



Actuators

SQM33...

for air dampers and control valves of oil and gas burners

Electromotoric actuators

- **Torques:**
 - SQM33.4... up to 1.2 Nm nominal output torque
 - - SQM33.5... up to 3 Nm nominal output torque
- **Running time for 90°:** 5...120 s depending on type of basic unit
(LMV2... / LMV3...)
- **Versions:** Choice of cables (refer to «Type summary»)

The SQM33... and this Data Sheet are intended for use by OEMs which integrate the actuators in their products!

Use

The actuators of the SQM33... range are used to drive and position gas dampers, air dampers, oil control valves 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 open, interfere with or modify the actuators!

- 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 depending on the torque required 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 excess air in the combustion process, which is less critical than lack of air

Mounting notes

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 mixup 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».

Cable and cable shielding

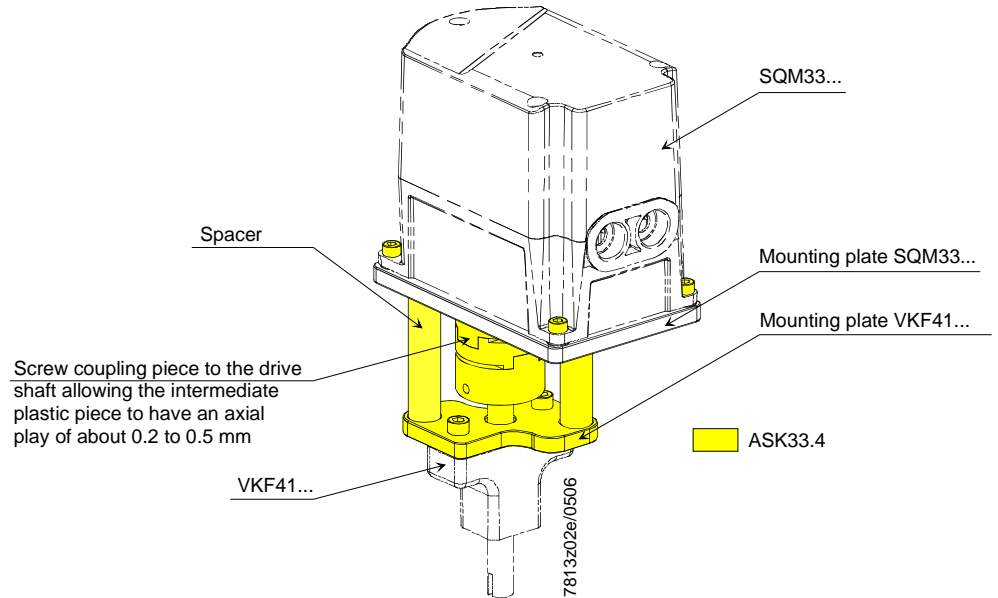
The actuators are supplied complete with attached connecting cable and plug. The cable's shielding must be connected to the basic unit of the LMV27...

Mounting notes (cont'd)

IP54

To ensure degree of protection IP54 over the actuator's entire service life, the bearing of the drive shaft must be located such that it will not be directly exposed to water or dust.

