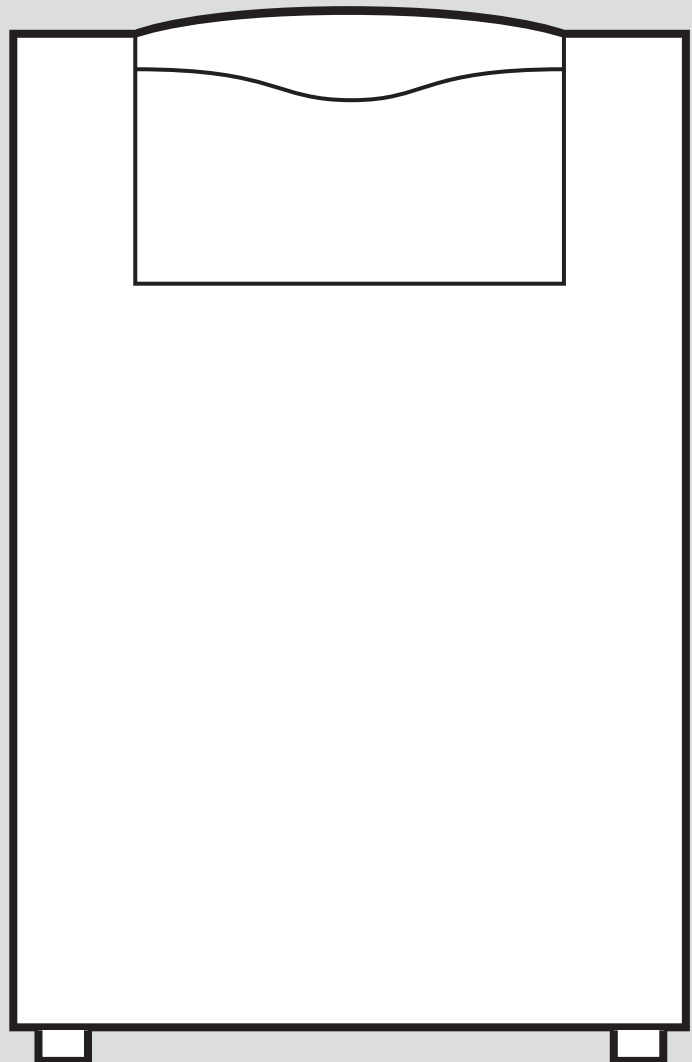




ecoCRAFT exclusive

VKK GB ..6/3-E R1



Installation and maintenance instructions

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1 Safety

1.1 Action-related warnings

Classification of action-related warnings

The action-related warnings are classified in accordance with the severity of the possible danger using the following warning signs and signal words:

Warning symbols and signal words



Danger!

Imminent danger to life or risk of severe personal injury



Danger!

Risk of death from electric shock



Warning.

Risk of minor personal injury



Caution.

Risk of material or environmental damage

1.2 Intended use

There is a risk of injury or death to the user or others, or of damage to the product and other property in the event of improper use or use for which it is not intended.

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

Depending on the unit type, the products referred to in these instructions must only be installed and operated in conjunction with the air/flue pipe accessories listed in the other applicable documents.

The use of the product in vehicles, such as mobile homes and caravans, is not classed as intended use. Units that are not classed as vehicles are those that are installed in a fixed and permanent location (known as "fixed installation").

Intended use 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

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

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

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

Caution.

Improper use of any kind is prohibited.

1.3 General safety information

1.3.1 Risk caused by inadequate qualifications


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

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

1.3.2 Risk of death from escaping gas

What to do if you smell gas in the building:

- ▶ Avoid rooms that smell of gas.
- ▶ If possible, open doors and windows fully and ensure adequate ventilation.
- ▶ Do not use naked flames (e.g. lighters, matches).
- ▶ Do not smoke.
- ▶ Do not use any electrical switches, mains plugs, doorbells, telephones or other communication systems in the building.

- 
- ▶ If it is safe to do so, close the emergency control valve or the main isolator.
 - ▶ If possible, close the gas 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.
 - ▶ Notify the gas supply company or the Emergency Service Provider +44 (0) 800 111999 by telephone once you are outside of the building.

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

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

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

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

1.3.4 Risk of poisoning and burns caused by escaping hot flue gases

- ▶ Only operate the product if the air/flue pipe has been completely installed.
- ▶ With the exception of short periods for testing purposes, only operate the product when the front casing is installed and closed.

1.3.5 Risk of death due to explosive and flammable materials

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

1.3.6 Risk of poisoning caused by insufficient combustion air supply

Condition: Open-flued operation

- ▶ Ensure that the air supply to the product's installation room is permanently unobstructed and sufficient in accordance with the relevant ventilation requirements.

1.3.7 Risk of death due to lack of safety devices

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

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

1.3.8 Risk of death from electric shock

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

Before commencing work on the product:

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

1.3.9 Risk of burns or scalding caused by hot components

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

1.3.10 Risk of material damage caused by using an unsuitable tool

- ▶ Use the correct tool.


1.3.11 Risk of material damage caused by frost

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

1.3.12 Risk of corrosion damage due to unsuitable combustion and room air

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

- ▶ Ensure that the supply of combustion air is always free of fluorine, chlorine, sulphur, dust, etc.

- 
- ▶ Ensure that no chemical substances are stored at the installation site.
 - ▶ If you are installing the product in hairdressing salons, painter's or joiner's workshops, cleaning businesses or similar locations, choose a separate installation room in which the room air is technically free of chemical substances.

1.4 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

	VKK GB 806/3-E R1	VKK GB 1206/3-E R1	VKK GB 1606/3-E R1	VKK GB 2006/3-E R1	VKK GB 2406/3-E R1	VKK GB 2806/3-E R1
Designated country (designation in accordance with ISO 3166)	GB (Great Britain)	GB (Great Britain)	GB (Great Britain)	GB (Great Britain)	GB (Great Britain)	GB (Great Britain)
Approved gas boiler category	I _{2H}	I _{2H}	I _{2H}	I _{2H}	I _{2H}	I _{2H}
Gas connection, boiler side	R 1 1/2 inch	R 1 1/2 inch	R 1 1/2 inch	R 1 1/2 inch	R 1 1/2 inch	R 1 1/2 inch
Flow/return heating connections, boiler side	R 2 inch	R 2 inch	R 2 inch	R 2 inch	R 2 inch	R 2 inch
Flue pipe diameter	150 mm	150 mm	150 mm	200 mm	200 mm	200 mm
Supply air pipe diameter	130 mm	130 mm	130 mm	130 mm	130 mm	130 mm
Condensate discharge pipe (min.)	21 mm	21 mm	21 mm	21 mm	21 mm	21 mm
Natural gas flow pressure (G20)	2 kPa (20 mbar)	2 kPa (20 mbar)	2 kPa (20 mbar)	2 kPa (20 mbar)	2 kPa (20 mbar)	2 kPa (20 mbar)
Gas flow rate at 15 °C and 1013 mbar, (G20)	8.5 m ³ /h	12.3 m ³ /h	16.9 m ³ /h	21.2 m ³ /h	25.4 m ³ /h	29.6 m ³ /h
Min. flue gas mass flow rate (G20)	6.3 g/s	10.0 g/s	12.2 g/s	19.9 g/s	21.7 g/s	23.5 g/s
Max. flue gas mass flow rate (G20)	35.4 g/s	51.2 g/s	70.7 g/s	88.4 g/s	106.1 g/s	123.8 g/s
Min. flue gas temperature (at tV/tR = 80/60 °C)	62 °C	62 °C	62 °C	62 °C	62 °C	62 °C
Max. flue gas temperature (at tV/tR = 80/60 °C)	60 to 70 °C	60 to 70 °C	60 to 70 °C	60 to 70 °C	60 to 70 °C	60 to 70 °C
Unit type	B23; B23P; B53; C33; C43; C53; C63; C83; C93	B23; B23P; B53; C33; C43; C53; C63; C83; C93	B23; B23P; B53; C33; C43; C53; C63; C83; C93	B23; B23P; B53; C33; C43; C53; C63; C83; C93	B23; B23P; B53; C33; C43; C53; C63; C83; C93	B23; B23P; B53; C33; C43; C53; C63; C83; C93
Nominal efficiency (stationary) at 80/60 °C	97.8 %	97.8 %	97.8 %	98.4 %	98.4 %	98.4 %
Nominal efficiency (stationary) at 60/40 °C	100.5 %	100.5 %	100.5 %	100.5 %	100.5 %	100.5 %
Nominal efficiency (stationary) at 50/30 °C	103.0 %	103.0 %	103.0 %	103.0 %	103.0 %	103.0 %
Nominal efficiency (stationary) at 40/30 °C	105.1 %	105.1 %	105.1 %	105.1 %	105.1 %	105.1 %
30% efficiency	108.4 %	108.4 %	108.4 %	108.2 %	108.2 %	108.2 %
Standard efficiency (when set to nominal heat output, DIN 4702, T8) at 75/60 °C	106.0 %	106.0 %	106.0 %	106.0 %	106.0 %	106.0 %
Standard efficiency (when set to nominal heat output, DIN 4702, T8) at 40/30 °C	110.0 %	110.0 %	110.0 %	110.0 %	110.0 %	110.0 %
Remaining feed pressure (does not apply for cascade systems)	100.0 Pa (0.001000 bar)	100.0 Pa (0.001000 bar)	150.0 Pa (0.001500 bar)	150.0 Pa (0.001500 bar)	150.0 Pa (0.001500 bar)	150.0 Pa (0.001500 bar)
NOx class	6	6	6	6	6	6
NOx emissions	33.93 mg/kW-h	41.76 mg/kW-h	41.76 mg/kW-h	41.76 mg/kW-h	41.76 mg/kW-h	41.76 mg/kW-h
CO emissions	<20 mg/kWh	<20 mg/kWh	<20 mg/kWh	<20 mg/kWh	<20 mg/kWh	<20 mg/kWh
Nominal CO ₂ (G20/G25)	9.1 to 9.3 vol. %	9.1 to 9.3 vol. %	9.1 to 9.3 vol. %	9.1 to 9.3 vol. %	9.1 to 9.3 vol. %	9.1 to 9.3 vol. %
Unit dimensions, width	695 mm	695 mm	695 mm	695 mm	695 mm	695 mm
Unit dimensions, height	1,285 mm	1,285 mm	1,285 mm	1,285 mm	1,285 mm	1,285 mm
Unit dimensions, depth	1,240 mm	1,240 mm	1,240 mm	1,550 mm	1,550 mm	1,550 mm

	VKK GB 806/3-E R1	VKK GB 1206/3-E R1	VKK GB 1606/3-E R1	VKK GB 2006/3-E R1	VKK GB 2406/3-E R1	VKK GB 2806/3-E R1
Approx. net weight	200 kg	220 kg	235 kg	275 kg	295 kg	310 kg
Ready for operation weight approx.	210 kg	235 kg	255 kg	300 kg	320 kg	340 kg

Technical data – G20 power/loading G20

	VKK GB 806/3-E R1	VKK GB 1206/3-E R1	VKK GB 1606/3-E R1	VKK GB 2006/3-E R1	VKK GB 2406/3-E R1	VKK GB 2806/3-E R1
Nominal heat output range P at 80/60 °C	13.6 to 78.2 kW	21.3 to 113.4 kW	26.2 to 156.5 kW	43.1 to 196.8 kW	47.0 to 236.2 kW	51.0 to 275.5 kW
Nominal heat output range P at 60/40 °C	14.1 to 80.4 kW	22.1 to 116.5 kW	27.1 to 160.8 kW	44.2 to 201.0 kW	48.2 to 241.2 kW	52.3 to 281.4 kW
Nominal heat output range P at 50/30 °C	14.4 to 82.4 kW	22.7 to 119.4 kW	27.8 to 164.8 kW	45.3 to 206.0 kW	49.4 to 247.2 kW	53.6 to 288.4 kW
Nominal heat output range P at 40/30 °C	14.7 to 84.1 kW	23.1 to 121.8 kW	28.4 to 168.2 kW	46.2 to 210.2 kW	50.4 to 252.2 kW	54.7 to 294.3 kW
Maximum heat input, heating side	80.0 kW	115.9 kW	160.0 kW	200.0 kW	240.0 kW	280.0 kW
Minimum heat input	14.0 kW	22.0 kW	27.0 kW	44.0 kW	48.0 kW	52.0 kW

Technical data – Heating

	VKK GB 806/3-E R1	VKK GB 1206/3-E R1	VKK GB 1606/3-E R1	VKK GB 2006/3-E R1	VKK GB 2406/3-E R1	VKK GB 2806/3-E R1
Max. flow temperature adjustment range (default setting: 80 °C)	35 to 85 °C	35 to 85 °C	35 to 85 °C	35 to 85 °C	35 to 85 °C	35 to 85 °C
Permissible total excess pressure	0.6 MPa (6.0 bar)	0.6 MPa (6.0 bar)	0.6 MPa (6.0 bar)	0.6 MPa (6.0 bar)	0.6 MPa (6.0 bar)	0.6 MPa (6.0 bar)
Floor-standing boiler capacity (without connection piece)	5.74 l	8.07 l	10.4 l	12.73 l	15.05 l	17.37 l
Circulation water volume (with reference to $\Delta T= 20$ K)	3.44 m ³ /h	4.99 m ³ /h	6.88 m ³ /h	8.60 m ³ /h	10.33 m ³ /h	12.05 m ³ /h
Pressure loss (with reference to $\Delta T= 20$ K)	0.008 MPa (0.080 bar)	0.0085 MPa (0.0850 bar)	0.009 MPa (0.090 bar)	0.0095 MPa (0.0950 bar)	0.01 MPa (0.10 bar)	0.0105 MPa (0.1050 bar)
Condensate volume at heating mode 40/30 °C	13 l/h	20 l/h	27 l/h	34 l/h	40 l/h	47 l/h
Heating standby losses per day (heating 70 °C)	<0.4%	<0.4%	<0.4%	<0.4%	<0.4%	<0.4%

Technical data – Electrics

	VKK GB 806/3-E R1	VKK GB 1206/3-E R1	VKK GB 1606/3-E R1	VKK GB 2006/3-E R1	VKK GB 2406/3-E R1	VKK GB 2806/3-E R1
Rated voltage	230 V/50 Hz	230 V/50 Hz	230 V/50 Hz	230 V/50 Hz	230 V/50 Hz	230 V/50 Hz
Permissible connected voltage	190 to 253 V	190 to 253 V	190 to 253 V	190 to 253 V	190 to 253 V	190 to 253 V
Built-in fuse (slow-blow, H or D)	4 A	4 A	4 A	4 A	4 A	4 A
Max. electrical power consumption	260 W	260 W	320 W	320 W	320 W	320 W
Standby electrical power consumption	8 W	8 W	8 W	8 W	8 W	8 W
IP rating	IP 00	IP 00	IP 00	IP 00	IP 00	IP 00
Unit protection class	Class I	Class I	Class I	Class I	Class I	Class I
Test symbol/registration no.	CE-0063B-S3740	CE-0063B-S3740	CE-0063B-S3740	CE-0063B-S3740	CE-0063B-S3740	CE-0063B-S3740

4 Notes on the documentation

4.1 Observing other applicable documents

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

4.2 Storing documents

- ▶ Pass these instructions and all other applicable documents on to the end user.

4.3 Validity of the instructions

These instructions apply only to:

Product – Article numbers

VKK GB 806/3-E R1	0010014388
VKK GB 1206/3-E R1	0010014389
VKK GB 1606/3-E R1	0010014390
VKK GB 2006/3-E R1	0010014391
VKK GB 2406/3-E R1	0010014392
VKK GB 2806/3-E R1	0010014393

4.4 System logbook

- ▶ Maintain a logbook for the system. (→ Page 48)


5 Product description



5.1 Serial number

The serial number can be found on a sticker behind the front flap on the front below the control panel and on the identification plate.

5.2 Data plate

The data plate is attached to the rear of the product at the factory.

Information on the data plate	Meaning
	Read the instructions.
VKK...	Vaillant gas-fired floor-standing condensing boiler
80	Power in kW
6	with condensing technology
/3	Product series
E	Comfort fittings
HL	Only suitable for natural gas
ecoCRAFT exclusiv	Product designation
G20 – 20 mbar	Gas group and gas connection pressure as set at the factory
Cat.	Approved gas category
Types	Approved gas-fired units
PMS	Permissible total overpressure
T	Max. flow temperature
230 V 50 Hz	Electric connection
W	Max. electrical power consumption
IP	IP rating

Information on the data plate	Meaning
	Heating mode
P	Nominal heat output range
Q	Heat input range
	Bar code with serial number, 7th to 16th digit = product article number

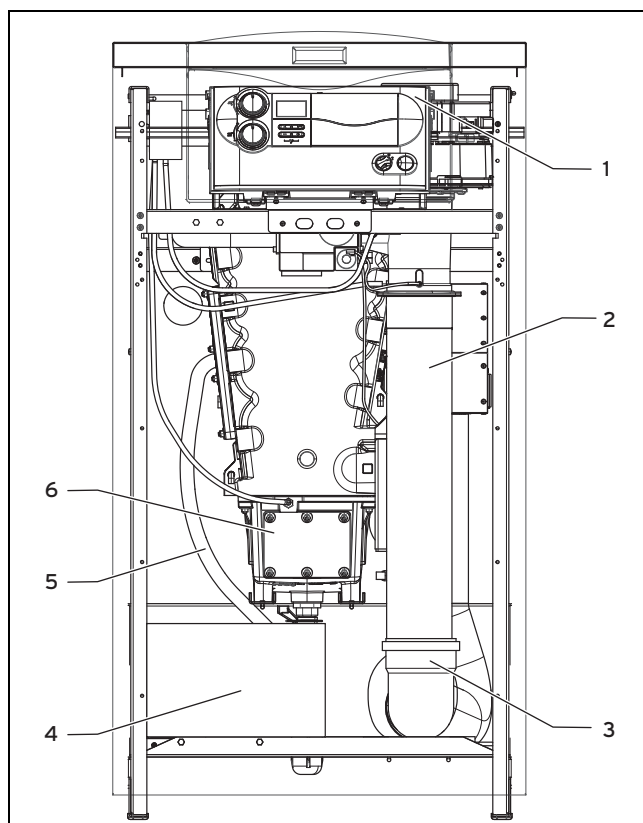


Note

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

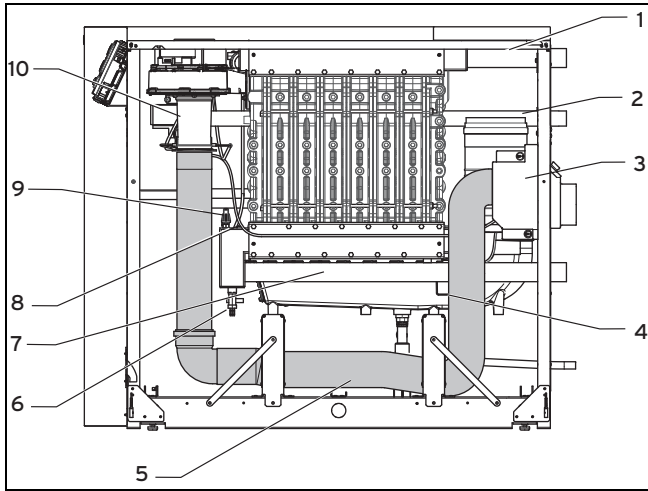
5.3 Product design

5.3.1 Front view of the functional elements



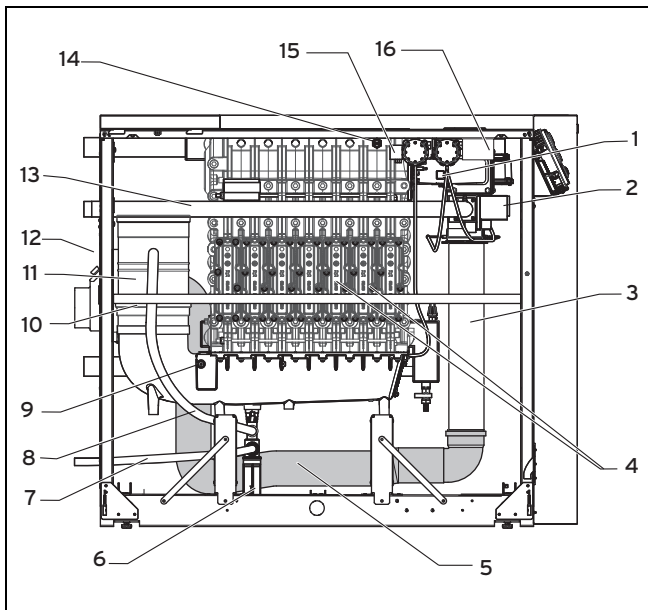
- | | | | |
|---|-------------------|---|------------------------------------|
| 1 | Switch box | 4 | Neutralisation box (optional) |
| 2 | Air intake damper | 5 | Condensate discharge |
| 3 | Supply air pipe | 6 | Condensate tray inspection opening |

