

Automatic gas burner controller for gas burners with or without fan DGAi. 73

DUNGS®
Combustion Controls

1.31



Technical description

The DGAi.73 is an automatic gas burner controller and has the following features:

- Ionisation flame monitor
- Program flow control by electronic timers
- Integrated cyclic spark ignition, glow 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

Depending on the model, the DGAi.73 automatic gas burner controller is designed for igniting and monitoring gas burners with or without fan and is suitable for intermittent operation. It conforms to EN 298.

For application in extended temperature range (-20 °C to +60 °C):

DGAi.73 Mod. WLE...

Approval

EU type test approval as per EU Gas Appliance Directive:

DGAi. 73 CE-0085 AT 0063

EU type test approval as per EU Pressure Equipment Directive:

DGAi. 73 CE0036

Automatic gas burner controller DGA1.73

The DGA1.73 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.

DGA1.73 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, if necessary after the glow time (VGZ).

Models with air monitor: The DGA1.73 waits until the contact of the air pressure monitor is open. Then the blower is switched on, and 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, if necessary after the glow time (VGZ).

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 the ignition flame goes out during the ignition safety time, the ignition is immediately re-activated in the TLL models. In the TCL models, a new attempt is made to start up the burner.

If a flame is not formed during the ignition safety time, the ignition and the pilot gas valve are switched off and interlocked in the fault state. If a loss of flame occurs during operation, all gas solenoid valves are switched off during the extinction safety time (SZB). The DGA1.73 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 DGA1.73 mod. ...TCL and ...TLL must be unlocked via an external contact.

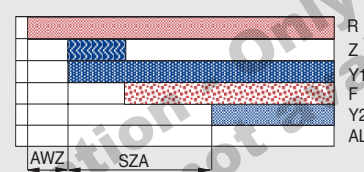
...TCV models with adjustable fault unlocking device can be unlocked by shutting down the heat requirement or with an external contact.

Auto-ignition

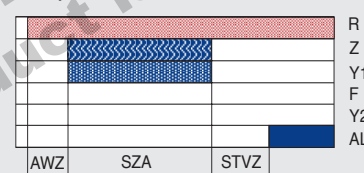
The models DGA1.73...-G can be operated with an igniter. In this way, ignition occurs in a reliable manner without HF disturbance. Use NORTON mini igniter type 701. It is available for 220 VAC, 230 VAC and 240 VAC voltages. For reliable ignition, choose the igniter according to the supply voltage.

Program flow for models without air monitoring

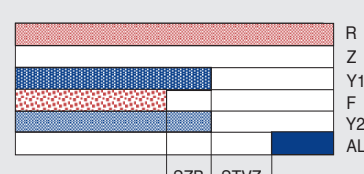
Startup with flame formation



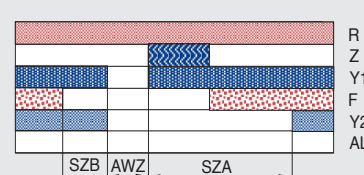
Startup without flame formation



Flame failure during operation without recycling (Mod. TLL)

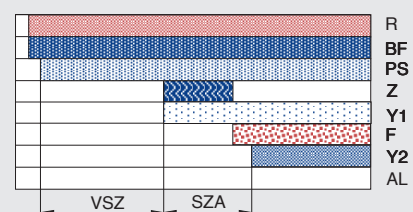


Flame failure during operation with recycling (Mod. TCL)

