SIEMENS

Gas burner controls LME...

Burner controls for the supervision of 1- or 2-stage gas burners or gas burners of small to medium capacity, with or without fan in intermittent operation.

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

Use, features

Use

LME are used for the startup and supervision of 1- or 2-stage gas burners or gas burners in intermittent operation.
Flame supervision takes place via an ionization probe or a QRA flame detector with AGQ3.xA27 ancillary unit for forced draft gas burners, or, in the case of blue-burning flames, with a QRC blue-flame detector.
In terms of housing dimensions, the LME... are identical with the burner control LGB… and LMG… burner controls (refer to *Type summary*).

- Applications in accordance with EN 676: Automatic forced draft burners for gaseous fuels
- Type-tested and approved in accordance with DIN EN 298

Features

- Undervoltage detection
- Air pressure supervision with functional check of the air pressure switch during startup and operation
- Electrical remote reset facility
- Multicolor indication of fault status and operational status messages
- Limitation of the number of repetitions
- Accurate control sequence thanks to digital signal handling
- Controlled intermittent operation after a maximum 24 hours of continuous operation

Supplementary documentation

Product type	Type of documentation	Documentation number
LME...	Product Range Overview	Q7101

Warning notes

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

Do not to open, interfere with or modify the unit!

- All activities (mounting, installation and service work, etc.) must be performed by qualified staff
- Before making any wiring changes in the connection area, completely isolate the plant from mains supply (all-polar disconnection). Ensure that the plant cannot be inadvertently switched on again and that it is indeed dead. If not observed, there is a risk of electric shock hazard. Use switches with all-polar disconnection and a contact gap of at least 3 mm
- Ensure protection against electric shock hazard by providing adequate protection for the connection terminals. If this is not observed, there is a risk of electric shock
- Check the connecting lines of the air pressure switch for short-circuits (connection terminals 3, 6 and 11). If this is not observed, there is a risk of loss of safety functions
- Press the lockout reset button/operation button of the LME... or the lockout reset button extension AGK20… only manually (applying a force of no more than 10 N) without using any tools or pointed objects. If this is not observed, there is a risk of loss of safety functions and a risk of electric shock
- Fall or shock can adversely affect the safety functions. Such units must not be put into operation, even if they do not exhibit any damage. If this is not observed, there is a risk of loss of safety functions and a risk of electric shock
- Each time work has been carried out (mounting, installation, service work, etc.), check to ensure that wiring is in an orderly state and make the safety checks as described in *Commissioning notes*. If this is not observed, there is a risk of loss of safety functions and a risk of electric shock

Engineering notes

- When used in connection with actuators, there is no position feedback signal from the actuator to the burner control
- When used in connection with actuators, the requirements of applicable norms and regulations must be observed
- The running times of the actuators must match the burner control's program. An additional safety check of the burner together with the actuators is required
- When substituting LGB… or LMG… by LME…, the ancillary unit AGQ1… or AGQ2… must be replaced by the AGQ3…A27

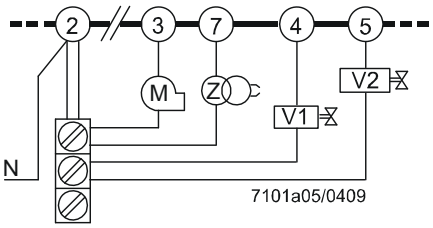
Mounting notes

Ensure that the relevant national safety regulations are complied with.

Installation notes

- Always run the high ignition voltage cables separate from the unit and other cables while observing the greatest possible distance
- Do not mix up live and neutral conductors
- Install switches, fuses, earthing, etc., in compliance with local regulations
- The connection diagrams show the burner controls with earthed neutral conductor. In networks with non-earthed neutral conductor and ionization current supervision, terminal 2 must be connected to the earth conductor via an RC unit (ARC 4 668 9066 0). It must be made certain that local regulations are complied with (e.g. protection against electric shock hazard) since AC 120 V (50/60 Hz) or AC 230 V (50/60 Hz) mains voltage produces peak leakage currents of 2.7 mA
- Ensure that the maximum permissible ratings will not be exceeded, refer to *Technical data*
- Do not feed external mains voltage to the control outputs of the burner control. When testing the devices controlled by the burner control (fuel valves, etc.), the burner control must not be connected
- Secure the earthing lug in the plug-in base AGK11 underneath with a screw and a lockwasher
- In the case of burners with no fan motor, an AGK25 must be connected to terminal 3 of the unit, or else the burner cannot reliably be started up
- For safety reasons, feed the neutral conductor to terminal 2. Connect the burner components (fan, ignition transformer and fuel valves) to the neutral distributor as shown below. The connection between neutral conductor and terminal 2 is prewired in the base

Example



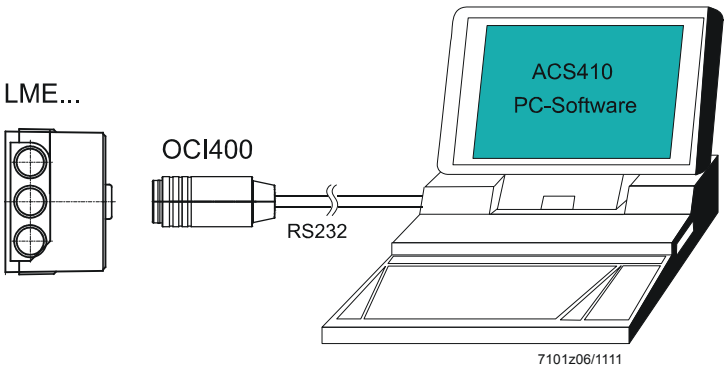
Legend

V...	Fuel valve
M	Fan motor
Z	Ignition transformer

Correct wiring of neutral conductors!

Connection interface OCI400...

- Put the interface OCI400... in the connector at lockout reset button of LME... Interface diagnostics works only if the AGK20... lockout reset button extension is not fitted
- Connect the interface OCI400... without other extension to the interface at your PC, follow the example design below



Electrical connection of flame detectors

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

- Never run detector cables together with other cables
  – Line capacitance reduces the magnitude of the flame signal
  – Use a separate cable
- Observe the permissible length of the detector cables (see Technical data)
- The ionization probe and ignition electrode are not protected against electric shock hazard
- Locate the ignition electrode and the ionization probe such that the ignition spark cannot arc over to the ionization probe (risk of electrical overloads) and that it cannot adversely affect the supervision of ionization
- With both ionization current and UV supervision, the cable length for the flame detector must not exceed 1 m (other cable lengths only available on request)
- 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

  Note!
  Recommendation:
  Use high-quality detector cables with heat-resistant insulation and an ionization probe with ceramic insulation.
- Earth the burner in compliance with the relevant regulations; earthing the boiler alone does not suffice

Commissioning notes

When commissioning the plant for the first time or when doing maintenance work, make the following safety checks:

	Safety check to be carried out	Anticipated response
a)	Burner startup with previously interrupted line to the flame detector	LME11…/LME41.051...: Max. 3 repetitions LME2…/LME41.052.../LME41.053.../LME41.054.../LME41.071.../LME41.09.../LME44...: Non-alterable lockout at the end of the safety time (TSA)
b)	Burner operation with simulated loss of flame. For that purpose, cut off the fuel supply (e.g. disconnect the fuel valve, risk of electric shock)	LME11…/LME41.051...: • Establishment of flame at the end of safety time (TSA) → Max. 3 repetitions • No establishment of flame at the end of safety time (TSA) → Non-alterable lockout LME2…/LME44...: Non-alterable lockout LME41.052.../LME41.053.../LME41.054.../LME41.071.../LME41.09.../LME44.190...: Repetition
c)	Burner operation with simulated air pressure failure (not with atmospheric burners)	Immediate non-alterable lockout LME41...: Safety shutdown / restart

Note!
Safety devices and switches in the line or the safety loop of the burner control must be checked in accordance with the specifications of the burner manufacturer.

Example:
Safety temperature limiter (STL) or gas pressure switch-min / gas pressure switch-max (Pmin / Pmax)

Applied directives:

- Low-voltage directive 2014/35/EC
- Directive for gas-fired appliances 2009/142/EC
- Directive for pressure devices 97/23/EC and 2014/68/EC (2016-07-16)
- Electromagnetic compatibility EMC (immunity) *) 2014/30/EC

*) The compliance with EMC emission requirements must be checked after the burner control is installed in equipment

Compliance with the regulations of the applied directives is verified by the adherence to the following standards / regulations:

- Automatic burner control systems for burners and appliances burning gaseous or liquid fuels DIN EN 298
- Safety and control devices for gas burners and gas burning appliances DIN EN 13611
- Automatic electrical controls for household and similar use Part 2-5: Particular requirements for automatic electrical burner control systems DIN EN 60730-2-5

The relevant valid edition of the standards can be found in the declaration of conformity!

Note on **DIN EN 60335-2-102**
Household and similar electrical appliances - Safety - Part 2-102:
Particular requirements for gas, oil and solid-fuel burning appliances having electrical connections. The electrical connections of the LME and the AGK11 comply with the requirements of EN 60335-2-102.

EAC Conformity mark (Eurasian Conformity mark)

ISO 9001:2008
ISO 14001:2004
OHSAS 18001:2007

China RoHS
Hazardous substances table:
http://www.siemens.com/download?A6V10883536

Standards and certificates (cont'd)

Product no.	DIN Geprüft	DVGW	TÜV CERT	AGA
LME11.230C2	---	●	●	---
LME11.330C2	---	●	●	●
LME21.130C1	●	●	●	---
LME21.130C2	●	●	●	●
LME21.230C2	●	●	●	●
LME21.330C1	●	●	●	---
LME21.330C2	●	●	●	●
LME21.350C1	●	●	●	---
LME21.350C2	●	●	●	●
LME21.550C2	●	●	●	●
LME22.131C2	●	●	●	●
LME22.231C2	●	●	●	●
LME22.232C2	●	●	●	●
LME22.233C2	●	●	●	●
LME22.331C1	●	●	●	---
LME22.331C2	●	●	●	●
LME23.331C2	●	●	●	●
LME23.351C2	●	●	●	●
LME41.051C2	---	●	●	---
LME41.052C2 *)	---	●	●	---
LME41.053C2 *)	---	●	●	---
LME41.054C2	---	●	●	---
LME41.071C2	---	●	●	---
LME41.091C2	---	●	●	---
LME41.092C2	---	●	●	---
LME44.056C2	---	●	●	●
LME44.057C1	---	●	●	---
LME44.057C2	---	●	●	●
LME44.190C2	---	●	●	●

*) On request

Service notes

The service adapters can only be used for a short time. They may only be used in supervised operation by qualified staff.

Lifetime

The burner control has a designed lifetime* of 250,000 burner startup cycles which, under normal operating conditions in heating mode, correspond to approx. 10 years of usage (starting from the production date given on the type field).
This lifetime is based on the endurance tests in the standard EN 298.
A summary of the conditions has been published by the European Control Manufacturers Association (Afecor) (www.afecor.org).

The designed lifetime is based on use of the burner controls according to the manufacturer's Data Sheet. After reaching the designed lifetime in terms of the number of burner startup cycles, or the respective time of usage, the burner control is to be replaced by authorized personnel.

* The designed lifetime is not the warranty time specified in the Terms of Delivery

Disposal notes

The unit contains electrical and electronic components and must not be disposed of together with domestic waste.
Local and currently valid legislation must be observed.

Mechanical design

LME...

- Units of plug-in design like their predecessor types LGB... and LMG... (see Dimensions)
- Burner controls LME… and plug-in base AGK11... are black
- The housing is made of impact-proof, heat-resistant and flame-retarding plastic. It is of plug-in design and engages audibly in the base
- The housing accommodates the
  - microcontroller for the control sequence and the control relays for load control
  - electronic flame signal amplifier (ionization)
  - lockout reset button with its integrated 3-color signal lamp for operational status and fault status messages and the socket for connecting the interface OCI400... or the lockout reset button extension AGK20...
- All safety-related digital inputs and outputs of the system are monitored by means of a contact feedback network

Versions

- Burner capacity unlimited (thermal output on startup ≤120 kW)
- 3 repetitions in the event of loss of flame during operation (LME11…/LME41.051…)
- Repetition in the event of loss of flame during operation (LME41.052…/LME41.053…/LME41.054…/LME41.071…/LME41.091…/ LME41.092…/LME44.190...)

