

## Minimum 34 lbf linear force

- For damper surfaces up to 10 sq-ft\*



All Actuators have BDCM

### LH Series - At A Glance

|                  |                           | <i>LHB(X)24-3(-100)(-200)(-300) (p. 246)</i> | <i>LHB(X)24-SR(-100)(-200) (p. 248)</i> | <i>LHX24-MFT-100 (p. 250)</i> | <i>LHX24-MFT-200 (p. 250)</i> | <i>LHX24-MFT-300 (p. 250)</i> | <i>LHQB(X)24-1-100 (p. 252)</i> | <i>LHQB(X)24-MFT-100 (p. 254)</i> |
|------------------|---------------------------|--|---|-------------------------------|-------------------------------|-------------------------------|---------------------------------|-----------------------------------|
| Basic Product    |                           | •  | •                                       |                               |                               |                               | •                               | •                                 |
| Flexible Product |                           | •  | •                                       | •                             | •                             | •                             | •                               | •                                 |
| Linear Force     | 34 lbf [150 N]            | •  | •                                       | •                             | •                             | •                             |                                 |                                   |
|                  | 22 lbf [150 N]            |  |   |                               |                               |                               | •                               | •                                 |
| Linear Stroke    | 4" [100mm]                | •  | •                                       | •                             |                               |                               | •                               | •                                 |
|                  | 8" [200mm]                | •  | •                                       |                               | •                             |                               |                                 |                                   |
|                  | 12" [300mm]               | •  |   |                               |                               | •                             |                                 |                                   |
| Power Supply     | 24 VAC/DC                 | •  | •                                       | •                             | •                             | •                             | •                               | •                                 |
| Control Input    | On/Off                    |  |   |                               |                               |                               | •                               |                                   |
|                  | On/Off, Floating Point    | •  |   |                               |                               |                               |                                 |                                   |
|                  | 2 to 10 VDC (4 to 20mA)   |  | •                                       |                               |                               |                               |                                 |                                   |
|                  | Multi-Function Technology |  |   | •                             | •                             | •                             |                                 | •                                 |
| Feedback         | None                      | •  |   |                               |                               |                               | •                               |                                   |
|                  | 2 to 10 VDC               |  | •                                       |                               |                               |                               |                                 |                                   |
|                  | Variable (0 to 10 VDC)    |  |   | •                             | •                             | •                             |                                 | •                                 |
| Running Time     | 3.5 seconds               |  |   |                               |                               |                               | •                               |                                   |
|                  | 150 seconds               | •  | •                                       |                               |                               |                               |                                 |                                   |
|                  | Adj. 75 to 150 seconds    | •  | •                                       | •                             | •                             | •                             |                                 |                                   |
|                  | Adj. 3.5 to 15 seconds    |  |   |                               |                               |                               |                                 | •                                 |
| Wiring           | Plenum Rated Cable        | •  | •                                       | •                             | •                             | •                             | •                               | •                                 |
|                  | Conduit Fitting           | •  | •                                       | •                             | •                             | •                             | •                               | •                                 |

Installation and Operation... (page 265).

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

# A CLOSER LOOK...

- Brushless DC Motor for Added Accuracy and Controllability.
- Don't Worry about Actuator Burn-Out; Belimo is Overload Proof throughout Rotation.
- Enjoy Added Flexibility with Easy Mechanical Stops to Adjust Linear Movement.
- Need to Change Control Direction? Do it easily with a Simple Switch.
- Easily Accessible Manual Override Button helps you Pre-Tension Damper Blades.
- 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.



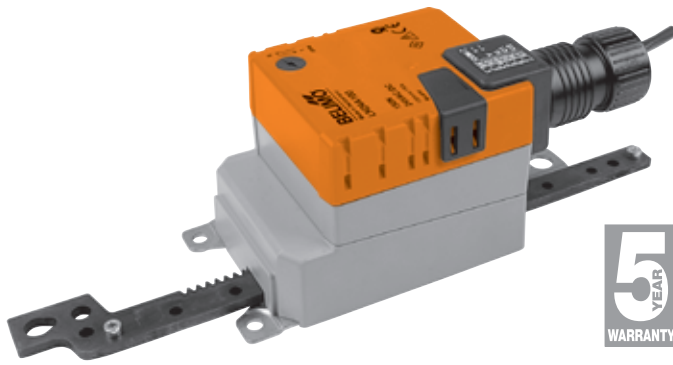
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## The Belimo Difference

- **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.

