SIEMENS

7804

SQN70/SQN71 SQN74/SQN75

# Actuators for air and gas dampers

# SQN7…

**Electromotoric actuators for air dampers and control valves of oil and gas burners of small to medium heat capacity.**

**The SQN7 and this data sheet are intended for original equipment manufacturers (OEMs) using the SQN7 in or on their products.**

## Use

The SQN7 actuators are designed for positioning and driving air/gas dampers of oil burners, gas burners, and other ancillary equipment of small and medium heat capacity. They also offer load-dependent control of the amount of fuel and combustion air.

The controlling elements are controlled as follows depending on the current burner load:

- In connection with P, PI, or PID controllers, such as the RWF5
- Directly via the different types of burner controls, such as LAL, LOA, LME, LMO, LFL, LGB, LGK16, LOK16
- In connection with 1- or 2-wire control or 3-position controllers

## Features

- Impact-proof and heat-resistant plastic housings
- Screw terminals for electrical connections
- Maintenance-free gear train, which can be disengaged
- Internal position indication
- Easy-to-adjust end and auxiliary switches for adjusting the switching points
- Integrated electronic circuits
- Holding torque SQN70/SQN71/SQN75 0.7…1.3 Nm
  SQN74 0.7 Nm
- Running times SQN70/SQN71/SQN75 4…30 s
  SQN74 4 s
- Direction of rotation SQN70/SQN74 Counterclockwise
  SQN71/SQN75 Clockwise
- SQN74 / SQN75
  Fixing holes and cable entries equivalent to actuators of the same category made by Conectron and Berger.

## Supplementary documentation

| Product type | Description | Documentation type | Documentation number |
|---|---|---|---|
| LAL | Oil burner control | Data sheet | N7153 |
| LFL | Burner control | Data sheet | N7451 |
| LFL1.148 | Burner control | Data sheet | N7454 |
| LGB21<br>LGB22<br>LGB32 | Gas burner control | Data sheet | N7435 |
| LGK16 | Burner control | Data sheet | N7785 |
| LME22<br>LME23 | Gas burner control | Data sheet | N7101 |
| LME7 | Burner control | Data sheet | N7105 |
| LMO24<br>LMO39<br>LMO44 | Oil burner control | Data sheet | N7130 |
| LOA24 | Oil burner control | Data sheet | N7118 |
| LOK16 | Burner control | Data sheet | N7785 |
| RWF50 | Compact universal controller | Data sheet | N7866 |
| | | User manual | U7866 |
| RWF55 | Compact universal controller | Data sheet | N7867 |
| | | User manual | U7867 |

**To avoid personal injury or damage to property or the environment, the following warning notes must be observed.**

**Only qualified personnel may open, interfere with or modify the actuators!**

- Read the documentation on the actuators carefully and fully. If not observed, dangerous situations might occur
- The control functions inside the actuator are not intended to ensure the safety of the overall application. Users must take this into account during the electrical integration of any systems (e.g., burner controls), and perform a risk analysis of the respective unit
- Safety-relevant applications are only available with Siemens burner controls. An application-specific risk analysis must still be carried out
- All product-related activities (mounting, settings, and maintenance) must be performed by appropriately qualified and authorized personnel
- Before making any wiring changes in the connection area, completely isolate the plant from the power supply (all-polar disconnection). Ensure that the plant cannot be inadvertently switched on again and that it is indeed dead. If the plant is not switched off, there is a risk of electric shock
- Take suitable measures to provide touch protection at the electrical connections and ensure the housing cover is screwed down tight
- Each time work has been carried out (mounting, installation, service work, etc.), check that the wiring is in an orderly state
- These units must not be put back into operation following impact or shock; even if they do not exhibit any visible damage, their safety functions may be impaired
- The user must ensure that the actuators meet the requirements of the relevant application standards

**Please note!**
**Risk of electric shock hazard**

- **To disconnect the unit from power, it may be necessary to open more than one switch. Before performing maintenance work, the unit must be disconnected from power**
- **All cam switch settings must satisfy the requirements of the relevant application standards**

- To ensure protection against electric shock, the connection terminals must have adequate touch protection. Make certain that non-insulated connections or wires cannot be touched. The housing cover must be screwed tight
- Static charges must be avoided since they can damage the electronic components of the unit when touched.

**Recommendation:**
Use ESD equipment

## Selection of actuator version

- Ensure that any torque from outside acting on the controlling element (e.g., torque from the airflow produced by the burner fan) is smaller than the self-holding torque of the actuator in zero-current state
- 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:
  If a torque acts on the asymmetrical bearing of the air damper due to the airflow in the air duct of the burner, the air damper is moved in the OPEN direction. This leads to a certain amount of excess air during combustion, which is less critical than a lack of air.

## Mounting notes

- Ensure that the relevant national safety regulations and notes on standards are complied with
- In the geographical areas where DIN regulations are in use for mounting and installation, the requirements of VDE must be complied with, especially DIN/VDE 0100, 0550, and DIN/VDE 0722
- Make certain that the actuator is not exposed to direct solar radiation
- The connection between the actuator shaft and controlling element must be **form-fitted** and **backlash-free**
- When mounting the actuator, be aware that additional axial and radial bearing loads are not permitted
- Be sure to observe the correct mounting sequence when mounting the actuator to the controlling element.

  This is usually as follows:
  1. Fit and secure the actuator
  2. Connect the actuator shaft to the controlling element via a coupling pin

Form-fitted design

**Please note!**
**Possible shaft/hub connections:**

- **Flattened shaft with corresponding counterpart**

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

- **When dimensioning a shaft connection, note that torques higher than the rated output torque of the actuator can also act during operation:**
  **- The actuator itself can apply a higher torque under optimum operating conditions**
  **- The effect of mass moments of inertia (caused by the rotating parts in the motor as well as on the actuator) can lead to sudden peak loads**
- **Siemens recommends overdimensioning the shaft connection by a factor of 2 compared to the rated torque of the actuator**
- **The connection between the actuator and burner or controlling element must be very rigid (no bending). This is particularly important when using column-mounted structures**

## Installation notes

- Ensure that the electrical wiring is in compliance with national and local regulations
- Ensure that the strain relief of the connected cables is in compliance with the relevant standards (e.g., as per EN 60730 and EN 60335)
- Ensure that spliced wires cannot come into contact with neighboring connections. Fit suitable ferrules
- When wiring the unit, the 230 V AC range must be strictly separated from the touchable low-voltage areas to ensure protection against electric shock
- The connection between the actuator shaft and the relevant controlling element must be form-fitted
- Only plastic versions of cable glands may be used

## Standards and certificates

**Applied directives:**

- Low Voltage Directive 2014/35/EU
- Electromagnetic compatibility EMC (immunity) 2014/30/EU

Compliance with the regulations of the applied directives is verified by the adherence to the following standards/regulations:

- Automatic electrical controls for household and similar use
  Part 1: General requirements — DIN EN 60730-1
- Automatic electrical controls for household and similar use
  Part 2-14: Particular requirements for electric actuators — DIN EN 60730-2-14

**The relevant valid edition of the standards can be found in the declaration of conformity.**

EAC conformity (Eurasian compliance)

UKCA conformity mark (UK compliance)

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

Only valid for SQN70.xxxRxx / SQN71.xxxRxx:

## Lifetime

The actuator has a designed lifetime* of 250,000 burner startup cycles (OFF ⇨ ON ⇨ OFF) under load with the rated torque in the entire rotation angle range, which under normal operating conditions in heating mode corresponds to approx. 10 years of service (starting from the production date given on the type label). This is based on the endurance tests specified in the EN 298 standard. 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 actuator according to the manufacturer's data sheet. After reaching the designed lifetime in terms of the number of burner startup cycles, or after the corresponding usage time, the actuator must be replaced by authorized personnel.

*The designed lifetime is not the warranty time specified in the terms of delivery

## Service notes

Unit replacement

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

- Correct connection to the basic unit
- Assignment of functions

## Disposal notes

The SQN7 contains electrical and electronic components and must not be disposed of together with domestic waste. Local and currently valid legislation must be observed.

## Design

**Housing**

- Made of impact-proof and heat-resistant plastic.
- The housing accommodates:
  – the synchronous motor with the **disengageable** reduction gear train
  – the camshaft of the control section
  – the relays – depending on the type
  – the switch section – connected to the connection terminals via an equipped PCB

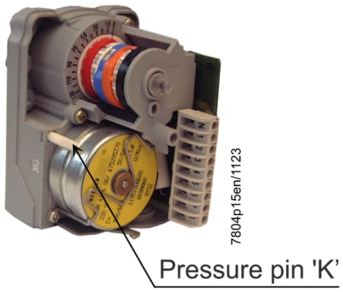
Color: SQN70/SQN71: Gear train housing dark gray, cover light gray
SQN74/SQN75: Gear train housing black, cover black

**Actuator motor**

Synchronous motor.

**Coupling**

- Shaft can be disengaged from the gear train and motor by manually actuating the coupling (pressure pin (K))
- Automatic reset




**Switching point adjustment**

- Via rotating cam disks
- Scales adjacent to the cams indicate the angle of the switching point
- Assignment of the cam disks to the color-coded end switches and auxiliary switches, refer to chapter ‘Circuit diagrams’
- Cam disks with fine adjustment, adjustable with standard screwdriver

**Position display**

Internal: Scale at the beginning of the camshaft on the gear train side.

**Connection technology**

Refer to chapter ‘Technical data’.

**Gear train**

Maintenance free.

**Drive shaft**

- Burnished steel
- Fixed on one side on the front of the gear train
- Available as a type variant of the SQN7 in different versions

**Mounting and fastening**

- Front of gear train as a bearing surface
- Fastening with through holes

## Specific versions for mounting the ASZ potentiometer

**Mounting the ASZ potentiometer**

Versions of various types are, in some cases, already available ex works with provision for mounting the ASZ potentiometer. These SQN7s differ from the basic type only in that the **housing is higher**. They are manufactured to accommodate the ASZ potentiometer and do not require any further parts. With these types of actuators, the third digit after the dot in the type reference is an **8**.