Indication and diagnostics

- Multicolor indication for operational status and fault status messages via multicolor signal lamp in the lockout reset button
- Transmission of operational status and fault status messages and detailed service information via UDS communication at interface diagnostic mode (UDS)
- PC software ACS410 enabled via optical interface OCI400... a simple operation, comfortable readout of settings and operating states, trend recording and targeted diagnostic of LME…

Type summary

The product nos. applies to the LME… without plug-in base and without flame detector. For ordering information on plug-in bases and other accessories, see *Accessories*.

Flame detector	Article no.	Product no.	Mains voltage	tw approx. s	TSA max. s	t1 min. s	t3 approx. s	t3n approx. s	t4 approx. s	t10 min. s [3]	t11 min. s [1]	t12 min. s [1]	Repetition	Replacing…
Burner controls for 1-stage burners (up to 120 kW output)														
Ionization probe	BPZ:LME11.230C2	LME11.230C2	AC 230 V	2,5	3	20	2	2,5	---	5	---	---	3x	---
	BPZ:LME11.330C2	LME11.330C2	AC 230 V	2,5	3	30	2	2,5	---	5	---	---	3x	---
Burner controls for 2-stage burners, without actuator control														
Ionization probe or flame detector QRA... [4] with AGQ3...A27	BPZ:LME21.130C1	LME21.130C1	AC 120 V	2,5	3	7	2	2,5	8	5	---	---	---	LGB21.130A17
	BPZ:LME21.130C2	LME21.130C2	AC 230 V	2,5	3	7	2	2,5	8	5	---	---	---	LGB21.130A27 LMG21.130B27
	BPZ:LME21.230C2	LME21.230C2	AC 230 V	2,5	3	20	2	2,5	8	5	---	---	---	LGB21.230A27 LMG21.230B27
	BPZ:LME21.330C1	LME21.330C1	AC 120 V	2,5	3	30	2	2,5	8	5	---	---	---	---
	BPZ:LME21.330C2	LME21.330C2	AC 230 V	2,5	3	30	2	2,5	8	5	---	---	---	LGB21.330A27 LMG21.330B27
	BPZ:LME21.350C1	LME21.350C1	AC 120 V	2,5	5	30	2	4,5	10	5	---	---	---	LGB21.350A17
	BPZ:LME21.350C2	LME21.350C2	AC 230 V	2,5	5	30	2	4,5	10	5	---	---	---	LGB21.350A27 LMG21.350B27
	BPZ:LME21.550C2	LME21.550C2	AC 230 V	2,5	5	50	2	4,5	10	5	---	---	---	LGB21.550A27

Legend

TSA	Safety time
tw	Waiting time
t1	Prepurge time
t3	Preignition time
t3n	Postignition time
t4	Interval between ignition OFF and release of fuel valve 2
t10	Specified time for air pressure signal
t11	Programmed opening time for actuator
t12	Programmed closing time for actuator
t22	2nd safety time

1) Max. running time available for actuator. Actuator running time must be shorter
2) 2nd safety time + response time of flame relay
3) Approx. 180 s
4) Only used for AC 230 V

Type summary (cont'd)

The product nos. applies to the LME… without plug-in base and without flame detector. For ordering information on plug-in bases and other accessories, see *Accessories*.

Flame detector	Article no.	Product no.	Mains voltage	tw approx. s	TSA max. s	t1 min. s	t3 approx. s	t3n approx. s	t4 approx. s	t10 min. s [3]	t11 min. s [1]	t12 min. s [1]	Repetition	Replacing…
Burner controls for 2-stage burners, with actuator control														
Ionization probe or flame detector QRA... [4] with AGQ3...A27	BPZ:LME22.131C2	LME22.131C2	AC 230 V	2,5	3	7	3	2,5	8	3	12	12	---	LGB22.130A27 LMG22.130B27
	BPZ:LME22.231C2	LME22.231C2	AC 230 V	2,5	3	20	3	2,5	8	3	12	12	---	---
	BPZ:LME22.232C2	LME22.232C2	AC 230 V	2,5	3	20	3	2,5	8	3	16,5	16,5	---	LGB22.230A27 LGB22.230B27 LMG22.230B27
	BPZ:LME22.233C2	LME22.233C2	AC 230 V	2,5	3	20	3	2,5	8	3	30	30	---	LMG22.233B27
	BPZ:LME22.331C1	LME22.331C1	AC 120 V	2,5	3	30	3	2,5	8	3	12	12	---	LGB22.330A17
	BPZ:LME22.331C2	LME22.331C2	AC 230 V	2,5	3	30	3	2,5	8	3	12	12	---	LGB22.330A27 LMG22.330B27
Burner controls for 2-stage burners, with actuator control														
Blue-flame detector QRC…	BPZ:LME23.331C2	LME23.331C2	AC 230 V	2,5	3	30	3	2,5	8	3	12	12	---	LGB32.330A27
	BPZ:LME23.351C2	LME23.351C2	AC 230 V	2,5	5	30	1	4,5	10	3	12	12	---	LGB32.350A27

Legend

TSA	Safety time
tw	Waiting time
t1	Prepurge time
t3	Preignition time
t3n	Postignition time
t4	Interval between ignition OFF and release of fuel valve 2
t10	Specified time for air pressure signal
t11	Programmed opening time for actuator
t12	Programmed closing time for actuator
t22	2nd safety time

1) Max. running time available for actuator. Actuator running time must be shorter
2) 2nd safety time + response time of flame relay
3) Approx. 180 s
4) Only used for AC 230 V

Type summary (cont'd)

The product nos. applies to the LME… without plug-in base and without flame detector. For ordering information on plug-in bases and other accessories, see *Accessories*.

Flame detector	Article no.	Product no.	Mains voltage	TSA max. s	tw approx. s	t1´ min. s	t3 approx. s	t3n approx. s	t4 approx. s	t22 approx. s	Repetition	Replacing…
Burner controls for atmospheric burners												
Ionization probe or flame detector QRA... [1] with AGQ3...A27	BPZ:LME41.051C2	LME41.051C2	AC 230 V	5	2,5	1	1	4,5	---	---	3x	---
	BPZ:LME41.052C2	LME41.052C2	AC 230 V	5	2,5	1	10	4,5	---	---	●	On request
	BPZ:LME41.053C2	LME41.053C2	AC 230 V	5	2,5	10	1	4,5	---	---	●	On request
	BPZ:LME41.054C2	LME41.054C2	AC 230 V	5	2,5	1	1	4,5	---	---	●	LGD12.05A27[2)3)]
	BPZ:LME41.071C2	LME41.071C2	AC 230 V	10	2,5	10	1	9	---	---	●	---
	BPZ:LME41.091C2	LME41.091C2	AC 230 V	10	2,5	1	10	9	---	---	●	---
	BPZ:LME41.092C2	LME41.092C2	AC 230 V	10	2,5	1	1	9	---	---	●	LGD12.01A27[2)3)]
Burner controls for atmospheric burners												
Ionization probe or flame detector QRA... [1] with AGQ3...A27	BPZ:LME44.056C2	LME44.056C2	AC 230 V	5	16	9	2	4,5	10	5	---	LGB41.255A27
	BPZ:LME44.057C1	LME44.057C1	AC 120 V	5	16	9	2	4,5	10	8	---	LGB41.258A17
	BPZ:LME44.057C2	LME44.057C2	AC 230 V	5	16	9	2	4,5	10	8	---	LGB41.258A27
	BPZ:LME44.190C2	LME44.190C2	AC 230 V	10	2,5	12	0,5	9,5	25	---	●	---

Legend

TSA	Safety time
tw	Waiting time
t1'	Prepurge time
t3	Preignition time
t3n	Postignition time
t4	Interval between ignition OFF and release of fuel valve 2
t22	2nd safety time

1) Max. running time available for actuator. Actuator running time must be shorter
2) Only suitable for 1-stage operation
3) Not pin-compatible

Service adapter **KF8872**

- For checking the functioning of burner controls in the burner plant
- For functional tests with signal lamps
- For measuring the detector current via Ø 4 mm jacks

Note!
With no load on the output terminals, the respective signal lamp may light up.

Accessories (to be ordered separately)

Connection accessories for small burner controls

Plug-in base **AGK11**
To connect the small-capacity burner controls to the burner plant.
Refer to Data Sheet N7201

Cable holder **AGK66**
For plug-in base AGK11.
Refer to Data Sheet N7201

Cable holder **AGK65**
For plug-in base AGK11.
Refer to Data Sheet N7201

Flame detector

UV flame detector **QRA2**
Only in conjunction with ancillary unit AGQ3
Refer to Data Sheet N7712

UV flame detector **QRA10**
Only in conjunction with ancillary unit AGQ3
Refer to Data Sheet N7712

UV flame detector **QRA4**
Only in conjunction with ancillary unit AGQ3
Refer to Data Sheet N7711

Blue-flame detector **QRC**
Refer to Data Sheet N7716

Frontal illumination

Lateral illumination

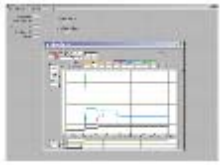
Ionization probe
To be supplied by customer

Service tools

Optical Interface **OCI400**
- Optical interface between burner control and PC
- Facilitates viewing and recording setting parameters on site using the ACS410 software

Refer to Data Sheet N7614

PC Software **ACS410**
For setting the parameters and for visualizing the burner controls.
Refer to Software Documentation J7352



Actuators

Actuator **SQN3**
Refer to Data Sheet N7808

Actuator **SQN7**
Refer to Data Sheet N7804

Actuator **SQN9**
Refer to Data Sheet N7806

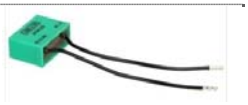
Others

Valve proving system **LDU11** (only LME2)
Designed to check the tightness of shutoff valves in connection with gas burners and gas devices. In the event of inadmissible leakage, the system prevents the burner from starting up.
Refer to Data Sheet N7696

RC unit **ARC 4 668 9066 0**
For the supervision of ionization currents in networks with non-earthed neutral conductor

PTC resistor **AGK25**

- AC 230 V
- To burden terminal 3 (for burners without fan motor



Ancillary unit **AGQ3**
For UV supervision. Can be fitted under the plug-in base.
AGQ3.1A27: Cable length 500 mm
AGQ3.2A27: Cable length 300 mm

Reset button extension **AGK20**

General unit data

Mains voltage	AC 120 V +10%/-15% AC 230 V +10%/-15%
Mains frequency	50...60 Hz ±6%
Power consumption	12 VA
External primary fuse (Si)	Max. 10 A (slow)
Mounting position	Optional
Input current at terminal 12	Max. 5 A
Weight	Approx. 160 g
Safety class I (burner control with plug-in base)	In accordance with DIN EN 60730-1 For applications without safe separation. Protection against electric shock is achieved through double or reinforced insulation. Provision for the protective earth connection is made in the plug-in base AGK11.
Details in accordance with DIN EN 60730-1:2012	
Type of shutdown or interruption for each circuit	Shutdown with micro switch, 1-pole Mode of operation type 2 B
Degree of protection	IP40 (to be ensured through mounting)
Rated surge voltage category III (DIN EN 60664)	
• LME total unit	4 kV
• Creepage distances and air gaps	2.5 kV due to voltage limitation measures
Pollution degree	2 in accordance with DIN EN 60730-1
Software class	Class C in accordance with DIN EN 60730-2-5:2011 2-channel structure
Reaction time in the event of loss of flame	Max. 1 s
Perm. cable length terminal 1	Max. 1 m at a line capacitance of 100 pF/m , unshielded (max. 3 m at 15 pF/m)
Perm. cable length from QRA… to AGQ3…A27 (lay separate cable)	Max. 20 m at 100 pF/m, unshielded
Remote lockout reset laid separately	Max. 20 m at 100 pF/m, unshielded
Perm. cable length terminals 8 and 10	Max. 20 m at 100 pF/m, unshielded (lay separate cable)
Perm. cable lengths other terminals	Max. 3 m at 100 pF/m, unshielded

Perm. terminal load	At $\cos\varphi \geq 0.6$	At $\cos\varphi = 1$
- Terminal 3	Max. 2.7 A (15 A for max. 0.5 s → only LME2…)	Max. 3 A
- Terminals 4, 5, 7 and 9 (11)	Max. 1.7 A	Max. 2 A
- Terminal 10	Max. 1 A	Max. 1 A

Environmental conditions

Storage	DIN EN 60721-3-1
Climatic conditions	Class 1K3
Mechanical conditions	Class 1M2
Temperature range	-20...60 °C
Humidity	<95% r.h.
Transport	DIN EN 60721-3-2
Climatic conditions	Class 2K2
Mechanical conditions	Class 2M2
Temperature range	-20...60 °C
Humidity	<95% r.h.
Operation	DIN EN 60721-3-3
Climatic conditions	Class 3K3
Mechanical conditions	Class 3M3
Temperature range	-20... 60 °C
Humidity	<95% r.h.
Installation altitude	Max. 2,000 m above sea level

Warning!
Condensation, formation of ice and ingress of water are not permitted!
If this is not observed, there is a risk of loss of safety functions and a risk of electric shock.

