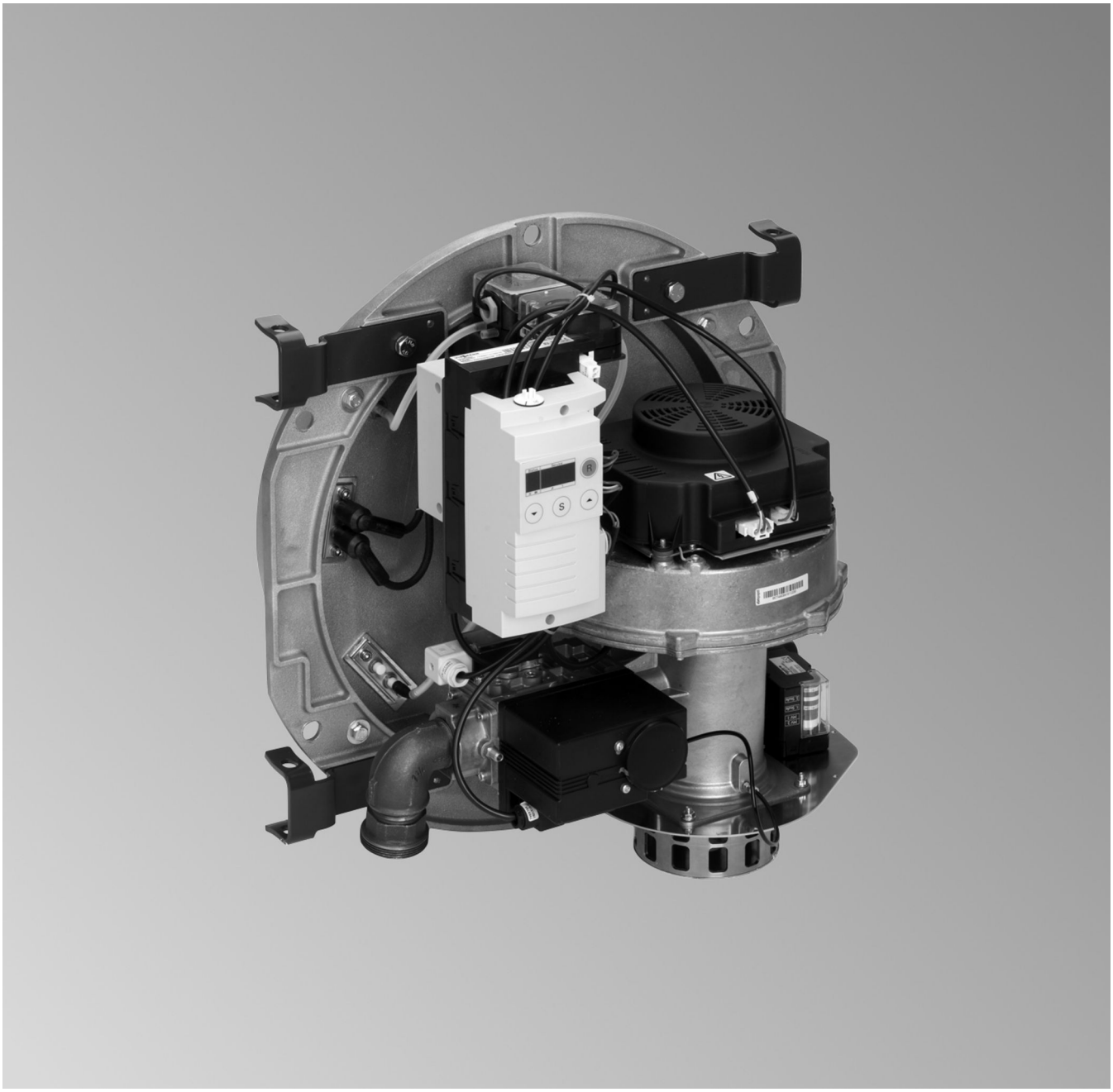
Service instructions

for contractors

MatriX radiant burner
Type VMIII
Pressure-jet gas burner
for the Vitocrossal 300, type CT3B
Rated heating output 187 to 314 kW

For applicability, see the last page

MatriX radiant burner



5609 774 GB 7/2017

Please keep safe.

Safety instructions

⚠ Please follow these safety instructions closely to prevent accidents and material losses.

Safety instructions explained

⚠ **Danger**
This symbol warns against the risk of injury.

! **Please note**
This symbol warns against the risk of material losses and environmental pollution.

Note
Details identified by the word "Note" contain additional information.

Target group

These instructions are exclusively intended for qualified contractors.

- Work on gas installations may only be carried out by a registered gas fitter.
- Work on electrical equipment may only be carried out by a qualified electrician.
- The system must be commissioned by the system installer or a qualified person authorised by the installer.
- This appliance has **not** been designed to be operated by individuals (including children) with limited physical, sensory or mental capacities or who are lacking in the appropriate experience and/or knowledge, unless they are supervised by a person with responsibility for their safety or were instructed by that person in the operation of this appliance.

  ! **Please note**
  Children should be supervised.
  Ensure that children never play with the appliance.

Regulations

Observe the following when working on this system:

- Statutory regulations for the prevention of accidents
- Statutory regulations for environmental protection
- Codes of practice of the relevant trade associations
- All current safety regulations as defined by DIN, EN, DVGW, TRGI, TRF, VDE and all locally applicable standards
  - (A) ÖNORM, EN, ÖVGW G K Guidelines, ÖVGW-TRF and ÖVE
  - (CH) SEV, SUVA, SVGW, SVTI, SWKI, VKF and EKAS guideline 1942: LPG, part 2

Safety instructions (cont.)

If you smell gas

Danger
Escaping gas can lead to explosions which may result in serious injury.
- Do not smoke. Prevent naked flames and sparks. Never switch lights or electrical appliances on or off.
- Close the gas shut-off valve.
- Open windows and doors.
- Evacuate any people from the danger zone.
- Notify your gas or electricity supply utility from outside the building.
- Have the power supply to the building shut off from a safe place (outside the building).

If you smell flue gas

Danger
Flue gas can lead to life threatening poisoning.
- Shut down the heating system.
- Ventilate the installation site.
- Close all doors in the living space.

Working on the system

- Where gas is used as the fuel, close the main gas shut-off valve and safeguard it against unintentional reopening.
- Isolate the system from the power supply (e.g. by removing the separate fuse or by means of a mains isolator) and check that it is no longer live.
- Safeguard the system against reconnection.

Please note
Electronic assemblies can be damaged by electrostatic discharge.
Prior to commencing any work, touch earthed objects such as heating or water pipes to discharge static loads.

Repair work

Please note
Repairing components that fulfil a safety function can compromise the safe operation of the system.
Replace faulty components only with genuine Viessmann spare parts.

Auxiliary components, spare and wearing parts

Please note
Spare and wearing parts that have not been tested together with the system can compromise its function. Installing non-authorised components and making non-approved modifications or conversions can compromise safety and may invalidate our warranty.
For replacements, use only original spare parts supplied or approved by Viessmann.

Index

Symbols

Symbol	Meaning
	Reference to other document containing further information
	Step in a diagram: The numbers correspond to the order in which the steps are carried out.
	Warning of material losses and environmental pollution
	Live electrical area
	Pay particular attention.
	▪ Component must audibly click into place. or ▪ Acoustic signal
	▪ Fit new component. or ▪ In conjunction with a tool: Clean the surface.
	Dispose of component correctly.
	Dispose of component at a suitable collection point. Do **not** dispose of component in domestic waste.

The steps in connection with commissioning, inspection and maintenance are found in the "Commissioning, inspection and maintenance" section and identified as follows:

Symbol	Meaning
	Steps required during commissioning
	Not required during commissioning
	Steps required during inspection
	Not required during inspection
	Steps required during maintenance
	Not required during maintenance

Intended use

The appliance is only intended to be installed and operated in sealed unvented heating systems that comply with EN 12828, with due attention paid to the associated installation, service and operating instructions as well as the details in the datasheet.
It is only designed for the heating up of heating water.

Commercial or industrial usage for a purpose other than the heating up of heating water shall be deemed inappropriate.

Intended use presupposes that a fixed installation in conjunction with permissible components designed for this purpose has been carried out.
Every other use will be deemed to be inappropriate.
Any resulting losses are excluded from the manufacturer's liability.

Any usage beyond this must be approved by the manufacturer for the individual case.

Intended use also includes the adherence to maintenance and inspection intervals.

Steps - commissioning, inspection and maintenance

Commissioning steps
Inspection steps
Maintenance steps

Commissioning the system

Danger
CO build-up as a result of incorrect burner adjustment can have serious health implications. Carry out a CO test before and after work on gas appliances.

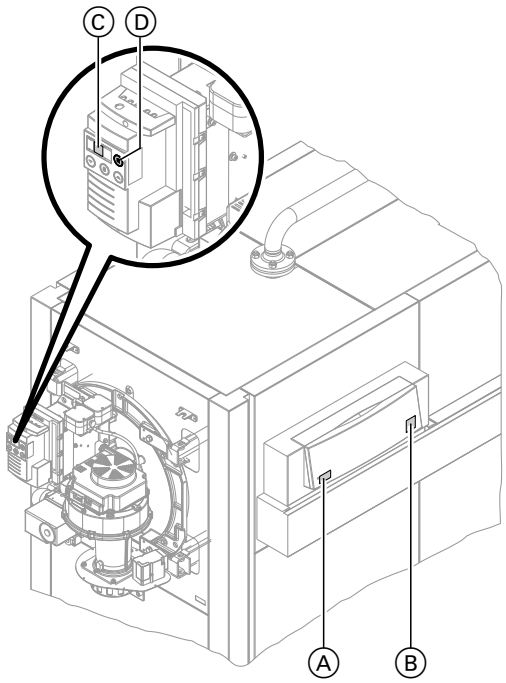


Fig. 1

Note
It is essential to check the burner settings with the boiler heated to operating temperature (min. 40 °C). Also check in the partial load range.

Boiler control unit service instructions

1. Check the heating system pressure.
2. Open the gas shut-off valve.
3. Switch ON the mains isolator (outside the installation room).
4. Remove the burner hood.
5. Turn ON the system ON/OFF switch Ⓑ at the control unit.
   If fault indicator Ⓐ on the control unit illuminates and display Ⓒ on the burner control unit flashes, first reset the system. To do this, press reset button Ⓓ on the burner control unit.

