GB

DUNGS®
Combustion Controls

Declaration of Conformity
User Manual

MPA 41xx V2.0

MPA 41xx V2.0

#298073

MC • Edition 2023.04 • No. 298 073 Re. -0

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DUNGS®
Combustion Controls

1. EU declaration of conformity

Product	**MPA 41xx V2.0**	**Automatic Burner Control System**
Manufacturer	**Karl Dungs GmbH & Co. KG · Karl-Dungs-Platz 1 · 73660 Urbach / Germany**	

hereby certifies that the products listed in this overview have been subjected to an **EU type-examination (production type)** and meet the essential safety requirements of:

- **EU Gas Appliances Regulation (EU) 2016/426**
- **EU Pressure Equipment Directive 2014/68/EU**
- **EMC Directive 2014/30/EU**
- **Low-Voltage Directive 2014/35/EU**

in the valid version.

All of the components certified according to the Pressure Equipment Directive are equipment parts with safety function.
Any unauthorised modification to the device will render this declaration invalid.
The object of the declaration described above conforms with the relevant Union harmonisation legislation.
This Declaration of Conformity is issued under the sole responsibility of the manufacturer.

Specified requirements of the EU type-examination (production type)	EN 298 EN 13611 EN 50156-2 EN 61508-Part 1 to 3	
Term of validity / attestation	**2033-03-05** **CE0036**	**2033-03-08** **CE-0123DL1090**
Notified body	**2014/68/EU** **TÜV SÜD Industrie Service GmbH** Westendstraße 199 D-80686 Munich Germany Notified Body number: 0036	**(EU) 2016/426** **TÜV SÜD Product Service GmbH Zertifizierstellen** Ridlerstraße 65 D-80339 Munich Germany Notified Body number: 0123
Monitoring of the QA system	Conformity process adopted: Module B+D	

B. Sc. MBA Simon P. Dungs,
Managing Director
Urbach, 2023-03-21

Intentionally free

3. Target group

The target group of this manual is specialised gas safety and control technology personnel, qualified persons or the persons instructed by them. They are capable of assessing the work assigned to them as well as potential hazards on the basis of their technical training, knowledge and experience, as well as knowledge of the relevant regulations. Only they are permitted to install, start up, adjust and service the equipment under compliance with the accepted rules of industrial safety.

Place this user manual in an easily viewable location in the installation room. Perform work only after reading the safety instructions in this user manual.

4. Warnings

4.1 General warnings

The accepted rules of industrial safety and the accident prevention regulations must be followed, if necessary taking safety measures to ensure the protection of persons.

Carry out all settings and setting values only in accordance with the user manual of the connected machine.

Never perform work when gas pressure or voltage is present. Avoid open fire. Comply with government regulations.

The device must be examined for transport damage prior to installation.

The device must not be exposed to an open flame. Protection against lightning must be provided.

The device may be operated only in accordance with the operating conditions specified on the rating plate.

Protection must be ensured against environmental and climatic influences (corrosion, snow, icing, moisture (e.g. due to condensation), mould, UV radiation, harmful insects and toxic, corrosive solutions / liquids (e.g. cutting / cooling fluids)). Subject to the installation site, safety measures must be taken when necessary.

The device must be protected against vibrations and mechanical impacts.

The device must be secured in areas with heightened risk of earthquakes in accordance with local regulations.

Radiation heat is a source of heat that can result in an ambient temperature above the permitted temperature. Provide proper shielding to protect against radiant heat.

Liability for safety-relevant systems, devices or components.
No liability on the part of DUNGS applies in the cases of safety-related components, equipment and systems. Both the product liability for consequential damages of any kind and the liability for material defects if these safety-related components, equipment and systems are overridden, modified or repaired by unauthorised technical staff or when using replacement parts not specifically permitted for the application.

Attached accessories must be suitable and approved for the medium.

After work has been completed, carry out a function test.

4.2 Intended use

The device is considered to be used as intended if the following instructions are followed:

- Use in heating systems and industrial thermal process systems.
- Use only in accordance with the operating conditions specified on the rating plate.
- Use only with the flame monitoring equipment specified in the approval.
- Use only in good order and condition.
- Malfunctions must be rectified immediately by authorised specialist staff and resolved prior to any further use.
- Use only when following the instructions in this user manual and the national regulations.

4.3 Risks in case of misuse

- The equipment is reliable in operation when used normally.
- Personal or consequential material damage, financial damage or environmental damage is possible in the event of non-observance of the instructions.
- Misuse or misapplication pose a risk to the life and limb of the operator, the device and other material assets.

5. MPA 41xx

Microprocessor-controlled automatic burner control system for continuous operation of gas burners when using monitoring with ionisation flame monitors or for intermittent operation when using UV flame monitoring.

5.1 Approvals

EC type-examination certificate according to:

• EC Gas Appliances Regulation
• EC Pressure Equipment Directive

Suitable for applications up to SIL 3.
Meets the requirements of IEC 61508

5.2 Versions

The conformity / user manual relates to the following MPA 41xx versions:

Version	Operating voltage	Material number
MPA 4112 V2.0	115 VAC	294815
MPA 4112 V2.0	230 VAC	294812
MPA 4114 V2.0	115 VAC	294822
MPA 4114 V2.0	230 VAC	294819
MPA 4122 V2.0	115 VAC	297009
MPA 4122 V2.0	230 VAC	297000
AM 41 V2.0 (Display)	internal	297004

These MPA41xx versions are already parameterised and can be used immediately.
Changes to program procedures and functions may be made by qualified users.
A password is required to change the parameter settings.
All settings can be found in the MPA 41xx product manual:

www.dungs.com / .....

