

User Manual MPA 41xx

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USA

CDN



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Warnings



Please read the instructions before installing or operating. Keep the instructions in a safe place. You can also find the instructions at www.dungs.com. If these instructions are not heeded, the result may be personal injury or damage to property.



The device must not be exposed to open fire. Protection against lightning strikes must be guaranteed.



Prior to assembly, the device must be inspected for transport damage.



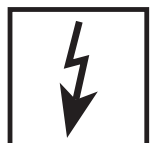
Connected gas piping systems and pipe fittings must be free from dirt, liquids, and other contaminants.



The installation and maintenance of this product must be done under the supervision of an experienced and trained specialist.



Protection from environmental impacts and weather conditions (corrosion, rain, snow, icing, humidity (e.g. by condensation), mold, UV radiation, harmful insects, poisonous, corrosive solutions/liquids (e.g. cutting and cooling fluids), must be guaranteed. Depending on the installation site, it may be necessary to take protective measures.



Never wire, install, remove from service or maintain as long as gas pressure or voltage is applied or a flame is present. Observe all public regulations.



The device must be protected from vibrations and mechanical impacts.



The device may only be operated in compliance with the operating conditions stated on the type plate. Check the ratings in the specifications to make sure that they are suitable for your application.



When installed in a seismic zone, the equipment shall be installed in accordance with local seismic codes.



All adjustments and settings should only be performed in accordance with the instruction manuals of the connected machines.



This product is intended for installations covered by, but not limited to, the following fuel gas codes: NFPA 54, IFGC (International Fuel Gas Code), or CSA B149.1 (for Canada) or the following equipment codes and standards: CSD-1, UL 795, NFPA 86, NFPA 85, NFPA 87, ANSI Z83.4/CSA 3.7, ANSI Z83.18, ANSI Z21.13/CSA 4.9, or CSA B149.3 (for Canada).



Perform a functional test to verify proper operation, program sequence and wiring as part of the commissioning process.

µP Automatic Burner Control MPA 41xx

Automatic burner control for
one-stage and modulating gas
burners

DUNGS®
Combustion Controls

- Automatic gas burner control for one-stage burners with pilot burner or direct ignition
- Continuous operation
- Configurable program sequence
- Version with or without display
- Two independent flame detectors:
Ionization input
Switching input
- Profibus DP and Modbus RTU/ASCII



Description

Microprocessor-controlled automatic gas burner control for intermittent and continuous operation of one-stage atmospheric burners or one-stage modulating fanned burners.

The program sequence and times can be customized by setting software parameters.

Versions

- MPA 4111 without display
- MPA 4112 with integrated display
- MPA 4122 with metal housing and integrated display

Application

For one-stage or modulating gas burners with or without ignition gas. In particular for industrial thermoprocessing equipment to EN 746-2.

Approvals

EC type-examination certificate according to the EC Gas Appliances Directive:
MPA 41xx CE-0085BU 0487

EC type-examination certificate according to the EC Pressure Equipment Directive:
MPA 41xx CE0036

FM Approved to FM 761
UL Recognized Component per UL 372,
UL 1998 and CSA C22.2.
GOST / Rostekhnadzor

Suitable for applications up to SIL3. Meets the requirement according to IEC 61508 (2nd Ed. 2011)
Certified by TÜV Süd

The program sequence and times can be modified on the mounted display (MPA 4112/MPA 4122) to match each application.

A laptop or PC is not required for the modification.

The automatic burner controls are protected by passwords against unauthorized access.



All settings for the MPA 41xx automatic gas burners can also be made by means of a laptop/PC via MPA Vision Box.

Display modes Operation display

- Display of the current operating state
- Display of the program state
- Display of bus address

Info display

- Display of flame quality
- Display of resettable counters for start-up, operating hours and operating cycles

MPA 4111

Version without display

The MPA 4111 version may be used if the dialogue via the display is not required or limited information is enough.

The parameters of the system can be set using the VisionBox.

The system status is indicated by means of two LEDs.

Display unit



Yellow LED

- Operation

Red LED

- Fault
- Flashing signal for fault code
- Pause state during parameter setting

Error display Display of the error memory

- Automatic activation of error messages
- Additional information about faults
- Query of the last ten faults

RESET key

- Unlocking
- Extended unlocking
- Confirmation of access level change

Yellow LED information

LED OFF:
Fault (state 0)

LED permanently ON:
Waiting for heat request (state 2) until second safety time for flame detection (state 17) and from states post-purge (20) to pause 5 (23).

Flashing LED (0.5 Hz):
Operation (states 18 and 19).

Fast flashing LED (2 Hz):
Waiting for gas pressure if gas is missing (state 24) and safety chain open (state 25).

Red LED information

Fault

The different flashing frequencies indicate the most important error codes. The remaining error codes are indicated by a permanently lit LED.

Parameter display

- Password-protected functional levels for service and OEM parameter settings
- Setting of important parameters such as:
Pre-purge time
Safety time for startup phase
Post-purge time
Behavior after flame lift-off
Operating modes of V1 and V2
Continuous or intermittent operation

Both LED information:

Password entry expected
Both LED flashing alternating

MPA 4111 in Parameter mode:

After entering of the password both LED are flashing simultaneously, parameter could be changed.

Approval overview

Approval overview	CE	FM	UL recogn- ized	UL listed	CSA C22.2	EAC	AGA
							
MPA 4111 / AC 230 V	x	x			x	x	x
MPA 4111 / AC 115 V	x	x	x		x	x	x
MPA 4112 / AC 230 V	x	x			x	x	x
MPA 4112 / AC 115 V	x	x	x		x	x	x
MPA 4122 / AC 230 V	x	x			x	x	x
MPA 4122 / AC 115 V	x	x	->	x	x	x	x
Flame detector							
FLW 41 I	x				x	x	x
UV41	x	x	x		x	x	x
UV41 HE	x	x	x		x	x	(x)*
UV42	x	x	x		x	x	x
UV 4x-EM1/1 (Shutter)	x	x	x		x	x	x
Ignition Transformer							
DEZ 1xx	x		(x)*			x	
DEZ 2xx	x		(x)*			x	

* on request

Safety Integrity Level (SIL)

MPA41xx from V1.1	UV4x	UV4x-EM1/1 (Shutter)	Components	SIL	SFF	PFH
X			Ionization input	3	99.48 %	1.80E-09
X			Input FLW2 NO, FLW2 NC, LDW and remote unlo- cking	3	99.38 %	1.80E-09
X	X		UV41 + ioniza- tion input	2	96.91 %	1.50E-07
X	X		UV42 + input FLW2 NO	2	96.87 %	1.51E-07
X	X	X	UV4x-EM1/1 (shutter) + UV41 + ioniza- tion input	3	99.35 %	3.15E-08
X	X	X	UV4x-EM1/1 (Shutter) + UV42 + input FLW2 NO	3	99.34 %	3.15E-08

Technical Data

General MPA41XX	
Protection type of the plastic housing	
MPA 4111 MPA 4112	IP 42 IP 54
Protection type of metal housing	
MPA 4122	IP 65 (Attention: use suitable cable screw connections only)
Ambient temperature MPA 41xx	-20 °C ... +60 °C (-4 °F ... +140 °F) UL Approval -40 °C ... +70 °C (-40 °F ... +158 °F)
Storage and transport	-40 °C ... +80 °C (-40 °F ... +176 °F)
Humidity	DIN 60730-1, no condensation admissible
Operational altitude	Suitable for use up to 2,000 metres (6,561.7 feet) above sea level
Useful life Switching outputs	Minimum 250,000 switching operations
Mounting position	as desired
Dimensions of MPA 411x	MPA 4111 (L x W x D): ca 77 x 152.5 x 148.5 mm (3 x 6 x 5.8 in.) MPA 4112 (L x W x D): ca 77 x 152.5 x 151.5 mm (3 x 6 x 6 in.)
Weight MPA 411x	0.82 kg (1.8 lb)
Dimensions of MPA 412x	MPA 4122 (L x W x D): ca 240 x 160 x 80 mm (9.4 x 6.3 x 3.1 in.) (excluding cable screw connection)
Weight MPA 412x	2.2 kg (4.9 lb)

