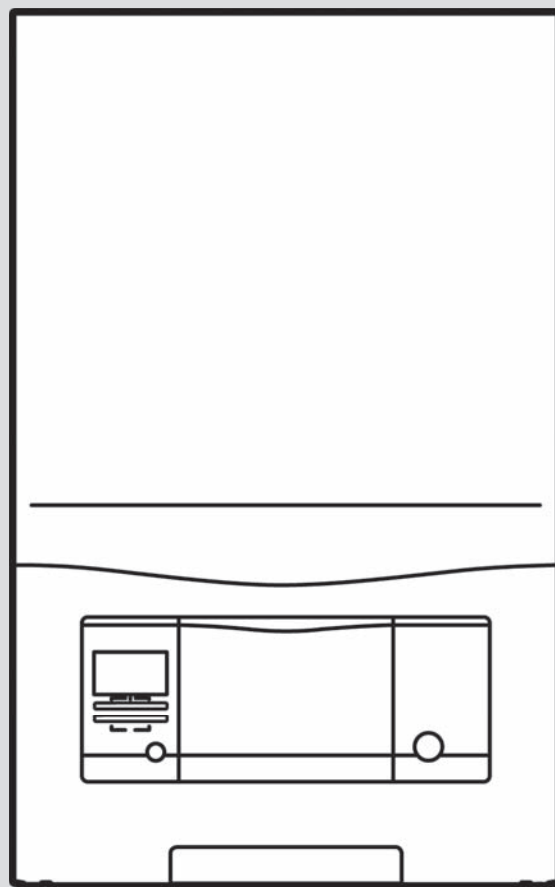




ecoTEC pro

VUW ..6/5-3



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):
 $\geq 200 \text{ mm}$

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.

1.4 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 246/5-3 (H-GB) ecoTEC pro 24	VUW 286/5-3 (H-GB) ecoTEC pro 28	VUW 286/5-3 (P-GB) ecoTEC pro 28
Designated country (designation in accordance with ISO 3166)	GB (Great Britain), IE (Ireland)	GB (Great Britain), IE (Ireland)	GB (Great Britain), IE (Ireland)
Approved unit categories	II _{2H3P}	II _{2H3P}	II _{2H3P}
Gas connection, boiler side	15 mm	15 mm	15 mm
Flow/return heating connections, boiler side	22 mm	22 mm	22 mm
Hot and cold water connection, boiler side	G 3/4"	G 3/4"	G 3/4"
Expansion relief valve connection pipe (min.)	15 mm	15 mm	15 mm
Air/flue gas connection	60/100 mm	60/100 mm	60/100 mm
Condensate drain pipe-work (min.)	19 mm	19 mm	19 mm
G20 natural gas flow pressure	2.0 kPa (20.0 mbar)	2.0 kPa (20.0 mbar)	–
G31 propane gas flow pressure	–	–	3.7 kPa (37.0 mbar)
Gas flow rate at 15 °C and 1013 mbar (based on domestic hot water generation, if applicable), G20	2.5 m³/h	2.9 m³/h	–
Gas flow rate at 15 °C and 1013 mbar (based on domestic hot water generation, if applicable), G31	–	–	2.2 kg/h
Min. flue gas mass flow rate (G20)	2.47 g/s	2.47 g/s	–
Min. flue gas mass flow rate (G31)	–	–	3.49 g/s
Max. flue gas mass flow rate	10.8 g/s	12.6 g/s	12.6 g/s
Min. flue gas temperature	40 °C	40 °C	40 °C
Max. flue gas temperature	70 °C	70 °C	70 °C
Approved gas-fired units	C13, C33, C43, C53	C13, C33, C43, C53	C13, C33, C43, C53
30% efficiency	109.4 %	109.4 %	108 %
NOx class	6	6	6
Test symbol/registration no.	CE-0085CM0320	CE-0085CM0320	CE-0085CM0320
SAP 2009/2012 annual efficiency (%)	89.5 %	89.5 %	89.7 %
Boiler dimension, width	440 mm	440 mm	440 mm
Boiler dimension, height	720 mm	720 mm	720 mm
Boiler dimension, depth	338 mm	338 mm	338 mm
Approx. net weight	38 kg	38 kg	38 kg

Technical data – G20 power/loading G20

	VUW 246/5-3 (H-GB) ecoTEC pro 24	VUW 286/5-3 (H-GB) ecoTEC pro 28
Nominal heat output range P at 50/30 °C	5.9 to 24.8 kW	5.9 to 25.9 kW
Nominal heat output range P at 80/60 °C	5.2 to 23.0 kW	5.2 to 24.0 kW
Maximum heat output for domestic hot water generation	23.4 kW	27.0 kW
Maximum heat input for domestic hot water generation	23.7 kW	27.5 kW
Maximum heat input, heating side	23.5 kW	24.5 kW
Minimum heat input	5.5 kW	5.5 kW
Heating adjustment range	5 to 19 kW	5 to 19 kW
Nominal heat input efficiency (stationary) at 40/30 °C	107.0 %	107.0 %
Nominal heat input efficiency (stationary) at 50/30 °C	106.0 %	106.0 %
Nominal heat input efficiency (stationary) at 60/40 °C	101.0 %	101.0 %
Nominal heat input efficiency (stationary) at 80/60 °C	98.0 %	98.0 %

Technical data – Power/loading G31

	VUW 286/5-3 (P-GB) ecoTEC pro 28
Nominal heat output range P at 50/30 °C	7.9 to 25.3 kW
Nominal heat output range P at 80/60 °C	7.2 to 24.0 kW
Maximum heat output for domestic hot water generation	27.0 kW
Maximum heat input for domestic hot water generation	27.5 kW
Maximum heat input, heating side	24.5 kW
Minimum heat input	7.7 kW
Nominal heat input efficiency (stationary) at 40/30 °C	105.0 %
Nominal heat input efficiency (stationary) at 50/30 °C	103.0 %
Nominal heat input efficiency (stationary) at 60/40 °C	101.0 %
Nominal heat input efficiency (stationary) at 80/60 °C	98.0 %

Technical data – Heating

	VUW 246/5-3 (H-GB) ecoTEC pro 24	VUW 286/5-3 (H-GB) ecoTEC pro 28	VUW 286/5-3 (P-GB) ecoTEC pro 28
Maximum flow temperature	85 °C	85 °C	85 °C
Max. flow temperature adjustment range (default setting: 75 °C)	30 to 80 °C	30 to 80 °C	30 to 80 °C
Permissible total excess pressure	0.25 MPa (2.50 bar)	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)	0.08 MPa (0.80 bar)
Expansion vessel capacity	10 l	10 l	10 l
Circulation water volume (with reference to $\Delta T = 20$ K)	813 l/h	813 l/h	813 l/h
Approx. condensate rate (pH value 3.5 to 4.0) in 50/30 °C heating mode	1.9 l/h	1.9 l/h	1.9 l/h
Remaining feed head of pump (at nominal circulation water volume)	0.025 MPa (0.250 bar)	0.025 MPa (0.250 bar)	0.025 MPa (0.250 bar)

Technical data – Hot water handling mode

	VUW 246/5-3 (H-GB) ecoTEC pro 24	VUW 286/5-3 (H-GB) ecoTEC pro 28	VUW 286/5-3 (P-GB) ecoTEC pro 28
Lowest water volume	2.0 l/min	2.0 l/min	2.0 l/min
Water volume (at $\Delta T = 30$ K)	11.2 l/min	13 l/min	13 l/min
Water volume (at $\Delta T = 35$ K)	9.6 l/min	11.1 l/min	11.1 l/min
Water volume (at $\Delta T = 42$ K)	8.0 l/min	9.3 l/min	9.3 l/min
Permitted overpressure	1.0 MPa (10.0 bar)	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)	0.035 MPa (0.350 bar)
Hot water output temperature range	35 to 65 °C	35 to 65 °C	35 to 65 °C

Technical data – Electrics

	VUW 246/5-3 (H-GB) ecoTEC pro 24	VUW 286/5-3 (H-GB) ecoTEC pro 28	VUW 286/5-3 (P-GB) ecoTEC pro 28
Electric connection	230 V/50 Hz	230 V/50 Hz	230 V/50 Hz
Permissible connected voltage	190 to 253 V	190 to 253 V	190 to 253 V
Built-in fuse (slow-blow)	2 A	2 A	2 A
Min. electrical power consumption	35 W	35 W	35 W
Max. electrical power consumption	80 W	85 W	85 W
Standby electrical power consumption	< 2 W	< 2 W	< 2 W
Level of protection	IP X4 D	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 number	Gas Council Number
VUW 246/5-3 (H-GB) ecoTEC pro 24	0010021836	47-044-88
VUW 286/5-3 (H-GB) ecoTEC pro 28	0010021837	47-044-89
VUW 286/5-3 (P-GB) ecoTEC pro 28	0010021838	47-044-90

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 data plate.

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' landmark 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 landmark 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 Hot Water Association

Vaillant is a full member of the Hot Water Association and promotes the scheme in association with its cylinder range. Details are available on the web site www.vaillant.co.uk



5.4 Information on the identification plate

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

Information on the data plate	Meaning
	Read the instructions.
VUW...	Vaillant gas-fired wall-hung boiler for heating and domestic hot water generation
.6/5-3	Gross calorific value power/product generation equipment
ecoTEC pro	Product designation
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.	Permissible gas categories
Types	Approved gas-fired units
PMS	Permissible total overpressure in heating mode
PMW	Permissible total overpressure during domestic 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	IP rating
	Heating mode
	Domestic hot water generation
P	Nominal heat output range
Q	Heat input range
D	Nominal domestic hot water draw-off rate
	Barcode with serial number, 7th to 16th digit = product article number



Note

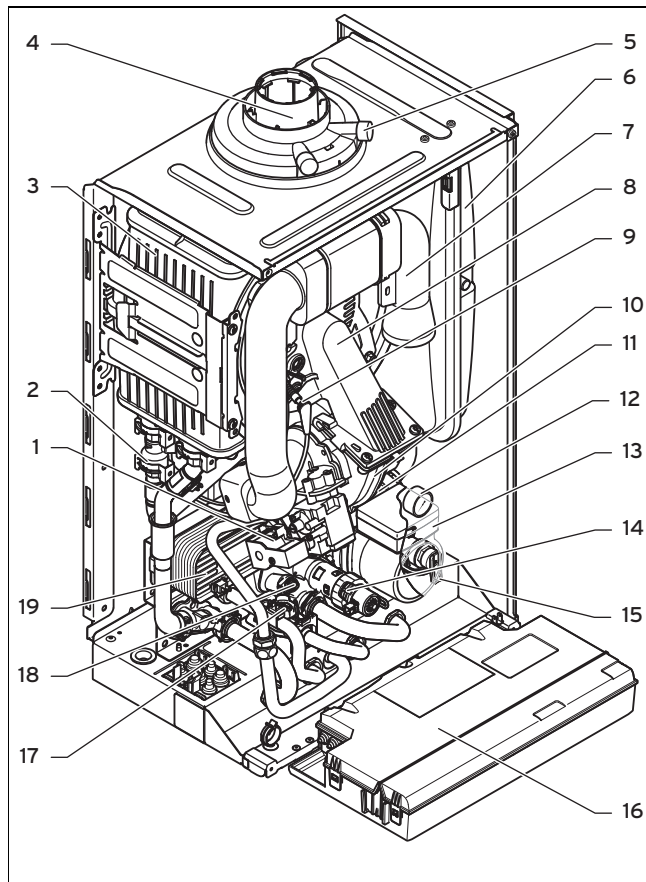
Make absolutely sure that the product is compatible with the gas group at the installation site.

5.5 Serial number

The serial number can be found on a plastic label at the bottom of the front casing and on the identification plate.

5.6 Product design

5.6.1 Functional elements, product with integrated domestic hot water generation



- | | |
|------------------------------------|---|
| 1 Gas valve assembly | 11 Automatic air vent |
| 2 Water pressure sensor | 12 Manometer |
| 3 Heat exchanger | 13 Internal pump |
| 4 Connection for the air/flue pipe | 14 Prioritising diverter valve |
| 5 Flue gas analysis point | 15 Expansion relief valve |
| 6 Expansion vessel | 16 Electronics box |
| 7 Air intake pipe | 17 Impeller sensor (domestic hot water) |
| 8 Compact thermal module | 18 Bypass valve |
| 9 Ignition electrode | 19 Secondary heat exchanger |
| 10 Fan | |

5.7 Safety Devices

5.7.1 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/Service company or Vaillant service.

5.7.2 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/Service company or Vaillant service.

5.7.3 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.

5.7.4 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

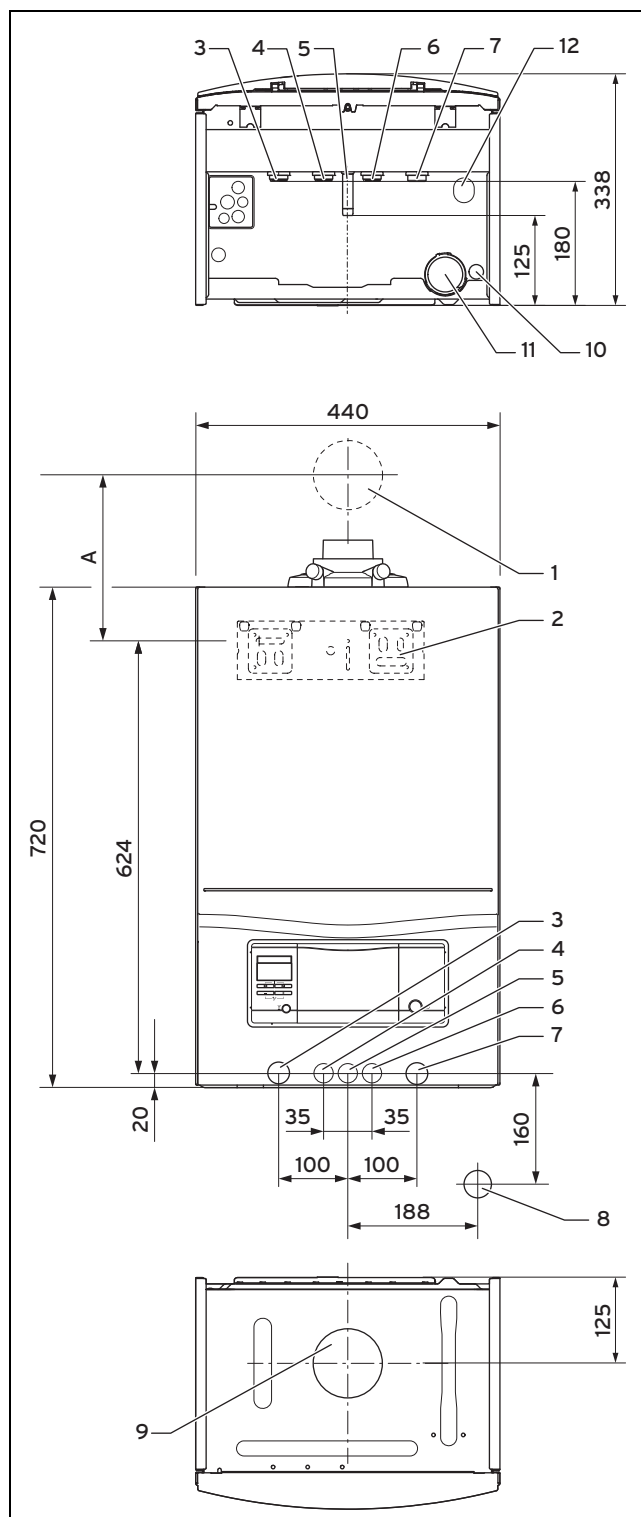
6.1 Checking the scope of delivery

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

6.1.1 Scope of delivery

Number	Designation
1	Heat generator
1	Installation set containing the following:
1	- Unit mounting bracket
1	- Expansion relief valve connection pipe
1	- Domestic hot water connection pipe
4	- Service valve
3	- Bag with small parts
1	Mounting template
1	Condensate discharge hose
1	Enclosed documentation

6.2 Dimensions



- | | | | |
|---|---|----|--|
| 1 | Air/flue pipe wall duct | 7 | Heating return (22 × 1.5 diameter) |
| 2 | Unit mounting bracket | 8 | R1 tundish/condensate trap connection |
| 3 | Heating flow (22 × 1.5 diameter) | 9 | Air/flue pipe connection |
| 4 | Domestic hot water connection (15 × 1.5 diameter) | 10 | Condensate discharge connection, 19 mm diameter |
| 5 | Gas connection (15 × 1.5 diameter) | 11 | Condensate trap |
| 6 | Cold water connection (15 × 1.5 diameter) | 12 | Drain pipework connection, expansion relief valve, heating, 15 mm diameter |

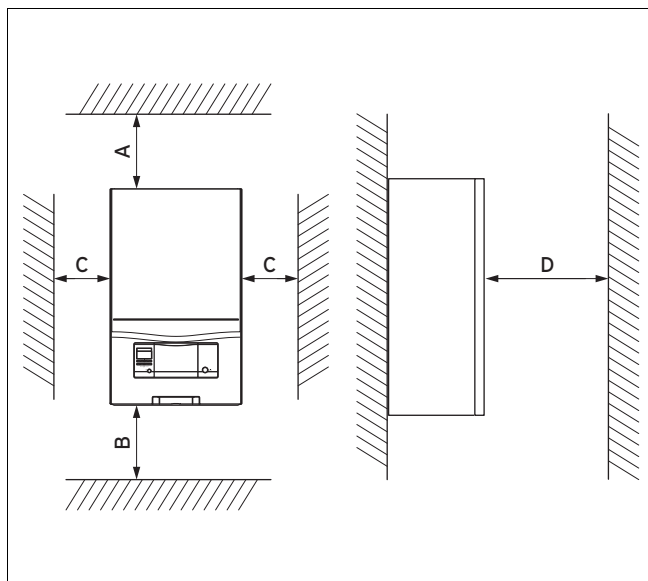
Consult the installation template that is supplied to find the dimension A.

