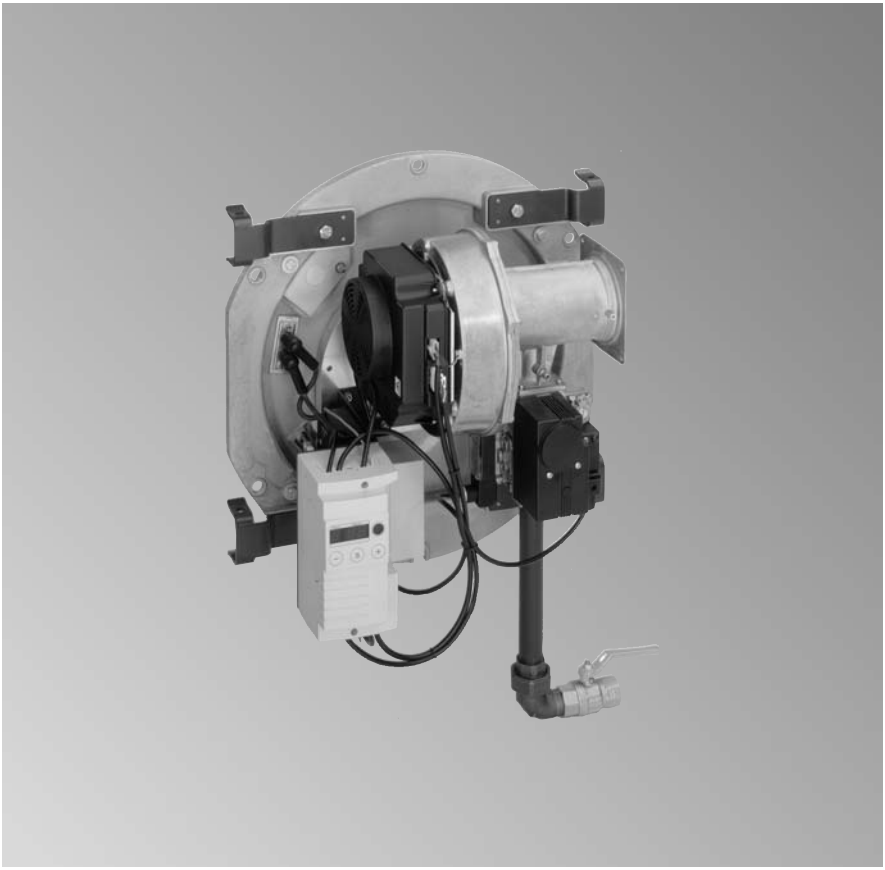
Service instructions

for heating engineers

MatriX radiant burner
Pressure-jet gas burner, type VM III
for Vitocrossal 300, type CT3
Rated output 187 to 314 kW

For validity, see final page.

MatriX radiant burner



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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 designed for qualified personnel.
- Work on gas equipment must only be carried out by a registered gas fitter.
- Electrical work must 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.

Regulations

Observe the following when working on this system
- all legal instructions regarding the prevention of accidents,
- all legal instructions regarding environmental protection,
- regulations issued by professional bodies,
- all current safety regulations as defined by DIN, EN, DVGW, TRGI, TRF, VDE and all locally applicable standards.

If you smell gas

Danger
Escaping gas can lead to explosions which may lead to serious injury.
- Do not smoke! Prevent naked flames and sparks. Never switch on electrical lights or equipment.
- Open windows and doors.
- Close the gas shut-off valve.
- Shut down the system.
- Remove all people from the danger zone.
- Observe the safety regulations of your local gas supplier, found on the gas meter.

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Steps – Initial start-up, inspection and maintenance

For further instructions on individual steps, see pages indicated.

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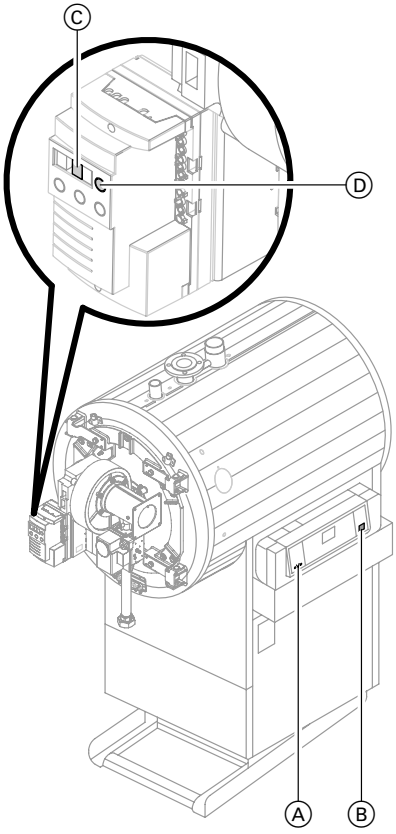
Further details regarding the individual steps

Danger
Increased CO emissions can lead to life-threatening poisoning.
Check the CO value before and after any work on gas appliances, to prevent any health hazards and to ensure the perfect operational condition of the system.

Note
An examination of the burner with the boiler heated to operating temperature (min. 40 °C) is essential.
Also carry out measurements at the lower rated output.

Starting the system



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Further details regarding the individual steps (cont.)

Starting the system (cont.)

Boiler control unit service instructions

1. Check the system pressure.

2. Open the gas shut-off valve.

3. Switch ON the mains isolator (outside of the boiler room).

4. Switch the system ON/OFF switch Ⓑ on the control unit ON. If the fault indicator lamp Ⓐ on the control unit illuminates and the gas burner control unit display Ⓒ flashes, initially press the reset button Ⓓ on the gas burner control unit.

Note
During the initial start-up the system can enter a fault state, if it has insufficient gas in the supply line (fault indicator on the control unit illuminates).
Ventilate the gas supply line again and reset the gas burner control unit.

5. Match the coding on the boiler control unit according to the table on page 47.

Control unit installation and service instructions

Checking the gas type

1. Determine the gas type and Wobbe index (Wo) from your gas supplier.
- With **natural gas setting E**, the boiler can be operated in the Wobbe index range 12.0 to 16.1 kWh/m^3 (43.2 to 58.0 MJ/m^3).
- With **natural gas setting LL**, the boiler can be operated in the Wobbe index range 10.0 to 13.1 kWh/m^3 (36.0 to 47.2 MJ/m^3).

2. The burner is set up in the factory for natural gas E. If necessary, convert the burner in accordance with details provided by your gas supplier to a different gas type (see page 7).

3. Record the gas type in the service report (on page 49).

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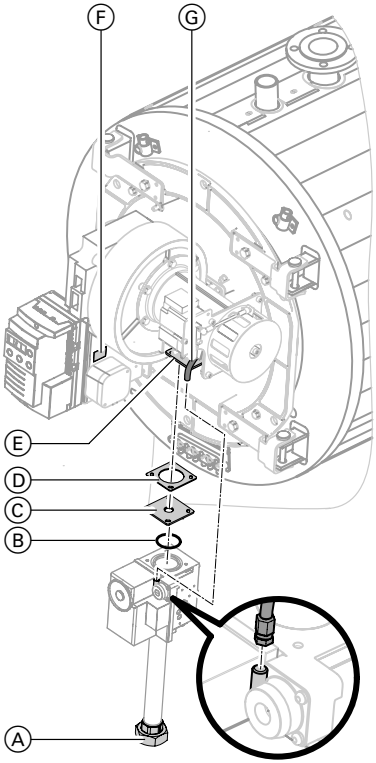
Further details regarding the individual steps (cont.)

Conversion to natural gas LL



1. Close the gas shut-off valve.
2. Switch OFF the system ON/OFF switch on the control unit.
3. Switch OFF the mains isolator (outside the installation room) or the power supply and prevent unauthorised reconnection.
4. Release the fitting Ⓐ.
5. Remove the compensation hose Ⓖ from the gas combination valve.
6. Release the flange Ⓔ from the gas combination valve.
7. Remove the restrictor Ⓒ with the rubber cork seal Ⓓ.
8. Secure the gas combination valve (without the restrictor Ⓒ and without the rubber cork seal Ⓓ, but with the O-ring Ⓑ) to the flange Ⓔ; in doing so, replace the factory-fitted screws M 5 × 16 with M 5 × 12 (see pack).
9. Secure the fitting Ⓐ.
10. Secure the compensation hose Ⓖ to the gas combination valve.
11. Affix the enclosed label "Adjusted to ..." Ⓕ above the existing label.
12. Start the burner (see page 5).

⚠ **Danger**
Escaping gas leads to a risk of explosions.
Check all fittings for soundness.

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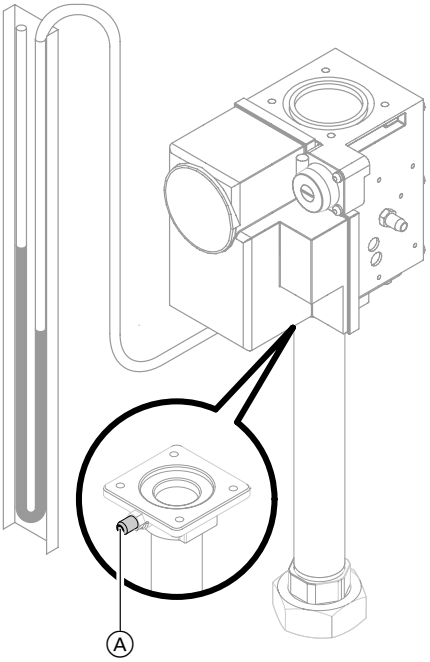
Further details regarding the individual steps (cont.)

