Extra information for ...Max actuators – size M

for optimization of planning, installation and initial startup for safe operation

Assembly

- Dimensions, drill plate
- Control elements: switch – push buttons – LED
- Outdoor installation
- Mounting on air dampers (form-fit)
- Mounting on fire dampers (form-fit)
- Mounting on butterfly valves and ball valves
- Mounting of terminal box ...Box and auxiliary switch ...Switch

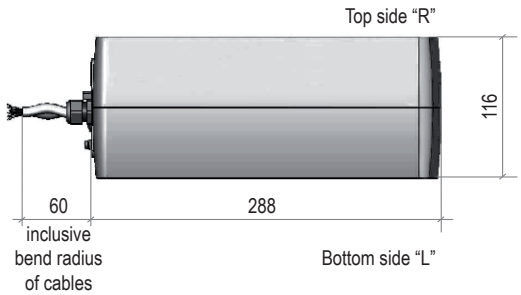
Electric

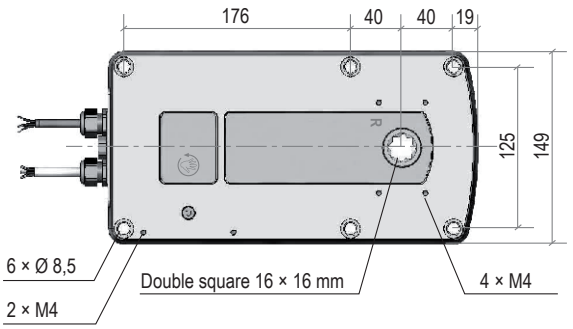
- Power supply design
- Line cross sections
- Problem treatment/error indication

Subject to change!

Dimensions

Dimensions in mm



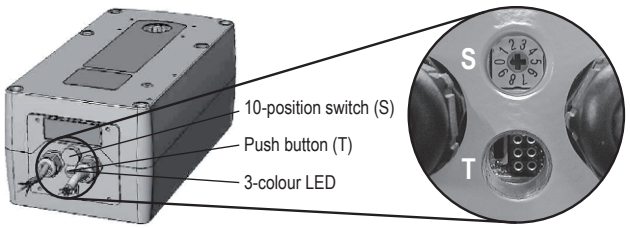


Control elements: switch – push button – LED

All actuators are equipped with a 10-position switch, a push button and a multicolour LED for calibration. These control elements are to be found cable-laterally behind the two middle sectioned dummy plugs. For operation these must be removed. The calibration can be achieved despite lining up power supply at the actuator. The explosion prevention is not impaired thereby. However, it has to be of great concern that the dummy plugs must be rescrewed in order to comply with the IP-protection class.

The operation of the switch and button has to be done by means of a small screwdriver. Force with strong pressure and/or rotation is to be avoided in any case, since otherwise control electronics can be damaged irreparably. Adjustments of torque and running time can be achieved also before mounting. The adjustment of angle of rotation can be started only with an outside load and accurate mounting.

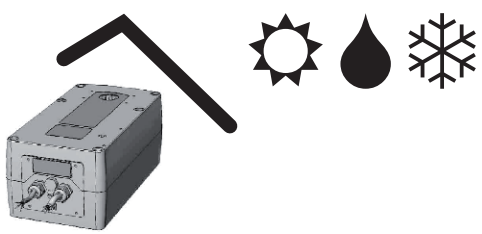
Switch – Push button – Lamp
for adjustment (behind the blanking plug)



Outdoor installation

When mounting actuator outdoors it has to be certain that the actuator is protected against direct sun exposure (heat and UV!), rain and snow by employing an enclosure roof. Supply voltage is to be applied immediately after mounting in order to assure integrated heating at start.

Since actuators must have an internal temperature fuse, they may not be exposed to a too high temperature, neither at storage nor during operation. Otherwise the fuse could respond and switch off the actuator irreversibly.



Mounting of ...Max actuators

...Max actuators size M are equipped with a 16 × 16 mm (double square) shaft connection by default. The form-fitting shaft connection is the most secure connection between damper shaft and actuator because slipping or slipping through is avoided compared to the force-fit clamp-connection.

The actuator will be connected firmly to the damper or fixed to a mounting bracket by means of four screws M8 (scope of delivery).

For square damper shafts 12 × 12 mm or 14 × 14 mm reducing bushes are also available.

The actuators are axially symmetric developed. In case of spring return function the safety position must be selected by turning the actuator to 180°.

Furthermore it is to be considered that the actuators have a total angle movement of approx. 95° in order to realize a pretension on the control element (damper or the like). Therefore the actuator sits tilted on the damper shaft.

