# SIEMENS



Presentation example PME7          Presentation example LME7

# PME71.111Ax

# Program module for burner control LME71.000Ax

## User Documentation

**Application:**   - **1-stage, direct or pilot ignited forced draft burners**
                   - **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)!

**Smart Infrastructure**

# Contents

# 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 |

# 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.

# 4  Program sequence PME71.111Ax

→ For fuel trains **G** and **Gp1/1**

> **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.**
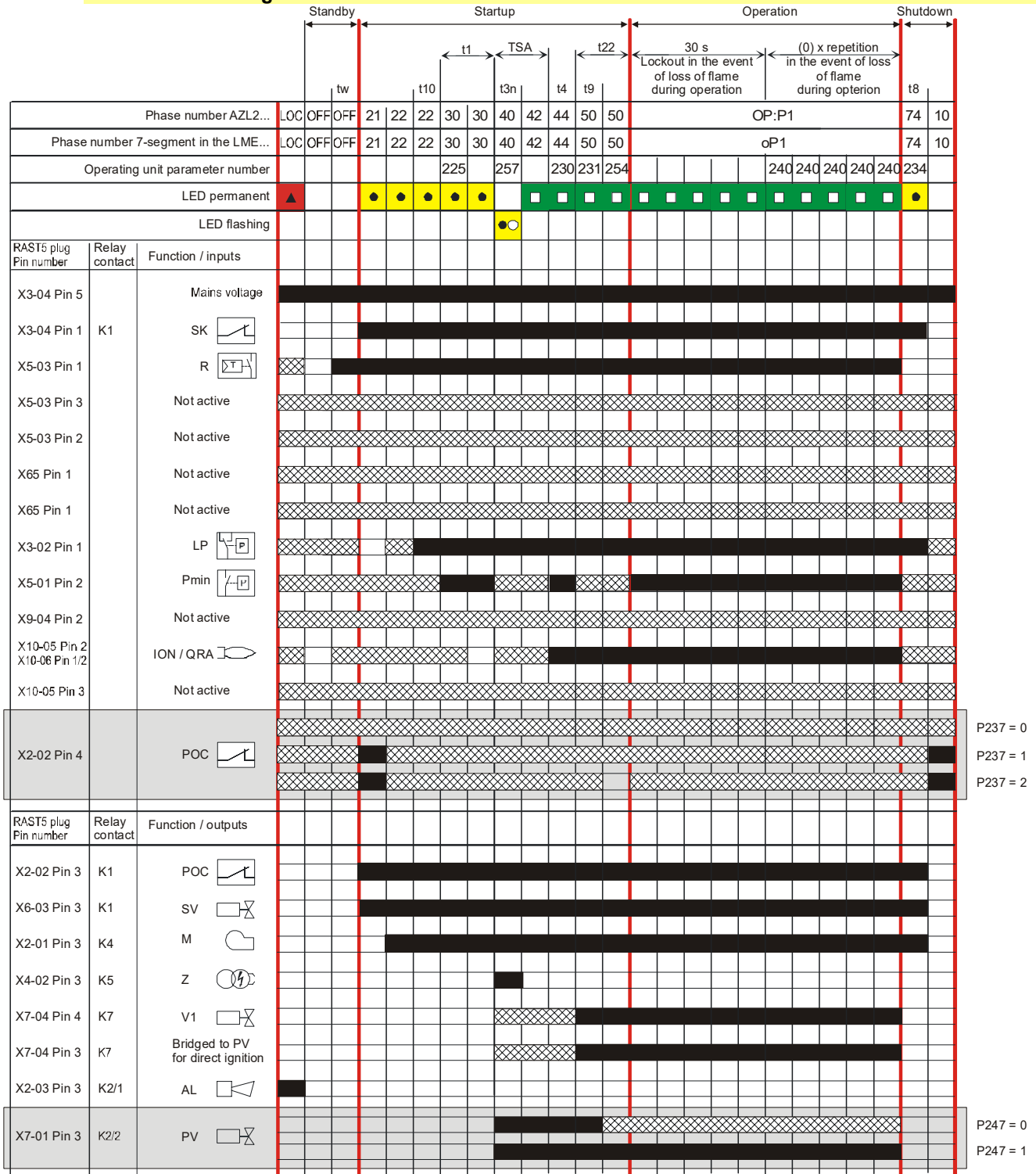


