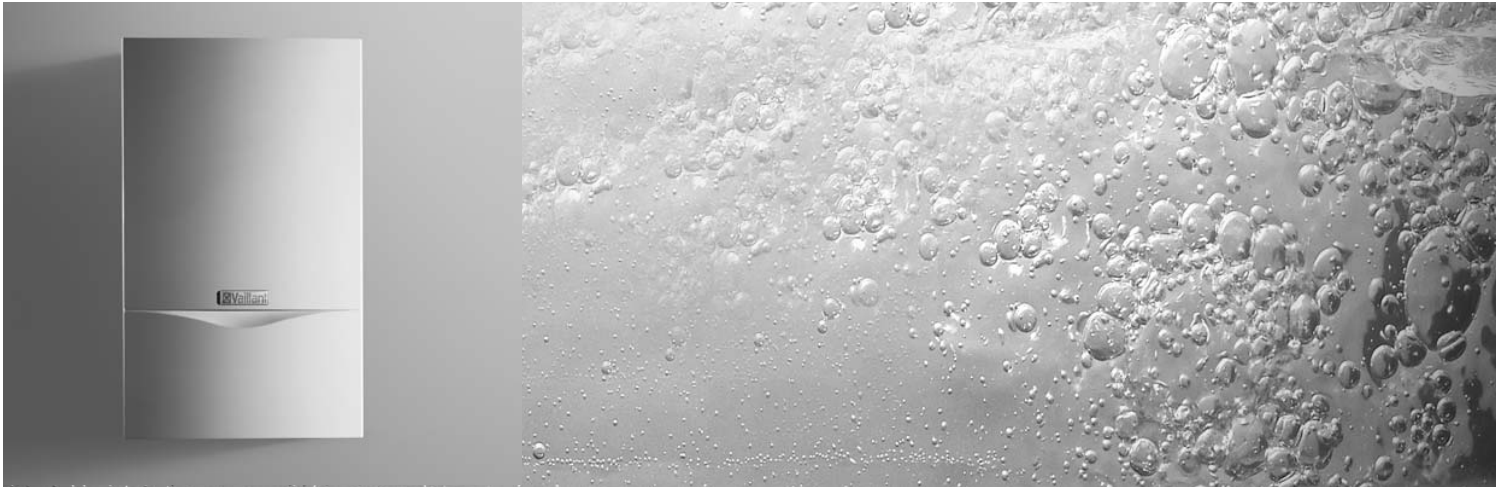


For the installer

Installation and maintenance manual
ecoMAX



Wall hung room sealed fan assisted condensing boiler

ecoMAX 646

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Notes on the documentation

The following information is intended to guide you through the entire documentation. Further documents apply in combination with this installation and maintenance manual. We accept no liability for any damage caused by not following these instructions.

Other relevant documentation and service aids

For the owner of the system

Brief operating instructions	No. 00 20 00 64 61
Operating manual	No. 00 20 01 46 08

For the installer

Installation Manual	
Flue accessories	No. 00 20 01 46 06
Checklist	No. 00 20 02 01 60
Sticker with name of appliance	No. 83 42 24
Installation template	No. 12 41 82
Safety sticker	No. 83 55 93

Service aids:

The following test and measuring equipment is required for inspection and maintenance:

- Flue gas analyser
- Manometer (U gauge)

Attachment and storage of the documents

Please pass on this installation and maintenance manual as well as the aids to the owner of the system, whose responsibility it is to ensure that the manuals and auxiliary equipment are available whenever required.

Symbols used

Please observe the safety instructions in this installation manual when installing the appliance!



Danger!

Immediate risk of serious injury or death!



Caution!

Potentially dangerous situations for product and environment!



Note!

Useful information and instructions.

- **Symbol for a necessary task**

1 Description of the appliance

1 Description of the appliance

1.1 Design

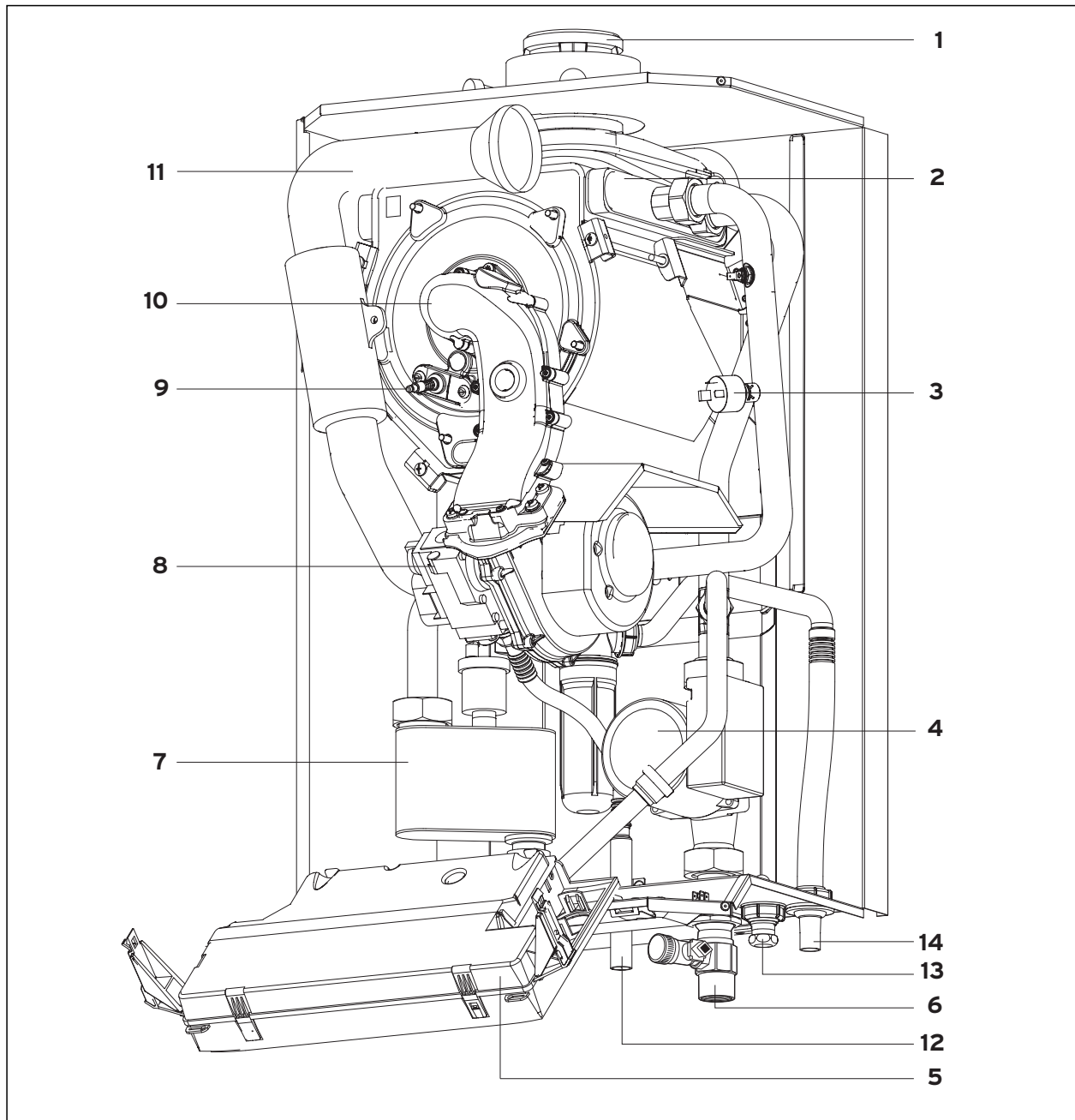


Fig. 1.1 Function elements

- | | |
|--|---|
| 1 Connection for the flue pipe | 8 Electronic gas valve |
| 2 Heat exchanger | 9 Ignition electrode |
| 3 Pressure switch | 10 Burner gas/air mixing chamber |
| 4 Pump | 11 Air intake pipe |
| 5 Electronics box | 12 Gas inlet |
| 6 Return connection (with drain point) | 13 Connection for pressure relief valve |
| 7 Air separator | 14 Connection for condensate discharge |

1.2 Type summary

Appliance type	Country of destination (designations according to ISO 3166)	License category	Type of gas	Nominal heat output range P (kW)	DHW primary output (kW)
ecoMAX 646	GB (Great Britain) IE (Eire)	II _{2H3P}	Natural gas H - G 20 -20 mbar (Propane - G 31 - 37 mbar)	13.3 - 47.7 (40/30 °C) 12.3 - 44.1 (80/60 °C)	44.1

Table 1.1 Type summary

1.3 Data badge

The data badge of the Vaillant ecoMAX 646 is attached at the factory to the bottom of the appliance.

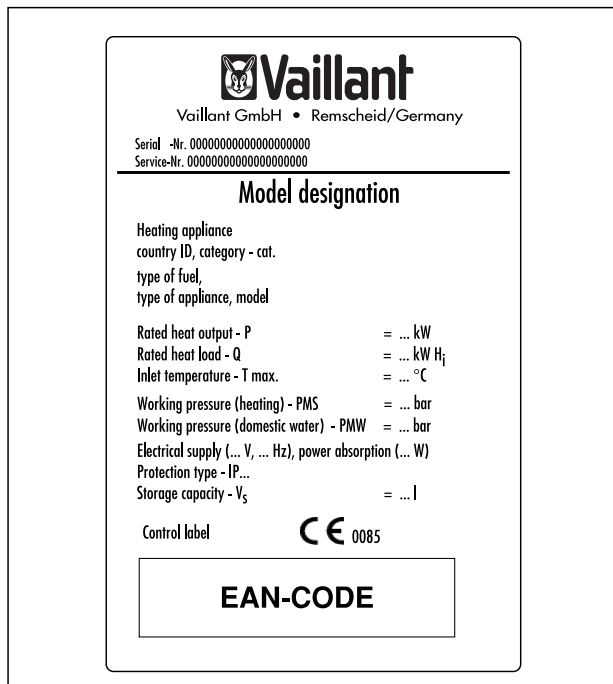


Fig. 1.2 Data badge (example)

1.4 CE marking

CE marking is used to document the fact that the appliances, in accordance with the type summary, meet the basic requirements of the directive on appliances burning gaseous fuels (Council Directive 90/396/EEC) and the EC directive on electromagnetic compatibility (Council Directive 89/336/EEC). The appliances meet the basic requirements of the efficiency requirements directive (Council Directive 92/42/EEC).

The appliances meet the basic requirements of the efficiency requirements directive (Council Directive 92/42/EEC) as condensing appliances.

1.5 Intended use

The Vaillant ecoMAX 646 is a state-of-the-art appliance which has been constructed in accordance with recognised technical safety regulations. Nevertheless, danger to the life and limb of the user or third parties can still occur or the appliance or other material assets be damaged when using it.

The appliance is designed to be used as a heater for closed hot water central heating systems. Any other use or extended use is considered to be improper. The manufacturer or supplier is not liable for any damage resulting from improper use. The user alone bears the risk. Appropriate use includes the observance of the operating and installation manual and the adherence to the inspection and maintenance conditions.

2 Safety instructions

2 Safety instructions and regulations

2.1 Safety instructions

2.1.1 Installing and setting the appliance



Important!

The appliance must be installed and serviced by a competent person as stated in the Gas Safety (Installation and Use) Regulations 1998. In IE, the installation must be in accordance with the current edition of IS 813 'Domestic Gas Installations', the current Building Regulations and reference should be made to the current ETCI rules for electrical installation.

2.1.2 Smell of gas

If you smell gas, the following safety instructions should be observed:

- don't switch on any electrical switch in the danger area,
- don't smoke in the danger area,
- don't use a telephone in the danger area,
- close the gas stop cock,
- ventilate the danger area,
- contact your gas supplier or National Grid Transco 0800 111999.

2.1.3 Changes to the surroundings of the boiler

No changes must be made to the following devices:

- the boiler
- the gas, air, water and electricity supply pipes
- the flue pipe
- the discharge pipe and the safety valve for the hot water
- the constructional conditions that could affect the operational reliability of the device.

2.1.4 Important instructions for propane appliances

Should the appliance be connected to an LPG supply, ensure that the tank has been correctly filled and purged prior to installation to the emergency gas control valve.



Danger!

Only propane G31 may be used.



Important!

When tightening or slackening screwed connections always use suitable open-ended spanners (not pipe wrenches or extensions etc.). Incorrect use and/or unsuitable tools can lead to damage being caused (e.g. gas or water leakage)!

2.2 General requirements

2.2.1 Preliminary remarks for roomsealed appliances

This appliance should only be installed in conjunction with either a Vaillant flue system or an alternative approved system (details of flue approval categories can be found in the technical section of the installation manual). Install the flue system as detailed in the separate flue installation instructions supplied with this boiler.

2.2.2 Related documents

The installation of the boiler must be in accordance with the relevant requirements of Gas Safety (Installation and Use) Regulations 1998, Health and Safety Document No. 635 (The Electricity at Work Regulations 1989), BS7671 (IEE Wiring Regulations) and the Water Supply (Water Fitting) Regulations 1999, or The Water Bylaws 2000 (Scotland). It should also be in accordance with the relevant requirements of the Local Authority, Building Regulations, The Building Regulations (Scotland). The Building Regulations (Northern Ireland) and the relevant recommendations of the following British Standards:

- BS 6700: Services supplying water for domestic use within buildings and their curtilages.
- BS 6798: Specification for installation of gas fired boilers not exceeding 60 kW input.
- BS 6891: Specification for installation of low pressure gas pipework up to 28 mm (R1) in domestic premises (2nd family gas).
- BS 7593: Treatment of water in domestic hot water central heating systems. Institute of Gas Engineers Publication "IGE/UP/7 Edition 2 Gas installation in timber framed and light steel framed buildings"
- BS. 5482 Pt. 1 Domestic butane and propane gas burning installations.
- IGE/UP1 Soundness testing and purging of industrial and commercial gas installation.
- IGE/UP2 Gas installation pipework, boosters and compressors on industrial and commercial premises.
- IGE/UP10 Installation of gas appliances in industrial and commercial premises.
- BS. 6644 Installation of gas fired hot water boilers of rated inputs between 60 kW and 2 MW (2nd and 3rd family gases).
- BS. 5449 Forced circulation hot water central heating systems for domestic premises.
Note: only up to 45 kW.
- BS. 6880 Low temperature hot water heating systems of output greater than 45 kW.
Part 1 Fundamental and design considerations.
Part 2 Selection of equipment.
Part 3 Installation, commissioning and maintenance.
- BS. 4814 Specification for: Expansion vessels using an internal diaphragm, for sealed hot water heating systems.
- BS. 5440 Installation and maintenance of flues and ventilation for gas appliances of rated input not exceeding 70 kW net (1st, 2nd and 3rd family gases).
Part 1 Specification for installation of flues.
Part 2 Specification for installation and maintenance of ventilation for gas appliances.



Important!

When tightening or loosening screwed connections always use suitable open-ended spanners (not pipe wrenches or extensions etc.). Incorrect use and/or unsuitable tools can lead to damage being caused (e.g. gas or water leakage)! Preliminary remarks: This appliance should only be installed in conjunction with a Vaillant flue system. Install the flue system as detailed in the separate flue installation instructions supplied with this boiler.

quate size. Do not use pipes of a smaller size than the boiler gas connection. The complete installation must be tested for soundness and purged as described in BS 6891.

Boiler location

The location chosen for the boiler must permit the provision of a satisfactory flue termination. The location must also provide adequate space for servicing and air circulation around the boiler. The boiler may be installed in any room, although particular attention is drawn to the requirements of BS7671 (IEE Regulations), the electrical provisions of the Building Regulations (Scotland) and in IE the current edition of IS 813 and the current ETCI rules, in respect of the installation of a boiler in a room containing a bath or shower.



Note!

Where a room sealed boiler is installed in a room containing a bath or shower, any electrical switch or boiler control utilising mains electricity should be so situated that it cannot be touched by a person using the bath or shower.

