SIEMENS

7106

Burner controls LME39...

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

The LME39… and this Data Sheet are intended for use by OEMs which integrate the burner controls in their products.

Use, features

Use

LME39… are used for the startup and supervision of 1- or 2-stage gas or gas / oil burners in intermittent operation. The flame is supervised by an ionization probe or flame detector type QRA… with ancillary unit AGQ3…A27 for gas / oil forced draft burners.

- For gas burners with or without fan to EN 298: 2003
- For forced draft gas burners to EN 676

Features

- Undervoltage detection
- Air pressure supervision with function 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 program sequences thanks to digital signal handling
- Controlled intermittent operation after 24 hours of continuous operation
- BCI

Supplementary documentation

ASN	Title	Documentation no.	Type of document
ACS410	PC software	CC1J7352	Installation and Operating Instructions
AGK11.6	Connection accessories for small burner controls	CC1N7201	Data Sheet
AZL21…	Display and operating units	CC1N7542	Date Sheet
AZL23…	Display and operating units	CC1N7542	Data Sheet
LDU11…	Valve proving system	CC1N7696	Data Sheet
LME…	Burner control	CC1Q7101	Range Overview
LME39…	Burner control	CC1P7106	Basic Documentation
OCI400…	Optical interface to the PC	CC1N7614	Data Sheet
OCI410…	BC interface	CC1N7615	Data Sheet
QRA2…	Flame detector	CC1N7712	Data Sheet
QRA4.U	Flame detector	CC1N7711	Data Sheet
QRA10…	Flame detector	CC1N7712	Data Sheet
SQN3…	Actuators	CC1N7808	Data Sheet
SQN4…	Actuators	CC1N7808	Data Sheet
SQN7…	Actuators	CC1N7804	Data Sheet
SQN9…	Actuators	CC1N7806	Data Sheet

Note

Warning!
All safety, warning and technical notes given in the Basic Documentation of the LME39 (P7106) also apply to this document!

Standards and certificates

Conformity to EEC directives

- Electromagnetic compatibility EMC (immunity)	2004/108/EC
- Directive for gas-fired appliances	2009/142/EC
- Low-voltage directive	2006/95/EC
- Directive for pressure devices	97/23/EC

ISO 9001: 2008
Cert. 00739

ISO 14001: 2004
Cert. 38233

Identification code to EN 230 / EN 298	
LME39.100…	**F T C L B N**
LME39.400…	**A B C L B N**

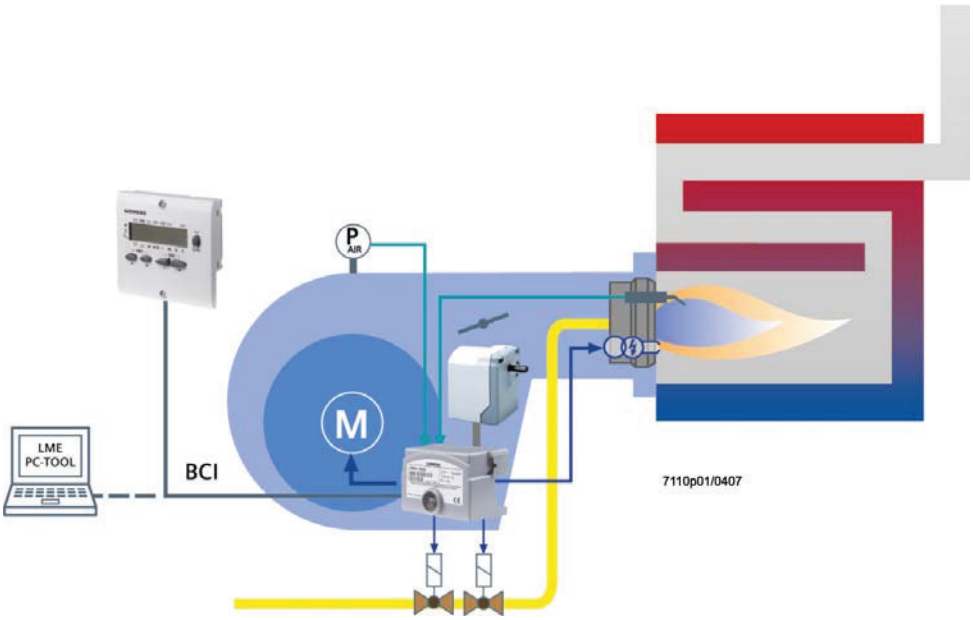
Life cycle

Burner controls have 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 specified in standard EN 230/EN 298 and the table containing the relevant test documentation as published by the European Association of Component Manufacturers (Afecor) (www.afecor.org).

The designed lifetime is based on use of the burner controls according to the manufacturer's Data Sheet and Basic Documentation. 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

System overview



Example: Modulating gas burner

The diagram shows the full scope of functions of the LME39… system. The actual functions are to be determined based on the respective execution / configuration!

Type summary (other types on request)

The type reference given below applies to the LME39… without plug-in base and without flame detector. For ordering information on plug-in bases and other accessories, see *Ordering*.

