

## Minimum 90 in-lb torque

- For damper areas up to 22 sq-ft\*



All Actuators have BDCM

## NM Series - At A Glance

		<i>NMMB(X)24-3 (p. 170)</i>	<i>NMNCB24-3 (p. 170)</i>	<i>NMMX120-3 (p. 174)</i>	<i>NMMB(X)24-SR (p. 176)</i>	<i>NMNCB24-SR (p. 178)</i>	<i>NMMX120-SR (p. 180)</i>	<i>NMMB(X)24-MFT (p. 182)</i>	<i>NMMX24-MFT95 (p. 186)</i>	<i>NMMX24-PC (p. 188)</i>	<i>NMNCX24-MFT (p. 184)</i>	<i>NMMOB(X)24-1 (p. 190)</i>	<i>NMMOB(X)24-MFT (p. 192)</i>
Basic Product		•	•		•	•		•	•			•	•
Flexible Product		•		•	•		•	•	•	•	•	•	•
Torque	90 in-lb [10 Nm]	•	•	•	•	•	•	•	•	•	•		
	70 in-lb [8 Nm]**											•	•
Angle of Rotation	95 degrees	•	•	•	•	•	•	•	•	•	•	•	•
Power Supply	24 VAC/DC	•	•		•	•		•	•	•	•	•	•
	100 to 240 VAC			•			•						
Control Input	On/Off											•	
	On/Off, Floating Point	•	•	•									
	2 to 10 VDC (4 to 20mA)				•	•	•	•					
	Multi-Function Technology								•		•		•
	0 to 135 Ohm									•			
	0 to 20V Phasecut												
Feedback	None	•	•	•	•							•	
	2 to 10 VDC				•	•	•						
	Variable (0 to 10 VDC)							•	•	•			•
Running Time	95 seconds	•			•								
	45 seconds		•			•							
	Adj. 45 to 150 seconds	•		•	•		•	•	•	•			
	Adj. 20 to 75 seconds										•		
	Adj. 4 to 15 seconds											•	•
Wiring	Plenum Rated Cable	•	•		•	•		•	•	•	•	•	•
	Appliance Rated Cable			•			•						
	Terminal Strip	•			•								
	Conduit Fitting	•	•	•	•	•	•	•	•	•	•	•	•
Auxiliary Switch	Add-On	•	•	•	•	•	•	•	•		•	•	

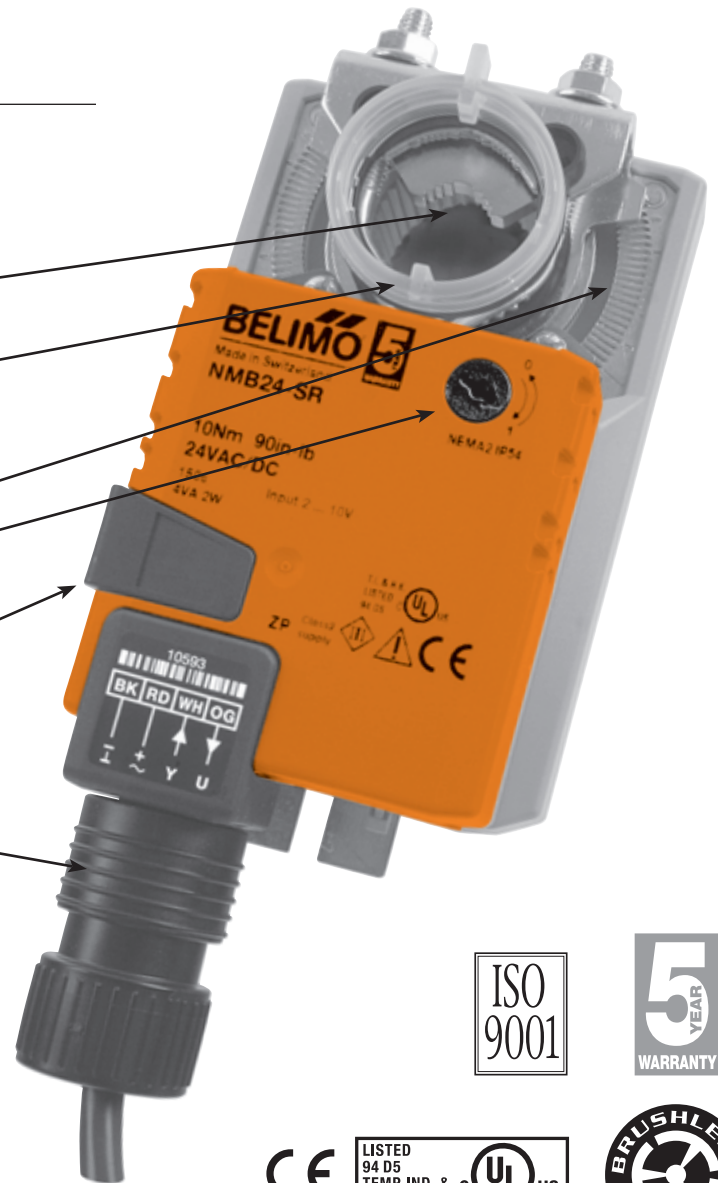
Installation and Operation... (page 265).

\*Based on 4 in-lb/ft<sup>2</sup> damper torque loading. Parallel blade. No edge seals.

\*\*Torque variable based on running time.

# A CLOSER LOOK...

- Brushless DC Motor for Added Accuracy and Controllability.
- Cut Labor Costs with Simple Direct Coupling.
- Self-Centers on 1/2", 3/4", and 1.05" Jackshafts with Standard Clamp.
- Check Damper Position with Clear Position Indicator.
- Don't Worry about Actuator Burn-Out; Belimo is Overload Proof throughout Rotation.
- Enjoy Added Flexibility with Easy Mechanical Stops to Adjust Angle of Rotation.
- Need to Change Control Direction? Do it easily with a Simple Switch.
- Easily Accessible Manual Override Button helps you Pre-Tension Damper Blades.
- Auxiliary Switch and Feedback Potentiometer Add-Ons Mount Directly on Clamp, Includes Conduit Connector.
- Standard 3ft Plenum Rated Cable and Conduit Connector Provided on Basic Models.
- Added Flexibility to Select Clamp, Electrical Connection, and Running Time to fit your Specific Application with Belimo's New Flexible Line of Actuators.



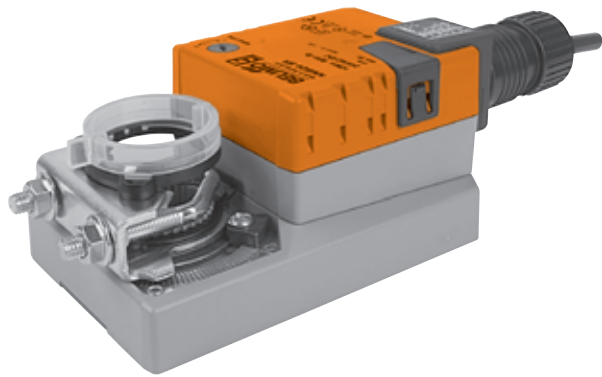
## The Belimo Difference

- **Customer Commitment.**  
Extensive product range. Application assistance.  
Same-day shipments. Free technical support. Five year warranty.
- **Low Installation and Life-Cycle Cost.**  
Easy installation. Accuracy and repeatability.  
Low power consumption. No maintenance.
- **Long Service Life.**  
Components tested before assembly. Every product tested before shipment.  
30+ years direct coupled actuator design.

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# NMB(X)24-3

On/Off-Floating Point Control, Non-Spring Return, Direct Coupled, 24V



Technical Data	NMB(X)24-3(-T)
Power Supply	24 VAC ± 20% 50/60 Hz 24 VDC ± 10%
Power Consumption	2 W (0.2 W)
Transformer Sizing	4 VA (Class 2 power source)
Electrical Connection	18 GA plenum rated cable 1/2" conduit connector Protected NEMA 2 (IP54) <input type="checkbox"/> 3 ft [1m] <input type="checkbox"/> 10 ft [3m] <input type="checkbox"/> 16 ft [5m]
Overload Protection	electronic throughout 0 to 95° rotation
Control	on/off, floating point
Input Impedance	600 Ω
Angle of Rotation	max. 95°, adjust. with mechanical stop
Torque	90 in-lb [10 Nm]
Direction of Rotation	reversible with  switch
Position Indication	reflective visual indicator (snap-on)
Manual Override	external push button
Running Time	95 seconds (default) constant independent of load
Humidity	5 to 95% RH non condensing (EN 60730-1)
Ambient Temperature	-22°F to 122°F [-30°C to 50°C]
Storage Temperature	-40°F to 176°F [-40°C to 80°C]
Housing	NEMA 2, IP54, UL enclosure type 2
Housing Material	UL94-5VA
Agency Listings†	cULus acc. to UL 60730-1A/-2-14, CAN/CSA E60730-1:02, CE acc. to 2004/108/EEC and 2006/95/EC
Noise Level	<45dB(A)
Servicing	maintenance free
Quality Standard	ISO 9001
Weight	1.7 lbs [0.75 Kg]

NMB(X)24-3-T	
Electrical connection	screw terminal (for 26 to 14 GA wire) <input type="checkbox"/> unprotected (NEMA 1/IP20) <input type="checkbox"/> protected (NEMA 2/IP20)

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

Torque min. 90 in-lb for control of damper surfaces up to 22 sq ft.

## Application

For on/off and floating point 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, 1/2" self-centered default. A crankarm and several mounting brackets are available for applications where the actuator cannot be direct coupled to the damper shaft.

## Operation

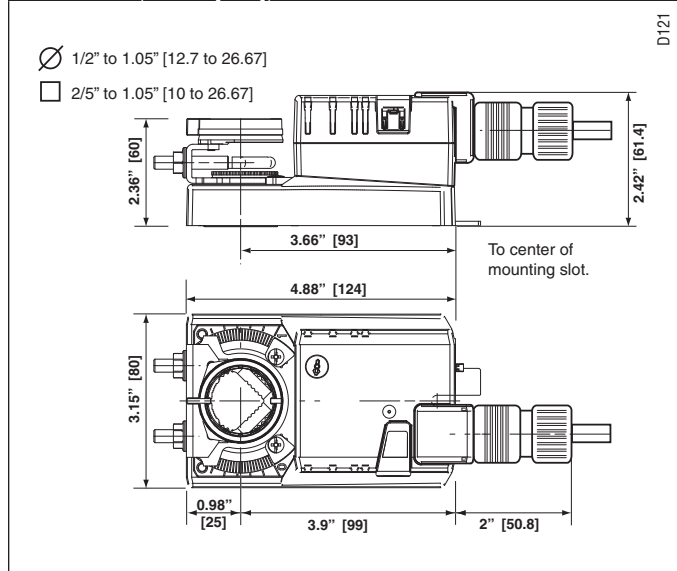
The actuator is not provided with and does not require any limit switches, but is electronically protected against overload. The anti-rotation strap supplied with the actuator will prevent lateral movement.

The NMB(X) series provides 95° of rotation and a visual indicator indicates position of the actuator. When reaching the damper or actuator end position, the actuator automatically stops. The gears can be manually disengaged with a button on the actuator cover.

The NMB(X)24-3... actuators use a sensorless Brushless DC motor, which is controlled by an Application Specific Integrated Circuit (ASIC). The ASIC monitors and controls the actuator's rotation and provides a digital rotation sensing (DRS) function to prevent damage to the actuator in a stall condition. Power consumption is reduced in holding mode.

Add on auxiliary switches or feedback potentiometers are easily fastened directly onto the actuator body for signaling and switching functions.

## Dimensions (Inches [mm])



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Accessories	
K-NA	Reversible Clamp
ZG-100	Universal Mounting Bracket
ZG-101	Universal Mounting Bracket
ZG-103	Universal Mounting Bracket
ZG-104	Universal Mounting Bracket
ZG-NMA	Crankarm Adaptor Kit
AV8-25	Universal Shaft Extension
ZG-NMSA-1	Shaft Adaptor
ZS-T	Terminal Cover for NEMA 2
ZS-100	Weather Shield - Steel
ZS-150	Weather Shield - Polycarbonate
Tool-06	8 mm & 10 mm Wrench
S1A, S2A	Auxiliary Switch (es)
P370	Shaft Mount Auxiliary Switch
P...A	Feedback Potentiometers

**NOTE:** When using NMX24-3... actuators, only use accessories listed on this page.

### Typical Specification

Floating point, on/off control damper actuators shall be electronic direct-coupled type, which require no crankarm and linkage and be capable of direct mounting to a shaft up to 1.05" diameter. 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. If required, actuators will be provided with a screw terminal strip for electrical connections (NMX24-3-T). Run time shall be constant and independent of torque. 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 Diagram

#### ✂ INSTALLATION NOTES

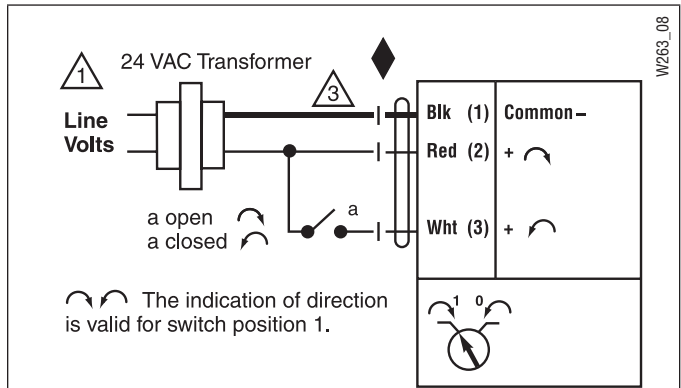
- 1 Provide overload protection and disconnect as required.
- 3 Actuators may also be powered by 24 VDC.

