



Presentation example PME7



Presentation example LME7

PME73.812Ax Program module for burner control LME73.000Ax

User Documentation

- Application:**
- 1-stage or modulating, direct or pilot ignited forced draft burners
 - Integrated actuator control via 3-position controller or analog signal (feedback potentiometer in the actuator required)
 - Actuator without CLOSED position, independent ignition load above low-fire position
 - Response time in case of loss of flame 3 seconds (1 second / 3 seconds adjustable)
 - E.g. for burners to EN 676 or industrial thermo process plants to EN 746-2

The PME7 and this User Documentation are intended for use by OEMs which integrate the LME7 with PME7 in their products.



Note!

This documentation is only valid together with LME7 Basic Documentation (P7105)!

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1 Supplementary documentation

Product type	Designation	Type of documentation	Documentation number
LME	Burner control	Environmental Product Declaration	E7105 *)
PME	Program module	Environmental Product Declaration	E7105.1 *)
LME7	Burner control	Data Sheet	N7105
LME	Burner control	Product Range Overview	Q7101
LME7	Burner control	Basic Documentation	P7105

*) On request only



Note

This document only refers to the product type – not the *product designation*. See the table below for details.

Product type	Product designation
ACS410	PC software
AZL2	Display and operating unit
ION	Ionization probe
LME7	Burner control
QRA	UV flame detector
QRB	Photo resistive detector
QRC	Blue-flame detector
PME7	Program module
SQM4	Actuator

2 Warning notes



Warning!

The safety, warning and technical notes given in the Basic Documentation on the LME7 (P7105) apply fully to the present document also!

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

The LME7 are safety devices! Do not open, interfere with or modify the unit. Siemens does not assume responsibility for damage resulting from unauthorized interference!



Warning!

On the OEM access level of the LME7, it is possible to make parameter settings that differ from application standards. When setting the parameters, it is important to ensure that the application will run safely in accordance with legal requirements. Failure to observe this information poses a risk of damaging the safety functions.



Warning!

Risk of damage to the switching contacts!

If the external primary fuse (Si) is blown due to overload or short-circuit at the terminals, the LME7 must be replaced.

3 Typographical conventions

3.1 Safety notes

This User Documentation contains notes which must be observed to ensure your personal safety and to protect the product and the connected equipment. The instructions and notes are highlighted by warning triangles or a hand symbol and are presented as follows, depending on the hazard level:



Warning

means that death, severe personal injury or substantial damage to property **can** occur if adequate precautionary measures are not taken



Note

draws your attention to **important information** on the product, on product handling, or to a special part of the documentation

3.2 Qualified personnel

Only **qualified staff** are allowed to install and operate the equipment. Qualified staff in the context of the safety-related notes contained in this document are persons who are authorized to commission, ground and tag devices, systems and electrical circuits in compliance with established safety practices and standards.

