

**ControlBloc
Control and safety
combination with direct-
connected automatic
burner control
MPA 109x**

DUNGS®
Combustion Controls

1.16



Technical description

The ControlBloc is the combination of an EN 298 compliant, automatic gas burner control and an EN 126 compliant multiple actuator of the DUNGS GB 055 or GB 057 family.

Application

- Gas burners with/without fan
- Intermittant operation acc. to EN 298: 2003
- For gases acc. to EN 437 and other neutral gaseous media

Approvals

EU type test approval as per EU Gas Appliance Directive.

EC-87/05/014/M1

ControlBloc
Control and safety
combination with direct-
connected automatic
burner control
MPA 109x

DUNGS®
 Combustion Controls

1.16



Technical description

The ControlBloc is the combination of an EN 298 compliant, automatic gas burner control and an EN 126 compliant multiple actuator of the DUNGS GB 055 or GB 057 family.

Application

- Gas burners with/without fan
- Intermittant operation acc. to EN 298: 2003
- For gases acc. to EN 437 and other neutral gaseous media

Approvals

EU type test approval as per EU Gas Appliance Directive.

EC-87/05/014/M1

Variants of the GasBloc

Designation

Application

GB...	Net calorific value appliances, atmospheric, 1-stage, optionally available without pressure regulator
GB-M...	Net calorific value appliances, atmospheric, electrical modulating
GB-G...	Gross calorific value appliances, 1:1 gas/air mixture
GB-N...	Gross calorific value appliances, gas/air mixture with zero pressure control
GB-WND...	Gross calorific value appliances, integrated Whirlwind gas/air ratio control system

Control and safety combination ControlBloc

The ControlBloc comprises the multiple actuator GasBloc and the automatic gas burner control MPA 109x.

Multiple actuator GasBloc

Refer to the specified table for a summary of the main types of the GasBloc.

For details: see datasheet GB 055 and GB 057

Solenoid valves

Solenoid valves as per EN 161, class B.

DC coils, protected against voltage peaks.

Dirt trap device

Narrow-mesh sieve for protecting the fitting.

Pressure tap

At the inlet and outlet ends

Solenoid valve operating mode

V1 and V2 are activated separately. Ignition output is enabled, V1 opens. When the flame forms, the 'enable' signal is generated and V2 opens.

If the main burner is ignited directly, the MPA 109x activates the valves V1 and V2 simultaneously.

Automatic gas burner control MPA 109x

The MPA 109x is accommodated in a plastic housing which is specially designed for mounting to the GasBloc multiple actuator. The automatic gas burner control mounted on a pcb operates with state-of-the-art micro-processor technology. This enables complex program flows (e.g. several start attempts).

In addition, exact switching times are also ensured during voltage and temperature fluctuations or very short switching cycles.

On models without air monitor, ignition starts when the controller sends a heat request after a start-up waiting period and the pilot gas valve V1 opens.

On models with air monitor, the MPA 109x waits until the contact of the air pressure switch is open. Then the blower is switched on and after a waiting period, the air pressure switch opens. After the pre-purge time expires, the ignition switches on and pilot gas valve V1 is opened.

At the end of the start-up safety period (SZA), the ignition switches off. If a flame forms, the main gas valve V2 opens after the stabilising period (STZ) has expired.

On models T..., the pilot gas valve remains open during heat request.

On models M... for direct ignition of the main burner, both valves will be activated common. If no flame forms within the start-up safety period, the pilot gas valve closes and is locked in fault position and/or the programmed number of restarts is attempted. In case of flame failure during operation, all gas valves are switched off within the operating safety period (SZB). Depending on the model, they are locked in fault position, a restart is attempted.

In the case of power failure, the gas valves are closed. If a flame is signalled before fuel release, start-up is disabled, depending on the model as long as the flame signal exists or locks in fault position (non-volatile lockout).

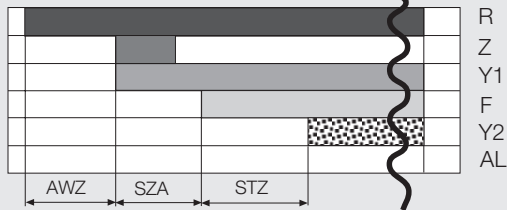
Fault unlock

Depending on the model, the MPA 109x is unlocked in case of fault via an external contact or by switching the power supply on and off.

