan overrun
S.07	Heating mode: Pump overrun	Heating mode: Pump overrun
S.08	Heating mode: Anti-cycling time	Heating mode: Remaining anti-cycling time
S.09	Heating mode: Measuring program	Heating mode: Measuring programme
DHW mode		
S.10	DHW demand	Domestic hot water requirement via impeller sensor
S.11	DHW mode: Fan start-up	DHW mode: Fan start-up
S.13	DHW mode: Ignition	DHW mode: Ignition
S.14	DHW mode: Burner on	DHW mode: Burner on
S.15	DHW mode: Pump/fan overrun	DHW mode: Pump/fan overrun
S.16	DHW mode: Fan overrun	DHW mode: Fan overrun
S.17	DHW mode: Pump overrun	DHW mode: Pump overrun
S.19	DHW mode: Measuring program	DHW mode: Measuring programme
Comfort mode, warm start or domestic hot water mode with actoSTOR		
S.20	DHW demand	Domestic hot water requirement
S.21	DHW mode: Fan start-up	DHW mode: Fan start-up
S.22	DHW mode: Pump pre-run	DHW mode: Pump prerun
S.23	DHW mode: Ignition	DHW mode: Ignition
S.24	DHW mode: Burner on	DHW mode: Burner on
S.25	DHW mode: Pump/fan overrun	DHW mode: Pump/fan overrun
S.26	DHW mode: Fan overrun	DHW mode: Fan overrun
S.27	DHW mode: Pump overrun	DHW mode: Pump overrun
S.28	DHW anti-cycling time	Domestic hot water burner anti-cycling time
S.29	DHW mode: Measuring program	DHW mode: Measuring programme
Others		
S.30	No heat demand: Controller	Room thermostat (RT) is blocking heating mode
S.31	No heat demand: Summer mode	Summer mode active or no heat requirement from eBUS control
S.32	Waiting time deviation: Fan speed	Waiting period because of fan speed deviation
S.33	Waiting time: Air monitor	Waiting period: Air pressure sensor/switch reports that the pressure signal is too low
S.34	Heating mode: Frost protection	Frost protection mode active
S.36	Target value for ext. controller lower than 20 °C	Reference setting for continuous controller 7-8-9 or eBUS controller is < 20°C and blocks the heating mode
S.37	Waiting time: Deviation in fan speed	Waiting period: Fan failure in operation
S.39	Contact thermostat triggered	"Burner off contact" has responded (e.g. surface-mounted thermostat or condensate pump)
S.40	Comfort protection active	Comfort protection mode is active: Product running with limited heating comfort
S.41	Water pressure too high	Water pressure > 2.8 bar

Status code	Parameter	Meaning
S.42	Flue non-return flap closed	Flue non-return flap response blocks burner operation (only in conjunction with accessory VR40) or condensate pump defective; heat requirement is blocked
S.46	Comfort protection: Minimum load, loss of flame	Comfort protection mode, flame loss at minimum load
S.53	Waiting time: Water shortage	Product is within the waiting period of the modulation block/operating block function as a result of water deficiency (flow/return spread too large)
S.54	Waiting time: Water shortage	Product is within the waiting period of the operating blocking function as a result of water deficiency (temperature gradient)
S.55	Waiting time: CO sensor	Waiting period: CO sensor
S.56	Waiting time: CO limit value exceedance	Waiting period: CO limit value exceedance
S.57	Waiting time: Measuring program	Calibration unsuccessful. Waiting period, comfort protection mode
S.58	Burner modulation limitation	Modulation limitation due to noise/wind
S.59	Waiting time: Water circulation vol.	Minimum circulation water volume
S.76	Service message: Check water pressure	System pressure too low. Top up water.
S.86	Service message: Check vortex sensor	Service message: Check vortex sensor
S.88	Purging programme is running	Purging programme is running
S.92	Water circulation volume self-test	Water circulation volume self-test
S.93	Flue gas measurement not possible	Flue gas analysis not possible because not all measuring programmes have yet run
S.96	Return temperature sensor self-test	Return sensor test running, heating demands are blocked.
S.97	Water pressure sensor self-test	Water pressure sensor test running, heating demands are blocked.
S.98	Flow/return temperature sensor self-test	Flow/return sensor test running, heating demands are blocked.
S.99	Vaillant self-test	Self-test