3.3 Correct use

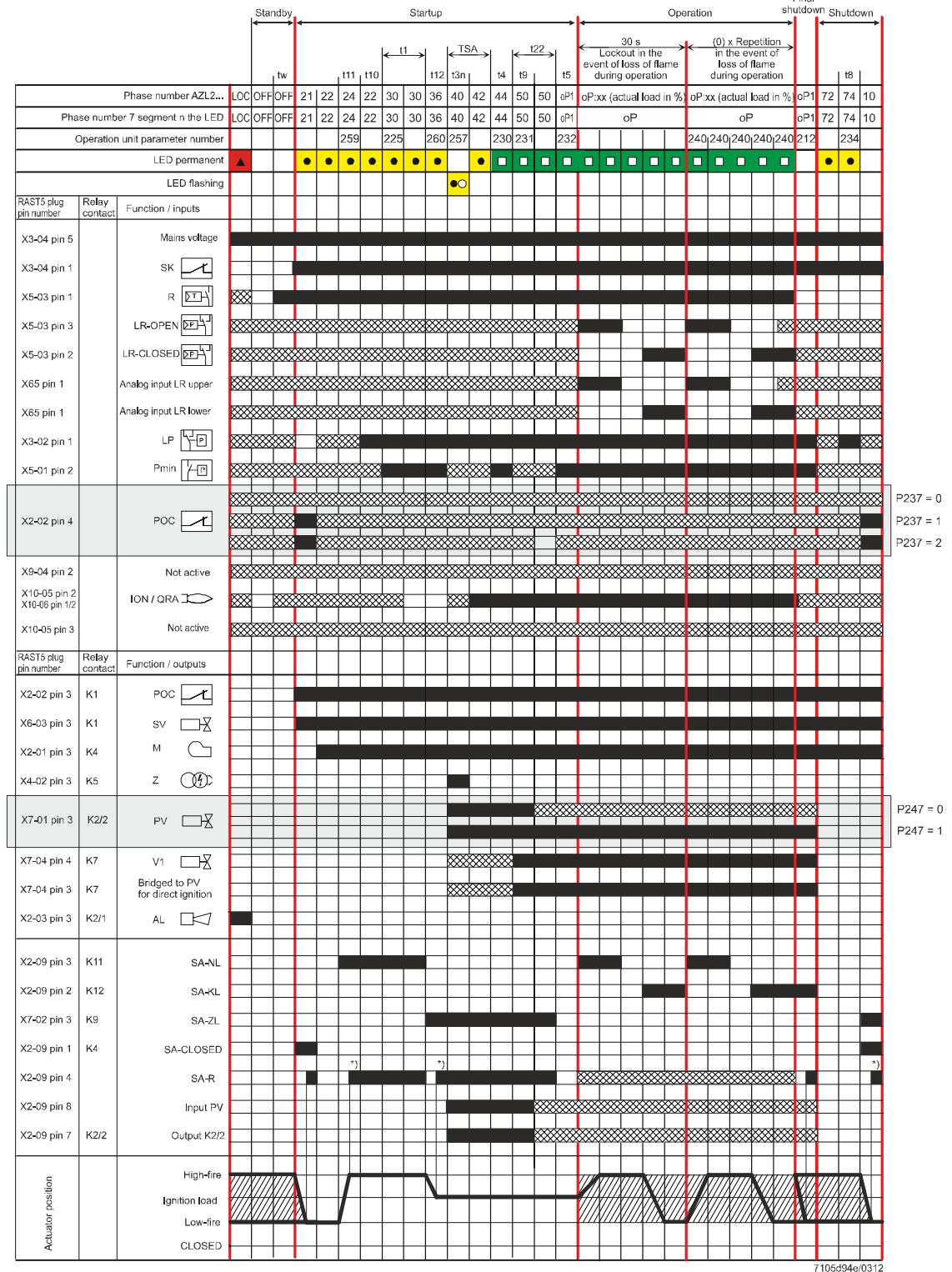
Note the following:

The device may only be used on the applications described in the technical documentation and only in connection with devices or components from other suppliers that have been approved or recommended by Siemens.

The product can only function correctly and safely if shipped, stored, set up and installed correctly, and operated and maintained as specified.

→ For fuel trains **G** and **Gp1/1** without valve proving

For automatic controlled intermittent operation after 24 hours of continuous operation, parameter 239 must be changed.



*) During the actuator's running phases, the actuator's feedback signal must first be OFF, then ON

5 List of phase display

Phase number of display 7-segment AZL2		LED	Function
LOC	LOC	Red	Lockout phase
Standby			
OFF	OFF	OFF	Standby, waiting for heat request
P08	Ph08	OFF	Power ON/test phase (e.g. detector test)
Startup			
P21	Ph21	Yellow	Safety valve ON, air pressure switch in no-load position Test if POC closed (timeout/lockout after 5 seconds) Actuator travels in CLOSED position (timeout)
P22	Ph22	Yellow	Part 1: Fan motor ON Part 2: Specified time air pressure switch Message (timeout), stabilization air pressure switch
P24	Ph24	Yellow	Actuator travels in prepurge position (timeout)
P30	Ph30	Yellow	Part 1: Prepurge time without extraneous light test Part 2: Prepurging with extraneous light test (2.1 seconds)
P36	Ph36	Yellow	Actuator travels in ignition load position (timeout)
P40	Ph40	Yellow flashing	Postignition time
P42	Ph42	Green	Flame detection
P44	Ph44	Green	Interval: End of safety time and fuel V1 ON
P50	Ph50	Green	Part 1: Interval: Fuel valve V1 ON and pilot valve OFF Part 2: Flame-out response time
Operation			
xx	oP:xx	Green	Operation (modulation), display of actual load in percent (%)
oP1	oP:P1	Green	Part 1: Interval until load controller release Part 2: Shutdown: Actuator closes by traveling for the running time (parameter 212) toward the low-fire position
Shutdown			
P10	Ph10	OFF	Home run
P72	Ph72	Yellow	Shutdown
P74	Ph74	Yellow	Postpurge time
Safety shutdown phases			
P01	Ph01	Yellow / red	Under voltage / over voltage
P02	Ph02	Yellow	Safety shutdown (e.g. open safety loop) → Non-volatile lockout
P04	Ph04	Green / red	Extraneous light in standby
P90	Ph90	Yellow	Gas pressure switch-min open → Non-volatile lockout

6 Fuel trains (examples)

6.1 Gas direct ignition (G), 1-stage

LME73.000...

