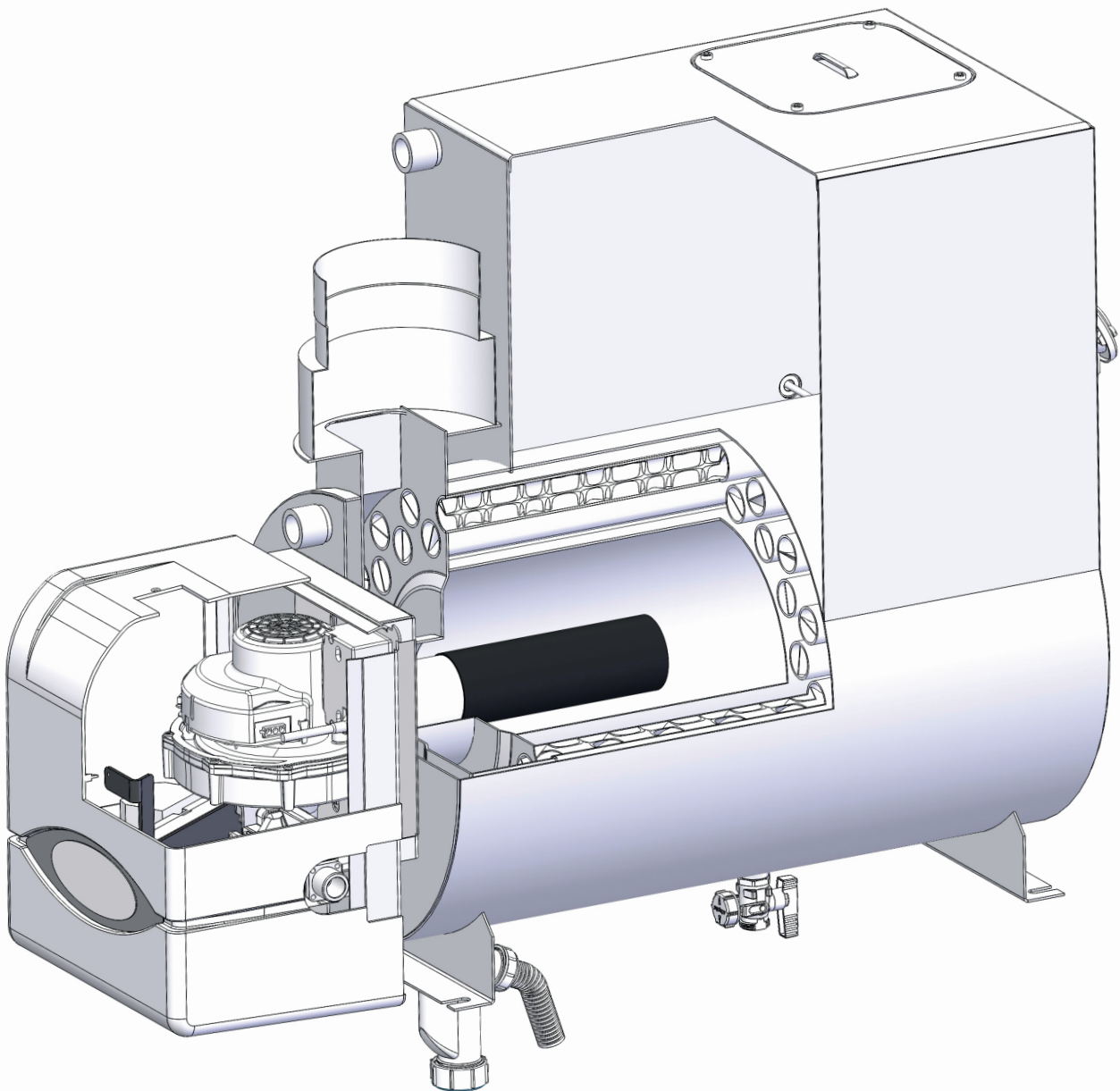


# Qualified Personnel manual

Installation and operating instructions



## Conformity certification

Manufacturer:

Ehrle GmbH

Address:

Siemensstraße 9  
D – 89257 Illertissen

Product: Condensing system

CarWash Gas LCE

The product described above conforms with  
the regulations of directives:

GAD 2009 / 142 / EC  
MD 2006 / 42 / EC  
LVD 2006 / 95 / EC  
EMC 2004 / 108 / EC

This product is labelled as  
follows:



CE-0085

Illertissen, 01.09.2016

Development

ppa.

A handwritten signature in black ink, appearing to read 'Christoph Nöldner'.

Christoph Nöldner

Head of development

A handwritten signature in black ink, appearing to read 'Reiner Ehrle'.

Reiner Ehrle

Managing Director

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Translation of original  
operating instructions

## 1 User instructions

These installation and operating instructions form part of the unit and must be kept on site.

### 1.1 User guide

#### 1.1.1 Meaning of WARNINGS, CAUTIONS and NOTES

The WARNINGS, CAUTIONS and NOTES in this installation and operation instruction are defined as follows:

##### WARNING

Warning together with the relevant symbol precedes operating procedures, instructions, etc., which, if not strictly observed, could result in personal injury or loss of life. Warning precedes also, when system respectively device misuse could result in personal injury or loss of life.



##### CAUTION





Caution together with the relevant symbol precedes operating procedures, instructions, etc., which, if not strictly observed, could result in damage to the system respectively devices. Caution precedes also, when device misuse could result in damage to the system or devices.



This symbol precedes or follows, when additional information is presented.

#### 1.1.2 Meaning of symbols

Symbol	Meaning
	<b>WARNING</b> <b>Explosion hazard due to leaking gas.</b> If a gas-air mixture is provided under certain conditions, any source of ignition can lead to an explosion and cause fatal or life-threatening injuries. Improper work on the condensing system may lead to leaking gas and cause explosions. Observe all work and safety instructions.
	<b>WARNING</b> <b>Danger to life due to electrical shock.</b> Always switch off the supply voltage to the system and disconnect the power cable from mains supply before starting any installation, maintenance or repair activities. Secure the system against unintended switch-on. Touching live parts may result in serious injury or death.

Symbol	Meaning
	<b>WARNING</b> <b>Risk of burns from hot system parts or components.</b> System parts or components may become hot during operation. Touching hot surfaces or parts can cause burns. Before starting any maintenance or repair activities allow the system parts, assemblies and components to cool down.
	<b>WARNING</b> <b>Toxic substances can lead to serious harm or even to death.</b> Inhaling and/or touching toxic substances as well as its uptake via the food chain can lead to serious harm or even to death. Take care when handling with toxic substances and observe all safety instructions.
	<b>CAUTION</b> <b>Observe all installation, operation, maintenance and repair instructions given in this installation and operation instruction manual.</b> If the given instructions are not strictly observed as well as operator errors and device misuse may cause damage to the system respectively devices.
	<b>General Information</b> Additional general information.
▶	Requires direct action.
✓	Result after an action.
•	Itemisation.
...	Range.

### 1.1.3 Target group

This installation and operation instruction manual contains information and instructions only for specially trained, qualified and authorized personnel.

### 1.2 Guarantee and Liability

The condensing system CarWash Gas LCE / ... / 21 ... 90-B must only be operated for its intended use.

The intended use encompasses:

- Only specially trained, qualified and by the operating company authorized personnel are allowed to operate the condensing system.
- The execution of maintenance and repair activities for the system, system parts or components are only allowed by specially trained and qualified personnel. On demand, the Ehrle GmbH company provides specially trained and qualified personnel by its customer service.
- The information and instructions given in this installation and operation instruction manual have to be observed and followed.
- The condensing system operation is only allowed with the fully functionality of the safety equipment and protection devices.
- In case of faulty safety equipment or protection devices the condensing system has to be switched off immediately and taken out of service. The system has to be secured against unintended operation.
- The condensing system operation is only allowed in the manufacturer certified configuration. Any operation with retrofitted units and components or additional devices are not allowed. Otherwise, it is a risk for life and limb of persons or may result in damage to system parts or components.
- Any constructive changes or unauthorised modifications concerning the condensing system are not allowed.
- For maintenance and repair activities it is only allowed to use original Ehrle GmbH spare parts or consumables.
- For condensing system operation it is only allowed to use fuels authorized by the manufacturer.
- In case of inadequate, faulty or defective supply lines the condensing system has to be switched off immediately and taken out of service. The condensing system has to be secured against unintended operation.
- Inadequate, faulty or defective conditions concerning supply lines have to be repaired immediately.
- In the event of force majeure (natural disasters etc.) the condensing system has to be switched off immediately and taken out of service. The Condensing system has to be secured against unintended operation.

In the event of a usage not according to the intended purpose of the condensing system CarWash Gas LCE / ... / 21 ... 90-B any guarantee and liability for persons or material damage expires.

## 2 Safety

### 2.1 Access to condensing system operating room

The condensing system operating room must be kept locked. Only authorized persons are allowed to have access to the room.

Make sure only the personnel listed below have access to the room with the condensing system:

- From the operating company authorized and for the area of responsibility specially trained personnel for operation and maintenance tasks.
- Authorized, qualified and specially trained personnel for maintenance and repair activities of the condensing system.

Keep the key for the condensing system access door on a place that is only accessible for the authorized personnel.

### 2.2 Permissible application

The combustion air must be free from aggressive compounds (e.g. Halogens). If the combustion air in the boiler room is contaminated, increased cleaning and servicing will be required. In this case the condensing system should be operated room air independent.

- The condensing system must only be operated in enclosed rooms. The installation room must comply with the local regulations.

Improper use could:

- endanger the health and safety of the user or third parties,
- cause damage to the appliance or other material assets.

### 2.3 What to do if gas can be smelled

- Immediately stop any manual operating commands respectively switching on or off any infrastructure equipment or electrical components (e.g. mains switch or circuit breakers of the house internal supply voltage, light switches etc.).
- Immediately stop any manual operating commands respectively switching on or off any electrical appliances (such as work lamps for workplace lighting, fan heater etc.) or electronic devices (such as mobile phones, laptop computers etc.).
- Do not pull out any mains plugs if connected to the power outlets.
- Open doors and windows to provide sufficient air ventilation.
- Close gas isolating valve.
- Warn the inhabitants (do not ring door bells).
- Leave the building.
- Inform the heating company or gas supplier from outside of the building.

### 2.4 What to do if flue gas can be smelled

- Immediately switch off the condensing system.
- Open doors and windows to provide sufficient air ventilation.
- Inform heating company.



## 2.5 Safety measures

Safety relevant fault conditions must be eliminated immediately.

Components, which show increased wear and tear or whose design lifespan is or will be exceeded prior to the next service should be replaced as a precaution (see Ch. 8.2).

### 2.5.1 Normal operation

- All labels on the condensing system must be kept in a legible condition.
- Stipulated settings, service and inspection work have to be carried out at regular intervals.

### 2.5.2 Electrical connection

For all work carried out on live parts:

- Observe the country-specific accident prevention instructions and adhere to local directives (as an example refer to: DGUV Regulation 3 (formerly BGV A3), German Social Accident Insurance Association (DGUV))
- Use only tools in accordance with IEC 60900.

### 2.5.3 Gas supply

- Only the gas supplier or an approved agent is allowed to carry out installation, alteration and maintenance work on gas appliances in buildings and properties.
- Pipe work must be subject to a pre- and main test and a combined load and valve proving test relative to the pressure range intended (e.g. DVGW-TRGI, work sheet G 600).
- Inform the gas supplier about the type and size of plant prior to installation.
- Local regulations and guidelines must be observed during installation (e. g. DVGW-TRGI, work sheet G 600).
- The gas supply pipe work has to be suitable for the type and quality of gas and has to be designed in such a way that it is not possible for liquids to form (e. g. condensate). For liquid gas observe the evaporating pressure and evaporating temperature.
- Use only tested and approved sealing materials, whilst observing all process information.
- Switching the gas type requires new adjustment of the condensing system. Switching from liquid gas to natural gas requires condensing system modification.
- After each service and fault rectification carry out a leakage test.

## 2.6 Alterations to the construction of the condensing system

- Any alterations or modifications of the condensing system are only allowed with the Ehrle GmbH certified approval.

## 2.7 Noise emission

The noise emissions are determined by the acoustic behaviour of all components fitted to the combustion system.

Prolonged exposure to high noise levels can lead to loss of hearing. Provide protective equipment for the operation and maintenance personnel.

## 2.8 Disposal

Dispose of all materials used in a safe and environmentally friendly way. Observe local regulations.

### 3 Product description


#### 3.1 Type key

Example: CarWash Gas LCE / N / 75-B

N        N: Natural Gas  
           F: Liquid Petroleum Gas (LPG)  
 75       Ratings size: 75 kW  
 -B       Construction

#### 3.2 Serial number

The serial number on the name plate identifies the product.  
 This is required by Ehrle customer service department.

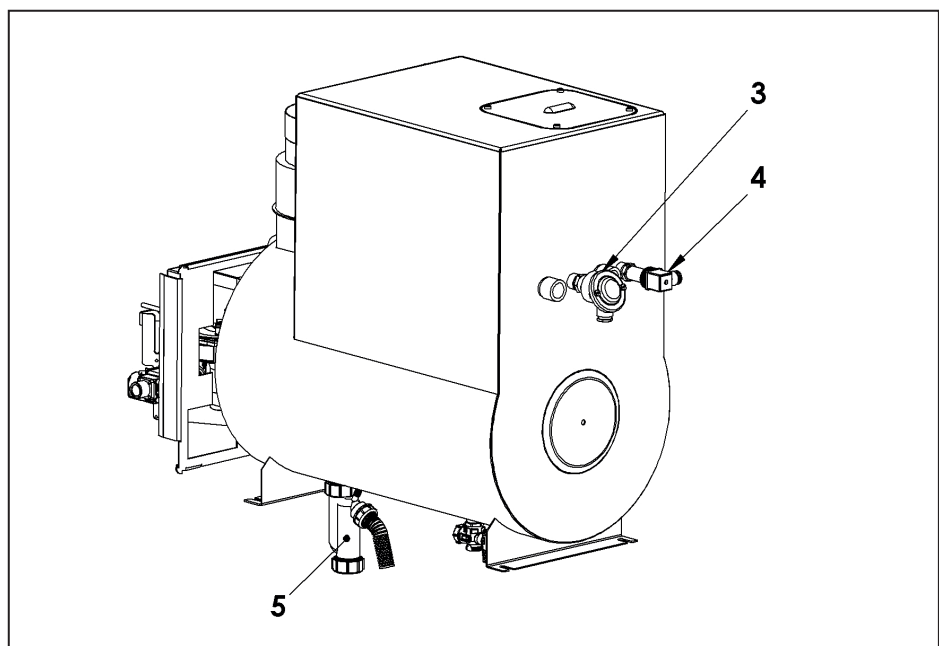
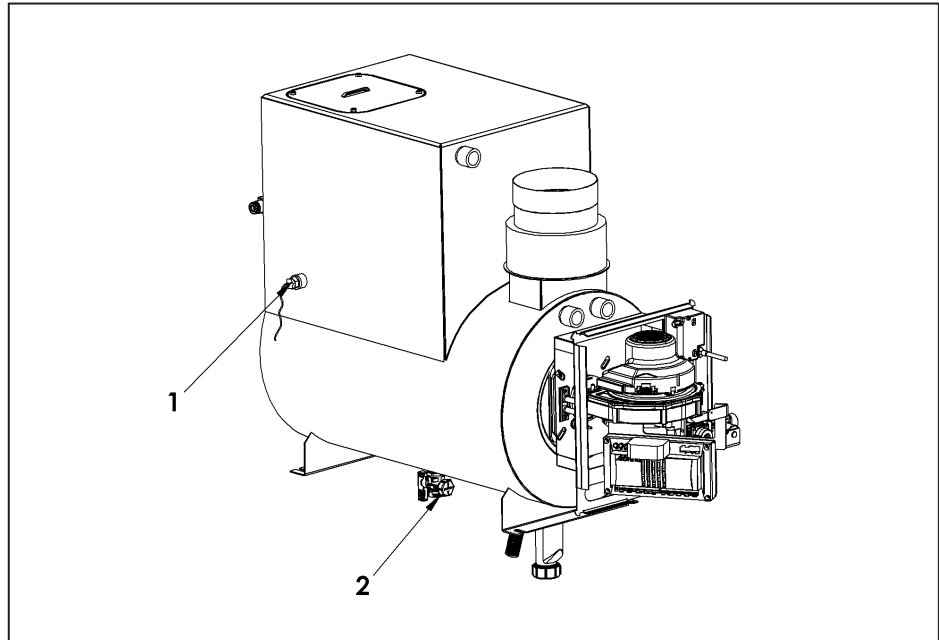
	EHRLE GmbH   Siemensstreet 9	
	89257 Illertissen / Bayern	
Tel.: 073 03/ 16 00-0   Fax: 073 03/ 16 00-60 Charge: 3816		
<b>Type: Condensing Boiler CarWash Gas LCE / N / 75-B</b> <b>Burner-Type: Baltur BPM 90</b> <b>Seriell No.: XXXXXXXX XXXXX</b> <b>Voltage: 230 V/1- / 50Hz IP 54, Iso. Kl. F.</b> <b>El. connection: 250 W S1 In: 2A</b> <b>Nominal heat input: 25-85 kW</b> <b>Country:GB</b> <b>Supply pressure: 20 mbar N</b> <b>Category: 112H3+ Installation type: B23</b> <b>CE-0085AR0179 SVGW-Nr.:09-034-8</b> <b>ATTENTION HIGH VOLTAGE !!!</b>		