Where the installation of the boiler will be in an unusual location, special procedures may be necessary and BS 5546 and BS 6798 give detailed guidance on this aspect. The boiler must be mounted on a flat, vertical wall, which must be sufficiently robust to take the weight of the boiler. The boiler may be installed on a combustible wall, subject to the requirements of the Local Authorities and Building Regulations.

A compartment used to enclose the boiler must be designed and constructed specifically for this purpose. (An existing cupboard or compartment may be used provided that it is modified for the purpose). Details of essential features of cupboard/compartment design including airing cupboard installations are given in BS 6891. In IE the current edition of IS 813.



Note!

If the boiler is to be installed in a timber framed building, it should be fitted in accordance with „IGE/UP/7 Edition 2 Gas installations in timber framed and light steel framed buildings“.

Gas Supply

The gas supplier should ensure the availability of an adequate supply of gas. A gas meter may only be connected to the service pipe by the supplier of gas or their contractor. An existing meter should be checked to ensure that it is capable of passing the rate of gas supply required. Installation pipes should be fitted in accordance with BS 6891. Pipework from the meter to the boiler must be of an ade-

3 Mounting

3 Mounting

The Vaillant ecoMAX 646 is delivered in a package unit.

3.1 Scope of delivery and accessories

Scope of delivery

Check that all the parts have been delivered intact (see fig. 3.1 and table 3.1).

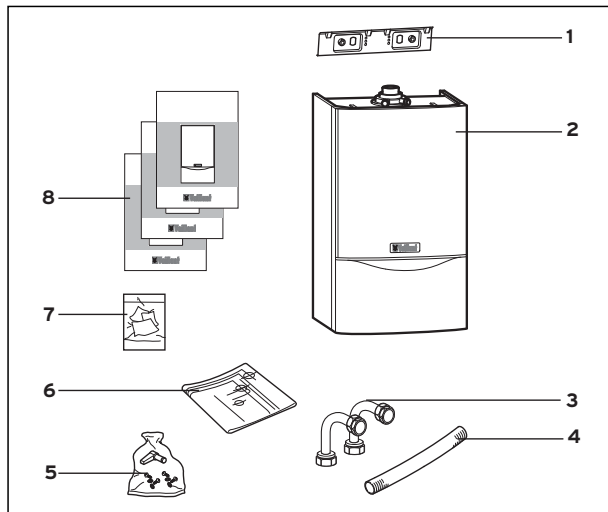


Fig. 3.1 Scope of delivery

Position	Quantity	Name
1	1	Boiler hanging bracket
2	1	Boiler
3	2	Connector - storage charging circuit
4	1	Condensate discharge hose
5	1	Bag with fixing screws, wall plugs and washers
6	1	Boiler installation template
7	1	Guarantee registration and envelope
8	3	Manuals: Installation and user instructions, flue installation instructions

Table 3.1 Scope of delivery

3.1.1 Unpack the boiler

To unpack the boiler, cut both plastic carton straps, open box and lift out the polystyrene top packing. Lift the cardboard upwards.



Note!

Care should be taken not to scratch the white surface of the boiler casing.

3.2 Installation site

Please note the following safety instructions below before choosing where to install the appliance:



Caution!

Do not install the appliance in rooms prone to frost. In rooms with aggressive steam or dust, the appliance must be operated independently of the ventilation!

When choosing the place of installation and while operating the appliance, make sure that the combustion air is technically free of chemical substances containing fluorine, chlorine, sulphur etc. Sprays, solvents and cleaning agents, paints, adhesives etc. contain these kinds of substances, which - in the worst case scenario - can lead to corrosion, even in the exhaust system, during ambient air dependent operating of the appliance.

The appliance must be operated independently of the ambient air particularly in hairdressing salons, carpenter's shops or paint shops, cleaning companies. Otherwise, a separate installation room is required to guarantee that the combustion air supply is technically free of the above mentioned substances.

3.2.1 Select position of boiler

Refer to section 'Boiler location' for information regarding siting the appliance. In general the boiler must be positioned such that:

- There is adequate space around the boiler for service and maintenance
- The boiler can be correctly flued, i.e. the flue terminal position is sited in accordance with these instructions and the air/flue duct can be installed in accordance with the flue installation instructions supplied.
- All necessary pipework can be connected, including the pressure relief valve and condensate drain.

3.2.2 Air supply

Detailed recommendations for air supply are given in BS 5440: Part 2. It is not necessary to have an air vent in the room or internal space in which the boiler is installed.

3.2.3 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 required if the flue used is not concentric and air is supplied from the room or compartment the boiler is installed in.

3.2.4 Electrical supply

A 230 V, ~ 50 Hz single phase electricity supply fused to 3 Amp. must be provided in accordance with the latest edition of BS7671 (IEE Wiring Regulations) and any other local regulations that may apply. In IE reference should be made to the current edition of the ETCI rules. The method of connection to the mains electricity supply must provide a means of completely isolating the boiler and its ancillary controls. Isolation is preferably by the use of a fused three pin plug and unswitched shuttered socket outlet, both complying with the requirements of BS 1363. Alternatively, a 3 Amp. fused doublepole switch with a 3 mm contact separation on both poles may be used.

3.3 Dimensional drawing and connections

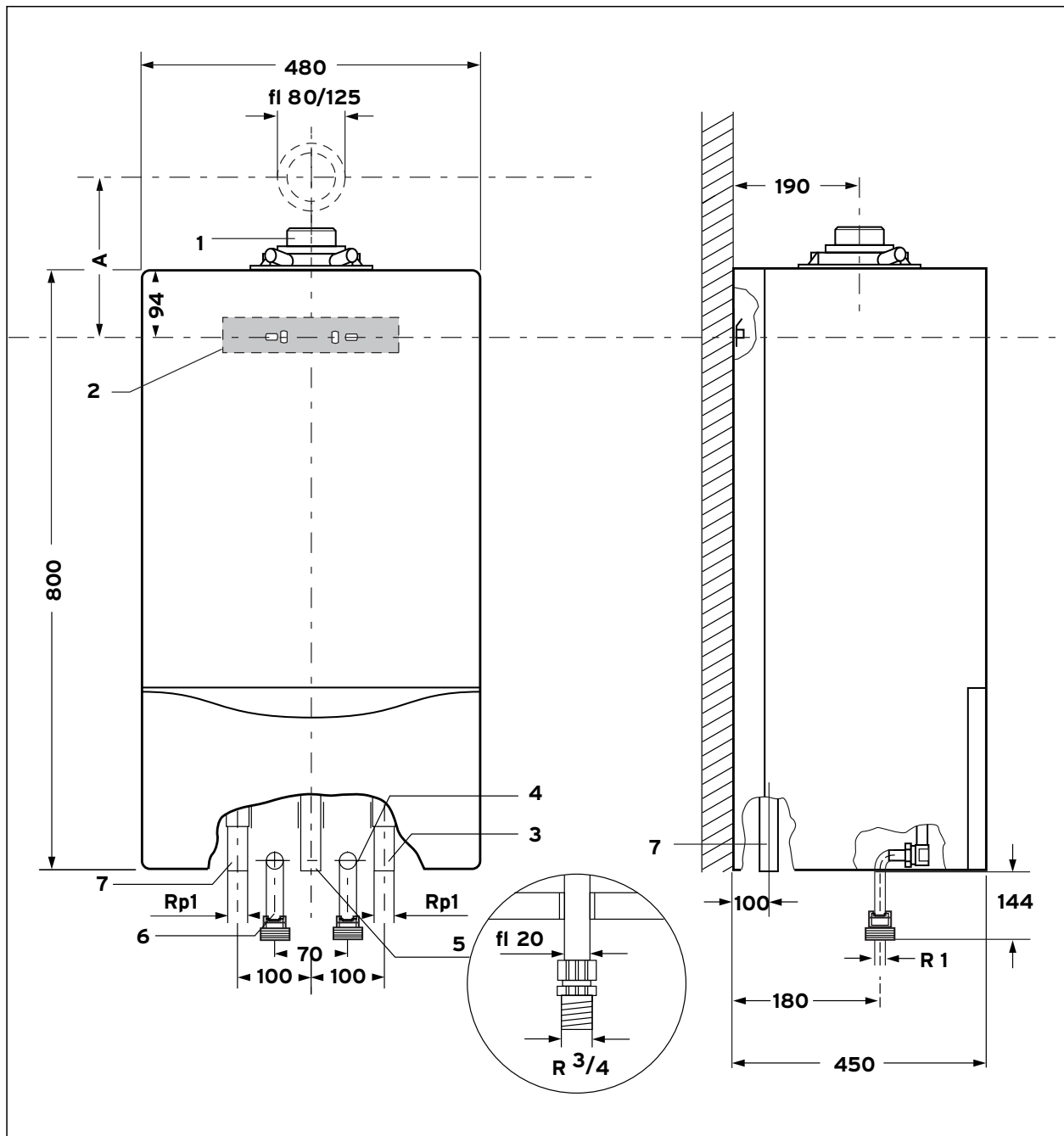


Fig. 3.2 Connection dimensions

- 1 Flue connection \varnothing 80/125 mm
Dimension A with 87° elbow: 253 mm
- 2 Mounting bracket
- 3 Heating return
- 4 DHW primary return (only in conjunction with cylinder)
- 5 Gas connection
- 6 DHW primary flow (only in conjunction with cylinder)
- 7 Heating flow

3 Mounting

3.4 Required minimum gaps/assembly clearances

Both for the installation/assembly of the appliance and for carrying out maintenance tasks later, you need the minimum gaps and assembly clearances given below:

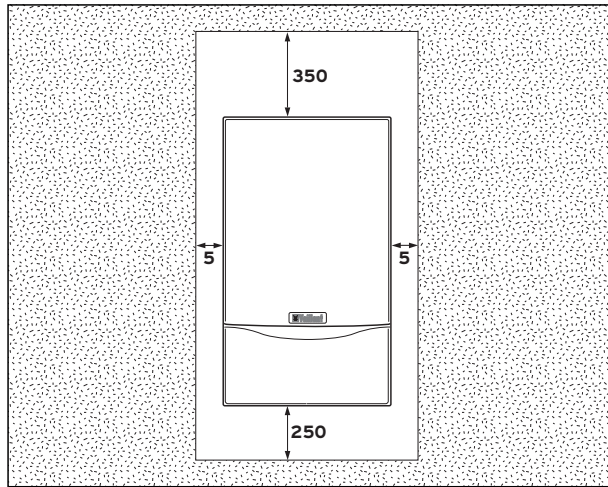


Fig. 3.3 Required minimum gaps/assembly clearances (mm)

Combustible materials may be safely placed next to the appliance provided the minimum side clearance of 5 mm is maintained for servicing, and if required ventilation purposes. The external temperature of the appliance will never be such as to cause combustion.

3.4.1 Using boiler template

- Fix the paper template to the wall ensure that the template is vertical. The template shows:
 - the position of the fixing holes for the boiler mounting bracket
 - the position of the connections
 - the position of the flue exit hole
- Mark the position of the hanging bracket fixing holes.
- Drill 2 holes \varnothing 8 mm for the hanging bracket.



Note!

Use alternative fixing holes where necessary.

3.5 Mounting the appliance on the bracket

- Hang the appliance on the mounting bracket (1) from above with the bracket (3).
- Mount the cable connections to the appliance, making sure they are disconnected from the power supply.

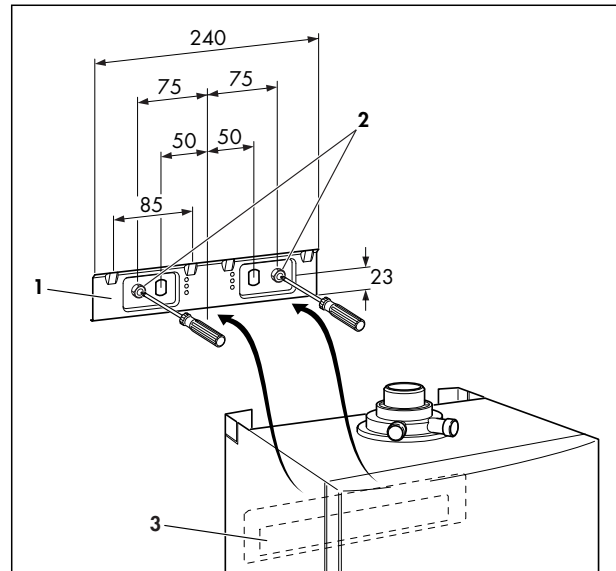


Fig. 3.4 Mounting the appliance on the bracket

3.6 Removing/Attaching the appliance casing

Removing the casing

To dismantle the front casing of the appliance, proceed as follows:

- Loosen the screw (1) on the bottom of the appliance.
- Press in both retaining clips (2) on the bottom of the appliance so that the casing is released.
- Pull the casing (3) forwards by its bottom edge and lift the casing up and off (4).

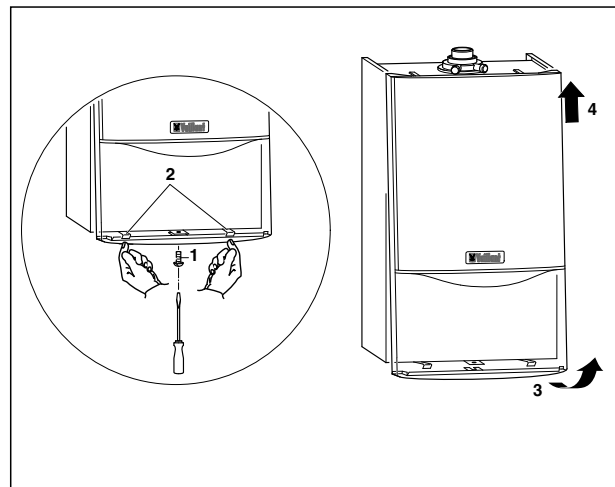


Fig. 3.5 Removing/Attaching the appliance casing

Attaching the casing

To mount the casing, proceed as follows:

- Place the casing on the upper appliance ensuring that the casing and appliance lips engage.
- Push the casing onto the appliance so that the retaining clips (2) on the casing click into place.
- Fix the casing by tightening the screw (1) on the bottom of the appliance.

4 Installation

When installing, please observe the following points in particular:

- Install the filling loop or other device in the return
- Ensure that the design of the system incorporates a suitably sized by-pass or low loss header is installed (as specified in paragraph 4.2)

When used with direct connection to an indirect DHW cylinder using the connections provided:

- Install a primary loading pump
- Install a non-return valve in both heating and DHW primary flows to prevent reverse circulation
- please also refer to section 4.3

4.1 Preparing the installation

Safety equipment for an emergency

- The outlet of the pressure relief valve must be suitably terminated in accordance with BS 6798 or BS 6644.
- The boiler is suitable for connection to plastic central heating pipes. It is preferred that the connections to the boiler are made in copper for the first 1.5 metres prior to the transition to plastic.
- Should a system be found to include non-oxygen barrier pipe then it is essential that a plate heat exchanger be installed in between the boiler and the non-oxygen barrier pipe. It is essential that the boiler and the system have provision for water make up and expansion.

4.2 Technical instructions for the heating system



Caution!

The schematics shown are for diagrammatical representation only - the system may demand further safety devices and depends fully on the control system employed. Unvented cylinders must comply with the requirements of Building Regulations Document G 3.

Always refer to British Standards, Good Practice Guides and CIBSE guidelines

4.2.1 Direct connection to the heating circuit using the integral boiler pump.

Pump layout; system dimensioning

The design flow rate of the ecoMAX 46 is optimally:

$$V = 2000 \text{ l/h at } \Delta T = 20 \text{ K}$$

flows through the boiler and system.

The resulting residual delivery head for the system design is to be taken from fig. 4.2.

Setting the by-pass valve

In order to guarantee the minimum circulating water volume of 1150 l/h through the appliance, a by-pass valve must be fitted as a minimum requirement.

If an automatic type by-pass valve is fitted the operating pressure should be able to be set between 250-400 mbar.