5.3.2 Functional elements, side view from the right



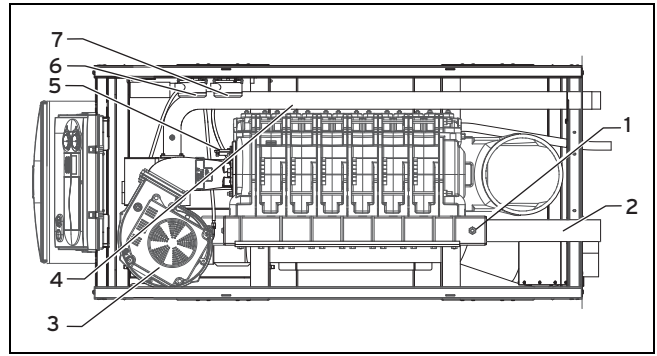
- | | | | |
|---|---------------------------------|----|--------------------------|
| 1 | Flow | 6 | Filling and drainage tap |
| 2 | Gas pipe | 7 | Return |
| 3 | Supply air box with dust filter | 8 | Return NTC sensor |
| 4 | Condensate tray | 9 | Water pressure sensor |
| 5 | Supply air hose | 10 | Venturi |

5.3.3 Functional elements, side view from the left



- | | | | |
|---|--|----|---|
| 1 | Fan | 9 | Flue gas safety cut-out (SCO) (optional) |
| 2 | Gas valve | 10 | Flue gas silencer |
| 3 | Air intake damper | 11 | Condensate trap |
| 4 | Heat exchanger inspection opening | 12 | Supply air box with dust filter |
| 5 | Supply air hose | 13 | Gas pipe |
| 6 | Siphon | 14 | Safety cut-out (SCO) and block temperature sensor |
| 7 | Condensate discharge | 15 | Reset button for the safety cut-out (SCO) |
| 8 | Connection between condensate trap and condensate siphon | 16 | VR 35 0-10 V pump module |

5.3.4 Functional elements, top view



- | | | | |
|---|---|---|------------------------------------|
| 1 | Flow NTC sensor | 5 | Ignition and monitoring electrodes |
| 2 | Flow | 6 | Combustion air pressure monitor |
| 3 | Fan | 7 | Flue gas pressure monitor |
| 4 | Safety cut-out (SCO) and block temperature sensor | | |

5.4 CE marking



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

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

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	Enclosed documentation

6.2 Unpacking the product

1. Remove the product from its box.
2. Remove the protective film from all parts of the product.

6.3 Installation site

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

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

- ▶ When selecting the installation site, take into consideration the product's weight when it is ready for operation, including the water content in accordance with the Technical data (→ Page 8).

A separate room with ventilation and aeration may be required as the installation site.

- ▶ When selecting the installation site and its aeration, observe the relevant national regulations.
- ▶ Particularly after the construction phase is complete, replace or clean the dust filter as it may be blocked with construction dust.

6.4 Transporting the product



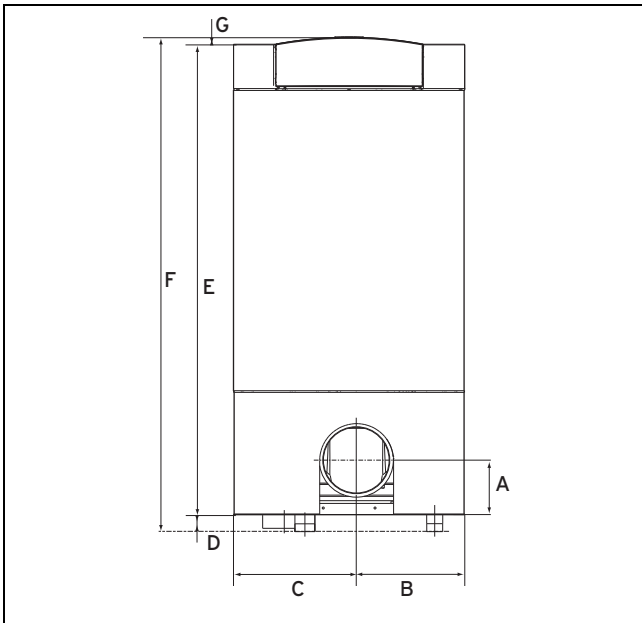
Warning.
The high product weight poses a risk of injury during transport.

Excessive load bearing may lead to injuries.

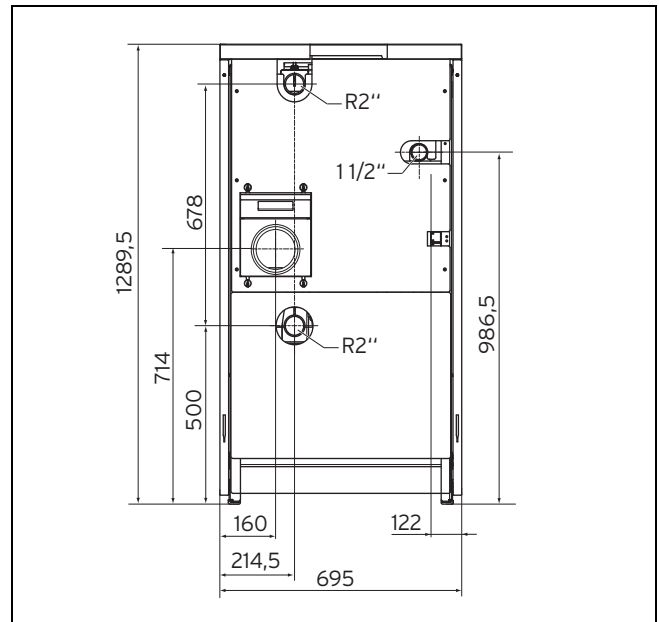
- ▶ Use a suitable carrying aid or a pallet truck to transport the product.

1. Secure the product to a suitable carrying aid or a suitable pallet truck.
2. Transport the product to the installation site.

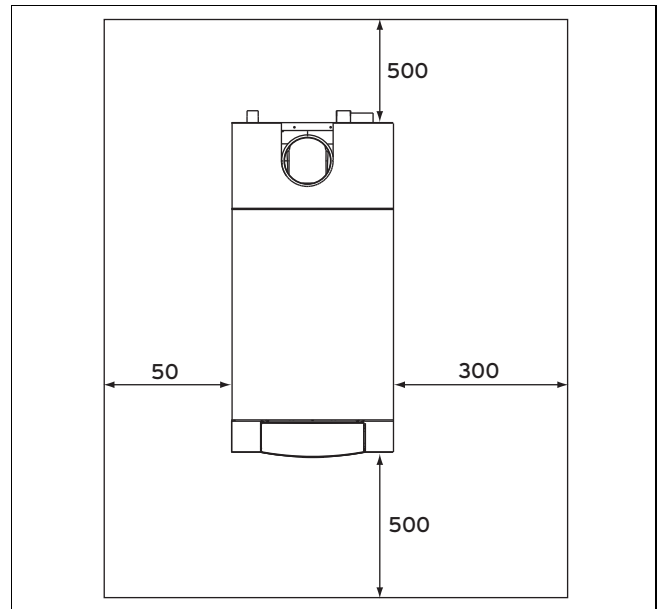
6.5 Dimensions



Item	VKK GB 806/3-E R1 VKK GB 1206/3-E R1 VKK GB 1606/3-E R1	VKK GB 2006/3-E R1 VKK GB 2406/3-E R1 VKK GB 2806/3-E R1
A	165	165
B	326	326
C	369	369
D	50	50
E	1168	1478
F	1270	1580
G	22	22



6.6 Minimum clearances



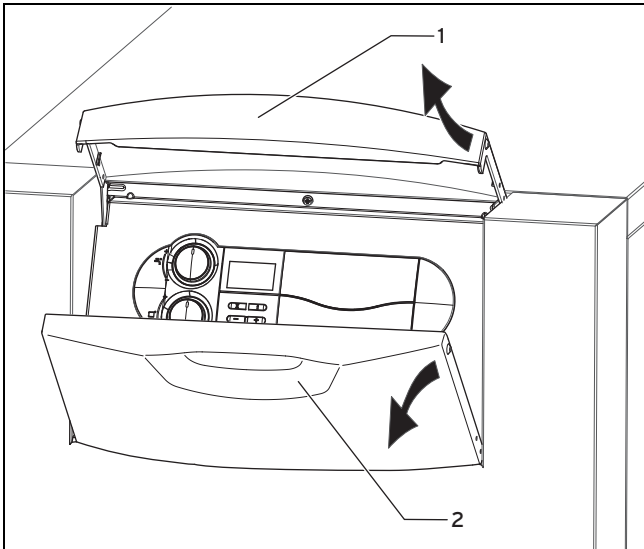
- ▶ When using the accessories, observe the minimum clearances/installation clearances.

The boiler shall only be sited on floors and adjacent to walls capable of withstanding at least 65 degrees C. (However, the recommended minimum distance must be observed).

6.7 Aligning the product

- ▶ Use the height-adjustable feet to align the product horizontally in order to ensure that the condensate drains from the condensate tray.

6.8 Opening the front flap

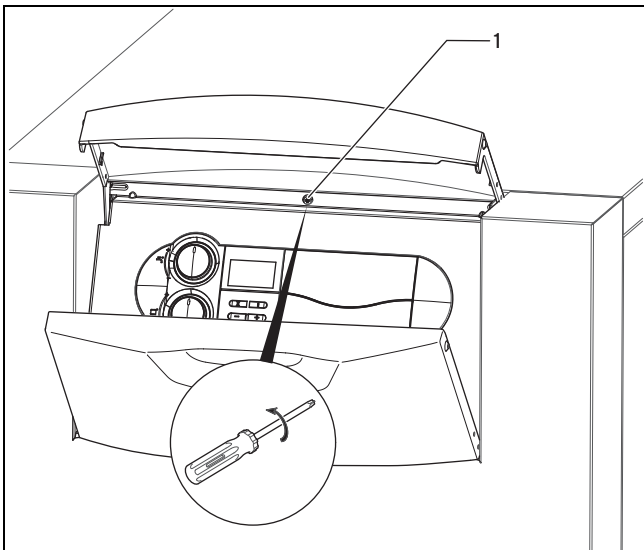


- ▶ Open the front flap by lifting the silver handle bar (1).
- ◀ The front flap (2) automatically swivels downwards and the control panel becomes accessible.

6.9 Removing/installing the front casing

6.9.1 Removing the front casing

1. Open the front flap. (→ Page 13)



2. Undo the screw (1) above the control panel.
3. Pull the front casing in the upper area to the front and out.
4. Raise the front casing to remove it.
5. If required, you can now remove the rest of the casing sections.

6.9.2 Installing the front casing

1. Attach the front casing to the bottom and press on the product until the locking bolts audibly click into place.
2. Screw in the screw for securing the front casing again.

6.10 Removing/installing the upper casing and side sections of the casing

6.10.1 Removing the upper casing and side sections of the casing

1. Remove the front casing. (→ Page 13)
2. Pull the upper casing forwards.
3. Remove the upper casing.
4. Pull the side sections of the casing up and out so that the side sections are released from the mount.
5. Lift the side sections of the casing up and out.

6.10.2 Installing the upper casing and side sections of the casing

1. Insert the side sections of the casing into the product from above.
2. Push the top of the side sections of the casing until the side sections click into place in the mount.
3. Place the upper casing onto the product.
4. Slide the upper casing backwards until the casing clicks into place.

7 Installation

7.1 Prerequisites



Danger!

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

Stresses in supply lines can cause leaks.

- ▶ Install the supply lines without tension.



Caution.

Risk of material damage caused by residues in the pipelines.

Welding remnants, sealing residues, dirt or other residues in the pipelines may damage the product.

- ▶ Flush the heating installation thoroughly before installing the product.



Caution.

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

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

- ▶ Install an expansion relief valve on-site.
- ▶ Make sure that the existing gas meter and pipe work are capable of passing the rate of gas supply required.
- ▶ Consider the maximum heat output given in DHW mode.
- ▶ Install the connection pipes such that they are free from mechanical stress.
- ▶ A discharge pipe with inlet funnel and siphon must be routed on-site from the drain pipe of the expansion re-

lief valve to a suitable drain in the installation room. The drain must be visible.

- ▶ Install a purging device at the highest point in the heating installation.
- ▶ Install a filling/draining device in the heating installation.

Condition: Plastic pipes present in the heating installation

- ▶ Install a suitable thermostat at the heating flow on-site in order to protect the heating installation against temperature-related damage.
- ▶ Connect the thermostat to the terminals for the surface-mounted thermostat (blue ProE plug).
- ▶ Use seals that are made of a paste-like fibre material because seals that are made of rubber-like materials may be subject to plastic deformation, which can lead to pressure losses.

7.2 Required accessories (on-site)

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

- Gas isolator cock with fire protection device
- Expansion relief valve, heating side
- Service valves (heating flow and return)
- Low loss header (optional)
- Heat generator pump
- Expansion vessel
- Controller
- Flue pipe
- Condensate pump (optional)
- Neutralising unit
- Automatic air vent

7.3 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.

7.4 Establishing the gas connection

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

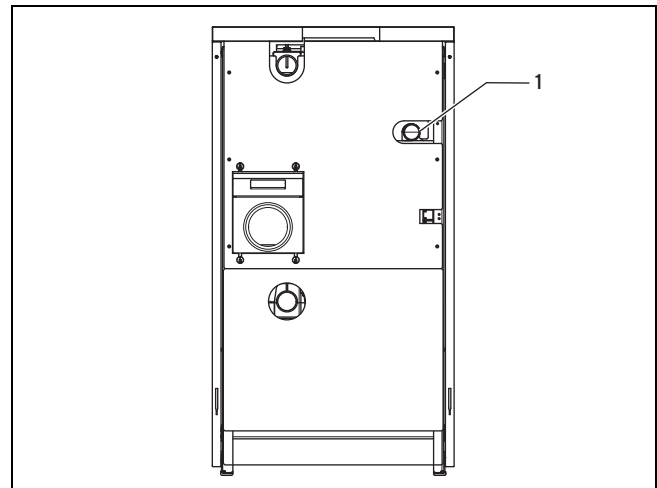


Caution.

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

At a test pressure of >11 kPa (110 mbar), gas leak-tightness tests may cause damage to the gas valve.

- ▶ If, during gas leak-tightness tests, you also place the gas lines and the gas valve in the product under pressure, use a max. test pressure of 1.1 kPa (110 mbar).
- ▶ If you cannot limit the test pressure to 11 kPa (110 mbar), close any gas isolator cocks that are installed upstream from the product before you carry out the gas leak-tightness test.
- ▶ If, during gas leak-tightness tests, you have closed the gas isolator cock that is installed upstream of the product, relieve the gas line pressure before you open this gas isolator cock.



- ▶ The cross-sections of the gas pipe must be designed to suit the nominal floor-standing boiler heat input.
- ▶ Install the gas pipe free from mechanical stress on the connection in the product (1) in accordance with the recognised rules of engineering practice.
- ▶ Remove the residues from the gas pipe by blowing through the gas pipe.
- ▶ Install a gas stopcock with fire protection device in the gas pipe, upstream from the product, at an easily accessible location. The gas stopcock must be at least the same nominal diameter as the gas connection (R 1.5”).
- ▶ Purge the gas pipe before start-up.

7.4.1 Checking the gas line for leak-tightness

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

7.5 Establishing water connections



Caution.

Risk of material damage due to heat transfer during soldering.

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



Caution.

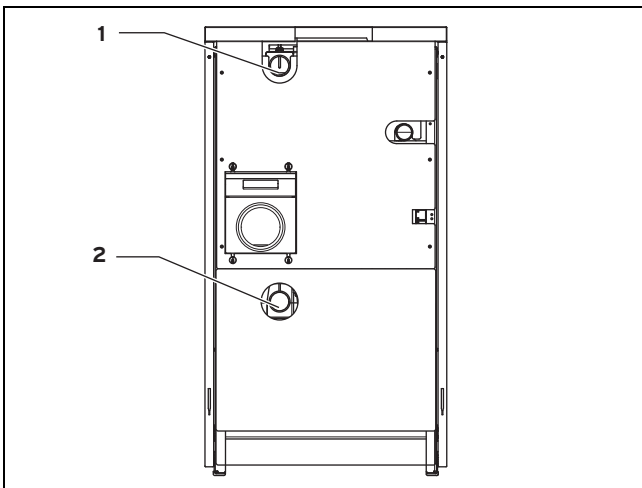
Risk of material damage caused by corrosion

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

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

1. Install the connections in accordance with the relevant standards and the generally recognised rules of good engineering practice.
2. If using non-diffusion-tight plastic pipes in the heating installation, partition the system by installing an external heat exchanger between the heat generator and the heating installation.
3. Only solder connectors if the connectors are not yet screwed to the service valves in order to avoid damaging the seals.

7.5.1 Connecting the heating flow and heating return



1. Between the heating installation and the product, install the required safety devices and isolators that are to be set on-site, along with a filling/draining cock in the return.
2. Connect the heating flow to the heating flow connection (1).
3. Connect the heating return to the heating return connection (2).
4. Install the heat generator pump that is to be set on-site and that is not integrated into the gas-fired floor-standing condensing boiler.