X7-01			X7-04		
1	2	3	1	2	3
PE	N	L	PE	N	L
Dbr2			V1		

LME73.000...

X2-09							
1	2	3	4	5	6	7	8
SA-CLOSE	SA-KL	SA-NL	SA-R	PE	N	Output K2/2	Input PV
Dbr3							

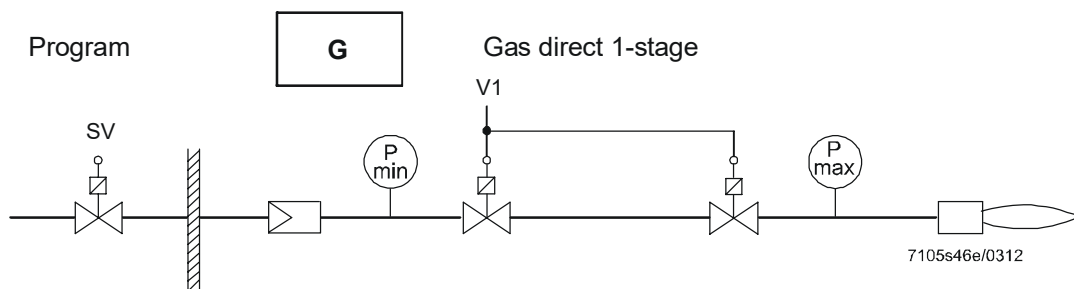


Figure 2: Fuel train gas direct ignition (G), 1-stage

6.2 Gas pilot ignition 1 (Gp1/1), 1-stage

LME73.000...

X7-01			X7-04		
1	2	3	1	2	3
PE	N	L	PE	N	L
PV			V1		

LME73.000...

X2-09							
1	2	3	4	5	6	7	8
SA-CLOSE	SA-KL	SA-NL	SA-R	PE	N	Output K2/2	Input PV
Dbr3							

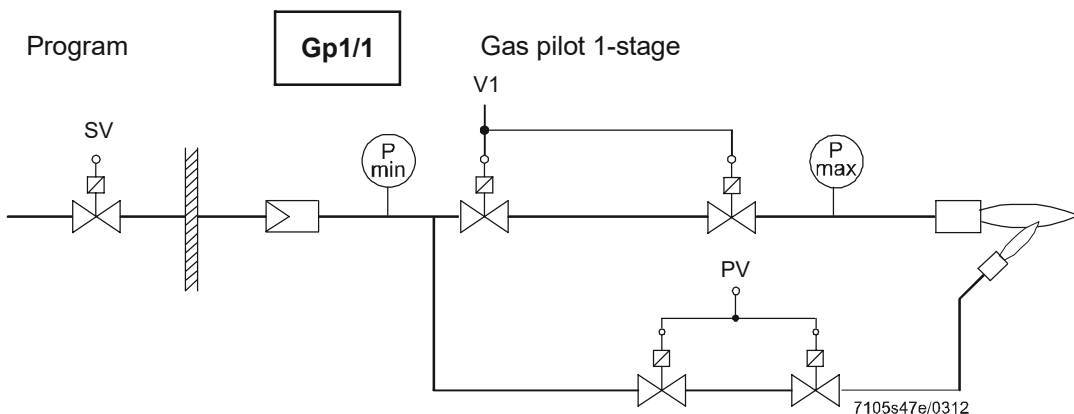


Figure 3: Fuel train gas pilot ignition 1 (Gp1/1), 1-stage

7 Input POC

Behavior POC input
(terminal X2-02 pin 3 and
pin 4)

Parameter 237 defines if and how the POC is tested.

