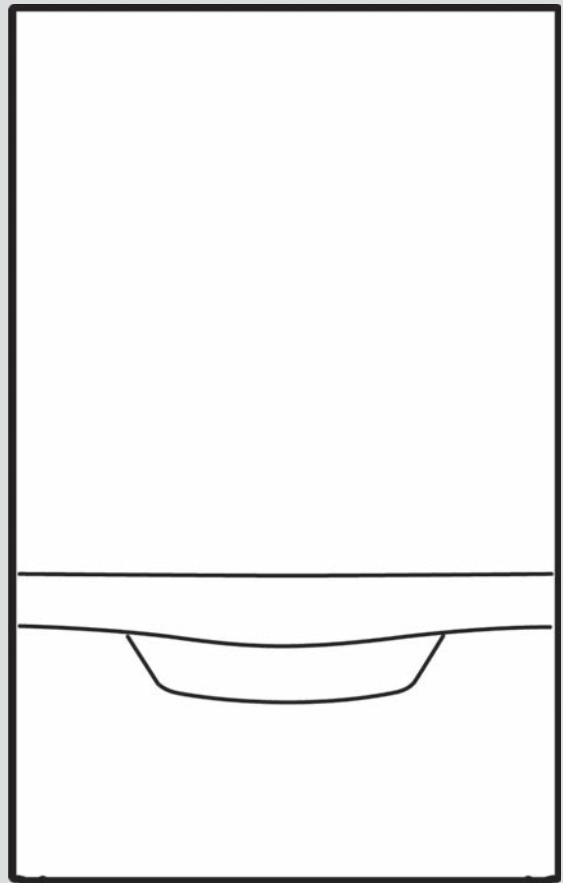




# ecoTEC plus

VUI 286/5-5 (H-GB) ecoTEC plus 938



# Installation and maintenance instructions

## Contents

<b>1</b>	<b>Safety</b> .....	<b>4</b>	<b>Start-up</b> .....	<b>27</b>
1.1	Intended use .....	4	9.1 Carrying out the initial start-up .....	27
1.2	Qualification .....	4	9.2 Switching the product on and off .....	27
1.3	General safety information .....	4	9.3 Running the installation assistants .....	27
1.4	Regulations (directives, laws, standards) .....	6	9.4 Restarting the installation assistants .....	27
1.5	List of relevant standards for Great Britain and Ireland .....	6	9.5 Test programmes.....	27
<b>2</b>	<b>Guarantee and Customer Service</b> .....	<b>7</b>	9.6 Performing a gas family check .....	28
<b>3</b>	<b>Technical data</b> .....	<b>8</b>	9.7 Using check programmes .....	28
<b>4</b>	<b>Notes on the documentation</b> .....	<b>9</b>	9.8 Checking and treating the heating water/filling and supplementary water .....	28
<b>5</b>	<b>Product description</b> .....	<b>9</b>	9.9 Filling the condensate trap .....	29
5.1	CE marking .....	9	9.10 Preventing low water pressure .....	29
5.2	Energy Saving Trust Endorsed Products .....	9	9.11 Flushing the heating installation for the first time ("cold") .....	29
5.3	Information on the identification plate .....	10	9.12 Filling the heating installation .....	30
5.4	Serial number .....	10	9.13 Purging the heating installation .....	30
5.5	Design of the product.....	10	9.14 Filling and purging the hot water system .....	30
5.6	Safety Devices.....	11	9.15 Gas inspection .....	30
<b>6</b>	<b>Set-up</b> .....	<b>12</b>	9.16 Thoroughly flushing the heating installation ("hot").....	33
6.1	Checking the scope of delivery .....	12	9.17 Checking leak-tightness .....	33
6.2	Dimensions .....	12	<b>10 Adapting the unit to the heating installation</b> .....	<b>34</b>
6.3	Installation site .....	13	10.1 Burner anti-cycling time .....	34
6.4	Minimum clearances .....	13	10.2 Setting the maintenance interval .....	34
6.5	Compartment Ventilation .....	13	10.3 Setting the pump output.....	34
6.6	Air/flue pipe .....	13	10.4 Setting the bypass valve.....	35
6.7	Using the installation template.....	16	<b>11 Handing over to the end user</b> .....	<b>35</b>
6.8	Wall-mounting the product.....	16	<b>12 Inspection and maintenance</b> .....	<b>36</b>
6.9	Removing/installing the front casing .....	17	12.1 Complete Service Interval Record section .....	36
6.10	Removing/installing the side section .....	17	12.2 Using original seals.....	36
<b>7</b>	<b>Installation</b> .....	<b>18</b>	12.3 Inspection and maintenance.....	36
7.1	Installation prerequisites .....	18	12.4 Preparing the maintenance work.....	36
7.2	Preparing for installation .....	18	12.5 Function menu .....	36
7.3	Descaling the water .....	18	12.6 Electronics self-test.....	36
7.4	Installing the gas connection .....	18	12.7 Checking the electrical plug connections .....	36
7.5	Installing the hot and cold water connection.....	19	12.8 Removing the compact thermal module .....	36
7.6	Installing pipe connections between the shift-load cylinder and the heat generator .....	19	12.9 Cleaning the heat exchanger.....	37
7.7	Connecting the heating flow and heating return .....	19	12.10 Checking the burner .....	37
7.8	Connecting the condensate discharge pipe .....	19	12.11 Cleaning the condensate trap.....	38
7.9	Installing the discharge pipe on the expansion relief valve.....	22	12.12 Cleaning the strainer in the cold water inlet.....	38
7.10	Connecting the flexible hose to the expansion relief valve on the shift-load cylinder .....	22	12.13 Installing the compact thermal module .....	38
7.11	Flue installation.....	22	12.14 Draining the product .....	38
7.12	Electrical installation .....	23	12.15 Checking the pre-charge pressure for the internal expansion vessel on the heat generator .....	38
<b>8</b>	<b>Operation</b> .....	<b>26</b>	12.16 Checking the pre-charge pressure of the shift-load cylinder expansion vessel.....	39
8.1	Operating concept .....	26	12.17 Checking the filling pressure of the heating installation.....	39
8.2	Calling up the installer level.....	26	12.18 Checking the quality of the heating water.....	39
8.3	Live Monitor (status codes) .....	26	12.19 Completing inspection and maintenance work ....	39
8.4	Setting the hot water temperature .....	26	12.20 Checking the product for leak-tightness .....	39
			<b>13 Troubleshooting</b> .....	<b>40</b>
			13.1 Checking service messages.....	40
			13.2 Eliminating faults.....	40

13.3	Calling up and clearing the fault memory .....	40
13.4	Resetting parameters to factory settings .....	40
13.5	Preparing the repair work .....	40
13.6	Replacing defective components.....	40
13.7	Completing repair work.....	46
13.8	Checking the product for leak-tightness .....	46
<b>14</b>	<b>Decommissioning.....</b>	<b>46</b>
14.1	Temporarily decommissioning the product.....	46
14.2	Permanently decommissioning the product.....	46
<b>15</b>	<b>Recycling and disposal.....</b>	<b>46</b>
<b>Appendix .....</b>		<b>47</b>
<b>A</b>	<b>Inspection and maintenance work.....</b>	<b>47</b>
<b>B</b>	<b>Installer level – Overview .....</b>	<b>48</b>
<b>C</b>	<b>Overview of diagnostics codes .....</b>	<b>50</b>
<b>D</b>	<b>Status codes – Overview .....</b>	<b>55</b>
<b>E</b>	<b>Overview of fault codes .....</b>	<b>56</b>
<b>F</b>	<b>Check programmes – Overview .....</b>	<b>59</b>
<b>G</b>	<b>Function menu – Overview .....</b>	<b>59</b>
<b>H</b>	<b>Wiring diagrams.....</b>	<b>60</b>
H.1	Wiring diagram, product with integrated domestic hot water generation, $\geq 37$ kW .....	60
<b>I</b>	<b>Commissioning Checklist.....</b>	<b>62</b>
<b>J</b>	<b>Commissioning Flow Chart .....</b>	<b>66</b>
<b>Index .....</b>		<b>67</b>



## 1 Safety

### 1.1 Intended use

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

Improper use of any kind is prohibited.

Intended use also includes the following:

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

The following is classed as improper use:

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

### 1.2 Qualification

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

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

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

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

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

### 1.3 General safety information

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

#### 1.3.1 Gas

If you smell gas:

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





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

### 1.3.2 Flue gas

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

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

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

To prevent flue gas exit:

- ▶ Only operate the product if the air/flue pipe has been completely installed.
- ▶ With the exception of short periods for testing purposes, only operate the product when the front casing is installed and closed.
- ▶ In order to operate the product, ensure that the condensate siphon is always full.
  - Water seal level for units with condensate siphon (third-party accessory):  
≥ 200 mm

To ensure that the seals are not damaged:

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

### 1.3.3 Air supply

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

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

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

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

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

### 1.3.4 Electricity

The power supply terminals L and N remain live.

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

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

### 1.3.5 Weight

To prevent injuries when transporting the product:

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

To prevent material damage to the flexible gas pipe:

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





### 1.3.6 Explosive and flammable substances

To prevent explosions and fire:

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

### 1.3.7 High temperatures

To prevent burns:

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

To prevent material damage that is caused by heat transfer:

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

### 1.3.8 Heating water

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

- ▶ Check the quality of the heating water. (→ Page 28)
- ▶ If you use non-diffusion-tight plastic pipes in the heating installation, ensure that no air gets into the heat generator circuit.

### 1.3.9 Neutralisation device

To prevent contamination of the waste water:

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

### 1.3.10 Frost

To prevent material damage:

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

### 1.3.11 Safety devices

- ▶ Install the necessary safety devices in the installation.

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

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

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

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

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

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

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

### 1.3.14 Risk of damage to the flexible gas pipe

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

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

## 1.4 Regulations (directives, laws, standards)

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

## 1.5 List of relevant standards for Great Britain and Ireland

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



You can find a list of relevant standards at:

<https://www.vaillant.co.uk/standards>



## Guarantee Registration

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

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

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

### **Sales Support:**

Telephone: 0345 602 0262

### **Technical Enquiries:**

Telephone: 0344 693 3133

Email: [technical@vaillant.co.uk](mailto:technical@vaillant.co.uk)

### **General Enquiries:**

Telephone: 0345 602 2922

### **Training Enquiries:**

Telephone: 0345 601 8885

Email: [training.enquiriesuk@vaillant-group.com](mailto: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

	VUI 286/5-5 (H-GB) ecoTEC plus 938
Designated country (designation in accordance with ISO 3166)	GB (Great Britain), IE (Ireland)
Approved gas boiler categories	II <sub>2H3P</sub>
Gas connection, boiler side	15 mm
Flow/return heating connections, boiler side	22 mm
Domestic hot and cold water connection, boiler side	G 3/4"
Expansion relief valve connection pipe (min.)	15 mm
Air/flue gas connection	60/100 mm
Condensate drain pipe-work (min.)	19 mm
G20 natural gas flow pressure	2.0 kPa (20.0 mbar)
G31 propane gas flow pressure	3.7 kPa (37.0 mbar)
Gas flow rate at 15 °C and 1013 mbar (based on domestic hot water generation, if applicable), G20	4.2 m <sup>3</sup> /h
Min. flue gas mass flow rate (G20)	3.05 g/s
Max. flue gas mass flow rate	17.9 g/s
Min. flue gas temperature	40 °C
Max. flue gas temperature	70 °C
Approved gas boiler types	C13, C33, C43, C53
30% efficiency	109.4 %
NOx class	6
Test symbol/registration no.	CE-0085CM0321
SAP 2009/2012 annual efficiency (%)	89.4 %
Boiler dimension, width	440 mm
Boiler dimension, height	720 mm
Boiler dimension, depth	624 mm
Mounting weight	– 43 kg VUW – 17 kg VIHCL
Operating weight (with water)	– 51 kg VUW – 32 kg VIHCL
Shift-load cylinder capacity	15 l

#### Technical data – G20 power/loading G20

	VUI 286/5-5 (H-GB) ecoTEC plus 938
Nominal heat output range P at 50/30 °C	7.1 to 30.9 kW
Nominal heat output range P at 80/60 °C	6.5 to 28.6 kW
Maximum heat output for domestic hot water generation	38.7 kW
Maximum heat input for domestic hot water generation	39.2 kW
Maximum heat input, heating side	28.9 kW
Minimum heat input	6.8 kW
Heating adjustment range	6 to 29 kW
Nominal heat input efficiency (stationary) at 40/30 °C	107.0 %
Nominal heat input efficiency (stationary) at 50/30 °C	107.0 %
Nominal heat input efficiency (stationary) at 60/40 °C	101.0 %
Nominal heat input efficiency (stationary) at 80/60 °C	98.0 %

#### Technical data – Power/loading G31

	VUI 286/5-5 (H-GB) ecoTEC plus 938
Nominal heat output range P at 50/30 °C	9.4 to 29.8 kW
Nominal heat output range P at 80/60 °C	8.7 to 28.6 kW
Maximum heat output for domestic hot water generation	38.7 kW
Maximum heat input for domestic hot water generation	39.2 kW
Maximum heat input, heating side	28.9 kW
Minimum heat input	9.0 kW
Nominal heat input efficiency (stationary) at 40/30 °C	104.0 %
Nominal heat input efficiency (stationary) at 50/30 °C	103.0 %
Nominal heat input efficiency (stationary) at 60/40 °C	101.0 %
Nominal heat input efficiency (stationary) at 80/60 °C	98.0 %



## Technical data – Heating

	VUI 286/5-5 (H-GB) ecoTEC plus 938
Maximum flow temperature	85 °C
Max. flow temperature adjustment range (default setting: 75 °C)	30 to 80 °C
Permissible operating pressure	0.25 MPa (2.50 bar)
Minimum pressure for full operation	0.08 MPa (0.80 bar)
Expansion vessel capacity	10 l
Circulation water volume (with reference to $\Delta T = 20$ K)	1,230 l/h
Approx. condensate rate (pH value 3.5 to 4.0) in 50/30 °C heating mode	2.9 l/h
Remaining feed head of pump (at nominal circulation water volume)	0.025 MPa (0.250 bar)

## Technical data – Hot water handling mode

	VUI 286/5-5 (H-GB) ecoTEC plus 938
Lowest water volume	2.0 l/min
Water volume (at $\Delta T = 30$ K)	20.8 l/min
Specific water volume D ( $\Delta T = 30$ K)	20.5 l/min
Water volume (at $\Delta T = 35$ K)	15.9 l/min
Water volume (at $\Delta T = 42$ K)	13.2 l/min
Permitted overpressure	1.0 MPa (10.0 bar)
Required connection pressure	0.035 MPa (0.350 bar)
Hot water output temperature range	35 to 65 °C

## Technical data – Electrics

	VUI 286/5-5 (H-GB) ecoTEC plus 938
Electric connection	230 V/50 Hz
Permissible connected voltage	190 to 253 V
Built-in fuse (slow-blow)	2 A
Min. electrical power consumption	55 W
Max. electrical power consumption	155 W

	VUI 286/5-5 (H-GB) ecoTEC plus 938
Electrical power consumption, standby	– 2.7 W VUW – 2.0 W VIHCL
Level of protection	IP X4 D

## 4 Notes on the documentation

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

These instructions apply only to:

### Product article number

	Article number	Gas Council Number
VUI 286/5-5 (H-GB) ecoTEC plus 938	0010021827	47-044-87

## 5 Product description

### 5.1 CE marking



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

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

### 5.2 Energy Saving Trust Endorsed Products



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





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

#### About the Energy Saving Trust

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

### 5.3 Information on the identification plate

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

Information on the data plate	Meaning
	Read the instructions.
VUI...	Vaillant gas-fired wall-hung boiler for heating and domestic hot water generation with shift-load cylinder
..6/5-5	Gross calorific value power/product generation equipment
ecoTEC plus	Product designation
2H, G20 – 20 mbar (2.0 kPa)	Gas group and gas connection pressure as set at the factory
ww/yyyy	Production date: Week/year
Cat.	Permissible gas categories
Types	Approved gas boiler types
PMS	Permissible operating pressure, heating mode
PMW	Permissible operating pressure for domestic hot water generation
T <sub>max.</sub>	Max. flow temperature
ED 92/42	Current efficiency directive fulfilled with 4* rating
V Hz	Mains voltage and mains frequency
W	Max. electrical power consumption
IP	IP rating
	Heating mode
	Domestic hot water generation
P	Nominal heat output range
Q	Heat input range
D	Nominal domestic hot water draw-off rate
	Barcode with serial number, 7th to 16th digit = product article number



#### Note

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

### 5.4 Serial number

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



#### Note

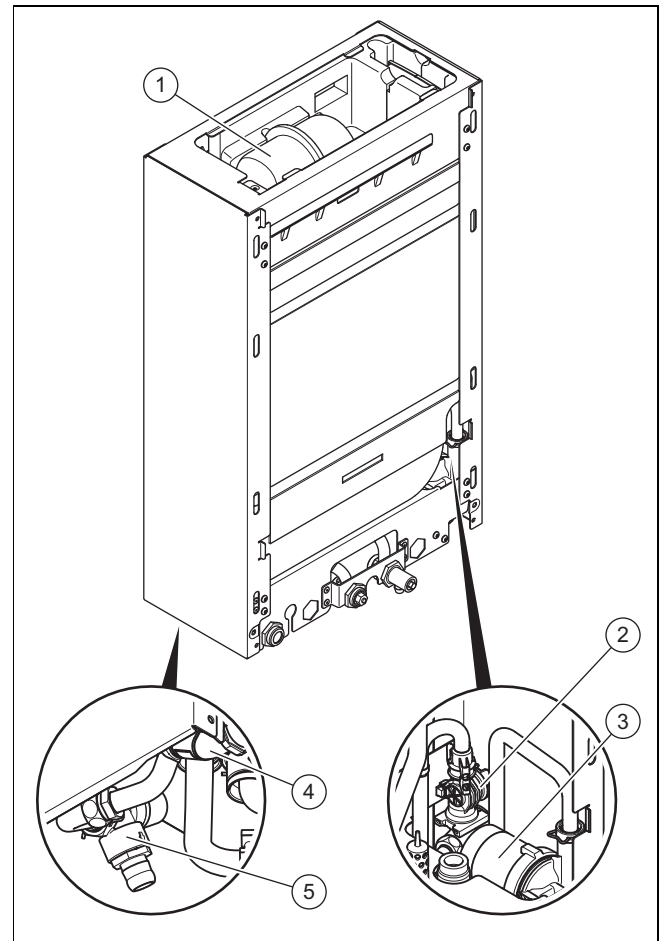
The serial number can also be shown on the display of the product (→ Operating instructions).

### 5.5 Design of the product

The product comprises:

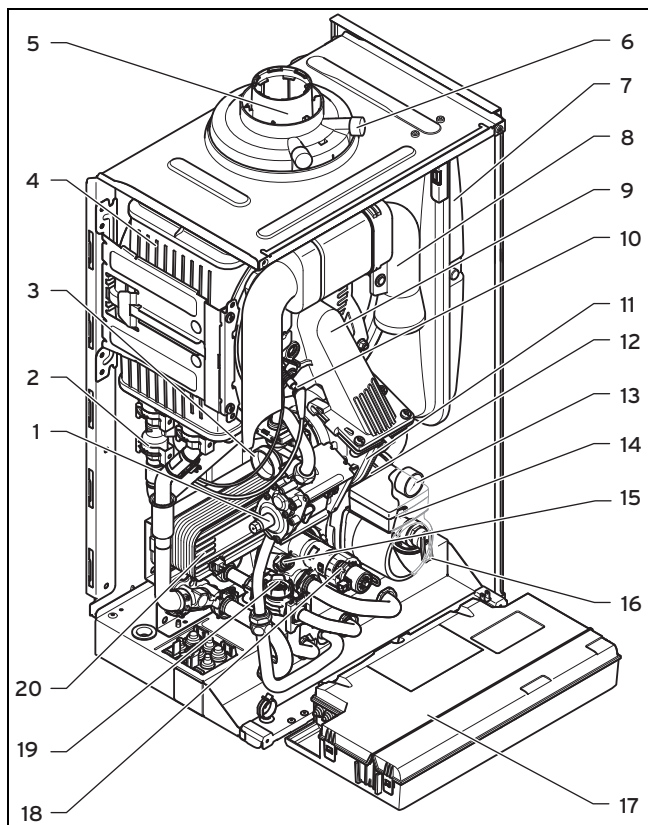
- A 15 litre shift-load cylinder
- A modified boiler with integrated hot water generation

#### 5.5.1 Functional elements of the shift-load cylinder



- |   |                        |   |                               |
|---|------------------------|---|-------------------------------|
| 1 | Expansion vessel       | 4 | Domestic hot water NTC sensor |
| 2 | Impeller sensor        | 5 | Expansion relief valve        |
| 3 | Cylinder charging pump |   |                               |

## 5.5.2 Functional elements, product with domestic hot water generation



1	Gas valve assembly	11	Fan
2	Water pressure sensor	12	Automatic air vent
3	Venturi with mass flow sensor	13	Manometer
4	Heat exchanger	14	Internal pump
5	Connection for the air/flue pipe	15	Bypass valve
6	Flue gas test point	16	Expansion relief valve
7	Expansion vessel	17	Electronics box
8	Air intake pipe	18	Prioritising diverter valve
9	Compact thermal module	19	Impeller sensor (domestic hot water)
10	Ignition electrode	20	Secondary heat exchanger

## 5.6 Safety Devices

### 5.6.1 Electrical Supply Failure

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

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

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

### 5.6.2 Overheating Safety

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

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

### 5.6.3 Frost protection

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

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

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

### 5.6.4 Condensate Drain Blockage

As a safety feature the boiler will stop working if the condensate drain becomes blocked. During freezing conditions this may be due to the forming of ice in the condensate drain external to the house. Release an ice blockage by the use of warm cloths on the pipe. After pressing reset the boiler should restart.

