ISO 9001

Actuators SQN7...

for air dampers and control valves of oil and gas burners

SQN70.../SQN71...

SQN74.../SQN75...

Reversible electric actuators with torques up to 2.5 Nm

- **Running times:** – **SQN70... / SQN71... 4 ... 30 s**
  – **SQN74... / SQN75... 4 ... 60 s**
- **Versions:** – **Clockwise or anticlockwise rotation**
  – **With integrated electronic units**
  – **Choice of drive shafts**
- **With two limit and two auxiliary switches; two of them (SQN70... / SQN71...) and one (SQN74... / SQN75...) with fine adjustment**
- **Geartrain can be disengaged**
- **Single or double potentiometer for fitting on site**
- **SQN70... / SQN71...** – **Direct replacement of damper actuators SQN30... / SQN31...**
- **SQN74... / SQN75...** – **Drive shafts, fixing holes and cable entries are matched to the same kind of actuators supplied by Conectron and Berger**

The SQN7... and this data sheet are intended for use by OEMs that integrate the actuators in their products!

Use

The actuators of the SQN7... range are designed to drive gas and air dampers of oil or gas burners of small to medium capacity and provide load-dependent control of the amount of gas, oil or combustion air

- in connection with single- or two-wire control or three-position controllers, or
- directly through the burner control

Function

A synchronous motor drives a drive shaft and a cam shaft through a geartrain.

The cam shaft actuates the limit and auxiliary switches. Using the associated cam, the switching position of each limit and auxiliary switch can be adjusted within the working range.

Some of the actuator versions are equipped with electronic units which perform auxiliary functions in connection with the limit and auxiliary switches or with external devices, such as controllers (refer to «Connection diagrams»).

The functions and technical data of both lines of actuators SQN70... / SQN71... and SQN74... / SQN75... are nearly identical.

Type summary

Actuators SQN70... / direction of rotation [9] : anticlockwise

Diagram no	Drive shaft [1] no	Running time at 50 Hz [2] for 90 ° ∢ s	Nominal torque [6] Nm	Holding torque Nm	10) pcs.	Length of housing [1] mm	AC 230 V [3] +10 % -15 % 50...60 Hz type reference [8]	AC 110 V [4] +10 % -15 % 50...60 Hz type reference	SQN7... replaces type reference [7]
4	0	4	1.5	0.7	2	117	**SQN70.244A20**		SQN30.121A2700
6	0	4	1.5	0.7	2	80	**SQN70.264A20**		SQN30.102A2700
9	0	4	1.5	0.7	2	117	**SQN70.294A20**		SQN30.111A2700
4	0	4	1.5	0.7	2	117	SQN70.244A20		SQN30.121A3500
9	0	4	1.5	0.7	2	117	SQN70.294A20		SQN30.111A3500
2	0	12	2.5	1.2	2	117	SQN70.424A20		
5	0	12	2.5	1.2	2	117	SQN70.454A20		
6	0	30	2.5	1.3	2	80	**SQN70.664A20**		SQN30.401A2700
6	3	30	2.5	1.3	2	80	**SQN70.664A23**		SQN30.402A2730
2	0	4	1.5	0.7	2	117	**SQN70.224A20**		

Legend

1) Refer to «Dimensions»
2) At 60 Hz, the running times are approx. 20 % shorter
3) 220 - 240 V +10 % / -15 % possible, but in the event of undervoltage, torque is reduced by about 20 %
4) 100 - 120 V +10 % / -15 % possible, but in the event of undervoltage, torque is reduced by about 20 %
6) Under nominal conditions; under extreme conditions (e.g. +60 °C, 230 V -15 %) approx. -25 %
7) Refer to «Replacement of SQN30... / SQN31...»
8) Types in normal print and other types available on request
9) When facing the drive shaft and when voltage is present at limit switch I
10) Auxiliary switches (in addition to the two limit switches)

Actuators SQN71... / direction of rotation [9] : clockwise

Diagram no.	Drive shaft [1] no.	Running time at 50 Hz [2] for 90 ° ∢ s	Nominal torque [6] Nm	Holding torque Nm	10) pcs.	Length of housing [1] mm	AC 230 V [3] +10 % -15 % 50...60 Hz type reference [8]	AC 110 V [4] +10 % -15 % 50...60 Hz type reference	SQN7... replaces type reference [7]
4	0	4	1.5	0.7	2	117	**SQN71.244A20**		SQN31.121A2700
4	3	4	1.5	0.7	2	117	SQN71.244A23		SQN31.121A2730
4	6	4	1.5	0.7	2	117	SQN71.244A26		SQN31.121A2760
6	0	4	1.5	0.7	2	80	SQN71.264A20	SQN71.264A10	SQN31.101A2700
9	0	4	1.5	0.7	2	117	**SQN71.294A20**		SQN31.111A2700
9	6	4	1.5	0.7	2	117	SQN71.294A26		SQN31.111A2760
2	0	12	2.5	1.2	2	117	**SQN71.424A20**		
5	0	12	2.5	1.2	2	117	SQN71.454A20		
6	0	30	2.5	1.3	2	80	**SQN71.664A20**	SQN71.664A10	SQN31.401A2700
6	6	30	2.5	1.3	2	80	SQN71.664A26		SQN31.401A2760
9	0	30	2.5	1.3	2	117	**SQN71.694A20**		SQN31.411A2700
9	3	30	2.5	1.3	2	117	SQN71.694A23		SQN31.411A2730

Type summary (cont'd)

Actuators SQN75... / direction of rotation [9] : clockwise

Diagram no.	Drive shaft [1] no.	Running time at 50 Hz [2] for 90 ° ∢ s	Nominal torque [6] Nm	Holding torque Nm	10) pcs.	AC 230 V [3] +10 % -15 % 50...60 Hz type reference [8]	AC 110 V [4] +10 % -15 % 50...60 Hz type reference
2	1	4	1.5	0.7	2	**SQN75.224A21**	
4	1	4	1.5	0.7	2	**SQN75.244A21**	
9	1	4	1.5	0.7	2	**SQN75.294A21**	
2	1	12	2.5	1.2	2	SQN75.424A21	
4	1	12	2.5	1.2	2	SQN75.444A21	
9	1	30	2.5	1.3	2	**SQN75.694A21**	
6	1	60	2.5	1.3	2	SQN75.864A21	

Actuators SQN74... / direction of rotation [9] : anticlockwise

Types SQN74... with the same type references after the period and the same technical data as the corresponding SQN75... types (see above).