#### 📄 APPLICATION NOTES

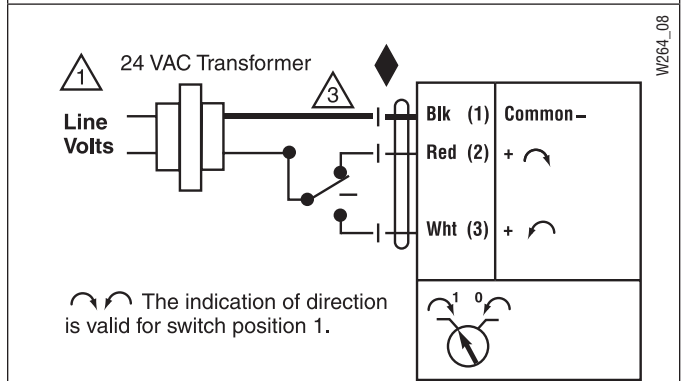
- ◆ Meets cULus or UL and CSA Standard requirements without the need of an electrical ground connection.

#### ⚠ 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.



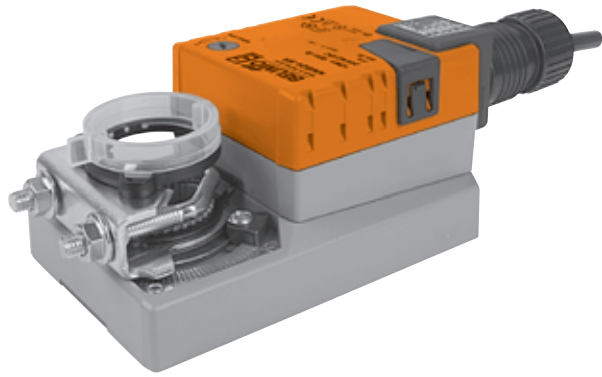
#### On/Off control



#### Floating Point or On/Off control

# NMCB24-3

On/Off-Floating Point Control, Non-Spring Return, Direct Coupled, 24V



Technical Data	NMCB24-3
Power Supply	24 VAC $\pm$ 20% 50/60 Hz 24 VDC $\pm$ 10%
Power Consumption	2 W (0.2 W)
Transformer Sizing	4 VA (Class 2 power source)
Electrical Connection	3 ft, 18 GA plenum rated cable 1/2" conduit connector Protected NEMA 2 (IP54)
Overload Protection	electronic throughout 0 to 95° rotation
Control	on/off, floating point
Input Impedance	600 $\Omega$
Angle of Rotation	max. 95°, adjust. with mechanical stop
Torque	90 in-lb [10 Nm]
Direction of Rotation	reversible with  switch
Position Indication	reflective visual Indicator (snap-on)
Manual Override	external push button
Running Time	45 seconds, constant independent of load
Humidity	5 to 95% RH non condensing (EN 60730-1)
Ambient Temperature	-22°F to 122°F [-30°C to 50°C]
Storage Temperature	-40°F to 176°F [-40°C to 80°C]
Housing	NEMA 2, IP54, UL enclosure type 2
Housing Material	UL94-5VA
Agency Listings†	cULus acc. to UL 60730-1A/-2-14, CAN/CSA E60730-1:02, CE acc. to 2004/108/EEC and 2006/95/EC
Noise Level	<45dB(A)
Servicing	maintenance free
Quality Standard	ISO 9001
Weight	1.7 lbs [0.75 Kg]

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

**Torque min. 90 in-lb for control of damper surfaces up to 22 sq ft.**

## Application

For on/off and floating point 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, 1/2" self-centered default. A crankarm and several mounting brackets are available for applications where the actuator cannot be direct coupled to the damper shaft.

## Operation

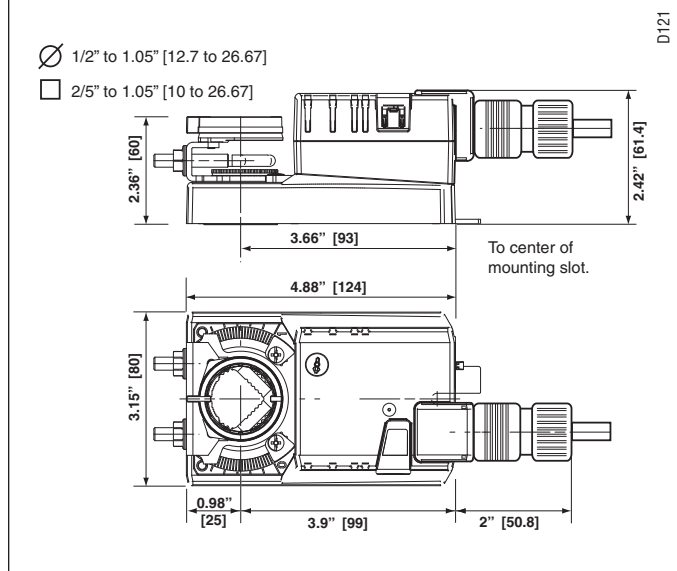
The actuator is not provided with and does not require any limit switches, but is electronically protected against overload. The anti-rotation strap supplied with the actuator will prevent lateral movement.

The NMB series provides 95° of rotation and a visual indicator indicates position of the actuator. When reaching the damper or actuator end position, the actuator automatically stops. The gears can be manually disengaged with a button on the actuator cover.

The NMCB24-3... actuators use a sensorless Brushless DC motor, which is controlled by an Application Specific Integrated Circuit (ASIC). The ASIC monitors and controls the actuator's rotation and provides a digital rotation sensing (DRS) function to prevent damage to the actuator in a stall condition. Power consumption is reduced in holding mode.

Add on auxiliary switches or feedback potentiometers are easily fastened directly onto the actuator body for signaling and switching functions.

## Dimensions (Inches [mm])



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#### Accessories

K-NA	Reversible Clamp
ZG-100	Universal Mounting Bracket
ZG-101	Universal Mounting Bracket
ZG-103	Universal Mounting Bracket
ZG-104	Universal Mounting Bracket
ZG-NMA	Crankarm Adaptor Kit
AV8-25	Universal Shaft Extension
ZG-NMSA-1	Shaft Adaptor
ZS-T	Terminal Cover for NEMA 2
ZS-100	Weather Shield - Steel
ZS-150	Weather Shield - Polycarbonate
Tool-06	8 mm & 10 mm Wrench
S1A, S2A	Auxiliary Switch (es)
P370	Shaft Mount Auxiliary Switch
P...A	Feedback Potentiometers

**NOTE:** When using NMCB24-3... actuators, only use accessories listed on this page.

#### Typical Specification

Floating point, on/off control damper actuators shall be electronic direct-coupled type, which require no crankarm and linkage and be capable of direct mounting to a shaft up to 1.05" diameter. 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. 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 Diagram

##### ✂️ INSTALLATION NOTES

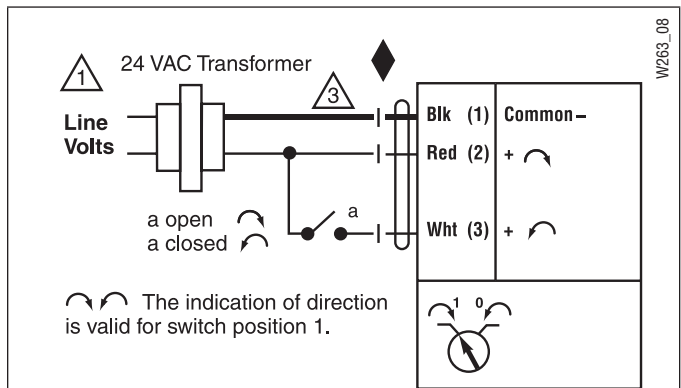
- ⚠️ 1 Provide overload protection and disconnect as required.
- ⚠️ 3 Actuators may also be powered by 24 VDC.

##### 📄 APPLICATION NOTES

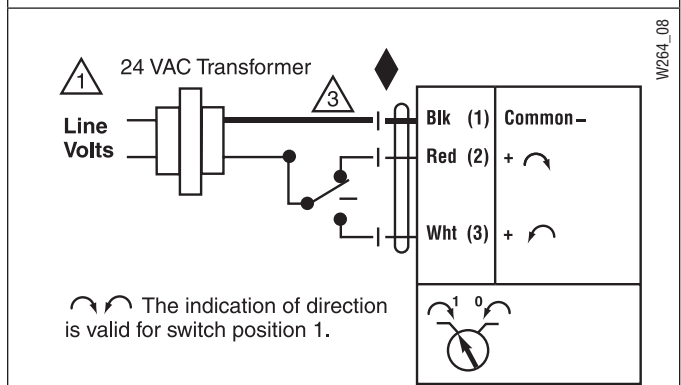
- ◆ Meets cULus or UL and CSA Standard requirements without the need of an electrical ground connection.

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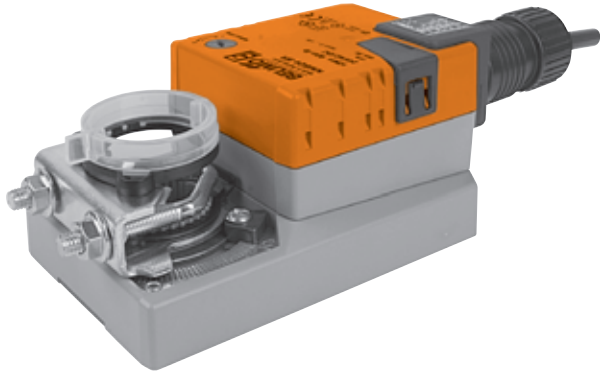
#### On/Off control



#### Floating Point or On/Off control

# NMX120-3

On/Off-Floating Point Control, Non-Spring Return, Direct Coupled, 100 to 240 VAC



Technical Data		NMX120-3
Power Supply	nominal	100 to 240 VAC, 50/60 Hz
	tolerance	85 to 265 VAC, 50/60 Hz
Power Consumption		3.5 W (0.6 W)
Transformer Sizing		5.5 VA (Class 2 power source)
Electrical Connection		18 GA appliance rated cable 1/2" conduit connector Protected NEMA 2 (IP54) □ 3 ft [1m] □ 10 ft [3m] □ 16 ft [5m]
Overload Protection		electronic throughout 0 to 95° rotation
Control		on/off, floating point
Input Impedance		600 Ω
Angle of Rotation		max. 95°, adjust. with mechanical stop
Torque		90 in-lb [10 Nm]
Direction of Rotation		reversible with  switch
Position Indication		reflective visual indicator (snap-on)
Manual Override		external push button
Running Time		□ 150 □ 95 □ 60 □ 45 seconds constant independent of load
Humidity		5 to 95% RH non condensing (EN 60730-1)
Ambient Temperature		-22°F to 122°F [-30°C to 50°C]
Storage Temperature		-40°F to 176°F [-40°C to 80°C]
Housing		NEMA 2, IP54, UL enclosure type 2
Housing Material		UL94-5VA
Agency Listings†		cULus acc. to UL 60730-1A/-2-14, CAN/CSA E60730-1:02, CE acc. to 2004/108/EEC and 2006/95/EC
Noise Level		<45dB(A)
Servicing		maintenance free
Quality Standard		ISO 9001
Weight		1.7 lbs [0.75 Kg]

†Rated Impulse Voltage 4kV, Type of action 1, Control Pollution Degree 3.

Torque min. 90 in-lb for control of damper surfaces up to 22 sq ft.

## Application

For on/off and floating point 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, 1/2" self-centered default. A crankarm and several mounting brackets are available for applications where the actuator cannot be direct coupled to the damper shaft.

## Operation

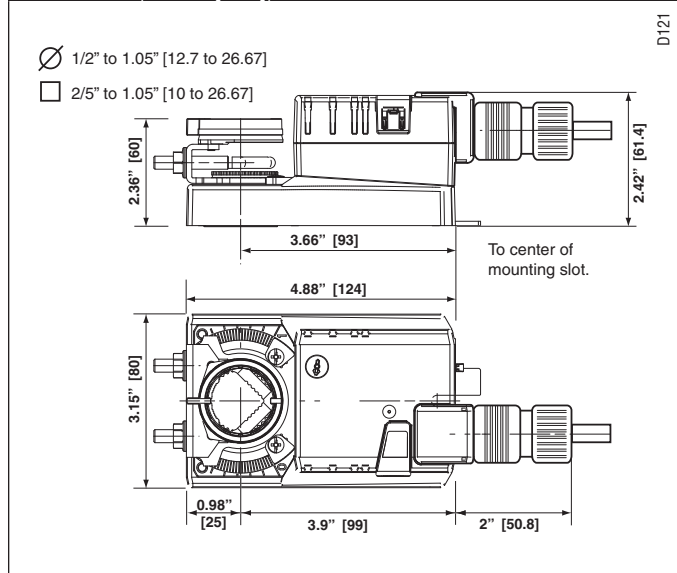
The actuator is not provided with and does not require any limit switches, but is electronically protected against overload. The anti-rotation strap supplied with the actuator will prevent lateral movement.

