

# NKQX24-MFT Damper Actuator Technical Data Sheet

## Modulating, Electronic Fail-Safe, 24 V, Multi-Function Technology®, Quick Running



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	22 VA (class 2 power source)
Shaft Diameter	1/2...1.05" round, centers on 1/2" and 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 (default), 4...20 mA w/ ZG-R01 (500 Ω, 1/4 W resistor), variable (VDC, on/off)
Operating range Y variable	Start point 0.5...30 V End point 2.5...32 V
Input Impedance	100 kΩ for 2...10 V (0.1 mA), 500 Ω for 4...20 mA, 1500 Ω for On/Off
Position Feedback	2...10 V, Max. 0.5 mA, VDC variable
Angle of rotation	Max. 95°, adjustable with mechanical stop
Torque motor	54 in-lb [6 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 or tool 0...100% in 10% increments
Position indication	Mechanically, 30...65 mm stroke
Manual override	external push button
Running Time (Motor)	default 4 s, variable 4...10 s
Running time fail-safe	<4 s
Bridging time	programmable 0...5 s (0 s default) delay before fail-safe activates
Pre-charging time	9...18 s
Angle of rotation adaptation override control	off (default) min. position = 0% , mid. Position = 50% , max. position = 100% (Default)
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	60 dB(A)
Noise level, fail-safe	60 dB(A)
Servicing	maintenance-free
Quality Standard	ISO 9001
Weight	1.9 lb [0.86 kg]

**Torque min. 54 in-lb, for control of damper surfaces up to 12 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. A feedback signal is provided for position indication.

### Default/Configuration

Default parameters for 2 to 10 VDC applications of the NKQ.-MFT actuator are assigned during manufacturing. If required, custom versions of the actuator can be ordered. The parameters are variable and can be changed by three means: Factory pre-set or custom configuration, set by the customer using PC-Tool software or the handheld ZTH US.

### Operation

The NKQ.-24-MFT 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-MFT 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

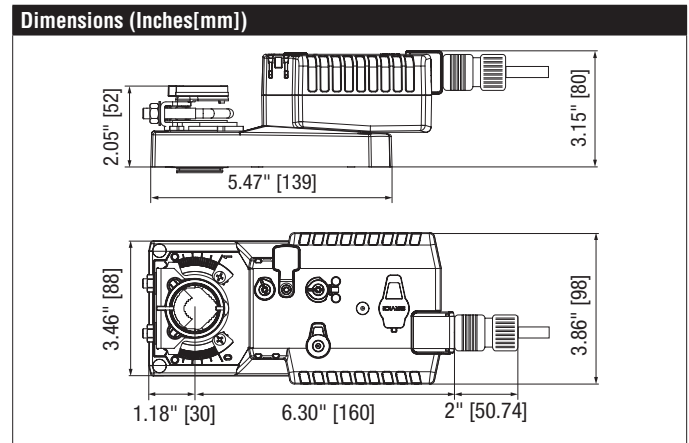
Yellow off / Green blinking: fail-safe mechanism is active

Yellow on / Green off: fault is detected

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

Yellow on / Green on: adaption running

Yellow blinking / Green on: communication with programming tool



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

\*Variable when configured with MFT options.

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



# NKQX24-MFT Damper Actuator Technical Data Sheet

Modulating, Electronic Fail-Safe, 24 V, Multi-Function Technology®, Quick Running

Weight | 1.9 lb [0.86 kg]

\*Variable when configured with MFT options.

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

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

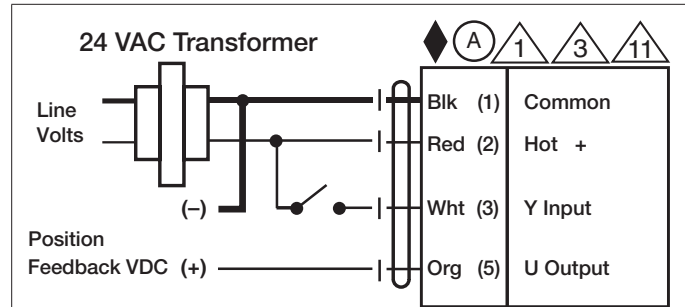
# NKQX24-MFT Damper Actuator Technical Data Sheet

Modulating, Electronic Fail-Safe, 24 V, Multi-Function Technology®, Quick Running

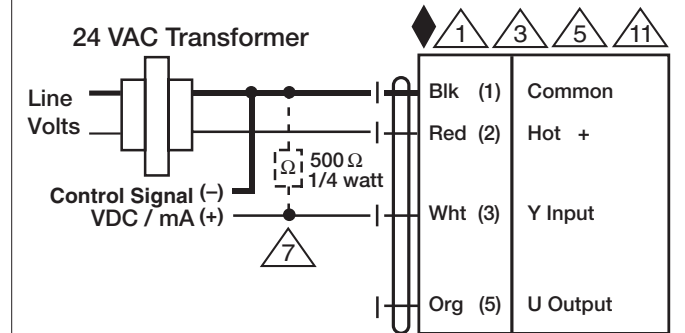


## Accessories

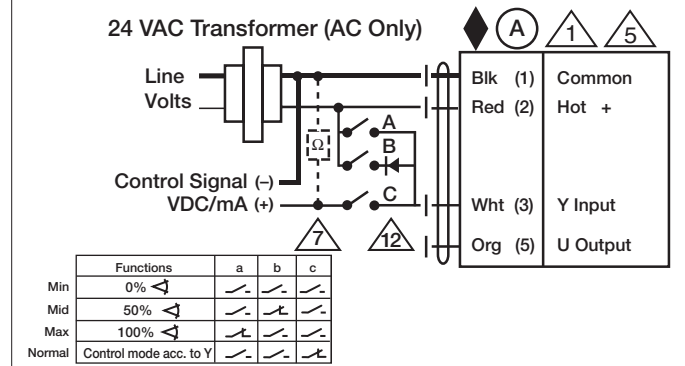
AH-25	Actuator arm
AV6-20	Shaft extension
AV8-25	Shaft extension
K-AM25	Standard NKQ/AM/NM clamp (1/2" to 1.05").
KG8	Ball joint
KH8	Damper crank arm
K-SA	Shaft clamp reversible
SH8	Push rod for KG6 & KG8 ball joints (36" L, 5/16" diameter).
TF-P	Anti-rotation bracket TF/NKQ/AM/NM/LM.
TOOL-06	8 mm and 10 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-DC1	Damper clip for damper blade, 3.5" width.
ZG-DC2	Damper clip for damper blade, 6" width.
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).
ZG-NMA	Mounting kit for linkage operation
ZG-NMSA-1	Shaft extension for 1/2" diameter shafts (3.8" L).
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).
ZG-120	Jackshaft mounting bracket.
IRM-100	Input rescaling module for modulating actuators.
MFT-P	Belimo PC-Tool
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".
UK24BAC	Gateway MP to BACnet MS/TP
UK24LON	Gateway MP to LonWorks
UK24MOD	Gateway MP to Modbus RTU
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.
ZK1-GEN	Connection cable
ZK2-GEN	Connection cable
ZTH US	Handheld programming tool w/ ZK1-GEN, ZK2-GEN, ZK6-GEN.



On/Off



VDC/mA Control



Override Control

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

## 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.



Actuators with appliance cables are numbered.



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.



IN4004 or IN4007 diode. (IN4007 supplied, Belimo part number 40155).