AGK11...

Connectable conductor cross-sections	
• Terminals 1...12	Min. 0.5 mm² Max. 1.5 mm² Wire or stranded wire with ferrules
• Auxiliary terminals N, PE, 31, 32	Min. 0.5 mm² Max. 1.5 mm² Wire or stranded wire with ferrules (when connecting 2 wires or stranded wires per terminal, the same cross-sectional areas must be used for each terminal)

Flame supervision with ionization probe

	At mains voltage	
	UN = AC 120 V [1])	UN = AC 230 V [1])
Detector voltage between ionization probe and ground (AC voltmeter Ri ≥10 MΩ)	AC 50...120 V	AC 115...230 V
Switching threshold (limit values): Switching on (flame ON) (DC ammeter Ri ≤5 kΩ) Switching off (flame OFF) (DC ammeter Ri ≤5 kΩ)	 ≥DC 1.5 µA ≤DC 0.5 µA	 ≥DC 1.5 µA ≤DC 0.5 µA
Detector current required for reliable operation	≥DC 3 µA	≥DC 3 µA
Switching threshold in the event of poor flame during operation (signal lamp flashes green)	Approx. DC 5 µA	Approx. DC 5 µA
Short-circuit current between ionization probe and ground (AC ammeter Ri ≤5 kΩ)	Max. AC 50...150 µA	Max. AC 100...300 µA
Possible detector current in operation	Max. 20 µA	Max. 20 µA

[1]) For applications outside the European Union, operation at mains voltage AC 120 V/AC 230 V ±10% is ensured

Note!
With the same quality of flame, the detector current with the LME… may be different from than with LMG…/LGB…

Flame supervision with ionization is accomplished by making use of the conductivity and rectifying effect of the flame.

The DC current that flows in the presence of a flame (ionization current) is largely proportional to the flame quality. This current is measured in the flame signal amplifier.

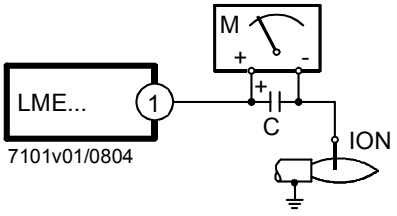
The amplifier is designed such that it only responds to the DC current component of the flame signal. This ensures that a short circuit between the ionization probe and ground cannot simulate a flame signal (since in that case AC current would flow).

Note!
The ignition (ignition spark) can have a negative effect on the ionization current formation during startup.

To minimize the impact
- the positioning of the ionization probe must be checked and optimized
- it may be beneficial to replace the electrical connections (phase / neutral) on the primary side of the ignition transformer

A short-circuit between ionization probe and ground initiates a non-alterable lockout.

Measuring circuit



Legend

C Electrolytic capacitor 100...470 µF; DC 10...25 V
ION Ionization probe
M Microammeter, Ri max. 5,000 Ω

For detector currents, see Technical data.

Only in connection with LMExx.xxxx2 (AC 230 V)!

Flame supervision with AGQ3…A27 and UV detector QRA...

Mains voltage	AC 230 V +10%/-15%
Mains frequency	50...60 Hz ±6%
Perm. cable length from QRA... to AGQ3…A27 (lay separate cable)	Max. 20 m, unshielded
Perm. cable length from AGQ3...A27 to LMExx.xxxx2	Max. 2 m, unshielded
Weight of AGQ3...A27	Approx. 140 g
Perm. mounting position	Optional
Degree of protection	IP40, to be ensured through mounting
Power consumption	4.5 VA

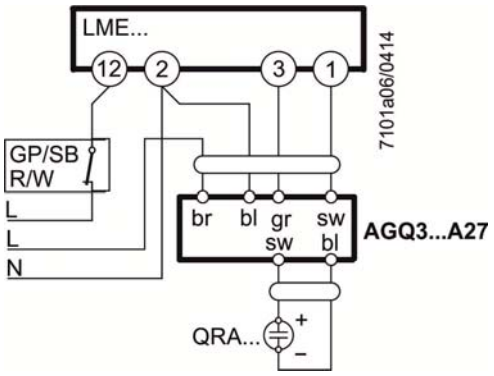
	At mains voltage U_N	
	AC 220 V	AC 240 V
Detector voltage at QRA... (with no load)		
Terminal 3 OFF (refer to control sequence)	DC 400 V	DC 400 V
Terminal 3 ON (refer to control sequence)	DC 300 V	DC 300 V
Detector voltage Load by DC measuring instrument Ri >10 MΩ		
Terminal 3 OFF (refer to control sequence)	DC 380 V	DC 380 V
Terminal 3 ON (refer to control sequence)	DC 280 V	DC 280 V
DC current detector signals with flame detector QRA...	**Min. required**	**Max. possible**
Measurement at the flame detector QRA…	200 µA	500 µA

Ancillary unit AGQ3...A27

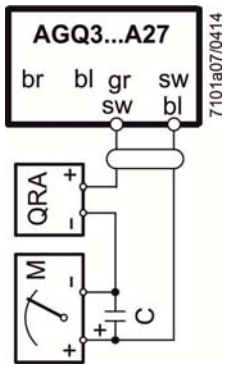
In connection with burner controls LMExx.xxxx2, use of UV ancillary unit AGQ3...A27 is mandatory.

Correct functioning of aged UV cells can be checked as UV test with a higher supply voltage across the UV cell after controlled shutdown until terminal 3 ON.

Connection diagram



Measuring circuit for measuring the UV flame current



Measurement made at the flame detector QRA…

Legend

C	Electrolytic capacitor 100...470 µF; DC 10...25 V	bl	Blue
M	Microammeter Ri max. 5,000 Ω	br	Brown
QRA...	Flame detector	gr	Grey
GP	Pressure switch		(old: rt = red)
SB	Safety limiter	sw	Black
R	Control thermostat or pressurestat		
W	Limit thermostat or pressure switch		

Flame supervision with QRC...
(only LME23…)

	Detector current required (with flame)	Perm. detector current (without flame)	Possible detector current with flame (typically)
QRC...	Min. 40 µA	Max. 5,5 µA	Max. 60 µA

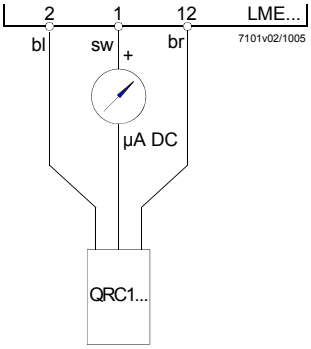
The values given in the table above only apply under the following conditions:
- Mains voltage AC 120 V/AC 230 V
- Ambient temperature 23 °C

Green signal lamp for indication of operating state

	Detector current in operation: - Flame signal instable - Green signal lamp flashing	Detector current in operation: - Flame signal stable - Green signal lamp steady on
QRC...	<45 µA	>45 µA

The values given in the table above only apply under the following conditions:
- Mains voltage AC 120 V/AC 230 V
- Ambient temperature 23 °C

Measuring circuit for detector current



Legend

µA DC	DC microammeter with an internal resistance of Ri = max. 5 kΩ
bl	Blue
sw	Black
br	Brown

As an alternative to detector current measurement, the OCI400.../ACS410 diagnostics tool can be used. In that case, the DC microammeter is not required.

Functions

Preconditions for burner startup

- Burner control must be reset
- All contacts in the line are closed, request for heat
- No undervoltage
- Air pressure switch must be in its no-load position
- Fuel valve 1 is connected
- Fan motor or AGK25 is connected (not at LME4...)
- Flame detector is darkened and there is no extraneous light

LME41...

- Air pressure switch must be in its no-load position or DBR1

LME44...

- CPI in its no-load position or DBR2

Undervoltage

- Safety shutdown from the operating position takes place should mains voltage drop below about AC 75 V (at U_N = AC 120 V)
- Restart is initiated when mains voltage exceeds about AC 95 V (at U_N = AC 120 V)
- Safety shutdown from the operating position takes place should mains voltage drop below about AC 165 V (at U_N = AC 230 V)
- Restart is initiated when mains voltage exceeds about AC 175 V (at U_N = AC 230 V)

Controlled intermittent operation

After no more than 24 hours of continuous operation, the burner control will initiate automatic controlled shutdown followed by a restart.

Control sequence in the event of fault

If a non-alterable lockout occurs, the outputs for the fuel valves, the burner motor and the ignition equipment are always immediately deactivated (<1 s).

Cause	Response
Mains voltage failure	Restart
Voltage below undervoltage threshold	Safety shutdown
Voltage above undervoltage threshold	Restart
Extraneous light during prepurge time (t1)	Non-alterable lockout
Extraneous light during waiting time (tw)	Start prevention, a non-alterable lockout occurs after a maximum of 30 seconds LME41.051..., LME41.054..., LME41.092...: Prevention of startup
No flame at the end of safety time (TSA)	LME11…, LME41.051...: Maximum of 3 repetitions, then a non-alterable lockout occurs at the end of the safety time (TSA) LME2…, LME41.052..., LME41.053..., LME41.054..., LME41.071..., LME41.09..., LME44.190...: Non-alterable lockout at the end of the safety time (TSA)
Loss of flame during operation	LME11…, LME41.051...: • Establishment of flame at the end of safety time → Max. 3 repetitions • No establishment of flame at the end of safety time → Non-alterable lockout LME2…: Non-alterable lockout LME41.052..., LME41.053..., LME41.054..., LME41.071..., LME41.09..., LME44.190...: Repetition
Air pressure switch welded in working position LME41...: No reaction	Start prevention, a non-alterable lockout occurs after 65 seconds
Air pressure switch welded in no-load position - Error with valve proving (only in conjunction with LDU11...) LME41...: Air pressure switch welded in no-load position or no connection (jumper) between terminal 3 and terminal 11	Non-alterable lockout approx. 180 seconds after the specified time (t10) has elapsed
No air pressure signal after completion specified time LME41…: No air pressure signal after completion specified time or breakdown of jumper terminal 3/terminal 11	Non-alterable lockout LME41...: Safety shutdown/restart
CPI contact is open during waiting time	Start prevention, a non-alterable lockout occurs after 60 seconds

In the event of a non-alterable lockout, the LME remains locked and the red signal lamp lights up permanently.
The burner control can immediately be reset. This state is also maintained in the case of mains failure.

Resetting the burner control

After a non-alterable lockout, a reset can be carried out immediately.
To do this, press the lockout reset button for about 1 second (<3 seconds). The LME… can only be reset when all contacts in the line are closed and when there is no undervoltage.

Limitation of repetitions (only LME11…, LME41.051...)

If no flame is established at the end of the safety time (TSA), or if the flame is lost during operation, a maximum of 3 repetitions per controlled startup can be performed via temperature controller/ control pressurestat, or else a non-alterable lockout will be initiated.
Counting of repetitions is restarted each time a controlled startup via control thermostat or pressurestat takes place.