Accessories

Accessories must be ordered as separate items.

Potentiometers for fitting on site

Can only be fitted in actuators having an internal circuitry according to connection diagram no. 6.

Single potentiometers (conducting plastic)		**Type reference**
• 1000 Ω / 90 ° ∢	(delivery on request)	ASZ12.303
• 1000 Ω / 135 ° ∢	(delivery on request)	ASZ12.333

Double potentiometers (conducting plastic)

• 1000 Ω / 1000 Ω / 90 ° ∢	(delivery on request)	ASZ22.303
• 1000 Ω / 1000 Ω / 135 ° ∢	(delivery on request)	ASZ22.333

Technical data of ASZ...: → refer to data sheet 7921

Adapter

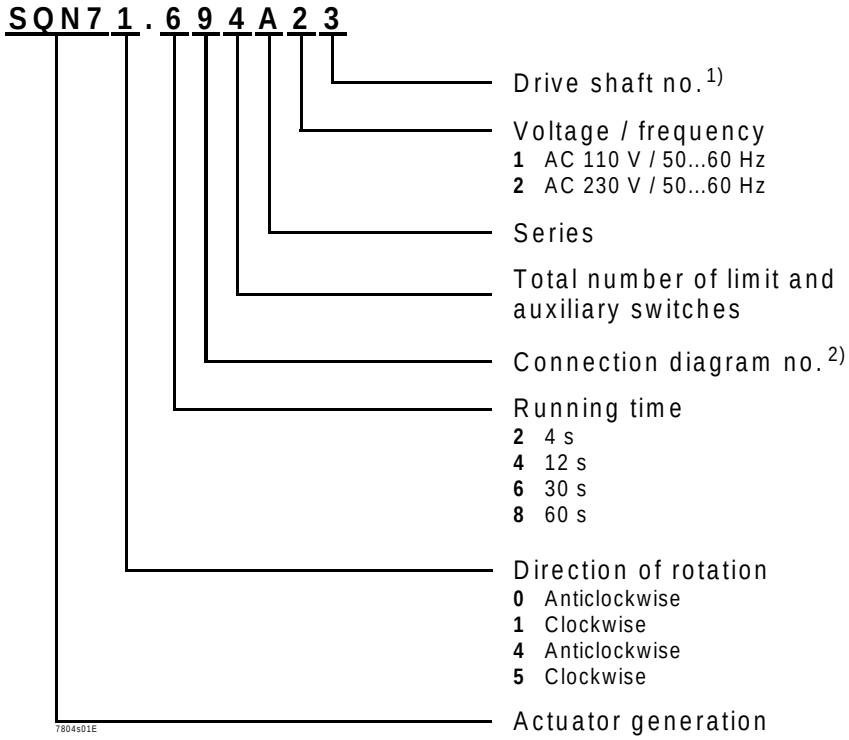
(Not suited for use with SQN74... / SQN75...) **AGA70.3**

For mounting the SQN70... / SQN71... in place of the SQN3...; fitted to the SQN70... / SQN71... by means of a self-tapping screw.

Screw and washer are included in the supply.

Type code

Do not use for ordering. This is only a general guide for creating type references.



1) Refer to «Dimensions»
2) Refer to «Connection diagrams»

Replacement of SQN30... / SQN31...

Using an adapter (refer to «Accessories»), actuators of the SQN30... and SQN31... lines can be replaced by SQN70... / SQN71... .

No mechanical modifications required.
The different assignment of the terminals of the two types of actuators must be observed, however.

The «Type summary» contains the **SQN3... types** that can be replaced by SQN7... actuators.

The **SQN30... and SQN31... types** listed under «Type summary»

- refer to the SQN7... 230 V versions.

  The respective SQN3... 110 V versions use the same type references as the 230 V versions, with one exception: type suffix ..A27... is replaced by ..A17...

- are versions **without** facility for fitting a potentiometer.

  The SQN70... / SQN71... also replace the **respective** SQN30... / SQN31... with facility for a potentiometer.

  Note: not all SQN7... types are suited for fitting a potentiometer.
  Refer to «Accessories / Potentiometers».

Ordering

When ordering, please give type references of actuator and accessories according to «Type summary».

The following items must be ordered **separately** and are also supplied as separate items:

- Potentiometers ASZ12... / ASZ22...
- Adapter AGA70.3 for replacing SQN3...

Warning notes

- **In the geographical areas where DIN standards are in use, the installation must be in compliance with the standards DIN / VDE 0100 and 0722!**
- **All regulations and standards applicable to the particular application must be observed!**
- **Installation and commissioning work must always be carried out by qualified personnel!**
- **The electrical wiring must be made in compliance with national and local standards and regulations!**
- **Ignition cables must always be laid separately, maintaining the greatest possible distance from other cables!**
- **Check wiring carefully before putting the actuator into operation!**
- **The SQN7... must be completely isolated from the mains before performing any work on it!**
- **Protection against electric shock on the actuator and on all electrical connections must be ensured by securing the housing cover!**
- **Electromagnetic emissions must be checked from an application point of view!**

Mechanical design

Housing

Made of impact-proof and heat-resistant plastic.

Colour:	SQN70... / SQN71...:	housing dark-grey cover light-grey
	SQN74... / SQN75...:	completely black

Drive motor

Reversible and locking-proof synchronous motor.

Coupling

Drive shaft can be manually disengaged from the geartrain and motor.
Re-engagement is automatic.

Adjustment of switching points

By means of adjustable cams. Scales beside the cams indicate the angle of the switching point.

The assignment of the cams to the limit and auxiliary switches is colour-coded (refer to «Technical data»).