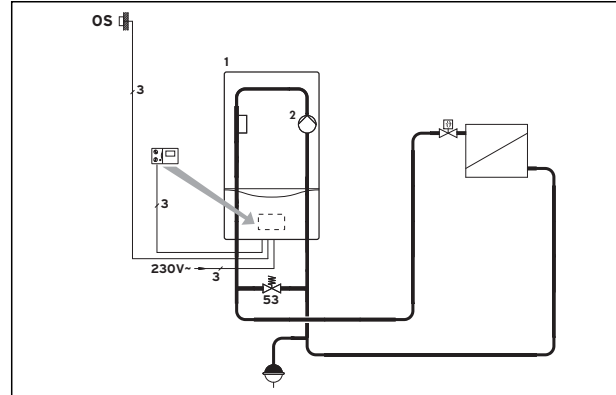


Fig. 4.1 Example 1: radiator heating, direct feeding, integral boiler pump

- 1 ecoMAX 646
- 2 integral boiler pump
- 53 automatic by-pass valve (not supplied)
- OS outside sensor

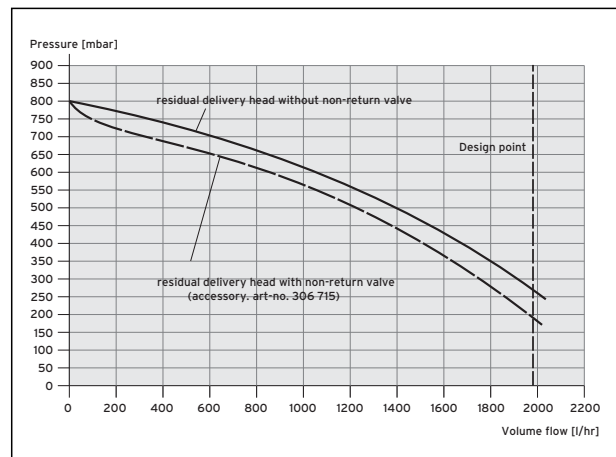


Fig. 4.2 Resulting characteristic curve (residual delivery head) ecoMAX 646

4.2.2 Connection to heating circuit containing a low loss header.

Pump layout in the primary circuit

The pump output must be set to 100% (in the DIA system under point d.14).

Selection of the low loss header

A suitable WH model hydraulic switch (accessory) can be selected with the aid of table 4.1.

A sufficiently large water volume (minimum circulating water volume) is constantly supplied through the boiler via the low loss header in conjunction with the pump built into the boiler.

4 Installation

heating system output	heating system spread		
	10 K	15 K	20 K
ecoMAX 646	WH 95	WH 40	WH 40
double cascade	WH 160	WH 95	WH 95
triple cascade	WH 280	WH 160	WH 160
quadruple cascade	WH 280	WH 160	WH 160

Table 4.1: Selection of the low loss header, WH model

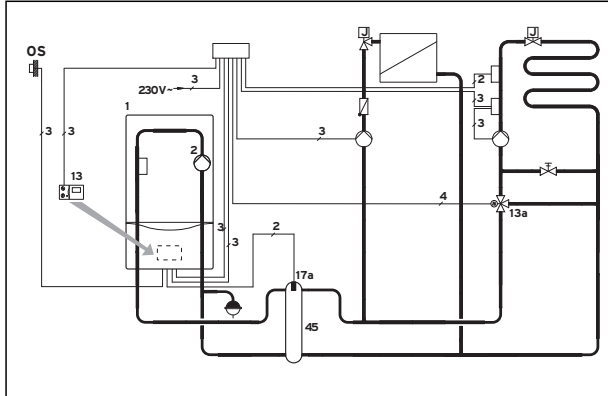


Fig. 4.3 Example 2: radiator heating and floor heating, low loss header, appliance-internal pump

- 1 ecoMAX 646
- 2 integral boiler pump
- 13 weather-compensated controller VRC 630
- 13a mixer valve
- 17a supply temperature sensor
- 45 low loss header
- OS outside sensor

4.3 Technical instructions for recharging

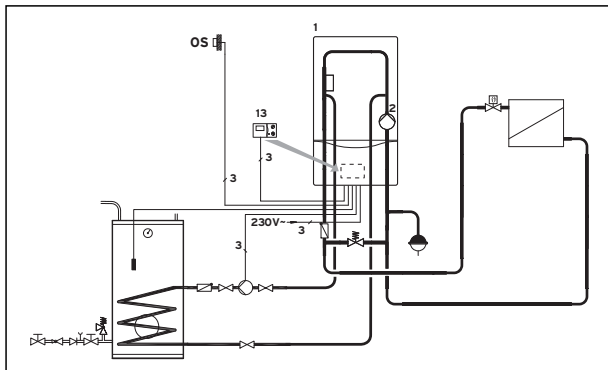


Fig. 4.4 Example 3: direct heating circuit and indirect cylinder schematic

- 1 ecoMAX 646
- 2 integral boiler pump
- 13 weather-compensated controller VRC 410
- OS outside sensor

Cylinder connection specification

It is imperative to keep to the minimum volume flow of the charging circuit of 1800 l/h.

When designing such a system, consideration must be made for the pressure losses of non-return valves and piping to the cylinder.

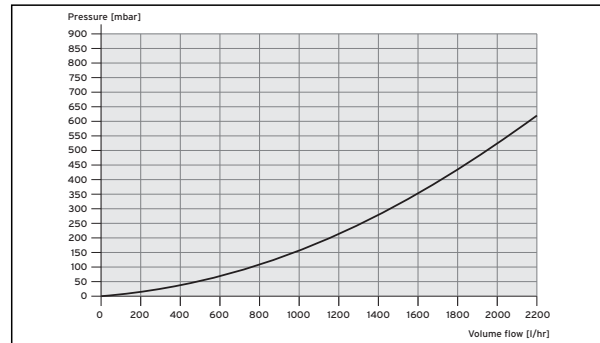


Fig. 4.5 Pressure loss characteristics of connecting a DHW cylinder

4.4 Gas connection

Caution!
Ensure a stress-relief assembly of the gas pipes to avoid leakages.

Caution!
Risk of damaging the gas control block by exceeding the testing pressure. The gas control block may only be tested for leaks up to a maximum pressure of 110 mbar. The operating pressure may not exceed 60 mbar. If these pressures are exceeded, the electronic gas valve may be damaged.

The appliance must be connected to your gas line via a gas cock.

- Screw the appliance's gas supply pipe (1) gas-tight with the gas cock (2). To do this, use the R3/4 compression fitting supplied with the appliance. This is suitable for the connection of a R3/4 gas cock.
- Inspect the gas connection for leakage.

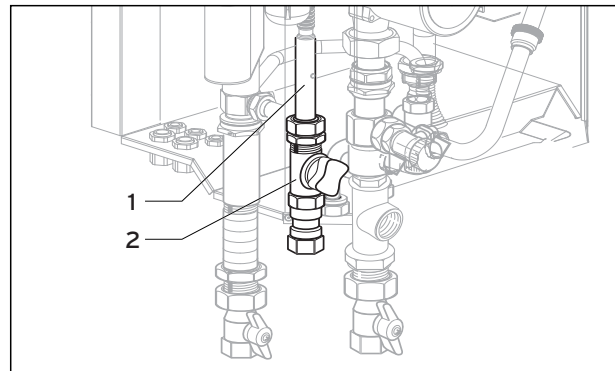


Fig. 4.6 Gas connection

4.5 Heating connections

Caution!
 Ensure a stress-relief assembly of the connecting pipes to avoid leakages in the heating system.

The appliance is connected to the heating flow and return via isolation valves. An installation set for the ecoMAX 646 is available.

Caution!
 It is imperative that the filling device be mounted in the return; otherwise, the bleeding of the appliance is not guaranteed.

Note!
 When using a cylinder, a non return valve is to be mounted in the supply.

- Screw in flow (3) and return (4) with the maintenance cocks.

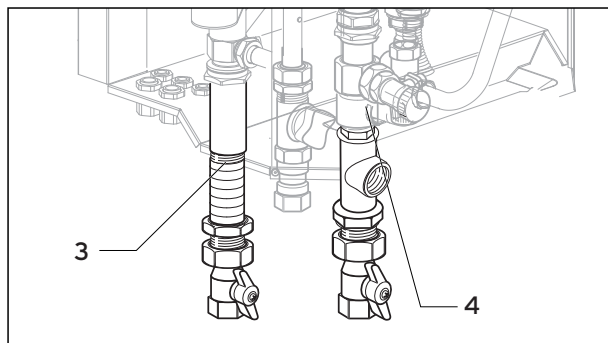


Fig. 4.7 Mounting the heating flow and return

4.6.1 Flue termination

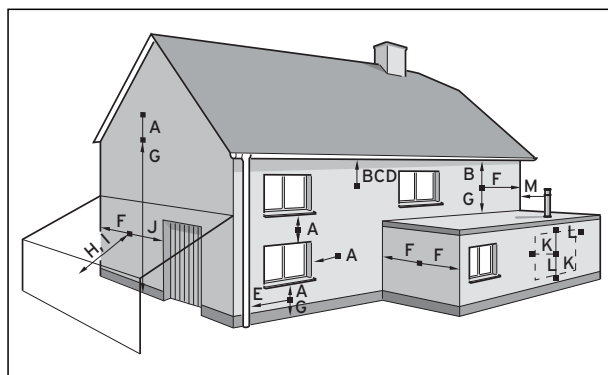


Fig. 4.8 Flue termination

The following details refer to both flue systems.

- The terminal must be positioned such that the products of combustion can disperse freely at all times.
- A plume of water vapour will sometimes be visible from the flue terminal. Positions where this could be a nuisance should be avoided.

- If the terminal is fitted less than 2 m above a balcony, above ground or above a flat roof to which people have access then a suitable terminal guard must be provided and fitted (contact Tower Flue Components, Tonbridge, TN9 1TB).

Note!
 Vertical flues must not terminate within 600 mm of an openable window, air vent or any other ventilation opening.

The flue assembly shall be so placed or shielded as to prevent ignition or damage to any part of the building.

	Terminal position	mm
A	Directly below an opening, above an opening or horizontal to an opening, air brick, opening window, etc.	300
B	Below gutters, soil pipes or drain pipes	75
C	Below eaves	200
D	Below balconies	200
E	From vertical drain pipes and soil pipes	25
F	From internal or external corners	300
G	Above ground, roof or balcony	300
H	From a surface facing a terminal	600
I	From a terminal facing a terminal	1200
K	Vertically from a terminal on the same wall	1500
L	Horizontally from a terminal on the same wall	300
M	Distance from adjacent for vertical Flue	500

Table 4.2 Terminal position for a fan assisted concentric flue

Note!
 In addition, the terminal should not be nearer than 150 mm to an opening in the building fabric formed for the purpose of accommodating a built-in element such as a window.

BS 5440-1 It is recommended that the fanned flue terminal should be positioned as follows:

- at least 2m from an opening in the building directly opposite, and
- so that the products of combustion are not directly directed to discharge across a boundary.

- Dimensions B, C and D:
 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 in fig. 3.8.
- Dimension F:
 This clearance may be reduced to 25 mm without affecting the performance of the boiler. However, in order to ensure that the condensate plume does not affect adjacent surfaces a clearance of 300 mm is preferred. For IE, recommendations are given in the current edition of IS 813.

4 Installation

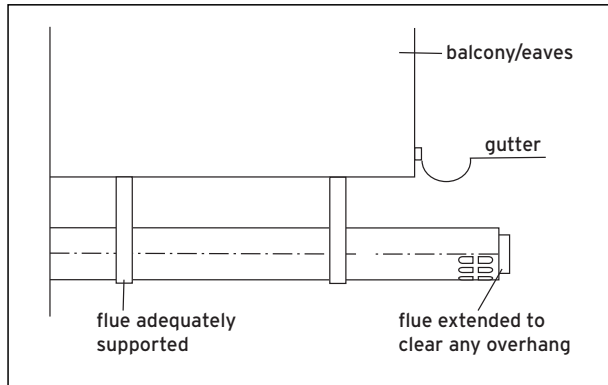


Fig. 4.9

4.6.2 Flue pipe



Danger!

Only Vaillant original 80/125mm concentric flue pipes may be used when installed in a room sealed application (type C) since these are authorized together with the boiler. Malfunctions can occur if you use other accessories. These may result in damage and injury.

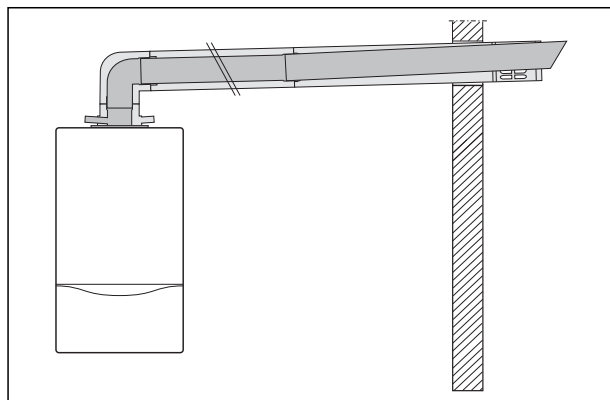


Fig. 4.10 Example of installation with horizontal air/flue duct

For detailed design guidance of the flue system please refer to the flue installation manual.

4.7 Condensate discharge

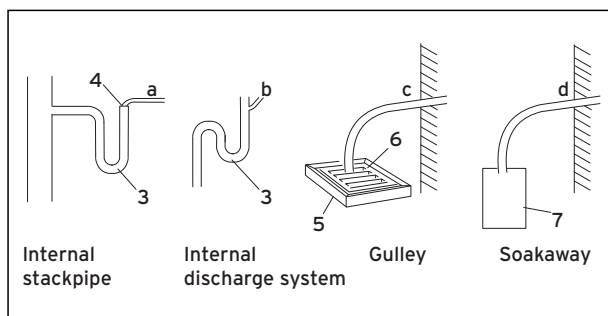


Fig. 4.11

The condensate generated during combustion is led from the condensate discharge pipe to the waste water connection via a draining funnel.



Note!

The discharge pipe from the boiler condensate drain must have a continuous fall (45 mm per meter) and preferably be installed and terminated within the building to prevent possible freezing.

The condensate discharge pipe must terminate in a suitable position, e.g.:

- preferably the discharge pipe should run and terminate internally to the house soil and vent stack (at least 450 mm above the invert of the stack). A trap giving a water seal of at least 75 mm (3) (built into the boiler) should be incorporated into the pipe run, and there must be an air break (4) in the discharge pipe upstream of the trap. The connection to the stack should not be made in a way that could cause cross flow into any other branch pipe, or from that branch pipe into the condensate drainpipe. This can be achieved by maintaining an offset between branch pipes of at least 110 mm on a 100 mm diameter stack and 250 mm on a 150 mm diameter stack.
- connecting into the internal discharge branch (e.g. sink waste) with an external termination, the condensate discharge pipe should have a minimum diameter of 22 mm with no length restriction and should incorporate a trap with a 75 mm (3) (built into the boiler) seal. The connection should preferably be made downstream of the sink waste trap. If the connection is only possible upstream, then an air break is needed between the two traps. This is normally provided by the sink waste.
- terminating in a gully (5) below grid level (6) and above the water level. The external pipe length should be kept as short as possible to minimise the risk of freezing and should not be more than 3 m.
- at a condensate absorption point (soakaway) (7). The external pipe length should not be more than 3 m.