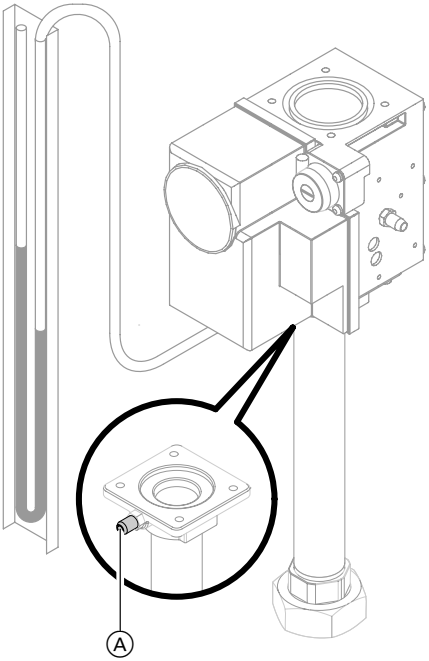
Checking the static and the supply pressure



Static pressure

1. Close the gas shut-off valve.
2. Release the screw in the test nipple Ⓐ, but do not remove.
3. Release the pressure gauge in the test nipple Ⓐ, but do not remove.
4. Open the gas shut-off valve.
5. Check the static pressure (max. 60 mbar).
6. Record the test value in the service report (on page 49).

Further details regarding the individual steps (cont.)



Supply pressure

7. Start the burner.

Note
Initial start-up, see page 5.
Switch the burner to max. output; for this, activate the emissions test switch on the control unit.

8. Check the supply pressure (flow pressure), see the table below.

Note
The supply pressure (flow pressure) should be between 20 and 50 mbar.
The gas governor is factory-set to 10 mbar.
Do not adjust this setting.

9. Record the test value in the service report (on page 49).

10. Close the gas shut-off valve.

11. Release the pressure gauge; close the test nipple Ⓐ.

Supply pressure (flow pressure)	Measures
below 15 mbar	Do not change the settings – notify your gas supply company
15 to 20 mbar	Please note: The boiler may only be operated temporarily with these settings (emergency mode). Notify your gas supply company.
20 to 50 mbar	Start the boiler
via 50 mbar	Install a separate gas governor with zero off upstream of the boiler and regulate the pressure to 20 mbar. Notify your gas supply company.

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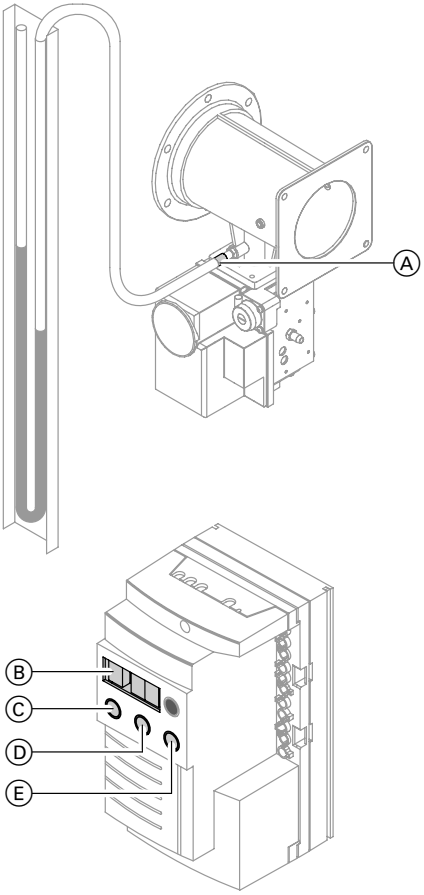
Further details regarding the individual steps (cont.)

Checking the venturi suction pressure
Burner with 187 kW rated output



Further details regarding the individual steps (cont.)

1. Release the screw in the test nipple Ⓐ, but do not remove.

2. Connect the pressure gauge to the test nipple Ⓐ (vacuum).

3. Open the gas shut-off valve.

4. Start the burner (see page 5).

5. Approx. 60 s after burner start, press "S" (Ⓓ) and "–" (Ⓒ) simultaneously.

Note
Display Ⓑ shows
- *Status: "d" (= control stop) and*
- *Service: Modulation level in % ("00." = 100% = higher output, "00" = 0% = lower output)*

6. Press "+" (Ⓔ), until the display shows "00.".
Burner runs at its higher output.

7. Check the venturi suction pressure.

Set negative pressure at the higher output:
- *7±0.5 mbar for natural gas E,*
- *6±0.5 mbar for natural gas LL.*

During the adjustment, also check the gas throughput by means of a volumetric test.

8. Record the test value in the service report (on page 49).

9. Press "S" (Ⓓ) and "–" (Ⓒ).
The burner is now in operating mode.

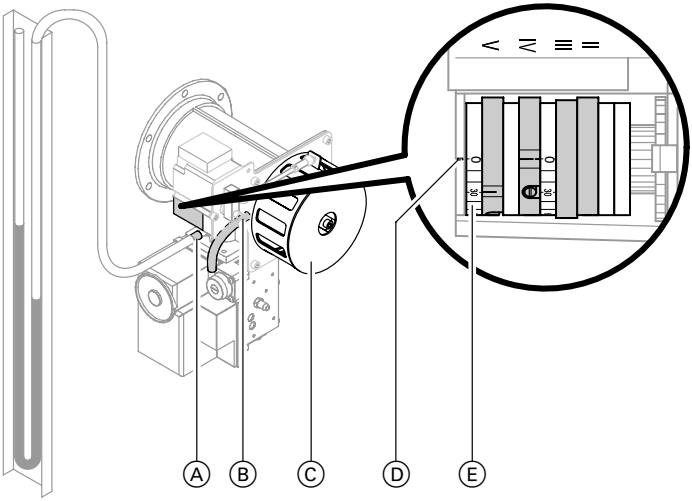
10. Close the gas shut-off valve.

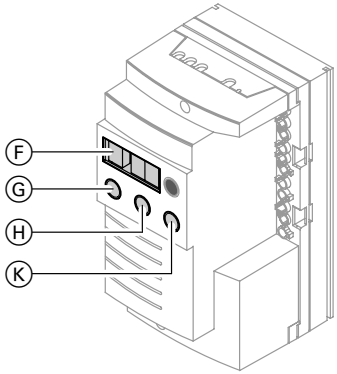
11. Release the pressure gauge, close the test nipple Ⓐ.

Danger
Escaping gas leads to a risk of explosions.
Check the test nipple and fittings for soundness.

Further details regarding the individual steps (cont.)

Burner with 248 and 314 kW





Further details regarding the individual steps (cont.)

1. Release the screw in the test nipple Ⓐ, but do not remove.

2. Connect the U-pipe pressure gauge to the test nipple Ⓐ (vacuum).

3. Open the gas shut-off valve.

4. Check the position of the rotary damper when the burner is in idle mode.
The rotary selector damper window Ⓒ must be fully open and the graduated collar Ⓔ on the air choke motor at the mark Ⓓ must be set to "0".

5. Check that the compensation cable Ⓑ is connected between the gas combination valve and the distributor pipe.

6. Start the burner (see page 5).

7. Check the position of the rotary damper during the start-up phase. The rotary selector damper window Ⓒ must close for approx. 4 s; during this period, the graduated collar Ⓔ is set to "30".

8. Approx. 60 s after burner start, press "S" (Ⓗ) and "–" (Ⓖ).

Note
Display Ⓕ shows
- *Status: "d" (= control stop)*
- Service: Modulation level in % ("00." = 100 % higher output "00" = 0 % lower output)

9. Press "+" (Ⓚ), until the display shows "00.".
Burner runs at its higher output.

10. Check the venturi suction pressure.

Burner output in kW	Permissible venturi suction pressure in mbar	
	Natural gas E	Natural gas LL
248	14.0±0.5	12.5±0.5
314	13.0±0.5	10.0±0.5

During the adjustment, also check the gas throughput by means of a volumetric test.

11. Record the test value in the service report (on page 49).

12. Press "S" (Ⓗ) and "–" (Ⓖ). The burner is now in operating mode.

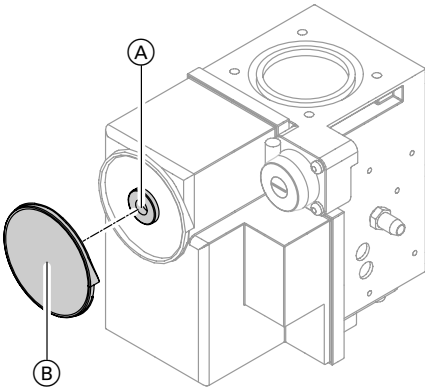
13. Close the gas shut-off valve.

