ExMax Multi-turn actuators – size S

Electrical, explosion proof rotary actuators
On-off / 3-pos. control mode, 24…240 VAC/DC, multi-turn 360° angle of rotation, 5/10 – 15 Nm
ATEX tested in acc. with directive 2014/34/EU for zone 1, 2, 21, 22

ExMax - ... - R
ExMax - ... - CTS
ExMax - ... - VAS

Subject to change!

Compact. Easy installation. Universal. Cost effective. Safe.

Type	Torque	Supply	Motor running time	Spring return	Control mode	Feedback	Wiring diagram
ExMax- 5.10 - R	5 / 10 Nm	24...240 VAC/DC	60 / 120 / 240 / 480 s/360°	–	On-off, 3-pos.	–	SB 1.0
ExMax- 15.30 - R	15 / 30 Nm	24...240 VAC/DC	60 / 120 / 240 / 480 s/360°	–	On-off, 3-pos.	–	SB 1.0
ExMax- ... - CTS	Types as above with aluminium housing and seawater resistant coating (cable glands brass nickel-plated)						
ExMax- ... - VAS	Types as above with stainless steel housing for aggressive ambient (cable glands brass nickel-plated)						

Product views and applications

Multi-turn actuator

Armatures rotation angle > 90°

Description

The ExMax actuators are a revolution for safety, control and shut-off dampers, VAV systems, rotation valves with angle of rotation > 90° and other motorized applications for HVAC systems in chemical, pharmaceutical, industrial and offshore/onshore plants, for use in Ex-areas zone 1, 2 (gas) and zone 21, 22 (dust).

Highest protection class (ATEX) and IP66 protection, small dimensions, only 3,5 kg weight, universal functions and technical data, an integrated heater and an optional stainless steel housing guarantee safe operation even under difficult environmental conditions. High quality brushless motors guarantee long life.

All actuators are programmable and adjustable on site. Special tools or equipment are not required. Motor running times, according to the actuator type, are selectable or adjustable on site. The integrated universal power supply is self adaptable to input voltages in the range of 24...240 VAC/DC. The actuators are 100 % overload protected and self locking. Standard shaft connection is a double square direct coupling with 12 × 12 mm.

Highlights

- For all types of gases, mists, vapours and dusts in zones 1, 2, 21 and 22
- Universal supply unit from 24…240 VAC/DC
- Motor running times 60–120–240–480 s/360° adjustable on site
- On-off and 3-pos. control
- 5–10–15–30 Nm actuators in the same housing size
- 100 % overload protected and self locking
- Compact design and small dimension (L × W × H = 210 × 95 × 80 mm)
- Direct coupling to the damper shaft with double square connection 12 × 12 mm
- n × 360° angle of rotation
- Robust aluminium housing (optional with seawater resistant coating) or in stainless steel
- IP66 protection
- Simple manual override included + preparation for comfortable manual override
- Gear made of stainless steel and sinter metal
- Weight only ~ 3,5 kg
- Integrated heater for ambient temperatures down to –40 °C
- Integrated safety temperature sensor
- Integrated equipment for manual adjustment (push button, lamp, switch)

Technical data

Technical data	ExMax- 5.10 - R	ExMax- 15.30 - R
Torque motor (min.)	5 / 10 Nm selectable on site	15 / 30 Nm
Supply voltage / frequency	24...240 VAC/DC ± 10 %, self adaptable, frequency 50...60 Hz ± 20 %	
Power consumption	max. starting currents see ⓘ Extra information (in acc. with voltage, $I_{start} >> I_{rated}$), approx. 5 W holding power, approx. 16 W for heater	
Protection class	Class I (grounded)	
Angle of rotation and indication	n × 360° multiturn, mechanical value indication	
Working direction	Selectable by left/right mounting to the damper/valve shaft	
Motor running times	60 / 120 / 240 / 480 s/360° selectable on site	
Motor	Brushless DC motor	
Control mode	On-off and 3-pos. in acc. with wiring, selectable on site	
Axle of the actuator	Double square 12 × 12 mm, direct coupling, 100 % overload protected and self locking up to 15 Nm	
Electrical connection	Cable ~ 1 m, wire cross section 0.5 mm², equipotential bonding 4 mm². Connections in hazardous areas require an Ex-e terminal box!	
Diameter of cable	~ Ø 7.1 mm	~ Ø 7.1 mm
Cable gland	M16 × 1.5 mm	
Manual override	Use delivered socket wrench, max. 4 Nm	
Heater	Integrated, controlled heater for ambient temperature down to –40 °C	
Housing material	Aluminium die-cast housing, coated. Optional with seawater resistant coating (...-CTS) or stainless steel housing, No. 1.4581 / UNS-J92900 / similar AISI 316Nb (...-VAS)	
Dimensions (L × W × H)	210 × 95 × 80 mm, for diagrams see ⓘ Extra information	
Weight	~ 3,5 kg aluminium housing, stainless steel ~ 7 kg	
Ambients	Storage temperature –40…+70 °C, working temperature –40…+40 °C at T6 and –40…+50 °C at T5	
Humidity	0...90 % rH, non condensing	
Operation mode	100 % of ED is permitted (ED = duty cycle)	
Maintenance	Maintenance free relative to function, maintenance must comply with regional standards, rules and regulations	
Wiring diagrams	SB 1.0	SB 1.0
Scope of delivery	Actuator, 4 screws M4 × 100 mm, 4 nuts M4, Allen key for simple manual override	
Parameter at delivery	5 Nm, 120 s/360°	15 Nm, 120 s/360°