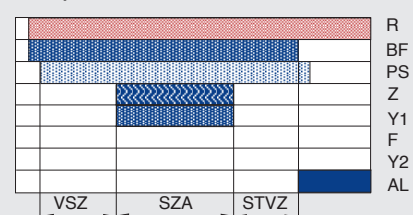


Program flow for models with air monitoring

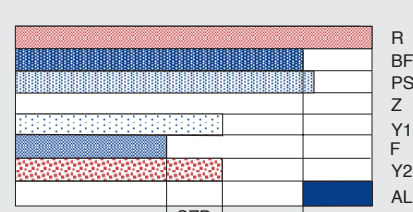
Startup with flame formation



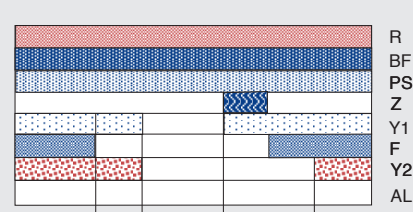
Startup without flame formation



Flame failure without recycling

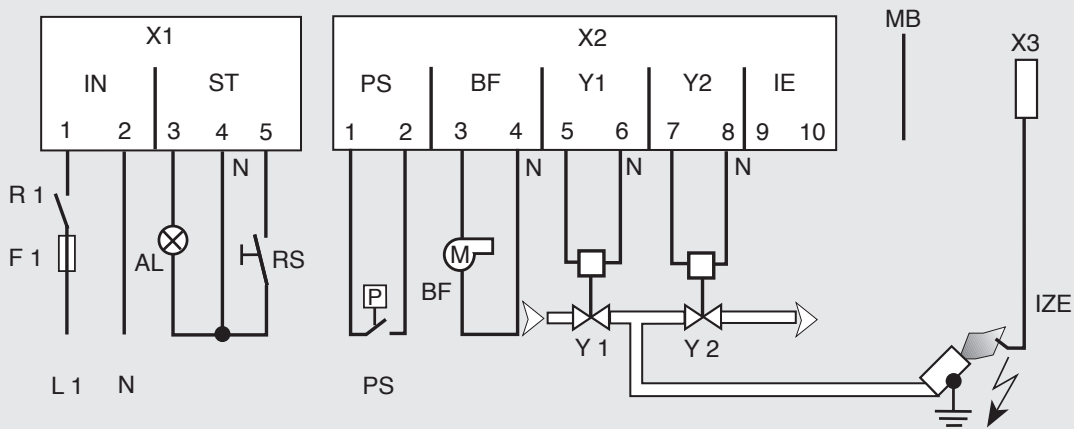


Flame failure with recycling

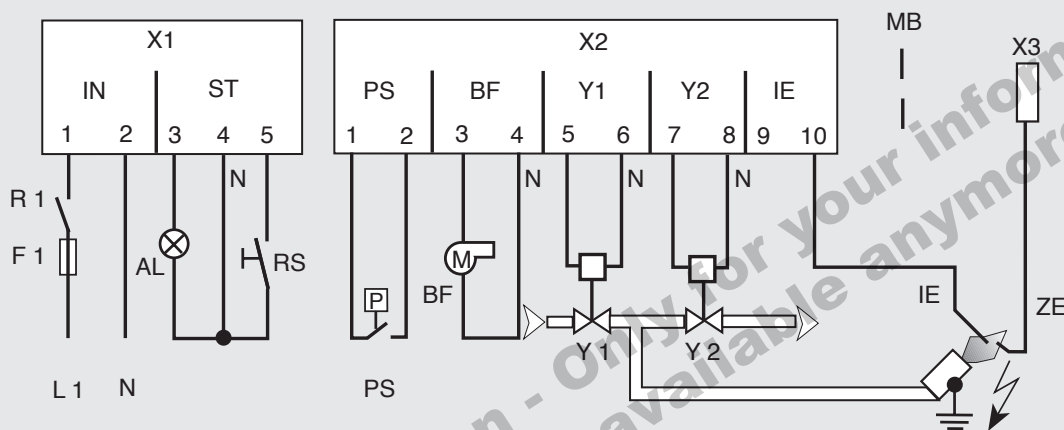


- AWZ Start-up delay period
- BF Blower motor
- F Flame
- PS Air pressure switch
- R1 Controller
- AL Fault indication
- STVZ Fault interlock time
- SZA Ignition safety time
- SZB Extinction safety time
- VSZ Pre-purge time
- VGZ Glow time
- Y1 Pilot gas valve
- Y2 Main gas valve
- Z Ignition