# LHB(X)24-3(-100)(-200)(-300)

On/Off, Floating Point Control, Non-Spring Return, Linear Stroke, 24V



| Technical Data        | LHB(X)24-3(-100)(-200)(-300)  |
|-----------------------|---|
| Power Supply          | 24 VAC ± 20% 50/60 Hz<br>24 VDC ± 20%   |
| Power Consumption     | 1.5 W (0.5 W)   |
| Transformer Sizing    | 3 VA (Class 2 power source)   |
| Electrical Connection | 18 GA appliance rated cable<br>1/2" conduit connector<br>Protected NEMA 2 (IP54)<br>□ 3 ft [1m] □ 10 ft [3m] □ 16 ft [5m] |
| Overload Protection   | electronic throughout full stroke   |
| Control               | On/Off, Floating Point  |
| Input Impedance       | 600 Ω   |
| Linear Stroke         |   |
| LHB(X)24-3-100        | 4 in [100 mm]   |
| LHB(X)24-3-200        | 8 in [200 mm]   |
| LHX24-3-300           | 12 in [300 mm]  |
| Linear Force          | 34 lbf [150 N]  |
| Stroke Direction      | reversible with ↓/↑ switch  |
| Manual Override       | external push button  |
| Running Time          | □ 150 □ 95 □ 75 seconds per 4" [100mm]  |
| 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,<br>CAN/GSA E60730-1:02,<br>CE acc. to 2004/108/EEC and 2006/95/EC                        |
| Noise Level (max)     | 35dB(A)   |
| Servicing             | maintenance free  |
| Quality Standard      | ISO 9001  |
| Weight                |   |
| LHB(X)24-3-100        | 0.81 lbs [365 g]  |
| LHB(X)24-3-200        | 0.86 lbs [390 g]  |
| LHX24-3-300           | 0.93 lbs [420 g]  |

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

Linear Force min. 34 lbf for control of damper surfaces up to 11 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.

## Operation

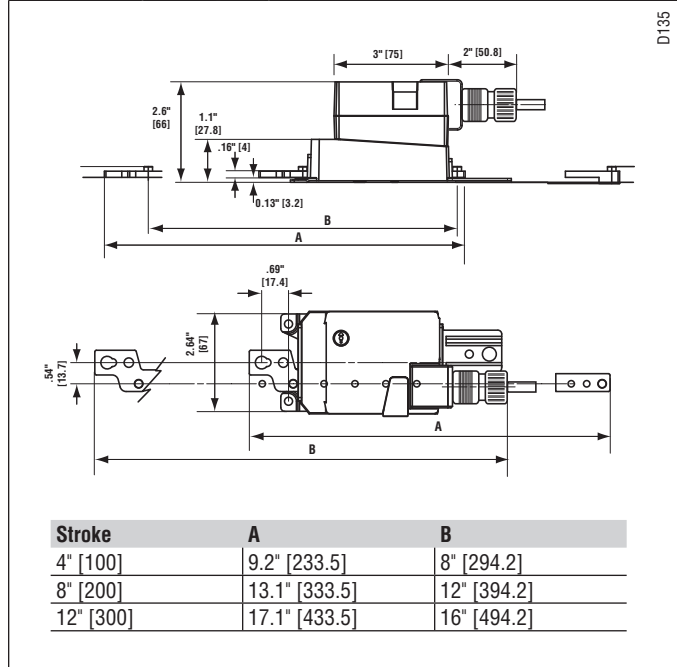
The actuator is not provided with and does not require any limit switches, but is electronically protected against overload. The anti-rotation strap supplied with the actuator will prevent lateral movement.

The LHB(X)24-3... series provides 4, 8, or 12 in of linear force. The stroke of the gear rack can be adjusted on both sides in increments of 0.8 in [20 mm] by means of the mechanical end stops.

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 LHB(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.