The NMX series provides 95° of rotation and a visual indicator indicates position of the actuator. When reaching the damper or actuator end position, the actuator automatically stops. The gears can be manually disengaged with a button on the actuator cover.

The NMX120-3... actuators use a sensorless Brushless DC motor, which is controlled by an Application Specific Integrated Circuit (ASIC). The ASIC monitors and controls the actuator's rotation and provides a digital rotation sensing (DRS) function to prevent damage to the actuator in a stall condition. Power consumption is reduced in holding mode.

Add on auxiliary switches or feedback potentiometers are easily fastened directly onto the actuator body for signaling and switching functions.

## Dimensions (Inches [mm])



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### Accessories

K-NA	Reversible Clamp
ZG-100	Universal Mounting Bracket
ZG-101	Universal Mounting Bracket
ZG-103	Universal Mounting Bracket
ZG-104	Universal Mounting Bracket
ZG-NMA	Crankarm Adaptor Kit
AV8-25	Universal Shaft Extension
ZG-NMSA-1	Shaft Adaptor
ZS-100	Weather Shield - Steel
ZS-150	Weather Shield - Polycarbonate
Tool-06	8 mm & 10 mm Wrench
S1A, S2A	Auxiliary Switch (es)
P370	Shaft Mount Auxiliary Switch
P...A	Feedback Potentiometers

**NOTE:** When using NMX120-3 actuators, only use accessories listed on this page.

### Typical Specification

Floating point, on/off control damper actuators shall be electronic direct-coupled type, which require no crankarm and linkage and be capable of direct mounting to a shaft up to 1.05" diameter. 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. 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 Diagram

#### ✂ INSTALLATION NOTES

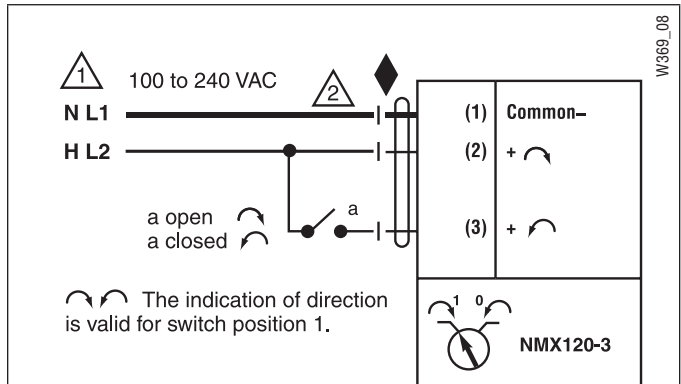
⚠ Provide overload protection and disconnect as required.

#### 📄 APPLICATION NOTES

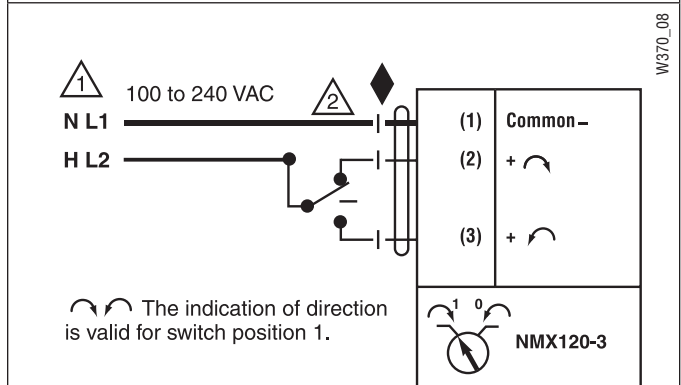
◆ Meets cULus or UL and CSA Standard requirements without the need of an electrical ground connection.

#### ⚠ WARNING Live Electrical Components!

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#### On/Off control

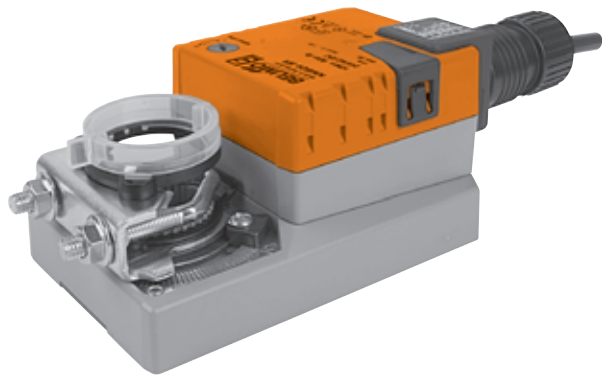


#### Floating Point or On/Off control



# NMB(X)24-SR

Proportional Control, Non-Spring Return, Direct Coupled, 24V, for 2 to 10 VDC and 4 to 20 mA



Technical Data	NMB(X)24-SR(-T)
Power Supply	24 VAC $\pm$ 20% 50/60 Hz 24 VDC $\pm$ 10%
Power Consumption	2.5 W (0.4 W)
Transformer Sizing	5 VA (Class 2 power source)
Electrical Connection	18 GA plenum rated cable 1/2" conduit connector Protected NEMA 2 (IP54) <input type="checkbox"/> 3 ft [1m] <input type="checkbox"/> 10 ft [3m] <input type="checkbox"/> 16 ft [5m]
Overload Protection	electronic throughout 0 to 95° rotation
Operating Range Y	2 to 10 VDC, 4 to 20 mA
Input Impedance	100 k $\Omega$ (0.1 mA), 500 $\Omega$
Angle of Rotation	max. 95°, adjust. with mechanical stop
Torque	90 in-lb [10 Nm]
Direction of Rotation	reversible with  switch Actuator will move: =CCW with decreasing control signal (10 to 2V) =CW with decreasing control signal (10 to 2V)
Position Indication	reflective visual indicator (snap-on)
Manual Override	external push button
Running Time	<input type="checkbox"/> 150 <input type="checkbox"/> 95 <input type="checkbox"/> 60 <input type="checkbox"/> 45 seconds constant independent of load
Humidity	5 to 95% RH non condensing (EN 60730-1)
Ambient Temperature	-22°F to 122°F [-30°C to 50°C]
Storage Temperature	-40°F to 176°F [-40°C to 80°C]
Housing	NEMA 2, IP54, UL enclosure type 2
Housing Material	UL94-5VA
Agency Listings†	cULus acc. to UL 60730-1A/-2-14, CAN/CSA E60730-1:02, CE acc. to 2004/108/EEC and 2006/95/EC
Noise Level	<45dB(A)
Servicing	maintenance free
Quality Standard	ISO 9001
Weight	1.7 lbs [0.75 Kg]

NMB(X)24-SR-T	
Electrical connection	screw terminal (for 26 to 14 GA wire) <input type="checkbox"/> unprotected (NEMA 1/IP20) <input type="checkbox"/> protected (NEMA 2/IP20)

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

Torque min. 90 in-lb for control of damper surfaces up to 22 sq ft.

## Application

For proportional modulation 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, 1/2" self centered default. A crankarm 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 500  $\Omega$  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 or master-slave applications.

## Operation

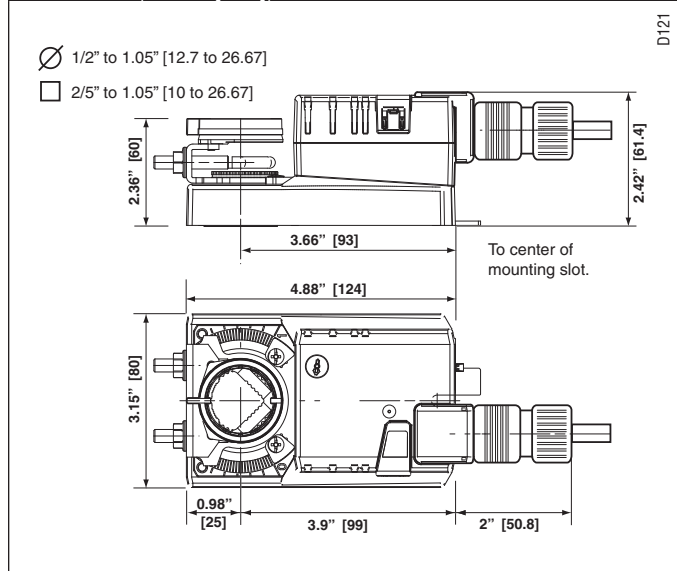
The actuator is not provided with and does not require any limit switches, but is electronically protected against overload. The anti-rotation strap supplied with the actuator will prevent lateral movement.

The NMB(X) series provides 95° of rotation and a visual indicator indicates position of the actuator. When reaching the damper or actuator end position, the actuator automatically stops. The gears can be manually disengaged with a button on the actuator cover.

The NMB(X)24-SR... actuators use a sensorless Brushless DC motor, which is controlled by an Application Specific Integrated Circuit (ASIC). The ASIC monitors and controls the actuator's rotation and provides a digital rotation sensing (DRS) function to prevent damage to the actuator in a stall condition. Power consumption is reduced in holding mode.

Add on auxiliary switches or feedback potentiometers are easily fastened directly onto the actuator body for signaling and switching functions.

## Dimensions (Inches [mm])



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Accessories	
K-NA	Reversible Clamp
ZG-100	Universal Mounting Bracket
ZG-101	Universal Mounting Bracket
ZG-103	Universal Mounting Bracket
ZG-104	Universal Mounting Bracket
ZG-NMA	Crankarm Adaptor Kit
AV8-25	Universal Shaft Extension
ZG-NMSA-1	Shaft Adaptor
ZS-T	Terminal Cover for NEMA 2
ZS-100	Weather Shield - Steel
ZS-150	Weather Shield - Polycarbonate
Tool-06	8 mm & 10 mm Wrench
S1A, S2A	Auxiliary Switch (es)
P370	Shaft Mount Auxiliary Switch
P...A	Feedback Potentiometers
SGA24	Min positioners in NEMA 4 housing
SGF24	Min positioners for flush panel mounting
PTA-250	Pulse Width Modulation Interface
IRM-100	Input Rescaling Module
ADS-100	Analog to Digital Switch
ZG-R01	Resistor for 4 to 20 mA Conversion
NSV24 US	Battery Back-Up Module
ZG-X40	Transformer

**NOTE:** When using NMB(X)24-SR... actuators, only use accessories listed on this page.

### Typical Specification

Proportional control damper actuators shall be electronic direct-coupled type, which require no crankarm and linkage and be capable of direct mounting to a shaft up to 1.05" diameter. Actuators must provide proportional damper control in 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. If required, actuator will be provided with screw terminal strip for electrical connections (NMX24-SR-T). Run time shall be constant and independent of torque. A 2 to 10 VDC feedback signal shall be provided for position indication. 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 Diagram

#### ✂ INSTALLATION NOTES

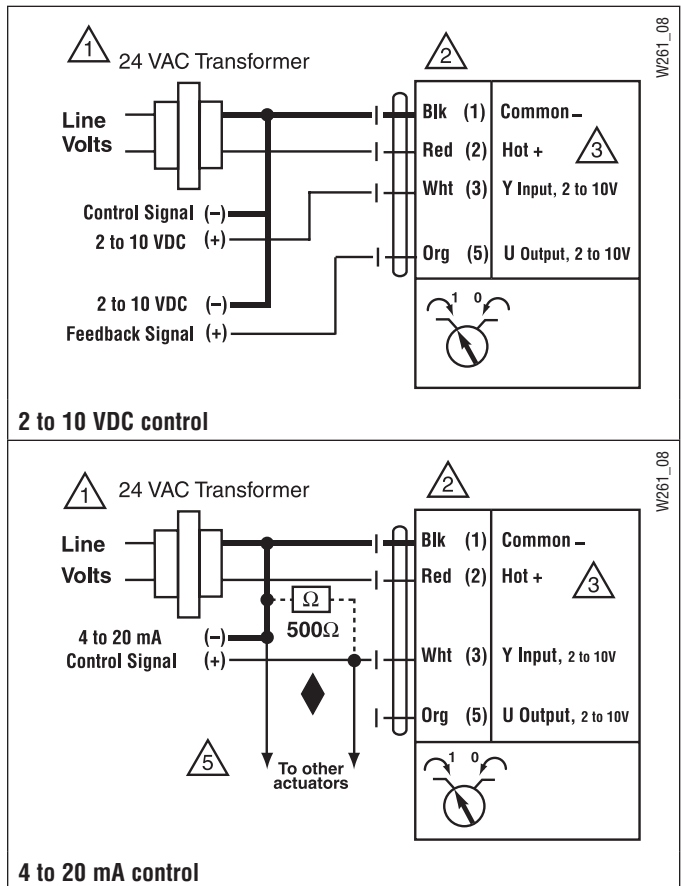
- 1 Provide overload protection and disconnect as required.
- 2 **CAUTION Equipment damage!**  
Actuators may be connected in parallel.  
Power consumption and input impedance must be observed.
- 3 Actuators may also be powered by 24 VDC.
- 5 Only connect common to neg. (-) leg of control circuits.

