



ExMax – Revolution

Electrical, explosion proof rotary actuators size S

On-off / 3-pos , 24...240 VAC/DC, 95° Angle of rotation incl. 5° pretention

5/10 Nm - 15/30 Nm without and 5/10 Nm - 15 Nm with safety operation (spring return)

PTB-tested in acc. with ATEX RL 94/9/EC for zone 1, 2, 21, 22.

ExMax- 5.10
ExMax-15.30
ExMax- 5.10 - F
ExMax- 15 - F
ExMax- ... - S
ExMax- ... - VAS
ExMax- ... - CTS

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	5 Nm & 10 Nm	24..240 VAC/DC	3/15/30/60/120 sec. at 90°	without	On-off, 3-pos	-	SB 1.0
ExMax-15.30	15 Nm & 30 Nm	24..240 VAC/DC	3/15/30/60/120 sec. at 90°	without	On-off, 3-pos	-	SB 1.0
ExMax- 5.10 - F	5 Nm & 10 Nm	24..240 VAC/DC	3/15/30/60/120 sec. at 90°	3 or 10 sec. at 90°	On-off, 3-pos	-	SB 2.0
ExMax- 15 - F	15 Nm	24..240 VAC/DC	3/15/30/60/120 sec. at 90°	3 or 10 sec. at 90°	On-off, 3-pos	-	SB 2.0
ExMax- ... - S/SF	Type as above but with 2 integral, potential free aux. switches, switching at 5° and 85° Angle of rotation, 2 × EPU, max.24 V/3 A, 240 V/0,25 A						SB 3.5
ExMax- ... - VAS	Type as above but with stainless steel housing (AISI 316) for aggressive ambient (12 × 12 mm shaft, shaft manual override, cable glands and hollow rivet nickel-plated)						
ExMax- ... - CTS	Type as above but with Al housing and amercoat painting (12 × 12 mm shaft connenction, shaft manual override, cable glands and hollow rivet nickel-plated)						

Application

Damper



Ball valve



Throttle valve



Description size S

The ExMax actuators are a revolution for safety, control and shut-off dampers, VAV systems, ball valves, throttle valves 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. 5 motor running times and 2 torques as well as 2 spring return 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 to 240 VAC/DC.

The actuators are 100% overload protected and self locking.

ExMax-...-F actuators are equipped with spring return fail safe function. Standard shaft connection is a double squared direct coupling with 12 × 12 mm.

Different accessories are available to adapt aux. switches, terminal boxes or adaptations for ball valves and throttle valves.

Highlights

- ▶ For all type of gas, mixtures, vapours and dust for use in zone 1, 2, 21 and 22
- ▶ Universal supply unit from 24 to 240 VAC/DC
- ▶ 5 different motor running times (3-15-30-60-120 sec./90°), adjustable on site
- ▶ 2 different spring return running times (3-10 sec./90°), selectable on site
- ▶ On-off and 3-pos control with or without spring return function
- ▶ 5/10/15/30 Nm actuators in the same size (S)
- ▶ 100 % overload protected
- ▶ Self locking
- ▶ Compact design and small dimension (L × W × H = 210 × 95 × 80 mm)
- ▶ Direct coupling to the damper shaft with double-squared connection 12 × 12 mm
- ▶ 95° Angle of rotation incl. 5° pre-tention
- ▶ Robust aluminium housing (optional stainless steel or amercoat painting)
- ▶ IP66 protection
- ▶ Simple manual override include + preparation for comfortable manual override
- ▶ Gear made of stainless steel and sinter metal
- ▶ Weight only 3,5 kg
- ▶ Integral heater for ambient temperatures down to -40°C
- ▶ Integral safety temperature sensor
- ▶ Integral equipment for manual adjustment (push button, lamp, switch)
- ▶ Preparation for adaptable aux. switches type ExSwitch
- ▶ Range of accessories