6. Technical data for MPA 41xx

Protection class MPA 4112, MPA 4114	IP 54
External display	IP 54 front / IP 20 rear
Protection class MPA 4122	IP 65
Ambient temperature	-40 °C...+70 °C
Storage and transport	-40 °C...+80 °C
Humidity	DIN 60730-1, no dewing admissible
Operating altitude	Suitable for use up to 2 000 metres above mean sea level
Service life of switching outputs	At least 250 000 switching operations
Installation position	Any
Dimensions MPA 411x in mm	MPA 4112 / 4114 (L x H x D): approx. 152.5 x 165 x 77 mm
Weight MPA 411x	0.82 kg
Dimensions MPA 412x in mm	MPA 4122 (L x H x D): approx. 160 x 240 x 100 mm
Weight MPA 412x	2.2 kg

7. Electrical data for MPA 41xx

Rated voltage	230 VAC -15% ... +10% or 115 VAC -15% ... +10%
Frequency	50 Hz ... 60 Hz
Fuse	6.3 A delayed or 10 A fast-acting, integrated, replaceable
Isolation	No galvanic isolation between grid and 24 VDC or 5 VDC
Electrical connection	In-phase connection and protective earth connection according to connection diagram The touch protection for the UV sensor must be ensured through installation in the operating equipment
Power consumption (own consumption)	Maximum 10 W
Short-circuit current ION against N	115 / 230 VAC 280 µA

8. Inputs / outputs

Outputs				
Designation	**Safety-relevant**	**Output type**	**Line length**	**Electrical data**
V1 / V2 Gas valves	•	Relay contact	100 m	115 / 230 VAC / 2 A cos ϕ = 1 / minimum load 0.5 W
Ignition	•	Electr. relay	100 m	115 / 230 VAC / 2 A cos ϕ = 1*
Fan		Relay contact	100 m	115 / 230 VAC / 1 A cos ϕ = 0.4 corresponds to 115 / 230VAC / 2.5 A cos ϕ = 1
Operation / fault		Relay contact	100 m	115 / 230 VAC / 1 A cos ϕ = 1
Supply Flame detector			100 m	230 VAC / 10 mA (also version MPA 115 VAC)

*1 With a pre-ignition time > 100 s or a duty cycle (DC) > 80 % of the ignition output, the maximum permissible output current is reduced to 1.5 A.

The total currents of all safety-related consumers must not exceed 5 A (note the safety value)
The total currents of all consumers must not exceed 6.3 A (10 A).

Inputs			
Designation	**Input type**	**Line length**	**Electrical data**
Safety chain	Potential-free contact	100 m	115 / 230 VAC / max. 5 A
Flame detector 1 (ionisation)	Ionisation	10 m	Threshold: approx. 1.2 µA
X 16 to X 20 e.g. remote unlocking, air pressure monitor, heat request, flame detector 2	Switching contact	100 m	115 / 230 VAC
AM 41 display connetion	-	10 m	internal

Use flame detector 2 for line lengths > 10 m.
For special applications, ionisation line lengths of up to 50 m are possible on request.
Different functions can be parameterised for inputs X 16 to X 20, see chapter tbd.
Safety devices in the safety chain must have potential-free normally open or normally closed contacts suitable for mains voltage and at least 10 A current load.
The connection lines must be suitable for an ambient temperature of at least 75 °C.

9. Assembly and electrical installation

⚠ The installation regulations applicable at the installation site must be observed.

- The data specified on the rating plate must be observed to ensure safe operation
- Before opening the housing, switch off the power to the system and secure it against being switched back on.
- Observe the maximum switching power of the outputs.
- **Version MPA 4122: Voltage is also present in the housing when the power switch is switched off.**
- The switch in the MPA4122 housing is not an disconnector within the meaning of DIN EN 60730. That is, even if the switch is deactivated, mains voltage is still present within the housing – **risk of fatal electric shocks!** As a result, the power supply must be interrupted before opening the housing.
- Version MPA 4114: The connection to the AM 41 display may be established or disconnected only in a voltage-free state.

⚠ **For inductive loads, pay attention to the inrush current!**

The cross-section of the connection lines must be observed.
The connection lines used must be suitable for an ambient temperature of at least 75 °C (167 °F).
A suitable high-voltage line must be provided for ignition and ionisation lines. Only use interference-suppressed connector plugs for the ignition electrode (1 kOhm)
All components must be provided with a protective earth at the connection points intended for this purpose.

Only use suitable cable fittings – observe IP protection.
The MPA is supplied with continuous voltage; the heat requirement is not used for the power supply.
All protective conductor connections must be professionally executed; the MPA can be destroyed if they are not, especially in single electrode operation.
In addition to the protective conductor connections on the MPA, also check the protective conductor connection of the burner.
Ionisation flame monitoring is possible only in earthed networks.
An isolating transformer is required for non-earthed networks.

