

SQM40/41...

Actuators for air and gas dampers

ISO 9000 and 14000
REGISTERED FIRM



Description

SQM40/41... actuators are used for the positioning of flow control valves, butterfly valves, dampers or any application requiring rotary motion. The SQM40/41... actuators accommodate control input signals of 4 to 20 mA, 0 to 135 Ω , 2 to 10 Vdc, position proportional and floating control. SQM4... actuators are available with up to six internal, easily adjustable switches.

The actuators are used primarily for precise flow control of gas, oil or combustion air.

The NEMA 4 SQM40/41... actuator may be mounted in any position. A selection of mounting brackets and shaft options provides installation flexibility and allows for the simple replacement of most competitive actuators.

Features

- 45 or 90 in-lb
- Clockwise and counterclockwise versions
- Running times of 12 or 25 seconds
- Various drive shaft options
- Drive shaft disengagement clutch
- C-UL-US, CE approved
- NEMA 4 weatherproof enclosure
- Internal position indication
- Mounting brackets available to replace competitive actuators
- Modulating version accepts 4 to 20 mA, 0 to 135 Ω or 2 to 10 Vdc
- Zero and span adjustment

Application

SQM40/41... actuators are suited for both industrial and commercial applications. On burner applications requiring high turndown and reliable ignition, the auxiliary switches can be applied to create separate positions for burner ignition and low fire.

The shaft disengagement clutch allows for quick manual alignment of the actuator shaft with a connected valve or linkage.

Product Numbers SQM40...Counterclockwise Table 1

Product no.	Torque (lb-in)	Time ¹ (90° @ 60 Hz; sec)	Control Board					Shaft	Approvals		Operating voltage		1000Ω position feedback
			Modulating	3-position	2-position	Switches	Relay		C-UL-US	CE	AC120V	AC230V	
SQM40.144R11SC	45	12.5	x			3		3/8" square	x	x	x		
SQM40.145R11SC	45	12.5	x			3		10mm D	x	x	x		
SQM40.164R11SC	45	12.5		x		6		3/8" square	x	x	x		x
SQM40.165R11SC	45	12.5		x		6		10mm D	x	x	x		x
SQM40.174R10SC	45	12.5			x	5	1	3/8" square	x	x	x		
SQM40.241A11SC	90	25	x			3		10mm key		x	x		
SQM40.241A21SC	90	25	x			3		10mm key		x		x	
SQM40.241R11SC	90	25	x			3		10mm key	x	x	x		
SQM40.244A21SC	90	25	x			3		3/8" square		x		x	
SQM40.244R11SC	90	25	x			3		3/8" square	x	x	x		
SQM40.245R11SC	90	25	x			3		10mm D	x	x	x		
SQM40.261A11SC	90	25		x		6		10mm key		x	x		x
SQM40.261A21SC	90	25		x		6		10mm key		x		x	x
SQM40.261R11SC	90	25		x		6		10mm key	x	x	x		x
SQM40.264A21SC	90	25		x		6		3/8" square		x		x	x
SQM40.264R11SC	90	25		x		6		3/8" square	x	x	x		x
SQM40.265R11SC	90	25		x		6		10mm D	x	x	x		x
SQM40.271R10SC	90	25			x	5	1	10mm key	x	x	x		
SQM40.274R10SC	90	25			x	5	1	3/8" square	x	x	x		

1. For 50 Hz, multiply running time by 1.2

Product Numbers

SQM41...Clockwise

Table 2

Product no.	Torque (lb-in)	Time ¹ (90° @ 60 Hz; sec)	Control Board					Shaft	Approvals		Operating voltage		1000Ω position feedback
			Modulating	3-position	2-position	Switches	Relay		C-UL-US	CE	AC120V	AC230V	
SQM41.144R11SC	45	12.5	x			3		3/8" square	x	x	x		
SQM41.145R11SC	45	12.5	x			3		10mm D	x	x	x		
SQM41.164R11SC	45	12.5		x		6		3/8" square	x	x	x		x
SQM41.165R11SC	45	12.5		x		6		10mm D	x	x	x		x
SQM41.174R10SC	45	12.5			x	5	1	3/8" square	x	x	x		
SQM41.241A11SC	90	25	x			3		10mm key		x	x		
SQM41.241A21SC	90	25	x			3		10mm key		x		x	
SQM41.241R11SC	90	25	x			3		10mm key	x	x	x		
SQM41.244A21SC	90	25	x			3		3/8" square		x		x	
SQM41.244R11SC	90	25	x			3		3/8" square	x	x	x		
SQM41.245R11SC	90	25	x			3		10mm D	x	x	x		
SQM41.261A11SC	90	25		x		6		10mm key		x	x		x
SQM41.261A21SC	90	25		x		6		10mm key		x		x	x
SQM41.261R11SC	90	25		x		6		10mm key	x	x	x		x
SQM41.264A21SC	90	25		x		6		3/8" square		x		x	x
SQM41.264R11SC	90	25		x		6		3/8" square	x	x	x		x
SQM41.265R11SC	90	25		x		6		10mm D	x	x	x		x
SQM41.271R10SC	90	25			x	5	1	10mm key	x	x	x		
SQM41.274R10SC	90	25			x	5	1	3/8" square	x	x	x		

