



Please refer to the appropriate product literature for detailed installation information.

Reference

- Mounting Methods Guide
- Wiring Guide
- Damper Application Guide

General Information

Preliminary steps

1. Belimo actuators with NEMA 2 ratings should be mounted indoors in a dry, relatively clean environment free from corrosive fumes. If the actuator is mounted outdoors, a protective enclosure must be used to shield the actuator.
2. For new construction work, **order dampers with extended shafts**. Instruct the installing contractor to allow space for mounting the Belimo actuator on the shaft.

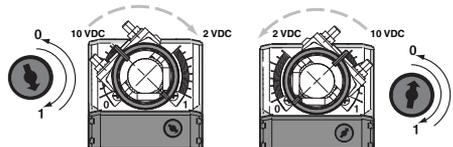
For replacement of existing gear train actuators, there are two options:

- A. From a performance standpoint, it is best to mount the actuator directly onto the damper shaft.
- B. If the damper shaft is not accessible, mount the non-spring return actuator with a ZG-GMA crankarm kit, and a mounting bracket (ZG-100, ZG-101, ZG-103, ZG-104).

Direction of Rotation Switch

Electronic fail-safe actuators have a reversing switch on the cover. Switch position indicates the start point. For the non-spring return, with the switch in position 1, the actuator rotates clockwise with a decrease in voltage or current. With the switch in position 0, the actuator rotates counterclockwise with a decrease in voltage or current.

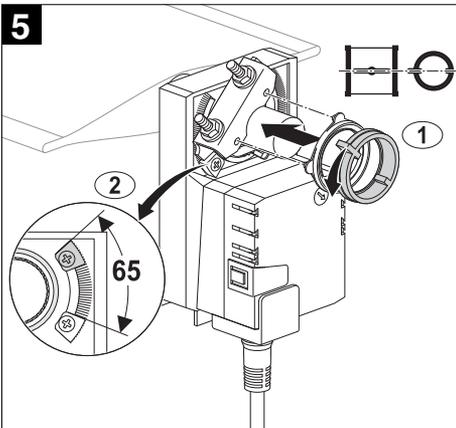
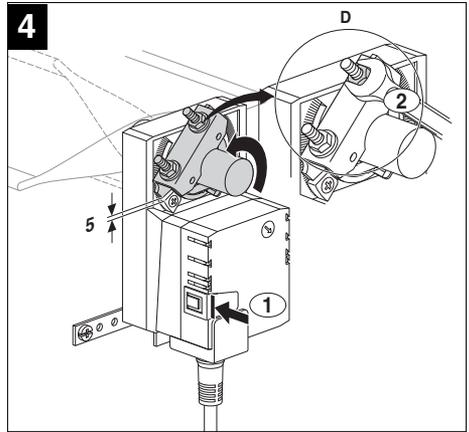
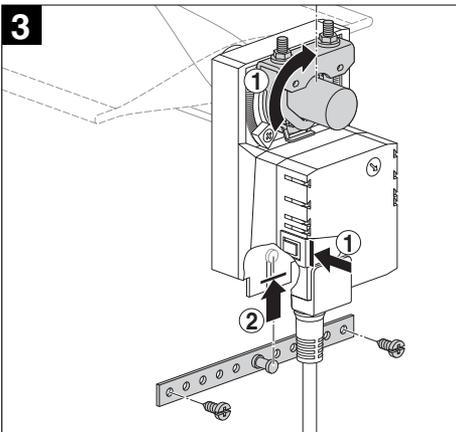
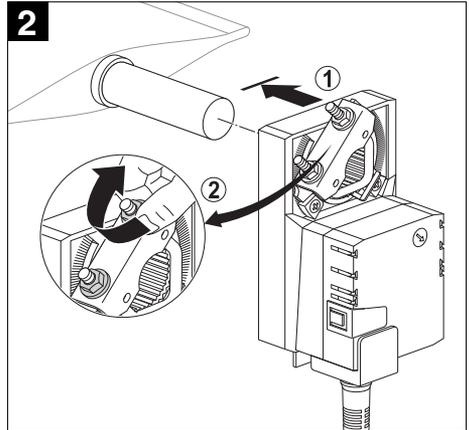
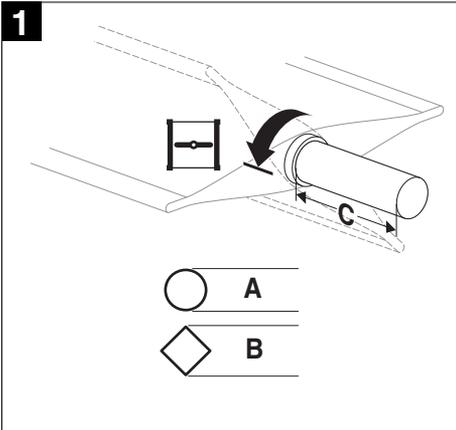
The electronic fail-safe rotates clockwise when the switch is in the 1 position and power is applied to wire #2. When power is applied to wire #3 and #4 for the -3 version, the actuator rotates counter clockwise. Rotating the switch to 0 reverses the control logic.



