

InMax – ¼ turn actuator

Electrical, industrial quarter turn actuators size S

24...240 VAC/DC, 95° Angle of rotation incl. 5° pretension

Control 0-10 V, 4-20 mA and feedback 0-10 V, 4-20 mA

45/90 & 135/270 lbf-in without and 45/90 & 135 lbf-in with safety operation (spring return)

tested in acc. with American - Canadian standards for ordinary location.

InMax-45.90-Y-A

InMax-135.270-Y-A

InMax-45.90-YF-A

InMax-135-YF-A

InMax- ... -VAS

InMax- ... -CTS

Subject to change!

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

Type	Torque	Supply	Motor running time	Spring return	Control mode	Feedback	Wiring diagram
InMax-45.90-Y-A	45/90 lbf-in, 5/10 Nm	24...240VAC/DC	7.5/15/30/60 s/90°	without	0-10VDC, 4...20 mA	0-10VDC, 4...20 mA	SB 4.0
InMax-135.270-Y-A	135/270 lbf-in, 15/30 Nm	24...240VAC/DC	7.5/15/30/60 s/90°	without	0-10VDC, 4...20 mA	0-10VDC, 4...20 mA	SB 4.0
InMax-45.90-YF-A	45/90 lbf-in, 5/10 Nm	24...240VAC/DC	7.5/15/30/60 s/90°	3 or 10 s/90°	0-10VDC, 4...20 mA	0-10VDC, 4...20 mA	SB 5.0
InMax-135-YF-A	135 lbf-in, 15 Nm	24...240VAC/DC	7.5/15/30/60 s/90°	3 or 10 s/90°	0-10VDC, 4...20 mA	0-10VDC, 4...20 mA	SB 5.0
InMax- ... - VAS	Type as above but with stainless steel housing (AISI 316) for aggressive ambient (0,47" x 0,47" shaft, shaft manual override, cable glands and hollow rivet Ms-Ni)						
InMax- ... - CTS	Type as above but with Al housing and amercoat painting (0,47" x 0,47" shaft connenction, shaft manual override, cable glands and hollow rivet Ms-Ni)						

Application

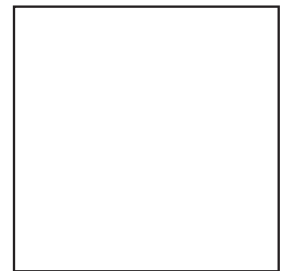
Damper



Ball valve



Throttle valve



Description size S

The new 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, for use in ordinary locations. Highest protection class and NEMA4X, IP66 protection, small dimensions, little 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 (Accessory "Stick" is required). 4 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...240 VAC / DC.

The actuators are 100% overload protected and self locking.

InMax-...-F-A actuators are equipped with spring return fail safe function. Standard shaft connection is a double squared direct coupling with 0,47" x 0,47" 12 x 12 mm.

Different accessories are available to adapt round/squared shafts with different sizes, conduit boxes or adaptations for ball valves and throttle valves.

Highlights

- ▶ Industrial actuators
- ▶ Universal supply unit from 24...240 VAC/DC
- ▶ 4 different motor running times (7.5-15-30-60 s/90°), adjustable with stick on site
- ▶ 2 different spring return running times (3-10 s/90°), adjustable with stick on site
- ▶ Control mode 0...10 VDC, 4...20 mA, with or without spring return function
- ▶ Feedback signal 0...10 VDC and 4...20 mA
- ▶ Reverse function
- ▶ 45/90/135/270 lbf-in (5 /10/15/30) Nm actuators in the same size (S)
- ▶ 100 % overload protected
- ▶ Compact design and small dimension (L x W x H = 8,27" x 3,74" x 3,15")
- ▶ Direct coupling to the damper shaft with double-squared connection 0,47" x 0,47"
- ▶ 95° Angle of rotation incl. 5° pretension
- ▶ Robust aluminium housing (optional stainless steel or amercoat painting)
- ▶ NEMA4X, IP66 protection
- ▶ Simple manual override include + preparation for comfortable manual override
- ▶ Gear made of stainless steel and sinter metal
- ▶ Only 7.7 lbs (3,5 kg) weight
- ▶ Integral heater for ambient temperatures down to -40°F, -40°C
- ▶ Integral safety temperature sensor
- ▶ Integral equipment for manual adjustment (push button, lamp, external stick)
- ▶ Range of accessories

