

# Automatic gas burner control for gas burners without fan

## DGAI. 65F

**DUNGS**<sup>®</sup>  
Combustion Controls

1.33



### Technical description

The DGAI.65F is an automatic gas burner control as per EN 298 with the following features:

- Ionisation flame monitor
- Restart attempt in case of flame failure in operation (depending on model)
- Program sequence control by means of electronic timers
- Burner ignition by means of external facilities
- Ignition gas solenoid valve
- Main gas solenoid valve
- Safety gas solenoid valve
- Complete circuit on one PCB
- Connections for operation and fault display as well as remote unlock facility
- Rast 5 connectivity

### Application

The automatic gas burner control DGAI.65F is suitable for igniting and monitoring gas burners without blower as per EN 297 and/or EN 656 for intermittent operation.

### Approvals

EC type test approval as per EC Gas Appliance Directive:

DGAI.65F      CE-0085 AQ 7128

EC type test approval as per EC Pressure Equipment Directive:

DGAI.65F      CE0036

## Automatic gas burner control DGAI.65F

The automatic gas burner control mounted on a PCB operates with electronic timers.

Therefore exact switching times are ensured during voltage and temperature fluctuations or very short switching cycles.

The DGAI.65F comprises:

- controller for program flow
- flame monitoring according to the ionisation principle

The ignition unit is external.

## Functional description

DGAI.65F Mod. ICL and ILL

On receipt of a heat request from the regulator, the ignition starts after a startup delay period of about 10 s, and after a safety gas valve and an ignition gas valve are opened. The main gas valve is opened on receipt of the ignition flame signal. The ignition and ignition gas valve are switched off after the safety period startup.

The DGAI.65F Mod. ICL and ILL can also be operated with 2 ionisation electrodes to monitor the end point of the main burner. Under no circumstances may the main flame contact the ionisation electrode of the ignition burner.

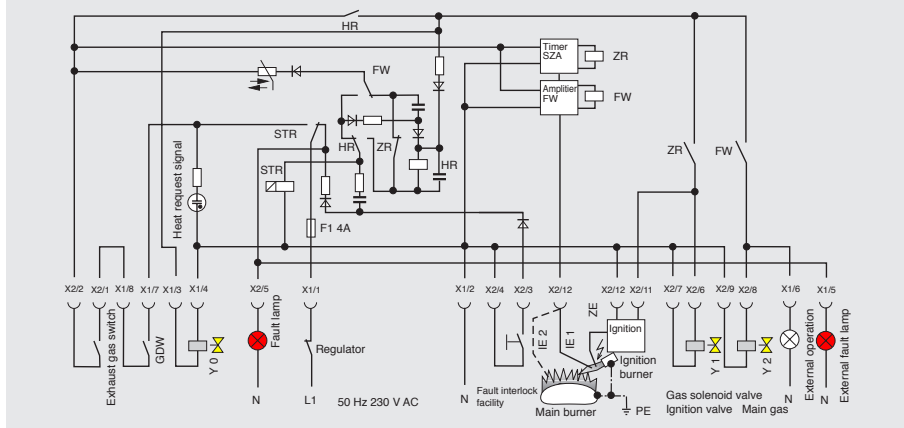
## DGAI.65F Mod. TCL and TLL

The safety gas valve opens immediately on receipt of a heat request. After the startup delay period, the ignition starts and the ignition gas valve is opened. The main gas valve is opened by the ignition flame signal (for DGAI.65F Mod. 50.5 TCL, only after about 5 s stabilising period).

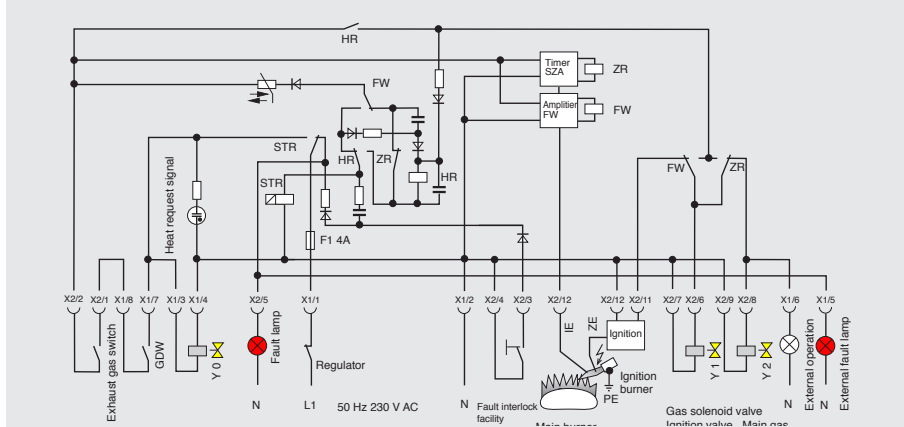
If the ignition flame goes out within the safety period startup, the ignition is reactivated or a restart is performed.

