

InMax ¼ turn actuators – size S

Electrical 24 VAC/DC rotary actuators for use in safe areas

4...20 mA control mode, with feedback 0...10 VDC, 95° angle of rotation

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

InMax - ... - CY
InMax - ... - CYF
InMax - ... - CTS
InMax - ... - VAS

Subject to change!

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

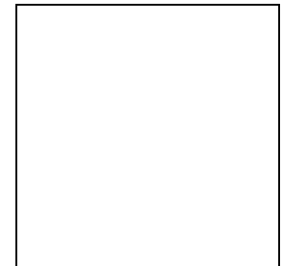
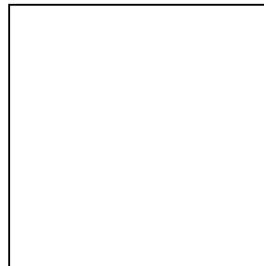
Type	Torque	Supply	Motor running time	Spring return	Control mode	Feedback	Wiring diagram
InMax- 5.10 - CY	5 / 10 Nm	24 VAC/DC	7.5 / 15 / 30 / 60 / 120 s/90°	–	4...20 mA	0...10 VDC	SB 6.0
InMax-15.30 - CY	15 / 30 Nm	24 VAC/DC	7.5 / 15 / 30 / 60 / 120 s/90°	–	4...20 mA	0...10 VDC	SB 6.0
InMax- 5.10 - CYF	5 / 10 Nm	24 VAC/DC	7.5 / 15 / 30 / 60 / 120 s/90°	10 s/90°	4...20 mA	0...10 VDC	SB 6.1
InMax- 15 - CYF	15 Nm	24 VAC/DC	7.5 / 15 / 30 / 60 / 120 s/90°	10 s/90°	4...20 mA	0...10 VDC	SB 6.1
InMax- ... - CTS	Types as above with aluminium housing and seawater resistant coating (cable glands brass nickel-plated)						
InMax- ... - VAS	Types as above with stainless steel housing for aggressive ambient (cable glands brass nickel-plated)						

Product views and applications

InMax-...-CY



VAV (variable air volume)



Description

The InMax 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.

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 and torques as well as 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 of 24 VAC/DC. The actuators are 100 % overload protected and self locking.

...Max-...-CYF actuators are equipped with spring return fail safe function. Standard shaft connection is a double square direct coupling with 12 x 12 mm.

Different accessories are available to adapt auxiliary switches, terminal boxes or adaptions for ball valves and throttle valves and other armatures.

Highlights

- ▶ Industrial use
- ▶ Universal supply unit from 24 VAC/DC
- ▶ 5 different motor running times 7,5–15–30–60–120 s/90°, adjustable on site
- ▶ Optional spring return running time ~ 10 s/90°
- ▶ Control mode 4...20 mA
- ▶ Feedback signals 0...10 VDC
- ▶ 5–10–15–30 Nm actuators in the same housing size
- ▶ 100 % overload protected and self locking
- ▶ Compact design and small dimension (L x W x H = 210 x 95 x 80 mm)
- ▶ Direct coupling to the damper shaft with double-square connection 12 x 12 mm
- ▶ 95° angle of rotation inclusive 5° pretension
- ▶ 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)
- ▶ Preparation for adaptable and adjustable auxiliary switches type ...Switch
- ▶ Wide range of accessories

