

**Automatic gas burner
controller for gas
burners with or without
fan
MPA 101x**

DUNGS®
Combustion Controls

1.10



Technical description

The MPA 101x is an automatic gas burner controller and has the following features:

- Ionisation flame monitor
- Integrated cyclic spark ignition, or external ignition
- Pilot gas valve
- Main gas valve
- Ignition and flame monitoring with common electrode or with separate ignition and ionisation electrodes
- A restart is attempted after loss of flame during operation (depending on model)
- Adjustable fault shutdown
- Non-volatile lock-out

Application

- Gas burners with/without fan
- Intermittant operation acc. to EN 298: 2003

Approval

EU type test approval as per EU Gas Appliance Directive:

EC-87/05/013/M1

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- Intermittant operation acc. to EN 298: 2003

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EU type test approval as per EU Gas Appliance Directive:

EC-87/05/013/M1

Automatic gas burner controller MPA 101x

The MPA 101x is installed in a plastic housing with RAST5 terminals. Assembled on a single PCB, the automatic gas burner controller uses electronic timers, which ensures exact operating times, even in the case of extreme voltage and temperature fluctuation or very short operating cycles.

The MPA 101x comprises:

- the program control module,
- the flame monitor which operates according to the ionisation principle,
- the ignition electronics and the integrated ignition coil (depending on model).

Models without air monitor: When the controller signals that heat is required, the ignition is activated after a start-up delay period and the pilot gas solenoid valve is opened.

Models with air monitor: The MPA 101x waits until the contact of the air pressure monitor is open. Then the blower is switched on, the system waits until the air pressure monitor responds.

At the end of the pre-purge time, the ignition is started and the pilot gas valve is opened.

The ignition is switched off when the pilot flame signal is generated. At the end of the ignition safety time (SZA), the main gas valve is opened if the flame is lit.

If a flame is not formed during the ignition safety time, depending on the model

- up to 4 restart attempts

- a complete recycling

or

- the control interlocks in the fault stage

If a loss of flame occurs during operation, all gas solenoid valves are switched off during the extinction safety time (SZB).

The MPA 101x is then interlocked in the fault state, or an attempt to restart the burner is made.

In the case of a normal shut-down, the gas valves are closed. If the flame signal is simulated before fuel feed is enabled, start-up is disabled for as long as the flame signal is applied.

Fault unlock

The MPA 101x Mod. ..L must be unlocked via an external contact.

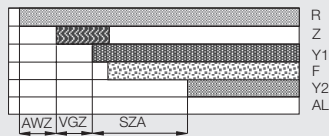
MPA 101x Mod. ..V-models with adjustable fault unlocking device can be unlocked by shutting down the heat requirement or with an external contact.

Order date Type	Order no	Specifica- tions-No.	Classifica- tion as per EN 298	Fan	Air monito- ring	Start up delay period	Prepur- ing time
MPA 1012 Mod. 5.1.0 TCL	250 867	54110120	ATCLXN	-	-	5 s	-
MPA 1015 Mod. 5.1.30 TCL	250 868	54110060	FTCLXN	●	●	-	30 s

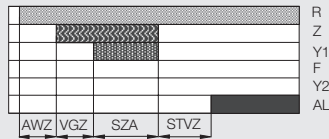
AWZ Start-up delay period
 BF Blower motor
 F Flame
 PS Air pressure switch
 R Controller
 AL Fault indication
 STVZ Fault interlock time
 SZA Ignition safety time
 SZB Extinction safety time
 VSZ Pre-purge time
 Y1 Pilot gas valve
 Y2 Main gas valve
 Z Ignition

Program flow for models without air monitoring

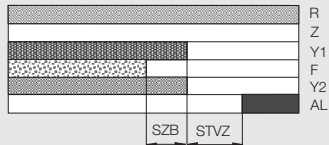
Startup with flame formation



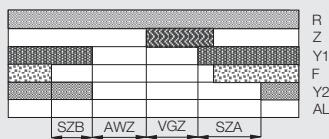
Startup without flame formation



Flame failure without recycling (Mod. TLL)

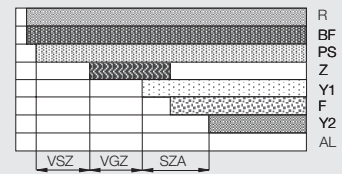


Flame failure with recycling (Mod. TLL)