## Dimensions (Inches [mm])



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#### Accessories

|       |   |
|-------|---|
| Z-DS1 | Rotary Support to Compensate Lateral Forces |
| Z-KSC | Linear Coupling                             |
| P370  | Shaft Mount Auxiliary Switch                |

**NOTE:** When using LHB(X)24-3... actuators, only use accessories listed on this page.

#### Typical Specification

Floating point, on/off control damper actuators shall be electronic type, with integrated linear stroking arm. Actuators shall have Brushless DC motor technology and be protected from overload at all positions of linear stroke. Actuators shall have reversing switch and manual override on the cover. Run time shall be constant and independent of torque. Actuators shall be cUL Approved, 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

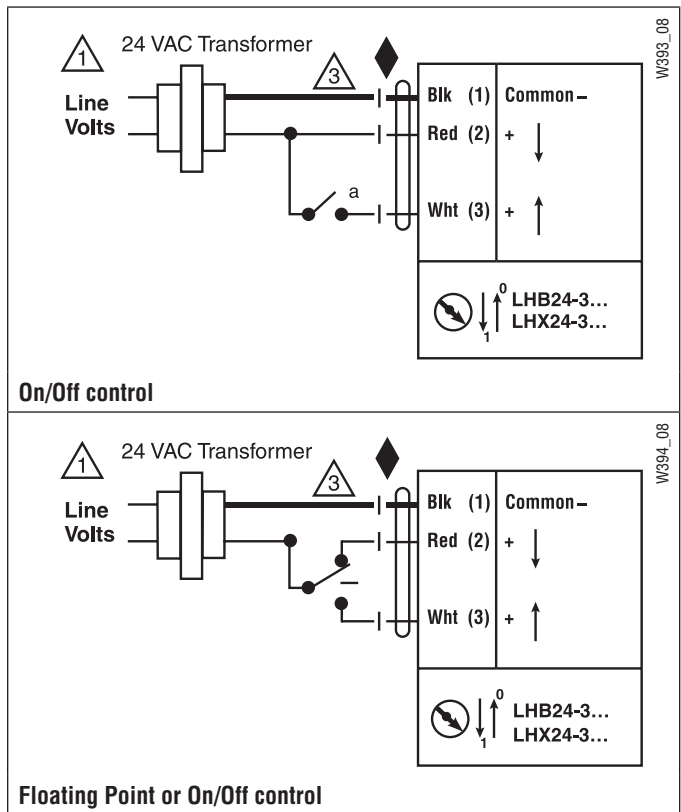
- 1 Provide overload protection and disconnect as required.
- 3 Actuators may also be powered by 24 VDC.

##### 📄 APPLICATION NOTES

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

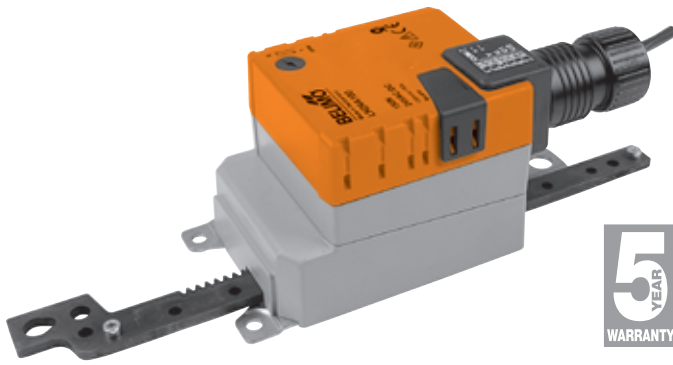
##### ⚠ WARNING Live Electrical Components!

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.



# LHB(X)24-SR(-100)(-200)

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



| Technical Data        | LHB(X)24-SR(-100)(-200)  |
|-----------------------|--|
| Power Supply          | 24 VAC ± 20% 50/60 Hz<br>24 VDC ± 20%  |
| Power Consumption     | 1.5 W (0.5 W)  |
| Transformer Sizing    | 3 VA (Class 2 power source)  |
| Electrical Connection | 18 GA appliance rated cable<br>1/2" conduit connector<br>Protected NEMA 2 (IP54)<br>□ 3 ft [1m] □ 10 ft [3m] □ 16 ft [5m]              |
| Overload Protection   | electronic throughout full stroke  |
| Control               | 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)   |
| Linear Stroke         |  |
| LHB(X)24-SR-100       | 4 in [100 mm]  |
| LHB(X)24-SR-200       | 8 in [200 mm]  |
| Linear Force          | 34 lbf [150 N]   |
| Stroke Direction      | reversible with $\downarrow/\uparrow$ switch<br>Actuator will move in the selected direction with increasing control signal (2 to 10V) |
| Manual Override       | external push button   |
| Running Time          | □ 150 □ 95 □ 75 seconds per 4" [100mm]   |
| 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,<br>CAN/CSA E60730-1:02,<br>CE acc. to 2004/108/EEC and 2006/95/EC                                     |
| Noise Level (max)     | 35dB(A)  |
| Servicing             | maintenance free   |
| Quality Standard      | ISO 9001   |
| Weight                |  |
| LHB(X)24-SR-100       | 0.81 lbs [365 g]   |
| LHB(X)24-SR-200       | 0.86 lbs [390 g]   |

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

Force min. 34 lbf for control of damper surfaces up to 11 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 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.