In the case of flame failure during operation, the ignition and main valve gas valves are closed within 5 s and a restart is attempted and runs through the complete startup program.

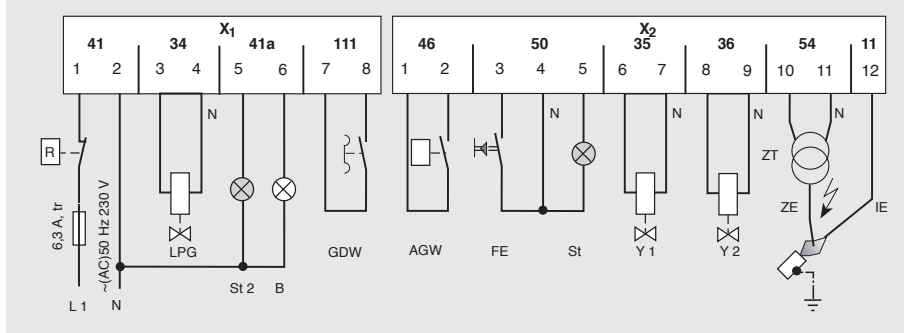
### Functional and program sequence DGAI.65F Mod. ICL and ILL



### Functional / circuit diagram DGAI.65F Mod. TCL and TLL



### Wiring diagram DGAI.65F



AGW	Exhaust gas switch	St	Fault
B	Operation	St 2	External fault
FE	Remote unlock facility	Y0	Safety gas valve
GDW	Gas pressure switch	Y1	Ignition gas solenoid valve
IE	Ionisation electrode	Y2	Main gas solenoid valve
PE-B	Burner ground	ZE	Ignition electrode
R	Regulator	ZT	Ignition facility

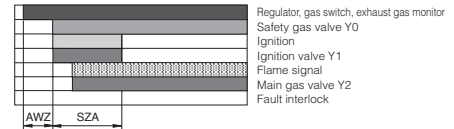
### DGAI.65F (all models)

When the regulator is switched off, the safety, ignition and main gas valves are switched off.

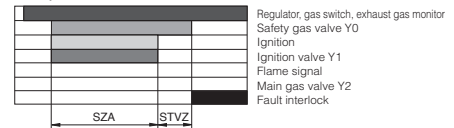
A flame signal before fuel release is tolerated for 5 s during the startup period. Then the DGAI.65F goes to blocking position which can only be cancelled by switching off the power voltage.

### Functional and program sequence DGAI.65F Mod. ICL and ILL

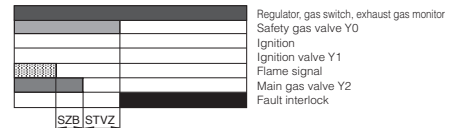
#### Startup after regulator switching, with flame



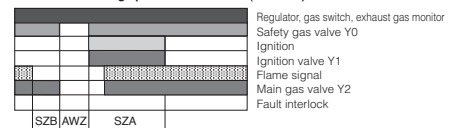
#### Startup without flame



#### Flame failure during operation without restart (Mod. ILL)



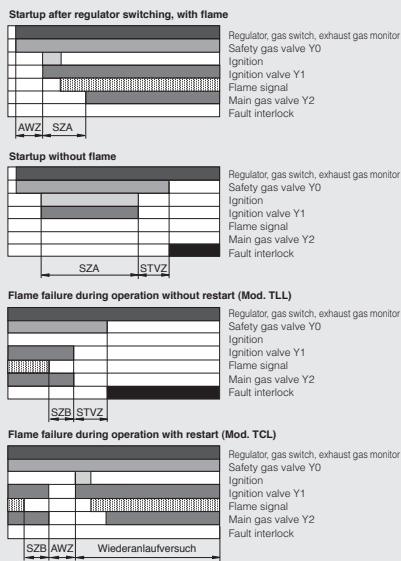
#### Flame failure during operation with restart (Mod. ICL)



### Program sequence periods

Startup delay period (AWZ)	approx. 10 s
Safety period startup (SZA)	see table
Safety period operation (SZB)	see table
Fault interlocking period (STVZ)	approx. 5 s

## Functional and program sequence DGAI.65F Mod. TCL and TLL



## Installation

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

## Electrical connection

Wiring has to be performed in compliance with the local prevailing regulations and the wiring diagram.