E Overview of fault codes



Note

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



Code	Parameter	Possible causes
F.00	Interruption: Flow sensor	NTC plug not plugged in or has come loose, multiple plug on the PCB not plugged in correctly, interruption in cable harness, NTC defective
F.01	Interruption: Return sensor	NTC plug not plugged in or has come loose, multiple plug on the PCB not plugged in correctly, interruption in cable harness, NTC defective
F.02	Interruption: DHW outlet sensor	Only in conjunction with F.91 NTC defective, NTC cable defective, defective plug connection on NTC, defective plug connection on the actoSTOR electronics
F.03	Interruption: Cylinder sensor	Only in conjunction with F.91 NTC defective, NTC cable defective, defective plug connection on NTC, defective plug connection on the actoSTOR electronics
F.10	Short circuit: Flow sensor	NTC defective, short circuit in cable harness, cable/housing
F.11	Short circuit: Return sensor	NTC defective, short circuit in cable harness, cable/housing
F.12	Short circuit: DHW outlet sensor	Only in conjunction with F.91 NTC defective, short circuit in cable harness, cable/housing
F.13	Short circuit: Cylinder sensor	Combination product: Warm start sensor/cylinder sensor short circuit Combination product with actoSTOR: Short circuit cylinder sensor (NTC) only in combination with F.91 NTC defective, short circuit in cable harness, cable/housing

Code	Parameter	Possible causes
F.20	Safety switch-off: Temperature limiter	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 Only in liquefied petroleum gas operation or in cascade mode: The differential pressure sensor was not replaced with a bypass valve; the bypass valve is not functional
F.22	Safety switch-off: Low water pressure	No or insufficient water in the product, water pressure sensor defective, cable to pump or water pressure sensor loose/not connected/defective
F.23	Safety switch-off: Temp.spread too large	Pump blocked, insufficient pump output, air in product, flow and return NTC connected the wrong way round
F.24	Safety switch-off: Temp. incr. 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 temp. too high	Break in plug connection for optional flue gas safety cut-out (SCO), break in cable harness
F.26	Fault: Fuel valve not working	Gas valve assembly stepper motor not connected, multiple plug on the PCB not plugged in correctly, interruption in cable harness, gas valve assembly stepper motor defective, electronics defective
F.27	Safety switch-off: Flame simulation	Moisture on the electronics, electronics (flame monitor) defective, gas solenoid valve leaking
F.28	Start-up failure: Ignit. unsuccessful	Gas meter defective or gas flow monitor has triggered, air in gas, gas flow pressure too low, thermal cut-out has triggered, condensate route blocked, incorrect gas injector, incorrect spare part gas valve assembly, value in D.052 does not correspond to the printed value on the current gas valve assembly, fault on the gas valve assembly, multiple plug on PCB incorrectly plugged in, break in cable harness, ignition system (ignition transformer, ignition cable, ignition plug, ignition electrode) defective, ionisation flow interrupted (cable, electrode), incorrect earthing of product, electronics defective
F.29	Operating failure: Ignit. unsuccessful	Gas supply temporarily stopped, flue gas recirculation, condensate route blocked, defective earthing of product, ignition transformer has spark failure
F.32	Fault: Fan	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.33	Air/flue gas pressure implausible	Check: Cable harness, vacuum hose (blockage), supply air/flue gas route (blockage), panel (correct type), flue pipe (length), air pressure sensor, settings (if necessary, switch D.132 to multiple-flue configuration), pressure switch, fan.
F.35	Fault: Air/flue gas duct	Check the entire air/flue pipe for: <ul style="list-style-type: none"> – Permitted design – Restriction or blockage in the air/flue pipe caused by obstructions – Damage <p>The air/flue pipe must be installed in accordance with the recognised rules</p> <p>If the combustion air supply (air pipe) or discharge of flue gas (flue pipe) occurs with no problems, reset the product using  and start it up</p> <p>If F.35 occurs again after start-up and the air/flue pipe is present and correct, the function for checking the air/flue pipe can be deactivated via D.145</p> <p>If the function is deactivated via D.145, any faults can be cleared in the product  and it can be started up</p> <p>Note</p> <p>D.145 can be used to permanently activate or deactivate the function</p> <p>After the function is deactivated, the product no longer automatically checks whether there are restrictions for the air/flue pipe.</p>
F.42	Fault: Coding resistor	Gas family coding resistor short circuit/interruption (on the PCB) <ul style="list-style-type: none"> – Gas family coding resistor missing – The coding resistor does not match the gas type selection under D.087 <p>Incorrect coding resistor or incorrect gas type selected</p>
F.49	Fault: eBUS	Short circuit on eBUS, eBUS overload or two power supplies with different polarities on the eBUS

