

Installation and maintenance instructions



atmoMAG

MAG ...4/1 Z

BE (de), DE

Publisher/manufacture

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1 Safety

1.1 Action-related warnings

Classification of action-related warnings

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

Warning symbols and signal words



Danger!

Imminent danger to life or risk of severe personal injury



Danger!

Risk of death from electric shock



Warning.

Risk of minor personal injury



Caution.

Risk of material or environmental damage

1.2 Intended use

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

The product is designed for use as a heat generator for hot water generation.

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

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

Intended use includes the following:

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

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

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

Caution.

Improper use of any kind is prohibited.

1.3 General safety information

1.3.1 Risk caused by inadequate qualifications

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

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

1.3.2 Risk of death from escaping gas

What to do if you smell gas in the building:

- ▶ Avoid rooms that smell of gas.
- ▶ If possible, open doors and windows fully and ensure adequate ventilation.
- ▶ Do not use naked flames (e.g. lighters, matches).
- ▶ Do not smoke.
- ▶ Do not use any electrical switches, mains plugs, doorbells, telephones or other communication systems in the building.
- ▶ Close the emergency control valve or the main isolator.
- ▶ If possible, close the gas isolator cock on the product.
- ▶ Warn other occupants in the building by yelling or banging on doors or walls.
- ▶ Leave the building immediately and ensure that others do not enter the building.
- ▶ Alert the police and fire brigade as soon as you are outside the building.



1 Safety



- ▶ Use a telephone outside the building to inform the emergency service department of the gas supply company.

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

Liquid gas accumulates at floor level. If the product is installed below ground level, liquid gas may accumulate at floor level if there are any leaks. In this case, there is a risk of explosion.

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

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

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

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

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

1.3.5 Risk of death due to explosive and flammable materials

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

1.3.6 Risk of poisoning caused by insufficient supply of combustion air

Conditions: Open-flued operation

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

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

Sprays, solvents, chlorinated cleaning agents, paint, adhesives, ammonia compounds, dust or similar substances may lead

to corrosion on the product and in the flue system.

- ▶ Ensure that the supply of combustion air is always free of fluorine, chlorine, sulphur, dust, etc.
- ▶ Ensure that no chemical substances are stored at the installation site.
- ▶ If you are installing the product in hairdressing salons, painter's or joiner's workshops, cleaning businesses or similar locations, choose a separate installation room in which the room air is technically free of chemical substances.
- ▶ Ensure that the combustion air is not routed through chimneys which have previously been used with floor-standing oil-fired boilers, or with other boilers, which could cause soot to build up in the chimney.

1.3.8 Risk of poisoning due to missing flue gas monitoring device

Flue gases may escape into the installation room under unfavourable conditions. If this happens, the flue gas monitoring device switches the heat generator off. If a flue gas monitoring device has not been installed, the heat generator will continue to run.

- ▶ Never decommission the flue gas monitoring device.

1.3.9 Risk of death due to cabinet-type casing

Cabinet-type casing can give rise to dangerous situations when used on a product which is operated with an open flue.

- ▶ Ensure that the product is supplied with sufficient combustion air.

1.3.10 Risk of material damage caused by frost

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

1.3.11 Risk of death due to lack of safety devices

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





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

1.3.12 Risk of being burned or scalded by hot components

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

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

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

1.3.14 Risk of material damage caused by using an unsuitable tool

- ▶ Use the correct tool.

1.4 Regulations (directives, laws, standards)

Applicability: Germany

OR Belgium

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



2 Notes on the documentation

2 Notes on the documentation

2.1 Observing other applicable documents

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

2.2 Storing documents

- ▶ Pass these instructions and all other applicable documents on to the system operator.

2.3 Validity of the instructions

These instructions apply only to:

Product article number

Applicability: Germany

OR Belgium

MAG 114/1 Z(E-BE/FR)	Belgium	0010022555
MAG 114/1 Z(E-DE)	Germany	0010022556
MAG 114/1 Z(LL-DE)	Germany	0010022557
MAG 114/1 Z(P-BE/FR)	Belgium	0010022554
MAG 144/1 Z(E-BE)	Belgium	0010022544
MAG 144/1 Z(E-DE)	Germany	0010022562
MAG 144/1 Z(LL-DE)	Germany	0010022563
MAG 144/1 Z(P-BE)	Belgium	0010022546

3 Product description

3.1 Information on the data plate

The data plate is mounted at the front of the down-draught diverter, under the product casing, at the factory.

Applicability: Belgium

OR Germany

Information on the data plate	Meaning
MAG	Product category
11/14	Power in l/min
-4/1	Chimney connection/product generation
Z	With Piezo ignition
atmoMAG	Product series
Type B11 BS	Approved gas boiler types
Cat I	Single-gas unit
Cat II	Multiple gas type boiler
2E+ (BE) 3P (BE) 2ELL 3P (DE)	Permissible gas categories
G20/25/31	Permitted gas types with connection pressures
P _{nom.}	Maximum heat output
P _{min.}	Minimum heat output
Q _{nom.}	Maximum heat input

Information on the data plate	Meaning
Q _{min.}	Minimum heat input
P _{w max.}	Maximum permissible water pressure
Serial number	7th to 16th digit = product article number

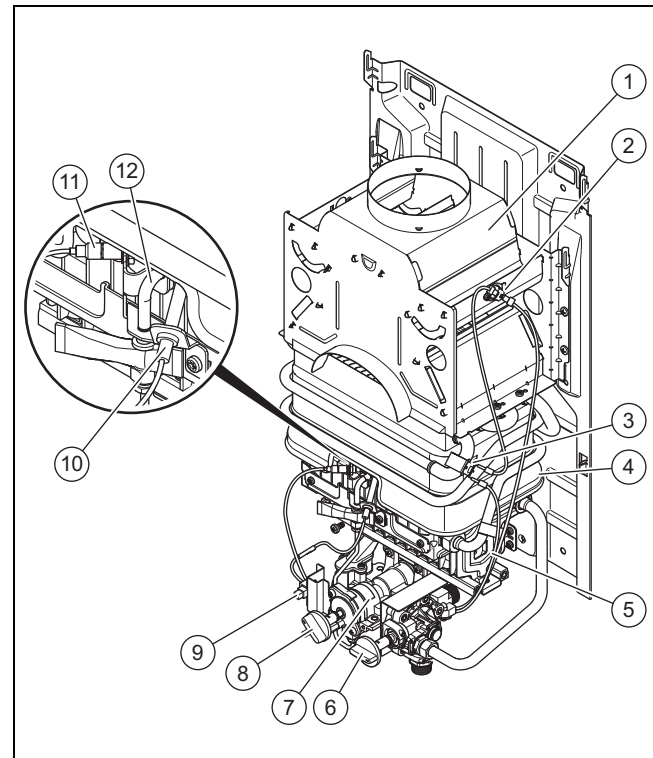
3.2 Product design

Applicability: MAG 114/1 Z(E-BE/FR)

OR MAG 114/1 Z(E-DE)

OR MAG 114/1 Z(LL-DE)

OR MAG 114/1 Z(P-BE/FR)



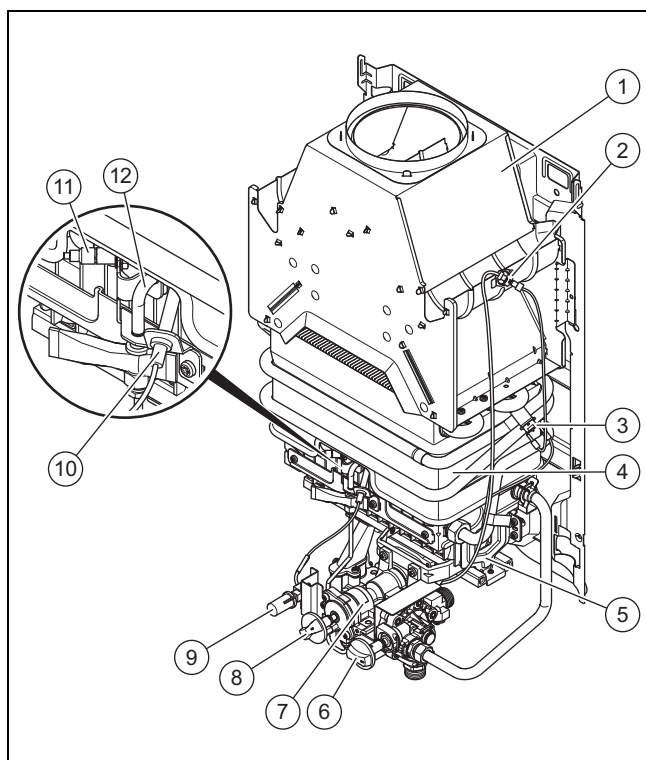
- | | |
|---|-----------------------|
| 1 Down-draught diverter | 7 Gas valve assembly |
| 2 Flue gas sensor | 8 Rotary power switch |
| 3 Safety cut-out | 9 Piezo igniter |
| 4 Heat exchanger | 10 Ignition electrode |
| 5 Burner | 11 Thermocouple |
| 6 Flow rate selector/temperature selector | 12 Pilot burner |

Applicability: MAG 144/1 Z(E-BE)

OR MAG 144/1 Z(E-DE)

OR MAG 144/1 Z(LL-DE)

OR MAG 144/1 Z(P-BE)



- | | |
|---|-----------------------|
| 1 Down-draught diverter | 7 Gas valve assembly |
| 2 Flue gas sensor | 8 Rotary power switch |
| 3 Safety cut-out | 9 Piezo igniter |
| 4 Heat exchanger | 10 Ignition electrode |
| 5 Burner | 11 Thermocouple |
| 6 Flow rate selector/temperature selector | 12 Pilot burner |

3.3 CE label



The CE label shows that the products comply with the basic requirements of the applicable directives as stated on the identification plate.

