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BOONYIUM AND ASSOCIATES LIMITED

SIEMENS

7154

Oil burner controls LMO39...

Microcontroller-based burner controls for the startup, supervision and control of forced draft oil burners in intermittent operation. Maximum oil throughput up to 30 kg/h, also above 30 kg/h on some versions.

The LMO39… and this Data Sheet are intended for use by OEMs which integrate the burner controls in their products.

Use, features

Use

LMO39 are used for the startup and supervision of 1- or 2-stage oil burners in intermittent operation.
Yellow-burning flames are supervised with photo resistive detectors QRB1 / QRB3 or yellow flame detector QRB4, blue-burning flames with blue flame detector QRC.

- Applications in accordance with EN 267: Gas burners for liquid fuels
- Type-tested and approved in accordance with DIN EN 298

Features

- Undervoltage detection
- Electrical remote reset facility
- Bridging contact for oil preheater
- Accurate and reproducible program sequence through digital signal handling
- Controlled intermittent operation after 24 hours of continuous operation
- Limitation of the number of repetitions
- Multicolor indication of fault status and operational status messages
- BCI
- For stationary air heaters
- Time supervision for oil preheater

Notes

Warning!
The safety, warning and technical notes given in the Basic Documentation on the LMO39... (P7154) apply fully to the present document also!
If not observed, the safety functions are no longer ensured and there will be a risk of electric shock.

Supplementary documentation

ASN	Title	Document no.	Document type
LMO39	Burner control	P7154	Basic Documentation
ACS410	PC software	J7352	Software documentation
OCI400	Optical interface	N7614	Data sheet
OCI410	Optical interface	N7616	Data sheet
QRB1 / QRB3	Photo resistive detector	N7714	Data sheet
QRB4	Yellow-flame detector	N7720	Data sheet
QRC1	Blue-flame detector	N7716	Data sheet

Standards and certificates

Applied directives:

- Low-voltage directive 2014/35/EC
- Directive for pressure devices 2014/68/EC
- 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 burners and appliances burning gaseous and/or liquid fuels — General requirements — 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 LMO39 and the AGK11 comply with the requirements of EN 60335-2-102.

EAC Conformity mark (Eurasian conformity mark)