1. For 50 Hz, multiply running time by 1.2

Accessories

Table 3

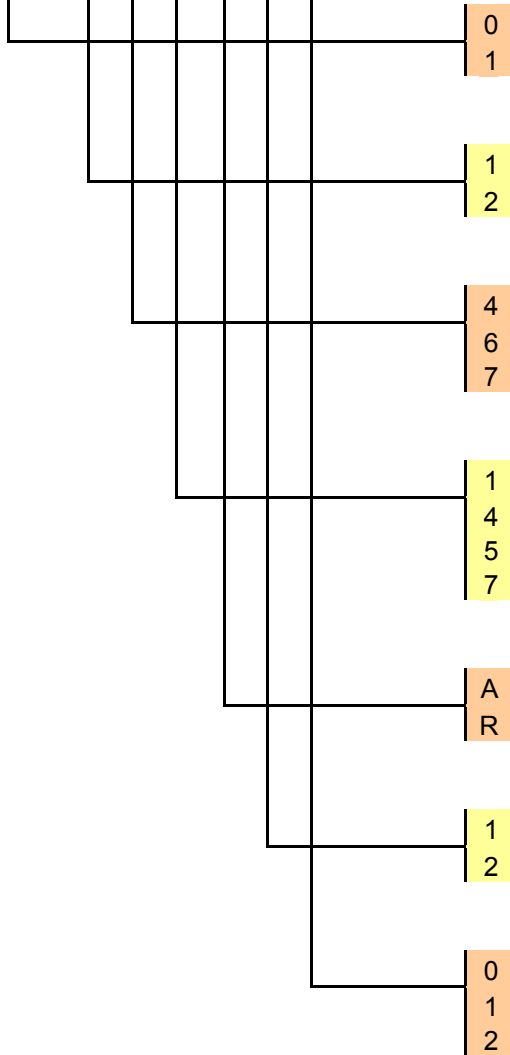
Each SQM40/41...actuator comes equipped with the appropriate power supply connection plate and terminal connection kit. Replacement or spare components available as accessories.

<u>Power supply connection plate</u>	
AGA45.11	Replacement conduit cover with 1/2" NPT threaded holes
AGA45.12	Replacement conduit cover with M16 unthreaded holes
<u>Terminal connector kits</u>	
AGA45.4	Terminal plug kit for modulating (analog) version
AGA45.6	Terminal plug kit for line voltage version
<u>Mounting brackets</u>	
AGA57.5	for replacement of Honeywell Modutrol actuators

Product Number Identification Legend

For actuator identification only. To select product numbers for ordering, see Tables 1 & 2

SQM4 0 . 2 6 1 A 1 0 SC



Basic Type
 counterclockwise
 clockwise

Torque (Time)
 45 in-lb (12 sec)
 90 in-lb (25 sec)

PCB type/ Switches
 3 switches, modulating version
 6 switches, position proportional control
 5 switches, position proportional control + relay

Shaft
 10 mm woodruff
 HW square type
 10 mm D type
 14 mm parallel key

Regional Versions
 European version, CE
 US version, C-UL-US & CE

Voltage
 120 Vac @ 50-60 Hz
 230 Vac @ 50-60 Hz

Potentiometer
 None
 Single, 1000 Ohms 90°
 Double, 2*1000 Ohms 90°

NOTE: Not all possible combinations are available

Technical Data

General unit data	Agency approvals	C-UL-US, CE
	Operating voltage	120 Vac -15% / +10% 230 Vac -15% / +10%
	Operating frequency	50 to 60 Hz
	Power consumption	10 VA
	Type of motor	Reversing synchronous motor
	Duty cycle	100%
	Torque	See tables 1 and 2
	Timings	See tables 1 and 2
	Rotational range of operation	Maximum 90°
	Direction of rotation	
	SQM40...	Counterclockwise
	SQM41...	Clockwise
	Shaft	See tables 1 and 2
	Shaft disengagement	Lever actuated clutch
	Number of auxiliary switches	
	SQM4x.x4xxx	1
	SQM4x.x6xxx	4
	SQM4x.x7xxx	3
	Number of limit switches	2
	Electrical rating of auxiliary switches	1 A, 250 Vac
	Mounting position	No restrictions
	Ambient operating temperature	-22°F to 140°F (-30°C to 60°C)
	Shipping/storage temperature	-22°F to 140°F (-30°C to 60°C)
	NEMA ratings	1, 2, 3, 3R, 4, 5, 12 and 13
	Connections	
	Wiring	Terminal strips
	Conduit	½" NPT (R version) M16 cord grips (A version)
	Dimensions	See pages 11-13
	Weight	4.4 lbs (2 kg)
	Housing	Aluminum die cast
	Gears and Bearings	Maintenance free
	Mounting	Face mounting with three self-tapping M5 screws around shaft. Or via four M5 clearance holes at corners of housing.
	Adaptation of Honeywell Mod IV actuators	Screw pattern and shaft height adaptation with AGA57.5

Electrical specifications

Control range	0 to 90°
Input control signals	
SQM4x.x4xxx	2 to 10 Vdc, 4 to 20 mA, 0 to 135 Ω, or 120Vac or 230Vac
SQM4x.x6xxx	120Vac or 230Vac
SQM4x.x7xxx	120Vac or 230Vac
Zero adjustment (see pg 9)	MIN: 0 to 20° or 0 to 30°
Span adjustment (see pg 9)	MAX: 60° to 90°
Permissible wire sizes	
For mains (120/230Vac)	Class 1 MIN: AWG 16 MAX: AWG 14 Rated for 220°F
For control signal (2 to 10 Vdc, 4 to 20 mA or 0 to 135 Ω)	Class 2 MIN: AWG 22 MAX: AWG 18 Rated for 220°F

Warning notes

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

Read the actuator documentation carefully and completely. If not observed, dangerous situations might occur.