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	180 mm; optimum approx. 250 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).

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

6.5 Compartment Ventilation

The boilers are very high efficiency appliances.

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

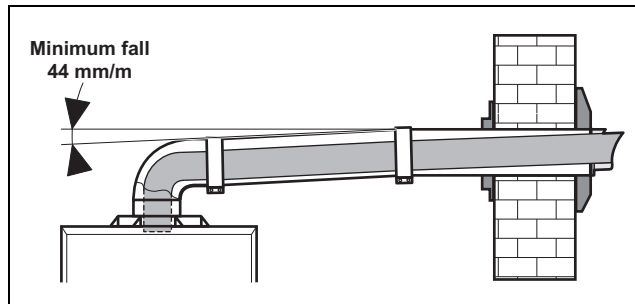
Compartment ventilation is not required as the products are only certified, and can only be fitted with a concentric flue system.

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.

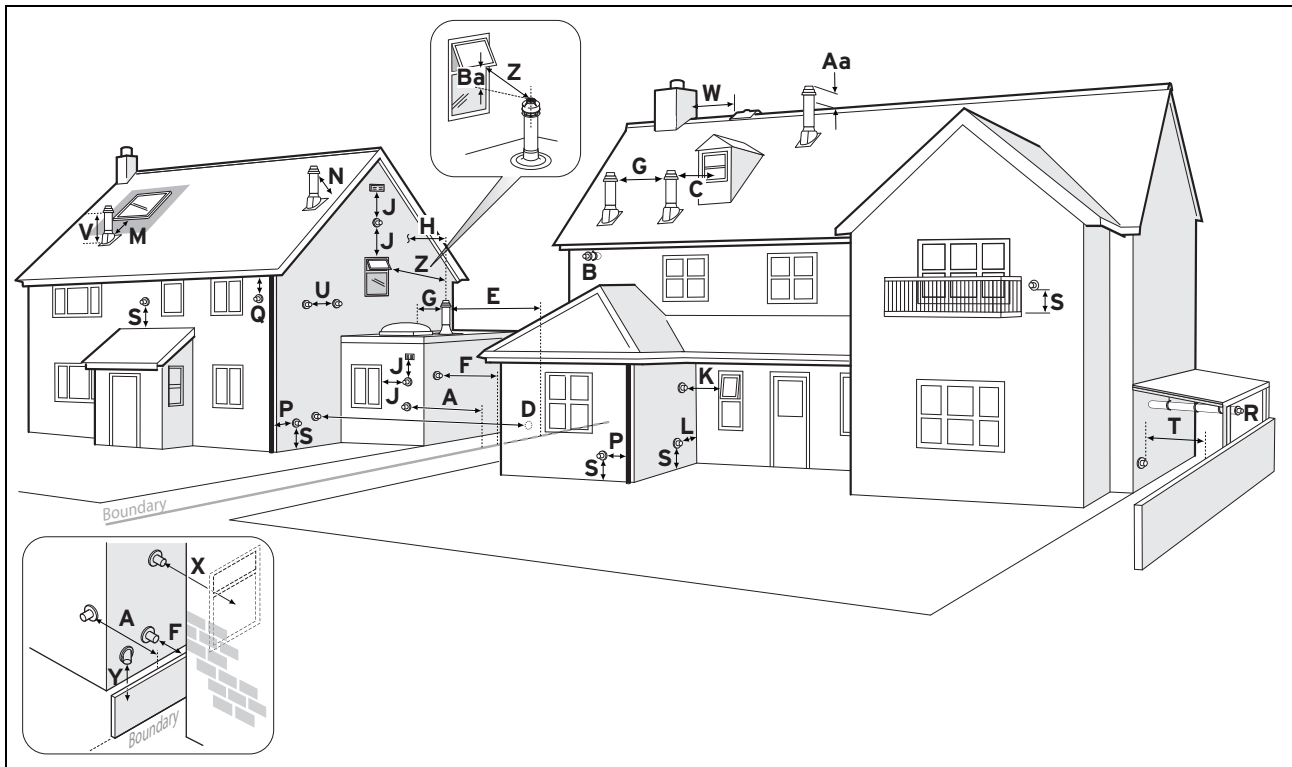
In GB the minimum acceptable siting dimensions for the terminal from obstructions, other terminals and ventilation openings are shown in diagram overleaf.

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:

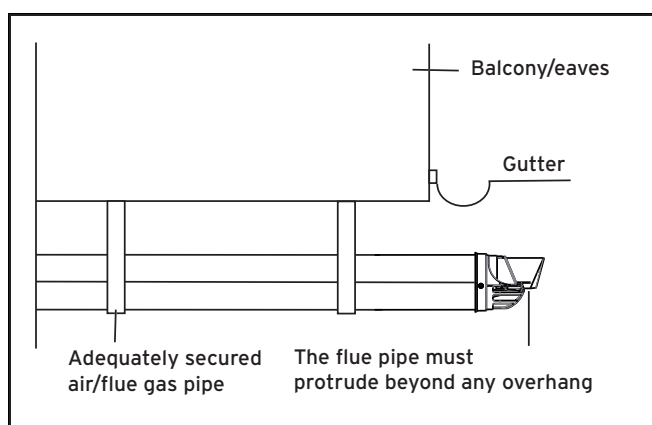
- at least 2 m from an opening in the building directly opposite, and
- so that the products of combustion are not directed to discharge directly across a boundary if the products are likely to cause a nuisance to a neighbour or discharge over a walkway or patio.

For IE see current issue of IS 813.

For boilers covered within this manual.

Dimensions B and R:

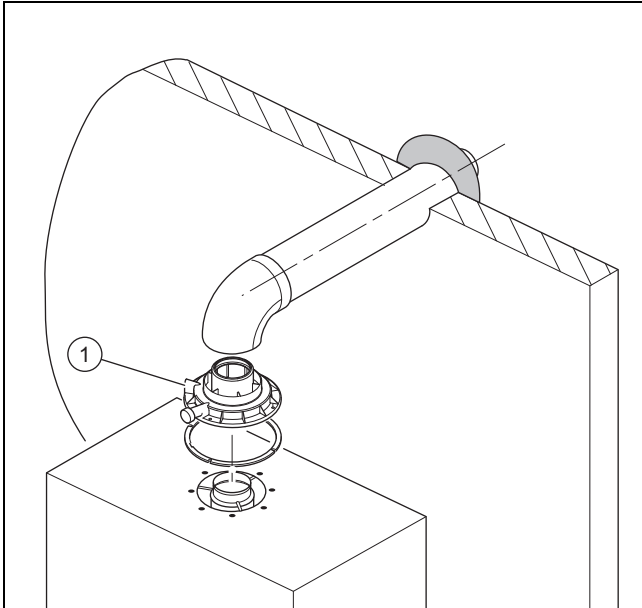
These clearances may be reduced to 25 mm without affecting the performance of the boiler. In order to ensure that the condensate plume does not affect adjacent surfaces the terminal should be extended as shown below.



You can use a plume management 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)

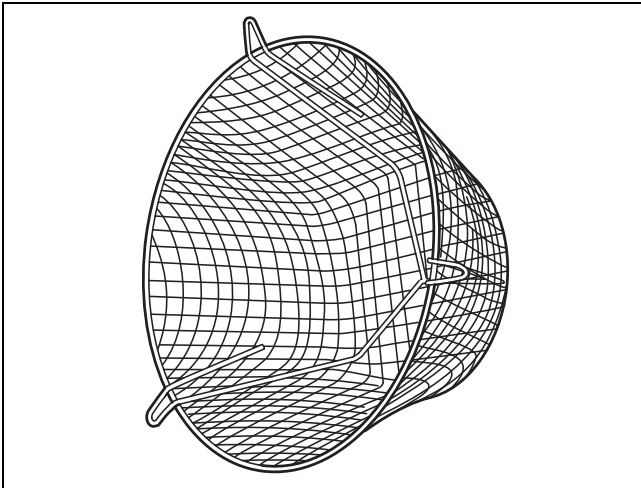


Note

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

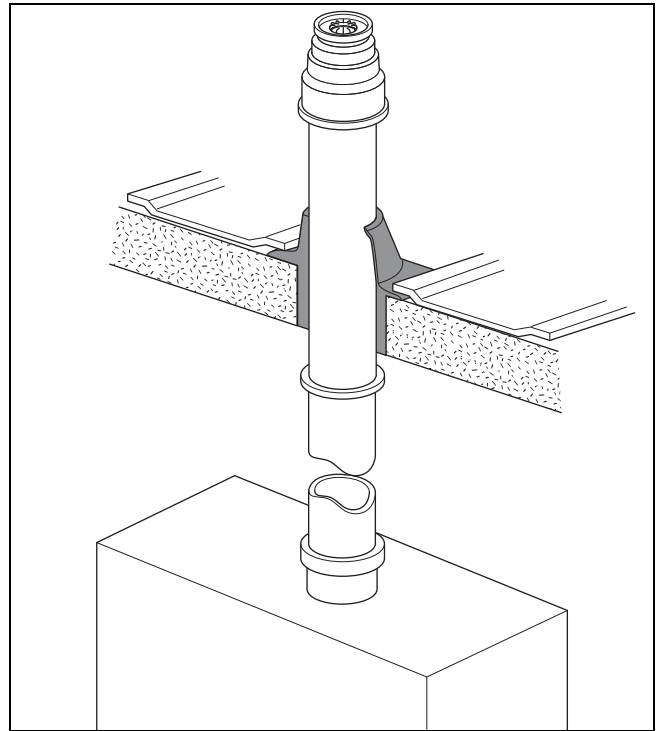


A terminal guard is required if persons could come into contact with the terminal or the terminal could be subject to damage.

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)



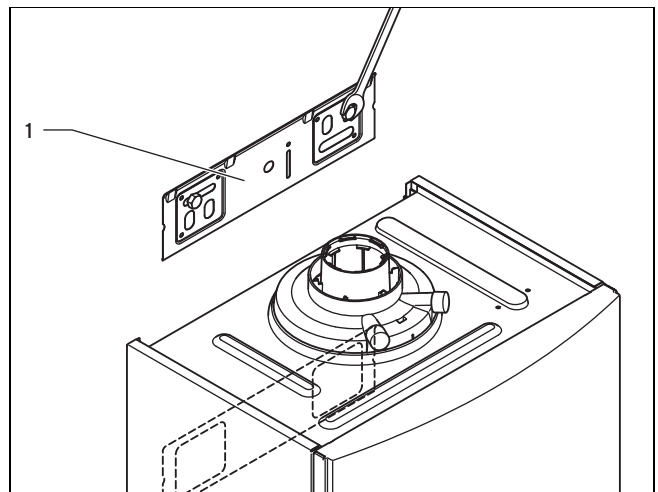
Consult the separate installation manual for air/flue gas systems supplied with your appliance for all possibilities and associated accessories and how to install the flue system.

6.7 Using the installation template

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

6.8 Wall-mounting the product

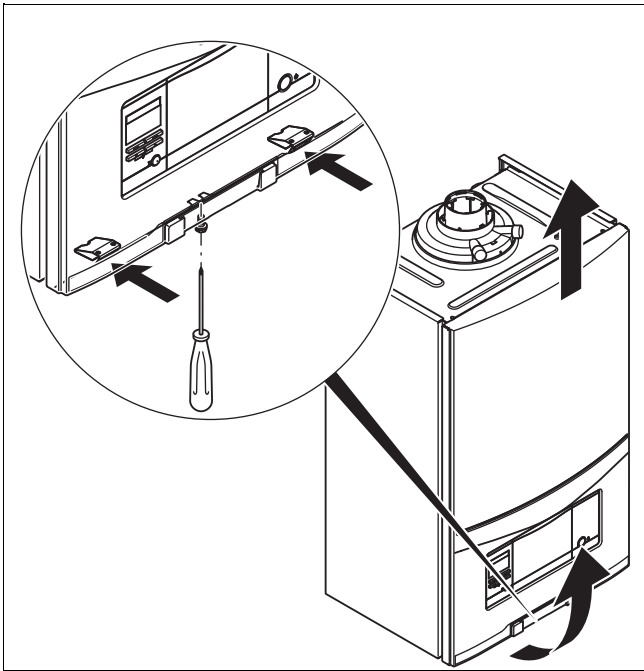
1. Check the load-bearing capacity of the wall.
2. Note the total weight of the product.
3. Only use fixing material that is permitted for the wall.
4. If required, ensure that mounting apparatus on-site has sufficient load-bearing capacity.
5. Wall-mount the product as described.



6. Install the product bracket (1) on the wall.
7. Hang the product on the product bracket from above using the hanging bracket.

6.9 Removing/installing the front casing

6.9.1 Removing the front casing



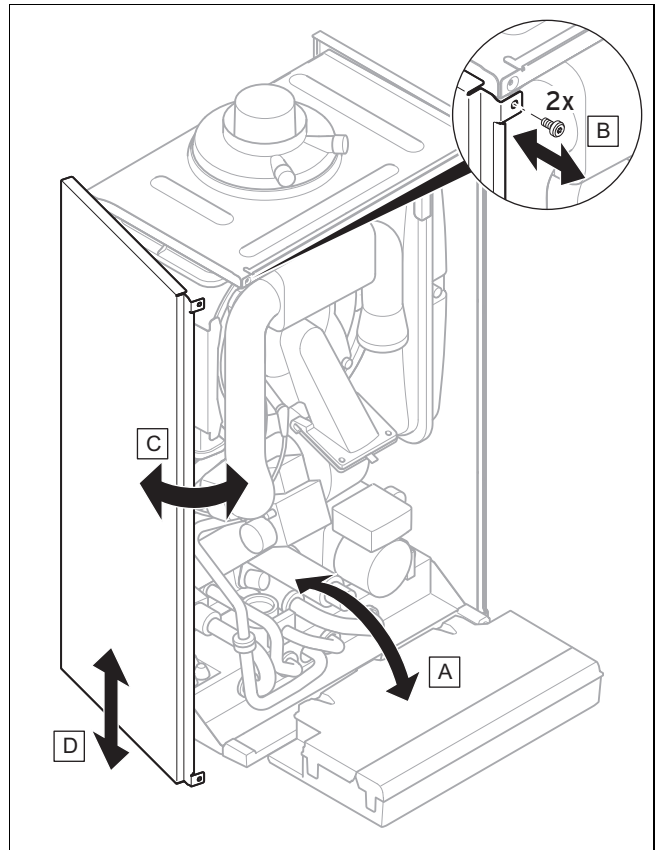
- Remove the front casing as shown in the illustration.