Technical data	InMax- 5.10 -CY	InMax- 15.30 -CY	InMax- 5.10 -CYF	InMax- 15 -CYF
Torque motor (min.)	5 / 10 Nm selectable on site	15 / 30 Nm selectable on site	5 / 10 Nm selectable on site	15 Nm
Torque spring (F)	–	–	min. 10 Nm	min. 15 Nm
Torque blockade	In blockade and end positions torques are higher than above specified torques for motor and spring.			
Dimensioning of external load	Upon spring return the external load should be max. 80 % of torque spring (F), but min. 3 Nm			
Supply voltage / frequency	24 VAC/DC \pm 10 %, self adaptable, frequency 50...60 Hz \pm 20 %			
Power consumption	max. starting currents see ⓘ Extra information (in acc. with voltage, $I_{start} \gg I_{rated}$), approx. 5 W holding power, approx. 16 W for heater			
Protection class	Class I (grounded)			
Angle of rotation and indication	95° incl. \sim 5° pretension, mechanical value indication			
Working direction	Selectable by left/right mounting to the damper/valve shaft			
Motor running times	7,5 / 15 / 30 / 60 / 120 s/90° selectable on site			
Motor	Brushless DC motor			
Control mode Y	4...20 mA , galvanic separation between supply and Y-signal			
Feedback signal U	0...10 VDC			
Resistance of Y and U signals	Input signal: U_U 0...10 VDC at 10 k Ω . Feedback signal: U_U 0...10 VDC at 2.000... ∞ Ω			
Adjustment of Y and U	In case of external mechanical limitation of the angle of rotation, it is possible to perform an adjustment drive started by pushing the button (T)			
Spring return (F)	–	–	spring return upon voltage interruption	
Spring return response time	–	–	up to 1 sec. after voltage interruption	
Spring return running time (F)	–	–	\sim 10 s/90°	
Safety operations at 10 sec. (F)	–	–	min. 10,000 acc. to construction of damper and ambient	
Axle of the actuator	Double square 12 \times 12 mm, direct coupling, 100 % overload protected			
Electrical connection	Cable \sim 1 m, wire cross section 0.5 mm ² , equipotential bonding 4 mm ²			
Diameter of cable	\sim \varnothing 8 mm	\sim \varnothing 8 mm	\sim \varnothing 8 mm	\sim \varnothing 8 mm
Cable gland	M16 \times 1.5 mm			
Manual override	Use delivered socket wrench, max. 4 Nm			
Heater	Integrated, controlled heater for ambient temperature down to max. -40 °C			
Housing material	Aluminium die-cast housing, coated. Optional with seawater resistant coating (...-CTS) or stainless steel housing, № 1.4581 / UNS-J92900 / similar AISI 316Nb (...-VAS)			
Dimensions (L \times W \times H)	210 \times 95 \times 80 mm, for diagrams see ⓘ Extra information			
Weight	\sim 3,5 kg aluminium housing, stainless steel \sim 7 kg			
Ambients	Storage temperature -40 ... $+70$ °C, working temperature -40 ... $+50$ °C			
Humidity	0...90 % rH, non condensing			
Operating 7,5 sec. motor run time	at 24 V: S3 – 50 % ED intermittent mode (ED = duty cycle)			
\geq 15 sec. motor run time	at 15 / 30 / 60 / 120 s 100 % of ED is permitted			
Self adjustment	Before initial operation you need to start the self adjustment mode for "gentle" blockade and adjustment of rotation angle			
Wiring diagrams	SB 6.0	SB 6.0	SB 6.1	SB 6.1
Scope of delivery	Actuator, 4 screws M4 \times 100 mm, 4 nuts M4, Allen key for simple manual override			
Parameter at delivery	5 Nm, 30 s/90°	15 Nm, 30 s/90°	5 Nm, 30 s/90°	15 Nm, 30 s/90°

Approbations

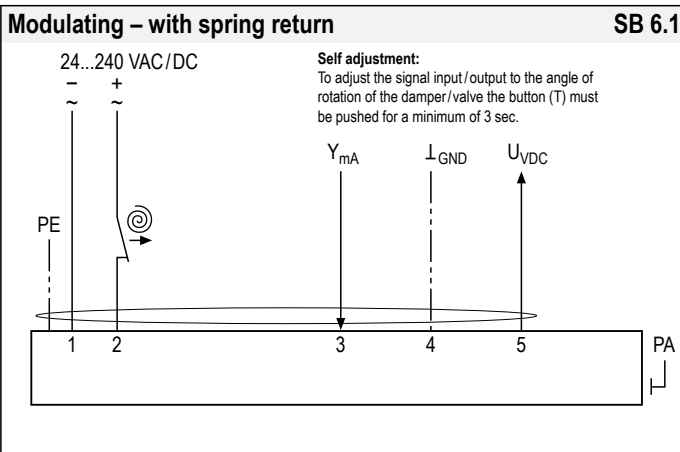
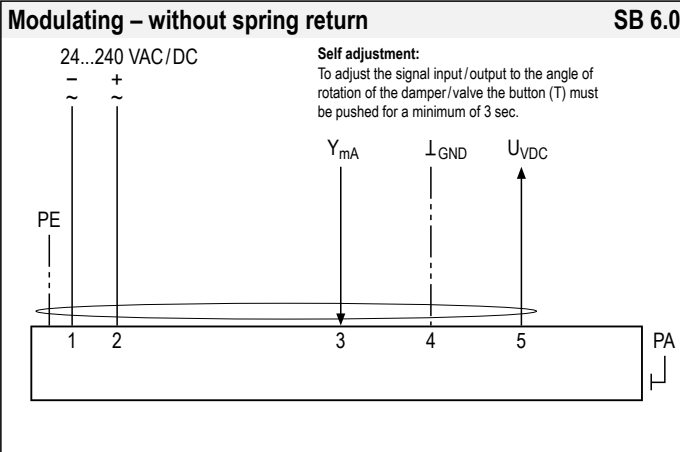
CE identification	CE
EMC directive	2014/30/EU
Low voltage directive	2014/35/EU
Enclosure protection	IP66 in acc. with EN 60529

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
InBox-Y/S...	Terminal boxes
MKK-S	Mounting bracket for boxes type ...Box-... directly on actuator
InSwitch	2 external aux. switches, adjustable
HV-S...	Comfortable manual override for...Max actuators size S
KB-S	Clamp for damper shafts \varnothing 10...20 mm and \square 10...16 mm
AR-12-xx	Reduction of square damper connection from 12 mm to 11, 10, 9 or 8 mm
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 of 24 VAC/DC. The safety operation of the spring return function works if the supply voltage is cut. An over-current protection fuse < 10 A has to be provided by installer. Note: the initial current is appr. 2 A for 1 second.