Example:
SQN7x.xx**8**Axx
→ Version for mounting an ASZ potentiometer, higher AGA34 housing cover pre-mounted

**Conversion by the user**

It is possible to convert a basic actuator version to a version for mounting an ASZ potentiometer. A **higher AGA34 housing cover** is available for this purpose – refer to chapter ‘Accessories’. If an ASZ potentiometer is required, it must always be ordered separately, refer to chapter ‘Accessories’.

## **Type summary** (further types on request)

| Diagram no. | Shaft [1]) no. | Running time at 50 Hz 2) for 90° (s) | Nominal torque (max.) Nm | Holding torque Nm | Auxiliary switch 6) Unit | Relay Unit | ASZ potentiometer 8) 9) | Housing length 1) mm | Types for mains voltage / mains frequency | | | | SQN7 replaces |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | 230 V AC 4) +10%/-15% 50…60 Hz | | 115 V AC 3) +10%/-15% 50…60 Hz | | |
| | | | | | | | | | Article no. | Type | Article no. | Type | Type |
| **SQN70 series A / counterclockwise rotation 8)** | | | | | | | | | | | | | |
| 9 | 0 | 4 | 1.5 | 0.7 | 2 | 1 | --- | 117 | **BPZ:SQN70.294A20** | **SQN70.294A20** | --- | --- | SQN30.111A2700 |
| 9 | 0 | 30 | 2.5 | 1.3 | 2 | 1 | --- | 117 | **BPZ:SQN70.694A20** | **SQN70.694A20** | --- | --- | --- |
| **SQN70 series B / counterclockwise rotation 7)** | | | | | | | | | | | | | |
| 2 | 0 | 4 | 1.5 | 0.7 | 2 | 2 | --- | 117 | **S55454-D315-A100** | **SQN70.224B20** | --- | --- | --- |
| 4 | 0 | 4 | 1.5 | 0.7 | 2 | 3 | --- | 117 | **S55454-D316-A100** | **SQN70.244B20** | --- | --- | SQN30.121A2700 |
| 5 | 0 | 4 | 1.5 | 0.7 | 2 | 3 | --- | 117 | **S55454-D317-A100** | **SQN70.254B20** | --- | --- | --- |
| 6 | 0 | 4 | 1.5 | 0.7 | 2 | --- | 9) | 80 | **S55454-D304-A100** | **SQN70.264B20** | --- | --- | SQN30.101A2700 |
| 2 | 0 | 12 | 2.5 | 1.2 | 2 | 2 | --- | 117 | **S55454-D320-A100** | **SQN70.424B20** | --- | --- | --- |
| 5 | 0 | 12 | 2.5 | 1.2 | 2 | 3 | --- | 117 | **S55454-D321-A100** | **SQN70.454B20** | --- | --- | --- |
| 6 | 0 | 12 | 2.5 | 1.2 | 2 | --- | 9) | 80 | **S55454-D305-A100** | **SQN70.464B20** | --- | --- | --- |
| 6 | 3 | 12 | 2.5 | 1.2 | 2 | --- | 9) | 80 | **S55454-D306-A100** | **SQN70.464B23** | --- | --- | --- |
| 2 | 0 | 30 | 2.5 | 1.3 | 2 | 2 | --- | 117 | **S55454-D322-A100** | **SQN70.624B20** | --- | --- | --- |
| 6 | 0 | 30 | 2.5 | 1.3 | 2 | --- | 9) | 80 | **S55454-D307-A100** | **SQN70.664B20** | --- | --- | SQN30.401A2700 |
| 6 | 1 | 30 | 2.5 | 1.3 | 2 | --- | 9) | 80 | **S55454-D314-A100** | **SQN70.664B21** | --- | --- | --- |
| 6 | 3 | 30 | 2.5 | 1.3 | 2 | --- | 9) | 80 | **S55454-D308-A100** | **SQN70.664B23** | --- | --- | SQN30.401A2730 |

**Type summary** (other types on request) (continued)

| Diagram no. | Shaft [1] no. | Running time at 50 Hz 2) for 90° (s) | Nominal torque (max.) Nm | Holding torque Nm | Auxiliary switch 6) Unit | Relay Unit | ASZ potentiometer 8) 9) | Housing length 1) mm | Types for mains voltage / mains frequency | | | | SQN7 replaces |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | 230 V AC [4] +10%/-15% 50…60 Hz | | 115 V AC [3] +10%/-15% 50…60 Hz | | |
| | | | | | | | | | Article no. | Type | Article no. | Type | Type |
| **SQN70 / counterclockwise rotation 7) / UL 'Recognized' for use in the USA and Canada** | | | | | | | | | | | | | |
| 0 | 0 | 30 | 2.5 | 1.3 | 1 | --- | 9) | 80 | --- | --- | **BPZ:SQN70.603R10** | **SQN70.603R10** | --- |
| **SQN71 series A / clockwise rotation 8)** | | | | | | | | | | | | | |
| 9 | 0 | 30 | 2.5 | 1.3 | 2 | 1 | --- | 117 | **BPZ:SQN71.694A20** | **SQN71.694A20** | --- | --- | --- |
| **SQN71 series B / clockwise rotation 7)** | | | | | | | | | | | | | |
| 4 | 0 | 4 | 1.5 | 0.7 | 2 | 2 | --- | 117 | **S55454-D324-A100** | **SQN71.244B20** | --- | --- | SQN31.121A2700 |
| 6 | 0 | 4 | 1.5 | 0.7 | 2 | --- | 9) | 80 | **S55454-D309-A100** | **SQN71.264B20** | --- | --- | SQN31.101A2700 |
| 2 | 0 | 12 | 2.5 | 1.2 | 2 | 2 | --- | 117 | **S55454-D325-A100** | **SQN71.424B20** | --- | --- | --- |
| 6 | 1 | 12 | 2.5 | 1.2 | 2 | --- | 9) | 80 | **S55454-D310-A100** | **SQN71.464B21** | --- | --- | --- |
| 6 | 0 | 30 | 2.5 | 1.3 | 2 | --- | 9) | 80 | **S55454-D312-A100** | **SQN71.664B20** | **S55454-D311-A100** | **SQN71.664B10** | SQN31.401A2700 |
| 6 | 3 | 30 | 2.5 | 1.3 | 2 | --- | 8) | 117 | **S55454-D313-A100** | **SQN71.669B23** | --- | --- | --- |
| **SQN71 / clockwise rotation 7) / UL 'Recognized' for use in the USA and Canada** | | | | | | | | | | | | | |
| 0 | 9 | 4 | 1.5 | 0.7 | 1 | --- | 9) | 80 | --- | --- | **BPZ:SQN71.203R19** | **SQN71.203R19** | --- |
| 0 | 9 | 12 | 2.5 | 1.2 | 1 | --- | 9) | 80 | --- | --- | **BPZ:SQN71.403R19** | **SQN71.403R19** | --- |
| 0 | 0 | 30 | 2.5 | 1.3 | 1 | --- | 9) | 80 | --- | --- | **BPZ:SQN71.603R10** | **SQN71.603R10** | --- |

The UL-recognized SQN7s

- also meet CE requirements
- are of the same basic design as the equivalent standard types

They differ from the non-UL Recognized SQN7s only in the use of materials, essentially other plastics. The SQN7s are also supplied with a connection adapter (3/8" connector) for the USA and Canada, refer to chapter 'Dimensions'.

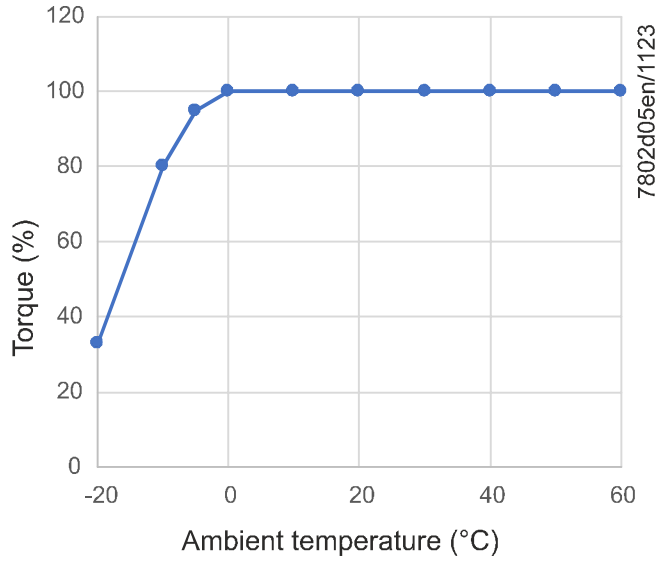
**Type summary** (continued) (other types on request)