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.

- Always only remove 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 the gas group

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

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 the gas type listed on the data plate.

7.1.4 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 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 of the product before you carry out the gas tightness test.

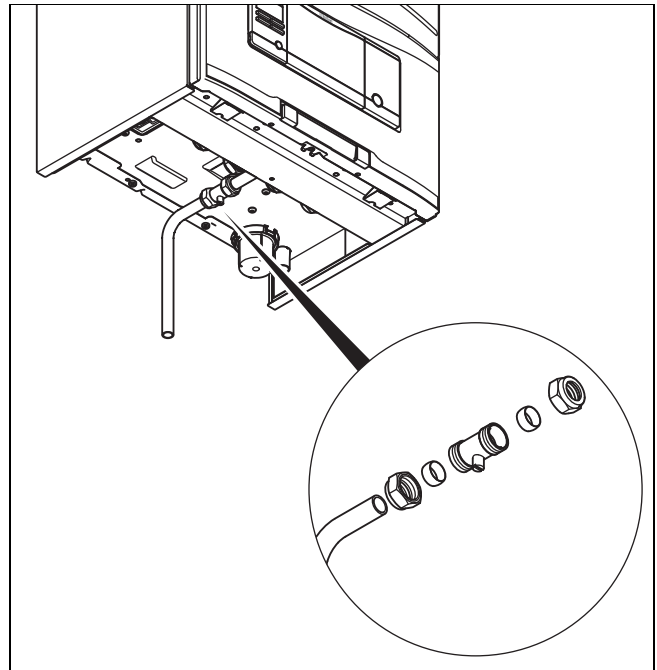
13. If, during gas tightness tests, you have closed the gas stopcock that is installed upstream of the product, relieve the gas line pressure before you open this gas stopcock.

7.1.5 Descaling the water

Scale deposition increases as the water temperature increases.

- ▶ Descale the water as required.

7.2 Installing the gas connection

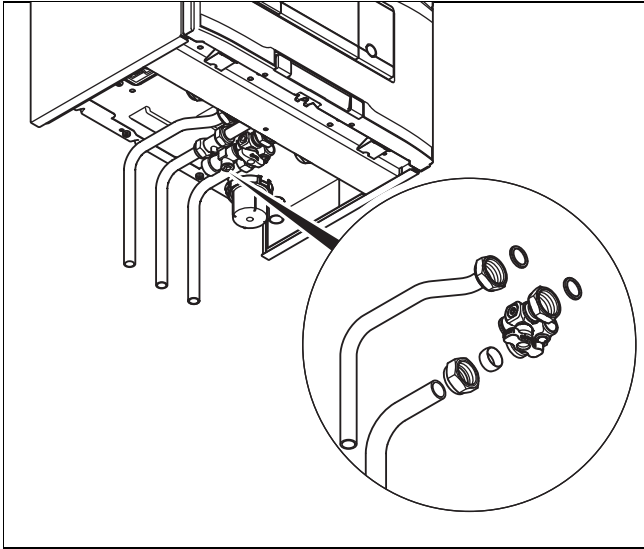


1. Install the gas pipe in accordance with the recognised rules of technology.
2. Connect the product to the gas line as shown in accordance with the recognised rules of good engineering practice.
3. Remove the residues from the gas line by blowing through the gas line beforehand.
4. Purge the gas line before start-up.

7.3 Checking the gas line for leak-tightness

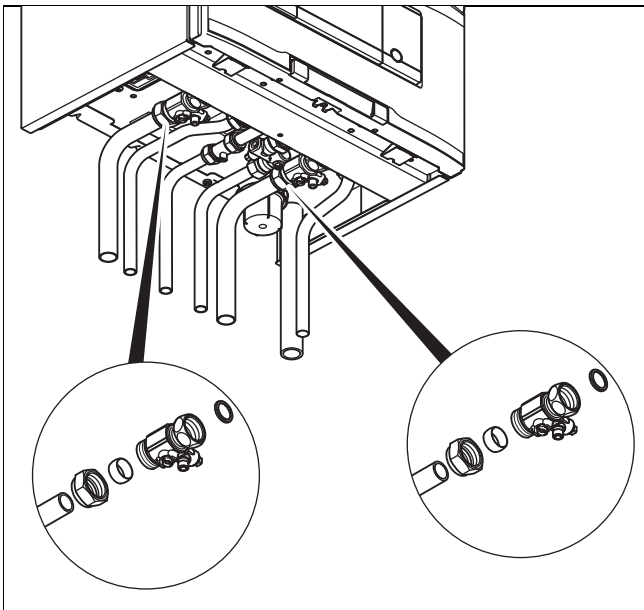
- ▶ Check the entire gas line properly for leak-tightness.

7.4 Installing the hot and cold water connection



1. Make the water connections as shown 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.

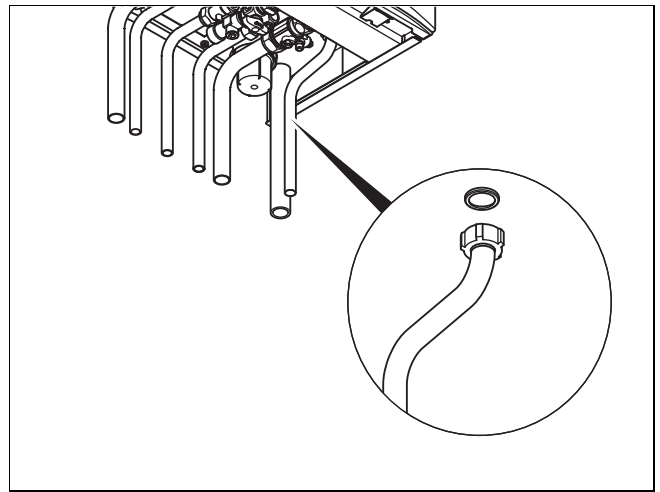
7.5 Connecting the heating flow and heating return



- Make the heating connections as shown in accordance with the relevant standards.

7.6 Installing the drain pipe on the expansion relief valve

1. Install the drain 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 drain 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.

7.7 Connecting the condensate discharge pipe

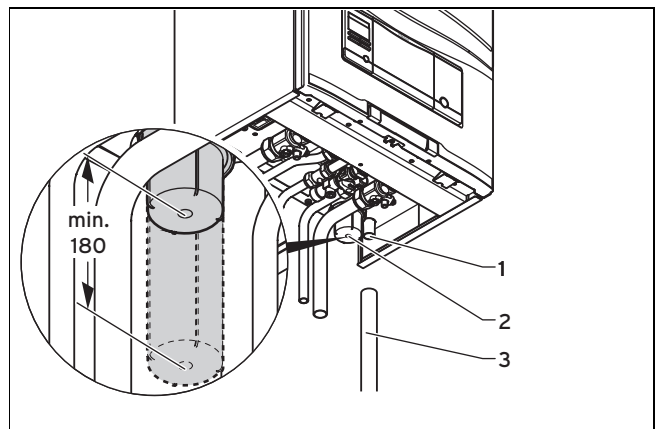


Danger!

Risk of death from escaping flue gases!

The condensate drain pipework for the siphon must not be connected tightly to waste-water piping because, otherwise, the internal condensate trap may be drained fully and flue gas may escape.

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



The product is equipped with a condensate trap (2).

- 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.
- Connect the condensate discharge (1) to a condensate discharge pipe (3) that has a minimum internal diameter of 19 mm (30 mm internal diameter for all external pipes that are fed out of the building) 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

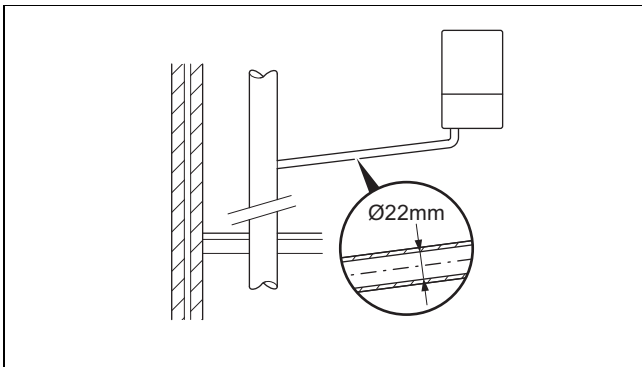
Ensure that the connection between the condensate discharge pipe and the drain hose is not air-tight.

- ▶ 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 an installation space of at least 180 mm beneath the condensate trap.

7.7.1 Condensate discharge systems

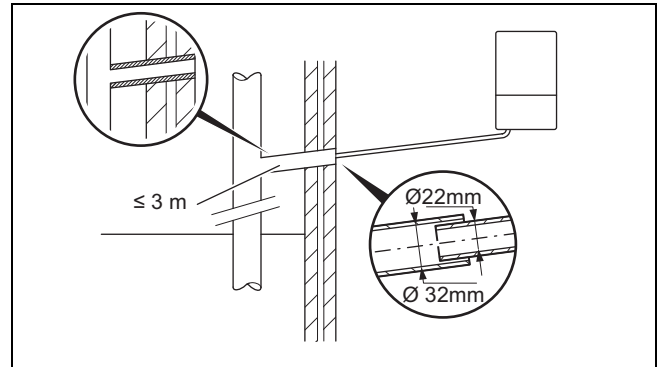
It is not necessary to provide extra traps in the discharge pipe as there is already a trap inside the boiler. Fitting an extra trap may cause the boiler siphon to work incorrectly. Refer to BS5546 or BS6798 for further advice on disposal of boiler condensate.

7.7.1.1 Direct Connection to internal soil and vent stack

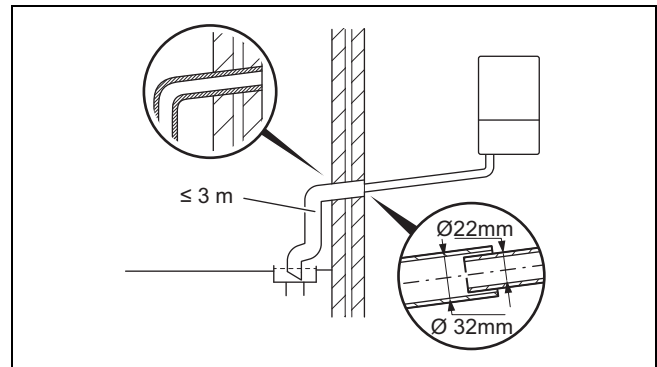


Preferred option

7.7.1.2 Direct connection to external soil and vent stack

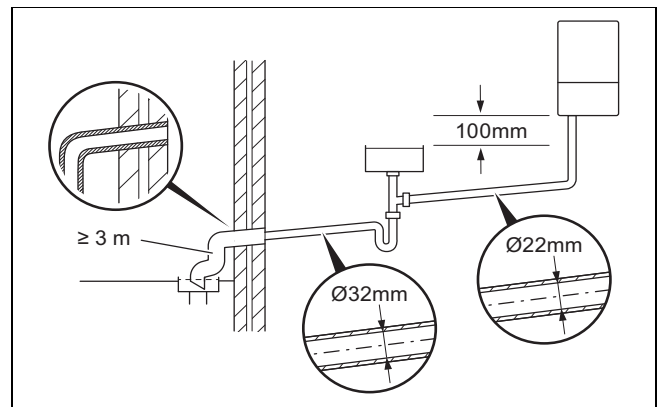


7.7.1.3 External termination to gulley or hopper



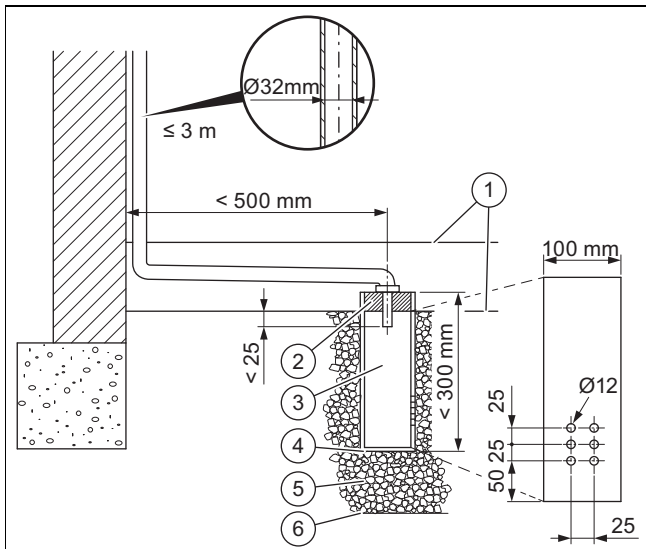
Best practice

7.7.1.4 Internal termination into combined sink waste



Preferred option for external termination

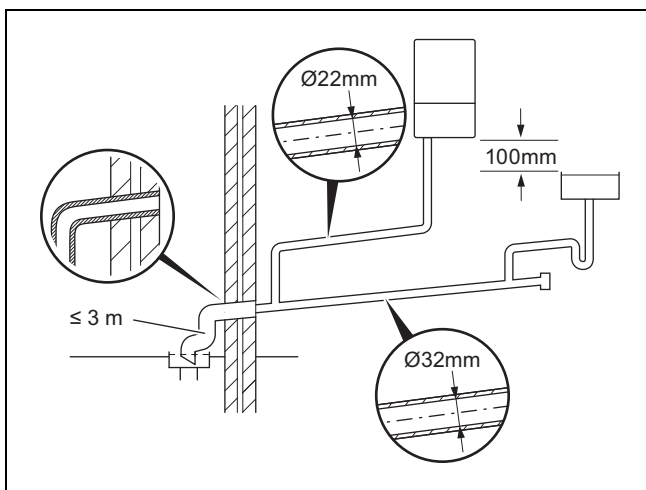
7.7.1.5 External termination into soakaway



- | | | | |
|---|----------------------------------|---|------------------------------|
| 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

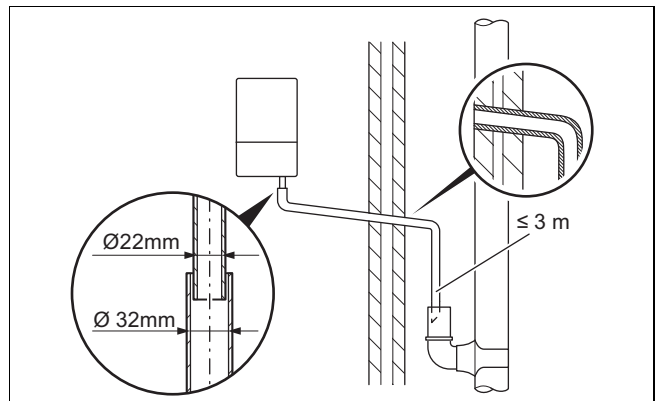
7.7.1.6 Internal termination downstream of sink waste



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

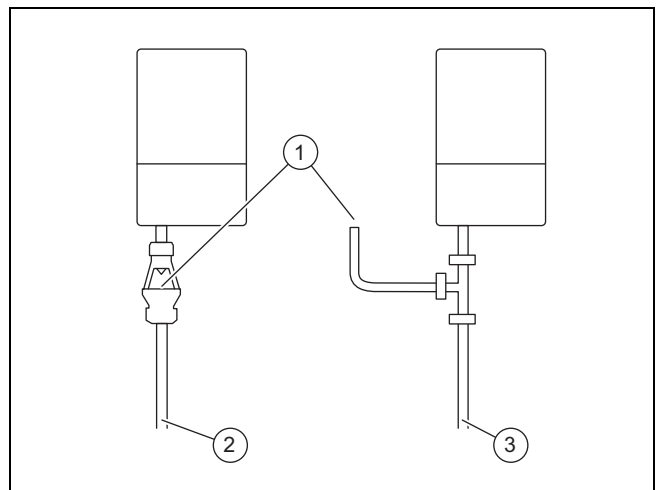
Susceptible to siphonage, must terminate in a gulley

7.7.1.7 External termination into rain water down pipe



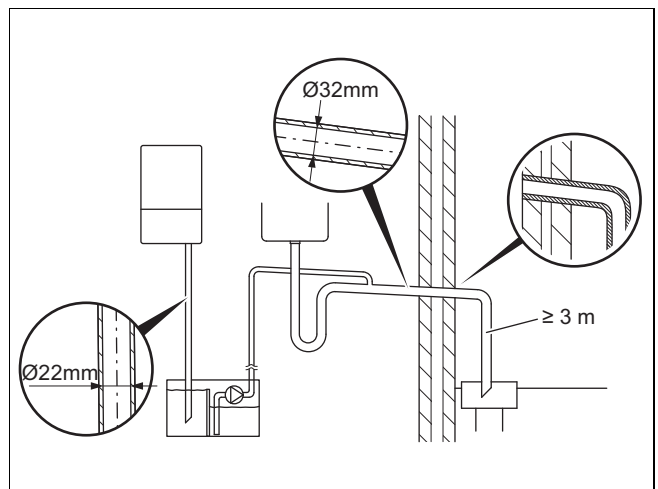
NB only combined foul/rainwater drain

7.7.1.8 Additional methods of introducing air breaks



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

7.7.1.9 Connection of condensate pump



Preferred option for external connection

7.8 Flue installation

7.8.1 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 site.