Mounting example

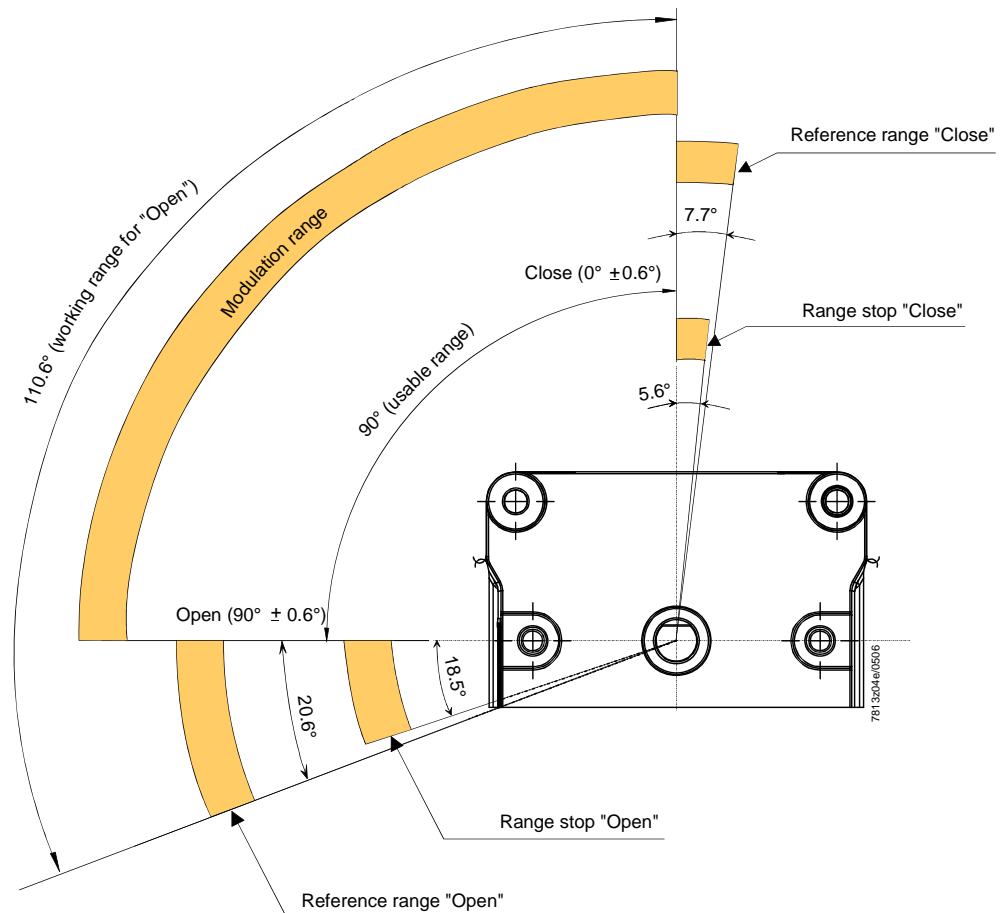


Mounting notes (cont'd)

Working range of actuator

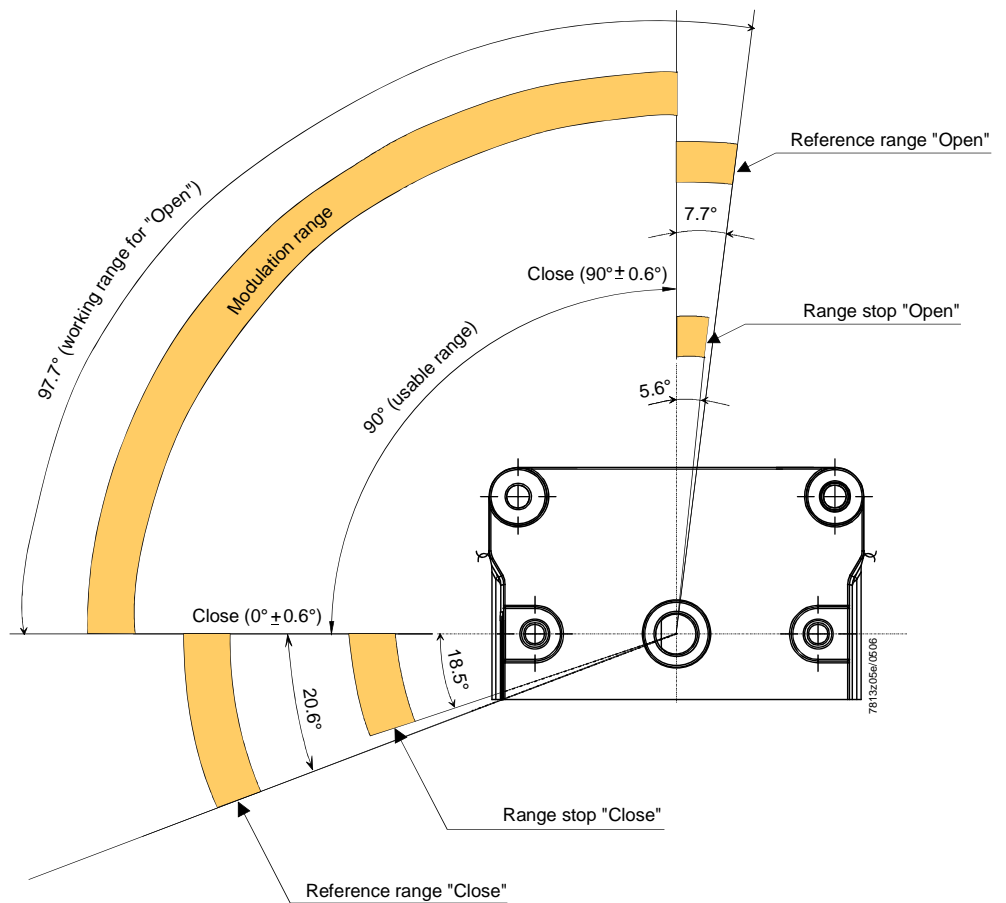
The actuator's working range consists of usable range and reference range. The usable range is specified on the type field. When mounting the actuator, the connected controlling element (e.g. air damper) must allow travel both in the reference range and the adjusted usable range. Reference ranges «Open» and «Close» differ. 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