   Note
   The appliance can enter a fault state during commissioning if there is insufficient gas in the gas line (the fault indicator on the control unit illuminates). Purge the gas line again. Reset the burner control unit.
6. Adjust the codes on the boiler control unit in accordance with the table on page 18.

   Control unit installation and service instructions

Checking the gas type

1. Check the gas type and Wobbe index (Wo) with your gas supply utility.
   - With the **natural gas E setting**, the boilers can be operated in the Wobbe index range 12.0 to 16.1 kWh/m³ (43.2 to 58.0 MJ/m³).
   - With the **natural gas LL setting**, the boilers can be operated in the Wobbe index range 10.0 to 13.1 kWh/m³ (36.0 to 47.2 MJ/m³) (not in Ⓐ or Ⓒⓗ).
2. In the delivered condition, the burner is set up for natural gas E. If necessary, convert the burner to the other gas type (see page 8) in accordance with the details provided by the gas supply utility.
3. Record the gas type in the report (on page 38).

Converting to natural gas LL

(not in Ⓐ and ⓒⓗ)

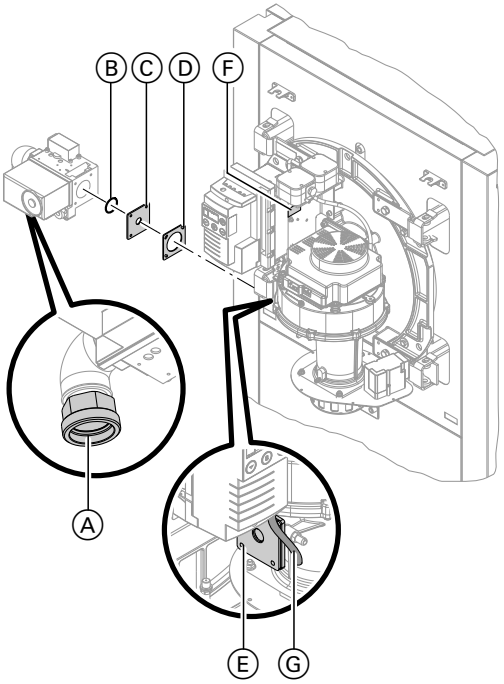


Fig. 2

1. Close the gas shut-off valve.
2. Turn OFF the system ON/OFF switch on the control unit.
3. Switch OFF the mains isolator (outside the installation room) or isolate the mains power and secure against unintentional reconnection.
4. Undo fitting Ⓐ from the gas supply pipe.
5. Pull compensation hose Ⓖ from the gas train.
6. Release the gas train from flange Ⓔ.
7. Remove restrictor Ⓒ with rubber cork gasket Ⓓ.
8. Secure the gas train (without restrictor Ⓒ and without rubber cork gasket Ⓓ) with O-ring Ⓑ at flange Ⓔ. Replace factory-fitted M 5 x 16 screws with M 5 x 12 (standard delivery, individual part). Torque when tightening screws: 1.5 Nm.
9. Secure fitting Ⓐ.
10. Push compensation hose Ⓖ on to the gas train.
11. Affix label "Set to natural gas LL" over existing label Ⓕ.
12. Start the burner (see page 7).

⚠ **Danger**
Escaping gas leads to a risk of explosion.
Check all fittings for gas tightness.

! Please note
The use of leak detection spray can result in incorrect functions.
Leak detection spray must not come into contact with electrical contacts.

Reducing the heating output (if required)

The maximum heating output of the burner can be set to between 70 and 100 % of the rated heating output if necessary.

Reducing the heating output (if required) (cont.)

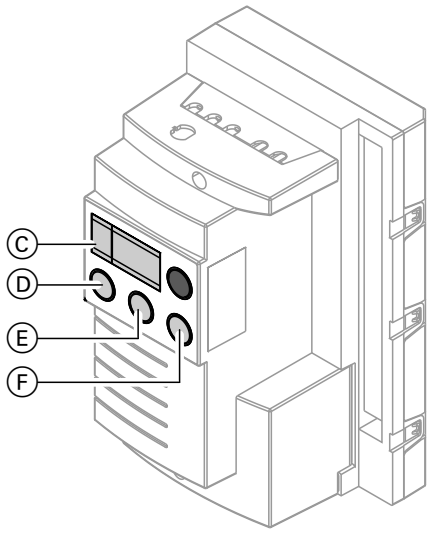


Fig. 3

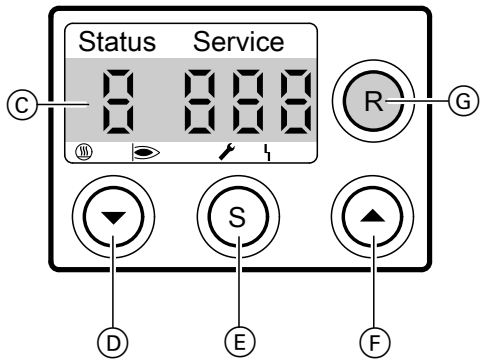


Fig. 4

1. Press **S** Ⓔ for longer than 2 s.
   flashes.
2. Press ▲ Ⓕ until "6" is shown on display Ⓒ under Service.
3. Press **S** Ⓔ. "6" is shown on display Ⓒ under Status.
4. Press **S** Ⓔ. "1" is shown on display Ⓒ under Status and the current value for the maximum heating output in % is shown under Service.
5. Press ▲ Ⓕ or ▼ Ⓓ for the required maximum heating output.
6. Press **S** Ⓔ to confirm. If applied successfully, "1" will be shown on display Ⓒ under Service; if not, "0" will appear.
7. Press **S** Ⓔ to switch to the operating display.
8. Press **R** Ⓖ.
   A system restart is initiated.

Checking static pressure and supply pressure

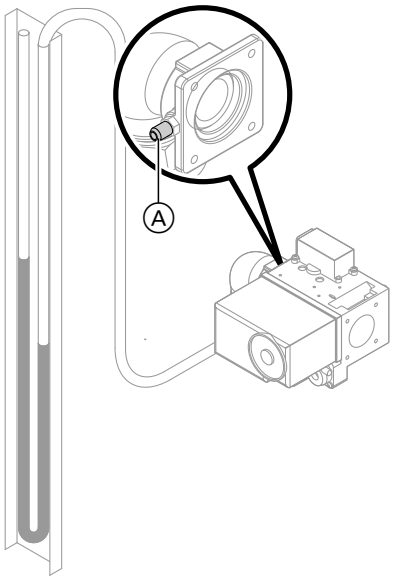


Fig. 5

Static pressure

1. Close the gas shut-off valve.

Checking static pressure and supply pressure (cont.)

2. Loosen the screw in test connector Ⓐ, but do not remove.
3. Connect the pressure tester at test connector Ⓐ.
4. Open the gas shut-off valve.
5. Check the static pressure (max. 60 mbar/6 kPa).
6. Record the actual value in the report (on page 38).

Supply pressure

1. Start the burner.

   Note
   For commissioning, see page 7. Switch the burner to maximum heating output by activating the emissions test switch at the control unit.

2. Check the supply pressure (flow pressure); see table on page 10.

   Note
   The supply pressure (flow pressure) should be between 18 and 50 mbar (1.8 and 5 kPa). The gas pressure switch is factory set to 10 mbar (1 kPa). Never alter this setting.

3. Record the actual value in the report (on page 38).
4. Close the gas shut-off valve.
5. Remove the pressure tester and close test connector Ⓐ.

Supply pressure (flow pressure)	Measure
< 15 mbar (1.5 kPa)	Make no adjustments and notify the gas supply utility
15 to 18 mbar (1.5 to 1.8 kPa)	Please note: The boiler may only be operated temporarily with this setting (emergency mode). Notify the gas supply utility.
18 to 50 mbar (1.8 to 5 kPa)	Start the boiler.
> 50 mbar (5 kPa)	Install a separate gas pressure governor with zero off upstream of the boiler system. Regulate the pressure to 20 mbar (2 kPa). Notify your gas supply utility.

Checking the rotary damper setting

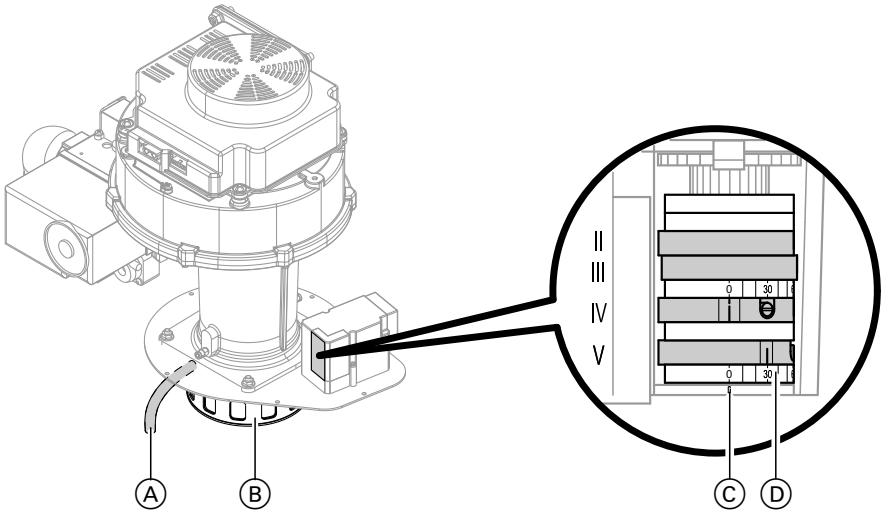


Fig. 6

1. Open the gas shut-off valve.
2. Check the position of the rotary damper with the burner in idle mode. Rotary damper windows Ⓑ must be fully opened. Scale ring Ⓓ on the air damper servomotor must be set to "0", relative to marking Ⓒ.
3. Check whether compensation hose Ⓐ has been connected between the gas train and distributor pipe.
4. Start the burner.
5. Check the position of the rotary damper during the start-up phase. Rotary damper windows Ⓑ must nearly close for approx. 5 s. During this period, scale ring Ⓓ is set as follows:

Rated heating output in kW	Rotary damper setting
187	35°
248	30°
314	30°

Checking the CO_2 content

Preparing the test

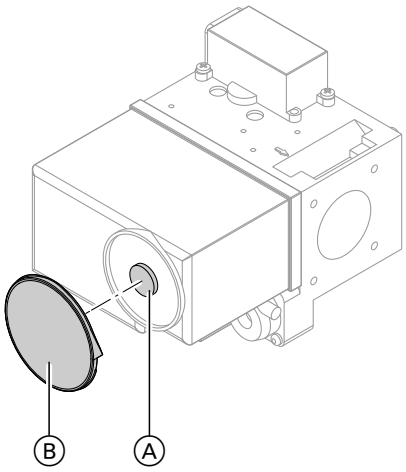


Fig. 7

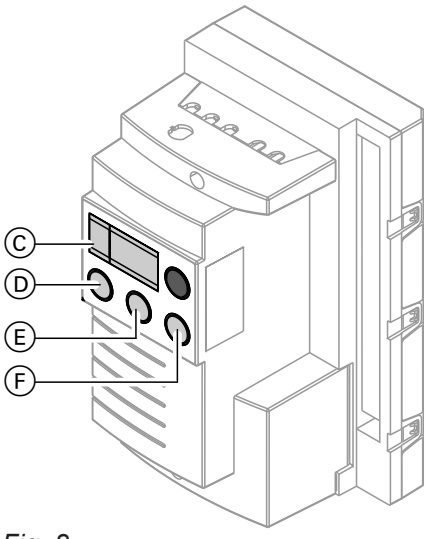


Fig. 8

1. Open the gas shut-off valve.

Checking the CO_2 content (cont.)