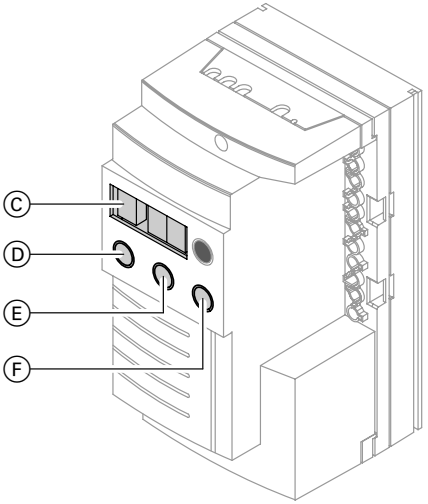
14. Remove the U-pipe pressure gauge; close the test nipple Ⓐ.

⚠ **Danger**
Escaping gas leads to a risk of explosions.
Check the test nipple and fittings for soundness.

Further details regarding the individual steps (cont.)

Checking the CO_2 content





1. Open the gas shut-off valve.

2. Start the burner.

3. Simultaneously press "S" (Ⓔ) and "–" (Ⓓ).

Note
The display Ⓒ shows
- *Status: "d" (= control stop) and*
- *Service: Modulation level in % ("00." = 100% = higher output, "00" = 0% = lower output)*

Higher output

4. Press "+" (Ⓕ), until the service display has incremented to "00." (= 100%).

5. Check the CO_2 content at the flue pipe.

Burner output in kW	Permissible CO_2 content in %
187	9.0 (-0.2/+0.3)
248	8.8 (-0.2/+0.3)
314	8.5 (-0.2/+0.3)

6. If the CO_2 content must be altered,
   - remove the cover Ⓑ and
   - turn the adjusting screw Ⓐ in small steps (Allen key, 3 mm) until the CO_2 content reaches the stipulated range:
     – turn clockwise
     → CO_2 content **falls**,
     – turn anti-clockwise
     → CO_2 content **rises**.

7. Record the test value in the service report (on page 49).

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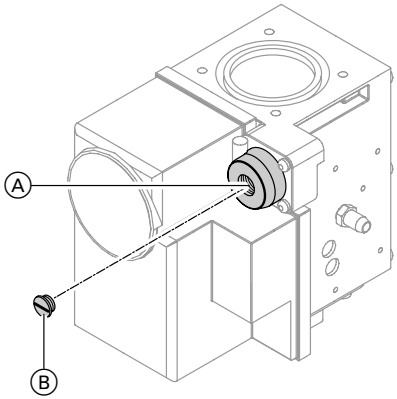
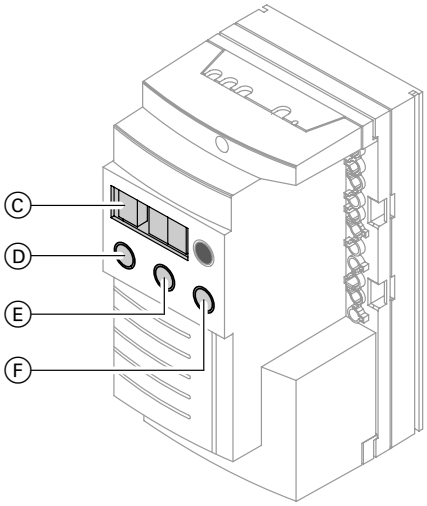
Further details regarding the individual steps (cont.)





Lower output

7. Press "–" (Ⓓ), until the service display shows "00" (lower output).

8. Check the CO_2 content at the flue pipe.
For permissible CO_2 content, see the table on page 14.

9. If the CO_2 content must be altered,
- remove the cover Ⓑ and
- turn the adjusting screw Ⓐ in small steps (torque 40) until the CO_2 content reaches the stipulated range.

– turn clockwise
→ CO_2 content **rises**,
– turn anti-clockwise
→ CO_2 content **falls**.

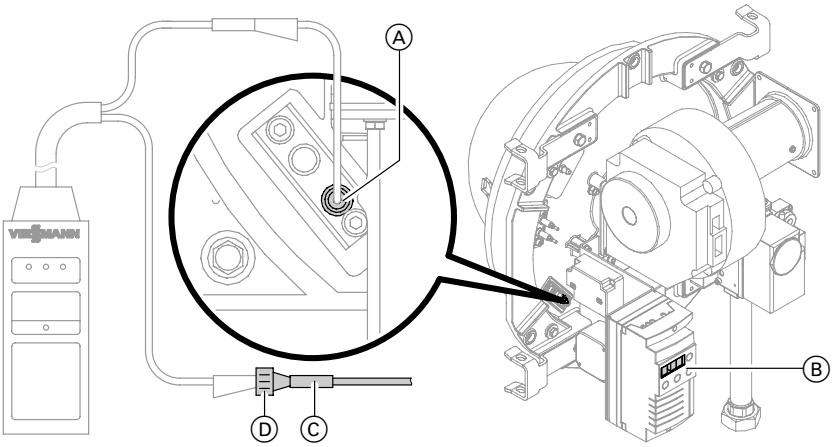
10. Record the test value in the service report (on page 49).

11. Check the measurements again. For this, use the gas burner control unit to approach the higher output (see step 4) and the lower output (see step 7). If the values do not match the permissible CO_2 contents according to the table on page 14, repeat the steps 6 or 9.

12. Press "S" (Ⓔ) and "–" (Ⓓ). The burner is now in operating mode.

Further details regarding the individual steps (cont.)

Checking the ionisation current



1. Switch OFF the mains isolator.
2. Pull the ionisation cable plug Ⓒ off.
3. Switch ON the mains isolator. There must be a fault shutdown after a burner start has been attempted. The display Ⓑ flashes fault code "F25".
4. Switch OFF the mains isolator.

   Note
   Test cable no. 1 is required when checking with the Testomatik-Gas. You can also carry out this check with a multimeter.

5. Connect the ionisation cable plug Ⓒ with the adaptor Ⓓ.
6. Plug the socket Ⓐ of the test cable onto the ionisation electrode.
7. Switch the mains isolator ON and check the ionisation current.

   Note
   The ionisation current must be at least 10 μA, approx. 2 to 3 s after the opening of the gas valve and during operation.

8. Record the test value in the service report (on page 49).
9. Switch the mains isolator OFF, remove the test equipment and reconnect the plug connector of the ionisation cable.
10. Switch ON the mains isolator.

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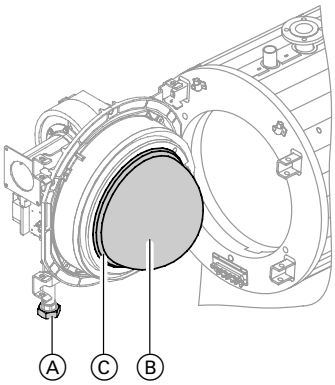
Further details regarding the individual steps (cont.)

Shutting down the system

1. Switch OFF the power supply or mains isolator and safeguard against unauthorised reconnection.
2. Pull the plug connectors 41 and 90 off the burner.
3. Close the gas shut-off valve.

Checking the burner gauze



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

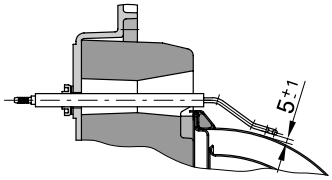
Installation instructions Replacing burner components

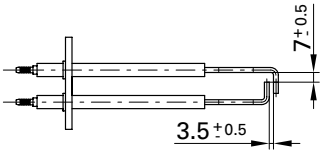
For cleaning the combustion chamber and hot gas flues, see boiler service instructions.

Further details regarding the individual steps (cont.)

Checking the ignition and ionisation electrodes

Ignition electrodes

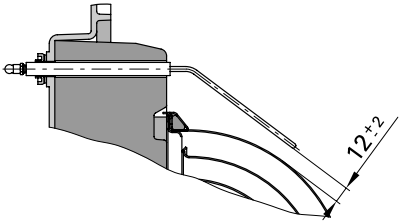




1. Check the ignition electrodes and the ionisation electrode for correct gap towards the burner gauze and for damage (replace, if necessary).

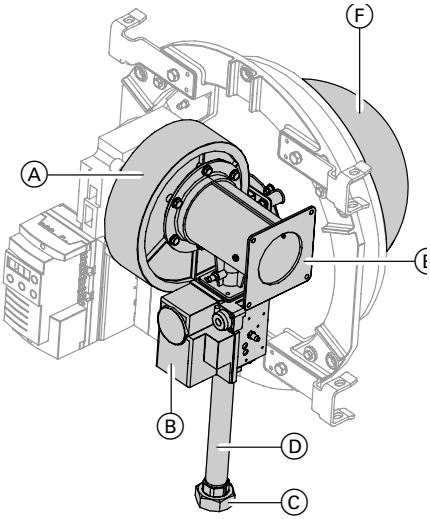
2. Close the boiler door and tighten the screws on the boiler door diagonally.

Ionisation electrode



Further details regarding the individual steps (cont.)

