

# NFB24-S - Damper Actuator

On/Off, Spring Return, 24 VAC/DC



Technical Data	
Power Supply	24 VAC, ±20%, 50/60 Hz, 24 VDC, -10% / +20%
Power Consumption Running	6 W
Power Consumption Holding	2.5 W
Transformer Sizing	8.5 VA (class 2 power source)
Shaft Diameter	1/2" to 1.05" round, centers on 1/2" and 3/4" with insert, 1.05" without insert
Electrical Connection	(2) 3ft [1m], 18 GA appliance cables with 1/2" conduit connectors
Overload Protection	electronic throughout 0° to 95° rotation
Electrical Protection	actuators are double insulated
Angle of Rotation	95°, adjustable with mechanical end stop, 35° to 95°
Torque motor	90 in-lbs [10 Nm]
Direction of Rotation (Motor)	reversible with CW/CCW mounting
Direction of Rotation (Fail-Safe)	reversible with CW/CCW mounting
Position Indication	visual indicator, 0° to 95° (0° is full spring return position)
Manual Override	5 mm hex crank (3/16" Allen), supplied
Running Time (Motor)	<75 sec
Running Time (Fail-Safe)	<20 sec @ -4°F to 122°F [-20°C to 50°C], <60 sec @ -22°F [-30°C]
Ambient Humidity	max. 95% RH non-condensing
Ambient Temperature Range	-22...122 °F [-30...50 °C]
Storage Temperature Range	-40...176 °F [-40...80 °C]
Housing	IP54, NEMA 2, UL Enclosure Type 2
Housing Material	zinc coated metal and plastic casing
Agency Listings†	cULus acc. to UL60730-1A/-2-14, CAN/CSA E60730-1:02, CE acc. to 2004/108/EC and 2006/95/EC
Noise Level (Motor)	≤50 dB (A)
Noise Level (Fail-Safe)	<62 dB (A)
Servicing	maintenance free
Quality Standard	ISO 9001
Weight	4.4 lb [2 kg]
Auxiliary switch	2 x SPDT, 3A resistive (0.5A inductive) @ 250 VAC, one set at 10°, one adjustable 10° to 90°

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

**Torque min. 90 in-lb, for control of air dampers.**

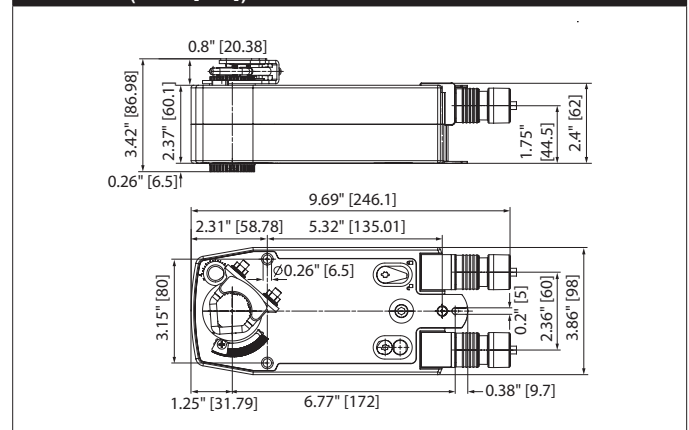
## Application

For On/Off, fail-safe control of dampers in HVAC systems. Actuator sizing should be done in accordance with the damper manufacturer's specifications. Control is On/Off from an auxiliary contact or a manual switch. The actuator is mounted directly to a damper shaft up to 1.05" in diameter by means of its universal clamp. A crank arm and several mounting brackets are available for applications where the actuator cannot be direct coupled to the damper shaft.

## Operation

The NF.24-S series actuators provide true spring return operation for reliable failsafe application and positive close off on air tight dampers. The spring return system provides constant torque to the damper with, and without, power applied to the actuator. The NF.24-S series provides 95° of rotation and is provided with a graduated position indicator showing 0° to 95°. The actuator may be stalled anywhere in its normal rotation without the need of mechanical end switches. The NF.24-S versions are provided with two built-in auxiliary switches. These SPDT switches are provided for safety interfacing or signaling, for example, for fan start-up. The switching function at the fail-safe position is fixed at 10°, the other switch function is adjustable between 10° to 90°. The NF.24-S actuator is shipped at 5° (5° from full fail-safe) to provide automatic compression against damper gaskets for tight shut-off.