2. Start the burner with the emissions test switch enabled.

3. Simultaneously press and hold **S** Ⓔ and ▼ Ⓓ for longer than 2 s.
   Display Ⓒ will then show the following:
   - Under Status: "P" (= controlled stop)
   - Under Service: Modulation level in %
     ("100" = 100 % = upper heating output,
     "0" = 0 % = lower heating output)

CO_2 test at the upper heating output

1. Press and hold ▲ Ⓕ until the service display has counted up to "100" (= 100 %).

2. Check the CO_2 content in the flue pipe.

Burner output in kW	Permissible CO_2 content in %
187	9.0 (+0.3/-0.1)
248	
314	

3. If the CO_2 content needs to be adjusted:
   Remove cap Ⓑ and turn setting screw Ⓐ in small steps (Allen key 3 mm) until the CO_2 content is within the specified range:
   - Turning clockwise → CO_2 content **drops**
   - Turning anticlockwise → CO_2 content **increases**

4. Record the actual value in the report (on page 38).

CO_2 test at the lower heating output

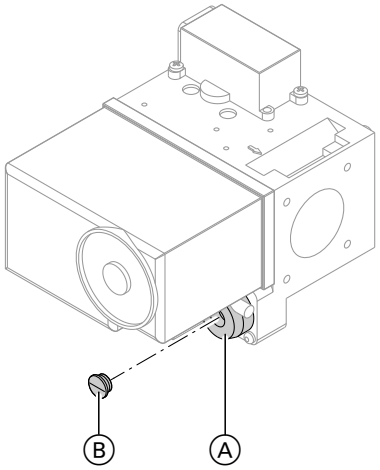


Fig. 9

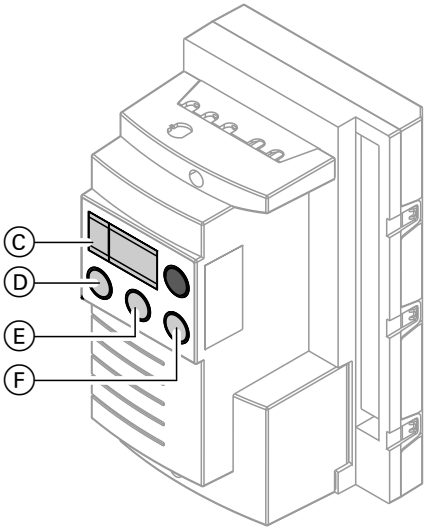


Fig. 10

1. Press and hold ▼ Ⓓ until the service display has counted down to "0" (lower heating output).

Checking the CO_2 content (cont.)

2. Check the CO_2 content in the flue pipe.

Burner output in kW	Permissible CO_2 content in %
187	8.5 (± 0.2)
248	
314	

Note
At the lower heating output, the CO_2 content must always be at least 0.2 % lower than at the upper heating output.

3. If the CO_2 content needs to be adjusted:
   Undo cover Ⓑ and turn setting screw Ⓐ in small steps (Torx 40) until the CO_2 content lies within the specified range:
   - Turning clockwise → CO_2 content **increases**
   - Turning anticlockwise → CO_2 content **drops**

4. Record the actual value in the report (on page 38).

   Rechecking the values
   Regulate to the upper and lower heating output again using the programming unit in the burner control unit. If the values do not match the permissible CO_2 content according to the tables on pages 12 and 13, repeat the steps for the upper and lower heating output.

5. Press and hold **S** Ⓔ and ▼ Ⓓ simultaneously for longer than 2 s. Burner switches to operating mode.

Checking the CO content

Checking the flue gas temperature

Displaying the ionisation current

Note
*The ionisation current must be called up via the burner control unit. It is **not** possible to measure the ionisation current using the Testomatik-Gas or a multimeter.*

1. Press **S** approx. 2 s , **"🔧"** flashes.
2. Press ▲ until "5" is shown under Service.
3. Press **S**. "5" will be displayed under Status.
4. Press ▲ until "3" is shown under Service.
5. Press **S**. "3" is shown under Status, and during operation the ionisation current is shown under Service (e.g. 30 = 3.0 µA).
6. Start the burner with the emissions test switch.
7. Read the ionisation current.

   Note
   The ionisation current should be at least 3 µA for approx. 2 to 3 s after the gas train has been opened and during operation.

8. Record the actual value in the report.
9. Press **S** approx. 2 s , **"🔧"** flashes.
10. Press ▲ until "5" is shown under Service.
11. Press **S**. "5" will be displayed under Status.
12. Press ▲ until "0" is shown under Service.
13. Press **S**. The operating display will be shown again.

Shutting down the system

1. Switch OFF the mains isolator or the power supply and safeguard against unauthorised reconnection.

   Danger
   Mains voltage can be life-threatening.
   For maintenance work, isolate the system from the power supply.

2. Remove the burner hood.
3. Remove burner cable with plug 41 and 90 from the burner control unit and pull out of the burner casing.
4. Close the gas shut-off valve.

Checking the burner gauze assembly

Danger
Escaping gas leads to a risk of explosion.
Close the gas shut-off valve.

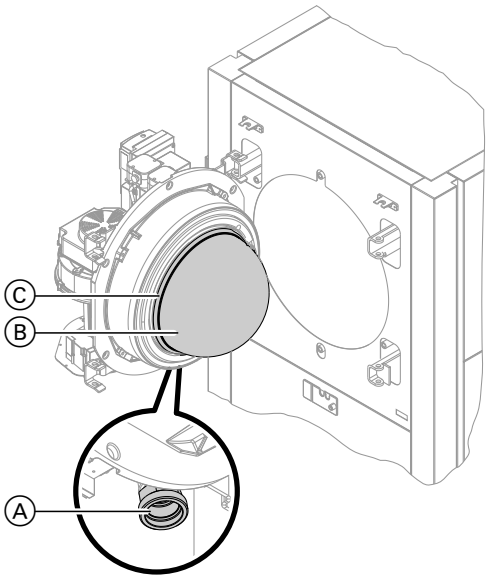


Fig. 11

1. Undo fitting Ⓐ from the gas supply pipe.
2. Undo the screws on the boiler door and open the door.
3. Check the wire mesh of burner gauze assembly Ⓑ and thermal protection ring Ⓒ for damage. Slight wavy deformations of burner gauze assembly Ⓑ are OK.
4. If required, replace burner gauze assembly Ⓑ together with thermal protection ring Ⓒ.

Please note
Scratches inside the combustion chamber can lead to corrosion.
Never place tools or other objects inside the combustion chamber.

Burner component installation instructions

For cleaning the combustion chamber and flues, see boiler service instructions.

Checking the ignition electrodes and ionisation electrode

Ignition electrodes

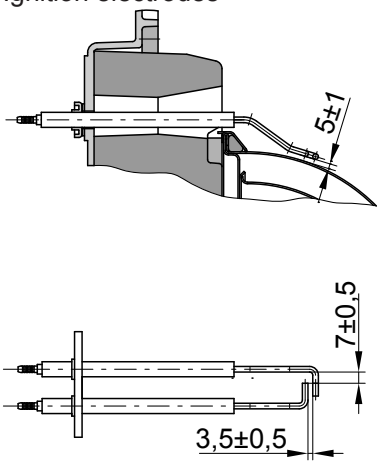


Fig. 12

Ionisation electrode

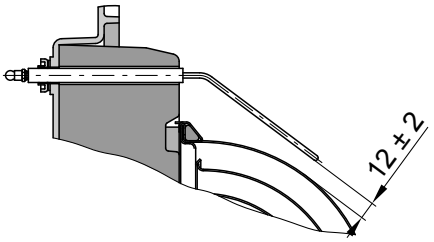


Fig. 13

Check ignition electrodes and ionisation electrode for correct gap to the burner gauze assembly and for possible damage. Replace electrodes if required.

Installation instructions "Replacing burner components"

Cleaning the burner

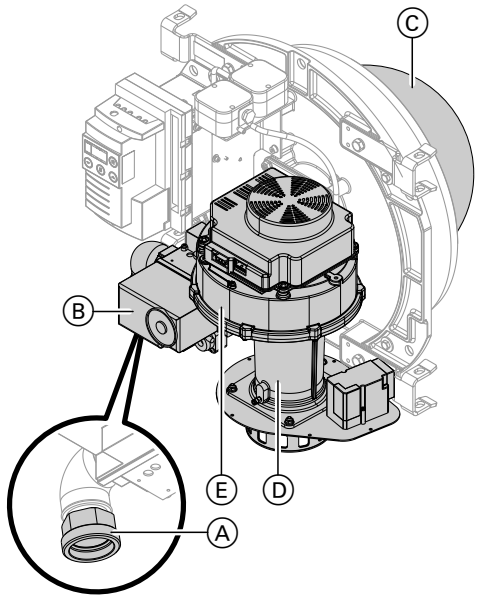


Fig. 14

1. Undo fitting Ⓐ from the gas supply pipe.
2. Undo Venturi mixing pipe Ⓓ from fan Ⓔ.
3. Remove Venturi mixing pipe Ⓓ with gas train Ⓑ.
4. Pull connecting cables "100" and "100A" from fan Ⓔ. Remove fan Ⓔ.
5. Clean the fan housing and impeller with compressed air.
6. If required, clean the inside of burner gauze assembly Ⓒ with a vacuum cleaner.