| Diagram no. | Shaft [1]) no. | Running time at 50 Hz 2) for 90° (s) | Nominal torque (max.) Nm | Holding torque Nm | Auxiliary switch 6) Unit | Relay Unit | ASZ potentiometer 8) 9) | Housing length 1) mm | Types for mains voltage / mains frequency | | | | SQN7 replaces |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | 230 V AC 4) +10%/-15% 50…60 Hz | | 115 V AC 3) +10%/-15% 50…60 Hz | | |
| | | | | | | | | | Article no. | Type | Article no. | Type | Type |
| **SQN74 series A / counterclockwise rotation 7)** | | | | | | | | | | | | | |
| 9 | 1 | 4 | 1.5 | 0.7 | 2 | 1 | 9) | 115 | **BPZ:SQN74.294A21** | **SQN74.294A21** | --- | --- | --- |
| **SQN74 series B / counterclockwise rotation 7)** | | | | | | | | | | | | | |
| 5 | 1 | 4 | 1.5 | 0.7 | 2 | 3 | 9) | 115 | **S55454-D338-A100** | **SQN74.254B21** | --- | --- | --- |
| **SQN75 series A / clockwise rotation 7)** | | | | | | | | | | | | | |
| 9 | 1 | 4 | 1.5 | 0.7 | 2 | 1 | 9) | 115 | **BPZ:SQN75.294A21** | **SQN75.294A21** | --- | --- | --- |
| 9 | 6 | 4 | 1.5 | 0.7 | 2 | 1 | 9) | 115 | **BPZ:SQN75.294A26** | **SQN75.294A26** | --- | --- | --- |
| 4 | 1 | 4 | 2,5 | 1,2 | 2 | 3 | --- | 115 | **S55454-D364-A100** | **SQN75.444A21** | --- | --- | --- |
| 9 | 1 | 12 | 2.5 | 1.2 | 2 | 1 | 9) | 115 | **BPZ:SQN75.494A21** | **SQN75.494A21** | --- | --- | --- |
| 6 | 6 | 30 | 2.5 | 1.3 | 2 | --- | 9) | 115 | **BPZ:SQN75.664A26** | **SQN75.664A26** | --- | --- | --- |
| 9 | 1 | 30 | 2.5 | 1.3 | 2 | 1 | 9) | 115 | **BPZ:SQN75.694A21** | **SQN75.694A21** | --- | --- | --- |
| K | 1 | 30 | 2.5 | 1.3 | 2 | 0 | --- | 115 | **BPZ:SQN75.6KA21** | **SQN75.6KA21** | --- | --- | --- |
| **SQN75 series B / clockwise rotation 7)** | | | | | | | | | | | | | |
| 2 | 1 | 4 | 1.5 | 0.7 | 2 | 2 | --- | 115 | **S55454-D339-A100** | **SQN75.224B21** | --- | --- | --- |
| 2 | 6 | 4 | 1.5 | 0.7 | 2 | 2 | --- | 115 | **S55454-D340-A100** | **SQN75.224B26** | --- | --- | --- |
| 4 | 1 | 4 | 1.5 | 0.7 | 2 | 3 | --- | 115 | **S55454-D347-A100** | **SQN75.244B21** | --- | --- | --- |
| 4 | 6 | 4 | 1.5 | 0.7 | 2 | 3 | --- | 115 | **S55454-D349-A100** | **SQN75.244B26** | --- | --- | --- |
| 2 | 1 | 12 | 2.5 | 1.2 | 2 | 2 | --- | 115 | **S55454-D342-A100** | **SQN75.424B21** | --- | --- | --- |
| 2 | 6 | 23 | 2.5 | 1.2 | 2 | 2 | --- | 115 | **S55454-D343-A100** | **SQN75.524B26** | --- | --- | --- |

Key

[1]) Refer to chapter ‘Dimensions’
[2]) At 60 Hz frequency, the running times are approx. 20% shorter
[3]) 115 V AC +10 %/-15 % possible, but the torque is reduced by approx. 20% in the case of undervoltage
[4]) 230 V AC +10 %/-15 % possible, but the torque is reduced by approx. 20% in the case of undervoltage
[5]) On request
[6]) Free auxiliary switches (along with 2 end switches)
[7]) When looking at the shaft and control voltage at end switch I
[8]) Directly suitable for mounting an ASZ potentiometer, refer to chapter ‘Mounting an ASZ potentiometer’
[9]) Indirectly suitable for mounting an ASZ potentiometer, order AGA34 housing cover separately

## Torque at rated voltage



## Accessories (must be ordered separately)

**VKP40** proportional controlling element with mounting plate
- VKP40 proportional controlling element for mounting between threaded flanges in gas trains
- Only SQN7 actuators with counterclockwise rotation may be mounted

Refer to Data Sheet N7646.

**VKF1x** butterfly valves with mounting plate
- VKF1x butterfly valves in intermediate flange design for mounting into gas trains
- Only SQN7 actuators with counterclockwise rotation may be mounted

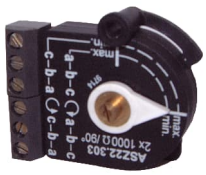
Refer to data sheet N7673.

**ASK33.5** mounting plate
Article no.: **S55857-Z101-A100**
(to be ordered separately)
- ASK33.5 mounting plate for mounting the SQN7
- Reducing sleeve included in scope of delivery

Refer to data sheet N7673.

Note
The required screws are included in the standard scope of delivery.

**ASZ** potentiometer
Refer to chapter ‘Mounting the ASZxx.3x potentiometer’ and, for all further details on ASZ potentiometers, data sheet N7921.



**AGA70.3** mounting kit
- For mounting the SQN70/SQN71 as a replacement for the SQN3
- Fastening to SQN70/SQN71 by means of self-tapping screw supplied.

**AGA34** housing cover
For retrofitting an SQN70/SQN71 with ASZxx.3x potentiometer.

*Example of conversion by the user:*
- SQN70.664B20 (refer to ‘Type summary’)
- AGA34 housing cover
- ASZ12.30 conductive plastic potentiometer (1000 Ω / 90°, 3-pole)

## Accessories (must be ordered separately) (continued)

**RWF50** compact universal controller
For load-dependent control of the amount of fuel and combustion air in connection with P, PI, or PID controllers.
Refer to Data Sheet N7866.


**RWF55** compact universal controller
For load-dependent control of the amount of fuel and combustion air in connection with P, PI, or PID controllers.
Refer to Data Sheet N7867.

## Technical data

General unit data

**SQN7**

| | |
|---|---|
| Mains voltage | 230 V AC -15%/+10%<br>115 V AC -15%/+10% |
| Mains frequency | 50…60 Hz ±6% |
| Motor of the SQN7 | Synchronous motor |
| Internal consumption | Max. 6 VA |
| External overload fuse | Max. 6.3 AT (slow) according to DIN EN 60127-5 |
| Internal overload fuse | 2 AT (slow), depending on the type, not interchangeable |
| Positioning angle, usable range | Max. 160°, scale range 0…130° |
| Mounting position | Optional |
| Degree of protection | |
| • All types | IP40 according to EN 60529, provided adequate cable entries and fixing screws are used |
| • SQN74/SQN75 | IP20 according to EN 60529, if the lateral knockout opening is used for cable entry |
| Protection class | |
| • SQN70/SQN71 | II according to EN 60730-1:2016 + A1:2019 and EN IEC 60730-2-14:2019 |
| • SQN74/SQN75 | I according to DIN EN 60730 |
| Mode of operation | Type 1, rotary motion / multi-position mode of operation |
| Cable entry | |
| • SQN70/SQN71 | Insertable threaded cable gland holder for 2 x Pg9, no locknut required |
| • SQN74/SQN75 | Openings for locknuts for fastening cable glands<br>Type of locknut<br>1 x Pg9 M Pg9 DIN 46320 MS<br>1 x Pg11 M Pg11 DIN 46320 MS<br><br>Additional lateral knockout opening for loose insertion of 2 cables with max. Ø 6 mm. |
| Cable strain relief | Strain relief to be provided by the user, also refer to *Degree of protection*.<br>Pg glands and locknuts for all types are not supplied. |
| Cable connection | Screw terminals for wires with a cross-sectional area of 0.5 to 2.5 mm² |
| Ferrules | Matching the cross-sectional area of the stranded wire |
| Direction of rotation (when facing the shaft) | Refer to chapter ‘Type summary’ |
| Torque and holding torque | Refer to chapter ‘Type summary’ |
| Running times | Refer to chapter ‘Type summary’ |
| Pause time at change in direction of rotation | > 100 ms |
| Lifetime | 250,000 start cycles (OFF ⇨ ON ⇨ OFF) under load with the rated torque in the entire rotation angle range |

General unit data

| | | |
|---|---|---|
| **SQN7** | Weight (on average) | Approx. 500 g |
| | Temperature of the mounting surface | Max. 60°C |
| | Rated surge voltage | 4 kV<br>Overvoltage category III according to DIN EN 60730-1 (VDE 0631-1):2021-06, Section 20<br>Pollution degree 2 |
| | Permissible on time | 60%, maximum 3 minutes without interruption |
| | Additional restrictions for SQN7x.4xx, SQN7x.6xx, and SQN7x.x4x | 50%, ambient temperature from 24…35°C<br>40%, ambient temperature from 35…45°C<br>25%, ambient temperature from 45…60°C |
| | Gear backlash between motor and shaft of the SQN7 | |
| | • Ex works | ≤1.2° ±0.3° |
| | • After 250,000 cycles | ≤1.5° ±0.3° |

**End switches and auxiliary switches**

| | |
|---|---|
| Type | In accordance with DIN 41636-1 |
| Switching voltage | 24…250 V AC |
| Number of end switches | 2 |
| Number of auxiliary switches | Refer to chapter ‘Type summary’ |
| Actuation | Via camshaft, color-coded cam disks, refer to chapter ‘Circuit diagrams’.<br>Switches with fine adjustment |
| Engagement of the cam disks with fine adjustment | Infinitely variable |

Maximum permissible current load at cos φ = 0.9:
(Values in brackets: short-time peaks for max. 0.5 s)