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

4 Set-up

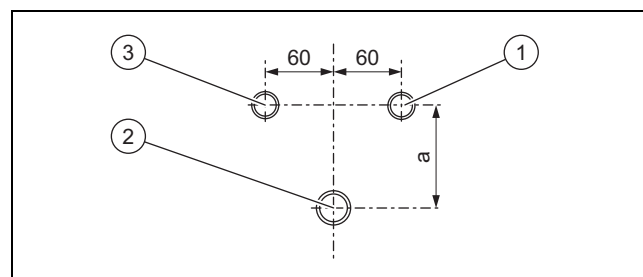
4.1 Checking the scope of delivery

1. Remove the product from its box.
2. Check that the scope of delivery is complete and intact.

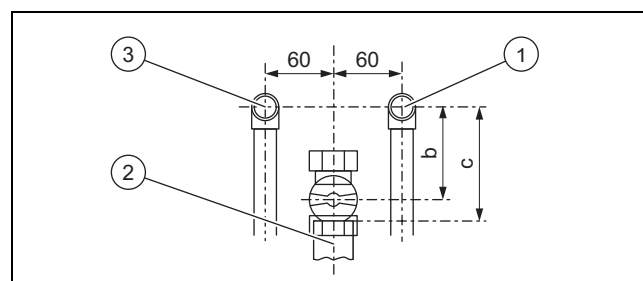
4.1.1 Scope of delivery

Number	Description
1	Gas-fired instantaneous water heater
1	Connection accessories that are included
1	Enclosed documentation

4.2 Wall pre-installation



Flush mounting

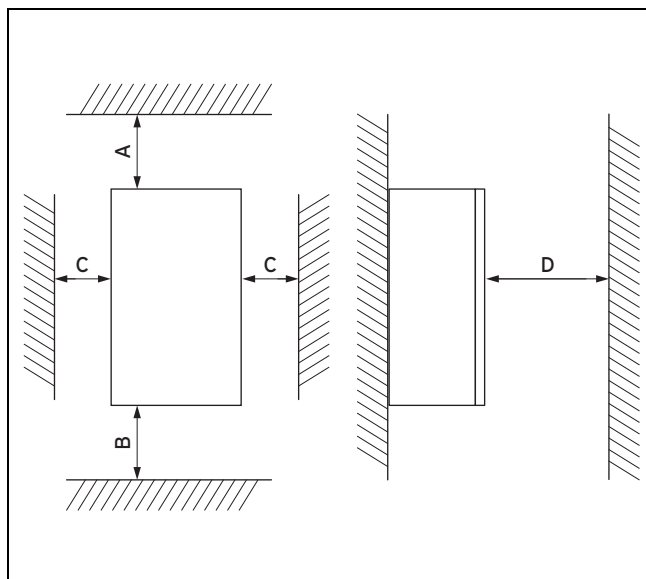


Surface installation

- Install the connections as follows:
 - 1 = Cold water connection R 1/2
 - 2 = Gas connection
 - 3 = R 1/2 hot water connection
- Observe the following clearances for all product types:
 - a = 92 mm
 - b = 85 mm
 - c ≈ 100 mm without thermal isolator device
 - c ≈ 145 mm with thermal isolator device

4 Set-up

4.3 Minimum clearances



	Minimum clearance
A	50 mm
B	180 mm; optimum approx. 250 mm
C	20 mm; optimum approx. 50 mm
D	500 mm in front of the heat generator to enable easy access for maintenance work (may be provided by an opening door).

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

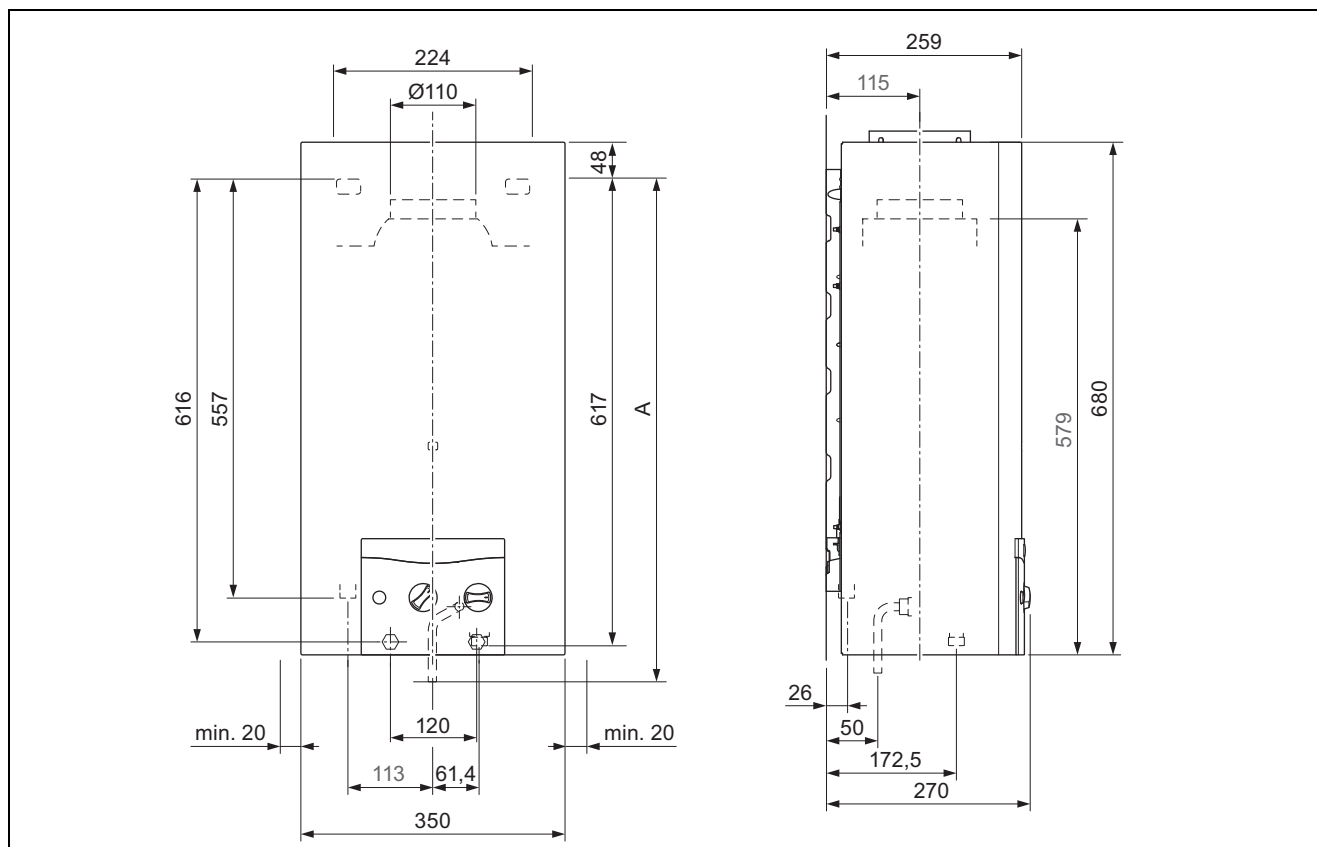
4.4 Dimensions

Applicability: MAG 114/1 Z(E-BE/FR)

OR MAG 114/1 Z(E-DE)

OR MAG 114/1 Z(LL-DE)

OR MAG 114/1 Z(P-BE/FR)



Height, dimension A

	Germany	Belgium
MAG 114/1 Z(E-BE/FR)		658 mm
MAG 114/1 Z(E-DE)	658 mm	
MAG 114/1 Z(LL-DE)	658 mm	
MAG 114/1 Z(P-BE/FR)		616 mm
MAG 144/1 Z(E-BE)		658 mm
MAG 144/1 Z(P-BE)		616 mm
MAG 144/1 Z(E-DE)	658 mm	
MAG 144/1 Z(LL-DE)	658 mm	

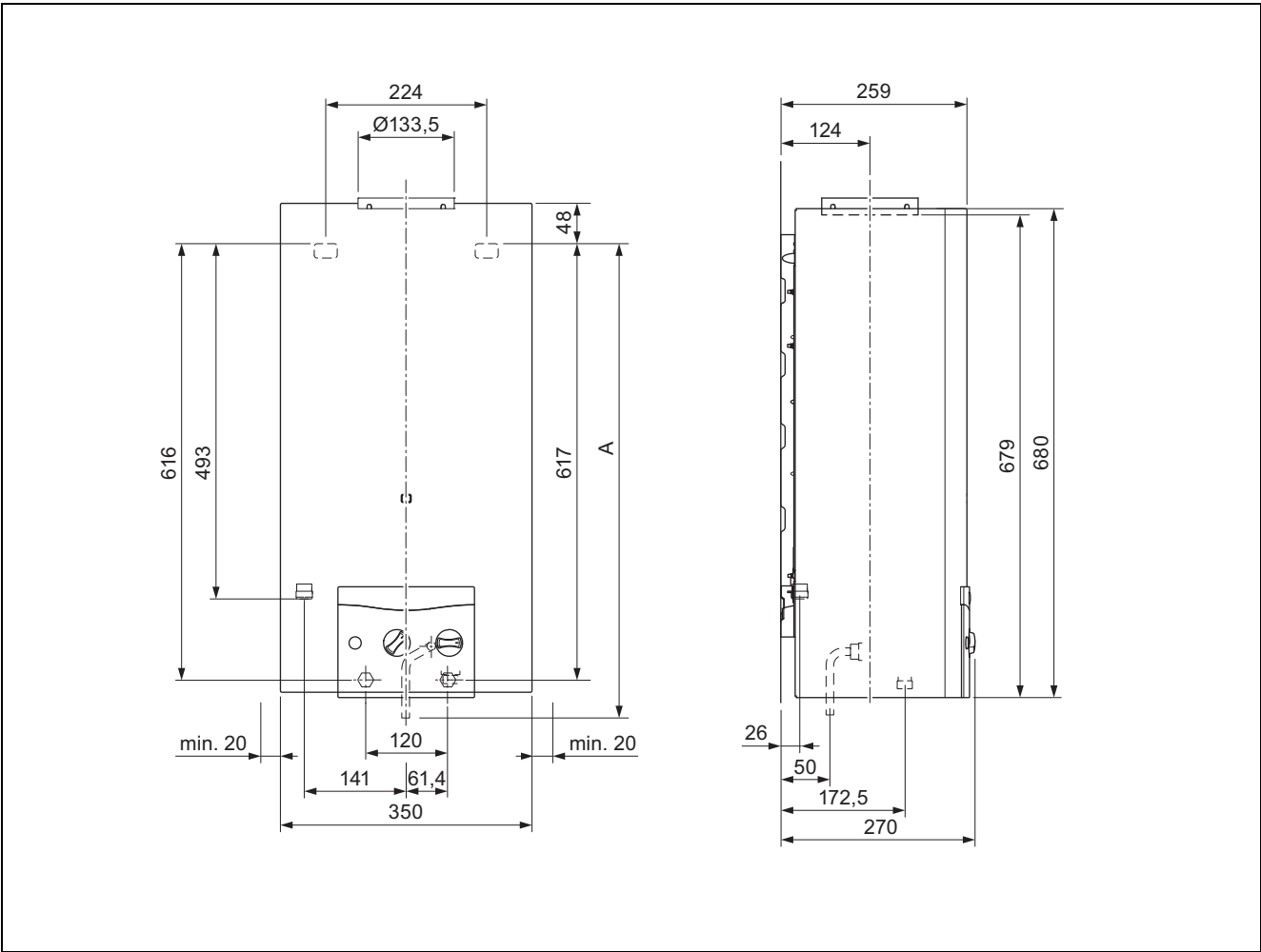
4 Set-up

Applicability: MAG 144/1 Z(E-BE)

OR MAG 144/1 Z(E-DE)

OR MAG 144/1 Z(LL-DE)

OR MAG 144/1 Z(P-BE)