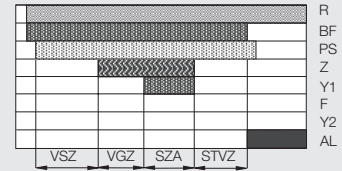


Program flow for models with air monitoring

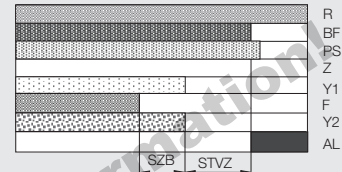
Startup with flame formation



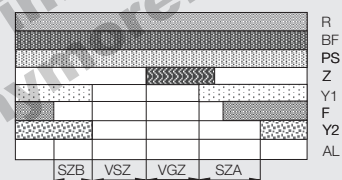
Startup without flame formation



Startup without flame formation (Mod. TLL)

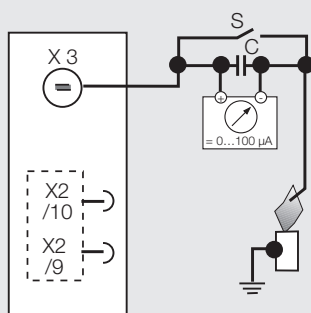


Startup without flame formation (Mod. TCL)



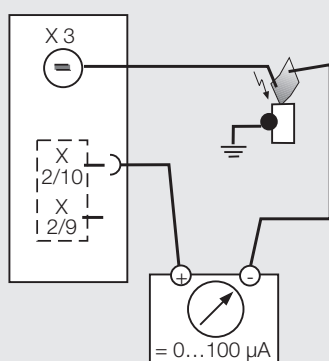
Prepurge time after flame failure	Ignition Attempts	Safety time Start up	Safety time Operating	Restart	External ignition	RAST 5 connector set
-	3	5 s	1 s	●	—	226 936
20 s	3	5 s	1 s	●	-	226 934

Measuring instrument connection for models with integrated ignition (single probe)



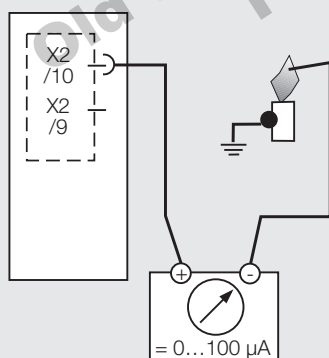
1) cf. Measuring the ionisation current

Measuring instrument connection for models with integrated ignition (dual probe)



2) cf. Ionisation flame monitoring

Measuring instrument connection for models with external ignition



Ionisation flame monitoring

An ionisation electrode serves as a flame probe, and the burner head usually serves as the earth. Pay attention to good flame contact at the burner head.

The burner head must be securely connected to PE to feed back the ionisation current.

The insulation resistance of the ionisation electrode should exceed 50 MΩ.

- Switch off controllers, monitoring devices and limiters (if any)
- Switching points of gas pressure switch (if any)
- Disconnect flame monitor and ionisation line or short-circuit the electrode to earth.

Fuses

Protect the automatic gas burner controller externally using a 6.3A slow-blow back-up fuse or a 10A quick-acting fuse. Pay attention to the permissible switching capacities.



If a fuse is faulty, the safety of the automatic gas burner controller must be checked, as there is a risk of contact welding due to a short circuit.



The effects of leak search spray and similar substances may cause dangerous flame-simulating conditions on ionisation electrodes and conductors, e.g. ionisation ammeters. Therefore please handle leak search sprays and similar substances with extreme care so that they are only applied to the leak test points. If it is not possible to limit the use of these substances, ionisation electrodes and conductors must be protected before applying the substances. It is not sufficient to merely wipe off the leak search spray substance after application.

Measuring the ionisation current

The intensity of the ionisation current can be measured with a DC current micro-ammeter. The current intensity should not be less than 3 µA in operation. A fault cut-off occurs if the ionisation current drops below approx. 1 µA.

To measure the ionisation current, connect the micro-ammeter between the ionisation electrode and the connector (see drawing for connection of the measuring instrument).

Installation

The automatic gas burner controller can be installed in any position.