PC software ACS410

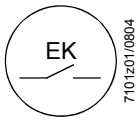
Purpose of PC software:

The PC software is a component of the LME… system and serves primarily as an operator module for the following basic tasks:

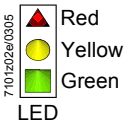
- Visualization of system state with the following data:
  - Parameters
  - Process data
- Reset

Note!
For operating and commissioning instructions, refer to Installation and Operating Instructions J7352.

Operation



Lockout reset button is the key operating element for resetting the burner control and for activating/deactivating the diagnostics functions.



The multicolor signal lamp in the lockout reset button is the key indicating element for visual diagnostics and interface diagnostics.

Both (lockout reset button/signal lamp) are located under the transparent cover of the lockout reset button.

There are 2 diagnostics choices:

1. Visual diagnostics: Operational status indication or diagnostics of the cause of fault.
2. Interface diagnostics: With the help of the interface OCI400... and the PC software ACS410 or flue gas analyzers of different makes.

Visual diagnostics:
In normal operation, the different operating states are indicated in the form of color codes according to the color code table given below.

Operational status indication

During startup, status indication takes place according to the following table:

Color code table for multicolor signal lamp (LED)

Status	Color code	Color
Waiting time (tw), other waiting states	○	OFF
Air pressure switch – waiting phase, prepurging	●	Yellow
Ignition phase, ignition controlled	○●○●○●○●○●○	Flashing yellow
Operation, flame ok	■	Green
Operation, flame not ok	○■○■○■○■○■○	Flashing green
Extraneous light on burner startup	■▲■▲■▲■▲■▲■	Green-red
Undervoltage	●▲●▲●▲●▲●▲●▲	Yellow-red
Fault, alarm	▲	Red
Error code output (see Error code table)	○▲○▲○▲○▲○▲○	Flashing red
Interface diagnostics	▲▲▲▲▲▲▲▲▲▲▲▲	Red flicker light

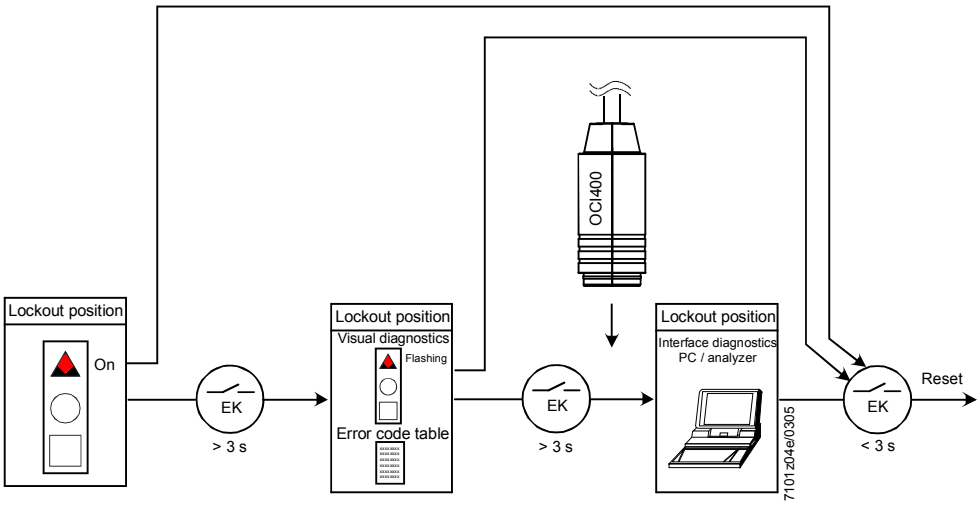
Legend

..... Steady on
○ OFF
▲ Red
● Yellow
■ Green

Diagnostics of the cause of fault

After a non-alterable lockout, the red signal lamp lights up.
In that condition, visual diagnostics of the cause of fault according to the error code table can be activated by pressing the lockout reset button for more than 3 seconds. Pressing the lockout reset button again for at least 3 seconds, interface diagnostics will be activated. Interface diagnostics works only if the lockout reset button extension AGK20… is not fitted. If, by accident, interface diagnostics has been activated, in which case the slightly red light of the signal lamp flickers, it can be deactivated by pressing again the lockout reset button for at least 3 seconds. The instant of switching over is indicated by a yellow light pulse.

The following sequence activates the diagnostics of the cause of fault:

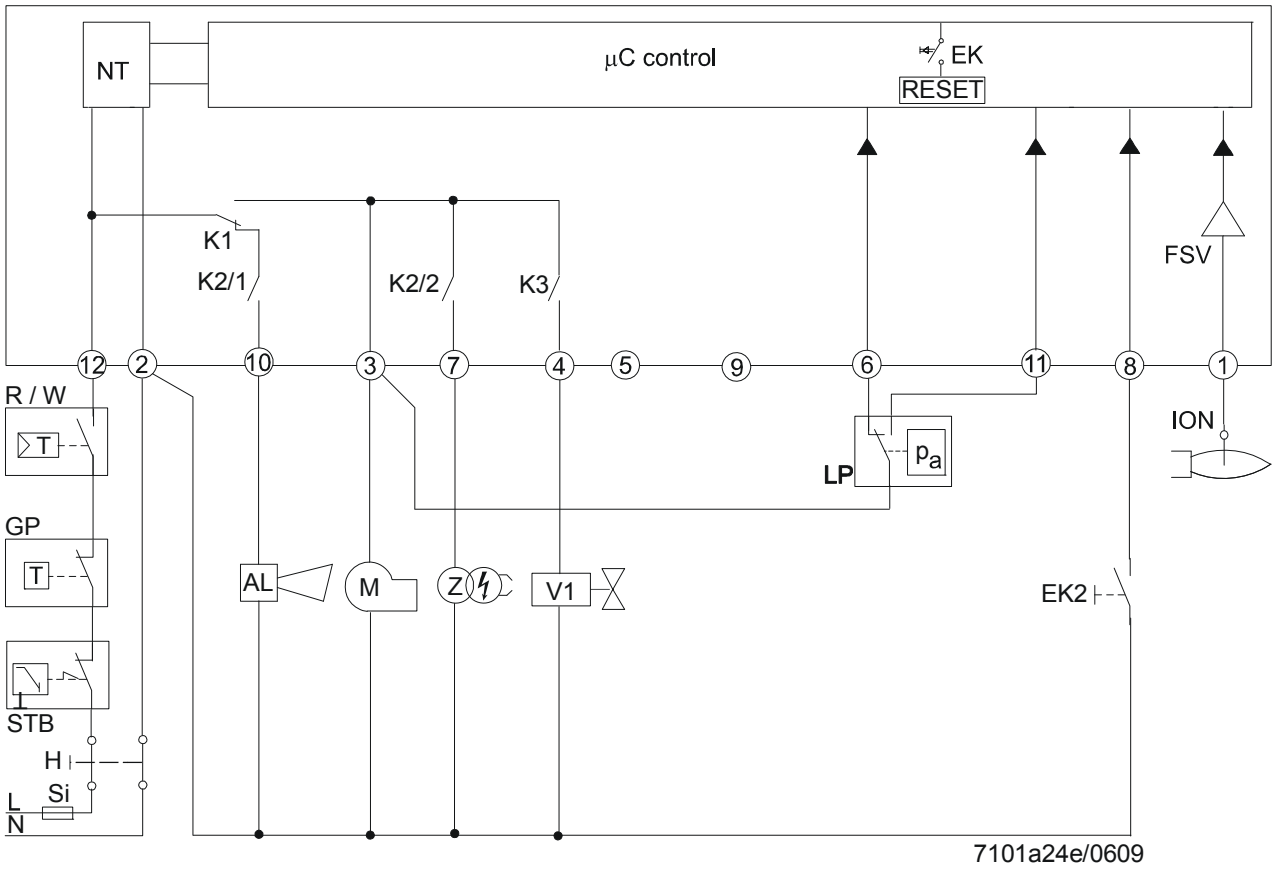


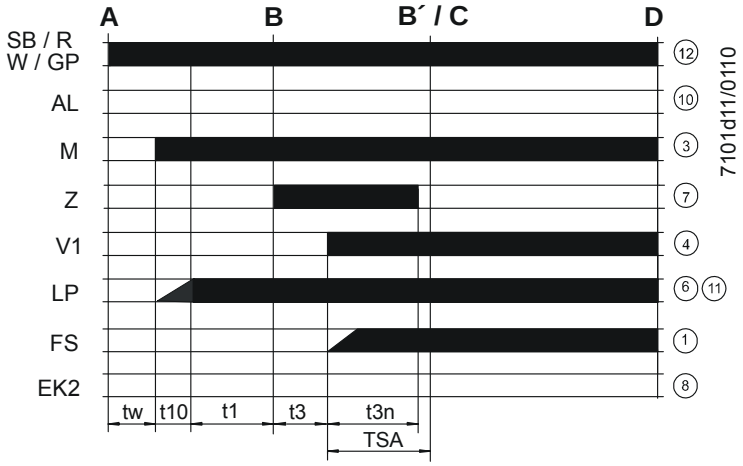
Error code table

Red blink code of signal lamp (LED)	Alarm at term. 10	Possible cause
2 blinks	ON	No establishment of flame at the end of safety time (TSA) - Faulty or soiled fuel valves - Faulty or soiled flame detector - Poor adjustment of burner, no fuel - Faulty ignition equipment
3 x blinks	ON	Air pressure switch faulty - Loss of air pressure signal after specified time (t10) - Air pressure switch welded in normal position - Fault during valve proving (only in conjunction with LDU11)
4 blinks	ON	Extraneous light when burner is started up
5 blinks	ON	Air pressure switch time supervision - Air pressure switch welded in working position
6 blinks	ON	Free
7 blinks	ON	Too many losses of flame during operation (limitation of repetitions) - Faulty or soiled fuel valves - Faulty or soiled flame detector - Poor adjustment of burner
8 x blinks	ON	Free
9 blinks	ON	Free
10 blinks	OFF	Wiring error or internal error, output contacts, other faults
14 blinks	ON	CPI contact not closed

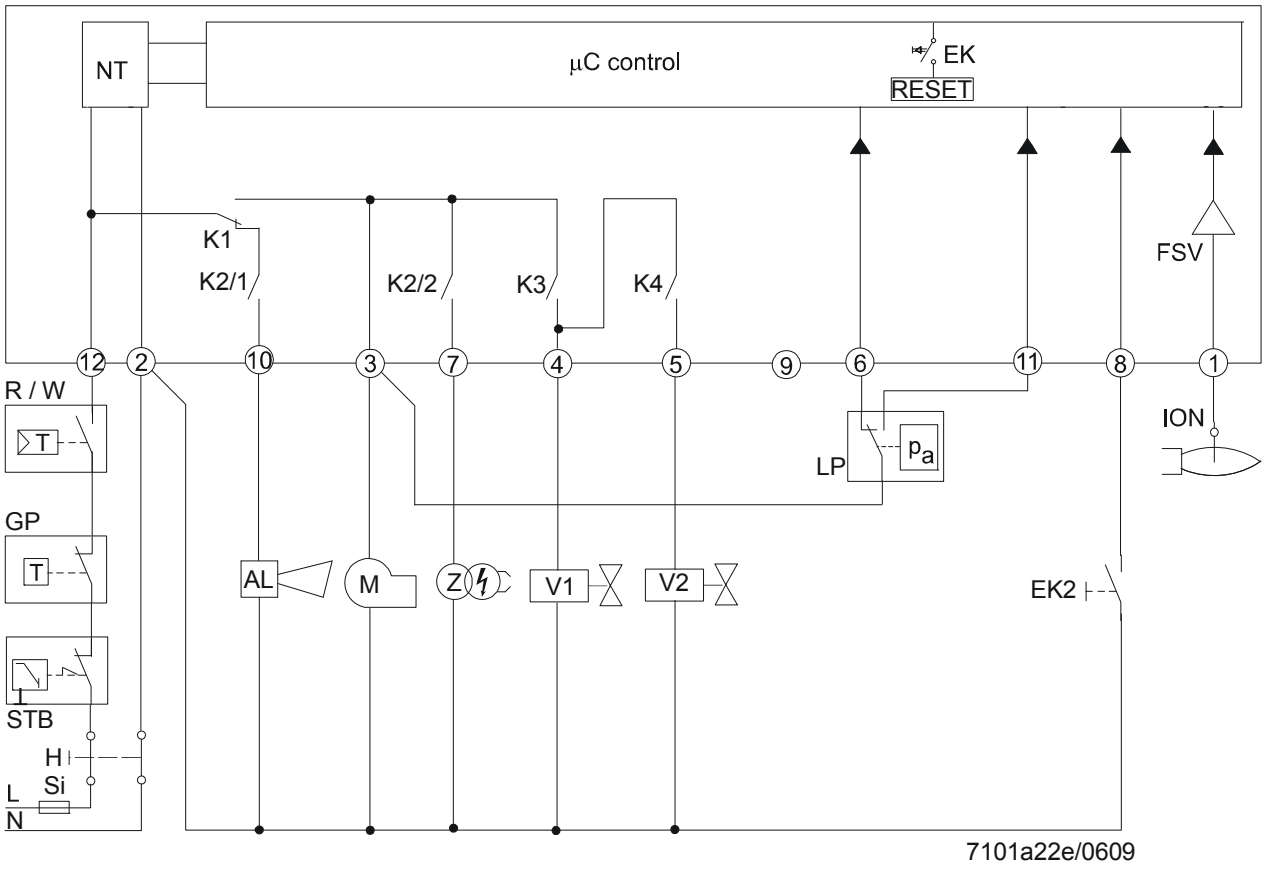
During the time the cause of fault is diagnosed, the control outputs are deactivated
- Burner remains shut down
- External fault indication remains deactivated
- Fault status signal (alarm) at terminal 10, according to the error code table

