

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

Modulating Control, Fail-Safe Operation, Direct Coupled, 24 V, for DC 2...10 V and 4 to 20mA, Torque min. 54 in-lb for control damper surfaces up to 12 sq ft.



5-year warranty



Technical data

<b>Electrical data</b>	Nominal voltage	AC/DC 24 V
	Nominal voltage frequency	50/60 Hz
	Power consumption in operation	11 W
	Power consumption in rest position	3 W
	Transformer sizing	22 VA (class 2 power source)
	Electrical Connection	18 GA plenum cable, 3 ft [1 m], with 1/2" conduit connector
	Overload Protection	electronic throughout 0...95° rotation
	Electrical Protection	actuators are double insulated
<b>Functional data</b>	Torque motor	54 in-lb [6 Nm]
	Operating range Y	2...10 V
	Operating range Y note	4...20 mA w/ ZG-R01 (500 Ω, 1/4 W resistor)
	Input Impedance	100 kΩ for 2...10 V (0.1 mA), 500 Ω for 4...20 mA
	Position feedback U	2...10 V
	Position Feedback	2...10 V, Max. 0.5 mA
	Position feedback U note	Max. 0.5 mA
	Setting fail-safe position	adjustable with dial 0...100% in 10% increments
	Bridging time	0 s delay before fail-safe activates
	Pre-charging time	9...15 s
	Direction of motion motor	selectable with switch 0/1
	Direction of motion fail-safe	reversible with switch
	Manual override	external push button
	Angle of rotation	Max. 95°, adjustable with mechanical stop
	Angle of rotation note	adjustable with mechanical stop
	Running Time (Motor)	4 s constant, independent of load
	Running time motor note	constant, independent of load
	Running time fail-safe	<4 s
	Noise level, motor	60 dB(A)
	Noise level, fail-safe	60 dB(A)
Shaft Diameter	1/2...1.05" round, centers on 1/2" and 3/4" with insert, 1.05" without insert	
Position indication	Mechanically, 30...65 mm stroke	
<b>Safety data</b>	Degree of protection IEC/EN	IP54
	Degree of protection NEMA/UL	NEMA 2
	Enclosure	UL Enclosure Type 2
	Agency Listing	cULus acc. to UL60730-1A/-2-14, CAN/CSA E60730-1:02, CE acc. to 2014/30/EU
	Quality Standard	ISO 9001
	Ambient temperature	-22...122°F [-30...50°C]

Storage temperature	-40...176°F [-40...80°C]
Ambient humidity	max. 95% r.H., non-condensing
Servicing	maintenance-free
<b>Weight</b>	<b>Weight</b> 2.9 lb [1.3 kg]
<b>Materials</b>	<b>Housing material</b> UL94-5VA

**Product features**

**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 2 to 10 VDC or, with the addition of a 500Ω resistor, a 4 to 20 mA control input from an electronic controller or positioner. A 2 to 10 VDC feedback signal is provided for position indication. Not to be used for a master-slave application.

**Operation** The NKQ..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 black button located on the actuator cover. The NKQ..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**

LED status indicator lights sequence:

Yellow off / Green on: operation ok, no faults

Yellow off / Green blinking: fail-safe mechanism is active

Yellow on / Green off: fault is detected

Yellow off / Green off: not in operation / capacitors charging

Yellow on / Green on: adaption running

**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 Ω 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.

**Accessories**

Electrical accessories	Description	Type
		IRM-100
	Belimo PC-Tool, Software for adjustments and diagnostics	MFT-P
	Feedback potentiometer 10 kΩ add-on, grey	P10000A GR
	Feedback potentiometer 1 kΩ add-on, grey	P1000A GR
	Feedback potentiometer 140 Ω add-on, grey	P140A GR
	Feedback potentiometer 2.8 kΩ add-on, grey	P2800A GR
	Auxiliary switch, mercury-free	P475
	Auxiliary switch, mercury-free	P475-1
	Feedback potentiometer 5 kΩ add-on, grey	P5000A GR
	Feedback potentiometer 500 Ω add-on, grey	P500A GR
	Signal Simulator, Power supply AC 230 V	PS-100
		PTA-250
	Auxiliary switch 1 x SPDT add-on	S1A