Connection to power supply

Use RAST5 connectors to connect the burner to the power supply (see specifications). Wiring must be carried out in compliance with the prevailing local regulations and as shown in the wiring diagram.

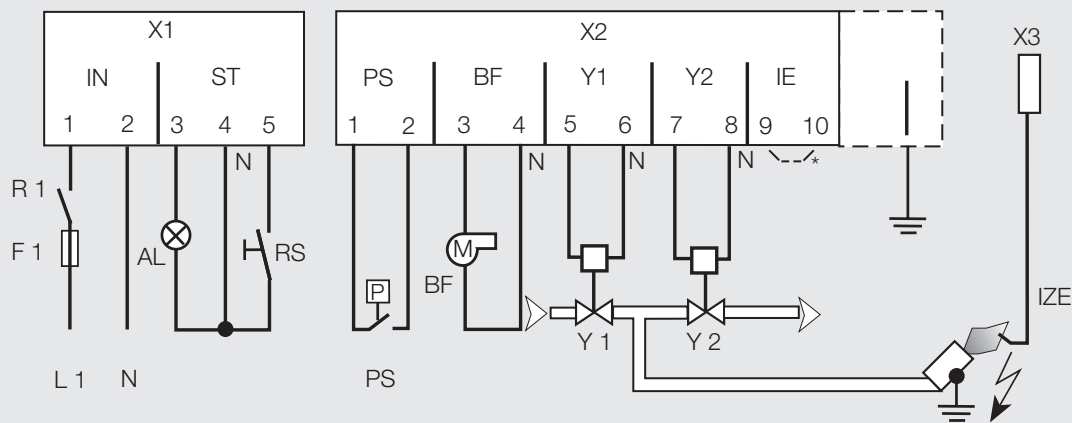
Commissioning

Before starting up the burner controller, check that all terminals are properly connected. When commissioning the controller, check the following safety functions:

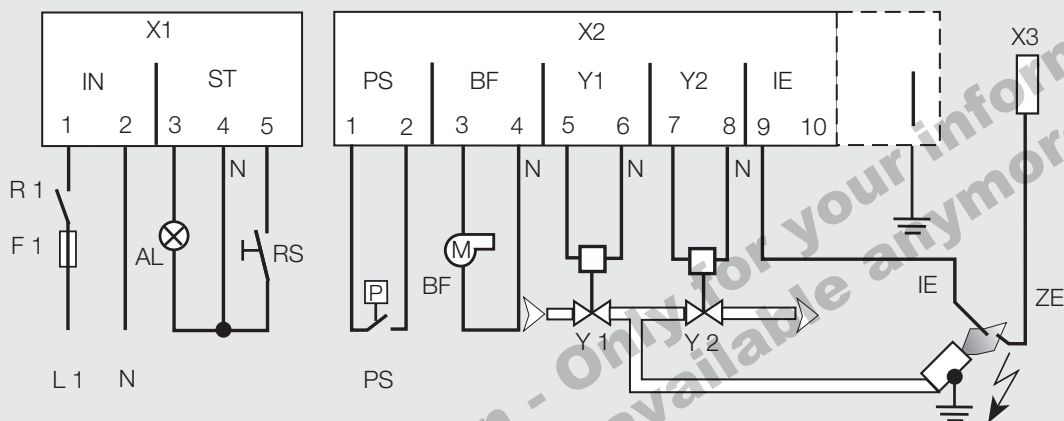


Ignoring the installation and operating instructions may result in injury to life and limb or damage to property. Compliance with the applicable instructions is therefore imperative. Unauthorised tampering with the electronics will render the warranty for this equipment null and void.