Only qualified and authorized personnel may mount, set-up and maintain the actuators



Risk of electric shock hazard – to disconnect from power, it may be necessary to open more than one switch. Before performing maintenance work, the actuator must be disconnected from power.

The electrical connection between the conduit fittings is not made automatically; it must be established on installation site.

The connecting terminals must have adequate touch protection. Make certain that non-insulated connections or wires cannot be touched.

Each time work is done (mounting, installation, service work, etc.), check to ensure that the wiring is in an orderly state.

Fall or shock can adversely affect the safety functions. Such actuators must not be put into operation even if they do not exhibit any damage.

Static charges must be avoided since they can damage the actuator's electronic components when touched.

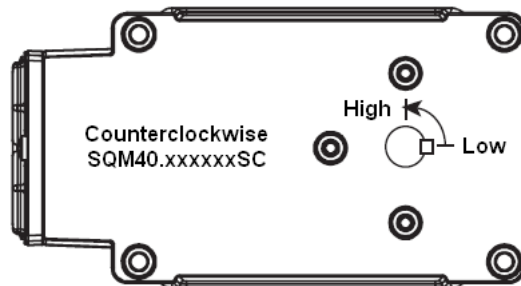
Use of copper wiring is mandatory.

Installation and Operation Instructions

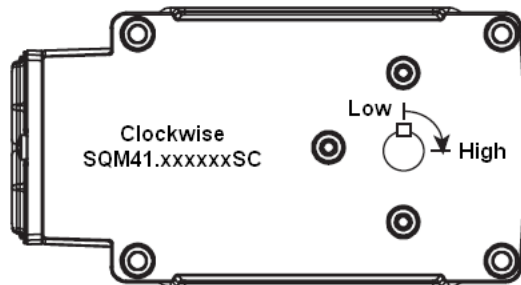
Rotation Direction

SQM40/41...actuators rotation direction is not field reversible. Ensure that the correct version is specified per application requirements. For example, a clockwise-to-open butterfly valve requires a counterclockwise actuator (SQM40).

The SQM40 has a counterclockwise rotation when looking at the shaft.



The SQM41 has a clockwise rotation when looking at the shaft.



Actuator Mounting

SQM40/41...actuators can be mounted in any orientation using the four M5 clearance holes at the corners of the actuator base. They can also be face mounted using M5 self-tapping screws in the three holes around the shaft.

There are no restrictions regarding mounting orientation.

An optional base mounting bracket is also available (Part # AGA 57.5)

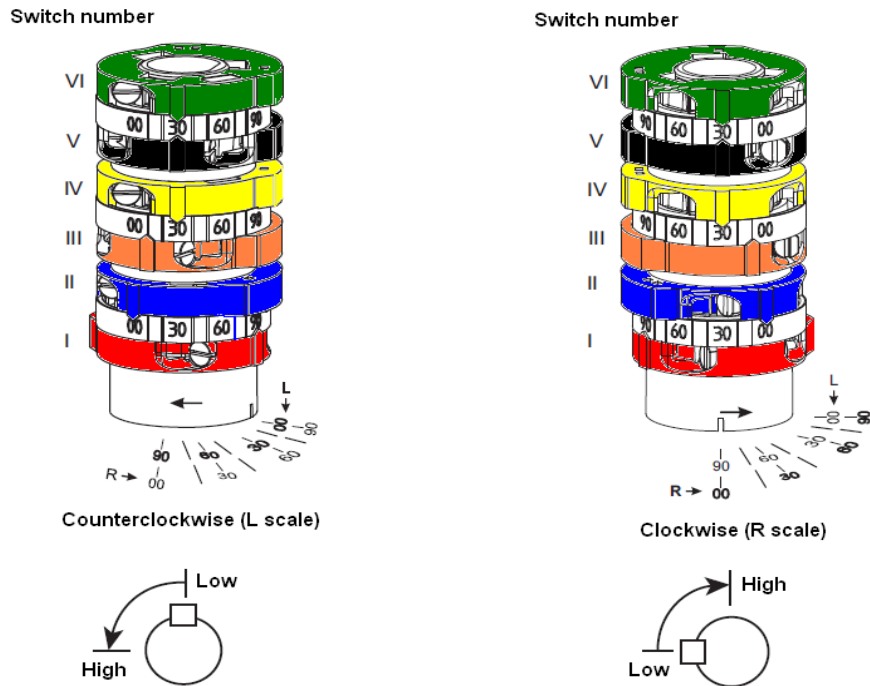
Shaft Adjustment

The actuator shaft can be disengaged by pressing the white shaft release button down and forward. The button is located in the aluminum base to the right of the terminal strips. Once the shaft is rotated to the desired position, simply push the white button down and backwards so it releases, the shaft will now be reengaged.

Switch Adjustment

Switches are set via adjusting screws on each cam. Three scales indicate the angle of switching point (as shown below).

All SQM40/41... actuators have six switch cams but not all models have six switches. Refer to tables below for details.