Type		Times in seconds												
		tw max. s	TSA max. s	tfz (P228) approx. s	t1 (P225) min. s	t1' (P256) min. s	t3 (P226) approx. s	t3n (P257) ca. s	t4 (P230) ca. s	t8 (P234) min. s	t10 (P224) approx. s	t11 (P259) min. s 1)	t12 (P260) min. s 1)	t22 (P231) max. s
LME39.100C1	Requirement	2.5	3	0.3	30	---	3	2.5	10	0	180	30	30	---
LME39.100C2	Requirement	2.5	3	0.3	30	---	3	2.5	10	0	180	30	30	---
Setting range	Min.	---	0.3	0	0	---	1.2	0 + 0.3	1.2	0	0	0	0	---
	Max.	---	37.5 + 1.5 + 0.3	1.5	75	---	37.5	37.5 + 0.3	75	1237	179.5	75	75	---
Increments (s)		---	0.147	0.147	0.294	---	0.147	0.147	0.294	4.851	4.851	0.294	0.294	---
Factory setting		---	t3n + tfz	0.294	32.34	---	3.234	2.205 + 0.3	9.996	0	179.487	32.34	32.34	---
LME39.400C1	Requirement	2.5	5	0.3	---	14.5	1.7	4.4	10	0	---	---	---	5
LME39.400C2	Requirement	2.5	5	0.3	---	14.5	1.7	4.4	10	0	---	---	---	5
Setting range	Min.	---	0.3	0	---	0	1.2	0	1	0	---	---	---	0
	Max.	---	37.5 + 1.5 + 0.3	1.5	---	75	37.5	37.5 + 0.3	75	1237	---	---	---	7.4
Increments (s)		---	0.147	0.147	---	0.294	0.147	0.147	0.294	4.851	---	---	---	0.147
Factory setting		---	t3n + tfz	0.294	---	15.582	1.911	4.116 + 0.3	9.996	0	---	---	---	4.557

Function parameter	Parameter number	Factory setting
Repetition limit value loss of flame and no flame at the end of safety time 0 = none 1 = none 2 = 1 x repetition 3 = 2 x repetition 4 = 3 x repetition	240	1

Note on parameterization:

Use the AZL2… or ACS410 to always set the exact value of the required time (multiples of increments of 0.147 seconds, 0.294 seconds or 4.851 seconds).
When parameterizing minimum or maximum times, the possibility of a ±7% tolerance must be taken into consideration.

For **min**imum values: The value to be parameterized must be at least 7% **greater**. For **max**imum values: The value to be parameterized must be at least 7% **smaller**.

Example:	Prepurge time shall be set to 30 seconds
Calculation:	30 seconds + 7% = 32.1 seconds
Value to be parameterized (P225):	Must be equal to or **greater** than the calculated value (e.g. 32,34 seconds)
Example:	Safety time shall be set via the change of postignition time to 5 seconds
Special case here:	Safety time is set directly via the change of postignition time and flame detection time using the following formula: **TSA = t3n + tfz = P257 + 0.3 seconds + P228**
Calculation:	5 seconds - 7% = 4.65 seconds
	t3n = 4.65 seconds - 0.3 seconds - P228
	t3n = 4.05 seconds (with tfz = 0.3 seconds)
Value to be parameterized (P257):	Must be equal to or **smaller** than the calculated value (e.g. 3.969 seconds)

Legend

tfz	Flame detection time	t4	Interval between ignition OFF and release fuel valve 2
TSA	Safety time	t8	Postpurge time
tw	Waiting time	t10	Specified time for air pressure signal
t1	Prepurge time	t11	Programmed opening time for actuator
t1´	Purge time	t12	Programmed closing time for actuator
t3	Preignition time	t22	2nd safety time
t3n	Postignition time (P257 + 0.3 seconds)		

1) Maximum running time available for actuator. The actuator's running time must be shorter, otherwise, the actuator will not reach the required position

Technical data

General unit data

Mains voltage	AC 120 V AC 230 V
Mains frequency	50...60 Hz
Power consumption	12 VA
External primary fuse	Max. T10H250V to IEC 60127-2 Recommendation: T6.3H250V to IEC 60127-2
Perm. mounting position	Optional
Input current at terminal 12	Max. 5 A
Weight	Approx. 160 g
Safety class	I (burner control with plug-in base)
Degree of protection	IP40 (to be ensured through mounting) (if RJ11 jack is not covered, only IP10)
Perm. cable length terminal 1	Max. 1 m at a line capacitance of 100 pF/m (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
Perm. cable length terminals 8, 10 and 11	Max. 20 m at 100 pF/m (lay separate cable)
Perm. cable lengths remaining terminals	Max. 3 m at 100 pF/m
Perm. input voltage terminals 6 and 11	AC 120 V AC 230 V
Possible input current terminals 6	0.5 mA
Possible input current terminals 8 and 11	1 mA

Perm. current rating	At cosφ ≥0.6	At cosφ = 1
- Terminal 3	Max. 2.7 A (15 A for max. 0.5 s	Max. 3 A
- Terminals 4, 5 and 7	Max. 1.7 A	Max. 2 A
- Terminal 9		
- LME39.100...	Max. 1 A	Max. 1 A
- LME39.400...	Max. 1.7 A	Max. 2 A
- Terminal 10	Max. 1 A	Max. 1 A

Signal cable AGV50...
Display → BCI

Signal cable	Color white Unshielded Conductor 4 x 0.141 mm² with RJ11-Stecker
Cable length AGV50.100	1 m
Supplier	Reference: Hütter http://www.hkt-netzwerktechnik.at/index.htm Order number: on request
Location	Under the burner hood (extra measures required for compliance with SKII EN 60730-1)

Environmental conditions

Storage	DIN EN 60721-3-1
Climatic conditions	Class 1K3
Mechanical conditions	Class 1M2
Temperature range	-20...+70 °C
Humidity	<95% r.h.
Transport	DIN EN 60 721-3-2
Climatic conditions	Class 2K3
Mechanical conditions	Class 2M2
Temperature range	-20...+70 °C
Humidity	<95% r.h.
Operation	DIN EN 60 721-3-3
Climatic conditions	Class 3K3
Mechanical conditions	Class 3M3
Temperature range	-20...+60 °C
Humidity	<95% r.h.