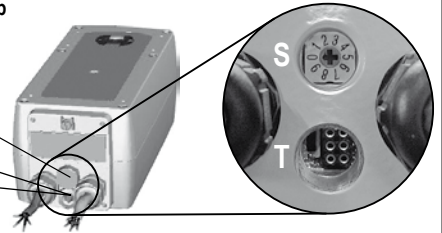
⚠ Attention ⚠

During commissioning apply a self adjustment drive.
 Regard duty cycle at motor running times!
 Never use spring return actuators without external load.

Parameters, adjustments and 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:
 InMax-15.30-CY
Requested parameter:
 Torque 30 Nm
 Motor running time 30 s/90°

Type	Torques	
InMax- 5.10-CY ▶	5 Nm	10 Nm
InMax- 15.30-CY ▶	15 Nm	30 Nm
InMax- 5.10-CYF ▶	5 Nm	10 Nm
InMax- 15-CYF ▶	15 Nm	
	▼	▼
Running times	Position of switch S	
7,5 s/90° ▶	00	05
15 s/90° ▶	01	06
30 s/90° ▶	02	07
60 s/90° ▶	03	08
120 s/90° ▶	04	09

Result:
 Switch position 07

Functions, adjustments and parameters

A) Self adjustment of angle of rotation

Turn switch (S) to position 02 (low torque) or 07 (high torque). Press button (T) for a minimum of 3 seconds. The actuator drives to both end positions and detects the blocking positions. The LED flashes GREEN during adjustment. The adjustment takes about 60 seconds (30 sec. "On", 30 sec. "Off").

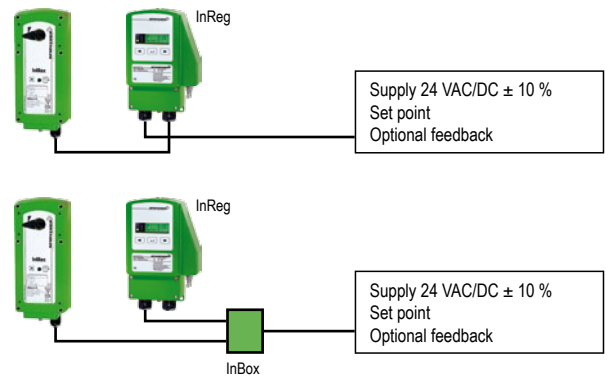
B) Selecting motor running time and torque

Adjust parameters only if actuator is in idle state or without applied potential. Turn switch (S) to the position required for the intended operation acc. to table above. The selected parameters will be carried out at the actuator's next operation.

C) Additional information for operation

The rotation direction (clockwise/counter clockwise) depends on left/right mounting of the actuator to the damper.

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

Important information for installation and operation

A. Installation, commissioning, maintenance

All national and international standards, rules and regulations must be complied with. 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.

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

The cable of the actuator must be installed in a fixed position and protected against mechanical and thermal damage. Connect potential earth. Avoid temperature transfer from armature to actuator! Close all openings with min. IP66. For outdoor installation a protective housing 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. During commissioning apply a self adjustment drive.

Actuators are maintenance free. An annual inspection is recommended. 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 x 12 mm. For round shafts there are adaptors/clamping connection (as accessories, e.g. KB-S) available. The housing of the actuator is built axially symmetrically 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. Spring return

Spring return function works only if the supply voltage for terminal 1 or 2 is cut. In the event of an electrical interruption, the spring returns to its end position even if supply voltage is available again during return function. Thereafter operation will continue.

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

All actuators are 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 irreversibly. 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.

H. Mechanical protection

Actuators must be operated with a minimum external load.

After installing the actuator to the damper/armature a self adjustment drive has to be performed in order to protect the damper/armature against mechanical overload. During operation the actuator reduces briefly its speed (motor power) before reaching the end position for a "gentle" blockade/stop.

Extra information (see additional data sheet)

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

Accessory InSwitch – adaptable auxiliary switch



For an end or inclined position indication it is possible to retrofit external, adjustable auxiliary switches type InSwitch. The switch housing is mounted directly to the actuator and the switches are linked to the actuator's square connector. The switches deliver a potential free output and can be adjusted separately. They are connected by cable.

Accessory InBox – adaptable terminal box



For electrical connection of ...Max actuators a terminal box is required. InBoxes are appropriate terminal boxes and placed at the disposal. To adapt the ...Box directly to the actuator housing a mounting bracket type MKK-S is required. InBox- Y/S for ...Max-...-CY and ...-CYF