AHKX24-MFT-100 - Damper Actuator
Modulating, Electronic Fail-Safe, Linear, 24 V, Multi-Function Technology®

BELIMO®

5 YEAR WARRANTY

CE LISTED 94 D5 TEMP. IND. & REG. EQUIP. c(UL)us BRUSHLESS dc motor®

Technical Data

Power Supply	24 VAC ± 20%, 50/60 Hz, 24 VDC ± 10%
Power Consumption Running	11 W
Power Consumption Holding	3 W
Transformer Sizing	22 VA (class 2 power source)
Electrical Connection	3 ft [1m], 10 ft [3m] or 16 ft [5m] 18 GA appliance or plenum cables, with or without 1/2" conduit connector
Overload Protection	electronic throughout full stroke
Electrical Protection	actuators are double insulated
Operating Range Y	2 to 10 VDC, 4 to 20 mA w/ ZG-R01 (500 Ω, 1/4 W resistor), variable (VDC, PWM, floating point, on/off)
Input Impedance	100 k Ω for 2 to 10 VDC (0.1 mA), 500 Ω for 4 to 20 mA, 1500 Ω for PWM, floating point and On/Off
Feedback Output U	2 to 10 VDC, 0.5 mA max, VDC variable
Stroke	4" [100 mm]
Linear Force	101 lbf [450 N force]
Direction of Rotation (Motor)	reversible with built-in switch
Direction of Rotation (Fail-Safe)	reversible with switch
Fail-Safe Position	adjustable with dial or tool 0 to 100% in 10% increments
Manual Override	external push button
Running Time (Motor)	150 sec (default) per 4 inches [100mm], variable (90 to 150 sec)
Running Time (Fail-Safe)	35 sec
Bridge Time	programmable 0 to 10 sec (2 sec default) delay before fail-safe activates
Pre-charging Time	5 to 26 seconds
Angle of Rotation Adaptation	Off (default)
Override Control	min. position = 0% , mid. Position = 50% , max. position = 100% (Default)
Humidity	max. 95% RH non-condensing
Ambient Temperature Range	-22°F to +122°F [-30°C to +50°C]
Storage Temperature Range	-40°F to +176°F [-40°C to +80°C]
Housing	NEMA 2, IP54, UL enclosure type 2
Housing Material	UL94-5VA
Agency Listings†	cULus acc. to UL60730-1A/-2-14, CAN/CSA E60730-1:02, CE acc. to 2004/108/EC
Noise Level (Motor)	≤53 dB (A)
Noise Level (Fail-Safe)	≤61 dB (A)
Servicing	maintenance free
Quality Standard	ISO 9001
Weight	3.3 lb [1.5 kg]

*Variable when configured with MFT options.
†Rated Impulse Voltage 800V, Type of action 1.AA, Control Pollution Degree 3

Linear Force min. 101 lbf.

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.

Default/Configuration
Default parameters for 2 to 10 VDC applications of the AHK..-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.

Operation
The AHKX24-MFT-100 provides a 4 inch linear stroke. The stroke of the gear rack can be adjusted on both sides in increments of 0.8 inches [20mm] with the mechanical end stops. When reaching the damper or actuator end position the actuator automatically stops. The gear can be manually disengaged by pressing the button located on the actuator cover. The AHKX24-MFT actuator uses a brushless DC motor controlled by an Application Specific Integrated Circuit (ASIC). The ASIC monitors and controls the actuator rotation and provides a digital rotation sensing (DRS) function to prevent damage to the actuator in a stall condition. Power consumption is reduced in a holding mode. The actuator is electronically protected against overload. The anti-rotation strap supplied with the actuator will prevent lateral movement.

Fail-Safe Indication

LED status indicator lights sequence:

Yellow off / Green on: operation ok, no faults

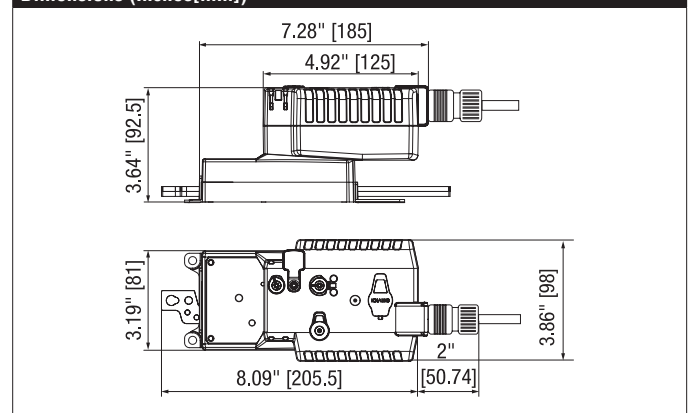Yellow off / Green blinking: fail-safe mechanism is active