Code	Parameter	Possible causes
F.55	Fault: CO sensor	Checking the cable harness All-gas sensor defective, replace the all-gas sensor Electronics defective, replace the PCB
F.56	Safety switch-off: CO limit exceeded	Safety shutdown: CO limit value exceeded A component in the combustion regulation is defective <ul style="list-style-type: none"> – Contact fault at the gas valve assembly (plug not plugged in correctly or not plugged in, plug defective, slot is defective (loose connection)) – If the fault occurs again after being reset: The gas valve assembly is defective
F.57	Fault: Measuring program	Active comfort protection mode has detected a regulation fault <ul style="list-style-type: none"> – Ignition electrode highly corroded
F.61	Fault: Fuel valve actuation	The gas valve assembly cannot be actuated <ul style="list-style-type: none"> – Cable harness supply line to the gas valve assembly is defective (short to earth, short circuit) – Gas valve assembly defective – PCB defective
F.62	Fault: Fuel valve switch-off delay	Delayed switch-off sequence of gas valve assembly detected <ul style="list-style-type: none"> – Flame indicator light (ignition and monitoring electrode indicates delayed extinguishing of the flame signal) – Gas valve assembly defective – PCB defective
F.63	Fault: EEPROM	Electronics defective
F.64	Fault: Electronics/sensor	Flow or return NTC short circuited, electronics defective
F.65	Fault: Electronics temp.	Electronics overheating due to external influences, electronics defective
F.67	Fault: Electronics/flame	Implausible flame signal, electronics defective
F.68	Fault: Flame signal unstable	Air in gas, gas flow pressure too low, incorrect air ratio, condensate route blocked, ionisation flow interruption (cable, electrode), flue gas recirculation, condensate route
F.70	Fault: Invalid Device Specific Number	If spare parts fitted: Display and PCB replaced at same time and DSN not reset, incorrect or missing output coding resistor
F.71	Fault: Flow sensor	Flow temperature sensor signalling constant value: <ul style="list-style-type: none"> – Flow temperature sensor incorrectly positioned on the flow pipe – Flow temperature sensor defective
F.72	Fault: Flow/return sensor	Flow/return NTC temperature difference too great → flow and/or return temperature sensor defective
F.73	Fault: Water press. sensor	Interruption/short circuit of water pressure sensor, interruption/short circuit to GND in supply line to water pressure sensor or water pressure sensor defective
F.74	Fault: Water press. sensor	The line to the water pressure sensor has a short circuit to 5 V/24 V or internal fault in the water pressure sensor
F.75	Fault: Pump/ water shortage	Water pressure sensor and/or pump defective, air in the heating installation, insufficient water in the product; connect external expansion vessel to the return
F.77	Fault: Flue non-ret. valve/condens. pump	No response from flue non-return flap or condensate pump defective
F.78	Interrupt.: DHW outlet sensor on ext. contr.	UK link box is connected but the domestic hot water NTC is not bridged
F.80	Fault: actoSTOR inlet sensor	Only in conjunction with F.91 NTC defective, NTC cable defective, defective plug connection on NTC, defective plug connection on the actoSTOR electronics Sensor plug has short to earth to the housing, short circuit in cable harness, sensor defective

Code	Parameter	Possible causes
F.81	Fault: cylinder charging pump	Only in conjunction with F.91 Cylinder is not fully charged after specified time. <ul style="list-style-type: none"> – Check cylinder charging sensor and cylinder sensor – Air in the actoSTOR pump – Inspect cable harness for pump – Check the impeller sensor and/or limiter in the product – Prioritising diverter valve defective – Secondary heat exchanger blocked – Pump defective
F.82	Fault: Ext. current anode	External current anode not connected: <ul style="list-style-type: none"> – X43 edge connector with bridge missing from the PCB External current anode connected: <ul style="list-style-type: none"> – Power supply to the external current anode was interrupted – Cable between PCB and external current anode defective – External current anode defective
F.83	Fault: NTC temp. gradient	When the burner starts, the temperature change registered at the flow and/or return temperature sensor is non-existent or too small. <ul style="list-style-type: none"> – Insufficient water in product – Flow or return temperature sensor not in correct position at pipe
F.84	Fault: NTC temp. diff. implausible	Flow and return temperature sensors returning implausible values. <ul style="list-style-type: none"> – Flow and return temperature sensors have been inverted – Flow and return temperature sensors have not been correctly installed
F.85	Fault: NTCs fitted incorrectly	The flow and/or return temperature sensors have been installed on the same pipe/incorrect pipe
F.90	Fault: Communication	Check the cable harness from the product to the actoSTOR module (PEBus). If the product is to be operated without an actoSTOR module, set D.092 = 0.
F.94	Fault: Vortex and differential pressure	Check: Pump (function), cable harness, plug, sensors.
LED actoSTOR module	actoSTOR electronics status	LED on: Communication OK LED flashing: Communication not OK LED off: No power supply
Commu- nication fault	Communication fault	Communication fault between display and PCB in the electronics box