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

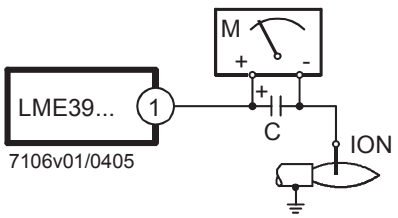
Flame supervision with ionization probe

	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 (LED flashes green)	Approx. DC 5 µA	Approx. DC 5 µA
Short-circuit current between ionization probe and ground (AC ammeter Ri ≤5 kΩ)	Max. AC50...150 µA	Max. AC 100...300 µA

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

Flame supervision via ionization is accomplished by making use of the conductivity and rectifying effect of the flame. The flame signal amplifier only responds to the DC current component of the flame signal. A short-circuit between ionization probe and ground causes the burner to initiate 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 *General unit data*.

Technical data (cont´d)

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

Only in connection with LME39.xxxx2 (AC 230 V)!

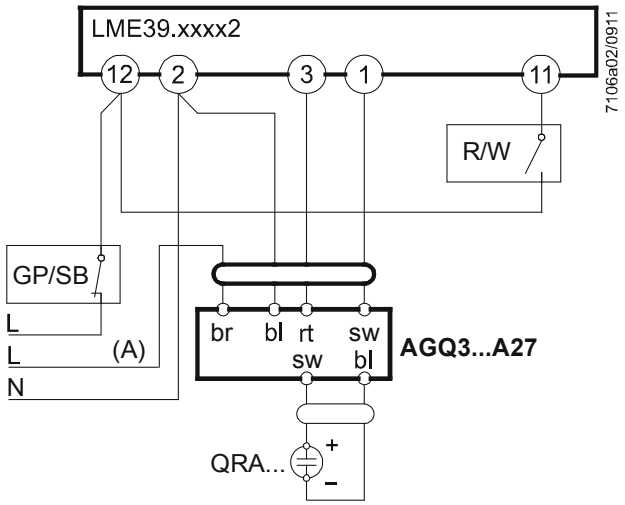
Mains voltage	AC 230 V
Mains frequency	50...60 Hz
Perm. cable length from QRA... to AGQ3…A27 (lay separate cable)	Max. 20 m
Perm. cable length from AGQ3...A27 to LME39.xxxx2	Max. 2 m
Weight of AGQ3...A27	Approx. 140 g
Perm. mounting position	Optional
Degree of protection	IP40, to be ensured through mounting
Power consumption	4.5 VA

	At mains voltage UN	
	AC 220 V	AC 240 V
Detector voltage at QRA... (with no load)		
Terminal 3 OFF (see *Program sequence*)	DC 400 V	DC 400 V
Terminal 3 ON (see *Program sequence*)	DC 300 V	DC 300 V
Detector voltage Load by DC measuring instrument Ri >10 MΩ		
Terminal 3 OFF (see *Program sequence*)	DC 380 V	DC 380 V
Terminal 3 ON (see *Program 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

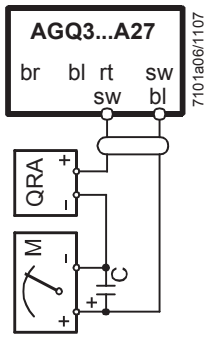
Ancillary unit AGQ3...A27

The correct functioning of aged UV cells can be checked with a UV test by applying a higher voltage to the UV cell after controlled shutdown until terminal 3 ON carries voltage.