ISO 9001:2015
ISO 14001:2015
OHSAS 18001:2007

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

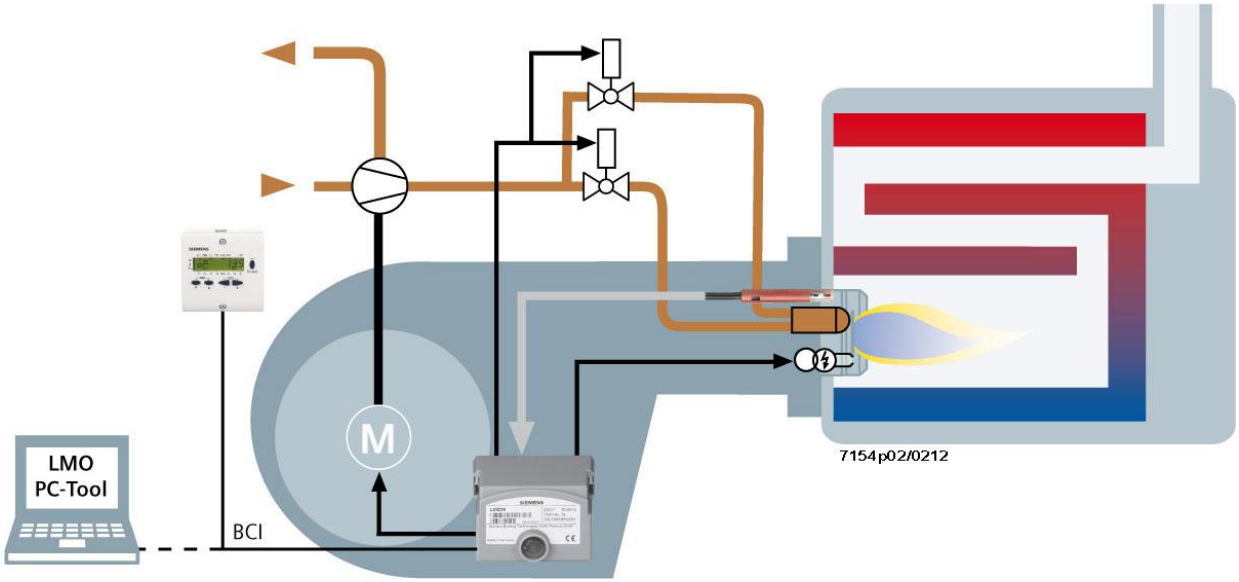
Life cycle

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 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 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: 1-/2-stage oil burner

The diagram shows the full scope of functions of the LMO39… system. The actual functions are to be determined based on the respective execution/configuration.

Type summary (other types of burner controls on request)

The product nos. given below applies to the LMO39… burner control without plug-in base and without flame detector. For ordering information on plug-in bases and other accessories, see Ordering.

Order number	Type		Times in seconds							
			tw max. s	TSA (P267) max. s	t1 (P265) min. s	t3 (P266) min. s	t3n (P295) approx. s	t4 (P270) approx. s	t8 (P274) min. s	tow (P296) approx. s
BPZ:LMO39.100C1	**LMO39.100C1**	Requirement	2.5	5	0	30	4.5	5	0	600
BPZ:LMO39.100C2	**LMO39.100C2**	Requirement	2.5	5	0	30	4.5	5	0	600
	Setting range	Min.	---	0	0	0 + 5.6	0	0	0	0
		Max.	---	14.994	1237	1237 + 5.6	14.994	1237	1237	1237
		Increment (s)	---	0.147	4.851	4.851	0.147	4.851	4.851	4.851
		Factory setting	---	4.557	0	29.106 + 5.6	4.410	4.851	0	596.673

Function parameter	Parameter number	Factory setting
Repetition limit value loss of flame 0 = none 1 = none 2 = 1 x repetition 3 = 2 x repetition 4 = 3 x repetition	280	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:	The preignition time shall be set to 30 seconds
Special case here:	The preignition time is made up of parameter 266 and a fixed time of 5.6 seconds that cannot be parameterized.
Calculation:	30 seconds + 7% - 5.6 seconds = 32.1 seconds – 5.6 seconds = 26.5 seconds
Value to be parameterized (parameter 266):	Must be equal to or **greater** than the calculated value (e.g. 29.106 seconds)

Example:	The safety time shall be set to 5 seconds
Calculation:	5 seconds - 7% = 4.65 seconds
Value to be parameterized (parameter 267):	Must be equal to or **smaller** than the calculated value (e.g. 4.557 seconds)

Legend

TSA	Safety time	t3n	Postignition time
tw	Waiting time	t4	Interval between flame ON and release fuel valve 2
t1	Prepurge time	t8	Postpurge time
t3	Preignition time		

1) Repetition (maximum number of startups per controlled start)

Accessories (to be ordered separately)

Connection accessories for small burner controls

Plug-in base **AGK11.6**
Article no.: **BPZ:AGK11.6**
For connection of LMO39... to burner system, grey
Refer to Data Sheet N7201.

Cable holder **AGK66**
Article no.: **BPZ:AGK66**
For plug-in base AGK11...
Refer to Data Sheet N7201.

Cable holder **AGK65**
Article no.: **BPZ:AGK65**
For plug-in base AGK11...
Refer to Data Sheet N7201.

Flame detectors

Photo resistive detector **QRB1 / QRB3**
See Data Sheet N7714

Yellow flame detector **QRB4**
See Data Sheet N7720.

Blue-flame detector **QRC…**
See Data Sheet N7716.

Frontal illumination:

Lateral illumination:

Accessories (to be ordered separately) (continued)

Service tools

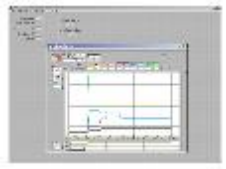
Optical interface **OCI400**
Article no.: **BPZ:OCI400**
- Optical interface between burner control and P
- Facilitates viewing, handling and recording setting parameters on site with the help of the ACS410 software package

Refer to Data Sheet N7614.