Fitting the burner

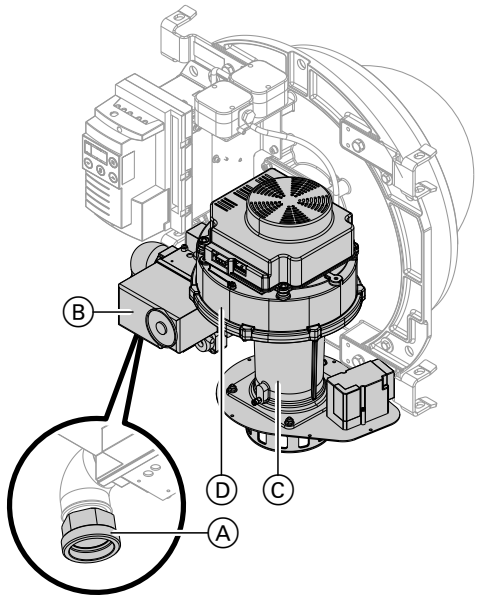


Fig. 15

1. Mount fan Ⓓ.

Note
Ensure the gasket between the fan housing and the boiler door is correctly seated.

2. Plug the connecting cables "100" and "100A" into the fan.
3. Secure Venturi mixing pipe Ⓒ with gas train Ⓑ on fan Ⓓ.
4. Close the boiler door. Tighten the screws on the boiler door evenly and diagonally.
   Torque: 30 Nm

   Information regarding the door lock
   Before commissioning, check that the boiler door is seated correctly and has no leaks.
5. Secure fitting Ⓐ to the gas supply pipe.

Danger
Escaping gas leads to a risk of explosion.
Check the fitting and gasket between the fan housing and the boiler door for gas tightness.

Checking both gas train valves for tightness

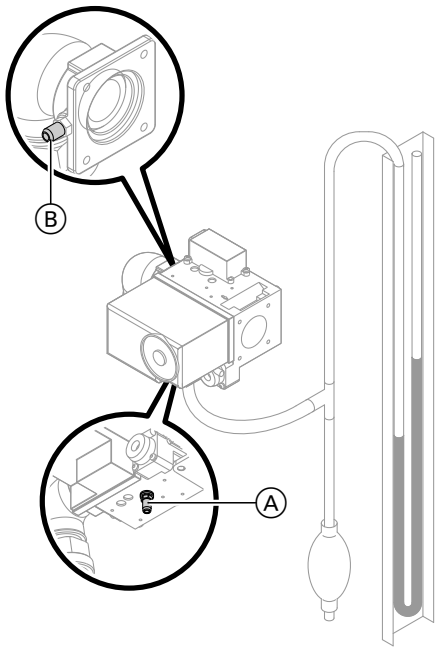


Fig. 16

1. Close the gas shut-off valve.
2. Undo screw inside test connector Ⓑ for intake pressure, but do not fully remove it.
3. Loosen the screw in test connector Ⓐ, but do not remove.
4. Connect the pressure tester with the manual pump at test connector Ⓐ.
5. Gently operate the manual pump to build a test pressure of approx. 50 mbar (5 kPa).
6. Wait approx. 5 min for the temperature to level out and then observe the display on the pressure tester:
   The gas train is gas-tight if the displayed pressure does not drop by more than 1 mbar (0.1 kPa) within a further 5 min.
   Otherwise there is a leak. In this case, return the gas train to your local Viessmann sales office for tests.
7. After the test, close both test connectors by tightening the respective screws.

Danger
Escaping gas leads to a risk of explosion.
Check test connector for gas tightness.

Please note
The use of leak detection spray can result in incorrect functions.
Leak detection spray must not come into contact with electrical contacts.

Checking the filter element in the gas line (if installed) and replacing if required

Checking all gas connections for tightness

Danger
Escaping gas leads to a risk of explosion.
Always carry out the following steps.

1. Insert new gaskets in all gas fittings that have been opened and then tighten those fittings.
2. Open the gas shut-off valve.
3. Check the inlet joints of the gas train for tightness.
4. Start the burner (see page 7).
5. Check the outlet seals for tightness:
   - Gas train
   - Joint between the fan and the boiler door
   - Joint between the fan and the Venturi pipe

Please note
The use of leak detection spray can result in faulty operation.
Leak detection spray must not come into contact with electrical contacts.

Implementing final checks

1. Carry out final checks in accordance with the points on pages 11 to 13.
2. Record actual values in the report (on page 38).

Operating and service documents

1. Complete and detach the customer registration card:
   - Hand system users their section for safekeeping.
   - Retain the heating contractor's section.

2. File all parts lists, operating and service instructions in the folder and hand this over to the system user.
   The installation instructions are no longer required after the installation is complete and therefore do not need to be retained.

Setting the codes at the control unit

Vitotronic service instructions

In conjunction with the following control units:
- Vitotronic 100, type GC1B
- Vitotronic 200, type GW1B
- Vitotronic 300, type GW2B

Settings for the control unit

Coding address	Rated heating output of the MatriX radiant burner in kW			Coding card
	187	**248**	**314**	
02	2	2	2	1040
05	0	0	0	
08	70	25	85	
09	1	2	2	
15	19	19	27	
0A	33	33	33	

Burner control unit VUC 310

Display and programming unit

A display and programming unit is integrated into the burner control unit. The display indicates the relevant operating conditions, the service and parameter conditions as well as all fault and error messages.

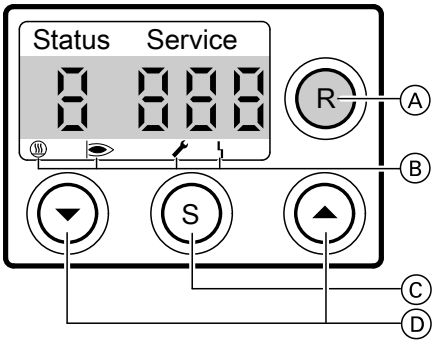


Fig. 17

The display comprises four elements of 7 segments each. Four keys serve to make adjustments at the different operating levels.

Ⓐ Reset button
Ⓑ LEDs, from left: heat demand, flame, maintenance and fault.
Ⓒ Selection key (Select)
Ⓓ Cursor keys

Operating display

In standard mode, the status display shows the current operating conditions. The same applies in a fault state after pressing reset button **R**.

The following displays are shown automatically. If a fault occurs, see the fault codes from page 26. You can exit at any time by pressing reset button **R** Ⓐ (hold for 0.5 to 10 s).

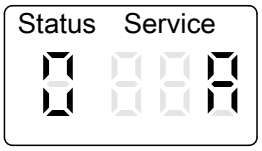


Fig. 18

System start-up after power supply – ON

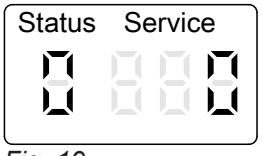


Fig. 19

Standby

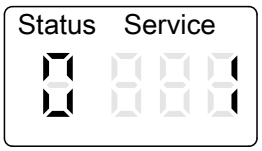


Fig. 20

Idle state check
System tests

Codes

Burner control unit VUC 310 (cont.)

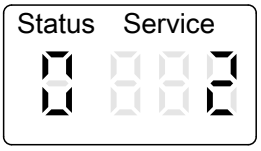


Fig. 21

Fan ramp-up

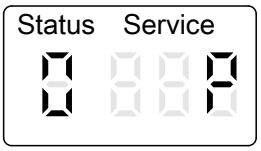


Fig. 22

Valve and/or
relay test

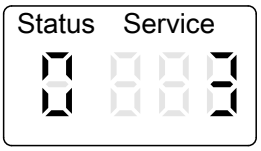


Fig. 23

Pre-purge

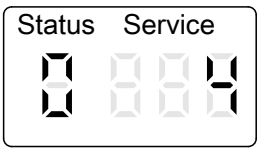


Fig. 24

Pre-ignition

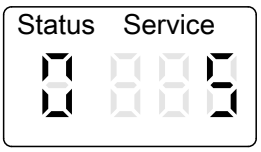


Fig. 25

Ignition
Safety time
Flame formation

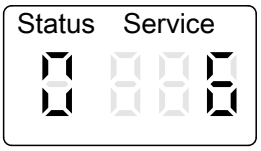


Fig. 26

Flame stabilisation

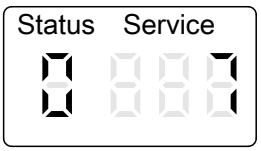


Fig. 27

Operation with flame

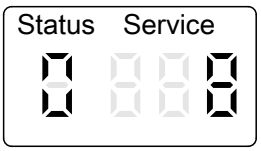


Fig. 28

Reheat
Post-purge

Burner control unit VUC 310 (cont.)

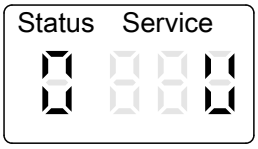


Fig. 29

Dwell program, no air pressure

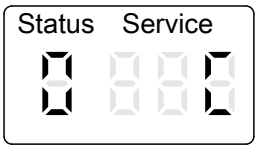


Fig. 30

Dwell program, no gas pressure or mains undervoltage

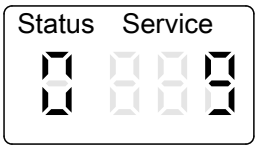


Fig. 31

Forced ventilation if no flame formation has been detected

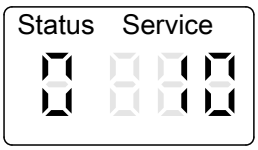


Fig. 32

Safety shutdown due to flame tear-off

Information display/configuration display

The information display and the configuration display are activated from the operating display. The menu selection is activated by pressing and holding **S** for longer than 2 s. You can scroll through the menu points with ▲/▼. To select a menu point press **S** again. The relevant point is then shown on the display under Service.
This mode is automatically terminated if no other key is pressed within 20 s.