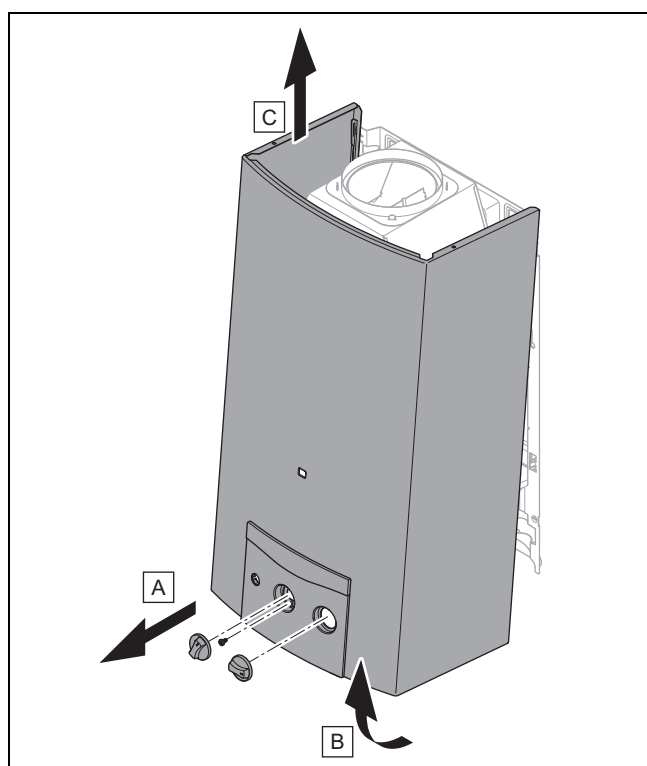
Height, dimension A

	Germany	Belgium
MAG 114/1 Z(E-BE/FR)		658 mm
MAG 114/1 Z(E-DE)	658 mm	
MAG 114/1 Z(LL-DE)	658 mm	
MAG 114/1 Z(P-BE/FR)		616 mm
MAG 144/1 Z(E-BE)		658 mm
MAG 144/1 Z(P-BE)		616 mm
MAG 144/1 Z(E-DE)	658 mm	
MAG 144/1 Z(LL-DE)	658 mm	

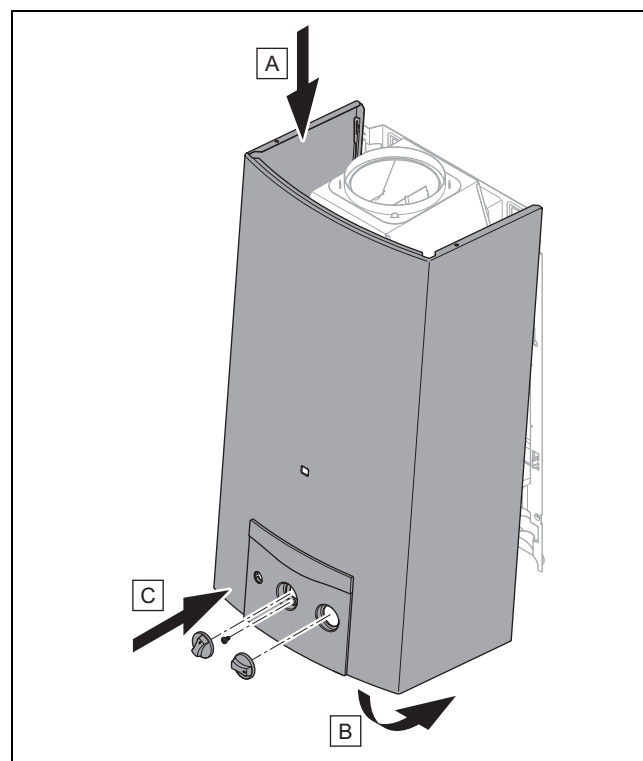
4.5 Requirements for the installation site

- ▶ Select the installation site so that the pipes can be easily routed (gas supply, water supply and drain).
- ▶ Do not install the product above an appliance whose use may damage the gas-fired instantaneous water heater (e.g. above a cooker that can emit grease vapours).
- ▶ Heat-insulate the wall on which you want to install the product if the wall is made of a combustible material, such as wood, so that the minimum clearance between the hot back panel of the product and the wall is complied with.
- ▶ Do not install the product in closed rooms.

4.6 Removing the product casing



4.7 Installing the product casing



4.8 Wall-mounting the product

1. Check the load-bearing capacity of the wall.
2. Note the total weight of the product.
3. Only use fixing material that is permitted for the wall.
4. If required, ensure that mounting apparatus on-site has sufficient load-bearing capacity.
5. Wall-mount the product as described.
6. Drill the holes for the fixing screws while taking into consideration the dimensions.
7. To secure the product, depending on the installation site, use wall anchors, hooks, bolts or threaded bolts as the fixing material.
8. Use suitable fixing material to install the back wall of the unit to the wall.

5 Installation



Danger!
Risk of scalding and/or damage due to incorrect installation leading to escaping water.

Stresses in supply lines can cause leaks.

- ▶ Install the supply lines so that they are free from mechanical stress.
- ▶ If you use plastic supply lines for the domestic hot and cold water connection, these must withstand temperatures up to 95 °C and pressures up to 1.3 MPa (13 bar).

5 Installation



Caution.

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

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

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

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

5.1 Information on liquid gas operation

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

Applicability: Except Belgium

If you have a product that has been preset for operation with natural gas, you must convert it to run on liquid gas. You will need a conversion set for this. The conversion procedure is described in the instructions supplied with the conversion set.

5.2 Purging the liquid gas tank

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

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

5.3 Using the correct gas type

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

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

5.4 Integration into a solar system

The inlet temperature must not exceed 45 °C.

The hot water temperature must not exceed 60 °C.

- ▶ Install thermostatic 3-way valves.

5.5 Sequence for installing the connection

1. Install the domestic hot water connection.
2. Install the cold water connection.
3. Install the gas connection.

5.5.1 Descaling the water

The probability of scale increases as the water temperature increases.

- ▶ Descale the water as required.

5.5.2 Installing the domestic hot and cold water connection



Warning.

Risk of adverse health effects caused by impurities in the potable water.

Sealing residues, dirt or other residues in the pipelines may adversely affect the quality of the potable water.

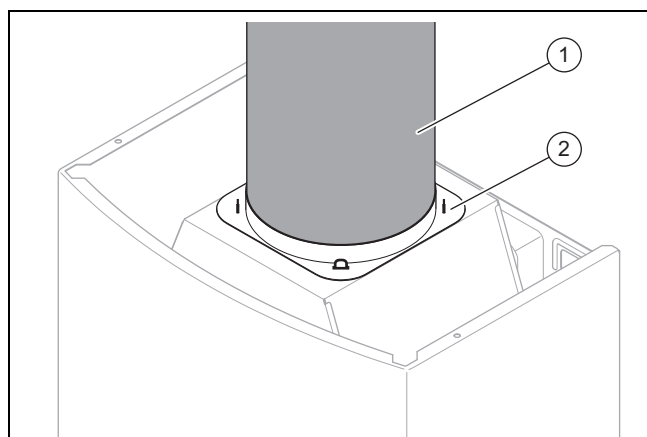
- ▶ Flush all of the hot and cold water pipes thoroughly before you install the product.

- ▶ Make the water connections in accordance with the relevant standards.

5.5.3 Installing the gas connection

- ▶ Install the gas pipe in accordance with the recognised rules of technology.
- ▶ Connect the product to the gas pipe in accordance with the recognised rules of technology.
- ▶ Remove the residues from the gas pipe by blowing through the gas pipe beforehand.
- ▶ Purge the gas pipe before start-up.
- ▶ Check the entire gas supply properly for leak-tightness.

5.6 Connecting the flue pipe



- Use a flue pipe with the diameter that is specified in the technical data to connect the product to a flue system that has a natural draught (hearth).
- Insert the flue pipe (1) into the flue pipe connection (2) on the down-draught diverter.

6 Start-up

6.1 Carrying out the initial start-up

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

- Remove the product casing (→ Page 11).
- When starting up the unit, proceed in accordance with the attached checklist.
Commissioning checklist (→ Page 21)

6.2 Gas conversion

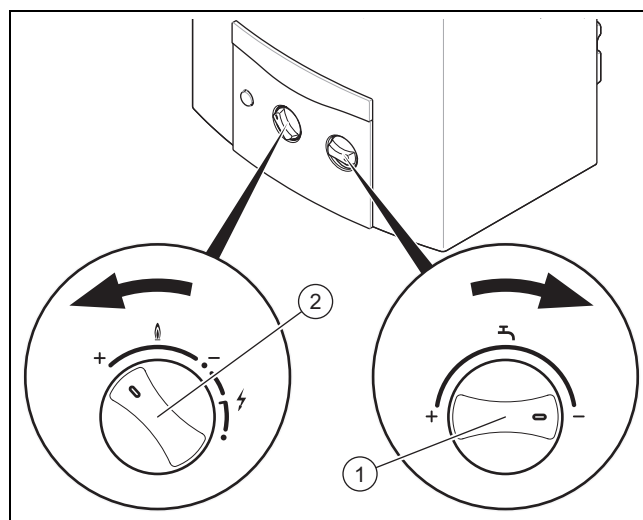
Applicability: Except Belgium

1. Observe the applicable national regulations.
2. To convert the gas, use only Vaillant conversion sets or Vaillant spare parts.
3. Follow the instructions contained in the documentation that is supplied with the conversion sets or spare parts.

6.3 Checking that the flue gas sensor works correctly

If the flue system is fully or partially blocked or the local air pressure conditions restrict the smooth flue system, the flue gas sensor registers an increase in temperature and interrupts the gas supply.

Check that the flue gas sensor is working correctly, as described below.



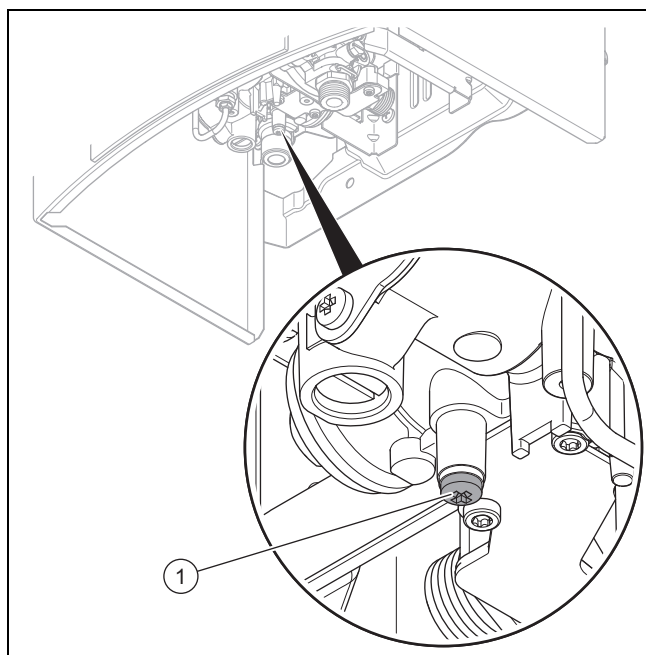
- Start up the product with the product casing attached.
- Turn the temperature selector (1) clockwise as far as it goes and turn the rotary power switch (2) anti-clockwise as far as it goes in order to set the lowest water volume and the maximum gas volume.
- Open a hot water tap.
- Ensure that the water pressure is at least 0.13 MPa (1.3 bar) during the test.
- Operate the product until a steady state is reached (approx. 10 minutes).
- Block off the flue gas route with a Vaillant flue gas restrictor, for example. Also observe the documentation enclosed with the flue gas restrictors.
 - ◁ The flue gas sensor must automatically interrupt the gas supply within two minutes.
- Close the hot water tap.
- Allow the flue gas sensor to cool for at least 15 minutes.
- Start up the product again.
- If the start-up does not work or the product is repeatedly blocked by a safety device, check the product or contact Vaillant Customer Service.
- In this case, shut down the product.