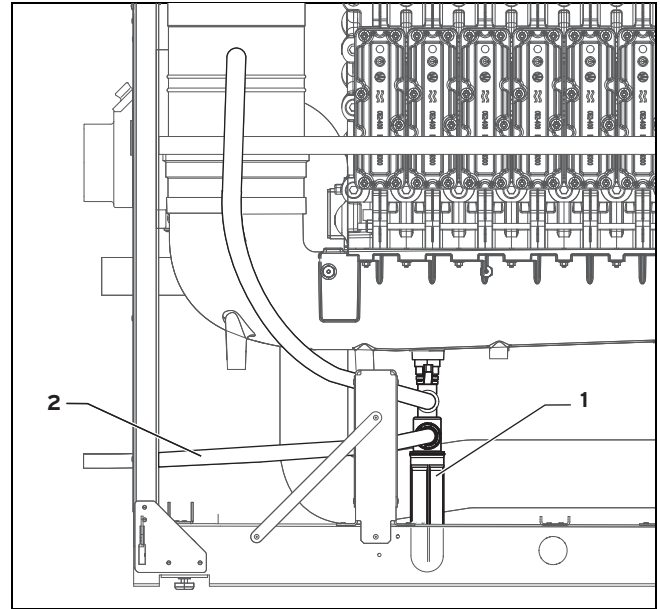
7.5.2 Connecting the domestic hot water cylinder

- ▶ If required, install a domestic hot water cylinder.

7.6 Connecting the condensate discharge pipe

The pH value of the flue gas condensate is between 3.5 and 4.5. The condensate does not contain any inadmissible heavy metals. The gas-fired floor-standing condensing boiler is equipped with a condensate collector and a condensate discharge with siphon. The condensate that is produced during the combustion is either guided directly to the drain channel via the siphon, or it is first neutralised and then guided to the drain.

- ▶ Find out from the local water authority whether neutralisation is required.



Danger!

Risk of death from escaping flue gases!

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

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

- ▶ Route the condensate discharge pipe for the channel with a downward gradient using a suitable plastic or stainless steel pipe to the nearest waste-water outlet, minimum cross-section of DN 25.
- ▶ If an extension of the on-site condensate discharge pipe is required, use only condensate-resistant drain pipes.
- ▶ Route the condensate discharge pipe (2) from the gas-fired floor-standing condensing boiler via a DN 25 plastic pipe. The discharge point must remain visible.
- ▶ Before starting up the product, fill the condensate siphon (1) with water through the flue gas opening in the flue gas collector.
- ▶ Check whether the condensate has been discharged correctly.

7.6.1 Condensate discharge systems

Condition: All units **except for** ecoTEC plus/ecoTEC exclusive with P-trap siphon

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.

Condition: All ecoTEC plus/ecoTEC exclusive units with P-trap siphon

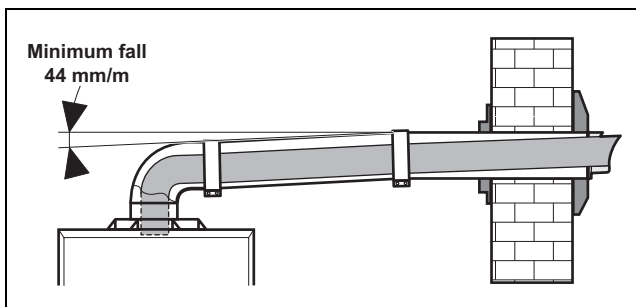
The condensate is discharged periodically in 'slugs' by siphonic action. It is not necessary to provide extra traps in the discharge pipe as there is already a trap inside the boiler. Fitting an extra trap may cause the boiler siphon to work incorrectly. Refer to BS5546 or BS6798 for further advice on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

7.7 Installing and connecting the air/flue pipe

7.7.1 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.

7.7.2 Air/flue system, system-certified, setting up

1. You can find out which air/flue pipes may be used by consulting the enclosed air/flue system set-up instructions.
2. Install the flue pipe using the installation manual.

7.7.3 Installing the air/flue pipe

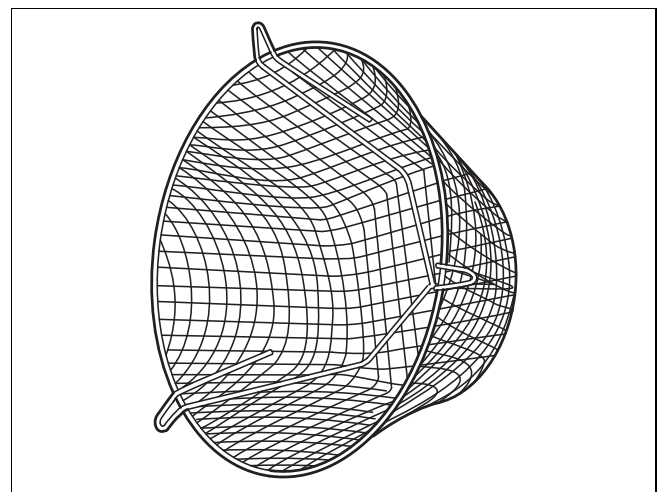
Condition: Boiler fitted as a single boiler in domestic premises

- ▶ Observe the information on positioning the opening for the air/flue pipe. (→ Page 45)

Condition: Boiler installed in a cascade or commercial premises

- ▶ When the boiler is installed in a cascade or commercial premises, then follow the requirements of IGEM / UP 10 for the flue termination and ventilation requirements:
 - <https://www.vaillant.co.uk>

7.7.4 Terminal protection

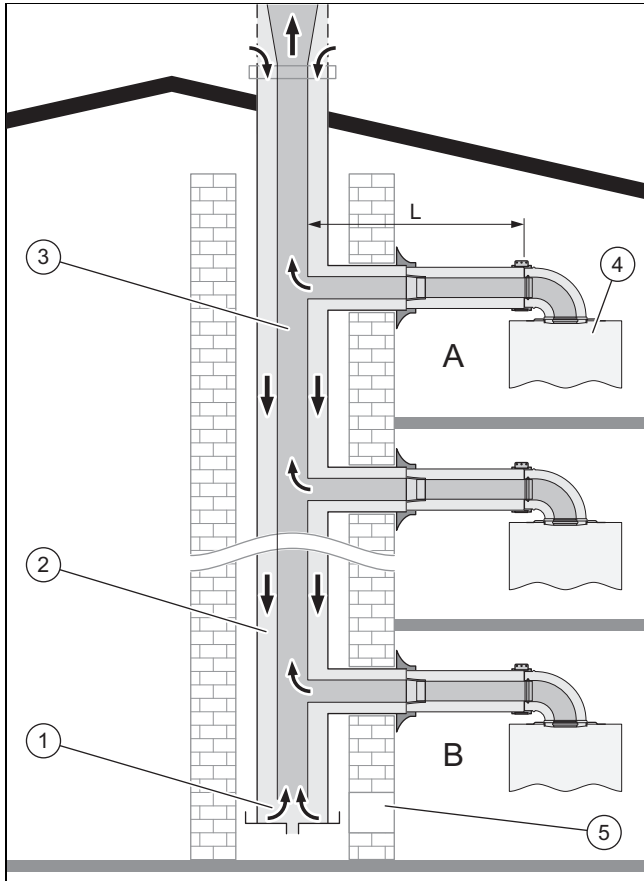


A terminal guard is required if persons could come into contact with the terminal or the terminal could be subject to damage.

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.

7.7.5 Multiple boiler chimney Flue ø 60/100 mm (C43 type installation)



- | | | | |
|---|---------------------------|---|------------------|
| 1 | Pressure balancing system | 4 | Boiler |
| 2 | Air-inlet pipe | 5 | Inspection hatch |
| 3 | Collector pipe | A | Final storey |
| | | B | Ground floor |



Note

The flue connecting from the appliance to the flue system must be supplied from the manufacturer of the boiler.

C43 flue systems must not be a 'pressurised system' but act under natural draught principles.

C43 type flue systems must have their own condensate drain fitted and not allow condensate to mix into other appliances.

The flue length must be calculated and installed according to the relevant standards EN 13384-1 and 2 (C43 flue systems only) with reference to the table below and the manufacturer's instructions supplied. The appliance maximum flue length must be included when calculating the overall design of the flue system.

Max Flue Length C43 (→ Page 17)

Each time an additional 90° bend is necessary (or 2 at 45°), the length (L) must be reduced by 1 m.

Type	Max. length (L)
60/100 diameter	10 m

7.7.6 Unit types: B23, B23P and C63

7.7.6.1 Air/flue system, not system-certified, setting up

With unit types B23 and B23P, the combustion air is taken out of the installation room. The ventilation openings in the installation room must comply with the relevant regulations.

With unit type C6, the combustion air is fed in from the outside through a combustion air pipe. The air intake port and the flue gas opening must not be on opposite sides of the building.

When using flue systems that have not been tested and approved with the boiler, you must observe the following conditions:

- The flue system must be suitable for the boiler (e.g. in terms of temperature, pressure and leak-tightness class). The flue pipework must be labelled with the CE conformity mark or, if necessary, be certified according to national standards.
- The design standards determine limits and safety-related requirements concerning the planning, construction and start-up as well as the maintenance of flue systems.
- ▶ Observe the applicable design standards for flue systems.
- ▶ Observe the information provided by the flue pipework manufacturers.
- ▶ Dimension the flue system in accordance with EN 13384-1. The required system parameters are listed under "Technical data".
- ▶ Select the flue pipework diameter so that it is at least as large as the diameter of the flue spigot on the boiler. A reduction is not permitted.
- ▶ Lay the horizontal part of the flue pipework with a downward gradient towards the boiler.

7.7.6.2 Connecting the flue pipe



Note

Information on chimney design:

The modulation of the boiler with combustion air adaptation achieves a high combustion efficiency. This requires technical proof of the suitability of the chimney in accordance with the applicable standards.

All condensing boilers are equipped with special connectors for connecting condensate-proof and overpressure-tight flue pipework.

- ▶ Install an inspection opening in the flue pipework for cleaning purposes.
- ▶ Install a sealable measurement opening for measuring the CO₂ content on-site on the outside of the product casing in the flue pipework.
- ▶ If necessary, equip the flue pipework with an optionally available flue gas safety cut-out (SCO) which switches off at 120 °C.

7.8 Electrical installation

Only qualified electricians may carry out the electrical installation.



Danger!

Risk of death from electric shock!

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

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



Caution.

Risk of material damage caused by malfunction.

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

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

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

The product is equipped with connection plugs and is wired ready for connection. The power supply cable and all other connection cables can be connected to the corresponding ProE system plugs that are provided; see the wiring diagram (→ Page 44).

7.8.1 Opening/closing the electronics box

7.8.1.1 Opening the electronics box

1. Open the front flap. (→ Page 13)
2. Remove the front casing. (→ Page 13)
3. Hinge the electronics box forwards.
4. Undo the clips from the retainers.
5. Fold up the cover.

7.8.1.2 Closing the electronics box

1. Close the cover by pressing it downwards onto the electronics box.
2. Ensure that all of the clips audibly click into the retainers.
3. Swing the electronics box up.

7.8.2 Wiring the cables

1. Open the electronics box. (→ Page 18)



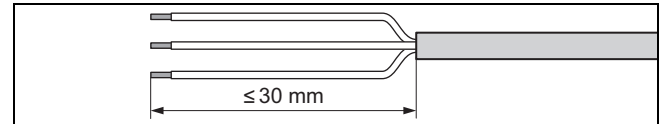
Caution.

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.

2. Route the connection cables of the components to be connected through the grommet to the electronics box.
3. Use the installed strain reliefs.
4. Shorten the connection cables according to requirements. Leave the conductors of the protective conductor approx. 10 mm longer than the conductors of the L and N conductors.



5. Strip the flexible line as shown in the figure. In doing so, ensure that the insulation on the individual conductors is not damaged.
6. Only strip inner conductors just enough to establish good, sound connections.
7. To avoid short circuits resulting from loose individual wires, fit conductor end sleeves on the stripped ends of the conductors.
8. Screw the respective plug to the connection cable.
9. Check whether all conductors are sitting mechanically securely in the terminals of the plug. Remedy this if necessary.
10. Plug the plug into the associated PCB slot.
11. Use the strain reliefs to secure the cable in the electronics box.
12. After wiring all of the accessories, switch on the mains voltage and check that the product is working correctly.

7.8.3 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. Provide one common power supply for the boiler and for the corresponding control:
 - Power supply: Single phase, 230 V, 50 Hz
 - Fuse protection: ≤ 6 A
3. Connect the product using a fixed connection and a partition with a contact opening of at least 3 mm (e.g. fuses or power switches).
4. Use a suitable flexible three-core cable that complies with standards for the power supply cable that is routed to the product via the grommet.
5. Route the power supply cable to the connection level in the electronics box.
6. Wire the cables. (→ Page 18)
7. Screw the turquoise plug that is installed to the right in the electronics box to the power supply cable.

8. Connect the plug to the slot of the same colour on the PCB.
9. Ensure that access to the partition is always available, and that it is not covered or blocked.

7.8.4 Connecting electrical accessories

- ▶ Wire the cables. (→ Page 18)
- ▶ Connect the connection cables to the corresponding terminals and/or slots in the electronics system, see Overall connection diagram (→ Page 44) and, if required, Connection diagram extract (→ Page 45) in the appendix.
- ▶ If you connect a room thermostat (continuous control connection terminals 7-8-9, white ProE plug) or a weather-controlled temperature control or room temperature control (bus terminals, red ProE plug) to the product, you must leave the bridge in place between terminals 3 and 4 (purple ProE plug).
- ▶ If no 230 V room/timer thermostat is used, you must leave the bridge in place between terminals 3 and 4 (purple ProE plug).
- ▶ If required, connect accessories in the same way.

Connecting the heat generator pump (fixed speed)

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

Connecting the heat generator pump (speed-controlled)

- ▶ Connect the heat generator pump to the green ProE plug (X18) on the terminal block.
- ▶ Connect the control wire to the 0-10 V adapter box that is located at the top left beside the two pressure switches in the product. In doing so, note the polarity because, if it is connected incorrectly, the heat generator pump will only work at minimum speed.

Connecting an external flow thermostat

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

Flue gas safety cut-out (SCO)

- ▶ Connect the flue gas safety cut-out to the supply line for the flue pressure switch; refer to the enclosed set-up instructions for further information about this.

Gas pressure monitor

- ▶ Connect a gas pressure monitor to the terminals for the surface-mounted thermostat (blue ProE plug).

Connecting a condensate pump

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



Note

If several contacts are connected to the terminals for the surface-mounted thermostat (blue ProE plug), connect the contacts in sequence.

Connecting a cylinder charging pump

- ▶ Connect the cylinder charging pump as specified in the Connection diagram extract (→ Page 45).

7.8.5 Connecting the controller

To control the heating installation, you can use a weather-controlled outside temperature control or room temperature control with modulating burner control, e.g. VRC 700.

- ▶ Observe the information in the controller's installation instructions.
- ▶ Connect the control to the heat generator as shown in the "Overall connection diagram" (→ Page 44).
- ▶ Alternatively, if the control allows, you can fit the control in the product's control panel fascia (install inside).
- ▶ Connect sensors and the system assemblies that are **not** listed in the section "Connecting electrical accessories" (→ Page 19) to the control.
- ▶ After completing the electrical installation, close the electronics box (→ Page 18).

8 Operation

8.1 Operating concept

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

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

8.2 Calling up the installer level

1. Only access the installer level if you are a competent person.
 2. Press the **i** and **+** buttons at the same time to activate diagnostics mode.
 3. Use the **-** or **+** button to select diagnostics code d.97.
 4. Press the **i** button.
 5. Use the **-** or **+** button to set the value to 17.
 6. Press and hold the **i** button for 5 seconds (until the display stops flashing) to save the value.
- Overview of diagnostics codes (→ Page 35)



Note

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

8.3 Checking the status codes

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

- ▶ Press the **i** button to display the current product status. The status code is displayed: **S.xx**.
 - ▶ Press the **i** button again to hide the status code.
- Status codes – Overview (→ Page 41)

9 Start-up

9.1 Servicing tools

The following test and measuring equipment is required for start-up:

- Digital or U tube manometer.
- Allen key 3.0 mm
- Star wrench (Torx) T40

9.2 Carrying out the initial start-up

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

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



Danger! **Risk of death due to escaping gas!**

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

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

- ▶ Remove the upper casing by pulling it forwards.
- ▶ Remove the side sections of the casing.
- ▶ When starting up the unit, proceed in accordance with the attached checklist.

9.3 Function menu

The function menu in the DIA system allows you to control how individual actuators work. The function menu can always be started after switching on the product or after pressing the **Reset** button. The product's electronics switch to normal operating mode if you do not operate the product for five seconds or if you press the – button. You can find a flow chart in the appendix under Function menu – Overview

9.4 Calling up the check programmes

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

Display	Meaning
P.00	Purge the product, heating circuit and cylinder charging circuit: The product does not start up. The heating pump runs intermittently. After approx. 6.5 minutes, the product switches to the cylinder charging pump (alternatively, by pressing the i button). The check programme runs for approx. 6.5 minutes for each circuit.
P.01	Start up the burner at maximum load: The product works at maximum load after a successful ignition.
P.02	Start up the burner at minimum load: The product works at minimum load after a successful ignition.

Display	Meaning
P.05	Test function for the safety cut-out (SCO): The burner is switched on at maximum power and the pumps are switched off; the temperature control is switched off so that the burner heats up until the safety cut-out is triggered by reaching the safety cut-out temperature.

- ▶ Press and hold the **+** button and, at the same time, briefly press the **Reset** button. Release the **+** button only when P.00 is shown in the display.
- ▶ Press the **+** or **–** button to switch to the next check programme.
- ▶ Press the **i** button to start the check programme.

9.5 Reading off the filling pressure

The product comes with a digital pressure indicator.

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

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

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

9.6 Preventing low water pressure

To prevent damage to the heating installation that is caused by low filling pressure, the product is fitted with a water pressure sensor. If the filling pressure falls below 0.06 MPa (0.6 bar), the product indicates low pressure by displaying a flashing pressure value. If the filling pressure falls below 0.03 MPa (0.3 bar), the product switches off. The display shows **F.22**.

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

The pressure value flashes in the display until a pressure of 0.6 MPa (6 bar) or higher has been reached.

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

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



Caution. **Risk of material damage due to poor-quality heating water**

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

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

Checking the quality of the heating water

- ▶ Remove a little water from the heating circuit.
- ▶ Check the appearance of the heating water.
- ▶ If you ascertain that it contains sedimentary materials, you must desludge the installation.
- ▶ Use a magnetic rod to check whether it contains magnetite (iron oxide).

- ▶ If you ascertain that it contains magnetite, clean the installation and apply suitable corrosion-inhibition measures, or fit a magnetic filter.
- ▶ Check the pH value of the removed water at 25 °C.
- ▶ If the value is below 6.5 or above 8.5, clean the installation and treat the heating water.
- ▶ Ensure that oxygen cannot get into the heating water.

Checking the filling and supplementary water

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

Treating the filling and supplementary water

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

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

You must treat the heating water in the following cases

- If the entire filling and supplementary water quantity during the operating life of the system exceeds three times the nominal volume of the heating installation, or
- If the guideline values listed in the following table are not met, or
- If the pH value of the heating water is less than 6.5 or more than 8.5.

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

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



Caution.

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

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

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



Caution.

