Oil Burner Control LOA44.252A27

Oil burner control for the supervision, startup and control of 1- or 2-stage forced draft oil burners, burners of direct-fired air heaters and burners having an oil throughput of more than 30 kg/h in intermittent operation.

The LOA44.252A27 and this Data Sheet are intended for use by OEMs which integrate the burner controls in their products.

Use, features

Use

The LOA44.252A27 is used for the supervision, startup and control of 1- or 2-stage forced draft oil burners in intermittent operation. Yellow-burning flames are supervised with photoresistive detectors QRB…, blue-burning flames with blue-flame detectors QRC…

- Forced draft oil burners conforming to EN 267
- For use with stationary direct-fired air heaters
- Oil burner controls for oil atomization burners in monoblock design conforming to EN 230

General features

- Undervoltage detection
- Bridging contact for oil preheater
- Electrical remote reset facility

Warning notes

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

Do not open, interfere with or modify the unit!

- All activities (mounting, installation and service work, etc.) must be performed by qualified staff
- Before performing any wiring changes in the connection area of the LOA44.252A27, completely isolate the unit from the mains supply (all-polar disconnection)
- Ensure protection against electric shock hazard by providing adequate protection for the burner control's connection terminals
- Check to ensure that wiring is in an orderly state
- Press the lockout reset button / operating button only manually (applying a force of no more than 60 N), without using any tools or pointed objects
- 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

Mounting notes

- Ensure that the relevant national safety regulations are complied with

Installation notes

- Always run high-voltage ignition cables separately while observing the greatest possible distance to the unit and to other cables
- Do not mix up live and neutral conductors
- When using the electrical remote reset facility, the lockout reset button must be integrated such that terminal 9 will be connected to the neutral conductor

Electrical connection of the flame detectors

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

- Never run the detector cable together with other cables
  – Line capacitance reduces the magnitude of the flame signal
  – Use a separate cable
- Observe the permissible lengths of the flame detector cables (refer to Data Sheets N7714 (QRB…) and N7716 (QRC…))

Commissioning notes

- Prior to commissioning, check to ensure that wiring is in an orderly state
- When commissioning the plant or when carrying out maintenance work, make the following safety checks:

	Safety check	Anticipated response
a)	Burner startup with flame detector darkened	Lockout at the end of «TSA»
b)	Burner startup with flame detector exposed to extraneous light	Lockout after approx. 40 seconds
c)	Simulation of loss of flame during operation. For that purpose, darken the flame detector during operation and maintain that state	Repetition followed by lockout at the end of «TSA»

Standards

Conformity to EEC directives
– Electromagnetic compatibility EMC (immunity) 89 / 336 EEC
– Low-voltage directive 73 / 23 EEC

ISO 9001: 2000
Cert. 00739

ISO 14001: 1996
Cert. 38233

Service notes

- Each time a unit has been replaced, check wiring to ensure that it is in an orderly state and make the safety checks as indicated in «Commissioning notes»
- Do not press the lockout reset button «EK» for more than 10 seconds
- Use the KF… test adapters for short periods of time only

Disposal notes

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

Mechanical design

The housing is made of impact-proof, heat-resistant and flame-retarding plastic. It is of plug-in design and engages audibly in its base.

The housing accommodates the
- electronic sequence control and the load control relays
- flame signal amplifier with the flame relay
- lockout reset button with its integrated fault indication lamp

Type summary

The type reference given below applies to the burner control without base and without flame detector.

Type reference	Mains voltage	Undervoltage detection	t1	t3	TSA max.	t3n	t4
LOA44.252A27	AC 220...240 V	X	25 s	25 s	5 s	2 s	5 s

Legend

t1	Prepurge time
t3	Preignition time
t3n	Postignition time, depending on the time of flame establishment
t4	Interval from establishment of flame to the release of «BV2»
TSA	Ignition safety time

Ordering

Oil burner control without plug-in base — refer to «Type summary»

Connection accessories for burner controls of small capacity — refer to Data Sheet 7201
- Plug-in base AGK11...
- Cable holders AGK65..., AGK66, AGK67...
- Cable strain relief elements for AGK67...