Max. cross-section of line: 2.5 mm^2 / PE 6 mm^2

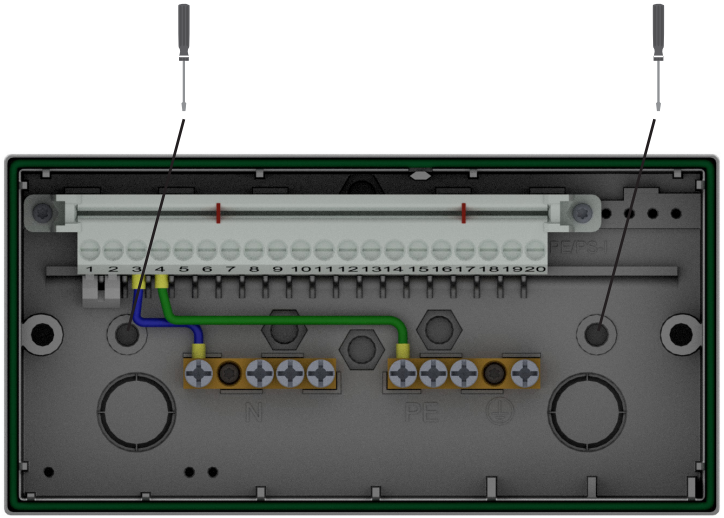
EMC-compliant version

The ignition line must be laid separately to the other current-carrying lines.
Do not route in metallic pipes or bundled with other lines.
Create all earth connections professionally and ensure low transition resistance.
Use interference-suppressed ignition plugs or suitable high-voltage lines with corresponding line resistance.

Installation of MPA 4122
4x screw M4, length min. 20 mm

⚠ The housing is not earthed using the mounting screws.
The protective earth must be provided ⏚ via the connection (screw M4 x 6).

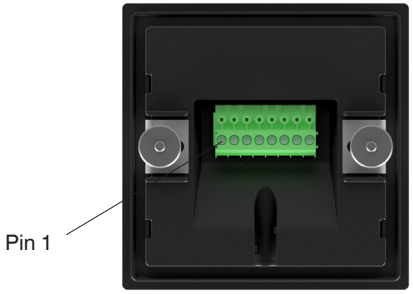
Installation of MPA 4112 and MPA 4114
Installation on DIN rail or
Installation with 2x screw M4, length min. 20 mm
Drill mounting holes with 4.5 mm drill
Place a sealing washer or O-ring underneath to obtain the protection class IP 54.



Installation of display AM 41
For installation, create a 68 x 68 mm cut-out at the installation location.
The maximum permissible material thickness of the installation surface is 5 mm.
Use connection line AM 41 # 298790, (max. 10 m) to connect the display.

AM 41 plug assignment

PIN	1	2	3	4	5	6	7	8
Colour	White	Brown	Green	Yellow	Grey	Pink	Blue	Red



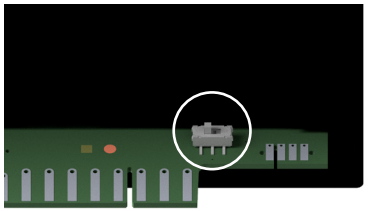
10. Special functions

Unlock function
Pressing the unlock button allows the MPA to be unlocked when in a locked state.
Actuation time > 0.5 s < 5 s. The device can be unlocked a maximum of five times in 15 minutes.
Further unlocking is possible only after a waiting period of three minutes.

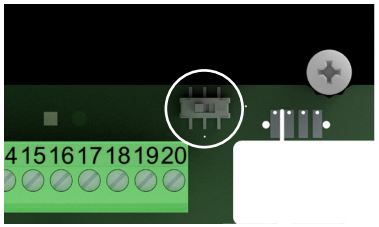
Enhanced unlock (only using the unlock button in the device)
Resetting the unlock block:
Hold the unlock button > 5 s < 10 s until the display starts flashing, then release the unlock key and press again.
The “Enhanced unlock” function is active in all operating states of the MPA.
Pressing it during operation results in a safety shutdown and subsequent restart.

Parameterisation switch
Attention: For a factory-set MPA, the switch must be set to the “Auto” position.
For additional information, refer to the product manual