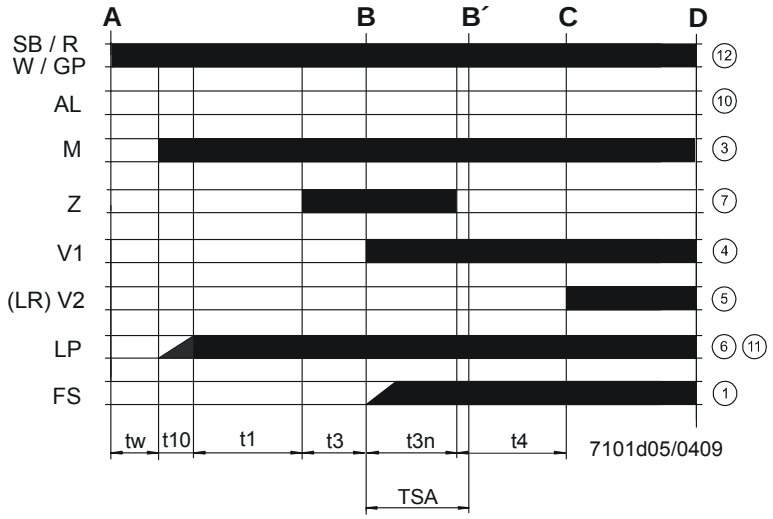
The diagnostics of the cause of fault is quit and the burner switched on again by resetting the burner control. Press the lockout reset button for about 1 second (<3 seconds).


NT
µC control
EK
RESET
K1
K2/1
K2/2
K3
FSV
12
2
10
3
7
4
5
9
6
11
8
1
R / W
T
GP
T
STB
H
Si
L
N
AL
M
Z
V1
LP
pa
ION
EK2
7101a24e/0609


A
B
B´ / C
D
SB / R
W / GP
AL
M
Z
V1
LP
FS
EK2
12
10
3
7
4
6
11
1
8
tw
t10
t1
t3
t3n
TSA
7101d11/0110

Inputs and outputs/internal connection diagram/control sequence of LME21…

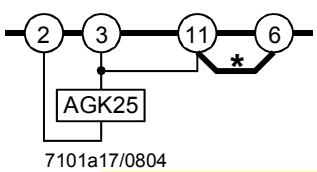




Application examples only LME11…/LME21…/LME22…

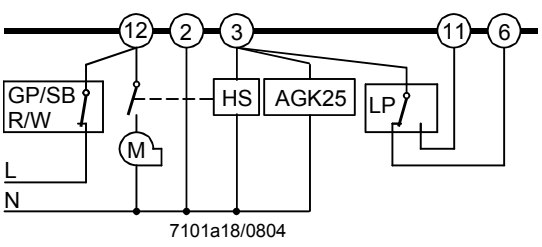
Caution!
The connection diagrams shown are merely examples which must be verified in the individual case depending on the application!

Burner without fan and without air pressure switch



*** Note!**
Different from LGB...

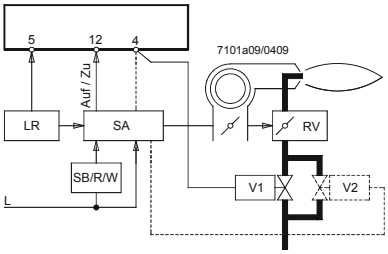
Only for burner with fan control via auxiliary contactor with air pressure switch

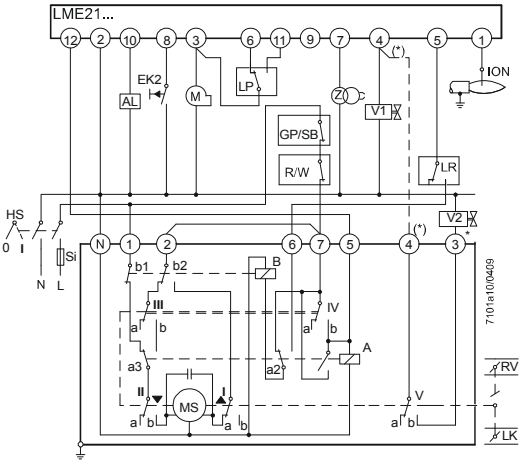


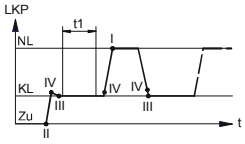
Caution!
The connection diagrams shown are merely examples which must be verified in the individual case depending on the application!

Control of actuators of 2-stage or 2-stage modulating burners. Controlled prepurging with low-fire air volume. Same low-fire actuator position during startup and operation.

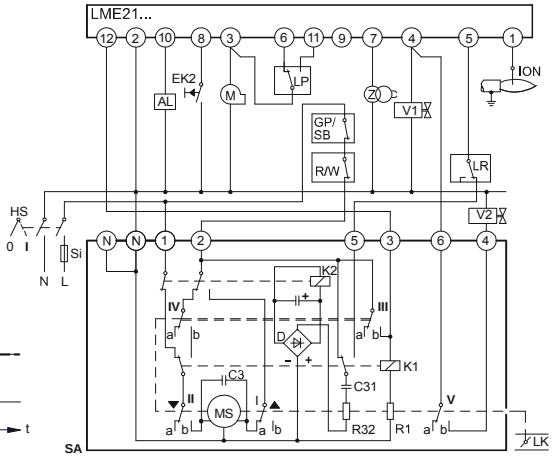
For information about actuators (SA)::
SQN3...: Refer to Data Sheet N7808
SQN7…: Refer to Data Sheet N7804
SQN9...: Refer to Data Sheet N7806