SQM4x.x4xxxSC - Modulating			
Cam color	Switch number	Description	Factory setting
Red	I	High	90°
Black	V	Low	10°
Green	VI	Ignition	0°

SQM4x.x6xxxSC - 3 position			
Cam color	Switch number	Description	Factory setting
Red	I	High	90°
Blue	II	Low	0°
Orange	III	Ignition	10°
Yellow	IV	Auxiliary switch	30°
Black	V	Auxiliary switch	30°
Green	VI	Auxiliary switch	30°

SQM4x.x7xxxSC - 2 position			
Cam color	Switch number	Description	Factory setting
Red	I	High	90°
Blue	II	Low	0°
Orange	III	Ignition	10°
Yellow	IV	Auxiliary switch	30°
Green	VI	Auxiliary switch	30°

Wiring

Electrical Connection

SQM4x.xxxRxxSC (US version) includes a conduit plate with two ½” NPT threaded connections. (Replacement plate part number is AGA45.11.)

The use of flexible conduit is required, rigid conduit must not be used.

SQM4x.xxxAxxSC (EU version) includes a conduit connection plate with two M16 holes, not threaded. (Replacement plate part number is AGA45.12.)

Grounding



CAUTION:

The SQM40/41...actuators must be grounded to balance ground potential and protect housing from carrying line voltage

The ground terminal is located next to the shaft disengagement button.

The conduit connecting plate is plastic and does not provide grounding of the conduit or fittings. They must be independently grounded with adequate washers and wire links at installation.

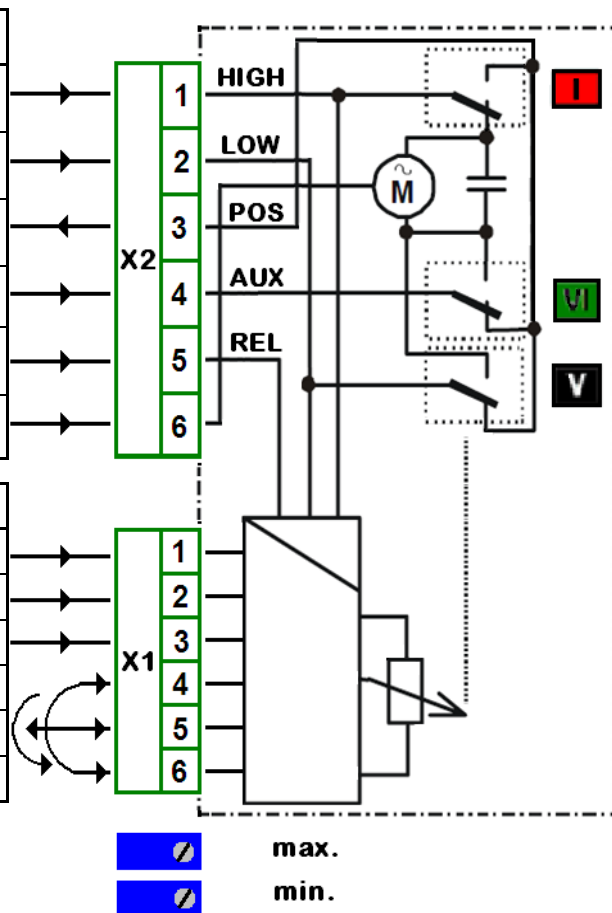
SQM4x.x4xxxxSC

Modulating version

Accepts 4 to 20 mA, 2 to 10 Vdc, or 0 to 135 Ω control signal

Main voltage terminals	I / O	Design
Drive to high (switch I – red)	Input	AC 120 V / AC 230 V
Drive to low (switch V – black)	Input	AC 120 V / AC 230 V
Position reached	Output	AC 120 V / AC 230 V max. 10 mA
Drive to ignition (switch VI – green) (if set higher than switch V)	Input	AC 120 V / AC 230 V
Release to modulating signal	Input	AC 120 V / AC 230 V
Neutral	Input	AC 120 V / AC 230 V

Low-voltage terminals	I / O	Design
2...10 Vdc input (+)	Input	Max. 10 VDC
Common (-)	Input	
4...20 mA input (+)	Input	Max. 20 mA
Low – (B)	Input	0...135 Ω
Wiper – (R)	Input	0...135 Ω
High – (W)	Input	0...135 Ω



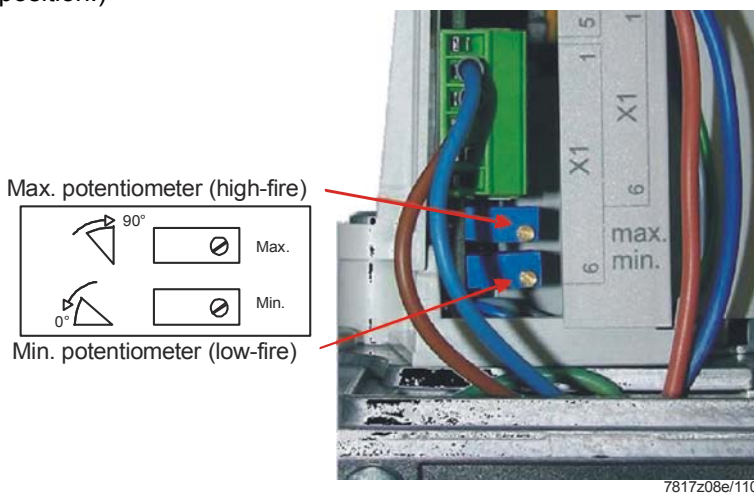
Range Adjustment (SQM4x.x4xxxxSC only)