Approbations

ATEX Directive	2014/34/EU
EU-Type Examination	EPS 17 ATEX 1 132 X
IECEx Conformity	IECEx EPS 17.0065X
Marking Gases	II 2 (2) G Ex db [ib Gb] IIC T6, T5 Gb
Marking Dusts	II 2 (2) D Ex tb [ib Db] IIIC T80°C, T95°C Db
CE Marking	CE 0158
EMC Directive	2014/30/EU
Low Voltage Directive	2014/35/EU
Enclosure Protection	IP66 in acc. with EN 60529

Special solutions and accessories

...-CTS	Types in aluminium housing with seawater resistant coating, parts nickel-plated
...-VAS	Types in stainless steel housing, parts nickel-plated
ExBox-...	Ex-e terminal boxes for zone 1, 2, 21, 22
MKK-S	Mounting bracket for boxes type ...Box-... directly on actuator
HV-S...	Comfortable manual override for...Max actuators size S
KB-S	Clamp for damper shafts Ø 10...20 mm and □ 10...16 mm
AR-12-xx	Reduction part for 12 mm square connection to 11, 10, 9 or 8 mm shafts
Kit-S8	Cable glands nickel-plated
Adaptions	for dampers and valves on request

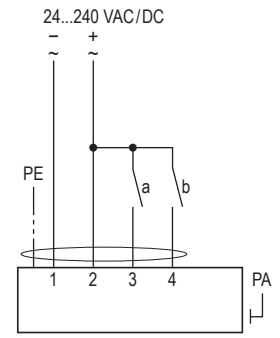
Electrical connection

All actuators are equipped with a universal supply unit working at a voltage range from 24...240 VAC/DC. The supply unit is self adjusting to the connected voltage!

For electrical connection inside hazardous areas an Ex-e terminal box, certificated in acc. with ATEX is required (e.g. ExBox).

When installed, the electrical protection shall be designed with regard to the inrush current and the starting current (see additional data sheet – extra information).

On-off / 3-pos. **SB 1.0**



Caution

During commissioning apply a self adjustment drive.

Regard duty cycle at motor running times!

Never use spring return actuators without external load.

Risk of injury due to rotating handwheel for actuators with spring return!

Accessory ExBox – Ex-e terminal box

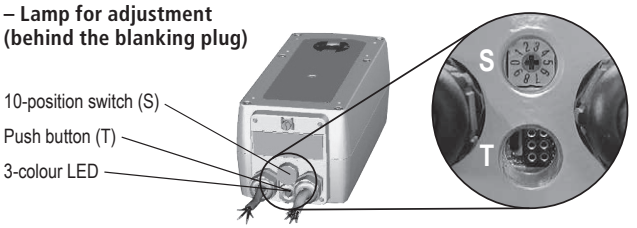
For electrical connection of the ...Max actuator in a hazardous area an explosion proof terminal box is required.

To adapt the ...Box directly to the actuator housing a mounting bracket is required.

ExBox- 3P for ...Max-...-R

Parameters, adjustments and failure indication

Switch – Push button
– Lamp for adjustment
(behind the blanking plug)



Parameter selection

Example:
ExMax-15.30-R

Requested parameter:
Torque 30 Nm
Motor running time 120 s/360°

Result:
Switch position 07

Type		Torques	
ExMax- 5.10 -R ▶		5 Nm	10 Nm
ExMax-15.30 -R ▶		15 Nm	**30 Nm**
		▼	▼
Running times		**Position of switch (S)**	
		00	05
60	s/360° ▶	01	06
120	**s/360° ▶**	02	07
240	s/360° ▶	03	08
480	s/360° ▶	04	09

Functions, adjustments and parameters

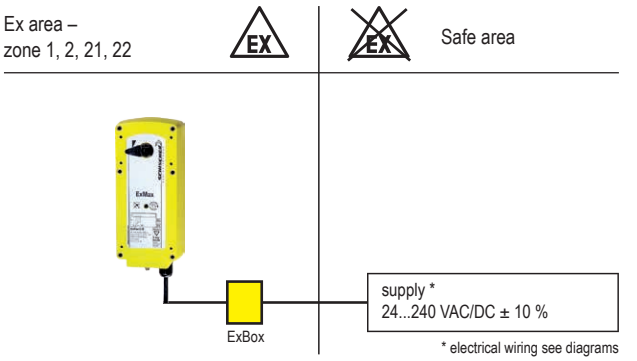
A) Self adjustment of angle of rotation:
Is not necessary.