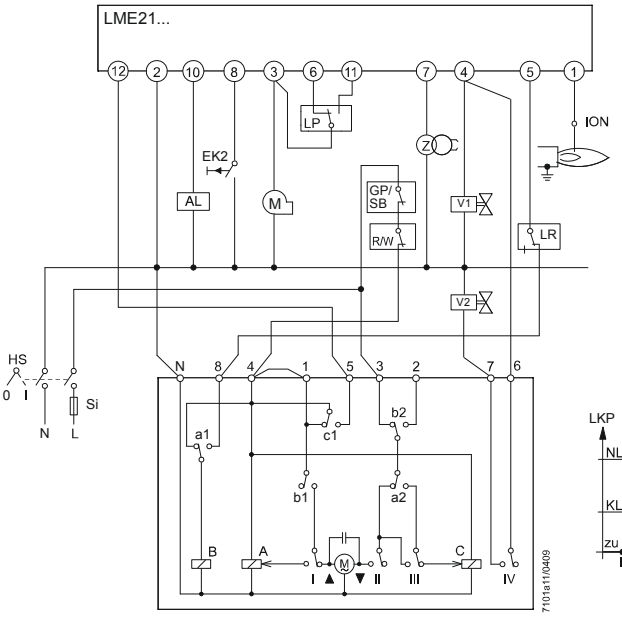


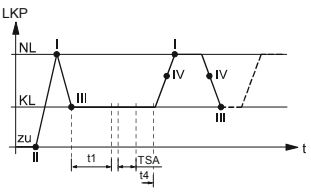
SQN3...121... / 2-stage control



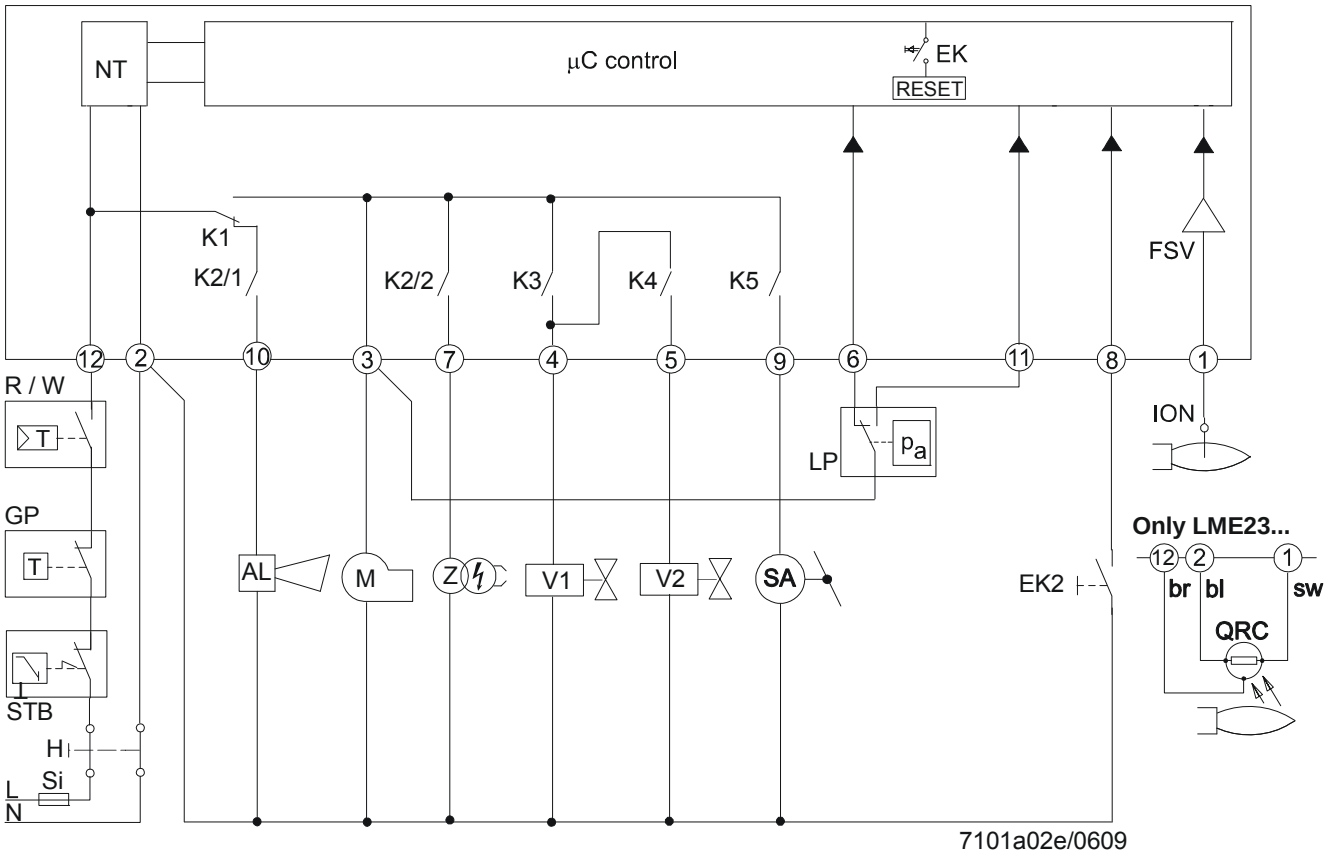
SQN91.140... / 2-stage control

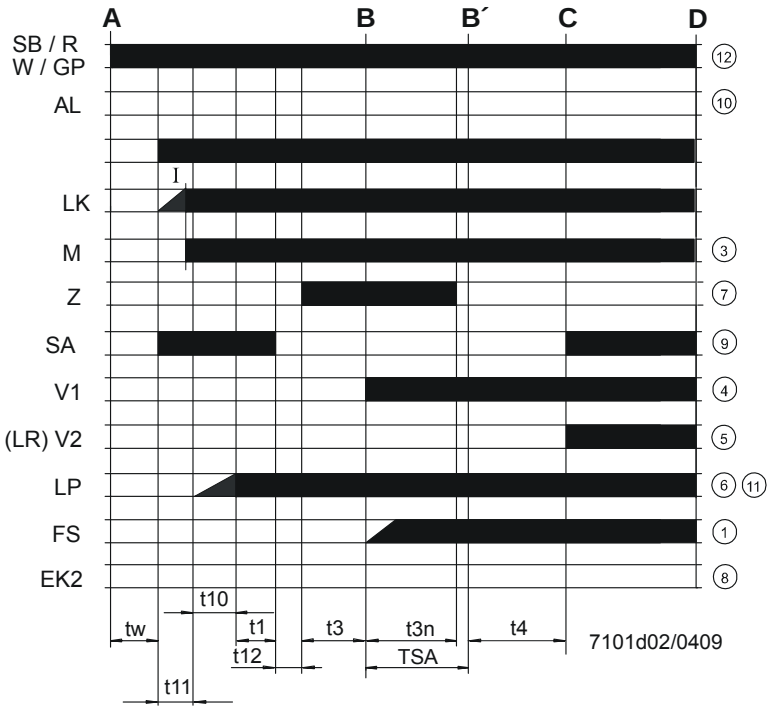
*** Note**
With 2-stage modulating burners (with gas regulation damper (RV)), fuel valve (V2) and the dotted connection between terminals (*) are not required.





SQN7...244 / 2-stage control

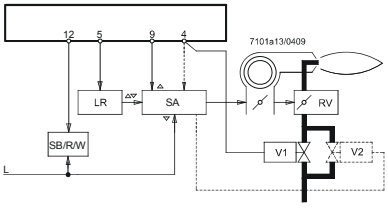

NT
µC control
EK
RESET
K1
K2/1
K2/2
K3
K4
K5
FSV
12
2
10
3
7
4
5
9
6
11
8
1
R / W
T
GP
T
STB
H
Si
L
N
LP
pa
ION
AL
M
Z
V1
V2
SA
EK2
Only LME23...
12
2
1
br
bl
sw
QRC
7101a02e/0609

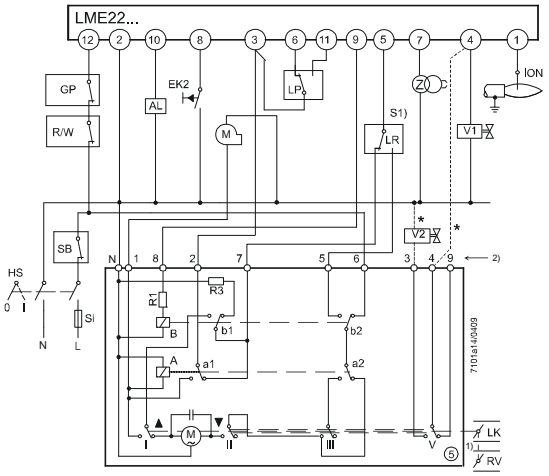

A
B
B´
C
D
SB / R W / GP
AL
LK
M
Z
SA
V1
(LR) V2
LP
FS
EK2
12
10
I
3
7
9
4
5
6
11
1
8
t10
tw
t1
t3
t3n
t4
t12
TSA
t11
7101d02/0409

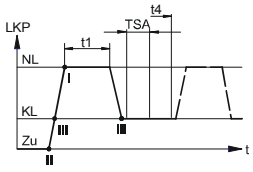
Caution!
The connection diagrams shown are merely examples which must be verified in the individual case depending on the application!

Control of actuators of 2-stage or 2-stage modulating burners. Controlled prepurging with high-fire air volume.

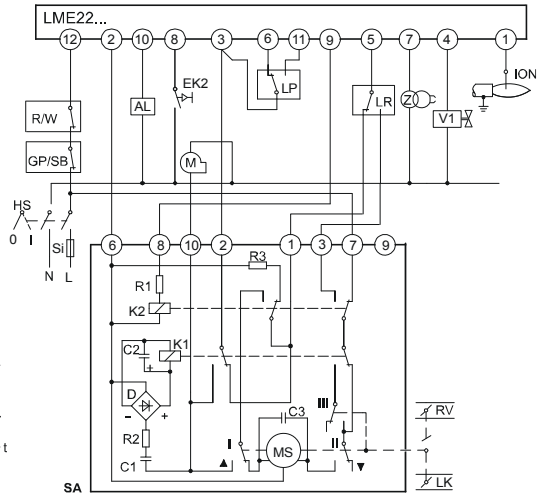
For information about actuators:
SQN3...: Refer to Data Sheet N7808
SQN7...: Refer to Data Sheet N7804
SQN9...: Refer to Data Sheet N7806





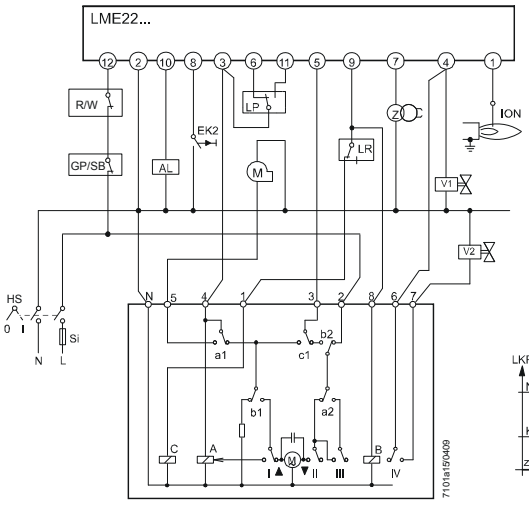


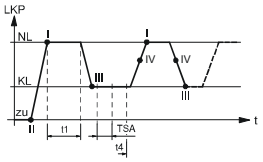
SQN3...151... or SQN3...251...

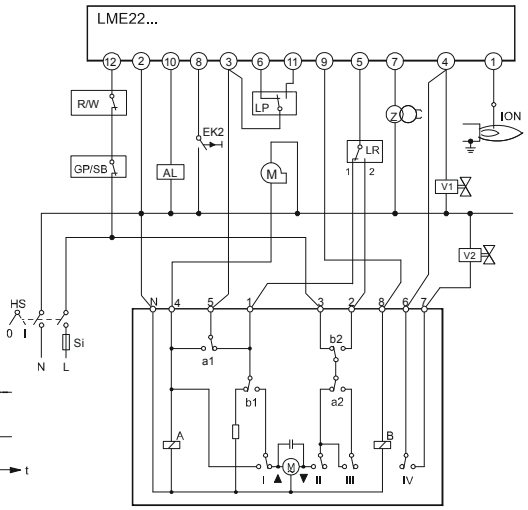


SQN90.220... / 2-stage modulating control

*** Note**
With 2-stage modulating burners (with gas regulation damper (RV)), fuel valve (V2) and the dotted connection between terminals (*) are not required.



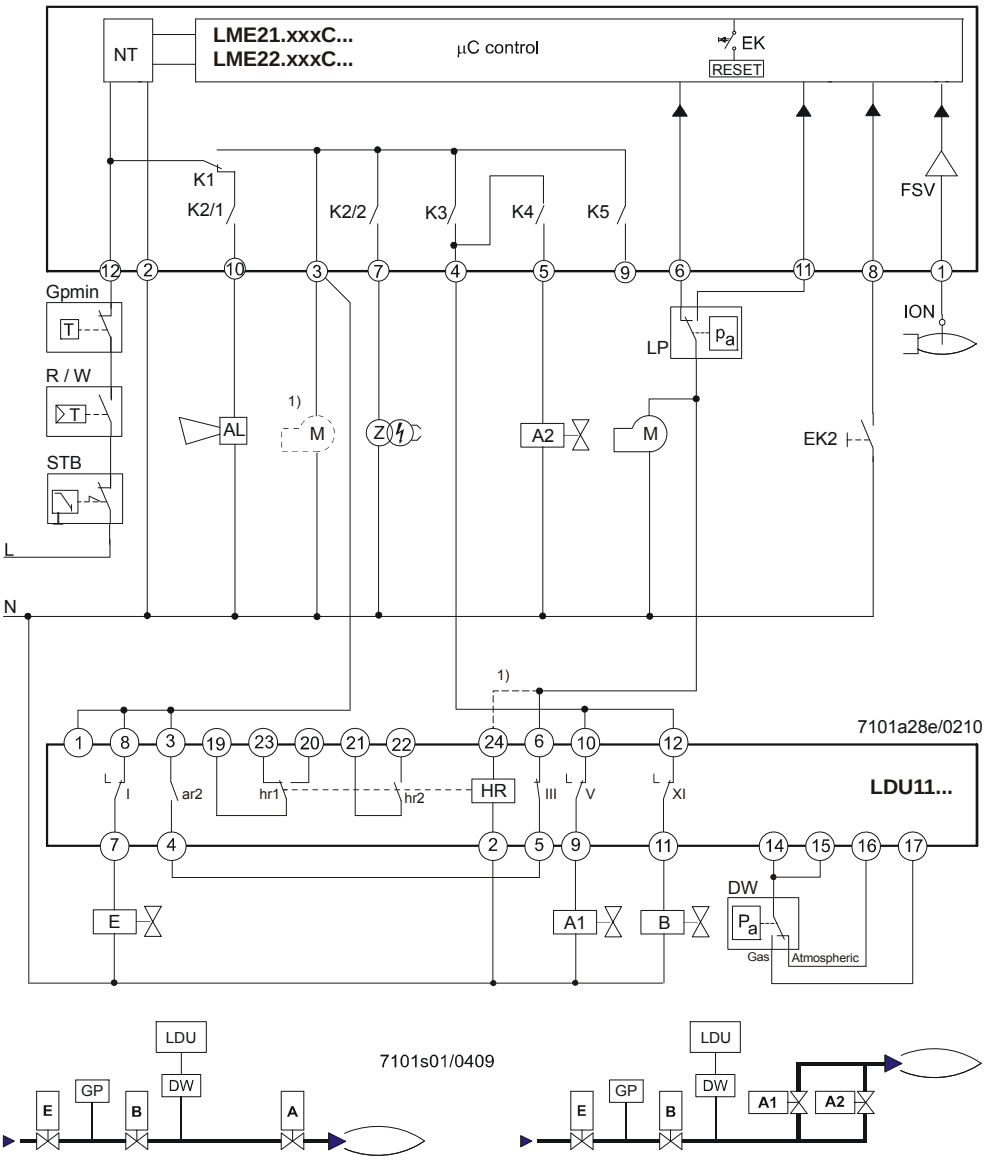




SQN7...454 / 2-stage control
1-wire control

SQN7...424 / 2-stage control
2-wire control

- LME21.xxxC.../LME22.xxxC... with LDU11... valve proving
- Valve supervision before startup of burner
- With plants without vent pipe to atmosphere