Adjust the range of the analog signal to match the switch positions (min. and max. position):

1. Set **cam I (red)** to the required high-fire position (e.g. 85°; position is indicated on the scale next to the cam).
2. Set **cam V (black)** to the required low-fire position (e.g. 20°).
3. Manually adjust the signal at the analog input according to the required high-fire position (e.g. 20 mA).
4. Turn the "max" potentiometer for maximum angular rotation
 - a) clockwise, if the actuator has not yet reached its maximum angular rotation, or
 - b) counterclockwise until the actuator starts
5. Manually adjust the signal at the analog input according to the low-fire position (e.g. 4 mA).
6. Turn the "min" potentiometer for minimum angular rotation
 - a) counterclockwise, if the actuator has not yet reached its minimum angular rotation, or
 - b) clockwise until the actuator starts

Modulation always takes place between high-fire and low-fire (**cam I** and **cam V**).

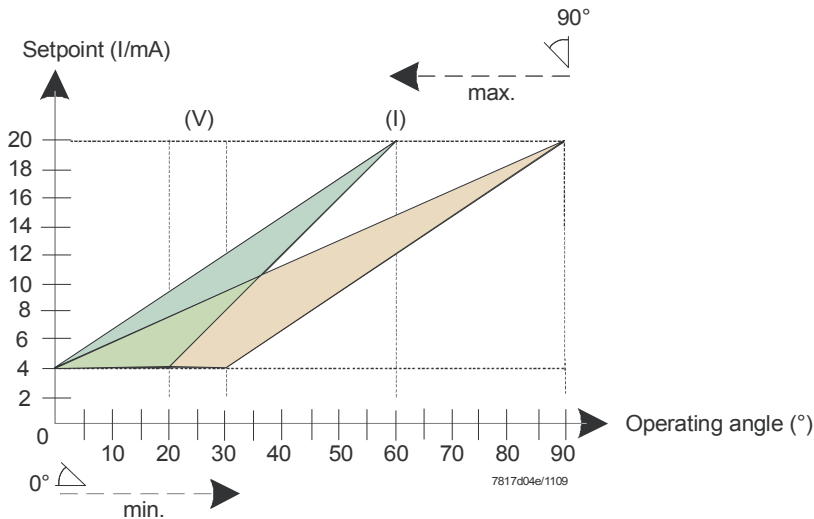
Also, it is possible to define a closed position or a separate ignition position by setting **cam VI (green)**. Independent of **cam V** (e.g. for defining a position higher than the low-fire position.)



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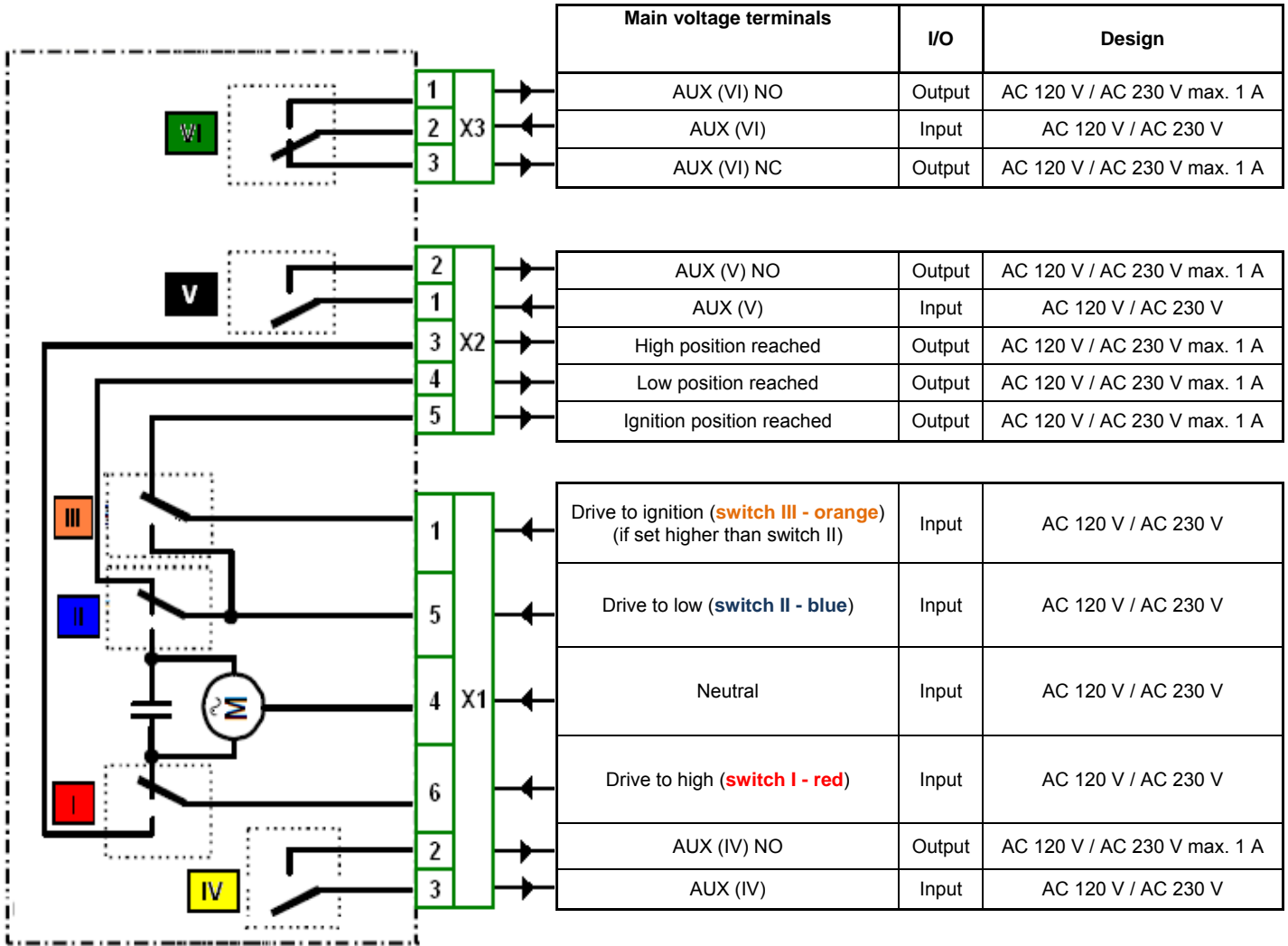
Usable range of the potentiometers