Caution.

Risk of poisoning due to escaping flue gas.

Mineral-oil-based greases can damage the seals.

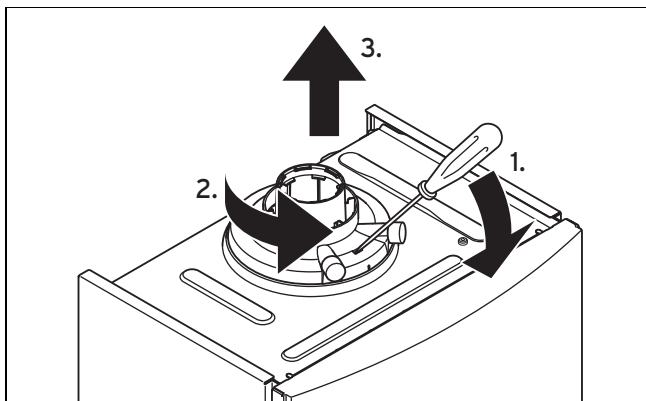
- Instead of grease, use only water or commercially available soft soap to aid installation.

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

7.8.2 Replacing the connector for the air/flue pipe as required

1. Replace the connector for the air/flue pipe as required. The product-specific standard equipment is listed under Technical data.
2. Remove the connection piece for the air/flue pipe – this is installed at the factory. (→ Page 23)
3. If required, install the connection piece for the air/flue pipe, 80/125 mm diameter. (→ Page 23)

7.8.2.1 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 (1.).
3. Turn the connection piece anticlockwise (2.) as far as it will go and then remove it by pulling it upwards (3.).

7.8.2.2 Installing the connection piece for the air/flue pipe, 80/125 mm diameter

1. Remove the connection piece for the air/flue pipe – this is installed at the factory. (→ Page 23)
2. Insert the alternative connection piece. In doing so, pay attention to the latching lugs.
3. Turn the connection piece clockwise until it clicks into position.

7.9 Electrical installation

The electrical installation must only be carried out by a qualified electrician.



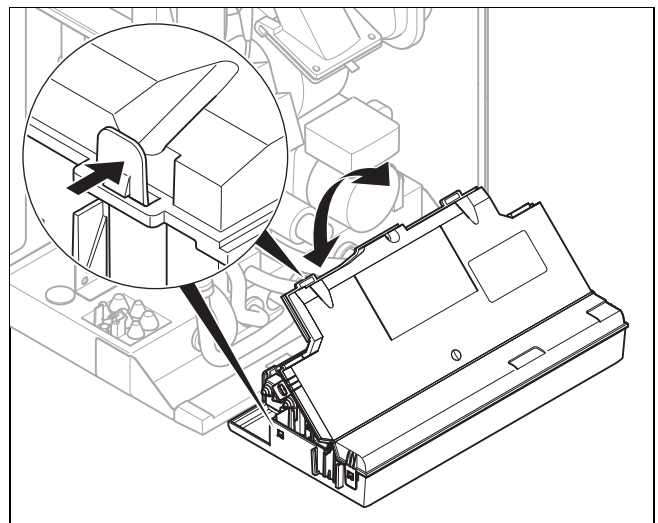
Danger!

Risk of death from electric shock!

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

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

7.9.1 Opening the electronics box



- Open the electronics box as shown in the illustration.

7.9.2 Carrying out the wiring



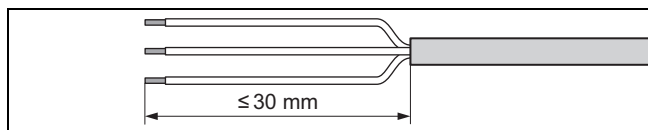
Caution.

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.

7.9.3 Establishing the power supply



Caution.

Risk of material damage due to high connected voltage.

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

- Make sure that the rated voltage of the mains is 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 23)
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 23)
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.

7.9.4 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.

- 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).
- Use a flexible line for the power supply cable, which is routed through the grommet into the product.

1. Open the electronics box. (→ Page 23)
2. Detach the plug from the PCB slot for the power supply (X1).
3. Use a suitable, three-core power supply cable that complies with the relevant standards.
4. Carry out the wiring. (→ Page 23)
5. Close the electronics box.
6. Observe the flue-gas connection that is required on a room-sealed air/flue system. (→ Page 23)

7.9.5 Connecting controls to the electronics

1. Install the control if necessary.
2. Open the electronics box. (→ Page 23)
3. Carry out the wiring. (→ Page 23)
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 230 V RT to the RT marked X1 position (besides LNPE). Do NOT connect the 230 V to any other terminal e.g. not to X106.

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 31)

7.9.6 Connecting additional components via 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**. (→ Page 31)

Condition: Components connected to relay 2

► Activate **D.028**. (→ Page 31)

7.9.7 Actuating the circulation pump according to requirements

1. Carry out the wiring.
2. Connect the supply line for the external button using terminals 1  (0) and 6 (functional drawing) on the X41 edge connector, which is supplied with the controller.
3. Plug the edge connector into the PCB slot X41.

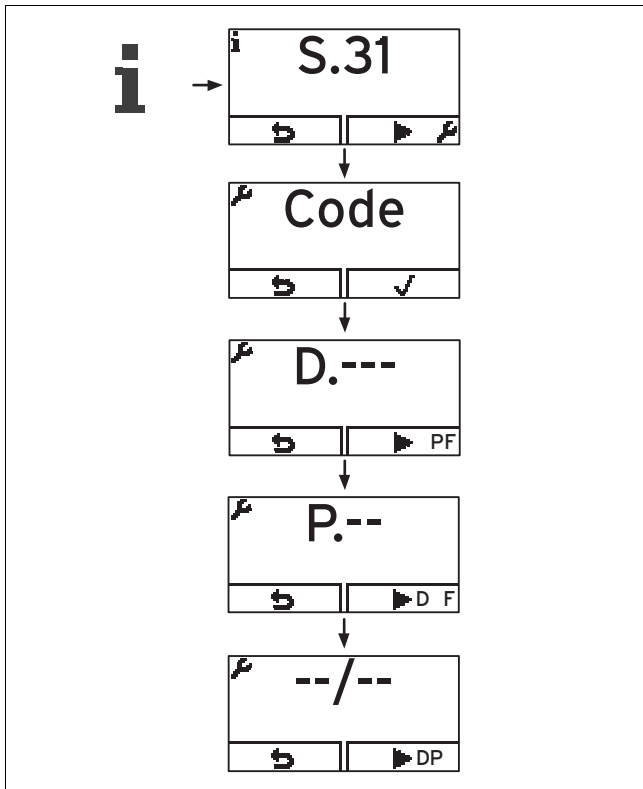
8 Operation

8.1 Operating concept

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

An overview of the display and setting options in the installer level can be found in the section "Overview of the installer level". (→ Page 26)

8.2 Installer level overview



8.3 Calling up the installer level

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

8.4 Live Monitor (status codes)

Menu → Live monitor

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

Status codes – Overview (→ Page 45)

8.5 Setting the hot water temperature



Danger!

Risk of death from legionella.

Legionella multiply at temperatures below 60 °C.

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

- ▶ Set the hot water temperature.

Condition: Water hardness: > 3.57 mol/m³

- Water temperature: ≤ 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 50) 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 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

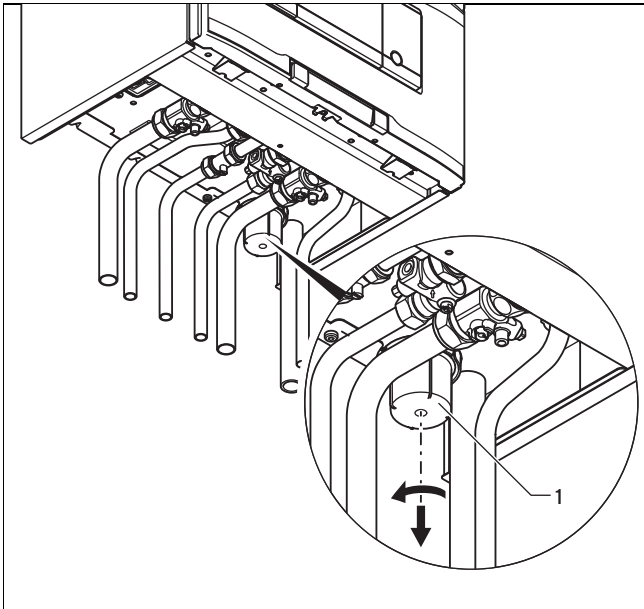
- Adey MC1+
- Fernox F1
- Fernox F2
- Sentinel X 100
- Sentinel X 200

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.

9.3 Filling the condensate trap



1. Remove the lower section from the condensate trap (1).
2. Fill the lower section with water up to 10 mm below the upper edge.
3. Attach the lower section to the condensate trap.

9.4 Switching the product on and off

- Press the on/off button on the product.
 - ◄ The display shows the basic display.

9.5 Using check programmes

Call up the installer level + 1x

By activating various check programmes, you can trigger special functions on the product.

Check programmes – Overview (→ Page 48)

9.6 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.

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

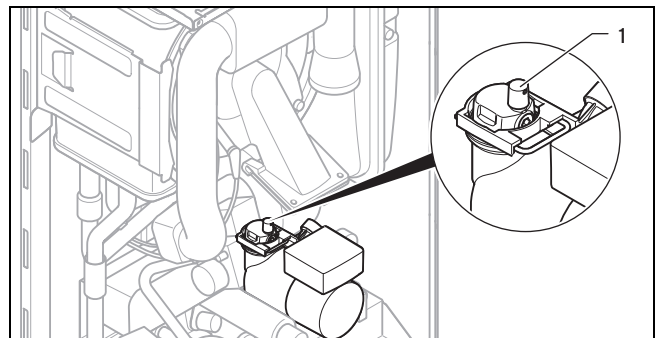


Note

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.

9.8 Filling the heating installation



1. Flush the heating installation through.
2. Undo the cap of the automatic air vent (1) by one to two rotations and leave it open, as the product purges itself via the automatic air vent even in continuous mode.
3. Select the check programme **P.06**.
 - ◄ The diverter valve moves to the mid-position, the pumps do not run and the product does not switch to heating mode.
4. Observe the information on treating heating water. (→ Page 27)
5. Connect the filling and drainage tap in the heating installation to a heating water supply, if possible with the cold water valve, in accordance with the relevant standards.
6. Open the heating water supply.
7. Open all radiator valves (thermostatic radiator valves) of the heating installation.
8. If necessary, check that both service valves on the product are open.
9. Slowly open the filling and drainage tap so that the water flows into the heating system.
10. Purge the lowest radiator until water flows out of the purging valve without bubbles.
11. Purge all other radiators until the entire heating system has been filled with water.

12. Close all purging valves.
13. Monitor the rising filling pressure in the heating installation.
14. Fill with water until the required filling pressure is reached.
15. Close the filling and drainage tap and the cold water valve.
16. Check all connections and the entire system for leaks.

9.9 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.

9.10 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.

9.11 Gas inspection

9.11.1 Checking the factory-set gas setting



Caution.

Risk of material damage caused by making unauthorised settings.

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

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

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

Only Vaillant Service may perform a gas conversion.

If a gas conversion to liquefied petroleum gas has been carried out, the smallest possible partial load is higher than is shown on the display. The correct values can be found in the Technical data in the appendix.

- ▶ Call Vaillant Service (0330 1003 143).
- ▶ Do not start up the product.

Condition: The product design is compatible with the local gas group

- ▶ Proceed as described below.

9.11.2 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.

9.11.3 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.

Qn, DHW	nom. Heatout-put DHW	H gas in m³/h			P gas in kg/h		
		Nom.	+5%	-10%	Nom.	+5%	-10%
18.9	18.5	2.00	2.10	1.80	1.47	1.54	1.32
23.5	23.0	2.49	2.61	2.24	1.83	1.92	1.64
24.5	24.0	2.59	2.72	2.33	1.90	2.00	1.71
27.8	27.2	2.94	3.09	2.65	2.16	2.27	1.94

Condition: Gas flow rate not in the permissible range

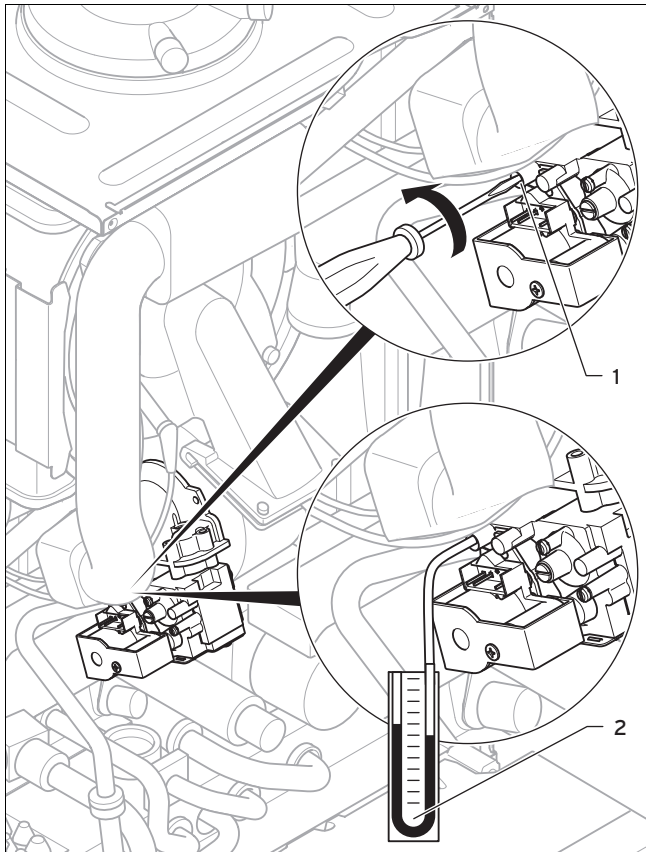
- ▶ Check all of the piping and ensure that the gas flow rates are correct.
- ▶ Only put the product into operation once the gas flow rates have been corrected.

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.