Two switches (SQN70... / SQN71...) and one switch (SQN74... / SQN75...) with fine adjustment. Can be adjusted with a standard screwdriver.
The other cams can be adjusted with the enclosed hook-spanner or similar.

Position indication

Internally: scale at the beginning of the cam shaft on the side.

Connections

Screw terminals.

Geartrain

Maintenance-free.

Drive shaft

Made of black-finished steel, ready fitted to the front of the geartrain. Different versions available.

Mounting and fixing

Front of the geartrain is used as the mounting surface. The actuator is secured from inside via through-holes.

Printed circuit boards

Made of glass-fibre reinforced epoxy resin with metalized through-holes.

Technical data

Actuator

Nominal voltage	AC 230 V -15 % +10 % AC 110 V -15 % +10 %
Mains frequency	50 Hz -6 %...60 Hz +6 %
Safety class to VDE 0631	SQN70... / SQN71...: II SQN74... / SQN75...: I
Drive	synchronous motor
Power consumption	6 VA
On time	60 %, 3 min max. (continuously)
Radio interference protection	N to VDE 0875
Angular adjustment	160 ° ∢ max., scale range 0...130 ° ∢
Mounting position	optional
Degree of protection to DIN 40050	**all types**: IP40, provided adequate cable entries and fixing screws are used **SQN74... / SQN75...**: if lateral knockout hole for cable entry is used: IP20
Cable entry	SQN70... / SQN71...: insertable cable gland holder with a thread for 2 x Pg9, no locknut required SQN74... / SQN75...: openings for locknut for fixing cable glands

	Type of locknut
1 x Pg9	M Pg9 DIN 46320 MS
1 x Pg11	M Pg11 DIN 46320 MS

additional lateral knockout hole for the lose introduction of two cables with a max. dia. of 6 mm, tension relief to be provided by the user (also refer to «Degree of protection» above)

Pg glands and locknuts are not part of the delivery

Cable connections	screw terminals for 0.5 mm^2 min. and a cross-sectional area of 2.5 mm^2 max.
– Cable terminating sleeves	matching the dia. of the stranded wire
Direction of rotation	refer to «Type summary»
Torques and holding torques	refer to «Type summary»
Running times	SQN70... / SQN71...: 4 ... 30 s for 90 ° ∢ SQN74... / SQN75...: 4 ... 60 s for 90 ° ∢
Coupling	disengagement of drive shaft and geartrain by means of a pin
Backlash between drive motor and shaft	
– Ex works	≤ 1.2 ° ±0.3 ° ∢
– After 250.000 cycles	≤ 1.5 ° ±0.3 ° ∢

Technical data
(cont'd)

Limit and auxiliary switches

– Number of limit switches	2
– Number of auxiliary switches	SQN70... / SQN71... = 2 SQN74... / SQN75... = 4
– Actuation	via cam shaft

colour-coded cam	actuates limit or auxiliary switch marked [1]
red	I
blue	II
orange	III
black	IV

switches with fine adjustment

SQN70... / SQN71...	II and III
SQN74... / SQN75...	III

– Breaking voltage	AC 24 ... 250 V
– Permissible loading of terminals at cos φ = 0.9	

- **Connection diagram ②**

– Terminals 1, 2, 3	< 0.5 A
– Terminal 4	2 A (14 A)
– Terminal 5	2 A (14 A)
– Terminal 6	1 A (7 A)
– Terminal 7	1 A (7 A)
– Terminal 8	< 0.5 A

- **Connection diagram ④**

– Terminals 1, 3	< 0.5 A
– Terminal 4	3 A (14 A)
– Terminal 5	3 A (14 A)
– Terminal 6	1 A (7 A)
– Terminal 7	1 A (7 A)
– Terminal 8	< 0.5 A

- **Connection diagram ⑤**

– Terminals 1, 2, 3	< 0.5 A
– Terminal 4	2 A (14 A)
– Terminal 5	2 A (14 A)
– Terminal 6	1 A (7 A)
– Terminal 7	1 A (7 A)
– Terminal 8	< 0.5 A

- **Connection diagram ⑥**

– Terminals 1, 2, 3, 4, 5	< 0.5 A
– Terminal 6	1 A (7 A)
– Terminal 7	1 A (7 A)
– Terminal 8	< 0.5 A

[1] Refer to «Connection diagrams»

[2] Amperage in parentheses permitted as short-time peak load for no more than 0.5 s

Technical data
(cont'd)

• **Connection diagram ⑨**

– Terminals 1, 2, 3, 4, 5	< 0.5 A
– Terminal 6	1 A (7 A)
– Terminal 7	1 A (7 A)
– Terminal 8	< 0.5 A

Adjustment of cams	
- Without fine adjustment	1 ° ∢
- With fine adjustment	variable

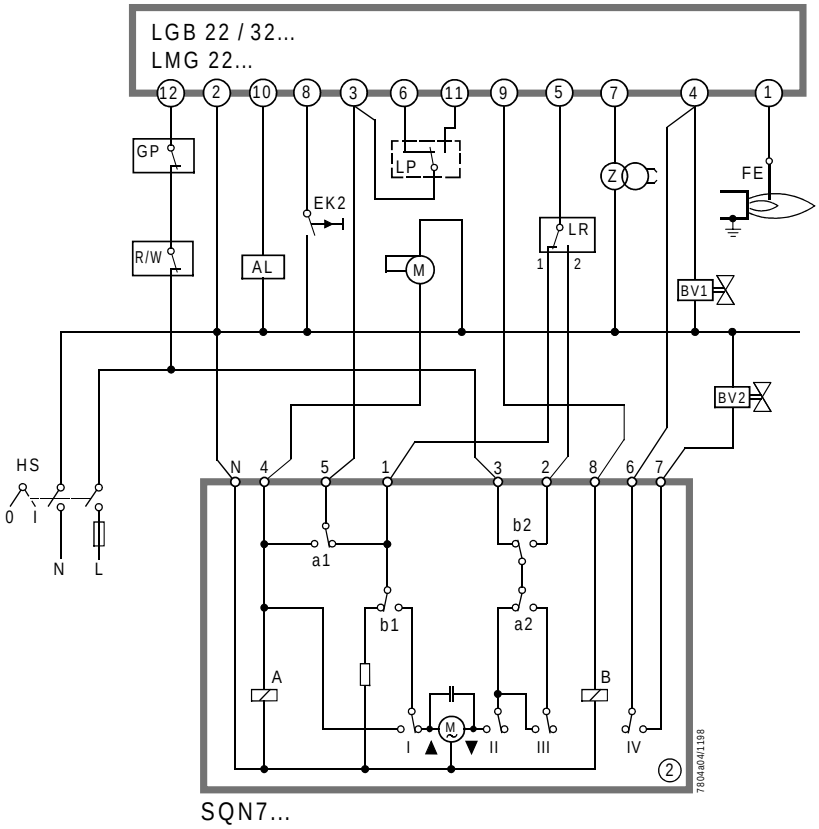
Perm. ambient temperature	
– Operation	-20 ... +60 °C IEC 721-3-3 Class 3K5
– Transport and storage	-50 ... +60 °C IEC 721-3-2 Class 2K2