## 6 Set-up

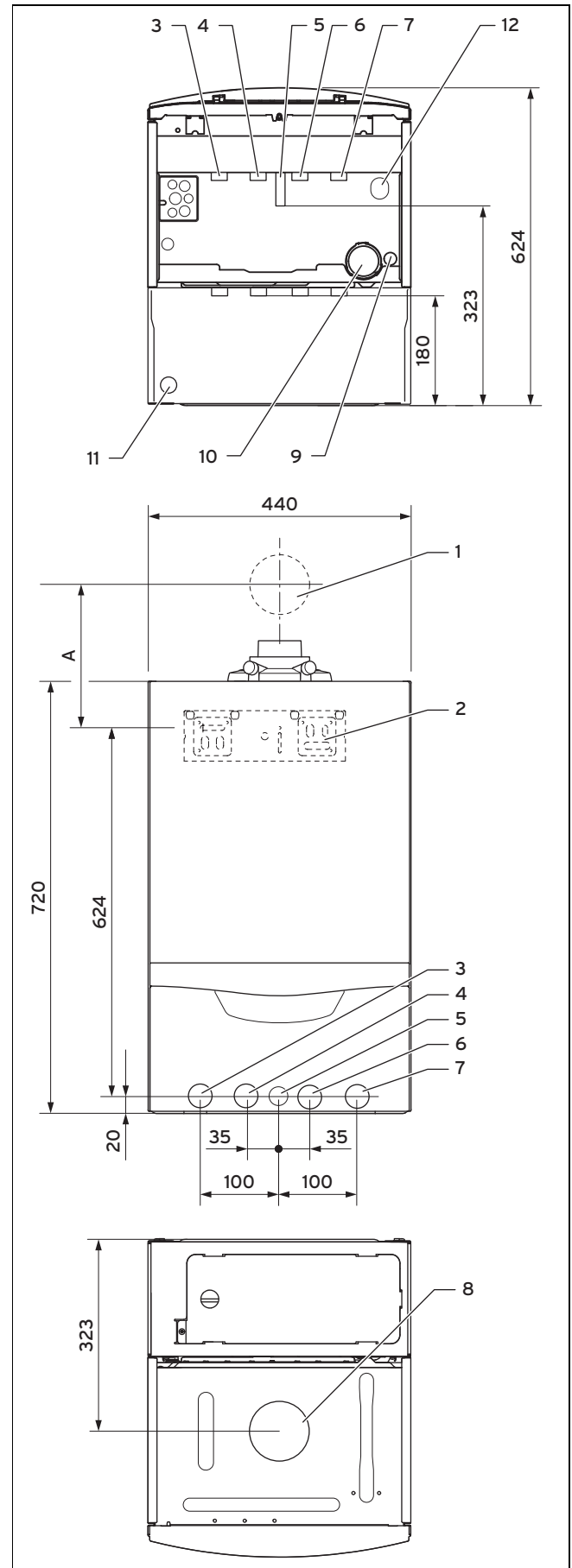
### 6.1 Checking the scope of delivery

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

#### 6.1.1 Scope of delivery

Number	Description
1	Heat generator
1	Shift-load cylinder
1	Lower cover of shift-load cylinder
1	Kit for wall installation:
1	- Product retainer
1	- Bag with small parts
1	Shift-load cylinder installation kit containing the following:
2	- Connection pipe (heating flow and return)
1	- Shift-load cylinder-in connection pipe
1	- Shift-load cylinder-out connection pipe
1	- Drain hose for the expansion relief valve on the shift-load cylinder
1	- Bag with small parts
1	Heat generator installation kit containing the following:
1	- Connector for the expansion relief valve on the boiler
1	- Connector 15 mm (gas)
1	- Gas compression joint, 15 mm
4	- Service valve
1	- Hot water connector
1	- 22 mm connection piece (heating flow and return connection)
2	- Bag with small parts
1	Lower cover of heat generator
1	Installation template
1	Condensate drain hose
1	Enclosed documentation

## 6.2 Dimensions



- |   |                         |   |  |
|---|-------------------------|---|--|
| 1 | Wall duct for flue pipe | 3 | Heating flow (22 × 1.5 diameter)         |
| 2 | Product holder          | 4 | Hot water connection (15 × 1.5 diameter) |

- |   |   |    |  |
|---|---|----|--|
| 5 | Gas connection<br>(15 × 1.5 diameter)                 | 10 | Condensate siphon  |
| 6 | Cold water connection<br>(15 × 1.5 diameter)          | 11 | Shift-load cylinder expansion relief valve<br>drain line connection,<br>15 mm diameter |
| 7 | Heating return (22 × 1.5<br>diameter)                 | 12 | Heat generator expansion<br>relief valve discharge pipe connection,<br>15 mm diameter  |
| 8 | Flue pipe connection                                  |    |  |
| 9 | Condensate discharge<br>connection, 19 mm<br>diameter |    |  |

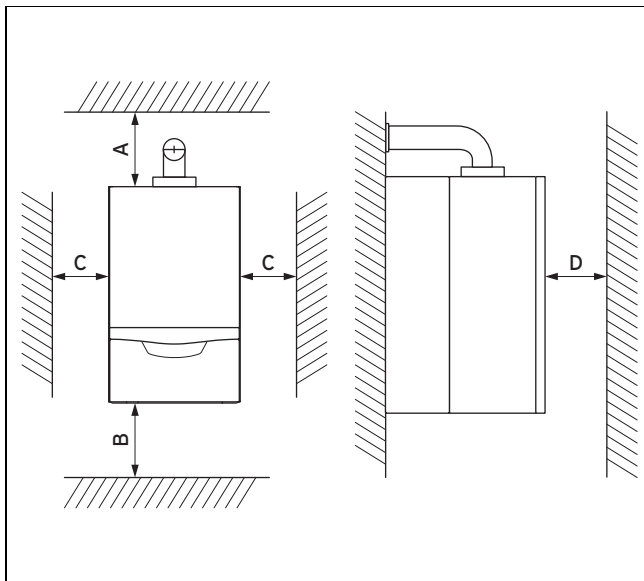
Consult the installation template that is supplied to find the dimension A.

### 6.3 Installation site

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

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

### 6.4 Minimum clearances



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

The boiler and flue are suitable for installation onto and through combustible materials provided that:

1. A minimum clearance of 5 mm is maintained around the circumference of the flue (air intake).
2. The combustible surface and fixings are suitable for supporting the load.
3. The minimum clearances from the boiler case are maintained.

## 6.5 Compartment Ventilation

The boilers are very high efficiency appliances.

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

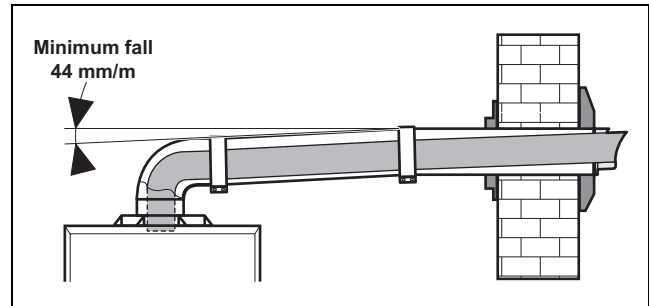
Compartment ventilation is not required as the products are only certified, and can only be fitted with a concentric flue system.

## 6.6 Air/flue pipe

### 6.6.1 Regulation

Different flue outlet configurations can be carried out.

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



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

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

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

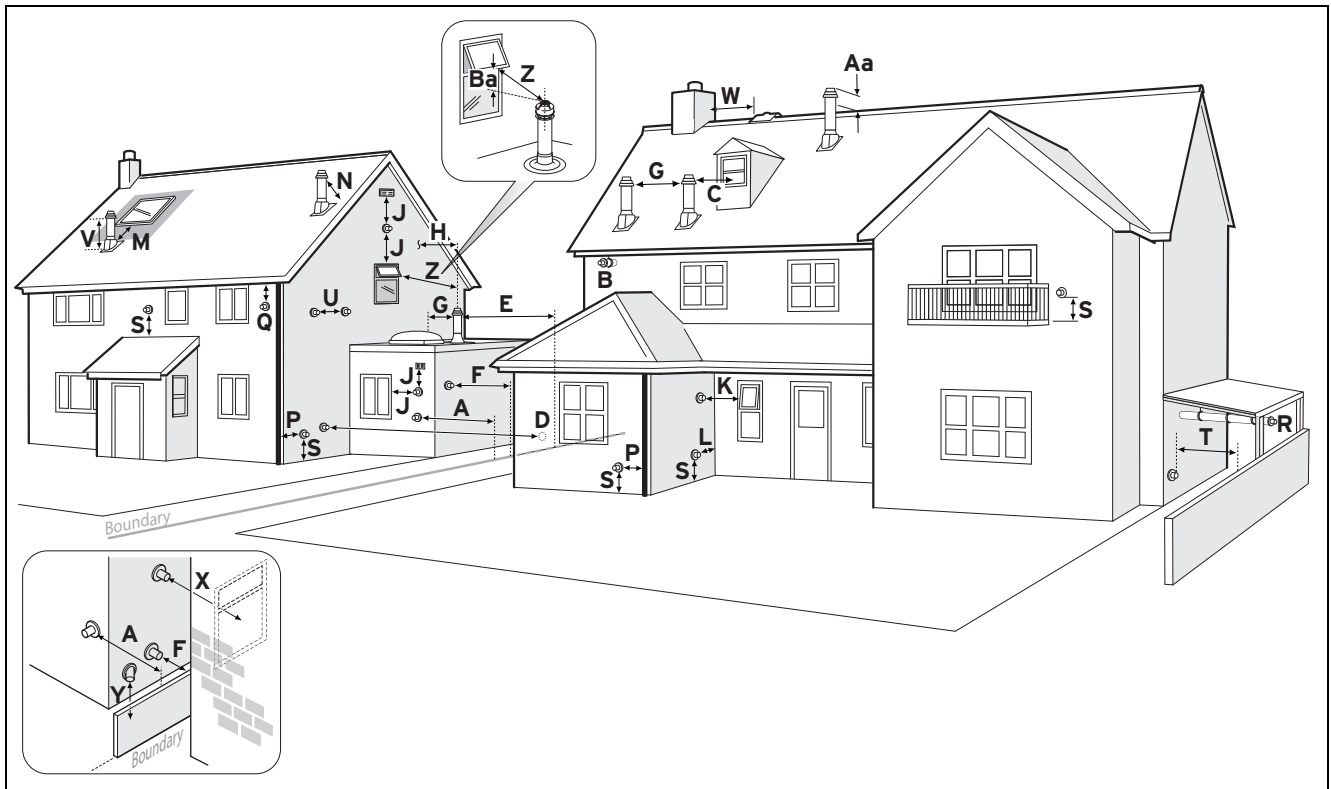
In GB the minimum acceptable siting dimensions for the terminal from obstructions, other terminals and ventilation openings are shown in diagram overleaf.

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

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

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

## 6.6.2 Position of the air/flue terminal



### 6.6.2.1 Positioning the terminal of a fan-supported flue system

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

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

### 6.6.2.2 Horizontal terminal positioning

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

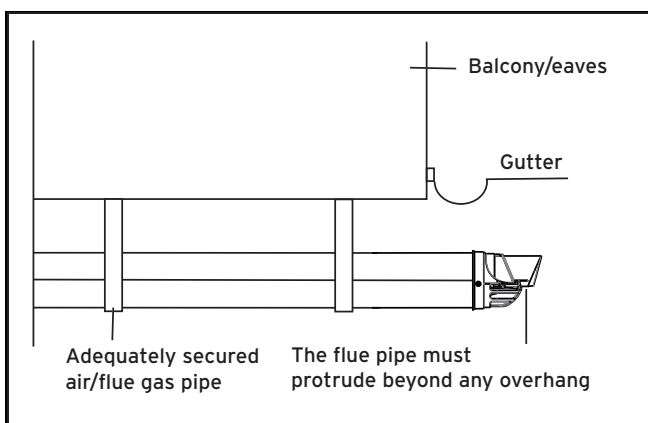
- a) at least 2 m from an opening in the building directly opposite, and
- b) so that the products of combustion are not directed to discharge directly across a boundary if the products are likely to cause a nuisance to a neighbour or discharge over a walkway or patio.

For IE see current issue of IS 813.

For boilers covered within this manual.

Dimensions B and R:

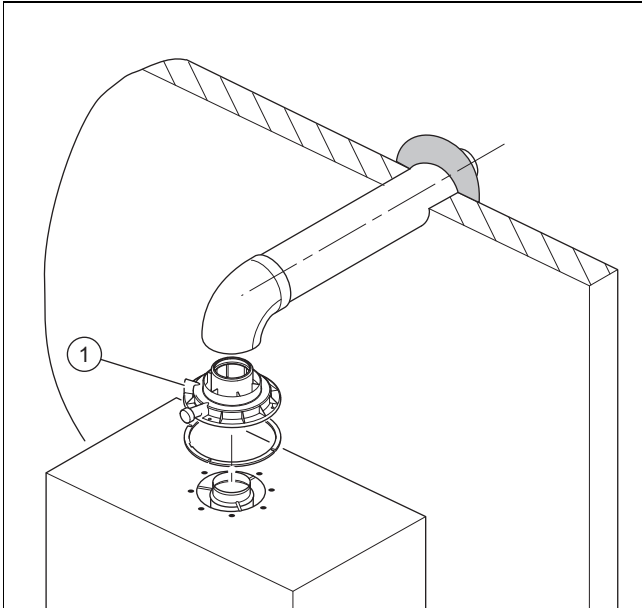
These clearances may be reduced to 25 mm without affecting the performance of the boiler. In order to ensure that the condensate plume does not affect adjacent surfaces the terminal should be extended as shown below.



You can use a plume management kit to enable the termination point to be positioned and directed away from the building fabric.

### 6.6.3 Flue Configuration Description

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



1 Gasket (fitted)

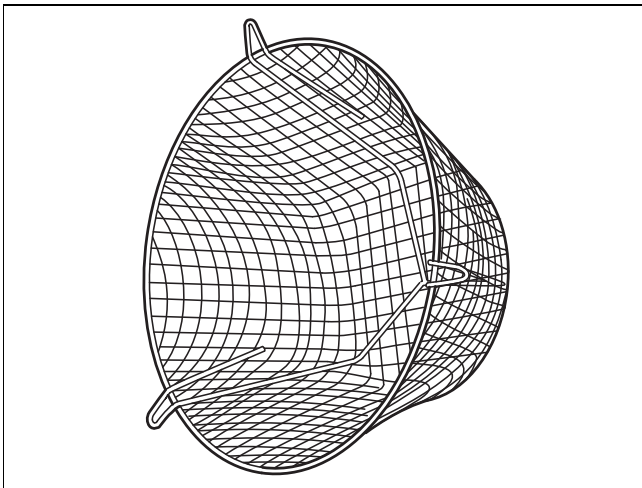


#### Note

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

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

#### 6.6.3.2 Terminal protection

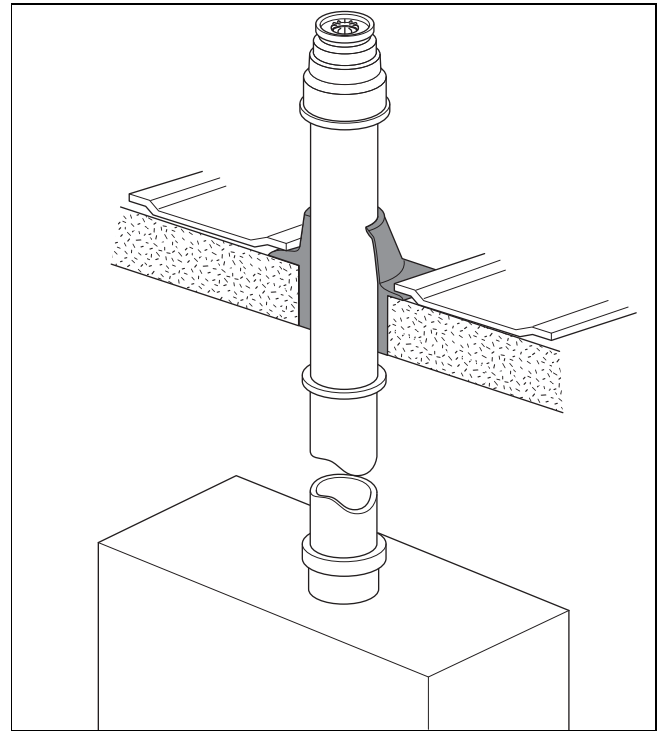


A terminal guard is required if persons could come into contact with the terminal or the terminal could be subject to damage.

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

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

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



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

### 6.7 Using the installation template

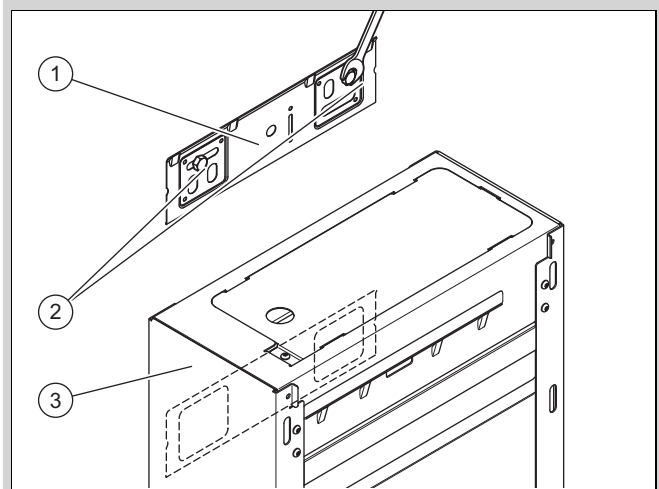
- Use the installation template to ascertain the locations at which you need to drill holes and make breakthroughs.

### 6.8 Wall-mounting the product

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

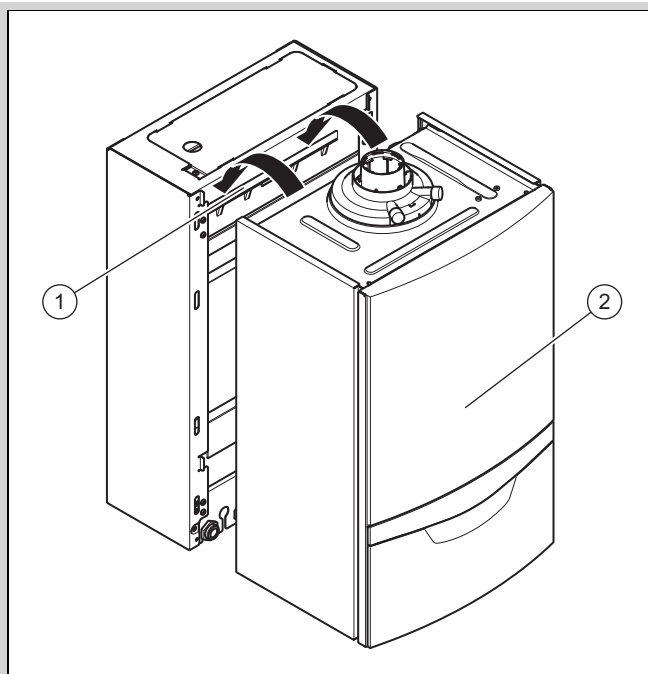
**Condition:** The load-bearing capacity of the wall is sufficient, The fixing material may be used for the wall

- Wall-mount the product as described.



- Install the reinforced product bracket (1) on the wall.
- Hang the shift-load cylinder on the product bracket from above using the hanging bracket.





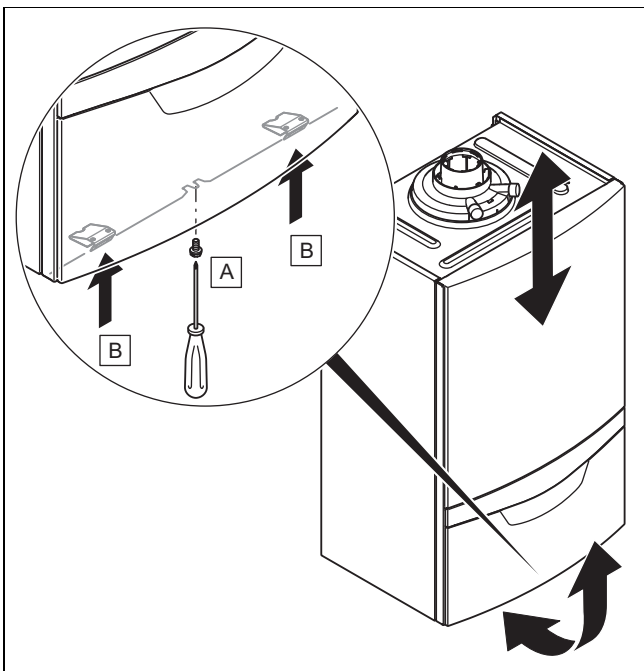
- ▶ Hang the heat generator (2) on the product bracket on the shift-load cylinder (1) from above using the hanging bracket.

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

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

## 6.9 Removing/installing the front casing

### 6.9.1 Removing the front casing



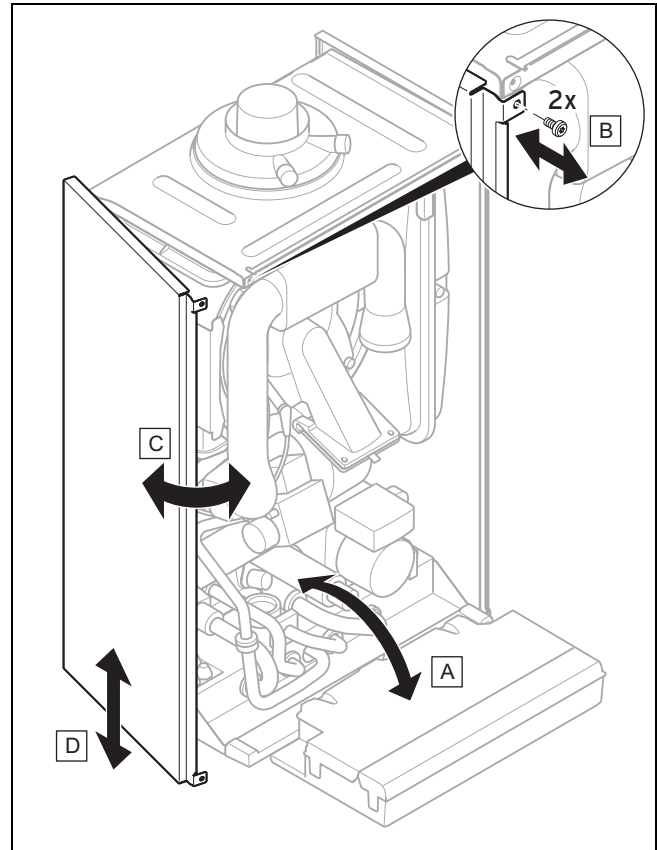
- ▶ Remove the front casing as shown in the illustration.

### 6.9.2 Installing the front casing

- ▶ Refit the components in the reverse order.

## 6.10 Removing/installing the side section

### 6.10.1 Removing the side section



#### Caution.

**Risk of material damage caused by mechanical deformation.**

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

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

- ▶ Remove the side section as shown in the illustration.

### 6.10.2 Installing the side section

- ▶ Refit the components in the reverse order.

## 7 Installation

### 7.1 Installation prerequisites

#### 7.1.1 Information on the gas group

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

#### 7.1.2 Purging the liquid gas tank

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

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

#### 7.1.3 Using the correct gas type

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

- ▶ Only use the gas type listed on the data plate.

### 7.2 Preparing for installation

1. Make sure that the existing gas meter is capable of passing the rate of gas supply required.
2. Consider the maximum heat output given in DHW mode.
3. Install a system separator (to be provided on-site) directly on the cold water connection for the combi boiler.
4. Install the following components:
  - Draining cocks at the lowest points in the heating installation (→ current version of "BS 2879")
  - A stopcock on the cold water connection
  - A stopcock in the gas pipe
5. Check that the volumetric capacity of the expansion vessel is sufficient for the system volume.

**Condition:** The volume of the installed expansion vessel is insufficient

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

**Condition:** External expansion vessel installed and warm start active

- ▶ Install a non-return valve in the product outlet (heating flow) or decommission the internal expansion vessel in order to prevent the warm start function from being increasingly activated due to backflow.
6. Install the connection pipes such that they are free from mechanical stress.
  7. If you use non-diffusion-tight plastic pipes in the heating installation, ensure that no air gets into the heat generator circuit.
  8. Only solder connectors if the connectors are not yet screwed to the service valves.
  9. Only bend connection pipes if they have not yet been connected to the product.
  10. Flush the heating installation thoroughly before installing the product.
  11. If, during gas leak-tightness tests, you also place the gas pipes and the gas valve assembly in the product under pressure, use a max. test pressure of  $\leq 11$  kPa (110 mbar).
  12. If you cannot limit the test pressure to 11 kPa (110 mbar), close any gas stopcocks that are installed

upstream of the product before you carry out the gas leak-tightness test.