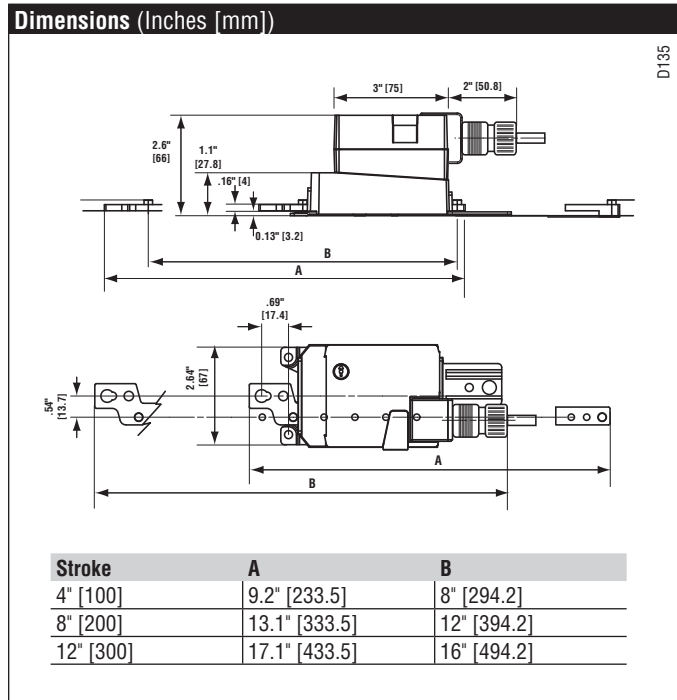
## Operation

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 LHB(X)24-SR... series provides 4 or 8 in of linear stroke. The stroke of the gear rack can be adjusted on both sides in increments of 0.8 in [20 mm] by means of the mechanical end stops.

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 LHB(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.



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### Accessories

|          |   |
|----------|---|
| Z-DS1    | Rotary Support to Compensate Lateral Forces |
| Z-KSC    | Linear Coupling                             |
| P370     | Shaft Mount Auxiliary Switch                |
| 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 LHB(X)24-SR... actuators, only use accessories listed on this page.

### Typical Specification

Proportional control damper actuators shall be electronic type, with integrated linear stroking arm. 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 cUL Approved, 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

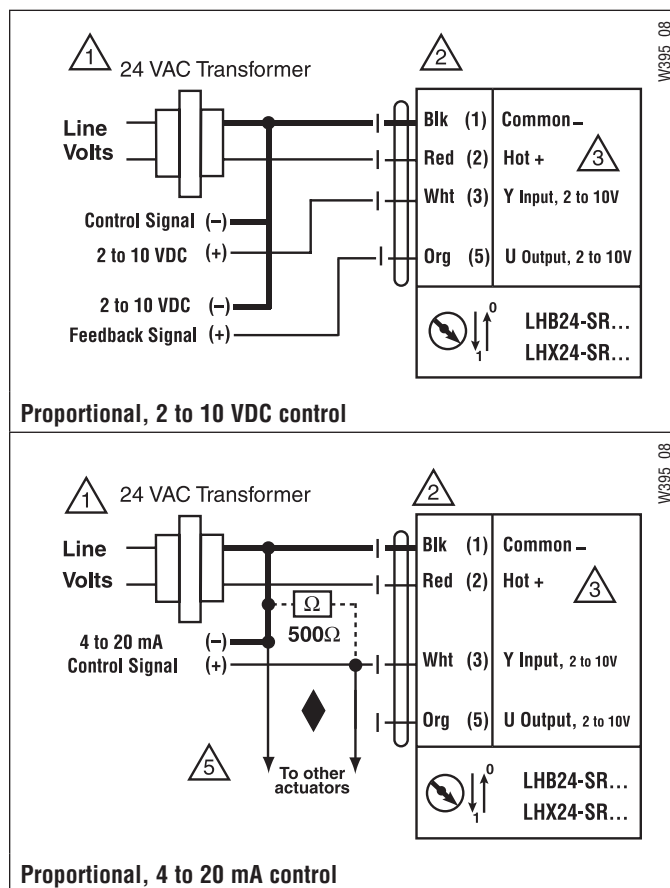
- 1 Provide overload protection and disconnect as required.
- 2 **CAUTION Equipment damage!**  
Actuators may be connected in parallel.  
Power consumption and input impedance must be observed.
- 3 Actuators may also be powered by 24 VDC.
- 5 Only connect common to neg. (-) leg of control circuits.