No.	Parameter
237	<p>POC function</p> <p>0: Inactive → Input does not need to be connected</p> <p>1: Active (test during startup and shutdown (not safety relevant) → POC is checked for closed during startup and shutdown. This means that the POC can be replaced with a wire link.</p> <p>2: Active (test during startup and shutdown, as well as when switching to operating mode (safety relevant) → POC is checked for closed during startup and shutdown and checked for open when switching to operating mode. This means that a signal change must take place by switching the POC.</p>

An incorrect signal from the POC (parameter 237 > 0) is detected in the relevant phases. A non-volatile lockout takes place (lockout code Loc: 14). Factory setting of parameter 237 = 1. This means the POC is active and can be replaced with a wire link.

Access level: SO

8 Input gas pressure switch-min

Behavior when gas pressure
switch-min opens
(terminal X5-01 pin 2 and
pin 3)

If the minimum gas pressure is not reached (opening of the gas pressure switch-min), the LME7 moves to the lockout position (lockout code Loc: 20). If the gas pressure switch-min is closed again following reset, the LME7 carries out a restart (if the heat request is still in place). If the gas pressure switch-min is still open following reset, the LME7 is locked again. The minimum gas pressure is tested after the prepurge time, in the interval (t_4 / t_9), and during operation. The gas pressure switch-min is not evaluated during the first and second safety time.

9 Shutdown sequence (parameter 212)

If the heat request at terminal X5-03 pin 1 is deactivated, the actuator closes by traveling toward the low-fire position for the parameterized running time (parameter 212). At the end of the running time (parameter 212) or when the actuator reaches the low-fire position, the closing action and burner operation are ended. The burner is shut down in the actuator position reached. Postpurgings takes place during shutdown depending on the parameter settings. If parameter 212 = 0, the burner is shut down in the actuator's last running position before the heat request is deactivated.

10 Connection diagram for LME73.000Ax with SQM4



Note:

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

PME73.812Ax 1-stage modulating

With/without pilot ignition

Separate ignition load position

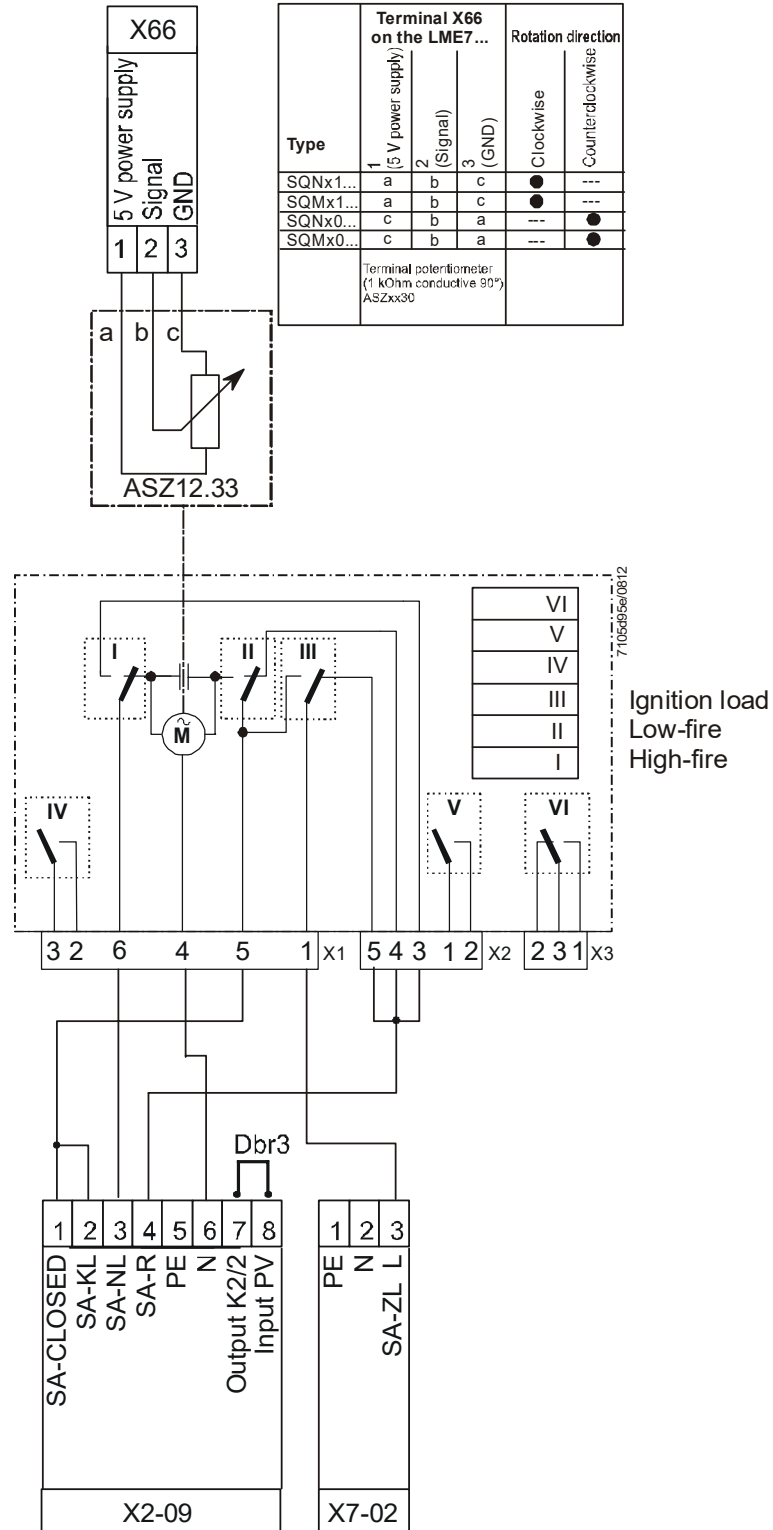


Figure 4: Connection diagram for LME73.000Ax with SQM4

11 Time table and settings

Type	Times in seconds													
PME73.812Ax	tw	TSA max.	t1 P225 min.	t3n P257 approx.	t4 P230 min.	t5 P232 min.	t8 P234 min.	t9 P231 approx.	t10 approx.	t11 P259 approx.	t12 P260 approx.	t22	2)	3)
Requirements	2.5	5	30	4.4	3	2	15	10	15	60	60	---	---	---
Factory setting	---	t3n+0.45	29.106+2.1	4.116+0.3	3.234	2.058	19.404	9.996	15	58.212	58.212	t9+P254(1/3)	---	---
Max.	2.5	14	1237+2.1	13.23+0.3	74.97	74.97	1237	74.97	---	1237	1237	---	0.45	0.45
Min.	---	---	0+2.1	0+0.3	3.234	2.058	0	0	---	0	0	---	0.3	---
Step size	---	---	4.851	0.147	0.294	0.294	4.851	0.294	---	4.851	4.851	---	---	---

Parameter number	Function	Factory setting
212	Actuator running time to low-fire position in the event of shutdown	58,212 seconds
237	POC function 0: Inactive 1: Active (test during startup and shutdown (not safety relevant)) 2: Active (test during startup and shutdown, as well as when switching to operating mode (safety relevant))	1
239	Intermittent operation after 24 hours of continuous operation 0: OFF 1: ON	0 ¹⁾
240	Restart in the event of loss of flame during operation 0: None 1: None 2: 1 x restart	0
247	Continuous pilot (during operation) 0 = OFF 1 = ON	0
254	Reaction time flame error or air pressure switch error 0: 1 second 1: 3 seconds	1 ¹⁾



- 1) **Caution!**
Factory setting:
Parameter 254 → Response time in case of loss of flame 3 seconds! For a response time about 1 second, the parameter 254 must be changed.
Parameter 239 → Controlled intermittent operation after 24 hours of continuous operation OFF! For automatic controlled intermittent operation after 24 hours of continuous operation, parameter 239 must be changed.

Legend

tw	Waiting time
TSA	Safety time
t1	Prepurge time
t3n	Postignition time parameter 257 +0.3 seconds
t4	Interval: End of safety time – fuel valve V1 ON
t5	Interval: Pilot valve OFF – load controller release
t8	Postpurge time
t9	Interval: Fuel valve V1 ON and pilot valve OFF
t10	Specified time air pressure switch message (timeout)
t11	Opening time of actuator (timeout)
t12	Closing time of actuator (timeout)
t22	2 nd safety time

- 1) Reaction time to a change of signal by the air pressure switch contact (opens) and flame-out response time in the event of loss of flame
- 2) Response time to a change of signal by the inputs (e.g. pressure switch-min)
- 3) Flame detection time