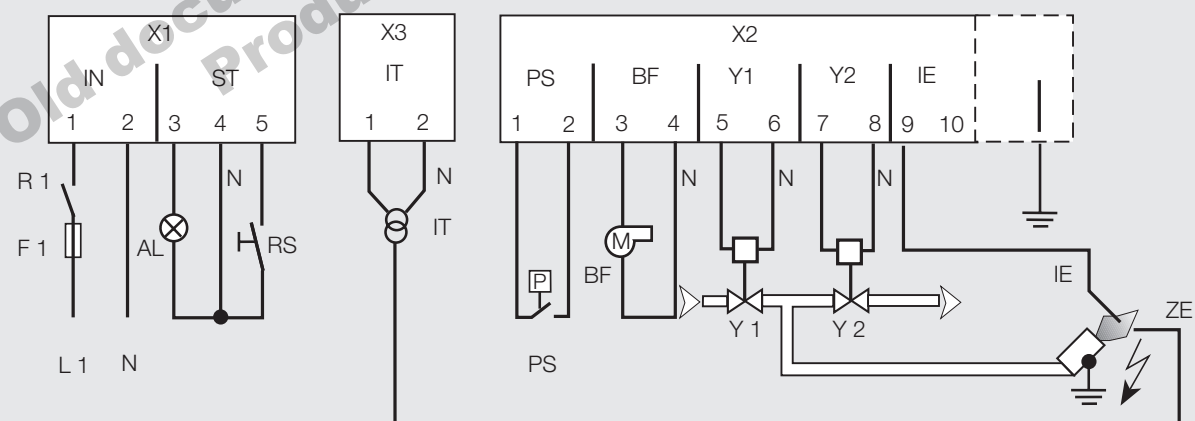
Terminal diagram for models with integrated ignition, single probe



Terminal diagram for models with integrated ignition, dual probe



Terminal diagram for models with external ignition



AL External fault indication
BF Blower motor
F1 Back-up fuse, max. 6.3 A, slow-blow
IE Ionisation electrode

IT Ignition transformer
IZE Ionisation and ignition electrode
PS Air pressure switch
R Controller
RS Remote unlock

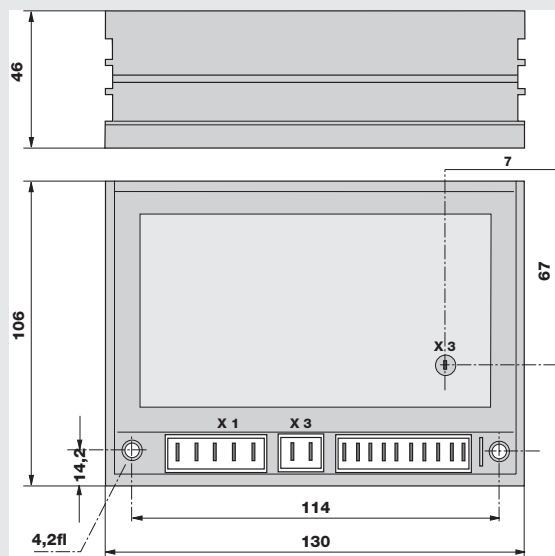
X1...X3 Terminal designation
Y1 Pilot gas solenoid valve
Y2 Main gas valve
ZE Ignition electrode

* MPA 10... versions for single/double electrode detection: IE 9 and 10 has to be connected

**Automatic gas burner controller for
gas burners with and without fan
MPA 101x**



Dimensions



MPA 101x Table of connectors

Function	Slot No.	No. of poles	Code Connector No.
Pilot gas valve	Y1	02	... ¹⁾ 02 K51
Main gas valve	Y2	02	... ¹⁾ 02 K53
Blower motor	BF	02	... ¹⁾ 02 K49
Power supply	IN	02	... ¹⁾ 02 K51
Ion. measuring connection	IE	02	... ¹⁾ 02 K50
Air pressure switch	PS	02	... ¹⁾ 02 K12
High-voltage connection	X3	01	Fast-On 2,8 x 0,8 mm
External fault display/ unlock	ST	03	... ¹⁾ 03 K66
Ignition transformer	IT	02	... ¹⁾ 02 K44

1) Lumberg: Insulation displacement terminal 3623.../
screw-type terminal 3611...

Specifications

Nominal voltage ~ (AC) 230 V -15% +10 %
Frequency 50 Hz
Power consumption approx. 5 VA
Internal strip conductor fuse 2A, non-interchangeable
Back-up fuse max. 6,3 A slow-blow/
10 A quick-acting