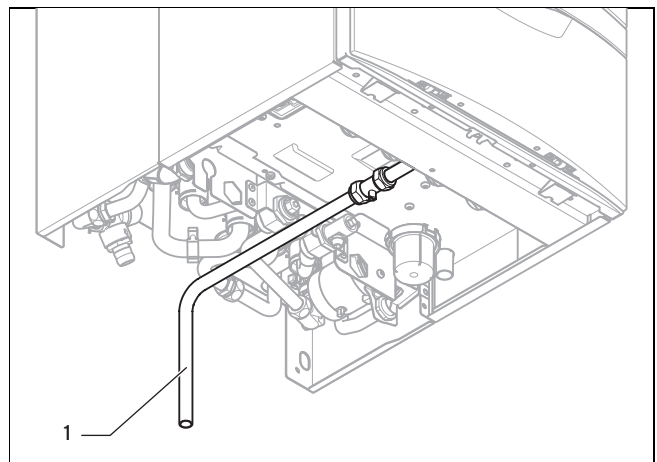
13. If, during gas leak-tightness tests, you have closed the gas stopcock that is installed upstream of the product, relieve the gas line pressure before you open this gas stopcock.
14. Install a tundish with condensate siphon for the condensate discharge and the exhaust pipe on the expansion relief valve. Route drain pipework that is as short as possible, at a downward gradient away from the tundish.
15. Insulate bare pipes exposed to environmental influences to protect them from frost using suitable insulation material.

### 7.3 Descaling the water

Scale deposition increases as the water temperature increases.

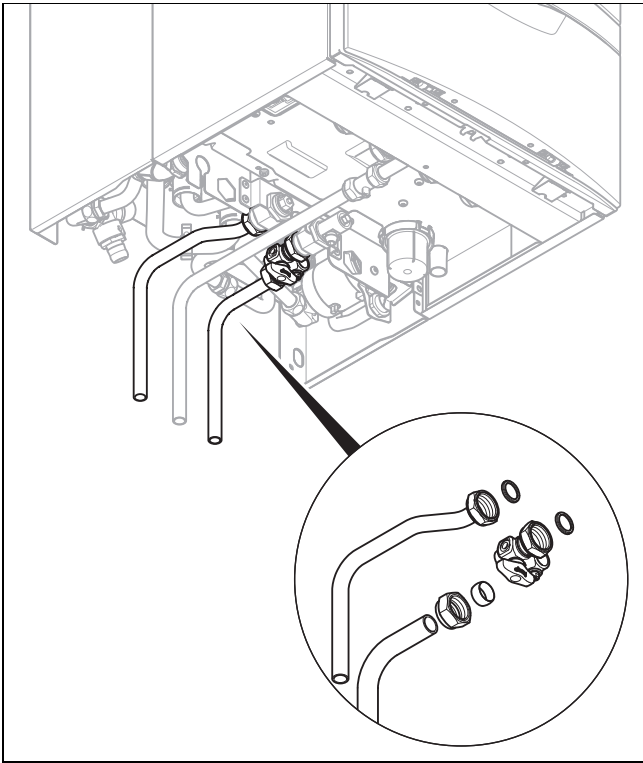
- ▶ Descale the water as required.

### 7.4 Installing the gas connection



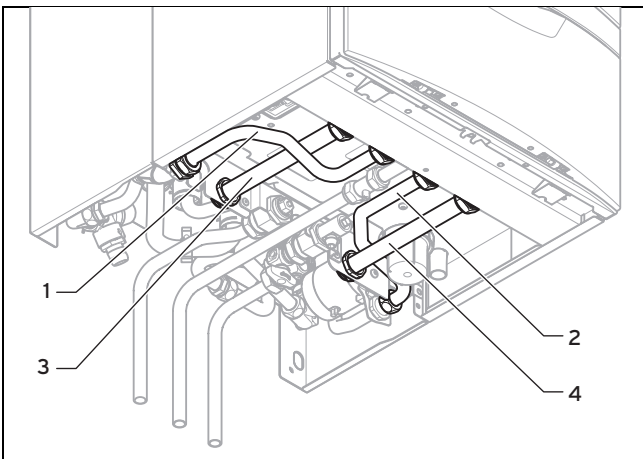
1. Install the gas pipe in accordance with the recognised rules of technology.
2. In doing so, ensure that the dimensioning of the gas pipes is sufficient since, otherwise, this may lead to fault shutdowns of the unit.
3. Connect the product to the gas pipe as shown in accordance with the recognised rules of good engineering practice. Use the extended gas pipe (1) from the bag of small parts to do this.
4. Remove the residues from the gas pipe by blowing through the gas pipe beforehand.
5. Purge the gas pipe before start-up.
6. Check the gas pipe for leak-tightness.

### 7.5 Installing the hot and cold water connection



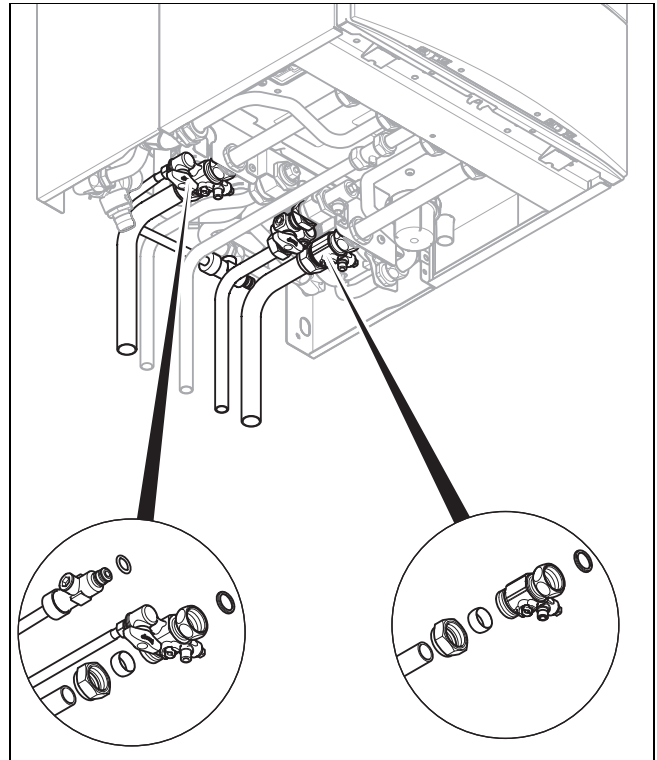
1. Make the water connections as shown in accordance with the relevant standards.
2. Ensure correct water pressure and flow requirements and that any expansion can be accommodated with the cold supply pipe work.

### 7.6 Installing pipe connections between the shift-load cylinder and the heat generator



1. Install pipe connections between the shift-load cylinder and the heat generator.
2. From the shift-load cylinder installation kit, install first the pipes **(1)** and **(2)**, and then the pipes **(3)** and **(4)**, to a professional standard.
  - ◁ These join the shift-load cylinder and the heat generator with integrated hot water generation to create the product VUI.

### 7.7 Connecting the heating flow and heating return



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

### 7.8 Connecting the condensate discharge pipe

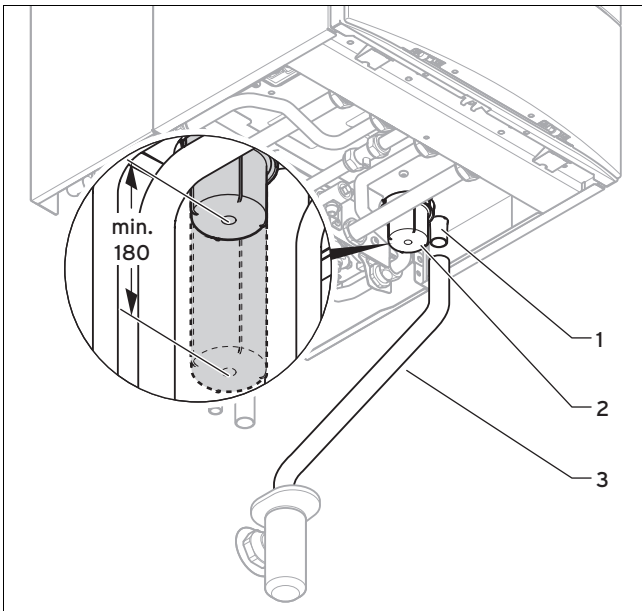


#### **Danger!**

#### **Risk of death from escaping flue gases!**

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

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



The product is equipped with a condensate trap (2). The condensate trap collects the condensate that has formed in a vessel with a volumetric capacity of approximately 200 ml, and intermittently releases the contents into the drain pipe. This minimises the risk of the drain pipe freezing.

- ▶ Follow the instructions listed here and observe directives and local regulations on condensate discharge.
- ▶ If you cannot guarantee that the materials from which the condensate discharge pipe is made are suitable, install a system to neutralise the condensate.
- ▶ Connect the condensate discharge pipe (1) to condensate drain pipework (3) which has a minimum internal diameter of 19 mm (22 mm outside diameter for all external pipes) and is made from an acid-resistant material (e.g. plastic overflow pipe).
  - The condensate discharge pipework must have a continuous fall (45 mm per metre) and should whenever possible terminate at a suitable discharge point within the heated envelope of the building that will remain frost free under long periods of low external temperatures.



**Note**

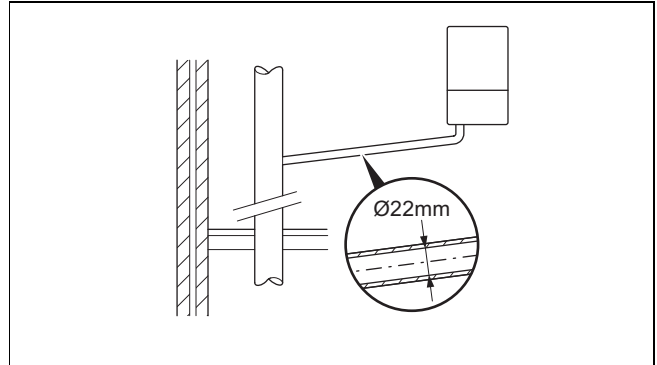
Ensure that the connection between the condensate discharge pipe and the drain hose is not air-tight.

- ▶ During installation remove all burrs from inside of cut pipe work and avoid excessive adhesive which may trap small pockets of water close to the pipe wall which can freeze and build into a larger ice plug.
- ▶ As with other pipe work insulate the condensate discharge pipe to minimise any risk of freezing and beware when crossing cavities that the fall is maintained and the pipe sleeved.
- ▶ Ensure that the condensate discharge pipe terminates in a suitable location. Further information can be obtained from BS 6798 Specification for installation of gas-fired boilers of rated input not exceeding 70 kW net.
- ▶ Leave an installation space of at least 180 mm beneath the condensate trap.

**7.8.1 Condensate discharge systems**

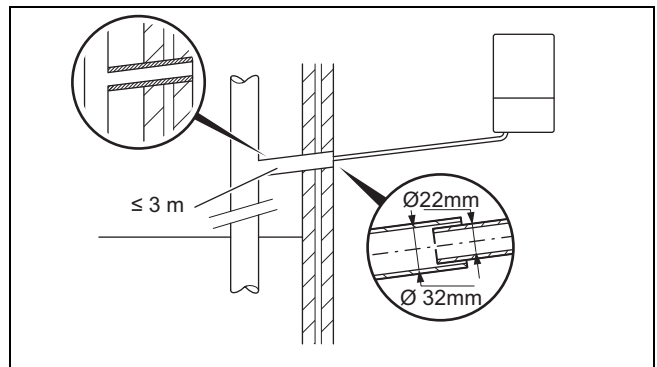
The condensate is discharged periodically in 'slugs' by siphonic action. It is not necessary to provide extra traps in the discharge pipe as there is already a trap inside the boiler. Fitting an extra trap may cause the boiler siphon to work incorrectly. Refer to BS5546 or BS6798 for further advice on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

**7.8.1.1 Direct Connection to internal soil and vent stack**

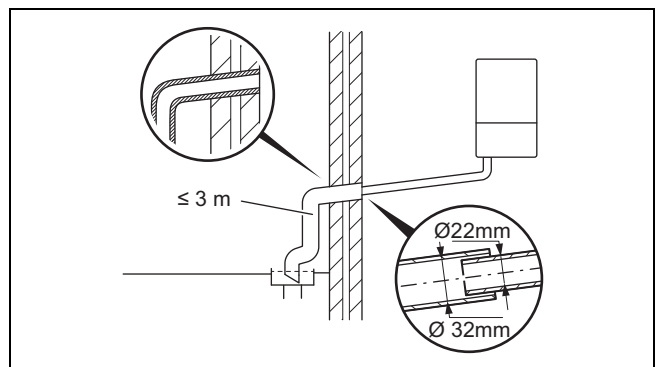


Preferred option

**7.8.1.2 Direct connection to external soil and vent stack**

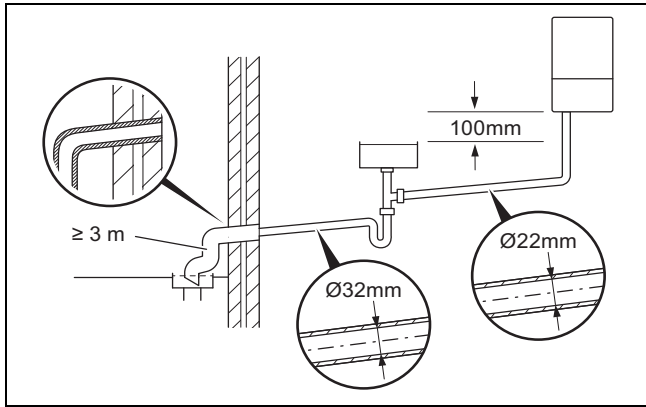


**7.8.1.3 External termination to gulley or hopper**



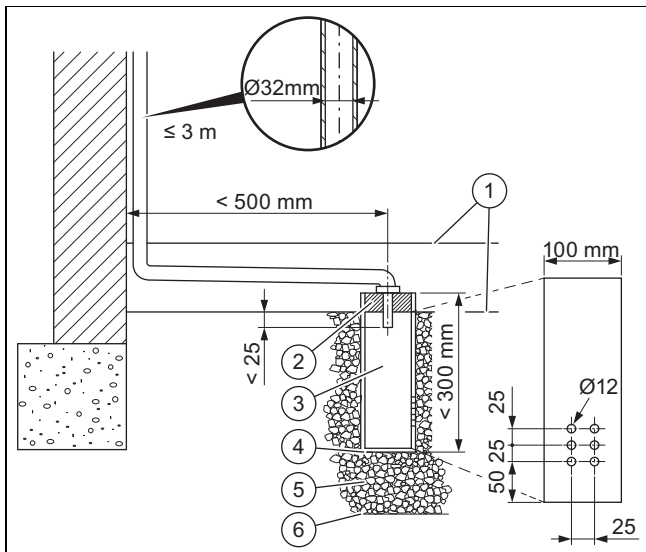
Best practice

### 7.8.1.4 Internal termination into combined sink waste



Preferred option for external termination

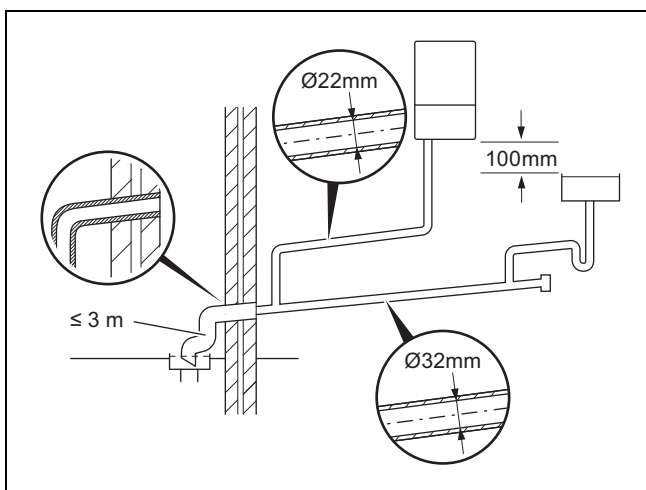
### 7.8.1.5 External termination into soakaway



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

Least preferred option, must not terminate in rain water drain

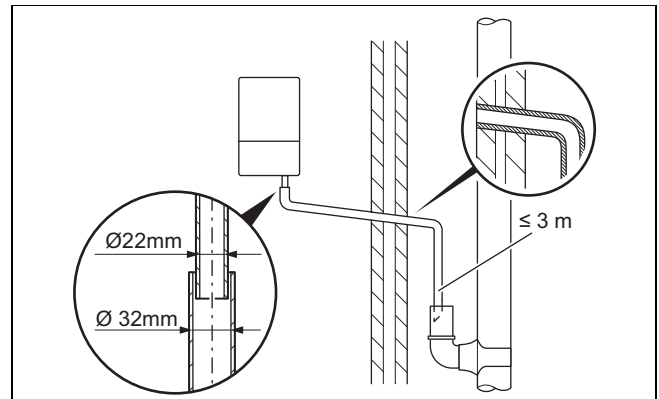
### 7.8.1.6 Internal termination downstream of sink waste



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

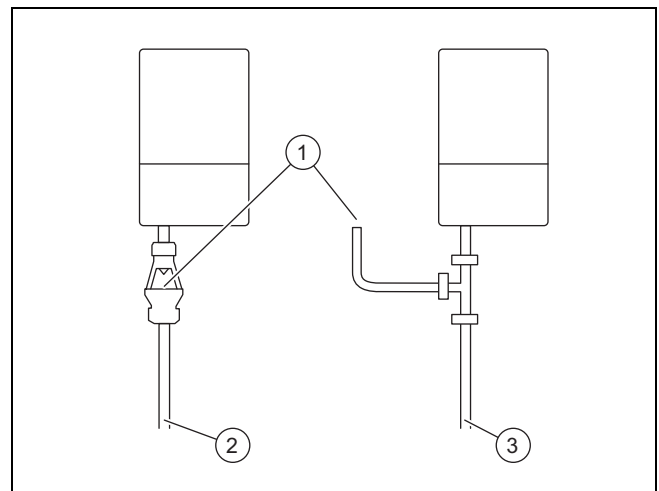
Susceptible to siphonage, must terminate in a gully

### 7.8.1.7 External termination into rain water down pipe



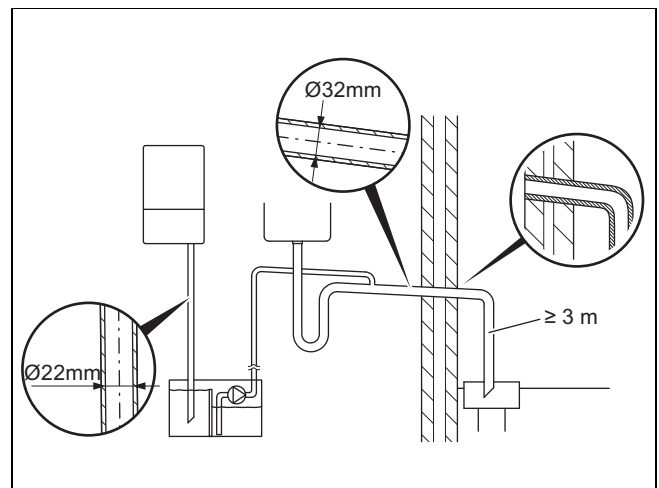
NB only combined foul/rainwater drain

### 7.8.1.8 Additional methods of introducing air breaks



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

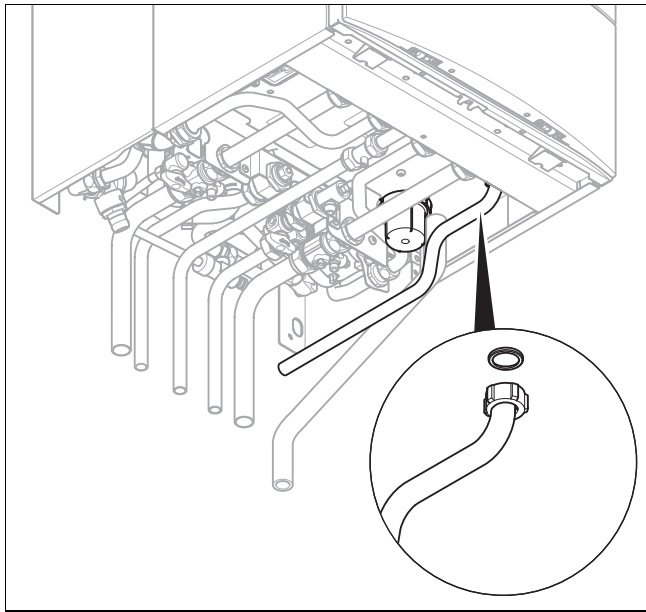
### 7.8.1.9 Connection of condensate pump



Preferred option for external connection

## 7.9 Installing the discharge pipe on the expansion relief valve

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



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

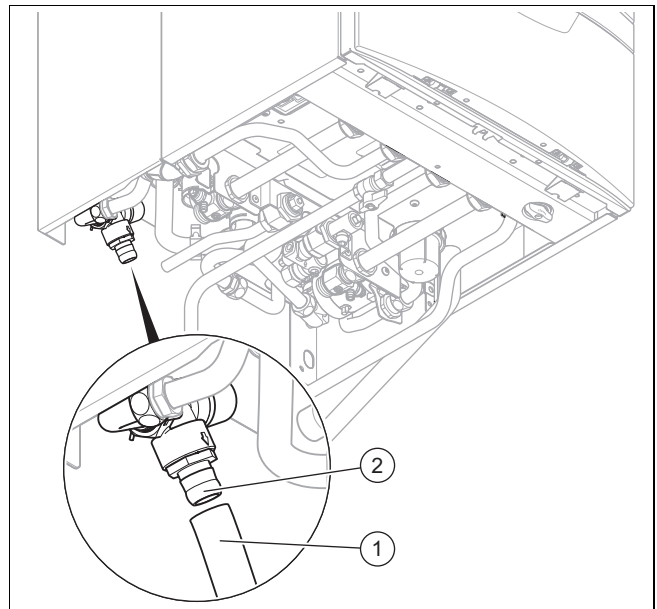
## 7.10 Connecting the flexible hose to the expansion relief valve on the shift-load cylinder



### **Danger!** **Risk of scalding!**

Heating water that leaks from the drain of the expansion relief valve may cause severe burns.

- ▶ Install the expansion relief valve drain to a professional standard.
- ▶ Use the flexible hose that is included in the scope of delivery.



1. Connect the flexible hose (1) to the expansion relief valve (2).
2. Route the end of the flexible hose with a downward gradient via an open connection to a tundish.
3. Make sure that the line end is visible.

## 7.11 Flue installation

### 7.11.1 Installing and connecting the air/flue pipe

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

**Condition:** Installation in damp rooms

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



### **Caution.** **Risk of poisoning due to escaping flue gas.**

Mineral-oil-based greases can damage the seals.

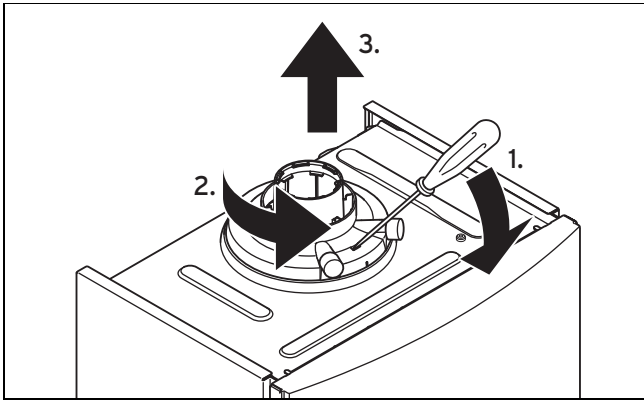
- ▶ Instead of grease, use only water or commercially available soft soap to aid installation.