During checkout, the switch position can be temporarily reversed and the actuator will reverse its direction. This allows the technician a fast and easy way to check the actuator operation without having to switch wires or change settings on the thermostat. When the check-out is complete, make sure the switch is placed back to its original position.

Installation Instructions

Quick-Mount Visual Instruction for Mechanical Installation



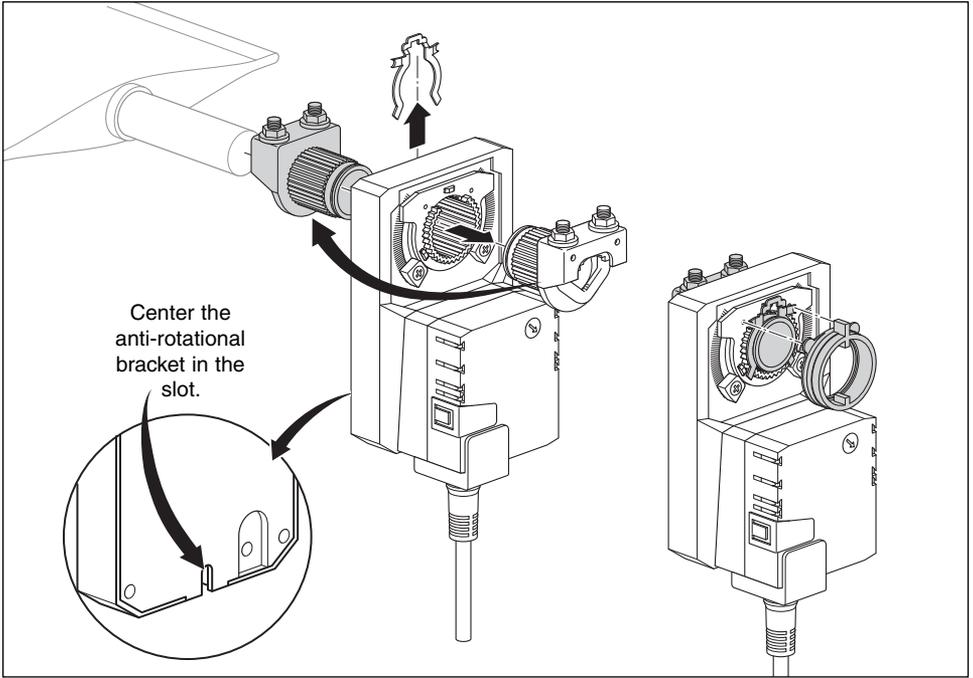
See next page for standard mounting instructions.

	A*	B	C**	D
NKQB	1/2" to 1.05"	≤ 1.0"		6 to 7 ft-lb
GKB	1/2" to 1.05"	≤ 1.0"	0.8"	6 to 7 ft-lb

*NKQB clamps have an insert that self-centers on the following diameter shafts: 1/2" (default), 3/4" and 1.05". GKB clamps have an insert that self-centers on 3/4" diameter. Without the insert, the clamp centers on 1.05"

**Shorter with reversible clamp for the GKB

Note: If an auxiliary switch or potentiometer is used while the clamp is reversed, part number (P/N) 23681-00001 is needed to connect the clamp to the auxiliary device.



Standard Mounting

1. Turn the damper shaft until the blades are fully closed.
2. ① Slip the actuator's universal clamp over the damper shaft. Make sure that the duct and the controls on the cover are accessible. Place the actuator in the desired mounting position.
 ② Hand tighten the two nuts on the actuators universal clamp.
3. ① Disengage the actuator gear train by pressing the manual override button and rotate the clamp until centered.
 ② Slide the anti-rotation strap up under the actuator so it engages the actuator at the **center of the cutout**. Bend the bracket as needed to support the rear of the actuator. Secure to ductwork with self-tapping screws (No. 8 recommended).
4. ① Loosen the nuts on the universal clamp. Press the manual override button and rotate the clamp to about 5° from the closed position (1/16 to 1/8" between stop and clamp).
 ② Tighten the two nuts on the universal clamp with a 8, 10 or 12mm wrench (see table, column D on page 2 for required torque).