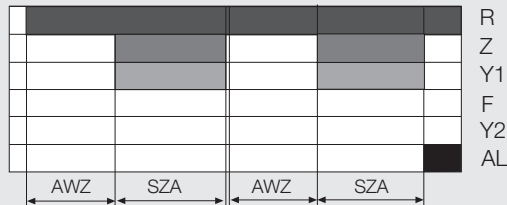
Program flow

Models without air monitor

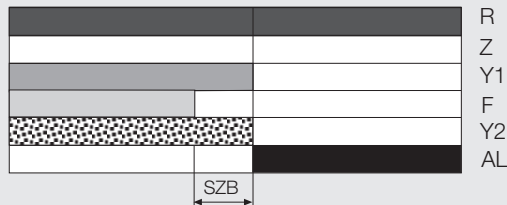
Start-up with flame formation



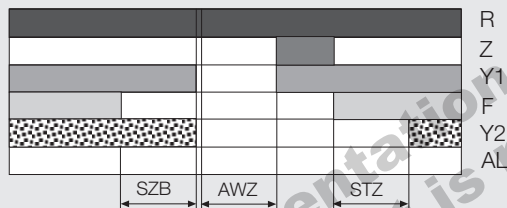
Start-up without flame formation (Example with 2 start-up attempts)



Flame failure without restart

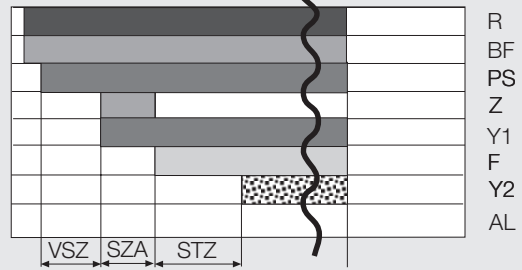


Flame failure with restart

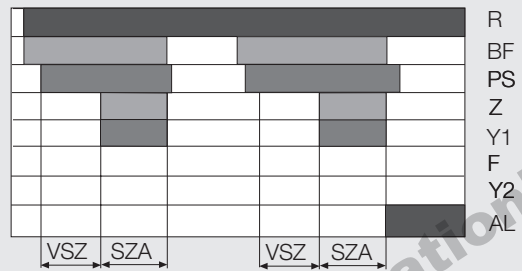


Models with air monitor

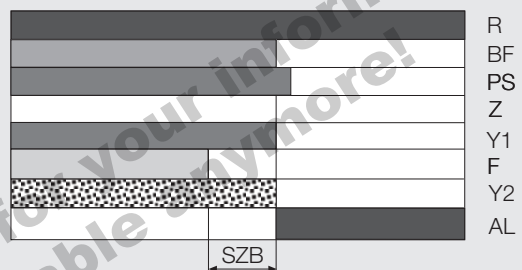
Start-up with flame formation



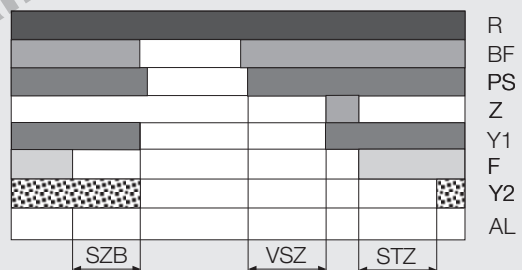
Start-up without flame formation (example with 2 start-up attempts)



Flame failure without restart



Flame failure with restart



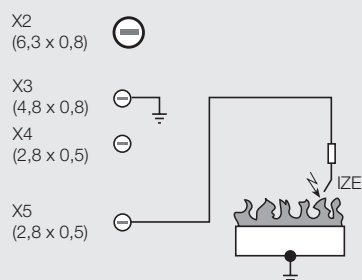
except models MCV, MCL, MLL

AL External fault display
AWZ Start-up waiting period
BF Blower motor
F Flame
IE Ionisation electrode
IZE Common ionisation and ignition electrode
PS Air pressure switch

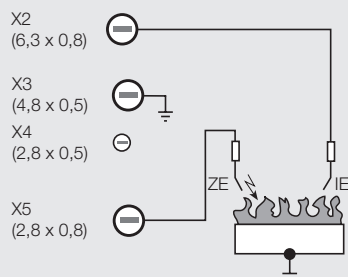
R Controller
RS Pushbutton for fault unlock
S Switch for ionisation current measurement
STZ Stabilising period
SZA Start-up safety period
SZB Operating safety period
VSZ Pre-purge time