ExMax-5.10

ExMax-15.30

ExMax-5.10-F

ExMax-15-F



Special makes

ExMax-..-S/SF

ExMax-..-VAS/-CTS

Technical data	ExMax-5.10	ExMax-15.30	ExMax-5.10-F	ExMax-15-F
Torque motor	5 / 10 Nm selectable on site	15 / 30 Nm selectable on site	5 / 10 Nm selectable on site	15 Nm
Torque spring return (F)	without F	without F	min. 10 Nm	min. 15 Nm
Dimension of external torque	above mentioned torques are min. torques in blocked position, external torque should be max. 80 % of max. actuator torque but min. 3 Nm			
Supply voltage/Frequency	24...240 VAC/DC, ± 10%, self adaptable, Frequency 50...60 Hz ± 20 %			
Dimension	max. starting currents see table (in acc. with voltage, I _{start} >> I _{rated}), max. 10 W blocking position, approx. 16 W for heater			
Protection class	class I (grounded)			
Angle of rotation and indication	95°, incl. ~ 5° pre-tention, mechanical value indication			
Working direction	selectable by left/right mounting to the damper/valve shaft			
Motor running time	3 / 15 / 30 / 60 / 120 sec. at 90° selectable on site			
3 sec. mode - motor	In acc. with the supply voltage rand external torque 3 to 4 sec at 90° Angle of rotation			
Motor	brushless DC Motor			
Spring return (F)	without F	without F	spring return in the event of loss of power	
Spring return running time (F)	without F	without F	spring return in 3 sec., or 10 sec. at 90°, selectable on site	
3 sec. mode - spring return	without F	without F	in acc. with external torque 3 to 4 sec. at 90° Angle of rotation	
Safety operations at 10 sec (F)	without F	without F	min. 10.000 in acc. with construction of damper and ambient	
Safety operations at 3 sec (F)	without F	without F	min. 1.000 in acc. with construction of damper and ambient	
Response time spring return	up to 1 sec. after power failure			
Control mode	On-off and 3-pos in acc. with wiring, selectable on site			
Axle of the actuator	double squared 12 × 12 mm, direct coupling, 100 % overload protected and self locking up to 15 Nm			
Electrical connection	cable, ~1 m, diameter of wires 0,5 mm², for connection inside hazardous areas an Ex-e terminal box is required!			
Diameter of cable	~ Ø 7,1 mm	~ Ø 7,1 mm	~ Ø 7,4 mm	~ Ø 7,4 mm
Cable gland	M16 × 1,5 mm standard cable- and wire entries are integral part of explosions proof encapsulation, tested acc. to EN 60079-1			
Manual override	Manual override only if supply voltage is cut, use delivered socket wrench, slow motion, enogh torque/force is required			
	Attention: with manual operation of actuators with spring return danger of injury exists, with release/let go the allen key			
Integral heater	integral heater, controlled, for ambient temperature down to -40°C			
Housing material	Aluminium die cast housing, painted (optional in stainless steel version AISI 316 – type ...-VAS, amercoat painting type ...-CTS)			
Dimensions	L × W × H = 210 × 95 × 80 mm, for diagramm see extra information "ME"			
Weight	~ 3,5 kg Aluminium housing (stainless steel ~ 7 kg)			
Ambients	storage temp. -40...+70°C, working temperature -40...+40°C at T6 and -40...+50°C at T5			
Humidity	0...90 %RH, non condensing			
Operation mode at	The motor will work in 3 seconds only after 1 minute voltage supply. While open/close-operation (open voltage supply and shut it down)			
runningtime motor 3 sec	the motor works only with speed 15 sec./90°			
Operation mode at	at 15/30/60/120 sec. 100 % ED (ED = duty cycle)			
runningtime motor 15 sec				
Self adjustment	if you select 3 sec. and 15 sec. mode for motor you need to start the self adjustment mode			
Maintenance	maintenance free, maintenance must be complied with regional standards, rules and regulations			
Wiring diagrams (SB)	SB 1.0	SB 1.0	SB 2.0	SB 2.0
Delivery	1 actuator, 1 m cable, double squared shaft connection 12 × 12 mm, 4 screws M 4 × 100, 4 nuts M 4			
	allen key for simple manual override			
Parameter at delivery	5 Nm, 30 sec./90°	15 Nm, 30 sec./90°	5 Nm, 30 sec./90°	15 Nm, 30 sec./90°

Explosion proof	ExMax actuators – size S
PTB-tested	PTB 04 ATEX 1028 X
In acc. with ATEX	RL 94/9/EC (ATEX)
Approval for gas	II(2)G Ex d [ia] IIC T6/T5 gas, mist, vapour, zone 1 and 2
Approval for dust	II(2)D Ex tD A21 [iaD] IP66 T80°C dust, zone 21 and 22
Identification	CE No. 0158
EMC	2004/108/EC
Low voltage	2006/95/EC
IP-Protection	IP66, in acc. with EN 60529
Potential compensation	external PA-terminal, 4 mm ²