Cleaning the burner

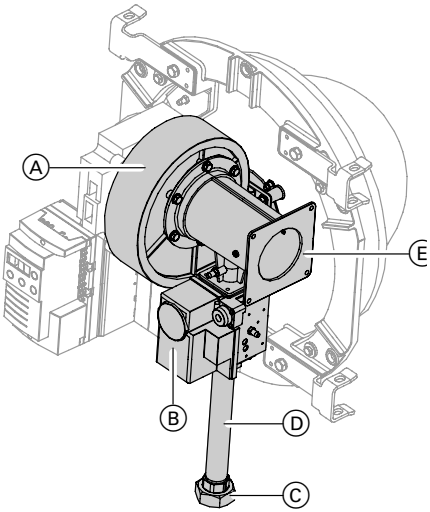


1. Release the fitting Ⓒ on the gas supply pipe Ⓓ.
2. Remove the venturi mixer pipe Ⓔ from the fan Ⓐ.
3. Remove the venturi mixer pipe Ⓔ with the gas combination valve Ⓑ and the gas supply pipe Ⓓ.

   Note
   187 kW version is shown. For larger burners, the rotary damper with drive is fitted to the position Ⓔ.
4. Pull the connecting cables "100" and "100a" off the fan Ⓐ and remove the fan Ⓐ.
5. Clean the fan housing and impeller with compressed air.
6. If required, vacuum the inside of the burner gauze Ⓕ.

Further details regarding the individual steps (cont.)

Fitting the burner



1. Fit the fan Ⓐ.

   Note
   Ensure correct positioning of the gasket between the fan housing and the boiler door.

2. Reposition the connecting cables "100" and "100a" onto the fan.

3. Refit the venturi mixer pipe Ⓔ with the gas combination valve Ⓑ and the gas supply pipe Ⓓ onto the fan Ⓐ.

   Note
   187 kW version is shown. For larger burners, the rotary damper with drive is fitted to the position Ⓔ.

4. Secure the fitting Ⓒ on the gas supply pipe Ⓓ.

   ⚠ **Danger**
   Escaping gas leads to a risk of explosions.
   Check the fitting and gasket between the fan housing and the boiler door for soundness.

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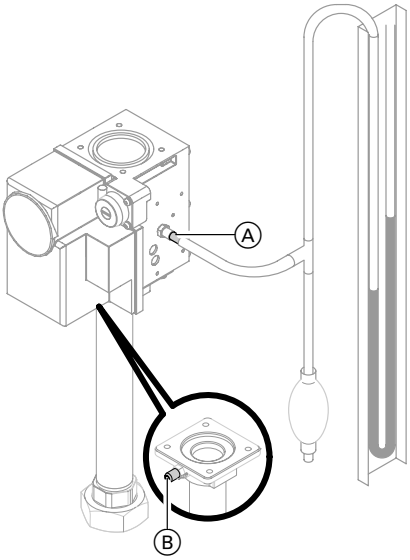
Further details regarding the individual steps (cont.)

Checking both valves of the gas combination valve for soundness



1. Close the gas shut-off valve.
2. Release the screw in the test nipple Ⓑ, but do not remove.
3. Release the screw in the test nipple Ⓐ, but do not remove.
4. Connect the pressure gauge on the test nipple Ⓐ with a manual pump.
5. Gently activate the manual pump to create a test pressure of approx. 50 mbar.
6. Wait approx. 5 minutes for the temperature to settle and then observe the display on the pressure gauge:

   If the displayed pressure does not fall within a further 5 minutes by more than 1 mbar, then the gas combination valve is sound → continue with step 7.
   Otherwise, the system leaks.
   In that case, return the gas combination valve to Viessmann Werke for tests.
7. After the test, close both screws in the test nipples.

Danger
Escaping gas leads to a risk of explosions.
Check the test nipples for soundness.

Further details regarding the individual steps (cont.)

Checking all gas connections for soundness

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

1. Insert new gaskets in all fittings which have been opened and tighten fittings.
2. Open the gas shut-off valve.
3. Check the inlet seals of the gas combination valve for soundness.
4. Start the burner (see page 5).
5. Check the outlet seals of the gas combination valve and fittings between fan and boiler door and fan and venturi pipe for soundness.

Implementing final tests

1. Carry out the finals tests according to the notes on pages 14 to 16.
2. Record the test values in the service report (on page 49).

Operating and service documents

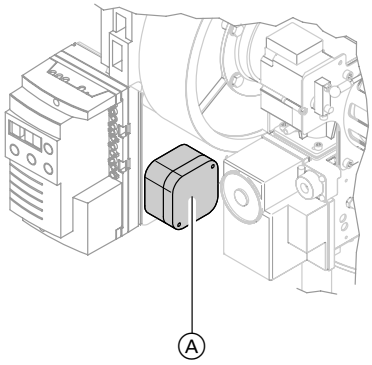
1. Complete and detach the customer registration card:
   - Give the system user this part for safe-keeping.
   - Retain the heating engineer part.
2. Keep all parts lists, operating and service instructions in the folder and hand this over to the system user.
   The installation instructions are not required after the installation is complete and may therefore be disposed of.

Air pressure limiter

Function

The air pressure limiter Ⓐ will signal in the following operating conditions:

- prior to the fan start (idle state check)
- in the pre-purge phase
- in the control mode, subject to at least the starting output being produced. Outputs which are lower than the starting output are not monitored.



Fault shutdown

The air pressure limiter triggers a fault shutdown on the gas burner control unit (see page 24) in the following situations:

- if the idle state check is unsuccessful after 5 attempts (anti-cycling function) (i.e the air pressure limiter contact does not open within 30 s)
- if, in the pre-purge phase, the minimum flow rate has not been produced (fault shutdown via the anti-cycling function)
- if, in the control mode, the air pressure limiter fails or the air pressure lies outside the permissible range

The fault shutdown is shown with fault display ”L” on the gas burner control unit (see pages 24 and 31) and **cannot** be rectified by pressing the reset button (see page 31).
The fault shutdown can only be rectified if the gas burner control unit is switched off by switching off the **power supply to the control unit**.
Before the gas burner control unit is set to fault (”L”) through a signal from the air pressure limiter, a re-attempt will take place five times every two hours. If these attempts are not successful, the gas burner control unit will be set to fault (”L”). This indicates a serious fault. A fault shutdown by the air pressure limiter (”L”) will not be displayed as a fault at the **control unit**, as it is normally (such as lack of gas ”A”) classified as a maintenance stage.
The air pressure limiter is always set to 1.0 mbar. This guarantees hygienic combustion. This will also ensure a minimum volume for pre-purge, as the air pressure limiter still regulates at minimum output.

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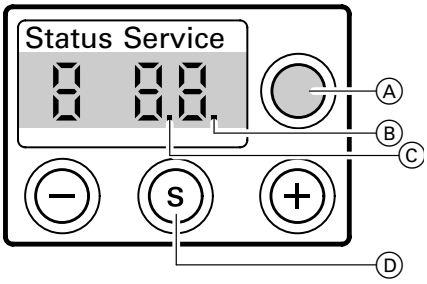
Gas burner control unit

Display and programming unit

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

The display comprises three, seven-segment elements; four keys enable settings to be adjusted at different operating levels. A DIP switch on the back of the display and programming unit enables burner parameters to be configured (for settings, see page 28).



Ⓐ Reset button
Ⓑ Decimal point
will be set if a display value exceeds 99
Ⓒ Memory LED
will be set if a value is saved
Ⓓ Selection key (select)

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Gas burner control unit (cont.)

Display	Status (single digit)	Service (two digit)	See
Operating display in standard mode	For the actual operating condition, see the following table	Display "FL" if a flame signal is present	Page 26
Operating display for operations deviating from the standard condition	Fault code "A" or "L" see following table	—	—
Service display	Fault code "d" see following table	Actual level of modulation	Page 27
Fault display	Fault code "F" see following table display flashes	Fault code Display flashes see pages 33 to 36	Page 31