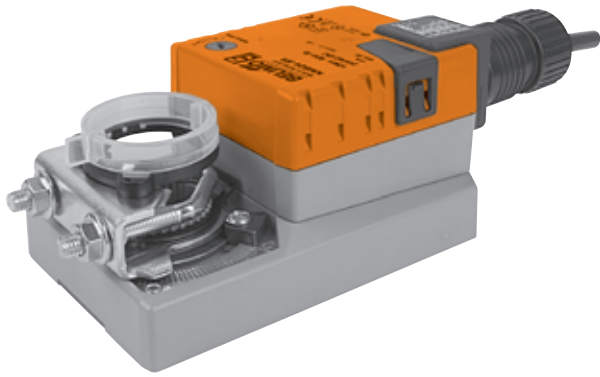
#### 📄 APPLICATION NOTES

- ◆ The ZG-R01 500 Ω resistor converts the 4 to 20 mA control signal to 2 to 10 VDC, up to 2 actuators may be connected in parallel.

#### ⚠ 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.





Technical Data	NMCB24-SR
Power Supply	24 VAC $\pm$ 20% 50/60 Hz 24 VDC $\pm$ 10%
Power Consumption	2.5 W (.4 W)
Transformer Sizing	5 VA (Class 2 power source)
Electrical Connection	3ft, 18 GA plenum rated cable 1/2" conduit connector Protected NEMA 2 (IP54)
Overload Protection	electronic throughout 0 to 95° rotation
Operating Range Y	2 to 10 VDC, 4 to 20 mA
Input Impedance	100 k $\Omega$ (0.1 mA), 500 $\Omega$
Feedback Output U	2 to 10 VDC (max 0.5 mA)
Angle of Rotation	max. 95°, adjust. with mechanical stop
Torque	90 in-lb [10 Nm]
Direction of Rotation	reversible with  switch Actuator will move: =CCW with decreasing control signal (10 to 2V) =CW with decreasing control signal (10 to 2V)
Position Indication	reflective visual indicator (snap-on)
Manual Override	external push button
Running Time	45 seconds, constant independent of load
Humidity	5 to 95% RH non condensing (EN 60730-1)
Ambient Temperature	-22°F to 122°F [-30°C to 50°C]
Storage Temperature	-40°F to 176°F [-40°C to 80°C]
Housing	NEMA 2, IP54, UL enclosure type 2
Housing Material	UL94-5VA
Agency Listings†	cULus acc. to UL 60730-1A/-2-14, CAN/CSA E60730-1:02, CE acc. to 2004/108/EEC and 2006/95/EC
Noise Level	<45dB(A)
Servicing	maintenance free
Quality Standard	ISO 9001
Weight	1.7 lbs [0.75 Kg]

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

Torque min. 90 in-lb for control of damper surfaces up to 22 sq ft.

## Application

For proportional modulation 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, 1/2" self centered default. A crankarm 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 500  $\Omega$  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 or master-slave applications.

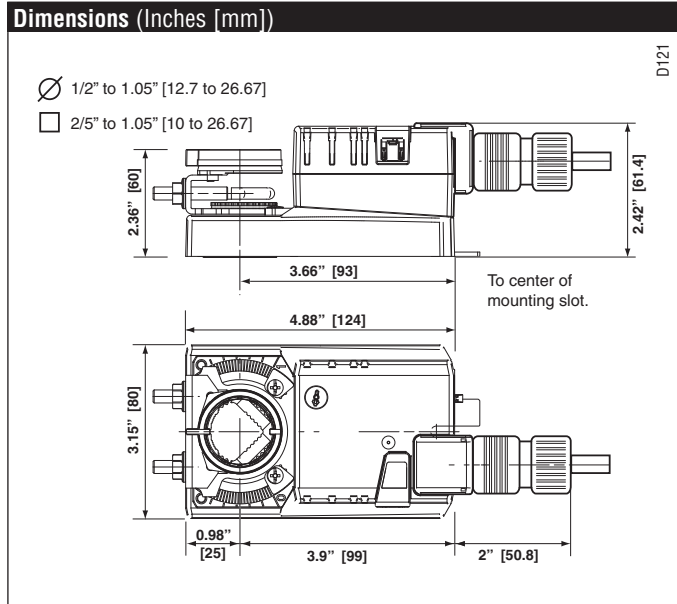
## Operation

The actuator is not provided with and does not require any limit switches, but is electronically protected against overload. The anti-rotation strap supplied with the actuator will prevent lateral movement.

The NM series provides 95° of rotation and a visual indicator indicates position of the actuator. When reaching the damper or actuator end position, the actuator automatically stops. The gears can be manually disengaged with a button on the actuator cover.

The NMCB24-SR... actuators use a sensorless Brushless DC motor, which is controlled by an Application Specific Integrated Circuit (ASIC). The ASIC monitors and controls the actuator's rotation and provides a digital rotation sensing (DRS) function to prevent damage to the actuator in a stall condition. Power consumption is reduced in holding mode.

Add on auxiliary switches or feedback potentiometers are easily fastened directly onto the actuator body for signaling and switching functions.



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#### Accessories

K-NA	Reversible Clamp
ZG-100	Universal Mounting Bracket
ZG-101	Universal Mounting Bracket
ZG-103	Universal Mounting Bracket
ZG-104	Universal Mounting Bracket
ZG-NMA	Crankarm Adaptor Kit
AV8-25	Universal Shaft Extension
ZG-NMSA-1	Shaft Adaptor
ZS-T	Terminal Cover for NEMA 2/IP54
ZS-100	Weather Shield - Steel
ZS-150	Weather Shield - Polycarbonate
Tool-06	8 mm & 10 mm Wrench
S1A, S2A	Auxiliary Switch (es)
P370	Shaft Mount Auxiliary Switch
P...A	Feedback Potentiometers
SGA24	Min positioners in NEMA 4 housing
SGF24	Min positioners for flush panel mounting
PTA-250	Pulse Width Modulation Interface
IRM-100	Input Rescaling Module
ADS-100	Analog to Digital Switch
ZG-R01	Resistor for 4 to 20 mA Conversion
NSV24 US	Battery Back-Up Module
ZG-X40	Transformer

**NOTE:** When using NMCB24-SR... actuators, only use accessories listed on this page.

#### Typical Specification

Proportional control damper actuators shall be electronic direct-coupled type, which require no crankarm and linkage and be capable of direct mounting to a shaft up to 1.05" diameter. Actuators must provide proportional damper control in 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 indication. 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 Diagram

##### ✂ INSTALLATION NOTES

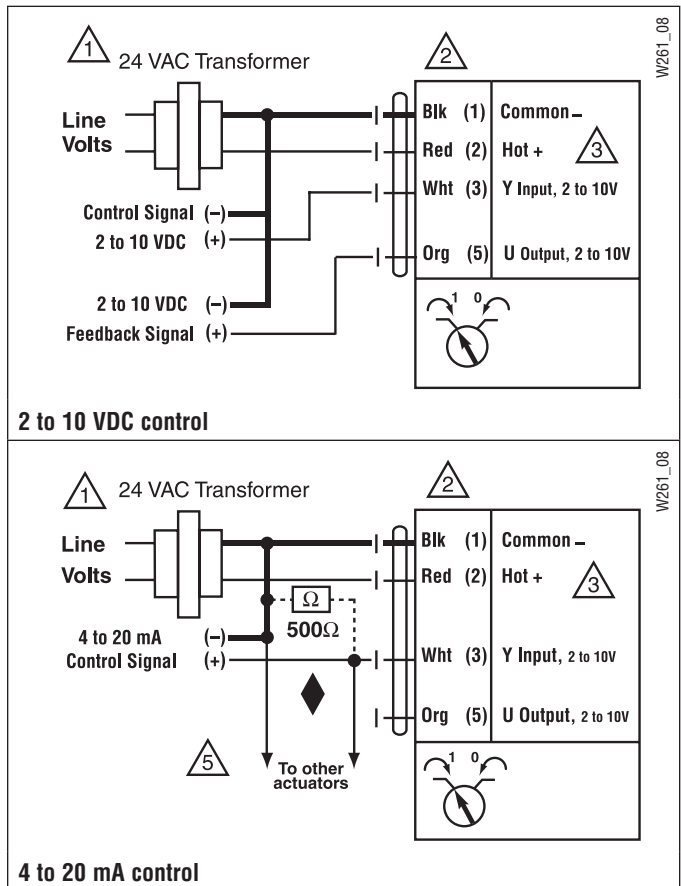
- 1 Provide overload protection and disconnect as required.
- 2 **CAUTION Equipment damage!**  
Actuators may be connected in parallel.  
Power consumption and input impedance must be observed.
- 3 Actuators may also be powered by 24 VDC.
- 5 Only connect common to neg. (-) leg of control circuits.

##### 📄 APPLICATION NOTES

- ◆ The ZG-R01 500 Ω resistor converts the 4 to 20 mA control signal to 2 to 10 VDC, up to 2 actuators may be connected in parallel.

##### ⚠ 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.





Technical Data		NMX120-SR
Power Supply	nominal	100 to 240 VAC, 50/60 Hz
	tolerance	85 to 265 VAC, 50/60 Hz
Power Consumption		3.5 W (1 W)
Transformer Sizing		6.5 VA (Class 2 power source)
Electrical Connection		18 GA appliance rated cable
		1/2" conduit connector
		Protected NEMA 2 (IP54) □ 3 ft [1m] □ 10 ft [3m] □ 16 ft [5m]
Overload Protection		electronic throughout 0 to 95° rotation
Operating Range Y		2 to 10 VDC, 4 to 20 mA
Input Impedance		100 kΩ (0.1 mA), 500 Ω
Feedback Output U		2 to 10 VDC (max 0.5 mA)
Angle of Rotation		max. 95°, adjust. with mechanical stop
Torque		90 in-lb [10 Nm]
Direction of Rotation		reversible with  switch
		Actuator will move:
		=CCW with decreasing control signal (10 to 2V) =CW with decreasing control signal (10 to 2V)
Position Indication		reflective visual indicator (snap-on)
Manual Override		external push button
Running Time		□ 150 □ 95 □ 60 □ 45 seconds
		constant independent of load
Humidity		5 to 95% RH non condensing (EN 60730-1)
Ambient Temperature		-22°F to 122°F [-30°C to 50°C]
Storage Temperature		-40°F to 176°F [-40°C to 80°C]
Housing		NEMA 2, IP54, UL enclosure type 2
Housing Material		UL94-5VA
Agency Listings†		cULus acc. to UL 60730-1A/-2-14, CAN/CSA E60730-1:02, CE acc. to 2004/108/EEC and 2006/95/EC
Noise Level		<45dB(A)
Servicing		maintenance free
Quality Standard		ISO 9001
Weight		1.7 lbs [0.75 Kg]

†Rated Impulse Voltage 4kV, Type of action 1, Control Pollution Degree 3.

Torque min. 90 in-lb for control of damper surfaces up to 22 sq ft.

## Application

For proportional modulation 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, 1/2" self centered default. A crankarm 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 500 Ω 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 or master-slave applications.

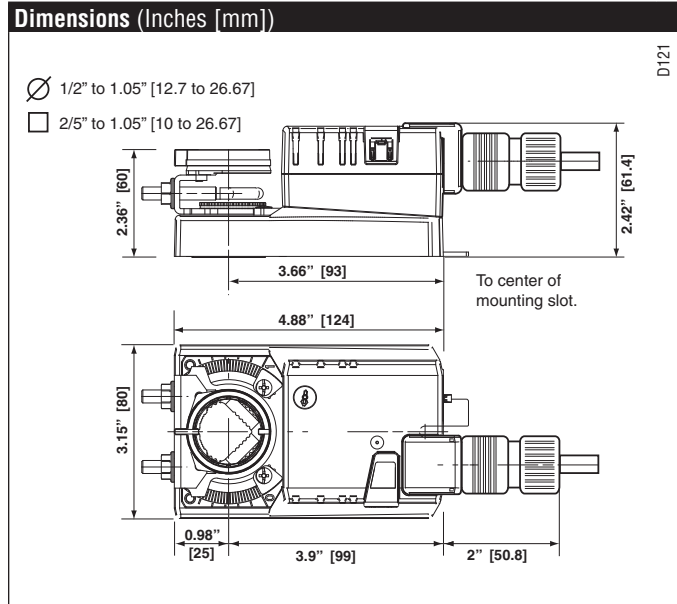
## Operation

The actuator is not provided with and does not require any limit switches, but is electronically protected against overload. The anti-rotation strap supplied with the actuator will prevent lateral movement.

The NMX series provides 95° of rotation and a visual indicator indicates position of the actuator. When reaching the damper or actuator end position, the actuator automatically stops. The gears can be manually disengaged with a button on the actuator cover.