Mounting notes (cont'd)

Direction of rotation:
Clockwise



Installation notes

- Always run the high-voltage 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



Conformity to EEC directives
- Electromagnetic compatibility EMC (immunity)
- Low-voltage directive

89 / 336 / EEC
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 actuator 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	The housing is made of die-cast aluminium. The cover is made of impact-proof and heat-resistant plastic. Color of cover: Black
Actuator	Stepper motor
Adjustment of switching points / position indication	In connection with the basic unit (e.g. LMV27...): 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 4 fixing holes and an elongated hole for the positioning pin. Alternatively, the actuator can be secured with 3 self-tapping screws from the side of the controlling element.

Type summary

Actuators SQM33...

Type reference	Nominal output torque (max.) Nm	Holding torque when live (max.) Nm	Holding torque when dead (max.) Nm	Cable length m	Radial load on bearing middle of driveshaft (max.) N
SQM33.410A9	1.2	1.2	0.8	1.5	100
SQM33.411A9	1.2	1.2	0.8	3	100
SQM33.510A9	3	3	2.6	1.5	100
SQM33.511A9	3	3	2.6	3	100
SQM33.550A9	3	3	2.6	3.6	100

Accessories

Accessories must be ordered as separate items:



Adapter for gas valves VKF41...C

ASK33.4

Technical data

Actuator	Operating voltage	AC / DC 24 V \pm 20 % (load on interface)
	Safety class	2 to EN 60 730 part 1 and parts 2-14
	Power consumption	
	- SQM33.4...	max. 7.5 W
	- SQM33.5...	max. 10 W
	Perm. on time	50 %, max. 3 min. continuously
	Angular adjustment, usable range	max. 90°
	Mounting position	optional
	Load on bearing	refer to «Type summary»
	Degree of protection	IP54 to EN 60 529-1
	Cable connection	RAST2,5 connectors (for details, refer to the basic unit)
	Direction of rotation	can be selected on the basic unit
	Nominal output torque	refer to «Type summary»
	Holding torque (when live)	refer to «Type summary»
	Holding torque (when dead)	refer to «Type summary»
	Reproducibility (typically when new)	\pm 0.2° (when used with the basic units of the LMV27...)
	Nominal resolution encoder supervision	0.7°
	Running times	can be selected on the basic unit
	Load changes with continuous heavy loads	typically 500,000
	Weight	approx. 1.4 kg
	Direction of rotation (when facing the shaft)	
	- Standard	counterclockwise
	- Reverse	clockwise
0-position of actuator drive shaft	supply state 0 \pm 0.6°	
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 3K5
	Mechanical conditions	class 3M4
	Temperature range	-20...+60 °C
	Humidity	< 95 % r.h.



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

Function

The SQM33... actuators are of robust design and have a gear train with only little backlash.

Control and position feedback take place via a common cable.

The same cable is used for powering the actuator.