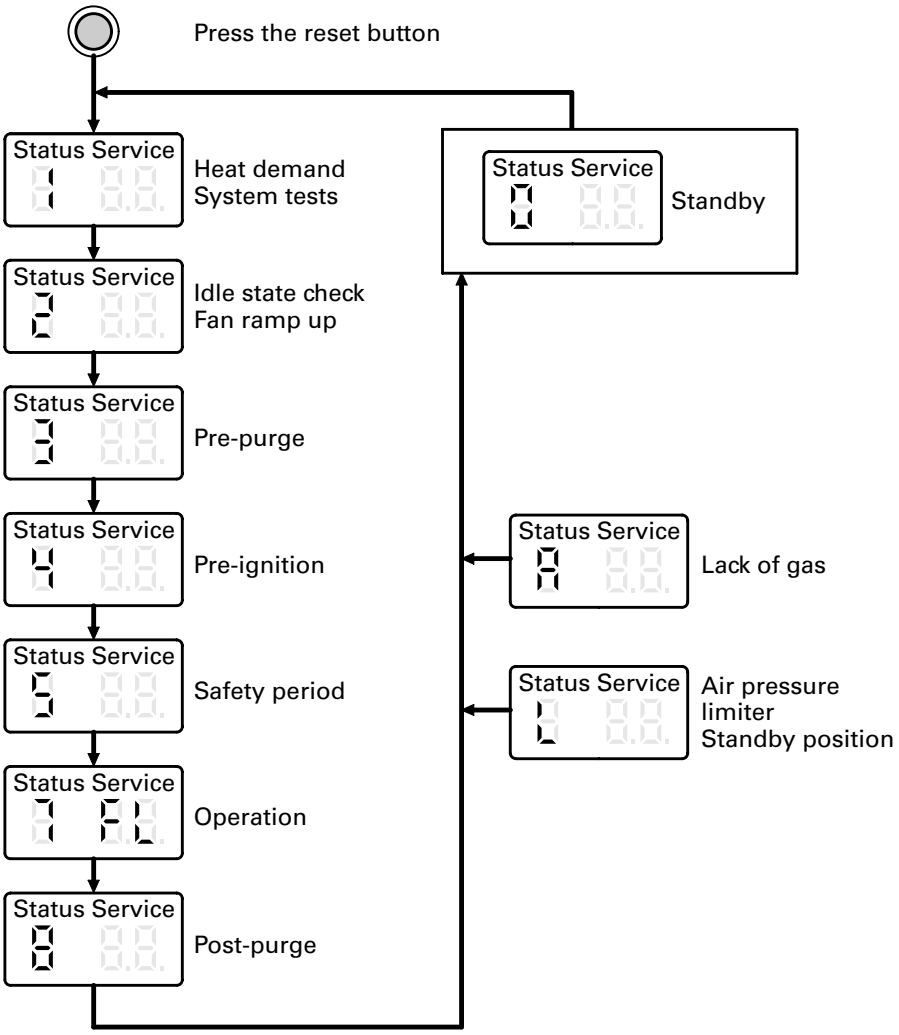
Display Status	Operating condition
0	No heat demand Standby
1	Heat demand System tests Start-up decision
2	Idle state check Fan ramp up
3	Pre-purge
4	Pre-ignition
5	Safety period
7	Operation
8	Post-purge

Display Status	Fault code
A	Lack of gas
d	Control stop; function active
F	Fault
L	Air pressure limiter standby position/flue gas backup
P	Parameter mode

Gas burner control unit (cont.)

Operating display

See also table on page 25.



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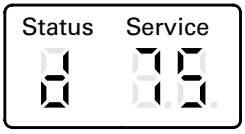
Gas burner control unit (cont.)

Manual mode and service display

A heat demand is required through the control unit to call up the service display and to operate in manual mode.
The actual level of modulation in % is shown in the service display; whereby:
"d 00" is the lower output
and
"d 00." (with the full stop after the last digit) is the higher output.

1. Press ⊖ and Ⓢ simultaneously; the burner will switch to manual mode. The display shows "d" under Status.



2. Adjusting the lower output: Press ⊖, until the display shows "d 00".

3. Adjusting the higher output: Press ⊕, until the display shows "d 00.".

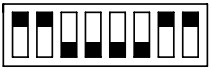
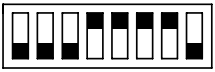
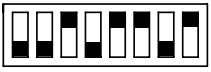
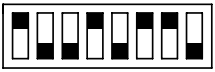
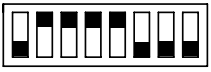
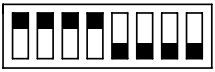
4. Press ⊖ and Ⓢ simultaneously; the burner will revert to modulating mode.

Gas burner control unit (cont.)

Adjusting the DIP switches or parameter set

The DIP switches are factory-set to the rated output of the burner.
A change to this factory setting is only required for reduced mode.

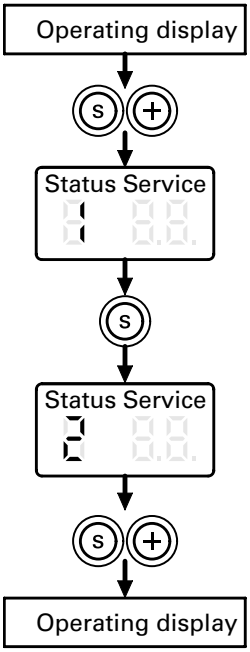
Note
If another parameter set is selected, this must be acknowledged (see page 30).

Setting **Rated burner output**	**Setting** **Reduced burner output**
Parameter set 3 ≙ 170 (187) kW ON  1 2 3 4 5 6 7 8	Parameter set 8 ≙ 119 (131) kW ON  1 2 3 4 5 6 7 8
Parameter set 4 ≙ 248 (225) kW ON  1 2 3 4 5 6 7 8	Parameter set 9 ≙ 174 (158) kW ON  1 2 3 4 5 6 7 8
Parameter set 14 ≙ 314 (285) kW ON  1 2 3 4 5 6 7 8	Parameter set 15 ≙ 220 (200) kW ON  1 2 3 4 5 6 7 8

Gas burner control unit (cont.)

Display of the selected parameter set

This display will be terminated if no key is pressed within 20 s.



Simultaneously press Ⓢ and ⊕

Press Ⓢ

Under "Service", the selected parameter set will be displayed

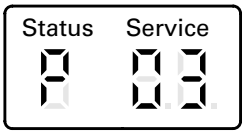
Simultaneously press Ⓢ and ⊕

Gas burner control unit (cont.)

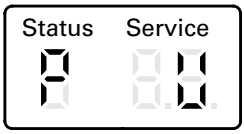
Cancelling a parameter set

If
- a parameter set has been modified via the DIP switches or
- if the gas burner control unit has been replaced,

a "P" flashes under Status. The figures under Service show the selected parameter set (see page 31).



"U" will appear under Service if an invalid DIP switch setting is selected.



1. Check the DIP switch setting, alter as per page 28 if required.

2. Press ⊖ and ⊕ simultaneously for approx. 2 s.
When "P" no longer flashes and the memory LED illuminates, the selected parameter setting has been accepted.

3. Press the reset button; the operating display will be shown.

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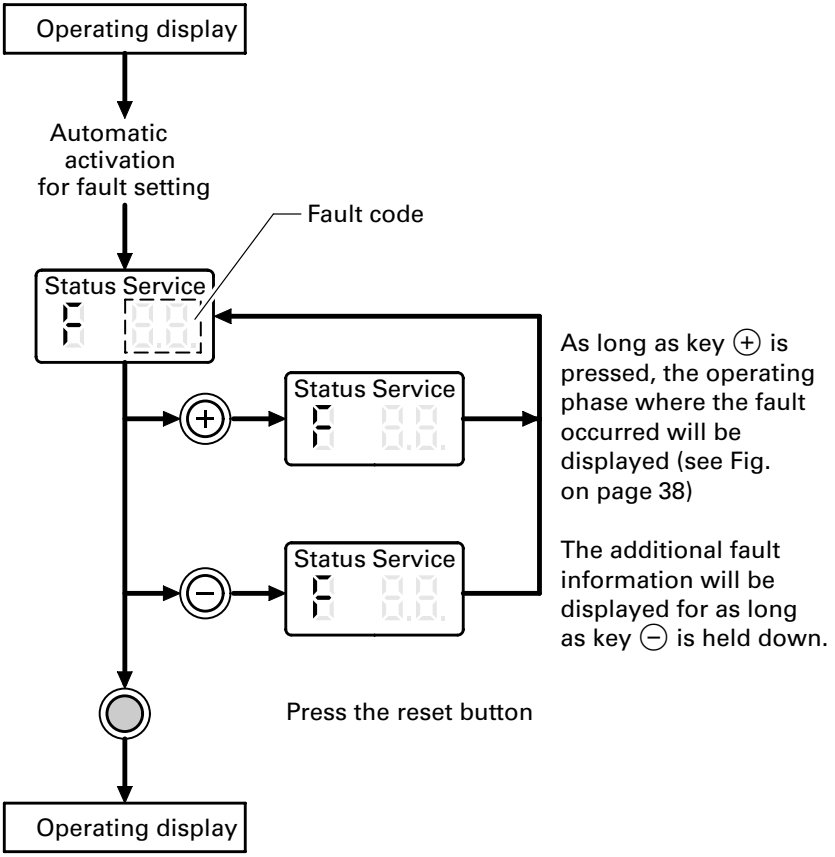
Gas burner control unit (cont.)

Fault display

The fault display will be activated automatically if the gas burner control unit changes into a fault state. The most recent fault will then be displayed. The light segments of the display will flash.



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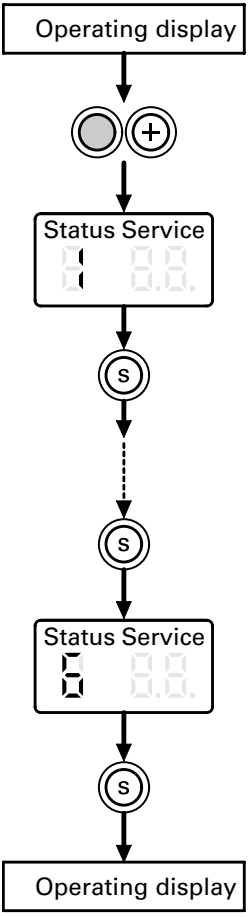
Gas burner control unit (cont.)

Fault memory

The most recent six faults are saved and may be scanned.
The order of scans ranges from the most recent to the previous fault codes.
This display will be terminated if no key is pressed within 20 s.



