

# NFB24-SR N4(H), NFB24-SR-S N4(H), NFX24-SR N4, NFX24-SR-S N4

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



## Technical Data

Technical Data		NFB24-SR N4(H), NFB24-SR-S N4(H), NFX24-SR N4, NFX24-SR-S N4
Power supply		24 VAC ±20%, 50/60 Hz 24 VDC +20% / -10%
Power consumption	running	3.5 W / heater 25 W
	holding	2.5 W
Transformer sizing		6 VA (class 2 power source) / heater 25 VA
Electrical connection		3 ft, 18 GA appliance cable, 1/2" conduit connector
	NFB... N4	-S models: two 3 ft, 18 gauge appliance cables with 1/2" conduit connectors
	heater (N4H)	terminal block, 26-16 GA
	NFX... N4	3 ft [1m], 10 ft [3m] or 16 ft [5m] 18 GA appliance or plenum cables, with 1/2" conduit connector
		-S models: two 3 ft [1m], 10 ft [3m] or 16 ft [5m] appliance cables with 1/2" conduit connectors
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		90 in-lb [10 Nm] minimum
Direction of rotation	spring motor	reversible with CW/CCW mounting inside housing reversible with built-in switch
Mechanical angle of rotation		95° (adjustable with mechanical end stop, 35° to 95°)
Running time	motor	95 seconds
	spring	< 20 seconds @ -4°F to 122°F [-20°C to 50°C]; < 60 seconds @ -22°F [-30°C]
	spring (with heater)	< 20 seconds @ -4°F to 122°F [-20°C to 50°C]; < 60 seconds @ -49°F [-45°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	-49°F to 122°F [-45°C to 50°C]
Storage temperature		-40°F to 176°F [-40°C to 80°C]
Housing		UL Type 4, NEMA 4, IP66
Housing material		polycarbonate
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		≤40dB(A) motor @ 95 seconds ≤62dB(A) spring return
Servicing		maintenance free
Quality standard		ISO 9001
Weight		9.25 lbs (4.2 kg); 9.5 lbs (4.3 kg) with switches 10 lbs (4.5 kg) with heater

† Rated Impulse Voltage 800V, Type of action 1.AA (1.AA.B for -S version), Control Pollution Degree 4.

## NFB24-SR-S N4(H), NFB24-SR-S N4

Auxiliary switches	2 x SPDT 3A (0.5A) @ 250 VAC, UL approved one set at +10°, one adjustable 10° to 90°
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Torque min. 90 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 NFB N4(H), NFX 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.

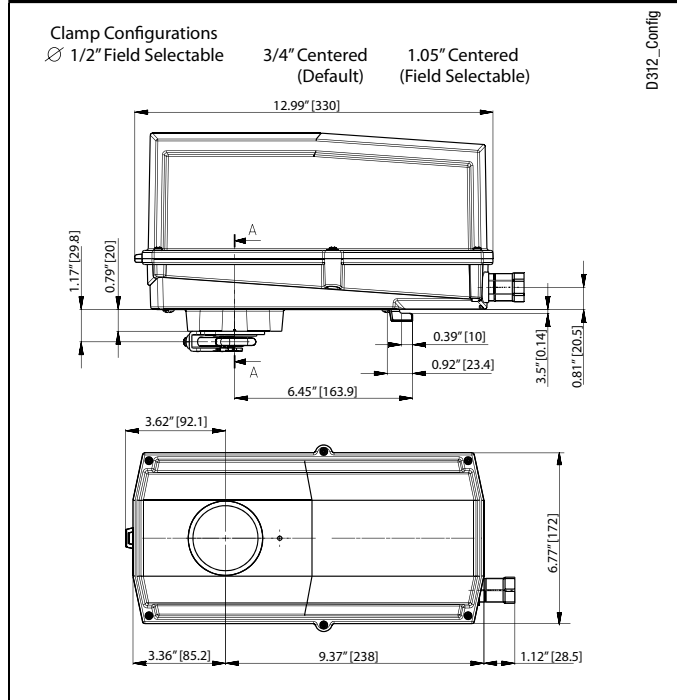
The NFB N4(H), NFX N4 series provides 95° of rotation and is provided with a graduated position indicator showing 0° to 95°.

The NFB24-SR N4(H), NFX24-SR N4 uses 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 NFB24-SR-S N4(H), NFX24-SR-S N4 version 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 adjustable between +10° to +90°.