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

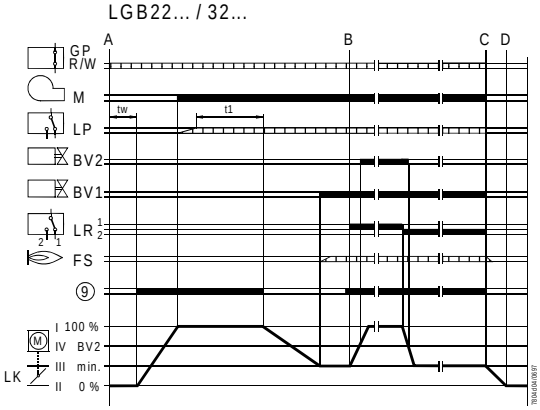
Weight (on average)	approx. 500 g
CE conformity	according to the directives of the European Union Electromagnetic compatibility EMC 89 / 336 EEC incl. 92 / 31 EEC
Emissions	EN 50081-1
Immunity	EN 50082-2

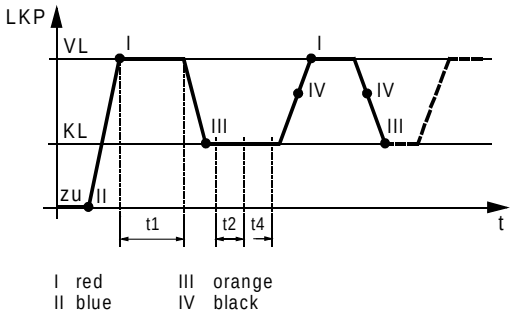
Connection diagrams

No. ② → LGB22 / 32... and LMG22... Two-wire control



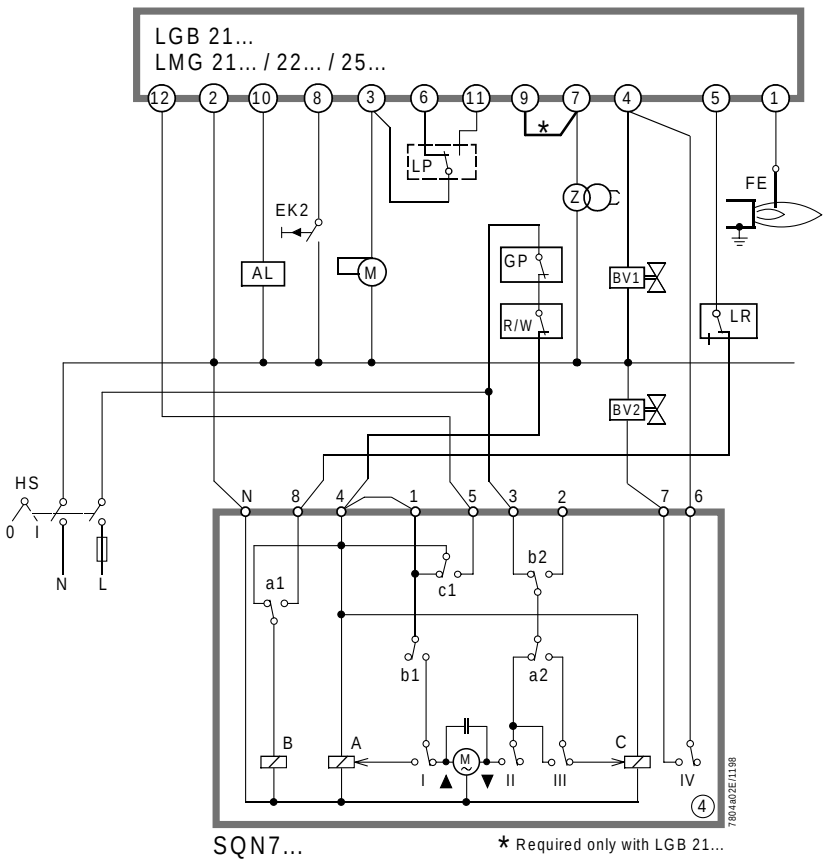
SQN7...





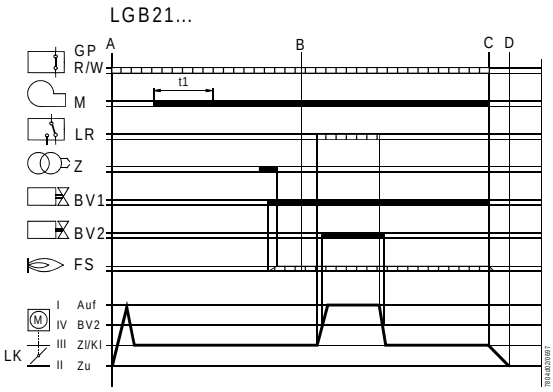
I red III orange
II blue IV black

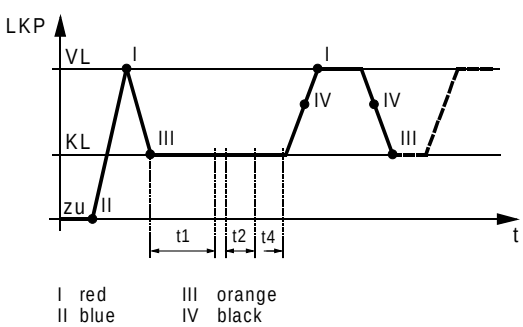
No. ④ → LGB21... and LMG21... / 22... / 25... Single-wire control



SQN7...