Connection accessories for burner controls of small capacity — refer to Data Sheet 7203
- Plug-in base AGK13
- Plug-in housing AGK56
- Cover AGK68

Flame detectors
- Photoresistive detectors QRB1... — refer to Data Sheet 7714
- Blue-flame detectors QRC1... — refer to Data Sheet 7716

Demo case — **KF8891**
- For showing the functioning of burner controls
- Refer to Operating Instructions B7989

Test adapter — **KF8885**
- For testing the functioning of burner controls on the burner
- With switch for manual startup of burner
- With switch for simulating the oil preheater's release contact
- With 2 pairs of jacks for measuring the flame detector current
- Refer to Operating Instructions B7986

Pedestal (empty housing) — **AGK21**
- To increase the overall height of the LOA44.252A27 to that of the LAB…

Adapter — **KF8819**
- For replacing LAB15.1 / LAB16.3 by LOA44.252A27
- No rewiring of plug-in base required

Test adapter — **KF8833**
- For testing the functioning of burner controls on the burner
- With signal lamps for program indication
- With 2 jacks for measuring the flame detector current

Test adapter — **KF8840**
- For testing the functioning of burner controls on the burner
- With signal lamps for program indication
- With switch for simulating the flame signal
- With holes for checking the voltages at the tabs of the burner control
- With 2 jacks for measuring the flame detector's resistance

Technical data

General unit data

Mains voltage	AC 220 V –15 %...AC 240 V +10 %
Mains frequency	50...60 Hz ±6 %
External primary fuse (Si)	max. 10 A, slow
Power consumption	approx. 3 VA
Mounting position	optional
Weight	approx. 140 g
Degree of protection	IP40, must be ensured through mounting
Safety class	I
Input current to	
- terminal 1	max. 5 A
- terminal 3	5 A (excl. current draw of burner motor and oil preheater)

Perm. current at cos φ ≥ 0.6	Terminal 4	Terminal 5	Terminal 6	Terminal 8	Terminal 10
LOA44.252A27	Max. 2 A	Max. 2 A	Max. 2 A	Max. 5 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 60 721-3-2
Climatic conditions	class 2K2
Mechanical conditions	class 2M2
Temperature range	-50...+60 °C
Humidity	< 95 % r.h.
Operation	DIN EN 60 721-3-3
Climatic conditions	class 3K5
Mechanical conditions	class 3M2
Temperature range at U_N	
- AC 187...242 V	-20...+60 °C
- AC 242...264 V	-20...+40 °C
Humidity	< 95 % r.h.

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

Flame supervision with QRB... and QRC...

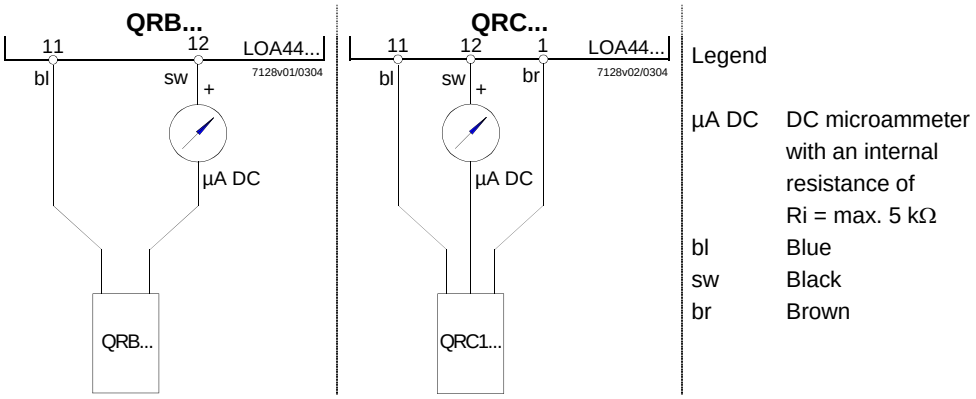
For detector cable lengths, refer to Data Sheets 7714 (QRB...) and 7716 (QRC...).

Type reference	Detector current required (with flame)	Perm. detector current (without flame)
QRB... / QRC...	Min. 58 µA	Max. 5.5 µA

The data given above only apply under the following conditions:
- Mains voltage AC 230 V ±3 V
- Temperature 23 °C ±5 °C
- Detector cable length < 5 m

The highest possible intensity of illumination is indicated by a slight increase of the detector current.

Measuring circuit for detector current



Function

Preconditions for startup

- Burner control is reset
- Contacts in the line are closed
- No undervoltage
- Flame detector is darkened, no extraneous light

Undervoltage detection

An additional electronic circuit ensures that, if mains voltage drops below approximately AC 160 V, burner operation will be prevented.