V1 Pilot gas valve
V2 Main gas valve
Z Ignition
ZE Ignition electrode

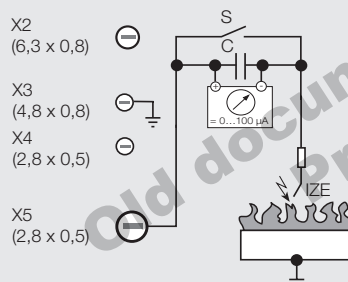
Terminal for single electrode mode



Terminal for double electrode mode



Ionisation current measurement in single electrode mode



Caution: To protect the measuring device, switch S must always remain closed during ignition phase. In the operating phase, the ionisation current is measured with switch S open. Alternatively, capacitor C (0,22 µF) can be used. Here, the current can also be measured in the ignition phase.

Legend: see page 3

Ionisation flame monitor

An ionisation electrode acts as a probe in the flame and the burner mouth normally as ground. Make sure that there is a proper flame friction at the burner mouth.

The burner mouth must be properly connected to PE to return the ionisation current. The insulation resistor of the ionisation electrode should be more than 50 MΩ.

Measuring the ionisation current

The intensity of the ionisation current can be measured using a DC microammeter. Current intensity in operation should not fall below 3 mA. The flame is cancelled when the ionisation current is below approx. 1 mA. For measurement, the microammeter is connected between the ionisation electrode and connector plug (for ionisation current measurement for single electrode mode, see below left).

Installation

The installation position of the automatic gas burner control is defined by the installation position of the valve.

Electrical connection

The electrical connection is performed using a 12-pin MOLEX connector. Perform wiring in accordance with the locally prevailing regulations and the wiring diagram.

Start-up

Before start-up, check whether all terminals are connected properly. During start-up, check the following safety functions:

- Switch off controllers, switches and limiters (if any)
- Switch off switching points of gas pressure switches (if any)
- Stop flame monitors and ionisation line and/or short circuit electrode with ground

Fuses

External fuses of automatic gas burner control using a back-up fuse (F1) 6.3 A slow-blow or 10 A quick-acting. Refer to the permissible switching capacities.

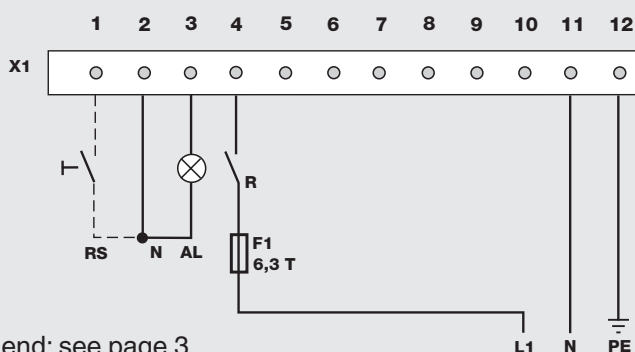


Check the safety function of the automatic gas burner control when a fuse is defective since a short-circuit may have welded the contacts.



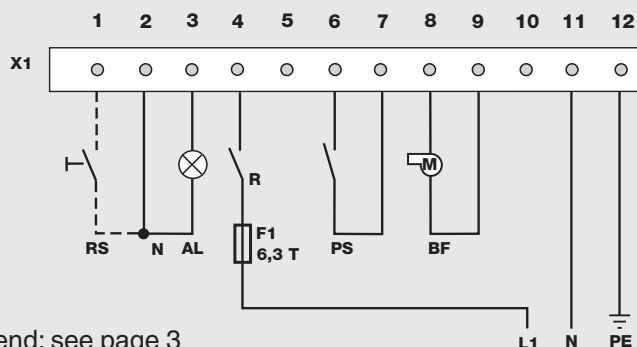
Failure to follow these instructions may result in danger to life and limb and to the equipment. Therefore, keep to the instructions. Improper handling of the electronic system will render the warranty for the control system null and void.