Figure 1: Program sequence for fuel trains **G** and **Gp1/1**

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# 5   List of phase display

| Phase number of display | | LED | Function |
|---|---|---|---|
| **7-segment** | **AZL2** | | |
| 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<br>Test if POC closed<br>(timeout/lockout after 5 seconds) |
| P22 | Ph22 | Yellow | Part 1: Fan motor ON<br>Part 2: Specified time air pressure switch<br>      Message (timeout), stabilization air pressure switch |
| P30 | Ph30 | Yellow | Part 1: Prepurge time without extraneous light test<br>Part 2: Prepurging with extraneous light test (2.1 seconds) |
| P40 | Ph40 | Yellow flashing | Postignition time |
| P42 | Ph42 | Green | Flame detection |
| P44 | Ph44 | Green | Interval: End of safety time and fuel valve V1 ON |
| P50 | Ph50 | Green | Part 1: Interval: Fuel valve V1 ON and pilot valve OFF<br>Part 2: Flame-out response time |
| **Operation** | | | |
| oP1 | oP:P1 | Green | Operation |
| **Shutdown** | | | |
| P10 | Ph10 | OFF | Home run |
| 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)<br>→ Non-volatile lockout |
| P04 | Ph04 | Green / red | Extraneous light in standby |
| P90 | Ph90 | Yellow | Gas pressure switch-min open<br>→ Non-volatile lockout |

# 6 Fuel trains (examples)

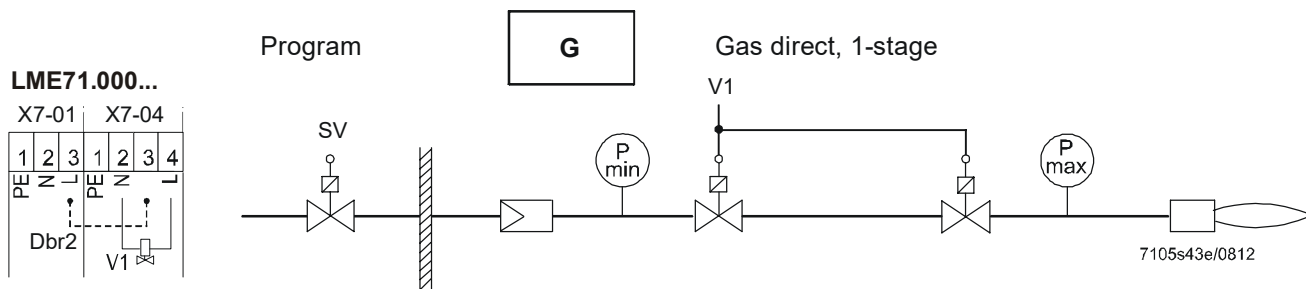## 6.1 Gas direct ignition (G), 1-stage



Figure 2: Fuel train gas direct ignition (G), 1-stage
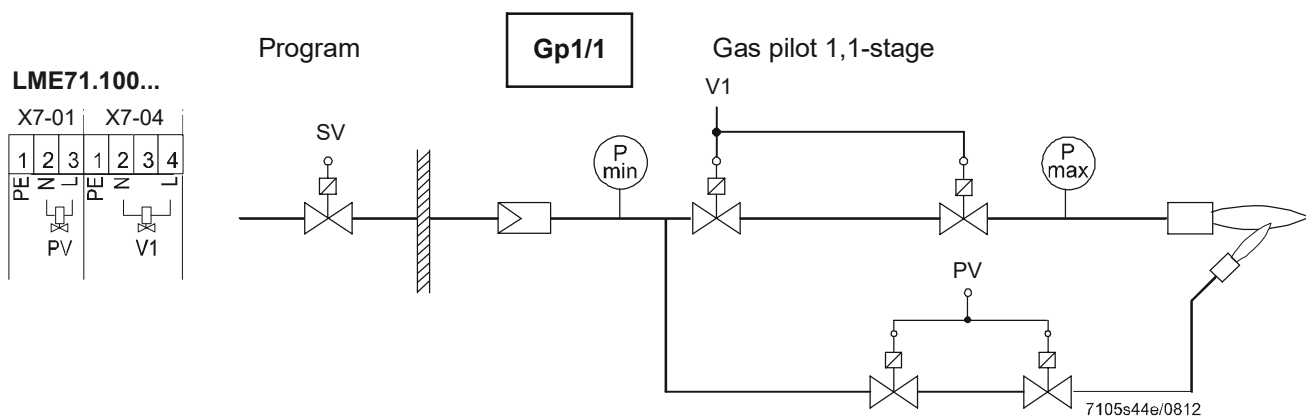
## 6.2 Gas pilot ignition 1 (Gp1/1), 1-stage



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

# 7 Input POC

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

Parameter 237 defines if and how the POC is tested.

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

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 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 (t4 / t9), and during operation. The gas pressure switch-min is not evaluated during the first and second safety time.