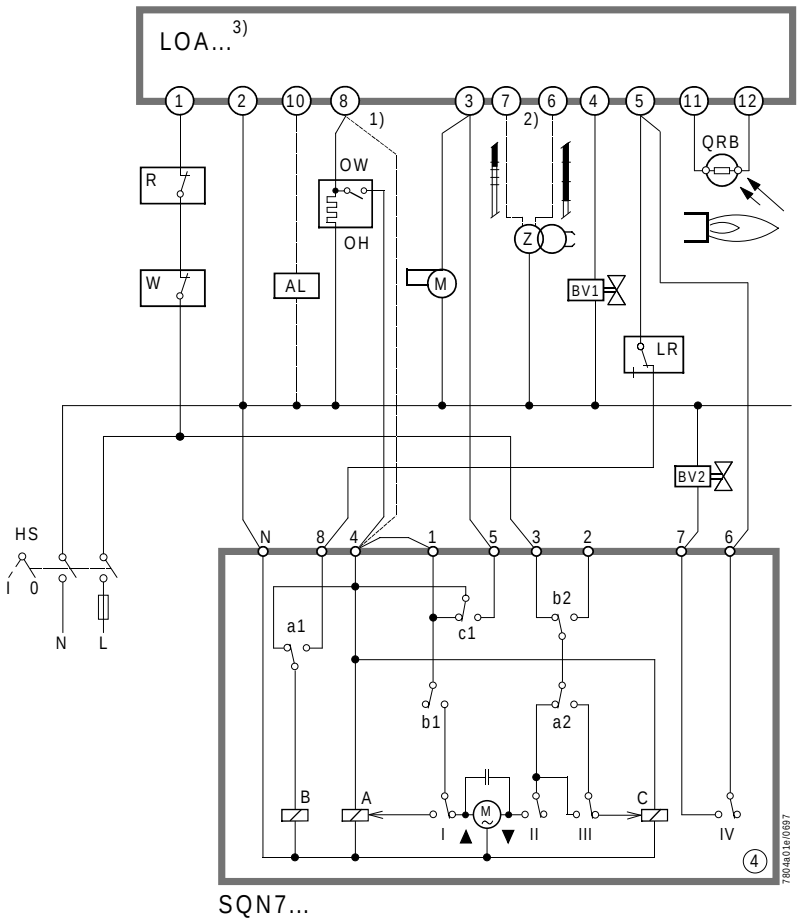
* Required only with LGB 21...