F Check programmes – Overview

Check programme	Meaning
P.00 Purging	The internal pump is cyclically actuated. The heating circuit and domestic hot water circuit are purged adaptively by automatically switching the circuits via the automatic air vent (the cap for the automatic air vent is loosened at the factory). DHW circuit active or Heating circuit active display.  once: Start purging.  once (Cancel): End purge programme. Note: The duration of the purge programme is displayed using a countdown. The programme then ends.
P.01 Maximum load	After successful ignition, the product is operated at maximum heat input.
P.02 Minimum load	After successful ignition, the product is operated at minimum heat input.
P.04 Reset eGas	Calling up the programme deletes all of the CH offsets (central heating) that have been saved from previous calibration processes. The products then starts by fully calibrating the combustion regulation (status S.09).
P.06 Filling mode	The prioritising diverter valve is moved to the mid-position. The burner and pump are switched off (to fill or drain the product).
P.14 Reset eGas	Calling up the programme deletes all of the DHW offsets that have been saved from previous calibration processes. The products then starts by fully calibrating the combustion regulation (status S.19).

G Function menu – Overview

Function menu	Meaning
T.01 Internal pump	The internal pump is switched on and off.
T.02 3-way valve	The prioritising diverter valve is moved to the heating or domestic hot water position.
T.03 Fan	The fan is switched on and off. The fan runs at maximum rotational speed.
T.04 Cylinder charging pump	The cylinder charging pump is switched on and off.
T.05 Circulation pump	The circulation pump is switched on and off.
T.06 External pump	The external pump is switched on and off.
T.08 Burner	The product starts up and switches to minimum load. The flow temperature is shown in the display.

H.1 Wiring diagram 12 - 35 kW

1	Main PCB	12	Bus connection (digital room thermostat/control)
2	Control panel PCB	13	Prioritising diverter valve
3	All-gas sensor	14	Water pressure sensor
4	Gas valve assembly	15	Warm start sensor
5	Outdoor temperature sensor, flow temperature sensor (optional, external), DCF receiver	16	Domestic hot water sensor
6	Circulation pump remote control	17	Internal heating circuit flow rate sensor
7	Return temperature sensor	18	Impeller sensor
8	Flow temperature sensor	19	Internal pump
9	Fan	20	Gas family coding resistor
10	Surface-mounted thermostat/burner off	21	Additional relay (select via D.026)
11	24 V DC room thermostat	22	Circulation pump
		23	Ignition electrode

[illegible]

- | | |
|---|--------------------|
| 3 | All-gas sensor |
| 4 | Gas valve assembly |

5	Outdoor temperature sensor, flow temperature sensor (optional, external), DCF receiver	15	Water pressure sensor
6	Circulation pump remote control	16	Warm start sensor
7	Coding resistor	17	Hot water sensor
8	Return temperature sensor	18	Internal heating circuit flow rate sensor
9	Flow temperature sensor	19	Impeller sensor
10	Fan	20	Gas family coding resistor
11	Surface-mounted thermostat/burner off	21	Additional relay (select via D.026)
12	24 V DC room thermostat	22	Circulation pump connection
13	Bus connection (digital room thermostat/control)	23	Internal pump
14	Prioritising diverter valve	24	Ignition electrode

Benchmark Commissioning & Warranty Validation Service Record

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 warranty the boiler needs to be registered with the manufacturer within one month of the installation. The warranty rests with the end-user (consumer), and they should be made aware it is ultimately their responsibility to register with the manufacturer, within the allotted time period.