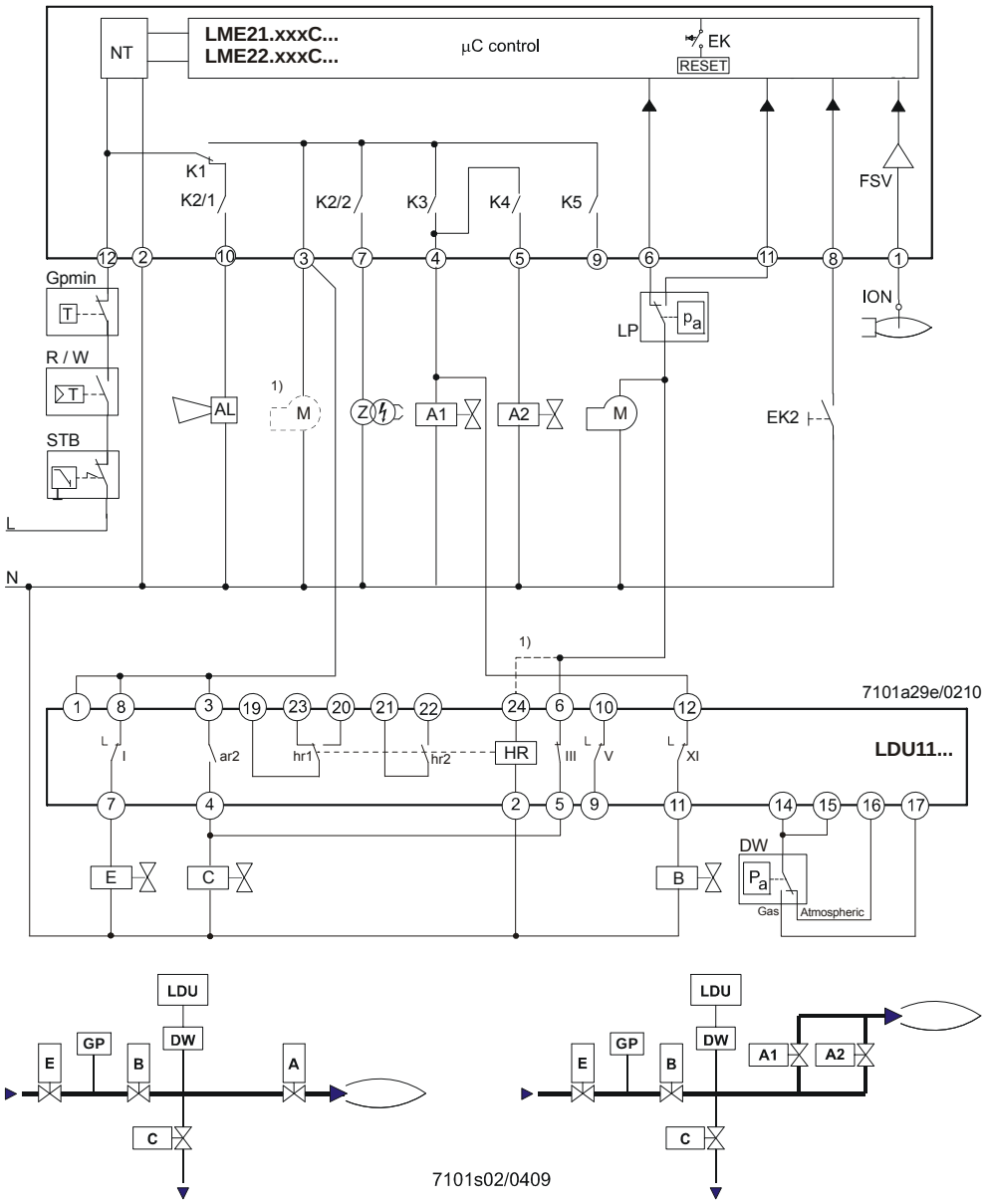
1) In connection with fan motor to terminal 3 of the LME21.xxxC.../LME22.xxxC...

- Start valve proving each startup, with connection of terminal 3, after controller ON or after lockout
- The valve proving after each lockout of the LDU11… can take up to 160 seconds. Therefore, the maximum permissible air pressure switch flame-out time is 180 seconds
- With the LDU11, faults during valve proving lead to lockout and, with the LME21.xxxCx, to a non-alterable lockout due to air pressure switch timeout (blink code 03)

Note!

- A faulty air pressure switch (air pressure switch does not close) leads to a non-alterable lockout (blink code 03) on completion of the pressure switch response time of 180 seconds and can only be distinguished from a non-alterable lockout due to faulty valve proving because the LDU11 did not go to lockout
- The fan motor can be connected either to terminal 3 in connection with a link between terminals 6 and 24 of the LDU11... (motor active during valve proving) or to terminal 6 of the LDU11... (motor active on completion of successful valve proving)

- LME21.xxxC.../LME22.xxxC... with LDU11... valve proving
- Valve supervision before startup of burner
- With plants with vent pipe to atmosphere

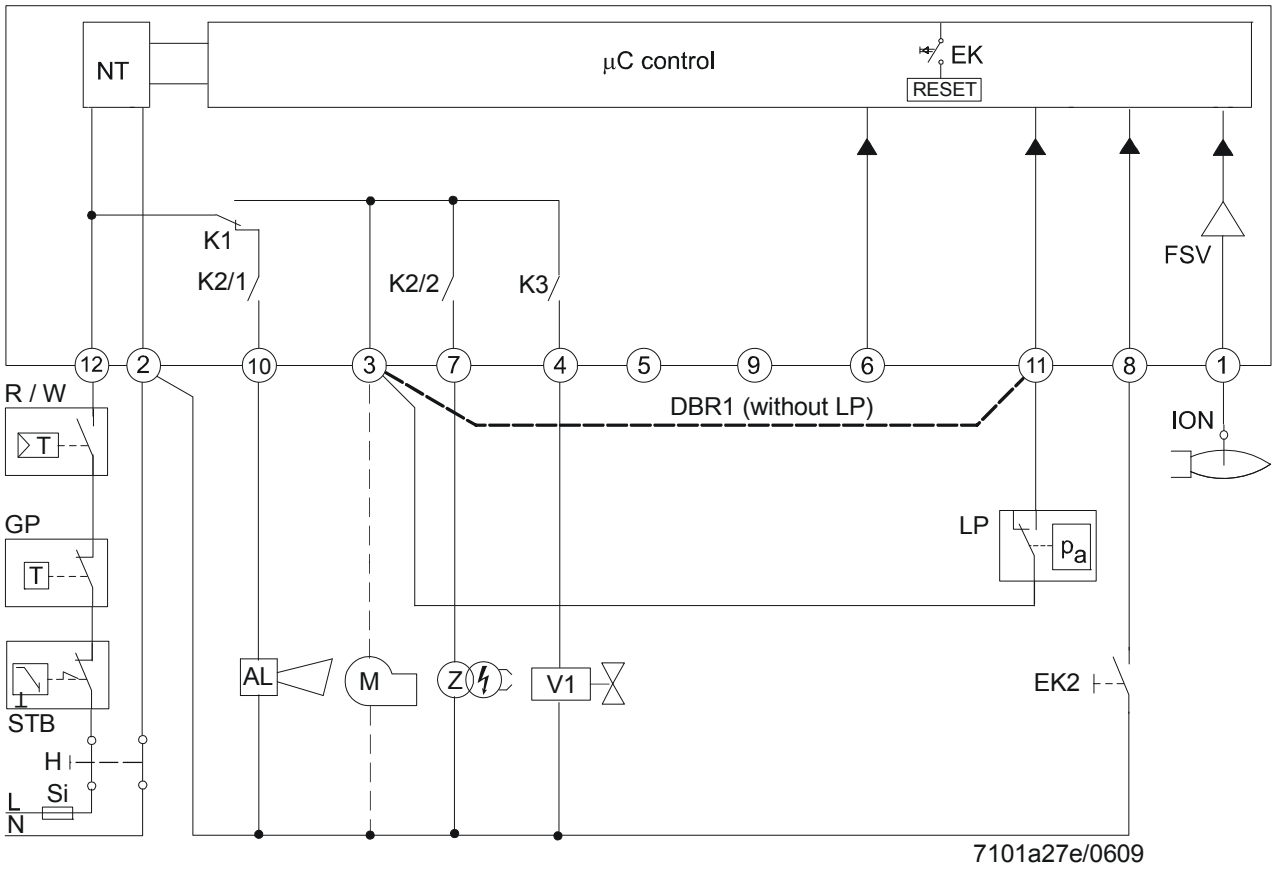


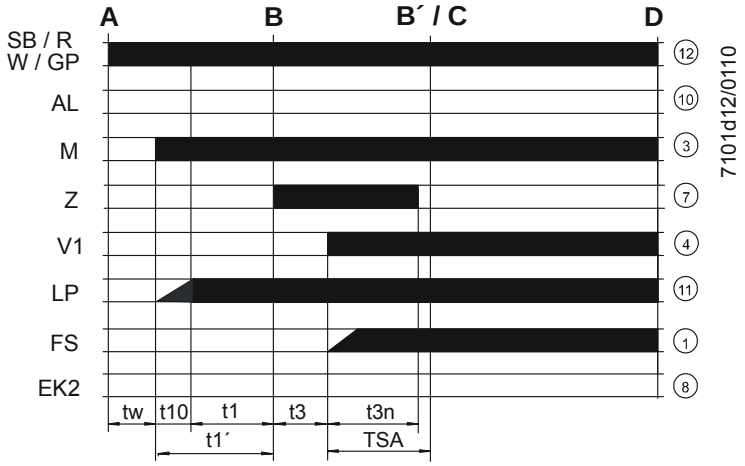
1) In connection with fan motor to terminal 3 of the LME21.xxxC.../LME22.xxxC...

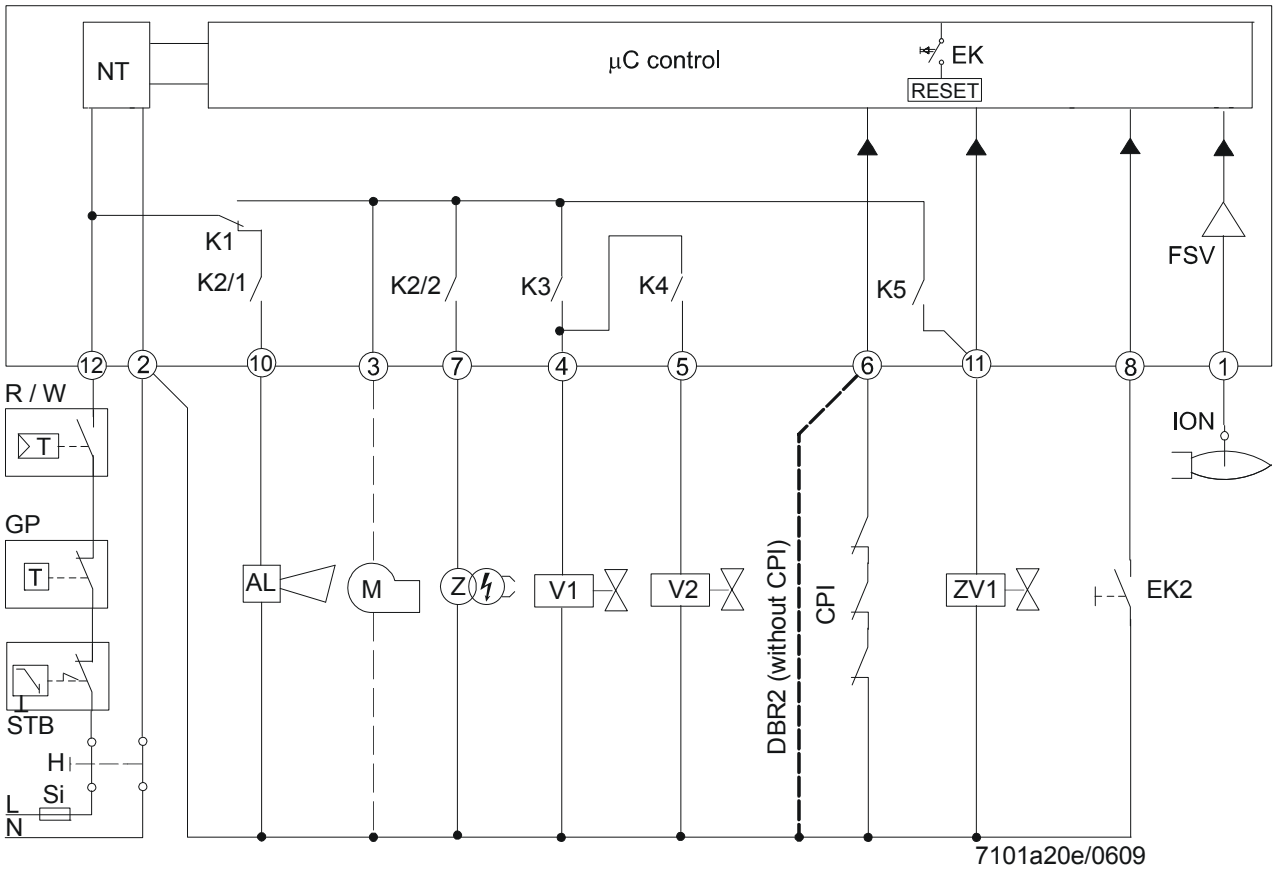
- Start valve proving each startup, with connection of terminal 3, after controller ON or after lockout
- The valve proving after a lockout of the LDU11… can take up to 160 seconds. Therefore, the maximum permissible air pressure switch flame-out time is 180 seconds
- With the LDU11, faults during valve proving lead to lockout and, with the LME21.xxxCx, to a non-alterable lockout due to air pressure switch timeout (blink code 03)