The NMX120-SR actuators use a sensorless Brushless DC motor, which is controlled by an Application Specific Integrated Circuit (ASIC). The ASIC monitors and controls the actuator's rotation and provides a digital rotation sensing (DRS) function to prevent damage to the actuator in a stall condition. Power consumption is reduced in holding mode.

Add on auxiliary switches or feedback potentiometers are easily fastened directly onto the actuator body for signaling and switching functions.



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**Accessories**

K-NA	Reversible Clamp
ZG-100	Universal Mounting Bracket
ZG-101	Universal Mounting Bracket
ZG-103	Universal Mounting Bracket
ZG-104	Universal Mounting Bracket
ZG-NMA	Crankarm Adaptor Kit
AV8-25	Universal Shaft Extension
ZG-NMSA-1	Shaft Adaptor
ZS-100	Weather Shield - Steel
ZS-150	Weather Shield - Polycarbonate
Tool-06	8 mm & 10 mm Wrench
S1A, S2A	Auxiliary Switch (es)
P370	Shaft Mount Auxiliary Switch
P...A	Feedback Potentiometers
SGA24	Min positioners in NEMA 4 housing
SGF24	Min positioners for flush panel mounting
PTA-250	Pulse Width Modulation Interface
IRM-100	Input Rescaling Module
ADS-100	Analog to Digital Switch
ZG-R01	Resistor for 4 to 20 mA Conversion
NSV24 US	Battery Back-Up Module

**NOTE:** When using NMX120-SR actuators, only use accessories listed on this page.

**Typical Specification**

Proportional control damper actuators shall be electronic direct-coupled type, which require no crankarm and linkage and be capable of direct mounting to a shaft up to 1.05" diameter. Actuators must provide proportional damper control in 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 indication. 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 Diagram**

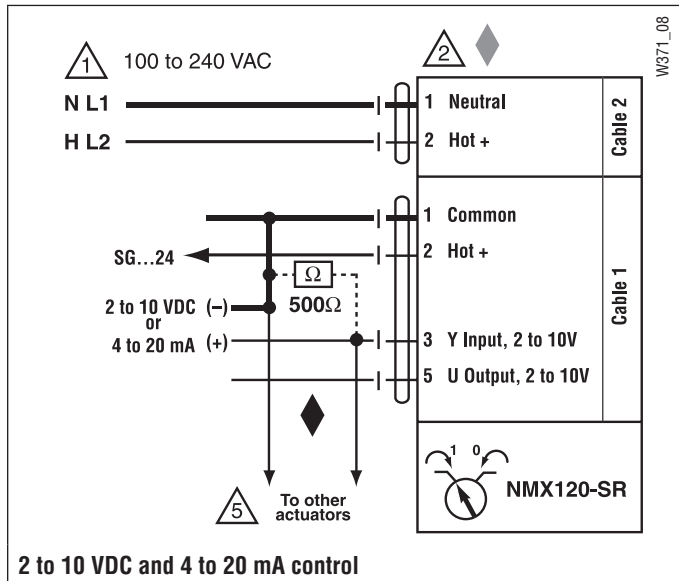
**✂ INSTALLATION NOTES**

- 1 Provide overload protection and disconnect as required.
- 2 **CAUTION Equipment damage!**  
Actuators may be connected in parallel.  
Power consumption and input impedance must be observed.
- 5 Only connect common to neg. (-) leg of control circuits.

**📄 APPLICATION NOTES**

- ◆ Meets cULus or UL and CSA Standard requirements without the need of an electrical ground connection.
- ◆ The ZG-R01 500 Ω resistor converts the 4 to 20 mA control signal to 2 to 10 VDC, up to 2 actuators may be connected in parallel.

**⚠ 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.



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Technical Data	NMB(X)24-MFT
Power Supply	24 VAC ± 20% 50/60 Hz 24 VDC ± 10%
Power Consumption	3.5 W (1.3 W)
Transformer Sizing	6 VA (Class 2 power source)
Electrical Connection	18 GA plenum rated cable 1/2" conduit connector Protected NEMA 2 (IP54) □ 3 ft [1m] □ 10 ft [3m] □ 16 ft [5m]
Overload Protection	electronic throughout 0 to 95° rotation
Operating Range Y	2 to 10 VDC, 4 to 20 mA (default) Variable (VDC, PWM, Floating Point, On/Off)
Input Impedance	100 kΩ (0.1 mA), 500 Ω 1500 Ω (PWM, Floating Point, On/Off)
Feedback Output U	2 to 10 VDC, 0.5 mA max, VDC Variable
Angle of Rotation	max. 95°, adjust. with mechanical stop electronically variable
Torque	90 in-lb [10 Nm]
Direction of Rotation	reversible with  switch
Position Indication	reflective visual indicator (snap-on)
Manual Override	external push button
Running Time	150 seconds (default) Variable (45 to 170 secs)
Humidity	5 to 95% RH non condensing (EN 60730-1)
Ambient Temperature	-22°F to 122°F [-30°C to 50°C]
Storage Temperature	-40°F to 176°F [-40°C to 80°C]
Housing	NEMA 2, IP54, UL enclosure type 2
Housing Material	UL94-5VA
Agency Listings†	cULus acc. to UL 60730-1A/-2-14, CAN/CSA E60730-1:02, CE acc. to 2004/108/EEC and 2006/95/EC
Noise Level	<45dB(A)
Servicing	maintenance free
Quality Standard	ISO 9001
Weight	2.1 lbs [0.95 Kg]

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

**Torque min. 90 in-lb for control of damper surfaces up to 22 sq ft.**

## Application

For proportional modulation 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, 1/2" self centered default. A crankarm and several mounting brackets are available for applications where the actuator cannot be direct coupled to the damper shaft.

The default parameters for 2 to 10 VDC applications of the ...MFT actuator are assigned during manufacturing. If necessary, custom versions of the actuators can be ordered. The parameters can be changed by two means: pre-set and custom configurations from Belimo or on-site configurations using the Belimo PC-Tool software.

## Operation

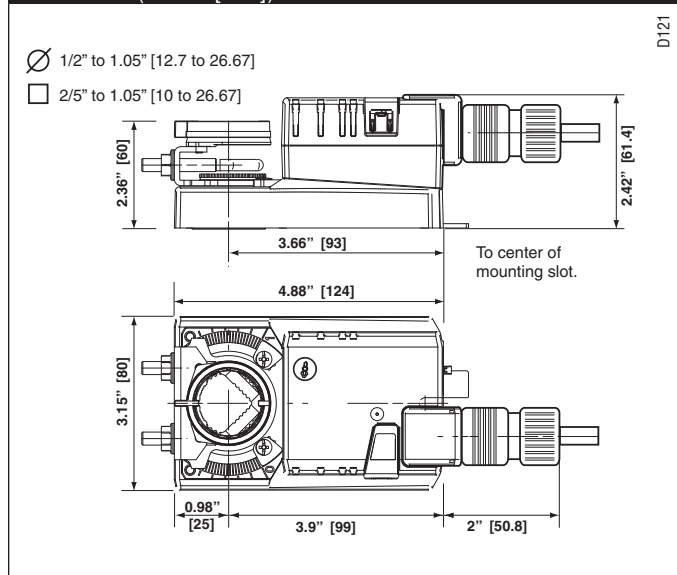
The actuator is not provided with and does not require any limit switches, but is electronically protected against overload. The anti-rotation strap supplied with the actuator will prevent lateral movement.

The NMB(X) series provides 95° of rotation and a visual indicator indicates position of the actuator. When reaching the damper or actuator end position, the actuator automatically stops. The gears can be manually disengaged with a button on the actuator cover.

The NMB(X)24-MFT actuators use a Brushless DC motor, which is controlled by an Application Specific Integrated Circuit (ASIC). The ASIC monitors and controls the actuator's rotation and provides a digital rotation sensing (DRS) function to prevent damage to the actuator in a stall condition. Power consumption is reduced in holding mode.

Add on auxiliary switches or feedback potentiometers are easily fastened directly onto the actuator body for signaling and switching functions.

## Dimensions (Inches [mm])



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#### Accessories

K-NA	Reversible Clamp
ZG-100	Universal Mounting Bracket
ZG-101	Universal Mounting Bracket
ZG-103	Universal Mounting Bracket
ZG-104	Universal Mounting Bracket
ZG-NMA	Crankarm Adaptor Kit
AV8-25	Universal Shaft Extension
ZG-NMSA-1	Shaft Adaptor
ZS-100	Weather Shield - Steel
ZS-150	Weather Shield - Polycarbonate
Tool-06	8 mm & 10 mm Wrench
S1A, S2A	Auxiliary Switch (es)
P370	Shaft Mount Auxiliary Switch
P...A	Feedback Potentiometers
SGA24	Min positioners in NEMA 4 housing
SGF24	Min positioners for flush panel mounting
ADS-100	Analog to Digital Switch
ZG-R01	Resistor for 4 to 20 mA Conversion
NSV24 US	Battery Back-Up Module
ZG-X40	Transformer

NOTE: When using NMB(X)24-MFT actuators, only use accessories listed on this page.

#### Typical Specification

Proportional control damper actuators shall be electronic direct-coupled type, which require no crankarm and linkage and be capable of direct mounting to a shaft up to 1.05" diameter. Actuators must provide proportional damper control in 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. 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

##### INSTALLATION NOTES

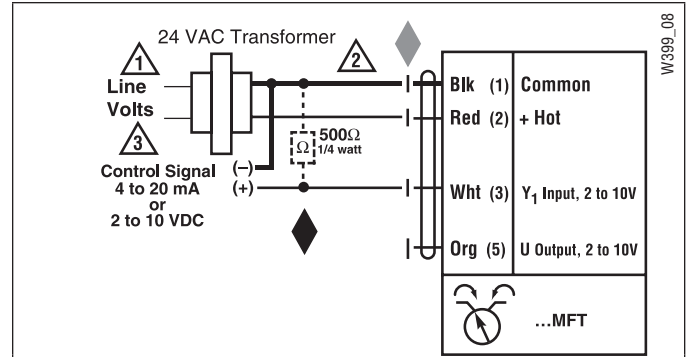
- 1 Provide overload protection and disconnect as required.
- 2 **CAUTION Equipment damage!**  
Actuators may be connected in parallel if not mechanically mounted to the same shaft. Power consumption and input impedance must be observed.
- 3 Actuators may also be powered by 24 VDC.
- 4 Position feedback cannot be used with Triac sink controller. The actuator internal common reference is not compatible.
- 5 Control signal may be pulsed from either the Hot (source) or the Common (sink) 24 VAC line.
- 8 Contact closures A & B also can be triacs.
- 8 A & B should both be closed for triac source and open for triac sink.
- 9 For triac sink the common connection from the actuator must be connected to the hot connection of the controller.

##### APPLICATION NOTES

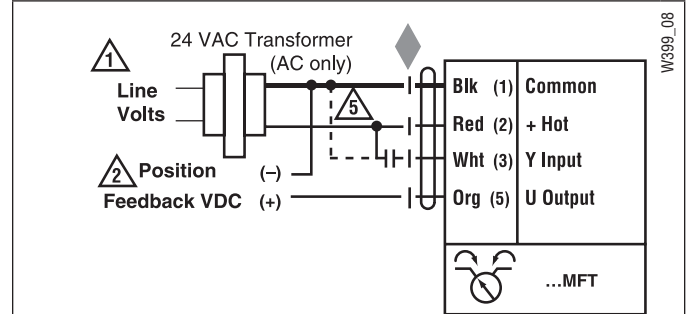
- ◆ The ZG-R01 500 Ω resistor may be used.