**Installation Note:** Use suitable flexible metallic conduit or its equivalent with the conduit fitting.

## Dimensions (inches [mm])



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### Accessories

Tool-06	8mm and 10 mm wrench
43442-00001	Gland (needed for additional wires)
11097-00001	Gasket for Gland (needed for additional wires)

**NOTE:** When using NFB24-SR N4(H), NFB24-SR-S N4(H), NFX24-SR N4, NFX24-SR-S N4 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 500 Ω 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 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

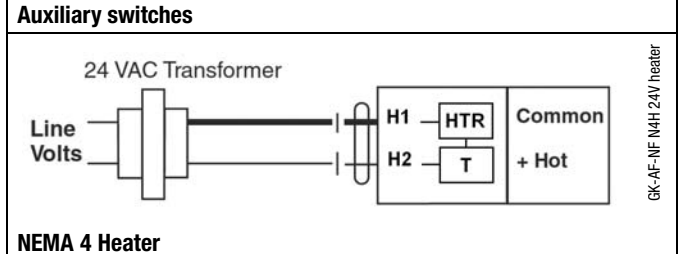
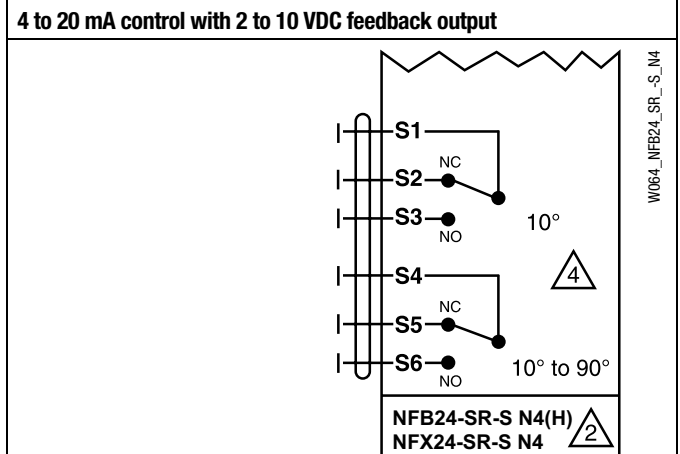
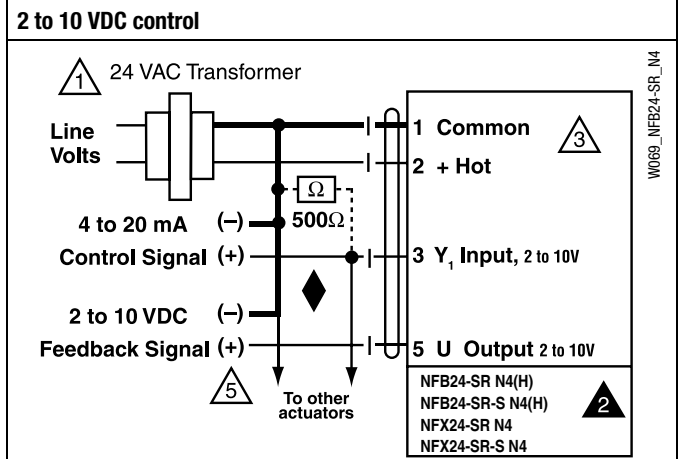
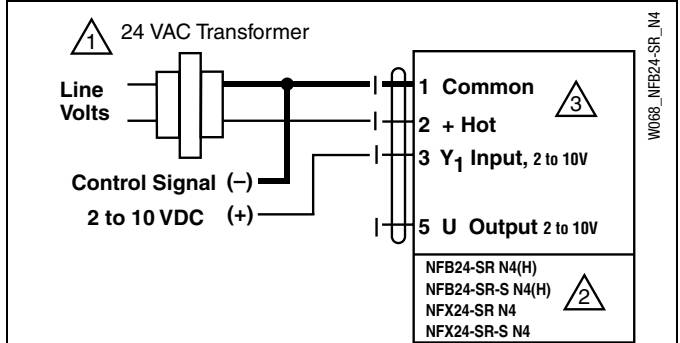
#### INSTALLATION NOTES

- 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.
- 3 Up to 4 actuators may be connected in parallel. With 4 actuators wired to one 500 Ω resistor. Power consumption must be observed.
- 4 Actuator may also be powered by 24 VDC.
- 5 For end position indication, interlock control, fan startup, etc., NFB24-SR-S N4(H), NFX24-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°, one is adjustable 10° to 90°.
- 6 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.



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W068\_NFB24-SR\_N4

W069\_NFB24-SR\_N4

W064\_NFB24-SR-S\_N4

GK-AF-NF-N4H 24V heater