① Name plate

Ser. No. \_\_\_\_\_

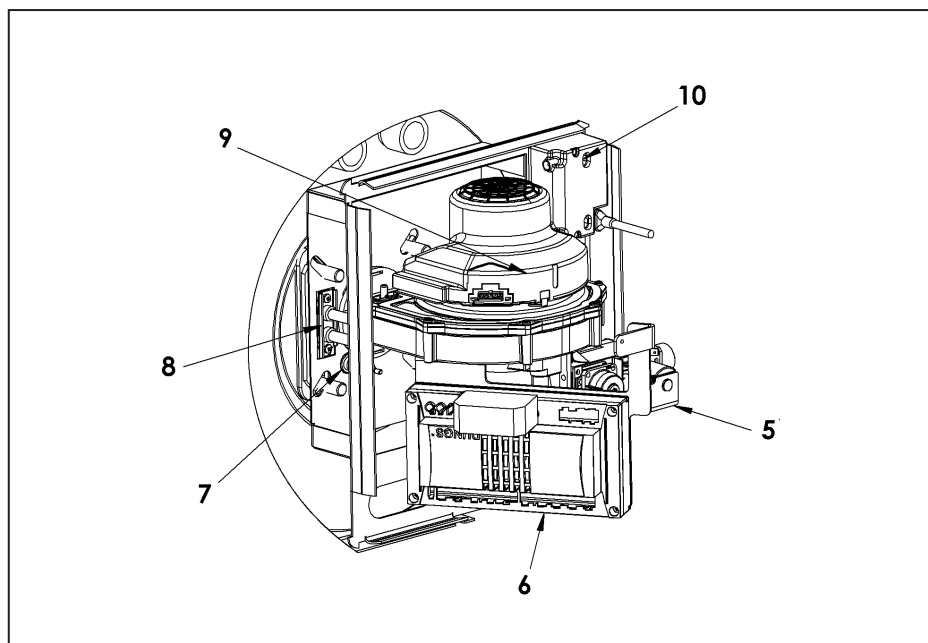
### 3.3 Function

#### 3.3.1 Mechanical components



- ① STL 95 °C
- ② KFE-cock
- ③ PT 100
- ④ DMU 20 mbar
- ⑤ Siphon

### 3.3.2 Electrical components



- ⑥ Gas controls
- ⑦ Combustion manager
- ⑧ Ionisation electrode
- ⑨ Ignition electrode
- ⑩ Fan
- ⑪ Ignition Unit

### 3.3.3 Safety devices

#### Safety temperature limiter (STL)

The fuel supply is shut off, if the temperature on the STL exceeds the threshold of 95 °C.

The condensing system switches into the lock mode and has to be unlocked manually.

### 3.3.4 Gas supply

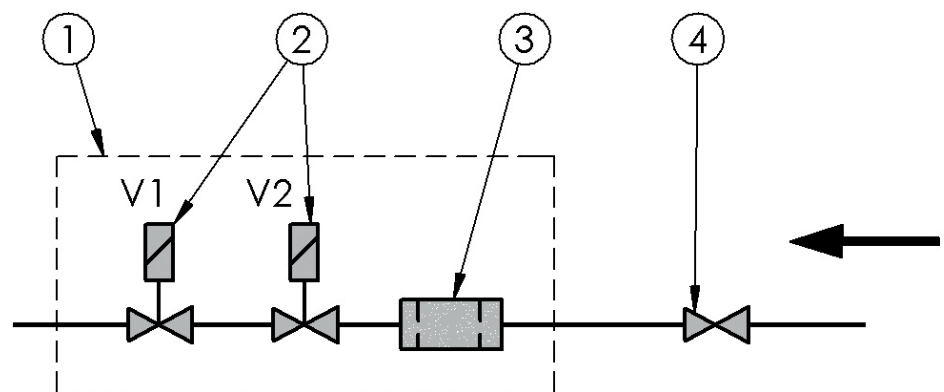
#### Gas controls ①

The gas controls assembly contains:

Gas combi valve ②	The gas combi valve opens and shuts off the gas supply.
Gas filter ③	The gas filter protects the subsequent valve train components from foreign particles.

#### Gas isolating valve (TEA) ④

The gas isolating valve shuts off the gas supply.



### 3.3.5 Electrical components

#### **Combustion Manager**

The combustion manager MPA5111 is the central control unit of the burner. It controls the sequence of operation, monitors the flame and communicates with all components concerned.

#### **Fan motor**

The fan motor drives the fan wheel.

#### **Ignition unit**

The electronic ignition unit creates a spark at the electrode, which ignites the fuel/air mixture.

#### **Ionisation electrode**

The combustion manager monitors the flame signal via the ionisation electrode. If the flame signal becomes too weak, the combustion manager initiates a safety shutdown.

### 3.3.6 Program sequence

#### Pre-purge

At heat demand ① the fan starts and drives to pre-purge speed ②.

The combustion chamber is pre-purged.

#### Ignition

The fan drives down to ignition speed ③, ignition ④ switches on, the gas valves ⑤ open. The ignition spark ignites the fuel. A flame appears.

#### Safety time

With the fuels supply enabled the safety time ⑥ starts. During the safety time ⑥ the flame signal ⑦ has to be provided.

#### Stabilisation of the flame

If a flame signal ⑦ is transmitted, the flame stabilisation time ⑧ will follow.

#### Operation

Pass to normal operation ⑨

#### Modulating operation

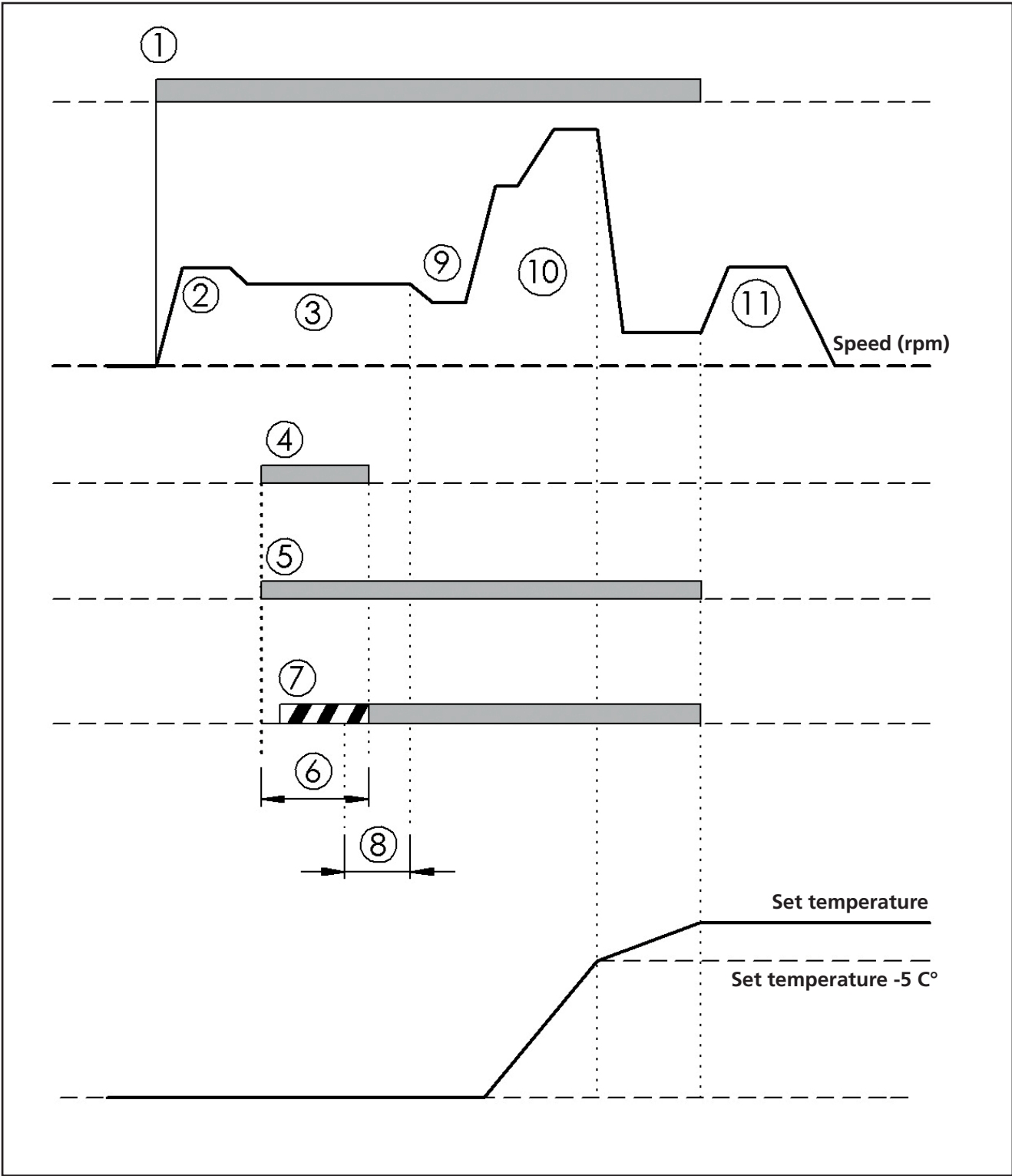
The analogue input connections EM1/3 at the extension module set the speed setpoint for the fan ⑩ within the programmed load limits.

#### Post-purge

If there is no longer a heat demand, the valves close and stop the fuel supply.

Following every normal shut down, after faults and after the return of the power supply, the fan is operated at the post-purge speed ⑪.





### 3.3.7 Functional routine combustion manager

15 Time diagram MPA51xx		by means of an extended module																																	
		General version		Viessmann version		Error		Waiting for heat request		Waiting for parameter record stick adjustment		Idle state control: Fan/stepped motor		Idle state control LDW (air pressure switch)		Watchdog loading phase		Startup phase: Fan/stepped motor		Waiting for air pressure		VPS A: Decision		VPS A : Emptying the area between the valves		VPS A: Test time V1		VPS A: Filling the area between the valves		VPA A: Gas pressure detection		VPS A: Test time V2		Pre-aeration A	
Parameter																					P40	P42	P43	P44			P45	P60							
Time				0...	0...	max. 3 min	max. 2 min	max. 2 min	3 s	max. 2 min	max. 30 s	0.1 s	1...3 s	1...240 s	1...3 s	0.1 s	1...240 s	0...1 h																	
State number				0	1	2	3	4	5	6	7	8	9	10	11	12	13	14																	
Safety chain																																			
Watchdog																																			
Alarm																																			
Temperature controller																																			
Additional valve *4		Y1	Y3																																
V1		Y2	Y1																																
V2		Y3	Y2																																
Ignition																																			
Fan relay																																			
PWM1 (fan)				*2a															*2b																
PWM2 (for ex. analogue 0...10 V)	●			*2a															*2b																
PWM3 (for ex. analogue 4... 20 mA)	●			*2a															*2b																
Stepped motor	●			*2a															*2b																
Flame (ionisation)																																			
LDW *1																																			
GDW min.																																			
GDW VPS *5																																			
Parameter record stick active	●																																		
Parameter VPS Startup																																			
Parameter VPS Regular switch-off																																			

	P61	0...1 h	Pre-aeration B
	16	max. 2 min	Ignition position
	17	0...1 h	Gas detection GDWVPS
	18	0...1 min.	Pre-ignition
	19	0.5...9,4 s	SZA ignition
	20	0.5 s	SZA - Flame detection
	21	1...200 s	Stabilisation flame A
	22	1...200 s	Stabilisation flame B
	23	max. 2 min.	Changeover to the standard mode
	24	0 ...	Standard mode
	25	1...30 s	Changeover after regular switch-off
	26	0.1 s	VPS B: Decision
	27	1...3 s	VPS B : Emptying the area between the valves
	28	1...240 s	VPS B: Test time V1
	29	1...3 s	VPS B: Filling the area between the valves
	30	0.1 s	VPA B: Gas pressure detection
	31	1...240 s	VPS B: Test time V2
	32	1...60 s	Follow-up time
	33	0...1 h	Post-aeration
	34	0...1 h	Restart protection
	1	0 ...	Waiting for heat request
	35	0 ...	Lack of gas GDWMIN
	36	x min.	Waiting program

### 3.3.8 MPA 5111 operation status display (state codes)

State xx	Designation	Description
00	<b>Error or initialisation</b>	The automatic control system is in the initialisation phase (e.g. reference run of the stepped motor) or an error is active. If an error is active, the display shows an error message and indicates the current fault (e.g. „F 11“) instead of the state number 00.
01	<b>Waiting for heat request</b>	The automatic control system is ready for operation but there is no heat request.
02	<b>Adjustment parameter record to stick</b>	If the function parameter record stick (P10) is active, the adapted parameter record is compared to the settings in the MPA and, if necessary, the data are copied to the MPA after a password has been entered. If necessary, the password must be entered via the display. For this, a small „c“ flashes.
03	<b>Idle state control fan and stepped motor</b>	The system waits until the fan and the stepped motor are in the OFF position. If the fan has not completely stopped after at least 2 minutes and/or the stepped motor has not yet reached its position, the MPA is switched off and a respective error message is displayed.
04	<b>Idle state control LDW (air pressure detector)</b>	Depending on the operating mode of the air pressure detector (P14), it is checked if the air pressure detector reports „no air pressure“...
05	<b>Watchdog loading phase</b>	The safety-related watchdog -circuit is activated.
06	<b>Startup fan and stepped motor</b>	The system waits until the stepped motor has moved to its nominal pre-aeration position and the fan has reached its nominal pre-aeration speed. Attention! The fan control does not check the feedback of the fan!
07	<b>Waiting for air pressure</b>	Depending on the operating mode of the air pressure detector (P14), the system waits until the air pressure detector indicates the air pressure.
08	<b>VPS A - Decision</b>	In this state the decision is made if a valve test during startup must be carried out. See also section 7.3.2 Operation with valve testing system. If no valve test must be carried out, the state „Pre-aeration A“ is activated. This state lasts only 1/16 of a second.
09	<b>VPS A - Empty the area between the valves</b>	V2 is opened (P42) in order to empty the area between the valves and to compensate the possibly existing gas pressure.
10	<b>VPS A - Test time V1</b>	In the defined test time (P43), no gas pressure may be built up in the area between the valves otherwise the valve 1 is considered as „leaking“.
11	<b>VPS A - Fill the area between the valves</b>	V1 is opened (P44) in order to fill the area between the valves with gas pressure.
12	<b>VPS A - Gas pressure detection</b>	This states lasts only one-eighth of a second and serves for the monitoring of the gas pressure detector GDWVPS.

