



Burner Controls for Continuous Operation

LGI16...

Supplementary Data Sheet 7712

- For use on industrial furnaces
- With self-supervising flame signal amplifier
- Quick start-up
- Single-stage operation with interrupted pilot burner or 2-stage operation
- UV or ionization flame supervision
- Common or separate ionization probe and ignition electrode (single- or double-electrode operation)
- Automatic restart (repetition) or lock-out after loss of flame during operation
- Without fan control and air pressure supervision
- Indication of program sequence
- Remote reset facility
- Programming mechanism in plastic casing, plugs into the base

The LGI16... and this Data Sheet are intended for use by OEMs which integrate the burner controls in their products.

Use

Supervision and control of oil or gas burners for use on industrial furnaces that operate continuously for longer periods of time (> 24 hours) without controlled shut-down.

Warning notes



To avoid injury to persons, damage to property or the environment, the following warning notes should be observed!

Do not open, interfere with or modify the unit!

- Before performing any wiring changes in the connection area of the LGI16..., completely isolate the burner control from the mains supply (all-polar disconnection)
- Ensure protection against electric shock hazard by providing adequate protection for the burner control's terminals
- Check wiring and all safety functions
- Press the lock-out reset button only manually without using any tools or pointed objects
- Fall or shock can adversely affect the safety functions. Such units may not be put into operation, even if they do not exhibit any damage

Mounting notes

- Ensure the relevant national safety regulations are complied with
- Locate the ignition electrode and ionization probe such that the ignition spark cannot arc over to the ionization probe (risk of electric overloads)

Installation notes

- Installation work must be carried out by qualified staff
- Observe the permissible length of the detector cables (refer to «Technical data»)
- Always run the ignition cables separately while observing the greatest possible distances to the unit and to other cables
- When used in connection with UV detector QRA5..., terminal 22 must be earthed
- UV detector current measuring unit KF8832 is not suited for continuous operation
- For repetitive operation, remove wire link «J» between terminals 8 and 11 in base AGM15
- In single-electrode operation, measurement of the ionization current is not possible. During the ignition times, the ionization current path is under high voltage

Electrical connection of ionization probe and UV detector

It is important to achieve practically disturbance-free and loss-free signal transmission:

- The cable length may not exceed 20 m (for exceptions, refer to «Technical data», section «Detector and flame supervision»)
 - Never run the detector cable together with other cables
 - Line capacitance reduces the magnitude of the flame signal
 - Use a separate cable
 - Insulation resistance
 - Must be a minimum of 50 MΩ between ionization probe and ground
 - Soiled detector holders reduce the insulation resistance, thus supporting creepage currents
 - Earth the burner in compliance with the relevant regulations; earthing the boiler alone does not suffice
 - Observe the polarity
-  Burner controls LGI16... are not able to detect wrong polarity of live and neutral conductors
- The ionization probe does not offer protection against electric shock hazard

Commissioning notes

- Commissioning and maintenance work must be carried out by qualified staff
- When commissioning the plant, when doing maintenance work, or after longer off periods, make the following safety checks:

	Safety check	Anticipated response
a)	Burner start-up with flame detector darkened	Lock-out at the end of «TSA»
b)	Burner start-up with flame detector exposed to extraneous light	Lock-out after no more than 40 seconds
c)	Burner operation with simulated loss of flame; for that purpose, darken the flame detector during operation	Restart followed by lock-out at the end of «TSA» if wire link «J» (terminals 8...11) is removed, otherwise immediate lock-out

Service notes

Do not press lock-out reset button «EK» for more than 10 seconds (burner control could get damaged).

Disposal notes



The unit contains electrical and electronic components and may not be disposed of as household garbage.
The local and currently applicable laws must be observed.