Simultaneously press the reset button and ⊕

Last fault

Press Ⓢ

Press Ⓢ

The six most recent faults

Press Ⓢ

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Diagnostics

Faults indicated at the display and programming unit

General process fault

Fault code	System characteristics	Cause	Remedy
20	Fan pressure produced during air pressure limiter idle state check	Wind influence on fan	Check flue gas draught (chimney)
	Air pressure limiter not functioning properly	Air pressure limiter faulty	Replace air pressure limiter
21	Air pressure limiter shows no air pressure, fan does not operate	Air pressure limiter faulty	Replace air pressure limiter
	Fan not running	Fan faulty, cables faulty or broken	Check cables and replace fan, if necessary
22	Gas governor shows no gas pressure during the safety period	Gas shut-off valve closed, gas governor faulty	Open gas shut-off valve, check gas supply pressure and clean gas filter, if necessary
25	No flame notified after the safety period, ionisation flame monitor shows no flame signal	Ionisation electrode incorrectly adjusted	Adjust ionisation electrode (see page 18)
		Ignition electrodes incorrectly adjusted	Adjust ignition electrodes (see page 18)
		Insulation body of ignition electrodes broken	Replace ignition electrodes
		Incorrect gas type selected	Adjust gas type (see pages 6 and 7)
		Gas combination valve does not open	Check gas combination valve and replace, if necessary
		Combustion characteristics not ideal	Adjust burner (see pages 14 and 15)
		Incorrect parameter set selected	Adjust parameter set (see pages 28 and 30)

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Diagnostics (cont.)

Fault code	System characteristics	Cause	Remedy
26	Ionisation flame monitor signals external light during start-up or after the post-purge period	Ignition cables short-circuited	Remedy short circuit
		Ionisation cables or electrode short-circuited	Remedy short circuit
		Gas combination valve leaks	Replace gas combination valve
		Incorrect parameter set selected	Adjust parameter set (see pages 28 and 30)
27	Flame extinguishes during operation	Incorrect gas type selected	Adjust gas type (see page 7)
		Burner gauze faulty	Replace burner gauze
		Incorrect parameter set selected	Adjust parameter set (see pages 28 and 30)
		Combustion characteristics not ideal	Adjust burner (see pages 14 and 15)
29	Gas burner control unit enters fault state	Internal fault – gas governor input	Replace gas burner control unit
2A		Internal fault – air pressure limiter input	
2b		Internal fault – flame monitor	
2C		Fault during test of safety inputs	
2d		Internal fault – low voltage monitor	
2E		Internal fault – voltage failure monitor	
2F		Internal fault – heat demand	

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Diagnostics (cont.)

Fault code	System characteristics	Cause	Remedy
31	Fault on gas burner control unit	Fault in feedback from gas safety valves, output relay does not activate	Replace gas burner control unit
32		Fault in feedback from auxiliary start-up valve, output relay does not activate	
35		Fault in feedback from ignition, output relay does not activate	
36	Fan speed during start-up or during operation is longer than 5 s outside the set range, speed for ignition setting or start-up output during operation is not reached	Fan faulty, cable "100a" faulty or broken	Check cables and replace cable "100a" or fan if necessary
37	Fan does not reach set speed	Fan faulty, cable "100" or "100a" faulty or broken, fan blocked by a foreign body	Check cable "100" or "100a", if necessary replace cable or fan, remove foreign body
42	Gas burner control unit remains in start-up position, no start in spite of heat demand	Safety chain broken	Check jumper B2 (plug 47) of the safety chain on the gas burner control unit
4E	Fault on gas burner control unit	Internal fault	Replace gas burner control unit

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Diagnostics (cont.)

Fault code	System characteristics	Cause	Remedy
Scrolling display: 1 - 2 - 3 - 4 - 5 - 7	Constant start attempt	Cores "L 1" and "N" exchanged on the power supply of the control unit	Check power supply and exchange cores
L	Fault on gas burner control unit	Fan faulty	Check cables or replace fan and reset gas burner control unit according to instructions on page 23
		Condensate backup	Let condensate drain off, remedy fault and reset gas burner control unit according to instructions on page 23

Internal system faults

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

Fault code	Fault in range	Cause	Remedy
01 and 02, 04 to 15, 70 to 79, 7A, FF	Gas burner control unit	Internal system fault	Replace gas burner control unit
FF		EEPROM	Test system for power faults

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Diagnostics (cont.)

Faults without fault display

Fault	Cause	Remedy
Combustion faults through pulsation	Gas throughput too high	Adjust the gas throughput in accordance with the rated boiler output
	Too little or too much air	
	Condensate backup in the flue gas system	Check condensate drain
	Inadequate flue gas draught	Check flue gas draught
Burner restarts and switches off after the safety period has ended	Cores "L 1" and "N" exchanged on the power supply of the control unit	Check power supply and exchange cores
CO is formed or burner is very sooty	Too little or too much air	Correct setting. Check boiler room ventilation
	Insufficient chimney draught	Check flue gas system
CO_2 content too low	Incorrect setting	Adjust nozzle pressure in accordance with type of gas used. Check that burner has been adjusted to correct gas type and change gas restrictor, if necessary.
Flue gas temperature too high	Gas throughput too high	Adjust the gas throughput in accordance with the rated boiler output. Check the conditions of the secondary heating surfaces of the boiler and clean, if necessary.
Whining noises	CO_2 settings incorrect	Adjust burner according to instructions on pages 14 and 15

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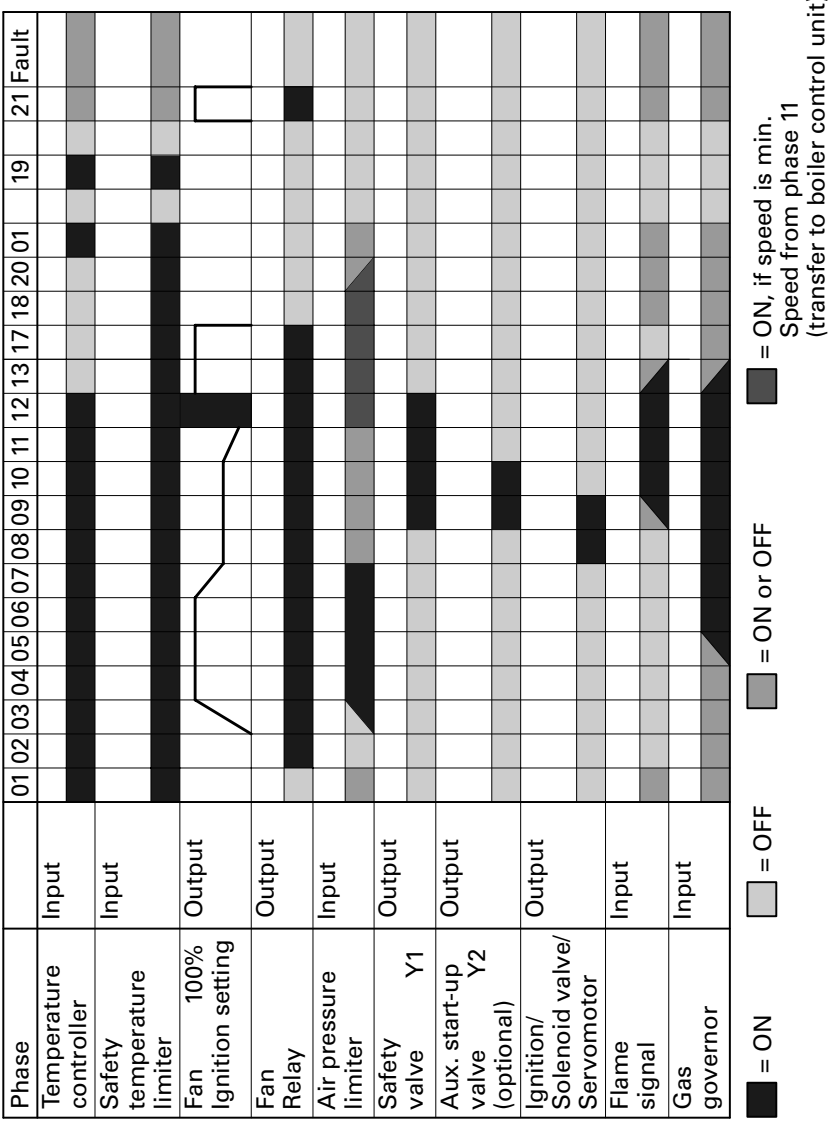
Gas burner control unit flow chart



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Gas burner control unit flow chart (cont.)