7 Eliminating the fault

6.4 Checking the gas flow pressure

Applicability: Germany

OR Belgium



- ▶ Close the gas stopcock.
- ▶ Unscrew the sealing screw (1) from the test nipple on the gas valve assembly.
- ▶ Remove the seal.
- ▶ Connect a manometer to the test nipple on the gas valve assembly.
- ▶ Open the gas stopcock.
- ▶ Start up the product in accordance with the operating instructions and draw off domestic hot water.
- ▶ Measure the gas flow pressure.

Applicability: Germany

Gas family	Permissible gas flow pressure
Natural gas	
G20	1.7–2.5 kPa (17–25 mbar)
G25	1.8–2.5 kPa (18–25 mbar)
Liquid gas	
G31	4.25–5.75 kPa (42.5–57.5 mbar)

Applicability: Belgium

Gas family	Permissible gas flow pressure
Natural gas	
G20	1.7–2.5 kPa (17–25 mbar)
G25	2.0–3.0 kPa (20–30 mbar)
Liquid gas	
G31	2.5–4.5 kPa (25–45 mbar)

Conditions: Gas connection pressure not in the permissible range



Danger!

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

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

- ▶ Do not make any adjustments to the product.
 - ▶ Check the gas installation.
 - ▶ Do not start up the product.
-
- ▶ If you are unable to remedy the fault, contact the gas supply company.
 - ▶ Close the gas stopcock.
 - ▶ Remove the pressure gauge.
 - ▶ Position the seal on the sealing screw.
 - ▶ Screw the sealing screw (1) into the test nipple on the gas valve assembly again.
 - ▶ Open the gas stopcock.
 - ▶ Check the test nipple for gas tightness.

6.5 Checking leak-tightness

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

6.6 Handing the product over to the operator

1. Explain to the operator how the safety devices work and where they are located.
2. Inform the operator how to handle the product. Answer any questions the operator may have.
3. Draw special attention to the safety instructions which the operator must follow.
4. Inform the operator of the necessity to have the product maintained according to the specified intervals.
5. Pass all of the instructions and documentation for the product to the operator for safe-keeping.
6. Inform the operator about measures taken to ensure the supply of combustion air and flue gas guiding, and instruct the operator that he must not make any changes.

7 Eliminating the fault

- ▶ Use the table that is included in the appendix to eliminate the fault.
- ▶ After each time you eliminate a fault, check that the flue gas sensor is working without any problems.
- ▶ If you are unable to eliminate the fault, contact Vaillant Customer Service.

8 Inspection and maintenance

- ▶ Adhere to the minimum inspection and maintenance intervals. The inspection may require maintenance to be

carried out earlier, depending on the results. You can find the inspection and maintenance work table in the appendix.

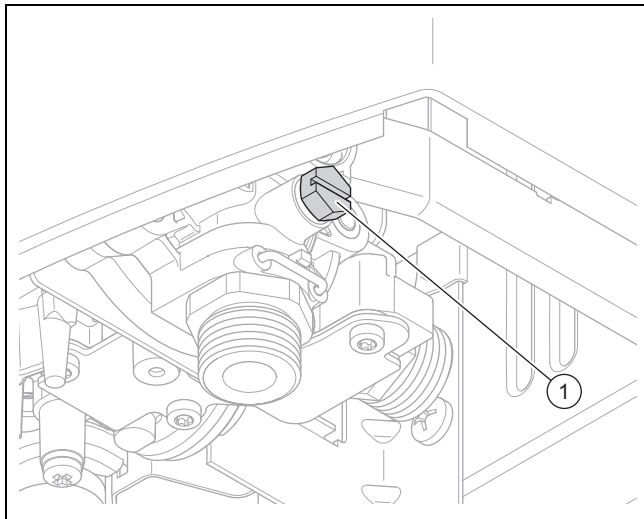
8.1 Procuring spare parts

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

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

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

8.2 Draining the product



1. Close the gas isolation valve and the isolation valve upstream of the cold water inlet.
2. Loosen the drain screw (1) and the sealing ring for the draining.
3. Open all of the hot water taps that are connected to the product so that the product and lines drain until they are completely empty.

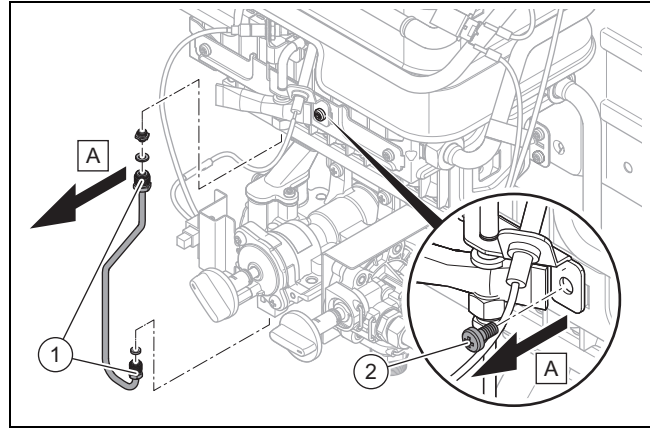
8.3 Removing the ignition electrode and ignition gas filter



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

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

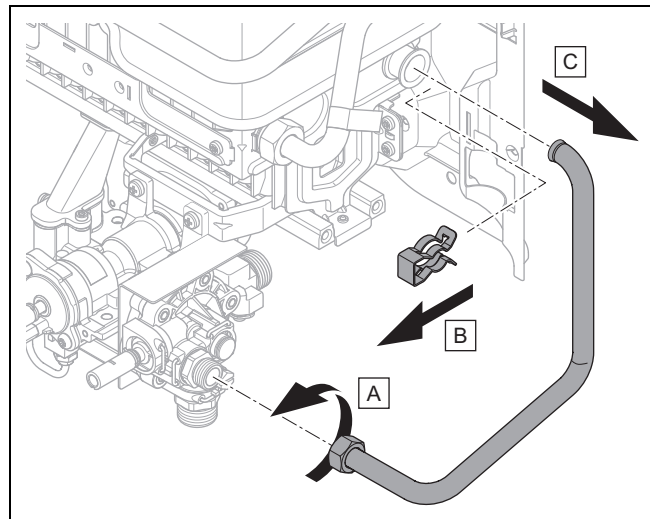
- Only carry out work on these components once they have cooled down.



1. Unscrew the nuts (1) from the ignition gas pipe.
2. Carefully remove the ignition gas pipe.
3. Unscrew the bolt (2) for securing the ignition gas fitting to the burner and remove the ignition gas fitting.

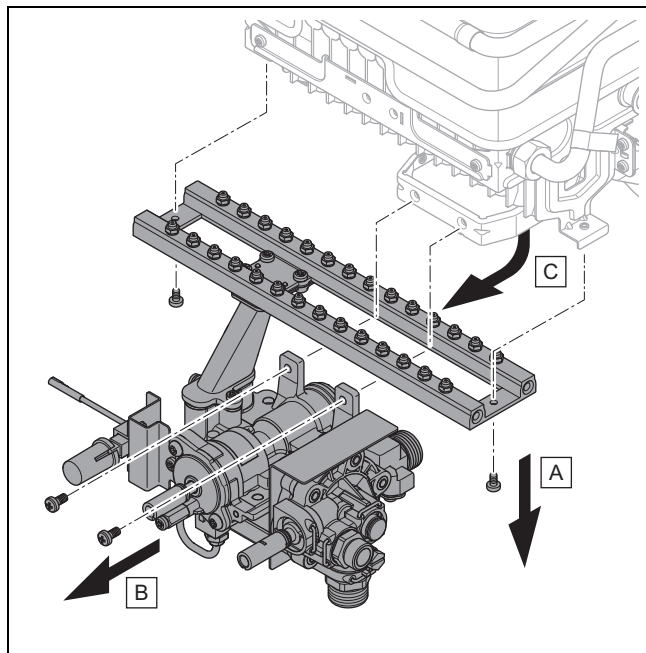
8.4 Removing the burner

1. Drain the product.
2. Remove the cold water connection from the product.
3. Remove the gas connection from the product.

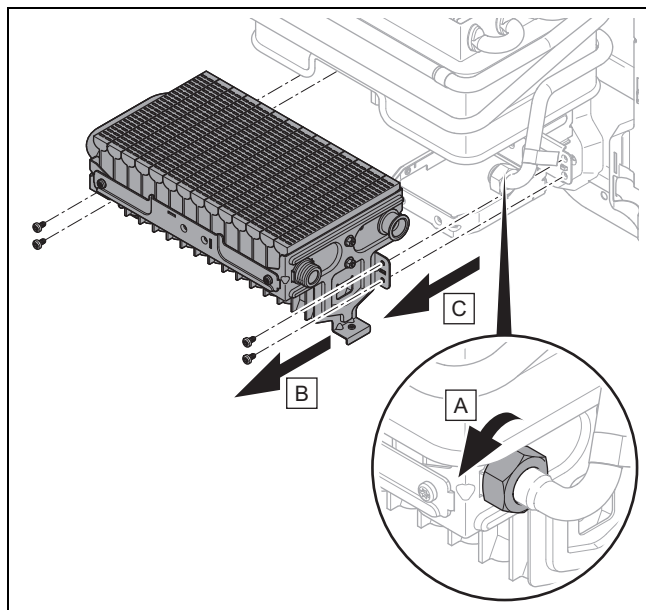


4. Unscrew the union nuts from the water valve. Remove the clip from the cold water connection on the burner.
5. Remove the pipe from the water valve and pull it out of the cold water connection on the burner.

8 Inspection and maintenance



6. Remove the two screws from the injector rail.
7. Remove the two screws from the gas valve assembly.
8. Remove the gas valve assembly together with the water valve.

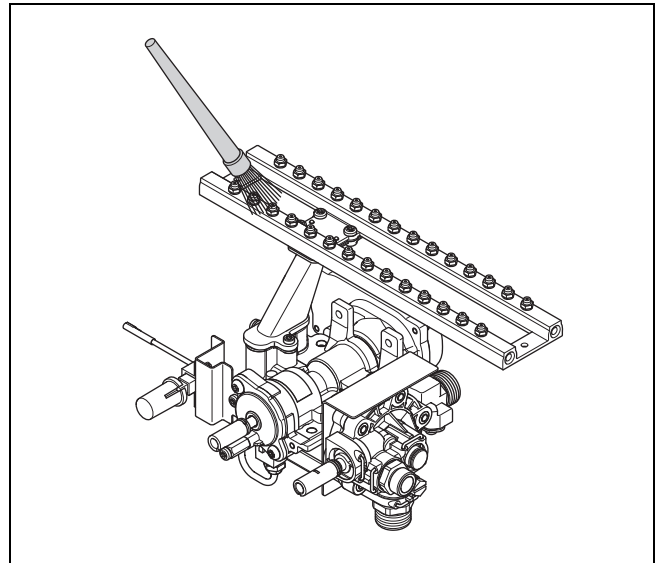


9. Unscrew the union nuts from the water connection for the heat exchanger on the burner.
10. Remove four screws.
11. Raise the burner slightly and carefully pull the burner forwards and out.