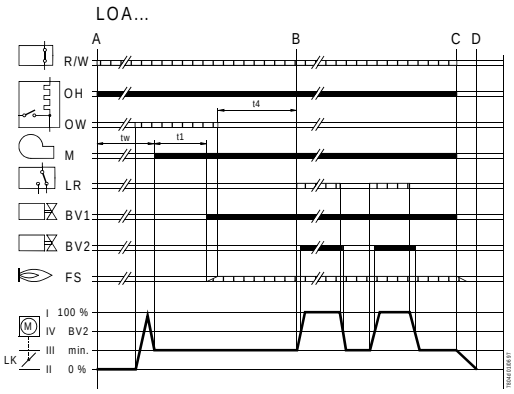




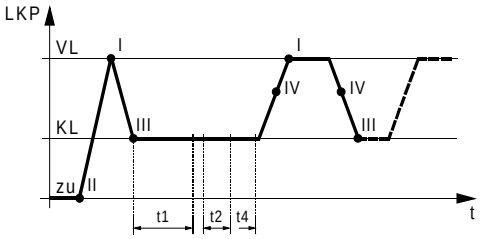
I red III orange
II blue IV black

No. ④ → LOA... Single-wire control



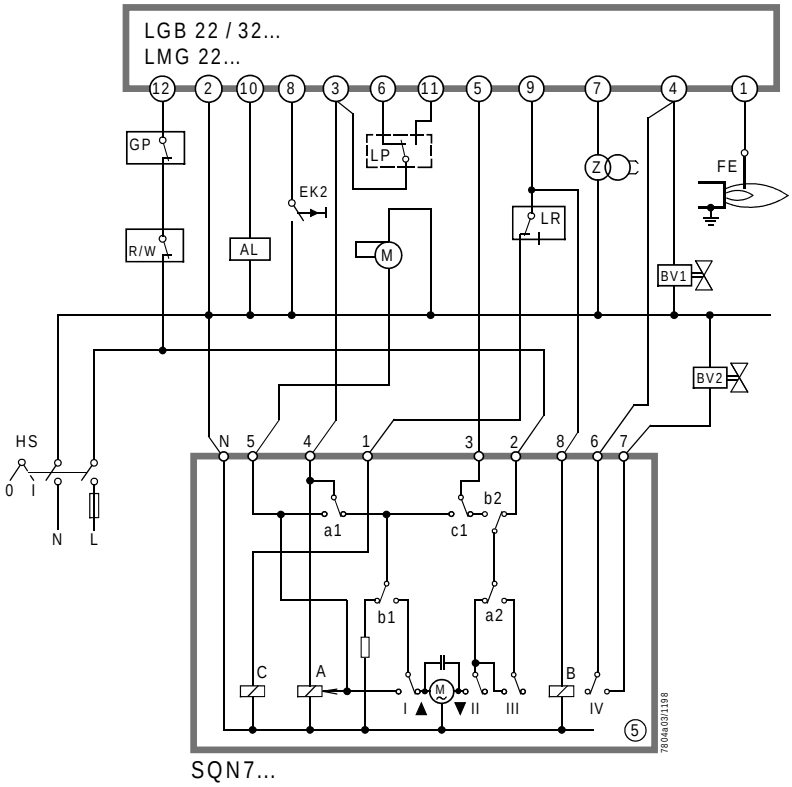


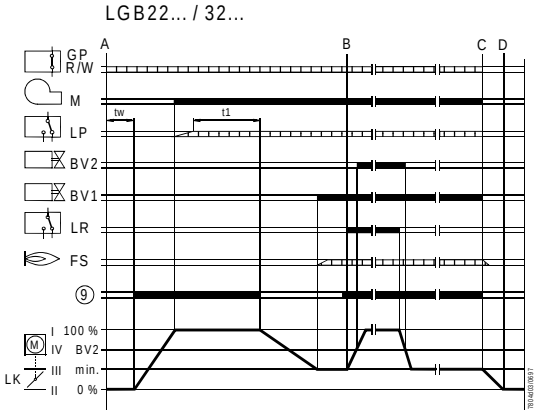
1) Without oil preheater
2) Refer tp data sheet 7118
3) LOA21... with oil preheater: opens contact OW; complete restart when in operation

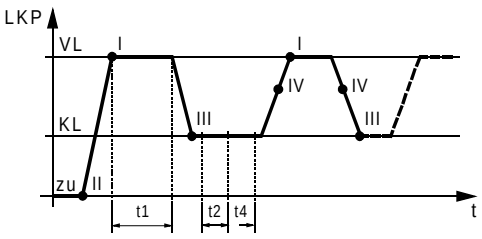


I red III orange
II blue IV black

No. ⑤ → LGB22 / 32... and LGM22... Single-wire control



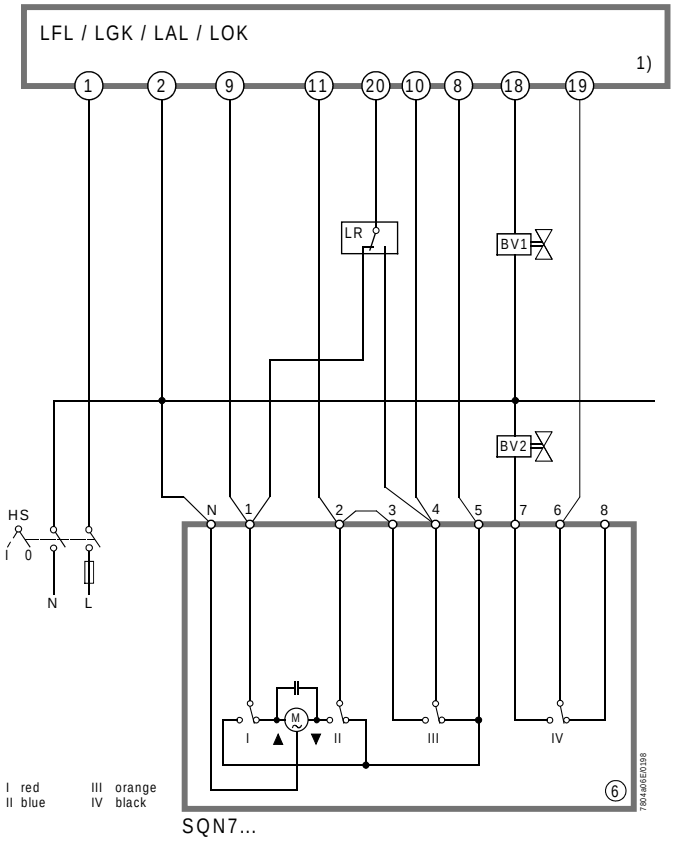


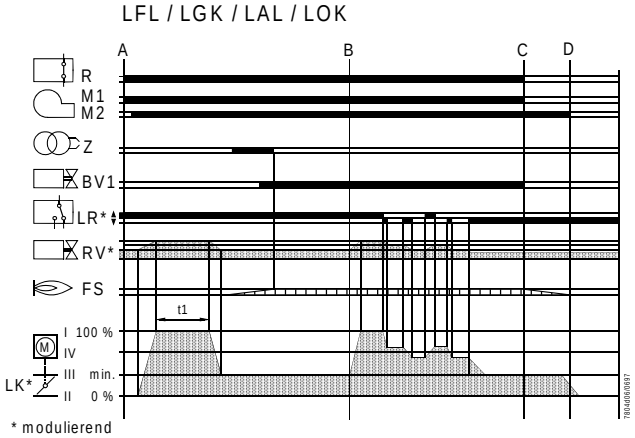


I red III orange
II blue IV black

Connection diagrams (cont'd)