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

### 7.11.2 Replacing the connector for the air/flue pipe as required

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

### 7.11.2.1 Removing the connector for the air/flue pipe



1. Insert a screwdriver into the slot between the test points.
2. Press the screwdriver carefully down (1.).
3. Turn the connector anti-clockwise (2.) as far as it will go and then remove it by pulling it upwards (3.).

### 7.11.2.2 Installing the connector for the air/flue pipe, 80/125 mm diameter

1. Remove the connector for the air/flue pipe.
2. Insert the alternative connector. In doing so, pay attention to the latching lugs.
3. Turn the connector clockwise until it clicks into position.

## 7.12 Electrical installation

Only qualified electricians may carry out the electrical installation.



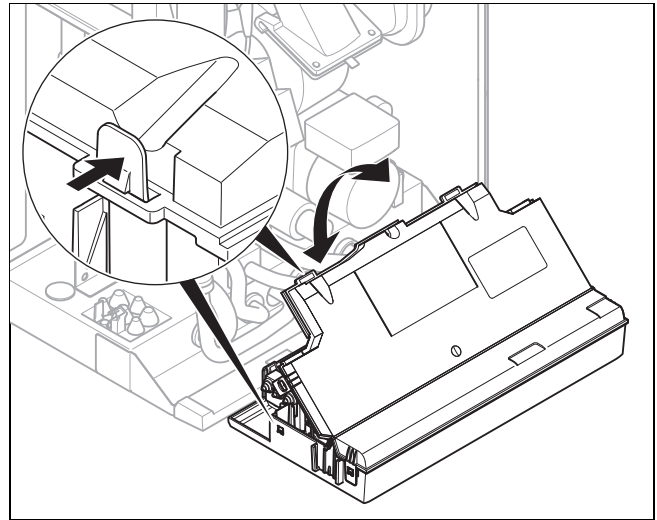
### Danger!

#### Risk of death from electric shock!

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

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

### 7.12.1 Opening the electronics box



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

### 7.12.2 Carrying out the wiring



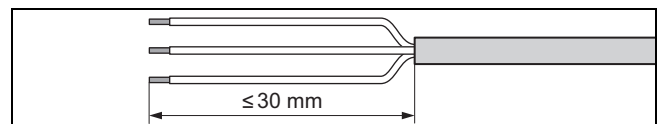
#### Caution.

#### Risk of material damage caused by incorrect installation.

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

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

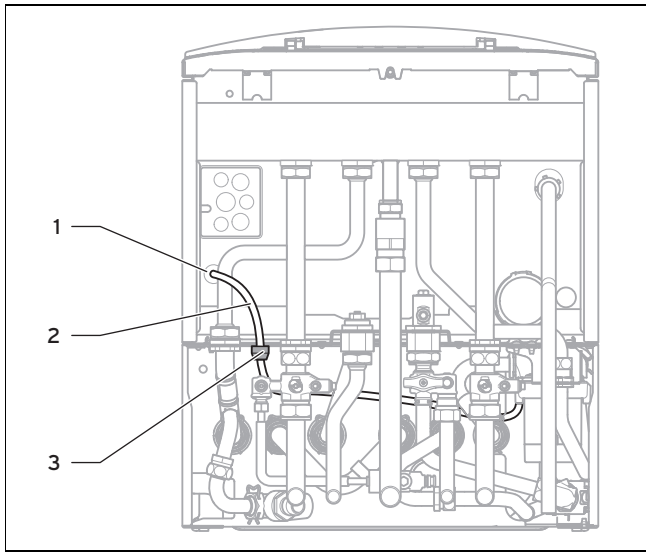
1. Route the connection cables of the components to be connected through the grommet provided on the underside of the product on the left.
2. Use strain reliefs.
3. If required, shorten the connection cables.



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

### 7.12.3 Connecting the shift-load cylinder to the heat generator electronics

1. Open the electronics box. (→ Page 23)
2. Carry out the wiring. (→ Page 23)

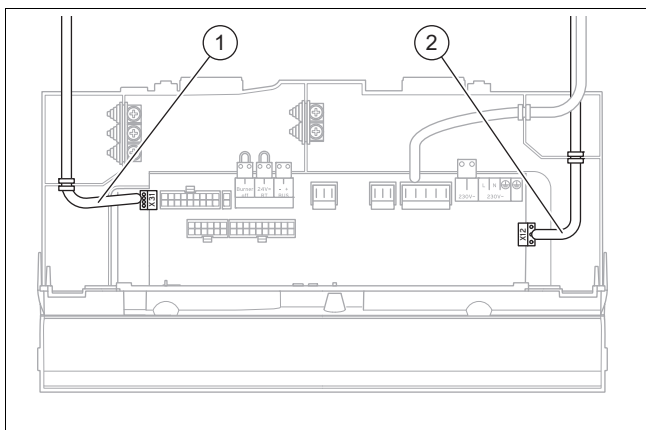


#### Caution. Risk of material damage caused by incorrect cable routing

Cables may become damaged if they come into contact with hot parts of the product.

- Lay cables in such a way that they do not touch any hot parts of the product.

3. Route the shift-load cylinder's cable harness (2) with the grommets (3) through the attached cable ducts on the shift-load cylinder and on the heat generator.
4. On the boiler, use the grommet (1).
5. Secure the grommets on the cable ducts using the enclosed spring clips.



6. Guide the pump cable (2) with the plug X12 along the outside of the electronics box.
7. Plug the pump cable's plug X12 into the slot X12 (right-hand side of the PCB).
8. Guide the sensor cable (1) with the plug X31 to the PCB.
9. Plug the sensor cable's plug X31 into the slot X31 (left-hand side of the PCB).
10. Secure the cables over the cable terminals in the electronics box.

### 7.12.4 Establishing the power supply



#### Caution. Risk of material damage due to high connected voltage.

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

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

1. Observe all valid regulations.
2. Make sure that the nominal mains voltage is 230 V.
3. Provide one common power supply for the boiler and for the corresponding control:
  - Power supply: Single-phase, 230 V, 50 Hz
  - Fuse protection: ≤ 3 A
4. Do not interrupt the mains supply with a time switch or programmer.
5. Open the electronics box. (→ Page 23)
6. Connect the product using a fixed connection and an electrical partition with a contact gap of at least 3 mm (e.g. fuses or power switches).
7. Isolation should preferably be by a double pole switched fused spur box having a minimum contact separation of 3 mm on each pole. The fused spur box should be readily accessible and preferably adjacent to the boiler. It should be identified as to its use.
8. Route a three-core power supply cable that complies with the relevant standards through the grommet and into the product.
  - Power supply cable: Flexible duct
9. Carry out the wiring. (→ Page 23)
10. Remove the supplied plug from the retainer in the electronics box and screw the plug onto the power supply cable.
11. Close the electronics box.
12. Make sure that access to the power supply is always available and is not covered or blocked.

### 7.12.5 Installing the product in a wet room



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

If you install the product in a room with high levels of moisture, e.g. a bathroom, observe the nationally recognised technical standards for electrical installations.

- Connect the product using a fixed connection and an electrical partition with a contact gap of at least 3 mm (e.g. fuses or power switches).
- Use a flexible line for the power supply cable, which is routed through the grommet into the product.



1. Open the electronics box. (→ Page 23)
2. Detach the plug from the PCB slot for the power supply (X1).
3. Use a suitable, three-core power supply cable that complies with the relevant standards.
4. Carry out the wiring. (→ Page 23)
5. Close the electronics box.
6. Observe the flue-gas connection that is required on a room-sealed air/flue system. (→ Page 22)

### 7.12.6 Connecting controls to the electronics

1. Install the control if necessary.
2. Open the electronics box. (→ Page 23)
3. Carry out the wiring. (→ Page 23)
4. Observe the wiring diagram in the appendix.

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

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

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

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

**Condition:** Connecting 230 volt controller

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

**Condition:** Connecting a limit thermostat for underfloor heating

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

5. Close the electronics box.
6. For multi-circuit controls, change **D.018** from **Eco** (intermittently operating pump) to **Comfort** (continuously operating pump). (→ Page 34)

### 7.12.7 Connecting additional components

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

#### 7.12.7.1 Using the auxiliary relay

1. Connect an additional component directly to the integrated auxiliary relay using the grey plug on the PCB.
2. Carry out the wiring.
3. To start up the connected component, select the component in diagnostics code **D.026**. (→ Page 34)

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

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

**Condition:** Components connected to relay 1

- ▶ Activate **D.027**. (→ Page 34)

**Condition:** Components connected to relay 2

- ▶ Activate **D.028**. (→ Page 34)

#### 7.12.8 Actuating the circulation pump according to requirements

1. Carry out the wiring.
2. Connect the connection cable for the external button using terminals 1 (0) and 6 (FB) on the X41 edge connector, which is supplied with the control.
3. Plug the edge connector into the PCB slot X41.

## 8 Operation



### 8.1 Operating concept

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

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

Installer level – Overview (→ Page 48)

### 8.2 Calling up the installer level

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

### 8.3 Live Monitor (status codes)

**Menu** → **Live monitor**

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

Status codes – Overview (→ Page 55)

### 8.4 Setting the hot water temperature



#### **Danger!**

#### **Risk of death from legionella.**

Legionella multiply at temperatures below 60 °C.

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

- ▶ Set the hot water temperature.

**Condition:** Water hardness: > 3.57 mol/m<sup>3</sup>

- Water temperature: ≤ 50 °C

## 9 Start-up

### 9.1 Carrying out the initial start-up

Initial start-up must be carried out by a customer service technician or an authorised competent person using the Benchmark Checklist. The Benchmark Checklist in the appendix (→ Page 62) of the installation instructions must be filled in and stored carefully along with the unit's documentation.

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

### 9.2 Switching the product on and off

- ▶ Press the product's on/off button.
  - ◀ The display shows the basic display.

### 9.3 Running the installation assistants


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

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

**Menu → Installer level → Appliance config.**

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


**Menu → Installer level → Diagnostics menu**

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




#### Note







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

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

#### 9.3.1 Language

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




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

- ▶ Press and hold  and  at the same time.
- ▶ Also briefly press .
- ▶ Press and hold  and  until the display shows the language setting option.
- ▶ Select the required language.
- ▶ Press  twice to confirm this change.




#### 9.3.2 Filling mode

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

#### 9.3.3 Purging

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


#### 9.3.4 Target feed temperature, hot water temperature, Comfort mode

1. To set the target flow temperature, hot water temperature and Comfort mode, use  and .
2. Press  to confirm this setting.

#### 9.3.5 Heating partial load

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

#### 9.3.6 Auxiliary relay and multi-functional module

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




#### Note

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

#### 9.3.7 Contact data

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

#### 9.3.8 Ending the installation assistant

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

### 9.4 Restarting the installation assistants

**Menu → Installer level → Start inst. assistant**

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

### 9.5 Test programmes

**Menu → Installer level → Test programs**

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

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

## 9.6 Performing a gas family check



### Danger! Risk of poisoning!

Inadequate combustion quality (CO), indicated by **F.92/93**, leads to an increased risk of poisoning.

- ▶ Make sure that the fault is completely eliminated before starting up the product for continuous operation.

Menu → Installer level → Test programs → Gas family check

The gas family check checks the product setting with regard to combustion quality.



### Note

If additional condensing boilers are connected to the same flue pipework in the heating installation, ensure that none of these condensing boilers are in operation or start operating throughout the entire test programme, so that the test result is not distorted.

- ▶ Perform the gas family check as part of routine product maintenance work, after replacing components, carrying out work on the gas route and following gas conversion.

Result	Meaning	Measure
<b>F.92</b>	See the table of fault codes in the appendix	See the table of fault codes in the appendix
"Successful"	Combustion quality is good. Unit configuration matches the specified gas group.	None
"Warning"	Combustion quality inadequate. CO <sub>2</sub> content is incorrect.	Start check programme P.01 and adjust the CO <sub>2</sub> content with the adjusting screw in the Venturi.  If the correct CO <sub>2</sub> content cannot be set: Check that the gas restrictor is correct (yellow: G20 natural gas, blue: G25 natural gas, grey: Liquid gas) and undamaged.  Repeat the gas family check.
<b>F.93</b>	See the table of fault codes in the appendix	See the table of fault codes in the appendix



### Note

It is not possible to perform CO<sub>2</sub> measurements during the gas family check.

## 9.7 Using check programmes

Menu → Installer level → Test programs → Check programs

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

Check programmes – Overview (→ Page 59)

## 9.8 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 magnetite separator.
- ▶ Check the pH value of the removed water at 25 °C.
- ▶ If the value is below 8.2 or above 10.0, clean the installation and treat the heating water.
- ▶ Ensure that oxygen cannot get into the heating water.

### Checking the filling and supplementary water

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

### Treating the filling and supplementary water

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

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

You must treat the heating water in the following cases

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

Total heating output	Water hardness at specific system volume <sup>1)</sup>					
	≤ 20 l/kW		> 20 l/kW ≤ 50 l/kW		> 50 l/kW	
kW	ppm CaCO <sub>3</sub>	mol/m <sup>3</sup>	ppm CaCO <sub>3</sub>	mol/m <sup>3</sup>	ppm CaCO <sub>3</sub>	mol/m <sup>3</sup>
< 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

Total heating output	Water hardness at specific system volume <sup>1)</sup>					
	≤ 20 l/kW		> 20 l/kW ≤ 50 l/kW		> 50 l/kW	
kW	ppm CaCO <sub>3</sub>	mol/m <sup>3</sup>	ppm CaCO <sub>3</sub>	mol/m <sup>3</sup>	ppm CaCO <sub>3</sub>	mol/m <sup>3</sup>
> 600	2	0.02	2	0.02	2	0.02

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



### Caution.

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

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

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

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

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

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

#### Additives for cleaning measures (subsequent flushing required)

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

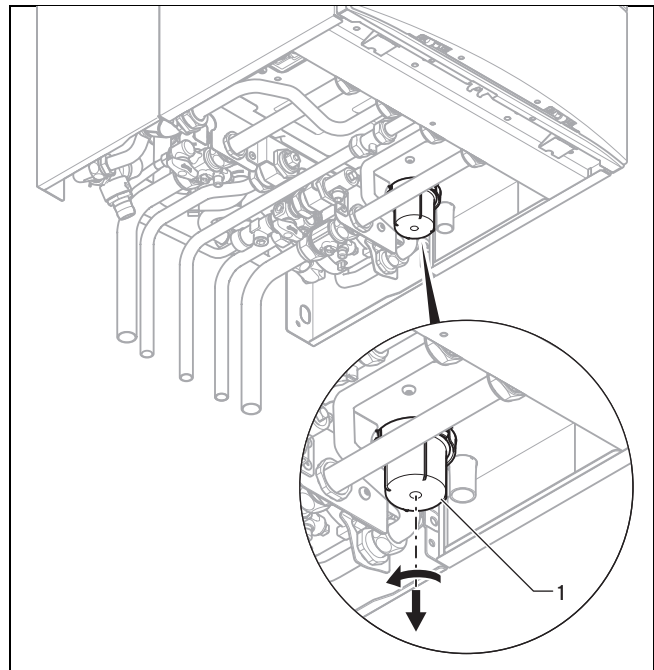
#### Additives intended to remain permanently in the installation

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

#### Additives for frost protection intended to remain permanently in the installation

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

## 9.9 Filling the condensate trap



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

## 9.10 Preventing low water pressure

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

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

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

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

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

## 9.11 Flushing the heating installation for the first time ("cold")



### Note

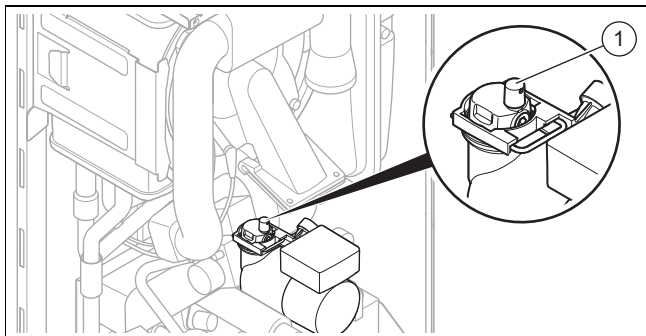
The complete heating system must be flushed at least twice: Once with cold water and once with hot water in accordance with the following instructions.

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 ra-

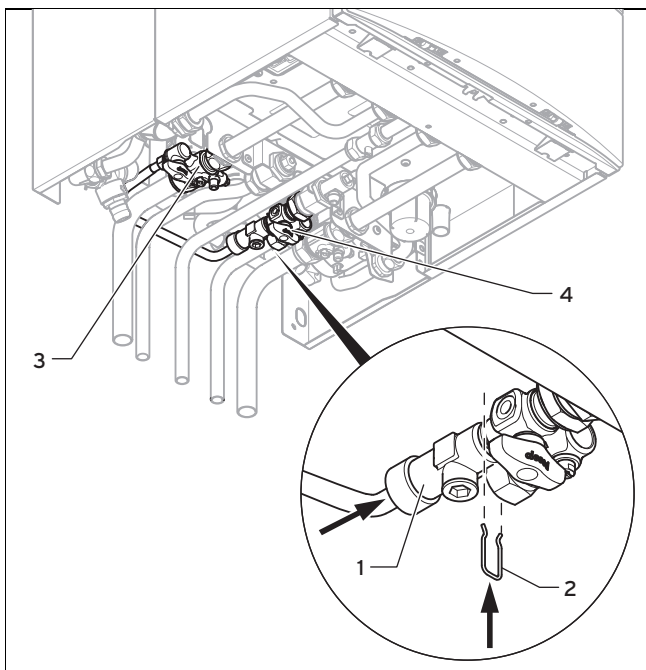
diators so that the contaminated water can completely drain.

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.

## 9.12 Filling the heating installation



1. Flush the heating installation through.
2. Undo the cap of the automatic air vent (1) by one to two rotations and leave it open, as the product purges itself via the automatic air vent even in continuous operation.
3. Select the check programme **P.06**.
  - ◁ The prioritising diverter valve moves to the mid-position, the pumps do not run and the product does not switch to heating mode.
4. Observe the information on treating heating water. (→ Page 28)



5. Open all radiator valves (thermostatic valves) of the heating installation.
6. Fit the double non-return valve (1) of the filling line to the cold-water isolation valve and secure the valve with the spring clip (2).
7. To fill, first open the isolation valve (3).

8. Open the isolation valve (4) so that the water flows into the heating system. Fill the heating system.
9. Purge the lowest radiator until water flows out of the purging valve without bubbles.
10. Purge all other radiators until the entire heating system has been filled with water.
11. Close all purging valves.
12. Monitor the rising filling pressure in the heating installation.
13. Fill with water until the required filling pressure is reached.
14. After filling, close both isolation valves and disconnect the filling device by removing the double non-return valve from the cold-water isolation valve.



### Note

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

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

## 9.13 Purging the heating installation

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

## 9.14 Filling and purging the hot water system

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

## 9.15 Gas inspection

### 9.15.1 Checking the factory-set gas setting



### Caution.

**Risk of material damage caused by making unauthorised settings.**

- ▶ Never modify the factory setting of the gas pressure regulator of the gas valve.
- ▶ Before you start up the product, compare the gas group information on the data plate with the gas group available at the installation site.

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

Only Vaillant Service may perform a gas conversion.

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

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

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

- ▶ Proceed as described below.

### 9.15.2 Checking the air/flue pipe/flue gas recirculation

1. Check the flue gas installation is intact in accordance with the latest gas safe technical bulletin and information supplied in the installation instructions.
2. For extended flue gas installations check for flue gas recirculation using the air analysis point.
3. Use a flue gas analyser.
4. If you discover unusual levels of CO or CO<sub>2</sub> 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 CO<sub>2</sub>.
7. If you cannot eliminate the damage, do not start up the product.

### 9.15.3 Checking the gas flow rate

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

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

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

**Condition:** Gas flow rate not in the permissible range

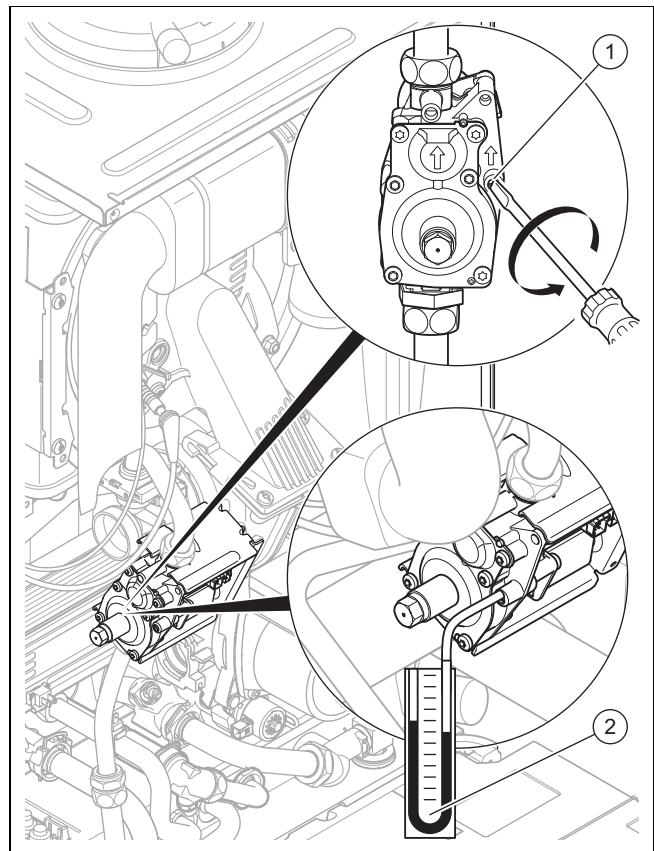
- ▶ Check all of the piping and ensure that the gas flow rates are correct.
- ▶ Only put the product into operation once the gas flow rates have been corrected.

**Condition:** Gas flow rate in the permissible range

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

### 9.15.4 Checking the gas flow pressure

1. Ensure that the gas inlet working pressure can be obtained with all other gas appliances in the property working.
2. Close the gas stopcock.



3. Use a screwdriver to undo the test nipple screw (1) (lower screw) at the gas valve assembly.
4. Connect a manometer (2) to the test nipple (1).
5. Open the gas stopcock.
6. Start up the product with the check programme **P.01**.
7. In addition, ensure that maximum heat can be dissipated into the heating system by turning up the room thermostat.
8. With the boiler operating at full load check that the gas inlet working pressure at the reference test point complies with the requirements.