Wiring diagram for models without air monitor



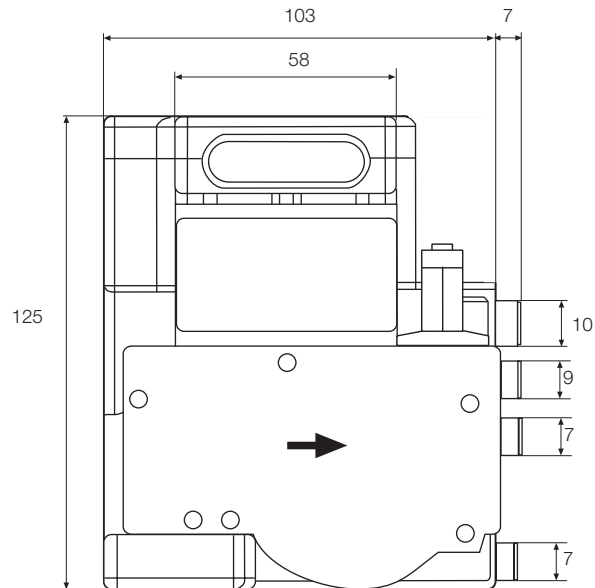
Legend: see page 3

Wiring diagram for models with air monitor

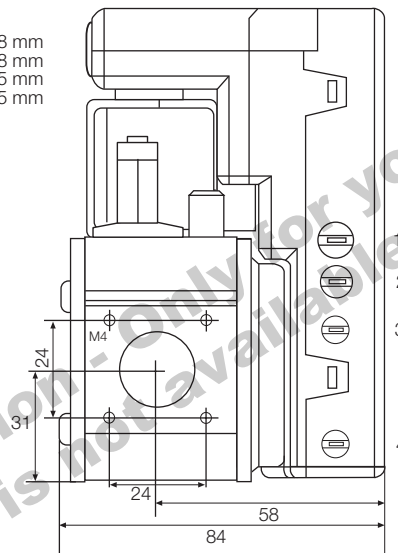


Legend: see page 3

**Dimensions in mm
with GB 055**



Flachstecker
1 6,3 x 0,8 mm
2 4,8 x 0,8 mm
3 2,8 x 0,5 mm
4 2,8 x 0,5 mm



**Technical Data
GasBloc 055**

Nominal width
Main gas connection

Flanges with tube threads

Max. inlet pressure
Ambient temperature
Automatic shut-off valves

Group

Gas governor

Degree of protection

Closing time

ON period

Voltage / frequency (coil)

Coil load (230 V)

Electrical connection

Optional specification

Installation position

DN 15

Rp 1/2 ISO 7/1

G 1/2 DIN ISO 228 (internal)

Rp 1/2 ISO 7/1

G 3/4 DIN ISO 228 (external)

65 mbar

0 °C up to +60 °C

class B as per EN 126

2

class C

IP 40

< 1 s

100 % ED

~(AC) 50 - 60 Hz 230 V +10 % -15 %

2 x 5.5 VA

connection for Molex System

gas failsafe device GW...A3, gas

pressure switch GW...A5

vertical – horizontal

ControlBloc
Control and safety combination
with direct-connected automatic
burner control
MPA 109x



Technical Data
MPA

Nominal voltage	~(AC) 230 V +/- 10 %
Frequency	50 Hz
Performance rating	< 25 VA
Internal fuse	3,15 A
Back-up fuse	max. 6.3 A slow-blow or 10 A quick-acting
Switching capacities:	
Blower motor	230 VAC / 1 A
Fault signal	230 VAC / 0,1 A
Flame monitor	Ionisation
Ionisation current/operation	> 3 mA
Switch-off sensitivity	< 1 mA
Short-circuit limitation	approx. 100 mA
Ionisation line length	max. 1 m
Ignition	Cyclical sparks
Ignition voltage	approx. 20 kV
Ignition frequency	approx. 15 Hz
Electrode distance	3-4 mm
Ignition line length	max. 1 m
Fault unlock	remote control
Fault display	external
Degree of protection	IP 40
Ambient temperature	0...60 °C
Connectivity	Molex KK3003 (12-pin)
Protective ground terminal	integrated
Weight	0.35 kg

Order data									Fault switch-off				
Type	Order No.	Classifica- tion as per EN 298	AWZ/ VSZ	SZA	SZB	STZ	NSZ*	Number of start attempts	not change- able	change- able.	Re-igni- tion	Restart	Air monitor
MPA1095 Mod. 5.1.0 TCL	250 869	ATCLXN	5 s	5 s	1 s	1 s	-	3	●			●	
MPA1094 Mod. 5.1.30 MCL	250 870	FMCLXN	30 s	5 s	1 s	1 s	20 s	3	●			●	●
Connecting cable 1m	249 707												
* post purge time after flame failure during operation additional types on request													

We reserve the right to make any changes in the interest of technical progress.