## Startup

Before startup, check whether all connections are correct.

Check the following safety functions during startup:

1. Switch off regulators, switches and limiters.
2. Refer to gas pressure switch switching points
3. Flame detector

Interrupt ionisation line and/or perform a short circuit between electrode and ground.

**! The models are connected in the same way. Ensure that the functions and safety times are correct.**

## Fault unlocking facility

In case of fault, the DGAI.65F is unlocked by means of an external contact.

## Fuses

An internal fuse (4A) protects the equipment from an output-side short circuit. The fuses cannot be replaced. For this reason, only DUNGS personnel may check and repair the automatic burner control.

External backup of the automatic gas burner control by means of a 6.3 A slow-blow and/or 10A quick-acting back-up fuse.

**! Refer to the permitted switching capacities. If a fuse is defective, check the safety function of the monitoring device, otherwise the contact may be welded by a short circuit.**

Type	Order no.	SZA	SZB	Restart	Start heat load		Heat load	
					EN 297	EN 656	EN 297	EN 656
<b>DGAI. 65F Mod. 50.3 TCL</b>	223 541	<50 s	<3 s	yes	< 250 W	< 1000 W	< 70 kW	< 300 kW
<b>DGAI. 65F Mod. 10.3 TCL</b>	225 161	<10 s	<3 s	yes	< 50 kW	< 50 kW	< 70 kW	< 300 kW
<b>DGAI. 65F Mod. 5.3 TCL</b>	225 162	< 5 s	<3 s	yes	< 70 kW	< 100 kW	< 70 kW	< 300 kW
<b>DGAI. 65F Mod. 10.1 TLL</b>	225 163	<10 s	<1 s	no	< 50 kW	< 50 kW	< 70 kW	< 300 kW
<b>DGAI. 65F Mod. 5.1 TLL</b>	225 164	< 5 s	<1 s	no	< 70 kW	< 100 kW	< 70 kW	< 300 kW
<b>DGAI. 65F Mod. 3.1 TLL</b>	225 165	< 3 s	<1 s	no	< 70 kW	< 166 kW	< 70 kW	< 300 kW
<b>DGAI. 65F Mod. 10.3 ICL</b>	225 725	<10 s	<3 s	yes	< 50 kW	< 50 kW	< 70 kW	< 300 kW
<b>DGAI. 65F Mod. 10.1 ILL</b>	225 726	<10 s	<1 s	no	< 50 kW	< 50 kW	< 70 kW	< 300 kW
<b>DGAI. 65F Mod. 5.1 ILL</b>	225 864	< 5 s	<1s	no	< 70 kW	< 100 kW	< 70 kW	< 300 kW

## Ionisation flame monitor

An ionisation electrode acts as a probe in the flame, the burner nozzle normally acts as ground.

Ensure that there is proper flame adhesion to the burner.

The burner nozzle must be properly connected with the opposite pole of the ionisation current return line.

In normal power supply conditions,

the opposite pole - N - is at ground potential. Connection of ground and/or protective grounding terminal to burner ground is sufficient. If a buffer or control transformer is used, it is absolutely necessary for the pole to be connected to ground instead of to N, and/or tied to burner ground. Otherwise the ionisation current has no return line. The situation may occur that, despite a proper

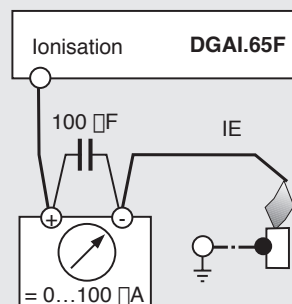
flame and proper arrangement of the electrode, no or only a weak ionisation current can flow. The material of the ionisation electrode and the insulation must be heat-resistant. A proven material is Kanthal for electrodes and a ceramic insulation made of aluminium oxide. The insulation resistance should be more than 50 MΩ.

## Measuring the monitor current

The intensity of the ionisation current can be measured by means of a DC microammeter. The current intensity should not undershoot 6 μA during operation. The maximum reachable ionisation current is approx. 50 μA. Fault shut-down takes place when the ionisation current undershoots approx. 1 μA.