9.11.4 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 test nipple screw (1) (lower screw) 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**.
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.
 - Permissible gas flow pressure for operation with natural gas H: 1.3 to 2.3 kPa (13.0 to 23.0 mbar)
 - Permissible gas flow pressure for operation with liquefied petroleum gas P: 2.3 to 4.3 kPa (23.0 to 43.0 mbar)
9. Should the pressure recorded at the reference test point in the boiler be lower than indicated check if there is any blockage in the pipework or if the pipework is undersized.

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

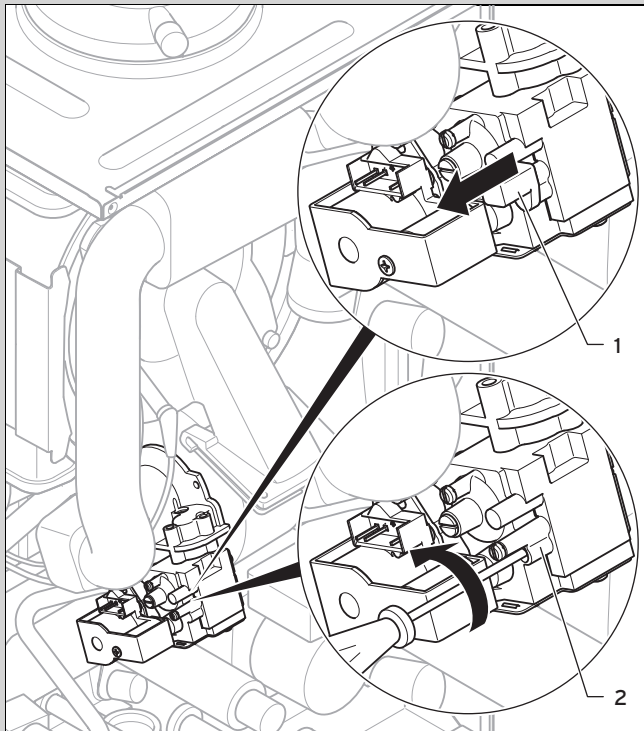
- ▶ End the check programme **P.01**.
- ▶ Allow the boiler to cool down allowing pump overrun to operate for a minimum of two minutes.
- ▶ Close the gas stopcock.
- ▶ Remove the pressure gauge and retighten the sealing screw (1) for the measuring nipple.
- ▶ Open the gas stopcock.
- ▶ Check the test 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.


9.11.5 Checking the CO₂ content and, if necessary, adjusting it (air index setting)

1. Start up the product with the check programme **P.01**.
2. Wait at least five minutes until the product reaches its operating temperature.
3. Measure the CO₂ and CO/CO₂ content at the flue gas analysis point.
4. Compare the measured value with the corresponding value in the table.

Set values	Unit	Natural gas H	Liquefied petroleum gas P
CO ₂ after 5 minutes in full load mode with front casing closed	Vol%	9.2 ± 1.0	10.4 ± 0.5
CO ₂ after 5 minutes in full load mode with front casing removed	Vol%	9.0 ± 1.0	10.2 ± 0.5
Set for Wobbe index W ₀	kWh/m ³	14.09	21.34
O ₂ after 5 minutes in full load mode with front casing closed	Vol%	4.5 ± 1.8	5.1 ± 0.8
CO value with full load	ppm	≤ 250	≤ 250
CO/CO ₂		≤ 0.0031	≤ 0.0026

Condition: The CO₂ content must be adjusted



- ▶ Remove the yellow sticker.
- ▶ Remove the covering cap (1).
- ▶ Set the CO₂ content (value with front casing removed) by turning the screw (2).
 - Higher CO₂ content: Turn anti-clockwise
 - Lower CO₂ content: Turn clockwise
- ▶ For natural gas only: Only perform the adjustment in small increments of a 1/8 turn and wait approx. one minute after each adjustment until the value stabilises.
- ▶ For liquid gas only: Only perform the adjustment in extremely small increments (approx. 1/16 turn), and wait approx. one minute after each adjustment until the value stabilises.
- ▶ After you have implemented the settings, press .
- ▶ If an adjustment is not possible in the specified adjustment range, you must not start up the product.
- ▶ If this is the case, inform Customer Service.
- ▶ Refit the covering cap.
- ▶ Install the front casing.

9.12 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 28) and Purging the heating installation (→ Page 29).
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.

9.13 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.

9.13.1 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**.

9.13.2 Checking the hot water generation

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

10 Adapting the unit to the heating installation

10.1 Calling up diagnostics codes

You can find the setting options in the diagnostics codes in the installer level.



Overview of diagnostics codes (→ Page 41)

- ▶ Call up the installer level. (→ Page 26)

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



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

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

10.2.2 Resetting the remaining burner anti-cycling time

- Press .


10.3 Setting the maintenance interval

1. Navigate to diagnostics code **D.084** in the installer level 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

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)
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

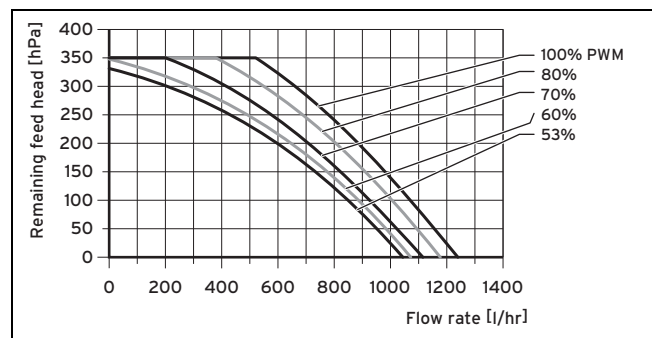
1. Navigate to diagnostics code **D.014** in the installer level and confirm by pressing .
2. Set the required pump output.

Condition: Low loss header installed

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

10.4.1 Remaining pump head

10.4.1.1 Pump curve for VUW 246, VUW 286



10.5 Setting the bypass valve



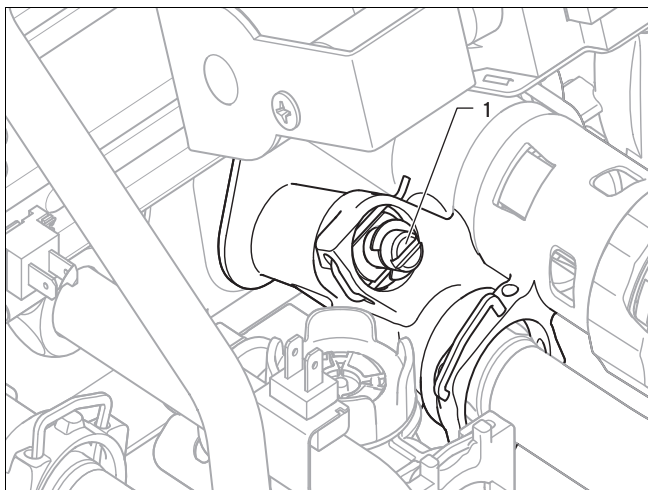
Caution.

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 18)



- ▶ 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.

- ▶ 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.

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

- ▶ You must carry out an annual inspection of the product. The annual inspection can be effectively performed without removing components by requesting data from the DIA system, carrying out the simple visual checks indicated in the table in the appendix and performing a flue gas measurement. The maintenance intervals and their scope are determined by the heating engineer based on the condition of the boiler found during the inspection. All inspection and maintenance work should be performed in the order specified in the table in the appendix.

During any inspection and maintenance or after change of parts of the combustion circuit, the following must be checked:

- The boiler has been installed in accordance with the relevant installation instructions.
 - The integrity of the flue gas installation and flue seals is in accordance with the relevant flue installation instructions enclosed.
 - Visual, the integrity of the boiler combustion circuit and relevant seals (paying particular attention to the burner door seal).
 - The gas inlet working pressure at maximum rate.
 - The gas flow rates.
 - Correctness of electrical, water and gas connections.
 - Correctness of the water pressure.
 - The condition of the whole system, in particular the condition of radiator valves, evidence of leakage from the heating system and dripping taps.
- ▶ Correct any faults before proceeding.

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 18)
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 36).
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 Removing the compact thermal module



Note

The compact thermal module consists of four main components:

- Speed-regulated fan,
- Gas/air connection,
- Gas supply (mixture pipe) with burner flange,
- Premix burner.



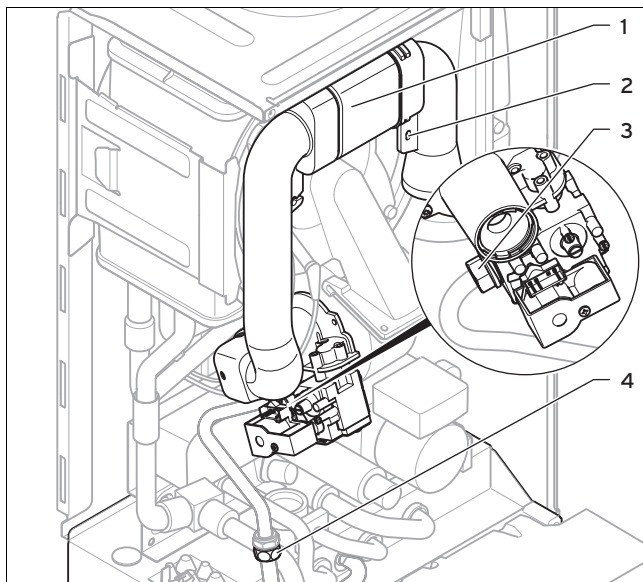
Danger!

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

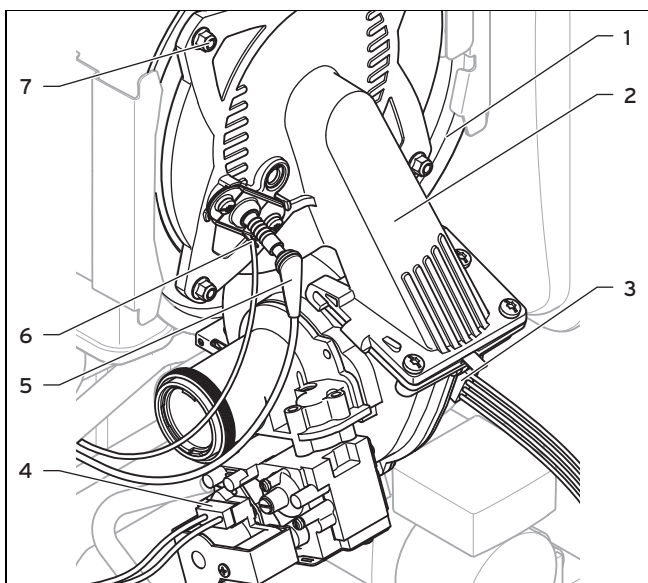
The seal, insulating mat and self-locking nuts on the burner flange must not be damaged. Otherwise, hot flue gases may escape and cause personal injury and material damage.

- ▶ 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. Switch off the product using the on/off button.
2. Close the gas stopcock.
3. Remove the front casing. (→ Page 18)
4. Hinge the electronics box forward.



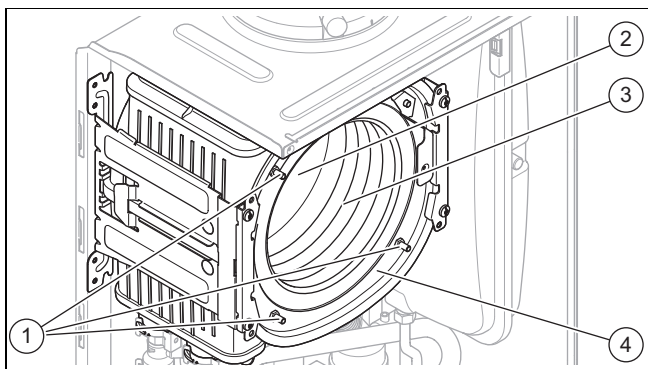
5. Unscrew the retaining screw (2) and remove the air intake pipe (1) from the intake stub.
6. Unscrew either the union nut on the gas valve assembly (3) or the union nut (4) between the gas pipes.



7. Remove the ignition line plug (5) and the earth wire plug (6) from the ignition electrode.
8. Remove the plug (3) from the fan motor.
9. Remove the plug (4) from the gas valve assembly.
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 panel of the heat exchanger. If you notice any signs of damage, replace the relevant insulating mat.

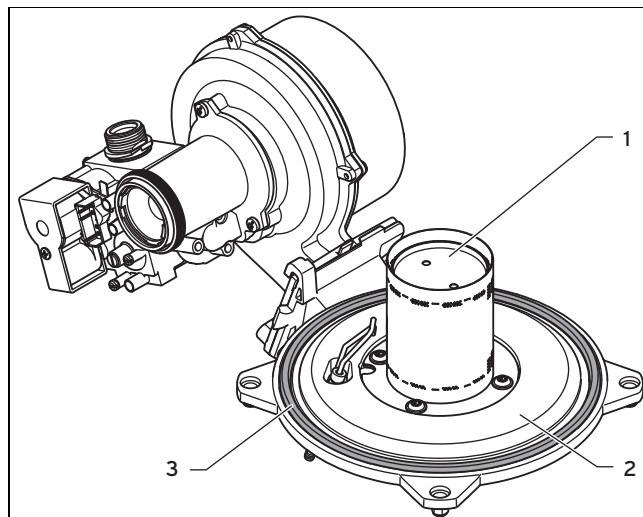
12.6 Cleaning the heat exchanger

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 (3) of the heat exchanger (4) 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 (2) on the back of the heat exchanger.
 - ◁ The water flows out of the heat exchanger through the condensate siphon.

12.7 Checking the burner



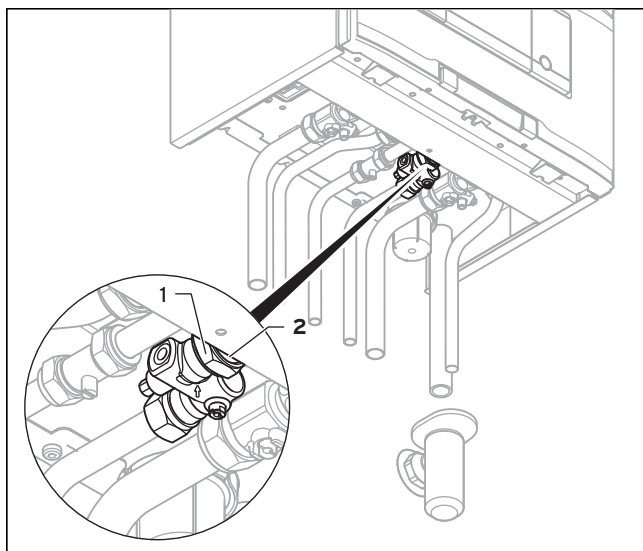
1. Check the surface of the burner (1) for damage. If you see any damage, replace the burner.
2. Fit a new burner flange seal (3).
3. Check the insulating mat (2) on the burner flange. If you notice any signs of damage, replace the insulating mat.

12.8 Cleaning the condensate trap

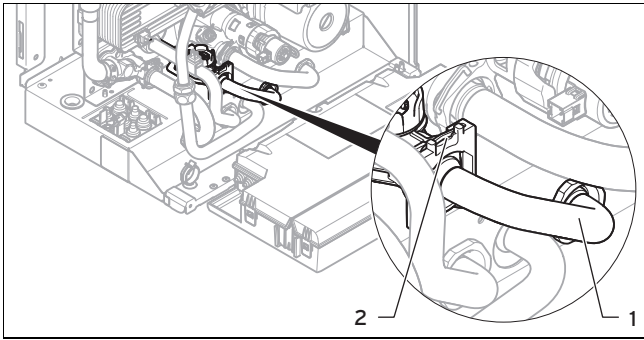
1. Remove the lower section from the condensate trap (1).
2. Flush out the lower section with water.
3. Fill the lower section with water up to about 10 mm below the upper edge.
4. Attach the lower section to the condensate trap.