BC interface module **OCI410**
Article no.: **BPZ:OCI410**
- BC interface module between burner control and PC
- Facilitates viewing, handling and recording setting parameters on site with the help of the ACS410 software package

Refer to Data Sheet N7616.

PC software **ACS410**
Article no.: **BPZ:ACS410**
For parameterization and visualization to burner controls.
Refer to software documentation J7352.



Display and operating units

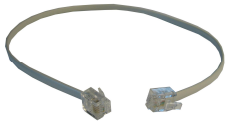
Display and operating unit **AZL21.00A9**
Article no.: **BPZ:AZL21.00A9**
detached, choice of mounting methods, 8-digit LCD, 5 buttons, BCI for LMO39, degree of protection IP40
See Data Sheet N7542

Display and operating unit **AZL23.00A9**
Article no.: **BPZ:AZL23.00A9**
detached, choice of mounting methods, 8-digit LCD, 5 buttons, BCI for LMO39, degree of protection IP54
See Data Sheet N7542

Others

Extension of lockout reset button **AGK20**

Signal cable **AGV50.100**
Article no.: **BPZ:AGV50.100**
For AZL2..., with RJ11 connector,
cable length 1 m, pack of 10



PTC resistor **AGK25**
Article no.: **BPZ:AGK25**
- AC 230 V
- As a burden for terminal 3 (for burners without fan motor, such as atmospheric gas burners)

Technical data

General unit data

Mains voltage - LMO39.100x1 - LMO39.100x2	 AC 120 V AC 230 V
Mains frequency	50...60 Hz
External primary fuse (Si)	T6.3H250V to IEC 60127-2
Power consumption	12 VA
Perm. mounting position	Optional
Input current at terminal 1	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 lengths	Max. 3 m at a line capacitance of 100 pF/m
Remote reset	Max. 20 m at 100 pF/m (laid separately)
Detector cable • QRB1 / QRB3 • QRB4 • QRC	 Max. 10 m at 100 pF/m (laid separately) Max. 3 m at 100 pF/m (laid separately) Max. 10 m at 100 pF/m (laid separately)
Control thermostat/pressurestat	Max. 20 m at 100 pF/m (laid separately)
Limit thermostat/pressure switch	Max. 20 m at 100 pF/m (laid separately)
Alarm terminal 10	Max. 20 m at 100 pF/m (laid separately)
Possible input current terminals 7 and 9	1 mA

Perm terminal load	**At cosφ ≥0.6**
- Terminal 1	Max. 5 A
- Terminals 3 and 8	Max 3 A (15 A during max. 0.5 s)
- Terminals 4, 5 and 10	Max. 1 A
- Terminal 6	Max. 2 A

Signal cable AGV50...

Display → BCI

Signal cable	Color white Unshielded Conductor 4 x 0.141 mm² with RJ11-connector
Cable length AGV50.100	 1 m
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.
	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.

Flame supervision with QRB... or QRC...

	Detector current required (with flame)	Perm. detector current (without flame)	Possible detector current with flame (typically)
QRB1 [1])	Min. 45 µA	Max. 5,5 µA	100 µA
QRB3 [1])	Min. 45 µA	Max. 5,5 µA	100 µA
QRB4 [1])	Min. 45 µA	Max. 5,5 µA	70 µA
QRC [1])	Min. 45 µA	Max. 5,5 µA	70 µA

[1]) The values given in the table above only apply under the following conditions:
- Mains voltage depending on execution AC 120 V or AC 230 V
- Ambient temperature 23 °C

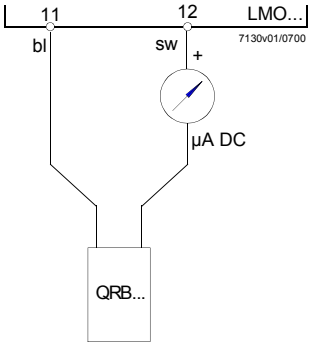
Green signal lamp (LED) for indication of operating state