MPA 4112 and MPA 4114



MPA 4122



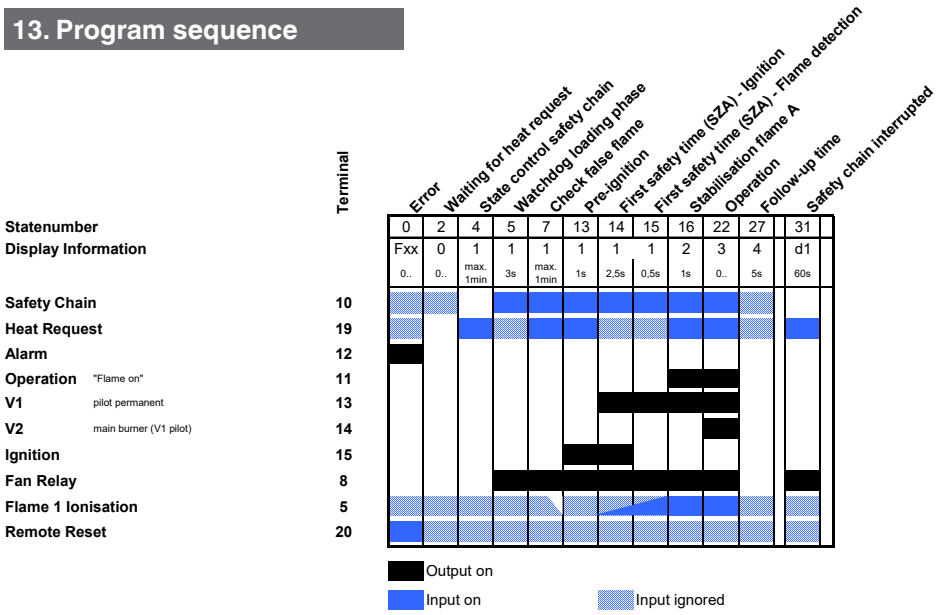
11. Versions

Version	Voltage	Display	Housing design	IP
MPA 4112	115	Integrated	Luranyl	54
MPA 4112	230	Integrated	Luranyl	54
MPA 4114	115	External	Luranyl	54
MPA 4114	230	External	Luranyl	54
MPA 4122	115	Integrated	Aluminium	65
MPA 4122	230	Integrated	Aluminium	65

12. Settings

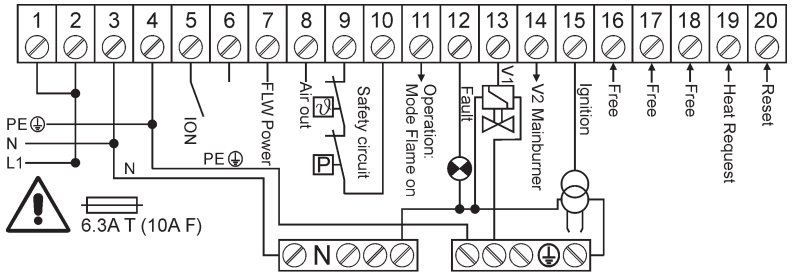
Settings	Seconds (s)
Pre-purge time	0
Ignition time	1
Safety time	3
Safety time operation 1	1
Post-purge time	0