Head offices and factory
Karl Dungs GmbH & Co. KG
Siemensstraße 6-10
D-73660 Urbach, Germany
Telefon +49 (0)7181-804-0
Telefax +49 (0)7181-804-166

Postal address
Karl Dungs GmbH & Co. KG
Postfach 12 29
D-73602 Schorndorf, Germany
e-mail info@dungs.com
Internet www.dungs.com

Variants of the GasBloc

Designation

Application

GB...	Net calorific value appliances, atmospheric, 1-stage, optionally available without pressure regulator
GB-M...	Net calorific value appliances, atmospheric, electrical modulating
GB-G...	Gross calorific value appliances, 1:1 gas/air mixture
GB-N...	Gross calorific value appliances, gas/air mixture with zero pressure control
GB-WND...	Gross calorific value appliances, integrated Whirlwind gas/air ratio control system

Control and safety combination ControlBloc

The ControlBloc comprises the multiple actuator GasBloc and the automatic gas burner control MPA 109x.

Multiple actuator GasBloc

Refer to the specified table for a summary of the main types of the GasBloc.

For details: see datasheet GB 055 and GB 057

Solenoid valves

Solenoid valves as per EN 161, class B.

DC coils, protected against voltage peaks.

Dirt trap device

Narrow-mesh sieve for protecting the fitting.

Pressure tap

At the inlet and outlet ends

Solenoid valve operating mode

V1 and V2 are activated separately. Ignition output is enabled, V1 opens. When the flame forms, the 'enable' signal is generated and V2 opens.

If the main burner is ignited directly, the MPA 109x activates the valves V1 and V2 simultaneously.

Automatic gas burner control MPA 109x

The MPA 109x is accommodated in a plastic housing which is specially designed for mounting to the GasBloc multiple actuator. The automatic gas burner control mounted on a pcb operates with state-of-the-art micro-processor technology. This enables complex program flows (e.g. several start attempts).

In addition, exact switching times are also ensured during voltage and temperature fluctuations or very short switching cycles.

On models without air monitor, ignition starts when the controller sends a heat request after a start-up waiting period and the pilot gas valve V1 opens.

On models with air monitor, the MPA 109x waits until the contact of the air pressure switch is open. Then the blower is switched on and after a waiting period, the air pressure switch opens. After the pre-purge time expires, the ignition switches on and pilot gas valve V1 is opened.

At the end of the start-up safety period (SZA), the ignition switches off. If a flame forms, the main gas valve V2 opens after the stabilising period (STZ) has expired.

On models T..., the pilot gas valve remains open during heat request.

On models M... for direct ignition of the main burner, both valves will be activated common. If no flame forms within the start-up safety period, the pilot gas valve closes and is locked in fault position and/or the programmed number of restarts is attempted. In case of flame failure during operation, all gas valves are switched off within the operating safety period (SZB). Depending on the model, they are locked in fault position, a restart is attempted.

In the case of power failure, the gas valves are closed. If a flame is signalled before fuel release, start-up is disabled, depending on the model as long as the flame signal exists or locks in fault position (non-volatile lockout).

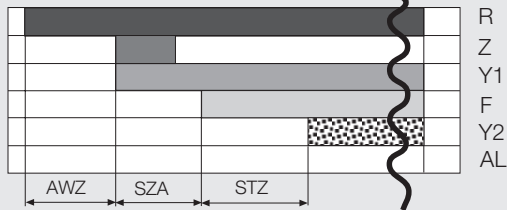
Fault unlock

Depending on the model, the MPA 109x is unlocked in case of fault via an external contact or by switching the power supply on and off.