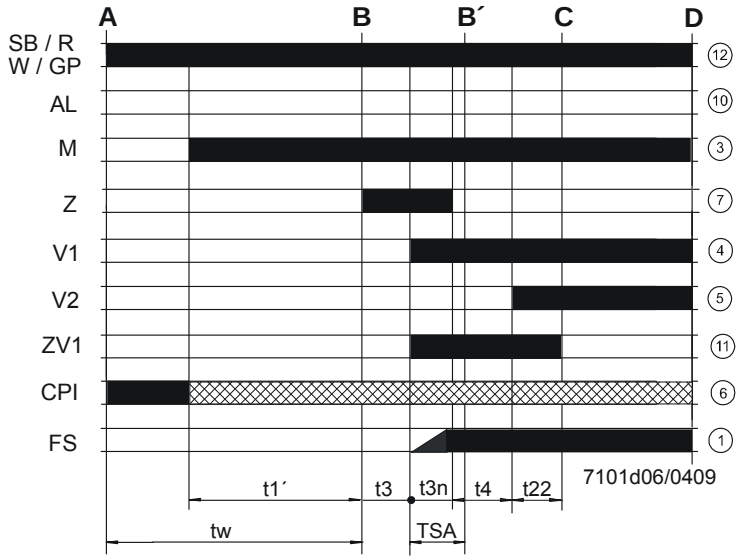
Note!

- A faulty air pressure switch (air pressure switch does not close) leads to a non-alterable lockout (blink code 03) on completion of the pressure switch response time of 180 seconds and can only be distinguished from a non-alterable lockout due to faulty valve proving because the LDU11 did not go to lockout
- The fan motor can be connected either to terminal 3 in connection with a link between terminals 6 and 24 of the LDU11... (motor active during valve proving) or to terminal 6 of the LDU11... (motor active on completion of successful valve proving)


NT
µC control
EK
RESET
K1
K2/1
K2/2
K3
FSV
12
2
10
3
7
4
5
9
6
11
8
1
R / W
T
DBR1 (without LP)
ION
GP
T
LP
pa
AL
M
Z
V1
EK2
STB
H
Si
L
N
7101a27e/0609


A
B
B´ / C
D
SB / R
W / GP
AL
M
Z
V1
LP
FS
EK2
12
10
3
7
4
11
1
8
tw
t10
t1
t3
t3n
t1´
TSA
7101d12/0110


NT
µC control
EK
RESET
K1
K2/1
K2/2
K3
K4
K5
FSV
12
2
10
3
7
4
5
6
11
8
1
R / W
T
GP
T
STB
H
Si
L
N
AL
M
Z
V1
V2
DBR2 (without CPI)
CPI
ZV1
EK2
ION
7101a20e/0609


A
B
B´
C
D
SB / R
W / GP
AL
M
Z
V1
V2
ZV1
CPI
FS
12
10
3
7
4
5
11
6
1
t1´
t3
t3n
t4
t22
tw
TSA
7101d06/0409

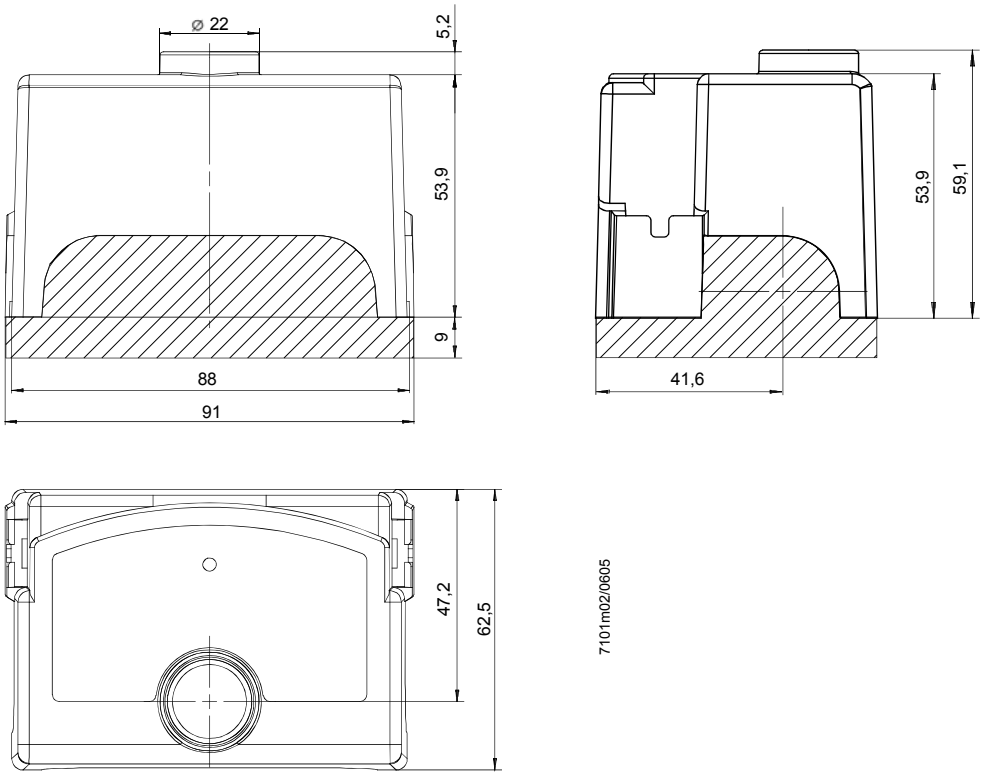
Legend

A	Start command (switching on by control thermostat or pressurestat)
B-B´	Interval for establishment of flame
C	Operating position of burner reached
C-D	Burner operation (generation of heat)
D	Controlled shutdown by control thermostat or pressurestat • Burner will immediately be shut down • Burner control will immediately be ready for new startup
I	Cam I actuator
t1	Prepurge time
t1´	Purge time
t3	Preignition time
t3n	Postignition time
t4	Interval between ignition OFF and release of fuel valve 2
t10	Specified time for air pressure signal
t11	Programmed opening time for actuator
t12	Programmed closing time for actuator
t22	Safety time
TSA	Ignition safety time
tw	Waiting time
	Input signal / output signal 1 (ON)
	Input signal / output signal 0 (OFF)
	Input permissible signal 1 (ON) or 0 (OFF)
AGK25...	PTC resistor
AL	Error message (alarm)
V...	Fuel valve
CPI	Closed Position Indicator
DBR...	Wire link
DW	Pressure switch valve proving
EK	Lockout reset button (internal)
EK2	Remote lockout reset button
FS	Flame signal
FSV	Flame signal amplifier
GP	Gas pressure switch
H	Main switch
HS	Auxiliary contactor, relay
ION	Ionization probe
K1...4	Internal relays
KL	Low-fire
LK	Air damper
LKP	Air damper position
LP	Air pressure switch
LR	Load controller
M	Fan motor
MS	Synchronous motor
NL	High-fire
NT	Power supply
QRA...	Flame detector
QRC…	Blue-flame detector (bl = blue, br = brown, sw = black)
R	Control thermostat/pressurestat
RV	Gas regulation damper
SA	Actuator SQN...
SB	Safety limiter
Si	External pre-fuse
STB	Safety limit thermostat
t	Time
W	Limit thermostat/pressure switch
Z	Ignition transformer
ZV	Extra valve

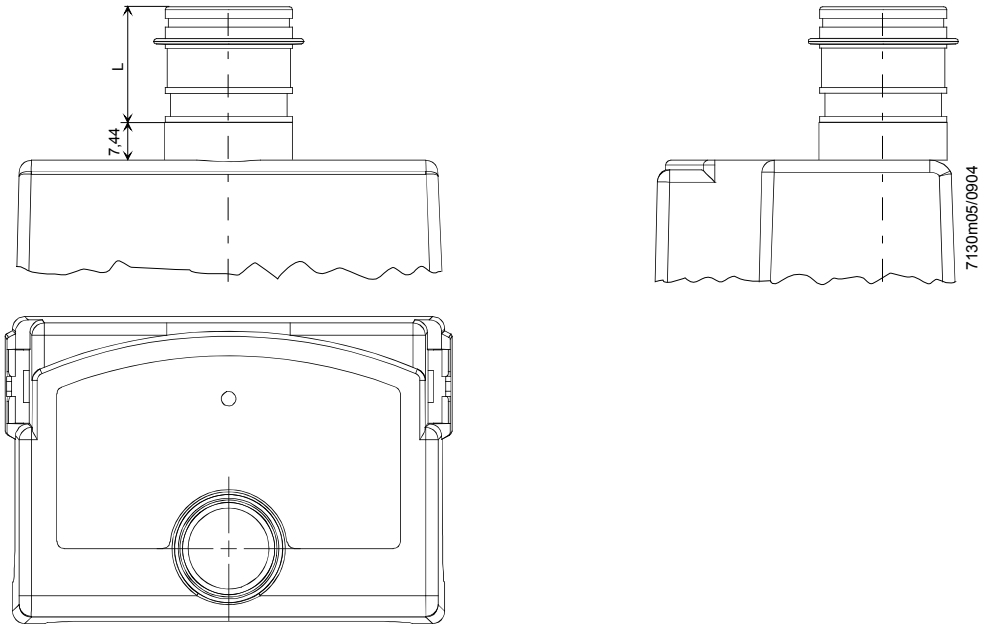
Dimensions in mm

LME...

Plug-in base AGK11...



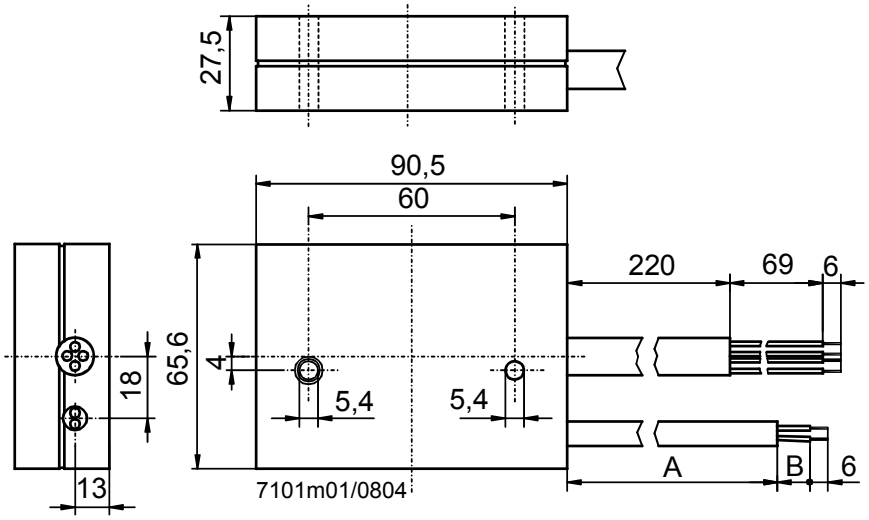
LME... with extension of lockout reset button AGK20...



Product no.	Length (L) in mm
AGK20.19	19
AGK20.43	43
AGK20.55	55

Dimensions in mm

Ancillary unit
AGQ3...A27



Product no.	Dimensions	
	A	B
AGQ3.1A27	500	19
AGQ3.2A27	300	34

© 2016 Siemens AG Building Technologies Division, Berliner Ring 23, D-76437 Rastatt
Subject to change!