The upper limit (span) can be adjusted between 60° and 90°. The lower limit (zero) can be adjusted between 0° and 20° or 0° and 30° respectively, depending on the upper limit setpoint.



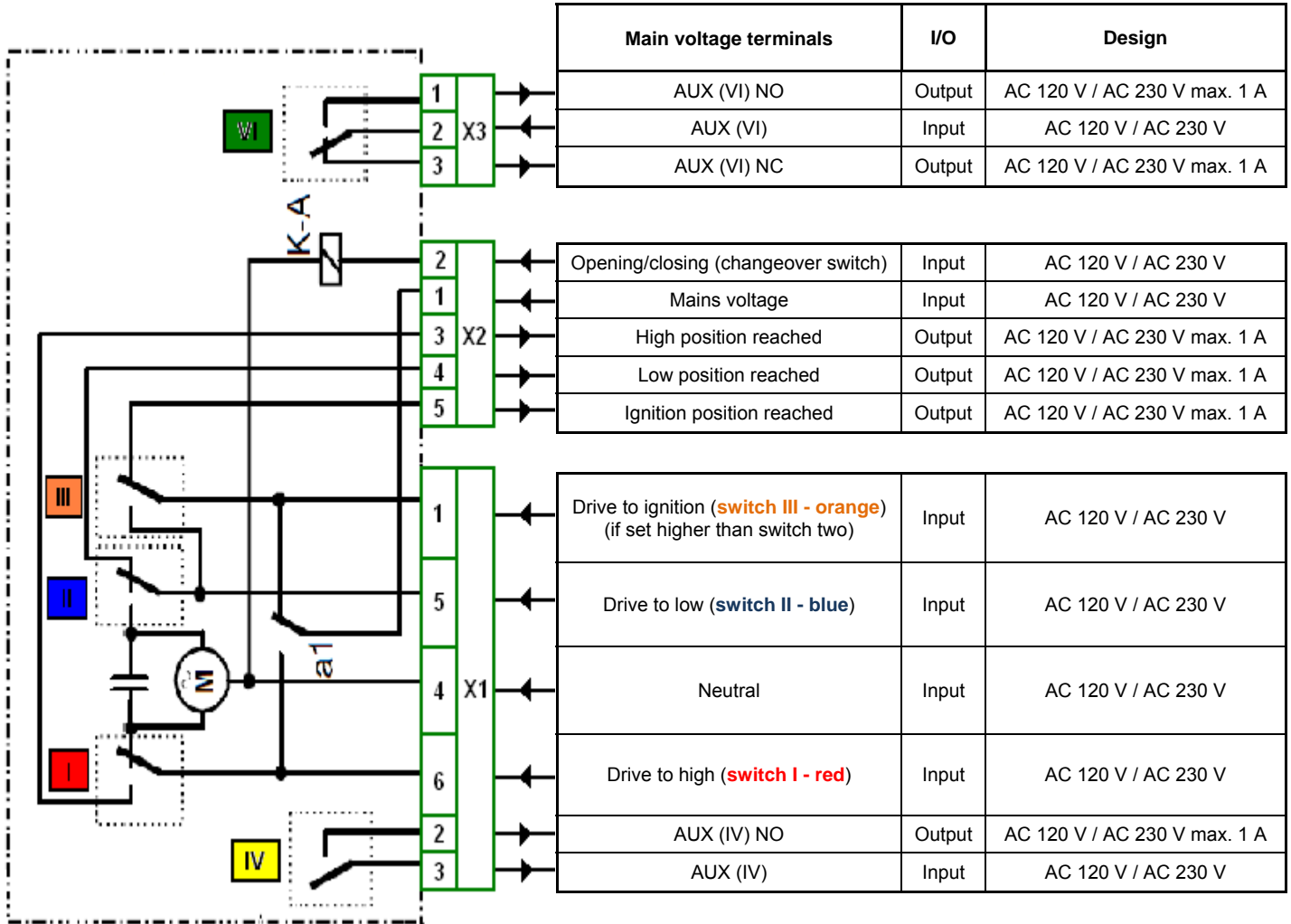
SQM4x.x6xxxSC

3-position version with 2 end switches and 4 auxiliary switches



