



5-year warranty



**MFT**

## 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 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
<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, 1500 Ω for On/Off
	Operating range Y variable	Start point 0.5...30 V End point 2.5...32 V
	Options positioning signal	variable (VDC, on/off)
	Position feedback U	2...10 V
	Position Feedback	2...10 V, Max. 0.5 mA, VDC variable
	Position feedback U note	Max. 0.5 mA
	Position feedback U variable	VDC variable
	Setting fail-safe position	adjustable with dial or tool 0...100% in 10% increments
	Bridging time	programmable 0...5 s (0 s default) delay before fail-safe activates
	Pre-charging time	9...18 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)	default 4 s, variable 4...10 s
	Running time motor variable	4...10 s
Running time fail-safe	<4 s	
Angle of rotation adaptation	off (default)	
Override control	MIN (minimum position) = 0% MID (intermediate position) = 50% MAX (maximum position) = 100%	
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>	Weight	1.9 lb [0.86 kg]
	<b>Materials</b>	
	Housing material	UL94-5VA

**Product features**

<b>Default/Configuration</b>	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.
<b>Application</b>	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.
<b>Operation</b>	<p>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.</p> <p>Fail-Safe Indication</p> <p>LED status indicator lights sequence:</p> <p>Yellow off / Green on: operation ok, no faults</p> <p>Yellow off / Green blinking: fail-safe mechanism is active</p> <p>Yellow on / Green off: fault is detected</p> <p>Yellow off / Green off: not in operation / capacitors charging</p> <p>Yellow on / Green on: adaption running</p> <p>Yellow blinking / Green on: communication with programming tool</p>
<b>Typical specification</b>	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.
<b>Factory settings</b>	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.

**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
	Gateway MP to BACnet MS/TP	UK24BAC
	Gateway MP to LonWorks	UK24LON
	Gateway MP to Modbus RTU	UK24MOD
	Resistor, 500 Ω, 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
	Connection cable 16 ft [5 m], A: RJ11 6/4 ZTH EU, B: 6-pin for connection to service socket	ZK1-GEN
	Connection cable 16 ft [5 m], A: RJ11 6/4 ZTH EU, B: free wire end for connection to MP/PP terminal	ZK2-GEN
	Connection cable 10 ft [3 m], A: RJ11 6/4 ZTH EU, B: 3-pin Weidmüller and supply connection	ZK4-GEN
	Service Tool, with ZIP-USB function, for configurable and communicative Belimo actuators / VAV controller and HVAC performance devices	ZTH US
Mechanical accessories	Description	Type
	Actuator arm for standard shaft clamp (one-sided)	AH-25
	Shaft extension 170 mm Ø10 mm for damper shaft Ø 6...16 mm	AV6-20
	Shaft extension 240 mm Ø20 mm for damper shaft Ø 8...22.7 mm	AV8-25
	Standard NKQ/AM/NM clamp (1/2" to 1.05").	K-AM25
	Shaft clamp reversible, clamping range Ø10...20 mm	K-SA
	Ball joint suitable for damper crank arm KH8	KG8
	Damper crank arm Slot width 8.2 mm, for Ø1.05"	KH12
	Damper crank arm Slot width 6.2 mm, clamping range Ø10...18 mm	KH6
	Damper crank arm Slot width 8.2 mm, clamping range Ø10...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)  
 Base Plate, for ZS-100  
 Weather shield 16x8-3/8x4" [406x213x102 mm] (LxWxH)

ZS-100  
 ZS-101  
 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.

Ⓐ Actuators with appliance cables are numbered.

⚠ Provide overload protection and disconnect as required.

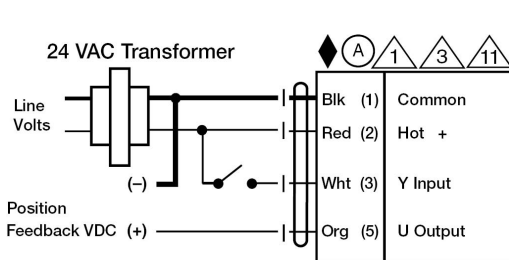
⚠ Actuators may also be powered by 24 VDC.

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

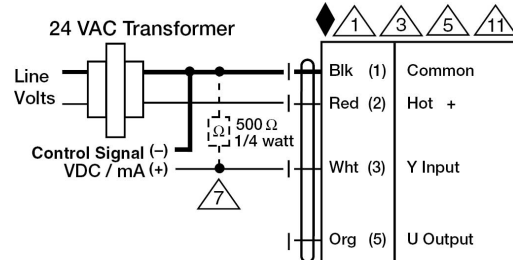
⚠ A 500 Ω resistor (ZG-R01) converts the 4...20 mA control signal to 2...10 V.

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

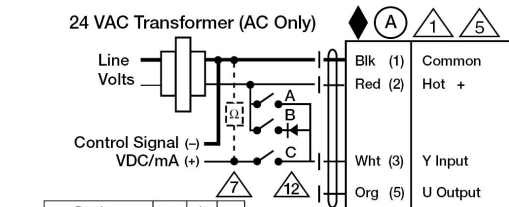
⚠ IN4004 or IN4007 diode. (IN4007 supplied, Belimo part number 40155).



On/Off



VDC/mA Control



Functions	a	b	c
Min 0%	✓	✓	✓
Mid 50%	✓	✓	✓
Max 100%	✓	✓	✓
Normal Control mode acc. to Y	✓	✓	✓

Override Control

Dimensions

Dimensional drawings