In order to adjust this and to induce pretension, the driving shaft has to be alined mechanically over the hand-operated control socket "HV" when connecting to the damper shaft.

The socket wrench has to be turned counterclockwise when facing the actuator's "side R", facing "side L" turn manual override clockwise.

⚠ Attention: Mount with appropriate safety precautions only!

- The drive shaft may only be mechanically adjusted either with the provided socket wrench or the optional accessory "HV-MK" manual override (turn off power supply). External force applied to the shaft can lead to mechanical damage of the actuator!
- At the manual override counteracting forces occur when mounting spring return actuators. **Do NOT release manual override under spring tension!**
- Press the "T" (push button) for 3 seconds after installation.
- To ensure the calibration of the positioning angle, The T-push button should be pressed once every 6 months.

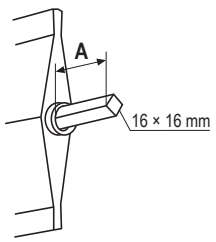
Mounting on air dampers

Form-fitted shaft connection – Mounting on square damper shaft

Mounting:

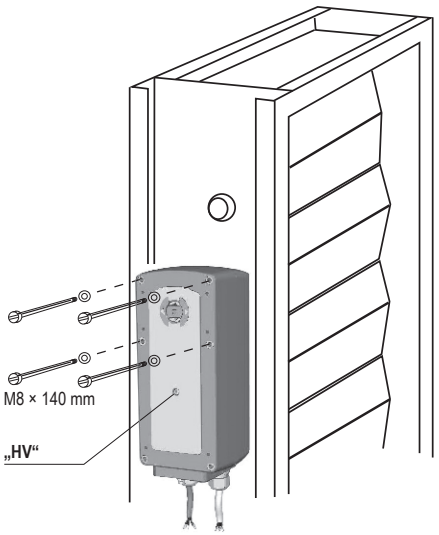
1. Affix tap holes M8 (in accordance with drill template) on the damper or to a mounting bracket.
2. Adjust drive shaft of the actuator with the socket wrench that the drive stands perpendicularly to the damper before plugging actuator onto the damper shaft.
3. Plug actuator onto damper shaft and fix diagonally with 2 screws.
4. Remove the socket wrench.
5. Pivot and tighten the remaining screws.

Dimension of the damper shaft



Length A
Measure A in acc. with indicator:

1. Actuator without indicator **A = no limit**
2. Actuator with indicator, no accessories **A < 95 mm**



4 screws M8 × 140 mm as well as a socket wrench are part of delivery. For square damper shafts 12 × 12 mm or 14 × 14 mm reducing bushes are available as optional accessories.

Mounting on fire dampers

ExMax-...-BF and RedMax-...-BF actuators integrate an intrinsically safe circuit in order to connect an ExPro-TT-... sensor which works like a temperature trigger. InMax-... and InPro-TT-... are for non hazardous areas.

Mounting:

1. Affix tap holes M8 (in accordance with drill template) on the damper or to a mounting bracket
2. Adjust drive shaft of the actuator with the socket wrench that the drive stands perpendicularly to the damper before plugging actuator onto the damper shaft
3. Plug actuator onto damper shaft and fix diagonally with 2 screws
4. Remove the socket wrench
5. Pivot and tighten the remaining screws
6. Mount temperature trigger ...Pro-TT-...
7. Mount terminal box (type ...Box-BF)
8. Plug sensor connector into actuator's socket

Connection of safety temperature trigger ...Pro-TT-...

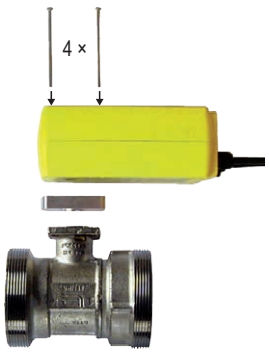
The temperature trigger is mounted directly to the duct or damper wall with pre-assembled tapping screws. The position of the safety elements must guarantee free air flow.
...Pro-TT-... is mounted to the actuator by means of quick fastener M12.

Mounting to ball valves and butterfly valves

Actuators of size M are equipped by default with a 16 × 16 mm double square form-fitting shaft connection. For mounting to butterfly valves or ball valves a special mounting bracket in acc. with DIN EN ISO 5211 is required.

Since this standard provides only certain basic conditions there can be substantial geometrical differences between armatures which require a special adaption.