12.9 Cleaning the filter in the cold water inlet

Validity: Product with integrated hot water generation

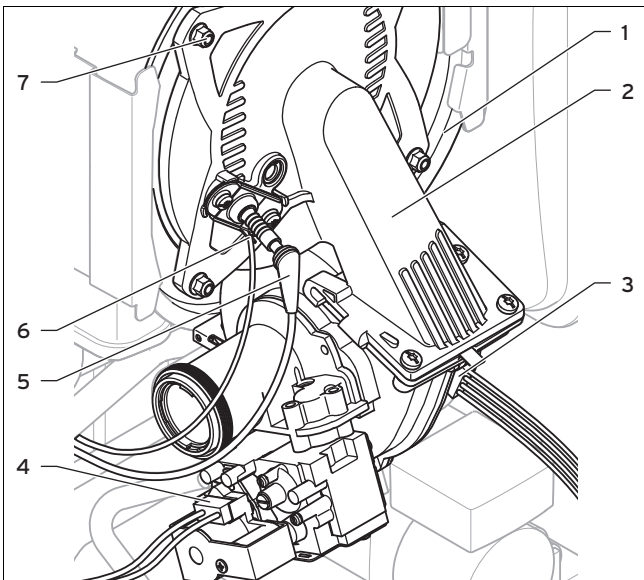


1. Close the cold water stop valve.
2. Drain the product on the hot water side.
3. Unscrew the cap nut (2) and the lock nut (1) from the product's casing.



4. Tilt the electronics box forward.
5. Remove the clamp (2).
6. Remove the pipe (1) from the product.
7. Rinse the filter under a jet of water, holding it against the direction of flow.
8. If the filter is damaged or it can no longer be cleaned sufficiently, you must replace the filter.
9. Refit the pipe.
10. Reinsert the clamp.
11. Always use new seals and retighten the cap nuts and the lock nut.
12. Open the cold water stop valve.

12.10 Installing the compact thermal module



1. Connect the compact thermal module (2) to the heat exchanger (1).
2. Tighten the four 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. Connect the plugs (3) to (6) again.
4. Connect the gas pipe using a new seal. In the process, secure the gas pipe against twisting.
5. Open the gas stopcock.
6. Make sure that there are no leaks.
7. Check that the sealing ring in the air intake pipe is positioned correctly in the seal seat.
8. Reconnect the air intake pipe to the intake stub.
9. Secure the air intake pipe with the retaining screw.
10. Check the gas flow pressure.

12.11 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.

12.12 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 39)
 4. Fill the heating installation. (→ Page 28)
 5. Purge the heating installation. (→ Page 29)

12.13 Checking the filling pressure of the heating installation

1. Check the filling pressure of the heating installation, top it up with heating water, if necessary, and purge it.
2. Fill the heating installation. (→ Page 28)
3. Purge the heating installation. (→ Page 29)

12.14 Checking the quality of the heating water

- ▶ Check the quality of the heating water: Clarity (clouding), correct inhibitor and pH value. (→ Page 27)

12.15 Completing inspection and maintenance work


- ▶ Start a test operation after the maintenance.
- ▶ Check the heating mode and, if required, the domestic hot water generation (if available).
- ▶ Check the gas flow pressure. (→ Page 30)
- ▶ Check the CO₂ content and, if necessary, adjust it (air index setting). (→ Page 30)
- ▶ If required, reset the maintenance interval. (→ Page 32)
- ▶ Install the front casing.
- ▶ Fill out the relevant Service Record section in the Benchmark Checklist.

12.16 Checking the product for leak-tightness

- ▶ Check that the product is leak-tight. (→ Page 31)

13 Troubleshooting

13.1 Checking service messages

 appears if you have set a maintenance interval, for example, and this has passed or a service message is issued. The product is not in fault mode.

- ▶ Call up the Live Monitor. (→ Page 26)

Condition: S.46 is displayed

The product is in Comfort protection mode. The product continues to run with restricted comfort after it has detected a fault.

- ▶ To establish whether or not a component is defective, read the fault memory. (→ Page 37)




Note

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

13.2 Eliminating faults




- ▶ If fault messages are displayed (**F.XX**), eliminate the fault after checking the table in the appendix.
Check programmes – Overview (→ Page 48)
Overview of fault codes (→ Page 46)

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.

13.3 Calling up and clearing the fault memory

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

- ▶ Call up the installer level. (→ Page 26)
- ▶ Navigate to the **fault codes**.
 - ◁ The number of faults that have occurred is shown in the display and the faults that are currently called up are displayed with their fault numbers **F.xx**.
- ▶ Press  or  to call up individual fault messages.
- ▶ To delete the entire fault list, navigate to diagnostics code **D.094** in the installer level.
- ▶ Set the diagnostics code to **1**, and confirm by pressing .

13.4 Resetting parameters to factory settings

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

13.5 Preparing the repair work

1. Decommission the product.
2. Disconnect the product from the power mains.
3. Remove the front casing. (→ Page 18)
4. Close the gas isolator cock.
5. Close the service valves in the heating flow and in the heating return.
6. Close the service valve in the cold water pipe.
7. Drain the product if you want to replace water-bearing components of the product.
8. Make sure that water does not drip on live components (e.g. the electronics box).
9. Use only new seals.

13.5.1 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.

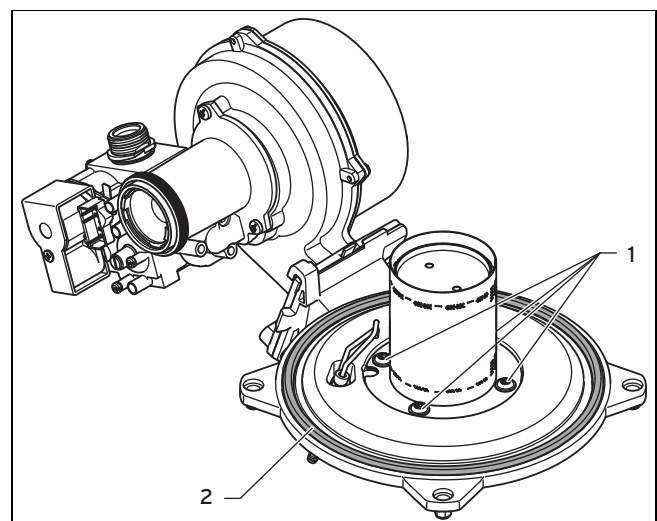
We strongly recommend that you use original spare parts from the manufacturer as this guarantees fault-free and safe operation of the product. To receive information about the available original spare parts, contact the contact address provided on the back page of these instructions.

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

13.6 Replacing defective components

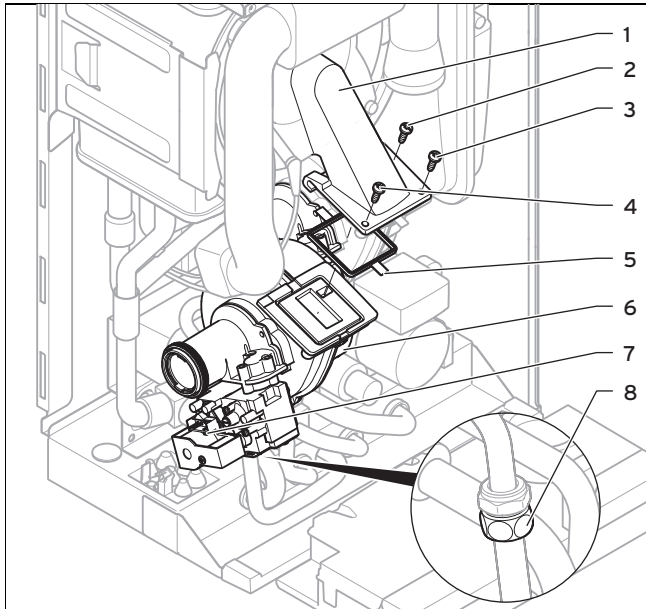
13.6.1 Replacing the burner

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

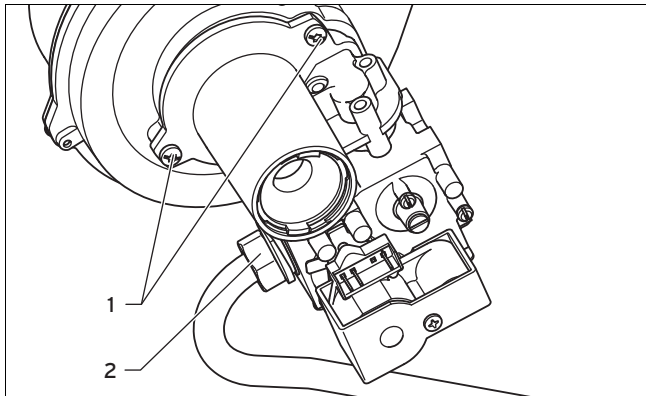


2. Undo the four screws (**1**) on the burner.
3. Remove the burner.
4. Install a new seal (**2**) on the new burner.
5. Install the compact thermal module. (→ Page 36)

13.6.2 Replacing the fan or gas valve



1. Remove the air intake pipe.
2. Remove the plug from the gas valve (7).
3. Remove the plug from the fan motor (6) by pushing in the latching lug.
4. Unscrew either the cap nut (2) on the gas valve or the cap nut (8) between the gas pipes. Secure the gas pipe against twisting.
5. Unscrew the three screws (2)-(4) between the mixture pipe (1) and the fan flange.

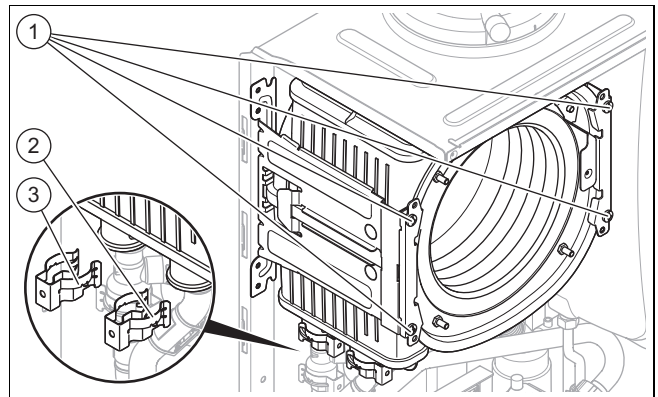


6. Remove the entire fan/gas valve unit from the product.
7. If you want to replace the gas valve, unscrew the cap nut (2) if the gas pipe is still secured to the gas valve.
8. Unscrew both fixing screws (1) on the gas valve and remove the fan from the gas valve.
9. Replace the defective fan or the defective gas valve.
10. Install the gas valve and the fan in the same position as before. Use new seals.
11. Screw the fan to the gas valve.
12. If you had removed the gas pipe, screw the cap nut of the gas pipe (2) only loosely to the gas valve. Only tighten the cap nut on the gas valve after the installation work has been completed.
13. Refit the entire fan/gas valve unit in reverse order. You must use a new seal (5) for this.
14. Ensure that the order in which the three screws are screwed in between the fan and the mixture pipe corresponds to the numbering (3), (2) and (4).

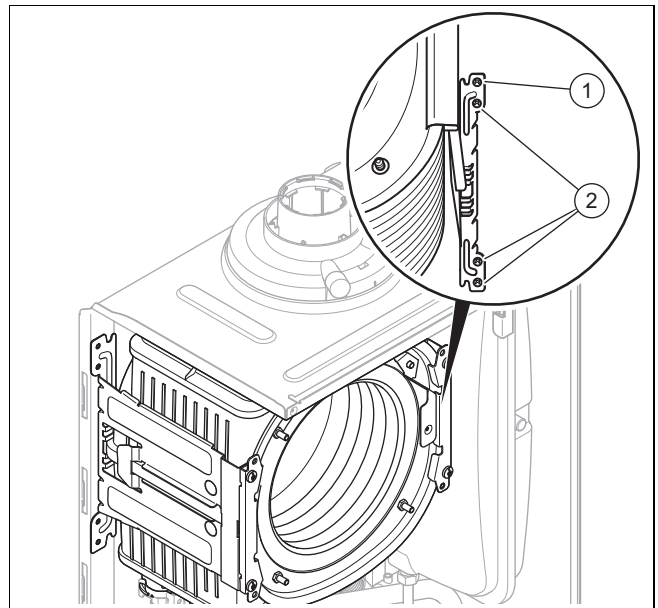
15. Tighten the cap nut (2) on the gas valve and the cap nut (8) between the gas pipes. In the process, secure the gas pipe against twisting. Use new seals.
16. After you have completed this work, carry out a leak-tightness test (function check). (→ Page 31)
17. If you have installed a new gas valve, adjust the gas ratio setting. (→ Page 29)

13.6.3 Replacing the heat exchanger

1. Drain the product. (→ Page 36)
2. Remove the compact thermal module. (→ Page 34)
3. Detach the condensate drain hose from the heat exchanger.



4. Remove the clamps (2) and (3) from the flow connection and the return connection.
5. Detach the flow connection.
6. Detach the return connection.
7. Remove two screws (1) on each of the two retainers.



8. Remove the lower three screws (2) on the rear section of the retainer.
9. Swing the retainer to the side around the top screw (1).
10. Pull the heat exchanger downwards and to the right, and remove it from the product.
11. Install the new heat exchanger in reverse order.
12. Replace the seals.

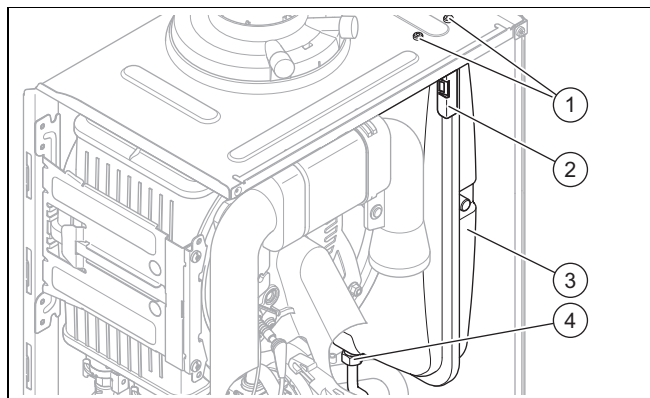
**Note**

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

13. Insert the flow and return connections into the heat exchanger as far as they will go.
14. Make sure that the brackets are seated correctly on the flow and return connections.
15. Install the compact thermal module. (→ Page 36)
16. Fill and purge the product and, if necessary, the heating installation. (→ Page 28)

13.6.4 Replacing the expansion vessel

1. Drain the product. (→ Page 36)



2. Undo the screwed connection (4).
3. Remove both screws (1) on the support plate (2).
4. Remove the support plate (2).
5. Pull out the expansion vessel (3) towards the front.
6. Insert the new expansion vessel into the product.
7. Screw the new expansion vessel to the water connection. Use a new seal for this.
8. Attach the support plate using both screws (1).
9. Fill and purge the product and, if necessary, the heating installation. (→ Page 28)

13.6.5 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 23)
2. Replace the PCB or display according to the assembly and installation instructions supplied.
3. Close the electronics box.

13.6.6 Replacing the PCB and the display

1. Open the electronics box. (→ Page 23)
2. Replace the PCB and display according to the assembly and installation instructions supplied.
3. Close the electronics box.
4. Press the on/off button on the product. (→ Page 28)
 - ◁ You are automatically taken to **D.093** to set the device specific number.

5. Set the correct value for the relevant product type in accordance with the table below and confirm by pressing

Product type number

VUW 246/5-3 (H-GB) ecoTEC pro 24	7
VUW 286/5-3 (H-GB) ecoTEC pro 28	22
VUW 286/5-3 (P-GB) ecoTEC pro 28	22

- ◁ The electronics are now set to the product type and the parameters of all diagnostics codes are set to default settings.

6. Make the system-specific settings.

13.7 Completing repair work

1. Establish the power supply.
2. Switch the product back on if this has not yet been done. (→ Page 28)
3. Install the front casing.
4. Open all service valves and the gas stopcock.