Mechanical design

- Programming mechanism with fixed settings
- Synchronous drive motor
- Lock-out relay with electrical reset from a remote location
- Self-supervising electronic flame signal amplifier with flame relay
- Indication of program sequence in viewing window by means of a disk fitted to the spindle of the programming mechanism (refer to «Control and function program»)
- Lock-out signal lamp in viewing window
- Reset after lock-out by slightly pressing on the viewing window
- Built-in unit fuse and spare fuse
- Printed circuit board with electronic components

The burner control is accommodated in a housing made of impact-proof plastic. It is of compact design and plugs into the base.

Base AGM15

Same mechanical design as the casing of the programming unit.
The base is coded such that only the LGI16... can be plugged in.

UV detector QRA...

Refer to Data Sheet 7712.

Type summary

Burner control

- AC 220...240 V
- AC 100...110 V

LGI16.053A27

LGI16.053A17

UV detector

(refer to Data Sheet 7712)

QRA5...

Connecting cable

(refer to Data Sheet 7712)

AGM19

Adapter, for mounting the flame detector

(refer to Data Sheet 7712)

AGG16.C

UV detector current measuring instrument,

only for measurements of short duration

(refer to Data Sheet 7712).

Not suited for continuous operation.

The KF8832 negates the self-supervision function

KF8832



Spare fuse

4 519 1630 0

Ordering

When ordering, please give name and type reference of the products required; for example:

Burner control

for AC 220...240 V
and / or

LGI16.053A27

Base for LGI16

AGM15

The products are supplied as separate items.

Technical data

General unit data	Mains voltage	AC 220 V –15 %...AC 240 V +10 % AC 100 V –15 %...AC 110 V +10 %
	Mains frequency	50...60 Hz ±6 %
	Power consumption	3.5 VA
	External primary fuse	max. 16 A, slow
	Unit fuse, built-in	T6,3H250, IEC 127 (5 x 20 mm)
	Perm. input current at terminal 1	5 A
	Perm. current load on control terminals	4 A
	Required switching capacity of the switching devices connected to terminals 4 and 5	depending on the loads connected to terminals 16...19 min. 1 A, AC 250 V
	Mounting position	optional
	Degree of protection	IP40
	Weight	approx. 1,000 g

Base AGM15

Weight

approx. 165 g

Terminals	Number	Marking
• Connection terminals	24	1...24
• Auxiliary terminals, galvanically separated	2	31, 32
• Earth terminals, linked to an earthing lug	3	Earth symbol
• Neutral conductor terminals, pre-wired to neutral conductor input	3	N
• Knock-out holes		
• Threaded for Pg11	6	
• Unthreaded 7.5 mm dia.	8 at the side 6 at the bottom	
	19 mm dia.	2 at the bottom

Detector and flame supervision

	QRA5...	Ionization
Operating voltage	AC 280 V ¹⁾	AC 245 V ¹⁾
Degree of protection	IP54	---
Min. detector current required	²⁾	12 µA
Max. detector current possible	²⁾	100 µA
Short-circuit current	---	Approx. 300 µA
Max. length of detector cable, laid separately	³⁾	60 m ⁴⁾
Mounting position	Optional	---

- 1) Alternating current, measured with no detector current at AC 110V / AC 220 V mains voltage.
Internal resistance of measuring instrument: 10 MΩ.
Shutter drive of UV detector QRA5... operates on mains voltage
- 2) Refer to specification of the KF8832 for detector current measurements
- 3)
 - Detector cable laid at a distance of at least 50 mm from other mains carrying cables:
 - As a multi-core cable: max. 50 m
 - With 5 single wires: max. 70 m
 - Detector cable laid directly adjacent to other mains carrying cables:
 - With screened 3-core control cable connected to pins 3, 4 and 5 of the QRA5...; for the mains connection (pins 1 and 2), a normal mains cable can be used max. 15 m
 - With 3 screened 3-core coaxial cables (93 Ω; 45 pF/m) connected to pins 3, 4 and 5 of the QRA5...; for the mains connection (pins 1 and 2), a normal mains cable can be used max. 60 m
 - If possible, connect cable shielding at both ends of the cable
- 4) If low capacitance is observed when laying the detector cable to terminal 24 of the burner control (especially against earthed conductors), the cable length can be extended

Environmental conditions

Transport	IEC 721-3-2
Climatic conditions	class 2K2
Mechanical conditions	class 2M2
Temperature range	-50...+60 °C
Humidity	< 95 % r.h.
Operation	IEC 721-3-3
Climatic conditions	class 3K5
Mechanical conditions	class 3M2
Temperature range	-20...+60 °C
Humidity	< 95 % r.h.