#### 📄 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.

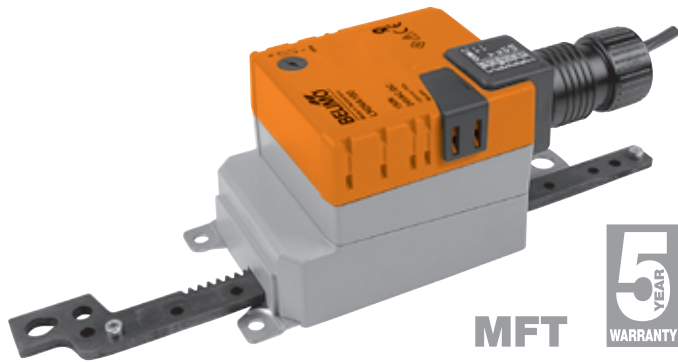
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# LHX24-MFT(-100)(-200)(-300)

Proportional Control, Non-Spring Return, Linear Stroke, 24V, Multi-Function Technology®



| Technical Data        | LHX24-MFT(-100)(-200)(-300)  |
|-----------------------|--|
| Power Supply          | 24 VAC ± 20% 50/60 Hz<br>24 VDC ± 20%  |
| Power Consumption     | 2.5 W (1.2 W)  |
| Transformer Sizing    | 5 VA (Class 2 power source)  |
| Electrical Connection | 18 GA plenum rated cable<br>1/2" conduit connector<br>Protected NEMA 2 (IP54)<br>□ 3 ft [1m] □ 10 ft [3m] □ 16 ft [5m] |
| Overload Protection   | electronic throughout full stroke  |
| Control               | 2 to 10 VDC, 4 to 20 mA (default)<br>Variable (VDC, PWM, Floating Point, On/Off)                                       |
| Input Impedance       | 100 kΩ (0.1 mA), 500 Ω<br>1500 Ω (PWM, Floating Point, On/Off)   |
| Feedback Output U     | 2 to 10 VDC (max 0.5 mA)<br>VDC Variable   |
| Linear Stroke         |  |
| LHX24-MFT-100         | 4 in [100 mm]  |
| LHX24-MFT-200         | 8 in [200 mm]  |
| LHX24-MFT-300         | 12 in [300 mm]   |
| Linear Force          | 34 lbf [450 N]   |
| Stroke Direction      | reversible with ↓/↑ switch   |
| Manual Override       | external push button   |
| Running Time          | 150 seconds per 4" [100mm]<br>Variable (75 to 150 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,<br>CAN/CSA E60730-1:02,<br>CE acc. to 2004/108/EEC and 2006/95/EC                     |
| Noise Level (max)     | 35dB(A)  |
| Servicing             | maintenance free   |
| Quality Standard      | ISO 9001   |
| Weight                |  |
| LHX24-MFT-100         | 0.81 lbs [365 g]   |
| LHX24-MFT-200         | 0.86 lbs [390 g]   |
| LHX24-MFT-300         | 0.93 lbs [420 g]   |

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

Linear Force min. 34 lbf for control of damper surfaces up to 11 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 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

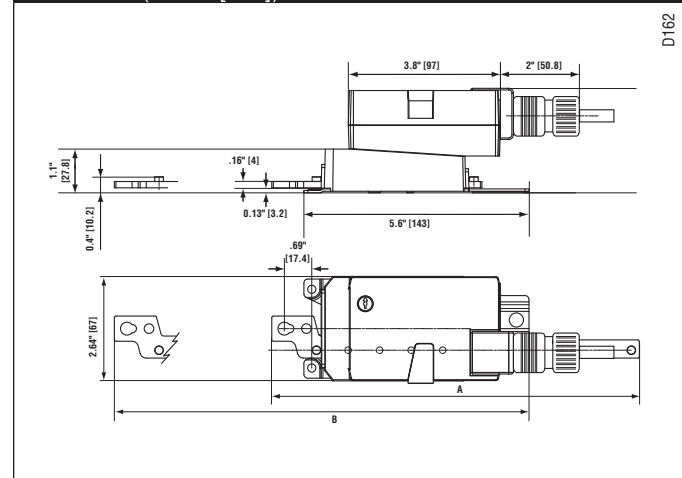
The actuator is not provided with and does not require and limit switches, but is electronically protected against overload. The anti-rotation strap supplied with the actuator will prevent lateral movement.