12 Inputs and outputs / internal connection diagram

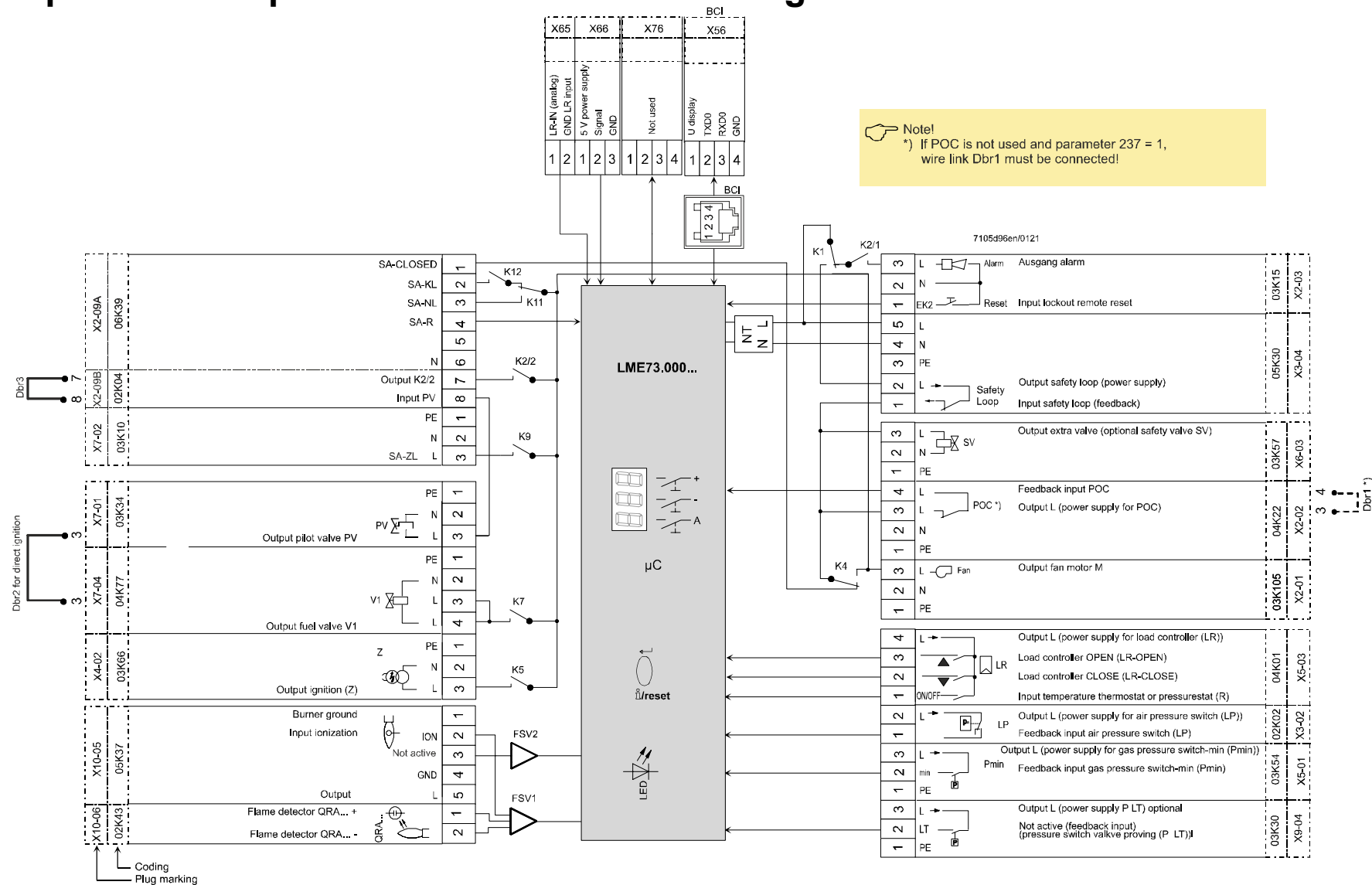


Figure 5: Inputs and outputs / internal connection diagram

13 Parameter list (AZL2)

Abbreviations for password level:

HF	Heating engineer
OEM	Manufacturer of the original product

Parameter number	Parameter	Edit	Value range		Increment	Factory setting	Password level reading from level	Password level writing from level
			Min.	Max.				
000	Internal parameter							
41	Heating engineer (HF) password (4 characters)	Edit	xxxx	xxxx	---	---	---	OEM
42	OEM's password (5 characters)	Edit	xxxxx	xxxxx	---	---	---	OEM
60	Backup/restore	Edit	Restore	Backup	---	---	---	SO
100	General							
102	Identification date	Read only	---	---	---	---	Info	---
103	Identification number	Read only	0	9999	1	0	Info	---
113	Burner identification	Edit	x	xxxxxxxx	1	-----	Info	OEM via ACS410
123	Min. power control step	Edit	1%	10%	0.1	2	SO	SO
140	Mode display for the 7-segment display 1 = standard (program phase) 2 = flame 1 (QRA/ION) 3 = flame 2 (QRB/QRC) ⇔ not used 4 = active power (power value)	Edit	1	4	1	1	SO	SO
164	Number of startups resettable	Resettable	0	999999	1	0	Info	Info
166	Total number of startups	Read only	0	999999	1	0	Info	---
170.00	Switching cycles relay contact K12	Read only	0	99999999	1	0	Info	---
170.01	Switching cycles relay contact K11	Read only	0	99999999	1	0	Info	---
170.02	Switching cycles relay contact K2	Read only	0	99999999	1	0	Info	---
170.03	Switching cycles relay contact K1	Read only	0	99999999	1	0	Info	---
171	Signaling of “Switching cycle exceeded” for one of the relay contact counters (parameters 170.00 to 170.03) → not active	Read only	0	99999999	1	1000000	Info	---

Parameter number	Parameter	Edit	Value range		Increment	Factory setting	Password level reading from level	Password level writing from level
			Min.	Max.				
200	LME7 burner control							
212	Actuator running time to low-fire position in the event of shutdown	Edit	0 s	1237 s	4.851 s	58.212 s	SO	SO
225	Prepurge time +2.1 seconds	Edit	0 s	1237 s	4.851 s	29.106 s	SO	OEM
230	Interval (t4): End of safety time - fuel valve V1 ON	Edit	3.234 s	74.97 s	0.294 s	3.234 s	SO	OEM
231	Interval (t9): Fuel valve V1 ON – pilot valve OFF	Edit	0 s	74.97 s	0.294 s	9.996 s	SO	OEM
232	Interval (t5): Pilot valve OFF – load controller release	Edit	2.058 s	74.97 s	0.294 s	2.058 s	SO	OEM
234	Postpurge time	Edit	0 s	1237 s	4.851 s	19.404 s	SO	OEM
237	POC function 0: Inactive 1: Active (test during startup and shutdown (not safety relevant)) 2: Active (test during startup and shutdown, as well as when switching to operating mode (safety relevant))	Edit	0	2	1	1	SO	SO
239	Intermittent operation after 24 hours of continuous operation 0 = OFF 1 = ON	Edit	0	1	1	0	SO	OEM
240	Restart in the event of loss of flame during operation 0: None 1: None 2: 1 x restart	Edit	0	2	1	0	SO	OEM
247	Continuous pilot (during operation) 0 = OFF 1 = ON	Edit	0	1	1	0	SO	OEM
254	Reaction time to loss of flame / fault air pressure switch 0 = 1 s 1 = 3 s	Edit	0	1	1	1	SO	OEM
257	Postignition time +0.3 seconds	Edit	0 s	13.23 s	0.147 s	4.116 s	SO	OEM
259	Opening time of actuator (timeout)	Edit	0 s	1237 s	4.851 s	58.212 s	SO	OEM
260	Closing time of actuator (timeout)	Edit	0 s	1237 s	4.851 s	58.212 s	SO	OEM
600	Power setting							
654	Analog input (feedback potentiometer ASZxx.3x required) 0 = 3-position step input 1 = 0...10 V 2 = 0...135 Ω 3 = 0...20 mA 4 = 4 to 20 mA with a non-volatile lockout at I < 4 mA 5 = 4...20 mA	Edit	0	5	1	1	SO	SO





Parameter number	Parameter	Edit	Value range		Increment	Factory setting	Password level reading from level	Password level writing from level
			Min.	Max.				
700	Error history							
701	Current error: 00: Error code 01: Startup meter reading 02: HMI phase 03: Power value	Read only	2 0 --- 0%	255 999999 --- 100%	1 1 --- 1	---	Service	---
702	Latest error in the history 00: Error code 01: Startup meter reading 02: HMI phase 03: Power value	Read only	2 0 --- 0%	255 999999 --- 100%	1 1 --- 1	---	Service	---
• • •								
711	Oldest error in the history 00: Error code 01: Startup meter reading 02: HMI phase 03: Power value	Read only	2 0 --- 0%	255 999999 --- 100%	1 1 --- 1	---	Service	---
900	Process data							
936	Normalized speed	Read only	0%	100%	0.01%	---	Service	---
951	Mains voltage	Read only	0 V	LME73.000x1: 175 V LME73.000x2: 350 V	1 V	---	Service	---
954	Flame intensity	Read only	0%	100%	1%	---	Service	---