Electrical data	
Rated voltage	230 VAC -15 % ... +10 % or 115 VAC -15 % ... +10 %, depending on the version
Frequency	50 Hz ... 60 Hz
Fuse	6.3 A slow-blow fuse or 10 A fast-blow fuse, integrated, exchangeable
Isolation	No galvanic isolation between mains and 24 VDC or 5 VDC
Electrical connection	Correct phase sequence (!) connection and protective earth conductor according to the wiring diagram The contact protection for the UV sensor must be guaranteed by mounting it in the operating equipment
Power consumption (own consumption)	Maximum 10 W Typically 115 V 230 V Standby 1.5 W ... 1.8 W Operation 3.4 W ... 4.8 W With Profibus / Modbus Standby 3.3 W ... 3.5 W Operation 5.4 W ... 6.3 W With modulation Standby xx W ... 6.3 W Operation xx W ... 9.0 W
Short-circuit current ION against N 115/230 VAC	280 µA

Technical Data

Outputs*				
Designation	Safety-related	Type of output	Line length	Electrical data
V1 Main gas valve	●	Relay contact	Max. 100 m (328 ft)	115/230 VAC / 2 A $\cos \varphi = 1$ Minimum load 0.5 W
V2 Safety gas valve	●	Relay contact	Max. 100 m (328 ft)	115/230 VAC / 2 A $\cos \varphi = 1$ Minimum load 0.5 W
Ignition	●	Relay contact	Max. 100 m (328 ft)	115/230 VAC / 1 A $\cos \varphi = 0.4$ corresponds to 115/230 VAC / 2.5 A $\cos \varphi = 1$
Fan		Relay contact	Max. 100 m (328 ft)	115/230 VAC / 1 A $\cos \varphi = 0.4$ corresponds to 115/230 VAC / 2.5 A $\cos \varphi = 1$
Operation		Relay contact	Max. 100 m (328 ft)	115/230 VAC / 1 A $\cos \varphi = 1$
Fault		Relay contact	Max. 100 m (328 ft)	115/230 VAC / 1 A $\cos \varphi = 1$
Flame detector supply		For UV41 (HE) and UV42	Max. 100 m (328 ft)	230 VAC / 10 mA *1

*1: The flame detector is always supplied with 230 VAC, even the 115 VAC version, via the MPA 41xx power supply flame detector, pin 7.

The sum of the currents of all safety-related consumers must not exceed 5 A!

The sum of the currents of all consumers must not exceed 6.3 A (10 A), note fuse value.

Inputs*			
Designation	Type of input	Line length	Electrical data
Safety chain	Potential-free contact	Max. 100 m (328 ft)	115/230 VAC / max. 10 A
Flame detector 1 (Ionisation)	Ionisation for one or two-probe operation	Max. 10 m ** (32.8 ft)	Threshold value: approx. 1.2 μ A
Flame detector 2 NO	Switching contact	Max. 100 m (328 ft)	115/230 VAC "normally open"
Flame detector 2 NC	Switching contact	Max. 100 m (328 ft)	115/230 VAC "normally closed"
Heat request	Switching contact	Max. 100 m (328 ft)	115/230 VAC
Air pressure switch	Switching contact	Max. 100 m (328 ft)	115/230 VAC
Remote unlocking	Switching contact	Max. 100 m (328 ft)	115/230 VAC

* The wires which are used for the connection must be approved for ambient temperatures of minimum 75 °C (167 °F) and suitable for the electrical loads listed in the table.

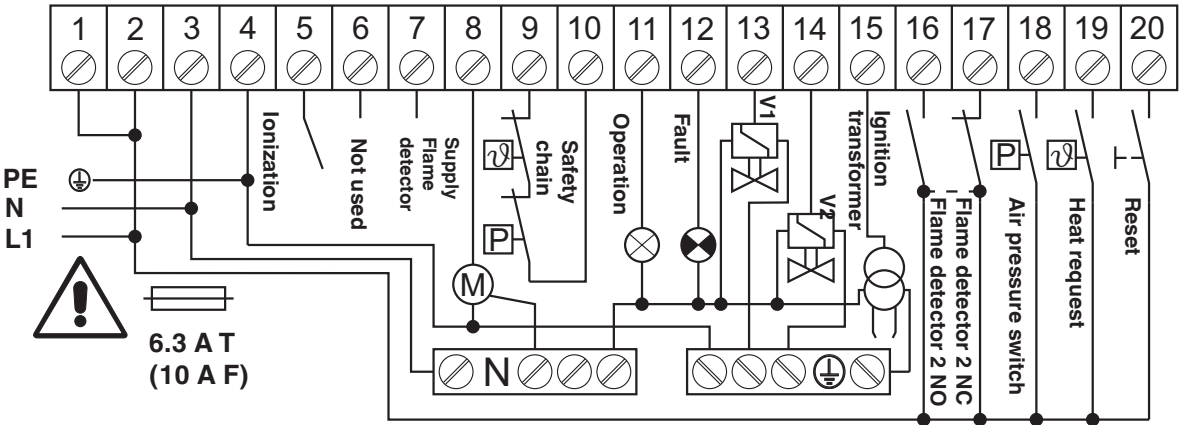
** For distances > 10 m (32.8 ft) flame detector 2 should be used.

For special applications ionization line length up to 50 m (164 ft) is possible upon request.

Technical Data

General information				
Designation	Type of input	Electrical data	MPA 4111	MPA 41x2
L1 connection over exchangeable backup fuse		L1 protected by integrated fuse, 6.3 A slow-blow or 10 A fast-blow	●	●
TWI interface	TWI	Connection only for Vision-Box. NOT galvanically isolated!	●	●
Switch for parameter mode	2-position selector switch	ON/OFF switch in MPA (may only be switched after having removed MPA from the base)	●	●
Display unit "Multi-function switch"	In housing towards integrated multi-function switch	1 pushbutton with 2 LED's	●	
Display	In housing towards integrated display	3x7 segment + 4 keys		●