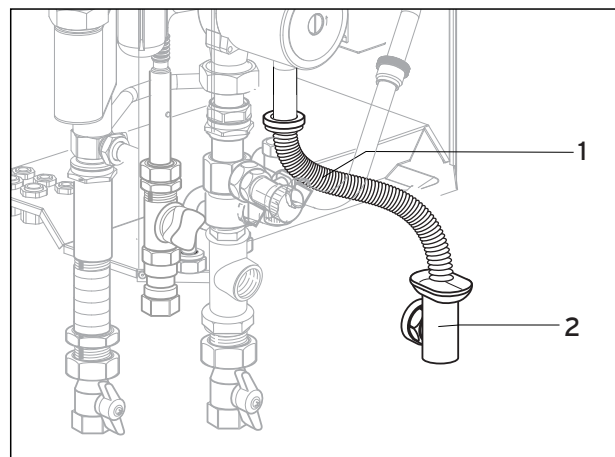


Fig. 4.12 Condensate discharge

Refer to 'BS 6798 Specification for installation of gas-fired boilers of rated input not exceeding 70 kW net' for further information. Before operating the boiler the condensate trap (1) must be filled with water as described in relevant section.

4.8 Electrical connection



Danger!

Electrocution caused by touching live parts can be fatal. Before working on the appliance, turn off the power supply and secure against restart.



Danger!

This appliance must be earthed.



Danger!

Mains connection terminals L and N remain live even when the boiler on/off control is switched off.



Note!

Do not connect 230 V mains to the connections 7-8-9 or BUS (+,-).



Note!

Ensure that all cords pass through the cable clamps in the rear of the control box and are securely fixed. Ensure that the power supply is connected such that the current carrying conductors become taut before the earth conductor should the supply cord slip from the cable clamp.

All electrical work shall be carried out by a competent person and shall comply with BS 7671 (IEE Regulations). In the Republic of Ireland, reference should be made to the current edition of the ETCl (Electro-Technical Council for Ireland) rules. The boiler is supplied for connection to 230 V, ~ 50 Hz supply fused at 3 A rating. Connection to the mains supply shall be made via a fused 3 pin plug to an unswitched shuttered socket, both complying with the requirements of BS 1363. (Alternatively, connection may be made via a 3 A fused double pole isolator having a contact separation of at least 3 mm in all poles and supplying the boiler and controls only). The point of connection to the mains supply must allow complete electrical isolation of the boiler and its ancillary controls. It should be readily accessible and adjacent to the boiler. A 3 core flexible cord according to BS 6500 tables 6, 8 or 16 (3 x 0.75 to 3 x 1.5 mm²) should be used.

4.8.1 Mains connection

- Remove the front case and lower the control panel.
- Unclip the bottom of the terminal box cover and hinge back to reveal the connection plugs.

- Feed the power supply flex into the appliance and the control panel through the cable clamps provided and tighten
- Connect the flex to the L, N and earth plug to the ProE connector.



Caution!

Supplying power to the wrong plug terminals of the Pro E system can destroy the electronics. Only connect a 230 Vac live supply to boiler terminal connections marked LNE.

The rated voltage of the mains must be 230 V; at rated voltages above 253 V and under 190 V, functional impairments are possible.

The mains supply must be connected via a fixed connection and a separator with a contact opening of at least 3 mm (e.g. fuses, circuit breakers).

4.8.2 Connecting controllers

Mounting is to be carried out as stated in the relevant installation manual. The necessary connections to the boiler's electronics (e.g. when using external controllers, external sensors or similar devices) are to be performed as follows:

- Remove the front casing of the appliance and lower the control panel.
- Unclip the back cover (2) of the electronic box from its fixings (3) and lift it up.
- Feed the connecting cables of each of the component to be connected through the cable clamps (4) located on the bottom of the appliance to the left.

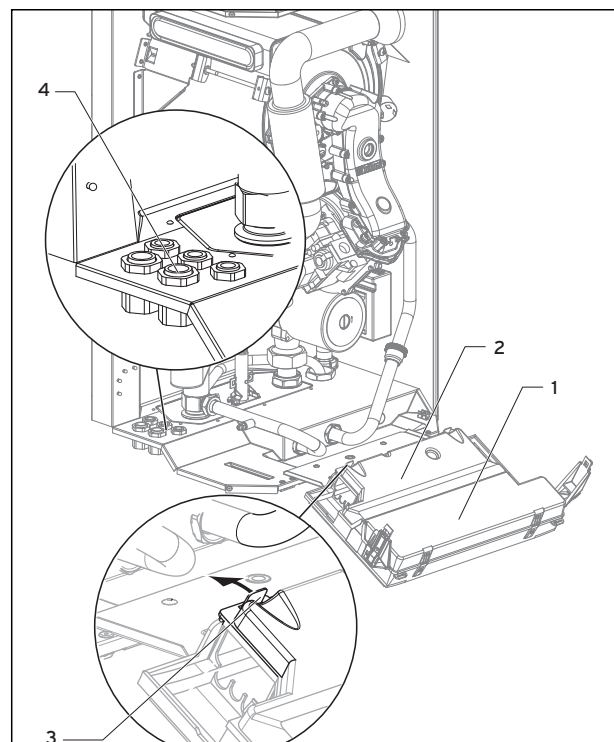


Fig. 4.13 Opening the rear of the electronics box

4 Installation

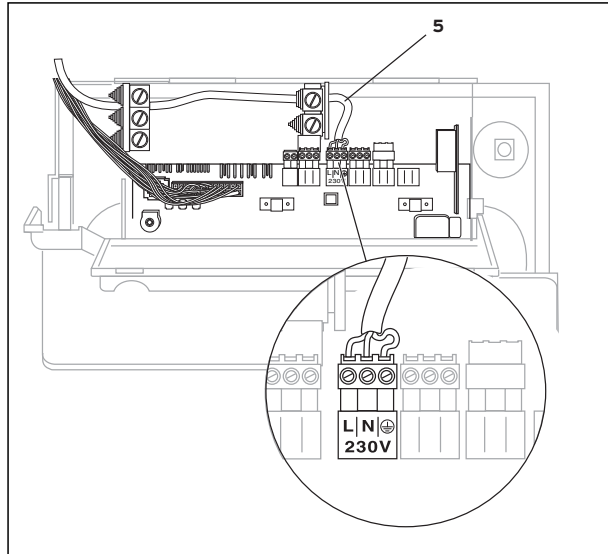


Fig. 4.14 Example of cable insertion

- Then insert the connecting cables (5) into the electronics box and cut them to length.
- Strip the connecting cable by about 2-3 cm and bare the wires.
- Connect the connecting cables to the corresponding ProE plug or terminal..



Caution!

Do not connect the mains voltage supply to terminals 7, 8, or 9. The electronics could be destroyed by this!

- If no room/clock thermostat is in place, provide a jumper between terminals 3 and 4 if not already present. Remove the jumper if a room/clock thermostat is connected to terminals 3 and 4.
- When connecting a weather-controlled temperature controller or room temperature controller (continuous controlling - terminals 7,8,9), the jumper between terminals 3 and 4 must remain in place.
- Close the rear cover of the electronics box and press it in until you hear it click into place.
- Lift up the electronics box and press it by the two clips on its left and right against the lateral appliance casings until you hear the clips click into place.
- Attach the front casing.
- In order to attain pump mode I (continuous pump) for the multicircuit controller (e.g. VRC 630), increase the pump run-out time to 15-20 minutes (diagnosis point d.1, see chapter 6.2).

4.8.3 Connecting accessories and external system components

The Vaillant ProE (plug in terminal connections) system facilitates a quick and trouble-free connection of accessories and external system components to the appliance electronics. Proceed with the wiring up as follows:

- Take off the front casing of the appliance and lift the electronics box forward.
- Unclip the back cover of the switch box (1) from its fixings (2) and lift it up.
- Guide the connecting cables of each of the components to be connected through the PG screw connections (4) located on the bottom of the appliance to the left.
- Then insert the connecting cables (5) into the electronics box and cut them to length.
- Strip the connecting cable by about 2-3 cm and bare the wires.
- Connect the connecting cables to the corresponding ProE plugs or slots of the electronics.

Please note that the jumper on the ProE plug should be removed when connecting a maximum thermostat (feed thermostat) for floor heating. Should a remote safety circuit for a mini pressurisation device or a pump flow switch. This will prevent the boiler firing should such an external device fail.

- Close the rear cover of the electronics box and press it in until you hear it click into place.
- Lift the electronics box up and press it by the two clips on its left and right against the lateral appliance casings until you hear the clips click into place.
- Attach the front casing.

4.8.4 Connection diagram

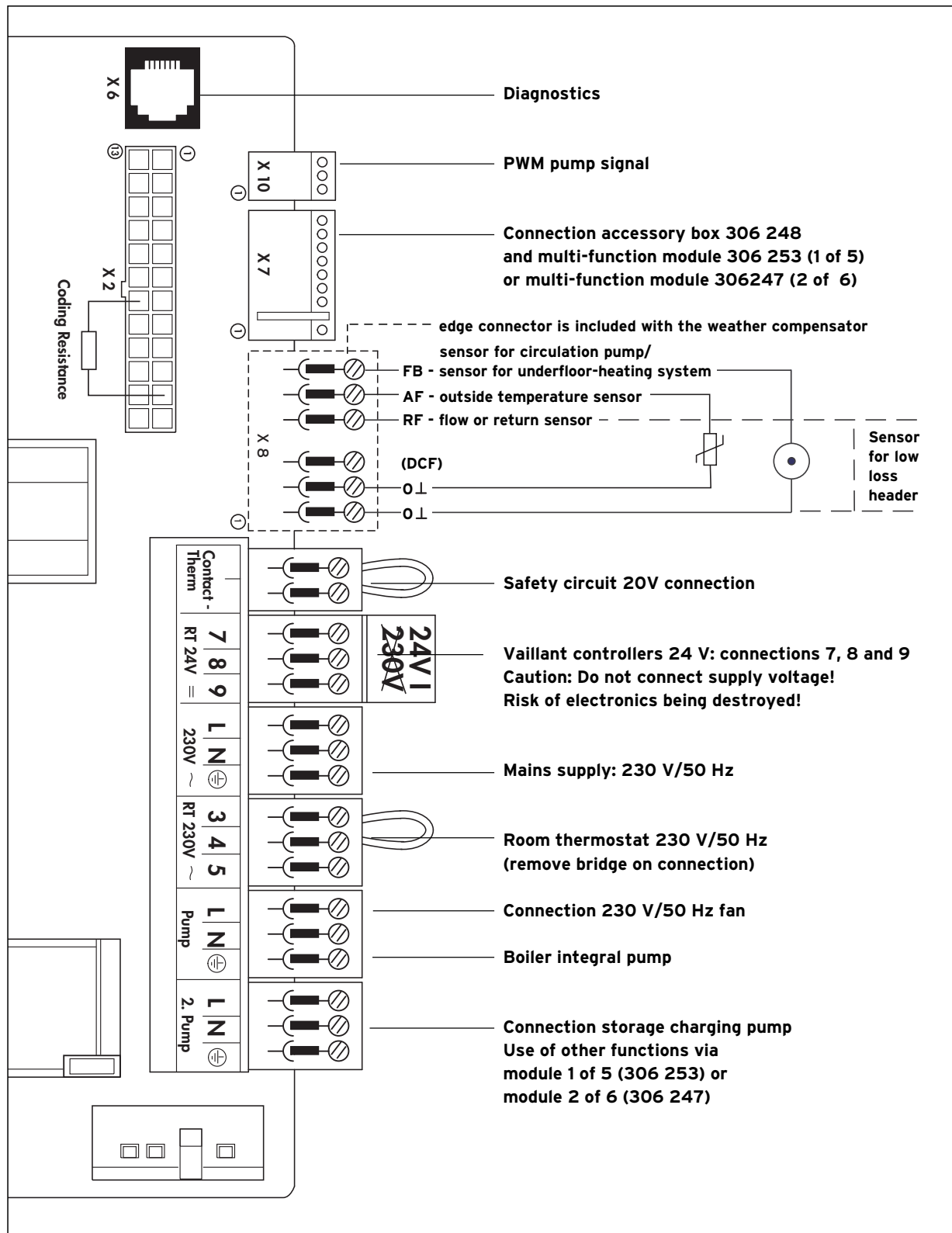


Fig. 4.15 Connection diagram ecoMAX 646

4 Installation

4.8.5 Wiring diagram

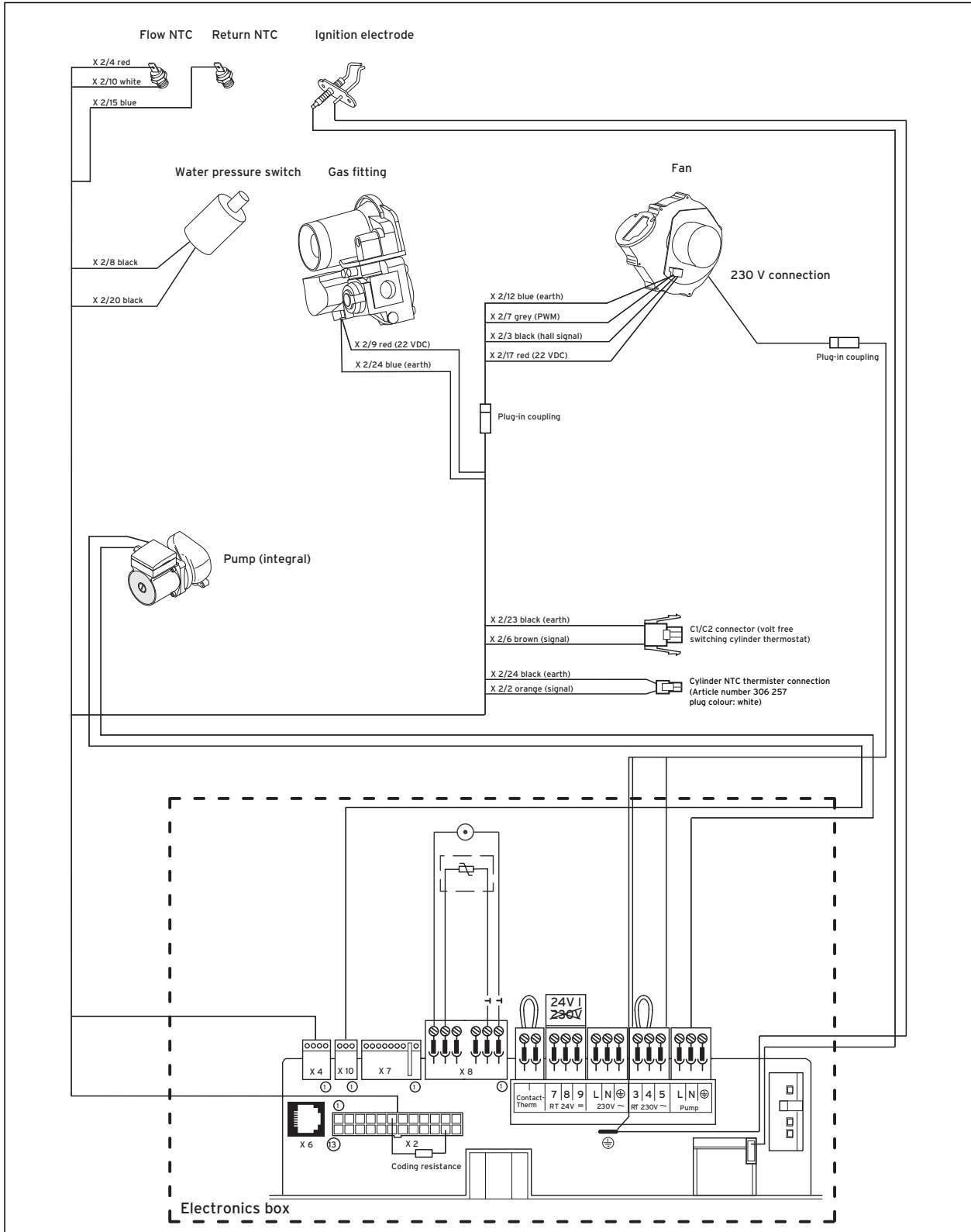


Fig. 4.16 Wiring diagram ecoMAX 646

5 Initial start up and commissioning



Note!

Vaillant offer a commissioning service. If used a 2 year warranty is given, if not only a 1 year warranty is available

Please note the following whilst commissioning the boiler.