It is essential that the boiler is serviced in line with the manufacturers' recommendations, at least annually. This must be carried out by a competent Gas Safe registered engineer. The service details should be recorded on the Benchmark Service and Interim Boiler Work Record and left with the householder. Failure to comply with the manufacturers' servicing instructions and requirements will invalidate the warranty.



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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 manufacturers' instructions and complete this Benchmark Commissioning Checklist will invalidate the warranty. This does not affect the customer's statutory rights.

* 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.

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GAS BOILER SYSTEM COMMISSIONING CHECKLIST & WARRANTY VALIDATION RECORD

Address:									
Boiler make and model:									
Boiler serial number:									
Commissioned by (PRINT NAME):					Gas Safe registration number:				
Company name:					Telephone number:				
Company email:					Company address:				
								Commissioning date:	
Heating and hot water system complies with the appropriate Building Regulations? Yes <input type="checkbox"/>									
Optional: Building Regulations Notification Number (if applicable):									
Time, temperature control and boiler interlock provided for central heating and hot water Yes <input type="checkbox"/>									
Boiler Plus requirements (tick the appropriate box(es))									
Boiler Plus option chosen for combination boiler in ENGLAND					Weather compensation		Smart thermostat with automisation and optimisation		
					Load compensation		Flue Gas Heat Recovery		
Time and temperature control to hot water		Cylinder thermostat and programmer/timer					Combination boiler		
Zone valves		pre-existing		Fitted		Not required			
Thermostatic radiator valves		pre-existing		Fitted		Not required			
Automatic bypass to system		pre-existing		Fitted		Not required			
Underfloor heating		pre-existing		Fitted		Not required			
Water quality									
The system has been flushed, cleaned and a suitable inhibitor applied upon final fill, in accordance with BS7593 and boiler manufacturers' instructions Yes <input type="checkbox"/>									
What system cleaner was used?					Brand:		Product:		
What inhibitor was used?					Brand:		Product:		
Primary water system filter		pre-existing		Fitted		Not required			
CENTRAL HEATING MODE measure and record (as appropriate)									
Gas rate (for combination boilers complete DHW mode gas rate)				m ³ /hr		or		ft ³ /hr	
Central heating output left at factory settings?				Yes <input type="checkbox"/>				No <input type="checkbox"/>	
If no, what is the maximum central heating output selected?				kW					
Dynamic gas inlet pressure				mbar					
Central heating flow temperature				°C					
Central heating return temperature				°C					
System correctly balanced/rebalanced?				Yes <input type="checkbox"/>					
COMBINATION BOILERS ONLY									
Is the installation in a hard water area (above 200ppm)?				Yes <input type="checkbox"/>				No <input type="checkbox"/>	
Water scale reducer/softener		pre-existing		Fitted		Not required			
What type of scale reducer/softener has been fitted?				Brand:		Product:			
Water meter fitted?				Yes <input type="checkbox"/>				No <input type="checkbox"/>	
If yes- DHW expansion vessel		pre-existing		Fitted		Not required			
Pressure reducing valve		pre-existing		Fitted		Not required			
DOMESTIC HOT WATER MODE Measure and record									
Gas rate				m ³ /hr		or		ft ³ /hr	
Dynamic gas inlet pressure at maximum rate				mbar					
Cold water inlet temperature				°C					
Hot water has been checked at all outlets				Yes <input type="checkbox"/>		Temperature		°C	
CONDENSATE DISPOSAL									
The condensate drain has been installed in accordance with the manufacturers' instructions and/or BS5546/BS6798								Yes <input type="checkbox"/>	
Point of termination				Internal <input type="checkbox"/>		External (only where internal termination impractical) <input type="checkbox"/>			
Method of disposal				Gravity <input type="checkbox"/>		Pumped <input type="checkbox"/>			
ALL INSTALLATIONS									
Record the following		At max rate:		CO ppm		CO ₂ %		CO/CO ₂ Ratio	
		At min rate (where possible)		CO ppm		CO ₂ %		CO/CO ₂ Ratio	
Where possible, has a flue integrity check been undertaken in accordance with manufacturers' instructions, and readings are correct?								Yes <input type="checkbox"/>	
The operation of the boiler and system controls have been demonstrated to and understood by the customer								Yes <input type="checkbox"/>	
The manufacturers' literature, including Benchmark Checklist and Service Record, has been explained and left with the customer								Yes <input type="checkbox"/>	
Commissioning Engineer's signature									
Customer's signature (To confirm satisfactory demonstration and receipt of manufacturers' 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.