Connection diagram MPA411x

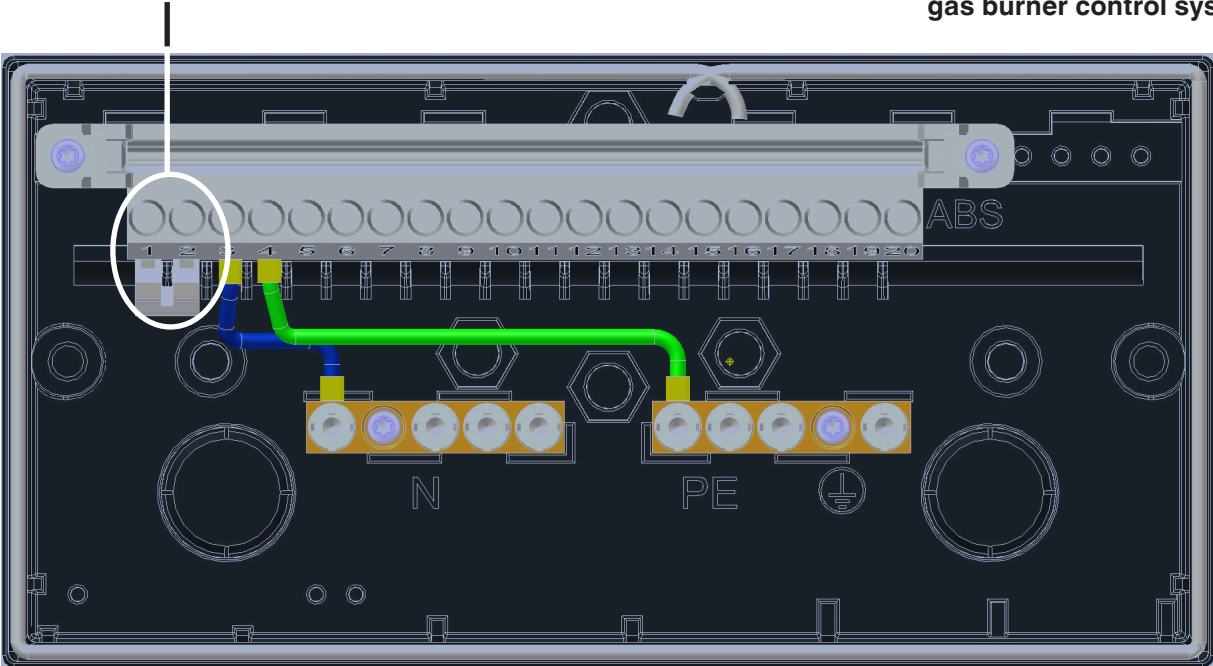


Attention:

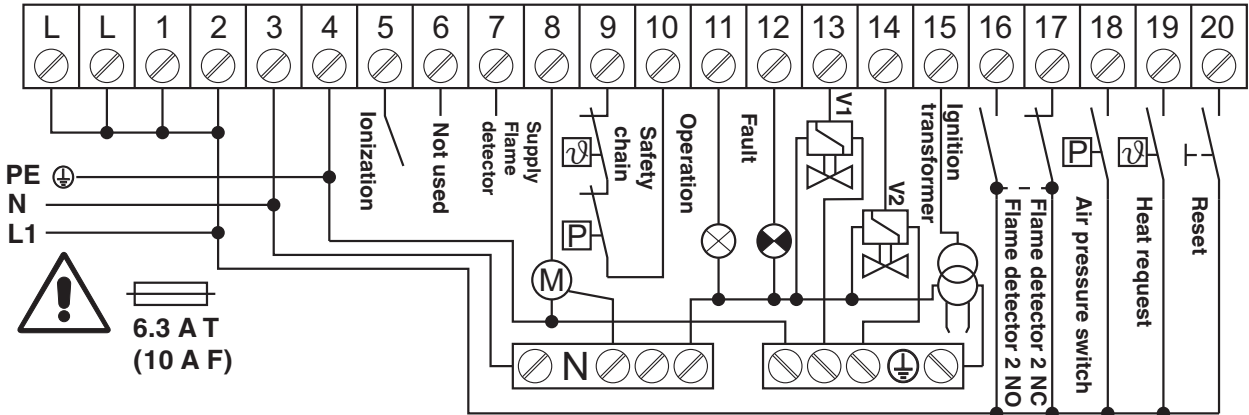
Risk of fatal electric shocks!
You must interrupt the power supply before removing the MPA 411x from the base.

After having removed the MPA 411x, you might get in contact with the electrical connections in the terminal socket.

Do not remove the jumper between terminals 1 and 2, which was mounted in the factory. It is required for the intended use of the automatic gas burner control system.



Connection diagram
MPA 412x

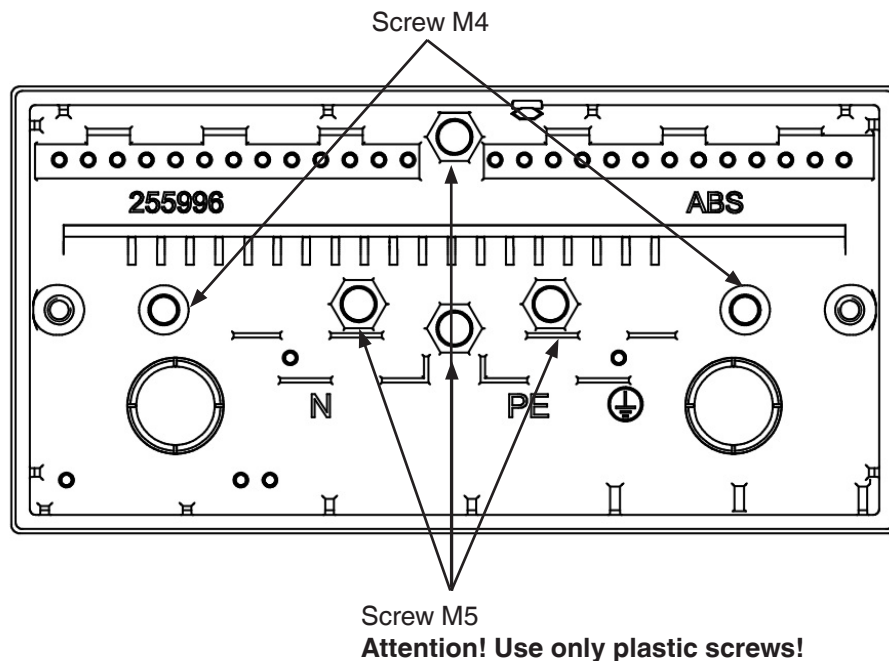
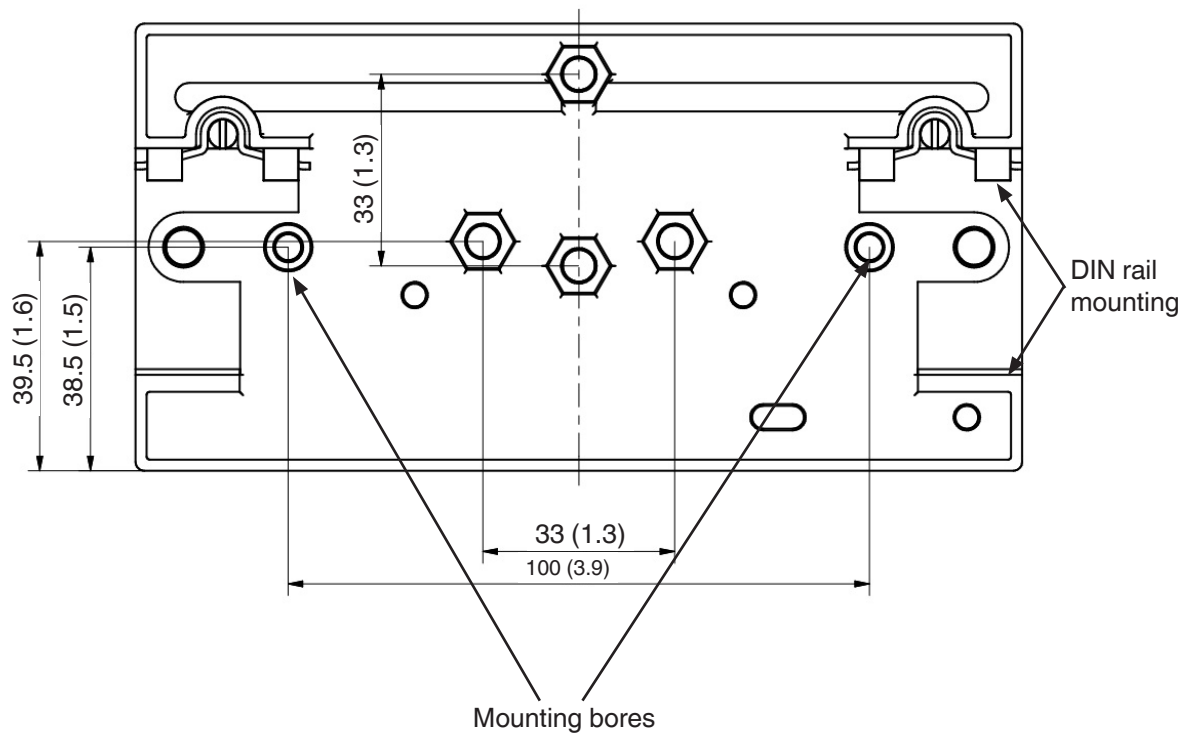