##### WARNING Live Electrical Components!

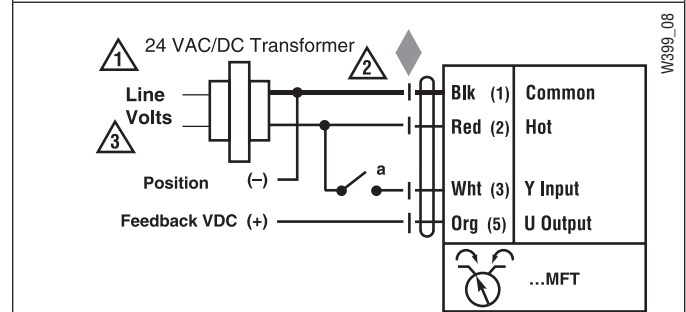
During installation, testing, servicing and troubleshooting of this product, it may be necessary to work with live electrical components. Have a qualified licensed electrician or other individual who has been properly trained in handling live electrical components perform these tasks. Failure to follow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



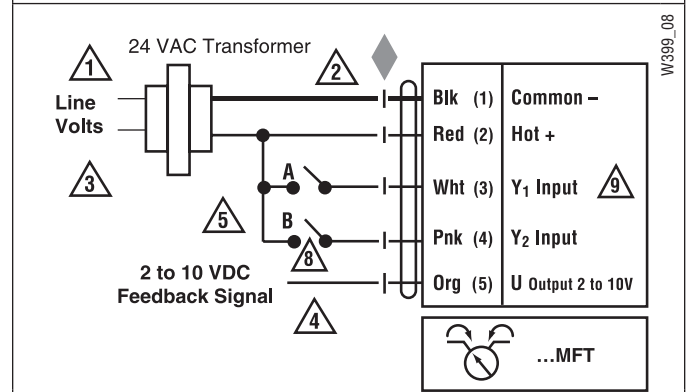
VDC/4-20 mA



PWM

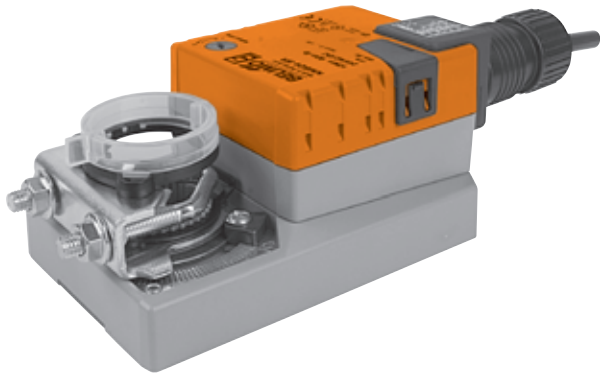


On/Off control



Floating Point control





Technical Data	NMCX24-MFT
Power Supply	24 VAC ± 20% 50/60 Hz 24 VDC ± 10%
Power Consumption	3.5 W (1.25 W)
Transformer Sizing	5.5 VA (Class 2 power source)
Electrical Connection	18 GA plenum rated cable 1/2" conduit connector Protected NEMA 2 (IP54) □ 3 ft [1m] □ 10 ft [3m] □ 16 ft [5m]
Overload Protection	electronic throughout 0 to 95° rotation
Operating Range Y	2 to 10 VDC, 4 to 20 mA (default) Variable (VDC, PWM, Floating Point, On/Off)
Input Impedance	100 kΩ (0.1 mA), 500 Ω 1500 Ω (PWM, Floating Point, On/Off)
Feedback Output U	2 to 10 VDC, 0.5 mA max, VDC Variable
Angle of Rotation	max. 95°, adjust. with mechanical stop electronically variable
Torque	90 in-lb [10 Nm]
Direction of Rotation	reversible with ↻/↻ switch
Position Indication	reflective visual indicator (snap-on)
Manual Override	external push button
Running Time	45 seconds (default) Variable (20 to 60 secs)
Humidity	5 to 95% RH non condensing (EN 60730-1)
Ambient Temperature	-22°F to 122°F [-30°C to 50°C]
Storage Temperature	-40°F to 176°F [-40°C to 80°C]
Housing	NEMA 2, IP54, UL enclosure type 2
Housing Material	UL94-5VA
Agency Listings†	cULus acc. to UL 60730-1A/-2-14, CAN/CSA E60730-1:02, CE acc. to 2004/108/EEC and 2006/95/EC
Noise Level	<45dB(A)
Servicing	maintenance free
Quality Standard	ISO 9001
Weight	2.1 lbs [0.95 Kg]

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

Torque min. 90 in-lb for control of damper surfaces up to 22 sq ft.

## Application

For proportional modulation 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, 1/2" self centered default. A crankarm and several mounting brackets are available for applications where the actuator cannot be direct coupled to the damper shaft.

The default parameters for 2 to 10 VDC applications of the ...MFT actuator are assigned during manufacturing. If necessary, custom versions of the actuators can be ordered. The parameters can be changed by two means: pre-set and custom configurations from Belimo or on-site configurations using the Belimo PC-Tool software.

## Operation

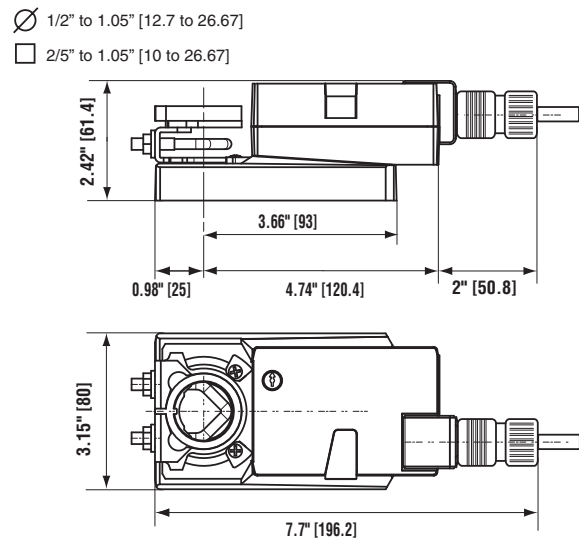
The actuator is not provided with and does not require any limit switches, but is electronically protected against overload. The anti-rotation strap supplied with the actuator will prevent lateral movement.

The NMCX series provides 95° of rotation and a visual indicator indicates position of the actuator. When reaching the damper or actuator end position, the actuator automatically stops. The gears can be manually disengaged with a button on the actuator cover.

The NMCX24-MFT actuators use a Brushless DC motor, which is controlled by an Application Specific Integrated Circuit (ASIC). The ASIC monitors and controls the actuator's rotation and provides a digital rotation sensing (DRS) function

to prevent damage to the actuator in a stall condition. Power consumption is reduced in holding mode. Add on auxiliary switches or feedback potentiometers are easily fastened directly onto the actuator body for signaling and switching functions.

## Dimensions (Inches [mm])



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#### Accessories

K-NA	Reversible Clamp
ZG-100	Universal Mounting Bracket
ZG-101	Universal Mounting Bracket
ZG-103	Universal Mounting Bracket
ZG-104	Universal Mounting Bracket
ZG-NMA	Crankarm Adaptor Kit
AV8-25	Universal Shaft Extension
ZG-NMSA-1	Shaft Adaptor
ZS-100	Weather Shield - Steel
ZS-150	Weather Shield - Polycarbonate
Tool-06	8 mm & 10 mm Wrench
S1A, S2A	Auxiliary Switch (es)
P370	Shaft Mount Auxiliary Switch
P...A	Feedback Potentiometers
SGA24	Min positioners in NEMA 4 housing
SGF24	Min positioners for flush panel mounting
ADS-100	Analog to Digital Switch
ZG-R01	Resistor for 4 to 20 mA Conversion
NSV24 US	Battery Back-Up Module
ZG-X40	Transformer

NOTE: When using NMCX24-MFT actuators, only use accessories listed on this page.

#### Typical Specification

Proportional control damper actuators shall be electronic direct-coupled type, which require no crankarm and linkage and be capable of direct mounting to a shaft up to 1.05" diameter. Actuators must provide proportional damper control in 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. 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

##### INSTALLATION NOTES

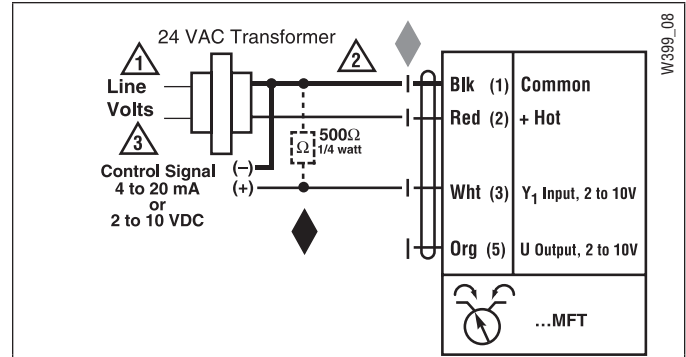
- 1 Provide overload protection and disconnect as required.
- 2 **CAUTION Equipment damage!**  
Actuators may be connected in parallel if not mechanically mounted to the same shaft. Power consumption and input impedance must be observed.
- 3 Actuators may also be powered by 24 VDC.
- 4 Position feedback cannot be used with Triac sink controller. The actuator internal common reference is not compatible.
- 5 Control signal may be pulsed from either the Hot (source) or the Common (sink) 24 VAC line.
- 8 Contact closures A & B also can be triacs.
- 8 A & B should both be closed for triac source and open for triac sink.
- 9 For triac sink the common connection from the actuator must be connected to the hot connection of the controller.

##### APPLICATION NOTES

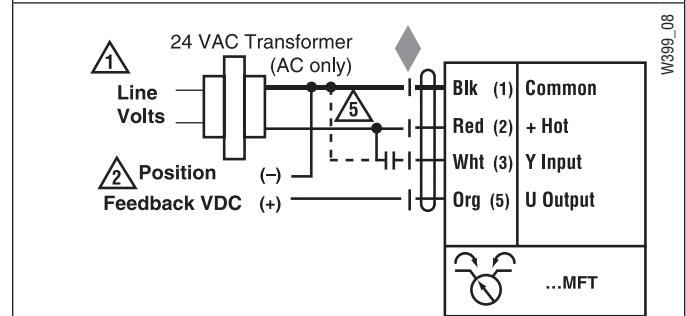
- ◆ The ZG-R01 500 Ω resistor may be used.

##### WARNING Live Electrical Components!

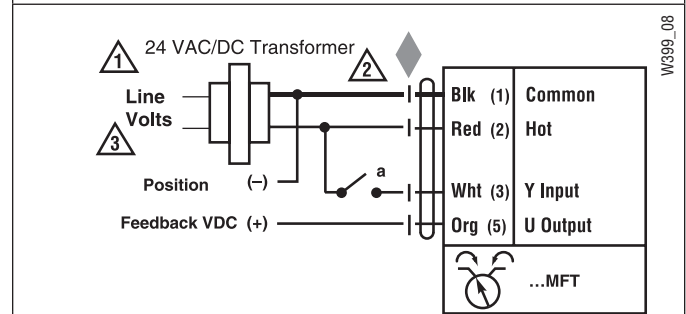
During installation, testing, servicing and troubleshooting of this product, it may be necessary to work with live electrical components. Have a qualified licensed electrician or other individual who has been properly trained in handling live electrical components perform these tasks. Failure to follow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



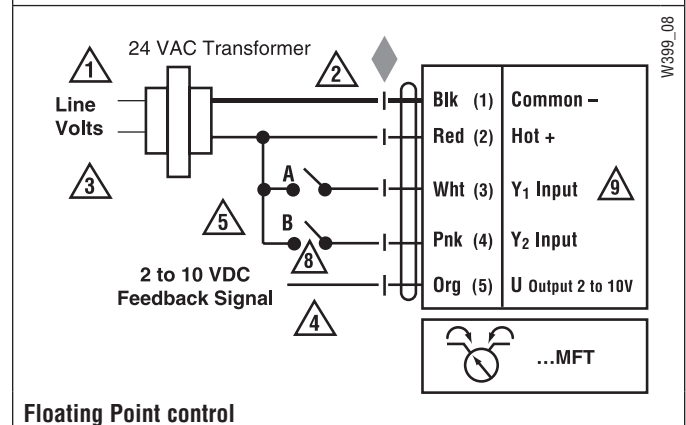
VDC/4-20 mA



PWM



On/Off control



Floating Point control

# NMX24-MFT95

Proportional Control, Non-Spring Return, Direct Coupled, 24V, 0 to 135 Ω Input



MFT



Technical Data	NMX24-MFT95
Power Supply	24 VAC ± 20% 50/60 Hz 24 VDC ± 10%
Power Consumption	3.5 W (1.3 W)
Transformer Sizing	6 VA (Class 2 power source)
Electrical Connection	18 GA plenum rated cable 1/2" conduit connector Protected NEMA 2 (IP54) □ 3 ft [1m] □ 10 ft [3m] □ 16 ft [5m]
Overload Protection	electronic throughout 0 to 95° rotation
Operating Range WRB	0 to 135 Ω Honeywell Electronic Series 90, 0 to 135 Ω Input
Feedback Output U	2 to 10 VDC, 0.5 mA max, VDC Variable
Angle of Rotation	max. 95°, adjust. with mechanical stop electronically variable
Torque	90 in-lb [10 Nm]
Direction of Rotation	reversible with  switch
Position Indication	reflective visual indicator (snap-on)
Manual Override	external push button
Running Time	150 seconds (default) Variable (45 to 170 secs)
Humidity	5 to 95% RH non condensing (EN 60730-1)
Ambient Temperature	-22°F to 122°F [-30°C to 50°C]
Storage Temperature	-40°F to 176°F [-40°C to 80°C]
Housing	NEMA 2, IP54, UL enclosure type 2
Housing Material	UL94-5VA
Agency Listings†	ULus acc. to UL 60730-1A/-2-14, CAN/CSA E60730-1, CSA C22.2 No. 24-93, CE acc. to 89/336/EEC
Noise Level	<45dB(A)
Servicing	maintenance free
Quality Standard	ISO 9001
Weight	2.1 lbs [0.95 Kg]

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

Torque min. 90 in-lb for control of damper surfaces up to 22 sq ft.

## Application

For proportional modulation 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, 1/2" self centered default. A crankarm and several mounting brackets are available for applications where the actuator cannot be direct coupled to the damper shaft.

The default parameters for 0 to 135 Ω input applications of the ...MFT95 actuator are assigned during manufacturing. If necessary, custom versions of the actuators can be ordered. The parameters can be changed by two means: pre-set and custom configurations from Belimo or on-site configurations using the Belimo PC-Tool software.