Switching capacities:
Ignition

230 VAC/1 A (only for models with external ignition)

Ignition gas valve

230 VAC/1 A

Main gas valve

230 VAC/1 A

Overall switching capacity

max. 2 A

Blower motor

230 VAC/2 A

Flame monitor

ionisation

Ionisation current/operation

> 3 µA

Switch-off sensitivity

< 1 µA

Models with integrated ignition

Ignition

cycle sparks

Ignition voltage

approx. 20 kV

Ignition frequency

approx. 15 Hz

Distance between electrodes

3 mm to 4 mm

Ignition wire length

max. 1 m

Fault remote unlock

Remote unlock

Degree of protection

IP 20 - IP 40 must be ensured by installation

Ambient temperature

0 °C to 60 °C

Connection

RAST5, encoded

PE connection

separate

Weight

0.35 kg

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e-mail info@dungs.com
Internet www.dungs.com

Automatic gas burner controller MPA 101x

The MPA 101x is installed in a plastic housing with RAST5 terminals. Assembled on a single PCB, the automatic gas burner controller uses electronic timers, which ensures exact operating times, even in the case of extreme voltage and temperature fluctuation or very short operating cycles.

The MPA 101x comprises:

- the program control module,
- the flame monitor which operates according to the ionisation principle,
- the ignition electronics and the integrated ignition coil (depending on model).

Models without air monitor: When the controller signals that heat is required, the ignition is activated after a start-up delay period and the pilot gas solenoid valve is opened.

Models with air monitor: The MPA 101x waits until the contact of the air pressure monitor is open. Then the blower is switched on, the system waits until the air pressure monitor responds.

At the end of the pre-purge time, the ignition is started and the pilot gas valve is opened.

The ignition is switched off when the pilot flame signal is generated. At the end of the ignition safety time (SZA), the main gas valve is opened if the flame is lit.

If a flame is not formed during the ignition safety time, depending on the model

- up to 4 restart attempts

- a complete recycling

or

- the control interlocks in the fault stage

If a loss of flame occurs during operation, all gas solenoid valves are switched off during the extinction safety time (SZB).

The MPA 101x is then interlocked in the fault state, or an attempt to restart the burner is made.

In the case of a normal shut-down, the gas valves are closed. If the flame signal is simulated before fuel feed is enabled, start-up is disabled for as long as the flame signal is applied.

Fault unlock

The MPA 101x Mod. ..L must be unlocked via an external contact.

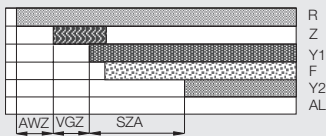
MPA 101x Mod. ..V-models with adjustable fault unlocking device can be unlocked by shutting down the heat requirement or with an external contact.

Order date Type	Order no	Specifica- tions-No.	Classifica- tion as per EN 298	Fan	Air monito- ring	Start up delay period	Prepur- ing time
MPA 1012 Mod. 5.1.0 TCL	250 867	54110120	ATCLXN	-	-	5 s	-
MPA 1015 Mod. 5.1.30 TCL	250 868	54110060	FTCLXN	●	●	-	30 s

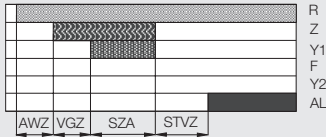
AWZ Start-up delay period
 BF Blower motor
 F Flame
 PS Air pressure switch
 R Controller
 AL Fault indication
 STVZ Fault interlock time
 SZA Ignition safety time
 SZB Extinction safety time
 VSZ Pre-purge time
 Y1 Pilot gas valve
 Y2 Main gas valve
 Z Ignition

Program flow for models without air monitoring

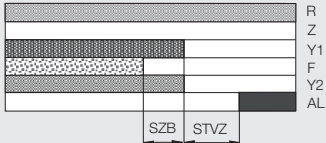
Startup with flame formation



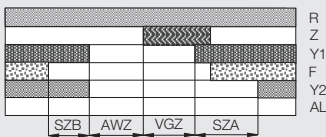
Startup without flame formation



Flame failure without recycling (Mod. TLL)

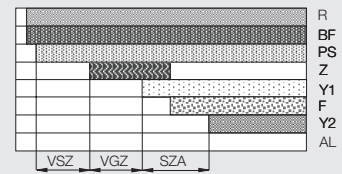


Flame failure with recycling (Mod. TLL)