Auxiliary switch 2 x SPDT add-on	S2A
Positioner for wall mounting	SGA24
Positioner for front-panel mounting	SGF24
Cable Conduit Connector 1/2"	TF-CC US
Adapter for auxiliary switch and feedback potentiometer	Z-SPA
Resistor, 500 $\Omega$ , 1/4" wire resistor with 6" pigtail wires	ZG-R01
Resistor Kit, 50% voltage divider	ZG-R02
Mounting plate for SGF.	ZG-SGF
Transformer, AC 120 V to AC 24 V, 40 VA	ZG-X40

**Mechanical accessories**
**Description**
**Type**

Actuator arm for standard shaft clamp (one-sided)	AH-25
Shaft extension 170 mm $\varnothing$ 10 mm for damper shaft $\varnothing$ 6...16 mm	AV6-20
Shaft extension 240 mm $\varnothing$ 20 mm for damper shaft $\varnothing$ 8...22.7 mm	AV8-25
Standard NKQ/AM/NM clamp (1/2" to 1.05").	K-AM25
Shaft clamp reversible, clamping range $\varnothing$ 10...20 mm	K-SA
Ball joint suitable for damper crank arm KH8	KG8
Damper crank arm Slot width 8.2 mm, for $\varnothing$ 1.05"	KH12
Damper crank arm Slot width 6.2 mm, clamping range $\varnothing$ 10...18 mm	KH6
Damper crank arm Slot width 8.2 mm, clamping range $\varnothing$ 10...18 mm	KH8
Push rod for KG6 & KG8 ball joints (36" L, 5/16" diameter).	SH8
Anti-rotation bracket TF/NKQ/AM/NM/LM.	TF-P
TOOL-06 8mm-10mm Wrench	TOOL-06
Univ. right angle bracket 17"x11-1/8"x6" (HxWxbase).	ZG-100
Univ. right angle bracket 13x11x7-7/16" (HxWxbase).	ZG-101
Univ. right angle bracket 7-1/2x11x2-3/4" (HxWxbase).	ZG-103
Univ. right angle bracket 13-5/8x7-1/2x4" (HxWxbase).	ZG-104
Jackshaft mounting bracket.	ZG-120
Damper clip for damper blade, 3.5" width.	ZG-DC1
Damper clip for damper blade, 6" width.	ZG-DC2
1" diameter jackshaft adaptor (11" L).	ZG-JSA-1
1-5/16" diameter jackshaft adaptor (12" L).	ZG-JSA-2
1.05" diameter jackshaft adaptor (12" L).	ZG-JSA-3
Mounting kit for linkage operation for flat installation	ZG-NMA
Shaft extension for 1/2" diameter shafts (3.8" L).	ZG-NMSA-1
Weather shield 13x8x6" [330x203x152 mm] (LxWxH)	ZS-100
Base Plate, for ZS-100	ZS-101
Weather shield 16x8-3/8x4" [406x213x102 mm] (LxWxH)	ZS-150

**Electrical installation**
**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.



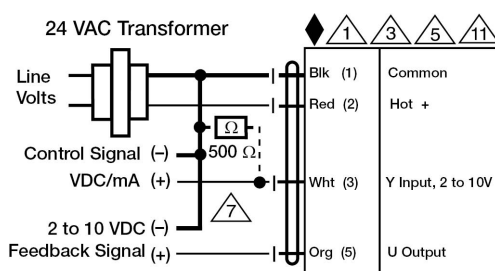
Only connect common to negative (-) leg of control circuits.



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



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



2...10 V / 4...20 mA Control

**Dimensions**

**Dimensional drawings**