Information regarding current meter readings, such as the start-up meter and permanent hours run meter, can be called up via the information display.

Information:

Menu point	Description
1	Permanent meters for start-ups and hours run
2	Meters for start-ups and hours run with reset
3	Software version
4	Fault history for the last 10 fault codes

Example – resetting the hours run meter:

1. S for longer than 2 s,
🔧 flashes.

2. ▲ until "2" is shown under Service.

3. S "1" will be displayed under Status.

4. ▲ Scroll through Status until "6" is shown under Status:

Status	Description
1	Display of resettable start-up meter, 1 digit
2	Display of resettable start-up meter, 1000 digit
3	Menu point for deleting the start-up meter reading
4	Display of resettable hours run meter, 1 digit
5	Display of resettable hours run meter, 1000 digit
6	Menu point for deleting the hours run meter reading

Burner control unit VUC 310 (cont.)

5. S to confirm the deletion. If deleted successfully, "1" will be shown under Service; if not, "0" will appear.

6. S To change to the operating display.

Menu points "5" and "6" are used to adjust configuration settings of the burner control unit.

Note
Only make adjustments when the burner control unit is on standby.

Configurations:

Menu point	Description
5	Changeover from the operating display of the burner control unit phase to other process information
6	Configuration of control function operating parameters

Menu point "5" is used to display the following process information:

Submenu point	Process information	Units/scale
0	Phase	1
1	Boiler water temperature*1	°C
2	Flue gas temperature*1	°C
3	Ionisation current	I in 1/10 µA
4	Set speed	%
5	PWM manipulated variable	%
6	Actual speed	n in 10/min
7	Gas pressure switch 1	0 or 1
8	Gas pressure switch 2*1	0 or 1
9	Air pressure switch	0 or 1
A	Gas valve 1	0 or 1
B	Gas valve 2*1	0 or 1

Example – displaying the ionisation current:

1. S for longer than 2 s, 🔧 flashes.

2. ▲ until "5" is shown under Service.

3. S "5" will be displayed under Status.

4. ▲ until "3" is shown under Service.

5. S "3" is shown under Status and during operation the ionisation current is shown under Service (e.g. 30 = 3.0 µA).

Menu point "6" is used to change the following operating parameters:

Sub-menu point	Parameter	Unit/scale
1	Maximum heating output	% of rated heating output
0	Reset all operating parameters to their delivered condition	

Example: set the maximum heating output of the burner to 70 to 100 % by pressing the following keys:

1. S for longer than 2 s, 🔧 flashes.

2. ▲ until "6" is shown under Service.

3. S "6" will be displayed under Status.

4. S "1" will be shown under Status and the current value for the maximum operational output in % is shown under Service.

5. ▲/▼ for required maximum operational output.

6. S to confirm. If applied successfully, "1" will be shown under Service; if not, "0" will appear.

7. S To change to the operating display.

**1 Not available for all boiler types, check at control unit if required.*

Burner control unit VUC 310 (cont.)

Reset all operating parameters to their delivered condition

Reset all operating parameters to their delivered condition:

1. S for longer than 2 s.
flashes.

2. ▲ until "6" is shown under Service.

3. S "6" will be displayed under Status.

4. ▲ until "0" is shown under Service.

5. S "1" is shown under Status and "dEL" under Service.

6. S to confirm. If reset successfully, "1" will be shown under Service; if not, "0" will appear.

7. S To change to the operating display.

Manual mode and service display

The burner must be running to call up the service display and for manual mode. The service display shows the current modulation level in %.

Press the following keys:

1. ▼ /S simultaneously for longer than 2 s.
The burner switches to manual mode. "P" appears on the display under Status and the current modulation level flashes under Service.

2. ▼ for the lower heating output to partial load (0 %)

3. ▲ The burner modulates upwards in 1 % steps to full load (100 %)

4. ▼ /S simultaneously for longer than 2 s.
The burner returns to modulating mode.

Burner control unit flow diagram

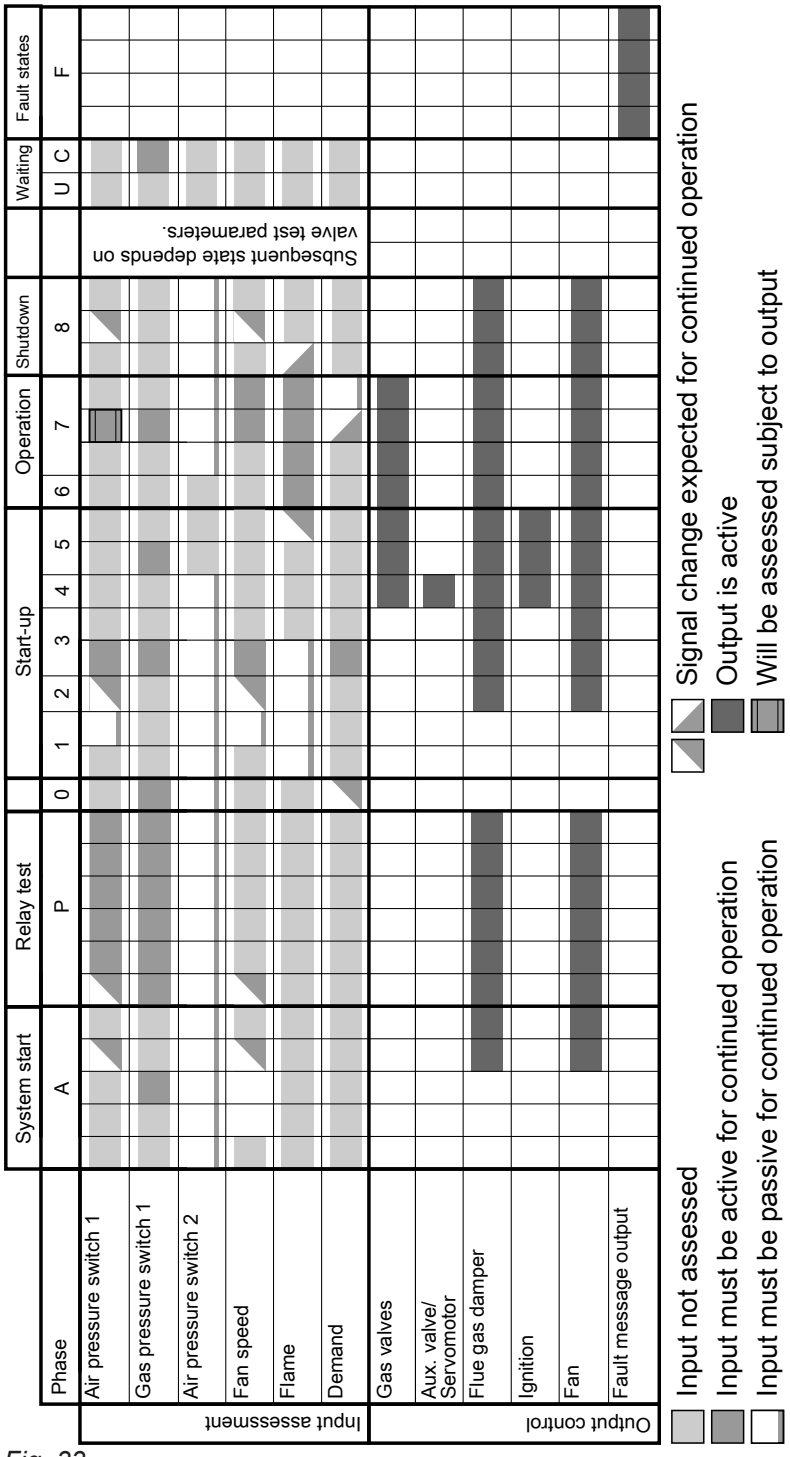


Fig. 33

Description of state:

Phase	Display	Description	Duration
System start	**"A"**	System start	10 s
		Initialisation of fault meter	0.1 s
		Mains test, gas pressure	1 s
		Fan ramp-up, system start	max. 20 s
		Forced ventilation, system start	20 s

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Burner control unit flow diagram (cont.)

Phase	Display	Description	Duration
Relay test	**"P"**	Fan ramp-up for test	max. 20 s
		Safety relay test	0.9 s
		Disabling relays BV1 and BV2	0.9 s
		Relays BV1 and BV2 test	0.9 s
		Ignition relay test	0.9 s
		Disabling safety relay	0.9 s
		Start-up meter, initialisation	0.1 s
Standby	**"0"**	Standby	0 ... s
Start-up	**"1"**	Flame signal amplifier test	max. 50 s
		Gas fan and air pressure switch test	max. 20 s
	"2"	Fan ramp-up	max. 20 s
	"3"	Pre-purge	10 s
		Adjusting start-up load, WD 1 test	1.9 s
	"4"	Pre-ignition	2 s
	"5"	Ignition safety time	2.3 s
		Flame detection safety time	max. 0.51 s
Operation	**"6"**	Flame stabilising time	15 s
	"7"	Start-up, partial load	20 s
		Modulating operation	0 to 24 h
		Adjusting shutdown load	0.1 s
Shutdown	**"8"**	Reheating, WD 2 test	min. 10 s, max. 60 s
		Fan ramp-up, post-purge	max. 20 s
		Post-purge	10 s
Waiting	**"U"**	Waiting for restart	1 min
	"C"	Waiting for mains gas pressure	5 min
Fault status	**"9"**	Forced ventilation fault	20 s
	"10"	Flame tear-off	0 ... s
	"11"	Safety shutdown	0 ... s
	"F"	Fault shutdown	0 ... s

Fault display

Fault display

If the burner control unit switches to a fault state, the fault display is automatically activated. The most recent fault is then displayed. The fault LED is also illuminated in the case of a non-lockout fault, or flashes together with the fault code in the case of a lockout fault.

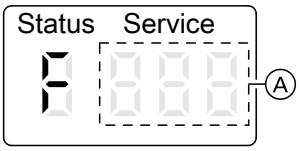


Fig. 34

Ⓐ Fault code of the most recent fault (see table from page)

1. Remedy the fault. For fault codes and measures, see chapter "Fault codes". Carry out measures in the indicated order.
2. Press reset button **R** for longer than 0.5 s. The operating display is shown again and the burner control unit is reset.

Fault memory

The 10 most recent faults are saved and can be called up. The most recent fault code is shown first, followed by the preceding codes. If no key is pressed within 20 s the fault memory display terminates automatically.

