

# GKX24-SR Damper Actuator Technical Data Sheet

## Modulating, Electronic Fail-Safe, 24 V, for DC 2...10 V or 4...20 mA Control Signal



| Technical Data                     |   |
|------------------------------------|---|
| Power Supply                       | 24 VAC, ±20%, 50/60 Hz, 24 VDC, ±10%  |
| Power consumption in operation     | 11 W  |
| Power consumption in rest position | 3 W   |
| Transformer sizing                 | 21 VA (class 2 power source)  |
| Shaft Diameter                     | 1/2...1.05" round, centers on 3/4" with insert, 1.05" without insert  |
| Electrical Connection              | 18 GA appliance or plenum cables, 3 ft [1 m], 10 ft [3 m] or 16ft [5 m], with or without 1/2" conduit connector |
| Overload Protection                | electronic throughout 0...95° rotation  |
| Electrical Protection              | actuators are double insulated  |
| Operating Range                    | 2...10 V, 4...20 mA w/ ZG-R01 (500 Ω, 1/4 W resistor)   |
| Input Impedance                    | 100 kΩ (0.1 mA), 500 Ω  |
| Position Feedback                  | 2...10 V, Max. 0.5 mA   |
| Angle of rotation                  | Max. 95°, adjustable with mechanical stop   |
| Torque motor                       | 360 in-lb [40 Nm]   |
| Direction of motion motor          | selectable with switch 0/1  |
| Direction of motion fail-safe      | reversible with switch  |
| Setting fail-safe position         | adjustable with dial 0...100% in 10% increments   |
| Position indication                | Mechanically, 30...65 mm stroke   |
| Manual override                    | external push button  |
| Running Time (Motor)               | default 150 s, variable 90...150 s  |
| Running time fail-safe             | <35 s   |
| Bridging time                      | 2 s delay before fail-safe activates  |
| Pre-charging time                  | 5...20 s  |
| Ambient humidity                   | max. 95% r.H., non-condensing   |
| Ambient temperature                | -22...122°F [-30...50°C]  |
| Storage temperature                | -40...176°F [-40...80°C]  |
| Degree of Protection               | IP54, NEMA 2, UL Enclosure Type 2   |
| Housing material                   | UL94-5VA  |
| Agency Listing                     | cULus acc. to UL60730-1A/-2-14, CAN/CSA E60730-1:02, CE acc. to 2014/30/EU                                      |
| Noise level, motor                 | 52 dB(A)  |
| Noise level, fail-safe             | 61 dB(A)  |
| Servicing                          | maintenance-free  |
| Quality Standard                   | ISO 9001  |
| Weight                             | 3.2 lb [1.5 kg]   |

†Rated Impulse Voltage 800V, Type of action 1.AA, Control Pollution Degree 3

**Torque min. 360 in-lb, for control of damper surfaces up to 90 sq. ft.**

### Application

For fail-safe, modulating control of dampers in HVAC systems. Actuator sizing should be done in accordance with the damper manufacturer's specifications. The actuator is mounted directly to a damper shaft up to 1.05" in diameter by means of its universal clamp. A crank arm and several mounting brackets are available for applications where the actuator cannot be direct coupled to the damper shaft. The actuator operates in response to a DC 2...10 V, with the addition of a 500Ω resistor, a 4...20 mA control input from an electronic controller or positioner. A DC 2...10 V feedback signal is provided for position indication.

A common installation technique for control of multi-section dampers is to use the U5 position feedback of one actuator (Master) to control multiple actuators (Slaves). Belimo refers to this as Master/Slave control. The only requirement is that the actuators are installed on MECHANICALLY SEPARATE damper shafts.

### Operation

The GK..24-SR actuator provides 95° of rotation and a visual indicator shows the position of the actuator. When reaching the damper or actuator end position the actuator automatically stops. The gear can be manually disengaged by pressing the button located on the actuator cover. The GK..24-SR actuators use a brushless DC motor, which is controlled by an Application Specific Integrated Circuit (ASIC). The ASIC monitors and controls the actuators rotation and provides a digital rotation sensing (DRS) function to prevent damage to the actuator in a stall condition. Power consumption is reduced in a holding mode. The actuator is electronically protected against overload. The anti-rotation strap supplied with the actuator will prevent lateral movement. Add-on auxiliary switches or feedback potentiometers are easily fastened directly onto the actuator body for signaling and switching functions.