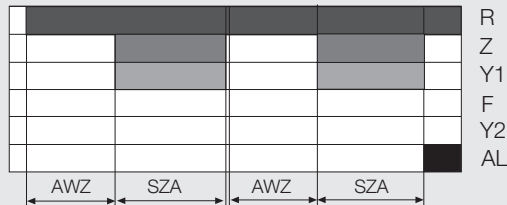
Program flow

Models without air monitor

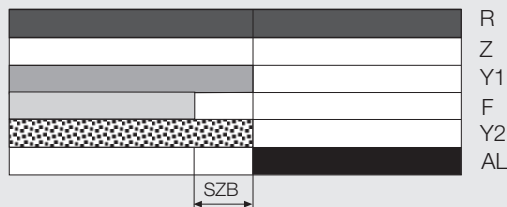
Start-up with flame formation



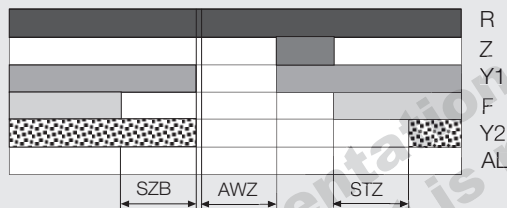
Start-up without flame formation (Example with 2 start-up attempts)



Flame failure without restart

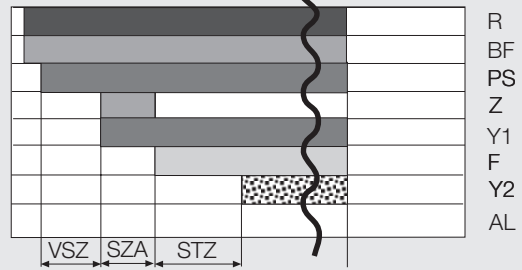


Flame failure with restart

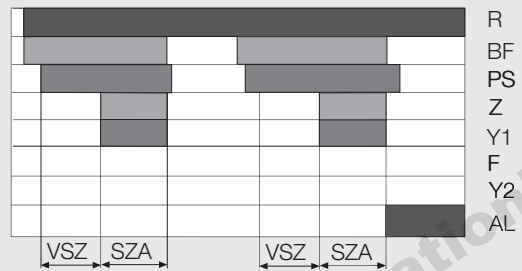


Models with air monitor

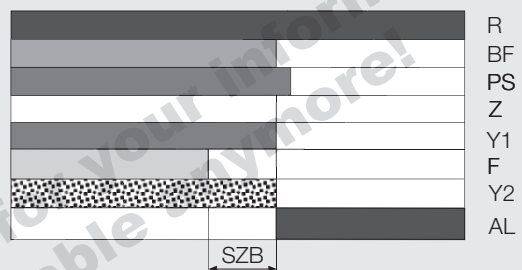
Start-up with flame formation



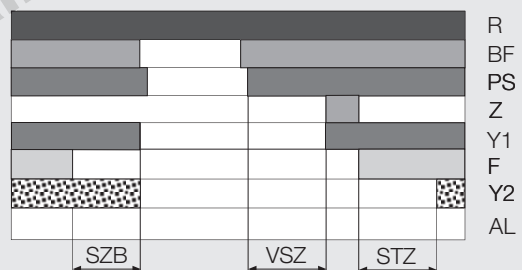
Start-up without flame formation (example with 2 start-up attempts)



Flame failure without restart



Flame failure with restart



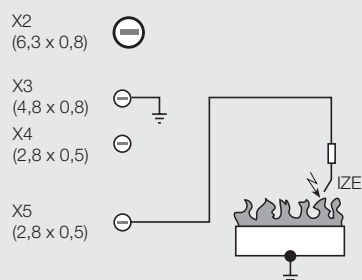
 except models MCV, MCL, MLL

AL External fault display
AWZ Start-up waiting period
BF Blower motor
F Flame
IE Ionisation electrode
IZE Common ionisation and ignition electrode
PS Air pressure switch

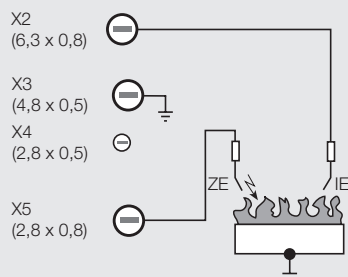
R Controller
RS Pushbutton for fault unlock
S Switch for ionisation current measurement
STZ Stabilising period
SZA Start-up safety period
SZB Operating safety period
VSZ Pre-purge time

V1 Pilot gas valve
V2 Main gas valve
Z Ignition
ZE Ignition electrode

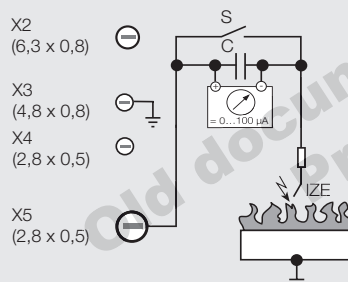
Terminal for single electrode mode



Terminal for double electrode mode



Ionisation current measurement in single electrode mode



Caution: To protect the measuring device, switch S must always remain closed during ignition phase. In the operating phase, the ionisation current is measured with switch S open. Alternatively, capacitor C (0,22 µF) can be used. Here, the current can also be measured in the ignition phase.