5. ① Snap on the reflective position indicator.
 ② Adjust end-stops, if required
6. Mount actuators indoors. If mounted outdoors, use approved protective enclosure. The damper is now fully closed but the actuator is 5° from fully closed. This is called "pre-loading" the actuator. When the actuator is powered and sent to the closed position: it will put its full torque on the shaft compressing the edge and blade seals. This ensures that the damper will meet its leakage rating. The actuator is electronically protected from overload and will not be damaged.

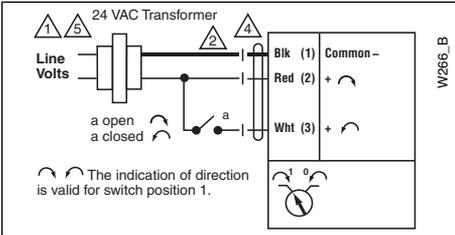
Testing the installation without power

1. Disengage the gear train with the manual override button and move the shaft from closed to open to closed. Ensure that there is no binding and that the damper goes fully open and closes with 5° of actuator stroke left.
2. Correct any problems and retest.

Airside Products	Torque (based on 4 in-lb per sq. ft)		Running Time	Power Supply	Power Consumption		Fail-Safe Running Time
	360 in-lb [40 Nm], Approx. 22 sq. ft.	54 in-lb [6 Nm], Approx. 3 sq. ft.			VA rating	Wattage running (holding)	
GK(B/X)24-3	●		150	●	21	12 (3)	35
NKQB(X)24-1		●	4	●	22	11 (3)	4

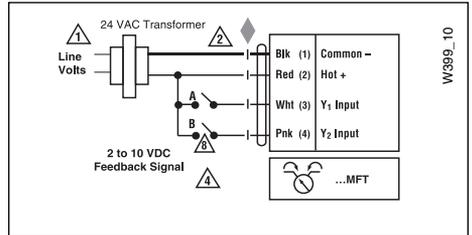
Wiring

NKQ



On/Off

GK



Floating Point or On/Off control

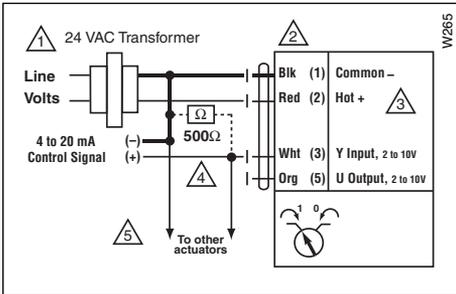
Notes:

- ⚠ Provide overload protection and disconnect as required.
- ⚠ Actuators may also be powered by 24 VDC for a 24V power supply.
- ⚠ Meets cULus requirements without the need of an electrical ground connection.
- ⚠ Contact closures A & B also can be triacs. A & B should both be closed for triac source and open for triac sink.

Note: Floating Point not available on NKQ series

Airside Products	Torque (based on 4 in-lb per sq. ft)		Running Time	Power Supply	Power Consumption		Feedback	Fail-Safe Running Time
	54 in-lb [6 Nm], Approx. 13 sq. ft.	360 in-lb [40 Nm], Approx. 90 sq. ft.			VA rating	Wattage running (holding)		
GKB24-SR, GKX24-SR	●	●	150	●	21	12 (3)	●	35
NKQB24-SR, NKQX24-SR	●		4	●	22	11 (3)	●	4

Wiring



Notes:

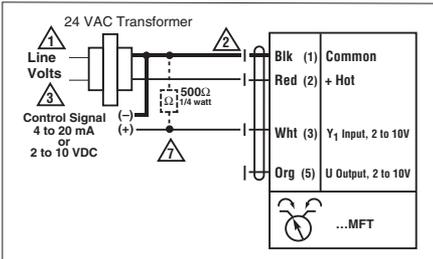
- 1 Provide overload protection and disconnect as required.
- 2 Actuators may be connected in parallel. Power consumption and input impedance must be observed.
- 3 Actuators may also be powered by 24 VDC.
- 4 The ZG-R01 500Ω resistor converts the 2 to 10 VDC control signal to 4 to 20 mA, up to 2 actuators may be connected in parallel.
- 5 Only connect common to neg. (-) leg of control circuits.