Note
If the burner does not start up due to a non-lockout fault without displaying a fault code, the fault memory may be able to indicate the cause.

To call up the fault codes, press the following keys:

1. S for longer than 2 s, 🔧 flashes.

2. ▲ until "4" is shown under Service.

3. S "4" will be displayed under Status.

4. ▲/▼ to scroll through the fault memory display.

Service	Description
1	Fault codes display
2	Detailed fault codes
3	Clear fault memory

5. S the selected fault memory display will be shown under Status.

6. ▲/▼ to scroll through the fault codes.

To clear the fault memory from the operating display, press the following keys:

1. S for longer than 2 s, 🔧 flashes.

2. ▲ until "4" is shown under Service.

3. S "4" will be displayed under Status.

4. ▲ until "3" is shown under Service.

5. S "1" is shown under Status and "dEL" under Service.

6. S to confirm the deletion. If deleted successfully, "1" will be shown under Service; if not, "0" will appear.

7. S To change to the operating display.

Fault codes

General process errors

Fault is displayed on the display and programming unit on the burner.

Note
Carry out measures in the order given.
All fault codes are saved to the fault memory and the last 10 can be called up.

Fault codes (cont.)

Displayed fault code	System characteristics	Cause	Measures
F b7	Burner control unit in a fault state; system cooling down; burner control unit locked out.	Coding card not inserted in the burner control unit, incorrect or faulty coding card	Insert coding card; check coding card, replace if required.
F b7	Type of coding card	Coding card does not match burner control unit.	Replace coding card or burner control unit. ⚠ **Danger** Plug-in terminals on the burner control unit are 'live'. Only replace the coding card when the power has been isolated from the burner control unit
F E4	Burner shuts down.	Multiple detection of undervoltage with return and renewed undervoltage	Check the power supply.
F E5	Burner control unit in a fault state	Internal fault of the burner control unit during test of ionisation input	Replace burner control unit.
F EE	Burner control unit in a fault state	Internal error in feedback from gas safety valves, output relay does not respond	Reset burner control unit, replace burner control unit
F EF	Burner control unit in a fault state	Internal error in feedback from gas safety valves, output relay does not respond	Reset burner control unit, replace burner control unit
F F3	Ionisation flame monitor reports faulty flame signal during start-up or after the post-purge	Gas train not gas-tight (gas is escaping and burning), incorrect coding card	Check ionisation path, replace coding card, replace gas train
F F4	No flame formation during the safety time, no flame signal captured by the ionisation flame monitor	Ionisation electrode incorrectly adjusted, ionisation electrode not plugged in. Earth leakage of electrode or cable	Insert plug of ionisation electrode; check cable; adjust ionisation electrode (see page 14)
F F4	No flame formation during the safety time, no flame signal captured by the ionisation flame monitor	Ignition electrodes incorrectly adjusted, electrodes earthed, faulty ignition unit, faulty burner control unit	Adjust ignition electrodes (see page 14); replace ignition unit; replace burner control unit
F F4	No flame formation during the safety time, no flame signal captured by the ionisation flame monitor	Insulation body of ignition or ionisation electrode cracked	Replace ignition or ionisation electrode
F F4	Poor start-up characteristics; rotary damper does not close. Solenoid valve not switching	Servomotor faulty, servomotor connecting cable faulty, solenoid valve faulty, faulty output relay (burner control unit)	Replace connecting cable, replace servomotor, replace solenoid valve, replace burner control unit
F F4	No flame formation during the safety time, no signal captured by the ionisation flame monitor	Incorrect gas type selected	Adjust gas type setting (see page 7)

Fault codes (cont.)

Displayed fault code	System characteristics	Cause	Measures
F F4	No flame formation during the safety time, no signal captured by the ionisation flame monitor	Gas train does not open	Check connecting cable, check gas train and replace if required
F F4	No flame formation during the safety time, no signal captured by the ionisation flame monitor	Combustion characteristics not ideal	Adjust the burner (see from page 11; if necessary also adjust the setting screws with the burner in idle mode to facilitate the burner start)
F F5	No air pressure captured by air pressure switch 1, fan idle	Air pressure switch 1 faulty, incorrectly connected or incorrectly set	Replace air pressure switch 1, connect or adjust correctly
F F5	Air pressure switch 1 switches off during operation	Flue gas back pressure, condensate banked up, air pressure switch 1 hose faulty, connecting hose leaking	Remove flue gas back pressure, check if condensate banked up, reset burner control unit, replace hose
F F6	No gas pressure captured by gas pressure switch	Gas shut-off valve closed, gas pressure switch faulty, multiple problems with gas supply	Open gas shut-off valve, check gas flow pressure, replace gas filter if required, reset burner control unit, replace gas train
F F7	Fan pressure is created during the idle state check of air pressure switch 1	Wind influence on fan	Check flue outlet (chimney)
F F7	Contact of air pressure switch 1 not in idle state	Air pressure switch 1 faulty	Replace air pressure switch 1
F F8	Flame extinguishes during operation	Incorrect gas type selected	Adjust gas type setting (see page 7)
F F8	Flame extinguishes during operation	Burner gauze assembly faulty	Check burner gauze assembly, replace if damaged
F F8	Flame extinguishes during operation	Combustion characteristics not ideal	Adjust burner setting (see from page 11)
F F9	Fan not running, fan speed not reached	Fan faulty, cables are faulty or broken	Check cables, replace fan if required
F F9	Status duration too long, fan ramp-up	Internal fault, fan cannot reach its set value	Replace fan or burner control unit
F F9	Varying fan speed	Fan faulty, cable "100A" faulty or broken	Check cable, possibly replace cable "100A" or fan
F F9	No fan feedback	Fan faulty, external fan power supply not connected or faulty, cable "100A" faulty or broken, fan blocked (possibly by foreign bodies)	Check cable "100A", check external power supply, replace cable or fan, remove foreign bodies
F FA	Fan runs without demand, burner control unit in a fault state	Fan does not reach idle state, cable "100A" faulty, fan faulty, burner control unit faulty	Fan subject to wind influence, check flue outlet and fan, replace cable "100A", replace fan, replace burner control unit
F FB	Excessive combustion chamber pressure, burner control unit in a fault state	Flue gas path or condensate path blocked off	Check flue gas path or condensate path and clean if required

Fault codes (cont.)

Internal system fault

Internal system faults are created if a perfect program sequence can no longer be guaranteed.

Display	System characteristics	Cause	Measures
F E5, F EC, F Ed, F Fd, F FF	Fault around burner control unit	Internal system fault and EMC	Reset burner control unit. Replace the burner control unit if the fault persists

Faults without fault display

Fault	Cause of fault	Measure
Combustion faults due to pulsation	Excessive gas throughput	Adjust gas throughput in accordance with rated boiler heating output
	Insufficient or excessive air	
	Condensate backed up in flue system	Check condensate drain.
	Flue outlet not installed correctly	Check flue outlet and flue system.
Thermo-acoustics/combustion noise	Incorrect CO_2 settings; insufficient or excessive air	Adjust burner in accordance with the details from page 11.
CO_2 content too low	Incorrect setting	Check whether the burner has been adjusted to the correct gas type; change gas restrictor if required (see from page 7). Adjust burner in accordance with the details from page 11.
CO formation or burner is very sooty	Insufficient or excessive air	Correct the settings. Check ventilation in installation room.
	Insufficient draught in flue system	Check flue system.
Flame tears off during operation	Inlet strainer of gas train contaminated	Remove flange. Clean strainer.
Flue gas temperature too high	Excessive gas throughput	Adjust gas throughput in accordance with the rated boiler heating output. Check condition of secondary heating surfaces of the boiler and clean if required.

Faults without fault display (cont.)

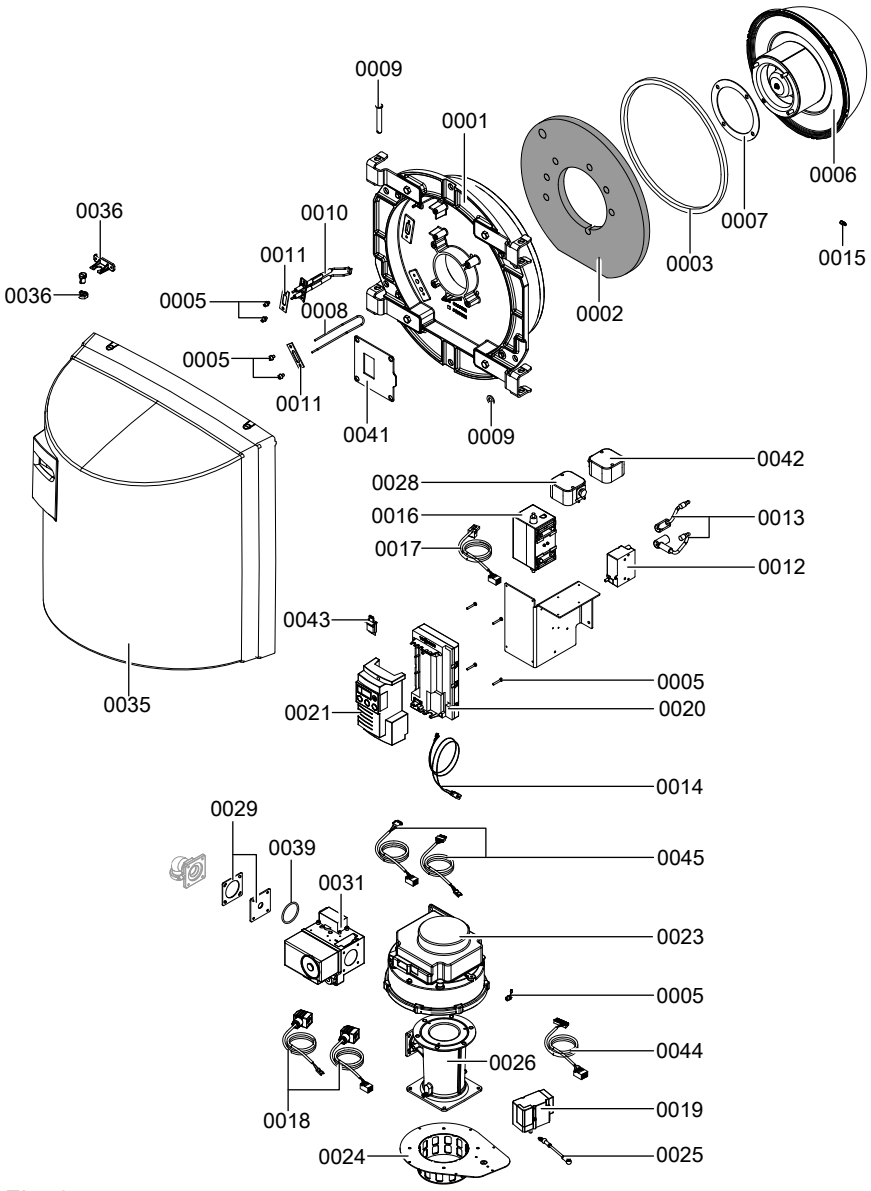
Ordering parts

The following information is required:
- Serial no. (see type plate Ⓐ)
- Assembly (from this parts list)
- Position number of the individual part within the assembly (from this parts list). Standard parts are available from your local supplier.