Control sequence in the event of fault

Whenever lockout occurs, the outputs for the fuel valves, the burner motor, oil preheater and ignition equipment will immediately be deactivated (< 1 second).
The lockout indication lamp changes to red and voltage is fed to terminal 10 («AL») for remote lockout indication.
This state is also maintained in the event of mains voltage failure.

Cause	Response
Mains voltage failure	Restart on restoration of mains supply
Extraneous light during «t1»	Lockout
No flame at the end of «TSA»	Lockout
Loss of flame during operation	Repetition
Loss of flame during «t3n»	Lockout after approx. 2.5 s

Reset

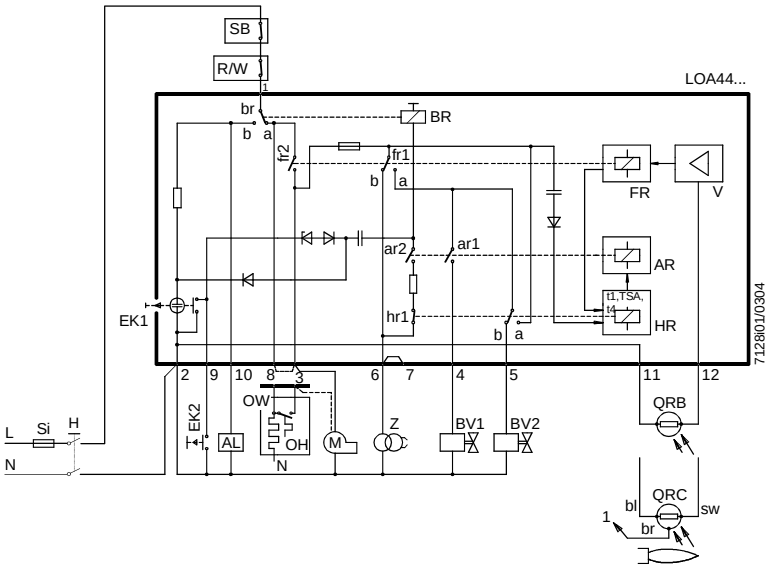
After lockout, the burner control can be reset after 120 seconds.

Indication

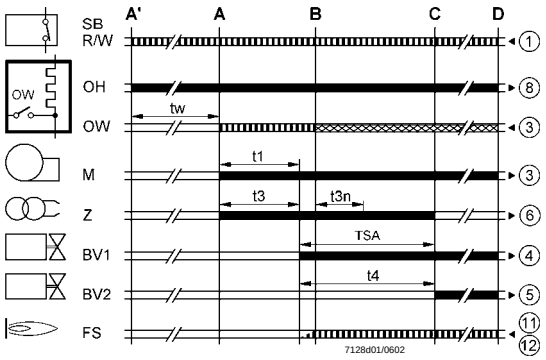
Lockout position

The lockout position is indicated by the lamp integrated in the lockout reset button.

Connection diagram and internal diagram



Control sequence



Legend	AL	Alarm device	OH	Oil preheater
	AR	Main relay with contacts «ar...»	QRB...	Photoresistive detector
	BR	Lockout relay with contacts «br...»	QRC...	Blue-flame detector
	BV...	Fuel valve		bl = blue, br = brown, sw = black
	EK...	Lockout reset button	R	Control thermostat or pressurestat
	FR	Flame relay with contacts «fr...»	SB	Safety limit thermostat
	FS	Flame signal	Si	External primary fuse
	HR	Auxiliary relay with contacts «hr...»	W	Limit thermostat or pressure switch
	M	Burner motor	V	Flame signal amplifier
	OW	Release contact of oil preheater	Z	Ignition transformer
	t1	Prepurge time	t4	Interval between establishment of flame and release of «BV2»
	t3	Preignition time		
	t3n	Postignition time	TSA	Ignition safety time
			tw	Waiting time
	A´	Beginning of startup sequence with burners using an oil preheater	C	Operating position
	A	Beginning of startup sequence with burners using no oil preheater	C-D	Burner operation
	B	Time of flame establishment	D	Controlled shutdown by «R»

Control signals of the LOA44.252A27
Required input signals
Permissible input signals

Dimensions

Dimensions in mm

LOA44.252A27

Plug-in base AGK11... / AGK13...