Legend: see page 3

Ionisation flame monitor

An ionisation electrode acts as a probe in the flame and the burner mouth normally as ground. Make sure that there is a proper flame friction at the burner mouth.

The burner mouth must be properly connected to PE to return the ionisation current. The insulation resistor of the ionisation electrode should be more than 50 MΩ.

Measuring the ionisation current

The intensity of the ionisation current can be measured using a DC microammeter. Current intensity in operation should not fall below 3 mA. The flame is cancelled when the ionisation current is below approx. 1 mA. For measurement, the microammeter is connected between the ionisation electrode and connector plug (for ionisation current measurement for single electrode mode, see below left).

Installation

The installation position of the automatic gas burner control is defined by the installation position of the valve.

Electrical connection

The electrical connection is performed using a 12-pin MOLEX connector. Perform wiring in accordance with the locally prevailing regulations and the wiring diagram.

Start-up

Before start-up, check whether all terminals are connected properly. During start-up, check the following safety functions:

- Switch off controllers, switches and limiters (if any)
- Switch off switching points of gas pressure switches (if any)
- Stop flame monitors and ionisation line and/or short circuit electrode with ground

Fuses

External fuses of automatic gas burner control using a back-up fuse (F1) 6.3 A slow-blow or 10 A quick-acting. Refer to the permissible switching capacities.

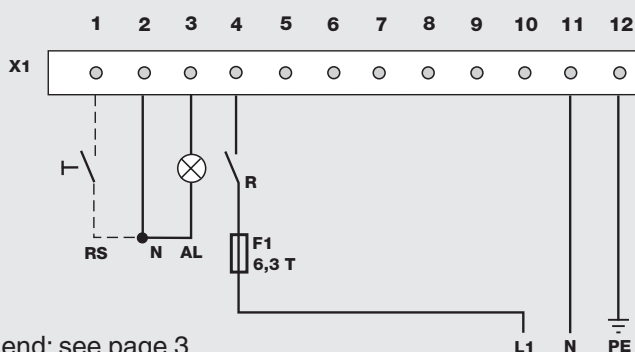


Check the safety function of the automatic gas burner control when a fuse is defective since a short-circuit may have welded the contacts.



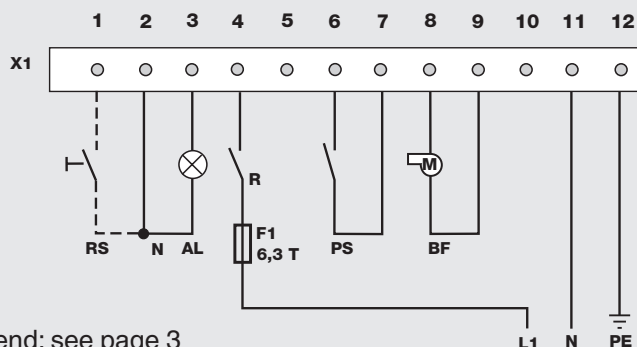
Failure to follow these instructions may result in danger to life and limb and to the equipment. Therefore, keep to the instructions. Improper handling of the electronic system will render the warranty for the control system null and void.