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

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

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

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

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

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

Additives for cleaning measures (subsequent flushing required)

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

Additives intended to remain permanently in the installation

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

Additives for frost protection intended to remain permanently in the installation

- Adey MC ZERO
- Fernox Antifreeze Alphi 11
- Sentinel X 500
- ▶ If you have used the above-mentioned additives, inform the end user about the measures that are required.
- ▶ Inform the end user about the measures required for frost protection.

9.8 Filling and purging the heating installation

1. Flush the heating installation thoroughly before filling it.
2. Observe the information on treating heating water.
3. Open all thermostatic radiator valves.
4. Loosen the cap on the automatic air vent (installed on-site) by one or two rotations. Ensure that the opening in the cap is not pointing in the direction of the electronic components.
5. Connect the filling and drainage tap (to be provided on-site) in the heating installation to a heating water supply in accordance with the relevant standards. Do not fill the heating installation via the product's filling and drainage tap.
6. Open the heating water supply.
7. If necessary, check that both service valves on the product are open.
8. Slowly open the heating installation's filling and drainage tap to fill the heating installation.
9. Close the purging valve as soon as water escapes.
10. Fill the installation up to a system pressure of 0.1 MPa (1.0 bar) to 0.2 MPa (2.0 bar).



Note

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

11. Shut off the heating water supply.
12. Purge the lowest radiator until water flows out of the purging valve without bubbles.

13. Purge all other radiators until the heating installation is completely filled with water.
14. To purge the heating or cylinder charging circuit, select check programme (→ Page 20) **P.00**.
 - ◁ The product does not start up and the on-site heating pump runs intermittently. The check programme runs for approx. 6.5 minutes.
15. Press the **i** button again to purge the cylinder charging circuit.
16. Top up with water if, while the check programme is running, the system pressure drops below 0.08 MPa (0.8 bar).
17. Read off the system pressure on the display at the end of the check programme. If the system pressure has dropped, fill and purge the system again.
18. Close the heating installation's filling and drainage tap and the hot water supply, and remove the hose.
19. Check all of the connections and the entire heating installation for leak-tightness.

9.9 Filling the condensate siphon

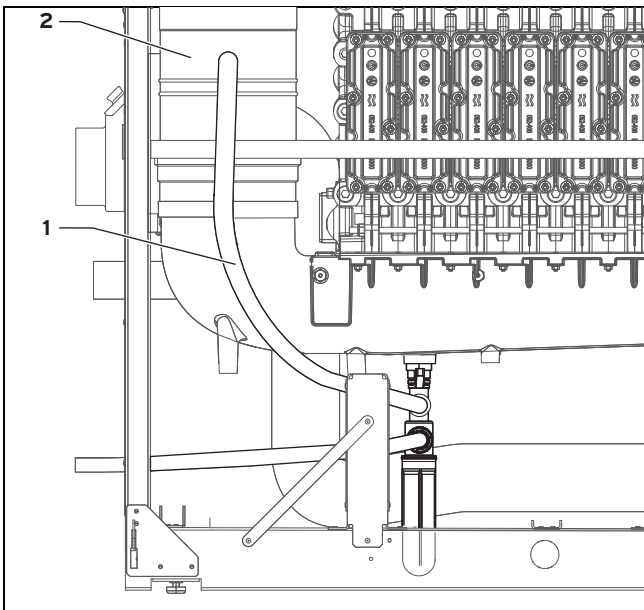


Danger!

Risk of poisoning from escaping flue gas!

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

- ▶ Before starting up the product, fill the condensate siphon with water through the flue gas opening in the flue gas collector.



1. Before filling the siphon, connect the condensate drain pipework to the rear of the product. Refer to the information on routing the condensate discharge pipe in the section entitled "Connecting the condensate discharge pipe (→ Page 15)".

Condition: Air/flue pipe not yet connected

- ▶ Fill the condensate siphon via the flue gas opening in the flue gas collector (**2**) (fill quantity approx. 1.5 l).

Condition: Air/flue pipe already connected

- ▶ Remove the condensate discharge pipe (**1**) from the condensate trap.
- ▶ Fill the condensate siphon with approx. 1.5 litres of water via the condensate discharge pipe.
- ▶ Slide the condensate discharge pipe back onto the condensate trap.

9.10 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.

9.11 Checking and adjusting the gas setting

9.11.1 Checking the gas setting



Note

Before starting up the boiler compare the details of the type of gas specified on the identification plate with the type of gas supplied at the installation site. This boiler is suitable for Natural Gas ONLY.

The combustion of this boiler has been checked, adjusted and preset at the factory for operation on the type of gas defined on the identification plate. No measurement of the combustion is necessary to set up the boiler.

- ▶ Do not adjust the multifunctional automatic gas valve.
- ▶ Ensure:
 - that the boiler has been installed in accordance with these instructions,
 - the integrity of the flue system and the flue seals, as described in the flue installation instructions enclosed with this boiler, and as described below
 - a visual check is carried out on the boiler combustion circuit and the relevant seals,
 - that any defects have been corrected at this stage.

Proceed to put the boiler into operation as follows:

- ▶ Start the boiler by activating the test program **P.1** (→ Page 20).

- ▶ Check for tightness of the flue gas system. (→ Page 23)
- ▶ Check the gas inlet working pressure. (→ Page 23)
- ▶ Check the gas flow rate. (→ Page 23)
- ▶ Please note that you must re-measure the gas flow rate or the gas inlet working pressure, if changes were required to correct any issues found.

9.11.2 Checking for tightness of the flue gas system



Caution.

Risk of malfunctions due to dirt on the burner.

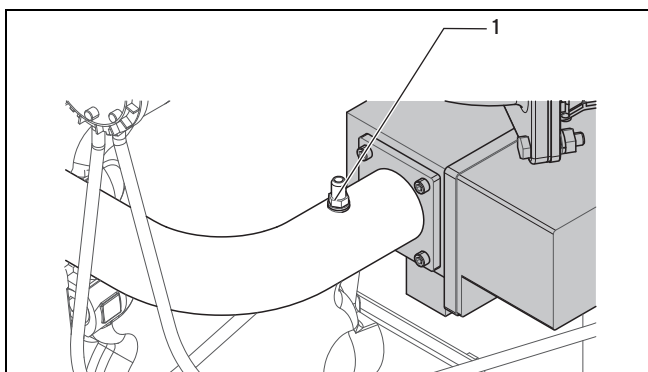
If the combustion air contains particles of dirt, this may make the burner dirty.

- ▶ Take particular care to ensure that there is no building dust, fibres of insulating material or pollen in the combustion air.

1. Check the integrity of the flues system according to TB 008 (Edition 2) and TB 017.
2. Check entire length of the air and flue gas system for correct installation to ensure that:
 - there are no blockages,
 - all joints are sound,
 - the fall angle is correct
 - it is adequately supported
 - all in accordance with the relevant flue installation instructions.
3. Correct the defects.
4. If you cannot correct the defects you must not start up the boiler.

9.11.3 Checking the gas inlet working pressure

1. Ensure that the gas inlet working pressure can be obtained with all other gas appliances in the property working.
2. Remove the front casing from the boiler.
3. Close gas isolation valve of the boiler.



4. Loosen the sealing screw of the pressure measurement nipple marked „in“ (1) on the gas pipe.
5. Connect a digital pressure gauge or U-tube manometer.
6. Open gas isolation valve of the boiler.
7. Start the boiler by activating the test program **P.1** (→ Page 20).

- In addition, ensure that maximum heat can be dissipated into the heating system.

8. With the boiler operating at full load check that the gas inlet working pressure at the reference test point (1) complies with the requirements:

Boiler	Natural Gas H	
	Minimum pressure	Maximum pressure
ecoCRAFT exclusive VKK GB 806/3-E R1 - VKK GB 2806/3-E R1	1.7 kPa (17.0 mbar)	2.5 kPa (25.0 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.
10. If the supply pressure is out of tolerance contact your Emergency Service Provider.
11. If the gas inlet working pressure at the reference test point (1) is not within the permissible range and you cannot correct the failure, notify the gas supply company.
12. Take the boiler out of operation by pressing the + and i buttons simultaneously and turn down both thermostat control knobs.
13. Close the gas isolation valve of the boiler.
14. Remove the pressure gauge and re-tighten the sealing screw (1).
15. Turn on gas at the gas isolation valve.
16. Make sure that there is no leakage at the sealing screw.
17. Turn off gas at the gas isolation valve.
18. Make sure that there is no leakage at the sealing screw.
19. Put the front casing back on.
20. Turn off electrical supply to the boiler.
21. You must not start up the boiler.
22. If the gas inlet working pressure is within the permissible range, proceed as follows:
23. Take the boiler out of operation by pressing the + and i buttons simultaneously and turning down both of the thermostat control knobs.
24. Close gas isolation valve of the boiler.
25. Remove the pressure gauge and re-tighten the sealing screw (1).
26. Open the gas isolation valve of the boiler.
27. Make sure that there is no leakage at the sealing bolt screw.
28. Put the front casing back on.
29. Reset boiler controls for normal operation.
30. Record the appliance gas inlet working pressure (mbar) in the Benchmark gas boiler commissioning checklist.

9.11.4 Checking the gas flow rate



Note

The boiler is fitted with a multifunctional automatic gas valve which ensures that the precise air/gas ratio is provided under all operating conditions. The gas flow rate has been set during production and does not require adjustment.

1. Start the boiler by activating the test program **P.1** (→ Page 20).
 - In addition, ensure that maximum heat can be dissipated into the heating system by.
2. Wait at least 5 minutes until the boiler has reached its operating temperature.
3. Ensure that all other gas appliances in the property are turned off.
4. Measure the gas flow rate at the gas meter..
5. Check that the gas flow rate is as stated:

Boiler	Nominal net heat input in kW	Gas Rate		
		Natural Gas in m³/h		
		nominal	+ 5 %	- 10 %
VKK GB 806/3-E R1	80	8.46	8.88	7.61
VKK GB 1206/3-E R1	115.9	12.25	12.86	11.03
VKK GB 1606/3-E R1	160	16.91	17.76	15.22
VKK GB 2006/3-E R1	200	21.14	22.2	19.03
VKK GB 2406/3-E R1	240	25.37	26.64	22.83
VKK GB 2806/3-E R1	280	29.59	31.97	26.63

6. If the measured gas flow rate lies outside the tolerance limits specified, do not operate the boiler and inform the Vaillant Service Solutions (0870 6060 777).
7. If the measured gas flow rate is within the tolerance limits, then proceed as follows:
8. Take the boiler out of operation by pressing the **+** and **i** buttons simultaneously and turn down both thermostat control knobs.
9. Record the boiler maximum gas flow rate onto the boiler commissioning checklist.

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 and Purging the heating installation.
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 that the product functions correctly and checking the leak-tightness

1. Start up the product.
2. In particular, check the burner seal for leaks using a CO₂ measuring instrument. If required, tighten the burner seal to a torque of 12 Nm.
3. Check that all control, regulation and monitoring devices are functioning properly.
4. Check that the condensate discharge pipe has been installed correctly and is securely fastened.
5. Check the over-ignition and that the flame on the burner is burning evenly (diagnostics code **d.44**: < 250 = excellent flame, > 700 no flame).
6. Ensure that all casing sections are installed correctly.

9.13.1 Checking the heating mode

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

9.13.2 Checking the hot water generation

Condition: Domestic hot water cylinder connected

- ▶ Check that the domestic hot water generation is working correctly by turning the dial for the cylinder temperature clockwise as far as it will go.
- ▶ If you have connected a control that can be used to set the domestic hot water temperature, set the domestic hot water temperature on the heat generator to the maximum possible temperature.
- ▶ Adjust the target temperature for the connected domestic hot water cylinder to the controller.

9.13.3 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.

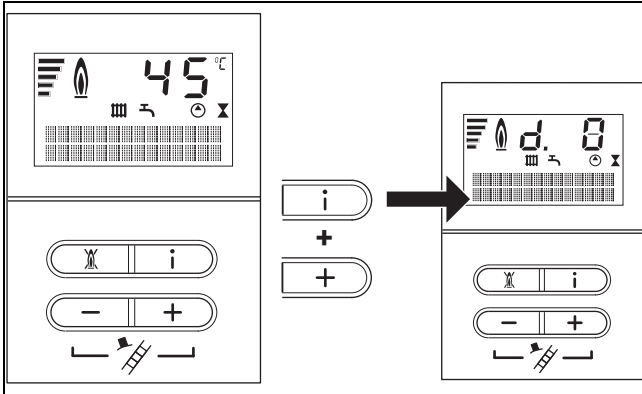
10 Adapting the unit to the heating installation

10.1 Calling up diagnostics codes

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

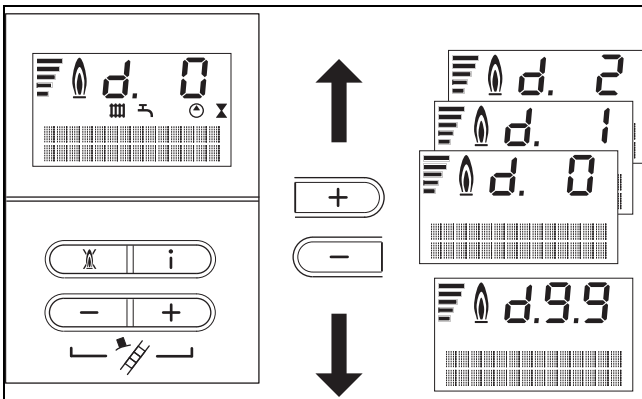
Overview of diagnostics codes (→ Page 35)

► Call up the installer level. (→ Page 19)

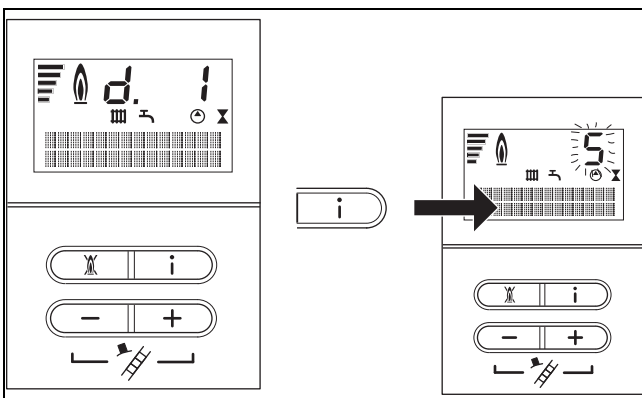


► Press the **i** and **+** buttons simultaneously.

◁ **d.00** will appear on the display.

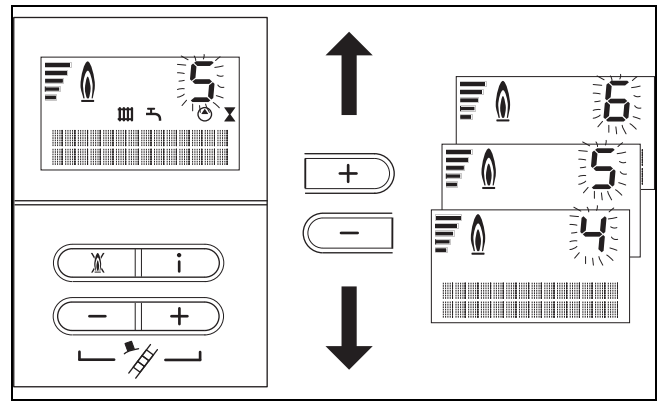


► Use the **-** or **+** button to select the required diagnostics code.

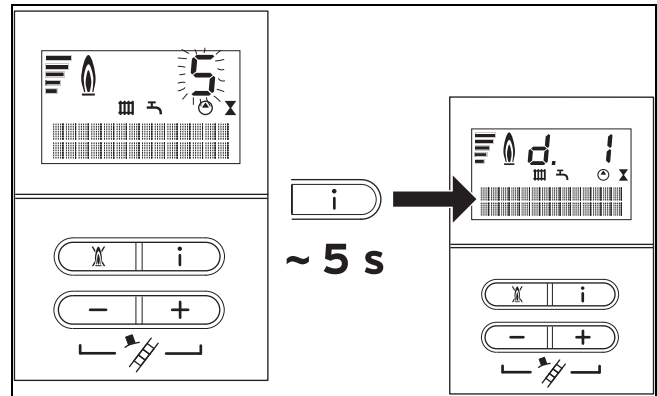


► Press the **i** button.

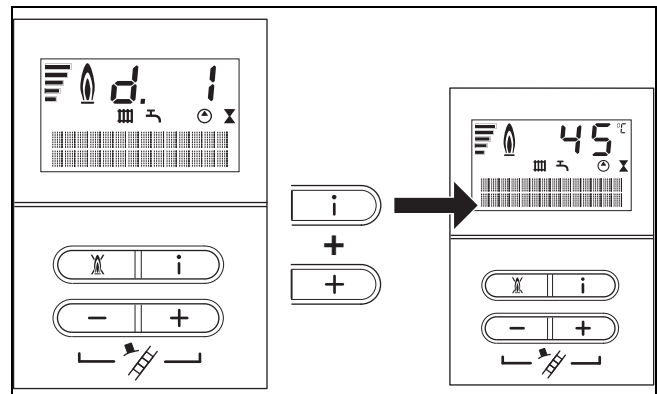
◁ The display will show the associated diagnostic information.



► If required, use the **-** or **+** button to set the required value (display will flash).



► Press and hold the **i** button for 5 seconds (until the display stops flashing) to save the value.



► Press the **i** and **+** buttons simultaneously or wait 4 minutes before pressing any buttons.

◁ The current heating flow temperature or (if this option has been selected) heating installation filling pressure will reappear on the display.

10.2 Setting the maximum flow temperature

You can set the maximum flow temperature for heating mode under **D.71**.

You can set the maximum flow temperature for cylinder charging mode under **D.78**.

10.3 Setting the pump overrun and pump operating mode

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

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

If the cylinder charging pump is connected to a VRC 630/700 or VRS 620 control, set the overrun time on the control.

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

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

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

The pump is switched off if:

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

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

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

If a temperature sensor is connected in the return:

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

10.4 Setting the 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. You can adjust the burner anti-cycling time to the conditions of the heating installation. The burner anti-cycling time is only active for the heating mode. You can set the maximum burner anti-cycling time under **D.02**.

The product is equipped with an automatic heating and cylinder charging partial load control. If diagnostics codes **D.00** or **D.77** are at the maximum value, the relevant partial load is optimised using the current burner running times. After an interruption in the mains voltage supply or after the **re-set** button is pressed, the value that is currently determined is reset to the maximum output in order to ensure that setting and test processes can take place. The partial heat load can be fixed under **D.00** and the cylinder partial load can be

fixed under **D.77**. The automatic function is then not active if a value smaller than the maximum value is set.

10.5 Start-up behaviour

When there is a heat requirement, the product goes into the status **S.02** (pump pre-run) for approx. 15 seconds and then the fan is started (**S.01** ... **S.03**).

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

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

10.6 Handing over to the end user

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

11 Inspection and maintenance

- ▶ Disconnect the product from the power grid.



Note

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

- ▶ Close the gas isolation valve.
- ▶ Remove the front casing. (→ Page 13)

- ▶ Carry out all inspection and maintenance work in the order shown in the table "Overview of inspection and maintenance work".

Inspection and maintenance work – Overview
(→ Page 38)

11.1 Observing inspection and maintenance intervals

Proper regular inspections and maintenance (once a year) combined with the exclusive use of genuine spare parts are decisive factors in ensuring smooth operation and long working life for the product.

