

EFB24-SR N4, EFB24-SR-S N4, EFX24-SR-S N4(H)

NEMA 4, Proportional, Spring Return, 24 V, for 2 to 10 VDC or 4 to 20 mA Control Signal



Technical Data		EFB24-SR N4, EFB24-SR-S N4, EFX24-SR-S N4(H)
Power supply		24 VAC ±20%, 50/60 Hz 24 VDC +20% / -10%
Power consumption	running holding	8 W / heater 21 W 4.5 W
Transformer sizing		14 VA (class 2 power source) / heater 21 VA
Electrical connection		terminal block(s) inside junction box with knockouts
Overload protection		electronic throughout 0 to 95° rotation
Operating range Y		2 to 10 VDC, 4 to 20mA
Input impedance		100 kΩ for 2 to 10 VDC (0.1 mA) 500 Ω for 4 to 20 mA
Feedback output U		2 to 10 VDC (max. 0.5 mA)
Torque		270 in-lb [30 Nm] minimum
Direction of rotation	spring motor	reversible with CW/CCW mounting reversible with built-in switch
Mechanical angle of rotation		95° (adjustable with mechanical end stop, 35° to 95°)
Running time	spring motor spring (w/heater)	< 20 seconds @ -4°F to 122°F [-20°C to 50°C]; < 60 seconds @ -22°F [-30°C] 95 seconds < 20 sec @ -22°F to 122°F [-30°C to 50°C]; < 60 sec @ -40°F [-40°C]
Position indication		visual indicator, 0° to 95° (0° is full spring return position)
Manual override		5 mm hex crank (3/16" Allen), supplied
Humidity		max. 95% RH non-condensing
Ambient temperature		-22°F to 122°F [-30°C to 50°C]
	with heater	-40°F to 122°F [-40°C to 50°C]
Storage temperature		-40°F to 176°F [-40°C to 80°C]
Housing		NEMA 4, IP66, Enclosure Type4
Housing material		aluminum diecast and plastic casing
Agency listings†		cULus acc. to UL60730-1A/-2-14, CAN/CSA E60730-1:02, CE acc. to 2004/108/EC & 2006/95/EC
Noise level		≤56.5dB(A) motor @ 95 seconds ≤71.4dB(A) spring return
Servicing		maintenance free
Quality standard		ISO 9001
Weight		10 lbs [4.54 kg], 10.1 lbs [4.59 kg] with heater
† Rated Impulse Voltage 800V, Type of action 1.AA (1.AA.B for -S version), Control Pollution Degree 4.		
EFB24-SR-S N4, EFX24-SR-S N4(H)		
Auxiliary switches		2 x SPDT 3A (0.5A) @ 250 VAC, UL approved one set at 10°, and one set at 85°

Torque min. 270 in-lb, for control of air dampers

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. A crank arm 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 500Ω 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. Not to be used for a master-slave application.

Operation

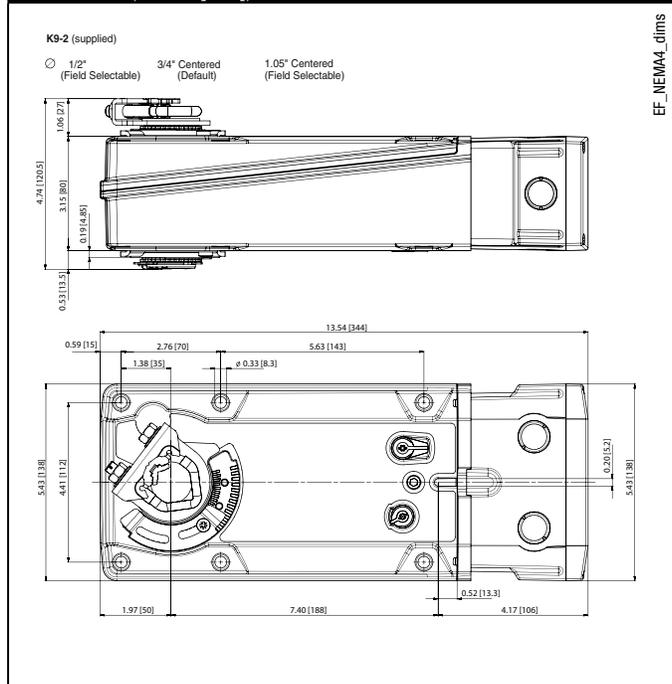
The EFB N4 and EFX N4 series actuators provide true spring return operation for reliable fail-safe application and positive close-off on air tight dampers. The spring return system provides constant torque to the damper with, and without, power applied to the actuator.

The EFB N4 and EFX N4 series provide 95° of rotation and is provided with a graduated position indicator showing 0° to 95°.

The EFB N4 and EFX N4 series use a brushless DC motor which is controlled by an Application Specific Integrated Circuit (ASIC) and a microprocessor. The microprocessor provides the intelligence to the ASIC to provide a constant rotation rate and to know the actuator's exact fail-safe position. The ASIC monitors and controls the brushless DC motor's rotation and provides a digital rotation sensing function to prevent damage to the actuator in a stall condition. The actuator may be stalled anywhere in its normal rotation without the need of mechanical end switches.

The EFB24-SR-S N4 and EFX24-SR-S N4(H) versions are provided with two built-in auxiliary switches. These SPDT switches provide 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 fixed at 85°. The EFB24-SR N4, EFB24-SR-S N4, and EFX24-SR-S N4(H) actuator is shipped at +5° (5° from full fail-safe) to provide automatic compression against damper gaskets for tight shut-off.