Condensation, formation of ice and ingress of water are not permitted!

Norms and standards

CE conformity

According to the directives of the European Union

Electromagnetic compatibility EMC 89 / 336 EEC incl. 92 / 31 EEC

Directive for gas-fired appliances 90 / 396 EEC

Identification code to EN 298

A T / B L / C L X K

Function

Program sequence

When power is supplied to the burner control and the control loop (terminals 4 and 5) is closed, the LG16... will start the program sequence as shown in «Control and function program», the most important program steps being the following:

- Waiting time
 - No external function
 - Internal flame simulation test
- Release of ignition
- Release of pilot gas valve
 - Establishment of pilot flame during the first safety time «TSA»
 - Release of gas valve stage 1
- Release of gas valve stage 1
 - Establishment of pilot flame during the first safety time «TSA»
 - Release of gas valve stage 2
 - Establishment of main flame during the second safety time «t9»
- Burner operation

The burner control maintains its operating position and continuously checks the presence of flame
- Shut-down

when the control loop between terminals 4 and 5 opens.
The signal to the gas valves will immediately be cut off.
During the time «t20», the programming mechanism returns to its start position

Control program in the event of fault

- Flame signal on start-up

causes the burner control to initiate lock-out
 - No flame signal at the end of the first or second safety time

causes the burner control to initiate lock-out
 - Loss of flame during operation

Wire link «J», between terminals 8...11 in the base
 - Wire link fitted: burner control will initiate lock-out
 - Without wire link: burner control will automatically execute a restart (repetition)
- Base AGM15 is supplied with wire link «J» fitted.

In the event of lock-out, the signals to the gas valves will be cut off in less than one second and the burner control locked.

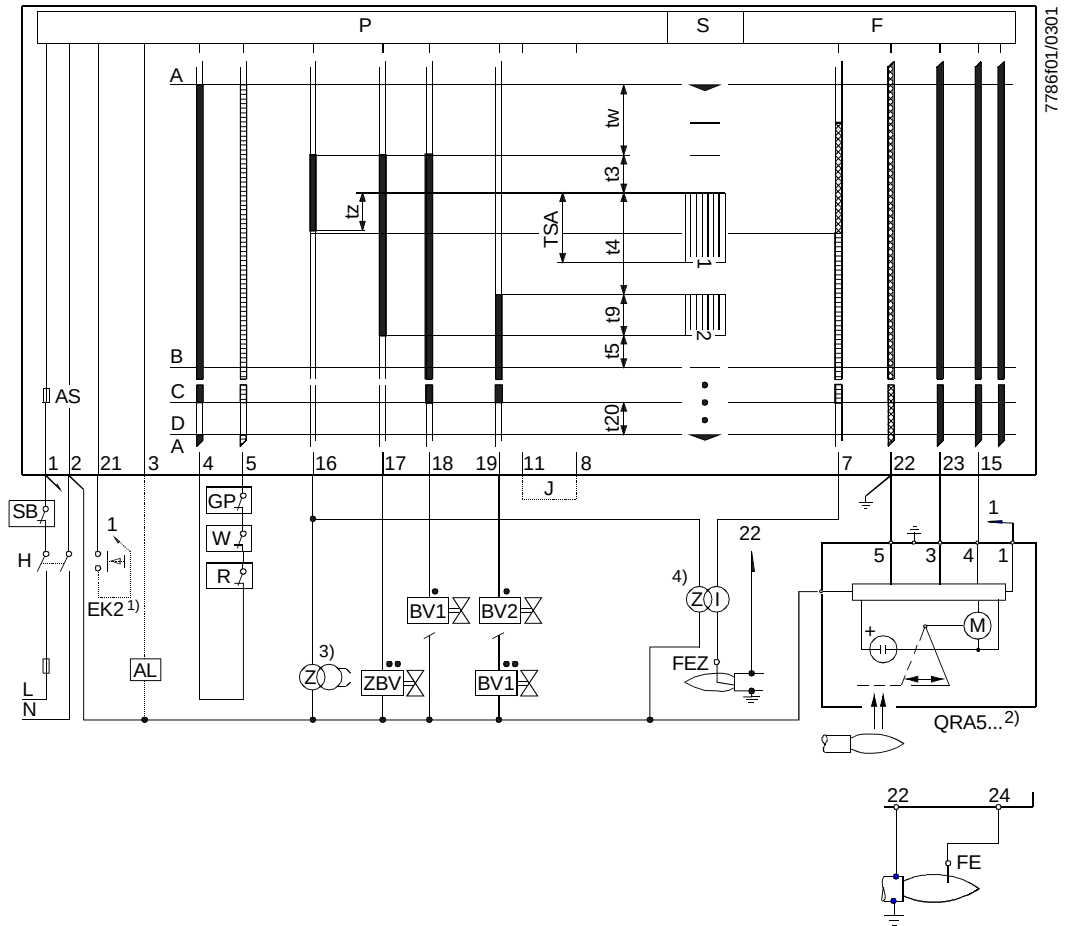
Resetting is always to be made manually by pressing lock-out reset button «EK1» or «EK2».