Connection diagram



Measuring circuit for measuring the UV detector current

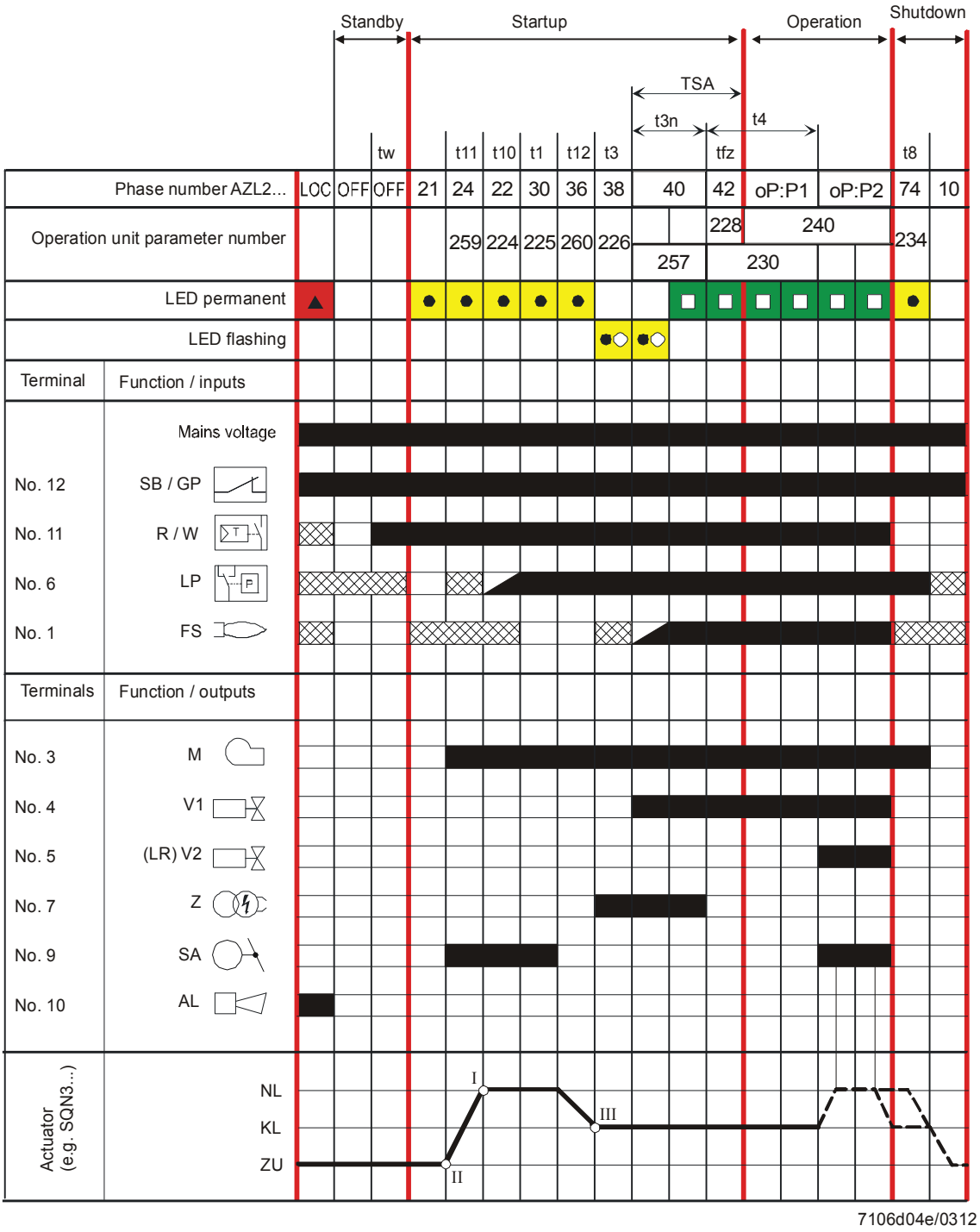


Measurement made at the flame detector QRA…

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	rt	Red
SB	Safety limit thermostat	sw	Black
R	Control thermostat or pressurestat		
W	Limit thermostat or pressure switch		

Program sequence LME39.100...



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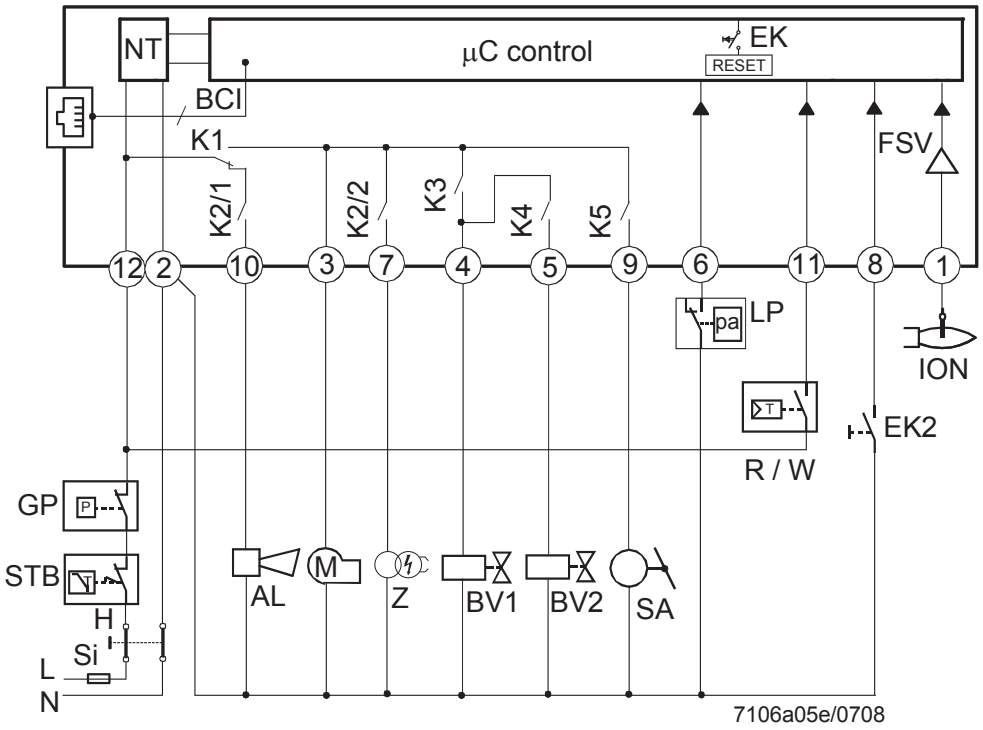
NT
µC control
EK
RESET
BCI
K1
K2/1
K2/2
K3
K4
K5
FSV
12
2
10
3
7
4
5
9
6
11
8
1
pa
LP
ION
EK2
R / W
GP
STB
H
Si
L
N
AL
M
Z
BV1
BV2
SA
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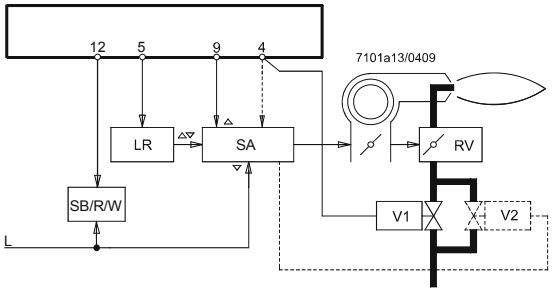
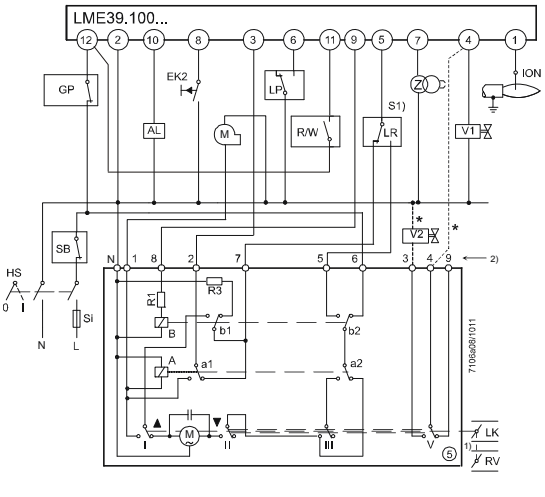
Application examples

