

Basic Fail-Safe modulating actuator for controlling dampers in typical commercial HVAC applications.

- Torque motor 180 in-lb [20 Nm]
- Nominal voltage AC/DC 24 V
- Control Modulating
- Position feedback 2...10 V



5-year warranty



Picture may differ from product

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 | 5.5 W |
| | Power consumption in rest position | 3 W |
| | Transformer sizing | 8.5 VA |
| | Electrical Connection | 18 AWG appliance cable, 3 ft [1 m], with 1/2" NPT conduit connector |
| | Overload Protection | electronic throughout 0...95° rotation |
| | Electrical Protection | actuators are double insulated |
| Functional data | Torque motor | 180 in-lb [20 Nm] |
| | Operating range Y | 2...10 V |
| | Operating range Y note | 4...20 mA w/ ZG-R01 (500 Ω, 1/4 W resistor) |
| | Input impedance | 100 kΩ for 2...10 V (0.1 mA), 500 Ω for 4...20 mA |
| | Position feedback U | 2...10 V |
| | Position feedback U note | Max. 0.5 mA |
| | Direction of motion motor | selectable with switch 0/1 |
| | 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) | 95 s / 90° |
| | Running time fail-safe | <20 s @ -4...122°F [-20...50°C], <60 s @ -22°F [-30°C] |
| | Noise level, motor | 40 dB(A) |
| | Noise level, fail-safe | 62 dB(A) |
| | Position indication | Mechanical |
| Safety data | Power source UL | Class 2 Supply |
| | Degree of protection IEC/EN | IP54 |
| | Degree of protection NEMA/UL | NEMA 2 |
| | Housing | UL Enclosure Type 2 |

Technical data

| | | |
|---------------------|---|---|
| Safety data | Agency Listing | cULus listed to UL60730-1A:02; UL 60730-2-14:02 and CAN/CSA-E60730-1:02 |
| 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 | |
| Weight | Weight | 5.3 lb [2.4 kg] |
| Materials | Housing material | UL94-5VA |

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

Product features

| | |
|--------------------|--|
| Application | For fail-safe, modulating control 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 DC 2...10 V or, with the addition of a 500Ω resistor, a 4...20 mA control input from an electronic controller or positioner. A DC 2...10 V feedback signal is provided for position indication. A common installation technique for control of multi-section dampers is to use the US position feedback of one actuator (Primary) to control multiple actuators (Secondary). Belimo refers to this as primary and secondary control. The only requirement is that the actuators are installed on MECHANICALLY SEPARATE damper shafts. |
| Operation | The AF..24-SR 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 AF..24-SR series provides 95° of rotation and is provided with a graduated position indicator showing 0° to 95°. The AF..24-SR 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 AF..24-SR actuator is shipped at 5° (5° from full fail-safe) to provide automatic compression against damper gaskets for tight shut-off. ATTENTION: AF..24-SR cannot be tandem mounted on the same damper or valve shaft. Only On/Off and MFT AF.. models can be used for tandem mount applications. |

Product features

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 modulating 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 counter clockwise 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 listed and have a 5 year warranty, and be manufactured under ISO 9001 International Quality Control Standards. Actuators shall be as manufactured by Belimo.

Parts included

| Description | Type |
|---|-----------|
| Cable conduit connector 1/2" | TF-CC US |
| Wrench 0.32 in and 0.39 in [8 mm and 10 mm] | TOOL-06 |
| Mounting bracket for AF.. | ZG-100 |
| Mounting bracket for AF / NF | ZG-101 |
| Mounting bracket for AF / NF | ZG-118 |
| Mounting kit for foot mount installation | ZG-AFB118 |
| Weather shield 13x8x6" [330x203x152 mm] (LxWxH) | ZS-100 |
| 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 |

Accessories

| Electrical accessories | Description | Type |
|--|-------------|----------|
| DC Voltage Input Rescaling Module | | IRM-100 |
| Auxiliary switch, mercury-free | | P475 |
| Auxiliary switch, mercury-free | | P475-1 |
| Signal simulator, Power supply AC 120 V | | PS-100 |
| Convert Pulse Width Modulated Signal to a 2...10 V Signal for Belimo | | PTA-250 |
| Proportional Actuators | | |
| Positioner for wall mounting | | SGA24 |
| Positioner for front-panel mounting | | SGF24 |
| Cable conduit connector 1/2" | | TF-CC US |
| Resistor, 500 Ω, 1/4" wire resistor with 6" pigtail wires | | ZG-R01 |
| Resistor kit, 50% voltage divider | | ZG-R02 |
| 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 |

Accessories

| Description | Type |
|---|-----------|
| 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 |
| 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 |
| Dual actuator mounting bracket. | ZG-102 |
| Mounting bracket | ZG-109 |
| Linkage kit | ZG-110 |
| Mounting bracket for AF / NF | ZG-118 |
| Jackshaft mounting bracket. | 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 |
| 1" diameter jackshaft adaptor (11" L). | ZG-JSA-1 |
| 1-5/16" diameter jackshaft adaptor (12" L). | ZG-JSA-2 |
| 1.05" diameter jackshaft adaptor (12" L). | 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 | |

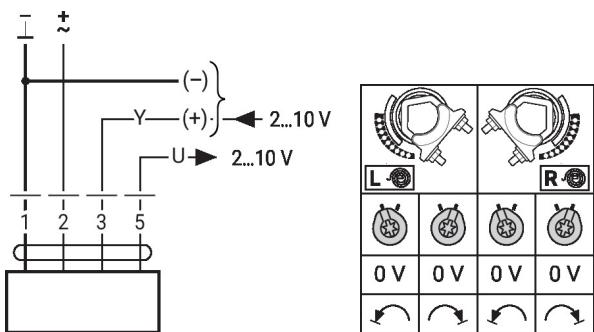
Electrical installation

Wire colors:

- 1 = black
- 2 = red
- 3 = white
- 5 = orange

Electrical installation

AC/DC 24 V, modulating



Dimensions

PC