13. Program sequence

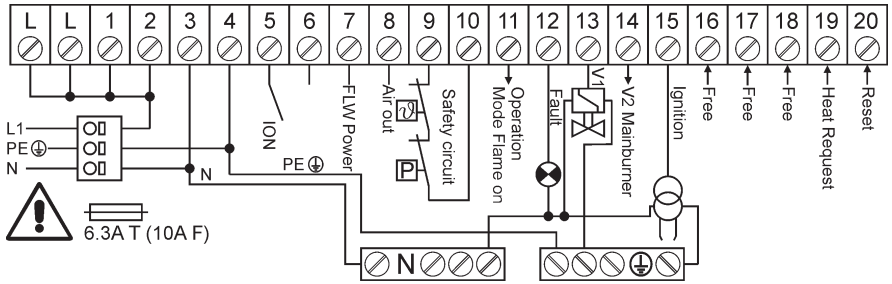


14. Connection diagram

MPA 4112 and MPA 4114

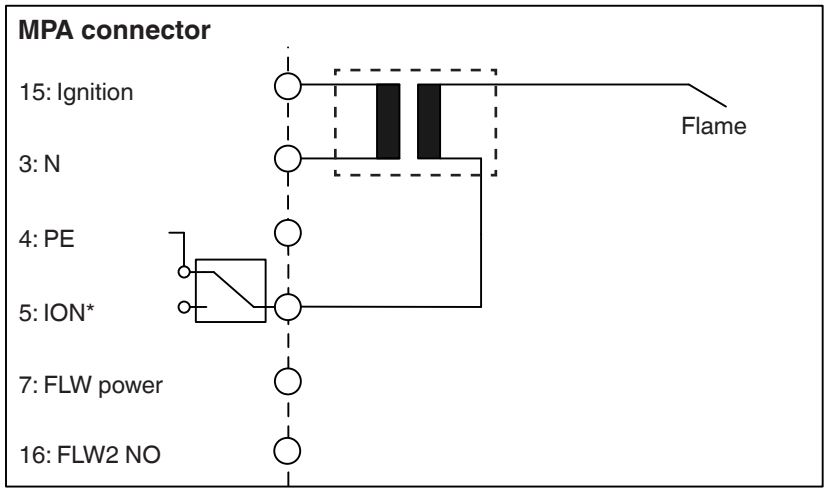


MPA 4122



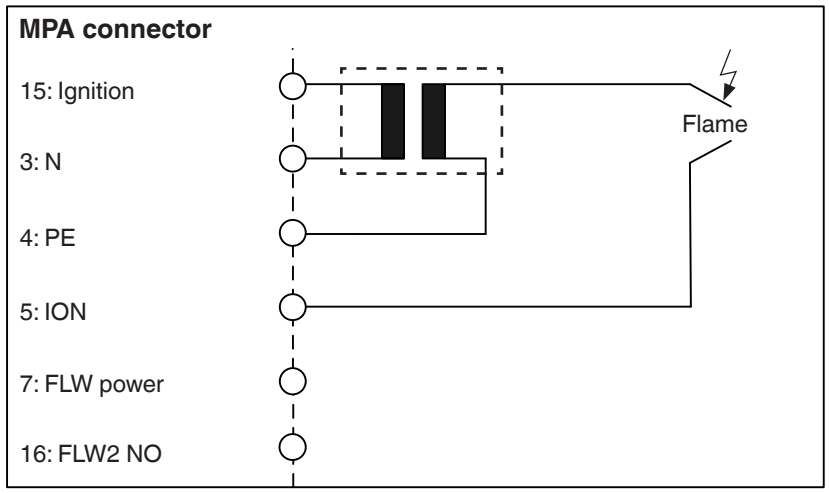
15. Flame sensor: ionisation electrode

Single electrode operation, ionisation



*When using a DUNGS DEZ 1xx SEO ignition transformer for single electrode operation, the green / yellow line must be connected to terminal 5.

Two electrode operation, ionisation



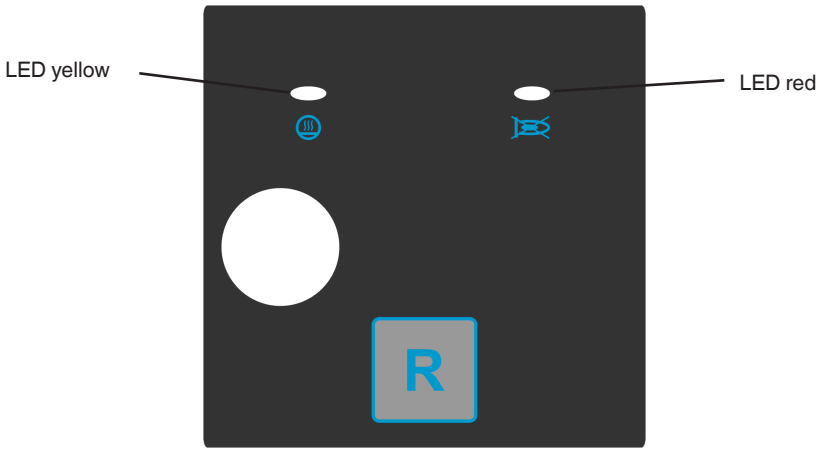
16. Approved flame detectors

Manufacturer	Designation	Type	Output signal	Safety time Flame detector	Total reaction time after flame lift-off	Intermittent	Continuous operation
–	Ionisation electrode	Ionisation	Ionisation	0 s	P41	Yes	Yes
DUNGS	UV41 (HE)	UV tube	Ionisation	0,125 s (= 2/16 s)	P41 + 0,125 s	Yes	Continuous operation only together with DUNGS shutter function
DUNGS	UV42	UV tube	Switching output 230 VAC	0,125 s (= 2/16 s)	P42 + 0,125 s	Yes	Continuous operation only together with DUNGS shutter function
DUNGS	FLW 41I	Ionisation	Switching output 230 VAC	0,19 s (= 3/16 s)	P42 + 0,19 s	Yes	Continuous operation only together with DUNGS shutter function
BST Solutions	FLW 20 (KLC 1000)	UV tube	Ionisation	0,5 s	P41 + 0,5 s	Yes	No
	KLC 10/230 KLC 1000/230 FLW 20 UV						
	KLC 10/230 RA KLC 1000/230 RA FLW 10 IR V2.1						
BST Solutions	KLC 2002 FLW 10 IR	Flicker detection with frequency monitoring	Ionisation	0,5 s	P41 + 0,5 s	Yes	No
	KLC 2002 FLW 10 IR V2.1						
	KLC 20/230						

⚠ When using flame detectors, the reation times must be observed and adjusted by correctly setting the corresponding parameters.

17. Display options

MPA 4114 minimal display



The MPA 4114 version features a minimal display of two LEDs that display the device status.

LED yellow
- Display of operating state

LED red
- Display of a fault
- Flashing signal for error code
- Display pause status during parameterisation

RESET button
- Unlocking
- Enhanced unlock
- Confirmation of change of access level

Information – LED yellow

LED off: fault present

LED permanently on
Waiting for heat request until second safety time flame detection

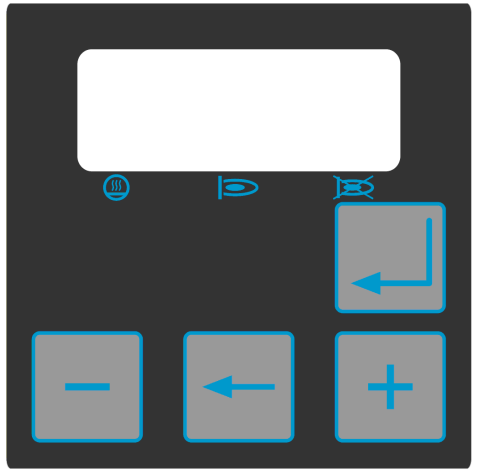
Flashing LED (0,5 Hz): operating indicator

LED flashing rapidly (2 Hz):
Waiting for gas pressure in the case of gas shortage and safety chain open.

Information – LED red
Fault
The most important error codes are displayed using different flashing patterns
The remaining error codes are displayed using a permanently on LED.