In the case of repetition, the signals to the gas valves will also be cut off in less than one second. Then, the programming mechanism will automatically return to its start position (home run) to make a new start.

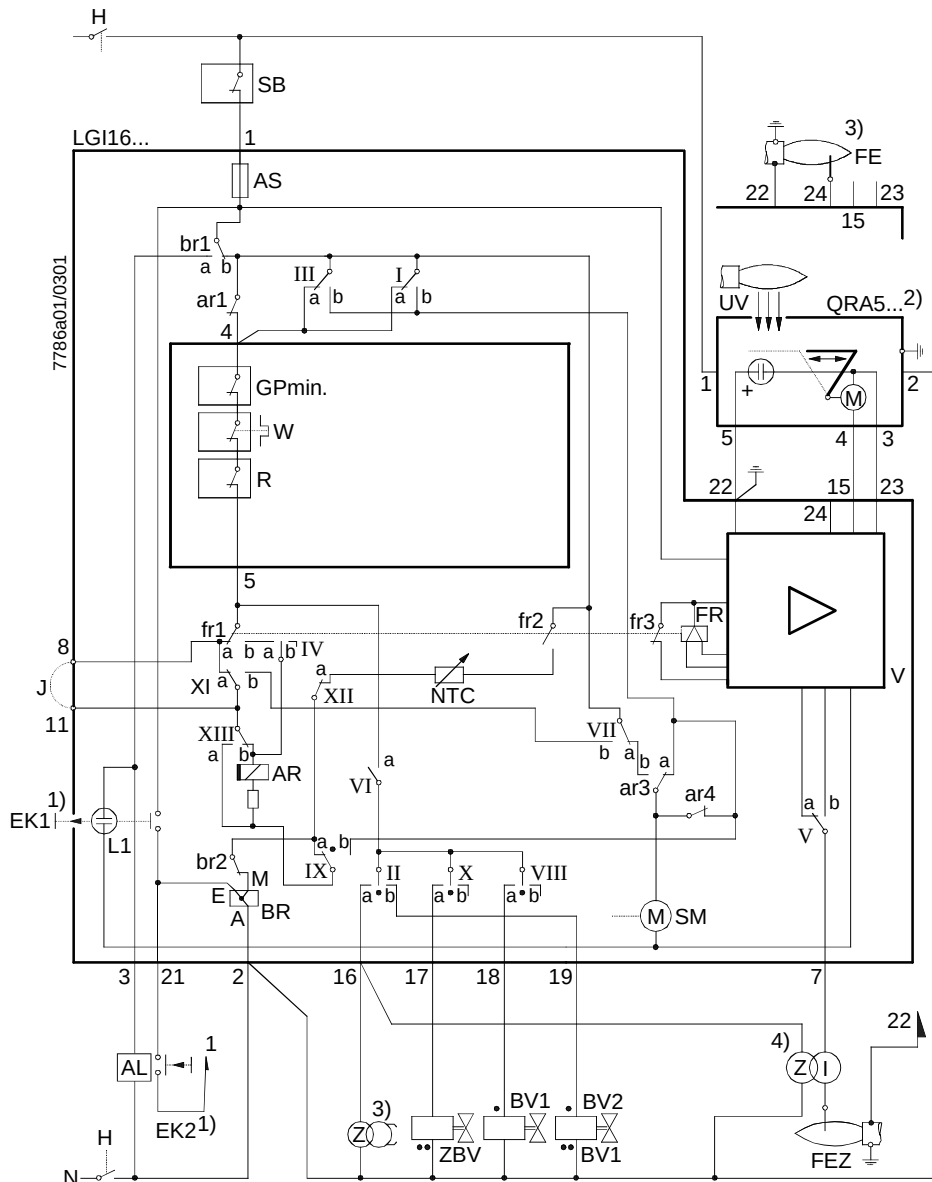
Common ignition probe and ionization electrode