Parts not shown

0001	MatriX burner installation instructions
0002	MatriX burner service instructions
0003	Touch-up spray paint, Vitosilver, 150 ml can
0004	Touch-up paint stick, Vitosilver

Parts


0009
0001
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0036
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0028
0016
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0017
0012
0043
0035
0005
0021
0020
0014
0029
0039
0045
0031
0023
0005
0044
0026
0019
0018
0024
0025

Fig. 35

Parts (cont.)

Pos.	Part
0001	Boiler door
0002	Thermal insulation block
0003	Packing
0005	Small parts
0006	Burner gauze assembly
0007	Graphite gasket
0008	Ionisation electrode
0009	Fixing parts
0010	Ignition electrode block
0011	Electrode block gasket
0012	Ignition transformer
0013	Ignition cable
0014	Ionisation cable
0015	Compensation set
0016	Suppressor choke box
0017	Ignition transformer connecting cable
0018	Gas train connecting cables
0019	Servomotor
0020	Burner control unit
0021	Programming unit
0023	Gas fan
0024	Rotary damper
0025	Articulated rod
0026	Venturi mixing pipe
0028	Air pressure switch with connecting cable 131
0029	E gas restrictor with gasket
0031	Gas train
0035	Burner hood
0036	Hood fixings
0039	O-ring gasket
0041	Fan sealing plate
0042	Air pressure switch with connecting cable 131A
0043	Coding card
0044	Servomotor connecting cable
0045	Gas fan connecting cables

Component overview

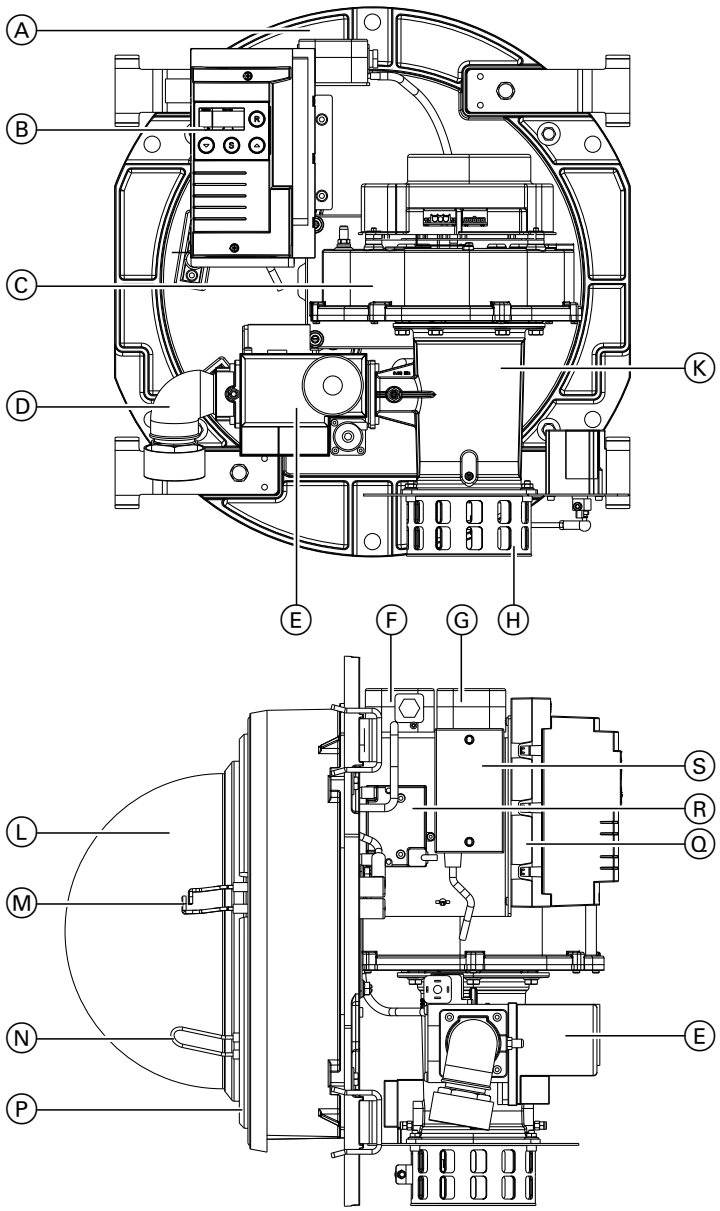

Fig. 36

Ⓐ Boiler door
Ⓑ Display and programming unit
Ⓒ Fan
Ⓓ Gas supply pipe
Ⓔ Gas train
Ⓕ Air pressure switch 1
Ⓖ Air pressure switch 2
Ⓗ Rotary damper with servomotor
Ⓚ Venturi mixing pipe
Ⓛ Burner gauze assembly
Ⓜ Ignition electrodes
Ⓝ Ionisation electrode
Ⓟ Thermal insulation block
Ⓠ Burner control unit
Ⓡ Ignition unit
Ⓢ Suppressor choke box

Air pressure switch

Fan pressure monitoring function (LDW1)

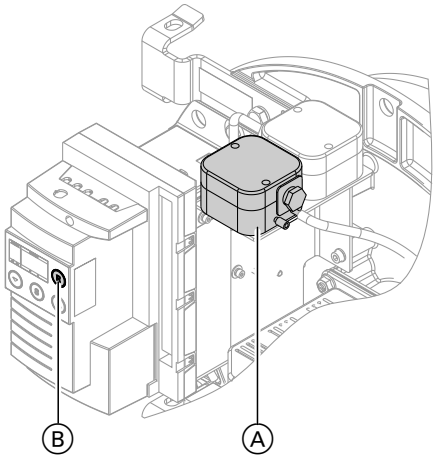

Fig. 37

The switching threshold of air pressure switch 1 (LDW1) is monitored in all fan ramp-up phases and checked in modulating burner operation. This ensures a minimum pre-purge.

Air pressure switch Ⓐ triggers a fault shutdown at the burner control unit under the following circumstances:

- If the static pressure check was unsuccessful after approx. 5 minutes
- If the air pressure is outside the permissible range during the pre-purge phase (tolerance time approx. 5 minutes)
- If the air pressure switch fails in regular operation or the air pressure lies outside the permissible range

The fault shutdown is shown with fault indicators "F F5" and "F F7" on the burner control unit display (see page 19) and can be cleared by pressing reset button Ⓑ.

Burner output in kW	LDW1 setting
187	1.2 mbar (0.12 kPa) ↑
248	
314	

Combustion chamber pressure monitoring function (LDW2)

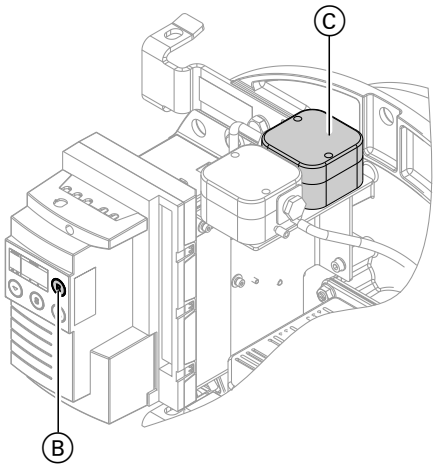

Fig. 38

To monitor the combustion chamber pressure, the switching threshold of air pressure switch 2 (LDW2) is monitored in all operating phases (except during safety and stabilising time).
Air pressure switch Ⓒ triggers a fault shutdown at the burner control unit under the following circumstances:

- If the combustion chamber pressure is outside the permissible range in the pre-purge phase, in control mode or in the post-purge phase after 2 attempts

The fault shutdown is shown with fault indicator "F FB" on the burner control unit display (see page 19) and can be cleared by pressing reset button Ⓑ.