Accessories or special solutions – size S	
..-VAS	Types in stainless steel V4A / AISI 316 Cd / DIN EN1.4581/X5CrNiMoNb 1810
..-CTS	Types in Al-housing with amercoat finish, parts nickel-plated
ExBox-...	Ex-e terminal boxes for zone 1, 2, 21, 22
MKK-S	Mounting bracket for Ex-e terminal boxes type ExBox-... direct on actuator
ExSwitch	2 external aux. switches, adjustable, for zone 1, 2, 21, 22
KB-S	Clutch for damper shafts Ø 10...20 mm and □ 10...16 mm
HV-S	comfortable manual override for ExMax actuators size S
Adaptations	various adaptations for dampers/valves on request
AR-12-xx	Reduction of square damper connection from 12 mm to 11, 10, 9, 8 mm
ExMax-.. S3	Ambient temperature up to +60°C (T4), 110-240 VAC/DC, 25 %ED
ExMax-.. S18	90° angle of rotation, 12 × 12 mm shaft not self-locking





ExMax-5.10

ExMax-15.30

ExMax-5.10-F

ExMax-15-F

SCHISCHEK
EXPLOSION PROOF

Special makes

ExMax-...S/SF

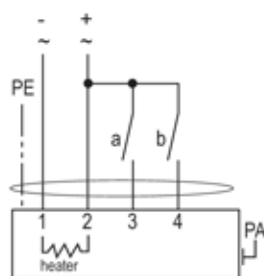
ExMax-...VAS/-CTS

Electrical connection

ExMax actuators are equipped with a universal supply unit working at a voltage range from 24 to 240 VAC/DC. The supply unit is self adjustable to the connected voltage!
The safety operation of the spring return function works if the supply voltage is cut.
For electrical connection inside hazardous areas an Ex-e terminal box, certificated in acc. with ATEX is required (e.g. ExBox).

Wiring diagram ExMax-5.10 and ExMax-15.30**On-off and 3-pos SB 1.0**

24 ... 240 VAC/DC

**Attention!**

If 3 sec. mode is selected, the self adjustment of Angle of rotation must be started and operation mode of max. 10% ED must be guaranteed.
Never use actuators in this mode without external torque/force.

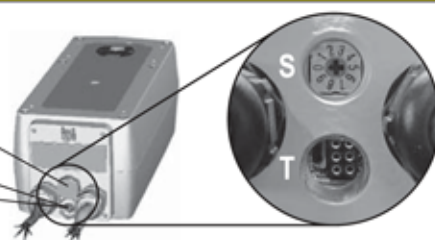
Parameter, Adjustment – Failure indication

Switch – Push button – Lamp for adjustment, behind the blanking plug

10-position switch (S)

Push button (T)

3-colour LED

**Parameter selection**

Example: ExMax-15.30

Requested parameter:

Torque 30 Nm

Running time motor 30 sec/90°

Result: switch position (S) 07

Type	Torques	
ExMax -5.10	5 Nm	10 Nm
ExMax-15.30	15 Nm	30 Nm
ExMax- 5.10-F	5 Nm	10 Nm
ExMax- 15-F	15 Nm	
Running times	Position of switch S	
3 sec./90°	00	05
15 sec./90°	01	06
30 sec./90°	02	07
60 sec./90°	03	08
120 sec./90°	04	09

Function, adjustment and parameter**A) Self adjustment of Angle of rotation:**

Switch (S) into position 02 (low torque) or 07 (high torque), then push button (T) for minimum 3 seconds. The actuator will drive into both end positions to be adjusted. LED indicates green.

Adjustment time needs approx. 60 sec. (30 sec. On, 30 sec. Off). After that, switch S into position 00-09 in acc. with your required torque and running time.

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) Running time spring return:

The running time of 3 or 10 sec. spring return is selected by wiring (see wiring diagrams SB2.0).

D) 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

Direction (I and II) depends on left/right mounting of the actuator to the damper/valve.

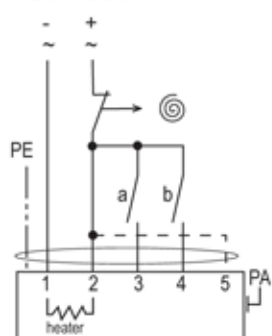
You can change direction of the motor by changing electrical wiring terminal 3 and 4.

Error indication

See extra information „EL“

Wiring diagram ExMax-5.10-F and ExMax-15-F (spring return)**3-pos SB 2.0**

24 ... 240 VAC/DC



Standard wiring = spring return in ~10 sec.
Additional wiring terminal 5 = spring return in ~3 sec.