- Remove the cap of the automatic air vent (1 - fig. 5.1) before filling the heating circuit/storage charging circuit.
- Start the bleeding program for the heating circuit/storage charging circuit.

5.1 Water circulation system

Detailed recommendations for the water circulation system are given in BS 6798 and BS 5449: Part 1 (for small bore and micro bore central heating systems). Pipework not forming part of the useful heating surface should be insulated to help prevent heat loss and possible freezing, particularly where pipes are run through roof spaces and ventilated underfloor spaces. Draining points must be located in accessible positions which permit the draining of the whole system including the boiler and the hot water system. Draining points should be at least 1/2 in. BSP nominal size and be in accordance with BS 2879. The boiler is suitable for use with mini-bore or microbore systems. Copper tubing to BS 2871: Part 1 should be used for water carrying pipework. All capillary joints in all DHW pipework must be made with lead free solder. Particularly where a new boiler is to be fitted to an existing system, it is good practice that the system is thoroughly cleansed.



Important!

To prevent the formation of deposits and prevent serious damage to the appliance and system, cleansers must be used carefully and must be completely removed by thoroughly flushing the system. Cleansers should only be left in systems for a maximum of 24 hours.

This cleansing must take place prior to the fitting of the new boiler and be in accordance with BS 7593. For advice on the application of system cleansers contact: Sentinel, Betz Dearborn Ltd. Widnes, Cheshire, WA8 8UD. Tel: 0151 495 1861 – or Fernox, Cookson Electronics, Forsyth Road, Sheerwater, Woking, Surrey GU21 5RZ, 01483 793200

5.1.1 Treating the heating water

If you enrich the heating water with frost or corrosion protection fluid, changes can be caused in the seals and noises may arise during the heating operation. Vaillant assumes no liability for this (or for any subsequent resulting damage).

Please inform the user as to how to go about frost protection.

5.1.2 Heating side filling and bleeding

For the heating system to function perfectly, a water pressure/filling pressure of between 1.0 and 2.0 bar is necessary. If the heating system stretches out over several storeys, higher values for the water level of the system at the pressure gauge can be necessary (maximum pressure for safety valve: 3 bar).



Caution!

Filling the system must only be carried using a proprietary filling loop in domestic applications. For commercial applications a pressurisation unit shall be installed.

5.1.3 Final system flush ("Hot")

- Turn on the boiler for central heating and allow the boiler and system to reach temperature.
- Check that the heating system is watertight.
- Turn the boiler off and rapidly drain both boiler and system while still hot
- Refill the system and release all air.
- Release water from the system until the system design pressure of 1.0 bar is attained. (The actual reading on the pressure gauge should ideally be 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 1 bar in any installation.) If the system is to be treated with an inhibitor it should be applied at this stage in accordance with the manufacturer's instructions. Further information can be obtained from Sentinel, Betz Dearborn Ltd., Tel: 0151 4951861, or Fernox, Tel: 01483 793200
- Disconnect the temporary filling connection.
- Refit the boiler casing.



Note!

The venting program ("P.O") runs for approx. 6.5 minutes.



Caution!

For the bleeding of the system, the minimum pressure must be 1.0 bar.

Do not allow the water pressure to drop below the above minimum during venting.

- Open the filling cock and tap valve again if necessary.



Caution!

If there is still too much air in the system after the bleeding program has finished, the program must be started again.

5 Initial start up and commissioning

Caution! After the filling process has finished

- Close the filling unit and remove the filling hose.
- Inspect all connections for leakage.

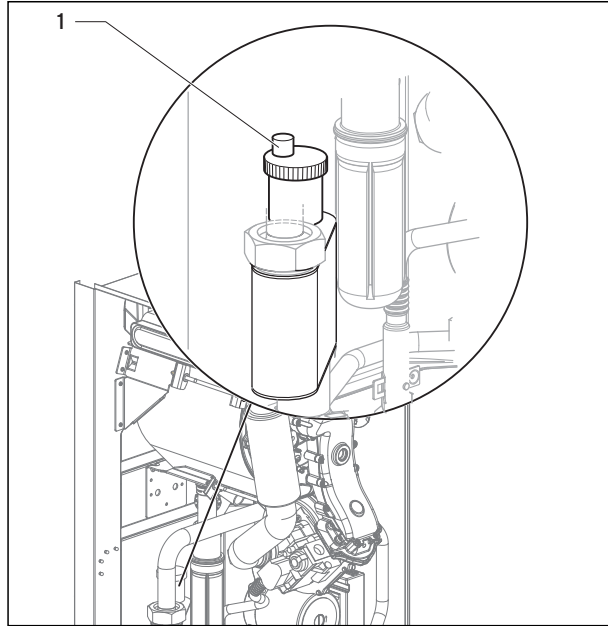


Fig. 5.1 Bleeding the appliance

5.1.3 Hot water side filling and bleeding

To fill the DHW primary circuit, proceed as described in point 5.1.2.

- Restart the venting program (P.O).

5.1.4 Filling the siphon

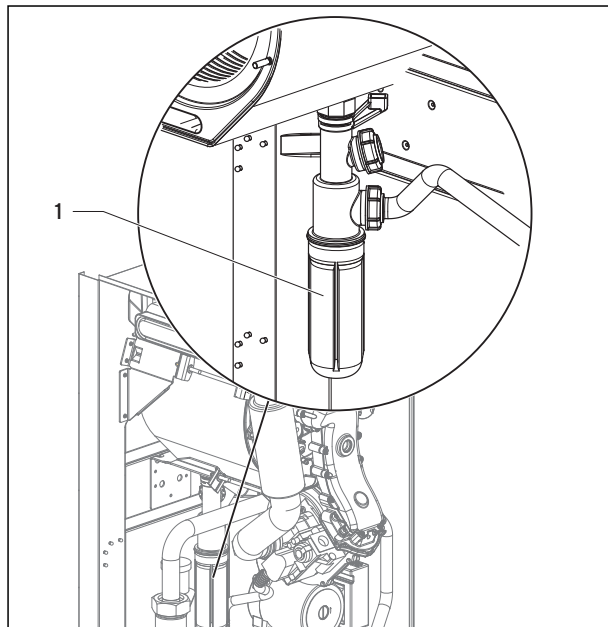


Fig. 5.2 Filling the siphon

Danger! If the device is operated with an empty condensate siphon, there is the danger of poisoning through escaping flue gases. Therefore, it is mandatory to fill the siphon as described below before start-up.

- Screw off the bottom (1) of the condensate siphon (fig. 5.2).
- Fill the bottom about 3/4 full with water.
- Screw the bottom back on the condensate siphon.

5.2 Checking the gas setting

5.2.1 Factory gas setting

Caution! Ensure the appliance is connected to the correct gas supply that it is intended to be used on. It is important to check the gas rate and check the CO₂ content in the flue gases, as part of the commissioning process.

The appliances are set ex works to the values listed in table 5.1.

The appliance design corresponds to the gas family available on site:

- Check the CO₂ percentage as described in chapter 5.2.3.

Note! Please ask Vaillant customer service about the gas conversion of the appliance.

- Check the CO₂ percentage as described in chapter 5.2.3.

Appliance type	ecoMAX 646
Appliance design	Natural gas H
Designation on the appliance badge	II _{2H3P}
Factory setting to Wobbe index Ws (in kWh/m ³), corresponding to 0 °C / 1013 mbar	15.0
Factory setting of the hot water output (in kW)	45
Factory setting of the heating output (in kW)	35

Table 5.1 Overview of factory gas settings

5.2.2 Gas inlet working pressure

Check the inlet pressure as described below:

- Remove the front case from the boiler.
- Close the gas shutoff valve fitted to the boiler.
- Loosen the sealing screw marked "in" (1) on the gas valve assembly (Fig. 5.3).
- Connect a digital or a U gauge (2).
- Open the gas shutoff valve fitted to the boiler.
- Put the boiler into service (refer to the Instructions for Use supplied with the boiler).
- Check the U gauge reading and ensure the inlet gas pressure is between the pressures detailed below.

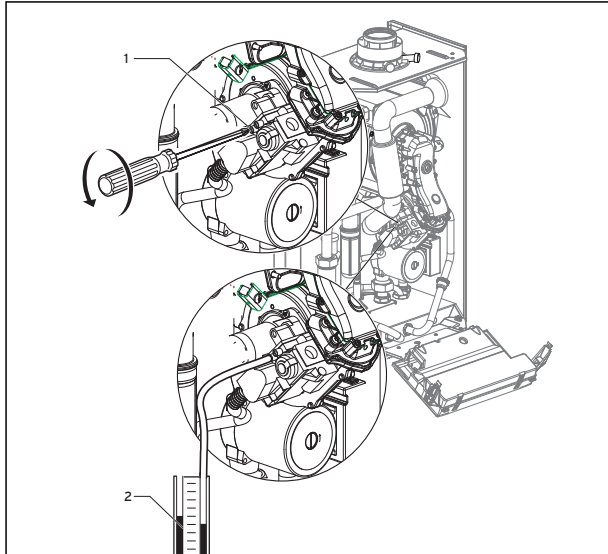


Fig. 5.3 Measuring the connection pressure



Caution!

Natural gas:

If the connection pressure lies outside the range from 15 to 23 mbar, you must ensure that the recommended pressure loss from the meter to the appliance is not exceeded.

Liquid gas:

If the connection pressure is less than 32 or greater than 42 mbar, you must ensure that the gas supply is correctly sized and has no more than the recommended pressure loss from the supply to the appliance.

If the connection pressure lies within the permissible range, proceed as follows:

- Put the appliance out of operation.
- Close the appliance's gas stop cock.
- Remove the pressure gauge and screw the seal plug (1) back on.
- Open the appliance's gas stop cock.
- Check that the seal plug is re-fitted correctly and tested for leaks.
- Put the front casing back on and start the appliance up again.

If the connection pressure does not lie within the permissible range and you can't correct the error, notify the gas supplier. Proceed as follows:

- Put the appliance out of operation.
- Close the appliance's gas stop cock.
- Remove the pressure gauge and screw the seal plug (1, fig. 5.3) back on.
- Check that the seal plug is fit tight.
- Put the front casing back on.

Do not start up the appliance!

5.2.3 Checking the CO₂ content and adjusting it if needed (air ratio setting)



Note!

Checking/adjustment of this value is required in the following instances: replacement of gas valve, conversion to or from Natural Gas/ LPG or if incorrect combustion is suspected!

- Remove the case from the unit.
- Activate full gas rate mode by simultaneously pressing the "+" and "-" buttons on the display system
- Wait at least five minutes, or until the unit has reached its operating temperature.
- Measure the level of CO₂ content at the exhaust-fume test outlet (3) (Fig. 5.4). Check the reading against the corresponding value in tab. 5.2.
- If the exhaust-fume setting requires adjustment, remove the screw (4) and swivel the air suction pipe (5) forwards through 90° (Fig. 5.4). DO NOT remove the air suction pipe.
- Adjust the corresponding setting as required by turning the screw (6) (fig. 5.4).

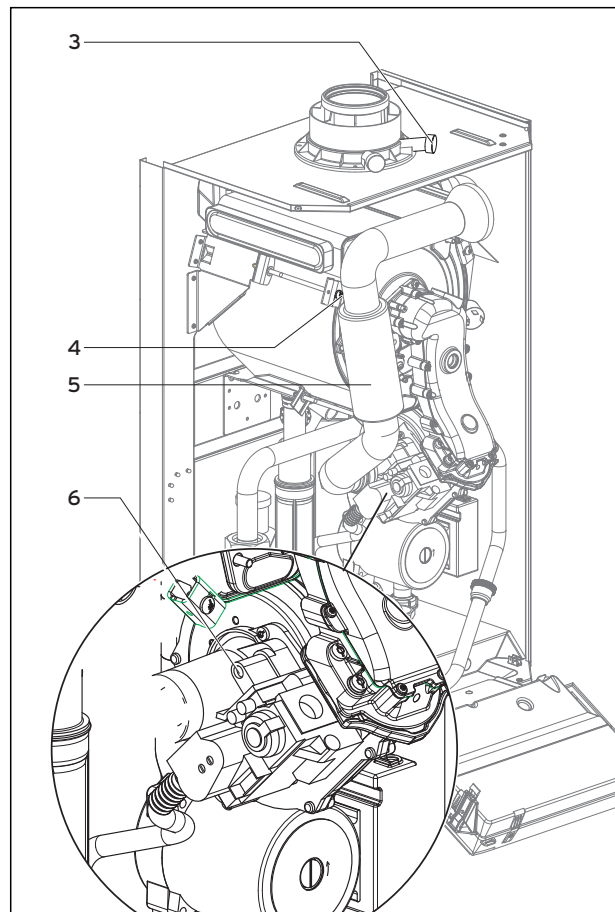




Fig. 5.4 Carrying out a CO₂ measurement, carrying out an air ratio setting (gas setting)

5 Initial start up and commissioning

Code	Meaning	Displayed/Adjustable values	Circuit board setting (default)	Setting for ecoMAX 646
d.0	Heating system part load	Adjustable values in kW	45 kW	system-dep.
d.1	Heating system pump over run	1 - 60 min.	5 min.	system-dep.
d.2	Heating system max. off-period	1 - 60 min.	20 min.	system-dep.
d.14	Pump speed	Set value for built-in pump 0 (= auto), 53, 60, 70, 85, 100 %	0 = (auto)	system-dep.
d.16	External CH pump	1, 2, 3, or 4	1	
d.71	Max. target value for heating-system flow temperature	40 - 85 °C.	82 °C.	system-dep.
d.72	Hot-water pump over run	0 - 250 s	80 s	system-dep.

Table 5.1 Values to be programmed in after installation of a new circuit board

 **Natural gas:**
Adjust in steps of no more than 1/8 of a turn, and wait for each new value to stabilise (about 1 min.).

 **LPG:**
Adjust in small steps of no more than 1/16 of a turn, and wait for each new value to stabilise (about 1 min.).

- Turn anti-clockwise to increase level of CO₂ content.
- Turn clockwise to reduce level of CO₂ content.
- Once the adjustment procedure is complete, swivel the air suction pipe upwards and back into position.
- Re-check the level of CO₂ content.
- The adjustment procedure may have to be repeated.
- Press the "+" and "-" buttons simultaneously to deactivate full gas rate mode. Measurement mode is also cancelled if no control button is operated for 15 minutes.
- Reposition air suction pipe and tighten screw (4).
- Raise control panel.

Settings	Natural gas (H) Tolerance	Propane Tolerance	Unit
CO ₂ after 5 minutes full load mode with appliance front closed	9.0 ± 1.0	10.0 ± 0.5	Vol.-%
CO ₂ after 5 minutes full load mode with appliance front removed	8.8 ± 1.0	9.8 ± 0.5	Vol.-%
Set for Wobbe index W ₀	15	22.5	kWh/m ³
CO value with full load	< 250	< 250	ppm

Table 5.2 Factory gas setting

Appliance	ecoMAX 646		
Maximum net heat input in kW	45		
Gas rate	nom.	+ 5 %	- 10 %
Natural gas in m ³ /h	4,76	5,00	4,29
Propane in kg/h	3,50	3,67	3,15

Table 5.3 Gas rates

5.3 Functional test

After installing the appliance and setting the gas, perform a functional test before commissioning the appliance and handing it over to the user.

- Commission the appliance in accordance with the instructions in the relevant operating manual.
- Check the appliance for gas and water leaks.
- Check the flue system for leaks and that it is fixed properly.
- Check over-ignition and that the flame on the burner is burning evenly.
- Check that the heating and hot water generation are working properly.
- Pass the appliance on to the user.