	Detector current in operation: - Flame signal instable - Green signal lamp (LED) flashing	Detector current in operation: - Flame signal stable - Green signal lamp (LED) steady on
QRB... [1])	<45 µA	>45 µA
QRC... [1])	<45 µA	>45 µA

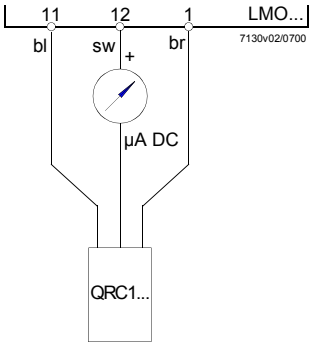
[1]) The values given in the table above only apply under the following conditions:
- Mains voltage depending on execution AC 120 V or AC 230 V
- Ambient temperature 23 °C

Measuring circuit for detector current

QRB...



QRC...



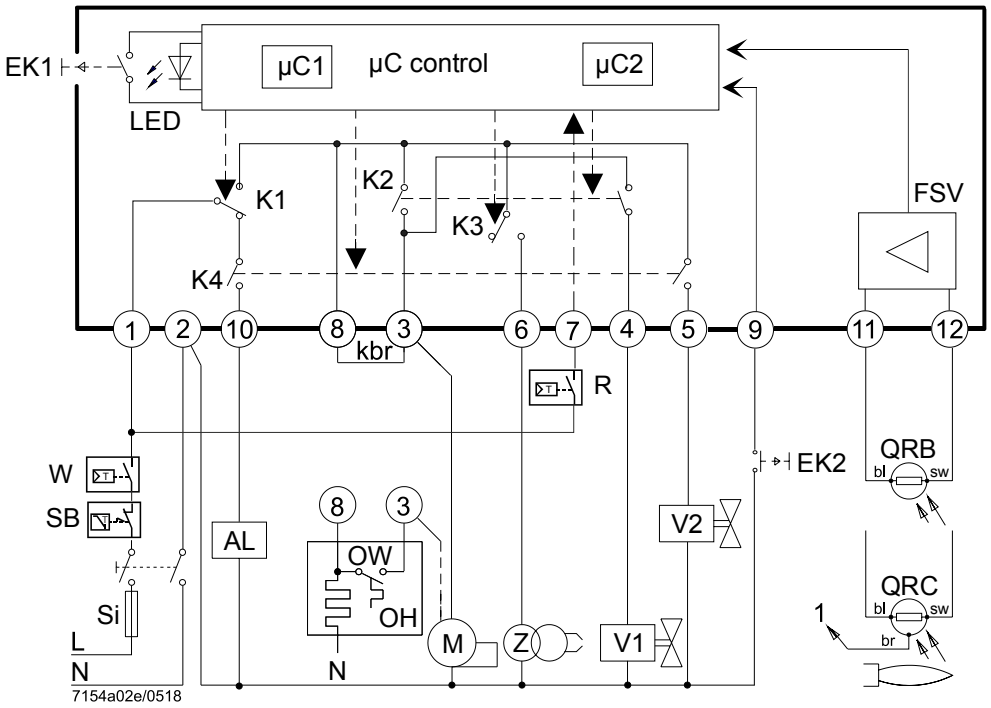
Legend

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

Alternatively, interface OCI400/OCI410 with PC software ACS410 or AZL2 (parameter 954) can be used to measure the detector current.
In that case, the DC microammeter is not required.

Note!
QRB4 cable connection!
Connect the blue QRB4 cable to terminal 11.
Connect the black QRB4 cable to terminal 12.
Otherwise the QRB4 will not function.