8.5 Cleaning the burner

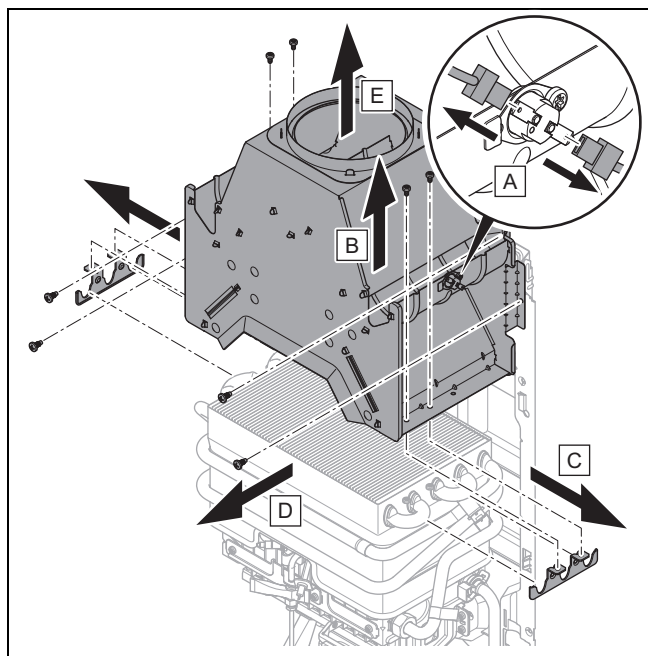
1. Use a brass wire-brush to carefully remove combustion residues from the burner without damaging the burner.
2. Clean the jets, injectors and burner rails with a soft brush and blow out any dust or dirt outside the installation room from the outside to the inside using compressed air.
3. If the burner is extremely dirty, clean it with soapy water and rinse it thoroughly with clean water.

8.6 Cleaning the injector rail



1. Check the components of the injector rail for dirt and damage. You must never remove the burner jets.
2. Clean the dirty components using a soft brush (leaving the installation room to do so), and replace any damaged components if required.
3. Check whether the burner jets are blocked. If a jet is blocked, carefully remove the blockage without damaging this jet.

8.7 Removing the down-draught diverter

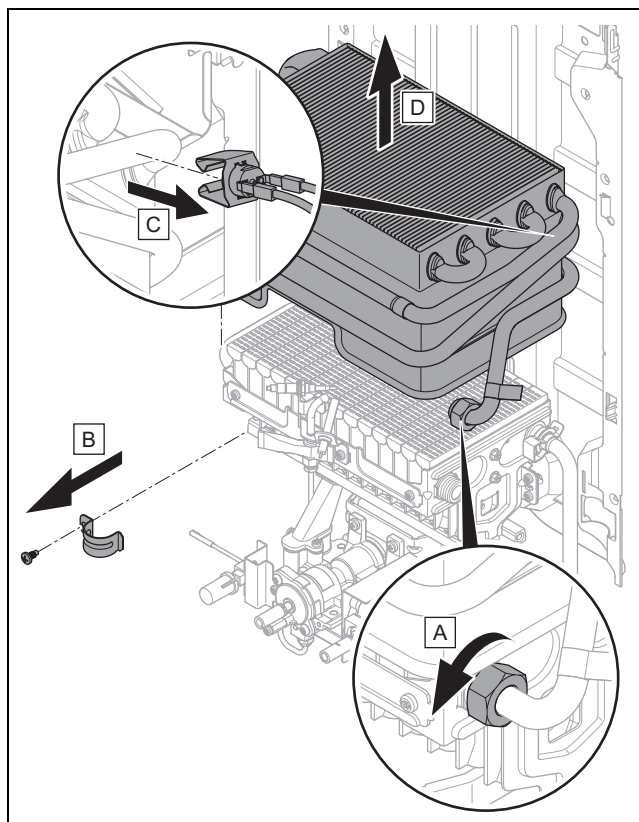


1. Remove the cables from the flue gas sensor.
2. Remove two screws each from the fixing plates on the heat exchanger.
3. Remove two screws each for securing the down-draught diverter on the back panel of the product.
4. Pull out the down-draught diverter.

8.8 Cleaning the down-draught diverter

1. Remove the down-draught diverter. (→ Page 17)
2. Blow any dust and dirt out of the slits in the down-draught diverter. Use a soft brush to remove any dust and greasy dirt from the outside of the down-draught diverter. Only use water if the flue gas sensor has been removed.

8.9 Removing the heat exchanger



Caution.

Risk of material damage caused by damage to the heat exchanger.

Damage that occurs when installing and removing the heat exchanger leads to premature wear.

- When installing or removing the heat exchanger, ensure that it does not become damaged or bent out of shape.
- Remove the heat exchanger in the specified sequence.

1. Unscrew the union nuts from the domestic hot water connection on the heat exchanger.
2. Unscrew the screw from the clamp for securing the domestic hot water outlet.
3. Remove the safety cut-out that is secured using a clip on a pipe to the right on the heat exchanger.
4. Remove the heat exchanger.

8 Inspection and maintenance

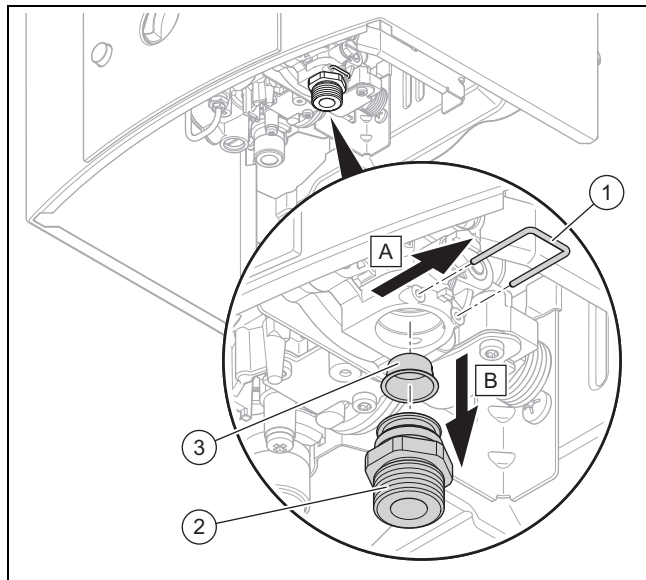
8.10 Cleaning the heat exchanger

1. Use a spray of water to rinse through the fins of the heat exchanger.
2. Use a soft brush to remove the heavier soiling on the fins of the heat exchanger.
 - Ensure that you do not bend the fins on the heat exchanger.
3. If required/necessary, remove any grease and dust by adding a fat-dissolving cleaning agent to a container of hot water.
4. Use a commercial descaler to remove any limescale, while taking into consideration the corresponding documentation.
5. Rinse the heat exchanger under running water.

8.11 Repairing any damage to the coating of the heat exchanger

1. Use a Supral pen to repair minor damage to the heat exchanger coating.
2. Ensure that the damaged area is free from deposits and greasy residues.
3. Shake the Supral pen vigorously before use.
4. Apply the coating material thinly and evenly.

8.12 Checking the water valve



1. Remove the cold water connection line from the cold water connection (2).
2. Visually check the cold water strainer (3) that is downstream of the cold water connection for dirt and scale.
3. If the cold water strainer is dirty or calcified, remove the clamp (1) and pull out the cold water connection.
4. Remove the cold water strainer from the cold water connection and clean the cold water strainer.
5. Reinsert the cold water strainer into the cold water connection.
6. Reinsert the cold water connection into the product's retainer and secure the clip.
7. Secure the cold water connection line to the cold water connection again.
8. Check whether the temperature selector spindle can be turned. Otherwise, loosen the clamps on the temperat-

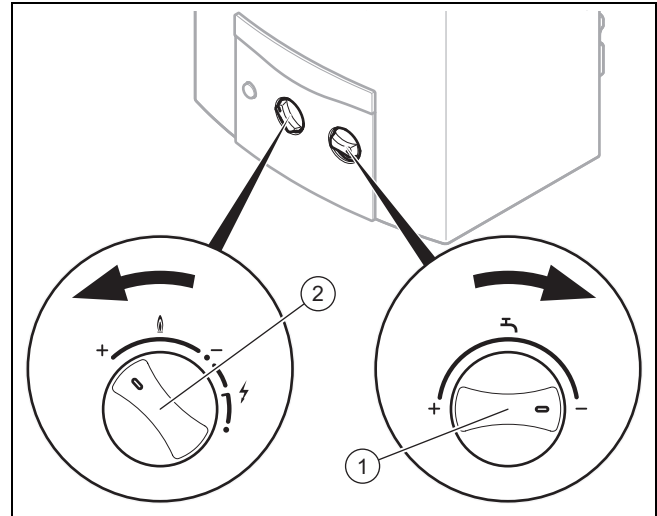
ure selector spindle, remove these and clean the temperature selector spindle.

9. Check the stuffing box for tightness. If a stuffing box is leaking, replace the water valve.

8.13 Checking the heat input

- ▶ Check the heat input either by reading off the gas flow values at the counter (volumetric method) or by checking the burner pressure (burner pressure test method).

Volumetric method



- ▶ When carrying out the check, ensure that no additional gases (e.g. mixtures of liquid gas and air) are fed in to cover the peak demand. Contact the responsible gas supply company for this.
- ▶ Ensure that no other gas-fired boilers are operated during the check.
- ▶ Start up the product.
- ▶ Turn the temperature selector (1) clockwise as far as it will go in order to reduce the water volume and set the maximum water temperature.
- ▶ Turn the rotary power switch (2) as far as it will go anti-clockwise to set the maximum product output.
- ▶ Determine the required gas flow value at nominal heat input in accordance with the tables of gas settings in the appendix.
- ▶ Note down the gas meter reading.
- ▶ Draw off domestic hot water with the water tap fully open to enable the nominal water volume to flow (→ Technical data).
- ▶ After approx. five minutes of the product running in continuous operation, read off the gas flow value at the meter and compare this with the gas flow value at nominal heat input in the tables of gas settings in the appendix.



Note

Deviations of $\pm 5\%$ are permitted.

Conditions: The deviation is greater than $\pm 5\%$

- ▶ Check whether the correct burner jets have been used in the injector rail for the burner by comparing the labels on the burner jets with the specifications in the tables of gas settings in the appendix.
- ▶ If incorrect burner jets have been used, contact Customer Service. Do not start up the product.
- ▶ If the correct burner jets are being used, continue with the following steps.
- ▶ Remove the burner. (→ Page 15)
- ▶ Clean the burner. (→ Page 16)
- ▶ Refit the burner assembly in the reverse order.
- ▶ Repeat the check of the heat input.