State xx	Designation	Description
13	<b>VPS A - Test time V2</b>	The gas pressure may not drop within the defined test time (P45) otherwise the valve 2 is considered as „leaking“. Note: When the MPA with ignition gas flame is used, also the additional valve (= main gas flame) may be leaky although the error message refers to V2.
14	<b>Pre-aeration A</b>	This state provides a sufficient pre-aeration. The defined duration (P60) is observed for every startup.
15	<b>Pre-aeration B</b>	This time is a second pre-aeration time. Contrary to the „Pre-aeration A“ state, this state is skipped if the last switch-off of the MPA was a regular switch-off with successful valve tightness test. Moreover, no power failure must have been occurred since the last switch-off. This state can be used, for example, to realise a „Reduced pre-aeration“ whose duration (P61) is defined in the state „Pre-aeration B“ and the duration of the „Pre-aeration A“ (P60) is set to 0 seconds or to the minimum required preaeration time. Please observe: The actual pre-aeration time increases by the time for the valve tightness tests (P40 to P45) in the startup phase, if they are activated. See also section 7.2.3 „Operation with reduced pre-aeration“.
16	<b>Ignition position</b>	The MPA moves to the special modulation point „Ignition position“. This state lasts as long as the stepped motor has reached its new position and the fan works with the set speed. The fan monitoring of the MPA waits until the fan has swung into the regular operation (detection of upper and lower limit in the tolerance range).
17	<b>Gas detection GDWVPS</b>	The valve 1 is opened so that a gas pressure can be built up between the valves and the GDWVPS can detect a gas pressure (P62). If both types of valve test (startup P40 and switch-off P41) are deactivated, the GDWVPS is not monitored! A bridge is not necessary.
18	<b>Pre-ignition</b>	The ignition is already activated here (P63) without opening valve 2. The valve output 1 is already active!
19	<b>SZA - Flame detection</b>	During this period (P64), the ignition remains active and valve 2 is open. The gas can flow now and a flame can be generated. This state is 0.5 seconds shorter than the time set in P64 because the safety time for startup is divided in state 19 and 20!
20	<b>SZA - Flame detection</b>	The ignition is deactivated 0.5 seconds before the end of the safety time for startup (P64) and the procedure for flame detection (ionisation input) is started. If an ionisation current is detected, the MPA reports a flame.
21	<b>Stabilisation flame A</b>	The flame can be stabilised with the help of a configurable special modulation point. The duration of the stabilisation phase (P65) can be configured.

State xx	Designation	Description
22	<b>Stabilisation flame B</b>	Another special modulation point can be defined for this stabilisation phase (P66). When using the MPA with pilot burner, this state can be used to activate the main flame. The main gas valve (=additional valve) can be activated after an adjustable time (P50 and P52) after the changeover to the state. See also section 7.4.4 Operation with ignition gas flame.
23	<b>Changeover to the standard mode</b>	The MPA leaves the current special modulation point and moves to the start simulation point of the standard mode (P67).
24	<b>Standard mode</b>	In this mode, the MPA can be modulated via several types (see P70 to P76, especially P72). A voluntary switch-off after a defined time can be activated (P70). If this time is set to a maximum of 23 hours and 59 minutes, the MPA is in the intermittent mode. Continuous operation ( $\geq 24$ h) is only possible using a continuous operation stick, see section 8.11
25	<b>Changeover after regular switchoff</b>	This state can be used to define the modulation degree after a regular switch-off (see also P80 and P81). Possible application: In order to avoid a switch-off when the system is under full load, this state can be used to reduce (or increase) the power to a defined value.
26	<b>VPS B - Decision</b>	In this state the decision is made if a valve test must be carried out. See Operation with valve testing system. This state lasts only 1/16 of a second.
27	<b>VPS B - Empty the area between the valves</b>	V2 remains open (P42) in order to empty the area between the valves and to compensate the possibly existing gas pressure.
28	<b>VPS B - Test time V1</b>	In the defined test time (P43), no gas pressure may be built up in the area between the valves otherwise the valve 1 is considered as „leaking“.
29	<b>VPS B - Fill the area between the valves</b>	V1 is opened (P44) in order to fill the area between the valves with gas pressure.
30	<b>VPS B - Gas pressure detection</b>	This states lasts only one-eighth of a second and serves for the monitoring of the gas pressure detector GDWVPS.
31	<b>VPS B - Test time V2</b>	The gas pressure may not drop within the defined test time (P45) otherwise the valve 2 is considered as „leaking“. Note: When the MPA with ignition gas flame is used, also the additional valve (= main gas flame) may be leaky although the error message refers to V2.
32	<b>Follow-up time</b>	During this time (P82), a flame signal may be present from the previous mode caused by e.g. existing residual gas in the combustion chamber. The external light monitoring is only started in the following state.

State xx	Designation	Description
33	Post-aeration	<p>In this state, the post-aeration of the combustion chamber is carried out (P83).</p> <p>In this state, no flame must be detected. Since the duration of the state with the setting P83=0 is only a few milliseconds, the MPA reacts also to external light if „no“ postaeration is configured.</p>
34	Restart protection	<p>In this state, the temperature controller is not evaluated, that means if another heat request is sent or activated, the automatic is not restarted.</p>
35	Lack of gas GDWMIN	<p>If the input GDWMIN of the automatic system is not closed, the automatic system waits in this state until the gas pressure is detected.</p>
36	Waiting program	<p>The MPA switches to this state if a lack of gas on the GDWVPS (depending on P46) or an open safety chain has been detected during startup.</p> <p>The MPA remains in this state for a certain waiting time and then carries out another restart test. The number of restart tests is configurable (P90).</p> <p>The waiting time duration depends on the number of waiting times that have been executed before. The first time, the waiting time is 2 minutes, the second time 5 minutes and the third time 1 hour and afterwards a time duration defined by a parameter is applied. If the waiting time defined by a parameter (P91) is shorter than the firmly defined times of the first 3 restart tests, these are also reduced to the parameter-defined time.</p> <p>The respective waiting time can be interrupted by setting the temperature controller to OFF (OFF depends on the operating mode in P15!).</p> <p>The waiting program start from the beginning if the automatic system</p> <ul style="list-style-type: none"> <li>a) has been separated from the mains,</li> <li>b) has been unlocked or</li> <li>c) has reached the standard mode after a restart test.</li> </ul>

### 3.4 Technical data

#### 3.4.1 Approval data

Basic standards	DIN EN 676
SVGW	09-034-8
DVGW	CE-0085AR0179
Gas Appliance Category	II <sub>2R/3R</sub>
Type of installation	B23

#### 3.4.2 Electrical data

Supply voltage / frequency	230 V AC -15%...+10% 50...60 Hz
Power consumption	250 W
Internal unit fuse	6,3 A AT
External pre-fuse	max. 16 AT

#### 3.4.3 Ambient conditions

Temperature in operation	-15 ... +40°C
Temperature during transport / storage	-20 ... +70°C
Relative humidity	max. 80 %, no dew point



### 3.4.4 Permissible fuels

- Natural Gas E/H
- LPG B/P

### 3.4.5 Emissions

#### Flue gas

The burner complies with DIN EN 676 Emission Class 3.

The NO<sub>x</sub> values are influenced by:

- flue gas system,
- combustion air (temperature and humidity),
- medium temperature.

#### Standard emission factor according to DIN 4702 Part 8

	21 kW	55 kW	75 kW	85 kW
Nitrogen Oxide NO <sub>x</sub> /ppm	13	33	29	31
Carbon Monoxide CO /ppm	2	4	5	7

#### O<sub>2</sub> content at min and max rating

Rating	min	max
O <sub>2</sub> content Natural Gas	6,0%	4,5%
O <sub>2</sub> content LPG	6,2%	4,2%

### 3.4.6 Rating

#### Combustion heat rating

	min			max
Combustion heat rating $Q_c$	21 kW	55 kW	75 kW	85 kW
Boiler capacity at 60/20°C	20 kW	52 kW	71 kW	82 kW
Fan speed Natural Gas	1650 1/min	3800 1/min	5100 1/min	6000 1/min
Fan speed LPG	1650 1/min	3600 1/min	4800 1/min	5600 1/min
Standard efficiency at 60/20°C	109,11% $H_i$ (98,3 % $H_s$ )	103,75 % $H_i$ (93,5 % $H_s$ )	101,56 % $H_i$ (91,5 % $H_s$ )	100,9 % $H_i$ (90,9 % $H_s$ )

### 3.4.7 Heat exchanger

	55 kW	75 kW	85 kW
Water content	36 l	36 l	36 l
Boiler temperature	max 95 °C	max 95 °C	max 95 °C
Operating pressure	0 bar	0 bar	0 bar

### 3.4.8 Flue gas system data

	min	55 kW	75 kW	85 kW
Flue gas temperature at 60/20 °C	80 ... 95 °C	148 ... 152 °C	180 ... 186 °C	190 ... 205 °C

## 4 Installation

### 4.1 Gas supply



#### WARNING

##### Explosion hazard due to leaking gas.

If a gas-air mixture is provided under certain conditions, any source of ignition can lead to an explosion and cause fatal or life-threatening injuries.

Improper work may lead to leaking gas and cause explosions.

Observe all work and safety instructions.

Only an approved gas installer may carry out the gas side connection. Observe local regulations.

The following should be obtained from the gas supply company:

- Type of gas,
- Gas connection pressure,
- Maximum CO<sub>2</sub> content in the flue gas,
- Calorific value in normal condition [kWh/m<sup>3</sup>].

Observe maximum permissible pressure of all components of the gas valve train.

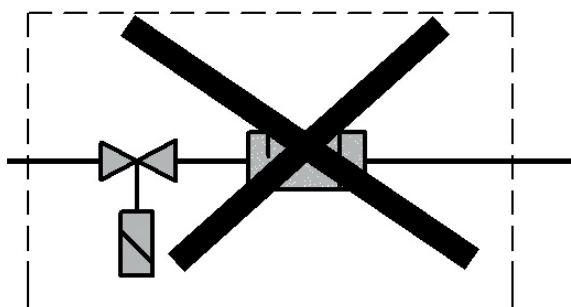
- ▶ Close all fuel shut off devices prior to commencing work and protect from accidental re-opening.

#### Observe general installation instructions

- Ensure correct mounting alignment and cleanliness of sealing surfaces.
- Mount valve train free of vibration. It must not be allowed to swing. Suitable supports should be fitted.
- Mount gas valve train free of stresses.
- Observe sequence and flow direction of gas valve train.
- If necessary, fit thermal shut off device (TAE) in front of the gas isolating valve.

#### Installation position

Gas combi valve assembly can be positioned with the actuator axis angled from standing vertical to lying horizontal.



## 4.2 Requirements for the heating water

The heating water has to be 0° dH.

## 4.3 Condensate connection



### WARNING

#### Danger of poisoning from outflowing waste gas.

If the siphon is not filled with water, in certain circumstances poisonous waste gas may occur. Inhaling poisonous waste gas may lead for persons to dizziness, nausea and even to death.

Make sure the siphon is periodically checked for sufficient water content. On condition, make sure it is immediately filled up with water.

This applies in particular after the condensing system was out of service a longer time or an operation with high return temperatures (> 55 °C).

Before checking the siphon for water provide sufficient ventilation for the condensing system environment. Make sure poisonous waste gas is immediately vented to the outside.

The condensate of the condensing system is fed via the integrated siphon to the waste water drain.

Observe the worksheet DWA-A 251 and the local regulations, where appropriate install a neutralisation system.

If the waste water inlet is on a higher level than the condensate output:

- ▶ install condensate lifting unit.

### Condensate hose routing

- ▶ Route the condensate hose to the condensate outlet.

### Filling the siphon

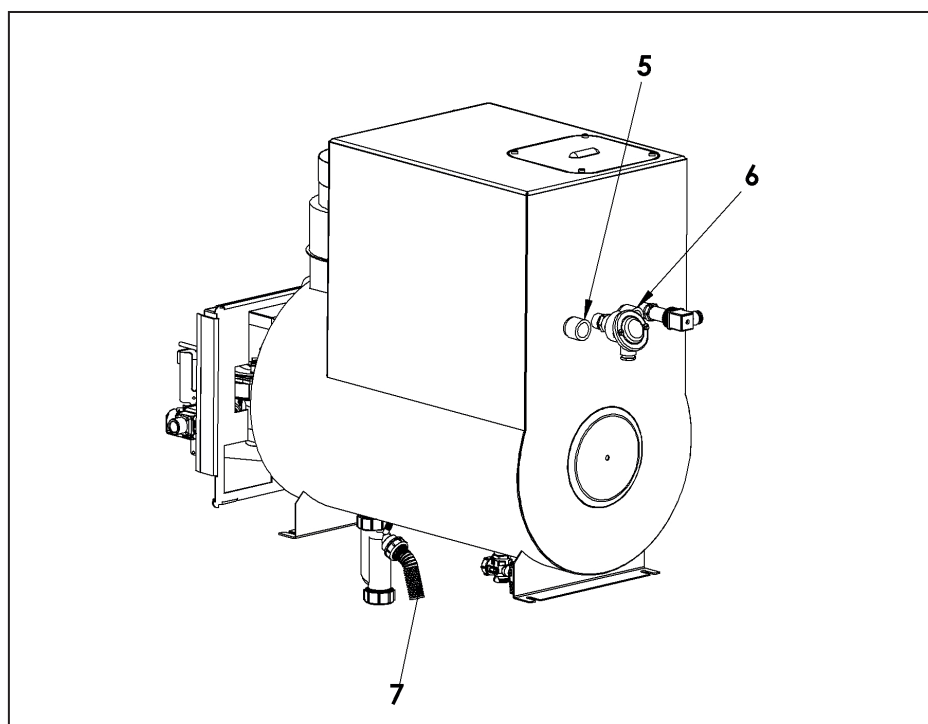
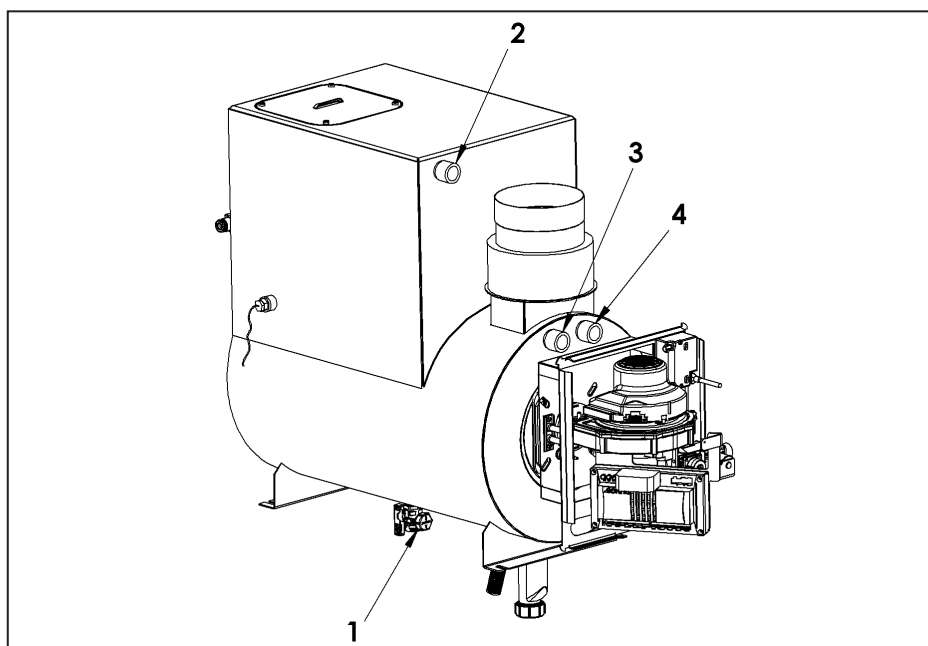
- ▶ Fill the siphon via the exhaust gas stub of the boiler until the water flows out from the condensate hose..