**Please note!**
**The control of fuel valves is only permitted at the cam designated for this purpose. When connecting a fuel valve: Max. 0.3 A, cosφ > 0.8 inductive. Safety-relevant applications are only available with Siemens burner controls!**

| | |
|---|---|
| • Connection diagram ⓪ | |
| - Terminals 1, 2, 3, 4 | 0.5 A |
| - Terminals 5, 6, 7 | 1 A (5 A) |
| • Connection diagram ② | |
| - Terminals 1, 2, 3, 8 | 0.5 A |
| - Terminal 4, 5 | 2 A (5 A) |
| - Terminal 6, 7 | 1 A (5 A) |
| • Connection diagram ④ | |
| - Terminals 1, 3, 8 | 0.5 A |
| - Terminal 4, 5 | 2 A (5 A) |
| - Terminal 6, 7 | 1 A (5 A) |
| • Connection diagram ⑤ | |
| - Terminals 1, 2, 3, 8 | 0.5 A |
| - Terminal 4, 5 | 2 A (5 A) |
| - Terminal 6, 7 | 1 A (5 A) |
| • Connection diagram ⑥ | |
| - Terminals 1, 2, 3, 4, 5 | 0.5 A |
| - Terminals 6, 7, 8 | 1 A (5 A) |
| • Connection diagram ⑨ | |
| - Terminals 1, 2, 3, 4, 5, 8 | 0.5 A |
| - Terminal 6, 7 | 1 A (5 A) |
| • Connection diagram Ⓚ | |
| - Terminals 1, 2 | 0.5 A |
| - Terminals 3, 4, 5, 6, 7, 8 | 1 A (5 A) |

| | | |
|---|---|---|
| **Environmental conditions** | **Storage** | EN 60721-3-1:1997 |
| | Climatic conditions | Class 1K3 |
| | Mechanical conditions | Class 1M2 |
| | Temperature range | -20…+60°C |
| | Humidity | < 95% r.h. |
| | **Transport** | EN 60721-3-2:1997 |
| | Climatic conditions | Class 2K2 |
| | Mechanical conditions | Class 2M2 |
| | Temperature range | -50…+60°C |
| | Humidity | < 95% r.h. |
| | **Operation** | EN 60721-3-3:1995 + A2:1997 |
| | Climatic conditions | Class 3K5 |
| | Mechanical conditions | Class 3M2 |
| | Temperature range | -20…+60°C |
| | Humidity | < 95% r.h. |
| | Installation altitude | Max. 2,000 m above sea level |

**Please note!**
**Condensation, formation of ice, and ingress of water are not permitted. Failure to observe this poses a risk of impairing the safety functions and the risk of electric shock.**

A synchronous motor drives the drive shaft with a mounted camshaft via a gear train. The camshaft actuates end switches and auxiliary switches. The switch position of each end switch and auxiliary switch can be adjusted by an assigned cams disk within the running range. Some SQN7 versions are equipped with electronic switching modules that perform additional functions in connection with the end switches and auxiliary switches and external units, such as controllers (refer to chapter 'Circuit diagrams'). The functions and technical data of the two actuator groups, SQN70/SQN71 and SQN74/SQN75, are nearly identical.

SQN30/SQN31 replacement

The 'Type summary' lists **possible SQN3s** that can be replaced by SQN70/SQN71s using an AGA70.3 mounting kit (refer to chapter 'Accessories').

The **SQN30** and **SQN31** listed in the *Type summary*

- refer to the 230 V AC versions of the SQN7
- are versions **without** the option of mounting an ASZ potentiometer, refer to data sheet N7808

Mechanical adaptations are not normally required. Note the different terminal assignments of the two SQN3s.

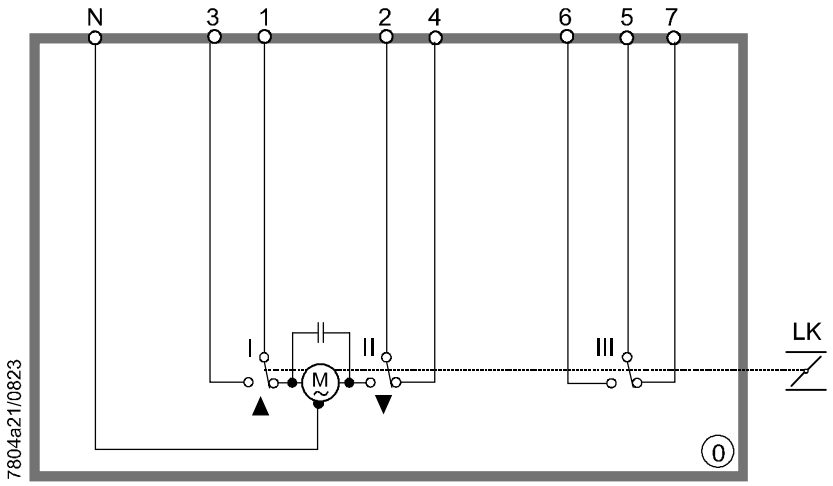
SQN7 series B replacement

The *Type summary* lists SQN7s in series A that are replaced by SQN7s in series B. Series B features an additional non-replaceable fuse on pin 6 of the auxiliary switch for fuel valves. Neither the SQN7s in series A nor the AC 115 V variants (marked with 'R') are suitable for controlling the fuel valves according to the standard.

## Internal diagram

Note
The following internal diagrams all show the start position as supplied:
- End switch position II CLOSED
- No voltage

### No. ⓪ → Universal use

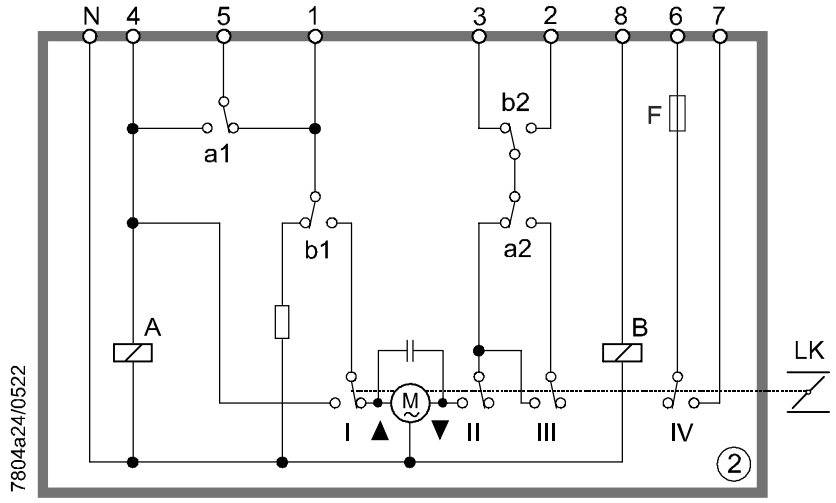



SQN7x.x0xxxx

Cam disks:
I Red
II Blue
III Orange

**Please note!**
**This variant is not suitable for controlling a fuel valve according to standard regulations.**

### No. ② → 2-stage or modulating operation → Prepurging at high-fire position (NL)
### e.g., for LGB22 / LGB32 / LME22 / LME23 burner control

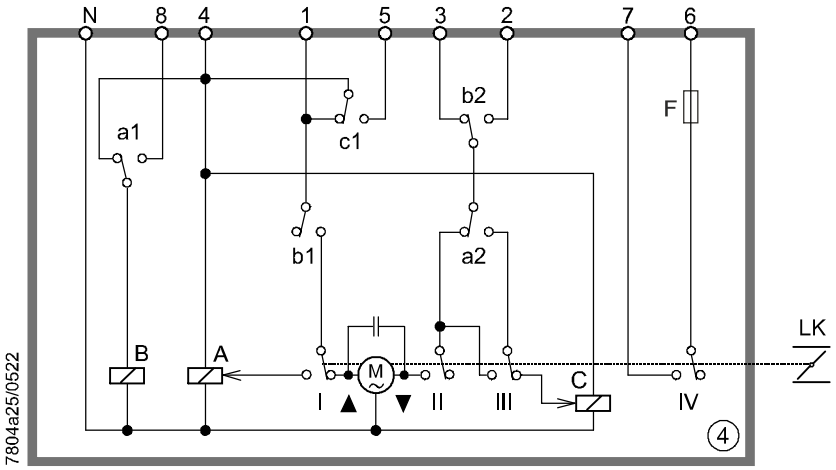



SQN7x.x2xBxx

*)

**Please note!**
**Connection of a fuel valve to cam IV only:**
**→ Max. 0.3 A, cosφ > 0.8 inductive.**
**Safety-relevant applications are only available with Siemens burner controls!**

**No. ④ → 2-stage operation → Prepurging at low-fire position (KL)**
**e.g., for LGB21 / LME21 / LOA24 / LOA25 / LOA26 / LOA28 / LOA36 / LMO24 / LMO44 burner control**

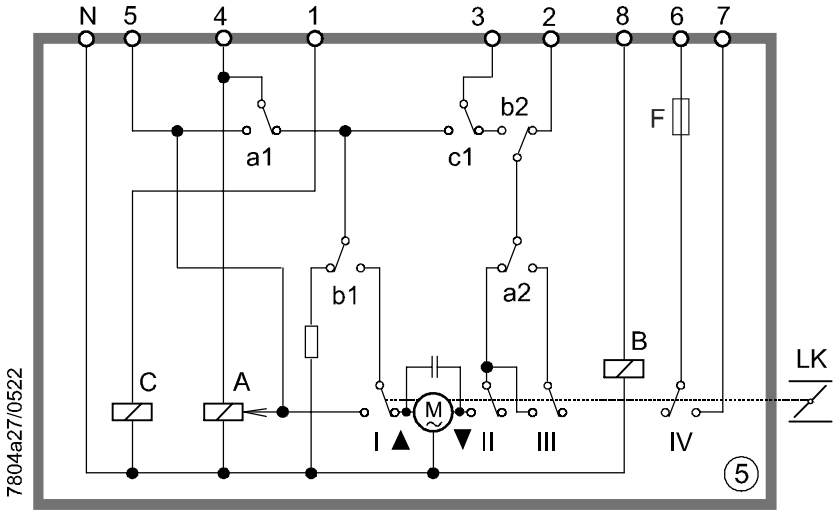



SQN7x.x4xBxx

Cam disks:
I Red
II Blue
III Orange
IV *) Black

*) **Please note!**
**Connection of a fuel valve to cam IV only:**
**→ Max. 0.3 A, cosφ > 0.8 inductive.**
**Safety-relevant applications are only available with Siemens burner controls!**

**No. ⑤ → 2-stage operation → Prepurging at high-fire position (NL)**
**e.g., for LME22 / LME23 / LGB22 / LGB32 burner control**