Installation of the MPA 41xx

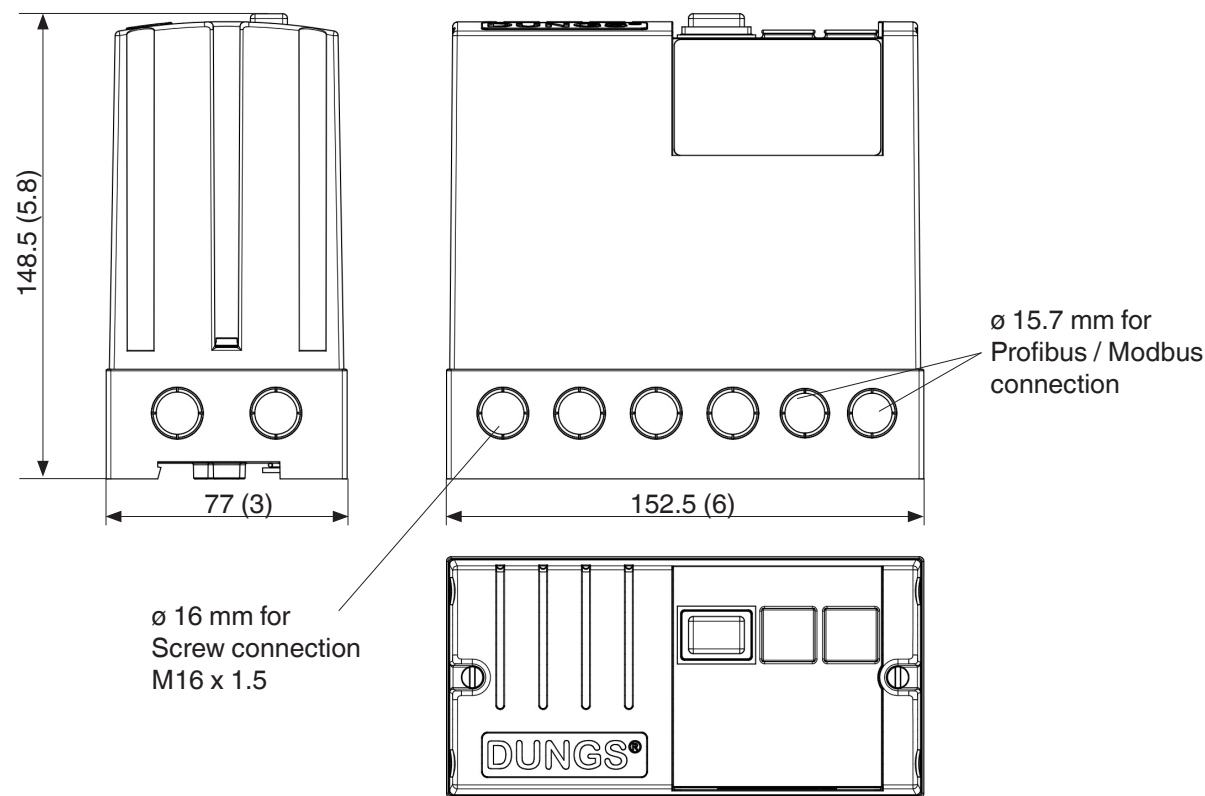
Installation options for the MPA 41xx:

- direct screw connection of the base on the mounting surface. Break out mounting holes, e.g., with a suitable screwdriver or drill them with a drill 4.2 mm (M4) or 5.5 mm (M5).
- DIN rail mounting (locking the base into place on a hat rail).

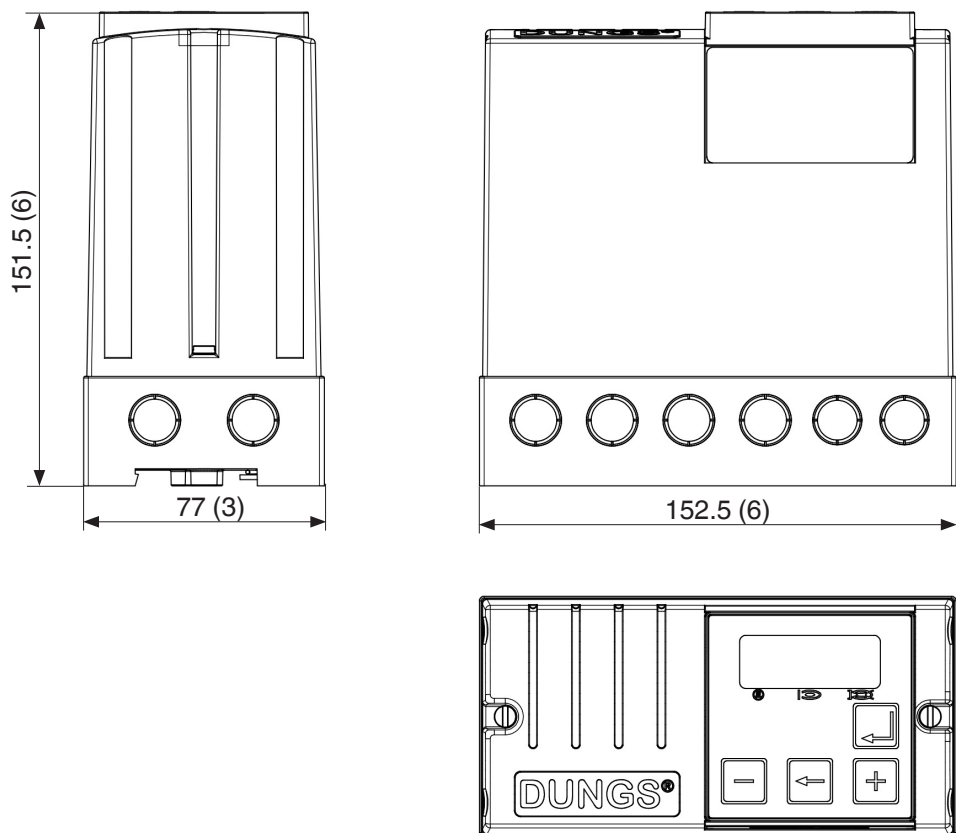
Dimension of DIN rail in mm (inches)



Dimensions of the MPA 4111 in mm (inches)