Technical data	InMax-45.90-Y-A	InMax-135.270-Y-A	InMax-45.90-YF-A	InMax-135-YF-A
Torque motor	45/90 lbf-in, 5/10 Nm selectable	135/270 lbf-in, 15/30 Nm selectable	45/90 lbf-in, 5/10 Nm selectable	135 lbf-in, 15 Nm
Torque spring return (F)	without spring (F)	without spring (F)	min. 90 lbf-in, 10 Nm	min. 135 lbf-in, 15 Nm
Dimension of external torque	above mentioned torques are min. torques, external torque should be max. 80 % of max. actuator torque but min. 30 lbf-in / 3 Nm			
Supply voltage/Frequency	24...240 VAC/DC, ± 10 %, self adaptable, Frequency 50...60 Hz ± 20 %,			
Power supply rating	Inrush current 2 A max. 1 sec. nominal currents see table (I _{start} >> I _{rated}),			
Power consumption	see table extra info EL depends on voltage and adjusted running time max. 30 W resp. 50 VA, in blocking position max. 10 W			
Power consumption heater	approx. 16 W, heater starts at temperature lower -4°F/-20°C			
Protection class	class I (grounded)			
Angle of rotation and indication	95°, incl. ~ 5° pretension, mechanical value indication			
Working direction	selectable by left/right mounting to the damper/valve shaft			
Motor running time	30 sec. at 90° (adjustable running times are 7.5 / 15 / 60 sec. at 90°with accessory stick on site)			
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 ~10 sec. at 90°	
3 sec. mode - spring return	without F	without F	spring return ~3 sec. at 90° (selectable by accessory stick)	
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 U	0-10 V, 4-20 mA in acc. with wiring, selectable on site, galvanic isolation between supply and signals			
Feedback Signal Y	0-10 V, 4-20 mA in acc. with wiring, selectable on site			
Resistance of Y and U signals	Input signal Yu (0-10 V) @ 10 kΩ , Yi (4-20 mA) @ 100 Ω; Feedback signal Uu (0-10V) @ 1000 ... ∞ Ω, Ui (4-20 mA) @ 0 ... 800 Ω			
Reverse function	Reverse function of Y and U signal accessory stick is required			
Adjustment of Y and U	If the angle of rotation is different to 90° the input Y and output signal U can be adjusted to a new angle of rotation „self adjustment“			
Axle of the actuator	double squared 0.47" × 0.47", 12 × 12 mm, direct coupling, 100 % overload protected and self locking up to 135 lbf-in, 15 Nm			
Electrical connection	cable ~ 39,4", (1 m), diameter of wires 20 AWG (0,5 mm²), for connection inside hazardous areas an XP junction box is required! connect an additional protection earth with min 18 AWG			
Diameter of cable	~ Ø 0.28", 8 mm	~ Ø 0.28", 8 mm	~ Ø 0.29", 8 mm	~ Ø 0.29", 8 mm
Conduit connection	1/2" NPT			
Manual override	Manual override only if supply voltage is cut, use delivered socket wrench, slow motion, enough 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°F / -40 °C			
Housing material	Aluminium die cast housing, painted (optional in stainless steel version - type ...-VAS, marine „amercoat“ painting type ...-CTS)			
Dimensions	L × W × H = 8.27" × 3.74" × 3.15" (210 × 95 × 80 mm), for diagramm see extra information „ME“			
Weight	~ 7.7 lbs / 3.5 kg Aluminium housing (stainless steel ~ 15.4 lbs / 7 kg)			
Ambient temperature	working temperature -40...+122°F / -40 ...+50°C,			
Humidity	0..90 %rH non condensing			
Storage temperature	-40...+158°F / -40...+70°C			
Environment conditions	for outdoor installation a protective housing against rain, snow, sun should be applied, altitude up to 2000 m, pollution degree 2			
Operation mode	S3 - 50% ED (ED = duty cycle) intermittent mode, note also page 4 section E			
Self adjustment	if you select 15 sec. mode for motor or angle of rotation is < 90° start the self adjustment mode (press push button 3 sec.)			
Maintenance	maintenance free, maintenance must be complied with regional standards, rules and regulations			
Cleaning	Dirt and dust deposition should be avoided, for cleaning use wet cloth			
Wiring diagrams (SB)	SB 4.0	SB 4.0	SB 5.0	SB 5.0
Delivery	1 actuator, 39,4" / 1 m cable, double squared shaft connection, 4 screws, 4 nuts, allen key for simple manual override			
	Parameters of actuator are preadjusted see "Parameter at delivery". The paramters can be changed by an optional accessory stick.			
Parameter at delivery	45 lbf-in, 5 Nm 30 sec	135 lbf-in, 15 Nm 30 sec	45 lbf-in, 5 Nm 30 sec.	135 lbf-in, 15 Nm 30s