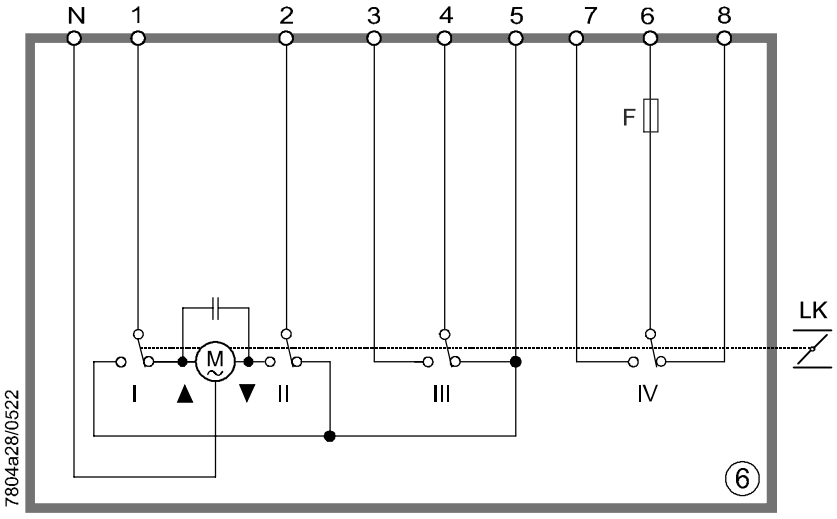



SQN7x.x5xBxx

Cam disks:
I Red
II Blue
III Orange
IV *) Black

*) **Please note!**
**Connection of a fuel valve to cam IV only:**
**→ Max. 0.3 A, cosφ > 0.8 inductive.**
**Safety-relevant applications are only available with Siemens burner controls!**

**No. ⑥ → 2-stage or modulating operation → Prepurging at high-fire position (NL)**
**e.g., for LFL / LGK16 / LAL / LOK16 burner control**



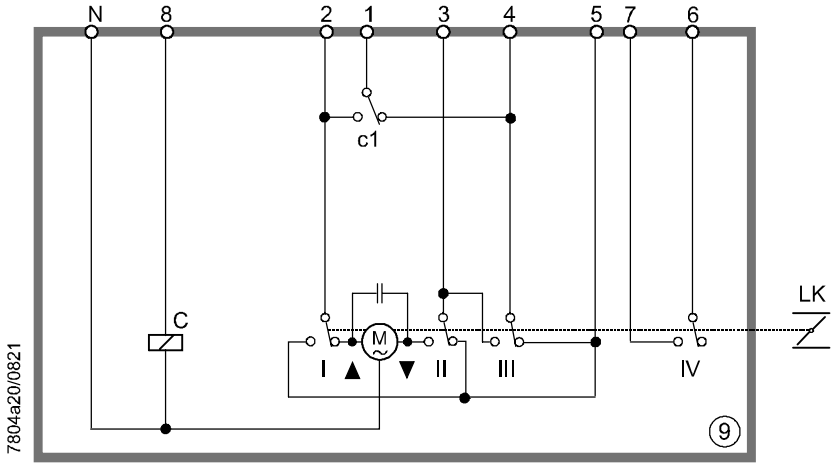

SQN7x.x6xBxx

Cam disks:
I Red
II Blue
III Orange
IV *) Black

*)

**Please note!**
**Connection of a fuel valve to cam IV only:**
**→ Max. 0.3 A, cosφ > 0.8 inductive.**
**Safety-relevant applications are only available with Siemens burner controls!**

**No. ⑨ → 2-stage operation, prepurging at low-fire position (KL)**



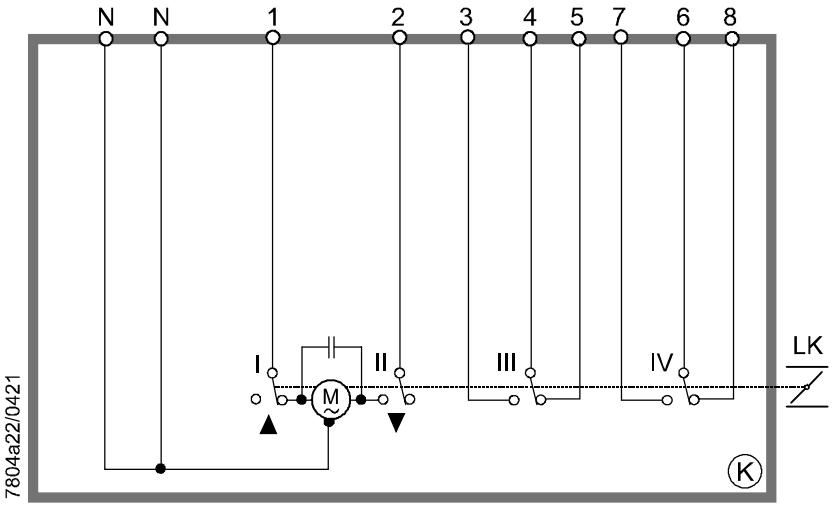

SQN7x.x9xAxx

Cam disks:
I Red
II Blue
III Orange
IV Black

**Please note!**
**This variant is not suitable for controlling a fuel valve according to standard regulations.**

## Internal diagram (continued)

**No. Ⓚ → Universal use**




SQN7x.xKxAxx

Cam disks:

| | |
|---|---|
| I | Red |
| II | Blue |
| III | Orange |
| IV | Black |

**Please note!**
**This variant is not suitable for controlling a fuel valve according to standard regulations.**

## Key

| | |
|---|---|
| No. ② | Designation for internal circuit. Appears in the second position after the period in the type reference |
| I / II | End switches |
| III / IV / V | Auxiliary switches |
| AL | Remote lockout display (alarm) |
| BV1 | Fuel valve stage 1 |
| BV2 | Fuel valve stage 2 |
| BV3 | Fuel valve stage 3 |
| EK2 | External remote lockout reset button |
| ION | Ionization probe |
| F  | Internal fuse, not replaceable |
| FS | Flame signal |
| GL | Gas/air ratio control |
| GP | Gas pressure switch |
| HS | Main switch |
| KL | Low-fire |
| L | Phase |
| LK | Air damper |
| LKP | Air damper position |
| LP | Air pressure switch |
| LR | Load controller |
| M | Burner motor or fan motor |
| Ⓜ | Synchronous motor of the SQN7 |
| M1 | Without postpurging |
| M2 | With postpurging |
| N | Neutral conductor |
| NL | High-fire |
| OH | Oil preheater |
| OW | Oil preheater readiness contact |
| QRB | Photoresistive detector |
| R | Control thermostat or pressurestat |
|  | Relay |
| RV | Control valve |
| SA | Actuator |
| Si | External primary fuse, as specified in the data sheet of the relevant burner control |
| SB | Safety limiter |
| STx | Stage |
| tx / Tx | Program times (refer to the data sheet of the relevant burner control) |
| TSA | Safety time |
|  | Resistor |
| Z | Ignition transformer |
| CLOSED | Damper closed |
| ▲ | Direction of rotation OPEN |
| ▼ | Direction of rotation CLOSED |