We recommend taking out an inspection and maintenance contract.

Inspection

The inspection is intended to determine the actual condition of the product and compare it with the target condition. This is done by measuring, checking and observing.

Maintenance

Maintenance is required in order to eliminate any deviations of the actual condition from the target condition. This is normally done by cleaning, setting and, if necessary, replacing individual components that are subject to wear.

11.2 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.

11.3 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.

11.4 Checking the CO/CO₂ ratio



Note

Checking/adjustment of the CO/CO₂ Ratio is required in the following instances:

- replacement of gas valve.
- or if an incorrect combustion is suspected
- during annual maintenance

1. Make sure that there is an opening for the CO/CO₂ measurement in the flue pipe. Connect a suitable flue gas analyser to this opening to establish the combustion performance of the boiler.



Note

The maximum draught should not exceed 20 Pa, as otherwise the results of the CO/CO₂ measurement in minimum load will be invalid. If necessary you can remove the cover of the inspection opening in the external exhaust gas ducting during the measurement. Then replace it after the measurement.

2. Remove the front casing.
3. Start the testing program **P.1** for full mode (→ Page 20).
 - Wait at least 5 minutes until the boiler reaches its operating temperature.
4. Measure the CO/CO₂ Ratio at the flue pipe. Compare the measured value with the corresponding value:

Settings for VKK GB 806/3-E R1 - VKK GB 2806/3-E R1	Unit	Natural gas (H) Tolerance
CO ₂ after 5 minutes full load mode (P.1)	Vol.-%	9.3 ±0.2
CO ₂ after 5 minutes minimum load mode (P.2)	Vol.-%	9.0 ±0.2
Set for Wobbe index W _s	kWh/m ³	15.0
CO value with full load	ppm	< 200
CO/CO ₂		< 0.0023

5. Start the testing program **P.2** for minimum load.
 - Wait at least 5 minutes until the boiler reaches its operating temperature.
6. Measure the CO/O₂ Ratio at the flue pipe. Compare the measured value with the corresponding value.
7. If all these points are as required, leave the test mode.
8. If one of the flue gas values is greater than the acceptable values then proceed as described in the following.

11.5 Adjusting the CO/CO₂ ratio

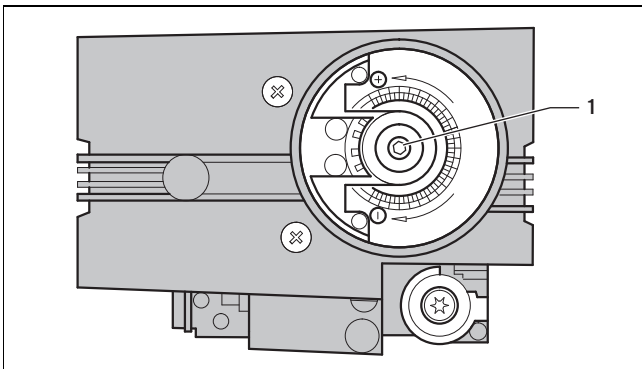


Danger! Increased risk of poisoning due to incorrect settings!

Incorrect setting may increase the risk of poisoning. If one of the flue gas values is greater than the acceptable values then check:

- ▶ the integrity of the complete flue gas installation.
- ▶ the integrity of the combustion circuit seals.
- ▶ the gas inlet working pressure.
- ▶ the gas flow rate.

1. If the flue gas value at maximum load has to be adjusted:



2. Remove the black cover cap to reach the screw of the main throttle on gas valve (1).
3. Be sure that the boiler is running in P.1 for full load. (→ Page 20)
4. Specify the required flue gas value if necessary by turning the screw of the main throttle (1).

Settings for VKK GB 806/3-E R1 - VKK GB 2806/3-E R1	Unit	Natural gas (H) Tolerance
CO ₂ after 5 minutes full load mode (P.1)	Vol.-%	9.3 ±0.2
CO ₂ after 5 minutes minimum load mode (P.2)	Vol.-%	9.0 ±0.2
Set for Wobbe index W _s	kWh/m ³	15.0
CO value with full load	ppm	< 200
CO/CO ₂		< 0.0023

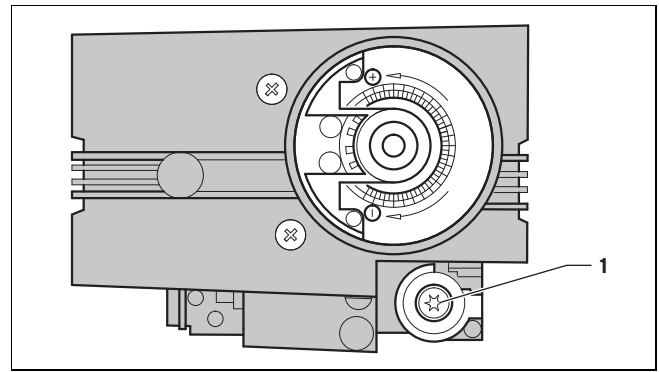
5. Use a 3 mm hexagon socket spanner to turn the screw.
 - Turn to the left: higher CO₂ concentration
 - Turn to the right: lower CO₂ concentration.



Note

Only perform the adjustment in increments of 1/8 turn and wait approximately 1 minute after each adjustment until the value stabilises.

6. After performing the adjustments, check the CO₂ concentration in minimum load.
7. If the flue gas value in minimum load needs to be adjusted:



8. Remove the cover cap of the zero point screw (1) on the gas valve.
9. Be sure that the boiler is running in P.2 for full mode.
 - The full load mode is also deactivated if no button is pushed for 15 minutes.
10. Specify the required flue gas value if necessary by turning the screw of the zero point (1).
11. Use a Torx Tx40 socket spanner to turn the screw.
 - Turn to the right: higher CO₂ concentration
 - Turn to the left: lower CO₂ concentration.



Note

The adjustment is very sensitive. Only perform the adjustment in increments of 1/16 turn. Wait approximately one minute after each adjustment until the value stabilises.

12. After performing the adjustments, push the i button to deactivate the minimum load mode.
 - The minimum load mode is also deactivated if no button is pushed for 15 minutes.
13. Fit the cover caps on the gas valve.
14. The cover caps shall be sealed after the adjustment.



Danger!

Risk to life due to poisoning!

CO is an extremely toxic gas. Risk to life due to excessive CO concentrations.

- ▶ If you are not able to adjust the boiler correctly and the flue gas values remain higher than allowed call the Vaillant Customer Service Centre.
- ▶ Do not start up the boiler.

15. Put the front casing back on.

11.6 Removing the burner assembly

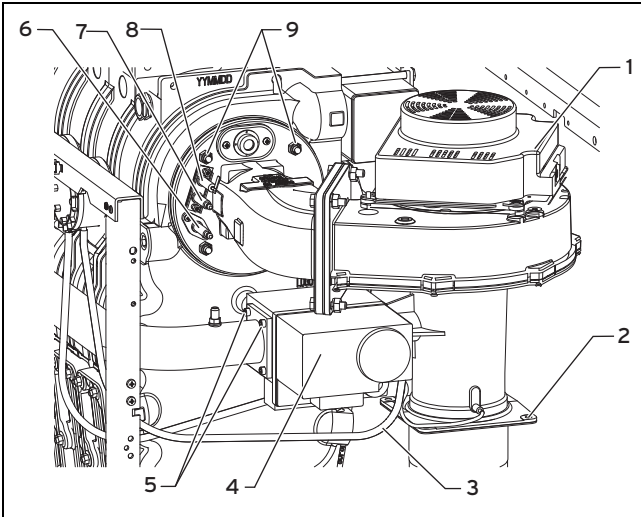


Danger!
Risk of being burned or scalded by hot components!

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

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

1. Swing the electronics box down.



2. Remove the connection cables from the gas valve assembly (4) and from the fan (1).
3. Remove the earth wire (8).
4. Remove the plug from the ignition electrode (7) and from the monitoring electrode (6).
5. Remove the control hoses (3) from the gas valve assembly and the Venturi.
6. Remove the four screws (2) between the Venturi and supply-air silencer or high-temperature polypropylene pipe.
7. Carefully put down the supply-air silencer with 87° high-temperature polypropylene elbow.
8. Remove the four M5 screws (5) from the gas pipe (gas filter) or from the gas valve assembly.
9. Remove the four M8 nuts (9) from the heat exchanger.
10. Pull the entire unit, comprising burner flange, gas valve assembly, fan and Venturi, forwards to remove it, and put it down carefully.
11. Remove the seal between the heat exchanger and burner flange.
12. Carefully pull the burner forwards to remove it.
13. Check the components of the burner assembly and the heat exchanger for damage and dirt.
14. If necessary, clean or replace the components in accordance with the following sections.

11.7 Cleaning the combustion chamber

1. Protect the electronics box from splashed water.
2. Use water and a cleaning brush to clean the combustion chamber.
3. Use water to rinse off the dirt that has softened up.
 - ◀ The water drains out via the flue gas collector and the condensate discharge pipe.

11.8 Cleaning the burner

1. Remove the burner assembly. (→ Page 29)
2. Do not use any pointed or sharp objects for cleaning in order to avoid damaging the surface of the burner.
3. Blow out the burner outside the installation room from outside to inside using compressed air. If no compressed air is available, you can also rinse the burner out with water as an alternative. Replace the burner if it is particularly dirty.
4. Install the burner assembly. (→ Page 29)

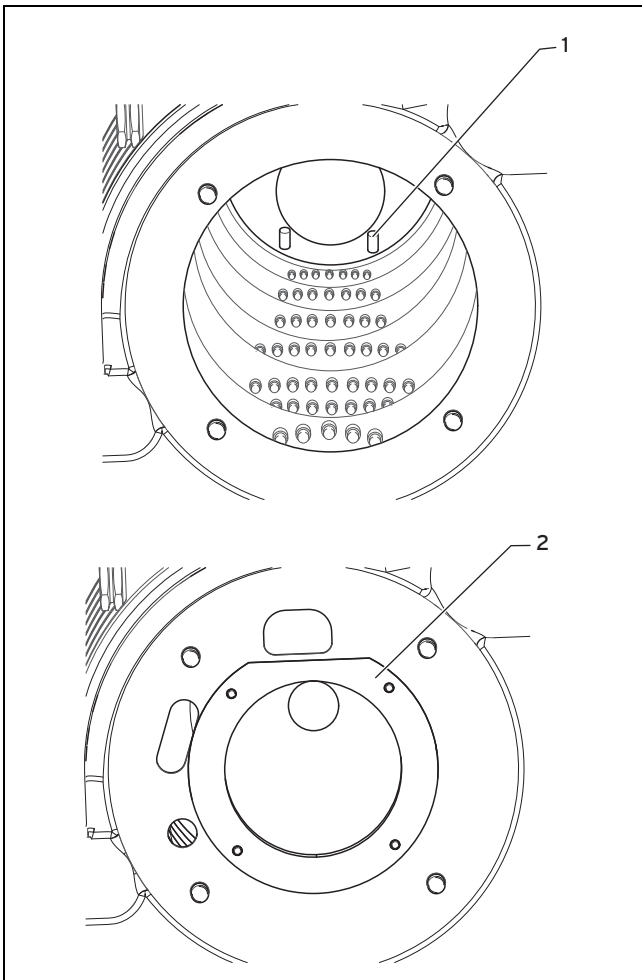
11.9 Installing the burner assembly



Danger!
Risk of death caused by escaping flue gas!

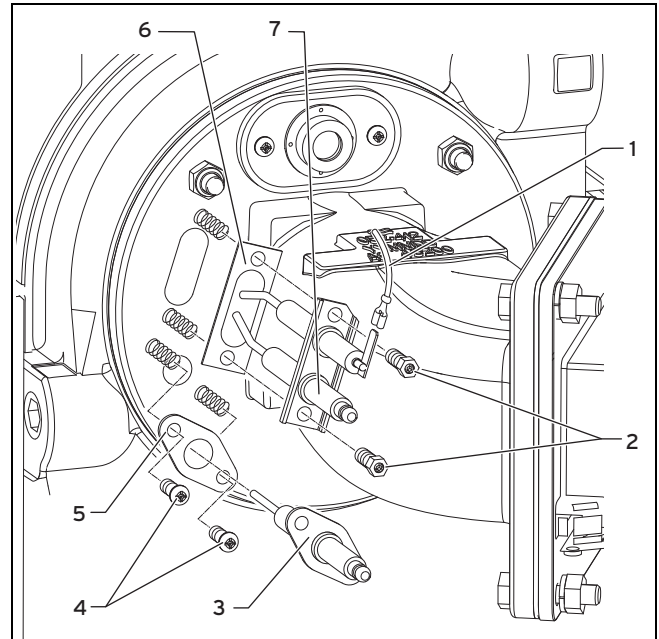
A defective combustion chamber seal may impair the operational safety of the product and lead to personal injury and material damage.

- ▶ Replace the combustion chamber seal after any inspection and maintenance work.



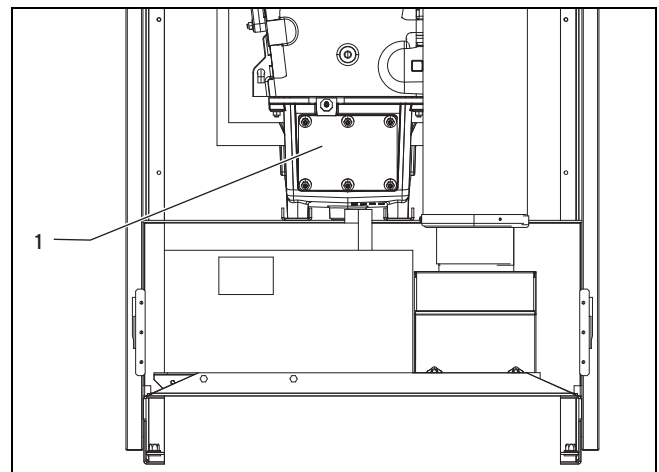
1. Install all of the components in reverse order to how they were removed (→ Page 29).
2. When inserting the burner, ensure that the burner is positioned on the rear guide grooves (1) in the heat exchanger and that the front plate (2) is flush with the heat exchanger.
3. Tighten the bolts on the elbow evenly to 12 Nm.
4. Open the gas isolator cock and check that it is gas-tight up to the gas valve.
5. Switch on the floor-standing gas-fired high-efficiency boiler.
6. Use a detector to check that the gas-air mixture cannot leak out after the gas valve and along all of the burner seals.
7. If required, tighten the bolts to 12 Nm.

11.10 Replacing electrodes



1. Carefully remove the earth line (1) from the counter electrode and the ignition line from the ignition electrode (7).
2. Remove both fixing nuts (2) from the ignition electrode and remove the ignition electrode.
3. Replace the seal (6) and install the new ignition electrode.
4. Carefully remove the ignition line from the monitoring electrode (3).
5. Remove both fixing nuts (4) from the monitoring electrode and remove the monitoring electrode.
6. Replace the seal (5) and install the new monitoring electrode.
7. Tighten the fixing nuts (2) and (4) to 2 Nm and connect the connection cables.

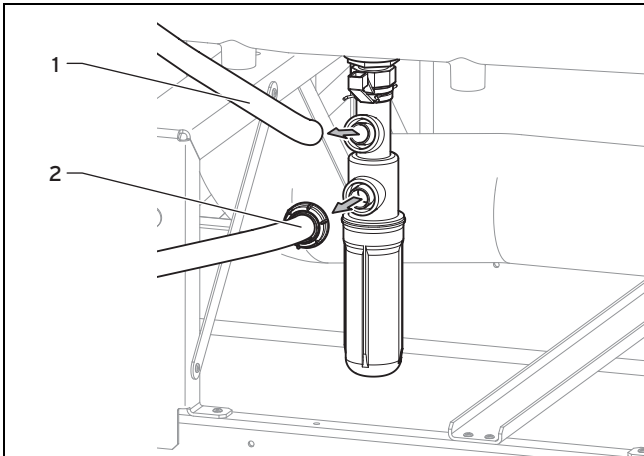
11.11 Cleaning the condensate collector



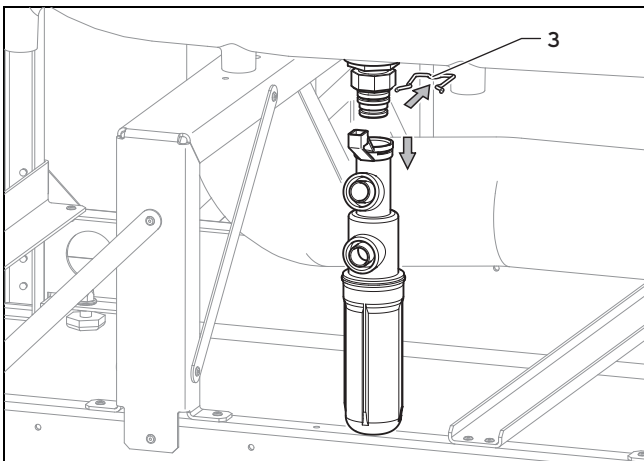
1. Remove the nuts from the cover on the inspection opening (1).
2. Remove the cover from the inspection opening.
3. Check the condensate collector for dirt and clean it using a scraper if necessary.
4. Check the seal on the inspection opening for damage. Replace any damaged seals.
5. Refit the cover on the inspection opening.

- Retighten the nuts.

11.12 Cleaning the condensate siphon

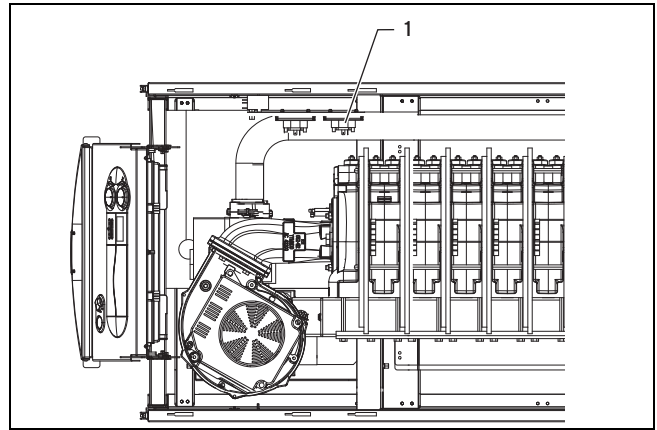


- Remove the condensate discharge pipe **(1)** from the condensate trap.
- Remove the drain hose **(2)**.



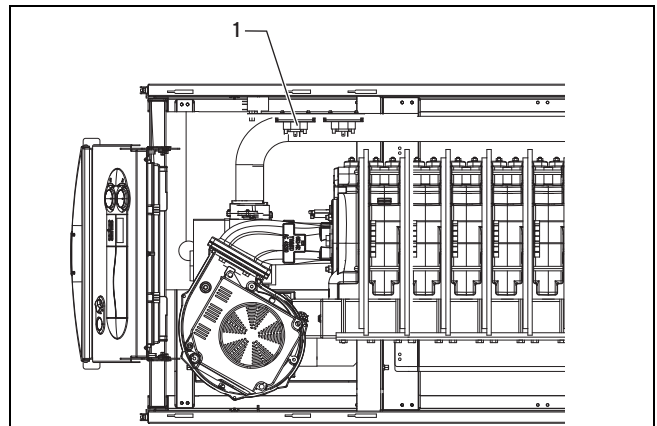
- Remove the bracket **(3)**.
- Remove the siphon and clean it.
- Install the siphon in reverse order.
- Fill the condensate siphon with approx. 1.5 litres of water via the condensate discharge pipe.
- Slide the condensate discharge pipe back onto the condensate trap.
- Reseal the opening in the flue gas measurement opening with the plug.