If an external siphon is provided after the boiler (for example by condensate hose):

- ▶ Cut off the cap from the vent opening.

If no external siphon is provided, the cap must not cut off from the vent opening.

## 4.4 Hydraulic connection



- ① KFE-cock 1/2"
- ② Overflow 1"
- ③ Afflux heating water 1"
- ④ Rewind FHS 1"
- ⑤ Outflow heating water 1"
- ⑥ Inlet FHS 1"
- ⑦ Siphon

## 4.5 Electrical installation



### WARNING

#### **Danger to life due to electrical shock.**

Always switch off the supply voltage to the system and disconnect power cable from mains supply before starting any installation, maintenance or repair activities. Secure the system against unintended switch-on.

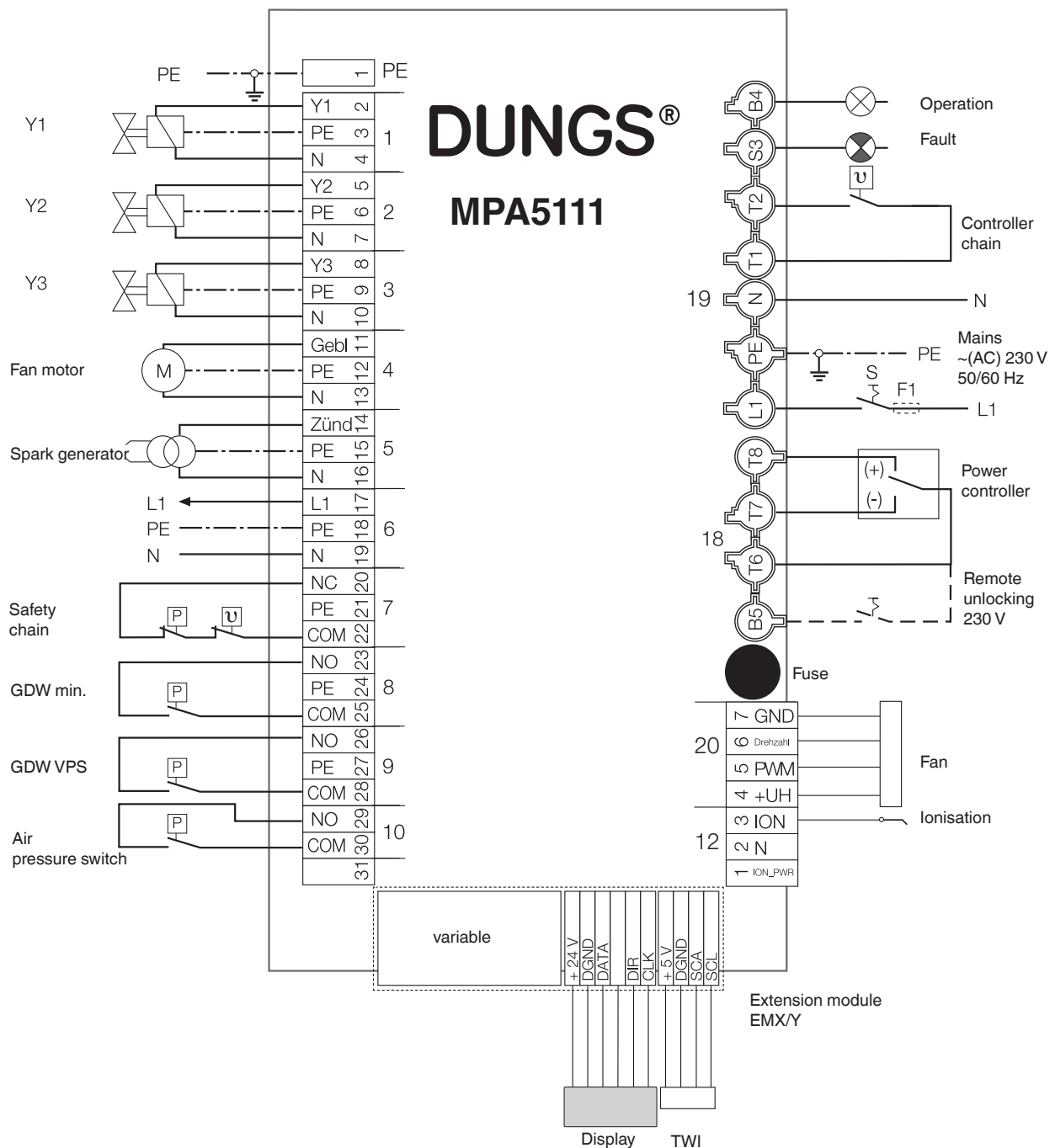
Touching live parts may result in serious injury or death.

The electrical installation must only be carried out by qualified electricians. Observe local regulations.

Observe wiring diagram enclosed (see Ch. 11.1)

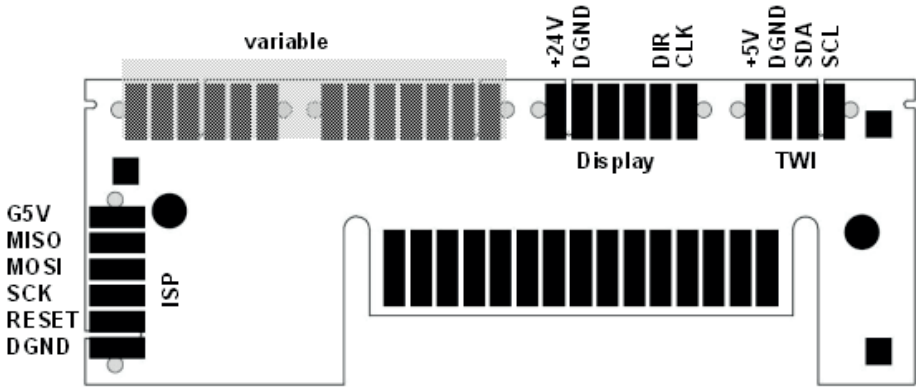
- Check polarity and wiring of 7 pole connection plug.
- Check polarity before plugging in the modulation connector.
- Plug in modulation connector.

### 4.5.1 Connection diagram for combustion manager MPA 5111



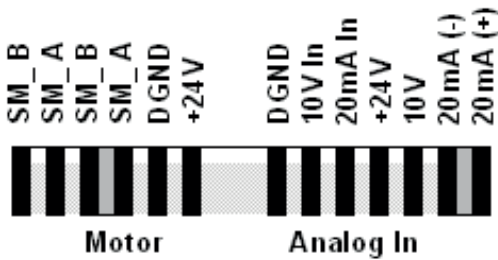
### 4.5.2 Connection diagram for extension modules

The extension modules EMX/Y are plug-in printed circuit boards.  
For the configuration the EM1/1 is the minimum requirement.  
Old extension modules have a slot for display connection and a slot for PC/  
laptop connection via VisionBox for system configuration (TWI).



Additional connection options are provided in the „variable area“.  
The functions and pin assignments are different depending on the EM  
variant.

#### EM 1/3

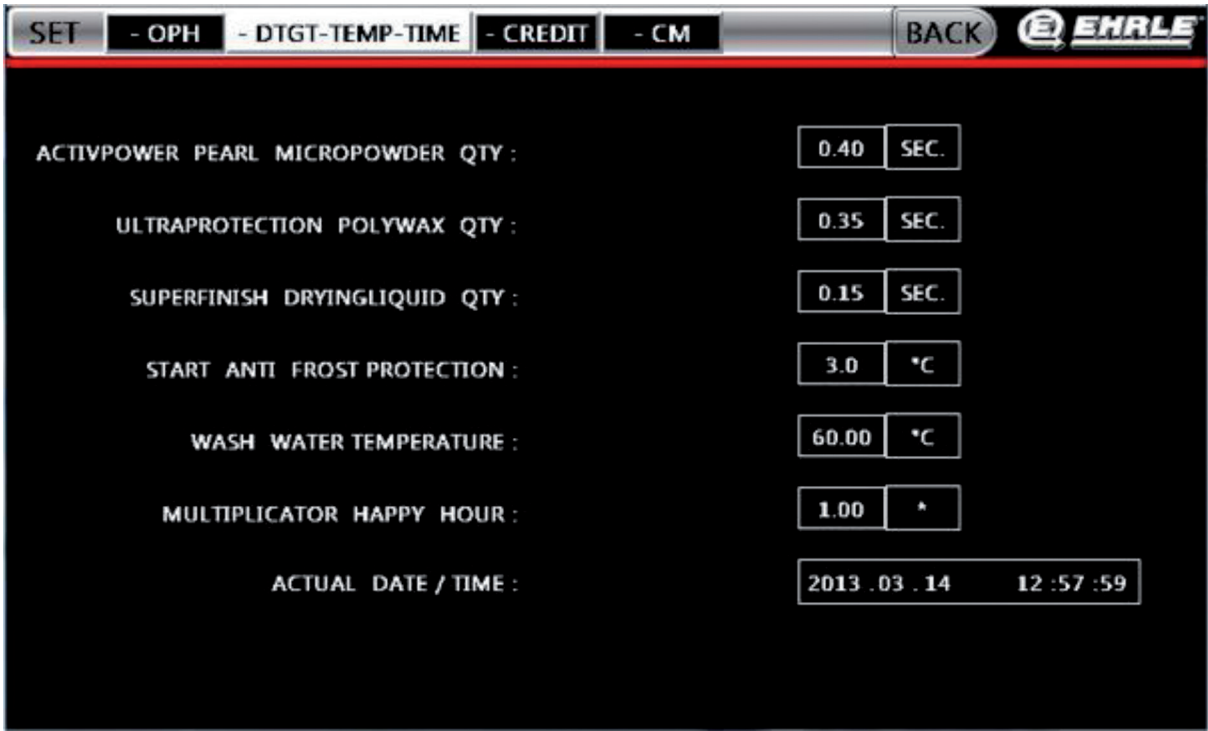




5 Operation

5.1 Control monitor

5.1.1 Set setpoint temperature



Wash Water Temperature	58 °C
------------------------	-------

### 5.1.2 Regulation adjustment (Modulation)



11 l/min * PL	55 kW - 2 PL	75 kW - 3 PL	85 kW - 4 PL
Base Load	5	5	5
Single Load	48	32	32
STBY HYST	20 K	20 K	20 K

8 l/min * PL	55 kW - 2 PL	55 kW - 3 PL	75 kW - 4 PL	85 kW - 5 PL
Base Load	5	5	5	5
Single Load	48	48	32	32
STBY HYST	20 K	20 K	20 K	20 K

## 5.2 Operating panel burner

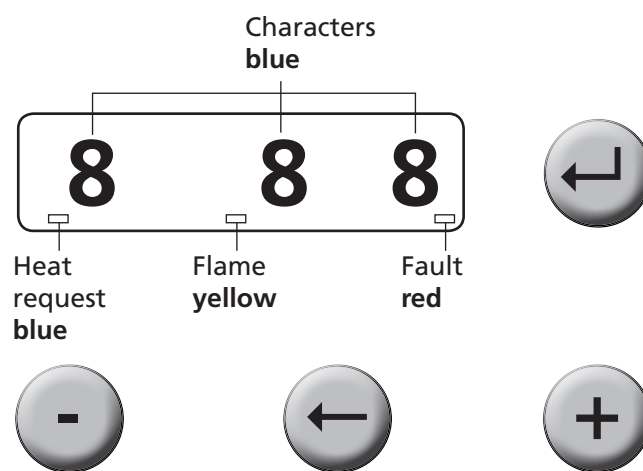
### 5.2.1 Key assignment



#### CAUTION

The operating panel of the combustion manager MP5111 may be damaged by improper operation.

Press the illuminated push button only lightly. Otherwise, excessive pressure applied to the illuminated push button may damage the operating panel of the combustion manager MP5111.



### 5.3 Overview display modes burner

Mode	Active	Reference
Operational status display	in normal operation if no error is active	see section 5.3.1
Error display	if the automatic burner control is in the fault switch-off phase	see section 5.3.2
Info display	by pressing the key combination (+ and ←) in state 1 or 35	see section 5.3.3
Service display	by pressing the key combination (- and ←) in state 1 or 35	see section 5.3.4
Display of the error memory	by pressing the key combination (+ and ←) in state 1 or 35	see section 5.3.5
Flashing display	Option 1: Request to confirm the access level change Option 2: Keep the unlock key depressed for more than 5 s to restart the MPA	

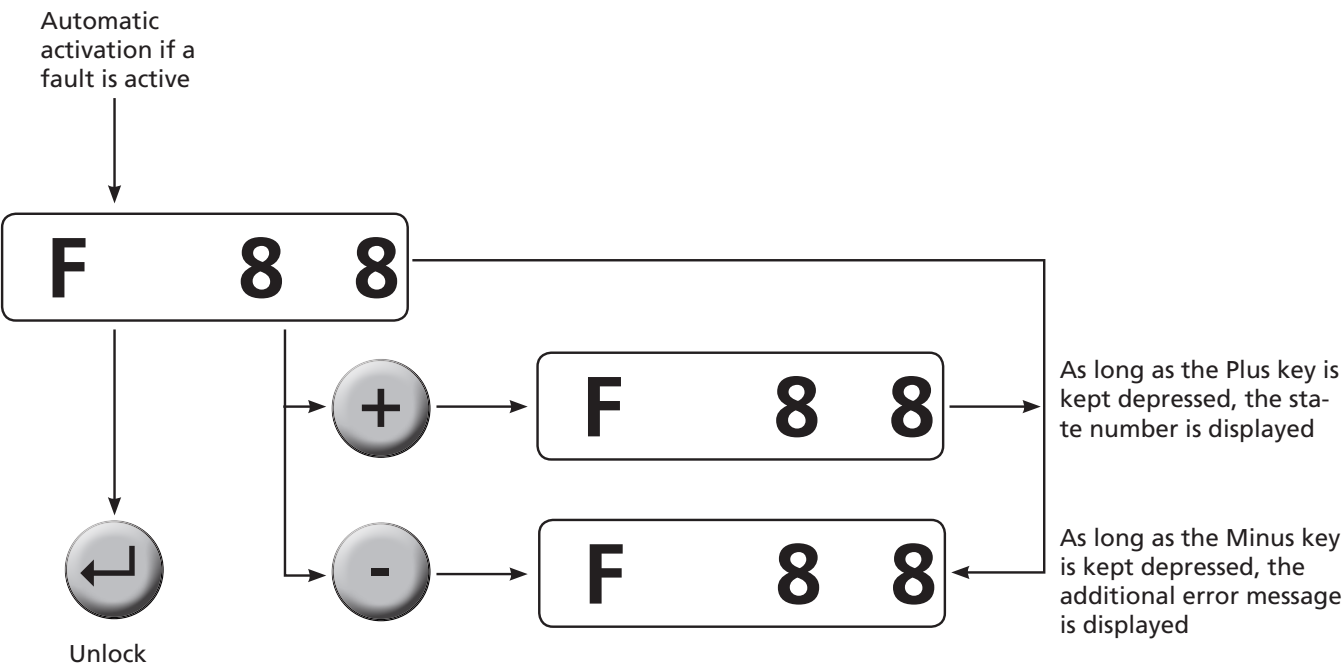
#### 5.3.1 Operational status display



Display of the individual process states

5.3.2 Error display (error codes)

Error display	
•	An error message is automatically displayed as soon as the automatic system goes to the fault lock system.
•	The error that has occurred last is displayed.