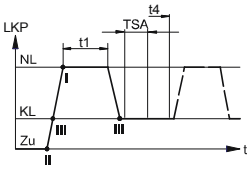
Attention!
The connection diagrams shown are merely examples which must be adapted in the individual case depending on the application!

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

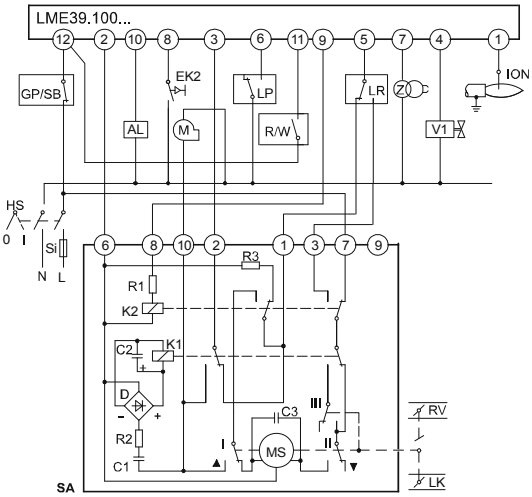
For information about actuators:
SQN3... see Data Sheet N7808
SQN7... see Data Sheet N7804
SQN9... see Data Sheet N7806



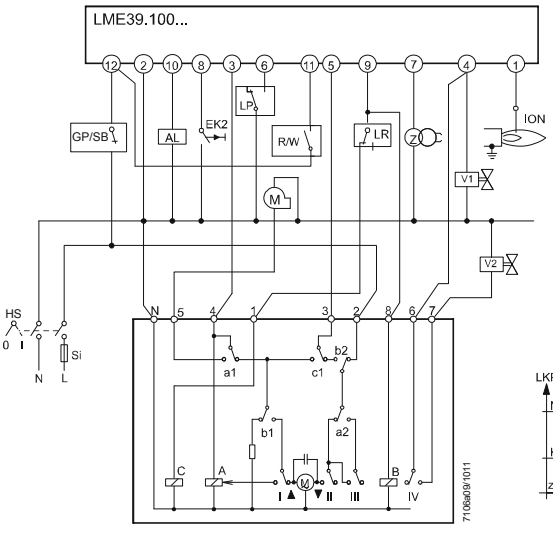


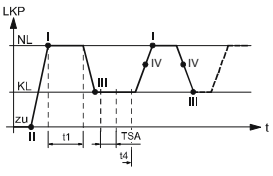


SQN3...151... or SQN3...251...
*** Note:**
With 2-stage modulating burners (with gas regulation damper), fuel valve 2 and the dotted connection between terminals (*) are not required.