B) Selection of running time and torque:
Put switch (S) into the correct selected position in acc. to above table. The selected parameter will work at next operation of the actuator. Adjustment can be done even without supply voltage. If supply voltage is available turn switch only if actuator is not running.

C) Additional information for 3-pos. operation:
a closed, b open = direction I
b closed, a open = direction II
a and b closed = motor doesn't work
a and b opened = motor doesn't work

The rotation direction (I and II) depends on left/right mounting of the actuator to the damper/valve. You can change direction of the motor by changing electrical wiring of terminal 3 and 4.

Installation



- Do not open the cover when circuits are live
- Connect potential earth
- Close all openings to ensure enclosure protection
- Clean only with damp cloth, avoid dust accumulation

⚠ **Warning!** The enclosure with a coating must not be used in areas affected by charge-producing processes, mechanical fricton and separation processes, electron emission, and pneumatically conveyed dust.

Important information for installation and operation

A. Installation, commissioning, maintenance
All national and international standards, rules and regulations for hazardous Ex-areas must be complied with. Certified apparatus must be installed in accordance with manufacturer instructions. If the equipment is used in a manner not specified by the manufacturer, the safety protection provided by the equipment may be impaired. For electrical installations design, selection and erection, EN/IEC 60079-14 can be used.

For electrical connection an Ex-e terminal box is required (e.g. ExBox-...).

Attention: If the actuator is put out of operation all Ex rules and regulations must be applied. You have to cut the supply voltage before opening the terminal box!

The cables of the actuator must be installed in a fixed position and protected against mechanical and thermical damage. Connect potential earth. Avoid temperature transfer from armature to actuator! Close all openings with min. IP66.

For outdoor installation a protective weather shield against sun, rain and snow should be applied to the actuator as well as a constant supply at terminal 1 and 2 for the integrated heater.

Actuators are maintenance free. An annual inspection is recommended. For electrical installations inspection and maintenance, EN/IEC 60079-17 can be used. Ex-actuators must not be opened by the customer.

B. Manual override
Manual override only if supply voltage is cut. Use delivered socket wrench with slow motions, usage can be tight.

Attention: Releasing or letting go the Allen key too fast at manual operating actuators with spring return causes risk of injury!

C. Shaft connection, selection of running time
Actuators are equipped with a direct coupling double square shaft connection of 12 × 12 mm. For round shafts adaptors/clamping connection (accessories, e.g. KB-S) are available. The housing of the actuator is axially symmetrically built to select Open-close direction of the spring return function by left-right mounting. Using the 10-position switch different motor running times and spring return running times can be selected on site in acc. to the actuator type.

D. 3-position control mode
...Max actuators are in the best way suitable for the 3-pos. operation.
To protect such elements as gears and mounting elements against harmful influences like minimum pulse time, ...Max actuators are protected via internal electronics. It ignores impulses < 0.5 s, the cyclic duration must be min. 0.5 s. At changing direction the pause is 1 s.

E. Operation at ambient temperatures below –20 °C
All actuators are equipped with a regulated integrated heating device designed for employments down to –40 °C ambient temperature. The heater will be supplied automatically by connecting the constant voltage supply on the clamps 1 and 2.

1. After mounting the actuator must be immediately electrically connected.
2. The heater switches on automatically when actuator reaches internally –20 °C. It heats up the actuator to a proper working temperature, then heater switches off automatically. Actuator will not run during heating process.
3. The adjustment options are only ensured after this heating up period.

F. Excess temperatures
In acc. to the ATEX rules and regulations Ex actuators must be protected against excess temperature. The internal thermostat works as a maximum limiter and, in the event of failure at incorrect temperatures, shuts off the actuator irreversible. An upstream connected temperature sensor stops the actuator before reaching its max. temperature. This safety feature is reversible, after cooling down the actuator is completely functional again. In this case the failure must be eliminated immediately on site!

G. Synchron mode
Do not connect several actuators to one shaft or link mechanically together.

ⓘ Extra information (see additional data sheet)

Additional technical information, dimensions, installation instruction, illustration and failure indication.

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