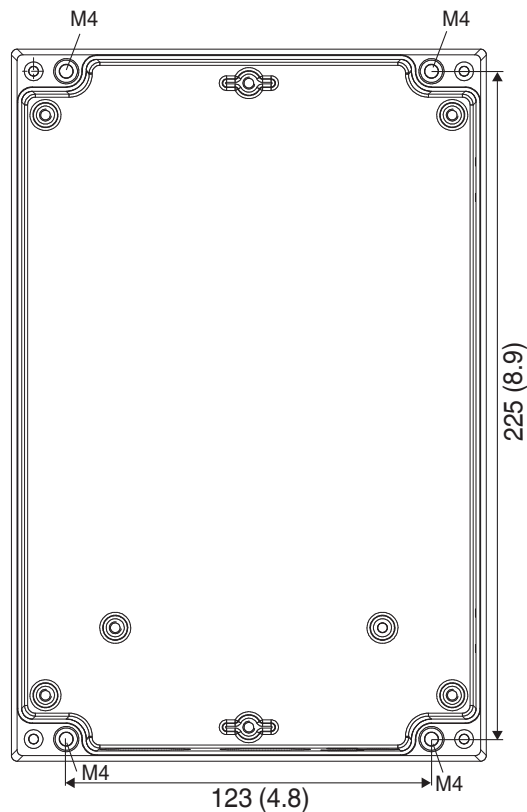


Dimensions of the MPA 4112 in mm (inches)

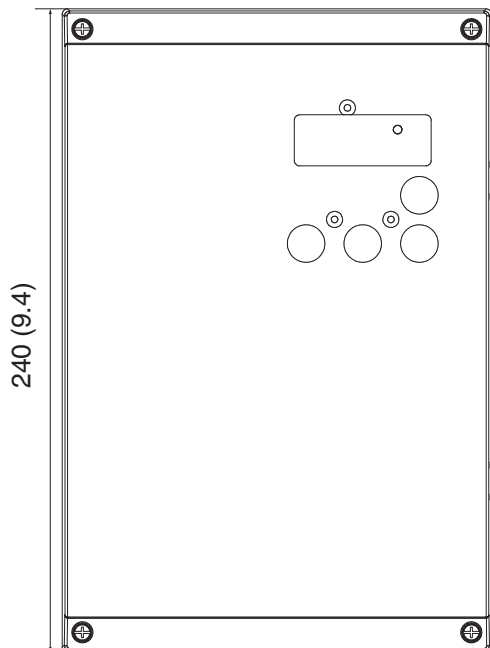
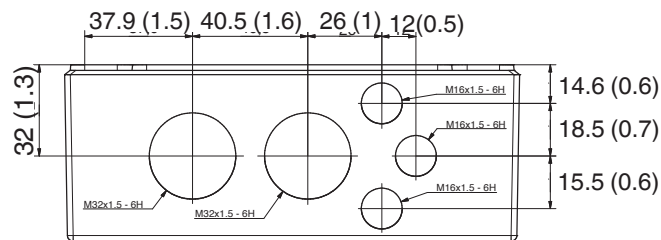
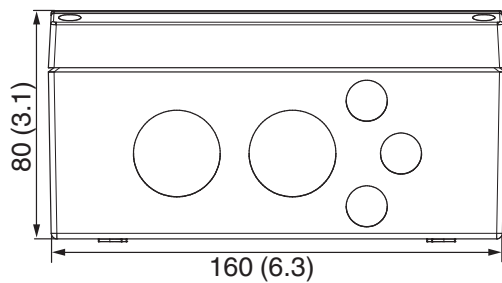


Installation of the MPA 4122

- direct screw connection of the housing on the installation surface using M4 screws, length min. 20 mm.



Dimensions of the MPA 4122 in mm (inches)



Flow chart

The program sequence may be customized by changing the parameters.

Attention: All modifications must comply with the requirements of the valid standard.

DUNGS shall not assume any liability for material or personal damage caused by improper use or parameter setting of the automatic gas burner control system.

- *1 The monitoring of the air pressure switch depends on the operating mode set in P16.
- *2 V1 can be deactivated via parameter P38 after the second safety time (= interrupted start gas).
- *3 The two inputs Flame 1 and Flame 2 can be activated or deactivated independently of one another per parameters P33 and P36 for phase 1 and phase 2.
- *4 Both flame inputs must be off!
- *5 With "Flame on", it will run with 15 minutes of follow-up after a regular switch-off. After 24h OFF, the signal will be activated for 1 minute.
- *6 The input "Flame 2 NC" can also be configured as gas pressure switch. The gas pressure switch tolerates faulty signals of up to 1s.
- *7 The follow-up time already starts during the "Post-purge" state. If the post-purge is greater than/equal to the follow-up time, the "Follow-up time" state will be skipped.
- *8 The MPA can also run in two-stage operation (P38=2). The selection of stage 1 / stage 2 will then be made via a field bus (e.g. Profibus, Modbus,...). V1 is always open (=stage 1). V2 will open after a field bus setpoint input (=stage 2). In the operating modes "interrupted start gas" (P38=0) and "permanent start gas" (P38=1), V2 is always ON.
- *9 The input "Flame 2 NC" can also be configured as Proof-Of-Closure (POC) as a function of output V1 or V2. The POC tolerates faulty signals of up to 1s.
- *10 In the operating mode P38 = 2 (two-stage operation), the second safety time is skipped, and the MPA goes from "Pause 3" directly to the "Operation" state!

State description		
MPA 41xx		
State xx	Designation	Description
00	Error	If the automatic gas burner control system is in this state, there is an error. The display automatically shows an error message and indicates the current error (e.g. "F 11") instead of the state number.
01	Manual operation - Pause 1	If the switch is on "Para" for the parameter mode, the MPA stops in this state. Press the "Next" key (unlock key) to continue with the next state. If you do not press any key during 30 minutes, the automatic gas burner control system restarts or indicates an error. The manual mode may only be cancelled after having run completely through all states and after having reset the parameter switch to automatic mode. If you reset the parameter switch before reaching state H5 and you have modified parameters, they are not yet applied, and the automatic gas burner control system indicates an error.
02	Waiting for heat request	The automatic control system is ready for operation but there is not any heat request.
03	Idle state control air pressure switch	Depending on the operating mode of air pressure switch (P16), it is checked whether air pressure switch reports "no air pressure". Max. waiting time 2 min. → Restart.
04	Safety chain monitoring	In this state, it is checked whether the safety chain is potential-free. The fan relay is still off, and the watchdog relay has not yet picked up. If the safety chain is not potential-free, the system waits maximum one minute before trying to restart.
05	Watchdog loading phase	The safety-related watchdog -circuit is activated. If the safety chain is interrupted → State 25.
06	Waiting for air pressure	The air pressure must be applied within a state time of max. 1 min., otherwise, the system tries to restart.
07	External light monitoring	The flame may not be detected within the state time of max. 1 min. Otherwise, the system tries to restart.
08	Pre-purge	This state provides sufficient pre-purge. Both flame inputs must be switched off for the duration defined in parameter "Pre-purge" (P30).
09	Manual operation - Pause 2	If the switch is on "Para" for the parameter mode, the MPA stops in this state. Press the "Next" key (unlock key) to continue with the next state. If you do not press any key during 30 minutes, the automatic gas burner control system restarts or indicates an error. The manual mode may only be cancelled after having run completely through all states and after having reset the parameter switch to automatic mode. If you reset the parameter switch before reaching state H5 and you have modified parameters, they are not yet applied, and the automatic gas burner control system indicates an error.
10	Pre-ignition	The ignition is activated for the duration specified in parameter P31 without opening valve V1.
11	First safety time - ignition	The gas valve V1 is opened in this state. The duration of this state is P32 - 0.5 s.