Certification	InMax actuators – size S
Approval elec. safety	CSA 61010-1
UL certified	QUYX E340805
Approval elec. safety	UL 61010-1
EMC	2004/108/EC
Low voltage	2006/95/EC overvoltage cat II,
NEMA / IP-Protection	NEMA4X / TYPE4X / IP66

Accessories or special solutions – size S	
Stick	for set (adjust) diff. actuator functions (motor running, spring return time)
...-VAS	listed types in stainl. steel V4A / AISI 316 Cd / 1.4581 / X5CrNiMoNb 1810
...-CTS	above listed types in Al-housing with amercoat painting, parts Ms-Ni
InBox-...	junction boxes for haz. locations acc. ATEX
MKK-S	mounting bracket for junction boxes type InBox-... direct on actuator
KB-S1-A	clutch for damper shafts Ø 0,39"...0,79" and □ 0,39"...0,63"
HV-S	comfortable manual override for InMax actuators size S
AR-12-xx	Reduction of square connection from 0,47" to 0,43", 0,39", 0,35", 0,32"

Electrical connection

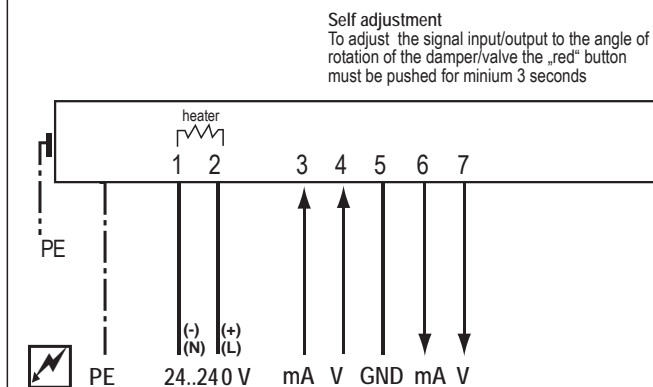
All actuators are equipped with a universal supply unit working at a voltage range from 24...240 VAC/DC. The supply unit is self adjustable to the connected voltage! Device is fuse protected with 5 AT (not replacable). Note the inrush current is approx. 2 A for max. 1 sec. For electrical connection inside hazardous locations an explosion proof junction box is required. For permanently connected equipment is an external 2 A (time lag) circuit-breaker in the control cabinet required. This should be in close proximity to the equipment and within easy reach of the operator. It should be marked as the disconnecting device for the equipment.

Approved fuse according IEC 60127-2 and/or UL 248-14 and min. breaking capacity 1500 A for AC and/or DC supply voltage should be used.

Wiring diagram InMax-45.90-Y-A and InMax-135.270-Y-A

Continuous control

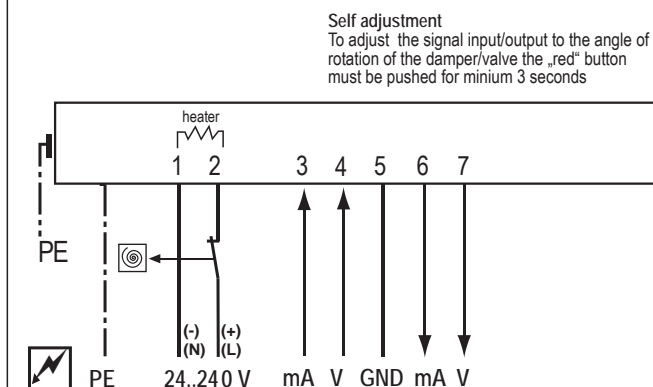
SB 2.0



Wiring diagram InMax-45.90-YF-A and .-135-YF-A (with spring)

Continuous control with spring return

SB 2.0



Never use actuators in this mode without external torque/force.