### 5.3.3 Information display

Information display	
•	The info display is activated out of the operational status display.
•	Using the info display, information on the current counter reading such as start counter and permanent runtime meter can be called.
•	This operating mode is left after a timeout of 20 s if no key is pressed within this time period.

Activation of the info display  
by simultaneous pressing of the keys



Display of the quality  
of the ionisation current

1 8 8



Display of the fifth  
place before the  
decimal point (1)  
on the permanent  
start counter

2 8 8



Display of the fifth  
place before the  
decimal point (100)  
on the permanent  
start counter

3 8 8



Display of the fifth  
place before the  
decimal point (10000)  
on the permanent  
start counter

4 8 8

Display of the fifth  
place before the  
decimal point (1) on  
the permanent run  
time meter

5 8 8



Display of the fifth  
place before the  
decimal point (100)  
on the permanent run  
time meter

6 8 8



Display of the fifth  
place before the  
decimal point (10000)  
on the permanent run  
time meter

7 8 8



Back to the operational  
status display

from each info display state

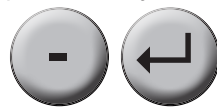


Switches to the operational  
status display

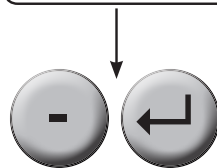
### 5.3.4 Service display

Service display	
●	The service display is activated out of the operational status display.
●	The service display can only be activated in the burner mode.
●	A heat request must be active on the temperature controller input.
●	Power setting by means of the $\pm$ keys
!!	In this mode, the device does not react to the power setting signal of the inputs Power [+] and Power [-]

Activation of the service display:  
press the keys simultaneously



↓ set modulation percentage



back to the  
operational status display



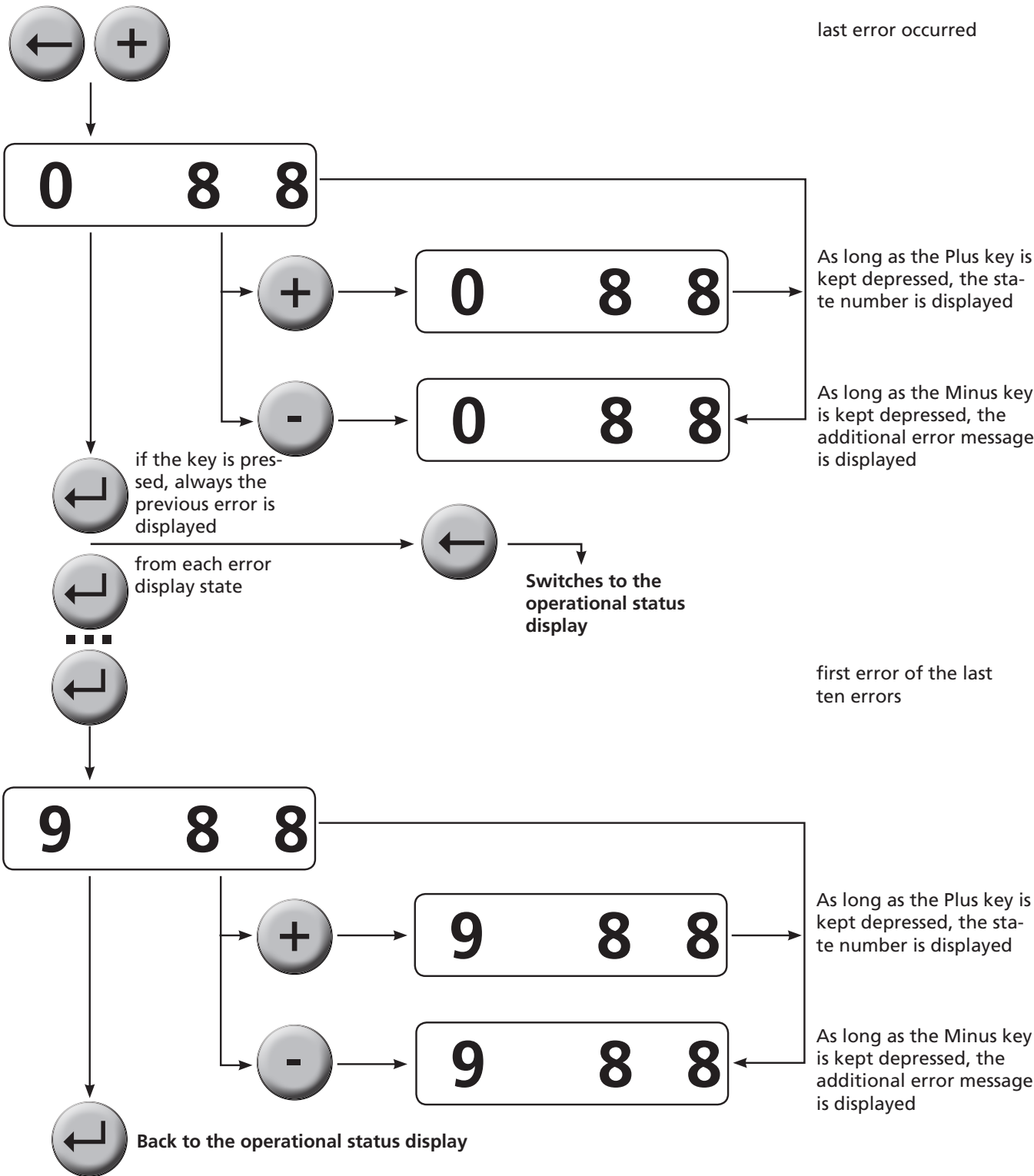
Reduces the power



Increases the power

5.3.5 Error memory display

Display of the error memory	
•	The display of the error memory is used to call the last ten errors.
•	The error that has occurred last is displayed.
•	The error memory display is activated out of the operational status display.
•	This error memory display is left after a timeout of 20 s if no key is pressed within this time period.





## 6 Commissioning

### 6.1 Prerequisite

Commissioning must only be carried out by qualified personnel.

Only correctly carried out commissioning ensures the operational safety of the condensing system.

#### Prior to commissioning check:

- All installation work must be completed and checked prior to commissioning.
- Sufficient combustion air supply is provided, if necessary install additional air intake.
- Heat exchanger is filled with sufficient medium.
- Annulus between flame tube and heat exchanger should be filled.
- All regulating, control and safety devices are functioning and set correctly.
- The flue gas ducts are unimpeded.
- A measuring point conforming to standards is available to measure the flue gas.
- Heat exchanger and flue gas ducting up to the test point are tight (no leakage, because extraneous air influences the test results).
- Operating instructions of the heat exchanger are observed.
- Heat demand is ensured.

Additional system-related tests could be necessary. Please observe the operating guidelines for the individual components.

#### 6.1.1 Connect measuring devices

##### Measuring device for ionisation current

If a flame is present, an ionisation current flows.

- Connect current measuring device in series.

For an optimal flame detection the flame signal has to be considered during configuration of the burner.

The LED of the flame on the display must not be flashing and the displayed signal in the VisionBox application must have more than 60 digits.

##### Ionisations current

Extraneous light from	0,8 $\mu$ A
Minimal ionisations current	1,2 $\mu$ A
At least a direct current	3 ... 40 $\mu$ A
flashing	Fault (see. Chap. 9)

### 6.1.2 Check leak tightness of gas valve train



#### WARNING

##### Explosion hazard due to leaking gas.

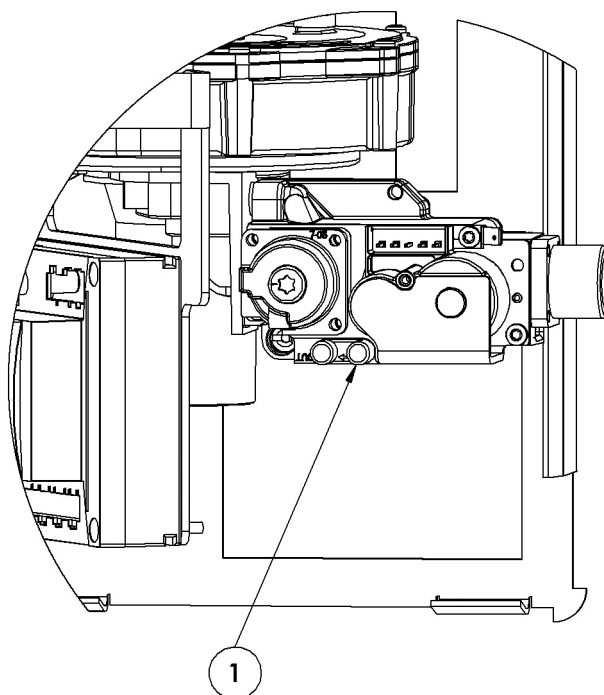
Only specially trained and qualified personnel is allowed to carry out work on the gas valve train.

Make sure, prior to commissioning and after work on the gas combi valve all screws on the test points are tightly closed and checked for leak tightness.

Otherwise, under certain conditions leaking gas can lead to explosions and cause fatal or life-threatening injuries.

#### Leakage test

- ▶ Carry out leakage test:
  - prior to commissioning,
  - after all service and maintenance work.
- ▶ Switch off condensing system.
- ▶ Close gas isolating valve.
- ▶ Open screw on test point Pe ① of the gas combi valve.
- ▶ Connect test equipment to Pe.
- ▶ Generate test pressure of 100 mbar.
- ▶ Wait for pressure equalisation for 5 minutes.
- ▶ Initiate a test period of 5 minutes.
- ▶ Check pressure loss.
- ✓ The gas section is tight, if the pressure does not drop by more than 1 mbar.
- ▶ Document result of the leakage test on the engineers report.



① Test point PE

### 6.1.3 Check gas connection pressure



#### WARNING

##### Explosion hazard due to leaking gas.

Make sure the gas connection pressure check is properly performed by specially trained and qualified personnel. Otherwise, under certain conditions leaking gas can lead to explosions and cause fatal or life-threatening injuries.

The gas connection pressure must be within the following ranges:

Natural Gas	17 ... <b>20</b> ... 60,0 mbar
LPG	28 ... <b>50</b> ... 60,0 mbar

Commissioning outside of the pressure ranges to DIN EN 437 is not permitted.

- ▶ Open screw on test point Pe of the gas combi valve (see Ch. 6.1.2).
- ▶ Connect pressure measuring device.
- ▶ Slowly open isolating valve whilst checking the pressure increase.

If the measured connection pressure exceeds:

Natural Gas	60 mbar
LPG	60 mbar

- ▶ Immediately close isolating valve.
- ▶ Do not start operation of the condensing system.
- ▶ Inform system operator.

If the measured connection pressure is insufficient:

- ▶ Do not start the condensing system.
- ▶ Inform system operator.

Due to the pressure loss in the gas supply, during operation (maximum rating) the minimum gas pressure at the test point Pe must not be lower than the gas connection pressure.

	Natural Gas	LPG
Gas isolating valve	1/2"	1/2"
VK 411	16 mbar	18 mbar

## 6.2 Adjusting the boiler

- ▶ During commissioning check:
  - Maximum possible water throughput is ensured.
  - Gas connection pressure at maximum rating within the value given (see Ch. 6.1.3).

### 1. Adjust combustion

The boiler is factory preset for operation with Natural Gas (G20) or LPG (G30 + G31).

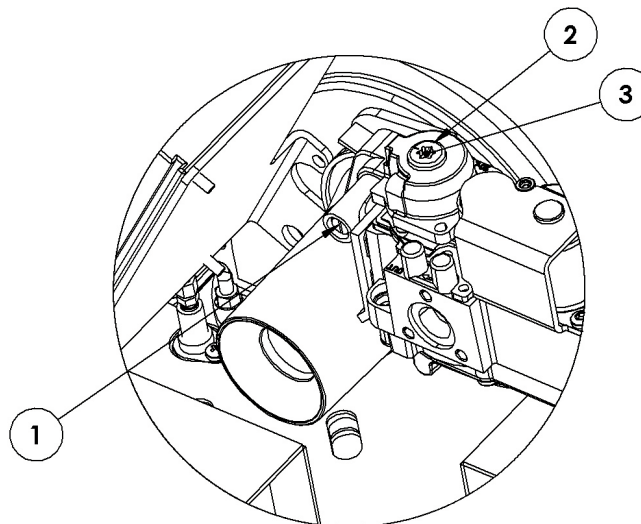
The O<sub>2</sub> content must be checked and if necessary adjusted.

Set O<sub>2</sub> content at maximum rating:

- ▶ Open gas isolating valve.
- ▶ Manually drive rating to maximum (see Ch. 5.1.2).
- ▶ Check combustion and if necessary adjust.
- ▶ Set O<sub>2</sub> content at setting screw ① as per table:
  - Clockwise rotation = O<sub>2</sub> content increases
  - Anticlockwise rotation = O<sub>2</sub> content decreases

Set O<sub>2</sub> content at minimum rating:

- ▶ Manually drive rating to minimum (see Ch. 5.1.2).
- ▶ Check combustion and if necessary adjust.
- ▶ Remove closing cover ③ from gas combi valve.
- ▶ Set O<sub>2</sub> content at setting screw ② as per table:
  - Anticlockwise rotation = O<sub>2</sub> content increased
  - Clockwise rotation = O<sub>2</sub> content reduces



	O <sub>2</sub> minimum rating	O <sub>2</sub> maximum rating
Natural Gas	6,0 % ± 0,2	4,5 % ± 0,2
LPG	6,2 % ± 0,2	4,2 % ± 0,2

## 2. Concluding work



### WARNING

#### Explosion hazard due to leaking gas.

Only specially trained and qualified personnel is allowed to carry out work on the gas valve train.

Make sure, prior to commissioning and after work on the gas combi valve all screws on the test points are tightly closed and checked for tightness.

Otherwise, under certain conditions leaking gas can lead to explosions and cause fatal or life-threatening injuries.

- ▶ Recheck O<sub>2</sub> content at maximum and minimum rating and optimise if necessary.
- ▶ Close the test points with the appropriate covers.
- ▶ Enter combustion values and settings in the commissioning record.
- ▶ Inform the operator about the use of the condensing system.
- ▶ Hand the installation and operating manual to the operator and inform him that this must be kept on site.
- ▶ The operator should be told that the installation must be serviced annually.
- ▶ Do not start the operation of the condensing system.



### General Information

Adjust to recommended modulation settings (see. Chap. 5.1.2).