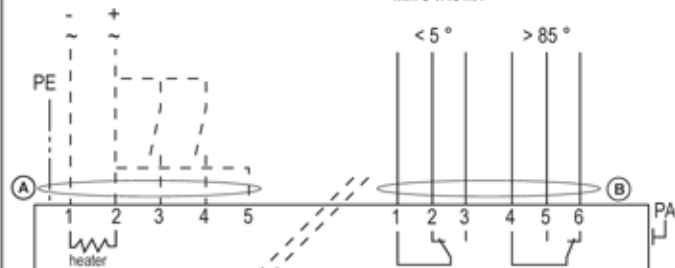
**Attention!**

If 3 sec. mode is selected for motor and/or spring return, the self adjustment of Angle of rotation must be started and operation mode of max. 10% ED must be guaranteed.
Never use actuators in this mode without external torque/force.

Wiring diagram type ExMax-...-S with integral aux. switches**Wiring of integral aux. switches**

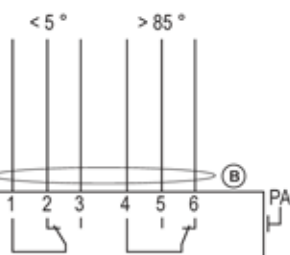
SB 3.5

24 to 240 VAC/DC



Wiring of the actuator in acc. with actuator type, see wiring diagrams 1.0/2.0

Integral aux. switches potential free contacts switching at 5° and 85°
Angle of rotation
max. 24 V/3 A, 240 V/0.25 A
min. 5 V/10 mA



Additional wiring of the integral aux. switches

MORGU!
INSTRUMENTS



ExMax-5.10

ExMax-15.30

ExMax-5.10-F

ExMax-15-F

Special makes

ExMax-...-S/SF

ExMax-...-VAS/-CTS

SCHISCHEK
EXPLOSION PROOF**Mounting instructions and important information for operation and installation****Important information for installation and operation****A. Installation, commissioning, maintenance**

The cable of the actuator must be installed in a fixed position and protected against mechanical and thermal damage. In acc. with operation ExMax actuators are maintenance free. Nevertheless maintenance must comply with regional standards, rules and regulations. The flameproof enclosure is protected against mechanical shock in acc. with EN 60079 by the housing of the actuator.

The actuators must not be opened by the customer. For outdoor installation a protective housing against rain, snow and sun should be applied to the actuator, as well as a constant supply at terminal 1 and 2 for the integral heater. For electrical connection inside hazardous areas an Ex-e terminal box is requested (e.g. type ExBox).

Attention: If the actuator is put out of operation all Ex-rules and regulation must be applied.

Example: you have to cut the supply voltage before opening an Ex-e terminal box

B. Shaft connection, selection of running time, heater

ExMax actuators are equipped with a direct coupling double squared shaft connection of 12 x 12 mm. For round shafts an adaptor is available (Accessory type KB-S).

The housing of the actuator is axially symmetrically built to select open/close direction of the spring return function by left/right mounting.

In acc. to the actuator type 5 different motor running times and 2 different spring return running times can be selected on site. The integral heater is for ambient temperatures down to -40°C.

C. Working with 3 sec. motor running time

See extra information „EL“.

D. 3-pos control mode

See extra information „EL“.

E. Spring return

Spring return function works if the supply voltage (terminal 1 or 2) is cut. In the event of an electrical interruption, the spring returns to its end position.

F. Operation at an ambient temperature below -20°C

See extra information „EL“.

G. Excess temperature

In acc. to the ATEX rules and regulations Ex actuators must be protected against excess temperature. An internal thermostat guarantees the temperature class in the event of failure. If this thermostat is working the actuator must be sent to the factory.

ExMax actuators are equipped with an additional temperature sensor to stop the actuator before reaching this max. temperature. In this case the failure must be eliminated immediately on site.

H. Synchron mode

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

Mounting on air dampers with double squared shaft connection

Details see extra information „ME“

**Mounting on air dampers with clutch**

Details see extra information „ME“

**Mounting of quarter turn valves**

Details see extra information „ME“

**ExSwitch – adaptable external Ex-d aux. switches**

ExSwitch is an accessory to ExMax actuators size S, fixing directly onto the actuator. ExSwitch are aux. switches with 2 potential free contacts, adjustable on site. The electrical wiring needs an Ex-e terminal box.

ExBox – adaptable Ex-e terminal box

For electrical connection of an ExMax inside the hazardous area an Ex-e terminal box is required.

ExBox-3P for ExMax-5.10, ...-15.30, ...-5.10-F, ...-15-F

ExBox-Y/S for ExMax-...-S integral aux. switches

To adapt the ExBox direct to the actuator housing an additional accessory type **MKK-S** is required.

Extra information „EL“ (see additional data sheet)

extra technical information, versions of circuit diagrams and failure indication

Extra information „ME“ (see additional data sheet)

extra technical information, dimensions, installation instruction and illustration

MORGUI
INSTRUMENTS