## Operation

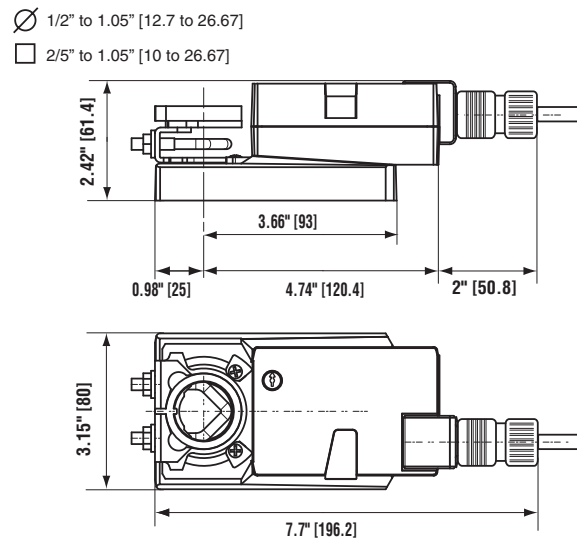
The actuator is not provided with and does not require any limit switches, but is electronically protected against overload. The anti-rotation strap supplied with the actuator will prevent lateral movement.

The NMX series provides 95° of rotation and a visual indicator indicates position of the actuator. When reaching the damper or actuator end position, the actuator automatically stops. The gears can be manually disengaged with a button on the actuator cover.

The NMX24-MFT95 actuators use a Brushless DC motor, which is controlled by an Application Specific Integrated Circuit (ASIC). The ASIC monitors and controls the actuator's rotation and provides a digital rotation sensing (DRS) function to prevent damage to the actuator in a stall condition. Power consumption is reduced in holding mode.

Add on auxiliary switches or feedback potentiometers are easily fastened directly onto the actuator body for signaling and switching functions.

## Dimensions (Inches [mm])



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### Accessories

K-NA	Reversible Clamp
ZG-100	Universal Mounting Bracket
ZG-101	Universal Mounting Bracket
ZG-103	Universal Mounting Bracket
ZG-104	Universal Mounting Bracket
ZG-NMA	Crankarm Adaptor Kit
AV8-25	Universal Shaft Extension
ZG-NMSA-1	Shaft Adaptor
ZS-100	Weather Shield - Steel
ZS-150	Weather Shield - Polycarbonate
Tool-06	8 mm & 10 mm Wrench
S1A, S2A	Auxiliary Switch (es)
P370	Shaft Mount Auxiliary Switch
P...A	Feedback Potentiometers
NSV24 US	Battery Back-Up Module
ZG-X40	Transformer

**NOTE:** When using NMX24-MFT95 actuators, only use accessories listed on this page.

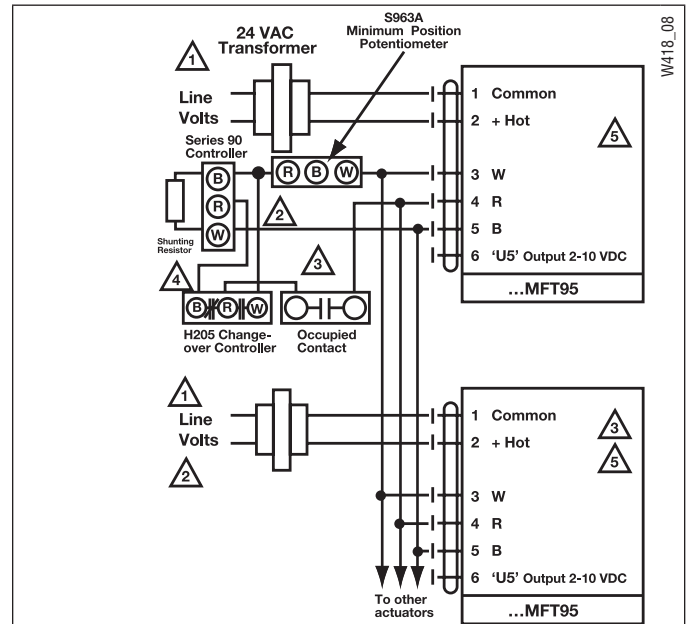
### Typical Specification

Proportional control damper actuators shall be electronic direct-coupled type, which require no crankarm and linkage and be capable of direct mounting to a shaft up to 1.05" diameter. Actuators must provide proportional damper control in response to a 0 to 135 Ω input 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. 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.

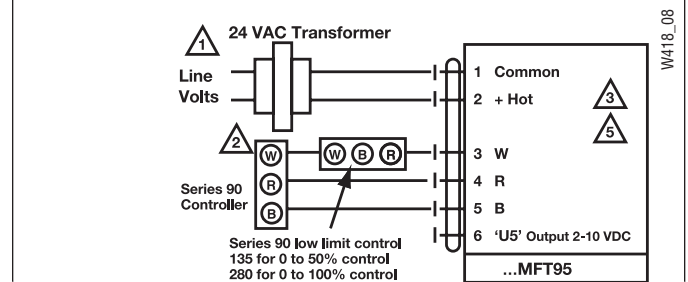
### Wiring Diagrams

#### INSTALLATION NOTES

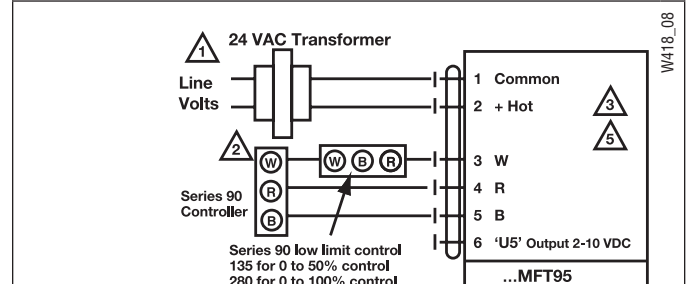
- 1 Provide overload protection and disconnect as required.
- 2 Actuators and controller must have separate transformers.
- 3 Consult controller instruction data for more detailed installation information.
- 4 Resistor value depends on the type of controller and the number of actuators. No resistor is used for one actuator. Honeywell resistor kits may also be used.
- 5 To reverse control rotation, use the reversing switch.



Wiring multiple actuators to a Series 90 controller using a minimum position potentiometer.



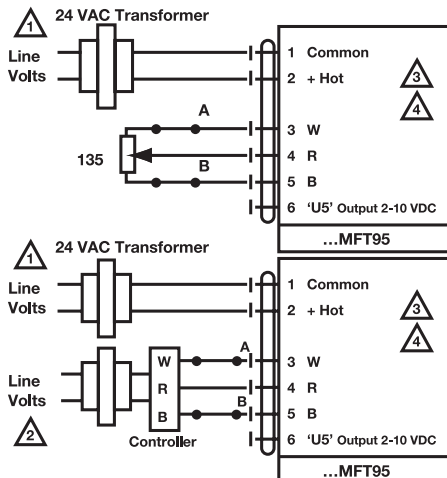
Low Limit Control



High Limit Control

Switch A	Switch B	Damper Position
		Damper Open
		Damper Closed

The direction of rotation switch is set so that the fail safe position and the position of the damper is closed with no signal at wire R.



Override



Technical Data	NMX24-PC
Power Supply	24 VAC ± 20% 50/60 Hz 24 VDC ± 10%
Power Consumption	3.5 W (1.3 W)
Transformer Sizing	6 VA (Class 2 power source)
Electrical Connection	18 GA plenum rated cable 1/2" conduit connector Protected NEMA 2 (IP54) □ 3 ft [1m] □ 10 ft [3m] □ 16 ft [5m]
Overload Protection	electronic throughout 0 to 95° rotation
Operating Range Y	0 to 20V phasecut
Input Impedance	8 kΩ (50 mW)
Feedback Output U	2 to 10 VDC, 0.5 mA max
Angle of Rotation	max. 95°, adjust. with mechanical stop electronically variable
Torque	90 in-lb [10 Nm]
Direction of Rotation	reversible with  switch
Position Indication	reflective visual indicator (snap-on)
Manual Override	external push button
Running Time	150 seconds (default)
Humidity	5 to 95% RH non condensing (EN 60730-1)
Ambient Temperature	-22°F to 122°F [-30°C to 50°C]
Storage Temperature	-40°F to 176°F [-40°C to 80°C]
Housing	NEMA 2, IP54, UL enclosure type 2
Housing Material	UL94-5VA
Agency Listings†	cULus acc. to UL 60730-1A/-2-14, CAN/CSA E60730-1:02, CE acc. to 2004/108/EEC and 2006/95/EC
Noise Level	<45dB(A)
Servicing	maintenance free
Quality Standard	ISO 9001
Weight	2.1 lbs [0.95 Kg]

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

**Torque min. 90 in-lb for control of damper surfaces up to 22 sq ft.**

### Application

For proportional modulation 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, 1/2" self centered default. A crankarm 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 0 to 20V phasecut control input from an electronic controller or positioner. A 2 to 10 VDC feedback signal is provided for position indication.

### Operation

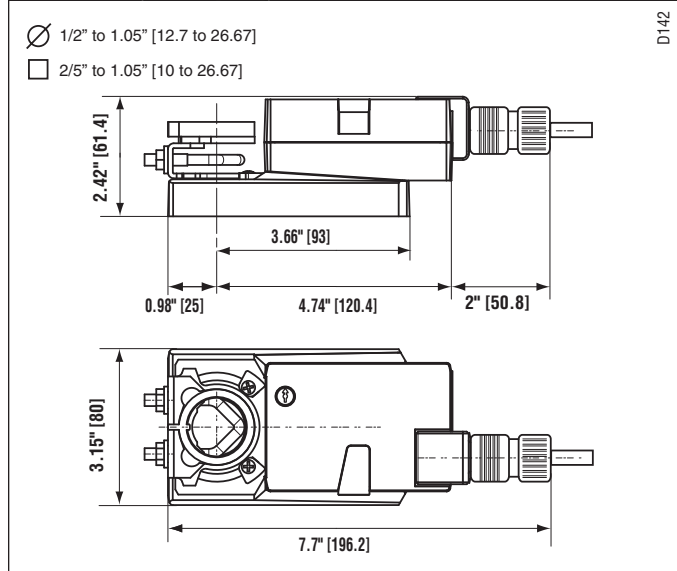
The actuator is not provided with and does not require any limit switches, but is electronically protected against overload. The anti-rotation strap supplied with the actuator will prevent lateral movement.

The NMX series provides 95° of rotation and a visual indicator indicates position of the actuator. When reaching the damper or actuator end position, the actuator automatically stops. The gears can be manually disengaged with a button on the actuator cover.

The NMX24-PC actuators use a Brushless DC motor, which is controlled by an Application Specific Integrated Circuit (ASIC). The ASIC monitors and controls the actuator's rotation and provides a digital rotation sensing (DRS) function to prevent damage to the actuator in a stall condition. Power consumption is reduced in holding mode.

Add on auxiliary switches or feedback potentiometers are easily fastened directly onto the actuator body for signaling and switching functions.

### Dimensions (Inches [mm])



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Accessories	
K-NA	Reversible Clamp
ZG-100	Universal Mounting Bracket
ZG-101	Universal Mounting Bracket
ZG-103	Universal Mounting Bracket
ZG-104	Universal Mounting Bracket
ZG-NMA	Crankarm Adaptor Kit
AV8-25	Universal Shaft Extension
ZG-NMSA-1	Shaft Adaptor
ZS-100	Weather Shield - Steel
ZS-150	Weather Shield - Polycarbonate
Tool-06	8 mm & 10 mm Wrench
S1A, S2A	Auxiliary Switch (es)
P370	Shaft Mount Auxiliary Switch
P...A	Feedback Potentiometers
NSV24 US	Battery Back-Up Module
ZG-X40	Transformer

**NOTE:** When using NMX24-PCactuators, only use accessories listed on this page.

### Typical Specification

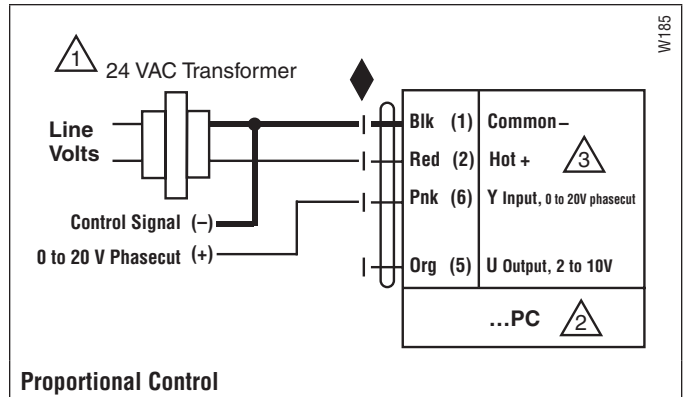
Proportional control damper actuators shall be electronic direct-coupled type, which require no crankarm and linkage and be capable of direct mounting to a shaft up to 1.05" diameter. Actuators must provide proportional damper control in response to 0 to 20V phasecut control input from an electronic 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. 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

#### ✂ INSTALLATION NOTES

- 1 Provide overload protection and disconnect as required.
- 2 **CAUTION Equipment damage!**  
Actuators may be connected in parallel.  
Power consumption and input impedance must be observed.
- 3 Actuators may also be powered by 24 VDC.