11.13 Checking the flue gas pressure monitor

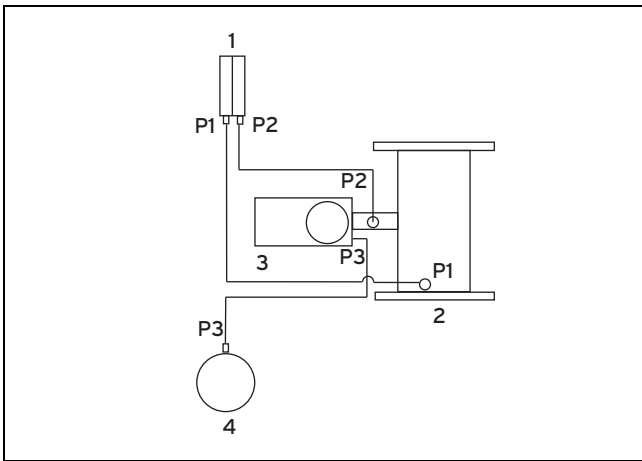


- Remove the hose from the flue gas pressure monitor **(1)** and from the connection on the flue spigot above the inspection opening in the condensate tray.
- Check the hose for dirt. Clean it by blowing through it if required.
- Connect the hose to connection **P1** on the flue gas pressure monitor and to the flue spigot.
- Ensure that the hose of the flue gas pressure monitor is connected to the correct connection.
- Ensure that the hose is fully pushed onto the connection.

11.14 Checking the combustion air pressure monitor

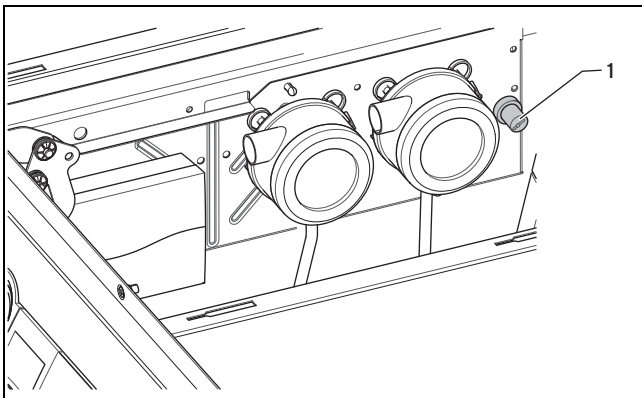


- Check the hoses leading to the combustion air pressure monitor **(1)** for damage. Clean them by blowing through them if required.



2. Connect hose **P1** of the combustion air pressure monitor (**1**) to the Venturi (**2**).
3. Connect hose **P2** of the combustion air pressure monitor to the connection between the gas valve assembly (**3**) and Venturi (**2**).
4. Ensure that the hoses of the combustion air pressure monitor are connected to the correct connections.
5. Ensure that the hoses leading to the combustion air pressure monitor are fully pushed onto the connections.
6. Check the hose between the gas valve assembly (**3**) and supply air box (**4**) for dirt. Clean it by blowing through it if required.
7. Connect hose **P3** to the gas valve assembly and supply air box.
8. Ensure that the hose is fully pushed onto the connection.

11.15 Checking the safety cut-out



1. Switch on the main switch.
2. Start check programme P.05 (→ Page 20).
 - ◁ The internally connected heating pump is switched off while the safety cut-out is being tested. The check programme starts automatically and triggers the safety cut-out after 5-8 minutes. Otherwise, the check programme is automatically terminated after 15 minutes.
 - ◁ The gas-fired floor-standing condensing boiler switches off at 110 °C (tolerance -6 K).
 - ▽ If the safety cut-out is not triggered at the latest after eight minutes, it is defective. In this case, replace the safety cut-out.
3. After the gas-fired floor-standing condensing boiler has cooled down, press the pin (**1**) to release the safety cut-out.

11.16 Draining the product

1. Close the service valves of the product.
2. Connect a hose to the product's filling and drainage tap.
3. Route the hose to a suitable outflow location.
4. Open the filling and drainage tap.
5. Open the automatic air vent so that the product is completely drained.
6. Once the water has drained out, close the automatic air vent and the filling/draining cock again.

11.17 Draining the heating installation

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

11.18 Completing maintenance work

Once you have completed all maintenance work:

- ▶ Check that all control, regulation and monitoring devices are functioning properly.
- ▶ Check the gas tightness of the product before each instance of start-up and after each instance of inspection, maintenance and repair.
- ▶ Check the product and the air/flue pipe for tightness.
- ▶ Check the over-ignition and that the flame on the burner is burning properly (diagnostics code d.44: < 250 = excellent flame, > 700 no flame).
- ▶ Hinge the electronics box up.
- ▶ Install the front casing. (→ Page 13)
- ▶ Fill out the relevant service record section in the benchmark checklist.

12 Troubleshooting

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

Overview of fault codes (→ Page 42)

12.1 Contacting your service partner

If you contact your Vaillant service partner, if possible, please mention

- The fault code that is displayed (**F.xx**),
- The product status that is displayed (**S.xx**).

12.2 Reading off the fault codes

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

Fault codes have priority over all other displays.

If multiple faults occur at the same time, the display shows the corresponding fault codes for two seconds each in sequence.

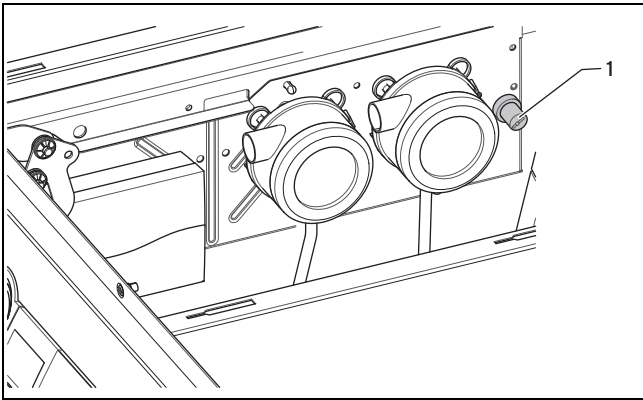
You can find an overview of the fault codes in the appendix under "Fault codes – overview".

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

12.3 Resetting parameters to factory settings

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

12.4 Unlocking the product after it has been switched off by the safety cut-out



If fault code **F.20** is displayed, the safety cut-out has automatically switched off the product because the temperature is too high.

- ▶ Remove the front casing. (→ Page 13)
- ▶ Remove the covering cap and press the pin (1) to unlock the safety cut-out. You can only press down on the pin once the temperature of the product is < 80 °C.
- ▶ After the safety cut-out is triggered, always carry out troubleshooting and eliminate the cause of the fault.

12.5 Fault in the product



Danger!

Risk of death from electric shock!

Touching live connections may cause serious personal injury.

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

Not shown in the display

If the product does not start up and nothing is shown in the display on the operator control panel, check the following points first:

- Is 230 V/50 Hz present at the turquoise-coloured plug?
- Is the main switch switched on?
- ▶ Check and, if required, replace fuse 4 AT on the PCB in the electronics box.

The product does not respond to a VRC 470, 630, VRS 620 or VRC 700 control

- ▶ Check the connection between the "Bus" connections in the control and the product.

Condition: VRC 630, VRS 620 or VRC 700

- ▶ Switch the control off and on again so that it re-reads the bus participants.

The product does not respond to a two-point control system

- ▶ Measure whether the switching contact between terminals 3 and 4 was closed by the external control.
- ▶ Place a bridge between terminals 3 and 4. If the product starts up after this, you must check the external control.

The product does not respond to a hot water request

- ▶ Check the settings for the control.
- ▶ Check the cylinder charging pump.
- ▶ Check the settings for the cylinder target value in the DIA system.

13 Decommissioning

13.1 Permanently decommissioning

1. Switch off the product.
2. Disconnect the product from the power grid.
3. Close the gas stopcock.
4. Close the cold-water isolation valve.
5. Drain the product via the filling/draining cock (→ Page 32).

14 Recycling and disposal

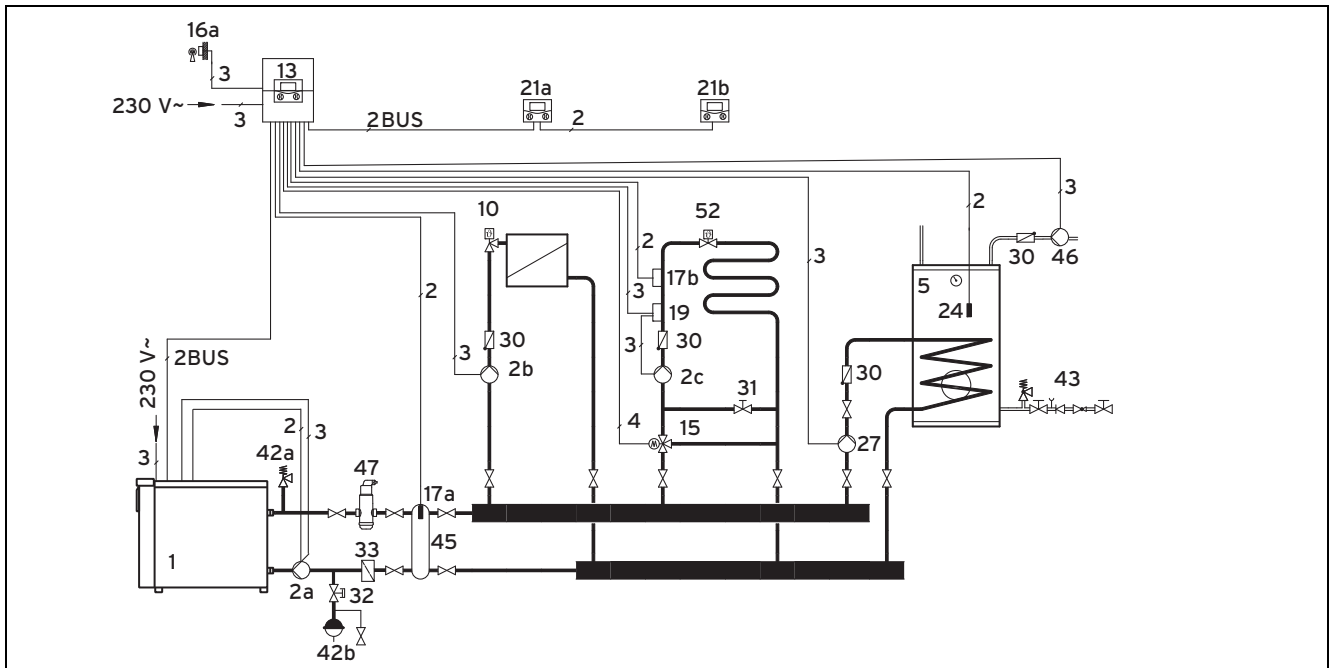
14.1 Recycling and disposal

Disposing of the packaging

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

Appendix

A System diagram



1	Heat generator	21b	Remote control (underfloor circuit)
2a	Heat generator pump in the heat generation circuit	24	Cylinder temperature sensor
2b	Heating pump (heating circuit 1)	27	Cylinder charging pump
2c	Heating pump (mixing circuit 2)	30	Non-return valve
5	Domestic hot water cylinder	31	Flow limiter
10	Thermostatic radiator valve	32	Cap valve
13	Weather compensator	33	Sludge separator
15	3-way mixer	42a	Expansion relief valve
16	outside temperature sensor	42b	Expansion vessel
17a	Flow temperature sensor	43	Safety group
17b	Flow temperature sensor (heating circuit 2, mixing circuit)	45	Low loss header
19	Maximum thermostat	46	Circulation pump
21a	Remote control (radiator circuit)	47	Air separator
		52	Room temperature-controlled valve

B Commissioning checklist

No.	Procedure	Comment	Required tool
1	Checking the gas flow pressure	The gas flow pressure relative to the atmospheric pressure must be 1.8-2.5 kPa (18-25 mbar) with G20 natural gases. For natural gas, the gas connection pressure (resting pressure) must not deviate from the gas flow pressure by more than 0.5 kPa (5 mbar).	U tube or digital pressure gauge
2	Check whether the condensate siphon has been filled	If required, fill it via the flue spigot (at least 1.5 l water)	
3	Check the electrical connection	Power supply: Terminals L, N, PE Control terminals: "Bus", or 7-8-9 or 3-4	
4	Switch on the product, the display view is active	Otherwise, check the fuses (4 OT)	
5	Activate the maximum output operation	Press the + and - buttons at the same time	

No.	Procedure	Comment	Required tool
6	Check the entire gas route for leaks	Leak-detection spray or leak detector (a leak detector is especially recommended for checking the burner seals for gas tightness) If required, tighten the burner seal (tightening torque: 12 Nm)	Leak detector
7	Carrying out a chimney draught measurement	The maximum draught must not exceed 20 Pa. If the draught is too great, the chimney draught must be restricted using suitable measures.	Measuring instrument for chimney draught
8	CO ₂ measurement	Target value for nominal heat loading: Only carry out the measurement after five minutes of normal operation – 9.3 vol.% ±0.2 with natural gas H Target value for the minimum heat load: – 9.0 vol.% ±0.2 with natural gas H	CO ₂ -measuring instrument
9	If the CO ₂ is not within the tolerance:	Adjust the CO ₂ and then take the measurement again	
10	After setting the CO ₂ , activate chimney sweep mode again and measure the CO ₂ content	Target value for nominal heat loading: – 9.3 vol.% ±0.2 with natural gas H Target value for the minimum heat load: – 9.0 vol.% ±0.2 with natural gas H	CO ₂ -measuring instrument
11	CO measurement (target value < 80 ppm)		CO measuring instrument
12	Check the condensate tray, condensate siphon and condensate discharge for leak-tightness	Carry out a visual check or also use a CO measuring instrument to go along the sealing points.	
13	Switching off the product and switching it back on again	End the maximum output operation	
14	Programme the heating controller with the customer and check that the hot water/heating are working correctly	Handing over the operating instructions to the customer	
15	Stick sticker 835593 "Read the operating instructions" on the front of the product, in the language spoken by the end user		

C Overview of diagnostics codes



Note

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

Code	Parameter	Values or explanations	Factory setting	Own setting
D.00	Partial heat load, adjustable values in kW	Maximum value = nominal heat output	Automatic partial heat load	
D.01	Heating pump overrun time	2 to 60 min	5 min	
D.02	Max. burner anti-cycling time heating at 20 °C flow temperature	2 to 60 min	20 min	
D.04	Measured value for the cylinder temperature in °C	If a domestic hot water cylinder with sensor is connected		
D.05	Target flow temperature value (or target return value) in °C	Current target value, calculated from the set value, controller, control type, etc.		
D.07	Target cylinder temperature	(15 °C = frost protection, 40 °C up to D.20 (max. 70 °C))		
D.08	Room thermostat at terminal 3-4	0 = Open, no heating mode; 1 = Closed, heating mode		Not adjustable

Code	Parameter	Values or explanations	Factory setting	Own setting
D.09	Target flow temperature in °C from the external continuous controller to terminal 7-8-9/eBUS	Minimum from the external eBUS target value and target value for terminal 7		Not adjustable
D.10	Status of the heating pump	0 = Off 1 = On		Not adjustable
D.11	Status of additional external heating pump	0 = Off 1-100 = On Connection via the 2 in 7 multi-functional module		Not adjustable
D.12	Status of cylinder charging pump	0 = Off 1-100 = On		Not adjustable
D.13	Status of circulation pump	0 = Off 1-100 = On Connection via the 2 in 7 multi-functional module		Not adjustable
D.14	Setting for speed-controlled heating pump	Adjustment range: - = auto, 20 ... 100% fixed value setting	-	
D.15	Current pump output for the speed-controlled heating pump in %			
D.17	Control type	0 = Flow temperature control 1 = Return temperature control	0	
D.18	Pump mode (overrun)	1 = Overrun (comfort) 3 = Continuous (eco)	1	
D.20	Max. set value for target cylinder value	Adjustment range: 50 - 70 °C	65 °C	
D.22	External cylinder charging, plug C1-C2	1 = on, 0 = off		
D.23	Summer/winter mode (heating off/on)	0 = Heating off (Summer mode) 1 = Heating on		
D.24	Differential pressure sensor	0 = Contact open, 1 = Contact closed		Not adjustable
D.25	Cylinder charging/warm start enabled by warm start clock control/timer:	1 = Yes, 0 = No	1	
D.26	Internal accessory relay at X6 (pink plug)	1 = Circulation pump 2 = Second external pump 3 = Cylinder charging pump 4 = Flue non-return flap/extraction hood 5 = External gas valve 6 = External fault message	1	
D.27	Switching accessory relay 1 for 2 in 7 multi-functional module accessory	1 = Circulation pump 2 = Second external pump 3 = Cylinder charging pump 4 = Flue non-return flap/extraction hood 5 = External gas valve 6 = External fault message	1	
D.28	Switching accessory relay 2 for 2 in 7 multi-functional module accessory	1 = Circulation pump 2 = Second external pump 3 = Cylinder charging pump 4 = Flue non-return flap/extraction hood 5 = External gas valve 6 = External fault message	2	
D.30	Control signal for gas valves	0 = Off; 1 = On		Not adjustable
D.33	Fan speed target value	in rpm/10		Not adjustable
D.34	Fan speed actual value	in rpm/10		Not adjustable
D.40	Flow temperature	Actual value in °C		Not adjustable
D.41	Return temperature	Actual value in °C		Not adjustable

Code	Parameter	Values or explanations	Factory setting	Own setting
D.43	Floor-standing boiler temperature			Not adjustable
D.44	Digitised ionisation value	Display field 0 to 1020 > 700 no flame < 450 flame detected < 250 very good flame		Not adjustable
D.47	Outdoor temperature (with weather-compensated control)	Actual value in °C, if the outdoor temperature sensor is connected to X41		Not adjustable
D.50	Offset for minimum speed	In rpm/10, adjustment range: -40 to +40	Nominal value set in factory	
D.51	Offset for maximum speed	In rpm/10, adjustment range: -40 to +40	Nominal value set in factory	
D.54	Switch-on hysteresis	0–10 K	-2	
D.55	Switch-off hysteresis	0–10 K	6	
D.60	Number of temperature cut-out shutdowns	Number of shutdowns		Not adjustable
D.61	Number of flame sequence control faults	Number of unsuccessful ignitions in the last attempt		Not adjustable
D.63	Number of air-monitoring switch-off sequences	Number of shutdowns		Not adjustable
D.64	Average ignition time	In seconds		Not adjustable
D.65	Maximum ignition time	In seconds		Not adjustable
D.67	Remaining burner anti-cycling time	In minutes		Not adjustable
D.68	Unsuccessful ignitions at 1st attempt	Number of unsuccessful ignitions		Not adjustable
D.69	Unsuccessful ignitions at 2nd attempt	Number of unsuccessful ignitions		Not adjustable
D.71	Maximum target flow temperature value for heating	40 to 85 °C	75 °C	
D.72	External heating pump overrun time after cylinder charging	Adjustable from 0 to 600 seconds	300 s	
D.73	Cylinder charging offset, raising the temperature between the target cylinder temperature and the target flow temperature when cylinder charging	0 to 25 K	25 K	
D.75	Max. charging time for domestic hot water cylinder without independent control system	20 - 90 min	45 minutes	
D.76	Floor-standing boiler type	14 = ecoCRAFT		Not adjustable
D.77	Limit on cylinder charging output in kW	Adjustable cylinder charging output in kW Maximum value = nominal heat output	Automatic partial cylinder load	
D.78	Cylinder charging temperature limit (target flow temperature in cylinder charging mode) in °C	55 °C – 85 °C	80 °C	