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SERVICE & INTERIM BOILER WORK RECORD

It is recommended that your boiler and heating system are regularly serviced and maintained, in line with manufacturers' instructions, and that the appropriate service / interim work record is completed.

Service provider

When completing a service record (as below), please ensure you have carried out the service as described in the manufacturers' instructions. Always use the manufacturers' specified spare parts.

SERVICE/INTERIM WORK ON BOILER <small>delete as appropriate</small>				Date:	
Engineer name:		Company name:			
Telephone N°:		Gas Safe registration N°:			
Max rate	CO	ppm	CO ₂	%	CO/CO ₂
Min rate	CO	ppm	CO ₂	%	CO/CO ₂
Where possible, has a flue integrity check been undertaken in accordance with manufacturers' instructions, and readings are correct?"					yes
Gas rate:	m ³ /h	OR	ft ³ /h		
Were parts fitted? <small>delete as appropriate</small>		Yes	No		
Parts fitted:					
System inhibitor concentration has been checked and appropriate action taken, in accordance with BS 7593 and boiler manufacturers' instructions. *					yes n/a
Comments:					
Signature:					

*A System inhibitor efficacy test is required on every annual service in accordance with the manufacturers' instructions and BS 7593. It is only acceptable to not have undertaken this if the service engineers attendance visit was in between annual services to attend a non-water facing component.

SERVICE/INTERIM WORK ON BOILER <small>delete as appropriate</small>				Date:	
Engineer name:		Company name:			
Telephone N°:		Gas Safe registration N°:			
Max rate	CO	ppm	CO ₂	%	CO/CO ₂
Min rate	CO	ppm	CO ₂	%	CO/CO ₂
Where possible, has a flue integrity check been undertaken in accordance with manufacturers' instructions, and readings are correct?"					yes
Gas rate:	m ³ /h	OR	ft ³ /h		
Were parts fitted? <small>delete as appropriate</small>		Yes	No		
Parts fitted:					
System inhibitor concentration has been checked and appropriate action taken, in accordance with BS 7593 and boiler manufacturers' instructions. *					yes n/a
Comments:					
Signature:					

*A System inhibitor efficacy test is required on every annual service in accordance with the manufacturers' instructions and BS 7593. It is only acceptable to not have undertaken this if the service engineers attendance visit was in between annual services to attend a non-water facing component.

SERVICE/INTERIM WORK ON BOILER <small>delete as appropriate</small>				Date:	
Engineer name:		Company name:			
Telephone N°:		Gas Safe registration N°:			
Max rate	CO	ppm	CO ₂	%	CO/CO ₂
Min rate	CO	ppm	CO ₂	%	CO/CO ₂
Where possible, has a flue integrity check been undertaken in accordance with manufacturers' instructions, and readings are correct?"					yes
Gas rate:	m ³ /h	OR	ft ³ /h		
Were parts fitted? <small>delete as appropriate</small>		Yes	No		
Parts fitted:					
System inhibitor concentration has been checked and appropriate action taken, in accordance with BS 7593 and boiler manufacturers' instructions. *					yes n/a
Comments:					
Signature:					

*A System inhibitor efficacy test is required on every annual service in accordance with the manufacturers' instructions and BS 7593. It is only acceptable to not have undertaken this if the service engineers attendance visit was in between annual services to attend a non-water facing component.

SERVICE/INTERIM WORK ON BOILER <small>delete as appropriate</small>				Date:	
Engineer name:		Company name:			
Telephone N°:		Gas Safe registration N°:			
Max rate	CO	ppm	CO ₂	%	CO/CO ₂
Min rate	CO	ppm	CO ₂	%	CO/CO ₂
Where possible, has a flue integrity check been undertaken in accordance with manufacturers' instructions, and readings are correct?"					yes
Gas rate:	m ³ /h	OR	ft ³ /h		
Were parts fitted? <small>delete as appropriate</small>		Yes	No		
Parts fitted:					
System inhibitor concentration has been checked and appropriate action taken, in accordance with BS 7593 and boiler manufacturers' instructions. *					yes n/a
Comments:					
Signature:					

*A System inhibitor efficacy test is required on every annual service in accordance with the manufacturers' instructions and BS 7593. It is only acceptable to not have undertaken this if the service engineers attendance visit was in between annual services to attend a non-water facing component.