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

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



**Caution.**

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

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

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

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

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

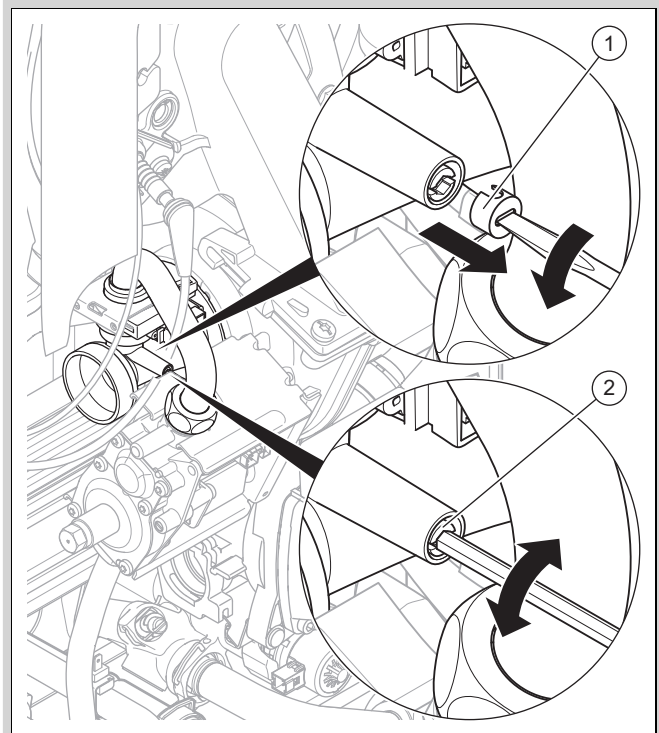
- ▶ End the check programme **P.01**.
- ▶ Allow the boiler to cool down allowing pump overrun to operate for a minimum of two minutes.
- ▶ Close the gas stopcock.
- ▶ Remove the pressure gauge and retighten the sealing screw (1) for the measuring nipple.
- ▶ Open the gas stopcock.
- ▶ Check the test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

**9.15.5 Checking and, if required, adjusting the CO<sub>2</sub> content and the CO/CO<sub>2</sub> ratio (air ratio setting)**

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


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

**Condition:** The CO<sub>2</sub> content must be adjusted



- ▶ Pierce the covering cap (1) at the mark using a small flat-blade screwdriver and unscrew it.
- ▶ After performing the adjustments, tilt the air intake pipe back up.
- ▶ Check the CO<sub>2</sub> content again.
- ▶ If necessary, repeat the setting process.
- ▶ Set the CO<sub>2</sub> content (value with front casing removed) by turning the screw (2).



- Higher CO<sub>2</sub> content: Turn anti-clockwise
- Lower CO<sub>2</sub> content: Turn clockwise
- ▶ For natural gas only: Only perform the adjustment in increments of 1 turn and wait approx. 1 minute after each adjustment until the value stabilises.
- ▶ For liquefied petroleum gas only: Only perform the adjustment in small increments (approx. 1/2 turn), and wait approx. 1 minute after each adjustment until the value stabilises.
- ▶ Check the CO<sub>2</sub> content again.
- ▶ If necessary, repeat the setting process.
- ▶ Press  (**Cancel**) once the adjustments have been made.
- ▶ If an adjustment is not possible in the specified adjustment range, you must not start up the product.
- ▶ If this is the case, inform Customer Service.
- ▶ Screw the covering cap back in.
- ▶ Install the front casing.

## 9.16 Thoroughly flushing the heating installation ("hot")

1. Operate the appliance until the boiler and the heating system are up to temperature.
2. Check the heating system for leaks.
3. Connect a hose to the drain valve located at the lowest position of the heating system.
4. Shut off the boiler, open the drain valve and all purge valves on the radiators and allow the water to flow out of the heating system and the boiler quickly and fully.
5. Close the drain valve.
6. Fill the heating system again with water as described in Filling the heating installation (→ Page 30) and Purging the heating installation (→ Page 30).
7. Re-fill the system until the system design pressure of 0,1 MPa (1,0 bar) is attained.



### Note

The actual reading on the digital pressure gauge should ideally be 0,05 MPa (0,5 bar) plus an additional pressure corresponding to the highest point of the system above the base of the boiler – 10 m head equals an additional 1 bar reading on the pressure gauge. The minimum pressure should not be less than 0,1 MPa (1 bar) in any installation. If the system is to be treated with an inhibitor it should be applied at this stage in accordance with the manufacturer's instructions.

8. Install the front casing.

## 9.17 Checking leak-tightness

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

**Condition:** Room-sealed operation

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

### 9.17.1 Checking the heating mode

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

### 9.17.2 Checking the hot water generation

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

### 9.17.3 Checking the cylinder charging



#### Note

Cylinder charging is deactivated ex-works and must be activated during initial start-up.

The cylinder charging of the shift-load cylinder is only active if Comfort mode is switched on. If Comfort mode is activated, the symbol "C" appears in the display ( Operating instructions).

When cylinder charging is switched on, the following temperatures can be set for the hot water temperature (see operating instructions):

- Minimum temperature 50 °C
- Maximum temperature 65 °C

When cylinder charging is switched off, the following temperatures can be set for the hot water temperature:

- Minimum temperature 35 °C
- Maximum temperature 65 °C

If cylinder charging is switched off, the cylinder is not held at temperature. If you draw off water, the boiler switches on and, in this case, only operates on the through-flow principle.

- ▶ The product is equipped with an automatic Anti-legionella function; if the temperature in the domestic hot water cylinder falls below 50 °C, the cylinder is heated up to 70 °C once every 24 hours. If required, in consultation with the operator, switch the Anti-legionella function off using diagnostics code **D.074**.

Overview of diagnostics codes (→ Page 50)

- ▶ Call up the **Live Monitor**.
  - **Menu** → **Live Monitor**
  - ◁ If the hot water generation is working correctly, **S.24** appears in the display.

## 10 Adapting the unit to the heating installation

To reset the most important system parameters, use the **Unit configuration** menu item.

**Menu → Installer level → Appliance config.**

Or manually relaunch the installation assistant.

**Menu → Installer level → Start inst. assistant**

You can find setting options in the **Diagnostics menu**.

**Menu → Installer level → Diagnostics menu**

Overview of diagnostics codes (→ Page 50)

### 10.1 Burner anti-cycling time

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

#### 10.1.1 Setting the burner anti-cycling time

1. Navigate to **Menu → Installer level → Diagnostics menu → D.002 Max. anti-cycl. time: Heating** and confirm by pressing .
2. Set the burner anti-cycling time and confirm by pressing .

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

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

### 10.1.2 Resetting the remaining burner anti-cycling time

#### 1. Alternatives 1:

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

#### 1. Alternatives 2:

- ▶ Press .

## 10.2 Setting the maintenance interval

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

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

## 10.3 Setting the pump output

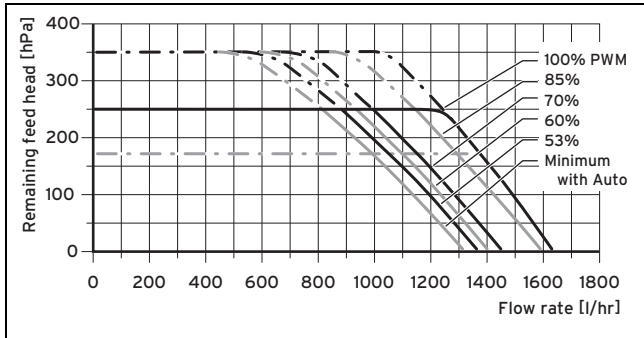
1. Navigate to **Menu → Installer level → Diagnostics menu → D.014 Pump speed target value** and confirm by pressing .
2. Set the required pump output.

**Condition:** Low loss header installed

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

### 10.3.1 Remaining feed head of the pump

#### 10.3.1.1 Pump characteristic line for VUI 286, VUI 386



### 10.4 Setting the bypass valve



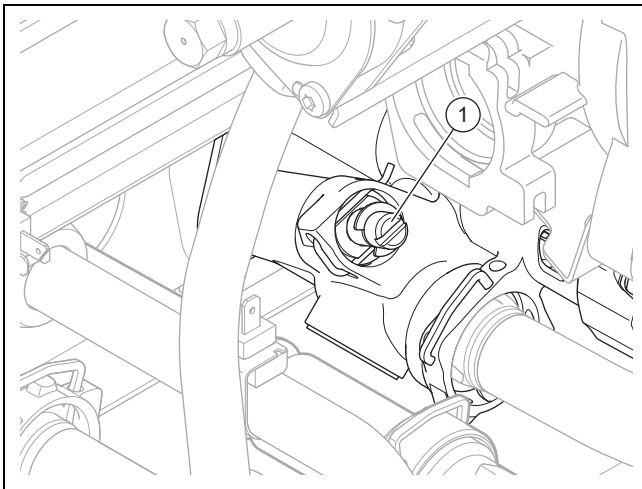
#### Caution.

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

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

- ▶ In this case, set the pump output to 5 = 100% using diagnostics code D.014.

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



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

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

- ▶ Install the front casing.

## 11 Handing over to the end user

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

## 12 Inspection and maintenance

### 12.1 Complete Service Interval Record section

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

### 12.2 Using original seals

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

### 12.3 Inspection and maintenance

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

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

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

### 12.4 Preparing the maintenance work

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

### 12.5 Function menu

Menu → Installer level → Test programs → Function menu

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

Function menu – Overview (→ Page 59)

### 12.6 Electronics self-test

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

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

### 12.7 Checking the electrical plug connections

1. Use the main switch to switch off the product.
2. Disconnect the product from the power supply by switching off the circuit breaker in the case of a fixed connection.

**Condition:** Product disconnected from the power supply

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

### 12.8 Removing the compact thermal module



#### Note

The compact thermal module consists of five main components:

- Speed-regulated fan,
- Gas valve assembly including support plate,
- Venturi incl. mass flow sensor and gas connection pipe,
- Burner flange,
- Premix burner.



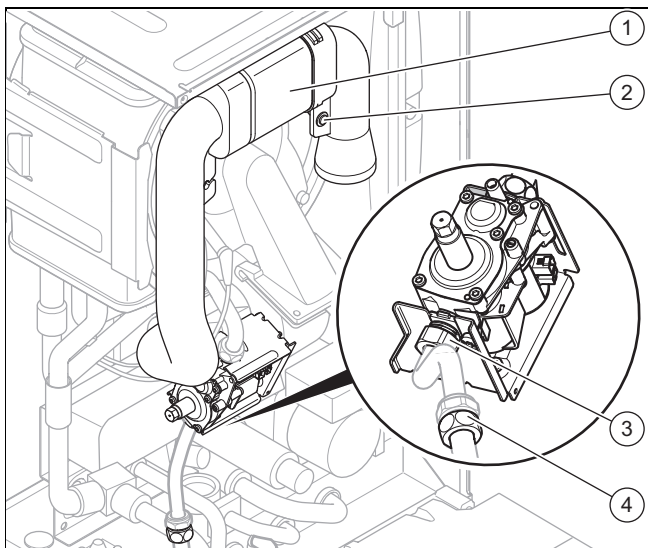
#### Danger!

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

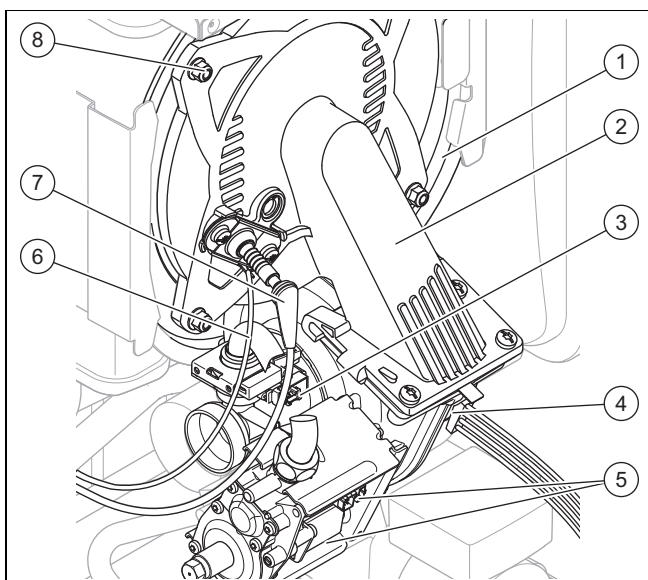
The seal, insulating mat and self-locking nuts on the burner flange must not be damaged. Otherwise, hot flue gases may escape and cause personal injury and material damage.

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

1. Switch off the product using the on/off button.
2. Close the gas stopcock.
3. Remove the front casing. (→ Page 17)
4. Hinge the electronics box forwards.



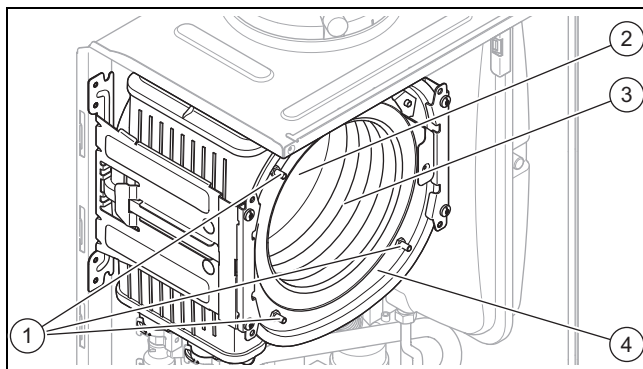
5. Unscrew the retaining screw (2) and remove the air intake pipe (1) from the intake stub.
6. Unscrew either the union nut on the gas valve assembly (3) or the union nut (4) between the flexible gas pipe and the fixed gas pipe.



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

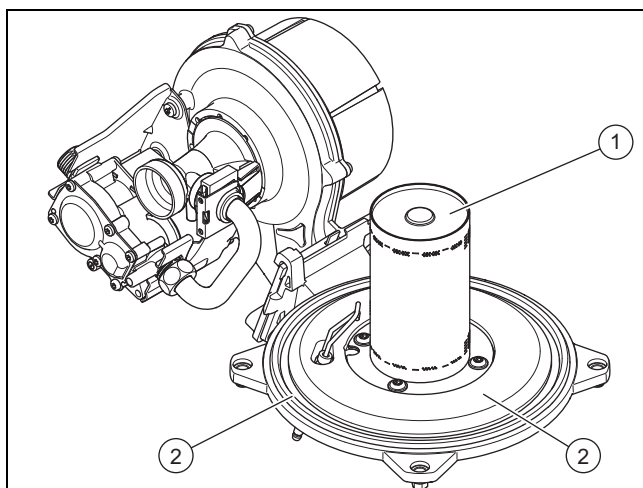
## 12.9 Cleaning the heat exchanger

1. Protect the open electronics box from spraying water.



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

## 12.10 Checking the burner

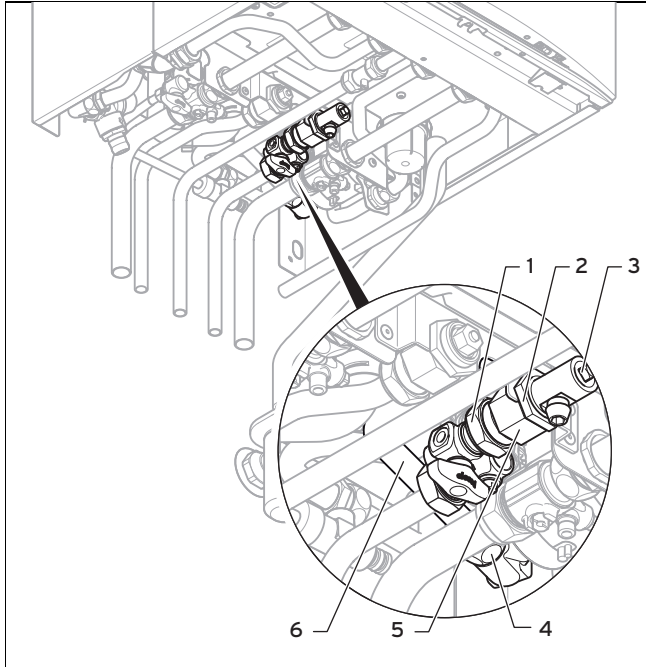


1. Check the surface of the burner (1) for damage. If you see any damage, replace the burner.
2. Fit a new burner flange seal (3).
3. Check the insulating mat (2) on the burner flange. If you notice any signs of damage, replace the insulating mat.

### 12.11 Cleaning the condensate trap

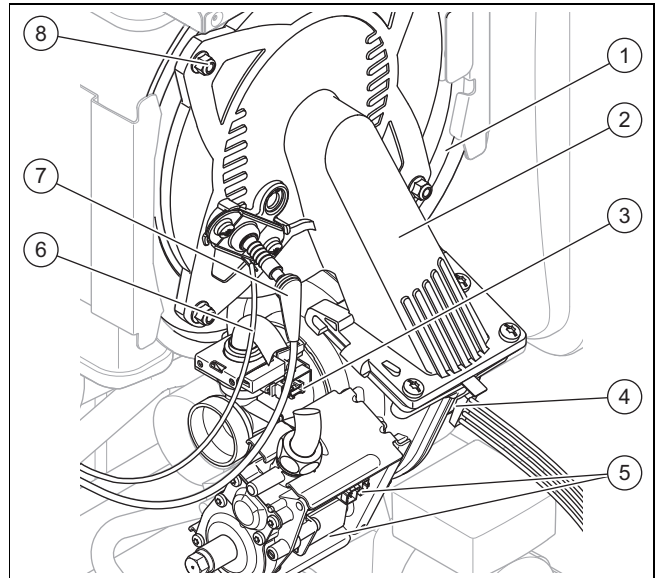
1. Remove the lower section from the condensate trap (1).
2. Flush out the lower section with water.
3. Fill the lower section with water up to about 10 mm below the upper edge.
4. Attach the lower section to the condensate trap.

### 12.12 Cleaning the strainer in the cold water inlet



1. Close the cold-water isolation valve.
2. Drain the product on the domestic hot water side (3).
3. Unscrew the union nut (1) from the cold water pipe.
4. Undo the nut (2) on the connector (5).
5. Unscrew the union nut (4).
6. Remove the connector, including the connection pipe (6).
7. Rinse the connector out under a jet of water in the opposite direction to the normal flow.
8. Refit the connector with the cleaned strainer.
9. Always use new seals and retighten the nut and the two union nuts.
10. Open the cold-water isolation valve.

### 12.13 Installing the compact thermal module



1. Connect the compact thermal module (2) to the heat exchanger (1).
2. Tighten the four new nuts (8) across the diagonal until the burner flange fits closely and uniformly onto the mating surfaces.
  - Tightening torque: 6 Nm, if a torque spanner is available
3. Reconnect the plugs (3) to (7).
4. Connect the gas pipe using a new seal. In the process, secure the gas pipe against twisting.
5. Open the gas stopcock.
6. Make sure that there are no leaks.
7. Check that the sealing ring in the air intake pipe is positioned correctly in the seal seat.
8. Reconnect the air intake pipe to the intake stub.
9. Secure the air intake pipe with the retaining screw.
10. Check the gas flow pressure.

### 12.14 Draining the product

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

### 12.15 Checking the pre-charge pressure for the internal expansion vessel on the heat generator

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

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

- Ideally, you should top up the expansion vessel with nitrogen. Otherwise, top it up with air. Ensure that the drain valve is open when topping up.
3. If water escapes from the valve of the expansion vessel, you must replace the expansion vessel. (→ Page 43)

4. Fill the heating installation. (→ Page 30)
5. Purge the heating installation. (→ Page 30)

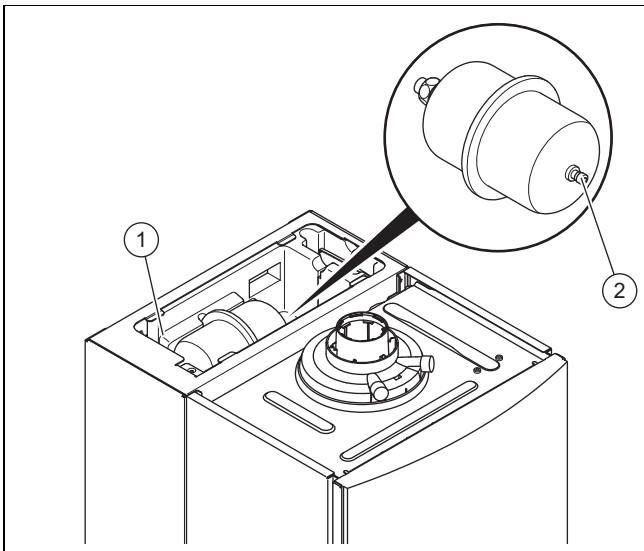
### 12.16 Checking the pre-charge pressure of the shift-load cylinder expansion vessel



#### Note

One check every three years is sufficient.

1. Close the isolation valves on the domestic hot water system.
2. Close the cold-water isolation valve.
3. Open a hot water tap to depressurise the water circuit. Close the hot water tap.
4. Unscrew the screw from the cover of the shift-load cylinder.
5. Remove the cover.
  - ◁ The expansion vessel is freely accessible.



6. Unscrew the sealing cap **(2)** from the expansion vessel **(1)**.
7. Check whether the pre-charge pressure of the expansion vessel is approx. 0.4 MPa (4 bar). If the pressure is lower than this, increase it using an air pump until it is 0.4 MPa (4 bar).
8. Screw the sealing cap **(2)** back onto the expansion vessel.
9. Reinstall the cover.
10. Repressurise the heat generator and the domestic hot water system.

### 12.17 Checking the filling pressure of the heating installation

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

### 12.18 Checking the quality of the heating water

- ▶ Check the quality of the heating water: Clarity (clouding), correct inhibitor and pH value. (→ Page 28)

### 12.19 Completing inspection and maintenance work

- ▶ Start a test operation after the maintenance.
- ▶ Check the heating mode and, if required, the domestic hot water generation (if available).
- ▶ Carry out a gas family check. (→ Page 28)
- ▶ Check the gas flow pressure. (→ Page 31)
- ▶ Check and, if required, adjust the CO<sub>2</sub> content and the CO/CO<sub>2</sub> ratio (air ratio setting). (→ Page 32)
- ▶ If required, reset the maintenance interval. (→ Page 34)
- ▶ Install the front casing.
- ▶ Fill out the relevant Service Record section in the Benchmark Checklist.


### 12.20 Checking the product for leak-tightness

- ▶ Check that the product is leak-tight. (→ Page 33)

## 13 Troubleshooting

### 13.1 Checking service messages

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

- ▶ Navigate to **Menu** → **Live monitor** and confirm by pressing .

**Condition:** S.40 is displayed

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

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



#### Note

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

### 13.2 Eliminating faults


- ▶ If fault messages (**F.XX**) occur, eliminate the faults by checking the table in the appendix or using the function menu or the check programmes.

Overview of fault codes (→ Page 56)

Function menu – Overview (→ Page 59)




Check programmes – Overview (→ Page 59)

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



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

### 13.3 Calling up and clearing the fault memory

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

- ▶ Navigate to the **Fault list** menu.
  - ◀ The display shows the number of faults that have occurred, the fault numbers and the corresponding plain text display.
- ▶ Press  or  to call up individual fault messages.
- ▶ Press  twice to delete the fault list.

### 13.4 Resetting parameters to factory settings

1. Navigate to **Menu** → **Installer level** → **Diagnostics menu** → **D.096 Reset to factory settings?** and confirm by pressing .
2. Set the diagnostics code to 1, and confirm by pressing .

### 13.5 Preparing the repair work

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

#### 13.5.1 Procuring spare parts

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

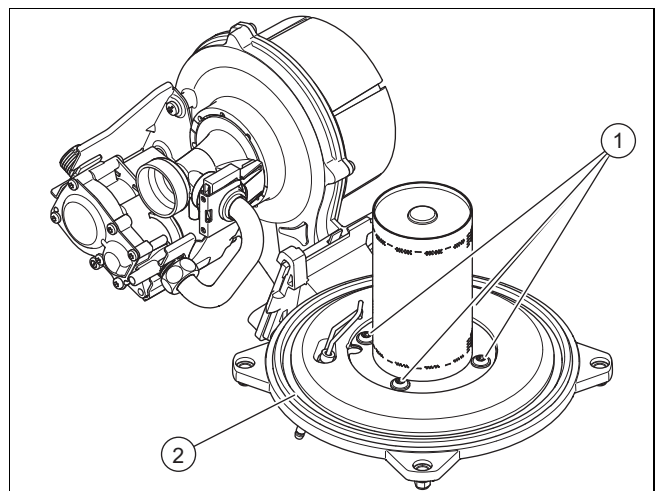
We strongly recommend that you use original spare parts from the manufacturer as this guarantees fault-free and safe operation of the product. To receive information about the available original spare parts, contact the contact address provided on the back page of these instructions.

