SIEMENS

7803

Actuators SQN1...

for air dampers and control valves of oil and gas burners

Electromotoric actuators

- **Torques:** **- SQN13…** **up to 1 Nm** **Nominal output torque**
  - SQN14… **up to 1 Nm** **nominal output torque**
  self-holding torque
  (refer to «Type summary»)
- **Direction of rotation:** **- SQN13…** **counterclockwise**
  - SQN14… **clockwise**
- **Running time for 90°:** **5 ... 120 s** **depending on type of basic unit (LMV2... / LMV3…)**
- **Versions:** **Choice of cables (refer to «Type summary»)**

The SQN1... and this Data Sheet are intended for use by OEMs which integrate the actuators in their products!

Use

The actuators of the SQN1... range are used to drive and position gas dampers and air dampers and other ancillary equipment.
When used in connection with burner controls or electronic fuel / air ratio control, the controlling elements are operated depending on the current burner output.

Warning notes

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

Do not to open, interfere with or modify the unit!

- All activities (mounting, installation and service work, etc.) must be performed by qualified staff.
- Before making any wiring changes in the connection area of the units, completely isolate the equipment from mains supply (all-polar disconnection). If not observed, there is a risk of electric shock hazard
- Ensure protection against electric shock hazard by providing adequate protection for the connection terminals and by securing the housing cover
- After any kind of activity (mounting, installation and service work, etc.), check wiring. Also ensure that the parameters are correctly set
- 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

Housing cover 

The actuator's housing **must not** be opened. The actuator contains an optical feedback system.

Selection of actuator version

- Select the type of actuator according to the required running direction for driving the controlling element
- Ensure that any other torque acting on the controlling element (e.g. torque from the airflow produced by the burner's fan) will be smaller than the actuator's self-holding torque when dead
- The mechanical design of the burner must be such that any inadmissibly high torque from outside acting on the controlling element will not lead to critical burner operation. Example: The airflow in the burner's air duct exerts a torque on the air damper's asymmetrical bearing, which means that the air damper will slightly travel towards the fully open position. This leads to a certain amount of excess air during combustion, which is less critical than lack of air

Mounting notes

- Ensure that the relevant national safety regulations are complied with
- The connection between actuator drive shaft and controlling element must be **rigid** with **no mechanical play**

Positive connection

Possible connection with drive shaft or hub:

- Drive shaft with flat edge and matching counterpiece

To avoid inadmissible loads on bearings caused by rigid hubs, it is recommended to use compensating clutches with no mechanical play (e.g. metal bellows clutches).

Unambiguous assignment

To prevent mix-up of the actuators connected to the LMV2… / LMV3…, these burner controls carry various reference marks.
The burner must be designed such that in the event of false connections, the relevant reference mark cannot be approached.
For that purpose, mechanical stops are to be provided in the range «Stop open» and «Stop closed».