State description

MPA 41xx

State xx	Designation	Description
12	First safety time - flame detection	After deactivating the ignition, the process for flame detection is started. If an ionization current flows or the 230V input is switched on - depending on the configuration -, the MPA reports a flame. The duration of this state is 0.5 s.
13	Flame A stabilization	The flame can stabilize in this state. The duration of the stabilization phase (P34) can be configured.
14	Manual operation - Pause 3	If the switch is on "Para" for the parameter mode, the MPA stops in this state. Press the "Next" key (unlock key) to continue with the next state. If you do not press any key during 30 minutes, the automatic gas burner control system restarts or indicates an error. The manual mode may only be cancelled after having run completely through all states and after having reset the parameter switch to automatic mode. If you reset the parameter switch before reaching state H5 and you have modified parameters, they are not yet applied, and the automatic gas burner control system indicates an error.
15	Second safety time	The gas valve V2 is opened in this state. The duration of this state is P35 - 0.5 s.
16	Second safety time - flame detection	The process for detecting the second flame is started. If an ionization current flows or the 230V input is switched on - depending on the configuration -, the MPA reports flame 2. The duration of this state is 0.5 s.
17	Flame B stabilization	The flame 2 can stabilize in this state. The duration of the stabilization phase (P37) can be configured.
18	Operation	The automatic gas burner control system is now operating. A voluntary switch-off after a defined time can be activated (P40). If this time is set to a maximum of 23 hours and 59 minutes, the MPA is in intermittent mode.
19	Manual mode - Pause 4	If the switch is on "Para" for the parameter mode, the MPA stops in this state. Press the "Next" key (unlock key) to continue with the next state. If you do not press any key during 30 minutes, the automatic gas burner control system restarts or indicates an error. The manual mode may only be cancelled after having run completely through all states and after having reset the parameter switch to automatic mode. If you reset the parameter switch before reaching state H5 and you have modified parameters, they are not yet applied, and the automatic gas burner control system indicates an error.
20	Post-purge	In this state, the post-purge of the combustion chamber is carried out (P51). The gas valves remain closed from this state on. The fan continues running in this state; it is switched off in the next state.
Post-purge (P51) may be interrupted by a repeated heat request if the restart protection (P52) has been set to 0 and the follow-up time (P50) has already lapsed.		

State description**MPA 41xx**

State xx	Designation	Description
21	Follow-up time	During this time ($P50-P51 > 0$), 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. The follow-up time starts in the post-purge state if the post-purge is equal to or greater than the follow-up time; then the follow-up time state is skipped.
22	Restart protection	In this state, the system waits until parameter P52 is finished; this prevents an immediate restart of the automatic gas burner control system if a heat request is active. The flame may no longer be detected in this state; otherwise, MPA reports an external light error.
23	Manual mode - Pause 5	If the switch is on "Para" for the parameter mode, all parameters are set, and the system has run through the entire process, the automatic gas burner control system stops in this state. The set parameter values are now applied automatically. You may reset the parameter switch to the "Auto" mode. Alternatively, you may press the "Next" key (unlock key) to restart parameter setting from the beginning. If you do not press any key during 30 minutes, the automatic gas burner control system restarts or indicates an error.
24	Waiting for gas pressure	If the automatic gas burner control system is configured for use of a Gas pressure switch, it changes to state 24 when detecting missing gas in states 1 to 10. It leaves it in state 1 after sufficient gas pressure has been built up. The MPA runs through the post-purge, follow-up time and restart protection states before changing to state 24.
25	Safety chain open	The automatic gas burner control system remains in this state during the time set in parameter P20 if the system does not detect a closed safety chain. After the time has lapsed, it decides based on P15 whether it locks immediately or tries to restart. If the safety chain is closed before the time of P20 has lapsed, MPA changes to state 1 to check the safety chain again. In this state, the fan relay is active, the fan is running.

Parameter						
Factory settings						
Parameter	Designation	Unit	Access level	Comfort parameter setting	Min. value	Max. value
P11	Field bus address configuration		SERVICE	x	0	255
P12	Number of restart attempts or anti-oscillation counter		OEM		0	5
P13	Number of restart attempts when flame is missing after the start-gas flame proving period		OEM	x	0	5
P14	Number of restart attempts after a flameout or missing flame after the second start-gas flame proving period		OEM	x	0	5
P15	Locking with open safety chain		OEM	x		
P16	Air pressure switch operating mode		OEM	x	0	15
P18	Flame detector 2 or gas pressure switch		OEM	x	0	4
P19	Configuration of the output operating mode		SERVICE	x	0	4
P20	Duration of safety chain open	1/16 s	OEM		0	65535
P21	Shutter test for flame detector		OEM	x	0	3
P22	FM mode		OEM			
P30	Duration of pre-purge	1/16 s	OEM	x	0	65534
P31	Duration of pre-ignition time	1/16 s	OEM	x	0	65534
P32	Start-gas flame proving period / first safety time	1/16 s	OEM	x	16	960
P33	Active flame detector(s) for start-gas flame proving period		OEM	x	1	4
P34	Stabilization time A	1/16 s	OEM		0	65534

Parameter						
Factory settings						
Pa- ram- eter	Designation	Unit	Access level	Comfort parameter set- ting	Min. value	Max. value
P35	Second start-gas flame proving period	1/16 s	OEM	x	16	480
P36	Active flame detector(s) for phase 2		OEM	x	1	4
P37	Stabilization time B	1/16 s	OEM		0	65534
P38	Operating mode V1 V2		OEM	x	0	2
P40	Standard mode duration	min.	OEM	x	0	65535
P41	Operation safety time FLW1	1/16 s	OEM	x	12	48
P42	Operation safety time FLW2	1/16 s	OEM	x	3	48
P50	Follow-up time	1/16 s	OEM		16	65534
P51	Post-purge time	1/16 s		x	0	65534
P52	Restart protection	1/16 s	SERVICE	x	0	65534

Status Information			
MPA 41xx			
Designation	Description	Display via VisionBox	Display via display
General information			
Lockout	System is locked	●	LED
State number	Current state of the system, key combination + and -	●	7-segment
Current access level		●	
Flame	Flame detected	●	LED
Manual mode	System in manual mode	●	7-segment
Flame quality	Value > 49 good flame (for ionization)	●	Info
Hardware input for temperature controller	Signal for temperature controller input	●	
Bus connection present		●	7-segment
Heat request	Signal combination from bus setpoint input and hardware input	●	LED
Inputs			
Air Pressure Switch	Signal from air pressure switch input	●	
Flame 1	Signal from flame 1 input	●	
Flame 2 NO	Signal from flame2_NO input	●	
Flame 2 NC / Gas Pressure Switch / POC	Signal from flame2_NC input or Gas Pressure Switch or POC	●	
Outputs			
Gas valve V1		●	
Gas valve V2		●	
Ignition		●	
Fan		●	
Counter			
Time counter/Lifetime counter	Time since switching on the automatic gas burner control system	●	
Runtime meter	Fixed runtime	●	Info
Runtime meter Resettable	Resettable via VisionBox and display	●	
Start counter	Fixed start counter	●	Info
Resettable start counter	Resettable via VisionBox and display	●	
Switching cycles counter V2		●	Info
Internal information			
State timer in minutes	Displayed state timer runs in minutes, otherwise in 1/16 sec.	●	
Initialization phase	The automatic gas burner control system is being initialized	●	
Multi-function switch	Is "ON" when unlock key is pressed	●	
Access level change	CCC or value flashes on display, ↵ key expected	●	7-segment
Safety switch-off flag	System is locked	●	
Error index	Internal error counter	●	
Remaining state time	is 65535 if unlimited remaining time	●	
Cycl. state counter	Counts in 1/128 s cycle	●	
Processor load		●	
Nominal modulation degree	No function	●	
Actual modulation degree	No function	●	

LED: Indicated by one of the 3 LEDs on the display.

7-segment: Indicated by one or several characters of the 7-segment display

Info: Displayed in informative display mode.