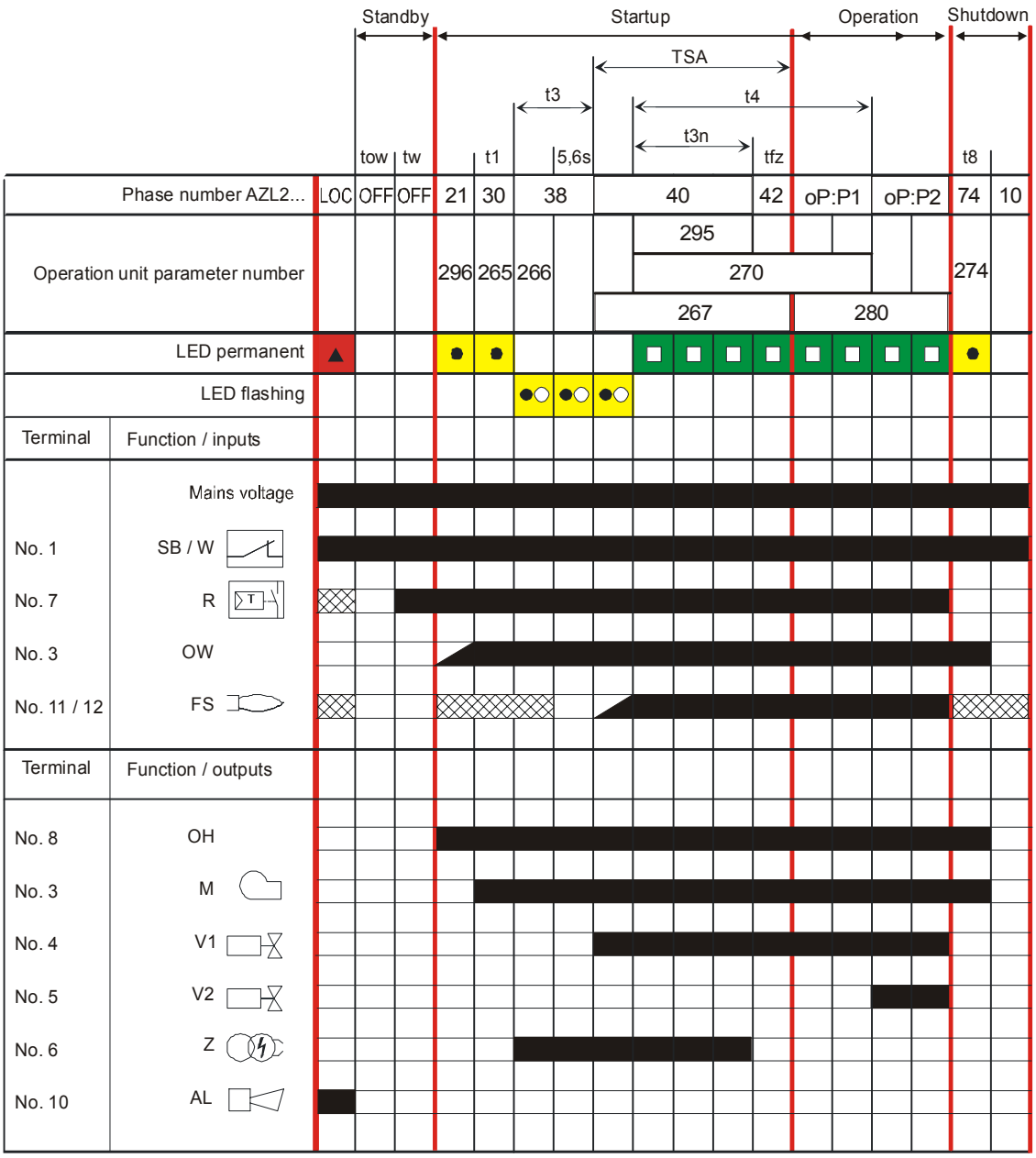
Inputs and outputs/internal connection diagram LMO39.100...



Legend

AL	Error message (alarm)
BCI	Communication interface
EK	Lockout reset button (internal)
EK2	Remote lockout reset button
FS	Flame signal
FSV	Flame signal amplifier
K1...4	Internal relay
kbr	Jumper
M	Fan motor
OH	Oil preheater
OW	Release contact of oil preheater
QRB1	Photo resistive detector
QRB3	Photo resistive detector
QRB4	Yellow flame detector
QRC…	Blue flame detector (bl = blue, br = brown, sw = black)
R	Control thermostat/pressurestat
SB	Safety limiter
Si	External pre-fuse
V...	Fuel valve
W	Limit thermostat/pressure switch
Z	Ignition transformer

Control sequence LMO39.100...