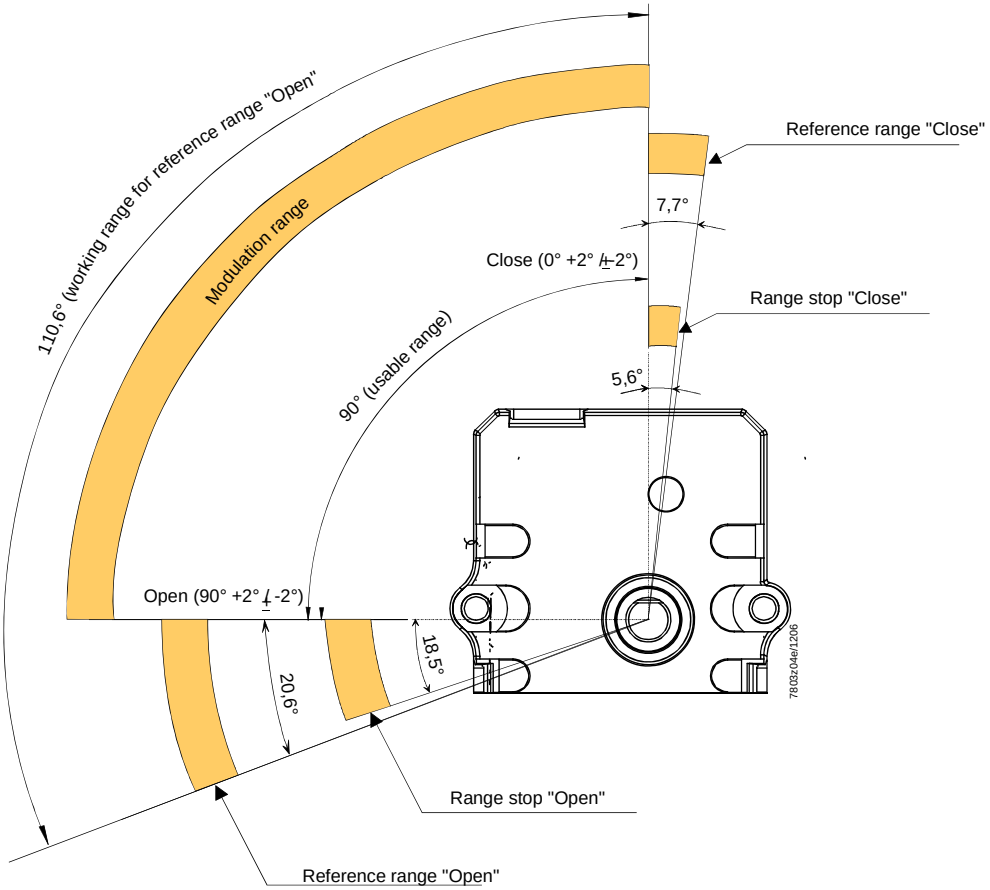
Cables

- The actuators are supplied complete with attached connecting cable and plug
- Single bend when laying the cable: 2 x cable diameter

Working range of actuator

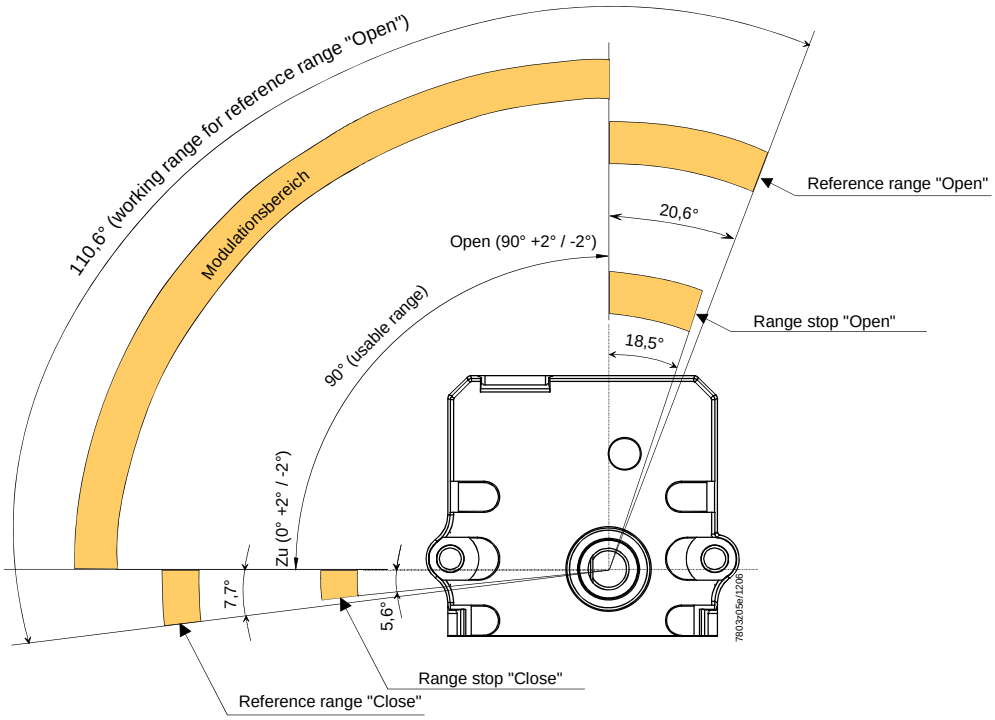
The actuator's working range consists of usable range and reference range. The usable range is specified on the type field. When mounting the actuator, the connected controlling element (e.g. air damper) must allow travel both in the reference range and the adjusted usable range. The reference range "Open" or "Close" are differently long. In the case of an actuator with **counterclockwise** direction of rotation, reference range «Close» lies between 0° and -7.7° and reference range «Open» between 90° and 110.6°. To ensure precise positioning of the actuator on the burner, a positioning pin of 6 mm dia. must be fitted to the mounting surface (refer to detail **A** under «Dimensions»).

Direction of rotation:
Counterclockwise
SQN13…



Mounting notes (cont'd)

Direction of rotation:
Clockwise
SQN14…



Installation notes

- Always run the ignition cables separate from the unit and other cables while observing the greatest possible distance
- The holding torque is reduced when the actuator is disconnected from power

Cable length

For the maximum permissible cable length, refer to the Basic Documentation of the LMV2… / LMV3…

Standards and certificates

CE

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

ISO 9001: 2000
Cert. 00739

ISO 14001: 2004
Cert. 38233

Service notes

Replacement

When replacing an actuator, the following points must be checked and, if necessary, corrected:

- Correct connection of the basic unit
- Assignment of functions
- Adjustment of curvepoints of electronic fuel / air ratio control (e.g. with the LMV27…)

Disposal notes

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

Mechanical design

Housing

Base and cover are made of shockproof and heat-resistant plastic.