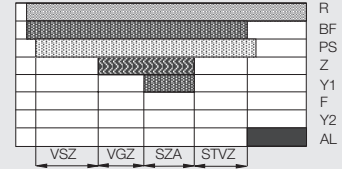


Program flow for models with air monitoring

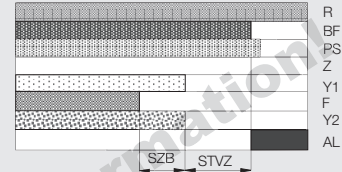
Startup with flame formation



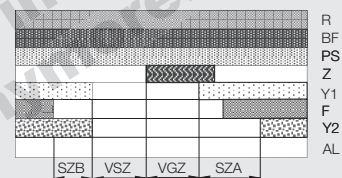
Startup without flame formation



Startup without flame formation (Mod. TLL)

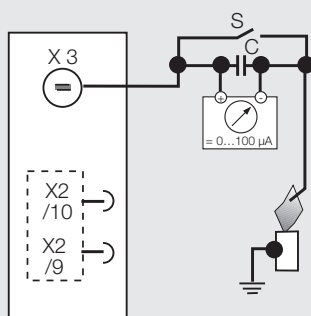


Startup without flame formation (Mod. TCL)



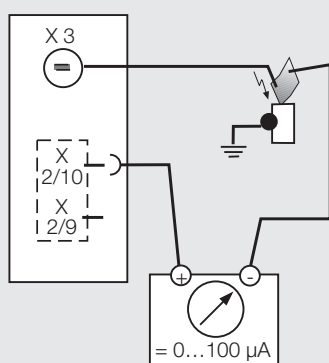
Prepurge time after flame failure	Ignition Attempts	Safety time Start up	Safety time Operating	Restart	External ignition	RAST 5 connector set
-	3	5 s	1 s	●	—	226 936
20 s	3	5 s	1 s	●	-	226 934

Measuring instrument connection for models with integrated ignition (single probe)



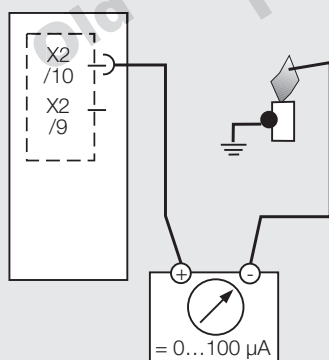
1) cf. Measuring the ionisation current

Measuring instrument connection for models with integrated ignition (dual probe)



2) cf. Ionisation flame monitoring

Measuring instrument connection for models with external ignition



Ionisation flame monitoring

An ionisation electrode serves as a flame probe, and the burner head usually serves as the earth. Pay attention to good flame contact at the burner head.

The burner head must be securely connected to PE to feed back the ionisation current.

The insulation resistance of the ionisation electrode should exceed 50 MΩ.

- Switch off controllers, monitoring devices and limiters (if any)
- Switching points of gas pressure switch (if any)
- Disconnect flame monitor and ionisation line or short-circuit the electrode to earth.

Fuses

Protect the automatic gas burner controller externally using a 6.3A slow-blow back-up fuse or a 10A quick-acting fuse. Pay attention to the permissible switching capacities.



If a fuse is faulty, the safety of the automatic gas burner controller must be checked, as there is a risk of contact welding due to a short circuit.



The effects of leak search spray and similar substances may cause dangerous flame-simulating conditions on ionisation electrodes and conductors, e.g. ionisation ammeters. Therefore please handle leak search sprays and similar substances with extreme care so that they are only applied to the leak test points. If it is not possible to limit the use of these substances, ionisation electrodes and conductors must be protected before applying the substances. It is not sufficient to merely wipe off the leak search spray substance after application.

Measuring the ionisation current

The intensity of the ionisation current can be measured with a DC current micro-ammeter. The current intensity should not be less than 3 µA in operation. A fault cut-off occurs if the ionisation current drops below approx. 1 µA.

To measure the ionisation current, connect the micro-ammeter between the ionisation electrode and the connector (see drawing for connection of the measuring instrument).

Installation

The automatic gas burner controller can be installed in any position.

Connection to power supply

Use RAST5 connectors to connect the burner to the power supply (see specifications). Wiring must be carried out in compliance with the prevailing local regulations and as shown in the wiring diagram.