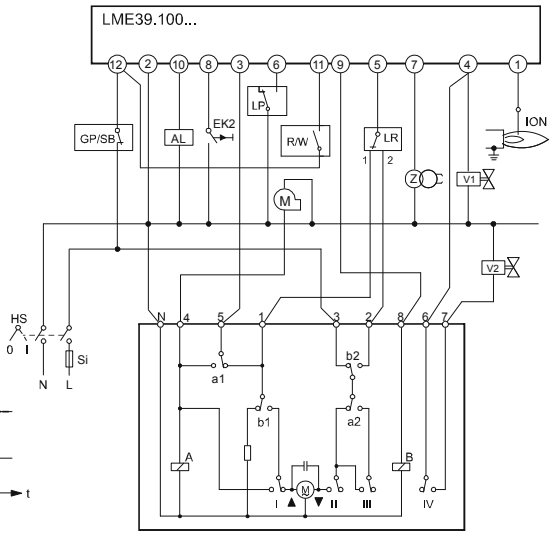


SQN90.220.../2-stage modulating control



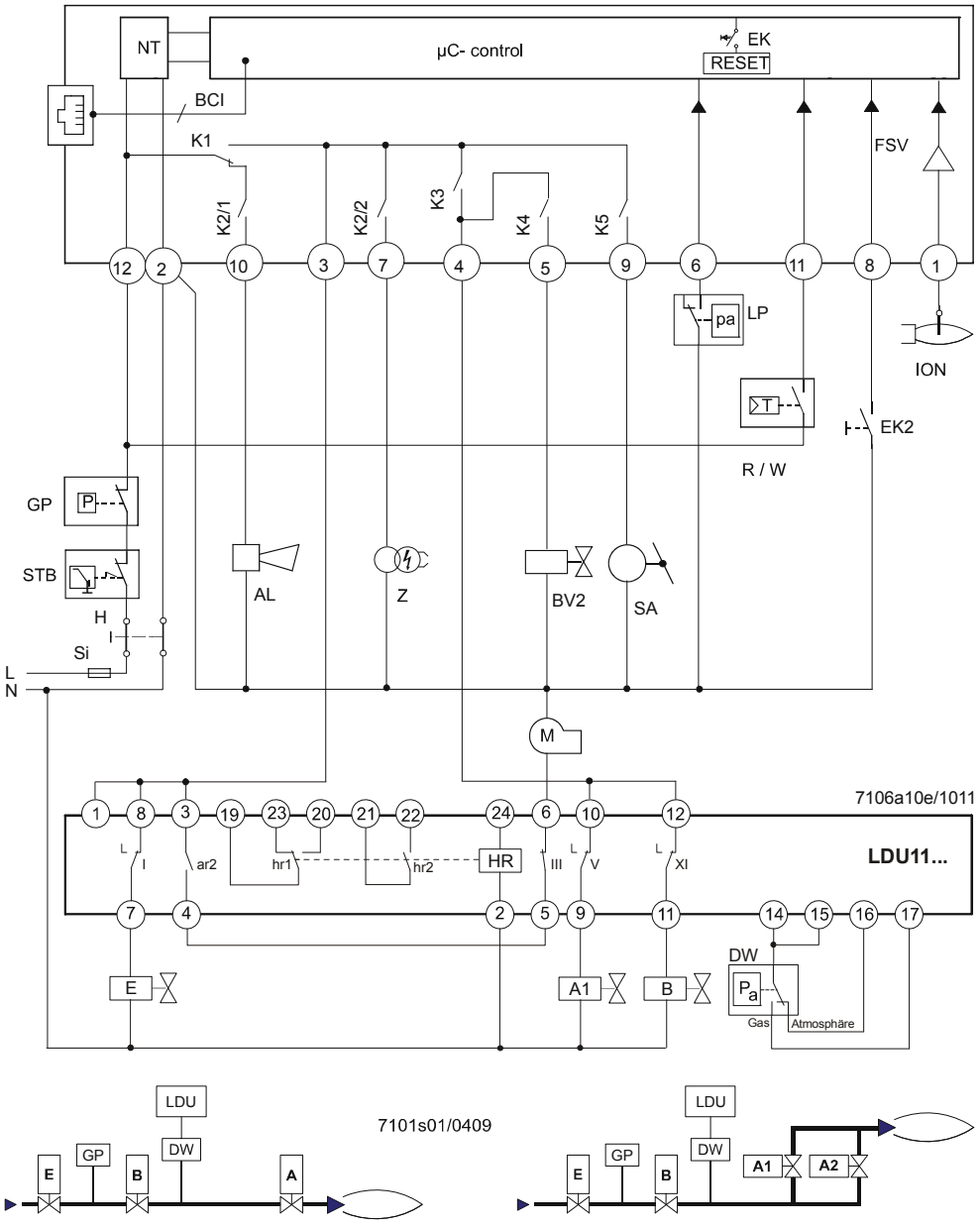


SQN7...454/2-stage control
1 wire control



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

- Before startup of burner
- In the case of plants without vent pipe to atmosphere