The LHX series provides 4, 8, or 12 in of linear force. The stroke of the gear rack can be adjusted on both sides in increments of 0.8 in [20 mm] by means of the mechanical end stops.

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 LHX24-MFT... 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.

## Dimensions (Inches [mm])



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**Accessories**

|          |   |
|----------|---|
| Z-DS1    | Rotary Support to Compensate Lateral Forces |
| Z-KSC    | Linear Coupling                             |
| P370     | Shaft Mount Auxiliary Switch                |
| 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 LHX24-MFT... actuators, only use accessories listed on this page.

**Typical Specification**

Proportional control damper actuators shall be electronic type, with integrated linear stroking arm. Actuators must provide control in response to a 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.
- 9 For triac sink the common connection from the actuator must be connected to the hot connection of the controller.

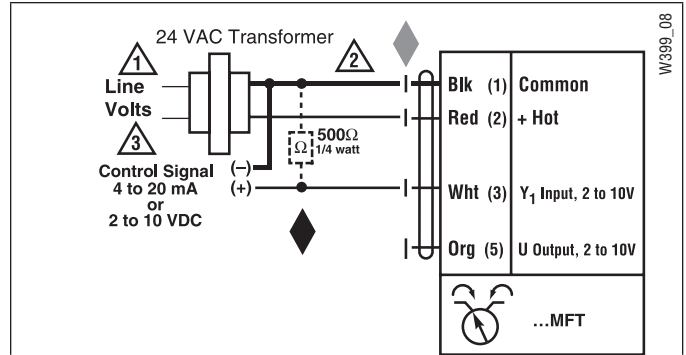
**APPLICATION NOTES**

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

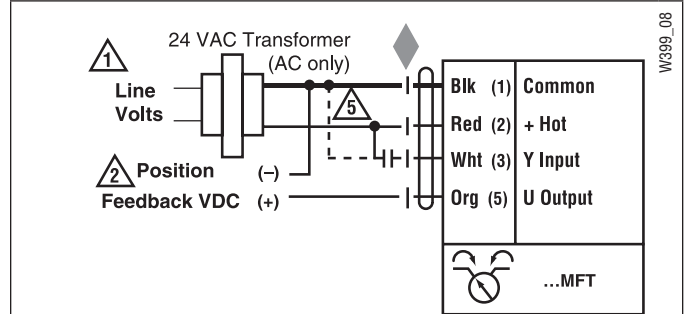
**WARNING Live Electrical Components!**

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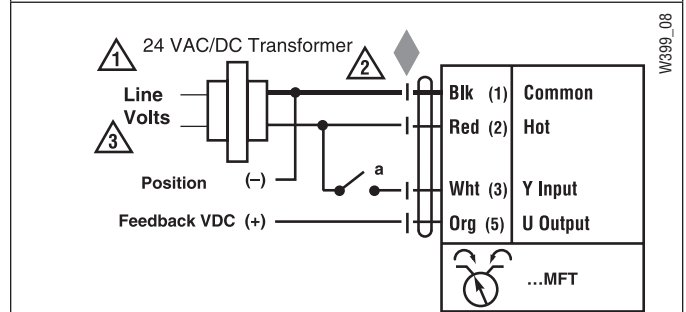
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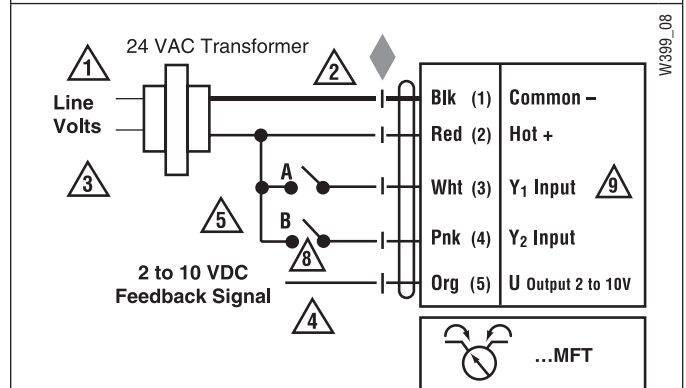
**VDC/4-20 mA**