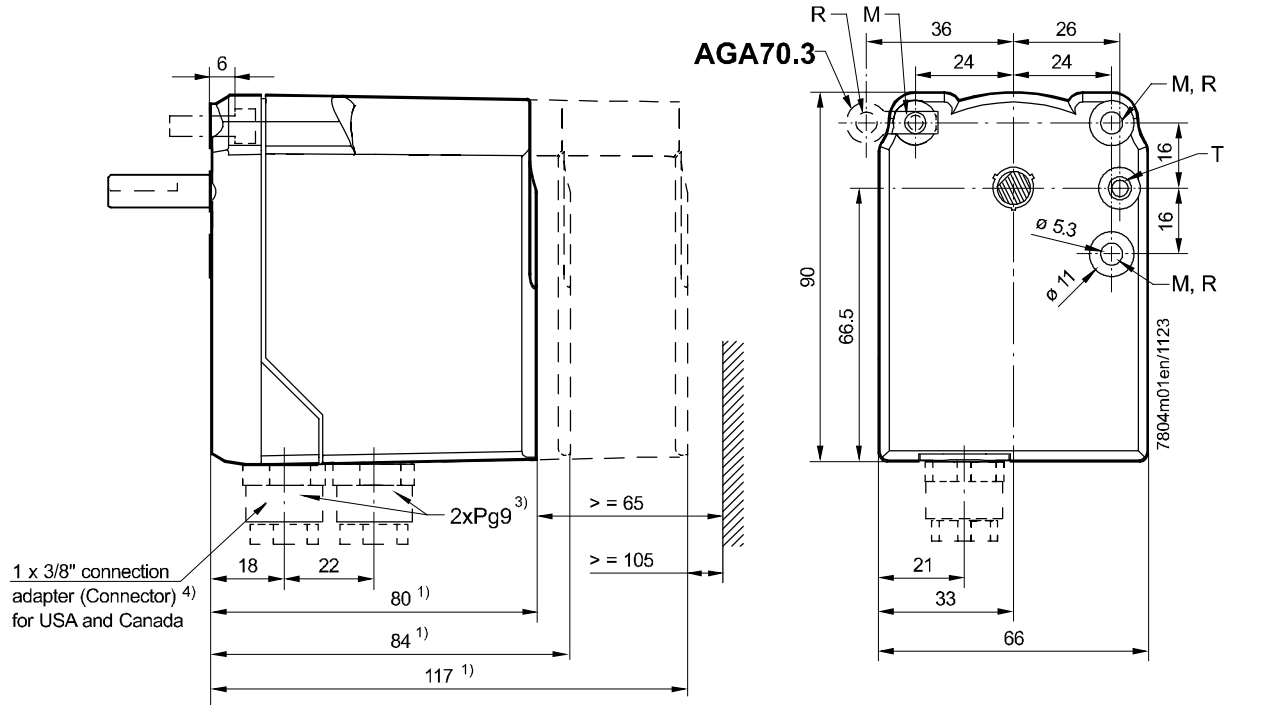
### Program sequence – Diagrams

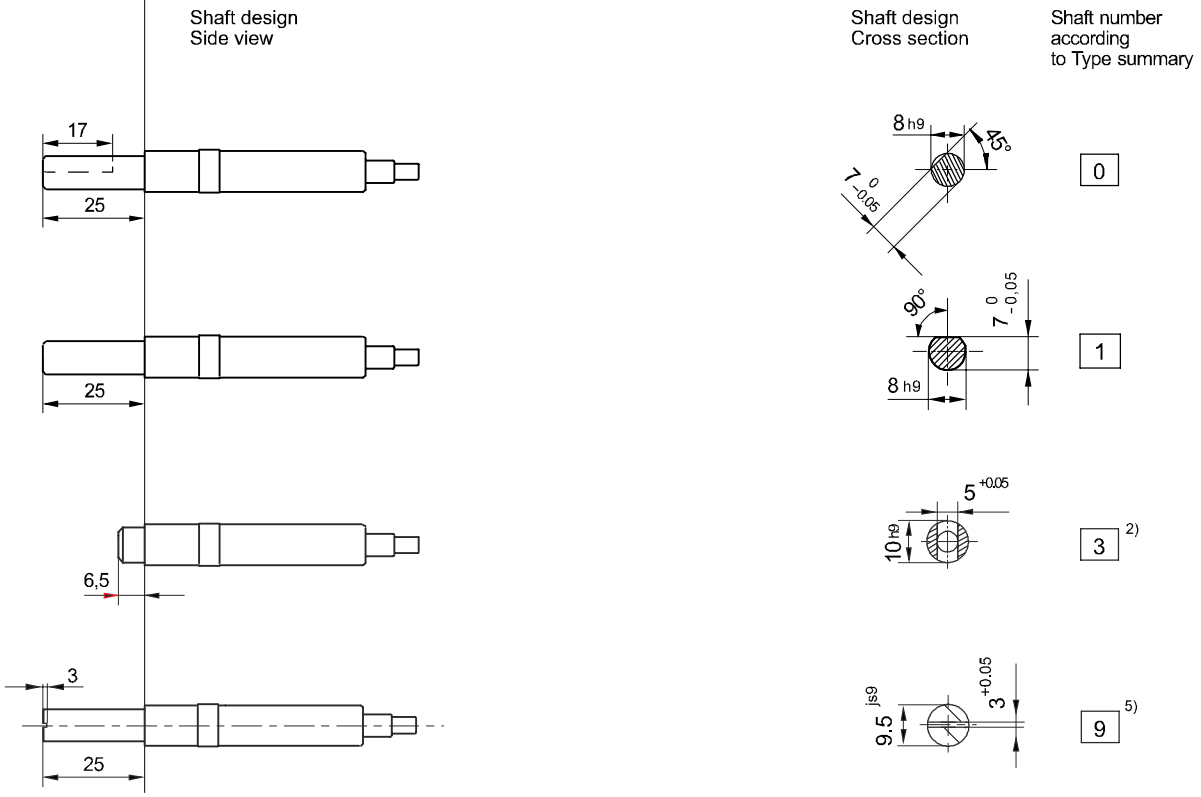
| | |
|---|---|
| A | Burner ON |
| A–B | Burner startup |
| B–C | Burner operation / load control operation, modulating or 2-stage |
| C | Burner OFF |
| C–D | Overrun time |
| D | End of program sequence, burner control ready for restart |

## Dimensions

Dimensions in mm

SQN70/SQN71



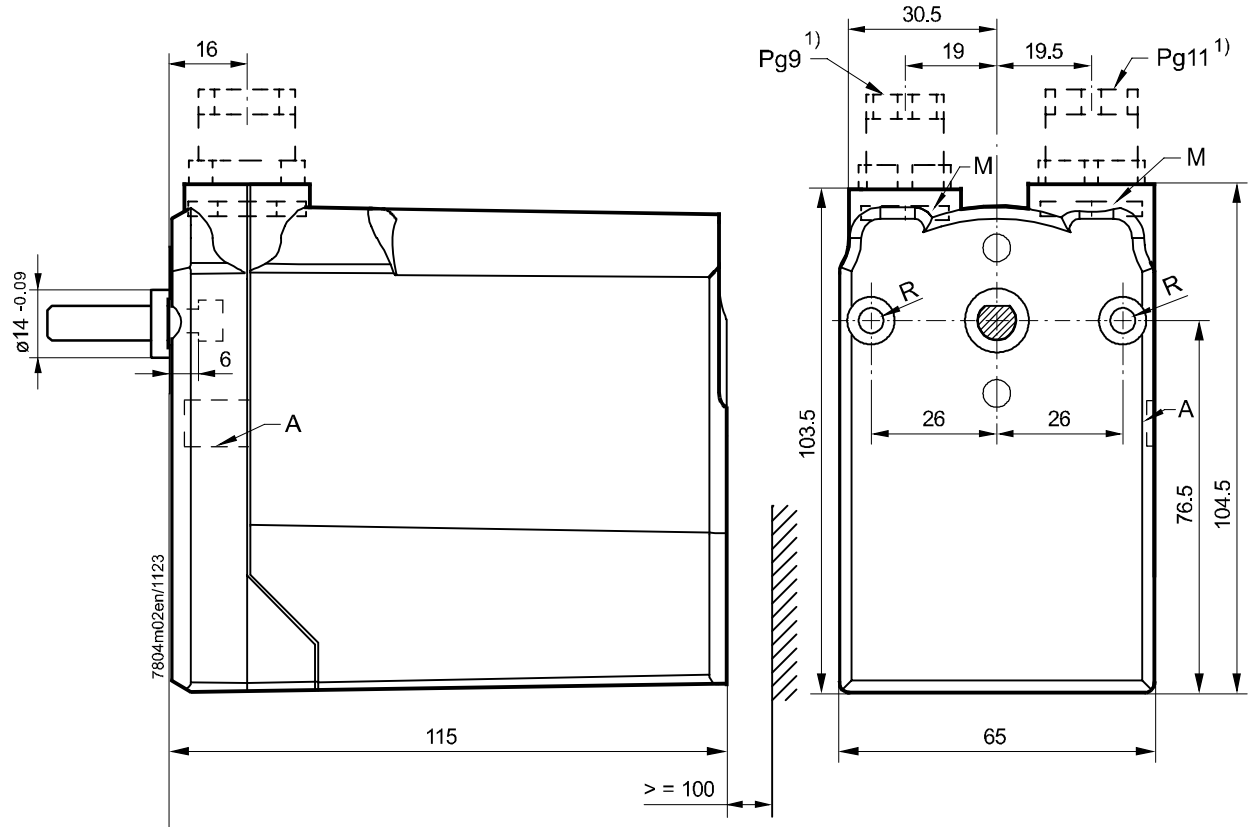

All shafts are shown in end switch position II CLOSED (as supplied).

1) Housing length varies depending on the SQN7 version (refer to chapter 'Type summary')
2) Center slot: 6.3 mm deep
Hole Ø 5.1 mm: 16.5 mm deep (incl. center slot depth)
3) Not supplied
4) Supplied with SQN7x.xxxRxx types
5) Slot is not used for power transmission
R Fastening positions equivalent to the SQN3 (for direct replacement with SQN70/SQN71) AGA70.3 mounting kit required
M Through-hole Ø 5.3 mm
T Knockout opening Ø 5.3 mm

## Dimensions (continued)

Dimensions in mm

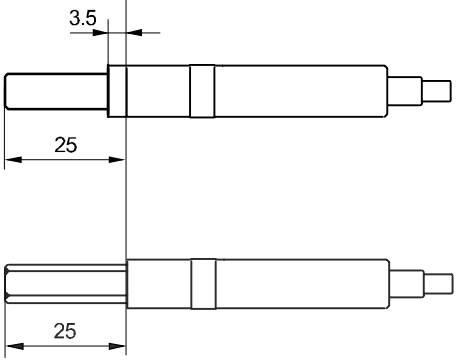
SQN74/SQN75

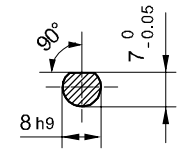



Shaft design
Side view

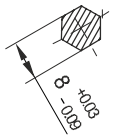
Shaft design
Cross section

Shaft number
according
to Type summary




1




6

Shafts shown in CLOSED position (end switch II)

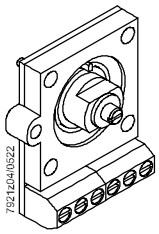
A Knockout opening for loose cable entry
R Through-hole Ø 5.3 mm
Fastening positions equivalent to Conectron LKS 160 and Berger STA
M Pg nuts (not supplied; refer to chapter ‘Technical data’ for type)