Code	Parameter	Values or explanations	Factory setting	Own setting
D.80	Operating hours, heating	In hours (h)	After pressing the i button once, the first three numbers are displayed; after pressing the i button a second time, the second three numbers of the six-digit number (burner starts x 100) are displayed.	Not adjustable
D.81	Operating hours, domestic hot water generation	In hours (h)		
D.82	Number of burner start-ups in heating mode	Number of burner start-ups (x 100)		
D.83	Number of burner starts in domestic hot water mode	Number of burner start-ups (x 100)		
D.84	Maintenance indicator: Number of hours until the next maintenance	Adjustment range: 0 to 3000 hrs and "----" for deactivated 300 equals 3000 hrs	"----"	
D.87	Gas type setting	Adjustment range: 0 = Natural gas	0	
D.90	Status of digital control	0 = Not recognised (eBUS address ≤ 10) 1 = Recognised		Not adjustable
D.91	Status of DCF with outdoor temperature sensor connected	0 = No reception 1 = Reception 2 = Synchronised 3 = Valid		Not adjustable
D.93	Unit variant setting (DSN)	80 kW: 0 120 kW: 1 160 kW: 2 200 kW: 3 240 kW: 4 280 kW: 5		
D.95	Software version of the eBUS components	1. PCB (BMU) 2. Display (AI)		Not adjustable
D.96	Factory setting	Reset all adjustable parameters to factory setting 0 = No 1 = Yes	0	
D.97	Activating the installer level	Service code 17		
D.98	Telephone number in the plain text display	Input option for the telephone number that you want to display if a fault occurs		
D.99	Language for the plain text display			

D Inspection and maintenance work – Overview



Note

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

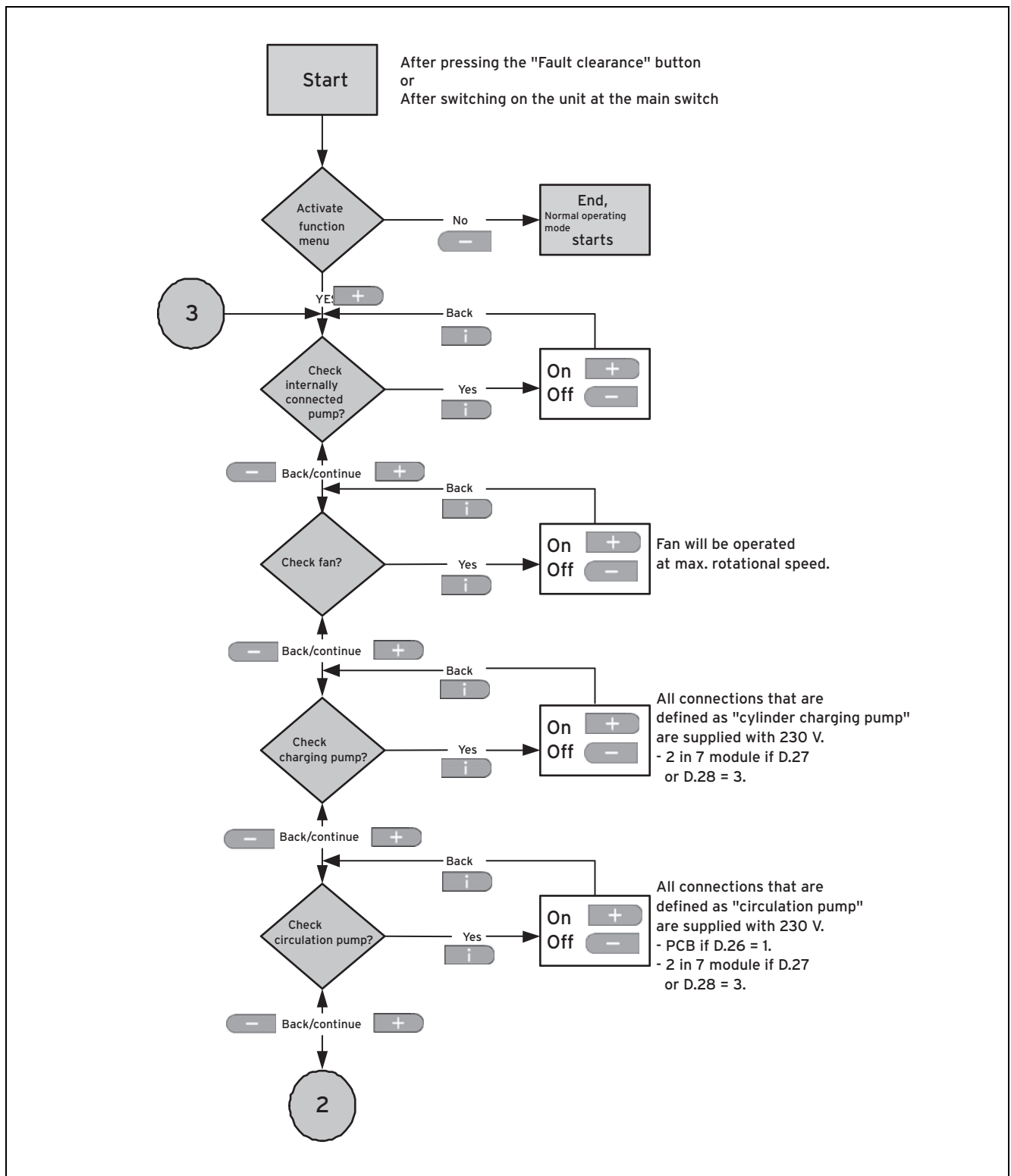
No.	Work	Inspection (annual)	Maintenance (must be carried out at regular intervals)*
1	Perform a test operation of the product and heating installation, including domestic hot water generation, and purge the system once more if necessary.	X	X

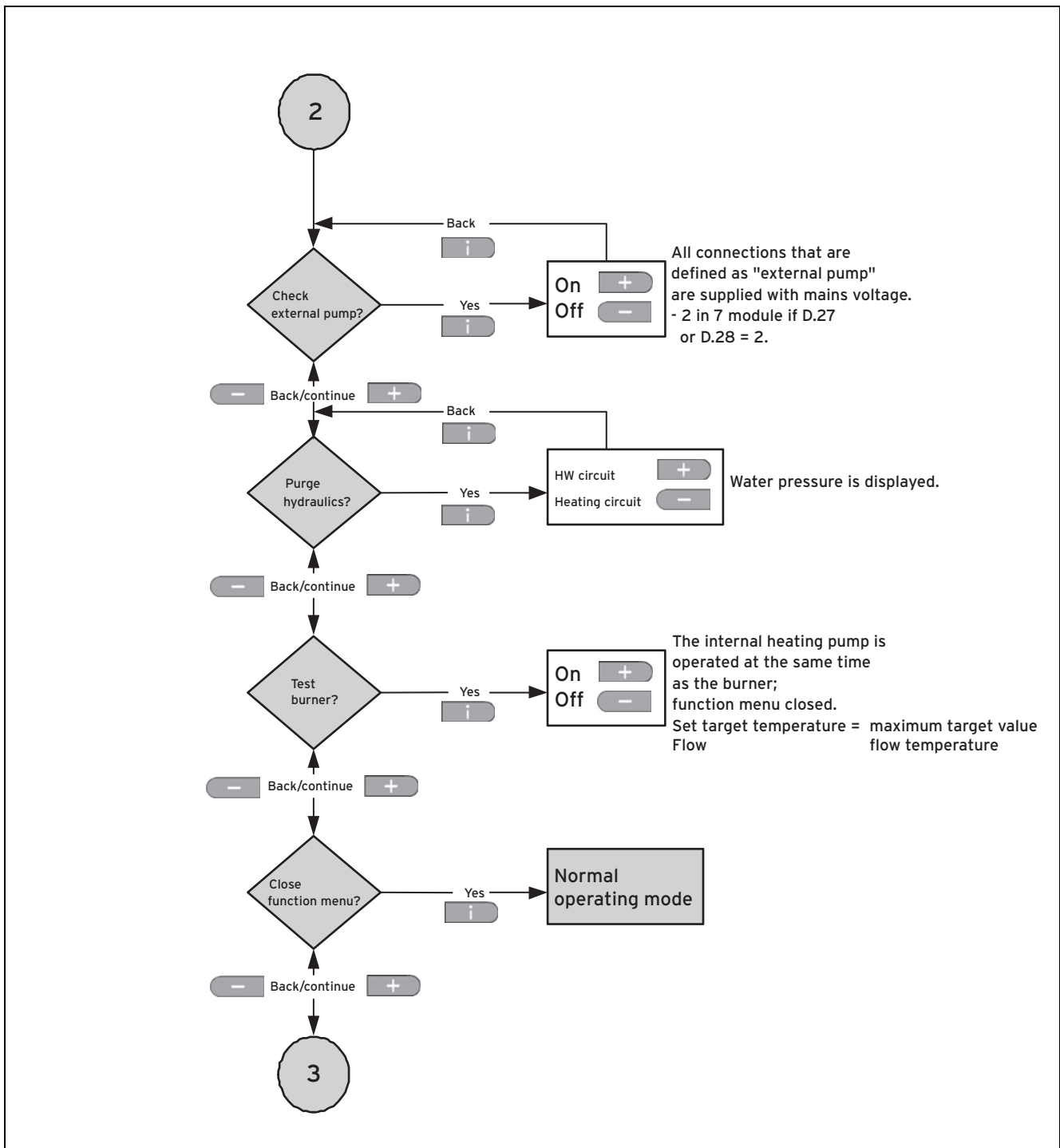
*Note: For those appliances which are not part of an annual service agreement/policy, maintenance must be carried out at least every 5 years.

*Note: If fitted: Maintenance work must be carried out on the domestic hot water cylinder every five years, irrespective of the heat generator.

No.	Work	Inspection (annual)	Maintenance (must be carried out at regular intervals)*
2	Isolate the product from the power grid and close the gas supply.	X	X
3	Remove the front casing.	X	X
4	Carry out a visual check to ensure the heating circuit for tightness, and a functional check of the automatic air vent.	X	X
5	Carry out a visual check of the expansion relief valve. No blockages or pipe connections must be detected at the expansion relief valve. Ensure that the correct expansion relief valve, tundish and line are present. The tundish must be visible. There must be no isolator between the gas-fired floor-standing condensing boiler and the expansion relief valve.	X	X
6	Remove the burner assembly		X
7	Clean the combustion chamber and, in doing so, rinse the condensate siphon.		X
8	Clean the burner and check it for damage.		X
9	Check the distance between the electrodes and between the electrodes and the burner.		X
10	Check the electrodes for depositions. If required, replace the electrodes.		X
11	Check the seals on the condensate tray and on the inspection opening for damage. Replace any damaged seals.	X	X
12	Clean the condensate collector.	X	X
13	Check the hose to the flue gas pressure monitor for dirt and leak-tightness.	X	X
14	Check the hoses leading to the combustion air pressure switch for dirt and leak-tightness.	X	X
15	Check the dust filter in the supply air box for dirt and damage. If necessary, replace the dust filter.	X	X
16	Reinstall the burner assembly. Caution: Replace the seal.		X
17	Check the condensate siphon in the product and, if required, fill the siphon.	X	X
18	Open the gas stopcock, reconnect the product to the power grid and switch it on.	X	X
19	Check the ignition and combustion behaviour under D.44	X	X
20	Check the CO ₂ content and adjust this, if required.		X
21	Check the product for gas, flue gas, domestic hot water and condensate leaks, and eliminate these leaks, if necessary.	X	X
22	Check all of the safety devices.	X	X
23	Check that the flue gas pressure monitor is working correctly by completely blocking the flue gas with flue gas restrictors. Carry out a visual check of all hoses and test nipples.		X
24	Check the control equipment (external control) and adjust this, if required.	X	X
25	Measure the load.		X
26	Record the inspection/maintenance work carried out.	X	X
27	Install the front casing.	X	X
28	Check and, if required, correct the system pressure.	X	X
29	Check the general condition of the product. Remove any general dirt from the product.	X	X
30	Record all of the analysis results in the Benchmark service record in these instructions.	X	X
<p>*Note: For those appliances which are not part of an annual service agreement/policy, maintenance must be carried out at least every 5 years.</p> <p>*Note: If fitted: Maintenance work must be carried out on the domestic hot water cylinder every five years, irrespective of the heat generator.</p>			

E Function menu – Overview





F Status codes – Overview

Status code	Meaning
Heating mode	
S.00	No heat demand
S.01	Advance fan operation
S.02	Pump pre-run
S.03	Ignition
S.04	Burner on
S.06	Fan overrun
S.07	Pump overrun
S.08	Burner anti-cycling time after heating mode
Cylinder charging	
S.20	Pump pre-run

Status code	Meaning
S.23	Ignition
S.24	Burner on
S.26	Fan overrun after cylinder charging
S.27	Pump overrun
S.28	Burner anti-cycling time after cylinder charging (cycle suppression)
Special cases	
S.30	Room thermostat (230/24 V) is blocking heating mode
S.31	Summer mode active or eBUS controller or built-in timer is blocking heating mode
S.32	Waiting period because of fan speed deviation (fan speed deviation still too high)
S.33	Pressure switch waiting period (pressure switch contact has not yet closed)
S.34	Frost protection mode active
S.35	Speed ramp waiting period (speed deviation at start of the ramp)
S.36	Target value for the eBUS control < 20 °C, i.e. the external control is blocking heating mode
S.39	Contact thermostat tripped
S.40	Limp home mode display active; product runs in restricted comfort protection mode. Corresponding fault code is displayed alternately with the status message
S.41	System pressure on the water side is too high
S.42	<ul style="list-style-type: none"> - Feedback of the flue non-return flap blocks burner operation (only in conjunction with accessories) - Condensate pump defective -> Requirement is blocked
S.49	Siphon pressure switch has been triggered, waiting period
S.59	Minimum volume of circulation water not achieved (block temperature is too high)
S.60	Waiting period after the flame goes out

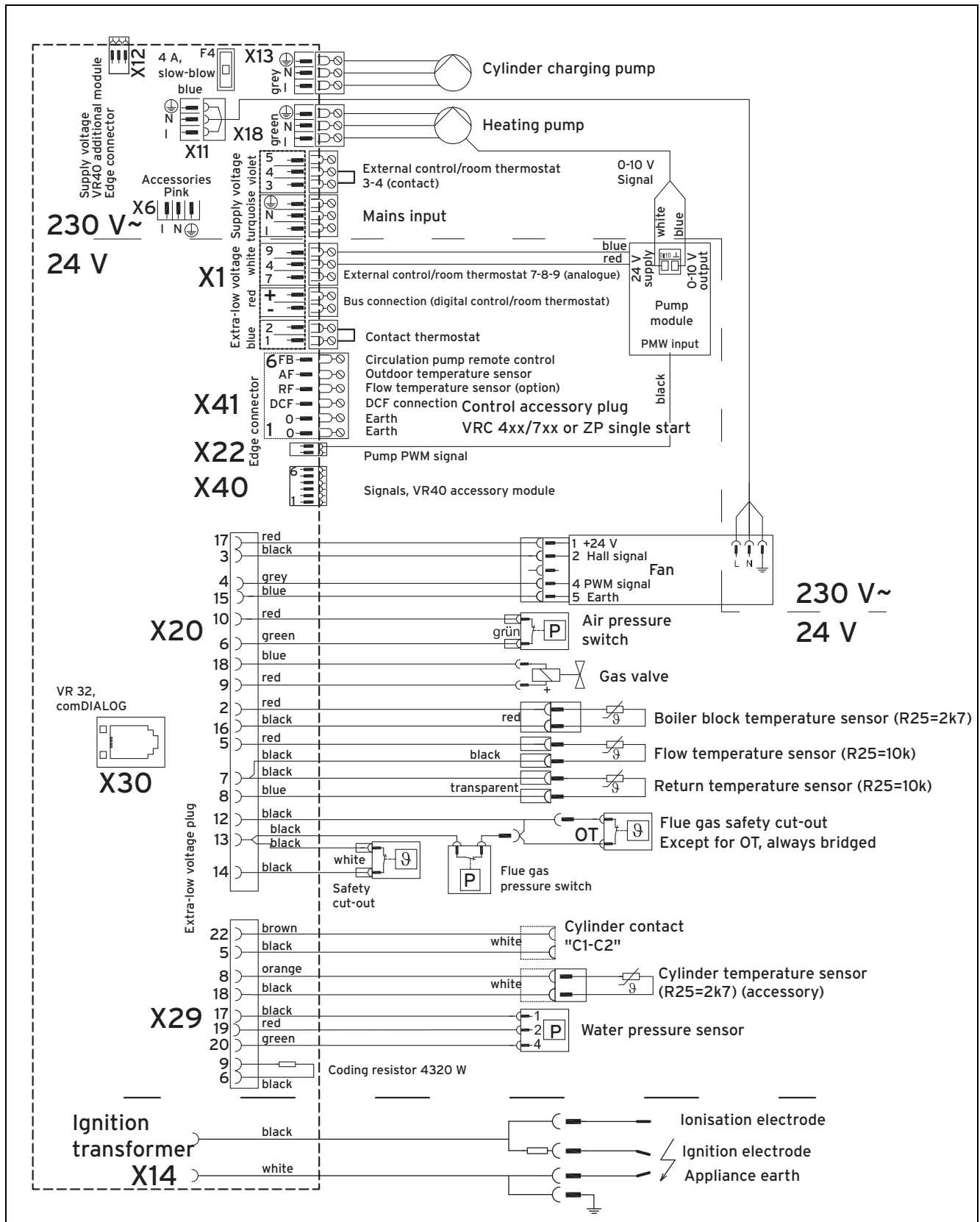
G Overview of fault codes

Code	Meaning	Cause
F.00	Flow temperature sensor interruption	Cable interrupted, cable not plugged in, sensor defective
F.01	Return temperature sensor interruption	Cable interrupted, cable not plugged in, sensor defective
F.10	Flow NTC short circuit	Cable short-circuited to earth or sensor defective
F.13	Cylinder temperature sensor short circuit	Cable short-circuited to earth or sensor defective
F.20	Safety switch-off: Temperature limiter	Air in the heat exchanger, combined with F.00 "Flow temperature sensor defective"
F.22	Safety switch-off: Low water pressure	Water pressure below 0.03 MPa (0.3 bar)
F.23	Temperature spread in the cast-iron heat exchanger is too high because the water circulation volume is too low	<ul style="list-style-type: none"> Pump blocked or defective Pump does not have enough power Installation throttled without low loss header
F.24	The temperature increases too quickly at the block or flow temperature sensor	<ul style="list-style-type: none"> Pump blocked or defective Pump does not have enough power Installation throttled without low loss header
F.27	"Secondary light"	Flame is detected when the gas valve is closed, electronics fault
F.28	Failure during start-up: Ignition unsuccessful	Gas supply missing, electrodes bent, defective or dirty, gas valve defective
F.29	Failure during operation: Re-ignition unsuccessful	Fault in the gas supply, gas valve defective, flue pipe not installed correctly (flue gas recirculation)
F.30	Interruption of the floor-standing boiler temperature sensor	Cable interrupted, cable not plugged in, sensor defective
F.31	Short circuit in the floor-standing boiler temperature sensor	Cable short-circuited to earth or sensor defective
F.32	Speed deviation too great, fan speed outside of the tolerance	Cable harness fault, fan fault
F.33	Pressure switch does not switch on	Burner is heavily soiled; supply-air filter is heavily soiled
F.34	Pressure switch does not switch off (if there is a fan)	Pressure switch defective, condensate in the measuring hose
F.37	Speed deviation during operation	Fan defective, or there is an electronics fault
F.42	Short circuit in coding resistor	Short circuit in coding resistor or cable harness fault