Burner output in kW	LDW2 setting
187	5 mbar (0.5 kPa) ↑
248	
314	

Burner control unit connection diagram

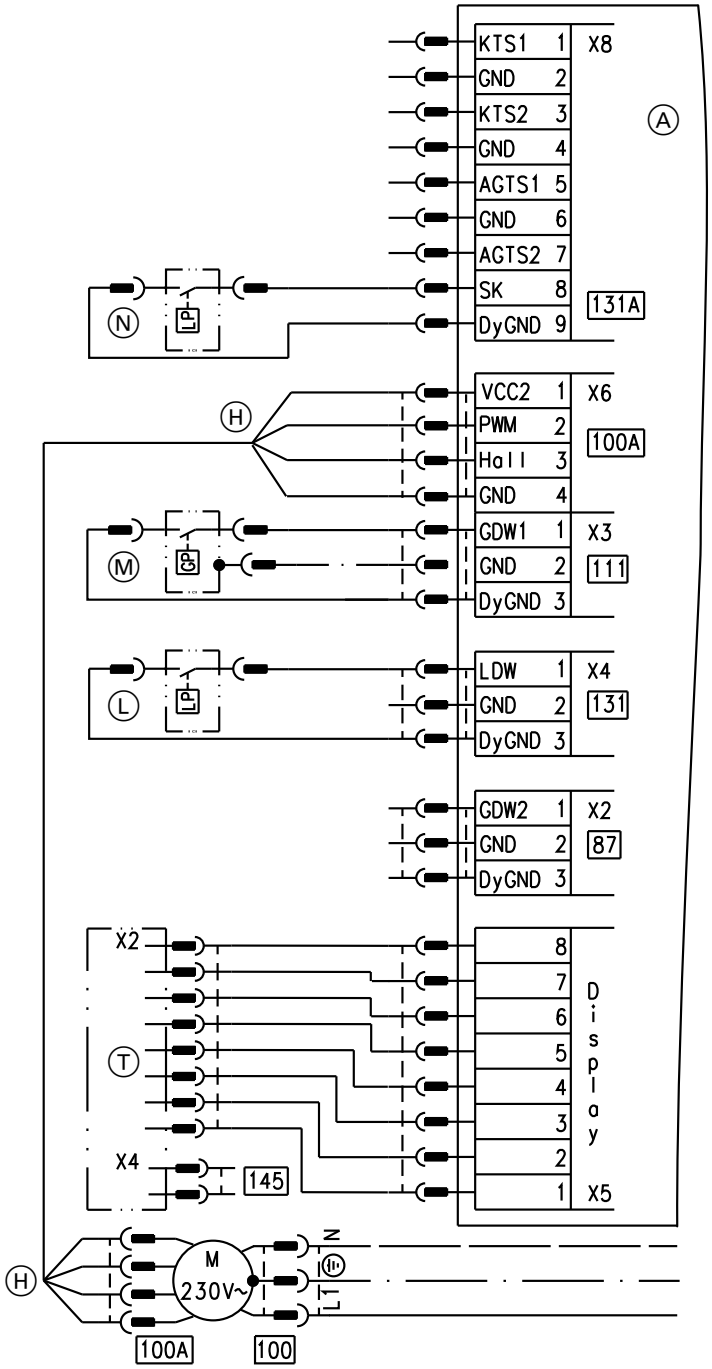

Fig. 39

Ⓐ Burner control unit VUC 310
Ⓗ Fan motor with PWM control and feedback
Ⓛ Air pressure switch 1
Ⓜ Gas pressure switch 1
Ⓝ Air pressure switch 2
Ⓣ Display and programming unit

Burner control unit connection diagram (cont.)

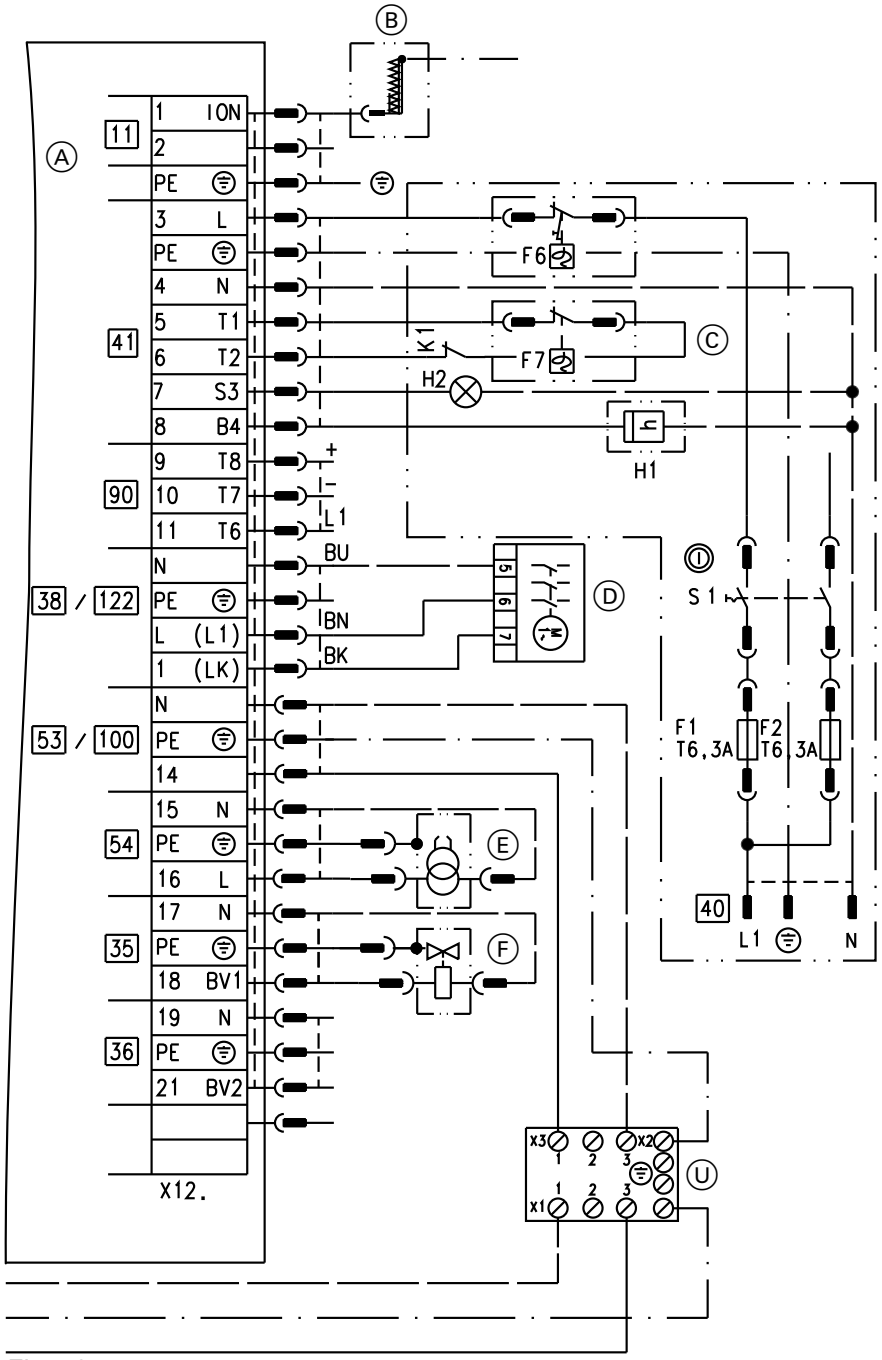

Fig. 40

Ⓐ Burner control unit VUC 310
Ⓑ Flame monitor with ionisation current
Ⓒ Vitotronic control unit
Ⓓ Servomotor for rotary damper
Ⓔ Ignition unit
Ⓕ Fuel valve BV1
Ⓤ Suppressor choke box

F1 Backup fuse
F2 Backup fuse
F6 High limit safety cut-out
F7 Temperature controller
H1 Hours run meter, modulation
H2 Fault message
S1 ON/OFF switch

Report

Setting and test values			Commissioning	Maintenance/Service
Static pressure		*mbar*		
		kPa		
Supply pressure (flow pressure)				
☐ for natural gas E		*mbar*		
		kPa		
☐ for natural gas LL		*mbar*		
		kPa		
Tick gas type				
Carbon dioxide content CO_2				
▪ At the upper rated heating output	actual	*% by vol.*		
	set	*% by vol.*		
▪ At the lower rated heating output	actual	*% by vol.*		
	set	*% by vol.*		
Oxygen content O_2				
▪ At the upper rated heating output	actual	*% by vol.*		
	set	*% by vol.*		
▪ At the lower rated heating output	actual	*% by vol.*		
	set	*% by vol.*		
Carbon monoxide content CO	actual	*ppm*		
	set	*ppm*		
Flue gas temperature (gross)	actual	*°C*		
	set	*°C*		
Ionisation current				
▪ At the upper rated heating output		*µA*		
▪ At the lower rated heating output		*µA*		
Draught	actual	*hPa*		
	set	*hPa*		

Specification

Rated boiler heating output T_V/T_R = 50/30 °C	kW	187	248	314
CE designation		CE-0085BL0403		
Burner type		VMIII-4	VMIII-5	VMIII-6
Voltage	V	230		
Frequency	Hz	50		
Power consumption	W	335	335	380
Modulation range	%	33-100		

Gas restrictor dimensions (natural gas E)

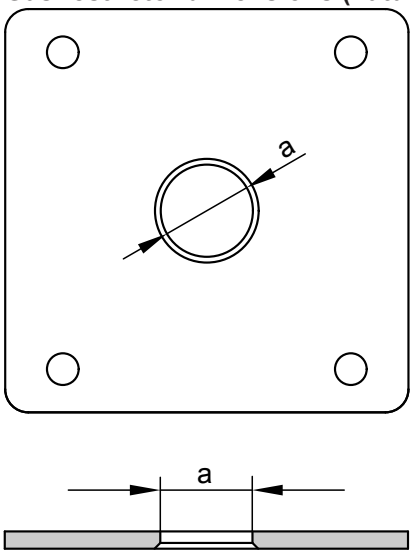

Fig. 41

Rated heating output in kW	Dimension a in mm
187	16.0
248	16.2
314	16.8

Final decommissioning and disposal

Viessmann products can be recycled. Components and substances from the system are not part of ordinary household waste.
For decommissioning the system, isolate the system from the power supply and allow components to cool down where appropriate.
All components must be disposed of correctly.

Declaration of Conformity

MatriX radiant burner, type VM III

We, Viessmann Werke GmbH & Co. KG, D-35107 Allendorf, declare as sole responsible body that the named product complies with the provisions of the following directives and regulations:

2014/30/EU	EMC Directive
2014/35/EU	Low Voltage Directive
2009/142/EC	Gas Appliances Directive
813/2013	EU Regulation "Energy Efficiency Requirements"
2009/125/EC	Ecodesign Directive

Applied standards:

EN 676: 203 + A2: 2008
EN 55014-1: 2011
EN 55014-2: 2015
EN 60335-1: 2015 + A11: 2014
EN 60335-2-102: 2006 + A1: 2010
EN 61000-3-2: 2006 + A1: 2009 + A2: 2009
EN 61000-3-3: 2013
EN 62233: 2008

In accordance with the listed directives, this product is designated with CE-0085.

Allendorf, 19 July 2017

Viessmann Werke GmbH & Co. KG

Authorised signatory Reiner Jansen
Head of Strategic Quality Management

Manufacturer's certificate

We, Viessmann Werke GmbH & Co. KG, D-35107 Allendorf, confirm that the **MatriX radiant burner, type VM III**, complies with the NO_x limits specified by the 1st BImSchV, paragraph 6 [Germany].

Allendorf, 19 July 2017

Viessmann Werke GmbH & Co. KG

Authorised signatory Reiner Jansen
Head of Strategic Quality Management

Keyword index

5609 774 GB

Applicability

Serial No.:

7501636	7501637	7501638

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5609 774 GB Subject to technical modifications.