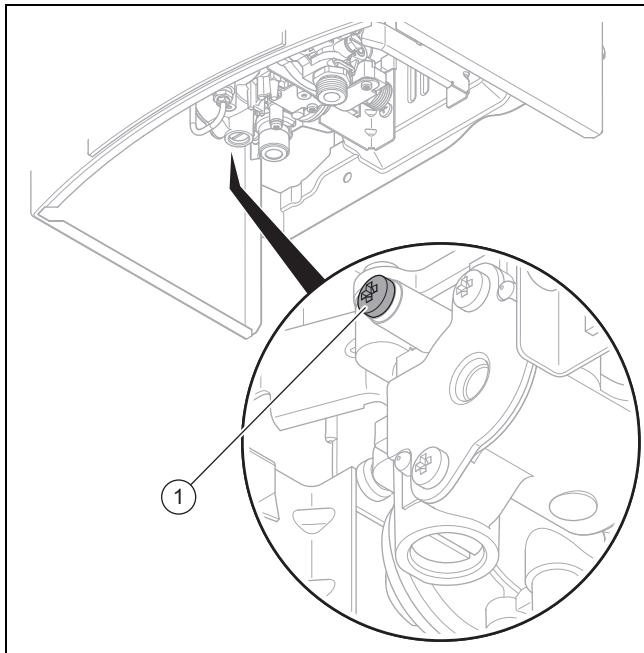
Applicability: Except Belgium

- ▶ If the deviation continues to be greater than $\pm 5\%$, adjust the maximum heat input (→ Page 19).

Applicability: Belgium

- ▶ If the deviation continues to be greater than $\pm 5\%$, check the heat input (→ Page 20).

Burner pressure test method



- ▶ Unscrew the sealing screw from the test nipple (1) for the burner pressure.
- ▶ Remove the seal.
- ▶ Connect a manometer (resolution at least 0.1 bar).
- ▶ Start up the product.
- ▶ Turn the temperature selector clockwise as far as it will go in order to reduce the water volume and set the maximum water temperature.
- ▶ Turn the rotary power switch as far as it will go anti-clockwise to set the maximum product output.
- ▶ Draw off domestic hot water with the water tap fully open to enable the nominal water volume to flow (→ Technical data).
- ▶ Look up the required burner pressure in the tables of gas settings in the appendix and compare the value with the corresponding value in the table.



Note

Deviations of $\pm 10\%$ are permitted.

- ▶ Remove the manometer.
- ▶ Place the sealing screw and the seal on the test nipple, tighten the sealing screw and check that it is leak-tight.

Conditions: The deviation is greater than $\pm 10\%$

- ▶ Check whether the correct burner jets have been used in the injector rail for the burner by comparing the labels on the burner jets with the specifications in the tables of gas settings in the appendix.
- ▶ If incorrect burner jets have been used, contact Customer Service. Do not start up the product.
- ▶ If the correct burner jets are being used, continue with the following steps.
- ▶ Remove the burner. (→ Page 15)
- ▶ Clean the burner. (→ Page 16)
- ▶ Refit the burner assembly in the reverse order.
- ▶ Repeat the check of the heat input.

Applicability: Except Belgium

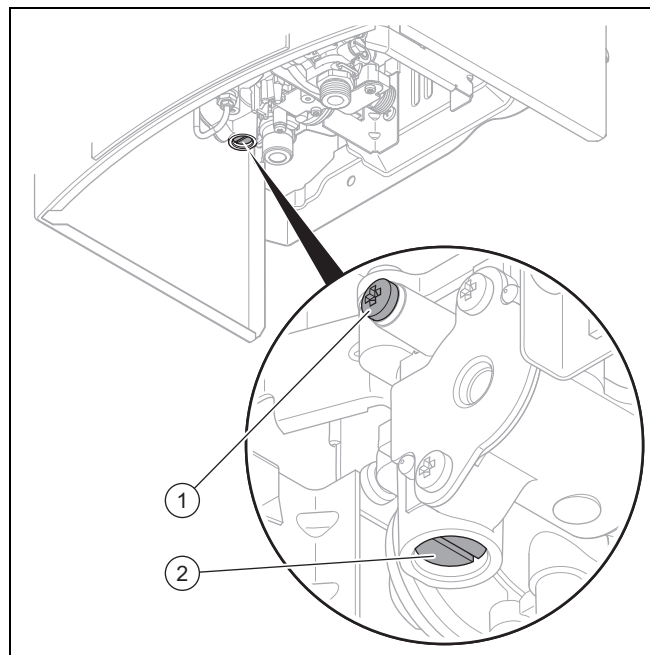
- ▶ If the deviation continues to be greater than $\pm 10\%$, adjust the maximum heat input (→ Page 19).

Applicability: Belgium

- ▶ If the deviation continues to be greater than $\pm 10\%$, check the maximum heat input (→ Page 20).

8.14 Setting the maximum heat input

Applicability: Except Belgium



1. Turn the temperature selector clockwise as far as it will go in order to reduce the water volume and set the maximum water temperature.
2. Turn the rotary power switch as far as it will go anti-clockwise to set the maximum product output.

9 Decommissioning

3. Unscrew the sealing screw from the test nipple (1) for the burner pressure.
4. Connect a U-tube manometer (resolution at least 0.1 bar).



Caution.

Risk of a gas leak

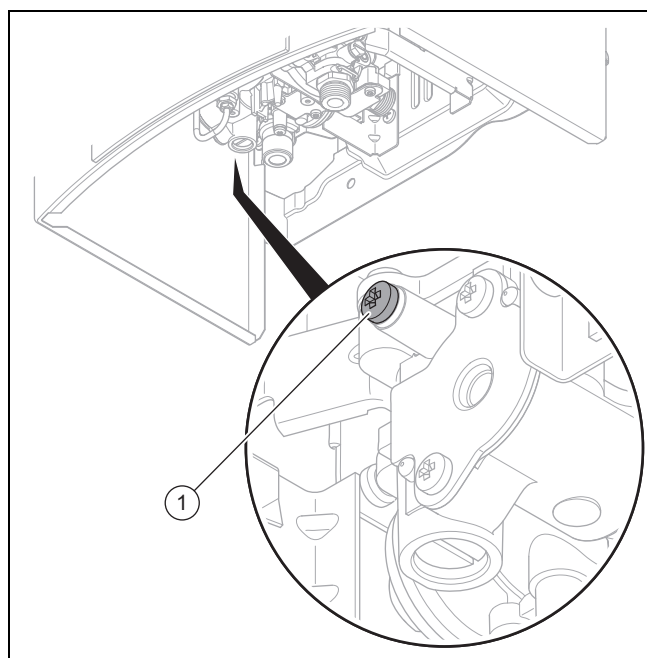
The adjusting screw seals the gas valve assembly in the housing.

- ▶ Never fully unscrew the adjusting screw.

5. Use a flat-blade screwdriver to set the maximum heat input on the adjusting screw (2).
6. Read off the value for the maximum heat input on the U-tube manometer.
7. If you are unable to set the correct values in accordance with the tables of gas settings in the appendix, do not start up the product. Report this to customer service.
8. Remove the U-tube manometer.
9. Place the sealing screw and the seal on the test nipple, tighten the sealing screw and check that it is leak-tight.

8.15 Checking the maximum heat input

Applicability: Belgium



1. Turn the temperature selector clockwise as far as it will go in order to reduce the water volume and set the maximum water temperature.
2. Turn the rotary power switch as far as it will go anti-clockwise to set the maximum product output.
3. Unscrew the sealing screw from the test nipple (1) for the burner pressure.
4. Connect a U-tube manometer (resolution at least 0.1 bar).
5. Read off the value for the heat input on the U-tube manometer.

6. If the measured values do not match the values in the tables of gas settings in the appendix, do not start up the product. Report this to Vaillant Customer Service.
7. Remove the U-tube manometer.
8. Place the sealing screw and the seal on the test nipple, tighten the sealing screw and check that it is leak-tight.

8.16 Completing inspection and maintenance work

- ▶ Install all of the components in reverse order.
- ▶ Install the product casing (→ Page 11).
- ▶ Start up the product.
- ▶ Check that all control, regulation and monitoring devices and, in particular, the flue gas sensor (→ Page 13) are working properly.
- ▶ Check that the product and the flue system are leak-tight.
- ▶ Log all maintenance work that is carried out.

8.17 Checking the product for leak-tightness

- ▶ Check that the product is leak-tight. (→ Page 14)

9 Decommissioning

- ▶ Close the gas isolator cock.
- ▶ Close the cold water stop valve.
- ▶ Drain the product. (→ Page 15)

10 Recycling and disposal

Disposing of the packaging

- ▶ Dispose of the packaging correctly.
- ▶ Observe all relevant regulations.

11 Customer service

Applicability: Belgium

N.V. Vaillant S.A.
Golden Hopestraat 15
B-1620 Drogenbos
Belgien, Belgique, België

Kundendienst / Service après-vente / Klantendienst:
2 3349352

Applicability: Germany

Auftragsannahme Vaillant Kundendienst: 021 91 5767901

Appendix

A Commissioning checklist

No.	Procedure	Comment	Required tool
1	Starting up the product		
2	Checking that the flue gas sensor works correctly	See section "Checking that the flue gas sensor works correctly".	Vaillant flue gas restrictor
3	Check the entire gas route for tightness	Use leak detection spray or a leak detector.	Leak detection spray/leak detector
4	Check the entire water route for tightness	Carry out a visual check.	
5	Measuring the chimney draught	The maximum draught must not exceed 15 Pa. If the draught is too great, the chimney draught must be restricted using suitable measures.	Analyser for chimney draught
6	Checking combustion	Check for flue gas exit. Target value for nominal heat input: Only carry out the measurement after ten minutes of normal operation. – Natural gas: CO 200 ppm Liquefied petroleum gas: CO 300 ppm	Dew point hygrometer CO analyser
7	Checking the gas flow pressure	See section "Checking the gas flow pressure".	U-tube or digital manometer
8	Setting the domestic hot water function		
9	Handing over the operating instructions to the customer		
10	Stick the sticker "Read the operating instructions" on the front of the product, in the language spoken by the end user		

B Troubleshooting

Symptom	Possible cause	Measure
The product cannot be started up. The ignition flame does not ignite.	The gas supply is interrupted.	1. Secure the gas supply. 2. For liquefied petroleum gas: Replace an empty gas cylinder with a full one. 3. Ensure that the isolation valve on the gas connection is open.
	There is air in the gas supply line.	► Open and close the water tap several times in order to remove air from the gas supply.
	The Piezo igniter is defective.	► Replace the entire thermocouple.
	The safety cut-out or flue gas sensor is defective.	1. Check the safety cut-out and flue gas sensor. 2. Replace the defective component.
The ignition flame goes out after the rotary power switch is released.	The safety cut-out has been triggered or is defective.	► Replace the entire thermocouple.
	The flue gas sensor is defective.	► Replace the entire thermocouple.
	The thermoelectric voltage is insufficient.	► Replace the entire thermocouple.
The ignition flame is burning but the product does not start up.	The cold-water isolation valve is closed.	► Ensure that the cold-water isolation valve is open.
	The strainer in the cold water inlet is dirty.	► If required, clean the strainer in the cold water inlet.
The product switches off during operation.	Incorrect installation of the flue gas guiding (flue pipe is too short).	► Check that the flue system has been installed correctly and that there are no problems with the flue system.
	The flue gas guiding is restricted, which causes overheating (flue pipe is blocked).	► Check that the flue system has been installed correctly and that there are no problems with the flue system.