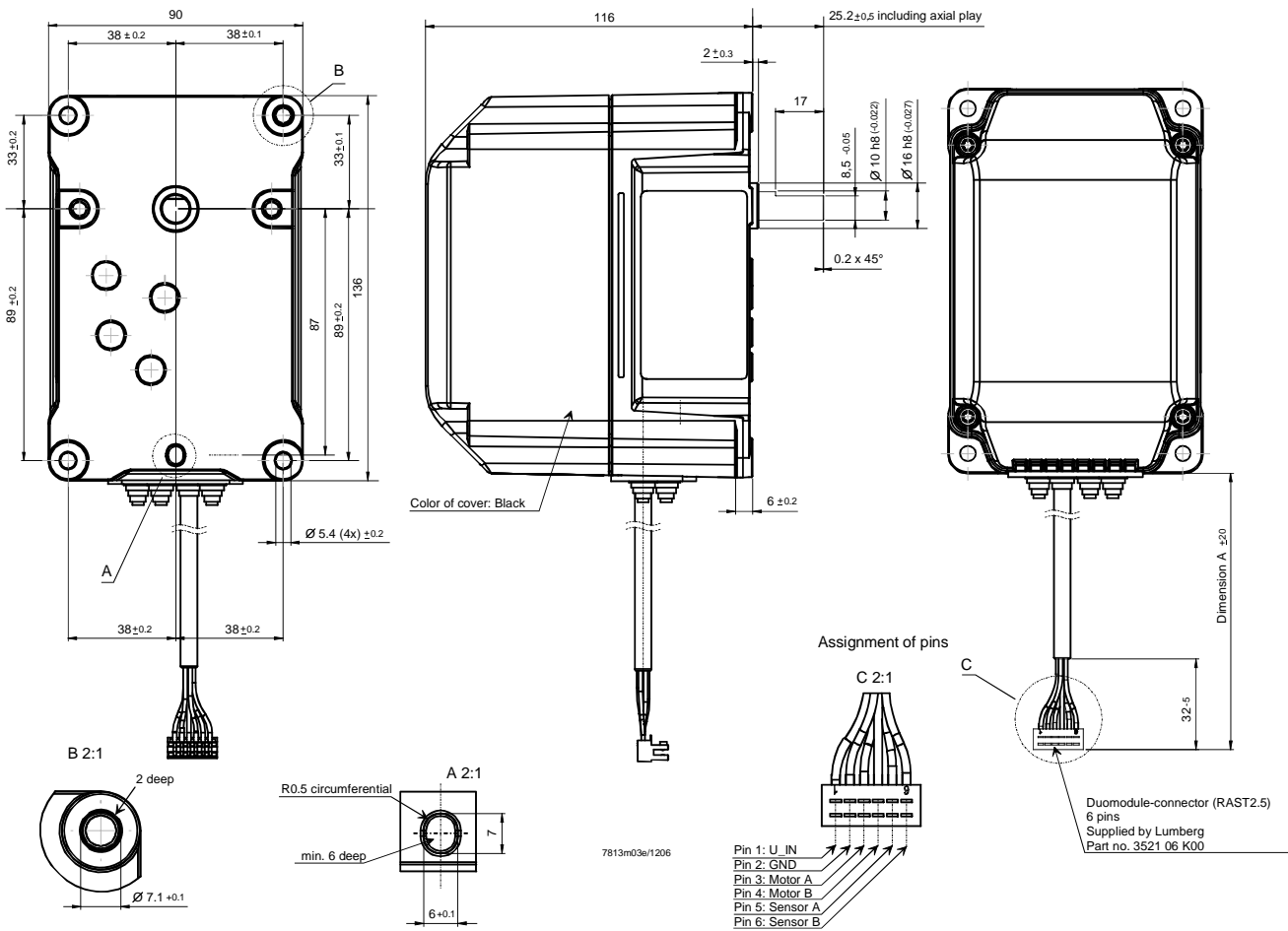
The actuators are driven by stepper motors and can be positioned with a resolution of 0.1°.

The characteristics and settings (running time, direction of rotation, end positions) of the SQM33... 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).

Dimensions

Dimensions in mm



Type	Dimension A
SQM33.410A9	1500
SQM33.411A9	3000
SQM33.510A9	1500
SQM33.511A9	3000
SQM33.550A9	3600