### 6.3 Calculate combustion heat rating

$V_B$	Operating volume in m <sup>3</sup> /h (gas throughput)
$V_N$	Normal volume in m <sup>3</sup> /h (gas throughput at 0 °C and 1013 mbar)
$V_G$	Gas throughput determined at gas meter (m <sup>3</sup> )
$T_M$	Time measured during gas throughput determination ( $V_G$ )
$f$	Conversion factor
$t_{Gas}$	Gas temperature at meter in °C
$P_{Gas}$	Gas pressure at meter in mbar
$P_{Baro}$	Barometric air pressure in mbar (see table)
$Q_F$	Combustion heat rating in kW
$H_i$	Calorific value in kWh/m <sup>3</sup> (at 0 °C and 1013 mbar)

#### Determine operating volume (gas throughput)

- Measure gas throughput ( $V_G$ ) at gas meter, measuring time ( $T_M$ ) should be a minimum of 60 seconds.
- Calculate operating volume ( $V_B$ ) using the following formula.

$$V_B = \frac{3600 \cdot V_G}{T_M}$$

#### Calculate conversion factor

- Determine gas temperature ( $t_{Gas}$ ) and gas pressure ( $P_{Gas}$ ) at gas meter.
- Determine air pressure ( $P_{Baro}$ ) from the following table.

Height above sea level [m]	0	100	200	300	400	500	600	700	800	900	1000	1100	1200	1300
$P_{Baro}$ [mbar]	1013	1001	990	978	966	955	943	932	921	910	899	888	877	866

- Calculate conversion factor ( $f$ ) using the following formula.

$$f = \frac{P_{Baro} + P_{Gas}}{1013} \cdot \frac{273}{273 + t_{Gas}}$$

#### Calculate normal volume

- Calculate normal volume ( $V_N$ ) using the following formula.

$$V_N = V_B \cdot f$$

#### Calculate combustion heat rating

- Calculate combustion heat rating ( $Q_F$ ) using the following formula.

$$Q_F = V_N \cdot H_{i,n}$$

## 7 Temporary shutdown

For temporary shutdown:

- ▶ Switch off the condensing system.
- ▶ Close fuel shut off devices.
- ▶ If there is a risk of frost drain condensing system.

## 8 Servicing

### 8.1 Servicing general information

Servicing must only be carried out by qualified and authorized personnel. The combustion plant should be serviced annually. Depending on site conditions more frequent checks may be required.

Components with increased wear based on location dependent environmental conditions (e.g. high level of pollution at the installation site) or expired lifecycle, respectively expired before next servicing date, has to be replaced precautionary (s. Chap. 8.2).

Repair work on the following components must only be carried out by the component manufacturer or their approved agent:

- combustion manager,
- flame sensor,
- Gas combi valve.



#### Explosion hazard due to leaking gas.

Make sure

- prior starting any maintenance activities the fuel shut off devices are closed,
- the screws at the test points are tightly closed and checked for tightness,
- dismantling and assembling gas carrying system components are properly carried out.

Otherwise, under certain conditions leaking gas can lead to explosions and cause fatal or life-threatening injuries.



#### WARNING

##### Danger to life due to electrical shock.

Make sure, prior starting with any maintenance activities the supply voltage to the condensing system is switched off and the power cable disconnected from the mains supply. Secure the system against unintended switch-on.

Touching live parts may result in serious injury or death.



#### WARNING

##### Risk of burns from hot system parts or components.

System parts or components may become hot during operation. Touching hot surfaces or parts can cause burns. Make sure, before starting any maintenance or repair activities the system parts, assemblies and components are cooled down.





### General Information

The manufacturer EHRLE GmbH recommends the conclusion of a maintenance contract to ensure the regular condensing system check carried out correctly.

### Prior to every servicing

- ▶ Inform the operator about the extent of service work to be carried out.
- ▶ Switch off mains switch of installation and safeguard against accidental reactivation.
- ▶ Close fuel shut off devices.
- ▶ Remove cover.
- ▶ Unplug boiler control connection plug (Modulation) at the combustion manager.

### Following servicing

- ▶ Check leak tightness of gas carrying components.
- ▶ Check function of:
  - ignition,
  - flame monitoring,
  - gas carrying components (gas inlet and outlet pressure),
  - safety interlock circuit.
- ▶ Check combustion values, if necessary re-adjust the burner.
- ▶ Enter combustion values and settings in the commissioning record.
- ▶ Refit cover.

## 8.2 Components



### WARNING

#### Danger of poisoning from outflowing waste gas.

If the siphon is not filled with sufficient water, in certain circumstances poisonous waste gas may occur. Inhaling poisonous waste gas may lead for persons to dizziness, nausea and even to death.

Make sure the siphon is periodically checked for sufficient water content. On condition, make sure it is immediately filled up with water.

This applies in particular after the condensing system was out of service a longer time or an operation with high return temperatures (> 55 °C).

Before checking the siphon for water provide sufficient ventilation for the condensing system environment. Make sure poisonous waste gas is immediately vent to the outside.



### CAUTION

#### Short-circuit hazard with ionisation electrode.

Once finished cleaning, ensure that the fibres of the burner fleece do not stick out too far in the area near the ionisation electrode.

Otherwise a short-circuit hazard with the ionisation electrode is given.

Components	Criteria	Service procedure	Period
Fan wheel	Soiling Damage	► Clean ► Replace	on condition (appr. 5 years)
Air duct	Soiling	► Clean	on condition (appr. 5 years)
Ignition cable	Damage	► Replace	5 years
Ignition electrode	Soiling Damage/wear	► Clean ► Replace	2 years
Combustion Manager	250 000 start-ups reached (equal to approx. 10 years)	► Recommendation: replace	10 years
Ionisation electrode	Soiling Damage/wear	► Clean ► Replace	2 years
Flame tube	Soiling Damage	► Clean* ► Replace	2 years
Gas combi valve	Damage/leak tightness	► Replace	10 years
Filter insert gas combi valve	Soiling	► Replace	2 years
Siphon	Not, respectively not sufficient filled with water	► Replace	2 years

#### \* Cleaning the flame tube

Clean flame tube if required:

- Clean the inside of the flame tube (if necessary use compressed air to blow through from outside to inside).
- If dust deposits are present, brush out burner fleece using a soft brush to prevent damaging the burner fleece.

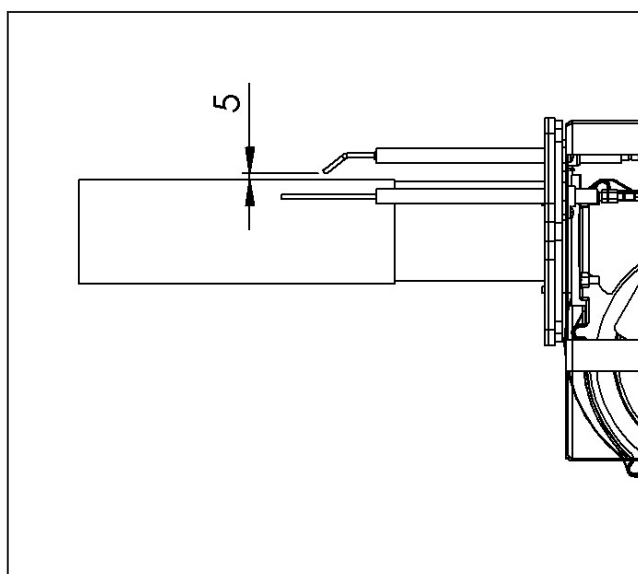
### 8.3 Replacing electrodes

Observe notes on servicing (see Ch. 8.2)

#### Ignition electrode

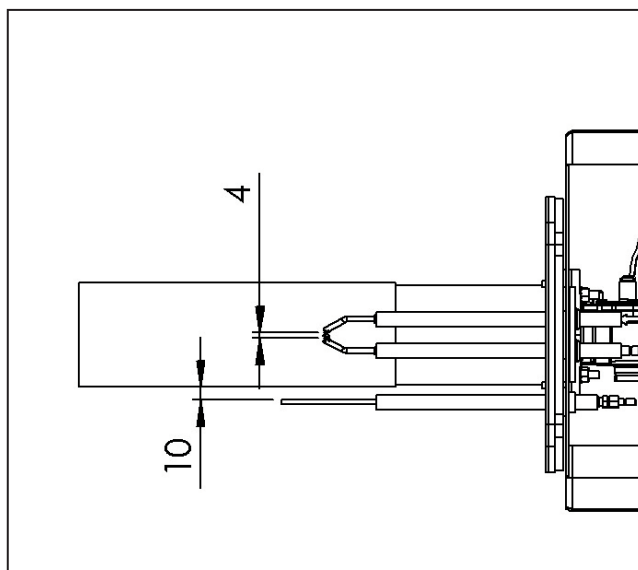
- ▶ Remove ignition plug and earth wire with a slightly twist.
- ▶ Remove bolts.
- ▶ Replace ignition electrode and gasket, whilst observing the ignition electrode distance of 4.0 mm.

The combustion manager recognises irregularities of the burner and indicates these with the illuminated push button (see. Ch. 5.2.1)



#### Ionisation electrode

- ▶ Remove plug and earth wire from combustion manager.
- ▶ Remove bolts.
- ▶ Replace ionisation electrode and gasket.



## 9 Troubleshooting

### 9.1 Procedures for fault conditions



#### CAUTION

**Damage resulting from incorrect servicing.**

To prevent damage to the combustion plant

- do not carry out more than two lockout resets successively,
- only specially trained and qualified personnel is allowed to rectify faults.

The combustion manager recognises irregularities of the burner and indicates these with the illuminated push button (see. Ch. 5.2.1)

## 9.2 Rectifying faults

### 9.2.1 Error codes

#### MPA 51 xx

Error ID	Internal error	Error description	Possible cause of the error
<b>9.2.1.1 Error from processor 2</b>			
F1 Display flashes	●	No bus connection to processor 1	? TWI bus connection blocked by an defective external bus user, for example a defective VisionBox or ....
F2 Display flashes		Incorrect display	? The display AM03 (only for MPA 51) has been connected to the MPA 51xx. Correct: Use AM08 or AM09
F3 Display flashes		Password change for access level failed.	? Incorrect password for the access level ? Unlock key has not been pressed
<b>9.2.1.2 Error from the basic system (01 to 3F)</b>			
01	●	ERROR_INTERRUPT_CYCL_STATEFRAME	
02	●	FEHLER_WD_TRIGGERUNG	
03	●	ERROR_WD_HARDWARE	
04		ERROR_UNLOCKING_DENIED	? more than 5 unlockings in the last 15 minutes, remedy: Wait or carry out an Extended unlocking
05	●	ERROR_ROM_TEST	
06	●	ERROR_RAM_TEST	
07	●	ERROR_PINSHORTCIRCUIT	
08	●	ERROR_STACK_OVERFLOW	
09	●	ERROR_PROGRAMMING	
0A	●	ERROR_DI_VARIABLE	
0B	●	ERROR_IN_TABCONTROLERROR	
0C	●	not used	
0D	●	ERROR_CPU_TEST	
0E	●	ERROR_EEPROM_PARAMETER	
0F	●	ERROR_ADDRESS_TEST	

## MPA 51 xx

Error ID	Internal error	Error description	Possible cause of the error
<b>9.2.1.2 Error from the basic system (01 to 3F)</b>			
10	●	not used	
11		ERROR_UNDERVOLTAGE	? The admissible lower voltage limit was not reached at least for a short time
12		ERROR_POWERFAILURE	? The supply voltage was interrupted during startup, in the operation or during the regular switch-off
13		ERROR_WD_STATUS	? The safety chain is not potential-free
14	●	ERROR_DI_SEGMENT_TEST	
15	●	ERROR_SFRREGISTER_TEST	
16		ERROR_TWI_COMMUNICATION	? A user of the TWI bus must be connected to the bus or separated from the bus while the MPA was disconnected from the mains. Remedy: Connect or separate a user of the TWI bus only if the MPA is disconnected from the mains. ? Too many users are connected to the TWI bus or EMC faults occur on the TWI line. Remedy: Use shorter lines or reduce the number of users
17	●	ERROR_STATEFRAME_OVERLOAD	
18		ERROR_EXTERNAL_APPLICATION	A switch-off has been activated by an external user, for example by selecting the function „Switch-off“ in the PC software of the VisionBox
19	●	not used	
1A	●	ERROR_SWWD_DURING_INITIALISATION	
1b	●	ERROR_BUFFEROVERFLOW	
1C	●	ERROR_SYNCHRONISATION_DURING_INITIALISATION	
1D	●	ERROR_PROCESSORFAILURE	? MPA is influenced by strong EMC interferences

**MPA 51 xx**

Error ID	Internal error	Error description	Possible cause of the error
<b>9.2.1.2 Error from the basic system (01 to 3F)</b>			
<b>1E</b>	●	ERROR_SFRREGISTER_STATEBLOCK	
...		not used	
<b>9.2.1.3 Error from the extended functions (40 to 9F)</b>			
<b>40</b>		ERROR_FANDEFAULTS	? In the curve segment, a fan default is predefined, which is smaller than the minimum speed or higher than the maximum speed of the fan (P26 or P27). P26 (min. speed) is 500 U/min but the speed for modulation degree 0% is set to 480 rpm. Or P27 (max. speed) is set to 5600 rpm but the pre-aeration B should be carried out with 5800 rpm.
<b>41</b>		ERROR_FAN_DEVIATION	? The number of pulses in the fan feedback is set to an incorrect value ? The fan is not suitable for the desired speed ? The predefined tolerance is too low or the fan controller is not optimised
<b>42</b>		ERROR_FAN_NO_FEEDBACK	? The feedback line of the fan is not correctly connected or is interrupted ? The fan is blocked and does not work ? The fan is not supplied with power or is defective
<b>43</b>		ERROR_TEST_IONISATIONINPUT	
<b>44</b>		ERROR_CURVECRC16_TEST	? The curve segment was temporarily changed, for ex. for putting the MPA into operation, and was not correctly enabled later
<b>45</b>		ERROR_INVALID_MODULATIONDEGREE	? Modulation degree is outside the limits
<b>46</b>		not used	

## MPA 51 xx

Error ID	Internal error	Error description	Possible cause of the error
<b>9.2.1.3 Error from the extended functions (40 to 9F)</b>			
<b>47</b>		ERROR_INVALID_STEPPEDMOTORTYPE	? Check stepped motor (compare P30)
<b>48</b>		ERROR_STEPPEDMOTOR_TOLERANCE_EXCEEDED	? The lines to the stepped motor are not correctly connected or partly interrupted ? The stepped motor is charged with more than the admissible torque, for example due to improper mounting of the flap or pressure impulses.
<b>49</b>		ERROR_STEPPEDMOTOR_REFERENCE_NOT_FOUND	? see error 0x48
<b>4A</b>		ERROR_STEPPEDMOTOR_NO_REACTION	? see error 0x48
<b>4B</b>		ERROR_PARAMETERRECORDSTICK_NOT_FOUND	? Parameter record activated but not plugged in the MPA ? Stick defective ? Duration of the standard mode (P70) is higher than 23 h 59 min and the continuous run is not enabled ? PWM outputs configured to analogue operation (0..10 V or 4...20 mA) but no suitable stick is plugged in.
<b>4C</b>		ERROR_PARAMETER_RECORD_STICK_BLOCK_ADJUSTMEN	? A parameter could not be copied from the stick, for ex. because the variable limits in the MPA were confined.
<b>4D</b>		ERROR_PARAMETER_RECORD_STICK_INCORRECT_PASSWORD	? The entered password is not suitable for this stick
<b>4E</b>		ERROR_PARAMETER_RECORD_STICK_NO_CONTINUOUS_RUN	? Duration of the standard mode (P70) is higher than 23 h 59 min and the continuous run is not enabled
<b>4F</b>		ERROR_PARAMETER_RECORD_STICK_TYPE	? The stick does not fit with the type of automatic burner control
<b>50</b>	●	ERROR_FEEDBACK_ADDITION_INCORRECT	