Dimensions (Inches [mm])



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Accessories

IND-EFB	Damper position indicator
KH-EFB	Crank arm
K9-2	Universal clamp for up to 1.05" diameter jackshafts
Tool-07	13 mm wrench
ZG-EFB	Crank arm adaptor kit

NOTE: When using EFB24-SR N4, EFB24-SR-S N4, and EFX24-SR-S N4(H) actuators, only use accessories listed on this page.
For actuator wiring information and diagrams, refer to Belimo Wiring Guide.

Typical Specification

Spring return control 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 actuator must provide proportional damper control in response to a 2 to 10 VDC or, with the addition of a 500Ω resistor, a 4 to 20 mA control input from an electronic controller or positioner. The actuators must be designed so that they may be used for either clockwise or counterclockwise fail-safe operation. Actuators shall use a brushless DC motor controlled by a microprocessor and be protected from overload at all angles of rotation. Run time shall be constant, and independent of torque. A 2 to 10 VDC feedback signal shall be provided for position feedback. 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 Approved and 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

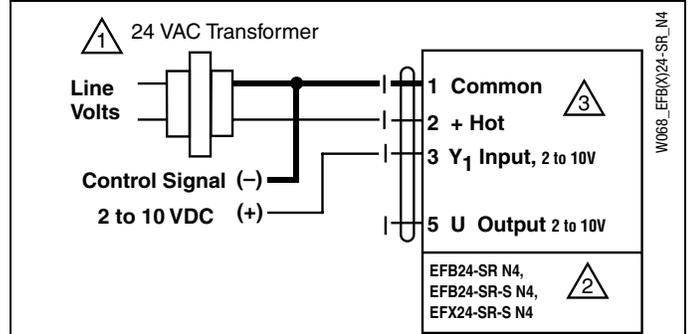
- 1 Provide overload protection and disconnect as required.
- 2 **CAUTION Equipment Damage!**
Actuators may be connected in parallel.
Power consumption and input impedance must be observed.
Up to 4 actuators may be connected in parallel if not mechanically mounted to the same shaft. With 4 actuators wired to one 500 Ω resistor.
Power consumption must be observed.
- 3 Actuator may also be powered by 24 VDC.
- 4 For end position indication, interlock control, fan startup, etc., EFB24-SR-S N4 and EFX24-SR-S N4 incorporates two built-in auxiliary switches: 2 x SPDT, 3A (0.5A) @250 VAC, UL Approved, one switch is fixed at +10°, the other is fixed at 85°.
- 5 Only connect common to neg. (-) leg of control circuits

APPLICATION NOTES

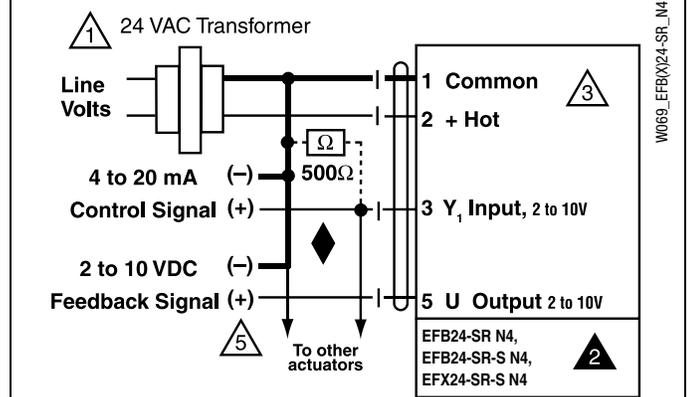
- ◆ The ZG-R01 500 Ω resistor converts the 4 to 20 mA control signal to 2 to 10 VDC.

WARNING Live Electrical Components!

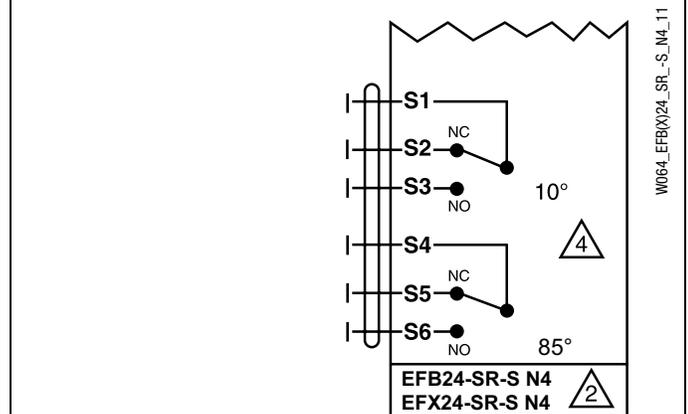
During installation, testing, servicing and troubleshooting of this product, it may be necessary to work with live electrical components. Have a qualified licensed electrician or other individual who has been properly trained in handling live electrical components perform these tasks. Failure to follow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



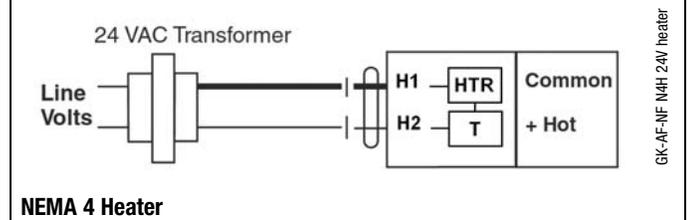
2 to 10 VDC control



4 to 20 mA control with 2 to 10 VDC feedback output



Auxiliary switches



NEMA 4 Heater

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W068_EFB(X)24-SR_N4

W069_EFB(X)24-SR_N4

W064_EFB(X)24-SR-S_N4_11

GK-AF-NF N4H 24V heater