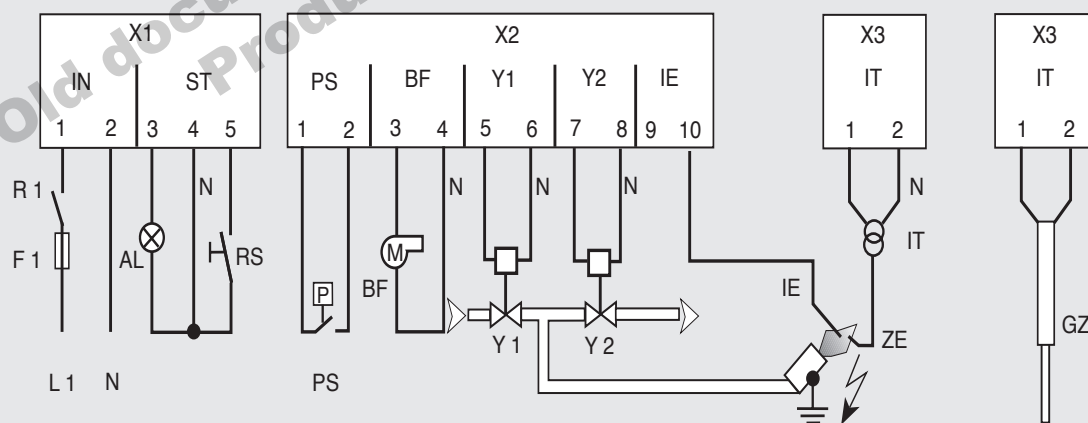
Terminal diagram for models with integrated ignition, single probe



Terminal diagram for models with integrated ignition, dual probe



Terminal diagram for models with external ignition



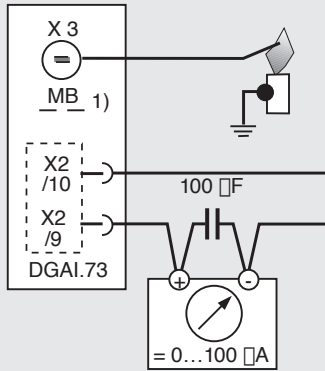
AL External fault indication
 BF Blower motor
 F1 Back-up fuse, max. 6.3 A, slow-blow
 IE Ionisation electrode
 GZ Glow igniter

IT Ignition transformer
 IZE Ionisation and ignition electrode
 *MB Wire jumper (cuttable)
 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

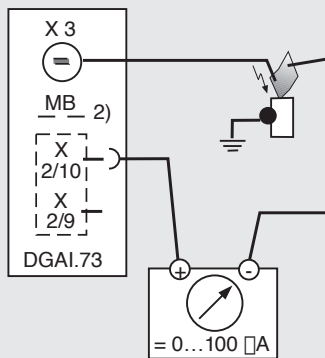
* Jumper MB for mod. B... not available, X2 9-10 must be bypassed for 1-electrode operation (plug IE)

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



1) cf. Measuring the ionisation current

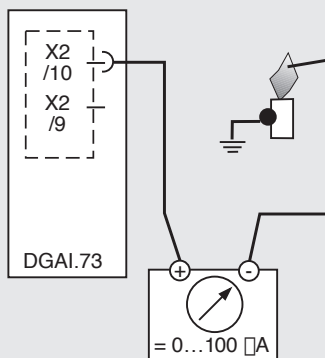
Measuring instrument connection for models with integrated ignition (dual probe)



2) cf. Ionisation flame monitoring

! For dual probe, jumper MB must be cut, otherwise the flame will also be seen by the ignition electrode!

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.

If a separate ionisation electrode is used (dual probe), jumper MB (on the right-hand side of the terminal) must be cut.

Jumper MB is not installed with modulator B. Therefore, they can only be operated with separate ignition and ionisation electrode, or X2 9-10 must be bridged (IE plug).

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. If a common ignition and ionisation electrode (single probe) is used, jumper MB must be cut so that the ionisation current can be measured. No jumper MB with modulator B. On completion of the measurement, terminals X2/9 and X2/10 must be bridged instead of jumper MB.

Installation

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

For application in extended ambient temperature range (-20 °C to +60 °C), DGA1.73 mod. WLE... must be installed.

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:

- 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 integrated electronic spark ignition is unsuitable for igniting conventional gas burners with fan owing to the low spark frequency and the short spark duration.
Version DGA1.73 Mod.-Z should be used for this purpose.

! 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.

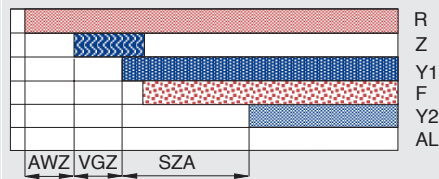
! Ignoring the installation and operating instructions may result in injury to life and limb or damage to property. Compliance with the applicable instructions is therefore imperative. Unauthorised tampering with the electronics will render the warranty for this equipment null and void.