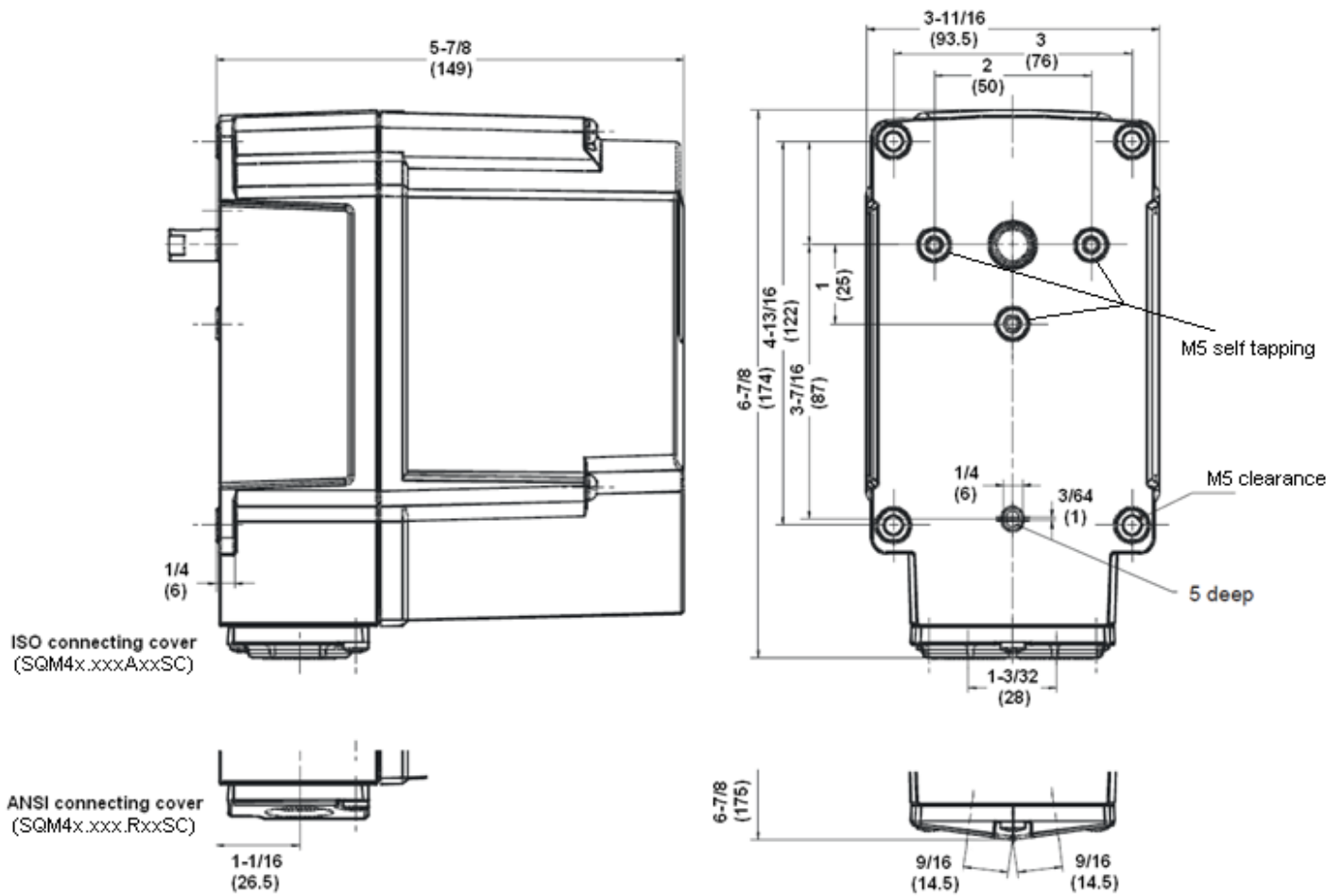
SQM4x.x7xxxSC

2-position version with 2 end switches and 3 auxiliary switches



Dimensions

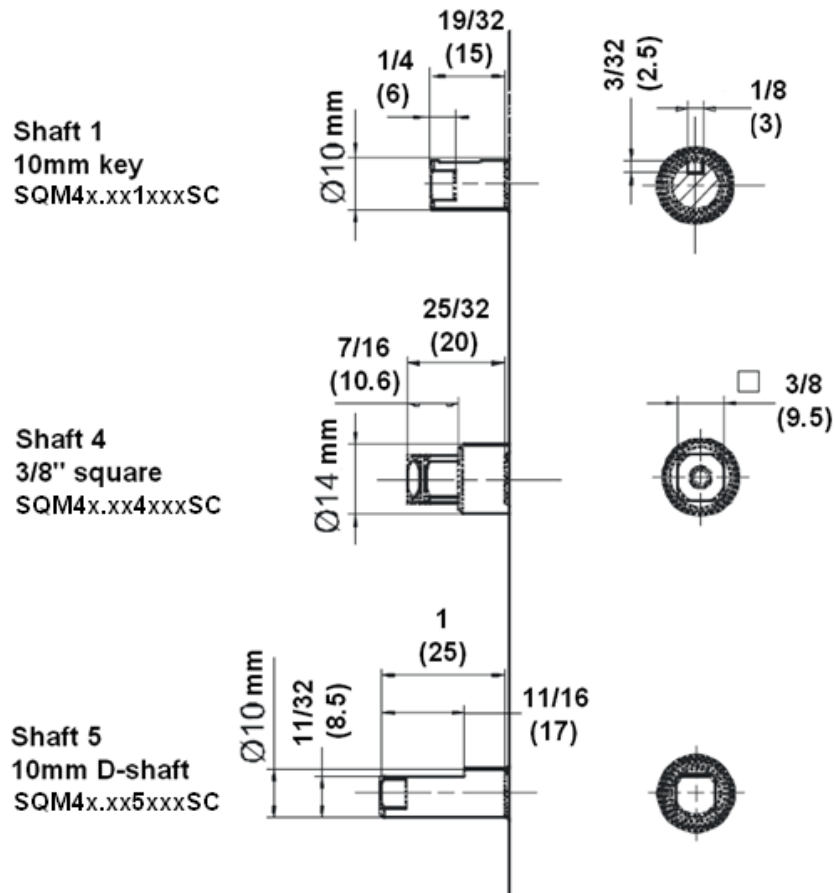
The first dimension shown is in inches, millimeters are shown in parentheses.