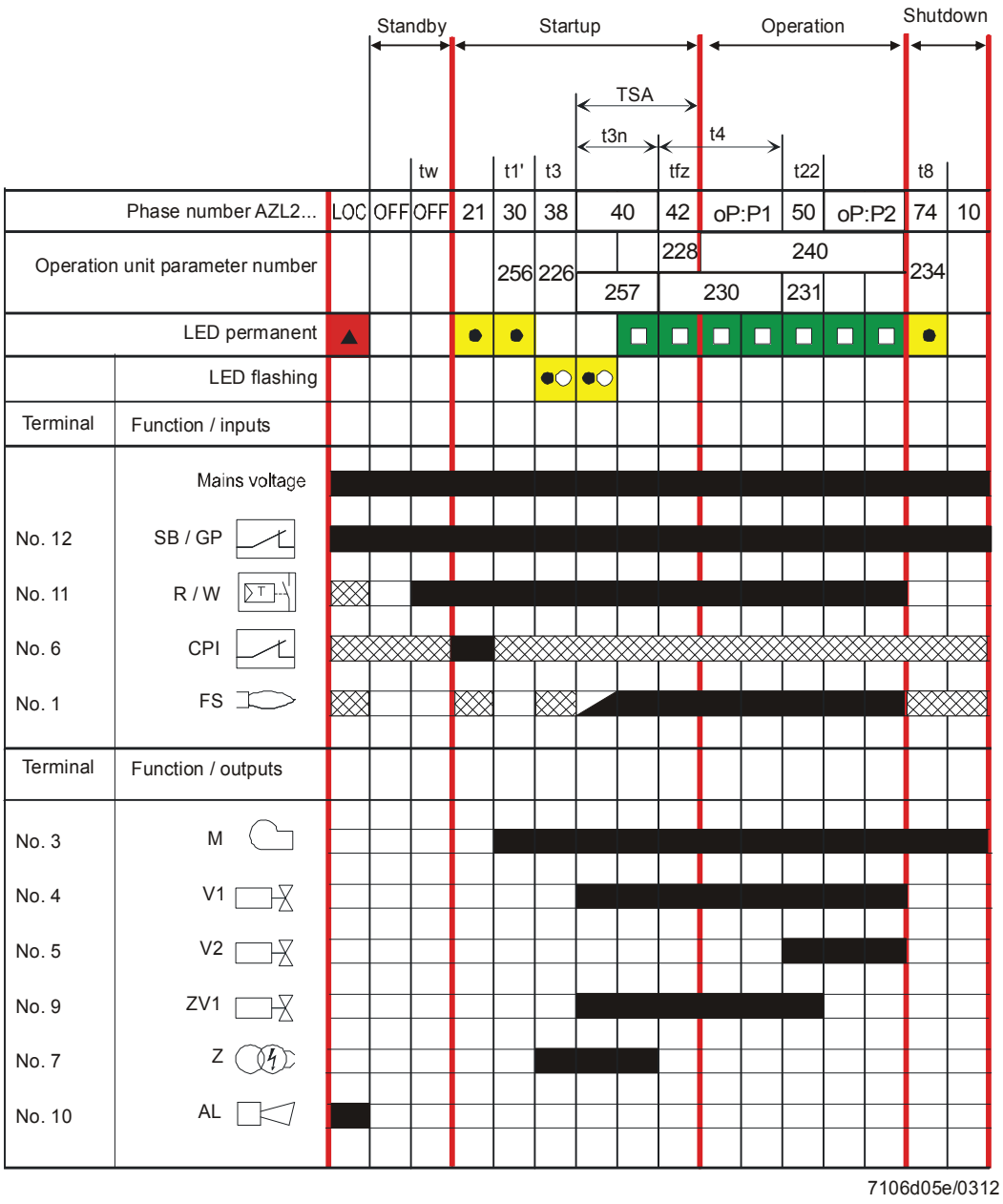


- Valve proving is started each time the system is switched on, with connection of terminal 3, after controller ON or after lockout
- If the LDU11... initiates lockout, valve proving can take up to 160 seconds. Therefore, the maximum permissible response time of the air pressure switch is 180 seconds
- With the LDU11…, faults during valve proving lead to lockout and, with the LME39.100..., to lockout due to air pressure switch timeout (blink code 03)

- Note!
  A faulty air pressure switch (air pressure switch does not closing) leads to lockout (blink code 03) on completion of the pressure switch response time of 180 seconds and can be distinguished from lockout due to faulty valve proving only because the LDU11... did not go to lockout

- The fan motor must be connected to terminal 6 of the LDU11... since release takes place via the air pressure switch upon successful valve proving

Program sequence LME39.400...



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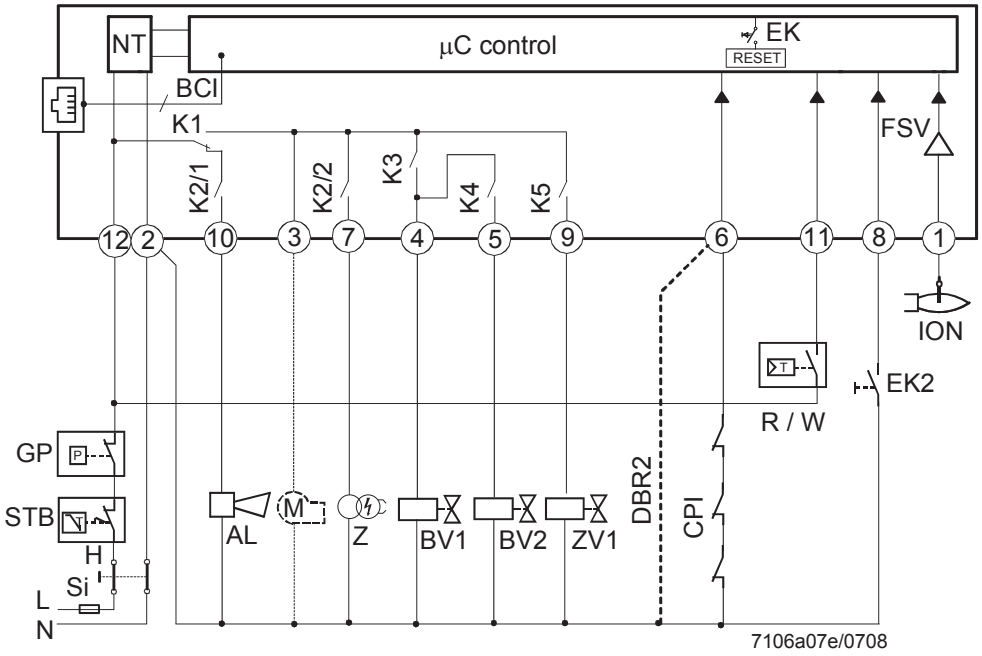
Inputs and outputs/internal connection diagram LME39.400...

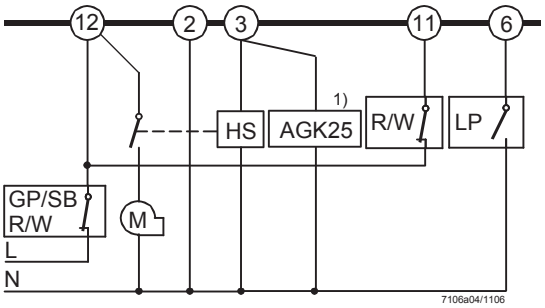


Application examples

Attention!
The connection diagram shown is merely an example which must be adapted in the individual case depending on the application!