SERVICE/INTERIM WORK ON BOILER <small>delete as appropriate</small>				Date:	
Engineer name:		Company name:			
Telephone N°:		Gas Safe registration N°:			
Max rate	CO	ppm	CO ₂	%	CO/CO ₂
Min rate	CO	ppm	CO ₂	%	CO/CO ₂
Where possible, has a flue integrity check been undertaken in accordance with manufacturers' instructions, and readings are correct?"					yes
Gas rate:	m ³ /h	OR	ft ³ /h		
Were parts fitted? <small>delete as appropriate</small>		Yes	No		
Parts fitted:					
System inhibitor concentration has been checked and appropriate action taken, in accordance with BS 7593 and boiler manufacturers' instructions. *					yes n/a
Comments:					
Signature:					

*A System inhibitor efficacy test is required on every annual service in accordance with the manufacturers' instructions and BS 7593. It is only acceptable to not have undertaken this if the service engineers attendance visit was in between annual services to attend a non-water facing component.

SERVICE/INTERIM WORK ON BOILER <small>delete as appropriate</small>				Date:	
Engineer name:		Company name:			
Telephone N°:		Gas Safe registration N°:			
Max rate	CO	ppm	CO ₂	%	CO/CO ₂
Min rate	CO	ppm	CO ₂	%	CO/CO ₂
Where possible, has a flue integrity check been undertaken in accordance with manufacturers' instructions, and readings are correct?"					yes
Gas rate:	m ³ /h	OR	ft ³ /h		
Were parts fitted? <small>delete as appropriate</small>		Yes	No		
Parts fitted:					
System inhibitor concentration has been checked and appropriate action taken, in accordance with BS 7593 and boiler manufacturers' instructions. *					yes n/a
Comments:					
Signature:					

*A System inhibitor efficacy test is required on every annual service in accordance with the manufacturers' instructions and BS 7593. It is only acceptable to not have undertaken this if the service engineers attendance visit was in between annual services to attend a non-water facing component.

* 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.

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SERVICE & INTERIM BOILER WORK RECORD

It is recommended that your boiler and heating system are regularly serviced and maintained, in line with manufacturers' instructions, and that the appropriate service / interim work record is completed.

Service provider

When completing a service record (as below), please ensure you have carried out the service as described in the manufacturers' instructions. Always use the manufacturers' specified spare parts.

SERVICE/INTERIM WORK ON BOILER <small>delete as appropriate</small>				Date:
Engineer name:		Company name:		
Telephone N°:		Gas Safe registration N°:		
Max rate	CO	ppm	CO ₂	% CO/CO ₂
Min rate	CO	ppm	CO ₂	% CO/CO ₂
Where possible, has a flue integrity check been undertaken in accordance with manufacturers' instructions, and readings are correct?"				yes
Gas rate:	m ³ /h	OR	ft ³ /h	
Were parts fitted? <small>delete as appropriate</small>		Yes	No	
Parts fitted:				
System inhibitor concentration has been checked and appropriate action taken, in accordance with BS 7593 and boiler manufacturers' instructions. *				yes n/a
Comments:				
Signature:				

*A System inhibitor efficacy test is required on every annual service in accordance with the manufacturers' instructions and BS 7593. It is only acceptable to not have undertaken this if the service engineers attendance visit was in between annual services to attend a non-water facing component.

SERVICE/INTERIM WORK ON BOILER <small>delete as appropriate</small>				Date:
Engineer name:		Company name:		
Telephone N°:		Gas Safe registration N°:		
Max rate	CO	ppm	CO ₂	% CO/CO ₂
Min rate	CO	ppm	CO ₂	% CO/CO ₂
Where possible, has a flue integrity check been undertaken in accordance with manufacturers' instructions, and readings are correct?"				yes
Gas rate:	m ³ /h	OR	ft ³ /h	
Were parts fitted? <small>delete as appropriate</small>		Yes	No	
Parts fitted:				
System inhibitor concentration has been checked and appropriate action taken, in accordance with BS 7593 and boiler manufacturers' instructions. *				yes n/a
Comments:				
Signature:				

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Min rate	CO	ppm	CO ₂	% CO/CO ₂
Where possible, has a flue integrity check been undertaken in accordance with manufacturers' instructions, and readings are correct?"				yes
Gas rate:	m ³ /h	OR	ft ³ /h	
Were parts fitted? <small>delete as appropriate</small>		Yes	No	
Parts fitted:				
System inhibitor concentration has been checked and appropriate action taken, in accordance with BS 7593 and boiler manufacturers' instructions. *				yes n/a
Comments:				
Signature:				

