



5-year warranty



MFT

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 | 6.5 W |
| | Power consumption in rest position | 3 W |
| | Transformer sizing | 9 VA |
| | Electrical Connection | 18 GA appliance cable, 1 m, with 1/2" conduit connector |
| | Overload Protection | electronic throughout 0...95° rotation |
| | Electrical Protection | actuators are double insulated |
| Functional data | Torque motor | 90 in-lb [10 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, 1500 Ω for PWM, On/Off and Floating point |
| | Operating range Y variable | Start point 0.5...30 V End point 2.5...32 V |
| | Operating modes optional | variable (VDC, PWM, on/off, floating point) |
| | Position feedback U | 2...10 V |
| | Position feedback U note | Max. 0.5 mA |
| | Position feedback U variable | VDC variable |
| | 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) | 150 s / 90° |
| | Running time motor variable | 40...150 s |
| | Running time fail-safe | <20 s @ -4...122°F [-20...50°C], <60 s @ -22°F [-30°C] |
| | Adaptation Setting Range | off (default) |
| | Override control | MIN (minimum position) = 0% MID (intermediate position) = 50% MAX (maximum position) = 100% |
| | 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 |

| | | |
|--------------------|------------------------------|---|
| Safety data | Degree of protection NEMA/UL | NEMA 2 |
| | Enclosure | UL Enclosure Type 2 |
| | 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 | 5.0 lb [2.3 kg] |
| Materials | Housing material | Galvanized steel and plastic housing |

Footnotes *Variable when configured with MFT options.

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

Product features

- Default/Configuration** Default parameters for 2 to 10 VDC applications of the NF..-MFT actuator are assigned during manufacturing. If required, custom versions of the actuator can be ordered. The parameters are variable and can be changed by three means: Factory pre-set or custom configuration, set by the customer using PC-Tool software or the handheld ZTH US.
- Application** For fail-safe, modulating control of dampers in HVAC systems. Actuator sizing should be done in accordance with the damper manufacturer's specifications. A feedback signal is provided for position indication.
- Operation** The NF..24-MFT actuator provides 95° of rotation and is provided with a graduated position indicator showing 0° to 95°. The actuator will synchronize the 0° mechanical stop or the physical damper or valve mechanical stop and use this point for its zero position during normal control operations. A unique manual override allows the setting of any actuator position within its 95° of rotation with no power applied. This mechanism can be released physically by the use of a crank supplied with the actuator. When power is applied the manual override is released and the actuator drives toward the fail-safe position. The actuator 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 actuators's exact position. The ASIC monitors and controls the brushless DC motor's rotation and provides a Digital Rotation Sensing (DRS) function to prevent damage to the actuator in a stall condition. The position feedback signal is generated without the need for mechanical feedback potentiometers using DRS. The actuator may be stalled anywhere in its normal rotation without the need of mechanical end switches. The NF..24-MFT is mounted directly to control shafts up to 1.05" diameter by means of its universal clamp and anti-rotation bracket. A crank arm and several mounting brackets are available for damper applications where the actuator cannot be direct coupled to the damper shaft. The spring return system provides minimum specified torque to the application during a power interruption. The NF..24-MFT actuator is shipped at 5° (5° from full fail-safe) to provide automatic compression against damper gaskets for tight shut-off.

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 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.

Factory settings Default parameters for 2 to 10 VDC applications of the NF..-MFT actuator are assigned during manufacturing. If required, custom versions of the actuator can be ordered. The parameters are variable and can be changed by three means: Factory pre-set or custom configuration, set by the customer using PC-Tool software or the handheld ZTH US.

Accessories

| Electrical accessories | Description | Type |
|------------------------|---|----------|
| | DC Voltage Input Rescaling Module | IRM-100 |
| | Auxiliary switch, mercury-free | P475 |
| | Auxiliary switch, mercury-free | P475-1 |
| | Convert Pulse Width Modulated Signal to a 2...10 V Signal for Belimo Proportional Actuators | PTA-250 |
| | Positioner for wall mounting | SGA24 |
| | Positioner for front-panel mounting | SGF24 |
| | Cable conduit connector 1/2" | TF-CC US |
| | Gateway MP to BACnet MS/TP | UK24BAC |
| | Gateway MP to LonWorks | UK24LON |
| | Gateway MP to Modbus RTU | UK24MOD |
| | 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 |