No. ⑥ → LFL / LGK / LAL / LOK... Two-wire control



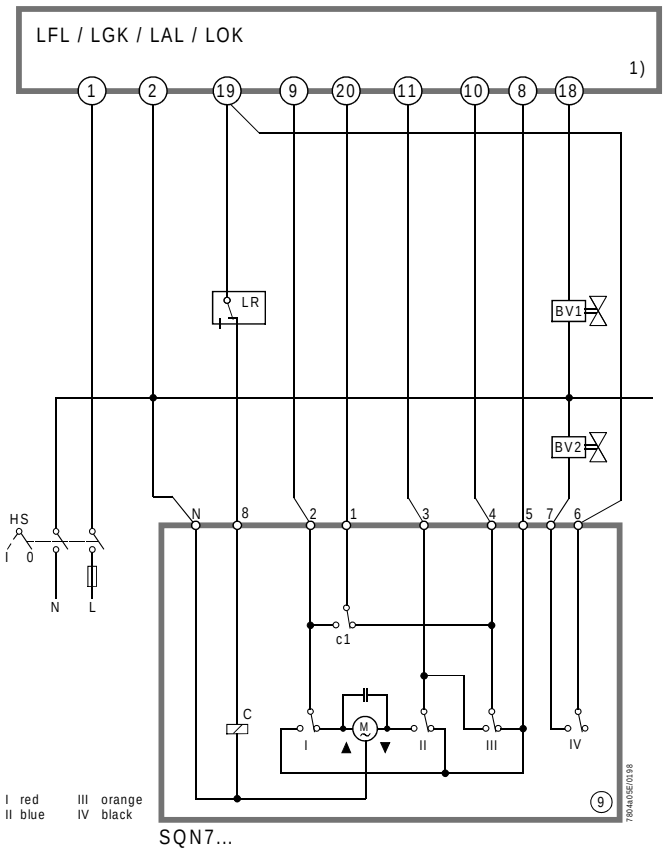


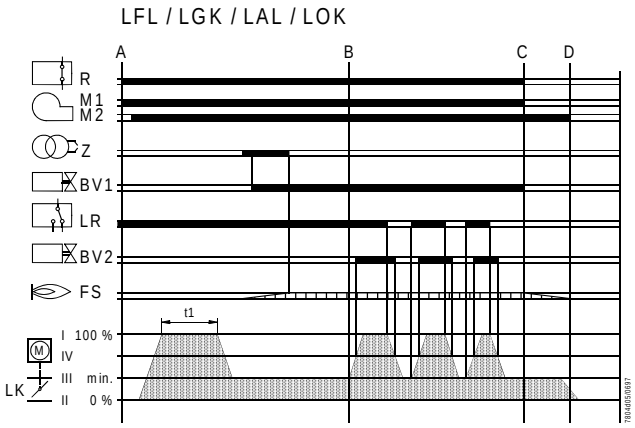
Legend for «Connection diagrams»

No. O → **L...** SQN7... connection diagram no. according to «Type summary» in connection with Landis & Staefa burner control

For type references, refer to the data sheets of the respective burner controls

No. ⑨ → LFL / LGK / LAL / LOK... Single-wire control





Engineering notes

For auxiliary switches with fine adjustment, refer to «Technical data».

In the connection diagrams, the positions of the limit and auxiliary switches I...IV in the actuator are shown for the working range between 0° and the adjusted angular position of the cam ring.

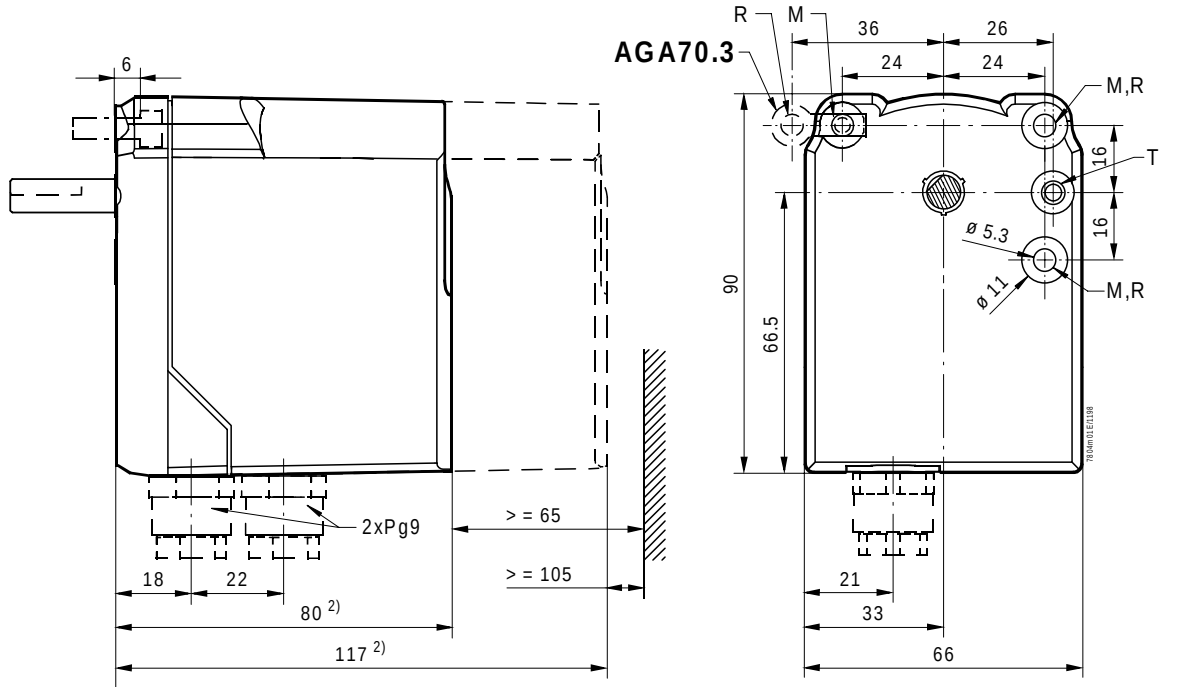
For colour-coding of the cams according to the limit and auxiliary switches, refer to «Technical data / Limit and auxiliary switches / Actuation».