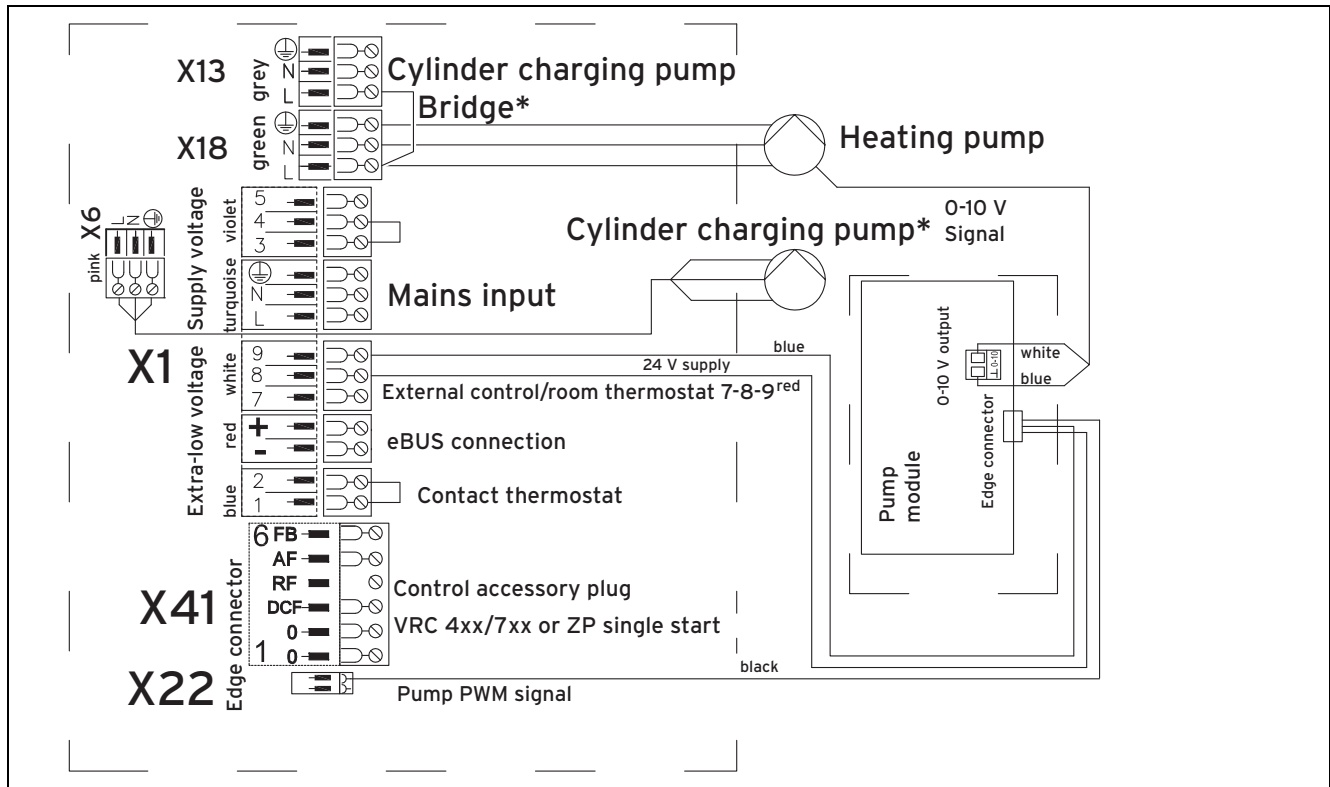
Code	Meaning	Cause
F.43	Interruption in coding resistor	Interruption in coding resistor or cable harness defective
F.49	Fault: eBUS	Short circuit on eBUS, eBUS overload or two power supplies with different polarities on the eBUS
F.50	Fault in the flue gas pressure switch	Flue gas installation blocked, condensate siphon blocked or condensate discharge blocked or routed on an incline
F.60	Fault: Gas valve regulation +	Electronics defective
F.61	Fault: Gas valve regulation –	Electronics defective
F.62	Fault: Gas valve switch-off delay	<ul style="list-style-type: none"> – Delayed shutdown of gas valve – Delayed extinguishing of flame signal – Gas valve leaking – Electronics defective
F.63	Fault: EEPROM	Electronics defective
F.64	ADC fault	Electronics defective or short circuit in the flow temperature sensor
F.65	Fault: Electronics temp.	Electronics overheating due to external influences, electronics defective
F.66	Electronics fault	Electronics defective
F.67	Fault: Electronics/flame	Implausible flame signal, electronics defective
F.70	Invalid device specific number (DSN)	Electronics ID and display do not match
F.73	Water pressure sensor signal in the wrong range (too low)	Pressure sensor not connected or it has short-circuited
F.74	Water pressure sensor signal outside correct range (too high)	Pressure sensor defective or there is a cable interruption
Err	Communication fault between the operator control panel and the electronics	The reset button function remains active

H Wiring diagrams

H.1 Connection diagram, complete



H.2 Wiring diagram, extract



* If you connect the cylinder charging pump downstream of a low loss header or a heat exchanger, set this bridge and connect the cylinder charging pump to X6. Set the value from **D.26** to 3. Otherwise, connect the cylinder charging pump to and do not set the bridge.

I Position of the air/flue terminal

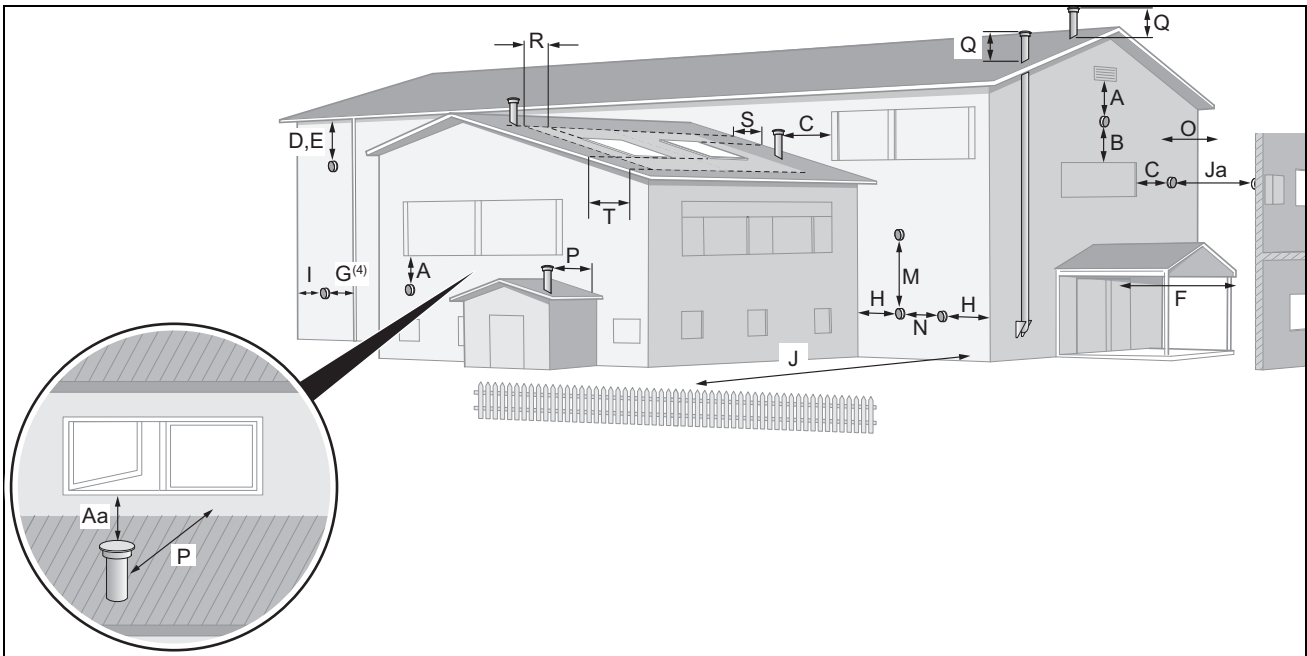
The diagram is relevant for the installation of boilers with a gross heat input > 70 kW net but less than 333 kW net. For further information see the current IGEM UP/10 and the risk assessment appendix for guidance on suitable flue terminal locations.

For installations above 333 kW net input, refer to the "Clean Air Act," as the discharge of flue products must comply with the stated and calculated distances above ground (see note 3).

It is essential to ensure that discharged flue products do not create any hazard or nuisance to persons within the discharge area and do not come into contact with building surfaces or build-up within an area where they may re-enter a building.

Notes

1. No installations should discharge into a courtyard, light well, car port or enclosed environment.
2. Care should be taken to ensure that even if the installation complies with the minimum dimensions shown, that all site conditions are taken into consideration to avoid products re-entering the building, the plume becoming a nuisance or causing wall staining.
3. Above 333 kW net input the height and termination of flues will require approval from the local authority.



I.1 Positioning of the opening of a fan-supported flue system

Minimum clearances for concentric terminations			
Key	Horizontal → 70 kW up to 120 kW	mm	All systems > 120 kW
A	Directly below an opening, air brick, opening windows	2,500	Flue system to be designed and installed according to IGEN UP/10. Use the risk assessment at appendix 9. Above 333 kW net heat input the clean air act must also be adhered to and system will need approval of local authority.
B	Above an opening, air brick, opening windows	900	
C	Horizontally to an opening, air brick, opening windows	900	
D (1,4,9)	Below metal gutter, drain/soil pipe (extending out to clear)	200*	
E (1,4,9)	Below eaves, adjacent to drain pipes	200	
F(6)	Below balcony or car port - must be extend to clear air	50	
G(4)	From a vertical drain pipes and soil pipes (extend out to clear)	50	
H(7,9)	From internal/external corner	300	
I(2,7)	To a boundary alongside the terminal/external corner	300	
J (2)	Facing a boundary or surface opposite	2,200	
Ja(2)	From a terminal opposite facing the terminal	3,000	
M (7)	Vertical from a terminal	1,500	
N (7)	Horizontally from a terminal	300	
O	Rosette to face of wall (can be extended up to 500mm *)	0	
* Terminal and wall entry must be sealed to prevent water ingress.			
Key	Vertical flues → 70 kW up to 120 kW	mm	All systems > 120 kW
*Products must disperse freely and not make contact with building surfaces			
1.	There should be no ventilation/opening in the eaves within 900 mm 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 plumbing depending on site conditions.		
3.	It is recommended that an elbow termination is fitted to direct the plume away from the window.		
4.	If the pipe is shielded from the heat, this dimension may be reduced to 25 mm.		
5.	The flue through the roof should not be located within the shaded areas – R, S and T.		
6.	It is recommended that the terminal should not be located below 2 m in any occupied space.		
7.	Terminals below 2 m must be fitted with a suitable terminal guard and should be a minimum of 300 mm above surface level.		
8.	It is the installer's responsibility to carry out a suitable risk assessment to ensure the location of the terminal is safe and products can freely disperse without causing nuisance or harm to persons. Refer to IGEN/UP/10.		
9.	All flue terminations must be positioned such that the flue products can discharge freely from the terminal for rapid dispersal and cannot enter or re-enter a building, whilst ensuring they do not come into contact with objects or building fabrics as these could be damaged by the condensate.		

Minimum clearances for concentric terminations

Aa (8,9)	Within 2000mm horizontally of opening window.	2,500	Flue system to be designed and Installed according to IGEM UP/10. Above 333 kW net heat input the clean air act must also be adhered to and system will need approval of local authority.
C(2,3)	From adjacent non-opening window	1,000	
P (3,9)	From structure or (taller) building without openings or windows	300*	
Q	Above flat roof or intersection with pitched roof	600	
R(5)	Horizontal from opening windows on pitched or flat roofs	900	
S(5)	Above an opening roof light or windows on pitched roofs	600	
T(5)	Below an opening roof light or windows on pitched roofs	2,000	

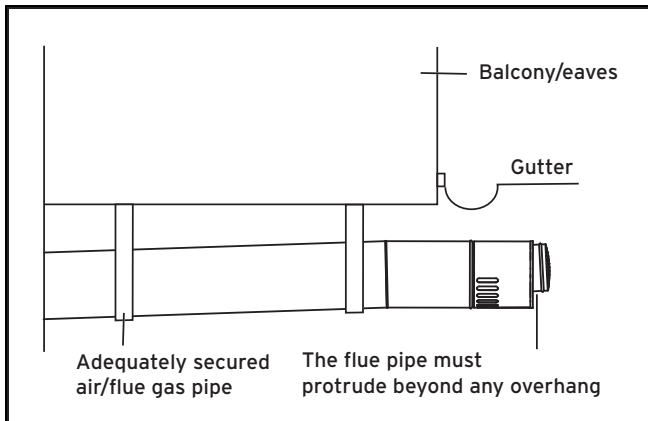
*Products must disperse freely and not make contact with building surfaces

1. There should be no ventilation/opening in the eaves within 900 mm 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 plumbing depending on site conditions.
3. It is recommended that an elbow termination is fitted to direct the plume away from the window.
4. If the pipe is shielded from the heat, this dimension may be reduced to 25 mm.
5. The flue through the roof should not be located within the shaded areas – R, S and T.
6. It is recommended that the terminal should not be located below 2 m in any occupied space.
7. Terminals below 2 m must be fitted with a suitable terminal guard and should be a minimum of 300 mm above surface level.
8. It is the installer's responsibility to carry out a suitable risk assessment to ensure the location of the terminal is safe and products can freely disperse without causing nuisance or harm to persons. Refer to IGEM/UP/10.
9. All flue terminations must be positioned such that the flue products can discharge freely from the terminal for rapid dispersal and cannot enter or re-enter a building, whilst ensuring they do not come into contact with objects or building fabrics as these could be damaged by the condensate.

I.2 Horizontal terminal positioning

Dimensions D, E, F and G:

These clearances may be reduced 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.



Horizontal Termination

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

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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
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Comments:				
Signature:				

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

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SERVICE & INTERIM BOILER WORK RECORD

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

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

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

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

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

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

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

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

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

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

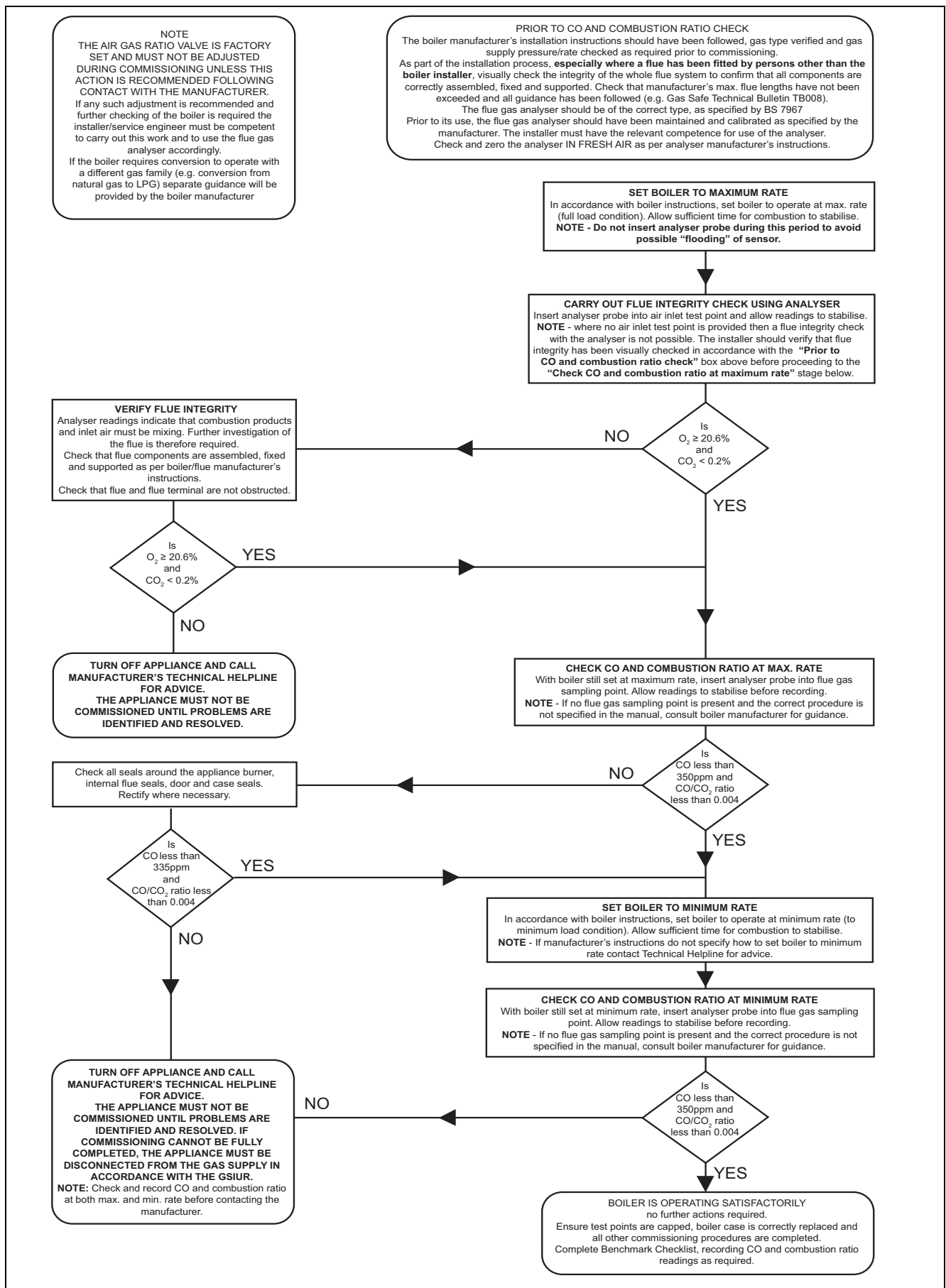
* All installations in England and Wales must be notified to Local Authority Building Control (LABC) either directly or through a Competent Persons Scheme. A Building Regulations Compliance Certificate will then be issued to the customer.

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K Commissioning Flow Chart



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