**MPA 51 xx**

Error ID	Internal error	Error description	Possible cause of the error
<b>9.2.1.3 Error from the extended functions (40 to 9F)</b>			
51		ERROR_ADDITION_INVALID_DELAY	? Parameter P52 or P53 are set to an invalid value because the concerned state (P50 or P51) cannot have the set duration
52		not used	
53		ERROR_LACKOFGAS_GDWVPS	
54	●	ERROR_PWM_CALIBRATION_VALUES	? The EEPROM was changed or deleted when programming the parameter record stick ? Parameter record stick defective
55	●	ERROR_PARAMETER_RECORD_STICK_CRC_DATA	? Parameter record stick defective
...		not used	
<b>9.2.1.4 Error from the application (from A0)</b>			
A0		ERROR_STATE_DURATION_TOO_LONG (Error fan and/or stepped motor)	? in the state 3, 16 and 23: The fan and/or the stepped motor cannot reach its nominal value within the expected time period ? other states: Internal error
A1		ERROR_FAN_STARTUP (Error fan and/or stepped motor)	? in the state 3, 16 and 23: The fan and/or the stepped motor cannot reach its nominal value within the expected time period ? other states: Internal error
A2		ERROR_SAFETY_CHAIN_OPEN	? The safety chain has been opened or is not closed ? The wires of the safety chain are interrupted
A3		ERROR_PARAMETER_RECORD_STICK_NO_PASSWORD	? The values in the MPA and in the parameter record stick are different. The requested password was not entered (timeout).
A4	●	ERROR_FEEDBACK_V1_INCORRECT	
A5	●	ERROR_FEEDBACK_V2_INCORRECT	

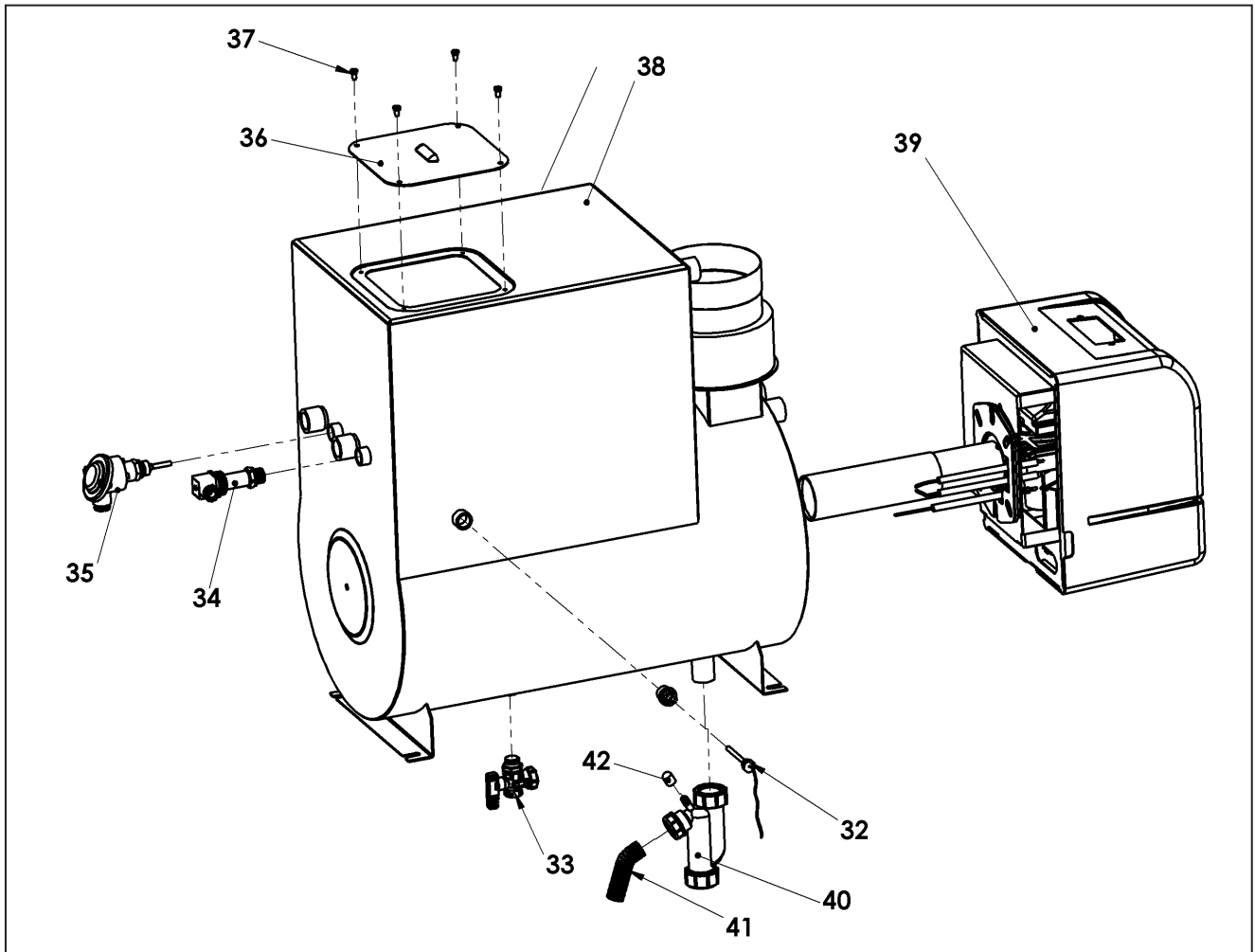
## MPA 51 xx

Error ID	Internal error	Error description	Possible cause of the error
<b>9.2.1.4 Error from the application (A0)</b>			
<b>A6</b>		ERROR_EXTERNAL_LIGHT	? Earth connection to an ionisation electrode ? Gas flows out and is burned for ex. by neighbouring burners ? Connected flame detector detects external light
<b>A7</b>		ERROR_NO_FLAME_DURING_SZA	? Ionisation electrode incorrectly set ? Ignition electrodes incorrectly set ? Insulated lines of the ignition electrodes or the ionisation electrode defective ? Pneumatic composite incorrectly set / Incorrect gas type ? Gas valves do not open the gas flow ? Incorrect configuration of the curve points ? Connected flame detector (UV, ...) detects light or is defective ? Lines of mains connection on the MPA exchanged („N“ and „L1“)
<b>A8</b>		ERROR_FLAME_GONE_OUT_DURING_OPERATION	? Gas supply or pneumatic composite are not set/suitable for high capacities ? Flame body defective ? Connected flame detector (UV, ...) detects no light or is defective
<b>A9</b>		ERROR_FLAME_GONE_OUT_DURING_STABILISATION	? see 0xA8, the problem occurs earlier.
<b>AA</b>		ERROR_IDLESTATECONTROL_LDW	? The air pressure detector is defective ? There is an air pressure during the idle state control, for ex. due to an air flow from the exhaust line,... ? The threshold value of the air pressure detector is set to an incorrect value
<b>AB</b>		ERROR_NO_AIR_PRESSURE	? the air pressure detector is incorrectly connected or defective ? the fan does not work ? the threshold value of the air pressure detector is set to an incorrect value

**MPA 51 xx**

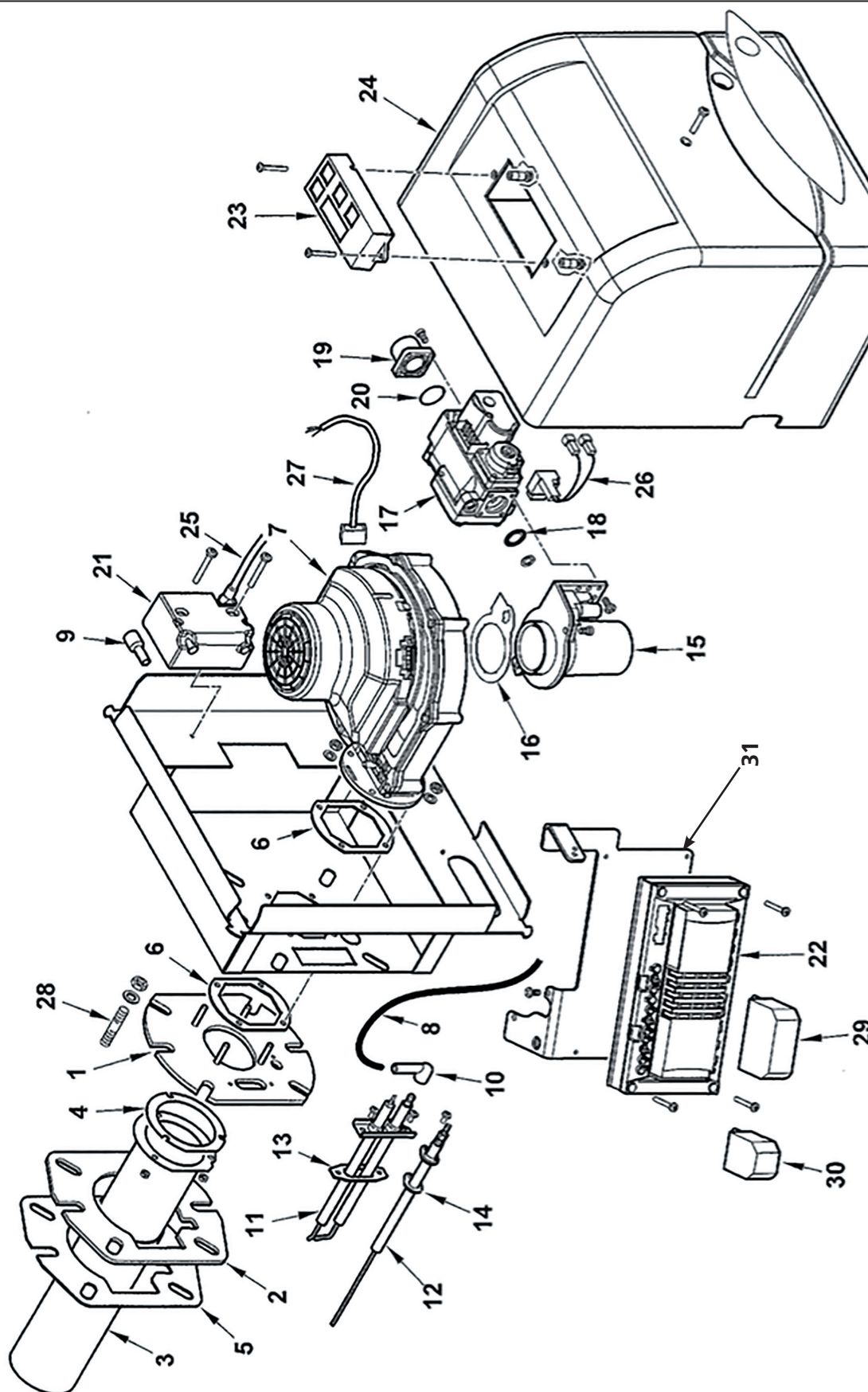
Error ID	Internal error	Error description	Possible cause of the error
<b>9.2.1.4 Error from the application (A0)</b>			
AC	●	ERROR_FEEDBACK_IGNITION_INCORRECT	
AD		ERROR_LACKOFGAS_GDWMIN	
AE		ERROR_VPS_V1_LEAKING	
AF		ERROR_VPS_V2_LEAKING	
B0	●	ERROR_TESTCIRCUIT_EXTENSION	
...		not used	

## 10 Spares



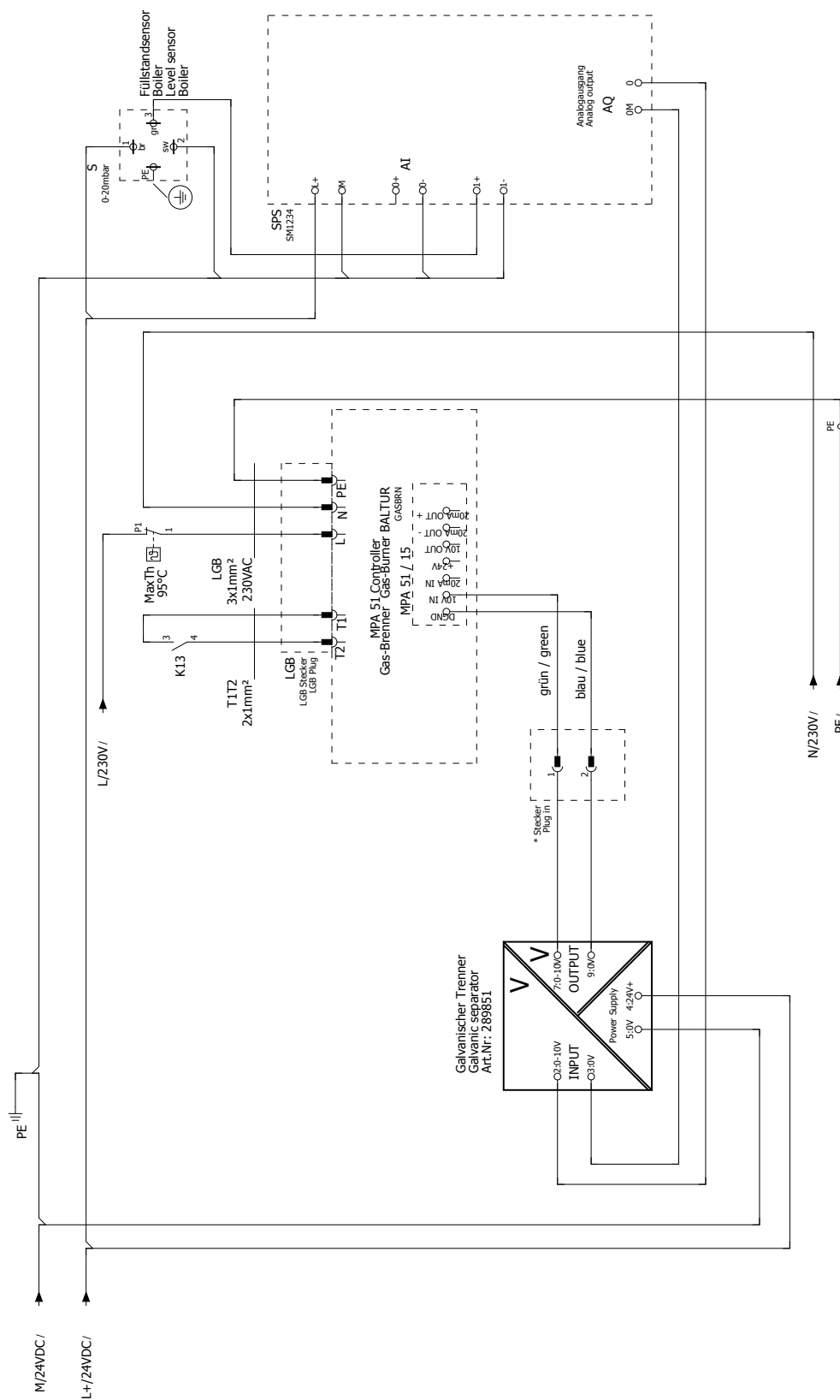
Position	Description	EHRLE Art.-No.
32	Maximum Thermostat 95°C with mechanical On-delay	24372
33	Gas isolating valve KFE Messing-VN Simplex PN 16 1/2" AG	5084
34	Pressure transmitter CIT-U10 0-20mbar 1/2" E, DC 12-32V, 0-10V, 3 wire	5147071
35	Resistant thermometer PT100 0-100°C 1/2" with connection head form B	5147055
36	Water tank cover	200356
37	Hexagon head screw serrated with flange like DIN 6921 M5x10 stainless steel	286212
38	Boiler gas stainless-steel Burner 85 kW	225704