For measurement purposes, the microammeter is switched between the ionisation electrode and the connection

## Test equipment connection



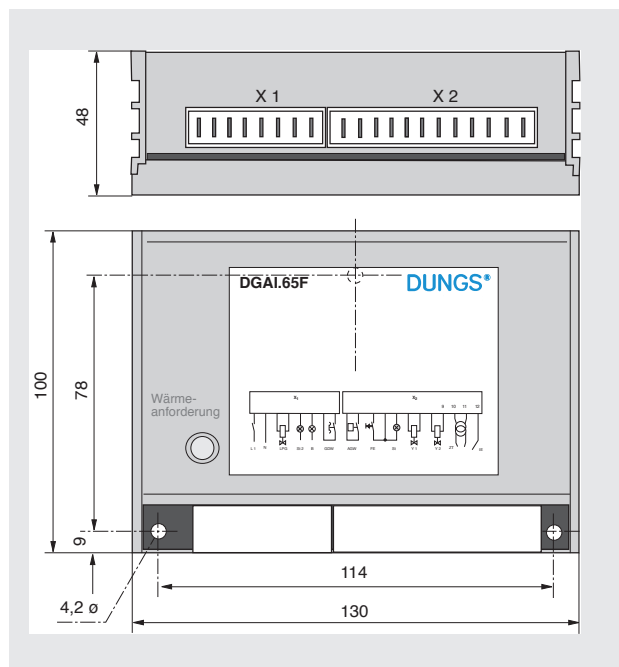
**! If you do not observe these installation and operating instructions, it may result in personal injury or material damage. For this reason, strictly keep to the instructions. The warranty for the equipment will expire on any attempt to access the electronic circuits, i.e. automatically when the seal is broken.**

# Automatic gas burner control for gas burner without fan

## DGAI. 65F



### Dimensions



### Specifications

Nominal voltage	~(AC) 230 V -15 % / +10 %
Frequency	50 Hz
Performance rating	approx. 5 VA
Internal fuse	4 A (not replaceable)
Back-up fuse	max. 6 A slow-blow or 10 A quick-acting
Switching capacity:	
Fault signal	max. 1 A (with external fault signal)
Ignition	max. 1 A
Ignition gas valve	max. 1 A
Main gas valve	max. 1 A (with operating signal)
Safety gas valve	max. 1 A
Total switching capacity	max. 4 A
Flame detector	ionisation
Ionisation current / operation	6 - 10 µA
Shut-down sensitivity	1 µA
Short-circuit current limitation	approx. 100 µA
Unlock facility	Remote unlock
Degree of protection	IP 20 - IP 40 must be ensured by installation
Ambient temperature	0 °C to 60 °C
Connectivity	Rast 5
Weight	0.50 kg

### DGAI. 65F Table of connectors

Function	Slot No.	Number of poles	Code Connector-No.
Power feed	41	02	.... <sup>1)</sup> 02 K04
LPG-upstream valve	34	02	.... <sup>1)</sup> 02 K16
Pressure switch	111	02	.... <sup>1)</sup> 02 K05
Fault/unlock	50	03	.... <sup>1)</sup> 03 K04
Fault/operation	41a	02	.... <sup>1)</sup> 02 K06
Flue gas switch	46	02	.... <sup>1)</sup> 02 K05
Ignition	54	02	.... <sup>1)</sup> 02 K03
Gas valve 1	35	02	.... <sup>1)</sup> 02 K16
Gas valve 2	36	02	.... <sup>1)</sup> 02 K16
ionisation	11	01	Flat-type connector 6,3 x 0,8 mm

### Ignition

external ignition source

Type	Order - no.	Classification as per EN298
DGAI. 65F Mod. 50.5 TCL	223 541	ATCLXN
DGAI. 65F Mod. 10.5 TCL	225 161	ATCLXN
DGAI. 65F Mod. 5.5 TCL	225 162	ATCLXN
DGAI. 65F Mod. 10.1 TLL	225 163	ATLLXN
DGAI. 65F Mod. 5.1 TLL	225 164	ATLLXN
DGAI. 65F Mod. 3.1 TLL	225 165	ATLLXN
DGAI. 65F Mod. 10.5 ICL	225 725	AICLXN
DGAI. 65F Mod. 10.1 ILL	225 725	AILLXN
DGAI. 65F Mod. 5.1 ILL	225 864	AILLXN
Terminal-Set DGAI. 65F (Screw terminal)	226 340	

<sup>1)</sup> Insulation displacement connector 3623...  
Screw-type terminal 3611...

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

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