Information – both LEDs: password input expected. Both LEDs flash alternately (refer also to the product manual)

MPA 41xx display
Valid for internal and external display AM xx



Display 3 x 7 segment

LED:
Blue: heat request
Yellow: flame quality (flashes in the case of a bad flame)
Red: fault

Release button
RESET function and confirmation of input

Back

Plus
Increase the indicated value

Minus
Reduce the indicated value

Attention
Note the appearance on a 7-segment display

1. Digits

6 = 

8 = 

0 = 

2. Letters

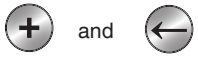
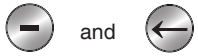
B or b =

D or d =

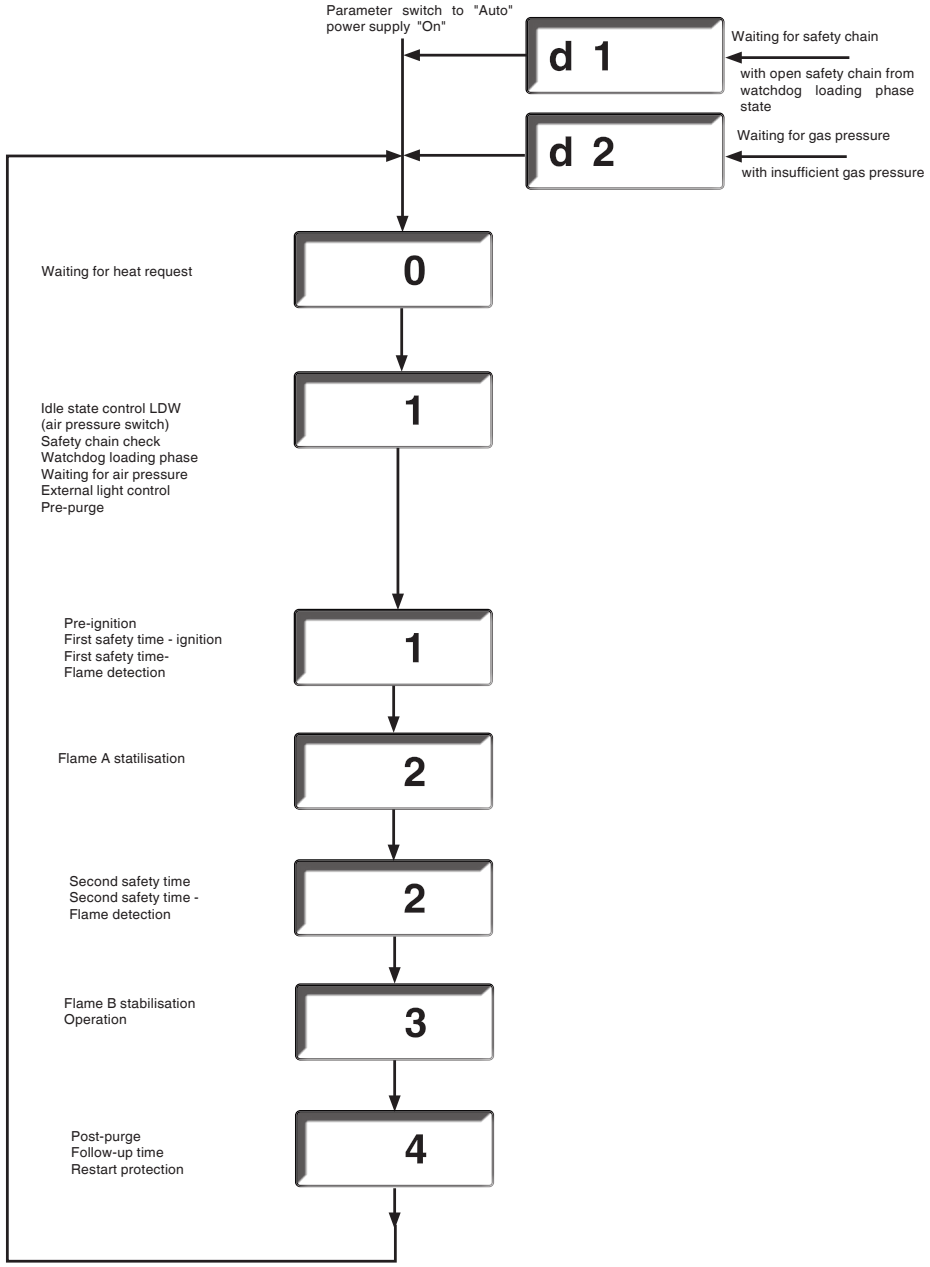
O or o =

18. Overview of the display modes MPA 4112, MPA 4122 AM 41

The display can show different information depending on the operating status of the automatic burner control system:

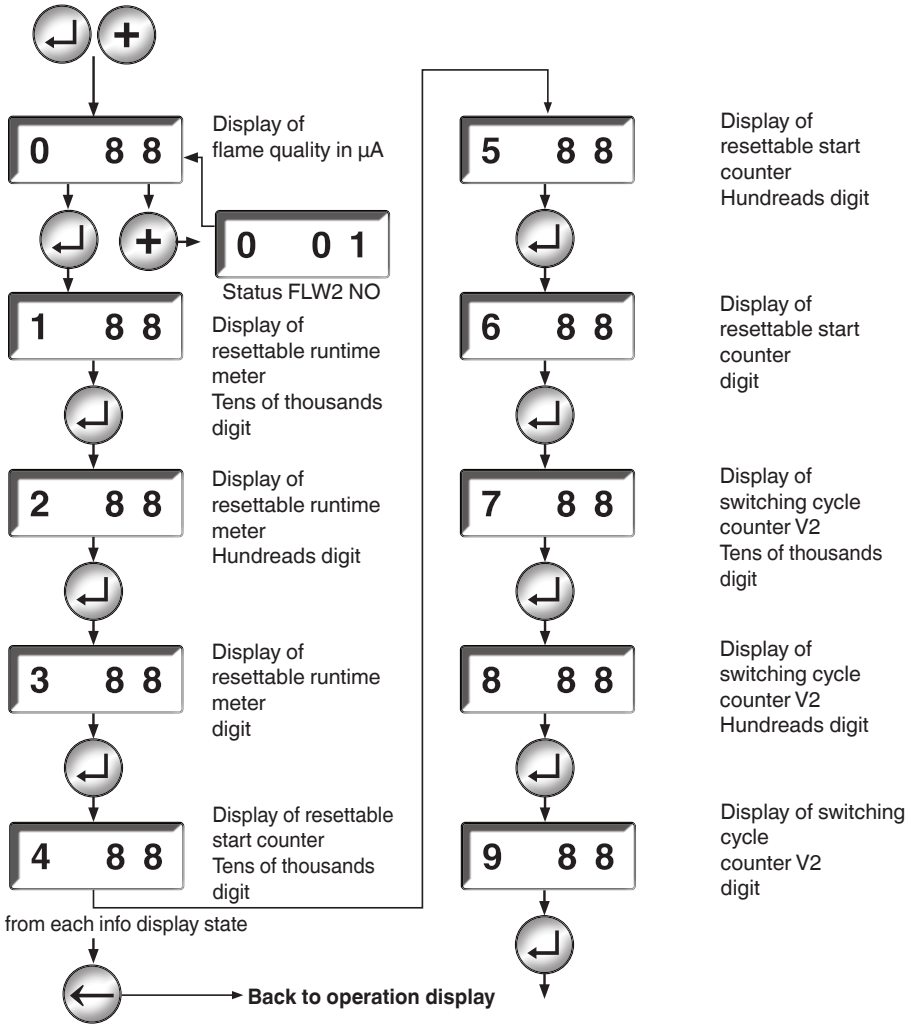
Mode	Active
Operating mode display	in normal operating conditions, if there is no fault.
Error display	if the unit is subject to a malfunction interlock.
Information display	From the operating- or error display by pressing the key combination 
Error memory display	From the operating- or error display by pressing the key combination 
Resetting display	From the operating- or error display by pressing the key combination 
Flashing display	Depending on display mode: 1. Prompt to confirm the switch of access level 2. To intentionally reboot the MPA, press and hold the unlock button for more than 5 seconds (“Enhanced unlock”) 3. Processor 2 error, see error list 4. New password after password change 5. Unit restart, all segments and LEDs flash

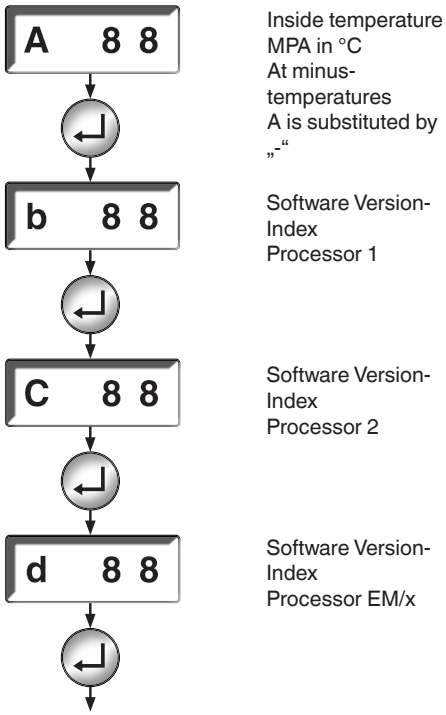
18.1 Operating mode display



18.2 Operating information: info display

The info display can be called up from the operating mode by pressing the + and Enter buttons.
The information display can be used to access information about the flame quality, the resettable operating hours counter, the resettable start-up counter and the switching cycle counter.
This mode is exited again after 60 seconds if no further keys are pressed during this time.





19. Startup

The system must be in inspected by qualified personnel prior to initial startup or after modifications have been made.
- Power supply
- Gas supply
- Gas leak-tightness

The MPA is supplied with continuous voltage; the program starts when mains voltage is provided to the heat request input.

When “3” is shown in the display, the unit in operating mode.

Errors are displayed with F xx

20. Behaviour in the case of faults

If an error occurs, the MPA displays the detected error using coded information.

Attention: The cause of the detected error must be established.

If no impairment of function can be determined on connected equipment parts, the automatic burner control system must be replaced.