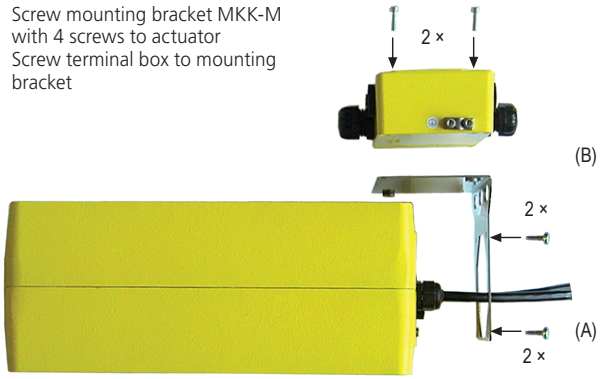
Mounting to a ball valve



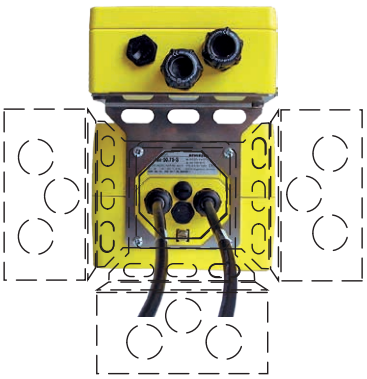
Mounting to a butterfly valve

Mounting of terminal boxes ...Box to actuator via mounting bracket MKK-M (accessory)

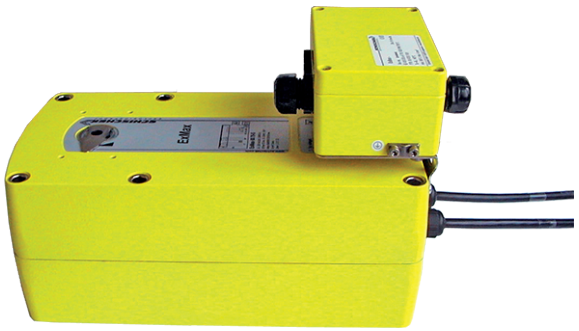
A) Screw mounting bracket MKK-M with 4 screws to actuator
B) Screw terminal box to mounting bracket



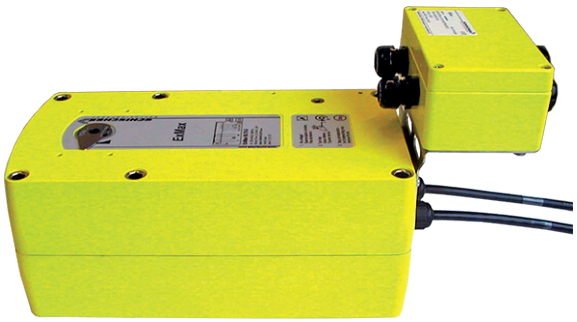
Mounting bracket can be mounted every 90°



Terminal box mounted above the actuator

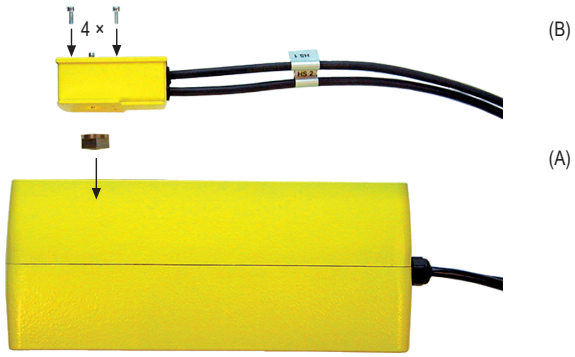


Terminal box mounted beside the actuator

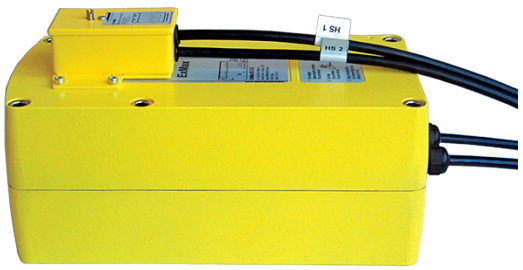


Mounting of auxiliary switch ...Switch to actuator

A) Place square connection part on actuator's shaft
B) Mount ...Switch and fix it with screws



...Max with mounted ...Switch



Inrush current and electrical fuse

The inrush current can vary in the microsecond range depending on the random phase on the sinusoidal voltage of the power supply.

Each actuator shall be protected with a single type D/2A miniature circuit breaker when operating at 240VAC.

In case that the electrical protection with single circuit breaker is not desired or possible, appropriate professional measures shall be taken by the installers.

Suggestions for possible actions are listed below. This list does not claim to be exhaustive:

- Connecting appropriate resistors and/or chokes (ferrites) ahead of the actuators
- Time-delayed switching of the actuators to the supply voltage

The appropriate designing and installation shall be the responsibility of the commissioning engineer.