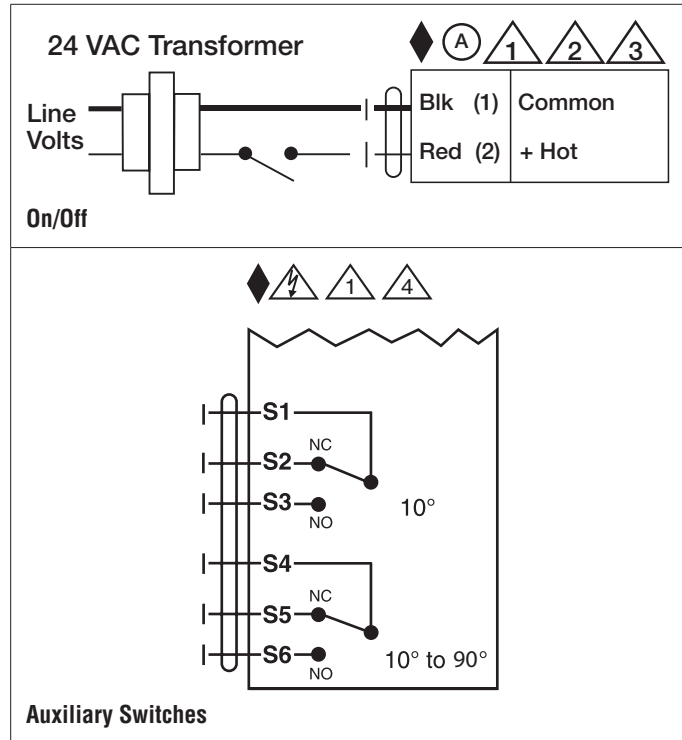
## Dimensions (Inches[mm])



Accessories	
AF-P	Anti-rotation bracket AF/NF.
AV8-25	9.8" shaft extension for 5/16" to 1" diameter shafts.
IND-AFB	AFB(X)/NFB(X) position indicator.
K7-2	Standard AFB(X)/NFB(X) clamp (1/2" to 1.05").
KG10A	Ball joint for 3/8" diameter rod, zinc plated.
KG8	Ball joint for 5/16" diameter rod, 90°, galvanized steel.
KH10	Univ. crankarm, slot 21/64" w, for 9/16" to 1" dia. shafts.
KH8	Univ. crankarm, slot 21/64" w, for 3/8" to 11/16" dia. shafts.
KH-AFB	AFB(X)/NFB(X) crankarm (with 3/4" dia. shaft pass through).
SH10	Push rod for KG10A ball joint (36" L, 3/8" diameter).
SH8	Push rod for KG6 & KG8 ball joints (36" L, 5/16" diameter).
TOOL-06	8 mm and 10 mm wrench.
ZG-100	Univ. right angle bracket (17" H x 11-1/8" W x 6" base).
ZG-101	Univ. right angle bracket (13" H x 11" W x 7-7/16" base).
ZG-109	Right angle bracket for ZS-260.
ZG-110	Stand-off bracket for ZS-260.
ZG-118	AFB(X)/NFB(X) U bracket (5-7/8" H x 5-1/2" W x 2-19/32" D).
ZG-120	Jackshaft mounting bracket.
ZG-AFB	AFB(X)/NFB(X) crankarm adaptor kit.
ZG-AFB118	AFB(X)/NFB(X) crankarm adaptor kit.
ZG-DC1	Damper clip for damper blade, 3.5" width.
ZG-DC2	Damper clip for damper blade, 6" width.
ZG-JSA-1	1" diameter jackshaft adaptor (11" L).
ZG-JSA-2	1-5/16" diameter jackshaft adaptor (12" L).
ZG-JSA-3	1.05" diameter jackshaft adaptor (12" L).
ZS-100	Weather shield - galvanneal (13" L x 8" W x 6" D).
ZS-101	Base plate for ZS-100.
ZS-150	Weather shield - PC w/ foam seal (16" L x 8-3/8" W x 4" D).
ZS-260	Explosion proof housing.
ZS-300	NEMA 4X, 304 stainless steel enclosure.
ZS-300-5	NEMA 4X, 316L stainless steel enclosure.
ZS-300-C1	1/2" shaft adaptor, standard with ZS-300(-5).
ZS-300-C2	3/4" shaft adaptor for ZS-300(-5).
ZS-300-C3	1" shaft adaptor for ZS-300(-5).
Z-SF	20 piece Z-AF kit.
P475	Shaft mount, non-Mercury aux. switch for 1/2" dia. shafts.
P475-1	Shaft mount, non-Mercury aux. switch for 1" dia. shafts.
PS-100	Actuator power supply and control simulator.
TF-CC US	Cable conduit connector, 1/2".
ZG-X40	120 to 24 VAC, 40 VA transformer.

### Typical Specification

On/Off spring return damper actuators shall be direct coupled type which require no crank arm and linkage and be capable of direct mounting to a jackshaft up to a 1.05" diameter. The actuators must be designed so that they may be used for either clockwise or counter clockwise fail-safe operation. Actuators shall be protected from overload at all angles of rotation. If required, two SPDT auxiliary switch shall be provided having the capability of one being adjustable. Actuators with auxiliary switches must be constructed to meet the requirements for Double Insulation so an electrical ground is not required to meet agency listings. Actuators shall be cULus listed and have a 5 year warranty, and be manufactured under ISO 9001 International Quality Control Standards. Actuators shall be as manufactured by Belimo.



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## Wiring Diagrams



### **WARNING! LIVE ELECTRICAL COMPONENTS!**

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



Meets cULus requirements without the need of an electrical ground connection.



Apply only AC line voltage or only UL-Class 2 voltage to the terminals of auxiliary switches. Mixed or combined operation of line voltage/safety extra low voltage is not allowed.



Actuators with appliance cables are numbered.



Provide overload protection and disconnect as required.



Actuators may also be powered by 24 VDC.



Two built-in auxiliary switches (2x SPDT), for end position indication, interlock control, fan startup, etc.



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