Appendix

Symptom	Possible cause	Measure
The product switches off during operation.	Cable break or short circuit in the cable on the safety cut-out or flue gas sensor.	► Check how the cables are laid.
	The safety cut-out or flue gas sensor is defective.	1. Check the safety cut-out and flue gas sensor. 2. Replace the defective component.

C Tables of gas settings

Applicability: Germany

Factory gas ratio setting

Unit type for	Natural gases				Liquefied petroleum gases	
Label on the data plate	2E G20 – 2 kPa (20 mbar)		2LL G25 – 2 kPa (20 mbar)		3P G31 – 5 kPa (50 mbar)	
Factory setting	G20		G25		G31	
	11-4/1	14-4/1	11-4/1	14-4/1	11-4/1	14-4/1
Burner jets label	085	085	100	102	050	051
Pilot burner jet label	0.25	0.25	0.3	0.3	0.18	0.18

Gas flow

Gas family	Gas flow at nominal heat input in l/min	
	11-4/1	14-4/1
Natural gas 2E (G20)	38.3	48.7
Natural gas 2LL (G25)	44.5	56.0
Liquid gas 3P (G31)	14.8	18.8

Burner pressure

Gas family	Burner pressure for nominal heat input	
	11-4/1	14-4/1
Natural gas 2E (G20)	1.12 kPa (11.2 mbar)	1.38 kPa (13.8 mbar)
Natural gas 2LL (G25)	0.97 kPa (9.7 mbar)	1.05 kPa (10.5 mbar)
Liquid gas 3P (G31)	3.17 kPa (31.7 mbar)	3.45 kPa (34.5 mbar)

D Tables of gas settings

Applicability: Belgium

Factory gas setting

Unit type for	Natural gases		Liquefied petroleum gases	
Label on the data plate	2E+ G20/G25 – 2.0–2.5 kPa (20–25 mbar)		3P G31 – 3.7 kPa (37 mbar)	
Factory setting	G20		G31	
	11-4/1	14-4/1	11-4/1	14-4/1
Burner jets label	085	085	050	051
Pilot burner jet label	0.25	0.25	0.18	0.18

Gas flow

Gas family	Gas flow at nominal heat input in l/min	
	11-4/1	14-4/1
Natural gas 2E (G20)	38.3	48.7
Natural gas 2E+ (G25)	41.7	52.8
Liquid gas 3P (G31)	14.8	18.8

Burner pressure

Gas family	Burner pressure for nominal heat input	
	11-4/1	14-4/1
Natural gas 2E (G20)	1.12 kPa (11.2 mbar)	1.38 kPa (13.8 mbar)
Natural gas 2E+ (G25)	1.48 kPa (14.8 mbar)	1.85 kPa (18.5 mbar)
Liquid gas 3P (G31)	3.17 kPa (31.7 mbar)	3.45 kPa (34.5 mbar)

E Inspection and maintenance interval

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

#	Maintenance work	Interval	
1	Remove any dirt from the product	Annually	
2	Check the flue gas sensor for dirt and damage. Checking that the flue gas sensor is working correctly by completely blocking the flue gas with flue gas restrictors	Annually	
3	Checking the safety cut-out for dirt and damage	Annually	
4	Cleaning the burner	If required, at least every 2 years	16
5	Cleaning the heat exchanger	If required, at least every 2 years	18
6	Cleaning the injector rail	If required, at least every 2 years	16
7	Cleaning the down-draught diverter	If required, at least every 2 years	17
8	Check the ignition electrode and thermocouple for damage, and replace any bent and damaged components	Annually	
9	Checking the seals on the test nipples for damage and replacing any damaged seals	Annually	
10	Checking that the water flow switch (micro switch) is working correctly	Annually	
11	Carry out a test operation on the product, incl. domestic hot water generation	Annually	
12	Checking leak-tightness	Annually	14
13	Checking the heat input	Annually	18
14	Check the flame pattern. Flames must not touch the heat exchanger shaft	If required, at least every 2 years	
15	Visually inspecting the test nipples and hoses	Annually	
16	Interrupt the thermocurrent by disconnecting the connection between the thermocouple and holding magnet. The product must be shut down	Annually	
17	Checking the water valve	If required, at least every 2 years	18
18	Logging flue-gas measured values and any maintenance work that was carried out	Annually	
19	Checking the product to see if flue gas is escaping at the down-draught diverter, with the doors and windows closed and the casing installed	Annually	

F Technical data

Technical data – General

	MAG 114/1 Z(E-BE/FR)	MAG 114/1 Z(E-DE)	MAG 114/1 Z(LL-DE)	MAG 114/1 Z(P-BE/FR)
Designated country (designation in accordance with ISO 3166)	BE, FR	EN	EN	BE, FR
Approved unit categories	I _{2E+} (BE), II _{2E+3P} (FR)	II _{2ELL} 3P	II _{2ELL} 3P	I _{3P} (BE), II _{2E+3P} (FR)
Unit dimensions, height	680 mm	680 mm	680 mm	680 mm
Unit dimensions, width	350 mm	350 mm	350 mm	350 mm
Unit dimensions, depth (incl. rotary switch)	270 mm	270 mm	270 mm	270 mm
Flue pipe connection diameter	110 mm	110 mm	110 mm	110 mm
Min. length of the flue pipe	0.5 m	0.5 m	0.5 m	0.5 m
Gas connection diameter	1/2" conical	1/2" conical	1/2" conical	1/2" conical
Water connection diameter (inlet)	G1/2"	G1/2"	G1/2"	G1/2"
Water connection diameter (outlet)	G1/2"	G1/2"	G1/2"	G1/2"
Net weight	10.9 kg	10.9 kg	10.9 kg	10.9 kg
Gross weight	13.8 kg	13.8 kg	13.8 kg	13.8 kg
Test symbol/registration no.	1008CS3137	1008CS3137	1008CS3137	1008CS3137

	MAG 144/1 Z(E-BE)	MAG 144/1 Z(E-DE)	MAG 144/1 Z(LL-DE)	MAG 144/1 Z(P-BE)
Designated country (designation in accordance with ISO 3166)	BE	EN	EN	BE
Approved unit categories	I _{2E+}	II _{2ELL} 3P	II _{2ELL} 3P	I _{3P}
Unit dimensions, height	680 mm	680 mm	680 mm	680 mm
Unit dimensions, width	350 mm	350 mm	350 mm	350 mm
Unit dimensions, depth (incl. rotary switch)	270 mm	270 mm	270 mm	270 mm
Flue pipe connection diameter	130 mm	130 mm	130 mm	130 mm
Min. length of the flue pipe	0.5 m	0.5 m	0.5 m	0.5 m
Gas connection diameter	1/2" conical	1/2" conical	1/2" conical	1/2" conical
Water connection diameter (inlet)	G1/2"	G1/2"	G1/2"	G1/2"
Water connection diameter (outlet)	G1/2"	G1/2"	G1/2"	G1/2"
Net weight	12.2 kg	12.2 kg	12.2 kg	12.2 kg
Gross weight	15.1 kg	15.1 kg	15.1 kg	15.1 kg
Test symbol/registration no.	1008CS3137	1008CS3137	1008CS3137	1008CS3137

Technical data – Power/load

	MAG 114/1 Z(E-BE/FR)	MAG 114/1 Z(E-DE)	MAG 114/1 Z(LL-DE)	MAG 114/1 Z(P-BE/FR)
Domestic hot water volume at the "hot" temperature selector position	2.3 ... 5.5 l/min	2.3 ... 5.5 l/min	2.3 ... 5.5 l/min	2.3 ... 5.5 l/min
Domestic hot water volume at the "warm" temperature selector position	5.0 ... 11.0 l/min	5.0 ... 11.0 l/min	5.0 ... 11.0 l/min	5.0 ... 11.0 l/min
Max. heat input (in relation to the net calorific value H _i)	21.7 kW	21.7 kW	21.7 kW	21.7 kW
Min. heat input (Q _{min.})	7.6 kW	7.6 kW	7.6 kW	7.6 kW
Max. heat output (P _{max.})	18.1 kW	18.1 kW	18.1 kW	18.1 kW
Min. heat output (P _{min.})	6.4 kW	6.4 kW	6.4 kW	6.4 kW
Control range	6.4 ... 18.1 kW	6.4 ... 18.1 kW	6.4 ... 18.1 kW	6.4 ... 18.1 kW
Max. permissible water pressure P _{w max.}	1.3 MPa (13.0 bar)	1.3 MPa (13.0 bar)	1.3 MPa (13.0 bar)	1.3 MPa (13.0 bar)

	MAG 114/1 Z(E-BE/FR)	MAG 114/1 Z(E-DE)	MAG 114/1 Z(LL-DE)	MAG 114/1 Z(P-BE/FR)
Min. permissible water pressure $P_{w \text{ min.}}$ when the temperature selector is positioned at "warm"	27 kPa (270 mbar)	27 kPa (270 mbar)	27 kPa (270 mbar)	27 kPa (270 mbar)
Min. permissible water pressure $P_{w \text{ min.}}$ when the temperature selector is positioned at "hot"	13 kPa (130 mbar)	13 kPa (130 mbar)	13 kPa (130 mbar)	13 kPa (130 mbar)
Flue gas temperature at max. heat output	200 °C	200 °C	200 °C	200 °C
Flue gas temperature at min. heat output	105 °C	105 °C	105 °C	105 °C
Min. chimney draught	1.5 Pa	1.5 Pa	1.5 Pa	1.5 Pa
Min. chimney draught when using a thermal flue non-return flap	10.0 Pa	10.0 Pa	10.0 Pa	10.0 Pa

	MAG 144/1 Z(E-BE)	MAG 144/1 Z(E-DE)	MAG 144/1 Z(LL-DE)	MAG 144/1 Z(P-BE)
Domestic hot water volume at the "hot" temperature selector position	3.2 ... 7.0 l/min	3.2 ... 7.0 l/min	3.2 ... 7.0 l/min	3.2 ... 7.0 l/min
Domestic hot water volume at the "warm" temperature selector position	6.2 ... 14.0 l/min	6.2 ... 14.0 l/min	6.2 ... 14.0 l/min	6.2 ... 14.0 l/min
Max. heat input (in relation to the net calorific value H_i)	27.7 kW	27.7 kW	27.7 kW	27.7 kW
Min. heat input ($Q_{\text{min.}}$)	9.7 kW	9.7 kW	9.7 kW	9.7 kW
Max. heat output ($P_{\text{max.}}$)	23.1 kW	23.1 kW	23.1 kW	23.1 kW
Min. heat output ($P_{\text{min.}}$)	8.3 kW	8.3 kW	8.3 kW	8.3 kW
Control range	8.3 ... 23.1 kW	8.3 ... 23.1 kW	8.3 ... 23.1 kW	8.3 ... 23.1 kW
Max. permissible water pressure $P_{w \text{ max.}}$	1.3 MPa (13.0 bar)	1.3 MPa (13.0 bar)	1.3 MPa (13.0 bar)	1.3 MPa (13.0 bar)
Min. permissible water pressure $P_{w \text{ min.}}$ when the temperature selector is positioned at "warm"	38 kPa (380 mbar)	38 kPa (380 mbar)	38 kPa (380 mbar)	38 kPa (380 mbar)
Min. permissible water pressure $P_{w \text{ min.}}$ when the temperature selector is positioned at "hot"	19 kPa (190 mbar)	19 kPa (190 mbar)	19 kPa (190 mbar)	19 kPa (190 mbar)
Flue gas temperature at max. heat output	185 °C	185 °C	185 °C	185 °C
Flue gas temperature at min. heat output	90 °C	90 °C	90 °C	90 °C
Min. chimney draught	1.5 Pa	1.5 Pa	1.5 Pa	1.5 Pa
Min. chimney draught when using a thermal flue non-return flap	10.0 Pa	10.0 Pa	10.0 Pa	10.0 Pa