After the controller issues a heat demand, the following program sequence will be run:

Phase		Duration
01	Test for heat demand	1 s
02	Idle state check of the air pressure limiter and the fan	1 to 30 s
03	Fan ramp up (a fault shutdown will be initiated if the air pressure limiter does not signal that the air pressure has reached a specified range within this timescale, or the fan does not reach its set speed)	1 to 30 s
04	Pre-purge I	5 s
05	Pre-purge II	1 s
06	Pre-purge III	30 s
07	Ignition (if the fan speed does not achieve the set value, the gas burner control unit will display a fault)	1 to 30 s
08	Pre-ignition	2 s
09	Start-up safety period (safety period A) (safety valves enabled at the beginning of safety period A, safety period operation < 1 s)	2.8 s
10	Stabilising the flame in the ignition position 187 kW: 248 and 314 kW:	 20 s 55 s
11	Changeover to control operation (up to the programmed set speed)	1 to 30 s
12	Operation (the system will be restarted after expiry of this time)	max. 23:59 h
13	Burner run-on time	max. 30 s
17	Post-purge	1 to 60 s
18	Restart lockout time	0 s
19	Gas shortage position	max. 30 min
20	Standby (a restart follows a heat demand and the system will be restarted after expiry of this time)	max. 23:59 h
in case of fault shutdown from phase 09:		
21	Fan run-on prior to lockout	5 s

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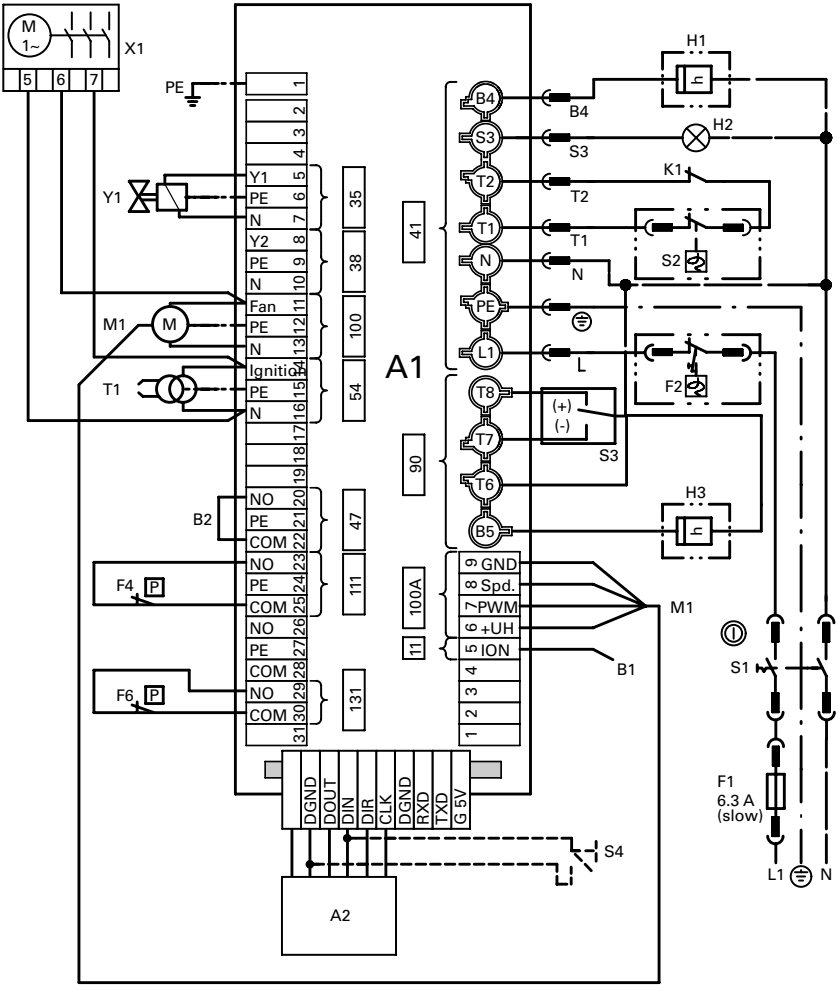
Gas burner control unit connection diagram



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Gas burner control unit connection diagram (cont.)

Legend

A1 Gas burner control unit MPA 51
A2 Display unit with reset function
B1 Flame monitoring through ionisation current
B2 Safety chain jumper
F1 Main fuse
F2 High limit safety cut-out
F4 Gas governor minimum pressure
F6 Air pressure limiter
H1 Total operating hours
H2 Fault reporting
H3 Operating hours modulation lower rated output/ higher rated output
K1 Relay contact
M1 Fan motor with PWM selection and feedback
S1 Main ON/OFF switch (in the control unit)
S2 Thermostat
S3 Output control (in the control unit)
T1 Ignition device
X1 Actuator for rotary damper
Y1 Gas fuel – safety valve

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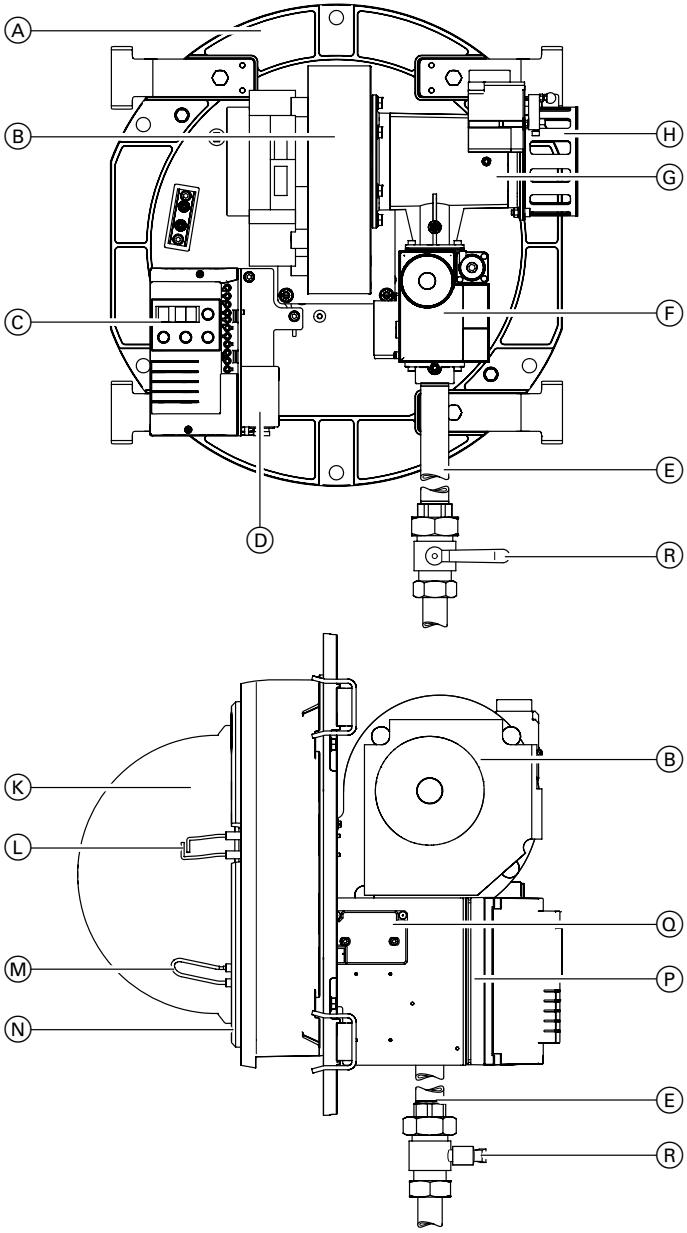
Overview of components



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Overview of components (cont.)

Ⓐ Boiler door
Ⓑ Fan
Ⓒ Display and programming unit
Ⓓ Air pressure limiter
Ⓔ Gas supply pipe
Ⓕ Gas combination valve
Ⓖ Venturi mixing pipe
Ⓗ Rotary damper with servomotor
(only for 248 and 314 kW)
Ⓚ Burner gauze
Ⓛ Ignition electrodes
Ⓜ Ionisation electrode
Ⓝ Thermal insulation block
Ⓟ Gas burner control unit
Ⓠ Ignition device
Ⓡ Gas shut-off valve

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Parts list

When ordering spare parts:
Quote the type and serial no. (see type plate) and the item no. of the required part (as per parts list). Obtain standard parts from your local supplier.

Parts

001 Boiler door
002 Thermal insulation block
003 Gasket set 20 × 15 mm
005 Small parts comprising: see list to the right
006 Burner gauze
007 Graphite gasket
009 Fasteners
012 Ignition unit
013 Ignition cable
014 Ionisation cable
017 Servomotor cable harness, fan and ignition transformer
018 Gas combination valve connecting cable
019 Servomotor
020 Gas burner control unit MPA51
021 Display and programming unit for gas burner control unit MPA51
022 Cable entry for gas burner control unit MPA51
023 Fan motor
024 Rotary damper
025 Pivoting link
026 Venturi mixing pipe
028 Air pressure limiter with connecting cable
029 Restrictor for natural gas E with gasket
031 Gas combination valve
035 Burner hood
036 Burner hood latch

005 Small parts comprising:
5a Threaded nipple
5b Dowel pin
5c Quick-release fitting
5d Strain relief
5e Cheese-head screw M 6 × 10
5f Washer 6.4 mm
5g Cheese head screw M 6 × 20
5h Washer B 6.4 mm
5k Hexagon screw
5l Washer 5.3 mm
5m Oval head screw A M 4 × 45
5n Screw EJOT-PT KBL 40
5o Countersunk screw M 8 × 16
5p Cheese head screw M 4 × 20
5r Threaded hose ferrule
5s Gasket OL ⅛
5t Protective threaded plug ∅ 8.5 mm
5u Protective threaded plug ∅ 7.3 mm

Parts not shown
004 Suppressor box (only for 187 kW)

Wearing parts
008 Ionisation electrode
010 Ignition electrode block
011 Gasket for electrode block

Ⓐ Type plate
Ⓑ Label "Set to ..."