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Legend

t1	Prepurge time (parameter 265)
t3	Preignition time (parameter 266 + 5.6 seconds)
t3n	Postignition time (parameter 295)
t4	Interval between flame ON and release of fuel valve 2 (parameter 270)
t8	Postpurge time (parameter 274)
TSA	Ignition safety time (parameter 267)
tw	Waiting time
tow	Oil pressure switch - timeout (parameter 296)

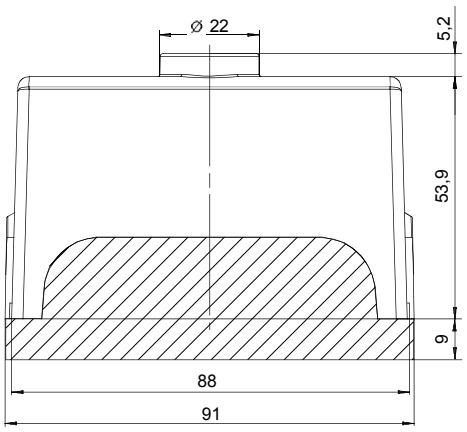
AL	Error message (alarm)
FS	Flame signal
M	Fan motor
OH	Oil preheater
OW	Release contact of oil preheater
R	Control thermostat/pressurestat
SB	Safety limiter
V...	Fuel valve
W	Limit thermostat/pressure switch
Z	Ignition transformer

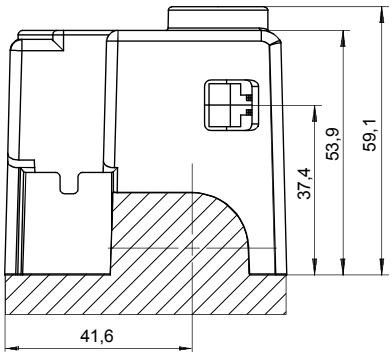
Input signal/output signal 1 (ON)
Input signal/output signal 0 (OFF)
Input permissible signal 1 (ON) or 0 (OFF)

Dimensions

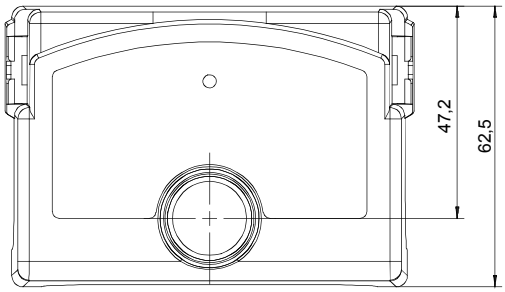
Dimensions in mm

LMO39...





Plug-in base AGK11.6



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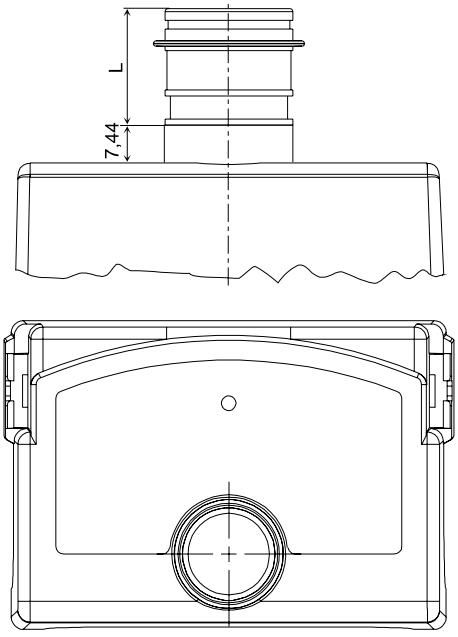
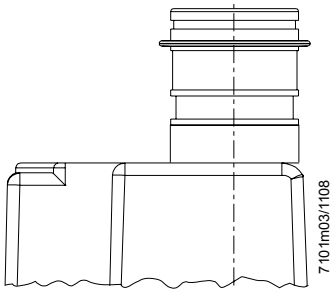
LMO39... with lockout reset button extension AGK20...





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

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Subject to change!

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