Technical data – Natural gas G20

	MAG 114/1 Z(E-BE/FR)	MAG 114/1 Z(E-DE)	MAG 114/1 Z(LL-DE)	MAG 114/1 Z(P-BE/FR)
Gas flow rate at max. heat output	2.30 m³/h	2.30 m³/h	2.30 m³/h	2.30 m³/h
Gas connection pressure	1.7 ... 2.5 kPa (17.0 ... 25.0 mbar)	1.7 ... 2.5 kPa (17.0 ... 25.0 mbar)	1.7 ... 2.5 kPa (17.0 ... 25.0 mbar)	1.7 ... 2.5 kPa (17.0 ... 25.0 mbar)
Number of burner jets	24	24	24	24
Burner jet	0.85 mm	0.85 mm	0.85 mm	0.85 mm
Burner pressure	1.12 kPa (11.20 mbar)	1.12 kPa (11.20 mbar)	1.12 kPa (11.20 mbar)	1.12 kPa (11.20 mbar)
Air requirement for combustion at max. heat input	38.77 m³/h	38.77 m³/h	38.77 m³/h	38.77 m³/h
Air requirement for combustion at min. heat input	30.62 m³/h	30.62 m³/h	30.62 m³/h	30.62 m³/h
CO ₂ content at max. heat output	6.30 %	6.30 %	6.30 %	6.30 %

Appendix

	MAG 114/1 Z(E-BE/FR)	MAG 114/1 Z(E-DE)	MAG 114/1 Z(LL-DE)	MAG 114/1 Z(P-BE/FR)
CO ₂ content at min. heat output	2.70 %	2.70 %	2.70 %	2.70 %
Max. flue gas mass flow rate	6.40 g/s	6.40 g/s	6.40 g/s	6.40 g/s
Min. flue gas mass flow rate	1.78 g/s	1.78 g/s	1.78 g/s	1.78 g/s

	MAG 144/1 Z(E-BE)	MAG 144/1 Z(E-DE)	MAG 144/1 Z(LL-DE)	MAG 144/1 Z(P-BE)
Gas flow rate at max. heat output	2.92 m³/h	2.92 m³/h	2.92 m³/h	2.92 m³/h
Gas connection pressure	1.7 ... 2.5 kPa (17.0 ... 25.0 mbar)	1.7 ... 2.5 kPa (17.0 ... 25.0 mbar)	1.7 ... 2.5 kPa (17.0 ... 25.0 mbar)	1.7 ... 2.5 kPa (17.0 ... 25.0 mbar)
Number of burner jets	28	28	28	28
Burner jet	0.85 mm	0.85 mm	0.85 mm	0.85 mm
Burner pressure	1.38 kPa (13.80 mbar)	1.38 kPa (13.80 mbar)	1.38 kPa (13.80 mbar)	1.38 kPa (13.80 mbar)
Air requirement for combustion at max. heat input	50.24 m³/h	50.24 m³/h	50.24 m³/h	50.24 m³/h
Air requirement for combustion at min. heat input	40.55 m³/h	40.55 m³/h	40.55 m³/h	40.55 m³/h
CO ₂ content at max. heat output	6.20 %	6.20 %	6.20 %	6.20 %
CO ₂ content at min. heat output	2.60 %	2.60 %	2.60 %	2.60 %
Max. flue gas mass flow rate	10.53 g/s	10.53 g/s	10.53 g/s	10.53 g/s
Min. flue gas mass flow rate	2.99 g/s	2.99 g/s	2.99 g/s	2.99 g/s

Technical data – Natural gas G25

Applicability: Germany

	MAG 114/1 Z(E-DE)	MAG 114/1 Z(LL-DE)	MAG 144/1 Z(E-DE)	MAG 144/1 Z(LL-DE)
Gas flow rate at max. heat output	2.67 m³/h	2.67 m³/h	3.36 m³/h	3.36 m³/h
Gas connection pressure	1.8 ... 2.5 kPa (18.0 ... 25.0 mbar)	1.8 ... 2.5 kPa (18.0 ... 25.0 mbar)	1.8 ... 2.5 kPa (18.0 ... 25.0 mbar)	1.8 ... 2.5 kPa (18.0 ... 25.0 mbar)
Number of burner jets	24	24	28	28
Burner jet	1.00 mm	1.00 mm	1.02 mm	1.02 mm
Burner pressure	0.97 kPa	0.97 kPa	1.05 kPa	1.05 kPa
Air requirement for combustion at max. heat input	36.95 m³/h	36.95 m³/h	50.06 m³/h	50.06 m³/h
Air requirement for combustion at min. heat input	30.00 m³/h	30.00 m³/h	39.73 m³/h	39.73 m³/h
CO ₂ content at max. heat output	6.50 %	6.50 %	6.10 %	6.10 %
CO ₂ content at min. heat output	2.70 %	2.70 %	2.60 %	2.60 %
Max. flue gas mass flow rate	7.46 g/s	7.46 g/s	12.83 g/s	12.83 g/s
Min. flue gas mass flow rate	2.13 g/s	2.13 g/s	3.58 g/s	3.58 g/s

Technical data – Natural gas G25

Applicability: Belgium

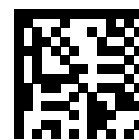
	MAG 114/1 Z(E-BE/FR)	MAG 114/1 Z(P-BE/FR)	MAG 144/1 Z(E-BE)	MAG 144/1 Z(P-BE)
Gas flow rate at max. heat output	2.50 m³/h	2.50 m³/h	3.17 m³/h	3.17 m³/h
Gas connection pressure	2.0 ... 3.0 kPa (20.0 ... 30.0 mbar)	2.0 ... 3.0 kPa (20.0 ... 30.0 mbar)	2.0 ... 3.0 kPa (20.0 ... 30.0 mbar)	2.0 ... 3.0 kPa (20.0 ... 30.0 mbar)
Number of burner jets	24	24	28	28
Burner jet	0.85 mm	0.85 mm	0.85 mm	0.85 mm
Burner pressure	14.8 mbar	14.8 mbar	18.5 mbar	18.5 mbar
Air requirement for combustion at max. heat input	39.9 m³/h	39.9 m³/h	52.5 m³/h	52.5 m³/h

	MAG 114/1 Z(E-BE/FR)	MAG 114/1 Z(P-BE/FR)	MAG 144/1 Z(E-BE)	MAG 144/1 Z(P-BE)
Air requirement for combustion at min. heat input	31.1 m³/h	31.1 m³/h	41.6 m³/h	41.6 m³/h
CO ₂ content at max. heat output	5.67 %	5.67 %	5.50 %	5.50 %
CO ₂ content at min. heat output	2.60 %	2.60 %	2.47 %	2.47 %
Max. flue gas mass flow rate	7.65 g/s	7.65 g/s	12.77 g/s	12.77 g/s
Min. flue gas mass flow rate	2.21 g/s	2.21 g/s	3.74 g/s	3.74 g/s

Technical data – Liquid gas G31

	MAG 114/1 Z(E-BE/FR)	MAG 114/1 Z(E-DE)	MAG 114/1 Z(LL-DE)	MAG 114/1 Z(P-BE/FR)
Gas flow rate at max. heat output	1.69 kg/h	1.69 kg/h	1.69 kg/h	1.69 kg/h
Gas connection pressure at max. heat output	2.5 ... 4.5 kPa (25.0 ... 45.0 mbar)	4.25 ... 5.75 kPa (42.50 ... 57.50 mbar)	4.25 ... 5.75 kPa (42.50 ... 57.50 mbar)	2.5 ... 4.5 kPa (25.0 ... 45.0 mbar)
Number of burner jets	24	24	24	24
Burner jet	0.5 mm	0.5 mm	0.5 mm	0.5 mm
Burner pressure	31.7 mbar	31.7 mbar	31.7 mbar	31.7 mbar
Air requirement for combustion at max. heat input	38.3 m³/h	38.3 m³/h	38.3 m³/h	38.3 m³/h
Air requirement for combustion at min. heat input	28.9 m³/h	28.9 m³/h	28.9 m³/h	28.9 m³/h
CO ₂ content at max. heat output	7.30 %	7.30 %	7.30 %	7.30 %
CO ₂ content at min. heat output	3.30 %	3.30 %	3.30 %	3.30 %
Max. flue gas mass flow rate	4.13 g/s	4.13 g/s	4.13 g/s	4.13 g/s
Min. flue gas mass flow rate	1.10 g/s	1.10 g/s	1.10 g/s	1.10 g/s

	MAG 144/1 Z(E-BE)	MAG 144/1 Z(E-DE)	MAG 144/1 Z(LL-DE)	MAG 144/1 Z(P-BE)
Gas flow rate at max. heat output	2.15 kg/h	2.15 kg/h	2.15 kg/h	2.15 kg/h
Gas connection pressure at max. heat output	2.5 ... 4.5 kPa (25.0 ... 45.0 mbar)	4.25 ... 5.75 kPa (42.50 ... 57.50 mbar)	4.25 ... 5.75 kPa (42.50 ... 57.50 mbar)	2.5 ... 4.5 kPa (25.0 ... 45.0 mbar)
Number of burner jets	28	28	28	28
Burner jet	0.51 mm	0.51 mm	0.51 mm	0.51 mm
Burner pressure	34.5 mbar	34.5 mbar	34.5 mbar	34.5 mbar
Air requirement for combustion at max. heat input	49.84 m³/h	49.84 m³/h	49.84 m³/h	49.84 m³/h
Air requirement for combustion at min. heat input	38.04 m³/h	38.04 m³/h	38.04 m³/h	38.04 m³/h
CO ₂ content at max. heat output	7.15 %	7.15 %	7.15 %	7.15 %
CO ₂ content at min. heat output	3.20 %	3.20 %	3.20 %	3.20 %
Max. flue gas mass flow rate	6.82 g/s	6.82 g/s	6.82 g/s	6.82 g/s
Min. flue gas mass flow rate	1.84 g/s	1.84 g/s	1.84 g/s	1.84 g/s



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