# 9 Time table and settings

| Type | | | | | Times in seconds | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PME71.111Ax | tw | TSA max. | t1 P225 min. | t3n P257 approx. | t4 P230 min. | t8 P234 min. | t9 P231 approx. | t10 approx. | t22 | 2) | 3) |
| Requirements | 2.5 | 5 | 30 | 4.4 | 3 | 15 | 10 | 15 | --- | --- | --- |
| Factory setting | --- | t3n+0.45 | 29.106+2.1 | 4.116+0.3 | 3.234 | 19.404 | 9.996 | 15 | t9+P254(1/3) | --- | --- |
| Max. | 2.5 | 14 | 1237+2.1 | 13.23+0.3 | 74.97 | 1237 | 74.97 | --- | --- | 0.45 | 0.45 |
| Min. | --- | --- | 0+2.1 | 0+0.3 | 3.234 | 0 | 0 | --- | --- | 0.3 | --- |
| Step size | --- | --- | 4.851 | 0.147 | 0.294 | 4.851 | 0.294 | --- | --- | --- | --- |

| Parameter number | Function | Factory setting |
|---|---|---|
| 237 | POC function<br>0: Inactive<br>1: Active (test during startup and shutdown (not safety relevant)<br>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<br>0 = OFF<br>1 = ON | 0 [1] |
| 240 | Restart during operation<br>0 = none<br>1 = none<br>2 = 1 x restart | 0 |
| 247 | Continuous pilot (during operation)<br>0: OFF<br>1: ON | 0 |
| 254 | Reaction time to loss of flame or fault air pressure switch<br>0 = 1 s<br>1 = 3 s | 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
t8      Postpurge time
t9      Interval: Fuel valve V1 ON and pilot valve OFF
t10     Specified time air pressure switch message (timeout)
t22     2nd 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)      Reaction time to a change of signal by the inputs (e.g. gas pressure switch-min)
3)      Flame detection time

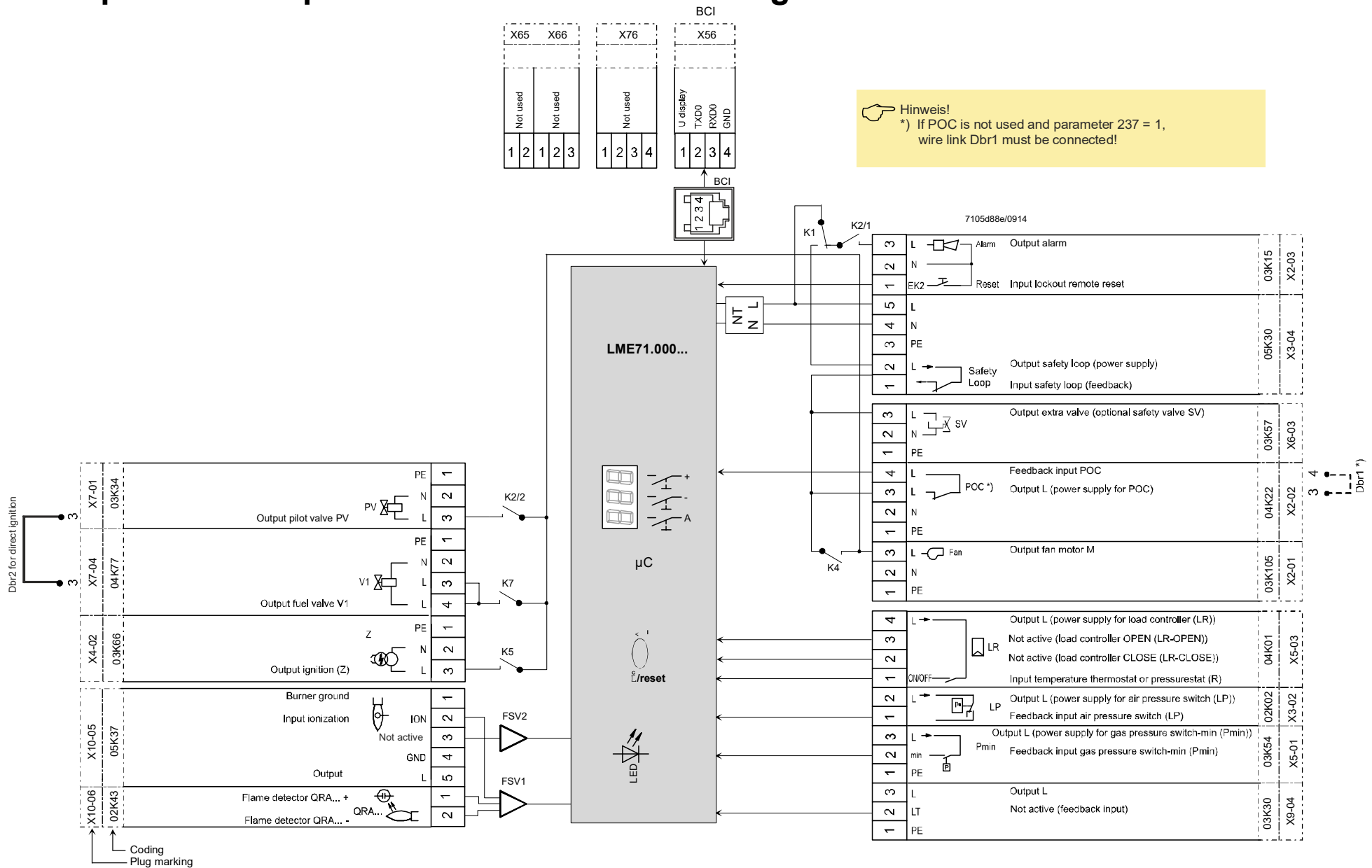# 10 Inputs and outputs / internal connection diagram