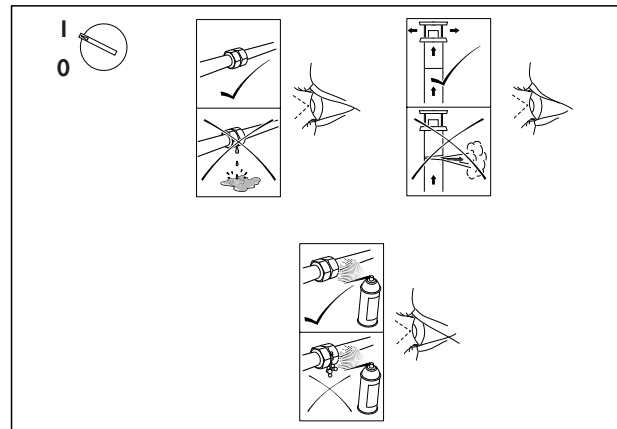


Fig. 5.5 Functional test

The Vaillant ecoMAX 646 possesses status codes that display the operating status of the appliance in the DIA system display. A functional test of the hot water operation and heating operation can be carried out using these status codes by pressing the "i" key.

Enabling the DHW function (if connected)

- Switch on the appliance and the connected hot water cylinder.
- Make sure that the cylinder thermostat is requesting heat.
- Press the "i" key.

When the cylinder is operating correctly, the status code "S.24" appears in the display.

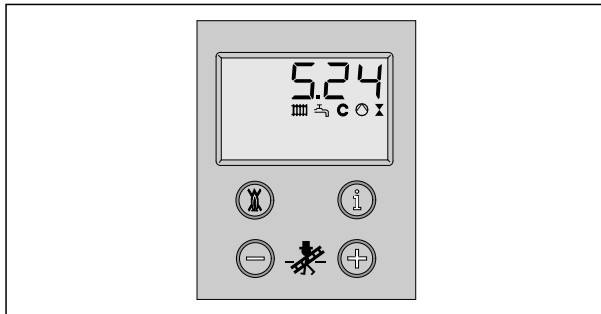


Fig. 5.6 Display during recharging

Heating

- Switch on the appliance.
- Make sure that heat is being requested.
- Press the "i" key.

When the heating is running correctly, the status code "S.4" appears in the display.

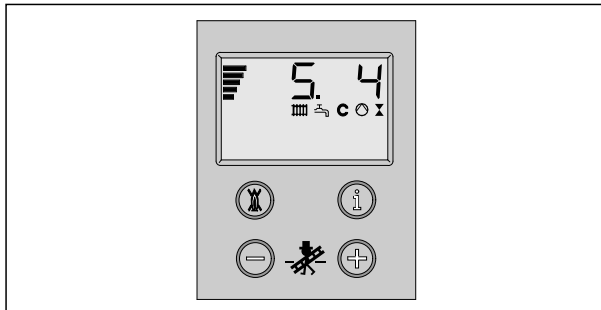


Fig. 5.7 Display during heating mode

5.4 Instructing the user

The user of the heating system must be instructed about its functions and how to operate it. The following measures in particular are to be carried out here:

- Hand over any instructions intended for the user as well as the appliance documentation.
- Inform the user that the instruction manuals should be kept near the appliance.



Note!

When you have finished the installation, attach the sticker supplied (835593) to the appliance in the user's language.



Caution!

The front cover should only be removed

- for initial installation access
- for servicing
- for testing

For continuous and safe operation the front cover must be fitted together with a correctly fitted and sealed flue system.

5.4.1 Instructing the user about the heating system

- Instruct the user about the methods used for combustion air supply and flue conducting. Be especially sure to point out that these must not be altered.
- Instruct the user on how to check the required water level/filling pressure of the system as well as on methods of refilling and bleeding the heating system when needed.
- Point out to the user the correct (economical) settings for temperatures, controllers and thermostat valves.
- Instruct the user on the need for yearly inspection and maintenance of the system. Recommend making a maintenance contract.

5.4.2 Vaillant warranty

Vaillant provide a full parts and labour warranty for this appliance. The appliance must be installed by a suitably competent person in accordance with the Gas Safety (Installation and Use) Regulations 1998, and the manufacturer's instructions. In the UK 'CORGI' registered installers undertake the work in compliance with safe and satisfactory standards.

All unvented domestic hot water cylinders must be installed by a competent person to the prevailing building regulations at the time of installation.

Failure to install and commission this appliance in compliance with the manufacturer's instructions may invalidate the warranty (this does not affect the customer's statutory rights).



Note!

1 year warranty as standard.

2 year warranty available if commissioned by Vaillant (contact 0870 8503072 for details)

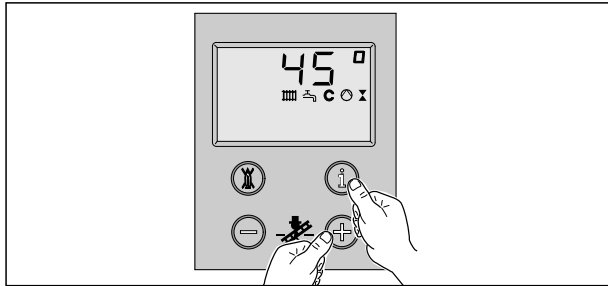
6 Adapting the appliance to the heating system

6 Adapting the appliance to the heating system

6.1 Adjusting the central heating output (range rating)

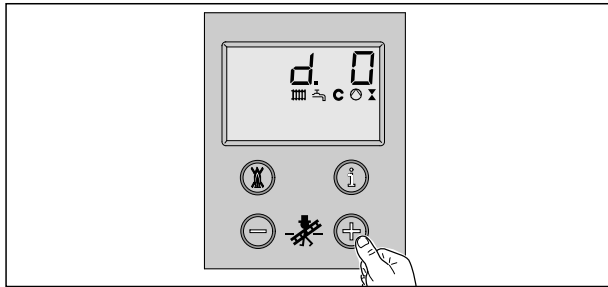
The appliances are set in the factory to the thermal load shown in table 6.1. If you want to set a different load, proceed as follows:

- Press the "i" and "+" keys simultaneously.



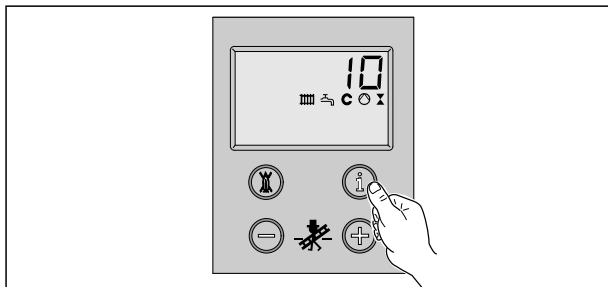
- Continue to hold the "+" key down until "d.0" appears in the display.

The display runs from "d.0" through to "d.99" and starts again at "d.0".



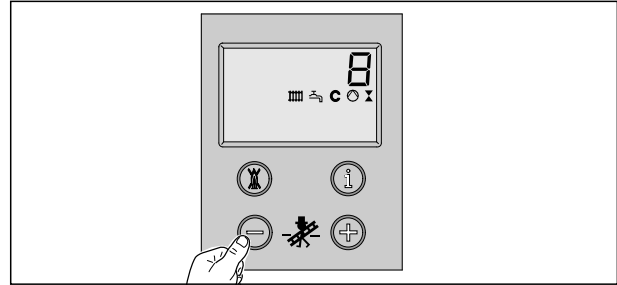
- Press the "i" key.

The "=" symbol appears in the display. Then the set partial load is displayed in kW.



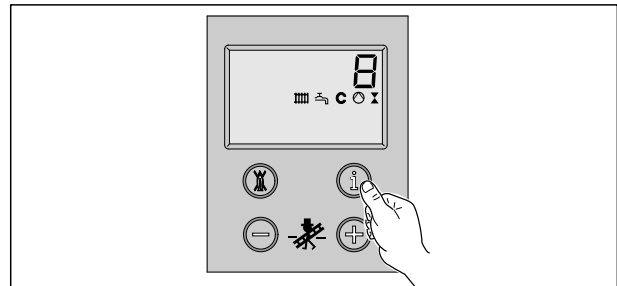
- By pressing the "+" or "-" keys you can now increase or decrease the value in 1 kW increments.

The displayed value flashes during the setting procedure. The possible setting ranges are to be found in table 6.1.



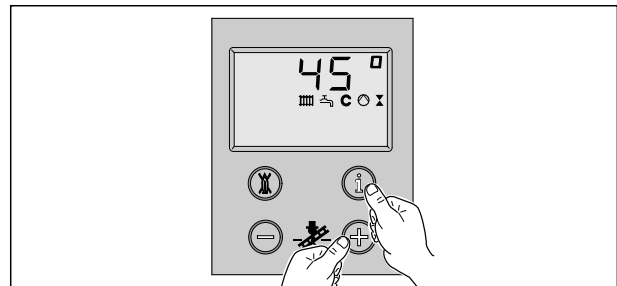
- Then hold down the "i" key for approx. 5 s until the display no longer flashes.

The value is now saved. The standard display appears again in the display (current heating supply temperature, e.g. 45 °C).



- Quit the setting mode by pressing the "i" and "+" keys simultaneously.

The setting mode is also quit if you do not touch a key for 4 minutes.



Appliance type	Setting range in kW	Factory setting in kW
ecoMAX 646	12 - 45	35

Table 6.1 Setting range central heating output

6.1.1 Setting the DHW part load output

The same process can also be carried out using the code d.77 for DHW output to a directly connected cylinder.

6.2 Setting the pump over-run time

The pump over-run time for the heating mode is set to 5 minutes (default). It can be varied within a range from 1 minute to 60 minutes or be in "continuous" mode.

In order to change the pump over-run time, proceed as follows:

- Pull the front panel of the appliance outwards.
- Switch the appliance main switch to the "I" position.
- Press the "i" and "+" keys simultaneously and hold down the "+" key until "d.1" appears in the display.
- Press the "i" key.

The current pump run-out time in minutes appears in the display.

- By pressing the "+" or "-" keys you can now increase or decrease the value.

To set the pump mode "continuous", do not enter a number, rather select the symbol "--" with the "+" or "-" key.

- Hold down the "i" key for about 5 seconds until the display stops flashing.

The value is now saved.

- Quit the setting mode by pressing the "i" and "+" keys simultaneously.

The standard display appears again in the display (current heating supply temperature, e.g. 45 °C). The setting mode is also quit if you do not touch a key for 4 minutes.

6.3 Setting the burner anti-cycling time

In order to avoid frequent switching on and off of the burner (energy loss), an electronic block preventing it being switched on after switching off, for a pre-determined time. The burner anti-cycle time can be adjusted to fit the characteristics of the heating system.

The burner anti-cycle time is only activated for the heating mode. Hot water operation during a burner anti-cycle time in progress does not affect the timer.

The maximum burner anti-cycle time can be set under diagnosis point d.2 between 2 and 60 minutes (factory setting: 20-minutes). The anti-cycle time effective in each case is then automatically calculated from the current set supply temperature and the set maximum burner anti-cycle time.

The timer can be reset or deleted by pressing the appliance on/off switch. The burner anti-cycle time remaining in the heating mode after a control shutdown can be viewed under diagnosis point d.67.

In order to change the lockout time, proceed as follows:

- Pull the front panel of the appliance outwards.
- Switch the appliance main switch to the "I" position.
- Press the "i" and "+" keys simultaneously and hold down the "+" key until the diagnosis code "d.2" appears in the display.
- Press the "i" key.

The symbol "=" now appears in the display and then the current burner lockout time in minutes.

- By pressing the "+" or "-" keys you can now increase or decrease the value in 1 minute increments.

The displayed value flashes during the setting procedure.

- Hold down the "i" key for about 5 seconds until the display stops flashing.

The value is now saved.

- Quit the setting mode by pressing the "i" and "+" keys simultaneously.

The standard display appears again in the display (current heating supply temperature, e.g. 45 °C). The setting mode is also quit if you do not touch a key for 4 minutes.

7 Inspection and maintenance

7.1 Initial inspection

To ensure the continued safe and efficient operation of the boiler it is recommended that it is checked and serviced as necessary at regular intervals. The frequency of servicing will depend upon the particular installation conditions and usage. An inspection must be carried out once a year.



Danger!

It is law that all servicing work is carried out by a competent person (CORGI registered). Inspections/Maintenance work not carried out by a competent person can result in damage to property and personal injury.

Only genuine Vaillant spare parts may be used for inspections, maintenance and repair work to ensure the long-term working order of all functions of your Vaillant appliance.

Any spare parts which might be required are contained in the current spare parts catalogues. Information can be obtained from Vaillant Customer Service Centres.

7.1.1 Safety instructions

Important:

Before starting any maintenance work:

- Isolate the mains electricity supply by disconnecting the plug at the socket outlet (if there is only an isolating switch remove the fuse from the switch).
- Turn OFF the gas supply at the gas service valve fitted to the boiler.
- When removing any water carrying components ensure that water is kept away from all electrical components.
- Always use new seals and O-rings when parts are replaced.
- Always test for gas soundness and always carry out functional checks after any service work and after replacing any gas carrying component.
- Always check earth continuity, polarity and resistance to earth with a multimeter after any service work and after replacing any electrical component.



Danger!

Electrocution by touching live parts can be fatal!
The supply terminals in the appliance switch box are live even if the main ON/OFF switch is turned off.
Protect the switch box from spray water.
Before working on the appliance, turn off the power supply and secure against restart!

Always perform the following steps after completing any inspection tasks:

- Open the service valves in the heating flow and return and in the cold water inlet (combination boilers only).

- If necessary, refill the device with cold water up to a pressure of approx 1.5 bar and bleed air from the entire heating system.
- Open the service valve of the gas supply pipe.
- Turn on the power supply and the main switch.
- Check the appliance for gas and water leaks.
- Fill and bleed air from the heating system again, if necessary.



Note

If it is necessary to keep the main switch on for certain inspection and maintenance, this is indicated in the description of the maintenance task.



Note

The boiler is fitted with a combustion analysis test point. A suitable combustion analyser can be connected to this point to establish the combustion performance of the boiler. Checking/adjustment of this value is required in the following instances; replacement of gas valve, conversion to or from Natural Gas/ LPG or if incorrect combustion is suspected (see section 5.2.3).

7.1.2 Maintenance

Before commencing any servicing or maintenance work, carry out an initial inspection of the system as follows:

- Inspect the flue, pipework and electrical connections for indications of damage or deterioration.
- Inspect the air supply and ventilation arrangements of the installation.
- Check the heating and water system, in particular the condition of radiator valves, evidence of leakage from the heating system and dripping hot water taps.

7.1.3 Overview of the inspection and maintenance tasks

No.	Activity	Column 1 Inspection must be carried out once a year	Column 2 Maintenance
1	Check the air / gas flue system and ensure it is not blocked, damaged and is fitted correctly.	x	
2	Measure the gas rate during operation (see table 5.3 inside the chapter Start-up). If the gas rate is lower than the minimum gas rate follow the maintenance instructions (column 2).	x	
3	Check combustion by measuring the CO and CO ₂ values, compare to table 5.2. If the measurement is outside the tolerances follow the maintenance instructions, (column 2) If a flue gas analyser is not available check the ignition and burner flame picture through the sight glass, if incomplete combustion is evident perform the maintenance instructions (column 2).	x	
4	Isolate the appliance from the electrical mains supply, close the gas and water service valves.		x
5	Visually inspect the general heat exchanger area for signs of corrosion, sooting or other forms of damage. If damage is evident perform the tasks in the maintenance column 2.	x	
6	Remove the compact thermal module (as described in section 7.2.1) if maintenance schedule is required from steps 2, 3 or 5 above. Clean the primary heat exchanger. Fit a new burner door seal kit (observe the assembly instructions enclosed with the seal kit). Refit the thermal compact module and tighten the nuts.		x
7	Clean the air intake tube.		x
8	Check all the appliances electrical connections and make adjustments if necessary.	x	x
9	Check the appliance generally, check for dirt / dust and clean if necessary.	x	x
10	Check and clean the condensate trap and flexible condensate hose.	x	x
11	Open the gas and water service valves, re-establish the electrical supply and turn on the boiler.	x	x
12	Perform a test operation of the appliance including the heating and hot water systems and bleed the system if necessary.	x	x
13	Re-pressurise the appliance/system up to between 1.0 - 2.0 bar (depending on the static height of the system).	x	x
14	Measure the gas rate during operation and ensure it is within the tolerances specified (see table 5.3 inside the chapter Start-up).		x
15	Re-check the combustion by measuring the CO and CO ₂ values, (compare to table 5.2). Ensure that the measurement is within the tolerances. If a flue gas analyser is not available check the ignition and burner flame picture visually through the site glass.		x
16	Check the boiler for leaks of any kind, rectify as necessary.	x	x
17	Complete the gas commissioning checklist (Benchmark).	x	x

Tab. 7.1 Inspection and maintenance steps

7.1.4 Functional check of boiler operation

- Carry out a functional check of the boiler operation as previously detailed.
- Remove the appliance casing as detailed and operate the boiler.
- Inspect the burner operation through the viewing window.
- Check that the flames are evenly covering the surface of the burner.
- Inspect for signs of excessive flame lift or sooting.