21. Error overview – minimal display (MPA 4114)

Flashing code	Error code	Error description
1 x flash	F A2	Safety chain interrupted
2 x	F 60	Parameter change not enabled
3 x	F A7	No flame during first safety period
3 x	F bC	No flame during second safety period
3 x	F A9	Flame failure during stabilisation time
4 x	F A8	Flame failure during operation
5 x	F AA	Idle state control for air pressure monitor
5 x	F AB	No air pressure
6 x	F A6	Extraneous light detected
7 x	F 18	Error due to expansion module
8 x	F 16	Undervoltage or TWI communication

22. Error overview display (MPA 41x2 and display AM 41)

Error code	Error description
F 03	ERROR_WD_HARDWARE Ambient temperature too high, overvoltage
F 04	ERROR_UNLOCKING_DENIED Unlocks in the last 15 minutes; wait or use enhanced unlock
F 11	ERROR_UNDERVOLTAGE Lower voltage limit reached; check power supply
F 12	ERROR_POWERFAILURE Voltage interrupted during startup, operation or shutdown
F 1d	ERROR_PROCESSORFAILURE MPA is subject to strong EMC interference
F A2	ERROR_SAFETY_CHAIN_OPEN Safety chain opened; check limiters, breakers and wiring
F A4	ERROR_FEEDBACK_V1_INCORRECT Faulty output, external voltage present at output; check wiring, EMC effect on valve line
F A5	ERROR_FEEDBACK_V2_INCORRECT Faulty output, external voltage present at output; check wiring, EMC effect on valve line
F A6	ERROR_EXTERNAL_LIGHT Ground fault on ionisation electrode, fuel is flowing out and burning (check valves), UV tube defective
F A7	ERROR_NO FLAME_DURING_FIRST SAFETY TIME Ionisation electrode in incorrect position, ignition electrode in incorrect position, no fuel present, electrical grid connection for MPA is switched, fire monitor defective, line interrupted.
F A8	ERROR_FLAME_GONE_OUT_DURING_OPERATION Burner, flame detector, ionisation electrode defective. Check wiring and mixture setting.
F A9	ERROR_FLAME_GONE_OUT_DURING_STABILISATION See F A7 and F A8
F AA	ERROR_IDLE STATE CONTROL_LDW Air pressure monitor defective, air pressure signal during idle state control, incorrect setting of air pressure monitor.
F Ab	ERROR_NO_AIR_PRESSURE Air pressure monitor defective, air pressure signal during idle state control, incorrect setting of air pressure monitor.
F AC	ERROR_FEEDBACK_IGNITION_INCORRECT Faulty output, external voltage present at output, check wiring, EMC effect on ignition transformer line
F Ad	ERROR_LACKOFGAS_GDWMIN No fuel, gas pressure monitor defective, incorrect adjustment or wiring of gas pressure monitor
F b3	ERROR_GASVALVEFEEDBACK_FALSE See F AC
F b6	ERROR_LIMIT SWITCH_V1 (POC)
F bA	ERROR_FALSEFLAME_START Extraneous light > 1 min after heat request
F bC	ERROR_NO FLAME_DURING_SECOND SAFETY TIME
F bD	ERROR_FLAME DETECTOR_NOT SWITCHED_INVERSE
F bF	ERROR_SAFETY_CHAIN_NOT_POTENTIAL-FREE

For a detailed description, see the MPA 41xx product manual

23. Replacement of MPA 41xx V1.1 with MPA 41xx V2.0

The V2.0 automatic burner control systems are backward compatible.
Prior to replacement, check that the program sequence and parameter values are set correctly.

For further information, see the MPA 41xx product manual.

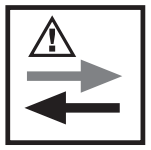
Safety-relevant components	Design-related service life		Standard	Permanent storage temperature
	Cycle number	Years		
Valve proving systems	250 000	10	EN 1643	0…45 °C 32…113 °F
Gas pressure sensing device	50 000	10	EN 1854	
Air pressure sensing device o	250 000	10	EN 1854	
Gas failure switch	N / A	10	EN 1854	
Automatic burner control system	250 000	10	EN 298 EN 230	
UV flame sensor [1]	N / A	10 000 h[3]	---	
Gas pressure regulators [1]	N / A	15	EN 88-1 EN 88-2	
Gas valve with valve proving system [2]	after error detected		EN 1643	
Gas valve without valve proving system [2]	DN ≤ 25 200 000 25 < DN ≤ 80 100 000 80 < DN ≤ 150 50 000	10	EN 161	
Gas / air ratio control systems	N / A	10	EN 88-1 EN 12067-2	

[1] Decreasing performance on account of ageing
[2] Gas families II, III
[3] Operating hours
N / A not applicable

Storage periods

Lagerzeiten ≤ 1 Jahr verkürzen nicht die konstruktionsbedingte Lebensdauer / **Storage time ≤ 1 year** does not reduce the designed lifetime /

DUNGS recommends a **maximum storage period of 3 years**



The Pressure Equipment Directive (PED) and the Directive on the energy performance of buildings (EPBD) require a regular inspection of heat generators to guarantee a high degree of long-term efficiency and thus minimal environmental impact.

There is a need to replace safety-related components after they reach the end of their useful life:

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