13.8 Checking the product for leak-tightness

- ▶ Check that the product is leak-tight. (→ Page 31)

14 Decommissioning**14.1 Temporarily decommissioning the product**

- ▶ Press the on/off button.
 - ◁ The display goes out.
- ▶ Close the gas stopcock.
- ▶ On combination products 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 36)


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	Carry out the combustion analysis: Measure the CO content, CO ₂ content and the CO/CO ₂ ratio. For products with a rear air/flue connection: The combustion analysis can only be carried out when the unit casing has been removed; it is not necessary to test these products for flue gas recirculation	Annually	
12	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	
13	Disconnect the product from the electrical installation	Annually	
14	Check and, if required, correct the electrical installation	Annually	
15	Removing dirt from the product and the vacuum chamber	Annually	
16	Visually check the heat cell to ascertain its condition and detect any corrosion, rust or damage, and carry out maintenance work, if required	Annually	
17	Check that the gas stopcock and service valves function correctly	Annually	
18	Check the quality of the heating water: Clarity (clouding), correct inhibitor and pH value	Annually	
19	Removing the compact thermal module	at regular intervals	34
20	Check the burner for damage	at regular intervals	
21	Checking the insulating mats in the combustion area and replacing damaged insulating mats	at regular intervals	
22	Cleaning the heat exchanger	at regular intervals	35
23	Cleaning the condensate trap	Annually	35
24	Filling the condensate trap	Annually	28
25	Installing the compact thermal module	at regular intervals	36
26	Checking the pre-charge pressure for the internal expansion vessel	at regular intervals	36
27	Cleaning the filter in the cold water inlet	at regular intervals	35
28	Check the impeller sensor for dirt/damage	at regular intervals	
29	If the water volume is insufficient (domestic hot water) or the outlet temperature is insufficient, check the secondary heat exchanger	at regular intervals	
30	Reassemble the product	After each time maintenance work is carried out	
31	Opening the service valves	Annually	

#	Maintenance work	Interval	
32	Filling the heating installation	at regular intervals	28
33	Completing inspection and maintenance work	Annually	36
34	Visually check the ignition and burner behaviour	Annually	
35	Check the CO content, CO ₂ content and the CO/CO ₂ ratio again	Annually	
36	Checking leak-tightness	Each time maintenance work is carried out	31

B 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 or explanations	Factory setting	Own setting
D.000	Heating partial load	Adjustable partial heat load in kW Auto: Product automatically adjusts max. partial load to current system demand	Auto	
D.001	Pump overrun: Heating	1 to 60 min	5 min	
D.002	Max. anti-cycl. time: Heating	2 to 60 min	20 min	
D.003	Outlet temperature actual value	In °C		Not adjustable
D.004	Cylinder temperature actual value	In °C		Not adjustable
D.005	Heating target flow temperature	In °C; the maximum value that is set in D.071 and is restricted by means of an eBUS control if such a control is connected		Not adjustable
D.006	Outlet temperature target value	35 to 65 °C		Not adjustable
D.007	Comfort mode target value APC target value Cylinder temperature target value	Product with integrated domestic hot water generation, and product with integrated domestic hot water generation and shift-load cylinder 35 to 65 °C Product with heating mode only Frost protection is at 15 °C, then 40 to 70 °C (max. temperature can be adjusted under D.020)		Not adjustable
D.008	Controller 3-4	Room thermostat open (no heat requirement) Room thermostat closed (heat requirement)		Not adjustable
D.009	eBUS controller target value	In °C		Not adjustable
D.010	Internal pump	On, Off		Not adjustable
D.011	External pump	On, Off		Not adjustable
D.012	Cyl. charging pump	On, Off		Not adjustable
D.013	Circulation pump	On, Off		Not adjustable
D.014	Pump speed target value	Target value of internal high-efficiency pump in %. Possible settings: 0 = Auto 1 = 53 2 = 60 3 = 70 4 = 85 5 = 100	0 = Auto	
D.015	Pump speed actual value	Actual value for internal high-efficiency pump in %		Not adjustable
D.016	Controller 24 V DC: Heating mode	Heating mode off/on		Not adjustable

Code	Parameter	Values or explanations	Factory setting	Own setting
D.017	Control type	Control type: 0 = Flow, 1 = Return Return: Automatic detection function for heat output inactive. Max. possible partial heat load when D.000 is on Auto .	0 = Flow	
D.018	Pump operating mode	1 = Comfort (continuously operating pump) 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 = Eco	
D.019	Pump operating mode: 2-stage pump	Setting for two-stage pump operating mode 0: Burner mode stage 2, pump prerun/overrun stage 1 1: Heating mode and pump prerun/overrun stage 1, domestic hot water mode stage 2 2: Automatic heating mode, pump prerun/overrun stage 1, domestic hot water mode stage 2 3: Always stage 2 4: Automatic heating mode, pump prerun/overrun stage 1, domestic hot water mode stage 1	2	
D.020	Max. DHW temperature target value	Adjustment range: 50–70 °C (actoSTOR 65 °C)	65 °C	
D.022	DHW demand	On, Off		Not adjustable
D.023	Heating mode status	Heating on, heating off (summer mode)		Not adjustable
D.025	Ext. eBUS signal: Cylinder charging	On, Off		Not adjustable
D.026	Auxiliary relay	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 = External pump	
D.027	Accessory relay 1	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 = External pump	

Code	Parameter	Values or explanations	Factory setting	Own setting
D.028	Accessory relay 2	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 = External pump	
D.029	Water circulation vol. actual value	Actual value in m³/h		Not adjustable
D.033	Fan speed target value	In rpm		Not adjustable
D.034	Fan speed actual value	In rpm		Not adjustable
D.035	3-way valve position	Heating mode Parallel operation (mid-position) DHW mode		Not adjustable
D.036	DHW flow rate	In l/min		Not adjustable
D.039	Solar inlet temp. actual value	Actual value in °C		Not adjustable
D.040	Flow temperature actual value	Actual value in °C		Not adjustable
D.041	Return temperature actual value	Actual value in °C		Not adjustable
D.044	Ionisation value actual value	Display field 0 to 1020 > 800 no flame < 400 good flame		Not adjustable
D.046	Pump mode	0 = Relay with disable facility 1 = PWM with disable facility	0 = Relay with disable facility	
D.047	Current outside temperature	(with Vaillant weather-compensated control) Actual value in °C		Not adjustable
D.050	Offset min. speed	In rpm, adjustment range: 0 to 3000	Nominal value set in factory	
D.051	Offset max. speed	In rpm, adjustment range: -990 to 0	Nominal value set in factory	
D.058	Solar post-heating	0 = Solar post-heating deactivated 3 = DHW activation target value minimum 60 °C, thermostatic mixing valve required between product and draw-off point	0 = Solar post-heating deactivated	
D.060	Number of safety therm. shut-downs	Number of shutdowns		Not adjustable
D.061	No. of shut-downs in ign. flame controller	Number of unsuccessful ignitions in the last attempt		Not adjustable
D.064	Avg. ignition time	In seconds		Not adjustable
D.065	Max. ignition time	In seconds		Not adjustable
D.067	Remaining anti-cycl. time for heating	In minutes		Not adjustable
D.068	Number of first start attempts	Number of unsuccessful ignitions		Not adjustable
D.069	Number of second start attempts	Number of unsuccessful ignitions		Not adjustable

Code	Parameter	Values or explanations	Factory setting	Own setting
D.070	3-way valve operation	0 = Normal operating mode 1 = Parallel operation (mid-position) 2 = Permanent heating position	0 = Normal operating mode	
D.071	Max. heating target flow temp.	40 to 80 °C	75 °C	
D.072	Pump overrun after cylinder charging	Adjustable from 0–10 minutes in increments of 1 minute	2 mins	
D.073	Offset setting for comfort mode	Adjustable from -15 K to 5 K	0	
D.074	Anti-legionella funct. with integrated cyl.	0 = Off 1 = On	1 = On	
D.075	Max. cylinder charging time	20–90 min	45 mins	
D.076	Device Specific Number	Device specific number = DSN 30 = VUW 246/5-3 (H-GB) ecoTEC pro 24 32 = VUW 286/5-3 (H-GB) ecoTEC pro 28; VUW 286/5-3 (P-GB) ecoTEC pro 28 26 = ecoTEC pro 30 H combi A VUW GB 306/5-3		Not adjustable
D.077	DHW partial load	Adjustable cylinder charging output in kW		
D.078	DHW max. flow temperature	Limit on cylinder charging temperature in °C 50 °C – 80 °C Note The chosen value must be at least 15 K or 15 °C above the target cylinder value.		75 °C
D.080	Heating operating hours	In hours (h)		Not adjustable
D.081	DHW operating hours	In hours (h)		Not adjustable
D.082	Heating burner starts	Number of burner start-ups		Not adjustable
D.083	DHW burner starts	Number of burner start-ups		Not adjustable
D.084	Maintenance in	Adjustment range: 0 to 3000 hrs and "---" for deactivated	„---“	
D.088	Min. DHW flow rate	Switch-on delay for domestic hot water draw-off detection via impeller (only products with integrated domestic hot water generation) 0 = 1.5 l/min and no delay, 1 = 3.7 l/min and 2 sec. delay	1.5 l/min and no delay	
D.090	eBUS controller	Status of digital control Recognised, not recognised		Not adjustable
D.091	Status DCF77	Status of DCF with outdoor temperature sensor connected No reception Reception Synchronised Valid		Not adjustable
D.092	actoSTOR communication status	actoSTOR module detection 0 = Not connected 1 = Connection fault: No communication via PeBus, actoSTOR module was previously detected 2 = Connection active		Not adjustable
D.093	Adjust Device Specific Number	Device Specific Number (DSN) Adjustment range: 0 to 99		
D.094	Clear fault history	Delete fault list 0 = No 1 = Yes		
D.095	Software version: PeBUS participant	PCB (BMU) Display (AI) actoSTOR (APC) HBI/VR34		Not adjustable
D.096	Reset to factory settings?	Reset all adjustable parameters to factory setting 0 = No 1 = Yes		

C Status codes – Overview



Note

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

Code	Meaning
S.00 Heating: No heat demand	Heating has no heat demand. The burner is off.
S.01 Heating mode: Fan start-up	The fan start-up for heating mode is activated.
S.02 Heating mode: Pump pre-run	The pump prerun for heating mode is activated.
S.03 Heating mode: Ignition	The ignition for heating mode is activated.
S.04 Heating mode: Burner on	The burner for heating mode is activated.
S.05 Heating mode: Pump/fan overrun	The pump/fan overrun for heating mode is activated.
S.06 Heating mode: Fan overrun	The fan overrun for heating mode is activated.
S.07 Heating mode: Pump overrun	The pump overrun for heating mode is activated.
S.08 Heating mode: Anti-cycling time	The anti-cycling time for heating mode is activated.
S.10 DHW demand	The domestic hot water demand is activated.
S.11 DHW mode: Fan start-up	The fan start-up for domestic hot water mode is activated.
S.13 DHW mode: Ignition	The ignition for domestic hot water mode is activated.
S.14 DHW mode: Burner on	The burner for domestic hot water mode is activated.
S.15 DHW mode: Pump/fan overrun	The pump/fan overrun for domestic hot water mode is activated.
S.16 DHW mode: Fan overrun	The fan overrun for domestic hot water mode is activated.
S.17 DHW mode: Pump overrun	The pump overrun for domestic hot water mode is activated.
S.20 DHW demand	The domestic hot water demand is activated.
S.21 DHW mode: Fan start-up	The fan start-up for domestic hot water mode is activated.
S.22 DHW mode: Pump pre-run	The pump prerun for domestic hot water mode is activated.
S.23 DHW mode: Ignition	The ignition for domestic hot water mode is activated.
S.24 DHW mode: Burner on	The burner for domestic hot water mode is activated.
S.25 DHW mode: Pump/fan overrun	The pump/fan overrun for domestic hot water mode is activated.
S.26 DHW mode: Fan overrun	The fan overrun for domestic hot water mode is activated.
S.27 DHW mode: Pump overrun	The pump overrun for domestic hot water mode is activated.
S.28 DHW anti-cycling time	The anti-cycling time for domestic hot water mode is activated.
S.30 No heat demand: Controller	Room thermostat blocks heating mode.
S.31 No heat demand: Summer mode	Summer mode is activated; there is no heat demand.
S.32 Waiting time deviation: Fan speed	The waiting period for the fan start-up is activated.
S.34 Heating mode: Frost protection	The frost protection function for heating mode is activated.
S.39 Contact thermostat triggered	The surface-mounted thermostat or the condensate pump has triggered.
S.40 Comfort protection active	The comfort protection mode is activated.
S.41 Water pressure too high	The system pressure is too high.
S.42 Flue non-return flap closed	Flue non-return flap return signal blocks burner operation (only in conjunction with the multi-functional module) or condensate pump defective, heat demand is blocked.

Code	Meaning
S.46 Comfort protection: Minimum load, loss of flame	Comfort protection mode for flame loss at minimum load is activated.
S.53 Waiting time: Water shortage	The product is within the waiting period of the modulation block/operating block function as a result of a water deficiency (flow/return spread too large).
S.54 Waiting time: Water shortage	Product is in the waiting period of the operation blocking function as a result of low water pressure (temperature gradient).
S.57 Waiting time: Measuring program	The product is within the waiting period as a result of the measuring programme.
S.58 Burner modulation limitation	The burner modulation limitation is activated.
S.61 Fault: Incorrect gas type	The coding resistor on the PCB does not match the entered gas group (see also F.92).
S.62 Adjust CO₂	Set the CO ₂ content.
S.63 Fault: Check gas route	A fault message is activated. Check the gas route.
S.76 Service message: Check water pressure	A service message is activated. Check the water pressure.
S.88 Purging programme is running	The purge programme is activated.
S.92 Water circulation volume self-test	The self-test for the water circulation volume is activated.
S.93 Flue gas measurement not possible	Flue gas analysis is not currently possible.
S.96 Return temperature sensor self-test	The self-test for the return temperature sensor is activated.
S.97 Water pressure sensor self-test	The self-test for the water pressure sensor is activated.
S.98 Flow/return temperature sensor self-test	The self-test for the flow/return temperature sensor is activated.
S.99 Vaillant self-test	The Vaillant self-test is activated.

D 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/meaning	Possible cause	Measure
F.00 Interruption: Flow sensor	Flow temperature sensor defective or not connected	► Check: Flow temperature sensor, plug, cable harness, PCB.
F.01 Interruption: Return sensor	Return temperature sensor defective or not connected	► Check: Return temperature sensor, plug, cable harness, PCB.
F.10 Short circuit: Flow sensor	Flow temperature sensor defective or has short-circuited	► Check: NTC plug, cable harness, cable/housing, PCB, NTC sensor.
F.11 Short circuit: Return sensor	Return temperature sensor defective or has short-circuited	► Check: NTC plug, cable harness, housing, PCB, NTC sensor.
F.20 Safety switch-off: Temperature limiter	Maximum temperature at the flow/return temperature sensor is too high when the safety cut-out function is operating using the NTC	► Check: Flow temperature sensor (correct thermal connection), cable harness, sufficient purging.
F.22 Safety switch-off: Low water pressure	No/insufficient water in the product or the water pressure is too low	1. Check: Plug, cable to heating pump or water pressure sensor, water pressure sensor, heating pump. 2. Activate and purge check programme P.0.
F.23 Safety switch-off: Temp.spread too large	Temperature spread too great. Water circulation too low	► Check: Plug, cable to heating pump/water pressure sensor, air/insufficient water in the heating circuit, flow and return temperature sensor inverted, strainer in the hydraulic block, water pressure sensor, heating pump (sufficient circulation, level 2: D.19, D.14, non-return valve). Activate check programme P.0.
F.24 Safety switch-off: Temp. incr. too fast	Temperature increase too fast	► Check: Plug, cable to the heating pump, air/insufficient water in the heating circuit, internal air vent (function), heating pump (system pressure too low, temperature gradient too great on heating flow, non-return valve). Activate check programme P.0.