1) For other connections, refer to data sheet 7451

Dimensions

Dimensions in mm

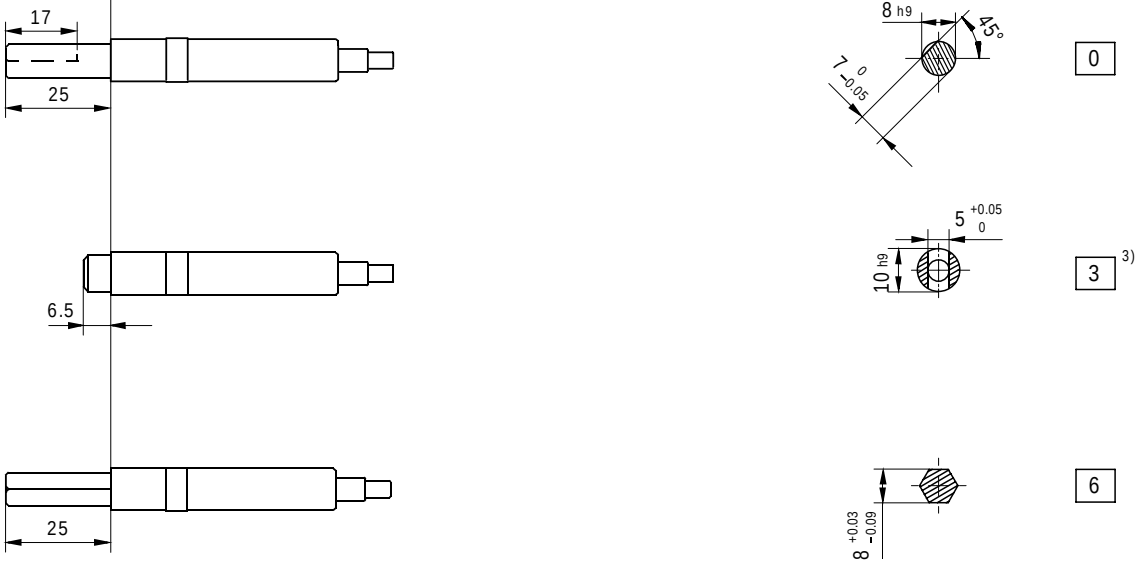
SQN70... / SQN71...



Drive shaft versions
Side view

Drive shaft versions
Cross-section

Drive shaft no.[1)]



1) Drive shafts shown in fully closed position (voltage present at limit switch II)
The drive shaft no. is identical with the 6th digit after the period in the type reference
Example: SQN70.664A2**3** = drive shaft no. **3**

2) Length of housing depending on the type of actuator (refer to «Type summary»)

3) Centre slot: 6.3 mm deep
Hole dia. 5.1 mm: 16.5 mm deep (incl. depth of centre slot)

R Location of fixing holes matched to SQN3...
(for 1-to-1 replacement by SQN7..., use adapter AGA70.3)

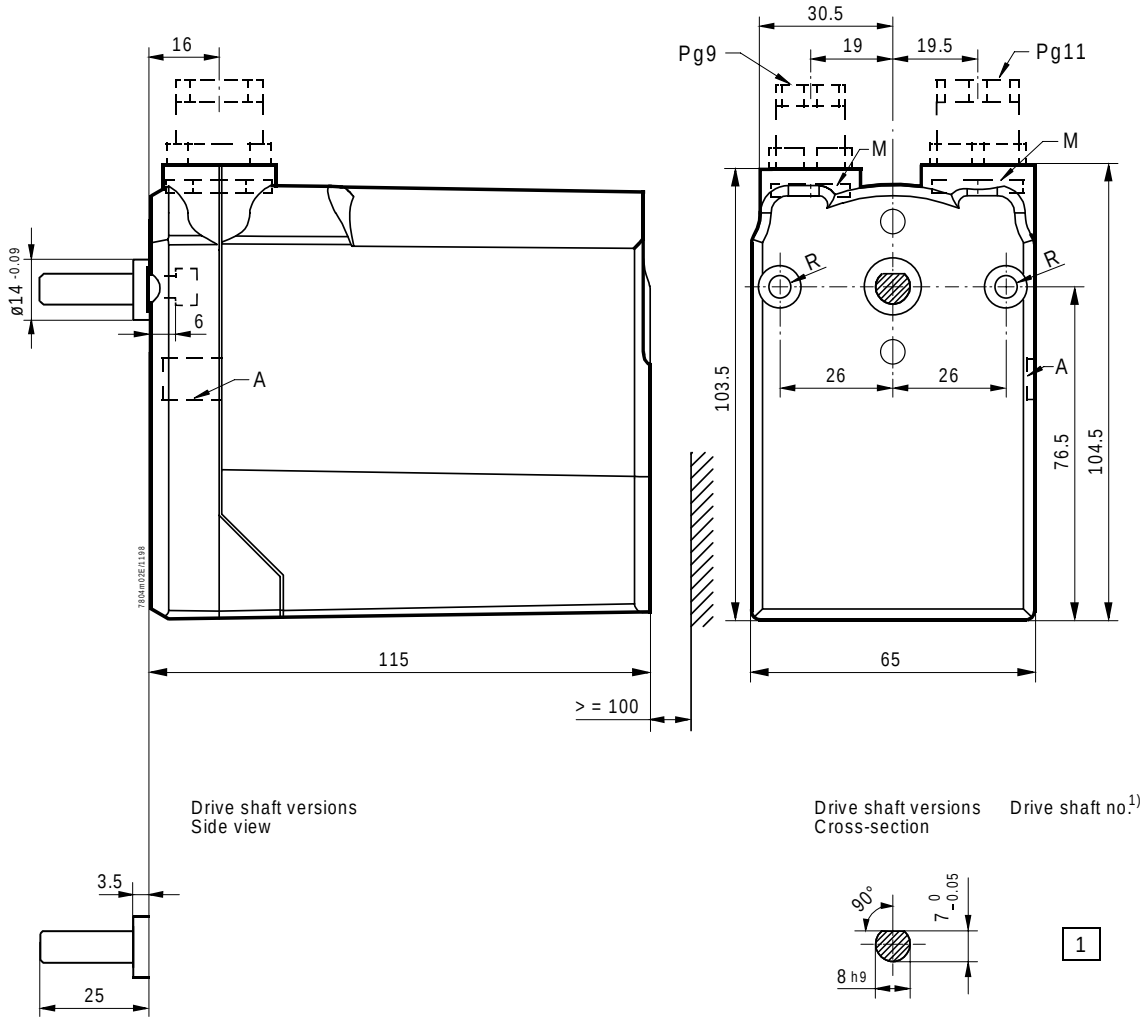
M Dia. of through-hole: 5.3 mm

T Dia. of knockout hole: 5.3 mm

Dimensions (cont'd)

Dimensions in mm

SQN74... / SQN75...



1) Drive shaft shown in fully closed position (voltage present at limit switch II)

A Knockout hole for lose cable entry

R Dia. of through-hole: 5.3 mm
Fixing positions matched to Conectron LKS160 and Berger STA actuators

M Pg nuts, not part of delivery (for type reference, refer to «Technical data»)