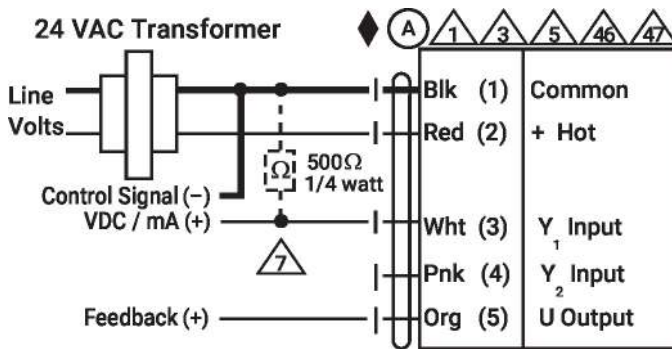
| Mechanical accessories | Description | Type |
|------------------------|---|----------------|
| | Anti-rotation bracket, for AF / NF | AF-P |
| | Shaft extension 240 mm Ø20 mm for damper shaft Ø 8...22.7 mm | AV8-25 |
| | End stop indicator | IND-AFB |
| | Shaft clamp reversible, for central mounting, for damper shafts Ø12.7 / 19.0 / 25.4 mm | K7-2 |
| | Ball joint suitable for damper crank arm KH8 / KH10, Multipack 10 pcs. | KG10A |
| | Ball joint suitable for damper crank arm KH8, Multipack 10 pcs. | 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 36" L, 3/8" diameter | SH10 |
| | Push rod for KG6 & KG8 ball joints (36" L, 5/16" diameter). | SH8 |
| | Wrench 0.32 in and 0.39 in [8 mm and 10 mm] | TOOL-06 |
| | Retrofit clip | Z-AF |
| | Mounting bracket for AF.. | ZG-100 |
| | Mounting bracket | ZG-101 |
| | 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 |
| | Damper clip for damper blade, 3.5" width. | ZG-DC1 |
| | Damper clip for damper blade, 6" width. | 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 330x203x152 mm [13x8x6"] (LxBxH) | ZS-100 |
| | Base plate, for ZS-100 | ZS-101 |
| | Weather shield 406x213x102 mm [16x8-3/8x4"] (LxWxH) | ZS-150 |
| | Explosion proof housing 406x254x164 mm [16x10x6.435"] (LxBxH), UL and CSA, Class I, Zone 1&2, Groups B, C, D, (NEMA 7), Class III, Hazardous (classified) Locations | ZS-260 |
| | Weather shield 438x222x140 mm [17-1/4x8-3/4x5-1/2"] (LxBxH), NEMA 4X, with mounting brackets | ZS-300 |
| | Weather shield 438x222x140 mm [17-1/4x8-3/4x5-1/2"] (LxBxH), 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 |
| | Base plate extension | Z-SF ZG-JSL |
| Tools | Description | Type |
| | Connection cable 16 ft [5 m], A: RJ11 6/4 ZTH EU, B: free wire end for connection to MP/PP terminal | ZK2-GEN |
| | Service Tool, with ZIP-USB function, for programmable and communicative Belimo actuators, VAV controller and HVAC performance devices | ZTH US |
| | Belimo PC-Tool, Software for adjustments and diagnostics | MFT-P |
| | Signal simulator, Power supply AC 120 V | PS-100 |

Electrical installation

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.