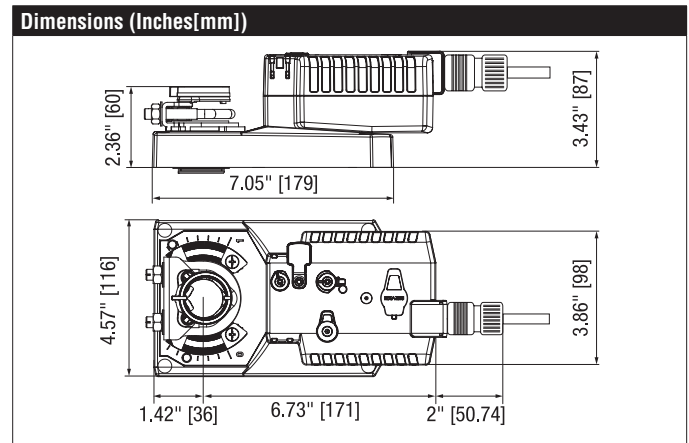
### Fail-Safe Indication

Green LED status indicator light sequence:

On: operation ok, no faults

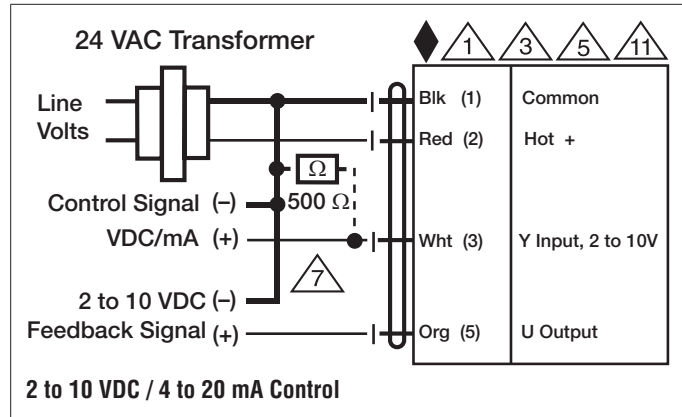
Blinking: fail-safe mechanism is active

Off: fault is detected or not in operation / capacitors charging



Date created, 02/10/2020 - Subject to change. © Belimo Aircontrols (USA), Inc.