7.2 Servicing the compact thermal module

7.2.1 Removing the compact thermal module

The compact thermal module consists of a speed-controlled fan, combined gas/air electronic gas valve, the gas supply (mixer tube) for the fan of the pre-mix burner and the pre-mix burner itself. These four components make up the complete assembly that is the compact thermal module. Proceed as follows to dismantle it: (see fig. 7.1)



Danger!

There is danger of being injured or scalded at the compact thermal module and at all components carrying water. Only work on the components once they have cooled down. The mixer tube (7) between gas control unit and burner may not be opened. It can only be guaranteed that this component is gas-tight after it has been inspected at the factory.

- Turn off the gas supply to the appliance.
- Lower the electronics box.
- Undo the fastening screw of the air intake pipe (5) and pull the air intake pipe forward (3); remove the air intake pipe from the air intake socket.
- Pull the two plugs of the ignition and earthing connection off the ignition electrode (6).
- Undo the gas pipe union (10) on the underside of the electronic gas valve (fig. 7.2).
- Pull the cables (9) off the fan motor and the cable (8) off the electronic gas valve.
- Undo the five nuts (2).

7 Inspection and maintenance

Caution!
Under no circumstances may the compact thermal module be suspended from the flexible corrugated gas pipe.

- Pull the entire compact thermal module (4) off the heat exchanger (1).

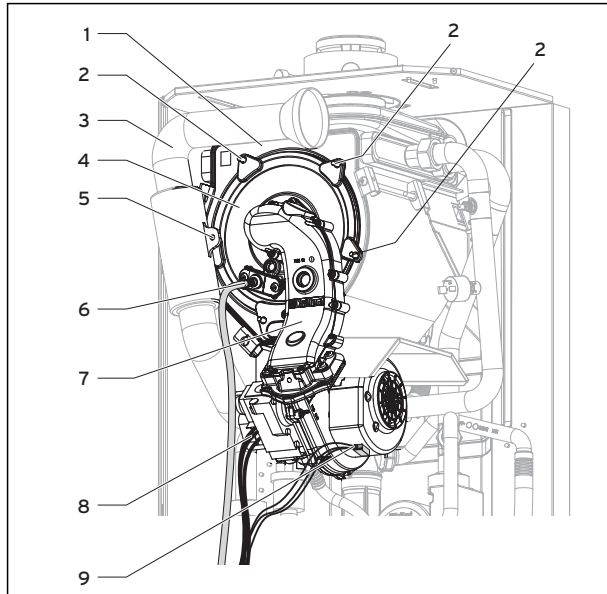


Fig. 7.1 Dismounting/Mounting the compact thermal module

Mounting the compact thermal module

Danger!
The two seals (1) on the compact thermal module (fig. 7.3) must be replaced every time the compact thermo module is removed. The burner flange insulation (2) on the compact thermal module (fig. 7.3) must not show any signs of damage; if it does, it must also be replaced (minor cracks are acceptable).

- Put the compact thermal module (4) onto the heat exchanger (1) (fig. 7.1).
- Tighten the five nuts (2) evenly and crosswise.
- Put the air intake pipe (3) onto the intake socket and tighten the screw (5).
- Connect the gas supply line (10) with a new seal (SP no. 98-0012) to the gas fitting (fig. 7.3). Use a smooth jawed spanner to tighten the gas pipe union nut and to hold the gas fitting.
- Connect the two plugs of the ignition and earthing cables to the ignition electrode (6).
- Connect the cables (9) to the fan motor and the cable (8) to the gas fitting.
- Open the gas supply to the appliance.

Danger!
Check the gas connection (10) for leaks with leak spray (fig. 7.2).

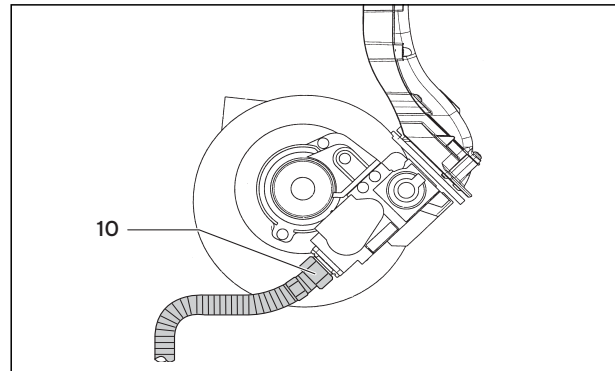


Fig. 7.2 Gas union connection

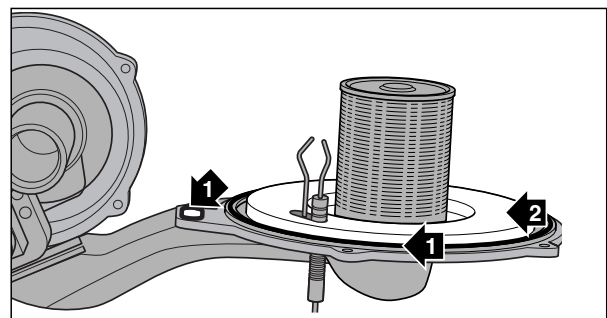


Fig. 7.3 Checking seals and burner flange insulation

7.2.2 Cleaning the heat exchanger

Caution!
Protect the lowered electronics box against spray water.

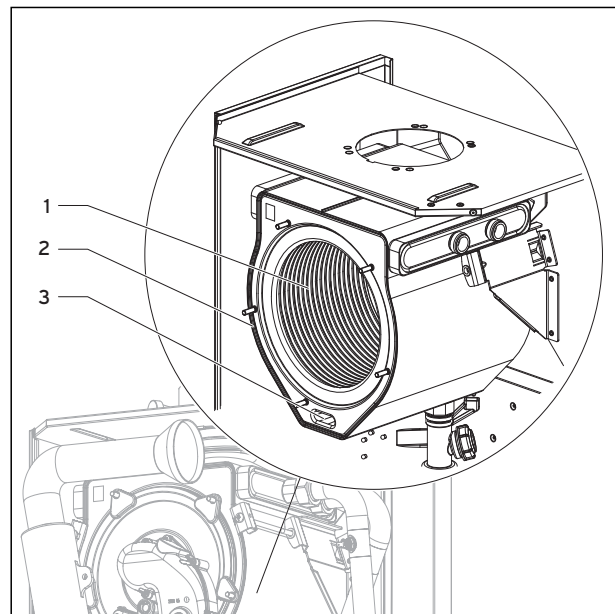


Fig. 7.4 Cleaning the heat exchanger

- Dismantle the compact thermo module as described under 7.2.1.
- Clean the heating spiral (1) of the integral condensation heat exchanger (2) using a soft brush (fig. 7.4). Rinse with water.
- The condensate receptacle can also be cleaned via the opening (3).

7.2.3 Checking the burner

The burner is maintenance-free and needs no cleaning. The surface should be checked for damage, and the burner replaced if necessary.

- After checking/replacing the burner, install the compact thermo module as described in 7.2.1.

7.2.4 Cleaning the condensate siphon

- Screw off the bottom (3) of the condensate siphon (see fig. 7.5).
- Clean the bottom of the siphon by rinsing it out with water.
- Then fill the bottom about 3/4 full with water.
- Screw the bottom back on the condensate siphon.



Danger!

If the appliance is operated with an empty condensate siphon, there is the danger of poisoning through escaping flue gases. Therefore, refill the siphon after each cleaning.

7.2.5 Cleaning the condensate paths

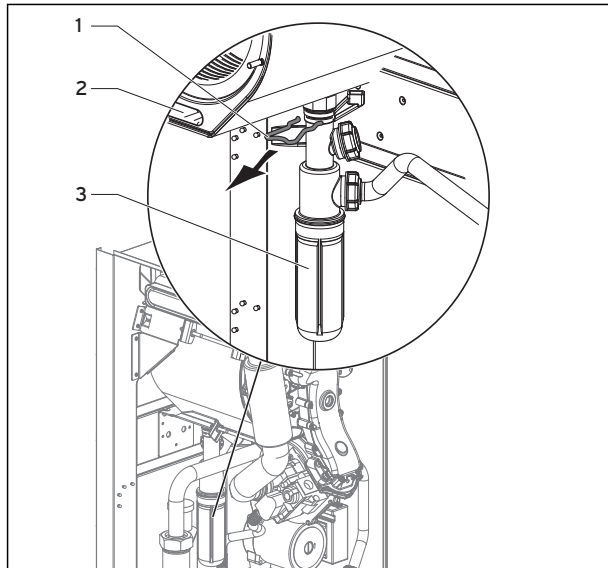


Fig. 7.5 Cleaning the condensate paths

To clean the condensate paths, the complete condensate siphon can be taken off by pulling out the clips (1). Then the two condensate outlets on the heat exchanger are accessible.

Dirt in the front condensate discharge area can be removed via the lower cleaning hole (2).

7.3 Checking the gas setting

Perform a gas rate check as described in chapter 5.2.

7.4 Filling and venting the system

Proceed as described in points 5.1.2 and 5.1.3.

7.5 Draining the appliance and the system

7.5.1 Draining the appliance

- Close the appliance's maintenance cocks.
- Open the drain valve in the return.
- Open the air-release valve on the cylinder supply in order for the appliance to be completely drained.

7.5.2 Draining the entire system

- Attach a hose to the system's drain point.
- Bring the open end of the hose to a suitable discharge point.
- Make sure that the boiler's maintenance cocks are open.
- Open the draining cock.
- Open the air-release valves on the radiators. Start with the radiator that is highest up and then continue downward.
- When the water has run out, close the radiators' vents and the draining cock again.

7.5.3 Cleaning the air separator



Danger!

There is danger of being injured or scalded at all components carrying water. Only carry out work on these components once they have cooled down.

- remove the air separator tube as shown in fig. 7.6 and rinse it with hot water.
- Remount the air separator tube and make sure to use new seals (SP no. 981272).

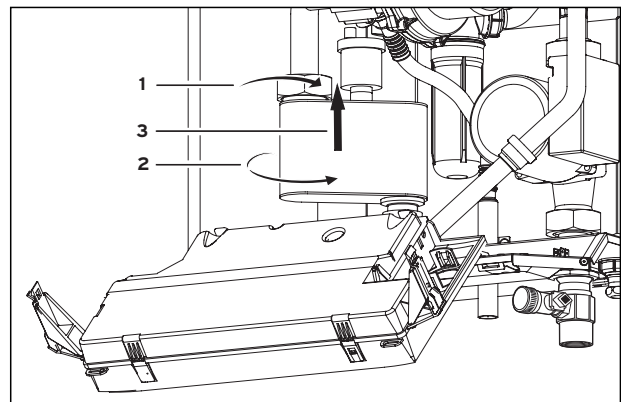


Fig. 7.6 Cleaning the air separator tube

7.6 Test operation

After the maintenance work has been completed, carry out a functional test (see chapter 5.3).

8 Troubleshooting

8 Troubleshooting

8.1 Diagnostics

8.1.1 Status codes

The status codes, which you get via the DIA system's display, give you information about the appliance's current operating status.

If several operating statuses exist simultaneously, the most important status code is always shown.

The display of the status codes can be viewed as follows:

- Press the "i" key beneath the display.
The status code appears in the display, e.g. S.04 for "Burner mode - heating".

The display of the status codes can be ended as follows:

- Press the "i" key beneath the display
or
- do not press any key for about 4 minutes. The current heating supply temperature appears in the display again.

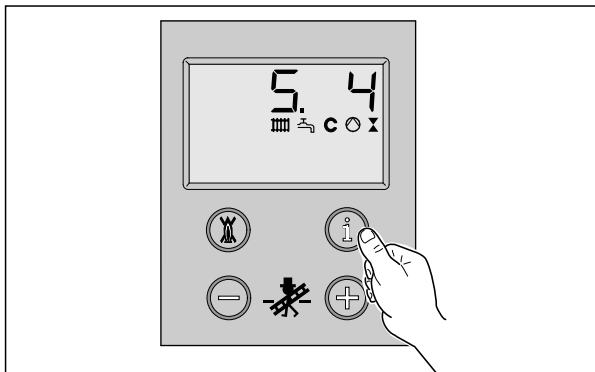


Fig. 8.1 Display of status codes

Code	Meaning
S. 0	No heat required
S. 1	Heating pump supply
S. 2	Heating fan start
S. 3	Heating ignition
S. 4	Heating burner on
S. 5	-
S. 6	Heating fan run-out
S. 7	Heating pump run-out
S. 8	Remaining anti-cycle time heating
S. 10	Hot water request
S. 11	Hot water fan start
S. 13	Hot water ignition
S. 14	Hot water burner on
S. 15	-
S. 16	Hot water fan over-run
S. 17	Hot water pump over-run
S. 20	Hot water cycle mode
S. 21	Hot water fan start
S. 23	Hot water ignition
S. 24	Hot water burner on
S.25	-
S. 26	Hot water fan over-run
S. 27	Hot water pump over-run
S. 28	Hot water lockout time
S. 30	No heat requirement controller (2-point controller)
S. 31	No heat demand from external controls or CH dial off
S. 32	Waiting time fan
S. 34	Heating frost protection
S. 36	No heat requirement controller (Vaillant controller)
S. 37	Waiting time fan
S. 39	Flow thermostat contact open
S. 42	Flue gas flap no feedback
S. 53	Waiting time lack of water (burner on ΔT VL-RL was > 40 K; burner off ΔT VL-RL was > 45 K
S. 54	Low water pressure (boiler blocked)

Table 8.1 Status codes

8.1.2 Diagnosis codes

In the diagnosis mode, you can change certain parameters or display more information (see following table).

- Press the "i" and "+" keys under the display simultaneously.

The display shows "d.0".

- Scroll to the desired diagnosis number with the "+" or "-" buttons.
- Press the "i" key.

The display shows the relevant diagnosis information.

- If necessary, use the "+" or "-" keys to change the value (display flashes).
- Save the new value by holding down the "i" key for approx. 5 seconds until the display no longer flashes.

You can end the diagnosis mode as follows:

- Press the "i" and "+" keys simultaneously or
- do not press any key for about 4 minutes. The current heating supply temperature appears in the display again.

