Electronic Fail-Safe Actuators – Enhanced Controlled During Power Outages

Designed for the toughest conditions.

Belimo electronic fail-safe actuators were developed for the HVAC market using several patented technologies to provide reliable operation and new selectable fail-safe positioning. Unique electronics, software and super capacitor technology not only enables user selection of fail position (0-100%), but also delays unnecessary actuator movements during short brown out conditions – avoiding changes in the HVAC and building automation system.

Reliable and versatile
Environmental and climate conditions often result in short power interruptions which can cause damper and valve actuators to begin fail-safe operation and temporarily destabilize the room or building temperature control. This causes unnecessary actuator movements and additional energy usage. The new electronic fail-safe actuator series with the control power-off function and durable, maintenance-free capacitors provide solutions to these climate conditions.

Like all Belimo actuators – the electronic fail-safe actuators are easy to install, commission, inspect and connect to higher level systems and have a complete line of accessories available. The electronic fail-safe actuators are available in the following models:

- High Torque: GK Series – 360 in-lbs [40 Nm], approximately 90 sq. ft.
- High Torque: Tandem Mounted: GK Series – 720 in-lbs [80 Nm], approximately 180 sq. ft
- Quick Speed: NKQ Series – 54 in-lbs [6 Nm], approximately 12 sq. ft.
- Linear Motion: AHKX Series – 101 in-lbs [450 N force]
Reliability and Safety Performance.

As a leading manufacturer of electric direct coupled actuators and motorized valves, we have committed ourselves to help create comfort, safety, and efficiency in buildings. Our sophisticated electronic fail-safe solutions provide fail-safe operation that is adapted to your needs, whether for air-conditioned buildings, hospitals, pharmaceutical facilities, trains, ships, tunnels, animal stock breeding, greenhouses or paint drying systems.

**Technology**

The electronic fail-safe actuators were developed by integrating super capacitor technology to provide reliable operation and bridge short voltage interruptions to control the damper into a defined power-off position.

Super capacitors supply sufficient power to bridge power interruptions for up to 10 seconds and moves the dampers or valves accurately into the predefined fail-safe or power-off position avoiding an extreme open or close position.

The fail-safe position can be set 0-100% in 10% increments providing the user a wide range of power-off positions. Power consumption is significantly reduced in standby and hold mode by a patented function; offering further energy savings.

**Actuator electronics:**
- Patented super capacitor technology
- Manages a uniform charge in the capacitors assuring complete charge and long product life.

**Fail-safe (power-off) position switch**

**Manual override button**

**MFT service tool socket**

**Electrical connection**
3 ft [1m] cable

**Direction of rotation (stroke switch for linear models)**

**LED power and status indicators**

**Current flow during charging**
Charging and discharging indefinitely and offer a long service life.

**Separator**
Performs as an insulator as well to insulate electricity between anode and cathode aluminum foil, while keeping electrolyte in it.

**Electrolyte**
Porous, high-surface area carbon
Performance Innovation
With over 5 years of development these electronic fail-safe actuators incorporate the latest super capacitor technology. Offering:
- Increase cycle life
- Selectable fail-safe position (0-10%)
- Rapid charging
- Charging diagnostics
- Maintenance free

Design
The electronic fail-safe actuator market has experienced serious problems in the past. Actuators designs have had short life cycle, capacitors have not charged completely, problems were experienced at high and low temperatures, and long start-up times; all of these past concerns have been addressed with Belimo Electronic Fail-Safe actuator series.
- Maintenance free
- 100,000 full cycles
- 1,000,000 partial cycles
- Current reduction in standby/hold mode

Testing
- Over 5 years of research and testing to ensure long life cycle.
- Evaluated over 30 worldwide suppliers of super capacitors to ensure the best and most consistent quality.
- Detailed testing criteria with recognized testing labs and universities to provide quality product offering.
- Extensive endurance and environmental testing at high and low humidity and temperature conditions to ensure reliable operation.
Fail-Safe Solutions Offering Protection for People and Tangible Assets.

<table>
<thead>
<tr>
<th>Technical data</th>
<th>Rotary actuators</th>
<th>Fast-running rotary actuators</th>
<th>Linear actuators</th>
</tr>
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<tbody>
<tr>
<td>Torque</td>
<td>360 in-lb [40 Nm]</td>
<td>54 in-lb [6 Nm]</td>
<td>101 lbf</td>
</tr>
<tr>
<td>Max. angle of rotation/stroke height</td>
<td>95°</td>
<td>95°</td>
<td>4&quot; [100 mm]</td>
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<tr>
<td>Power supply</td>
<td>24 VAC/DC</td>
<td>24 VAC/DC</td>
<td>24 VAC/DC</td>
</tr>
<tr>
<td>Motor running time</td>
<td>150 seconds / 95°</td>
<td>4 seconds / 95°</td>
<td>150 seconds / 100 mm</td>
</tr>
<tr>
<td>Adjustable fail-safe (power-off) position</td>
<td>0...100%</td>
<td>0...100%</td>
<td>0...100%</td>
</tr>
<tr>
<td>Fail-safe (power-off) running time</td>
<td>35 seconds / 95°</td>
<td>4 seconds / 95°</td>
<td>35 seconds / 3.94&quot; [100 mm]</td>
</tr>
<tr>
<td>Power supply</td>
<td>24 VAC</td>
<td>24 VAC</td>
<td>24 VAC</td>
</tr>
<tr>
<td>Adjustable fail-safe delay</td>
<td>0...10 seconds</td>
<td>N/A</td>
<td>0...10 seconds</td>
</tr>
<tr>
<td>Control input</td>
<td>On/Off, SR, 3-point, MFT</td>
<td>On/Off, SR, MFT</td>
<td>On/Off, SR, 3-point, MFT</td>
</tr>
<tr>
<td>Choice of rotation/stroke direction</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>Angle of rotation/stroke limitation</td>
<td>Integrated</td>
<td>Integrated</td>
<td>Integrated</td>
</tr>
<tr>
<td>Mechanical coupling</td>
<td>Clamp</td>
<td>Clamp</td>
<td>Gear rod head</td>
</tr>
<tr>
<td>Protection class</td>
<td>NEMA 2, IP54</td>
<td>NEMA 2, IP54</td>
<td>NEMA 2, IP54</td>
</tr>
<tr>
<td>Piggyback-compatible*</td>
<td>•</td>
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</table>

* Dual mounting capability will be available in 4th quarter 2010.
NEMA 4 available for GK models in September 2010.

Electronic fail-safe actuator solutions providing safety and protection in hospitals, laboratories, commerical buildings, greenhouses, paint rooms....

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