**PWM**



**On/Off control**



**Floating Point control**



# LHQB(X)24-1-100

On/Off Control, Non-Spring Return, Linear Stroke, 24V



| Technical Data        | LHQB(X)24-1-100  |
|-----------------------|--|
| Power Supply          | 24 VAC ± 20% 50/60 Hz<br>24 VDC ± 20%  |
| Power Consumption     | 12 W (1.5 W)   |
| Transformer Sizing    | 18 VA (Class 2 power source)   |
| Electrical Connection |  |
| LHQB24-1-100          | 3 ft [1m]<br>18 GA plenum rated cable<br>Protected NEMA 2 (IP54)                                   |
| LHQX24-1-100          | □ 3 ft [1m] □ 10 ft [3m] □ 16 ft [5m]<br>18 GA plenum rated cable<br>Protected NEMA 2 (IP54)       |
| Overload Protection   | electronic throughout full stroke  |
| Control               | On/Off   |
| Input Impedance       | 1000 Ω   |
| Feedback Output U     | 2 to 10 VDC (max 0.5 mA)<br>VDC Variable   |
| Linear Stroke         | 1.6" to 4.0" [40mm to 100 mm]  |
| Linear Force          | 22 lbf [100 Nm]  |
| Stroke Direction      | reversible with ↓/↑ switch   |
| Manual Override       | external push button   |
| Running Time          | 3.5 seconds per 4" [100mm]   |
| 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,<br>CAN/CSA E60730-1:02,<br>CE acc. to 2004/108/EEC and 2006/95/EC |
| Noise Level (max)     | <52 dB(A)  |
| Servicing             | maintenance free   |
| Quality Standard      | ISO 9001   |
| Weight                | 1.4 lbs [640 g]  |

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

**Linear Force min. 22 lbf for control of damper surfaces up to 6 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.

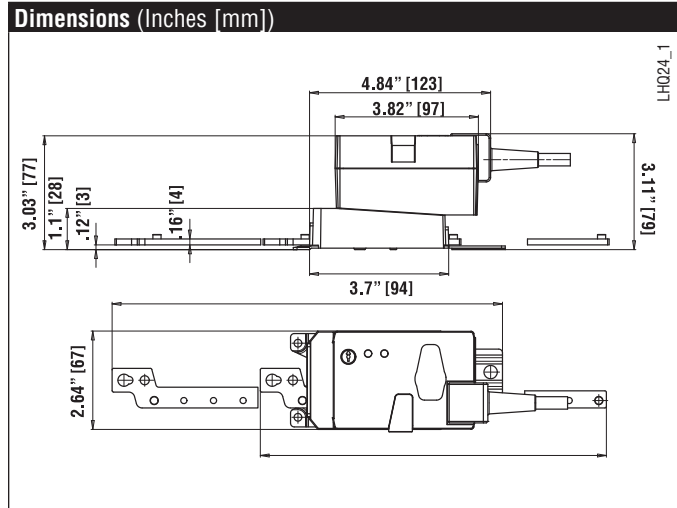
## Operation

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 LHQB(X) provides 4" [100 mm] of linear stroke. The stroke of the gear rack can be adjusted on both sides in increments of 0.8" [20 mm] by means of the mechanical end stops.

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 LHQB(X)24-1-100 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.



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### Accessories

|       |   |
|-------|---|
| Z-DS1 | Rotary Support to Compensate Lateral Forces |
| Z-KSC | Linear Coupling                             |
| P370  | Shaft Mount Auxiliary Switch                |

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

### Typical Specification

On/Off control damper actuators shall be electronic type, with integrated linear stroking arm. Actuators shall have Brushless DC motor technology and be protected from overload at all positions of linear stroke. Actuators shall have reversing switch and manual override on the cover. Run time shall be constant and independent of torque. Actuators shall be cUL 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**

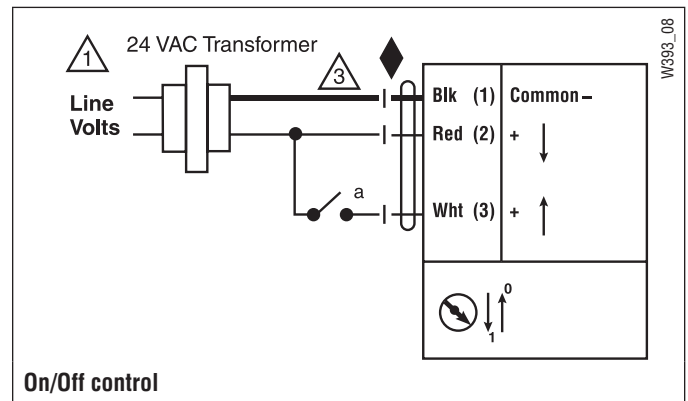
- ⚠ 1 Provide overload protection and disconnect as required.
- ⚠ 3 Actuators may also be powered by 24 VDC.