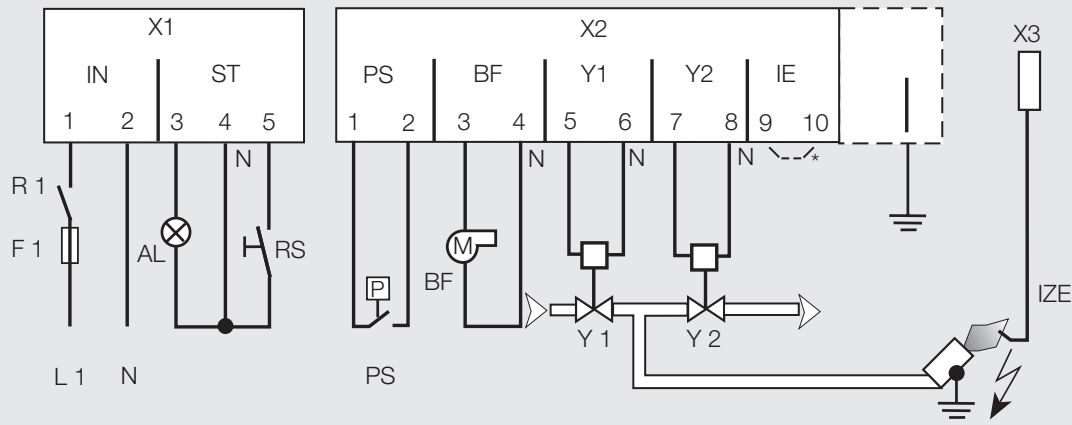
Commissioning

Before starting up the burner controller, check that all terminals are properly connected. When commissioning the controller, check the following safety functions:

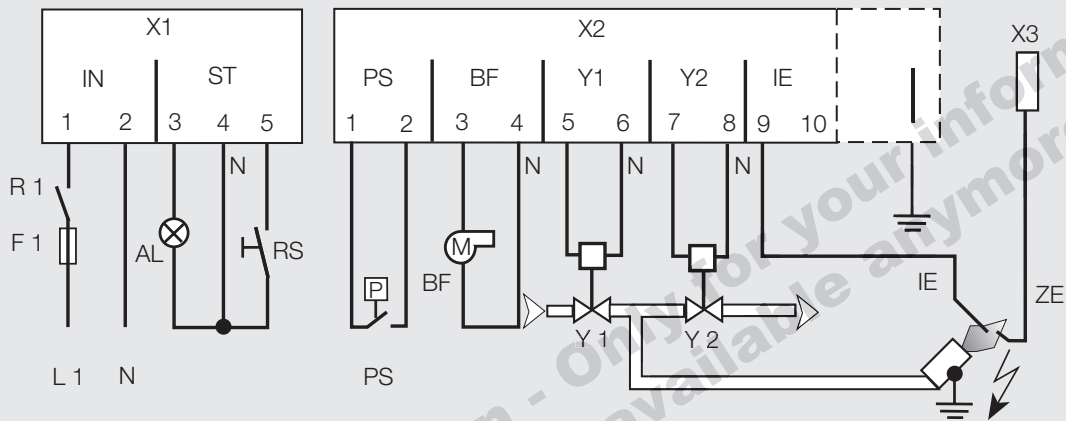


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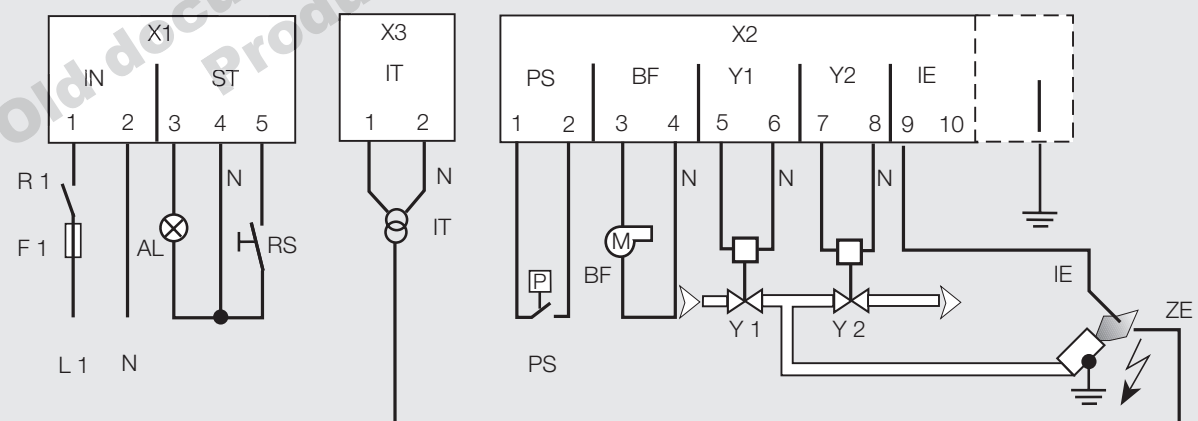
Terminal diagram for models with integrated ignition, single probe