Airside Products

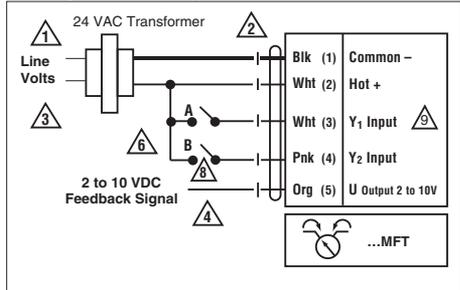
	Torque (based on 4 in-lb per sq. ft)		Running Time	Power Supply	Power Consumption		Feedback		Fail-Safe Running Time
	54 in-lb (6 Nm), Approx. 13 sq. ft.	360 in-lb (40 Nm), Approx. 90 sq. ft.			VA rating	Wattage running (holding)	2-10 VDC (default)	VDC Variable (0 to 10 VDC)	
GKX24-MFT	●	●	150	●	21	12 (3)	●	●	35
NKQX24-MFT	●	●	4	●	22	11 (3)	●	●	4

Wiring

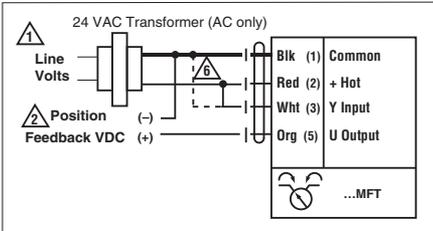
VDC/4-20 mA



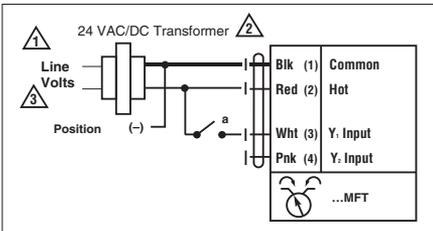
Floating Point (GK only)



PWM



On/Off



Notes:

- 1 Provide overload protection and disconnect as required.
- 2 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 a Triac sink controller. The actuator internal common reference is not compatible.
- 6 Control signal may be pulsed from either the Hot (Source) or Common (Sink) 24 VAC line.
- 7 ZG-R01 may be used.
- 8 Contact closures A & B also can be triacs. 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.

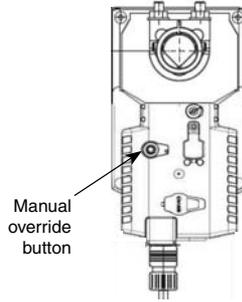
Note: Floating Point not available on NKQ series

W396_B

Manual Override

The Belimo non-spring return actuators have a black, "manual override button" located on the top of the housing. Press this button and the gear train is disengaged so the damper shaft can be moved manually. Release the button and the gear train is re-engaged.

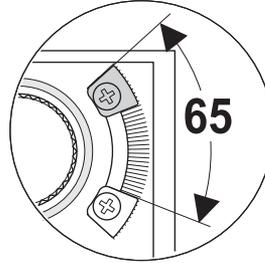
Use the manual override to test the installation without power. For tight shut-off the damper should close with 5° of actuator stroke left.



Mechanical Angle of Rotation Limiting

The adjustable stops are needed when there is no damper stop or if you want the damper to stop rotating before it reaches its stops. The non-spring return actuators can be indefinitely stalled in any position without harm.

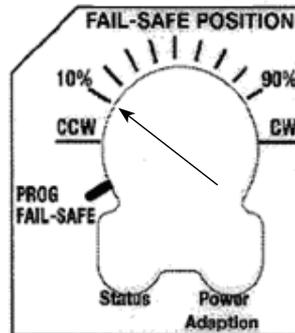
1. Loosen the two end stops with a No. 2 Phillips head screwdriver being careful not to unscrew the captive nut under the slot.
2. Move the stops (in 2.5° steps) to the desired position and re-tighten the screws.



Setting the Fail-Safe Position

Belimo's new Electronic Fail-Safe Actuators allows the user to set the fail position (0-100% in 10% increments). To set the position of the fail-safe, rotate the cover away from the fail-safe switch. Turn the switch to the desired position. To set with PC Tool, turn the switch to PROG FAIL-SAFE. When done, rotate the cover back into position.

Note: If switch is left in PROG FAIL-SAFE, the PC Tool software setting is active and can set the fail-safe position. It is recommended that the switch be set on the front of the actuator. This gives a simple visual as to what the fail-safe position is set as. If the fail-safe is programmed using the PC Tool, and the switch is then moved off the PROG FAIL-SAFE position, the new position will override the PC Tool setting. The direction switch does not affect the fail-safe position switch.



Belimo worldwide: www.belimo.com

BELIMO Americas

USA Locations, 43 Old Ridgebury Road, Danbury, CT 06810
Tel. 800-543-9038, Fax 800-228-8283, marketing@us.belimo.com
1049 Fortunado Loop, Sparks, NV 89436
Tel. 800 987-9042, Fax 800-987-8875, marketing@us.belimo.com

Canada Locations, 14/16 – 5716 Coopers Avenue, Mississauga, Ontario L4Z 2E8
Tel. 866-805-7089, Fax 905-712-3124, marketing@us.belimo.com

Latin America and The Carribean Customer Service,
Tel. 203-791-8396, Fax 203-791-9139, marketing@us.belimo.com