Heater is not activated in case of switch off the power supply respective spring return

Parameter, Adjustment – Failure indication

Push button – Lamp for adjustment

3-colour LED

Connection of stick

Push button



Function, adjustment and parameter

A) Self adjustment of Angle of rotation for fast running time and angle < 90°:
Push the red button for minimum 3 seconds. The actuator will drive into both end positions to be adjusted. LED indicates blinking green. Adjustment time needs approx. 60 sec. (30 sec. On, 30 sec. Off).

B) Additional information:

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

C) Selection of running time and torque:

Adjustment can be done with supply voltage only.

Settings only if actuator is not running.

Set DIP switch „accessory switch“ into the correct position

Push the button more than 1 sec and less than 3 sec. LED is orange and after data transfer blinking red-green. If LED is red blinking only there was an error.

D) Running time spring return:

The running time of 3 or 10 sec. spring return is selected by wiring "Stick" see table below

Error indication

See extra information „EL“

Parameter selection with accessory "Stick"

Position of switch S

Write protection	ON	on	OFF	off
Blank	no function			
Blank	no function			
Invers	ON	high	OFF	low
Torque	ON	high	OFF	low
Running time	SW 2	SW 3		
Running time	OFF	OFF	7.5 sec.	
Running time	ON	OFF	15 sec.	
Running time	OFF	ON	30 sec.	
Running time	ON	ON	60 sec.	
Spring Return	ON	3 sec	OFF	10sec.

Mounting instructions and important information for operation and installation

Important information for installation and operation

A. Installation, commissioning, maintenance

Wiring must be in accordance with local codes and regulations. In acc. with operation all actuators are maintenance free. Nevertheless maintenance must comply with regional standards, rules and regulations. The enclosure is protected against mechanical shock 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 a junction box is requested.

Attention: If the actuator is put out of operation all national regulation must be applied.

B. Shaft connection, selection of running time, heater

All actuators are equipped with a direct coupling double squared shaft connection of 0,47" x 0,47", (12 x 12) mm. For round shafts an adaptor is available (Accessory type KB-S-A).

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 4 different motor running times and 2 different spring return running times can be selected on site.

C. 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.

D. Operation at an ambient temperature below -40°F / -40°C

See extra information „EL“. The integral heater is for ambient temperatures down to -40°F / -40 °C.

E. Excess temperature and Operation mode

Actuators are 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. The actuator works with intermitted operation mode S3 50%. This restriction is valid for full load (30 W) applications. Means. 5 min working, 5 min cooling. Otherwise the internal thermostat switch off the motor.

F. Synchron mode

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

Installation



Option (-Y) Modulating signals
 Input 4-20 mA / 0-10 V
 Output 4-20 mA / 0-10 V

Supply *
 24...240 VAC/DC ± 10%

* electrical connection see wiring diagram

- 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
- Installation and maintenance must comply with regional standards, rules and regulations
- Install per Canadian Electrical Code (CEC)
- Install per National Electrical Code (NEC)
- Do not open covers when circuits alive
- The cable must be installed in a fixed position and protected against mechanical and thermal damage. Damaged cords must be replaced by manufacturer
- Connect protection earth with min. 18 AWG wire size
- Avoid thermal transfer from ducts, pipes, .. to actuator (ensure max. ambient temp!)
- Ambient temperature -40...+122 °F / -40...+50 °C
- Close after settings all covers and entries tight min. NEMA4X/IP66
- For outdoor installation a protective housing against rain, snow, sun should be applied
- For electrical connection use a conduit box, junction box
- Use supply wires suitable for 5°C above surroundings

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".

InSwitch – adaptable external aux. switches



InSwitch is an accessory to InMax actuators size S, fixing directly onto the actuator. InSwitch are aux. switches with with 2 potential free contacts, adustable on site.

InBox – adaptable terminal box



For electrical connection of an InMax actuator. InBox-Y/S for InMax-...-Y-A types 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