Color of housing and cover: Black

Actuator

Stepper motor

Adjustment of switching points / position indication

Via the AZL2... display and operating unit (refer to the Basic Documentation of the LMV27…).

Cable / electrical connections

RAST2.5 connectors complete with cable.

Gear train

Spur gears made of steel and plastic, with little backlash and permanent lubrication.

Drive shaft

Made of black-finished steel, ready fitted to the front of the gear train.

Mounting and fixing

The front of the gear train is used as the mounting surface. The actuator has 2 fixing holes and an elongated hole for the positioning pin.

Type summary

Actuators SQN1...

Type reference	Direction of rotation	Rated output torque in direction of rotation "Open" (max.) Nm	Holding torque when live (max.) Nm	Holding torque when dead (max.) Nm	Cable length m	Radial load on bearing (max.) N
SQN13.140A9	Counter-clockwise	1	0.7	0.2	1.2	30
SQN14.140A9	Clockwise	1	0.7	0.2	1.2	30

[1]) Middle of drive shaft

Technical data

Electromotoric actuator	Operating voltage	AC / DC 24 V ± 20 %(load on interface)
	Safety class	2 to EN 60 730 part 1 and parts 2…14
	Power consumption	max. 7.5 W
	Perm. on-time	max. 50 %
	Perm. running time	max. 60 s
	Angular adjustment, usable range	max. 90 °
	Mounting position	optional
	Load on bearing	refer to «Type summary»
	Degree of protection	IP 40 according to EN 60 529-1
	Cable connection	RAST2,5 connectors(for details, refer to the basic unit)
	Direction of rotation	not in the LMV2... adjustable but tightly given by a respective motor type
	Nominal output torque	refer to «Type summary»
	Holding torque (when live)	refer to «Type summary»
	Holding torque (when dead)	refer to «Type summary»
	Nominal resolution encoder supervision	0,7°
	Running times	in the LMV2... adjustable
	Load changes with continuous heavy loads	typically 500,000
	Weight	approx. 0.3 kg
	Direction of rotation (when facing the shaft)	
	- SQN13…	counterclockwise
	- SQN14…	clockwise
	0-position of actuator drive shaft	as supplied 0 +2° / -2°
Environmental conditions	**Storage**	DIN EN 60 721-3-1
	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	-10...+60 °C
	Humidity	< 95 % r.h.

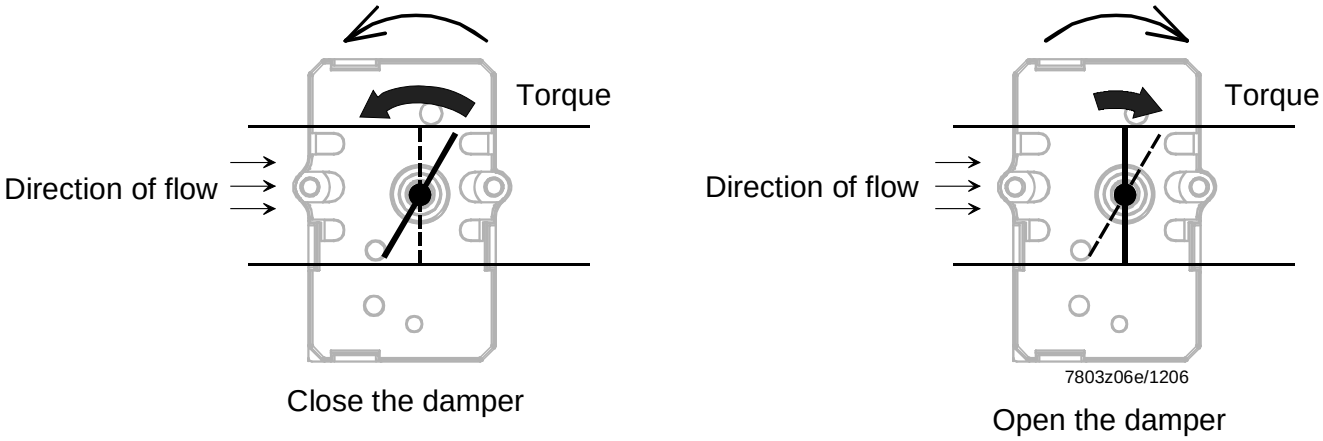
⚠ **Condensation, formation of ice and ingress of water are not permitted!**

Function

The SQN1... actuators feature an integrated reset spring with backlash-free gear train.
Control and position feedback take place via a common cable.
The reset spring always acts against the actuator's direction of rotation.
This ensures backlash-free operation.
The drive shaft's torque must always act in the actuator's direction of rotation (e.g. with the SQN13… always counterclockwise).
To ensure reliable operation, the torque in the other direction must not exceed 0.2 Nm when the connected air or gas damper closes.