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

### 13.6 Replacing defective components

#### 13.6.1 Replacing the burner

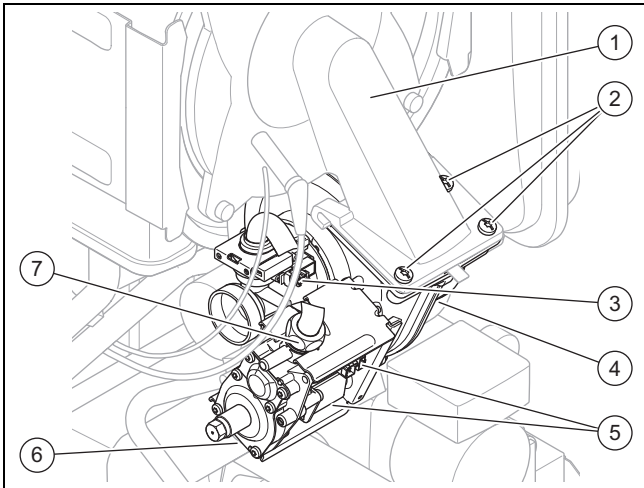
1. Remove the compact thermal module. (→ Page 36)



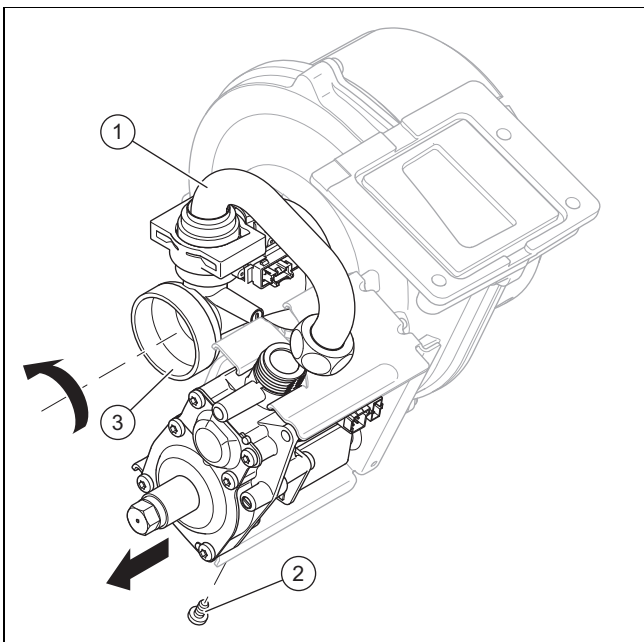
2. Undo the four screws **(1)** on the burner.
3. Remove the burner.
4. Install a new seal **(2)** on the new burner.
5. Install the compact thermal module. (→ Page 38)



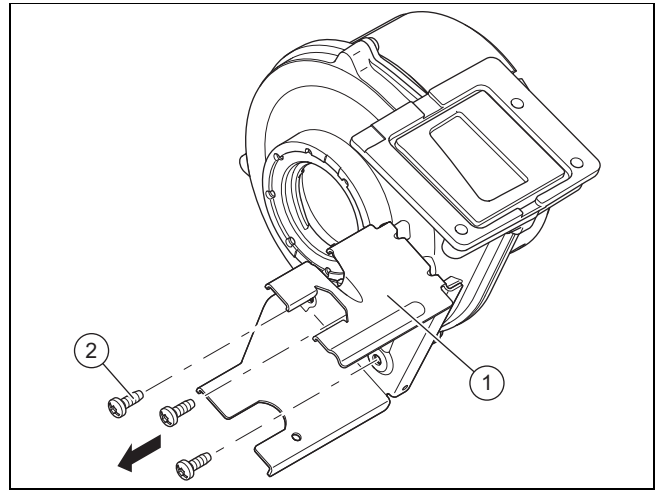
### 13.6.2 Replacing the fan



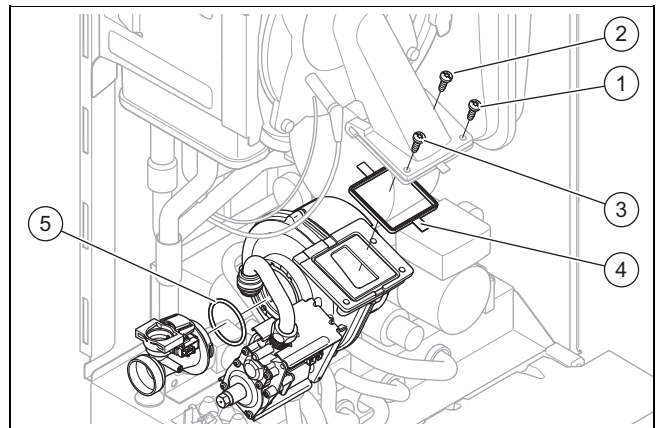
1. Remove the air intake pipe.
2. Remove the three plugs from the gas valve assembly (5).
3. Remove the plug from the sensor on the Venturi (3) by pushing in the latching lug.
4. Remove the plug/plugs (4) (depending on the unit design) from the fan motor by pushing in the latching lug in each case.
5. Unscrew the two union nuts (7) and (6) on the gas valve assembly. Use an open-ended spanner to counterhold the opposite side of the gas valve assembly when unscrewing.
6. Unscrew the three screws (2) between the mixture pipe (1) and the fan flange.



7. Remove the entire unit comprising the fan, Venturi and gas valve assembly from the product.
8. Unscrew the gas valve assembly fixing screw (2) from the retainer.
9. Remove the gas valve assembly from the retainer.
10. Remove the Venturi (3), including the gas connection pipe (1), from the fan by turning the bayonet fitting on the Venturi anti-clockwise as far as it goes and removing it straight from the fan.



11. Remove the gas valve assembly retainer (1) from the fan by unscrewing the three screws (2).
12. Replace the defective fan.



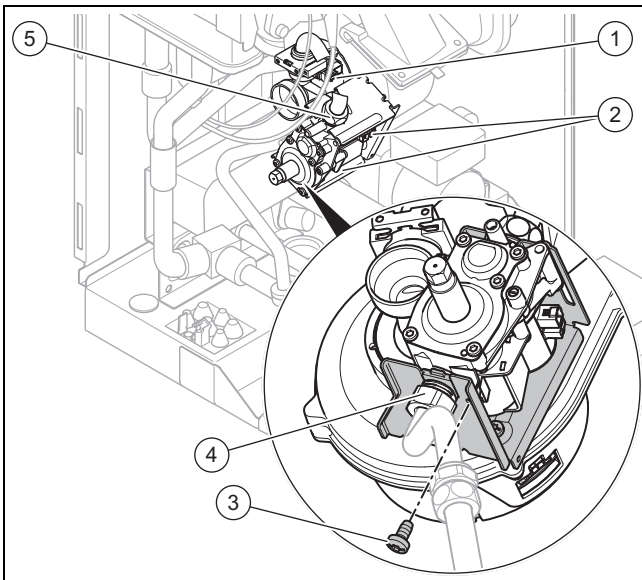
13. Refit the components in the reverse order. New seals (4) and (5) must be used for this. Pay attention to the order in which the three screws between the fan and the mixture pipe are screwed in, as per the numbering (1), (2) and (3).
14. Screw the flexible gas supply to the gas valve assembly. Use new seals for this.
15. When tightening the union nut on the gas valve assembly, use an open-ended spanner to counterhold the opposite side of the gas valve assembly.
16. Perform a gas family check after installing the new fan. (→ Page 28)

### 13.6.3 Replacing the gas valve assembly



#### Note

To replace the gas valve assembly, you will need a Torx T20. To replace the gas valve assembly directly from the front, you will need an offset screwdriver or a Torx T20 socket. If you do not have access to an offset screwdriver or the like, you must first remove the entire unit comprising the fan with gas valve assembly before you can remove the gas valve assembly from the retainer.



1. Remove the air intake pipe.
2. Remove the three plugs from the gas valve assembly (2).
3. Remove the plug from the sensor on the Venturi (1) by pushing in the latching lug.
4. Unscrew the two union nuts (5) and (4) on the gas valve assembly. Use an open-ended spanner to counterhold the opposite side of the gas valve assembly (4) and (5) when unscrewing.
5. Either remove the unit comprising the fan with gas valve assembly (Replacing the fan (→ Page 41)), or use an offset screwdriver or Torx T20 socket to unscrew the fixing screw of gas valve assembly (3) from the retainer.

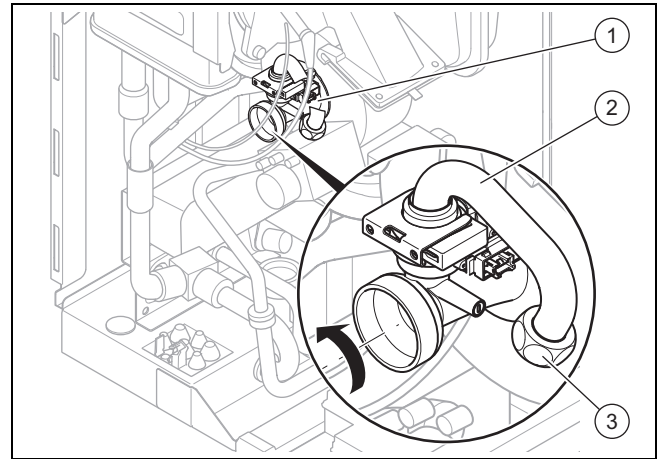


#### Note

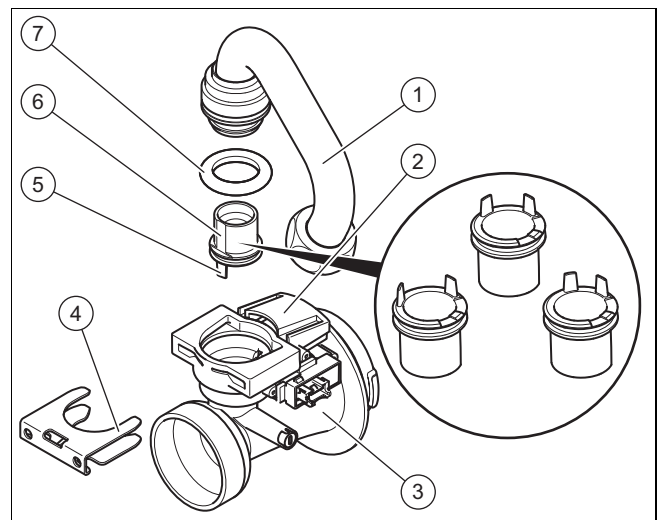
The screw in the gas valve assembly retainer secures the gas valve assembly against turning and must be screwed back in once the gas valve assembly has been replaced.

6. Remove the gas valve assembly from the retainer.
7. Reinstall the new gas valve assembly in the reverse order. Use new seals for this.
8. When tightening the union nuts on the gas valve assembly, use an open-ended spanner to counterhold the opposite side of the gas valve assembly (4) and (5).
9. After installing the new gas valve assembly, perform a leak-tightness test (→ Page 33), gas family check (→ Page 28) and gas setting (→ Page 30).

### 13.6.4 Replacing the Venturi



1. Remove the air intake pipe.
2. Remove the plug from the sensor on the Venturi (1) by pushing in the latching lug.
3. Unscrew the union nuts (3) of the gas connection pipe (2) on the gas valve assembly.
4. Remove the Venturi, including the gas connection pipe, from the fan by turning the bayonet fitting on the Venturi anti-clockwise as far as it goes and removing it straight from the fan.



5. Remove the gas connection pipe (1) from the Venturi (3) by removing the clamp (4) and pulling the gas connection pipe out vertically. Dispose of the seal (7).
6. Pull the gas injector (6) straight off, and keep it for re-use.
7. Check whether the Venturi is free of residue at the gas inlet side.



#### Caution.

#### Risk of material damage to the product.

Lubricant can block function-related channels in the Venturi.

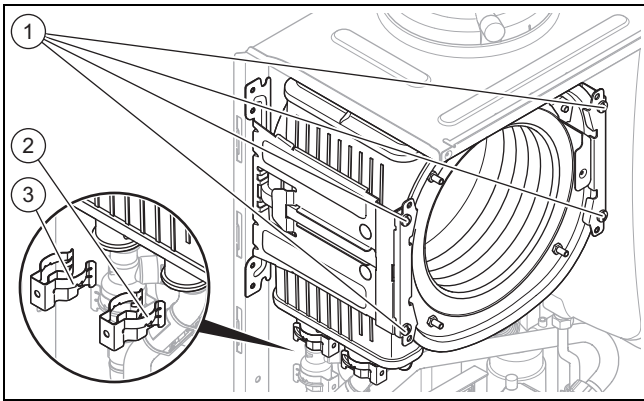
- ▶ Do not use lubricant when installing the gas restrictor.

8. Ensure that you use the correct gas injector (colour coding and position of pins on the underside of the gas injector). The colour of the gas injector must match the colour of the coding resistor on the PCB.

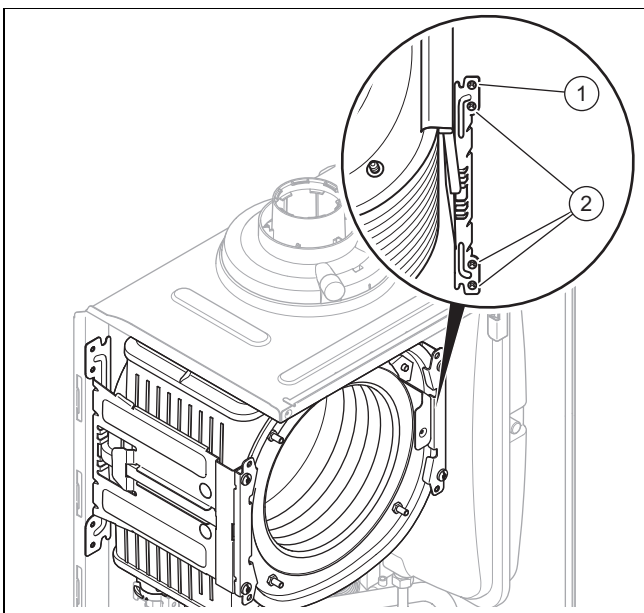
9. Insert the gas injector for the gas group in question into the new Venturi (yellow: G20 natural gas, grey: Liquefied petroleum gas).
10. When inserting the gas injector, ensure that the gas injector is correctly aligned using the indicated position marks on the upper side of the Venturi and also the positioning pins (5) on the underside of the gas injector.
11. Refit the components in the reverse order. Use new seals for this.
12. After installing the new Venturi, carry out a gas setting. (→ Page 30)
13. If you cannot adjust the CO2 content, the gas injector has been damaged during installation. In this case, replace the gas injector with an appropriate spare part.
14. Perform a gas family check. (→ Page 28)

### 13.6.5 Replacing the heat exchanger

1. Drain the product. (→ Page 38)
2. Remove the compact thermal module. (→ Page 36)
3. Detach the condensate discharge hose from the heat exchanger.



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



8. Remove the lower three screws (2) on the rear section of the retainer.
9. Swing the retainer to the side around the top screw (1).

10. Pull the heat exchanger downwards and to the right, and remove it from the product.
11. Install the new heat exchanger in reverse order.
12. Replace the seals.



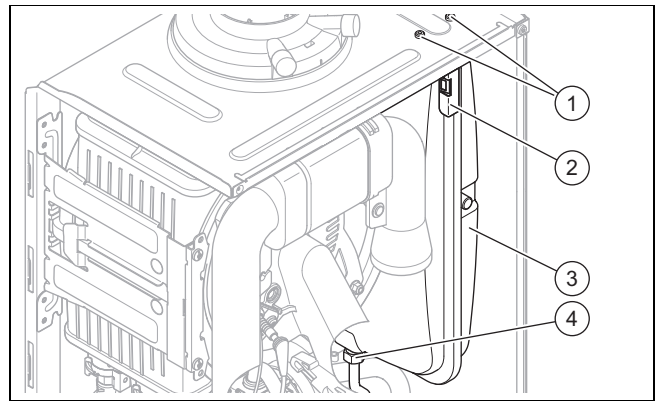
#### Note

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

13. Insert the flow and return connections into the heat exchanger as far as they will go.
14. Make sure that the clamps are seated correctly on the flow and return connections.
15. Install the compact thermal module. (→ Page 38)
16. Fill and purge the product and, if necessary, the heating installation. (→ Page 30)

### 13.6.6 Replacing the expansion vessel on the heat generator

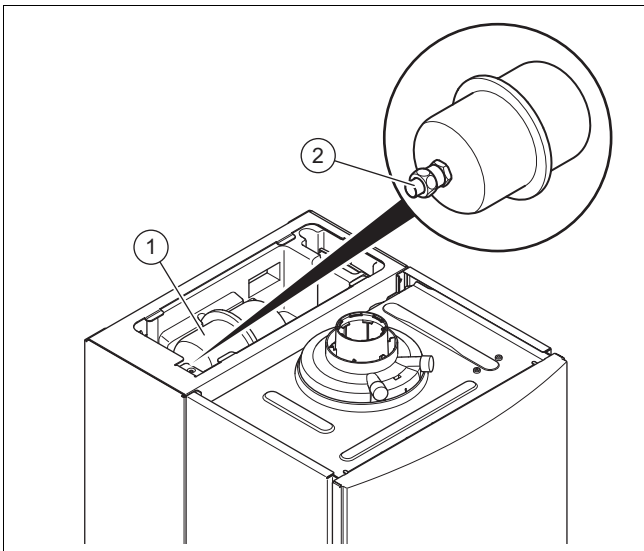
1. Drain the product. (→ Page 38)



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

### 13.6.7 Replacing the expansion vessel on the shift-load cylinder

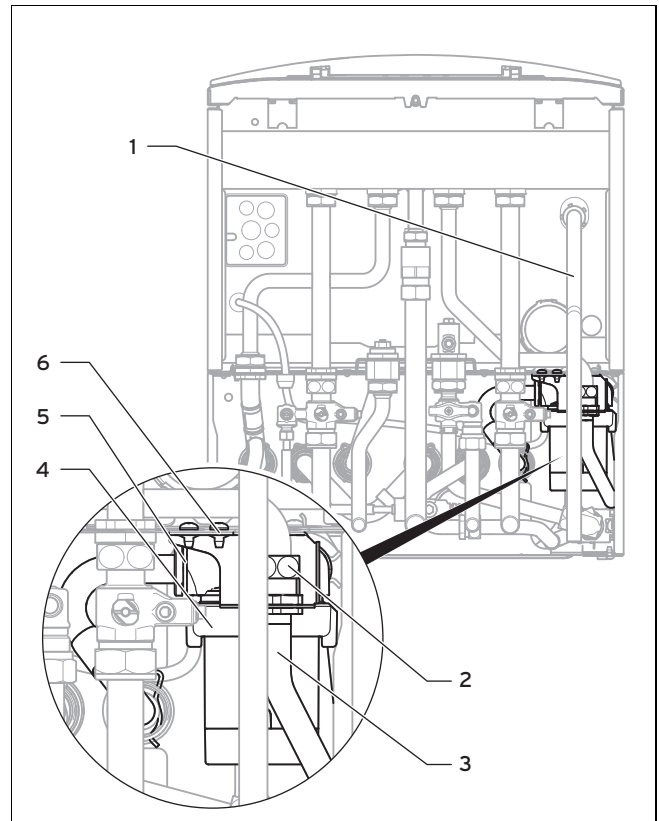
1. Close the cold-water isolation valve.
2. Open a hot water tap to depressurise the water circuit. Close the hot water tap.
3. Unscrew the screw from the cover of the shift-load cylinder.
4. Remove the cover.



5. Undo the nuts **(2)** on the expansion vessel **(1)**.
6. Detach the expansion vessel from the screwed pipe and remove it from the EPS insulation.
7. Insert the new expansion vessel into the EPS insulation.
8. Connect the new expansion vessel. To do this, use a new seal.
9. Check the filling pressure of the expansion vessel (minimum pressure is 0.4 MPa (4 bar)).
10. Fill and purge the heat generator and the shift-load cylinder.

### 13.6.8 Replacing the cylinder charging pump on the shift-load cylinder

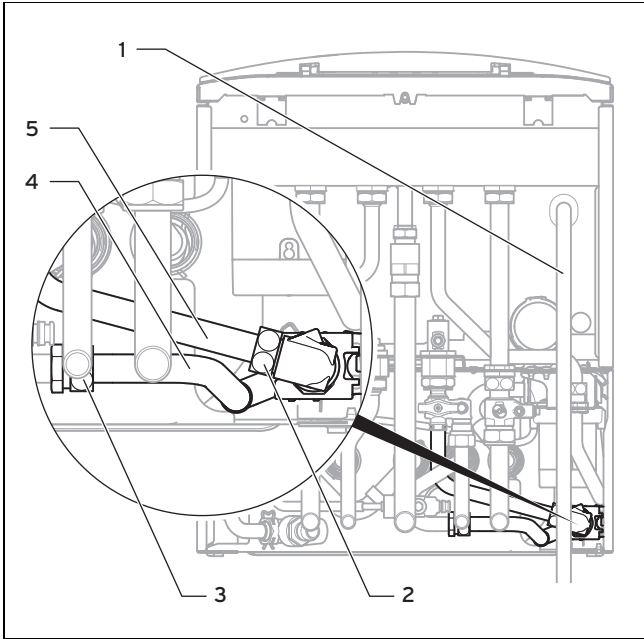
1. Close the domestic hot water system isolation valves and drain the heat generator and shift-load cylinder on the domestic hot water side.



2. Remove the drain pipe **(1)** from the expansion relief valve on the heat generator.
3. Hinge the heat generator's electronics box forwards.
4. Open the electronics box.
5. Pull the **X12** plug out of the PCB.
6. Pull the free end of the line carefully through the gromets on the heat generator and on the shift-load cylinder.
7. Detach the pump sensor line from the cable harness by pulling the plug out of the cable harness.
8. Unscrew the pipe elbow **(6)** from the housing.
9. Undo the screwed connection **(2)** on the connection pipe **(3)**.
10. Detach the spring clip **(5)** from the housing of the cylinder charging pump **(4)**. At the same time, use your free hand to support the cylinder charging pump to ensure that it does not fall out of the housing.
11. Pull the cylinder charging pump downwards out of the housing.
12. Install the pipe elbow on the new cylinder charging pump and use new seals for it.
13. Install the new cylinder charging pump in reverse order and use new seals.
14. Connect the pump's electrical wires in reverse order. In doing so, pay attention to the correct pipe routing.
15. Reinstall the drain pipe **(1)** and use new seals.
16. Fill and purge the heat generator and the shift-load cylinder.

### 13.6.9 Replacing the impeller sensor on the shift-load cylinder

1. Close the domestic hot water system isolation valves and drain the heat generator and shift-load cylinder on the domestic hot water side.



2. Remove the drain pipe (1) from the expansion relief valve on the heat generator.
3. Remove the plug from the impeller sensor.
4. Undo the screwed connections (2) and (3) on the angle pieces (4) and (5).
5. Turn the impeller sensor slightly to the side and pull it downwards to remove it from the housing.
6. Remove the pipe elbow from the impeller sensor.
7. Install the pipe elbow on the new impeller sensor and use new seals for it.
8. Install the new impeller sensor in reverse order and use new seals.
9. Connect the connection cable plug to the new impeller sensor.
10. Reinstall the drain pipe (1) and use new seals.
11. Fill and purge the heat generator and the shift-load cylinder.