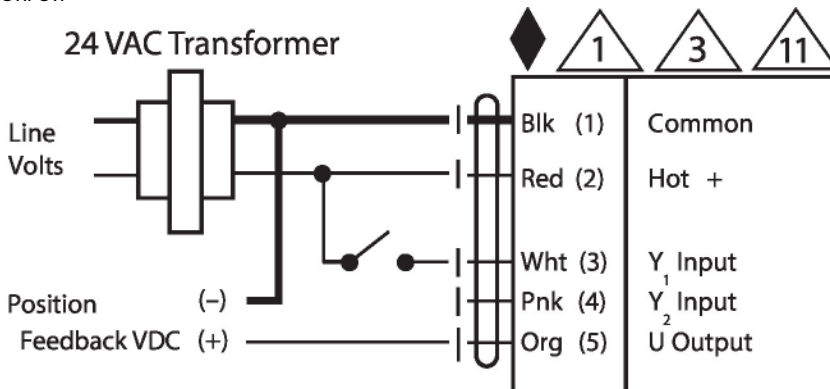
- ◆ Meets cULus requirements without the need of an electrical ground connection.
- Ⓐ Actuators with appliance cables are numbered.
- 1 Provide overload protection and disconnect as required.
- 3 Actuators may also be powered by DC 24 V.
- 5 Only connect common to negative (-) leg of control circuits.
- 7 A 500 Ω resistor (ZG-R01) converts the 4...20 mA control signal to 2...10 V.
- 8 Control signal may be pulsed from either the Hot (Source) or Common (Sink) 24 V line.
- 10 For triac sink the Common connection from the actuator must be connected to the Hot connection of the controller. Position feedback cannot be used with a triac sink controller; the actuator internal common reference is not compatible.
- 11 Actuators may be connected in parallel if not mechanically linked. Power consumption and input impedance must be observed.
- 12 IN4004 or IN4007 diode. (IN4007 supplied, Belimo part number 40155).



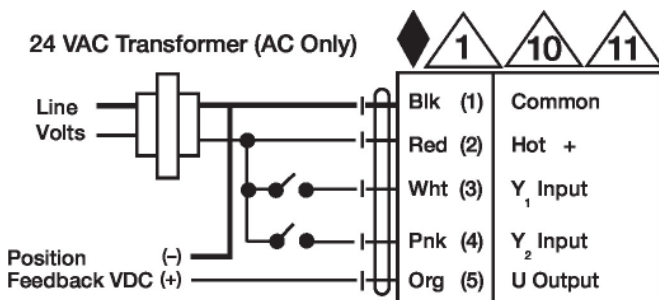
VDC/mA Control

Wiring diagrams

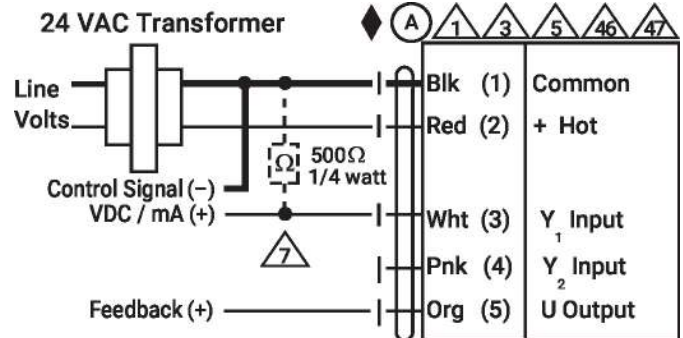
On/Off



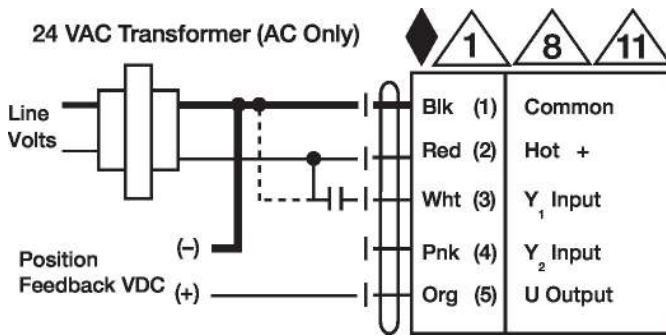
Floating Point



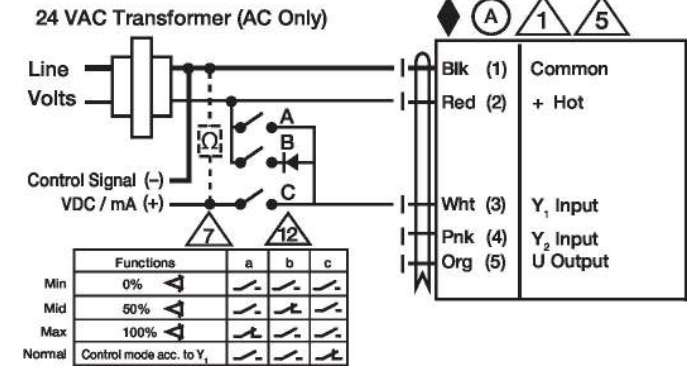
VDC/mA Control



PWM Control



Override Control



Dimensions