| Accessories |   |
|-------------|---|
| AH-GMA      | Actuator arm  |
| AV8-25      | Shaft extension   |
| KG10A       | Ball joint  |
| K-GM20      | Standard GK/GM clamp (1/2" to 1.05").   |
| KH10        | Damper crank arm  |
| SH10        | Push rod for KG10A ball joint (36" L, 3/8" diameter).   |
| TOOL-07     | 13 mm wrench.   |
| ZG-100      | Univ. right angle bracket 17"x11-1/8"x6" (HxWxbase).  |
| ZG-101      | Univ. right angle bracket 13x11x7-7/16" (HxWxbase).   |
| ZG-103      | Univ. right angle bracket 7-1/2x11x2-3/4" (HxWxbase).   |
| ZG-104      | Univ. right angle bracket 13-5/8x7-1/2x4" (HxWxbase).   |
| ZG-109      | Right angle bracket for ZS-260.   |
| ZG-110      | Stand-off bracket for ZS-260.   |
| ZG-DC1      | Damper clip for damper blade, 3.5" width.   |
| ZG-DC2      | Damper clip for damper blade, 6" width.   |
| ZG-GMA      | Mounting kit for linkage operation  |
| ZG-JSA-1    | 1" diameter jackshaft adaptor (11" L).  |
| ZG-JSA-2    | 1-5/16" diameter jackshaft adaptor (12" L).   |
| ZG-JSA-3    | 1.05" diameter jackshaft adaptor (12" L).   |
| Z-GMA       | Base plate extension  |
| ZS-100      | Weather shield - galvaneal 13x8x6" (LxWxD).   |
| ZS-101      | Base plate for ZS-100.  |
| ZS-150      | Weather shield - PC w/ foam seal 16x8-3/8x4" (LxWxD).   |
| ZS-260      | Explosion proof housing.  |
| ZS-300      | NEMA 4X, 304 stainless steel enclosure.   |
| ZS-300-5    | NEMA 4X, 316L stainless steel enclosure.  |
| ZS-300-C1   | 1/2" shaft adaptor, standard with ZS-300(-5).   |
| ZS-300-C2   | 3/4" shaft adaptor for ZS-300(-5).  |
| ZS-300-C3   | 1" shaft adaptor for ZS-300(-5).  |
| EF-P        | Anti-rotation bracket EFB(X)/GKB(X)/GMB(X).   |
| ZG-120      | Jackshaft mounting bracket.   |
| IRM-100     | Input rescaling module for modulating actuators.  |
| P10000A GR  | Feedback potentiometer for damper actuators and rotary actuators  |
| P1000A GR   | Feedback potentiometer for damper actuators and rotary actuators  |
| P140A GR    | Feedback potentiometer for damper actuators and rotary actuators  |
| P2800A GR   | Feedback potentiometer for damper actuators and rotary actuators  |
| P475        | Shaft mount, non-Mercury aux. switch for 1/2" dia. shafts.  |
| P475-1      | Shaft mount, non-Mercury aux. switch for 1" dia. shafts.  |
| P5000A GR   | Feedback potentiometer for damper actuators and rotary actuators  |
| P500A GR    | Feedback potentiometer for damper actuators and rotary actuators  |
| PS-100      | Low voltage and control signal simulator.   |
| PTA-250     | Pulse width modulation interface for modulating actuators.  |
| S1A         | Auxiliary switch for damper actuators and rotary actuators  |
| S2A         | Auxiliary switch for damper actuators and rotary actuators  |
| SGA24       | Positioners suitable for use with the modulating damper actuators LM..A-SR, NM..A-SR, SM..A-SR and GM..A-SR |
| SGF24       | Positioners suitable for use with the modulating damper actuators LM..A-SR, NM..A-SR, SM..A-SR and GM..A-SR |
| TF-CC US    | Cable conduit connector, 1/2".  |
| ZG-R01      | 4 to 20 mA adaptor, 500Ω, 1/4 W resistor w 6" pigtail wires.  |
| ZG-R02      | 50% voltage divider kit (resistors with wires).   |
| ZG-SGF      | Mounting plate for SGF.   |
| ZG-X40      | 120 to 24 VAC, 40 VA transformer.   |
| Z-SPA       | Adapter   |



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## Typical Specification

Modulating control, electronic fail-safe damper actuators shall be electronic direct-coupled type, which require no crank arm and linkage and be capable of direct mounting to shaft up to 1.05" diameter. Actuators must provide modulating damper control response to a 2 to 10 VDC or, with the addition of a 500  $\Omega$  resistor, a 4 to 20 mA control input from an electronic controller or positioner. Actuators shall have brushless DC motor technology and be protected from overload at all angles of rotation. Actuators shall have reversing switch and manual override on the cover. Run time shall be constant and independent of torque. A 2 to 10 VDC feedback signal shall be provided for position feedback. Actuators shall be cULus listed, have a 5-year warranty, and be manufactured under ISO 9001 International Quality Control Standards. Actuators shall be as manufactured by Belimo.

## Wiring Diagrams



### **WARNING! LIVE ELECTRICAL COMPONENTS!**

During installation, testing, servicing and troubleshooting of this product, it may be necessary to work with live electrical components. Have a qualified licensed electrician or other individual who has been properly trained in handling live electrical components perform these tasks. Failure to follow all electrical safety precautions when exposed to live electrical components could result in death or serious injury.



Meets cULus requirements without the need of an electrical ground connection.



Provide overload protection and disconnect as required.



Actuators may also be powered by 24 VDC.



Only connect common to negative (-) leg of control circuits.



A 500  $\Omega$  resistor (ZG-R01) converts the 4 to 20 mA control signal to 2 to 10 VDC.



Actuators may be connected in parallel if not mechanically linked. Power consumption and input impedance must be observed.