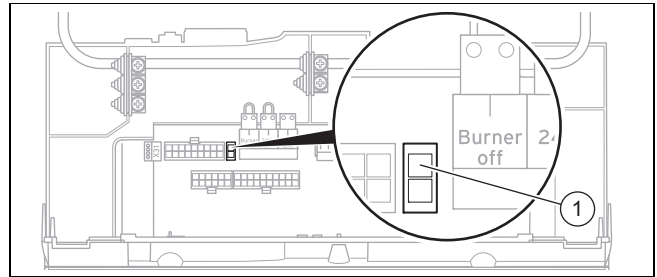
### 13.6.10 Replacing the PCB or display for the heat generator



#### Note

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

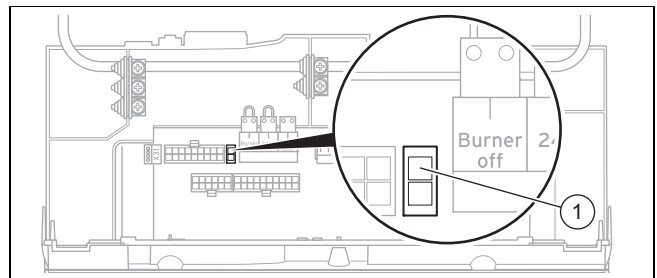
1. Open the electronics box. (→ Page 23)
2. Replace the PCB or display according to the set-up and installation instructions supplied.





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

### 13.6.11 Replacing the PCB and display for the heat generator

1. Open the electronics box. (→ Page 23)
2. Replace the PCB and display according to the set-up and installation instructions supplied.



3. Remove the coding resistor (1) (plug X24) from the old PCB and plug the plug into the new PCB.
4. Close the electronics box.
5. Press the product's on/off button. (→ Page 27)
  - ◁ After switching on, the product switches directly to the menu to select the language. The factory-set language setting is English.
6. Select the required language and confirm by pressing .
- ◁ You are automatically taken to **D.093** to set the device specific number.
7. Set the correct value for the relevant product type in accordance with the table below and confirm by pressing .

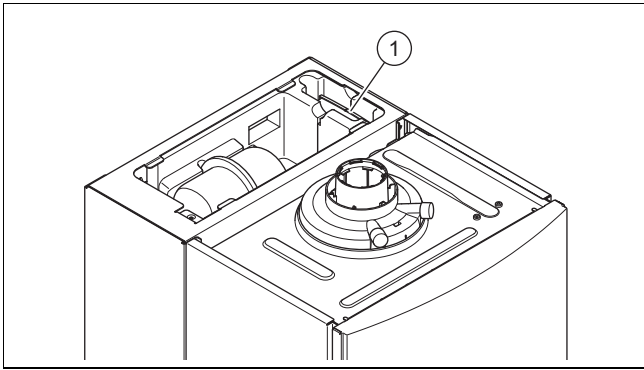
#### Product type number

VUI 286/5-5 (H-GB) ecoTEC plus 938	17
------------------------------------	----

- ◁ The electronics are now set to the product type and the parameters of all diagnostics codes are set to factory settings.
- ◁ The installation assistant starts.
8. Make the system-specific settings.

### 13.6.12 Replacing the PCB on the shift-load cylinder

1. Comply with the assembly and installation instructions provided with the spare parts.
2. Unscrew the screw from the cover of the shift-load cylinder and remove the cover.



3. Remove the electronics box with the shift-load cylinder's PCB **(1)** from the appliance slot.
4. Open the electronics box and remove the plug from the PCB.
5. Install the new PCB in reverse order.
6. Start up the product.

### 13.7 Completing repair work

1. Establish the power supply.
2. Switch the product back on if this has not yet been done. (→ Page 27)
3. Install the front casing.
4. Open all service valves and the gas stopcock.

### 13.8 Checking the product for leak-tightness

- ▶ Check that the product is leak-tight. (→ Page 33)

## 14 Decommissioning

### 14.1 Temporarily decommissioning the product

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

### 14.2 Permanently decommissioning the product

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

## 15 Recycling and disposal


### Disposing of the packaging


- ▶ Dispose of the packaging correctly.
- ▶ Observe all relevant regulations.
- ▶ For detailed information refer to [www.vaillant.co.uk](http://www.vaillant.co.uk).

## Appendix

### A Inspection and maintenance work

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

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

#	Maintenance work	Interval	
32	Opening the service valves	Annually	
33	Filling the heating installation	at regular intervals	30
34	Starting a test operation after maintenance work	Annually	
35	Completing inspection and maintenance work	Annually	39
36	Perform the gas family check	at regular intervals	
37	Visually check the ignition and burner behaviour	Annually	
38	Checking the CO/CO <sub>2</sub> content following maintenance work	Annually	
39	Check the product for gas, flue gas, water and condensate leaks	Annually	

## B Installer level – Overview

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



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

Setting level	Values		Unit	Increment, select, explanation	Factory setting
	Min.	Max.			
Auxiliary relay	1	10	–	1 = Circulation pump 2 = External pump 3 = Cylinder charging pump 4 = Extraction hood 5 = External solenoid valve 6 = External fault message 7 = Solar pump (not active) 8 = eBUS remote control (not active) 9 = Anti-legionella pump (not active) 10 = Solar valve (not active)	2
Accessory relay 1	1	10	–	1 = Circulation pump 2 = External pump 3 = Cylinder charging pump 4 = Extraction hood 5 = External solenoid valve 6 = External fault message 7 = Solar pump (not active) 8 = eBUS remote control (not active) 9 = Anti-legionella pump (not active) 10 = Solar valve (not active)	2
Accessory relay 2	1	10	–	1 = Circulation pump 2 = External pump 3 = Cylinder charging pump 4 = Extraction hood 5 = External solenoid valve 6 = External fault message 7 = Solar pump (not active) 8 = eBUS remote control (not active) 9 = Anti-legionella pump (not active) 10 = Solar valve (not active)	2
Contact details	Phone number		–	0-9	–
End the installation assistant?	–	–	–	Yes, No	–

<sup>1</sup>Fault lists are only displayed, and can only be deleted, if faults have occurred.

## C Overview of diagnostics codes



### Note

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

Code	Parameter	Values or explanations	Factory setting	Own setting
D.000	Heating partial load	Adjustable partial heat load in kW Auto: Product automatically adjusts max. partial load to current system demand	Auto	
D.001	Pump overrun: Heating	1 to 60 min	5 min	
D.002	Max. anti-cycl. time: Heating	2 to 60 min	20 min	
D.003	Outlet temperature actual value	In °C		Not adjustable
D.004	Cylinder temperature actual value	In °C		Not adjustable
D.005	Heating target flow temperature	In °C; the maximum value that is set in D.071 and is restricted by means of an eBUS control if such a control is connected		Not adjustable
D.006	Outlet temperature target value	35 to 65 °C		Not adjustable

Code	Parameter	Values or explanations	Factory setting	Own setting
D.007	Comfort mode target value APC target value Cylinder temperature target value	Product with integrated domestic hot water generation, and product with integrated domestic hot water generation and shift-load cylinder 35 to 65 °C Product with heating mode only Frost protection is at 15 °C, then 40 to 70 °C (max. temperature can be adjusted under <b>D.020</b> )		Not adjustable
D.008	Controller 3-4	Room thermostat open (no heat requirement) Room thermostat closed (heat requirement)		Not adjustable
D.009	eBUS controller target value	In °C		Not adjustable
D.010	Internal pump	On, Off		Not adjustable
D.011	External pump	On, Off		Not adjustable
D.012	Cyl. charging pump	On, Off		Not adjustable
D.013	Circulation pump	On, Off		Not adjustable
D.014	Pump speed target value	Target value of internal high-efficiency pump in %. Possible settings: 0 = Auto 1 = 53 2 = 60 3 = 70 4 = 85 5 = 100	0 = Auto	
D.015	Pump speed actual value	Actual value for internal high-efficiency pump in %		Not adjustable
D.016	Controller 24 V DC: Heating mode	Heating mode off/on		Not adjustable
D.017	Control type	Control type: 0 = Flow, 1 = Return Return: Automatic detection function for heat output inactive. Max. possible partial heat load when <b>D.000</b> is on <b>Auto</b> .	0 = Flow	
D.018	Pump operating mode	1 = Comfort (continuously operating pump) Internal pump is switched on when the heating flow temperature is not at <b>Heating off</b> and the heat requirement is enabled via an external control 3 = Eco (intermittently operating pump) Internal pump is switched on every 25 minutes for 5 minutes once the overrun time has elapsed	3 = Eco	
D.019	Pump operating mode: 2-stage pump	Setting for two-stage pump operating mode 0: Burner mode stage 2, pump prerun/overrun stage 1 1: Heating mode and pump prerun/overrun stage 1, domestic hot water mode stage 2 2: Automatic heating mode, pump prerun/overrun stage 1, domestic hot water mode stage 2 3: Always stage 2 4: Automatic heating mode, pump prerun/overrun stage 1, domestic hot water mode stage 1	2	
D.020	Max. DHW temperature target value	Adjustment range: 50–70 °C ( <b>actoSTOR</b> 65 °C)	65 °C	
D.022	DHW demand	On, Off		Not adjustable
D.023	Heating mode status	Heating on, heating off (summer mode)		Not adjustable
D.025	Ext. eBUS signal: Cylinder charging	On, Off		Not adjustable

Code	Parameter	Values or explanations	Factory setting	Own setting
D.026	Auxiliary relay	1 = Circulation pump 2 = External pump 3 = Cylinder charging pump 4 = Extraction hood 5 = External solenoid valve 6 = External fault message 7 = Solar pump (not active) 8 = eBUS remote control (not active) 9 = Anti-legionella pump (not active) 10 = Solar valve (not active)	2 = External pump	
D.027	Accessory relay 1	Switching of relay 1 on the VR 40 "2 in 7" multi-functional module 1 = Circulation pump 2 = External pump 3 = Cylinder charging pump 4 = Extraction hood 5 = External solenoid valve 6 = External fault message 7 = Solar pump (not active) 8 = eBUS remote control (not active) 9 = Anti-legionella pump (not active) 10 = Solar valve (not active)	2 = External pump	
D.028	Accessory relay 2	Switching of relay 2 on the VR 40 "2 in 7" multi-functional module 1 = Circulation pump 2 = External pump 3 = Cylinder charging pump 4 = Extraction hood 5 = External solenoid valve 6 = External fault message 7 = Solar pump (not active) 8 = eBUS remote control (not active) 9 = Anti-legionella pump (not active) 10 = Solar valve (not active)	2 = External pump	
D.029	Water circulation vol. actual value	Actual value in m <sup>3</sup> /h		Not adjustable
D.033	Fan speed target value	In rpm		Not adjustable
D.034	Fan speed actual value	In rpm		Not adjustable
D.035	3-way valve position	Heating mode Parallel operation (mid-position) DHW mode		Not adjustable
D.036	DHW flow rate	In l/min		Not adjustable
D.039	Solar inlet temp. actual value	Actual value in °C		Not adjustable
D.040	Flow temperature actual value	Actual value in °C		Not adjustable
D.041	Return temperature actual value	Actual value in °C		Not adjustable
D.044	Ionisation value actual value	Display field 0 to 1020 > 800 no flame < 400 good flame		Not adjustable
D.046	Pump mode	0 = Relay with disable facility 1 = PWM with disable facility	0 = Relay with disable facility	
D.047	Current outside temperature	(with Vaillant weather-compensated control) Actual value in °C		Not adjustable

Code	Parameter	Values or explanations	Factory setting	Own setting
D.050	Offset min. speed	In rpm, adjustment range: 0 to 3000	Nominal value set in factory	
D.051	Offset max. speed	In rpm, adjustment range: -990 to 0	Nominal value set in factory	
D.058	Solar post-heating	0 = Solar post-heating deactivated 3 = DHW activation target value minimum 60 °C, thermostatic mixing valve required between product and draw-off point	0 = Solar post-heating deactivated	
D.060	Number of safety therm. shut-downs	Number of shutdowns		Not adjustable
D.061	No. of shut-downs in ign. flame controller	Number of unsuccessful ignitions in the last attempt		Not adjustable
D.064	Avg. ignition time	In seconds		Not adjustable
D.065	Max. ignition time	In seconds		Not adjustable
D.067	Remaining anti-cycl. time for heating	In minutes		Not adjustable
D.068	Number of first start attempts	Number of unsuccessful ignitions		Not adjustable
D.069	Number of second start attempts	Number of unsuccessful ignitions		Not adjustable
D.070	3-way valve operation	0 = Normal operating mode 1 = Parallel operation (mid-position) 2 = Permanent heating position	0 = Normal operating mode	
D.071	Max. heating target flow temp.	40 to 80 °C	75 °C	
D.072	Pump overrun after cylinder charging	Adjustable from 0–10 minutes in increments of 1 minute	2 mins	
D.073	Offset setting for comfort mode	Adjustable from -15 K to 5 K	0	
D.074	Anti-legionella funct. with integrated cyl.	0 = Off 1 = On	1 = On	
D.075	Max. cylinder charging time	20–90 min	45 mins	
D.076	Device Specific Number	Device specific number = DSN 1 = VU 126/5-5 (H-GB) ecoTEC plus 612 3 = VU 156/5-5 (H-GB) ecoTEC plus 615 4 = VU 186/5-5 (H-GB) ecoTEC plus 618, VU 186/5-5 (P-GB) ecoTEC plus 618 9 = VU 246/5-5 (H-GB) ecoTEC plus 624 14 = VU 306/5-5 (H-GB) ecoTEC plus 630, VU 306/5-5 (P-GB) ecoTEC plus 630 20 = VU 386/5-5 (H-GB) ecoTEC plus 637 6 = VUW 196/5-5 (H-GB) ecoTEC plus 825 10 = VUW 246/5-5 (H-GB) ecoTEC plus 832, VUW 246/5-5 (P-GB) ecoTEC plus 832 62 = VUW 306/5-5 (H-GB) ecoTEC plus 835 17 = VUW 286/5-5 (H-GB) ecoTEC plus 838, VUI 286/5-5 (H-GB) ecoTEC plus 938		Not adjustable
D.077	DHW partial load	Adjustable cylinder charging output in kW		
D.078	DHW max. flow temperature	Limit on cylinder charging temperature in °C 50 °C – 80 °C <b>Note</b> The chosen value must be at least 15 K or 15 °C above the target cylinder value.		75 °C
D.080	Heating operating hours	In hours (h)		Not adjustable
D.081	DHW operating hours	In hours (h)		Not adjustable
D.082	Heating burner starts	Number of burner start-ups		Not adjustable

Code	Parameter	Values or explanations	Factory setting	Own setting
D.083	DHW burner starts	Number of burner start-ups		Not adjustable
D.084	Maintenance in	Adjustment range: 0 to 3000 hrs and "---" for deactivated	„---“	
D.088	Min. DHW flow rate	Switch-on delay for domestic hot water draw-off detection via impeller (only products with integrated domestic hot water generation) 0 = 1.5 l/min and no delay, 1 = 3.7 l/min and 2 sec. delay	1.5 l/min and no delay	
D.090	eBUS controller	Status of digital control Recognised, not recognised		Not adjustable
D.091	Status DCF77	Status of DCF with outdoor temperature sensor connected No reception Reception Synchronised Valid		Not adjustable
D.092	actoSTOR communication status	actoSTOR module detection 0 = Not connected 1 = Connection fault: No communication via PeBus, actoSTOR module was previously detected 2 = Connection active		Not adjustable
D.093	Adjust Device Specific Number	Device Specific Number (DSN) Adjustment range: 0 to 99		
D.094	Clear fault history	Delete fault list 0 = No 1 = Yes		
D.095	Software version: PeBUS participant	PCB (BMU) Display (AI) actoSTOR (APC) HBI/VR34		Not adjustable
D.096	Reset to factory settings?	Reset all adjustable parameters to factory setting 0 = No 1 = Yes		
D.098	Coding resistor	Display xx.yy xx = Coding resistor 1 in cable harness for output range: 8 = VU 126/5-5 (H-GB) ecoTEC plus 612; VU 156/5-5 (H-GB) ecoTEC plus 615; VU 186/5-5 (H-GB) ecoTEC plus 618, VU 186/5-5 (P-GB) ecoTEC plus 618; VUW 196/5-5 (H-GB) ecoTEC plus 825 9 = VU 246/5-5 (H-GB) ecoTEC plus 624; VUW 246/5-5 (H-GB) ecoTEC plus 832; VUW 246/5-5 (P-GB) ecoTEC plus 832 10 = VU 306/5-5 (H-GB) ecoTEC plus 630; VU 306/5-5 (P-GB) ecoTEC plus 630; VUW 306/5-5 (H-GB) ecoTEC plus 835 11 = VU 386/5-5 (H-GB) ecoTEC plus 637; VUW 286/5-5 (H-GB) ecoTEC plus 838; VUI 286/5-5 (H-GB) ecoTEC plus 938 yy = Coding resistor 2 on PCB for gas group: 02 = P gas 03 = H gas 07 = L gas		Not adjustable

## D Status codes – Overview



### Note

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

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

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

## E Overview of fault codes



### Note

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

Code/meaning	Possible cause	Measure
<b>F.00</b> Flow temperature sensor interruption	Flow temperature sensor defective or not connected	▶ Check: Flow temperature sensor, plug, cable harness, PCB.
<b>F.01</b> Return temperature sensor interruption	Return temperature sensor defective or not connected	▶ Check: Return temperature sensor, plug, cable harness, PCB.
<b>F.02</b> Interruption: DHW outlet sensor	Shift-load cylinder temperature sensor defective or not connected	▶ On the shift-load cylinder, check (only in conjunction with F.91): Plug, cable harness, temperature sensor.
<b>F.03</b> Cylinder temperature sensor interruption	Shift-load cylinder temperature sensor defective or not connected	▶ On the shift-load cylinder, check (only in conjunction with F.91): Temperature sensor plug, PCB plug, cable harness.
<b>F.10</b> Flow temperature sensor short circuit	Flow temperature sensor defective or has short-circuited	▶ Check: NTC plug, cable harness, cable/housing, PCB, NTC sensor.
<b>F.11</b> Return temperature sensor short circuit	Return temperature sensor defective or has short-circuited	▶ Check: NTC plug, cable harness, housing, PCB, NTC sensor.
<b>F.12</b> DHW outlet sensor short circuit	Cylinder charging sensor defective or has short-circuited	▶ Check (only in conjunction with F.91): NTC plug, cable harness, NTC sensor, PCB.
<b>F.13</b> Cylinder temperature sensor short circuit	Warm-start sensor/cylinder temperature sensor defective or not connected	1. Check: NTC plug, earth connection, cable harness, NTC sensor, PCB. 2. Check the following on the shift-load cylinder (in conjunction with F.91): NTC plug, earth connection, cable harness, NTC sensor, connection to the PCB.
<b>F.20</b> Safety switch-off: Temperature limiter	Maximum temperature at the flow/return temperature sensor is too high when the safety cut-out function is operating using the NTC	▶ Check: Flow temperature sensor (correct thermal connection), cable harness, sufficient purging.





Code/meaning	Possible cause	Measure
<b>F.22</b> Safety switch-off: Low water pressure	No/insufficient water in the product or the water pressure is too low	<ol style="list-style-type: none"> <li>1. Check: Plug, cable to heating pump or water pressure sensor, water pressure sensor, heating pump.</li> <li>2. Activate and purge check programme P.0.</li> </ol>
<b>F.23</b> Safety switch-off: Temp.spread too large	Temperature spread too great. Water circulation too low	► Check: Plug, cable to heating pump/water pressure sensor, air/insufficient water in the heating circuit, flow and return temperature sensor inverted, strainer in the hydraulic block, water pressure sensor, heating pump (sufficient circulation, stage 2: D.19, D.14, non-return valve). Activate check programme P.0.
<b>F.24</b> Safety switch-off: Temp. incr. too fast	Temperature increase too fast	► Check: Plug, cable to the heating pump, air/insufficient water in the heating circuit, internal air vent (function), heating pump (system pressure too low, temperature gradient too great on heating flow, non-return valve). Activate check programme P.0.
<b>F.25</b> Safety switch-off: Flue temp. too high	flue gas temperature too high	► Check: Plug, safety cut-out plug, cable harness, cable to the heating pump, internal air vent (function), flue gas route (blockage, adverse wind conditions, flue pipework too long), insufficient water in heating circuit, heating pump, activate check programme P.0.
<b>F.26</b> Fault: Fuel valve not working	Gas valve assembly stepper motor defective or not connected	► Check: Gas valve assembly stepper motor (plug, cable, passage for rinsing, voltage), multiple plug, cable harness.
<b>F.27</b> Safety switch-off: Flame simulation	Monitoring electrode reports an incorrect flame	► Check: Gas pressure at upper test opening, monitoring electrode, PCB, gas solenoid valve.
<b>F.28</b> Start-up failure: Ignit. unsuccessful	Failure during start-up or ignition unsuccessful. Gas pressure monitor or thermal cut-out has been triggered.	► Check: Gas stopcock, gas flow pressure, gas valve assembly, air intake pipe (blockage, loosened screw), condensate route (blockage), multiple plug, cable harness, ignition transformer, ignition cable, ignition plug, ignition electrode, monitoring electrode, electronics, earthing, CO <sub>2</sub> setting.
<b>F.29</b> Operating failure: Ignit. unsuccessful	Gas supply interrupted intermittently. Re-ignition failed.	► Check: Flue gas recirculation, condensate route (blockage), earthing, cable to the gas valve assembly and electrode (loose connection).
<b>F.32</b> Fault: Fan	Fan defective or not connected	► Check: Plug, cable harness, fan (blockage, function, correct speed), Hall sensor, PCB, flue gas route (blockage).
<b>F.42</b> Fault: Coding resistor	Coding resistor or gas group resistor causes a short circuit	► Check: Plug, earth connection, cable, output coding resistor (in the cable harness).
<b>F.49</b> Fault: eBUS	Undervoltage on the eBUS	► Check: eBUS (overload, two power supplies with different polarities, short circuit).
<b>F.52</b> Mass flow sensor not connected	Mass flow sensor defective or not connected	► Check: Plug, cable harness, mass flow sensor.
<b>F.53</b> Gas valve assembly mass flow unexpected	The mass flow through the gas valve assembly is not as expected.	► Check: Gas flow pressure too low, sharp drop in pressure during ignition or full load, filter below Venturi filter cap wet or blocked, internal pressure measuring point in the Venturi blocked (do not use any lubricants on the O-ring in the Venturi), gas valve assembly does not regulate correctly.
<b>F.54</b> Fault: Boiler start	No gas inlet pressure or insufficient gas inlet pressure causes faults when the product is started	► Check (in conjunction with F.28/F.29): Gas stopcock, gas valve assembly, plug, cable harness.
<b>F.55</b> Fault: CO sensor	All-gas sensor defective or has short-circuited	► Check: Plug, cable harness, all-gas sensor, PCB.
<b>F.56</b> Safety switch-off: CO limit exceeded	Safety shutdown after the CO limit value is exceeded	► Check: Gas valve assembly, plug, cable harness. If the fault occurs again after being cleared, the gas valve assembly is defective.
<b>F.57</b> Fault: Measuring program	Regulation fault caused by corroded ignition electrode	► Check: Ignition electrode, PCB (microcontrol).
<b>F.61</b> Fault: Fuel valve actuation	The gas valve assembly cannot be actuated	► Check: Cable harness, plug, gas valve assembly (rinse), PCB.
<b>F.62</b> Fault: Fuel valve switch-off delay	Delayed switch-off sequence for the gas valve after the flame is extinguished	► Check: Gas valve, surface of the burner (dirt), plug, cable harness, PCB.
<b>F.63</b> Fault: EEPROM	EEPROM faulty	► Replace: PCB.
<b>F.64</b> Fault: Electronics/sensor	Electronics, safety-relevant sensor or cable defective	► Check: Flow sensor, cable to the sensor, flame recording sensor (e.g. ionisation electrode) for an unstable signal, electronics.
<b>F.65</b> Fault: Electronics temp.	Electronics defective or too hot due to external influences	<ol style="list-style-type: none"> <li>1. Check: PCB.</li> <li>2. If required, reduce the environmental temperature.</li> </ol>
<b>F.67</b> Fault: Electronics/flame	Implausible flame signal	► Check: Cable harness, flame monitor, PCB.