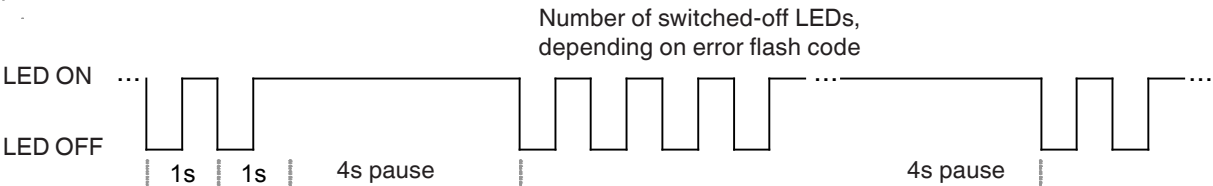
MPA4111
Version without display
Error code - flashing frequency

Information about both LEDs see also page 5.

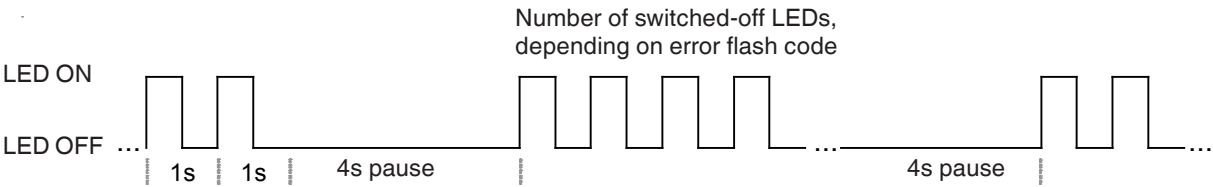
Both LEDs are powered twice to check their functionality when live voltage is applied.

Both LED flash (1 Hz) if you are requested to press a button to change a level or if the automatic gas burner control system is ready for the extended unlocking (pressing a button after 5

s, until 10 s). Both LEDs flash alternately if the system is started in parameter mode and the password for changing the parameters has not been entered yet (in VisionBox on PC). The RESET button and the manual mode are locked.



Blink code Minimum indication	Error ID	Error designation
Please see the tables below for more information about the individual errors.		
1	0xA2	ERROR_SAFETY_CHAIN_OPEN
2	0x60	ERROR_PARAMETER CHANGE_NOT RELEASED
3	0xA7	ERROR_NO FLAME_DURING_FIRST SAFETY TIME
3	0xBC	ERROR_NO FLAME_DURING_SECOND SAFETY TIME
3	0xA9	ERROR_FLAME_GONE_OUT_DURING_STABILIZATION
4	0xA8	ERROR_FLAME_GONE_OUT_DURING_OPERATION
5	0xAA	ERROR_IDLE STATE CONTROL_AIR_PRESSURE_SWITCH
5	0xAB	ERROR_NO_AIR_PRESSURE
6	0xA6	ERROR_EXTERNAL_LIGHT
7	0x18	ERROR_EXTERNAL_APPLICATION
8	0x16	ERROR_TWI_COMMUNICATION AND LOW VOLTAGE



MPA 4112/MPA 4122

Version with display

The customer may customize the MPA 4112/MPA 4122 version on the integrated display to match the desired burner. All important parameters may be set by means of the four operating keys.

The parameters of the system can be set using the Vision-Box.



3x7 segment display

LED:

Blue: Heat request

Yellow: Flame quality

(flashes if the flame quality is poor)

Red: Fault



Release button

RESET function and confirmation of the entry



Back



Plus

Increases the displayed value



Minus

Reduces the displayed value

Depending on the operating state of the automatic gas burner control system, different information is displayed.

Error overview

MPA 41xx error table for minimum indication (MPA4111) ordered by flash code

Error ID	Internal error	Error description Please see the tables above for more information about the individual errors.
1	0xA2	ERROR_SAFETY_CHAIN_OPEN
2	0x60	ERROR_PARAMETER_CHANGE_NOT_RELEASED
3	0xA7	ERROR_NO_FLAME_DURING_FIRST_SAFETY_TIME
3	0xBC	ERROR_NO_FLAME_DURING_SECOND_SAFETY_TIME
3	0xA9	ERROR_FLAME_GONE_OUT_DURING_STABILISATION
4	0xA8	ERROR_FLAME_GONE_OUT_DURING_OPERATION
5	0xAA	ERROR_IDLE_STATE_CONTROL_LDW
5	0xAB	ERROR_NO_AIR_PRESSURE
6	0xA6	ERROR_EXTERNAL_LIGHT
7	0x18	ERROR_EXTERNAL_APPLICATION
8	0x16	ERROR_TWI_COMMUNICATION_AND_LOW_VOLTAGE

Error overview**MPA 41xx error without error ID**

Error ID	Internal error	Error description
F1 flashing		Low voltage Bus connection interrupted Internal error
F2 flashing	x	The connected display is invalid.
F3 flashing		The password has been entered incorrectly when trying to change it or has not been confirmed by means of the unlock key.
F4 flashing		The signal of the remote unlocking via bus is active too long.
F5 to F8		not used
F9 flashing		Connection to bus missing. The bus module has been connected but there is not any connection to the master.
FA flashing	x	Failed to read parameter "Output operating mode", the output for the operating mode is not switched.

Error overview			
MPA 41xx			
Error from the basic system (0x01 to 0x3F)			
Error ID	Flash code minimum indication	Internal error	Error description
0x01	0	X	ERROR_INTERRUPT_CYCL_STATE FRAME
0x02	0	X	ERROR_WD_TRIGGERING
0x03	0		ERROR_WD_HARDWARE Possible cause of the error: Too high ambient temperature Overvoltage
0x04	0		ERROR_UNLOCKING_DENIED Possible cause of the error: More than 5 unlocking operations in the last 15 minutes. Remedy: Wait or extended unlocking.
0x05	0	x	ERROR_ROM_TEST
0x06	0	x	ERROR_RAM_TEST
0x07	0	x	ERROR_PINSHORTCIRCUIT
0x08	0	x	ERROR_STACK_OVERFLOW
0x09	0	x	ERROR_PROGRAMMING
0x0A	0	x	ERROR_DI_VARIABLE
0x0B	0	x	ERROR_IN_TABCONTROLERROR
0x0C	0	x	ERROR_CONFIGURATION
0x0D	0	x	ERROR_CPU_TEST
0x0E	0	x	ERROR_EEPROM_PARAMETER
0x0F	0	x	ERROR_ADDRESS_TEST
0x10	0	x	ERROR_FUNCTION_ERROR ID
0x11	0		ERROR_UNDERVOLTAGE Possible cause of the error: The admissible lower voltage limit was not reached at least for a short time.
0x12	0		ERROR_POWERFAILURE Possible cause of the error: The supply voltage was interrupted during startup, operation or regular switch-off.
0x13	0	x	ERROR_WD_STATUS Safety chain not potential-free. Possible cause of the error: The fan continues running too long. Remedy: Increase the time for the restart protection.
0x14	0	x	ERROR_DI_SEGMENT_TEST
0x15	0	x	ERROR_SFRREGISTER_TEST
0x16	0		ERROR_TWI_COMMUNICATION Possible cause of the error: A TWI bus user was connected to the bus or separated from the bus while the MPA was not 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.
0x17	0	x	ERROR_STATE_FRAME_OVERLOAD

Error overview

MPA 41xx

Error from the basic system (0x01 to 0x3F)