Power input depending on supply voltage

The design of the on-site supply depends on the selected motor running time and selected supply voltage. Accompanying values are "about values" since there can be construction unit dispersions within electronics. The holding power is run time independently typical at ~ 5 W. The power consumption for the heater is ~ 16 W. In the heating phase the motor is not active!

The power supply unit needs about 1 second to initiallize the actuator motor - starting current 2.0 A. (please consider this while concepting the cross section of the supply line). The power factor is between 0.8 and 0.5 in dependence of motor running time.

		Rated current in acc. with motor running time				
Voltage	**Current**	**40 s**	**60 s**	**90 s**	**120 s**	**150 s**
24 V DC	$I_{Nominal}$	1,5 A	1,0 A	0,8 A	0,7 A	0,7 A
120 V AC	$I_{Nominal}$	0,26 A	0,18 A	0,14 A	0,12 A	0,12 A
240 V AC	$I_{Nominal}$	0,13 A	0,09 A	0,07 A	0,06 A	0,06 A

LED function

LED Status	**Slot (100ms for each slot)**									
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Electronics not supplied with voltage / Electronics defective (call service)										
Initialization of actuator (electronic start up) if status not changed after 10s: failure call service										
Internal failure call service / blockage										
Internal failure call service / blockage										
Save of parameters from US-Stick complete										
Fire safe not connected/ broken (BF-actuators)										
Endposition "open"										
Endposition "closed"										
Self-adjustment run										
Normal operation mode										
Self-adjustment run (y-actuator used as a 3P-version)										
Normal operation mode (y-actuator used as a 3P-version)										

All other features of the actuators are not affected.

Problem handling / Error indication

	Problem	Possible cause	Course of action
01	Actuator does not work LED does not light	• No power supply attached	• Attach power supply and turn on
		• The actuator is operated at ambient temperature beyond specifications and the internal temperature fuse shuts down irreversibly	• Caused by inadmissable operation and for safety relevant reasons the actuator drove into an irreversable condition and must be exchanged. Accompanying new installation the ambient temperature has to be reduced accordingly
02	Actuator does not work LED lights RED	• The actuator is operated at a too high ambient temperature and the internal temperature sensor responded	• Shut off actuator and let temperature decrease, reduce ambient temperature by suitable measures e.g. ventilation or other mounting position of the actuator
		• ...-BF actuators require a temperature trigger type ...Pro-TT or FireSafe	• Connect trigger, LED changes to GREEN, actuator is ready-to-operate
03	Actuator does not work LED lights GREEN	• 3-pos. control signal is wired on both entrances	• Readjust / correct circuit
		• Required torque is greater than actuators torque	• Adjust a higher torque at the actuator if possible otherwise exchange for a type with higher torque
		• Control signals are not attached or attached on a wrong conductor	• Examine rule and adjusting signals and connect in accordance with diagram
		• Actuator is incorrectly mounted and is blocked by an external stop unit	• Dismount actuator and testdrive without load for operability. Then install actuator accordingly so that the power transmission of the actuator runs the armature/damper without external blockade or torsion
		• Interchanged supply lines	• Switch wires: 1 must be connected to (–, N) and wire 2 to (+, L)
04	Actuator does not work LED is blinking RED	• The actuator has been mounted at temperatures < –20 °C and did not reach its operating temperature of at least –20 °C	• Ensure that a constant voltage supply is applied on conductor 1–2 • Wait until the required operating temperature is achieved by the actuators internal heating system. The actuator will start operating independently
05	Y-drive in 3-pos. mode cannot gear into intermediate positions	• The conversion of constant mode to 3-pos. mode was not set	• Recalibrate the actuator in accordance with assembly instructions
06	Actuator sits diagonally on square damper shaft	• Actuators have an angle of rotation of 95° incl. 5° pretension. While assembling the pre-load was not considered	• Dismount actuator off the damper, use enclosed socket wrench to draw up approx. 5° over the hand operated control device before remounting on the damper shaft. Consider assembly instructions!
07	A modulating Y-actuator working with reduced angle of rotation, reaches its end positions already at > 0 V/4 mA resp. < 10 V/20 mA	• At start up no self-adjustment of angle of rotation was accomplished	• Accomplish self adjustment of angle of rotation in accordance with assembly instruction
08	LED flashes irregularly and actuator does not work	• Actuator does not receive sufficient supply voltage	• Increase line cross section or power supply
		• Cable too long, voltage drop in the supply line too large	• Increase line cross section or power supply

Contact us now
mail@rotork.com
www.rotork.com

PUB113-018-00
Issue 04/25