(Single-electrode operation, ionization probe, connected to terminal 7)

In the period between the ignition time «tz» and the end of the first safety time «TSA», the secondary side of the ignition transformer is switched from earthing to the flame signal amplifier.



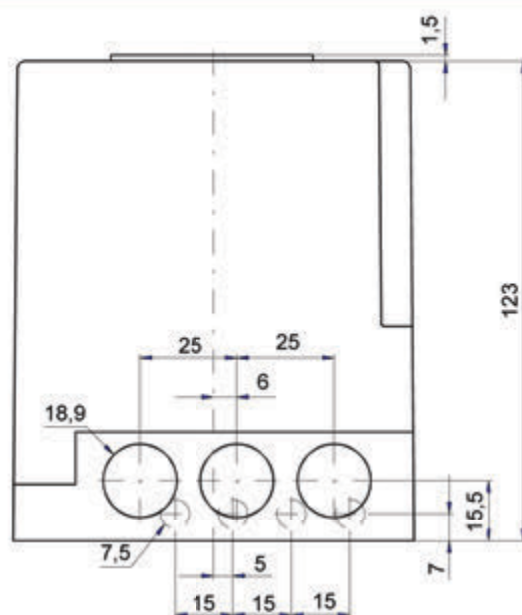
Program times		5)	Legend
TSA	Ignition safety time	5 s	A Start of program; control loop between terminals 4 and 5 closed
tw	Waiting time	4.5 s	A – B Start-up program
tz	Ignition time	2.5 s	B – C Burner operation
t3	Pre-ignition time	2.5 s	C Controlled shut-down; control loop between terminals 4 and 5 open
t4	Interval between start of release of the valve connected to terminal 17 or 18 and release of the valve connected to terminal 19	7.5 s	C – D Home run of programming mechanism
t5	Interval up to the self-shut-down of the programming mechanism in the operating position	2.5 s	D Ready for restart
t9	Transition time from pilot burner to main burner Second safety time («t9» plus safety time in operation)	2.5 s 3.5 s	P Programming mechanism
t20	Home run time until the start-up position after a controlled shut-down is reached	15 s	S Indication of program sequence in viewing window
1) Do not press «EK» for more than 10 s			F Flame signal amplifier
2) When used in connection with QRA5..., terminal 22 must be earthed			AL Remote indication of lock-out (alarm)
3) Connection with separate ignition electrode and ionization probe (double-electrode operation)			AS Unit fuse
4) Connection with common ignition electrode and ionization probe (single-electrode operation)			BV... Fuel valve
5) Data valid at 50 Hz; at 60 Hz, the times are 20 % shorter			EK2 Lock-out reset button
			FE Ionization probe
			FEZ Ignition electrode and ionization probe
			GP Gas pressure monitor, minimum gas pressure switch
			H Main switch
			J Wire link between terminals 8 and 11 in the base of the LGI16..., in the event of loss of flame during operation: Wire link fitted: lock-out Without wire link: automatic restart (repetition)
			M Fan motor
			QRA5... UV detector
			R Temperature or pressure controller
			SB Manual reset safety limiter
			W Limit thermostat or pressure monitor
			Z Ignition transformer for double electrode operation
			ZBV Pilot gas valve
			ZI Ignition transformer for single-electrode operation