SQM4x.xxxxxSC Dimensions

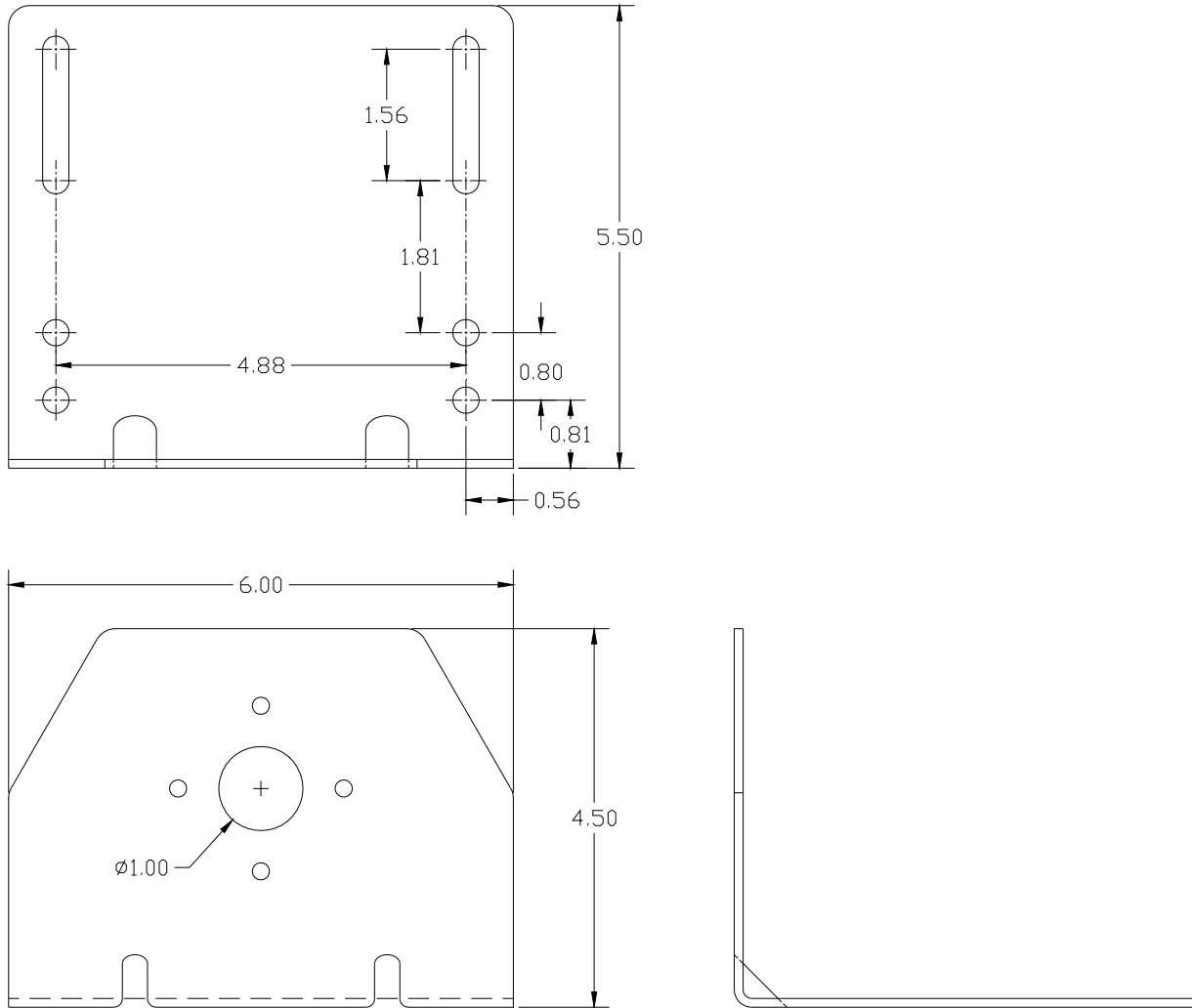
Dimensions, Continued

The first dimension shown is in inches, millimeters are shown in parentheses.



Shaft Dimensions

Dimensions, Continued



AGA57.5 Mounting Bracket

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