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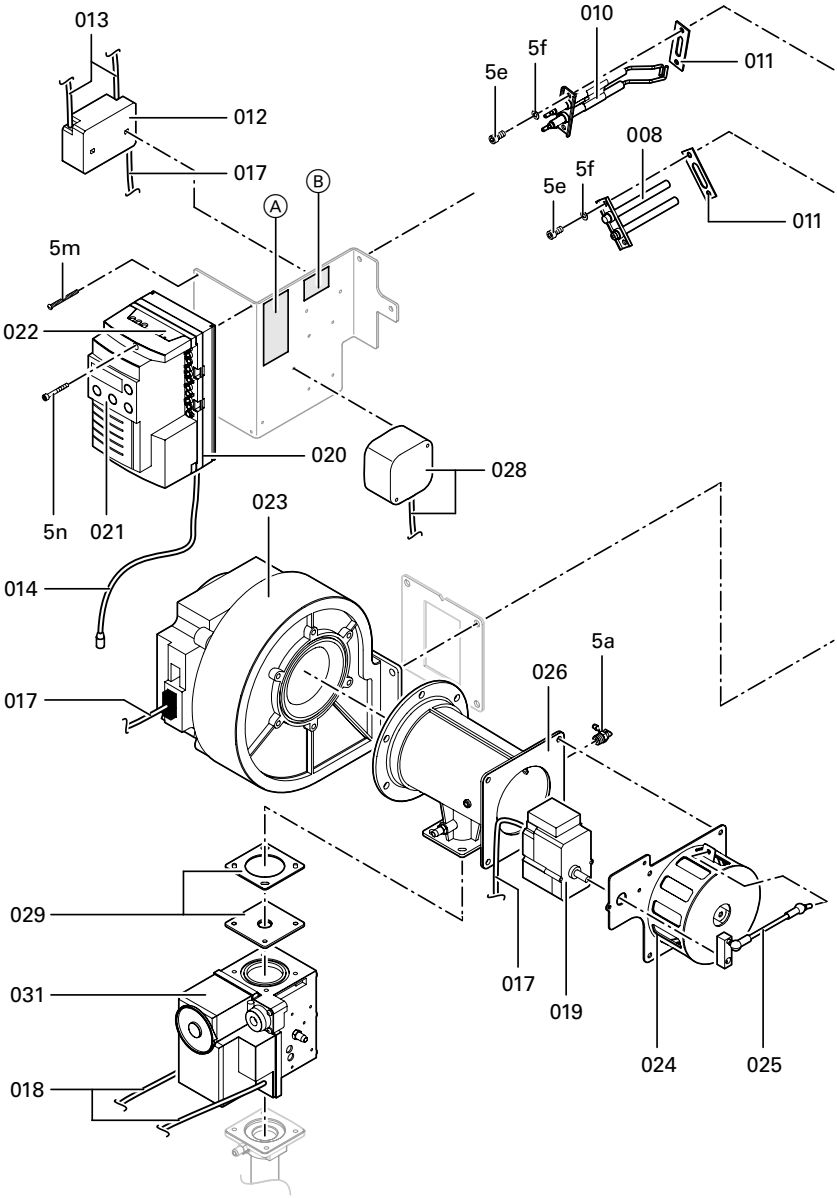
Parts list (cont.)



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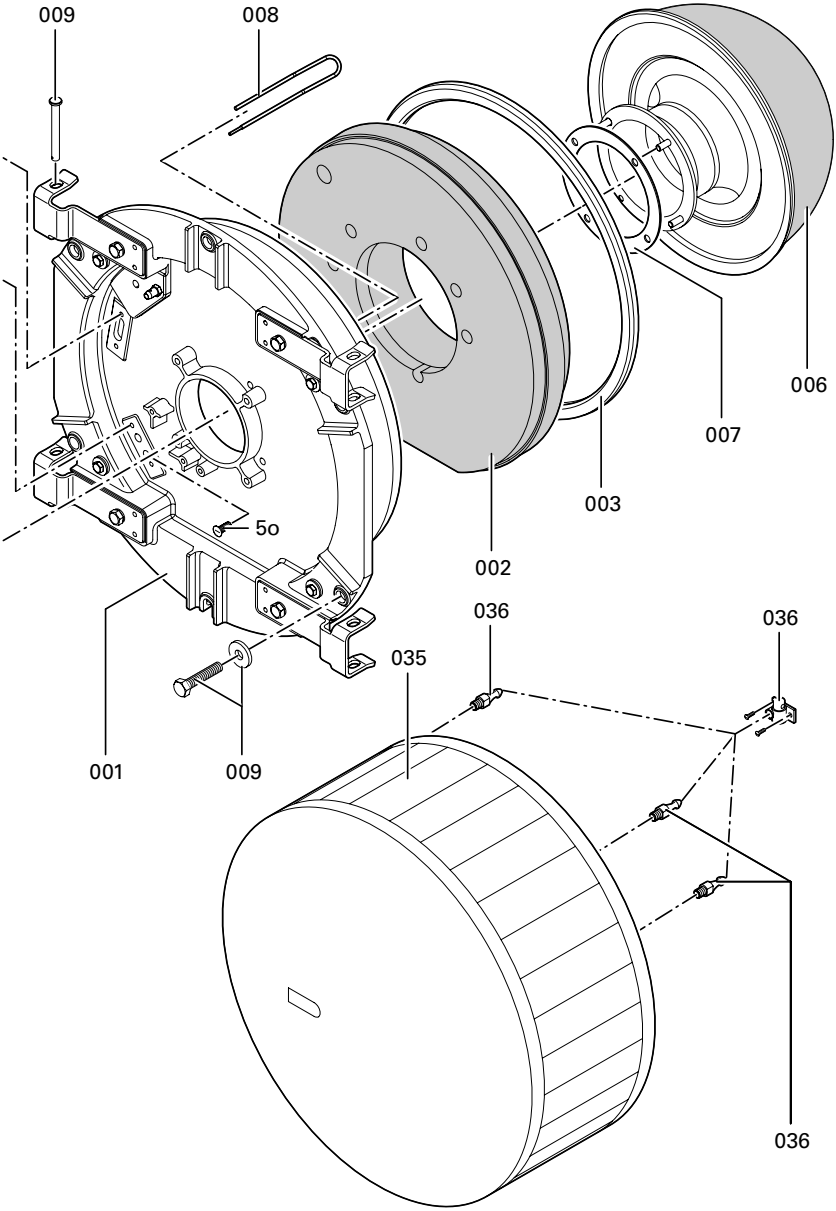
Parts list (cont.)



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Coding

For MatriX radiant burner 187 to 314 kW in conjunction with
- Vitotronic 100, type GC1
- Vitotronic 200, type GW1
- Vitotronic 300, type GW2

Coding address	Rated 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	20	19	27	
0A	25	33	33	

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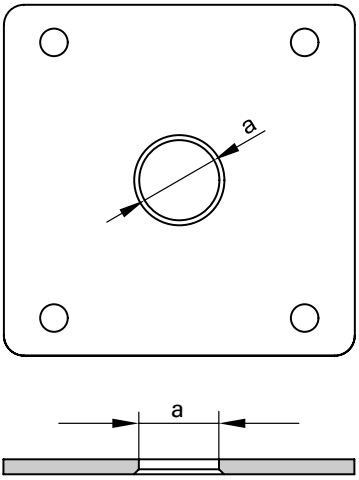
Specification

Rated output at a heating water temperature of 50/30 °C	kW	187	248	314
Product ID		CE-0085 AT 0403		
Burner type		VM III-4	VM III-5	VM III-6
Voltage	V			230
Frequency	Hz			50
Power consumption	W	225	335	380
Motor speed	rpm	1344-5216	1504-5952	1824-5984
Modulation range	%	25-100		33-100

Restrictor dimensions (natural gas E)



Dimension a

187 kW ∅ 16.0 mm
248 kW ∅ 15.7 mm
314 kW ∅ 16.8 mm

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Commissioning/service report

Setting and test values			Initial start-up	Maintenance/ service
Static pressure		*mbar*		
Supply pressure (flow pressure)				
☐ for natural gas E		*mbar*		
☐ for natural gas LL		*mbar*		
Tick gas type				
Check the venturi suction pressure at higher rated output	Natural gas E	*mbar*		
	Natural gas LL	*mbar*		
Carbon dioxide content CO_2				
■ at higher rated output	actual	*% by vol.*		
	set	*% by vol.*		
■ at lower rated output	actual	*% by vol.*		
	set	*% by vol.*		
Oxygen content O_2				
■ at higher rated output	actual	*% by vol.*		
	set	*% by vol.*		
■ at lower rated output	actual	*% by vol.*		
	set	*% by vol.*		
Carbon monoxide content CO	actual	*ppm*		
	set	*ppm*		
Gross flue gas temperature	actual	*°C*		
	set	*°C*		
Ionisation current		*µA*		
Draught	actual	*hPa*		
	set	*hPa*		

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Keyword index

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