Terminal diagram for models with integrated ignition, dual probe



Terminal diagram for models with external ignition



AL External fault indication
BF Blower motor
F1 Back-up fuse, max. 6.3 A, slow-blow
IE Ionisation electrode

IT Ignition transformer
IZE Ionisation and ignition electrode
PS Air pressure switch
R Controller
RS Remote unlock

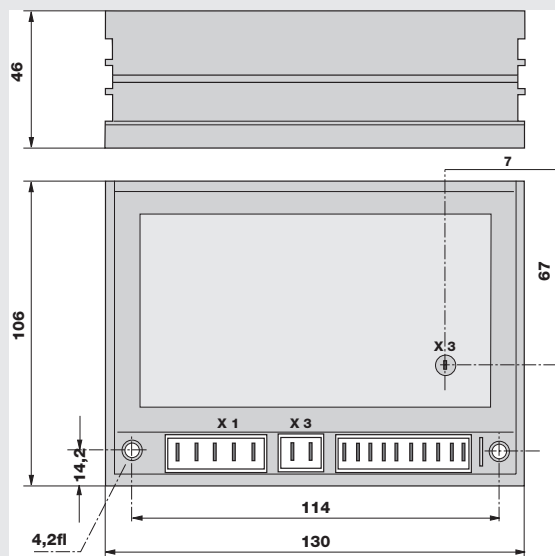
X1...X3 Terminal designation
Y1 Pilot gas solenoid valve
Y2 Main gas valve
ZE Ignition electrode

* MPA 10... versions for single/double electrode detection: IE 9 and 10 has to be connected

**Automatic gas burner controller for
gas burners with and without fan
MPA 101x**

DUNGS®
Combustion Controls

Dimensions



Specifications

Nominal voltage ~ (AC) 230 V -15% +10 %
Frequency 50 Hz
Power consumption approx. 5 VA
Internal strip conductor fuse 2A, non-interchangeable
Back-up fuse max. 6,3 A slow-blow/
10 A quick-acting

Switching capacities:
Ignition

230 VAC/1 A (only for models with external ignition)

Ignition gas valve

230 VAC/1 A

Main gas valve

230 VAC/1 A

Overall switching capacity

max. 2 A

Blower motor

230 VAC/2 A

Flame monitor

ionisation

Ionisation current/operation

> 3 µA

Switch-off sensitivity

< 1 µA

Models with integrated ignition

Ignition

cycle sparks

Ignition voltage

approx. 20 kV

Ignition frequency

approx. 15 Hz

Distance between electrodes

3 mm to 4 mm

Ignition wire length

max. 1 m

Fault remote unlock

Remote unlock

Degree of protection

IP 20 - IP 40 must be ensured by installation

Ambient temperature

0 °C to 60 °C

Connection

RAST5, encoded

PE connection

separate

Weight

0.35 kg

MPA 101x Table of connectors

Function	Slot No.	No. of poles	Code Connector No.
Pilot gas valve	Y1	02	... ¹⁾ 02 K51
Main gas valve	Y2	02	... ¹⁾ 02 K53
Blower motor	BF	02	... ¹⁾ 02 K49
Power supply	IN	02	... ¹⁾ 02 K51
Ion. measuring connection	IE	02	... ¹⁾ 02 K50
Air pressure switch	PS	02	... ¹⁾ 02 K12
High-voltage connection	X3	01	Fast-On 2,8 x 0,8 mm
External fault display/ unlock	ST	03	... ¹⁾ 03 K66
Ignition transformer	IT	02	... ¹⁾ 02 K44

1) Lumberg: Insulation displacement terminal 3623.../
screw-type terminal 3611...

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

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