Code	Meaning	Display value/adjustable value
d. 0	Partial-load heating	adjustable values in kW
d. 1	Pump over-run heating	1 - 60 minutes or "continuous" (factory setting: 5 minutes)
d. 2	Max. anti-cycle time heating	1 - 60 minutes (factory setting: 20 minutes)
d. 3	With use of solar energy: collector temperature actual value	actual value in °C
d. 4	Cylinder temperature actual value	actual value in °C; with use of solar energy: actual value of the upper cylinder temperature sensor
d. 5	Flow temperature target value	target value in °C
d. 6	Cylinder temperature target value	target value in °C
d. 7	Cylinder temperature target value for VC appliances	target value in °C
d. 8	Terminal 3-4	0 = room thermostat open (no heating operation) 1 = room thermostat closed (heating operation)
d. 9	Terminal 7-8-9 target value	in °C (continuous controller)
d. 10	Internal pump	1 = on; 0 = off
d. 11	External pump	1 = on; 0 = off
d. 12	Storage charging pump	1 = on; 0 = off
d. 13	Circulation pump	1 = on; 0 = off
d. 14	Pump speed target value	target value internal pump in %. Possible settings: factory setting auto, 53, 60, 70, 85, 100 %
d. 15	Pump speed actual value	actual value internal pump in %
d. 16	Pump 2	1 = circulation pump; 2 = external pump; 3 = storage charging pump; 4 = solar pump
d. 17	Control type:	0 = supply temperature control; 1 = return temperature control
d. 22	Hot water request:	1 = on; 0 = off
d. 23	Operating mode	summer/winter mode: 1 = on; 0 = off
d. 24	Air pressure sensor actual value	actual value in Pa
d. 25	Hot water enabling via warm restart clock	1 = yes; 0 = no
d. 33	Fan target value	target value in upm/10
d. 34	Fan actual value	actual value in upm/10
d. 40	Flow temperature actual value	actual value in °C
d. 41	Return temperature actual value	actual value in °C
d. 42	Solar cylinder temperature actual value	actual value in °C; with use of solar energy: actual value of the lower cylinder temperature sensor
d. 44	Ionisation current actual value	actual value/100 in µA
d. 46	External temperature correction value	correction value in K
d. 47	External temperature actual value	actual value in °C
d. 50	Minimum speed offset	in upm/10
d. 51	Maximum speed offset	in upm/10
d. 52	Minimum air pressure offset	in Pa
d. 53	Maximum air pressure offset	in Pa
d. 60	Number of temperature limiting shutdowns	number
d. 61	Safety thermostat shutdown	number
d. 67	Remaining anti-cycle time heating	in minutes
d. 68	No first start number	number of failed ignitions in the first attempt
d. 69	No second start number	number of failed ignitions in the second attempt
d. 71	Max. flow temperature heating	max. target value of the heating supply temperature: adjustable value 40 - 85 °C (factory setting: 75 °C)
d. 72	Pump run-out hot water	pump over-run time in seconds after the charging of a hot water cylinder; factory setting: 80 s
d. 73	Activation difference for solar pump	recommended setting when using solar energy: +7 °C.
d. 75	Max. charging time hot water cylinder	maximum charging time for a cylinder without its own controller
d. 76	Appliance variants	1 - 17
d. 77	Partial-load hot water cylinder	limitation of the storage charging output in kW
d. 78	Max. supply temperature hot water when using solar energy; scalding protection temperature	limitation of the storage charging temperature in °C when using solar energy: temperature at which the solar pump is switched off.
d. 80	Operating hours heating	in h
d. 81	Operating hours hot water generation	in h
d. 82	Burner starts - heating	number of hystereses in the heating mode x 100
d. 83	Burner starts - hot water mode	number of hystereses in the hot water mode x 100

Table 8.2 Diagnosis codes

8 Troubleshooting

8.1.3 Error codes

The error codes displace all other displays when errors occur. An error that arises is shown in the display as "F...", e.g. "F.10" (see table on the next page). If several errors occur simultaneously, the corresponding error codes are displayed alternately for approx. 2 seconds each.

8.1.4 Error memory

The last 10 errors are saved in the appliance error memory.

- Press the "i" and "-" keys simultaneously.
- You can scroll back through the error memory by pressing the "+" key.

You can exit the error memory display as follows:

- Press the "i" key beneath the display
or
- do not press any key for about 4 minutes.

The current heating supply temperature appears in the display again.

Code	Meaning	Cause
F.0	Flow-NTC: - NTC broken - NTC cable broken - Defective connection at NTC - Defective connection at electronics	Flow-NTC cable defective/broken NTC faulty
F.1	Return-NTC: - NTC broken - NTC cable broken - Defective connection at NTC - Defective connection at electronics	Return-NTC cable defective/broken NTC faulty
F.10	Short circuit - flow-NTC (< 130 °C)	NTC- plug shorted to casing, NTC defective
F.11	Short circuit - return-NTC (< 130 °C)	NTC- plug shorted to casing
F.13	Short circuit in tank sensor	NTC defective, earth leak/short circuit in cable loom, damp plug connection
F.20	Over heat cut off activated	Maximum temperature exceeded
F.22	Low water or no water in appliance	No water in system, Pump defective, Pump lead defective
F.23	Water level low, Temperature range too wide	Pump obstructed, pump running at lower capacity, Air in appliance, system pressure too low, flow and backflow NTC reversed
F.24	Water level low, Temperature rises too fast	Pump obstructed, pump running at lower capacity, ir in appliance, system pressure too low, flow and backflow NTC reversed
F.25	Water Switch, System pressure too low	Water Switch - plug disconnected, Waterswitch activated
F.27	No demand to gas valve	Electronic board defective, Gas valve defective
F.28	Boiler goes to lock out	No gas, Insufficient gas, Incorrect gas valve adjustment, Electrode defective, Ignition lead defect, Electronic igniter defective, Check air inlet duct
F.29	Flame extinguished re-ignition unsuccessful	Gas supply absent or insufficient, Check flue duct
F.32	Fan turning-speed malfunction (too fast at start-up)	Fan unit obstructed, plug-in fan connector not correctly inserted, Hall sensor defective, fault in cable loom, defective electronic control system
F.37	Fan turning-speed malfunction (too fast or too slow during operation)	Fan unit obstructed or blocked with debris, plug-in fan connector not correctly inserted, Hall effect sensor defective, fault in cable loom, defective electronic control system. Fan motor and bearings sticking with debris.
F.42	Coding resistor - short circuit	Faulty cable loom (X2) defective electronic control system.
F.43	Coding resistor - open circuit	Wiring plug X 2 is not firmly located in the plug, defective electronic control system.
F.60	Gas-valve control + defective	Short circuit/earth (ground) leak in cable loom to gas valves, gas valve assembly defective (earth/ground leak from coils), electronic control system defective
F.61	Gas-valve control - defective	
F.62	Defective gas-valve closure mechanism	Leak in gas valve assembly, electronic fault
F.63	EEPROM error	Electronic fault
F.64	Electronic system/sensor fault	Short circuit in flow or backflow NTC, electronic fault
F.65	Electronic system temperature too high	Electronic system affected by external heat source, electronic fault
F.67	Electronic fault in flame system (non-plausible flame signal)	Electronic fault
Emergency run "speed"	No speed signal from the fan Hall sensor	Wiring cable on the fan is not firmly located, fault in cable loom, defective electronic control system.

Table 8.3 Error codes

8.1.5 Test programs

Special functions can be triggered in the appliances by activating various test programs. These programs are given in detail in the following table 8.4.

- The test programs P.0 to P.6 are started when "Power ON" is turned on and the "+" key is pressed for 5 s.

The display shows "P.1".

- Press the "+" key to start counting the test number upwards.
- By pressing the "i" key the appliance is now put onto operation and the test program started.
- Press "i" and "+" simultaneously to end the test programs. You can also end the test programs by not pressing any key for 15 minutes.

Display	Meaning
P. 0	Venting test program 1x "i" key: start bleeding the heating pump (display: HP) 2x "i" key: start bleeding the charging pump (display: LP) 3x "i" key: end bleeding program Note: the bleeding program runs for approx. 6.5 mins.
P. 1	Test program whereby the appliance is operated at full load after successful ignition
P. 2	Test program whereby the appliance is operated with minimum gas volume after successful ignition
P. 5	Test program for safety thermostat test; appliance heats up by bypassing a control shutdown until the safety thermostat shutdown temperature of 97 °C is reached

Table 8.4 Test programs

9 Vaillant service

10 Recycling and disposal

9 Vaillant Service

To ensure efficient and reliable operation of your boiler it is recommended that regular servicing is carried out by your service provider.

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Training

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Commercial Service

Telephone 0870 - 8 50 30 72
Mon - Fri 8.30 - 17.30
Fax 01773 - 52 59 46
email aftersales@vaillant.co.uk

10 Recycling and disposal

Recycling and disposal have already been taken into account during the development of all Vaillant products. Vaillant's standards lay down strict requirements. When selecting materials, the recyclability, dismantability and separability of materials and components are taken into account, just as environmental hazards and health risks during recycling and the disposal of unavoidable remains of unusable residue are.

10.1 Appliance

The Vaillant ecoMAX 646 consists 92 % of metallic materials which can be melted down again at iron and steel works and therefore can be recycled practically any number of times. The plastic materials used are labelled and, in this way, are already prepared for sorting and fractionation for subsequent recycling.

10.2 Packaging

Vaillant has reduced the transport packaging of the appliances to a minimum. The strict selection of the packaging materials is based on their recyclability. The high-quality cardboard articles are secondary raw materials which have been in demand in the cardboard and paper industry for a long time.

EPS (polystyrene)[®] is used to protect the products during transport. EPS is 100 % recyclable and CFC-free. Even the films and tightening bands are made of recyclable plastic.

11 Technical data

ecoMAX	646	unit
Heat Output Range (heating 50/30 °C)	12,9 - 46,4	kW
Heat Output Range (heating 80/60 °C)	12,3 - 44,1	kW
Maximum Heat Input (Net)	45	kW
Net Efficiency at 100% load	98,4	%
Net Efficiency at 30% load	108,3	%
SEDBUK rating	A	
SAP seasonal Efficiency	90,5	%
Inlet gas working pressure required (natural gas)	20	mbar
Inlet gas working pressure required (LPG)	37	mbar
NOx class	5	-
NOx level	42	mg / h
CO ₂ Percentage (after 5 minutes full load +/- 1)	8,8	%
Recommended CO level	150	ppm
Gas Rate (natural gas)	4,8	m ³ / h
Gas Rate (LPG)	3,5	kg / h
rated water volume (when ΔT = 20 K)	1935	l / h
residual delivery head of the pump (without gravity brake)	280	mbar
residual delivery head of the pump (with gravity brake)	190	mbar
max. flow temperature approx.	85	°C
Maximum operating pressure	3	bar
min. required total overpressure on the heating side	0,8	bar
condensate volume (pH value: 3.0-4.0)	4,5	l/h
water content	4,5	l
flue gas mass flow min./max	5,7 / 20,5	g/s
flue gas temperature min./max.	40 / 70	°C
maximum length of concentric flue horizontal	18	m
maximum length of concentric flue vertical	21	m
pressure drop across the heat exchanger (at full load and ΔT 20 K)	350	mbar
Connections heating flow/return	1"	mm / "
Gas inlet	20	mm
Pressure safety valve	1/2	mm / "
Condensate drain	19	mm
Flue connection	80/125	mm
Lift weight	45	kg
height	800	mm
width	480	mm
depth	450	mm
electrical connection	230 / 50	V / Hz
electrical power consumption min./max. (with integrated pump)	138 / 180	W
type of protection	IP X 4 D	-



GAS BOILER COMMISSIONING CHECKLIST

BOILER SERIAL No. _____ NOTIFICATION No. _____

CONTROLS To comply with the Building Regulations, each section must have a tick in one or other of the boxes

TIME & TEMPERATURE CONTROL TO HEATING	ROOM T/STAT & PROGRAMMER/TIMER <input type="checkbox"/>	PROGRAMMABLE ROOMSTAT <input type="checkbox"/>
TIME & TEMPERATURE CONTROL TO HOT WATER	CYLINDER T/STAT & PROGRAMMER/TIMER <input type="checkbox"/>	COMBI BOILER <input type="checkbox"/>
HEATING ZONE VALVES	FITTED <input type="checkbox"/>	NOT REQUIRED <input type="checkbox"/>
HOT WATER ZONE VALVES	FITTED <input type="checkbox"/>	NOT REQUIRED <input type="checkbox"/>
THERMOSTATIC RADIATOR VALVES	FITTED <input type="checkbox"/>	
AUTOMATIC BYPASS TO SYSTEM	FITTED <input type="checkbox"/>	NOT REQUIRED <input type="checkbox"/>

FOR ALL BOILERS CONFIRM THE FOLLOWING

THE SYSTEM HAS BEEN FLUSHED IN ACCORDANCE WITH THE BOILER MANUFACTURER'S INSTRUCTIONS?

THE SYSTEM CLEANER USED _____

THE INHIBITOR USED _____

FOR THE CENTRAL HEATING MODE, MEASURE & RECORD

GAS RATE _____ m³/hr _____ ft³/hr

BURNER OPERATING PRESSURE (IF APPLICABLE) N/A _____ mbar

CENTRAL HEATING FLOW TEMPERATURE _____ °C

CENTRAL HEATING RETURN TEMPERATURE _____ °C

FOR COMBINATION BOILERS ONLY

HAS A WATER SCALE REDUCER BEEN FITTED? YES NO

WHAT TYPE OF SCALE REDUCER HAS BEEN FITTED? _____

FOR THE DOMESTIC HOT WATER MODE, MEASURE & RECORD

GAS RATE _____ m³/hr _____ ft³/hr

MAXIMUM BURNER OPERATING PRESSURE (IF APPLICABLE) N/A _____ mbar

COLD WATER INLET TEMPERATURE _____ °C

HOT WATER OUTLET TEMPERATURE _____ °C

WATER FLOW RATE _____ lts/min

FOR CONDENSING BOILERS ONLY CONFIRM THE FOLLOWING

THE CONDENSATE DRAIN HAS BEEN INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS? YES

FOR ALL INSTALLATIONS CONFIRM THE FOLLOWING

THE HEATING AND HOT WATER SYSTEM COMPLIES WITH CURRENT BUILDING REGULATIONS

THE APPLIANCE AND ASSOCIATED EQUIPMENT HAS BEEN INSTALLED AND COMMISSIONED IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS

IF REQUIRED BY THE MANUFACTURER, HAVE YOU RECORDED A CO/CO₂ RATIO READING? N/A YES _____ CO/CO₂ RATIO

THE OPERATION OF THE APPLIANCE AND SYSTEM CONTROLS HAVE BEEN DEMONSTRATED TO THE CUSTOMER

THE MANUFACTURER'S LITERATURE HAS BEEN LEFT WITH THE CUSTOMER

COMMISSIONING ENG'S NAME PRINT _____ CORGI ID No. _____

SIGN _____ DATE _____

SERVICE INTERVAL RECORD

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

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

SERVICE 1 DATE

ENGINEER NAME

COMPANY NAME

TEL No.

CORGI ID CARD SERIAL No.

COMMENTS

SIGNATURE

SERVICE 2 DATE

ENGINEER NAME

COMPANY NAME

TEL No.

CORGI ID CARD SERIAL No.

COMMENTS

SIGNATURE

SERVICE 3 DATE

ENGINEER NAME

COMPANY NAME

TEL No.

CORGI ID CARD SERIAL No.

COMMENTS

SIGNATURE

SERVICE 4 DATE

ENGINEER NAME

COMPANY NAME

TEL No.

CORGI ID CARD SERIAL No.

COMMENTS

SIGNATURE

SERVICE 5 DATE

ENGINEER NAME

COMPANY NAME

TEL No.

CORGI ID CARD SERIAL No.

COMMENTS

SIGNATURE

SERVICE 6 DATE

ENGINEER NAME

COMPANY NAME

TEL No.

CORGI ID CARD SERIAL No.

COMMENTS

SIGNATURE

SERVICE 7 DATE

ENGINEER NAME

COMPANY NAME

TEL No.

CORGI ID CARD SERIAL No.

COMMENTS

SIGNATURE

SERVICE 8 DATE

ENGINEER NAME

COMPANY NAME

TEL No.

CORGI ID CARD SERIAL No.

COMMENTS

SIGNATURE

SERVICE 9 DATE

ENGINEER NAME

COMPANY NAME

TEL No.

CORGI ID CARD SERIAL No.

COMMENTS

SIGNATURE

SERVICE 10 DATE

ENGINEER NAME

COMPANY NAME

TEL No.

CORGI ID CARD SERIAL No.

COMMENTS

SIGNATURE

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