1) Not supplied

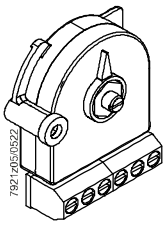
## Mounting the ASZxx.3x potentiometer

**Please note!**
**Electric shock hazard**
**The ASZ potentiometer must be installed when the unit is shut down.**

ASZxx.3x potentiometer



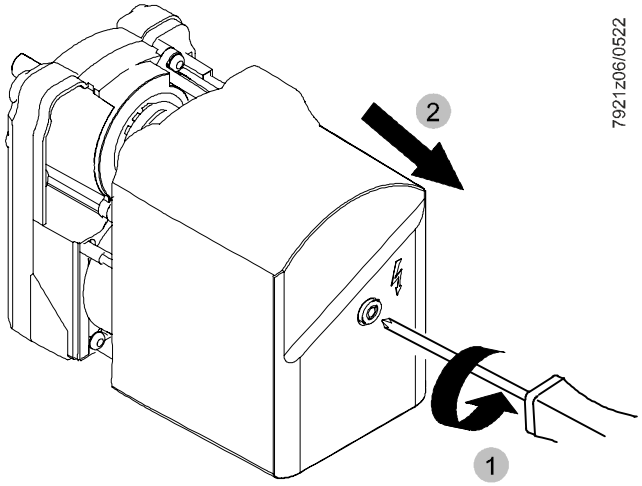

Option



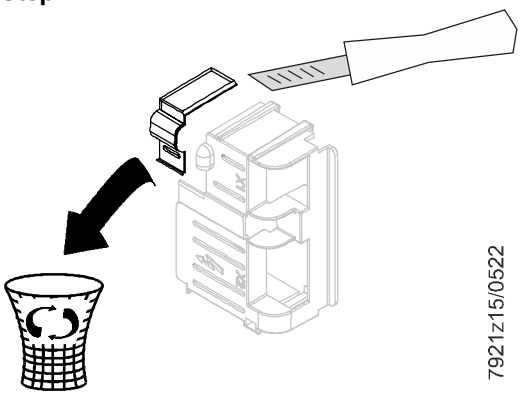

SQN7x actuators

| | |
|---|---|
| SQN70.x0x | SQN71.x0x |
| SQN70.x6x | SQN71.x6x |
| SQN70.x7x | SQN71.x7x |
| SQN74.x6x | SQN75.x6x |
| SQN74.x7x | SQN75.x7x |
| SQN74.x8x | SQN75.x8x |
| SQN74.x9x | SQN75.x9x |
| SQN74.xKx | SQN75.xKx |

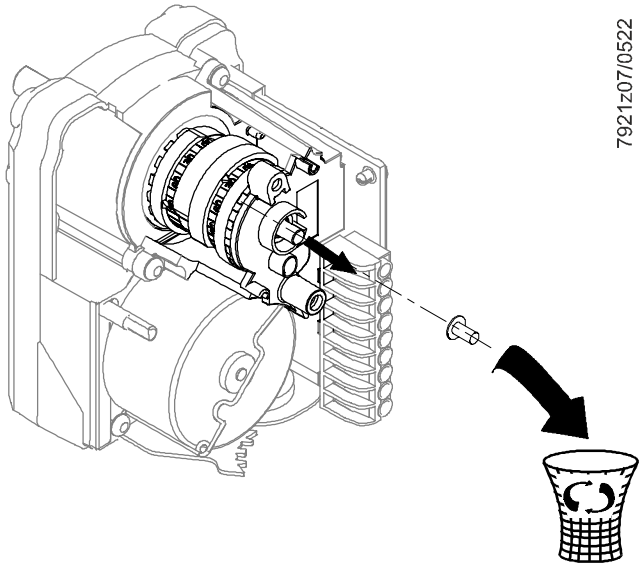
**Step 1:**




**Step 2:**

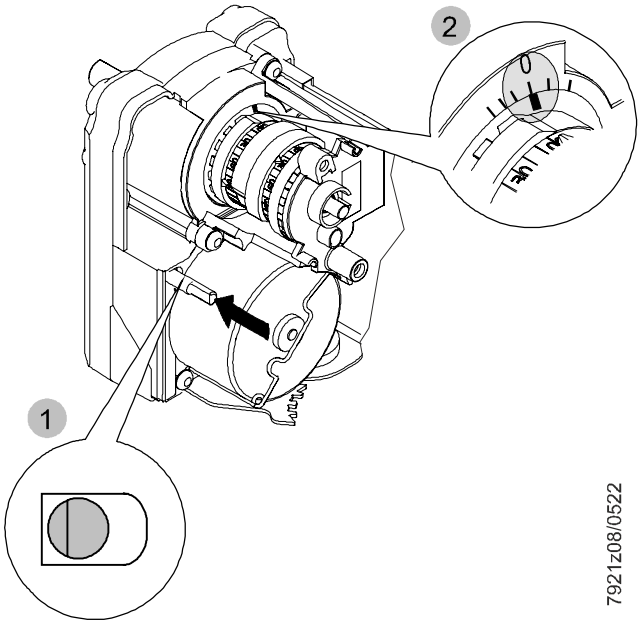



**Step 3:**



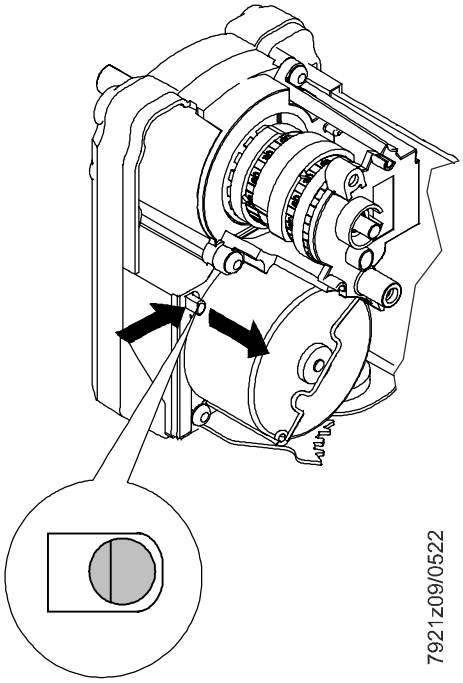
## Mounting the ASZxx.3x potentiometer (continued)