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Gas rate:	m ³ /h	OR	ft ³ /h	
Were parts fitted? <small>delete as appropriate</small>		Yes	No	
Parts fitted:				
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Comments:				
Signature:				

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Parts fitted:				
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Engineer name:		Company name:		
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Signature:				

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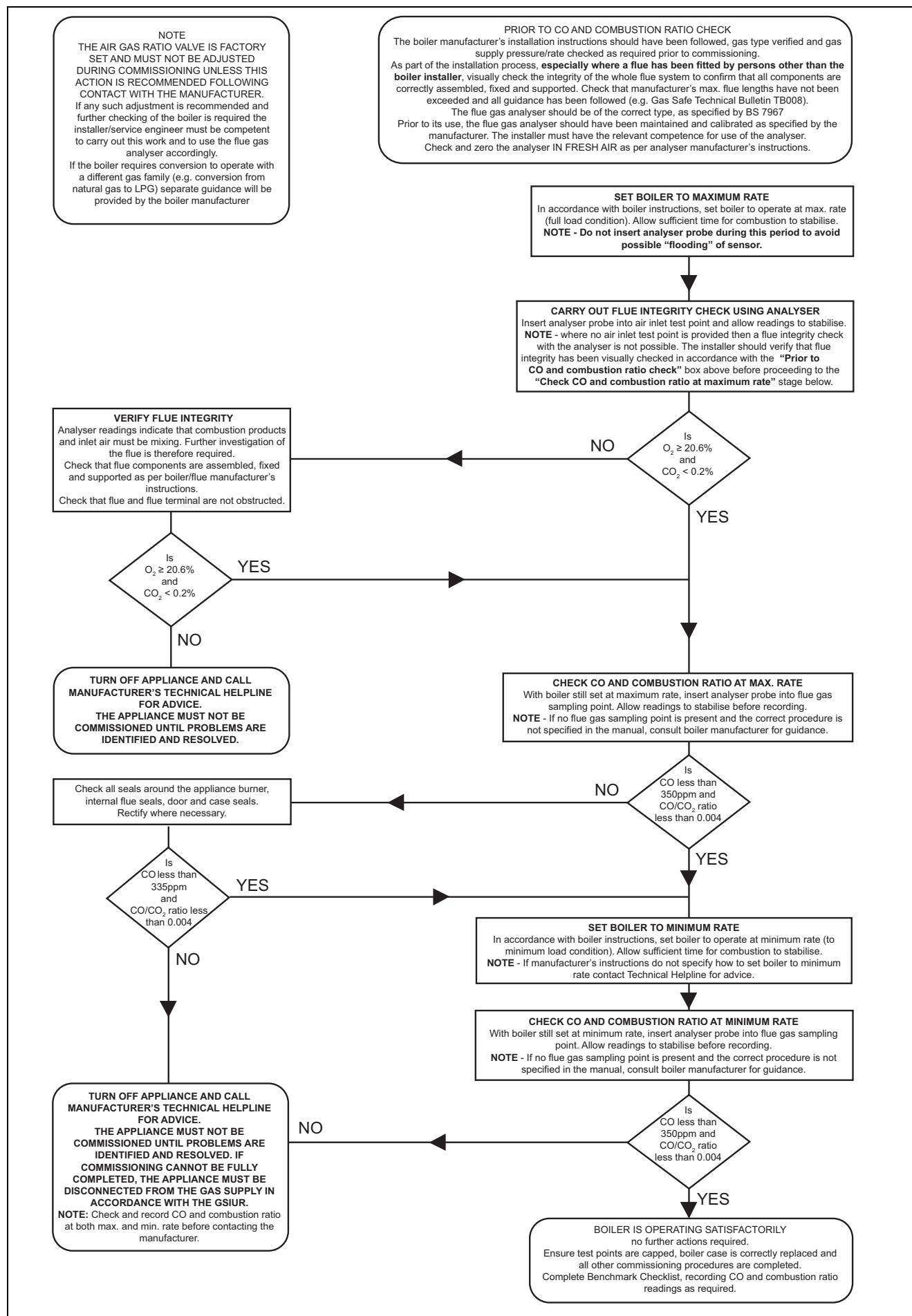
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J Commissioning Flow Chart



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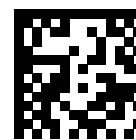
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