Order data Type	Order No.	Classification as per EN 298	Connecteur set srew type
DGAi.73 Mod. 3.1.0 TLL	229 526	ATLLXN	226 936
DGAi.73 Mod. 5.1.0 TCV	239 793	ATCVXN	226 936
DGAi.73 Mod. 5.1.0 TLL	238 213	ATLLXN	226 936
DGAi.73 Mod. 5.1.0 TLL	226 970	ATLLXN	226 936
DGAi.73 Mod. 5.1.0 TLL-Z	238 118	ATLLXN	226 935
DGAi.73 Mod. 5.1.0 TCL	229 107	ATCLXN	226 936
DGAi.73 Mod. 5.1.0 TCL	226 969	ATCLXN	226 936
DGAi.73 Mod. 5.1.0 TCL-Z	238 116	ATCLXN	226 935
DGAi.73 Mod. 10.1.0 TCL	229 179	ATCLXN	226 936
DGAi.73 Mod. B 10.1.0 TCL	229 713	ATCLXN	226 936
DGAi. 73 Mod. 10.1.0 TCL	226 968	ATCLXN	226 936
DGAi. 73 Mod. 10.1.0 TCL-Z	238 117	ATCLXN	226 935
DGAi. 73 Mod. 10.1.0 TCL-G	229 121	ATCLXN	226 935
DGAi. 73 Mod. 10.5.0 TCL	238 359	ATCLXN	226 936
DGAi. 73 Mod. 3.1.30 TLL	226 966	FTLLXN	226 934
DGAi. 73 Mod. 3.1.30 TLL-Z	226 971	FTLLXN	226 933
DGAi. 73 Mod. 5.1.3 TCV	240 244	FTCVXN	226 934
DGAi. 73 Mod. 5.1.3 TLL-Z	240 573	FTLLXN	226 933
DGAi. 73 Mod. 5.1.3 TCL	238 087	FTCLXN	226 934
DGAi. 73 Mod. 5.1.3 TCL-Z	238 115	FTCLXN	226 933
DGAi. 73 Mod. 5.1.10 TCL	227 821	FTCLXN	226 934
DGAi. 73 Mod. 5.1.30 TCV	239 681	FTCVXN	226 934
DGAi. 73 Mod. WLE B 5.1.30 TCL	239 842	FTCLXN	226 934
DGAi. 73 Mod. WLE 5.1.30 TCL	229 711	FTCLXN	226 934
DGAi. 73 Mod. 5.1.30 TCL	226 964	FTCLXN	226 934
DGAi. 73 Mod. 5.1.30 TCL-G	229 120	FTCLXN	226 933
DGAi. 73 Mod. 10.1.3 TCL	226 967	FTCLXN	226 934
DGAi. 73 Mod. 10.3.10 TCV	238 801	FTCVXN	226 934
DGAi. 73 Mod. 10.3.30 TCL	226 965	FTCLXN	226 934
DGAi. 73 Mod. 10.3.30 TCL-Z	244 061	FTCLXN	226 933
DGAi. 73 Mod. B 5.1.0 TCL	242 327	ATCLXN	226 936
DGAi. 73 Mod. B 5.1.10 TCL	242 328	FTCLXN	226 934
DGAi. 73 Mod. WLE 5.1.30 TCL-Z	243 261	FTCLXN	226 933