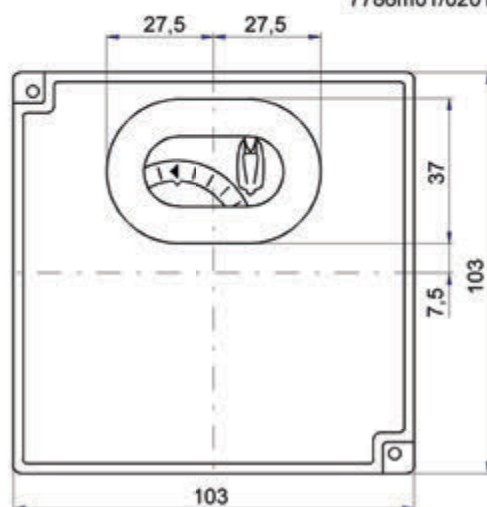
Legend

AL	Remote lock-out warning device (alarm)	L1	Lock-out warning lamp on the burner control
AR	Main relay (load relay) with contacts «ar»	M	Fan motor
AS	Unit fuse	NTC	Resistor with negative temperature coefficient
BR	Lock-out relay with contacts «br»	QRA5...	UV detector
BV...	Fuel valve	R	Temperature or pressure controller
EK...	Lock-out reset button	SB	Manual reset safety limiter
FE	Ionization probe	SM	Synchronous motor of programming mechanism
FEZ	Ignition electrode and ionization probe	UV	UV radiation
FR	Flame relay with contacts «fr»	V	Flame signal amplifier
GP	Gas pressure monitor, minimum gas pressure switch	W	Limit thermostat or pressure monitor
H	Main switch	Z	Ignition transformer for double-electrode operation
J	Wire link between terminals 8 and 11 in the base of the LGI16...; in the event of loss of flame during operation:	ZI	Ignition transformer for single-electrode operation
	Wire link fitted: lock-out	ZBV	Pilot gas valve
	Without wire link: automatic restart (repetition)		
•	Valid for expanding flame burner	1)	Do not press EK» for more than 10 s
••	Valid for interrupted pilot burner	2)	When used in connection with QRA5..., terminal 22 must be earthed
		3)	Connection with separate ignition electrode and ionization probe (double-electrode operation)
		4)	Connection with common ignition electrode and ionization probe (single-electrode operation)

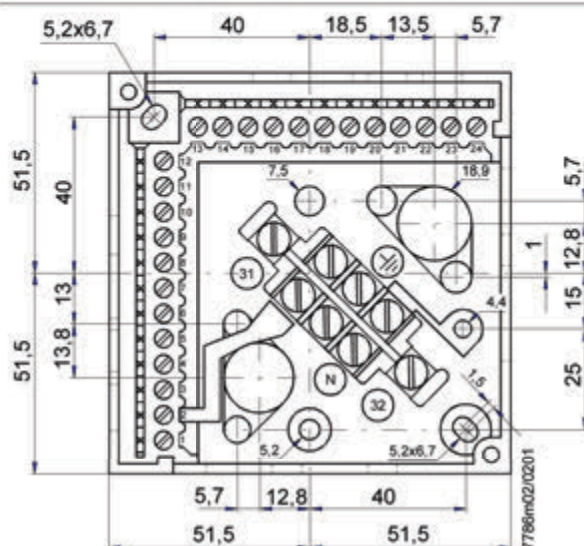
LGI16... + AGM15



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AGM15



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