**Step 4:**



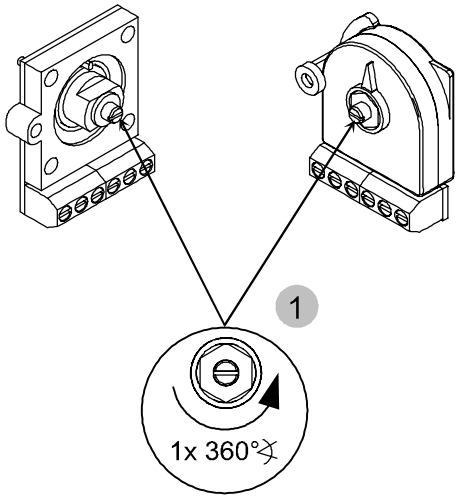

7921z08/0522

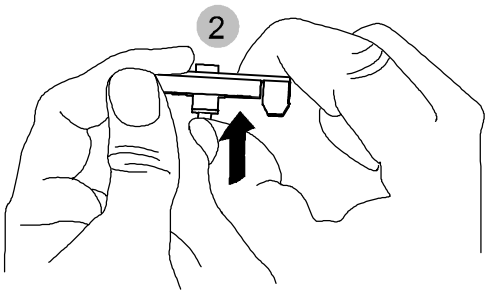
**Step 5:**



7921z09/0522

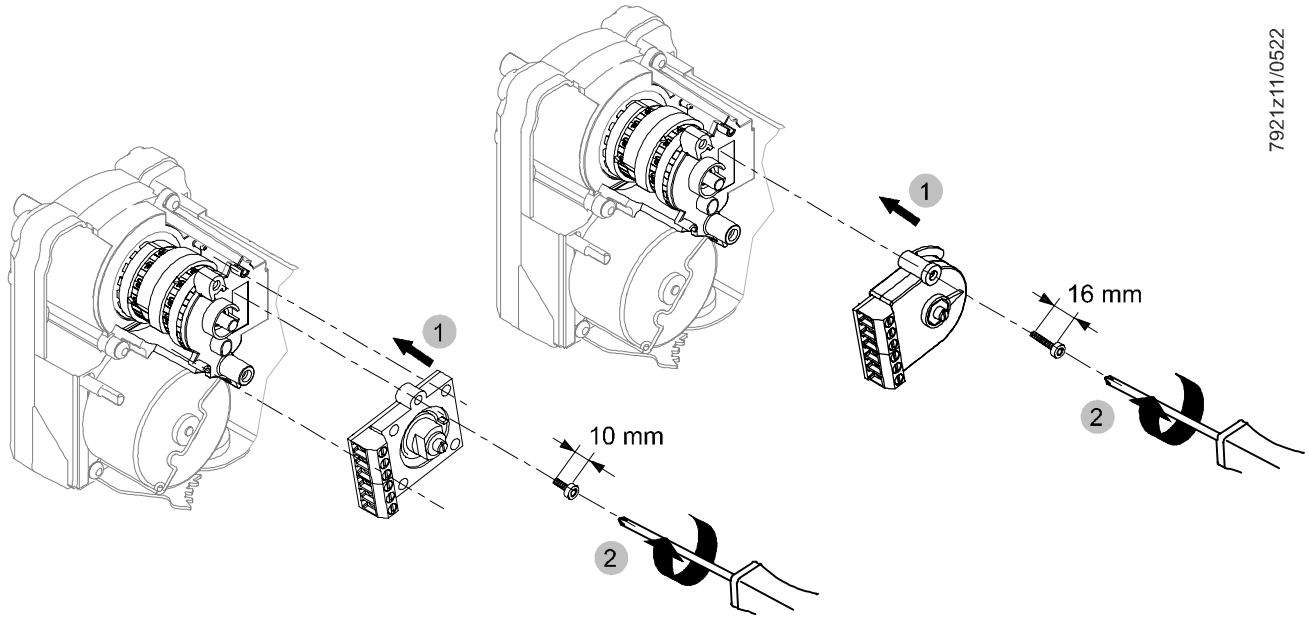
**Step 6:**



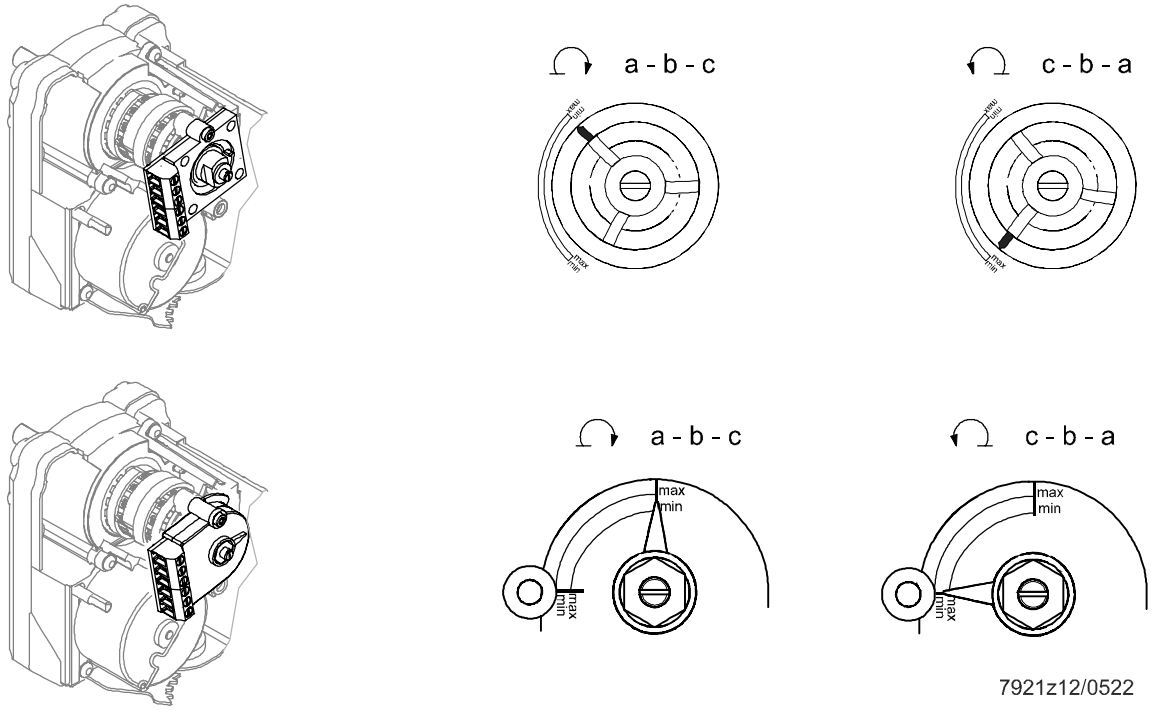




7921z10/0522

**Step 7:**

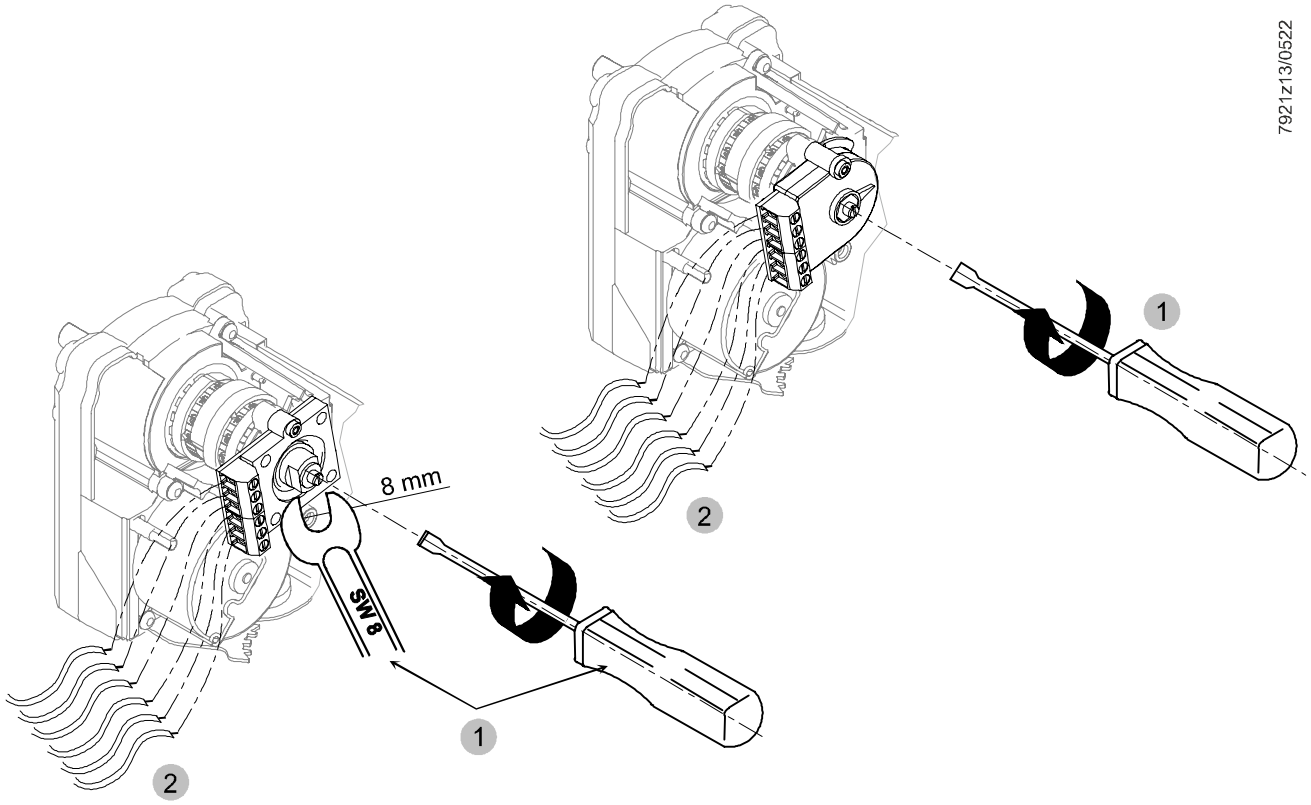

7921z11/0522
1
16 mm
2
1
10 mm
2

**Step 8:**

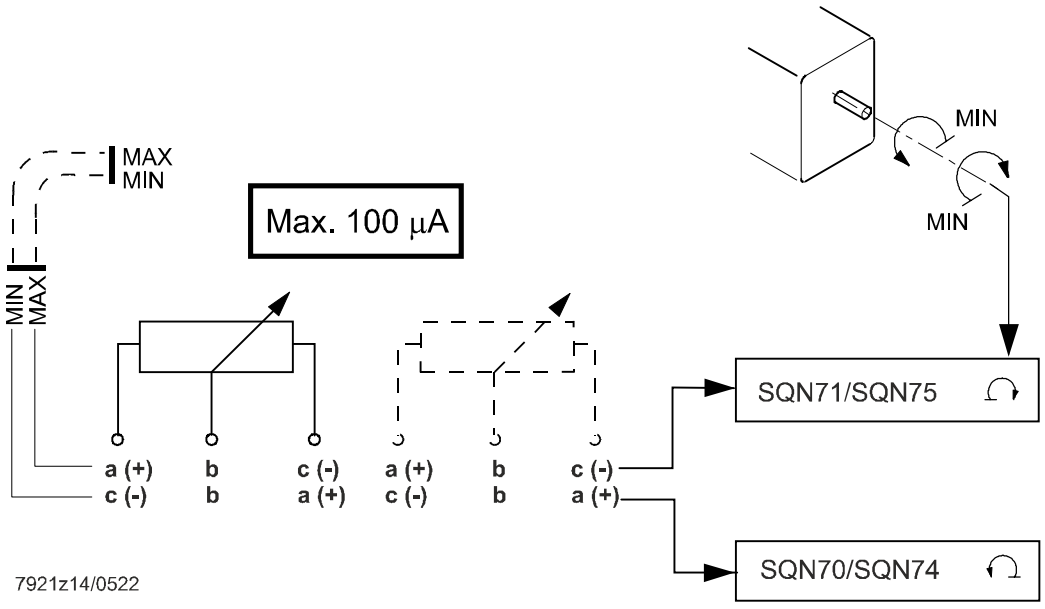

a - b - c
c - b - a
max
min
a - b - c
c - b - a
max
min
7921z12/0522

## Mounting the ASZxx.3x potentiometer (continued)

**Step 9:**




**Step 10:**



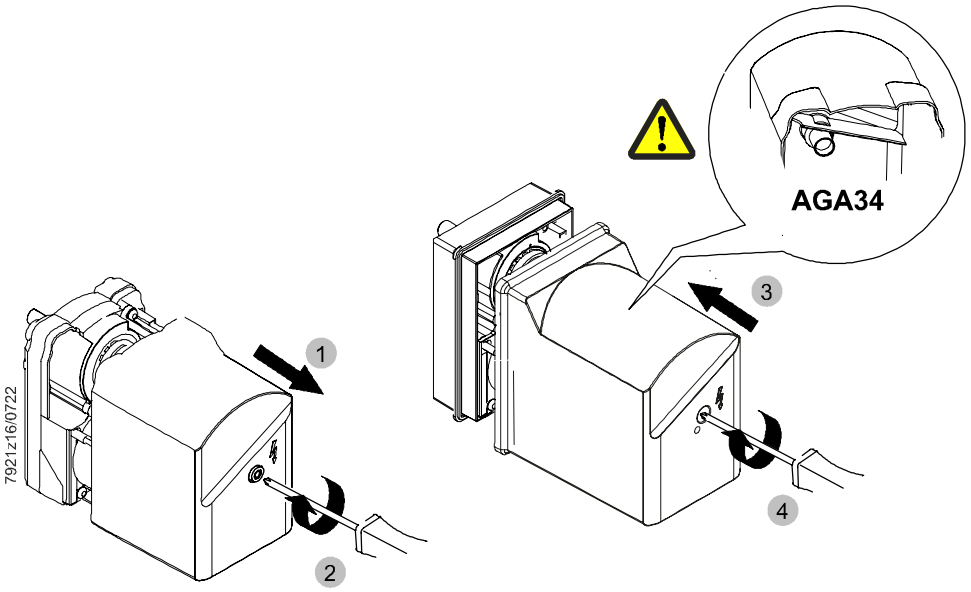
**Step 11:**

Only…

SQN70.x0x/SQN71.x0x

SQN70.x6x/SQN71.x6x

SQN70.x7x/SQN71.x7x




1 Remove the housing cover
2 Change the direction of rotation of the SQN7
3 Fit the AGA34 higher housing cover (117 mm)
4 Screw the AGA34 housing cover in place