Error ID	Flash code minimum indication	Internal error	Error description
0x18	7		Additional byte 1: 0xB4 (error of the VisionBox) Switch-off was caused externally by selecting the "switch-off" function in the PC software of the VisionBox Additional byte 1: 0x90 (internal MPA error P2) Additional byte 4: 0x01 Internal error: State frame Additional byte 4: 0x08 Internal error: Stack overflow Additional byte 4: 0x09 Internal error: Programming Additional byte 4: 0x16 Internal error: TWI communication Additional byte 4: 0x1D Internal error: Processor crash Additional byte 4: 0x1E Internal error: Work group control Additional byte 4: 0xA0 Timeout parameterization mode (0,5 h without pressing a key)6 Additional byte 4: 0xA1 Invalid bus address Additional byte 4: 0xA2 Error parameter adjustment of the service box Additional byte 4: 0xA3 anti-oscillation function shutter error Additional byte 4: 0xA4 extension module not ready Additional byte 4: 0xA5 The extension module does not respond Additional byte 1 0xC2 (extension module error) Additional byte 4: 0x08 Internal error: Stack overflow Additional byte 4: 0x09 Internal error: Programming Additional byte 4: 0x0A Internal error DI variable Additional byte 4: 0x17 Internal error: Work group control Additional byte 4: 0xE0 parameter error (consider parameters outside the limits P240 to P249) Additional byte 4: 0xE1/0xE2 calibration value not set in EEPROM or not OK. Additional byte 4: 0xE3 reserved Additional byte 4: 0xE4 High Fire Signal missing during pre-venting Additional byte 4: 0xE5 configuration error: - Parameter P249 one or more bits without function - Pre- or post-venting time too short for P248 Additional byte 4: 0xE6 configuration error: - $P248 < 16$ (1 s) - $P30 - 2 * P248 < 16$ (1 s) - $P51 - P248 < 16$ (1 s) Additional byte 4: 0xE7 reserved Additional byte 4: 0xE8 EM2/6 not recognized (P240=0, EM 2/6 connected) Additional byte 4: 0xE9 wrong signal Low Fire during ignition and stabilisation Additional byte 4: 0xEA wrong signal High Fire during post-venting time Additional byte 4: 0xEB reserved Additional byte 4: 0xEC-0xED: not used Additional byte 4: 0xEE Breakdown of the communication to the MPA Additional byte 4: 0xEF Additional module not compatible to the MPA version

Error overview			
MPA 41xx			
Error from the extended functions (0x40 to 0x9F)			
Error ID	Flash code minimum indication	Internal error	Error description
0x19	0		not used
0x1A	0	x	ERROR_SWWD_DURING_INITIALIZATION
0x1B	0	x	ERROR_BUFFEROVERFLOW
0x1C	0	x	ERROR_SYNCHRONIZATION_DURING_INITIALIZATION
0x1D	0		ERROR_PROCESSORFAILURE Possible cause of the error: There is strong EMC interference on MPA.
0x1E	0	x	ERROR_SFRREGISTER_STATEBLOCK
0x40 - 0x42			reserved
0x43	0	x	ERROR_TEST_IONIZATIONINPUT
0x44 - 0x5F			reserved
0x59			ERROR_MONITORING_INTERFACEP2 Internal failure Fieldbus not connected or interrupted while P38 setting = 2 (external determination V2).
0x60	2		ERROR_PARAMETER_CHANGE_NOT_RELEASED A monitored parameter has been changed.
0x61			ERROR_SHUTTERTEST

Error overview

MPA 41xx

Error from the extended functions (0x40 to 0x9F)

Error ID	Flash code minimum indication	Internal error	Error description
0xA0	0	x	ERROR_STATE_DURATION_TOO_LONG
0xA1			reserved
0xA2	1		ERROR_SAFETY_CHAIN_OPEN Possible cause of the error: The safety chain has been opened or is not closed. The wires of the safety chain are interrupted.
0xA3			not used
0xA4	0	x	ERROR_FEEDBACK_V1_INCORRECT
0xA5	0	x	ERROR_FEEDBACK_V2_INCORRECT
0xA6	6		ERROR_EXTERNAL_LIGHT Possible cause of the error: Earth connection to an ionization electrode. Gas flows out and is burned for example by adjacent burners. Defective UV tube. Connected flame detector (UV, ...) detects light or is defective.
0xA7	3		ERROR_NO_FLAME_DURING_FIRST_SAFETY_TIME Additional information byte 0: Bit 0 = Flame to FLW1; Bit 1 = Flame to FLW2 Additional information byte 1: Flame quality for FLW1 Possible cause of the error: Ionization electrode incorrectly set. Ignition electrodes incorrectly set. Insulated lines of the ignition electrodes or defective ionization electrode. Gas valves do not open the gas flow. Connected flame detector (UV, ...) does not detect light or is defective. Lines of mains connection on the MPA exchanged ("N" and "L1").
0xA8	4		ERROR_FLAME_GONE_OUT_DURING_OPERATION Additional information byte 0: Bit 0 = Flame to FLW1; Bit 1 = Flame to FLW2 Additional information byte 1: Flame quality for FLW1 Possible cause of the error: Flame body defective. Connected flame detector (UV, ...) does not detect light or is defective.
0xA9	3		ERROR_FLAME_GONE_OUT_DURING_STABILIZATION Additional information byte 0: Bit 0 = Flame to FLW1; Bit 1 = Flame to FLW2 Additional information byte 1: Flame quality for FLW1
0xAA	5		ERROR_IDLE_STATE_CONTROL_AIR_PRESSURE_SWITCH Possible cause of the error: The air pressure detector is defective. There is air pressure during the idle state control, for example due to an air flow from the exhaust line. The threshold value of the air pressure detector is set incorrectly.
0xAB	5		ERROR_NO_AIR_PRESSURE
0xAC	0	x	ERROR_FEEDBACK_IGNITION_INCORRECT
0xAD	0		ERROR_LACKOFGAS_GAS_PRESSURE_SWITCH_MIN
0xB0	0	x	ERROR_TESTCIRCUIT_EXTENSION
0xB3			ERROR_GASVALVEFEEDBACK_FALSE Additional information byte 0: 1 = V1, 2 = V2
0xB6	0		ERROR_LIMIT_SWITCH_MAIN_GAS (POC)
Error ID's 0xAE-0xAF, 0xB1-2, 0xB4-5 & 0xB7-0xBB reserved.			

Error overview**MPA 41xx****Error from the extended functions (0x40 to 0x9F)**

Error ID	Flash code minimum indication	Internal error	Error description
0xBA			ERROR_FALSEFLAME_START False flame > 1 min. after heat request
0xBC	3		ERROR_NO FLAME_DURING_SECOND SAFETY TIME Additional information byte 0: Bit 0 = Flame to FLW1; Bit 1 = Flame to FLW2 Additional information byte 1: Flame quality for FLW1
0xBD	0		ERROR_FLAME DETECTOR_NOT SWITCHED_INVERSE
0xBF	0		ERROR_SAFETY_CHAIN_NOT_POTENTIAL-FREE

Annual Maintenance & Testing

Line voltage wiring: Visually inspect all high voltage wiring for defects such as cracked and burnt wiring insulation, and verify wiring at all terminals is properly secured.

Ignition electrode: Visually inspect ignition electrode for signs of degradation and unusual deformation. The electrode should be in the same position as originally installed. Visually inspect all wiring to the electrode for defects such as cracked or burnt wiring insulation, and verify wiring at all terminals are properly secured.

Flame detector: When using a flame rod, visually inspect and verify that the rod is in the same position as originally installed. When using a UV scanner, remove dust or debris from the outside of the lense. It is recommended to replace the UV scanner after 10,000 hours of operation. Visually inspect all wiring to the electrode for defects such as cracked and burnt wiring insulation, and verify wiring at all terminals is properly secured.

Sequence of operation: Verify proper sequence of operation as detailed on page 15.

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