Wiring diagram for models without air monitor



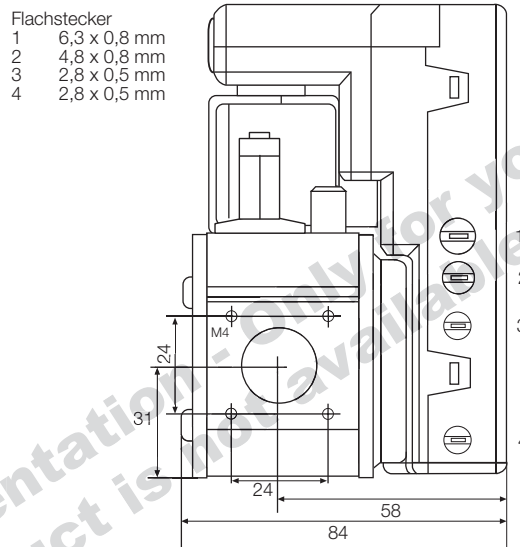
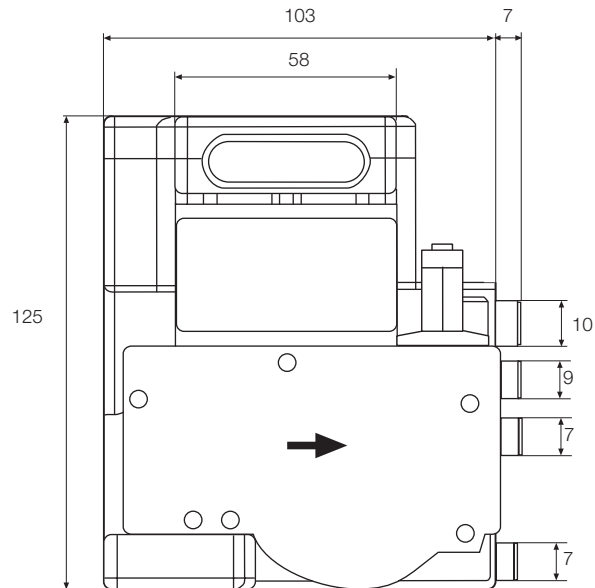
Legend: see page 3

Wiring diagram for models with air monitor



Legend: see page 3

**Dimensions in mm
with GB 055**



**Technical Data
GasBloc 055**

Nominal width	DN 15
Main gas connection	Rp 1/2 ISO 7/1 G 1/2 DIN ISO 228 (internal)
Flanges with tube threads	Rp 1/2 ISO 7/1 G 3/4 DIN ISO 228 (external)
Max. inlet pressure	65 mbar
Ambient temperature	0 °C up to +60 °C
Automatic shut-off valves	class B as per EN 126
Group	2
Gas governor	class C
Degree of protection	IP 40
Closing time	< 1 s
ON period	100 % ED
Voltage / frequency (coil)	~(AC) 50 - 60 Hz 230 V +10 % -15 %
Coil load (230 V)	2 x 5.5 VA
Electrical connection	connection for Molex System
Optional specification	gas failsafe device GW...A3, gas pressure switch GW...A5
Installation position	vertical – horizontal

ControlBloc
Control and safety combination
with direct-connected automatic
burner control
MPA 109x



Technical Data
MPA

Nominal voltage	~(AC) 230 V +/- 10 %
Frequency	50 Hz
Performance rating	< 25 VA
Internal fuse	3,15 A
Back-up fuse	max. 6.3 A slow-blow or 10 A quick-acting
Switching capacities:	
Blower motor	230 VAC / 1 A
Fault signal	230 VAC / 0,1 A
Flame monitor	Ionisation
Ionisation current/operation	> 3 mA
Switch-off sensitivity	< 1 mA
Short-circuit limitation	approx. 100 mA
Ionisation line length	max. 1 m
Ignition	Cyclical sparks
Ignition voltage	approx. 20 kV
Ignition frequency	approx. 15 Hz
Electrode distance	3-4 mm
Ignition line length	max. 1 m
Fault unlock	remote control
Fault display	external
Degree of protection	IP 40
Ambient temperature	0...60 °C
Connectivity	Molex KK3003 (12-pin)
Protective ground terminal	integrated
Weight	0.35 kg

Order data		Fault switch-off											
Type	Order No.	Classifica- tion as per EN 298	AWZ/ VSZ	SZA	SZB	STZ	NSZ*	Number of start attempts	not change- able	change- able.	Re-igni- tion	Restart	Air monitor
MPA1095 Mod. 5.1.0 TCL	250 869	ATCLXN	5 s	5 s	1 s	1 s	-	3	●			●	
MPA1094 Mod. 5.1.30 MCL	250 870	FMCLXN	30 s	5 s	1 s	1 s	20 s	3	●			●	●
Connecting cable 1m	249 707												
* post purge time after flame failure during operation additional types on request													

We reserve the right to make any changes in the interest of technical progress.

Head offices and factory
Karl Dungs GmbH & Co. KG
Siemensstraße 6-10
D-73660 Urbach, Germany
Telefon +49 (0)7181-804-0
Telefax +49 (0)7181-804-166

Postal address
Karl Dungs GmbH & Co. KG
Postfach 12 29
D-73602 Schorndorf, Germany
e-mail info@dungs.com
Internet www.dungs.com