Code/meaning	Possible cause	Measure
<b>F.68</b> Fault: Flame signal unstable	Flame monitor reports an unstable flame signal	► Check: Air ratio, gas flow pressure, condensate route (blockage), gas injector, ionisation flow (cable, electrode), flue gas recirculation.
<b>F.70</b> Fault: Invalid Device Specific Number	Incorrect/missing Device Specific Number or incorrect/missing coding resistor	► If the display and PCB have been replaced, change the Device Specific Number under <b>D.93</b> .
<b>F.71</b> Fault: Flow temperature sensor	Flow temperature sensor returns implausible values	► Check: Flow temperature sensor (correct thermal connection).
<b>F.72</b> Fault: Flow/return temperature sensor	Temperature difference between flow and return temperature sensor is too great	► Check: Flow temperature sensor/return temperature sensor (function, correct thermal connection).
<b>F.73</b> Fault: Water press. sensor (signal too weak)	Water pressure sensor reports that the water pressure is too low	► Check: Water pressure, earth connection, cable, plug, water pressure sensor (short circuit to GDN).
<b>F.74</b> Fault: Water press. sensor (signal too strong)	Water pressure too high	1. Drain water. 2. Check the water pressure sensor.
<b>F.75</b> Fault: Pump/ water shortage	Insufficient pressure jump detected when starting the pump	1. Check: Water pressure sensor, heating pump (blockage), heating circuit (air, sufficient water volume), adjustable bypass, external expansion vessel (must be connected at the return). Activate check programme P.0. 2. If a low loss header or heating pipes with a diameter greater than 1 1/2 inch are installed, replace the 3/4-inch seal in the heating flow with a screen. If required, install the F.75 service set.
<b>F.77</b> Fault: Flue non-ret. valve/condens. pump	No flue non-return flap feedback; condensate pump overflow	► Check: Cable to VR40 accessory, flue non-return flap (wiring, feedback switch), condensate pump, bridge from the surface-mounted thermostat, 2 in 7 multi-functional module (bridge).
<b>F.78</b> Interruption: DHW outlet sensor at ext. control	UK link box is connected without the domestic hot water temperature sensor being bridged	1. Check: Accessory (configuration/electrical connection). 2. The unit displays a fault, but the unit has not malfunctioned.
<b>F.80</b> Fault: actoSTOR inlet sensor	Inlet temperature sensor defective or not connected	► Check (only in conjunction with F.91): NTC sensor, plug, cable harness, PCB.
<b>F.81</b> Fault: cylinder charging pump	Cylinder is not fully charged after specified time	► Check (only in conjunction with F.91): Cylinder charging sensor, cylinder sensor, impeller sensor/limiter, prioritising diverter valve, pump, <b>actoSTOR</b> pump (air), cable harness, secondary heat exchanger (blockage).
<b>F.82</b> Fault: Ext. current anode	External current anode defective or not connected	► Check: Cable harness, external current anode. If the external current anode is not installed: Plug edge connector X43 with a bridge into the PCB.
<b>F.83</b> Fault: NTC temp. gradient	Temperature difference between flow and return temperature sensor is too small	► Check: Flow/return temperature sensor (function, correct thermal connection), sufficient water volume.
<b>F.84</b> Fault: NTC temp. diff. implausible	Temperature difference is implausible	► Check: Flow/return temperature sensor (correct thermal connection, sensors are inverted).
<b>F.85</b> Fault: NTCs fitted incorrectly	Flow/return temperature sensors returning incorrect/implausible values	► Check: Flow/return temperature sensor (correct thermal connection).
<b>F.90</b> Fault: Communication	Communication with actoSTOR interrupted	1. Check: Plug, check cable harness to the <b>actoSTOR</b> module (PEBus). 2. If the product is to be operated without an <b>actoSTOR</b> : Set D.092=0, if required, plug edge connector X31 into the BMU, if required plug edge connector X1 into the actoSTOR.
<b>F.91</b> Fault: actoSTOR sensor	Sensor on the actoSTOR is defective	► Check: Plug, cable harness, sensor.
<b>F.92</b> Fault: Incorrect gas type	The coding resistor on the PCB does not match the gas group that is entered	1. Check: Coding resistor. 2. Carry out the gas family check again and enter the correct gas group.
<b>F.93</b> Fault: Check gas route	Combustion quality outside the permitted range	► Check: Gas injector (suitable for the gas group), flue gas recirculation, gas group, internal pressure measuring point in the Venturi (blockage). Do not use any lubricants on the O-ring in the Venturi.
<b>F.94</b> Fault: Vortex and differential pressure	Sensors return implausible values.	► Check: Cable harness, plug, sensors.

Code/meaning	Possible cause	Measure
<b>LED actoSTOR Modul</b> actoSTOR communication status	actoSTOR communication status: Not connected, Connection error, Connection active	<ol style="list-style-type: none"> <li>1. LED on: Communication OK.</li> <li>2. LED flashing: Communication not OK.</li> <li>3. LED off: No power supply.</li> </ol>
Communication fault	Communication fault between the display and the PCB in the electronics box	► Check: Cable/plug between the display and the PCB.

## F Check programmes – Overview

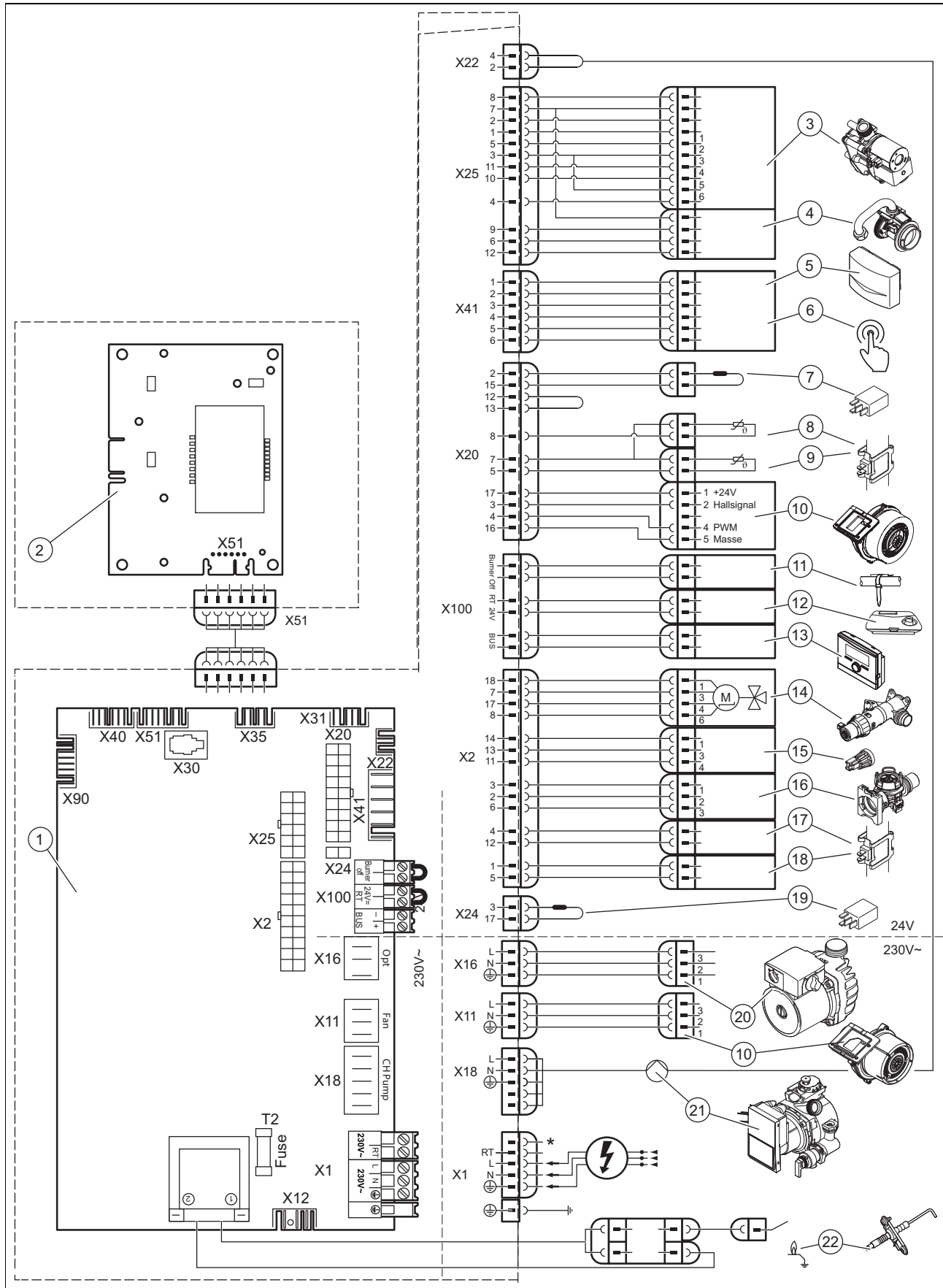
Check programme	Meaning
<b>P.00 Purging</b>	The internal pump is cyclically actuated. The heating circuit and the domestic hot water circuit are adaptively purged by automatically switching the circuits using the automatic air vent (the automatic air vent's cap must be loose). The active circuit is shown in the display. Press  once to start purging the heating circuit. Press  once to end the purge programme. Note: The purge programme runs for 7.5 min per circuit and then terminates. Purging the heating circuit: Prioritising diverter valve in heating position, actuation of internal pump for 9 cycles: 30 sec. on, 20 sec. off. Display: Active heating circuit. Purging the domestic hot water circuit: After the above-mentioned cycles have run or the right-hand selection button has been pressed again: Prioritising diverter valve in the domestic hot water position, actuation of the internal pump as above. Display: Active domestic hot water circuit.
<b>P.01 Maximum load</b>	After successful ignition, the product is operated at maximum heat input.
<b>P.02 Minimum load</b>	After successful ignition, the product is operated at minimum heat input.
<b>P.06 Filling mode</b>	The prioritising diverter valve is moved to the mid-position. The burner and pump are switched off (to fill or drain the product).

## G Function menu – Overview

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

# H Wiring diagrams

## H.1 Wiring diagram, product with integrated domestic hot water generation, ≥ 37 kW



- 1 Main PCB
- 2 Control panel PCB

- 3 Gas valve assembly
- 4 Mass flow sensor

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

# Benchmark Commissioning & Warranty Validation Service Record

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

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

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



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

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

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

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## GAS BOILER SYSTEM COMMISSIONING CHECKLIST & WARRANTY VALIDATION RECORD

Address:															
Boiler make and model:															
Boiler serial number:															
Commissioned by (PRINT NAME):						Gas Safe registration number:									
Company name:						Telephone number:									
Company email:						Company address:									
										Commissioning date:					
Heating and hot water system complies with the appropriate Building Regulations?											Yes				
Optional: Building Regulations Notification Number (if applicable):															
Time, temperature control and boiler interlock provided for central heating and hot water											Yes				
Boiler Plus requirements (tick the appropriate box(s))															
Boiler Plus option chosen for combination boiler in ENGLAND						Weather compensation			Smart thermostat with automation and optimisation						
						Load compensation			Flue Gas Heat Recovery						
Time and temperature control to hot water			Cylinder thermostat and programmer/timer						Combination boiler						
Zone valves			pre-existing			Fitted			Not required						
Thermostatic radiator valves			pre-existing			Fitted			Not required						
Automatic bypass to system			pre-existing			Fitted			Not required						
Underfloor heating			pre-existing			Fitted			Not required						
Water quality															
The system has been flushed, cleaned and a suitable inhibitor applied upon final fill, in accordance with BS7593 and boiler manufacturers' instructions											Yes				
What system cleaner was used?						Brand:			Product:						
What inhibitor was used?						Brand:			Product:						
Primary water system filter			pre-existing			Fitted			Not required						
CENTRAL HEATING MODE measure and record (as appropriate)															
Gas rate (for combination boilers complete DHW mode gas rate)						m <sup>3</sup> /hr			or			ft <sup>3</sup> /hr			
Central heating output left at factory settings?											Yes	No			
If no, what is the maximum central heating output selected?															
Dynamic gas inlet pressure															
Central heating flow temperature															
Central heating return temperature															
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 <sup>3</sup> /hr			or			ft <sup>3</sup> /hr			
Dynamic gas inlet pressure at maximum rate															
Cold water inlet temperature															
Hot water has been checked at all outlets											Yes	Temperature			
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 <sub>2</sub>		%		CO/CO <sub>2</sub>		Ratio	
		At min rate (where possible)		CO		ppm		CO <sub>2</sub>		%		CO/CO <sub>2</sub>		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 <sub>2</sub>	%	CO/CO <sub>2</sub>
Min rate	CO	ppm	CO <sub>2</sub>	%	CO/CO <sub>2</sub>
Where possible, has a flue integrity check been undertaken in accordance with manufacturers' instructions, and readings are correct?*					yes
Gas rate:	m <sup>3</sup> /h	OR	ft <sup>3</sup> /h		
Were parts fitted? <small>delete as appropriate</small>		Yes	No		
Parts fitted:					
System inhibitor concentration has been checked and appropriate action taken, in accordance with BS 7593 and boiler manufacturers' instructions. *					yes n/a
Comments:					
Signature:					

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

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Gas rate:	m <sup>3</sup> /h	OR	ft <sup>3</sup> /h			
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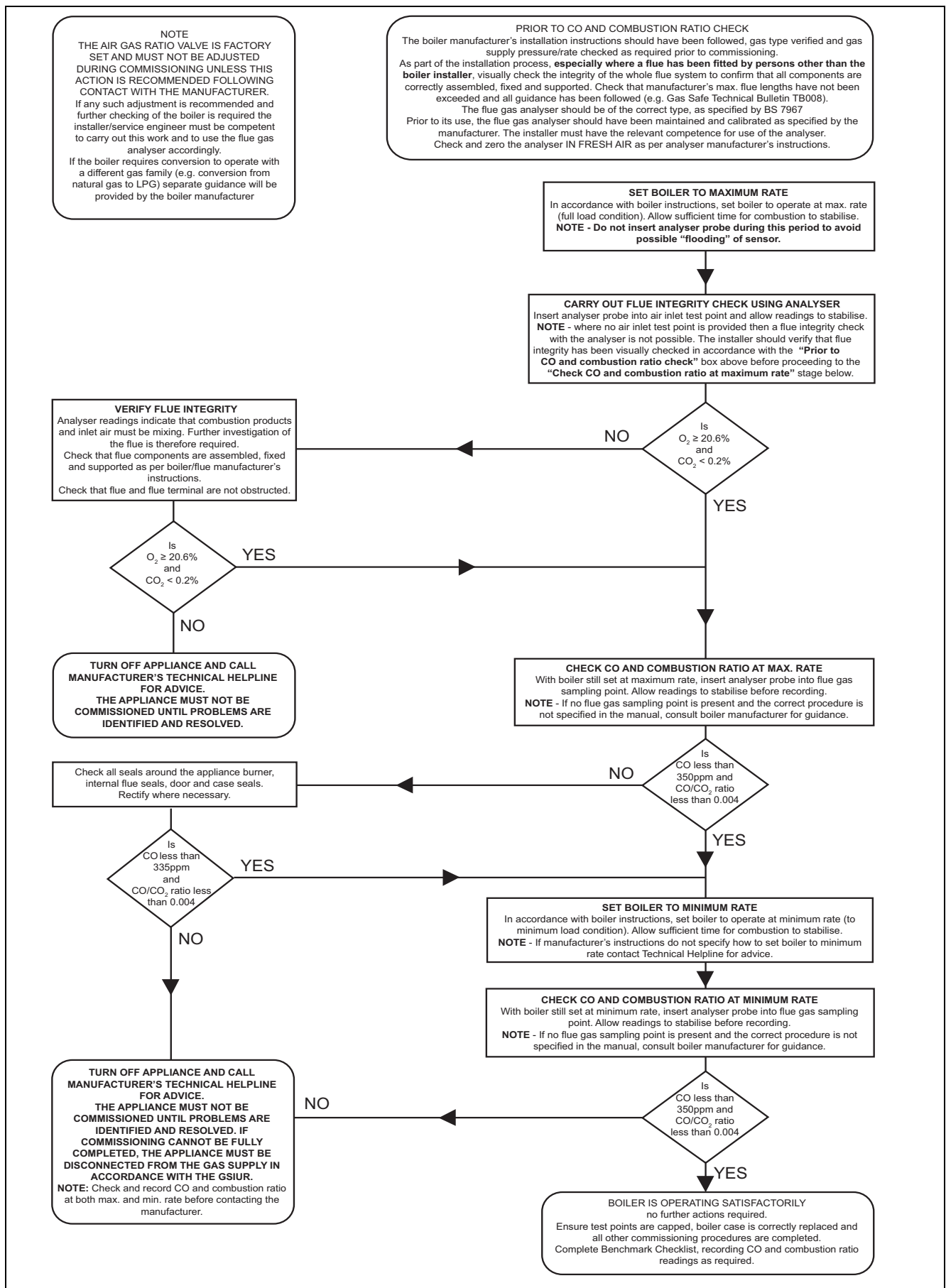
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# J Commissioning Flow Chart



# Index

<b>A</b>	
Air ratio setting .....	32
Air/flue pipe .....	22
Air/flue pipe, horizontal wall duct .....	16
Air/flue pipe, type C13 .....	16
Air/flue pipe, type C33 .....	16
Air/flue pipe, vertical roof duct .....	16
Article number .....	9–10
Automatic air vent .....	30
Auxiliary relay .....	27
<b>B</b>	
Burner anti-cycling time .....	34
Burner anti-cycling time, resetting .....	34
Burner anti-cycling time, setting .....	34
Burner, checking .....	37
Burner, replacing .....	40
Bypass valve, setting .....	35
<b>C</b>	
CE marking .....	9
Check programmes .....	27–28
Circulation pump .....	25
CO <sub>2</sub> content, checking .....	32
CO <sub>2</sub> content, setting .....	32
Cold water connection .....	19
Cold water inlet strainer, cleaning .....	38
Comfort mode .....	27
Comfort protection mode .....	40
Compact thermal module .....	6
Compact thermal module, installing .....	38
Compact thermal module, removing .....	36
Component test .....	36
Condensate discharge pipe .....	19
Condensate siphon .....	29, 38
Condensate trap .....	29, 38
Connection dimensions .....	12
Contact details .....	27
Control, connecting .....	25
Corrugated gas pipe .....	6
<b>D</b>	
Decommissioning .....	46
Decommissioning, temporarily .....	46
Diagnostics codes, calling up .....	34
Discharge pipe, expansion relief valve .....	22
Disposal, packaging .....	46
Disposing of the packaging .....	46
Documents .....	9
<b>E</b>	
Electronics box, closing .....	23
Electronics self-test .....	36
<b>F</b>	
Fan, replacing .....	41
Fault codes .....	40
Fault memory, calling up .....	40
Fault memory, deleting .....	40
Fault messages .....	40
Filling .....	30
Filling mode .....	27
Flexible hose, expansion relief valve on the shift-load cylinder .....	22
Frost protection .....	11
Function menu .....	36, 59
<b>G</b>	
Gas conversion .....	30
Gas Council Number .....	9
Gas family check, performing .....	28
Gas flow rate .....	31
Gas group .....	18
Gas injector .....	42
Gas setting .....	30
Gas type .....	18
Gas valve assembly .....	41
Gas valve assembly, replacing .....	41
Guarantee and Customer Service .....	7
<b>H</b>	
Handing over to the end user .....	35
Heat exchanger, cleaning .....	37
Heat exchanger, replacing .....	43
Heating flow .....	19
Heating partial load .....	27
Heating return .....	19
Hot water connection .....	19
Hot water temperature .....	27
<b>I</b>	
Identification plate .....	10
Impeller sensor .....	10
Inspection work, carrying out .....	36
Inspection work, completing .....	39
Installation assistant, ending .....	27
Installation assistants, restarting .....	27
Installer level, calling up .....	26
Intended use .....	4
Internal expansion vessel on the heat generator, replacing .....	43
Isolators .....	46
<b>K</b>	
Kammerbelüftung .....	13
<b>L</b>	
Language .....	27
Leak detection spray .....	6
Leak-tightness .....	33, 39, 46
Liquid gas .....	6, 18
<b>M</b>	
Maintenance interval, setting .....	34
Maintenance work, carrying out .....	36
Maintenance work, completing .....	39
Manometer .....	11
Mass flow sensor, replacing .....	42
Minimum clearance .....	13
Multi-functional module .....	27
<b>O</b>	
Operating concept .....	26
Overheating protection .....	11
<b>P</b>	
PCB and display for the heat generator, replacing .....	45
PCB or display for the heat generator, replacing .....	45
Power supply .....	24
Pre-charge pressure for the internal expansion vessel on the heat generator, checking .....	38
Pre-charge pressure for the shift-load cylinder expansion vessel, checking .....	39
Preparing, maintenance work .....	36
Preparing, repair work .....	40
Product dimensions .....	12
Product, draining .....	38
Product, switching off .....	46

Pump output, setting .....	34
Pump, remaining feed head .....	35
Purging .....	30
<b>R</b>	
Regulations .....	6
Remaining feed head, pump .....	35
Repair work, completing .....	46
Repair work, preparing .....	36, 40
<b>S</b>	
Safety devices .....	11
Scale .....	18
Scale deposition .....	18
Scope of delivery .....	12
Self-test .....	36, 59
Serial number .....	10
Service message .....	40
Shift-load cylinder charging pump, replacing .....	44
Shift-load cylinder expansion vessel .....	43
Shift-load cylinder impeller sensor, replacing .....	45
Shift-load cylinder PCB, replacing .....	45
Shift-load cylinder, connecting .....	24
Shift-load cylinder/heat generator pipe connections .....	19
Side section, installing .....	17
Side section, removing .....	17
Spare parts .....	40
Status codes .....	26
Switching off .....	27
Switching on .....	27
<b>T</b>	
Target feed temperature .....	27
Technical data .....	8
Telephone number, competent person .....	27
Test programmes .....	27, 59
Treating the heating water .....	28
<b>U</b>	
Unit configuration .....	34
Unit connection piece for the air/flue pipe, removing .....	23
Unit connection piece for the air/flue pipe, replacing .....	22
Unit connection piece, 80/125 mm diameter, installing .....	23
<b>V</b>	
Validity of the instructions .....	9
Venturi .....	41
Venturi, replacing .....	42
<b>W</b>	
Weight .....	16







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