Figure 4: Inputs and outputs / internal connection diagram

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10 Inputs and outputs / internal connection diagram

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# 11 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 |
| 140 | Mode display for the 7-segment display<br>1 = standard (program phase)<br>2 = flame 1 (QRA/ION)<br>3 = flame 2 (QRB/QRC) ⇨ not used<br>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 ⇨ not active | Read only | 0 | 99999999 | 1 | 0 | Info | --- |
| 170.01 | Switching cycles relay contact K11 ⇨ not active | 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** | | | | | | | |
| 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 |
| 234 | Postpurge time | Edit | 0 s | 1237 s | 4.851 s | 19.404 s | SO | OEM |
| 237 | POC function<br>0: Inactive<br>1: Active (test during startup and shutdown (not safety relevant)<br>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<br>0: OFF<br>1: ON | Edit | 0 | 1 | 1 | 0 | SO | OEM |
| 240 | Restart in the event of loss of flame during operation<br>0: None<br>1: None<br>2: 1 x restart | Edit | 0 | 2 | 1 | 0 | SO | OEM |
| 247 | Continuous pilot (during operation)<br>0: OFF<br>1: ON | Edit | 0 | 1 | 1 | 0 | SO | OEM |
| 254 | Reaction time detector fault or air pressure switch fault<br>0: 1 second<br>1: 3 seconds | 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 |

| 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:<br>00: Error code<br>01: Startup meter reading<br>02: HMI phase<br>03: Power value | Read only | 2<br>0<br>---<br>0% | 255<br>999999<br>---<br>100% | 1<br>1<br>---<br>1 | --- | Service | --- |
| 702 | Latest error in the history<br>00: Error code<br>01: Startup meter reading<br>02: HMI phase<br>03: Power value | Read only | 2<br>0<br>---<br>0% | 255<br>999999<br>---<br>100% | 1<br>1<br>---<br>1 | --- | Service | --- |
| •<br>•<br>• | | | | | | | | |
| 711 | Oldest error in the history<br>00: Error code<br>01: Startup meter reading<br>02: HMI phase<br>03: Power value | Read only | 2<br>0<br>---<br>0% | 255<br>999999<br>---<br>100% | 1<br>1<br>---<br>1 | --- | Service | --- |
| | | | | | | | | |
| **900** | **Process data** | | | | | | | |
| 936 | Normalized speed | Read only | 0% | 100% | 0.01% | --- | Service | --- |
| 951 | Mains voltage | Read only | 0 V | LME71.000x1: 175 V<br>LME71.000x2: 350 V | 1 V | --- | Service | --- |
| 954 | Flame intensity | Read only | 0% | 100% | 1% | --- | Service | --- |

# 12  Error code list

| Error code | | Clear text | Possible cause |
|---|---|---|---|
| **AZL2** | **LED display** (alternating) | | |
| Loc: 2 | Loc 2 | No establishment of flame at the end of safety time | • Faulty or soiled fuel valves<br>• Defective, soiled or incorrectly connected flame detector<br>• Poor adjustment of burner, no fuel<br>• - 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<br>• Loss of air pressure signal after specified time<br>• 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<br>• Air pressure switch has welded in working position |
| Loc: 7 | Loc 7 | Loss of flame | Too many losses of flame during operation (Restart limitation)<br>• Faulty or soiled fuel valves<br>• Faulty or soiled flame detector<br>• 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's closing control POC |
| Loc: 20 | Loc 20 | Gas pressure switch-min open | Gas shortage |
| Loc: 22 | Loc 22 | Safety loop open | • Gas pressure switch-max open<br>• Safety limit thermostat cut out |
| 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 |

# 13 Error code list

| Error code | | Clear text | Possible cause |
|---|---|---|---|
| **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 | • PME7 faulty<br>• 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 | • Data content of the PME7 defective<br>• No PME7 plugged in |

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# 14 Legend

| | |
|---|---|
| AL | Alarm device |
| Dbr... | Wire link |
| ⌢ ☉ î/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 | Gas pressure switch-max |
| Pmin | Gas pressure switch-min |
| POC | Valve closure control (proof of closure) |
| PV | Pilot valve |
| QRA | Flame detector |
| R | Control thermostat or pressurestat |
| 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) |

# 15 List of figures