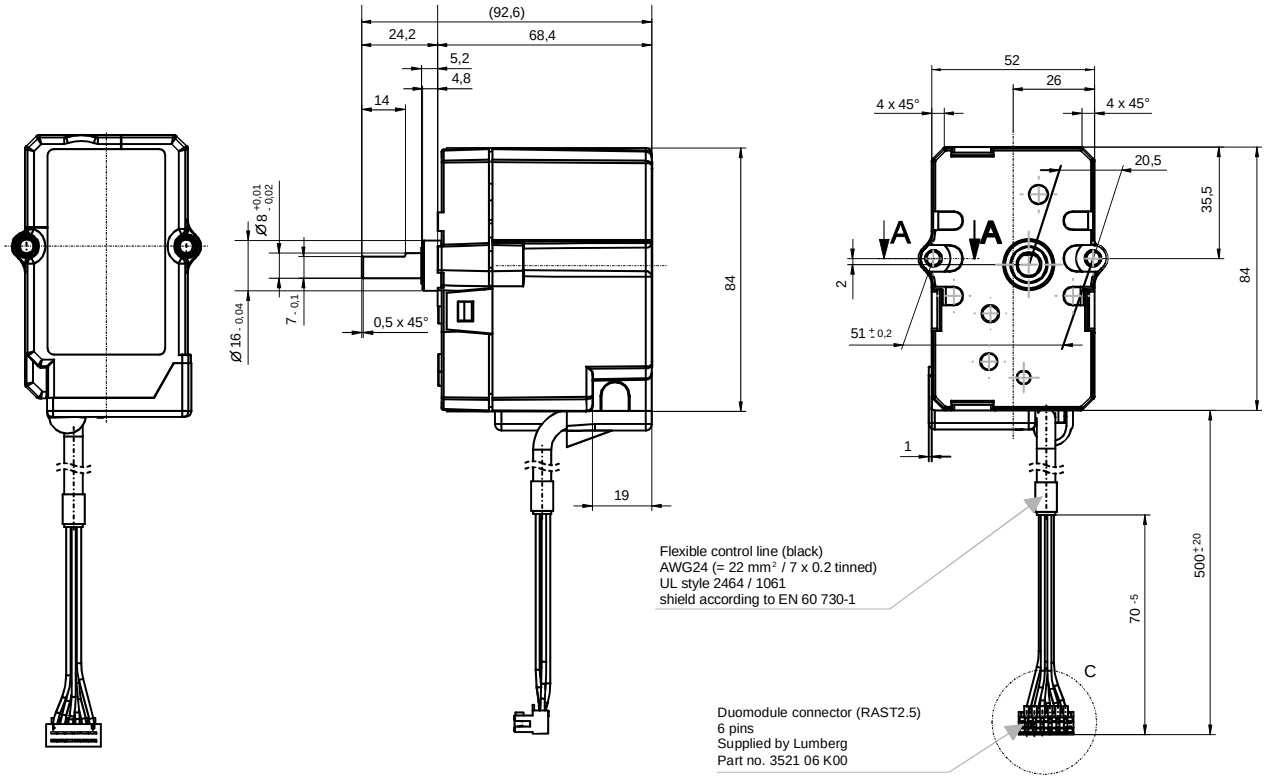
The same cable is used for powering the actuator.
The actuators are driven by stepper motors and can be positioned with a resolution of 0.1°.
The characteristics and settings (running time, end positions) of the SQN1... are determined by the controlling basic unit (e.g. LMV27…; for details, refer to the Basic Documentation of the LMV27…).
The running times of the controlling elements are varied by the basic unit depending on the burner's control phase (e.g. startup phase: short running time; operation: long running time).

Example:
SQN14… (clockwise)



Dimensions

Dimensions in mm



Assignment of pins

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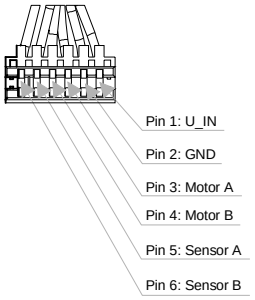
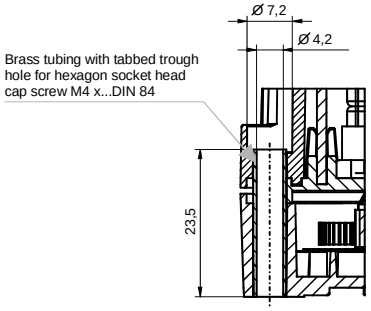


A - A 2:1



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