Recommendation:

Note!
In extremely EMC-stressed environments, burners without fan motor or burners equipped with fan control via auxiliary contactor should use an AGK25 to produce a burden on terminal 3. If not observed, the burner is not reliably started up



[1]) AGK25 is required only if an auxiliary relay with a coil resistance of ≥50 kΩ is used

Legend

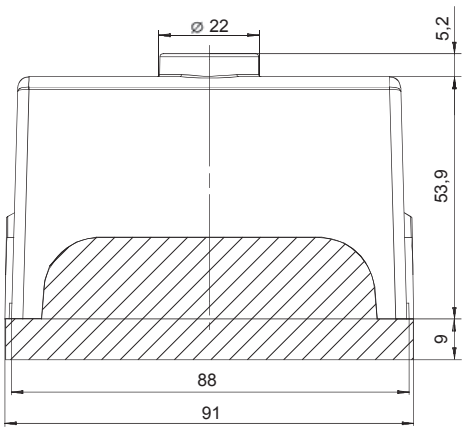
I, II, III	Cam actuator
t1	Prepurge time
t1´	Purge time
t3	Preignition time
t3n	Postignition time (P257+0.3 seconds)
t4	Interval between ignition OFF and release of fuel valve 2
t8	Postpurge time
t10	Specified time for air pressure signal
t11	Programmed opening time for actuator
t12	Programmed closing time for actuator
t22	2nd safety time
tfz	Flame detection time
TSA	Ignition safety time (t3n + tfz)
tw	Waiting time
A, A1, A2	Gas valves controlled to evacuate the test space with valve proving
AGK25…	PTC resistor
AL	Error message (alarm)
B	Gas valve controlled to fill the test space with valve proving
BCI	Communication interface
BV...	Fuel valve
CPI	Closed Position Indicator
DBR2	Wire link
DW	Pressure switch - valve proving
E	Safety shut-off valve, dead closed (optional)
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...5	Internal relay
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 unit
QRA…	Flame detector
R	Control thermostat / pressurestat
RV	Gas regulation damper
SA	Actuator SQN...
SB	Safety limiter
STB	Safety limit thermostat
Si	External pre-fuse
t	Time
V...	Fuel valve
W	Limit thermostat / pressure switch
Z	Ignition transformer
ZV	Extra valve
■	Input signal/output signal 1 (ON)
▥	Input signal/output signal 0 (OFF)
▩	Input permissible signal 1 (ON) or 0 (OFF)

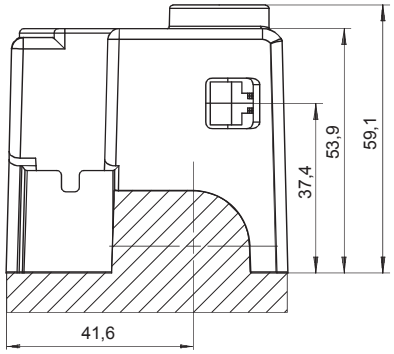
Dimensions

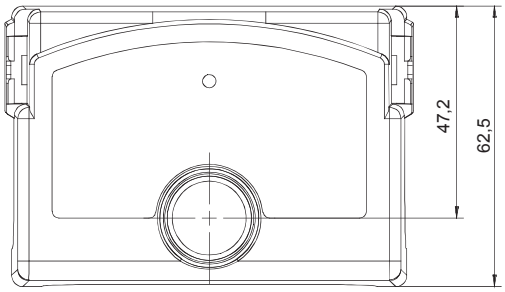
Dimensions in mm

LME39...

Plug-in base AGK11.6







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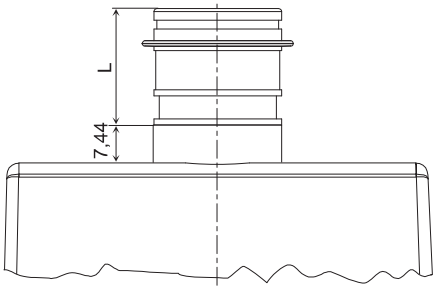
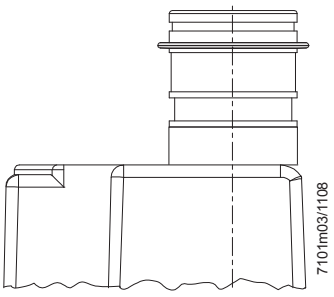
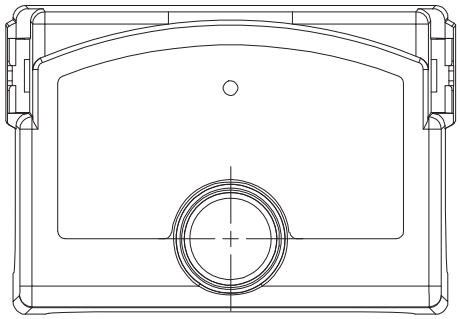
LME39... with lockout reset button extension AGK20...





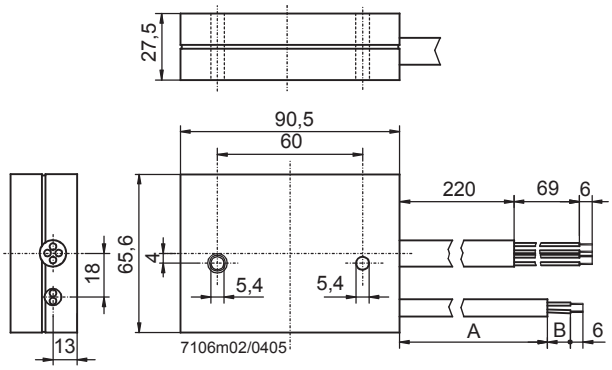
7101m03/1108



Designation	Length (L) in mm
AGK20.19	19
AGK20.43	43
AGK20.55	55

Dimensions in mm

Ancillary unit AGQ3...A27



Type	Dimensions	
	A	B
AGQ3.1A27	500	19
AGQ3.2A27	300	34