#### 📄 **APPLICATION NOTES**

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

#### ⚠ **WARNING Live Electrical Components!**

During installation, testing, servicing and troubleshooting of this product, it maybe 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.



# LHQB(X)24-MFT-100

On/Off Control, Non-Spring Return, Linear Stroke, 24V



| Technical Data        | LHQB(X)24-MFT-100  |
|-----------------------|--|
| Power Supply          | 24 VAC ± 20% 50/60 Hz<br>24 VDC ± 20%  |
| Power Consumption     | 12 W (1.5 W)   |
| Transformer Sizing    | 18 VA (Class 2 power source)   |
| Electrical Connection |  |
| LHQB24-MFT-100        | 3 ft [1m]<br>18 GA plenum rated cable<br>Protected NEMA 2 (IP54)                                   |
| LHQX24-MFT-100        | □ 3 ft [1m] □ 10 ft [3m] □ 16 ft [5m]<br>18 GA plenum rated cable<br>Protected NEMA 2 (IP54)       |
| Overload Protection   | electronic throughout full stroke  |
| Control               | 2 to 10 VDC, 4 to 20 mA (default)<br>Variable (VDC, On/Off)  |
| Input Impedance       | 100 kΩ (0.1 mA), 500 Ω,<br>1000 Ω (On/Off)   |
| Feedback Output U     | 2 to 10 VDC (max 0.5 mA)<br>VDC Variable   |
| Linear Stroke         | 1.6" to 4.0" [40mm to 100 mm]  |
| Linear Force          | 22 lbf [100 Nm]  |
| Stroke Direction      | reversible with ↓/↑ switch   |
| Manual Override       | external push button   |
| Running Time          | 3.5 seconds per 4" [100mm]<br>Variable (3.5, 5, 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,<br>CAN/CSA E60730-1:02,<br>CE acc. to 2004/108/EEC and 2006/95/EC |
| Noise Level (max)     | <52 dB(A)  |
| Servicing             | maintenance free   |
| Quality Standard      | ISO 9001   |
| Weight                | 1.4 lbs [640 g]  |

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

**Linear Force min. 22 lbf for control of damper surfaces up to 6 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 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.

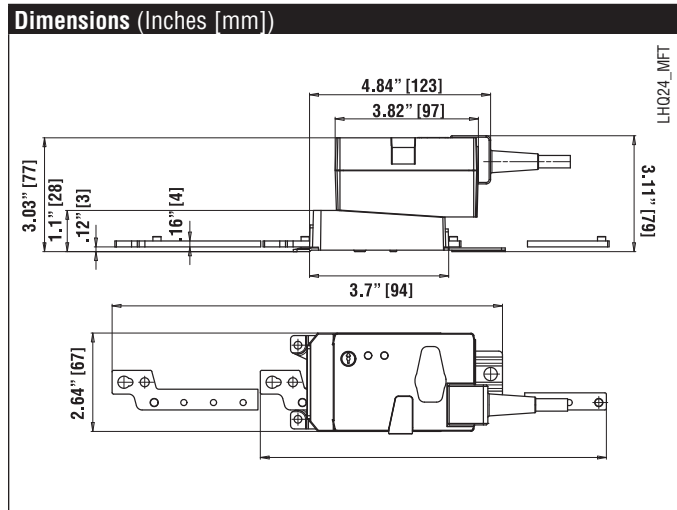
## Operation

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

The LHQB(X) series provides 4" [100 mm] of linear stroke. The stroke of the gear rack can be adjusted on both sides in increments of 0.8" [20 mm] by means of the mechanical end stops.

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 LHQB(X)24-MFT-100 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.



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### Accessories

|          |   |
|----------|---|
| Z-DS1    | Rotary Support to Compensate Lateral Forces |
| Z-KSC    | Linear Coupling                             |
| P370     | Shaft Mount Auxiliary Switch                |
| 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 LHQB(X)24-MFT-100 actuators, only use accessories listed on this page.

### Typical Specification

Proportional control damper actuators shall be electronic type, with integrated linear stroking arm. Actuators must provide control in response to a 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 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.