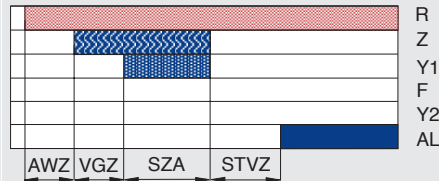
Type	Startup delay period	Pre- purging time	Extinction safety time	Safety time		Restart	Air monitor- ing	External ignition
				Start	Operating			
DGAI.73 Mod. 3.1.0 TLL	5 s	-	-	3 s	1 s	○	○	○
DGAI.73 Mod. 5.1.0 TCV	5 s	-	-	5 s	1 s	●	○	○
DGAI.73 Mod. 5.1.0 TLL	5 s	-	-	5 s	1 s	○	○	○
DGAI.73 Mod. 5.1.0 TLL	5 s	-	-	5 s	1 s	○	○	○
DGAI.73 Mod. 5.1.0 TLL-Z	5 s	-	-	5 s	1 s	○	○	●
DGAI.73 Mod. 5.1.0 TCL	5 s	-	-	5 s	1 s	●	○	○
DGAI.73 Mod. 5.1.0 TCL	5 s	-	-	5 s	1 s	●	○	○
DGAI.73 Mod. 5.1.0 TCL-Z	5 s	-	-	5 s	1 s	●	○	●
DGAI.73 Mod. 10.1.0 TCL	5 s	-	-	10 s	1 s	●	○	○
DGAI.73 Mod. B 10.1.0 TCL	5 s	-	-	10 s	1 s	●	○	○
DGAI.73 Mod. 10.1.0 TCL	5 s	-	-	10 s	1 s	●	○	○
DGAI.73 Mod. 10.1.0 TCL-Z	5 s	-	10 s	10 s	1 s	●	○	●
DGAI.73 Mod. 10.1.0 TCL-G	5 s	-	-	10 s	1 s	●	○	●
DGAI.73 Mod. 10.5.0 TCL	5 s	-	-	10 s	1 s	●	○	○
DGAI.73 Mod. 3.1.30 TLL	-	30 s	-	3 s	1 s	○	●	○
DGAI.73 Mod. 3.1.30 TLL-Z	-	30 s	-	3 s	1 s	○	●	●
DGAI.73 Mod. 5.1.3 TCV	-	3 s	-	5 s	1 s	●	●	○
DGAI.73 Mod. 5.1.3 TLL-Z	-	3 s	-	5 s	1 s	○	●	●
DGAI.73 Mod. 5.1.3 TCL	-	3 s	-	5 s	1 s	●	●	○
DGAI.73 Mod. 5.1.3 TCL-Z	-	3 s	-	5 s	1 s	●	●	●
DGAI.73 Mod. 5.1.10 TCL	-	10 s	-	5 s	1 s	●	●	○
DGAI.73 Mod. 5.1.30 TCV	-	30 s	-	5 s	1 s	●	●	○
DGAI.73 Mod. WLE B 5.1.30 TCL-	-	30 s	-	5 s	1 s	●	●	○
DGAI.73 Mod. WLE 5.1.30 TCL	-	30 s	-	5 s	1 s	●	●	○
DGAI.73 Mod. 5.1.30 TCL	-	30 s	10 s	5 s	1 s	●	●	○
DGAI.73 Mod. 5.1.30 TCL-G	-	30 s	-	5 s	1 s	●	●	●
DGAI.73 Mod. 10.1.3 TCL	-	3 s	-	10 s	1 s	●	●	○
DGAI.73 Mod. 10.3.10 TCV	-	10 s	-	10 s	3 s	●	●	○
DGAI.73 Mod. 10.3.30 TCL	-	30 s	-	10 s	3 s	●	●	○
DGAI.73 Mod. 10.3.30 TCL-Z	-	30 s	-	10 s	3 s	●	●	●
DGAI.73 Mod. B 5.1.0 TCL	5 s	-	-	5 s	1 s	●	○	○
DGAI.73 Mod. B 5.1.10 TCL	-	10 s	-	5 s	1 s	●	●	○
DGAI.73 Mod. WLE 5.1.30 TCL-Z-	-	30 s	-	5 s	1 s	●	●	●

Program listing for models without air monitoring and glow plug ignition

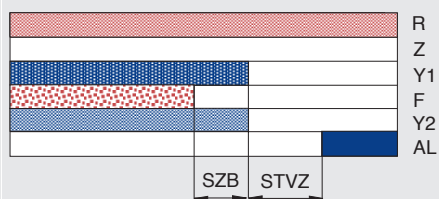
Startup with flame formation



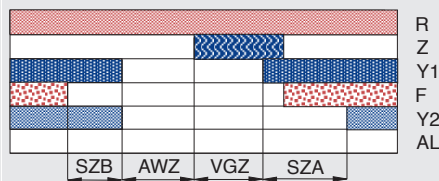
Startup without flame formation



Flame failure without recycling (Mod. TLL)