**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.



# NMQB(X)24-1

On/Off Control, Non-Spring Return, Direct Coupled, 24V



Technical Data	NMQB(X)24-1
Power Supply	24 VAC $\pm$ 20% 50/60 Hz 24 VDC $\pm$ 10%
Power Consumption	12 W (1.5 W)
Transformer Sizing	18 VA (Class 2 power source) (Imax 20A@5ms)
Electrical Connection	
NMQB24-1	3 ft [1m] 18 GA plenum rated cable Protected NEMA 2 (IP54)
NMQX24-1	□ 3 ft [1m] □ 10 ft [3m] □ 16 ft [5m] 18 GA plenum rated cable Protected NEMA 2 (IP54)
Overload Protection	electronic throughout 0 to 95° rotation
Control	On/Off
Input Impedance	100 $\Omega$
Angle of Rotation	min. 30°, max. 95°, adjust. with mechanical stop
Torque	70 in-lb [10 Nm]
Direction of Rotation	reversible with  switch
Position Indication	reflective visual indicator (snap-on)
Manual Override	external push button
Running Time	
NMQB24-1	4 seconds constant independent of load
NMQX24-1	4, 10 or 15 seconds constant independent of load
Humidity	5 to 95% RH non-condensing (EN 60730-1)
Ambient Temperature	-22°F to 122°F [-30°C to 50°C]
Storage Temperature	-40°F to 176°F [-40°C to 80°C]
Housing	NEMA 2, IP54, UL enclosure type 2
Housing Material	UL94-5VA
Agency Listings	cULus acc. to UL 60730-1A/-2-14, CAN/CSA E60730-1:02, CE acc. to 2004/108/EEC and 2006/95/EC
Noise Level	<52 dB(A)
Servicing	maintenance free
Quality Standard	ISO 9001
Weight	1.8 lbs [0.85 kg]

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

Torque min. 70 in-lb for control of damper surfaces up to 17 sq ft.

## Application

For On/Off 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, 1/2" self-centered default. A crankarm and several mounting brackets are available for applications where the actuator cannot be direct coupled to the damper shaft.

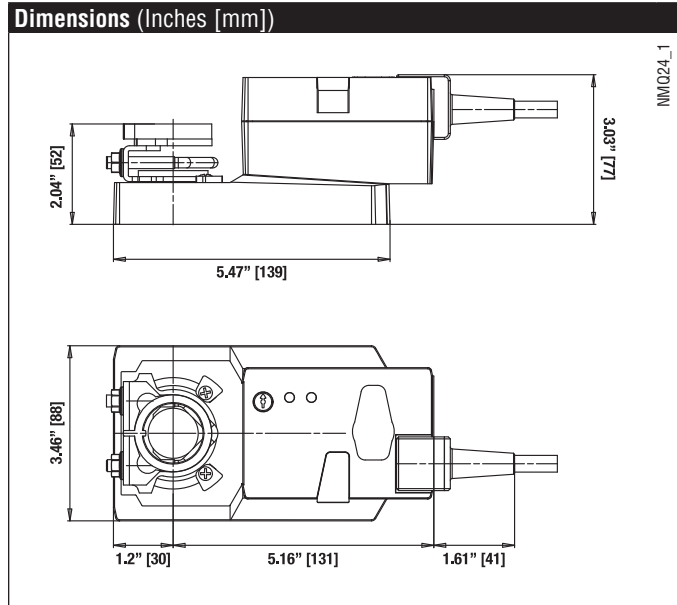
## Operation

The actuator is not provided with and does not require any limit switches, but is electronically protected against overload. The anti-rotation strap supplied with the actuator will prevent lateral movement.

The NMQB(X) series provides 95° of rotation and a visual indicator indicates position of the actuator. When reaching the damper or actuator end position, the actuator automatically stops. The gears can be manually disengaged with a button on the actuator cover.

The NMQB(X)24-1 actuators use a sensorless Brushless DC motor, which is controlled by an Application Specific Integrated Circuit (ASIC). The ASIC monitors and controls the actuator's rotation and provides a digital rotation sensing (DRS) function to prevent damage to the actuator in a stall condition. Power consumption is reduced in holding mode.

Add-on auxiliary switches or feedback potentiometers are easily fastened directly onto the actuator body for signaling and switching functions.



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Accessories	
K-NA	Reversible Clamp
ZG-100	Universal Mounting Bracket
ZG-101	Universal Mounting Bracket
ZG-103	Universal Mounting Bracket
ZG-104	Universal Mounting Bracket
ZG-NMA	Crankarm Adaptor Kit
AV8-25	Universal Shaft Extension
ZG-NMSA-1	Shaft Adaptor
ZS-T	Terminal Cover for NEMA 2
ZS-100	Weather Shield - Steel
ZS-150	Weather Shield - Polycarbonate
Tool-06	8 mm & 10 mm Wrench
S1A, S2A	Auxiliary Switch (es)
P370	Shaft Mount Auxiliary Switch
P...A	Feedback Potentiometers

**NOTE:** When using NMQB(X)24-1 actuators, only use accessories listed on this page.

### Typical Specification

On/Off control damper actuators shall be electronic direct-coupled type, which require no crankarm and linkage and be capable of direct mounting to a shaft up to 1.05" diameter. 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. 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

#### ✂️ INSTALLATION NOTES

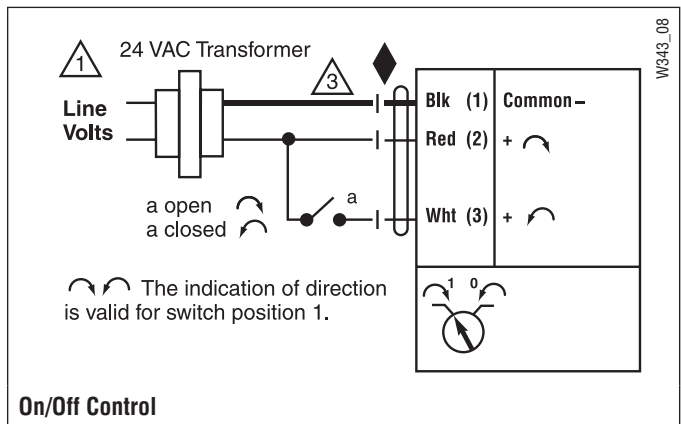
- 1 Provide overload protection and disconnect as required.
- 3 Actuators may also be powered by 24 VDC.

#### 📄 APPLICATION NOTES

- ◆ Meets cULus or UL and CSA Standard requirements without the need of an electrical ground connection.

#### ⚠️ WARNING Live Electrical Components!

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MFT



Technical Data	NMQB(X)24-MFT
Power Supply	24 VAC ±20% 50/60 Hz 24 VDC ±10%
Power Consumption	12 W (1.5 W)
Transformer Sizing	18 VA (Class 2 power source) (Imax 20A@5ms)
Electrical Connection	
NMQB24-MFT	3 ft [1m] 18 GA plenum rated cable Protected NEMA 2 (IP54)
NMQX24-MFT	□ 3 ft [1m] □ 10 ft [3m] □ 16 ft [5m] 18 GA plenum rated cable Protected NEMA 2 (IP54)
Overload Protection	electronic throughout 0 to 95° rotation
Operating Range Y	2 to 10 VDC, 4 to 20 mA (default)
Variable (VDC, On/Off)	On/Off
Input Impedance	100 kΩ (0.1 mA), 500 Ω, 1000 Ω (On/Off)
Feedback Output U	2 to 10 VDC, 0.5mA max, VDC Variable
Angle of Rotation	min. 30°, max. 95°, adjust. with mechanical stop electronically variable
Torque	70 in-lb [8 Nm]
Direction of Rotation	reversible with  switch
Position Indication	reflective visual indicator (snap-on)
Manual Override	external push button
Running Time	
NMQB24-MFT	4 seconds
NMQX24-MFT	4, 10 or 15 seconds
Humidity	5 to 95% RH non-condensing (EN 60730-1)
Ambient Temperature	-22°F to 122°F [-30°C to 50°C]
Storage Temperature	-40°F to 176°F [-40°C to 80°C]
Housing	NEMA 2, IP54, UL enclosure type 2
Housing Material	UL94-5VA
Agency Listings	cULus acc. to UL 60730-1A/-2-14, CAN/CSA E60730-1:02, CE acc. to 2004/108/EEC and 2006/95/EC
Noise Level	<52 dB(A)
Servicing	maintenance free
Quality Standard	ISO 9001
Weight	1.8 lbs [0.85 kg]

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

Torque min. 70 in-lb for control of damper surfaces up to 17 sq ft.

## Application

For proportional modulation 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, 1/2" self centered default. A crankarm and several mounting brackets are available for applications where the actuator cannot be direct coupled to the damper shaft.

The default parameters for 2 to 10 VDC applications of the ...MFT actuator are assigned during manufacturing. If necessary, custom versions of the actuators can be ordered. The parameters can be changed by two means: pre-set and custom configurations from Belimo or on-site configurations using the Belimo PC-Tool software (version 3.3 or later).

## Operation

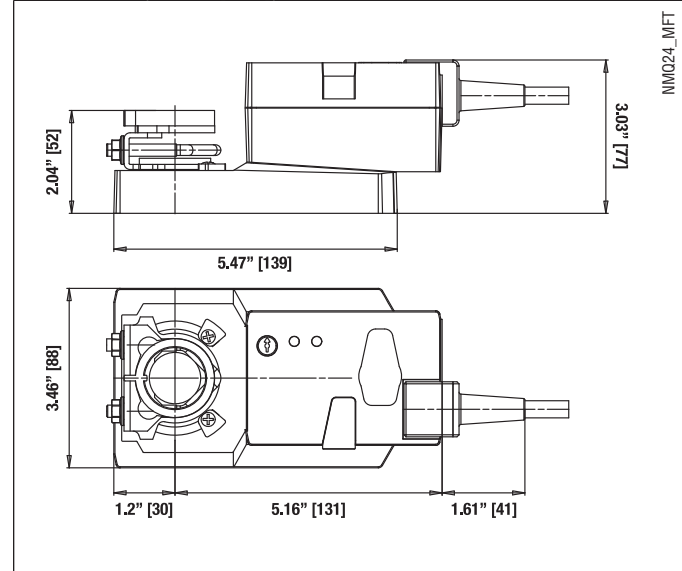
The actuator is not provided with and does not require any limit switches, but is electronically protected against overload. The anti-rotation strap supplied with the actuator will prevent lateral movement.

The NMQB(X) series provides 95° of rotation and a visual indicator indicates position of the actuator. When reaching the damper or actuator end position, the actuator automatically stops. The gears can be manually disengaged with a button on the actuator cover.

The NMQB(X)24-MFT actuators use a Brushless DC motor, which is controlled by an Application Specific Integrated Circuit (ASIC). The ASIC monitors and controls the actuator's rotation and provides a digital rotation sensing (DRS) function to prevent damage to the actuator in a stall condition. Power consumption is reduced in holding mode.

Add-on auxiliary switches or feedback potentiometers are easily fastened directly onto the actuator body for signaling and switching functions.

## Dimensions (Inches [mm])



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Accessories	
K-NA	Reversible Clamp
ZG-100	Universal Mounting Bracket
ZG-101	Universal Mounting Bracket
ZG-103	Universal Mounting Bracket
ZG-104	Universal Mounting Bracket
ZG-NMA	Crankarm Adaptor Kit
AV8-25	Universal Shaft Extension
ZG-NMSA-1	Shaft Adaptor
ZS-100	Weather Shield - Steel
ZS-150	Weather Shield - Polycarbonate
Tool-06	8 mm & 10 mm Wrench
S1A, S2A	Auxiliary Switch (es)
P370	Shaft Mount Auxiliary Switch
P...A	Feedback Potentiometers
SGA24	Min positioners in NEMA 4 housing
SGF24	Min positioners for flush panel mounting
ADS-100	Analog to Digital Switch
ZG-R01	Resistor for 4 to 20 mA Conversion
NSV24 US	Battery Back-Up Module
ZG-X40	Transformer

**NOTE:** When using NMQB(X)24-MFT actuators, only use accessories listed on this page.

### Typical Specification

Proportional control damper actuators shall be electronic direct-coupled type, which require no crankarm and linkage and be capable of direct mounting to a shaft up to 1.05" diameter. Actuators must provide proportional damper control in 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. 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

#### ✂ INSTALLATION NOTES

- 1 Provide overload protection and disconnect as required.
- 2 **CAUTION Equipment damage!**  
Actuators may be connected in parallel. Power consumption and input impedance must be observed.
- 3 Actuators may also be powered by 24 VDC.
- 5 Control signal may be pulsed from either the Hot (source) or the Common (sink) 24 VAC line.

#### 📄 APPLICATION NOTES

- ◆ The ZG-R01 500 Ω resistor may be used.

#### ⚠ 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.