14 Error code list

Error code		Clear text	Possible causes
AZL2	LED display (alternating)		
Loc: 2	Loc 2	No establishment of flame at the end of safety time	<ul style="list-style-type: none"> Faulty or soiled fuel valves Defective, soiled or incorrectly connected flame detector Poor adjustment of burner, no fuel Faulty ignition equipment
Loc: 3	Loc 3	Air pressure faulty (air pressure switch welded in no-load position, decrease to specified time (air pressure switch flame-on response time)	Air pressure switch faulty <ul style="list-style-type: none"> Loss of air pressure signal after specified time Air pressure switch has welded in no-load position
Loc: 4	Loc 4	Extraneous light	Extraneous light during burner startup
Loc: 5	Loc 5	Air pressure faulty, air pressure switch welded in working position	Time supervision air pressure switch <ul style="list-style-type: none"> Air pressure switch has welded in working position
Loc: 6	Loc 6	Fault of actuator	<ul style="list-style-type: none"> Actuator faulty or blocked Faulty connection Wrong adjustment
Loc: 7	Loc 7	Loss of flame	Too many losses of flame during operation (restart limitation) <ul style="list-style-type: none"> Faulty or soiled fuel valves Faulty or soiled flame detector Poor adjustment of burner
Loc: 10	Loc 10	Non-volatile lockout with alarm output switched on at terminal X2-03 pin 3 (fault lamp ON)	Wiring error or internal error, other errors
Loc: 10	Loc 10	Non-volatile lockout with alarm output switched off at terminal X2-03 pin 3 (fault lamp OFF)	Output contact error (welded contact of an output relay)
Loc: 14	Loc 14	POC error	Error valve closure control POC
Loc: 20	Loc 20	Gas pressure switch-min open	Gas shortage
Loc: 22	Loc 22	Safety loop open	<ul style="list-style-type: none"> Gas pressure switch-max open Safety limit thermostat cut out
Loc: 60	Loc 60	Analog power source 4...20 mA, I <4 mA	Wire breakage
Loc: 138	Loc 138	Restore process successful	Restore process successful
Loc: 139	Loc 139	No PME7 detected	No PME7 plugged in
Loc: 167	Loc 167	Manual locking	Manual locking
Loc: 206	Loc 206	AZL2 incompatible	Use the latest version

Error code		Clear text	Possible causes
AZL2	LED display (alternating)		
rSt Er1	rSt Er1	Error in compatibility between PME7 and LME7 during restore process	Program sequence of PME7 does not match the LME7
rSt Er2	rSt Er2	Error in compatibility between PME7 and LME7 during restore process	LME7 hardware does not match the PME7
rSt Er3	rSt Er3	Error during restore process	<ul style="list-style-type: none"> PME7 faulty PME7 removed during restore process
bAC Er3	bAC Er3	Error in compatibility between PME7 and LME7 during backup process	Program sequence of PME7 does not match the LME7
Err PrC	Err PrC	Error in PME7	<ul style="list-style-type: none"> Data content of the PME7 defective No PME7 plugged in

15 Legend

AL	Alarm device
Dbr...	Wire link
 i/reset (EK1)	Lockout reset button (info button)
EK2	Remote lockout reset button
FSV	Flame signal amplifier
ION	Ionization probe
Kx	Relay contact
LED	3-color signal lamp
LP	Air pressure switch
LR	Load controller
LR-OPEN	Load controller OPEN position
LR-CLOSED	Load controller CLOSED position
M	Fan motor
NT	Power supply unit
Pmax	Pressure switch-max
Pmin	Pressure switch-min
POC	Valve closure control (proof of closure)
PV	Pilot valve
QRA	Flame detector
R	Control thermostat or pressurestat
SA	Actuator
SA-KL	Actuator low-fire
SA-NL	Actuator high-fire
SA-R	Actuator feedback
SA-CLOSED	Actuator CLOSED
SA-ZL	Actuator ignition load
SK	Safety Loop
SV	Safety valve
V1	Fuel valve
Z	Ignition transformer
	Input/output signal 1 (ON)
	Input/output signal 2 (OFF)
	Permissible signal 1 (ON) or 0 (OFF)

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