**Customizable Non Fail-Safe actuator for controlling dampers in typical commercial HVAC applications.**

- **Torque motor 90 in-lb [10 Nm]**
- **Nominal voltage AC/DC 24 V**
- **Control On/Off**
- **2x SPDT**



Picture may differ from product

5-year warranty

## Technical data

| | | |
|---|---|---|
| **Electrical data** | Nominal voltage | AC/DC 24 V |
| | Nominal voltage frequency | 50/60 Hz |
| | Nominal voltage range | AC 19.2...28.8 V / DC 21.6...28.8 V |
| | Power consumption in operation | 6 W |
| | Power consumption in rest position | 2.5 W |
| | Transformer sizing | 8.5 VA |
| | Auxiliary switch | 2x SPDT, 1 mA...3 A (0.5 A inductive), DC 5 V...AC 250 V, 1x 10% / 1x 11...90% |
| | Switching capacity auxiliary switch | 1 mA...3 A (0.5 A inductive), DC 5 V...AC 250 V |
| | Electrical Connection | (2) 18 AWG appliance cables, 1 m, 3 m or 5 m, with or without 1/2" NPT conduit connectors |
| | Overload Protection | electronic throughout 0...95° rotation |
| | Electrical Protection | actuators are double insulated |
| **Functional data** | Torque motor | 90 in-lb [10 Nm] |
| | Direction of motion motor | selectable by ccw/cw mounting |
| | Direction of motion fail-safe | reversible with cw/ccw mounting |
| | Manual override | 5 mm hex crank (3/16" Allen), supplied |
| | Angle of rotation | 95° |
| | Angle of rotation note | adjustable with mechanical end stop, 35...95° |
| | Running Time (Motor) | 75 s / 90° |
| | Running time fail-safe | <20 s @ -20...50°C, <60 s @ -30°C |
| | Sound power level, motor | 50 dB(A) |
| | Sound power level, fail-safe | 62 dB(A) |
| | Position indication | Mechanical |
| **Safety data** | Power source UL | Class 2 Supply |
| | Degree of protection NEMA/UL | NEMA 2 |
| | Housing | UL Enclosure Type 2 |
| | Agency Listing | cULus acc. to UL60730-1A/-2-14, CAN/CSA E60730-1:02<br>CE acc. to 2014/30/EU and 2014/35/EU |
| | Quality Standard | ISO 9001 |
| | UL 2043 Compliant | Suitable for use in air plenums per Section 300.22(C) of the NEC and Section 602 of the IMC |
| | Ambient humidity | Max. 95% RH, non-condensing |
| | Ambient temperature | -22...122°F [-30...50°C] |
| | Storage temperature | -40...176°F [-40...80°C] |
| | Servicing | maintenance-free |

## Technical data

| | | |
|---|---|---|
| **Weight** | Weight | 4.7 lb [2.2 kg] |
| **Materials** | Housing material | UL94-5VA |

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

## Product features

**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.

**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.

## Accessories

**Electrical accessories**

| Description | Type |
|---|---|
| Auxiliary switch, mercury-free | P475 |
| Auxiliary switch, mercury-free | P475-1 |
| Signal simulator, Power supply AC 120 V | PS-100 |
| Cable conduit connector 1/2" | TF-CC US |
| Transformer, AC 120 V to AC 24 V, 40 VA | ZG-X40 |

**Mechanical accessories**

| Description | Type |
|---|---|
| Anti-rotation bracket, for AF / NF | AF-P |
| Shaft extension 240 mm ø20 mm for damper shaft ø8...22.7 mm | AV8-25 |
| End stop indicator | IND-AFB |
| Shaft clamp reversible, for central mounting, for damper shafts ø12.7 / 19.0 / 25.4 mm | K7-2 |
| Ball joint suitable for damper crank arm KH8 / KH10 | KG10A |
| Ball joint suitable for damper crank arm KH8 | KG8 |
| Damper crank arm Slot width 8.2 mm, clamping range ø14...25 mm | KH10 |
| Damper crank arm Slot width 8.2 mm, for ø1.05" | KH12 |
| Damper crank arm Slot width 8.2 mm, clamping range ø10...18 mm | KH8 |
| Actuator arm, for 3/4" shafts, clamping range ø10...22 mm, Slot width 8.2 mm | KH-AFB |
| Push rod for KG10A ball joint L 36”, 3/8” diameter | SH10 |
| | SH8 |

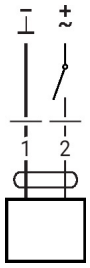
## Accessories

| Description | Type |
|---|---|
| Wrench 0.32 in and 0.39 in [8 mm and 10 mm] | TOOL-06 |
| Baseplate extension | Z-AF |
| Mounting bracket for AF.. | ZG-100 |
| Mounting bracket for AF / NF | ZG-101 |
| Mounting bracket | ZG-109 |
| Linkage kit | ZG-110 |
| Mounting bracket for AF / NF | ZG-118 |
| | ZG-120 |
| Mounting kit for linkage operation for flat and side installation | ZG-AFB |
| Mounting kit for foot mount installation | ZG-AFB118 |
| | ZG-DC1 |
| | ZG-DC2 |
| | ZG-JSA-1 |
| | ZG-JSA-2 |
| | ZG-JSA-3 |
| Weather shield 13x8x6" [330x203x152 mm] (LxWxH) | ZS-100 |
| Baseplate, for ZS-100 | ZS-101 |
| Weather shield 406x213x102 mm [16x8-3/8x4"] (LxWxH) | ZS-150 |
| Explosion proof housing 16x10x6.435" [406x254x164 mm] (LxWxH), UL and CSA, Class I, Zone 1&2, Groups B, C, D, (NEMA 7), Class III, Hazardous (classified) Locations | ZS-260 |
| Weather shield 17-1/4x8-3/4x5-1/2" [438x222x140 mm] (LxWxH), NEMA 4X, with mounting brackets | ZS-300 |
| Weather shield 17-1/4x8-3/4x5-1/2" [438x222x140 mm] (LxWxH), NEMA 4X, with mounting brackets | ZS-300-5 |
| Shaft extension 1/2" | ZS-300-C1 |
| Shaft extension 3/4" | ZS-300-C2 |
| Shaft extension 1" | ZS-300-C3 |
| Baseplate extension | Z-SF |
| Linkage kit | ZG-JSL |
| Jackshaft RetroFIT+ Linkage with Belimo Rotary Actuators | |

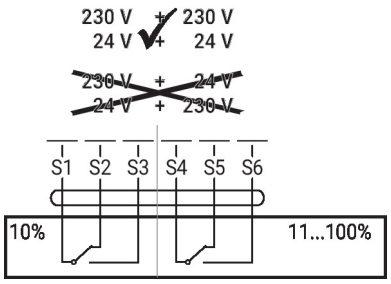
## Electrical installation

**Wire colors:**
1 = black
2 = red
S1 = violet
S2 = red
S3 = white
S4 = orange
S5 = pink
S6 = grey

AC/DC 24 V, on/off




Auxiliary switch



## Dimensions

PC