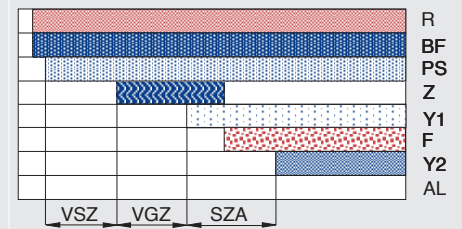
Flame failure with recycling (Mod. TCL)



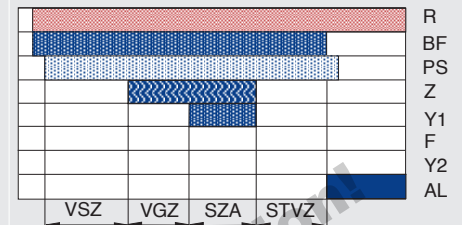
- AWZ Startup delay period
- BF Blower motor
- F Flame
- PS Air pressure switch
- R Controller
- AL Fault
- STVZ Fault interlock time
- SZA Ignition safety time
- SZB Extinction safety time
- VSZ Pre-purge time
- VGZ Glow time
- Y1 Pilot gas valve
- Y2 Main gas valve
- Z Ignition

Program listing for models with air monitoring and glow plug ignition

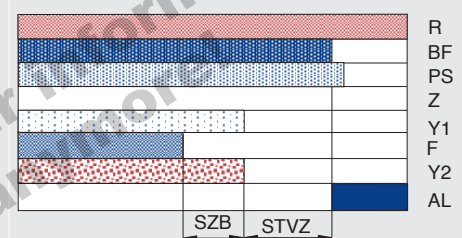
Startup with flame formation



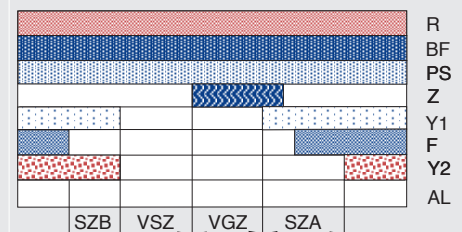
Startup without flame formation



Startup without flame formation (Mod. TLL)



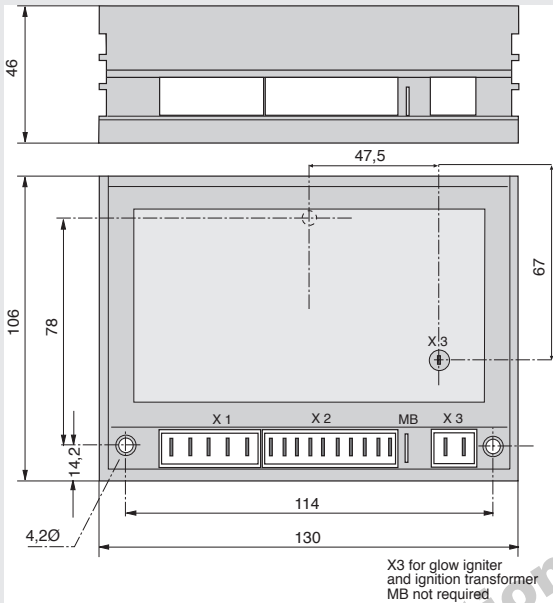
Startup with flame formation (Mod. TCL)



Automatic gas burner controller for
gas burners with and without fan
DGAI. 73



Dimensions



DGAI. 73 Table of connectors

Function	Slot No.	No. of poles	Code Con- nector 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 con- nection	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) 230V -15% +10%
Frequency 50 Hz (60 Hz on request)
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 mo-
dels 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 (> 0.5 µA)
Short-circuit current limitation approx. 100 µA

Models with integrated ignition
Ignition cycle sparks
Ignition voltage approx. 15 kV
Ignition frequency approx. 15 Hz
Distance between electrodes 3 mm to 4 mm
Ignition wire length max. 1 m

Models with glow ignition
Ignition NORTON Mini Igniter
Typ 701
(Adjust 220 VAC, 230 VAC
or 240 VAC according to
supply voltage)
Power consumption max. 120 VA

Fault remote unlock Remote unlock
Degree of protection IP 20 - IP 40 must be
ensured by installation

Ambient temperature 0 °C to 60 °C
WLE -20 °C...+60 °C
Connection RAST5, encoded
PE connection separate
Weight 0.35 kg

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
Telephone +49 (0)7181-804-0
Fax +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