Code/meaning	Possible cause	Measure
F.25 Safety switch-off: Flue temp. too high	flue gas temperature too high	► Check: Plug, safety cut-out plug, cable harness, cable to the heating pump, internal air vent (function), flue gas route (blockage, adverse wind conditions, flue pipework too long), insufficient water in heating circuit, heating pump, activate check programme P.0.
F.26 Fault: Fuel valve not working	Gas valve assembly stepper motor defective or not connected	► Check: Gas valve assembly stepper motor (plug, cable, passage for rinsing, voltage), multiple plug, cable harness.
F.27 Safety switch-off: Flame simulation	Monitoring electrode reports an incorrect flame	► Check: Gas pressure at upper test opening, monitoring electrode, PCB, gas solenoid valve.
F.28 Start-up failure: Ignit. unsuccessful	Failure during start-up or ignition unsuccessful. Gas pressure monitor or thermal cut-out has been triggered.	► Check: Gas stopcock, gas flow pressure, gas valve assembly, air intake pipe (blockage, loosened screw), condensate route (blockage), multiple plug, cable harness, ignition transformer, ignition cable, ignition plug, ignition electrode, monitoring electrode, electronics, earthing, CO ₂ setting.
F.29 Operating failure: Ignit. unsuccessful	Gas supply interrupted intermittently. Re-ignition failed.	► Check: Flue gas recirculation, condensate route (blockage), earthing, cable to the gas valve assembly and electrode (loose connection).
F.32 Fault: Fan	Fan defective or not connected	► Check: Plug, cable harness, fan (blockage, function, correct speed), Hall sensor, PCB, flue gas route (blockage).
F.49 Fault: eBUS	Undervoltage on the eBUS	► Check: eBUS (overload, two power supplies with different polarities, short circuit).
F.61 Fault: Fuel valve actuation	The gas valve assembly cannot be actuated	► Check: Cable harness, plug, gas valve assembly (rinse), PCB.
F.62 Fault: Fuel valve switch-off delay	Delayed switch-off sequence for the gas valve after the flame is extinguished	► Check: Gas valve, surface of the burner (dirt), plug, cable harness, PCB.
F.63 Fault: EEPROM	EEPROM faulty	► Replace: PCB.
F.64 Fault: Electronics/sensor	Electronics, safety-relevant sensor or cable defective	► Check: Flow sensor, cable to the sensor, flame recording sensor (e.g. ionisation electrode) for an unstable signal, electronics.
F.65 Fault: Electronics temp.	Electronics defective or too hot due to external influences	1. Check: PCB. 2. If required, reduce the environmental temperature.
F.67 Fault: Electronics/flame	Implausible flame signal	► Check: Cable harness, flame monitor, PCB.
F.68 Fault: Flame signal unstable	Flame monitor reports an unstable flame signal	► Check: Air ratio, gas flow pressure, condensate route (blockage), gas injector, ionisation flow (cable, electrode), flue gas recirculation.
F.70 Fault: Invalid Device Specific Number	Incorrect/missing Device Specific Number or incorrect/missing coding resistor	► If the display and PCB have been replaced, change the Device Specific Number under D.93 .
F.71 Fault: Flow sensor	Flow temperature sensor returns implausible values	► Check: Flow temperature sensor (correct thermal connection).
F.72 Fault: Flow/return sensor	Temperature difference between flow and return temperature sensor is too great	► Check: Flow temperature sensor/return temperature sensor (function, correct thermal connection).
F.73 Fault: Water press. sensor (signal too weak)	Water pressure sensor reports that the water pressure is too low	► Check: Water pressure, earth connection, cable, plug, water pressure sensor (short circuit to GDN).
F.74 Fault: Water press. sensor (signal too strong)	Water pressure too high	1. Drain water. 2. Check the water pressure sensor.
F.75 Fault: Pump/ water shortage	Insufficient pressure jump detected when starting the pump	1. Check: Water pressure sensor, heating pump (blockage), heating circuit (air, sufficient water volume), adjustable bypass, external expansion vessel (must be connected at the return). Activate check programme P.0. 2. If a low loss header or heating pipes with a diameter greater than 1 1/2 inch are installed, replace the 3/4-inch seal in the heating flow with a screen. If required, install the F.75 service set.
F.77 Fault: Flue non-ret. valve/condens. pump	No flue non-return flap feedback; condensate pump overflow	► Check: Cable to VR40 accessory, flue non-return flap (wiring, feedback switch), condensate pump, bridge from the surface-mounted thermostat, 2 in 7 multi-functional module (bridge).
F.78 Interrupt.: DHW outlet sensor on ext. contr.	UK link box is connected without the domestic hot water temperature sensor being bridged	1. Check: Accessory (configuration/electrical connection). 2. The unit displays a fault, but the unit has not malfunctioned.

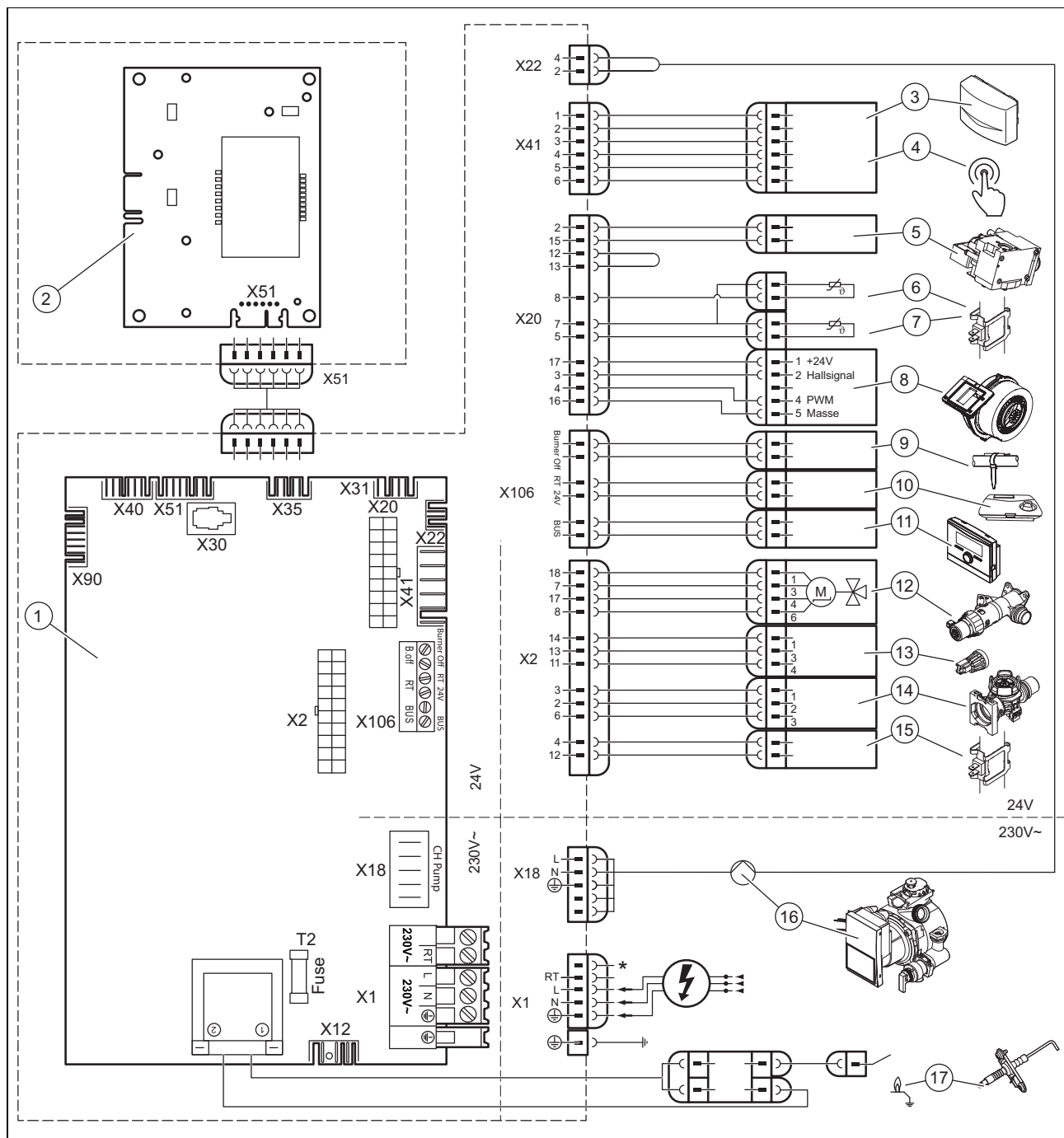
Code/meaning	Possible cause	Measure
F.83 Fault: NTC temp. gradient	Temperature difference between flow and return temperature sensor is too small	► Check: Flow/return temperature sensor (function, correct thermal connection), sufficient water volume.
F.84 Fault: NTC temp. diff. implausible	Temperature difference is implausible	► Check: Flow/return temperature sensor (correct thermal connection, sensors are inverted).
F.85 Fault: NTCs fitted incorrectly	Flow/return temperature sensors returning incorrect/implausible values	► Check: Flow/return temperature sensor (correct thermal connection).
Communication fault	Communication fault between the display and the PCB in the electronics box	► Check: Cable/plug between the display and the PCB.

E Check programmes – Overview

Check programme	Meaning
P.00 Purging	The internal pump is cyclically actuated. The heating circuit and the domestic hot water circuit are adaptively purged by automatically switching the circuits using the automatic air vent (the automatic air vent's cap must be loose). The active circuit is shown in the display. Press  once to start purging the heating circuit. Press  once to end the purge programme. Note: The purge programme runs for 7.5 min per circuit and then terminates. Purging the heating circuit: Prioritising diverter valve in heating position, actuation of internal pump for 9 cycles: 30 sec. on, 20 sec. off. Display: Active heating circuit. Purging the domestic hot water circuit: After the above-mentioned cycles have run or the right-hand selection button has been pressed again: Prioritising diverter valve in the domestic hot water position, actuation of the internal pump as above. Display: Active domestic hot water circuit.
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.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).

F Wiring diagrams

F.1 Product connection diagram with integrated hot water generation



- | | | | |
|----|--|----|---|
| 1 | Main PCB | 10 | 24 V DC room thermostat |
| 2 | Operator control panel PCB | 11 | Bus connection (digital room thermostat/controller) |
| 3 | Outside temperature sensor, flow temperature sensor (optional, external), DCF receiver | 12 | Diverter valve |
| 4 | Circulation pump remote control | 13 | Water pressure sensor |
| 5 | Gas valve | 14 | Impeller sensor |
| 6 | Return temperature sensor | 15 | Warm start sensor |
| 7 | Flow temperature sensor | 16 | Internal pump |
| 8 | Fan | 17 | Ignition electrode |
| 09 | Contact thermostat/burner off | * | Depending on product type |

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															
Optional: Building Regulations Notification Number (if applicable):															
Time, temperature control and boiler interlock provided for central heating and hot water Yes															
Boiler Plus requirements (tick the appropriate box(s))															
Boiler Plus option chosen for combination boiler in ENGLAND					Weather compensation		Smart thermostat with automation 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															
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				No							
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							
COMBINATION BOILERS ONLY															
Is the installation in a hard water area (above 200ppm)?				Yes				No							
Water scale reducer/softener		pre-existing		Fitted				Not required							
What type of scale reducer/softener has been fitted?				Brand:		Product:									
Water meter fitted?				Yes				No							
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		Temperature		°C							
CONDENSATE DISPOSAL															
The condensate drain has been installed in accordance with the manufacturers' instructions and/or BS5546/BS6798								Yes							
Point of termination				Internal		External (only where internal termination impractical)									
Method of disposal				Gravity		Pumped									
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			
The operation of the boiler and system controls have been demonstrated to and understood by the customer												Yes			
The manufacturers' literature, including Benchmark Checklist and Service Record, has been explained and left with the customer												Yes			
Commissioning Engineer's signature															
Customer's signature (To confirm satisfactory demonstration and receipt of manufacturers' literature)															

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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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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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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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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.

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SERVICE & INTERIM BOILER WORK RECORD

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Service provider

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SERVICE/INTERIM WORK ON BOILER delete as appropriate				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? ^{delete as appropriate}		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 delete as appropriate				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? ^{delete as appropriate}		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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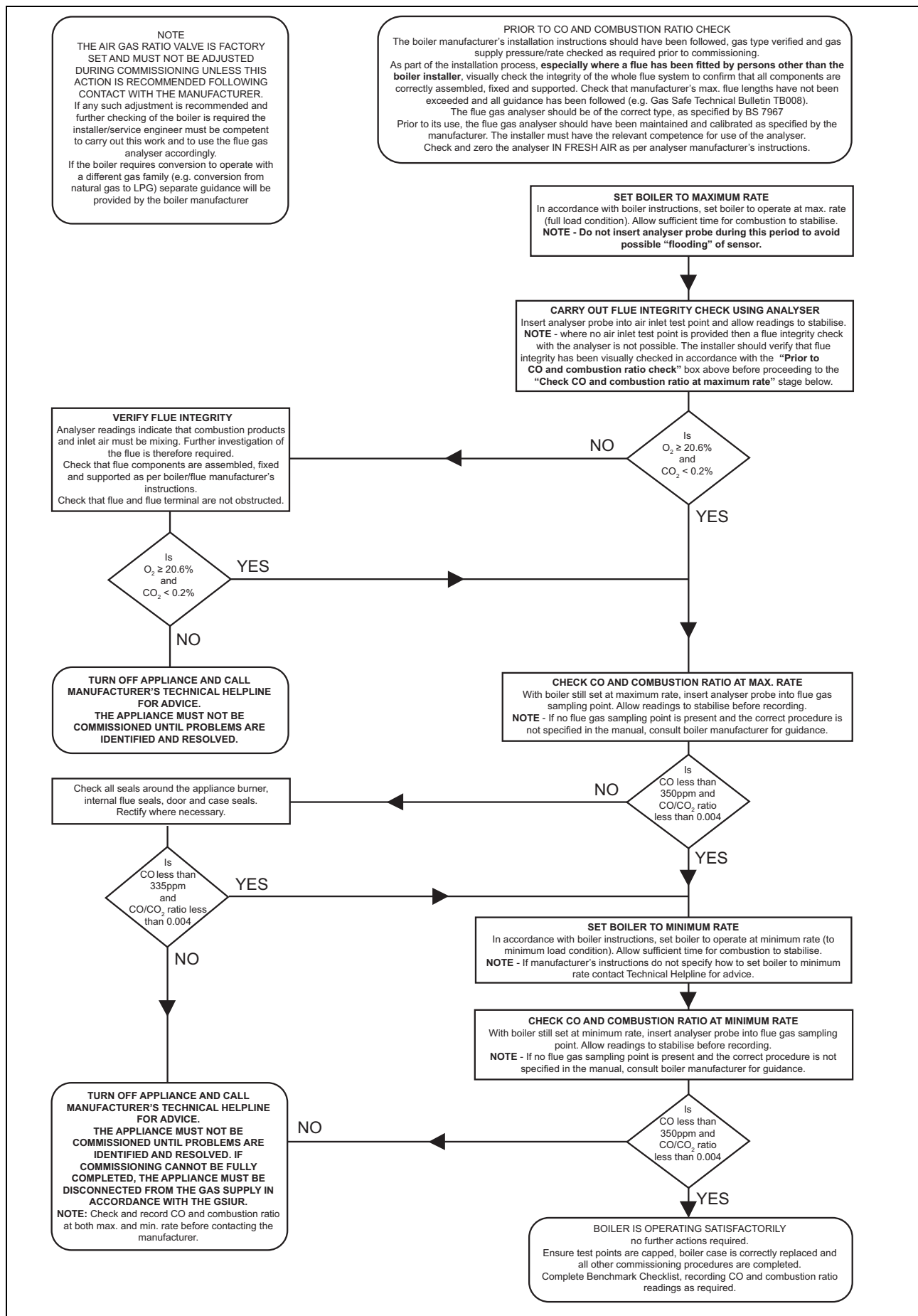
* All installations in England and Wales must be notified to Local Authority Building Control (LABC) either directly or through a Competent Persons Scheme. A Building Regulations Compliance Certificate will then be issued to the customer.

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H Commissioning Flow Chart



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