39	Gas burner BPM90 20-55 kW gasart: LPG 0-10V modulation AC230V/50Hz	289881
	Gas burner BPM90 20-74 kW gasart: LPG 0-10V modulation AC230V/50Hz	289882
	Gas burner BPM90 20-85 kW gasart: LPG 0-10V modulation AC230V/50Hz	289883
	Gas burner BPM90 20-55 kW gasart: N 0-10V modulation AC230V/50Hz	289913
	Gas burner BPM90 20-74 kW gasart: N 0-10V modulation AC230V/50Hz	289914
	Gas burner BPM90 20-85 kW gasart: N 0-10V modulation AC230V/50Hz	289915
40	Boiler-siphon 60mm PP transparent inlet Ø32mm, outlet Ø21mm	527521
41	Condensate hose PP grey 21x25mm +10°C / +90°C	205716
42	Plug Ø6mm for boiler-siphon 60mm PVC grey	527531



Position	Description	EHRLE Art.-No.
01	Gasburner fan flange BPM90	289837
02	Gas burner seal flange inside BPM90	289816
03	Gas burner flame head Premix Ø63 L300 NIT200 BPM90	289827
04	Gas burner seal flame tube BPM90	289838
05	Gas burner seal flange outside BPM90	289817
06	Gas burner fan seal BPM90/140	289839
07	Gas burner motor RG148 200W BPM90	289828
08	Gas burner Ignition cable L380mm D7/D4 BPM90	289831
09	Gas burner Cap D7 BPM90/140	289840
10	Gas burner Spark plug connection 90°1KOHM BPM90/140	289841
12	Gas burner ionisier electrode BPM90	289826
11	Gas burner double ignition electrode BPM90	289825
13	Gas burner double ignition electrode seal BPM90/140	289823
14	Gas burner ionisier electrode seal MC30 BPM90/140	289824
15	Gas burner Venturi mix system Honeywell 050 BPM90	289835
16	Gas burner seal Venturi mix system BPM90	289836
17	Gas valve VK4125V1005 BPM90	289832
18	Gas burner seal gas valve BPM90	289842
19	Gas burner flange 3/4" male BPM90	289843
20	Gas burner O-Ring 130 NBR flange/gas valve BPM90	289844
21	Gas burner Transformer 26/40 50% BPM90/140	289829
22	Gas burner Control box Dungs MPA 5111.V1 BPM90/140	289845
22	Gas burner connectors for control box Dungs BPM90/140	289847
23	Gas burner Display AM09 for DUNGS MPA51 BPM90/140	289833
24	Gas burner cover red BPM90	289834
25	Gas burner Ignition cable L450mm BPM90	288930
26	Gas burner connector for gas valve BPM90	289848
27	Gas burner connector with cable for electric fan BPM90	289849
28	Gas burner Stud bolt M8x37 BPM90/140	289850
29	Gas burner Male connector 7 poles BPM90/140	289818
30	Gas burner Male connector 4 poles green BPM90/140	289822
31	Gas burner Board for control box Dungs BPM90/140	289846

For special version observe wiring diagram supplied.





## 11.2 Appliance categories

### Labelling of gas and dual fuel burners to DIN EN 676

DIN EN 676, „Automatic forced draught burner for gaseous fuels“, is used for the implementation of the basic requirements of the Gas Appliance Directive 2009/142/EC.

DIN EN 676 from November 2003 stipulates the following appliance categories for forced draught gas burners under point 4.4.9:

I <sub>2R</sub>	for Natural Gas
I <sub>3R</sub>	for Liquid Petroleum Gas
II <sub>2R/3R</sub>	for Natural Gas / Liquid Petroleum Gas

The test gases listed under point 5.5.1, table 4 (DIN EN 676) and the minimum test pressures determined and listed under point 5.1.2, table 5 (DIN EN 676) are used to provide the evidence of service performance for the burner during type testing.

As EHRLE gas and dual fuel burners fulfil this requirement completely, the appliance category, as well as the test gases used with the permissible connection pressure range, are listed on the name plate when labelling the burner to point 6.2 (DIN EN 676). This clearly defines the suitability of the burner for use with second and/or third family gases.

On the basis of a type test report to DIN EN 45001 / DIN EN ISO/IEC 17025 from an accredited test centre, the EU Type Testing Certificate to Gas Appliance Directive 2009/142/EC also quotes the appliance category, the supply pressure and the country of destination.

DIN EN 437, „Test gases, test pressures, appliance categories“, describes the interrelationships and the special national characteristics relating to this subject in detail.

The following tables give an overview of the interrelationships between the R Categories and the nationally used appliance categories with their types of gas and connection pressures.

**Alternative appliance category to I<sub>2R</sub>**

Country of destination	Appliance category	Test gas	Connection pressure mbar
AL (Albania)	I2H	G20	20
AT (Austria)	I2H	G20	20
BA (Bosnia)	I2H	G20	20
BE (Belgium)	I2E+, I2N, I2E(R)B	G20 + G25	Pressures 20/25
BG (Bulgaria)	I2H	G20	20
BY (Belarus)			
CH (Switzerland)	I2H	G20	20
CY (Cyprus)	I2H	G20	20
CZ (Czech Republic)	I2H	G20	20
DE (Germany)	I2ELL, I2E, I2L	G20 / G25	20
DK (Denmark)	I2H	G20	20
EE (Estonia)	I2H	G20	
ES (Spain)	I2H	G20	20
FI (Finland)	I2H	G20	20
FR (France)	I2Esi, I2E+, I2L	G20 + G25	Pressures 20/25
GB (United Kingdom)	I2H	G20	20
GR (Greece)	I2H	G20	20
HR (Croatia)	I2H	G20	20
HU (Hungary)	I2H	G20	20
IE (Ireland)	I2H	G20	20
IS (Iceland)	I2H	G20	20
IT (Italy)	I2H	G20	20
LT (Lithuania)			
LU (Luxembourg)	I2E	G20	20
LV (Latvia)			
MD (Moldova)	I2H	G20	20
MK (Macedonia)	I2H	G20	20
MT (Malta)	I2H	G20	20
NL (The Netherlands)	I2L	G25	25
NO (Norway)	I2H	G20	20
PL (Poland)	I2E	G20 / GZ410	20
PT (Portugal)	I2H	G20	20
RO (Romania)	I2H	G20	20
SE (Sweden)	I2H	G20	20
SI (Slovenia)	I2H	G20	20
SK (Slovakia)	I2H	G20	20
SRB (Serbia)	I2H	G20	20
TR (Turkey)	I2H	G20	25
UA (Ukraine)	I2H	G20	20

**Alternative appliance category to I<sub>3R</sub>**

Country of destination	Appliance category	Test gas	Connection pressure mbar
AL (Albania)	I3+, I3P, I3B	G30 + G31	Pressures 28-30/37
AT (Austria)	I3B/P, I3P	G30 + G31	50
BA (Bosnia)	I3B/P	G30	30 (28-30)
BE (Belgium)	I3+, I3P, I3B, I3B/P	G30 + G31	Pressures 28-30/37
BG (Bulgaria)	I3+, I3P, I3B	G30 + G31	Pressures 28-30/37
BY (Belarus)			
CH (Switzerland)	I3B/P, I3+, I3P	G30 + G31	Pressures 28-30/37
CY (Cyprus)	I3B/P, I3+, I3P, I3B	G30 + G31	Pressures 28-30/37
CZ (Czech Republic)	I3B/P, I3+, I3P	G30 + G31	Pressures 28-30/37
DE (Germany)	I3B/P, I3P	G30 + G31	50
DK (Denmark)	I3B/P	G30 + G31	30 (28 - 30)
EE (Estonia)	I3B/P	G30 + G31	
ES (Spain)	I3+, I3P, I3B	G30 + G31	Pressures 28-30/37
FI (Finland)	I3B/P	G30 + G31	30 (28 - 30)
FR (France)	I3+, I3P, I3B	G30 G31	Pressures 28-30/37 Pressures 112/148
GB (United Kingdom)	I3+, I3P, I3B	G30 + G31	Pressures 28-30/37
GR (Greece)	I3B/P, I3+, I3P, I3B	G30 + G31	Pressures 28-30/37
HR (Croatia)	I3B/P, I3P	G30 + G31	50
HU (Hungary)	I3B/P	G30 + G31	50
IE (Ireland)	I3+, I3P, I3B	G30 + G31	Pressures 28-30/37
IS (Iceland)	I3B/P		
IT (Italy)	I3B/P, I3+, I3P	G30 + G31	Pressures 28-30/37
LT (Lithuania)			
LU (Luxembourg)	I3B/P	G30	
LV (Latvia)			
MD (Moldova)	I3+, I3P, I3B	G30 + G31	Pressures 28-30/37
MK (Macedonia)	I2H	G30 + G31	Pressures 28-30/37
MT (Malta)	I2H	G30 + G31	Pressures 28-30/37
NL (The Netherlands)	I3B/P, I3P	G30 + G31	30 (28-30)
NO (Norway)	I3B/P	G30 + G31	30 (28-30)
PL (Poland)	I3B/P	G30	
PT (Portugal)	I3+, I3P, I3B	G30 G31	Pressures 28-30/37 Pressures 50/67
RO (Romania)	I3B/P	G30	
SE (Sweden)	I3B/P	G30 + G31	30 (28-30)
SI (Slovenia)	I3B/P	G30	30
SK (Slovakia)	I3B/P	G30	30
SRB (Serbia)	I3B/P, I3P	G30 + G31	20
TR (Turkey)	I3B/P	G30 + G31	30
UA (Ukraine)	I3B/P, I3P	G30 + G31	50

Alternative appliance category to II<sub>2R/3R</sub>

Country of destination	Appliance category	Test gas	Connection pressure mbar	Test gas	Connection pressure mbar
AL (Albania)	II2H3+, II2H3P	G20	20	G31	30
AT (Austria)	II2H3B/P, II2H3P	G20	20	G30 + G31	50
BA (Bosnia)	II2H3B/P	G20	20	G30	
BE (Belgium)	II2E+3P, II2H3B/P	G20, G25	Druckpaar 20/25	G30 + G31	Pressures 28-30/37
BG (Bulgaria)	II2H3+, II2H3P	G20	20	G30 + G31	Pressures 28-30/37
BY (Belarus)					
CH (Switzerland)	II1a2H, II2H3B/P, II2H3+, II2H3P	G20	20	G30 + G31	Pressures 28-30/37
CY (Cyprus)	II2H3B/P, II2H3+, II2H3P	G20	20	G30 + G31	Pressures 28-30/37
CZ (Czech Republic)	II2H3B/P, II2H3+, II2H3P	G20	20	G30 + G31	Pressures 28-30/37
DE (Germany)	II2ELL3B/P, II2E3B/P	G20	20	G30 + G31	50
DK (Denmark)	II1a2H, II2H3B/P	G20	20	G30 + G31	30
EE (Estonia)	II2H3B/P	G20	20	G30	30
ES (Spain)	II2H3P, II2H3+	G20	20	G30 + G31	Pressures 28-30/37
FI (Finland)	II2H3B/P	G20	20	G30 + G31	
FR (France)	II2E+3+, II2E+3P, II2Esi3B/P	G20	20	G30 G31	Pressures 28-30/37 Pressures 112/148
GB (United Kingdom)	II2H3+, II2H3P	G20	20	G30 + G31	Pressures 28-30/37
GR (Greece)	II2H3B/P, II2H3+, II2H3P	G20	20	G30 + G31	Pressures 28-30/37
HR (Croatia)	II2H3B/P	G20	20	G30 + G31	30 (28-30)
HU (Hungary)	II2H3B/P	G20	20	G30 + G31	
IE (Ireland)	II2H3+, II2H3P	G20	20		
IS (Iceland)	II2H3B/P	G20	20	G30 + G31	30 (28-30)
IT (Italy)	II1a2H, II2H3B/P, II2H3+, II2H3P	G20	20	G30 + G31	Pressures 28-30/37
LT (Lithuania)					
LU (Luxembourg)	II2E3B/P	G20	20	G30 + G31	
LV (Latvia)					
MD (Moldova)	II2H3+, II2H3P	G20	20	G30 + G31	Pressures 30/37
MK (Macedonia)	II2H3+, II2H3P	G20	20	G30 + G31	Pressures 30/37
MT (Malta)	II2H3+, II2H3P	G20	20	G30 + G31	Pressures 30/37
NL (Netherlands)	II2L3B/P, II2L3P	G25	25	G30 + G31	30
NO (Norway)	II2H3B/P	G20	20	G30 + G31	30 (28-30)
PL (Poland)	II2E3B/P	G20	20	G30 + G31	30 (28-30)
PT (Portugal)	II2H3+, II2H3P	G20	20	G30 G31	Pressures 28-30/37 Pressures 50/67
RO (Romania)	II2H3B/P	G20	20	G30 + G31	30 (28-30)
SE (Sweden)	II1a2H, II2H3B/P	G20	20	G30 + G31	30 (28-30)
SI (Slovenia)	II2H3B/P	G20	20	G30	30
SK (Slovakia)	II2H3B/P	G20	20	G30	30
SRB (Serbia)	II2H3B/P	G20	20	G30 + G31	30 (28-30)
TR (Turkey)	II2H3B/P	G20	25	G30 + G31	30 + 37
UA (Ukraine)	II2H3B/P	G20	20	G30 + G31	30 (28-30)

## 12 Notes





## Our product range: Reliable technology and fast, professional service



### **KD 2 x 2 series**

Mobile cold water high pressure cleaners designed for continuous professional use  
10 - 14 l / min., 130 - 170 bar



### **KD 4 x 4 series**

Mobile cold water high pressure cleaners designed for continuous professional use  
16 - 30 l / min., 140 - 280 bar



### **KDB / KDD series**

Mobile cold water high pressure cleaners, designed for continuous professional use, with gasoline or diesel powered motor  
16 - 17 l / min., 180 - 280 bar



### **HD Etronic I series**

Mobile hot water high pressure cleaners, designed for continuous professional use, oil heated  
11 l / min., 120 - 160 bar



### **HD Etronic II series**

Mobile hot water high pressure cleaners, designed for continuous professional use, oil heated,  
12 - 20 l / min., 120 - 230 bar



### **HDE series**

Mobile hot water high pressure cleaners, designed for continuous professional use, electrically heated,  
11 l / min., 130 bar



### **HDB / HDD series**

Mobile hot water high pressure cleaners with petrol engine or diesel engine, designed for continuous professional use  
16 - 17 l / min., 180 - 280 bar



### **KS series**

Stationary cold water high pressure cleaners, designed for continuous professional use  
13 - 16 l / min., 130 - 180 bar

### **KSM series**

Stationary multiple outlet units, designed for continuous professional use  
1,800 - 5,400 l / h, 180 bar



### **HSC / HSC - ST series**

Stationary hot water high pressure cleaners, oil heated, designed for continuous professional use, indoor and outdoor  
12 - 20 l / min., 120 - 230 bar



### **ENT series**

Wet/dry vacuum cleaners with plastic container for continuous professional use  
3.200 l / min



### **ENT-S series**

Wet/dry vacuum cleaners with plastic container for continuous professional use  
3.200 l / min



### **KM 870**

Mobile and easy to maneuver hand sweeping machine for private and professional users  
Up to 2.500 m<sup>2</sup> working capacity



### **KME- KMB 900 - 2**

Mobile and easy to maneuver walk-behind sweeping/vacuum cleaners for professional users, battery or gasoline powered  
Up to 3.400 m<sup>2</sup> working capacity



### **KMB 999 - 2**

Mobile and easy to maneuver walk-behind sweeping/vacuum cleaners for professional users, gasoline powered  
Up to 5.000 m<sup>2</sup> working capacity



### **KME- KMB 1300 - 2**

Mobile and easy to maneuver rider sweeping/vacuum cleaners for professional users, battery or gasoline powered  
Up to 9.000 m<sup>2</sup> working capacity