Yellow on / Green off: fault is detected

Yellow off / Green off: not in operation / capacitors charging

Yellow on / Green on: adaption running

Yellow blinking / Green on: communication with programming tool
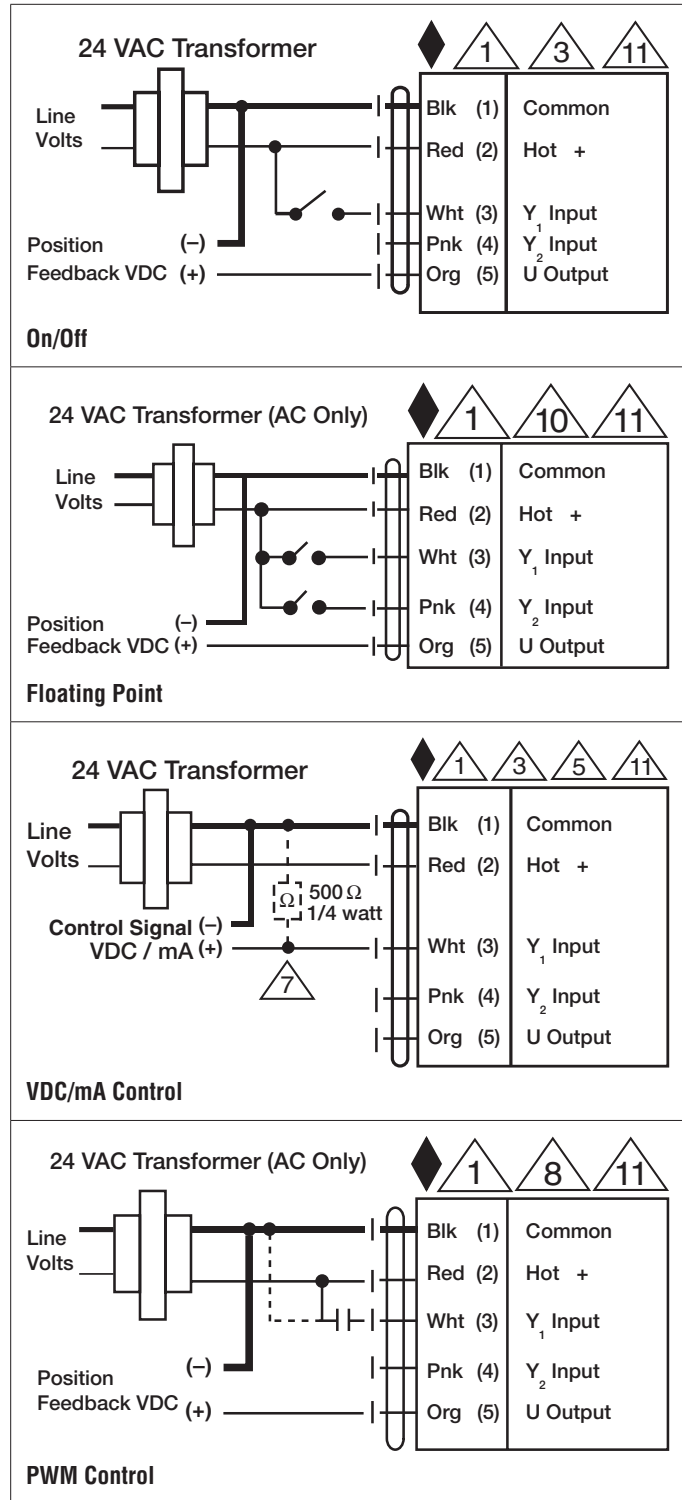
Dimensions (Inches[mm])

7.28" [185]
4.92" [125]
3.64" [92.5]
3.19" [81]
3.86" [98]
8.09" [205.5]
2"
[50.74]

Accessories

KG10A	Ball joint for 3/8" diameter rod, zinc plated.
KG6	Ball joint for 5/16" diameter rod, zinc plated.
KG8	Ball joint for 5/16" diameter rod, 90°, galvanized steel.
SH8	Push rod for KG6 & KG8 ball joints (36" L, 5/16" diameter).
Z-DS1	Rotary support for lateral force compensation in AHK/AH/LH.
Z-KSC	3/8"-16 shaft clevis for AHK/AH.
ZG-119	Bracket for AHK/AH/LH linear actuators.
ADS-100	Analog to digital switch for modulating actuators.
IRM-100	Input rescaling module for modulating actuators.
MFT-P	Belimo MFT configuration software (hardware not included).
PS-100	Actuator power supply and control simulator.
PTA-250	Pulse width modulation interface for modulating actuators.
SGA24	Positioner control for modualting actuators (surface mount).
SGF24	Positioner control for modulating actuators (flush mount).
TF-CC US	Cable conduit connector, 1/2".
UK24BAC	BACnet gateway module for up to 8 MFT actuators.
UK24LON	LON gateway module for up to 8 MFT actuators.
UK24MOD	MODbus gateway module for up to 8 MFT actuators.
ZG-R01	4 to 20 mA adaptor, 500Ω, 1/4 W resistor w 6" pigtail wires.
ZG-R02	50% voltage divider kit (resistors with wires).
ZG-SGF	Mounting plate for SGF.
ZG-X40	120 to 24 VAC, 40 VA transformer.
ZK1-GEN	Cable for ZTH US to diagnostic/programming socket.
ZK2-GEN	Cable for ZTH US to actuators w/o diagnostics socket.
ZK4-GEN	Cable for ZTH US to connect to UK24... gateways and VRP-M.
ZTH US	Handheld programming tool w/ ZK1-GEN, ZK2-GEN, ZK6-GEN.

Typical Specification

Modulating control, electronic fail-safe damper actuators shall be electronic type with integrated linear stroking arm. Actuators must provide modulating control in response to a control input from an electronic controller or positioner. Actuators shall have brushless DC motor technology and be protected from overload at all angles of rotation. Actuators shall have reversing switch and manual override on the cover. 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, have a 5-year warranty, and be manufactured under ISO 9001 International Quality Control Standards. Actuators shall be as manufactured by Belimo.

On/Off

Floating Point

VDC/mA Control

PWM Control

Date created, 09/02/2016 - Subject to change. © Belimo Aircontrols (USA), Inc.

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Wiring Diagrams

⚠️ ***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 24 VDC.

△5 Only connect common to negative (-) leg of control circuits.

△7 A 500 Ω resistor (ZG-R01) converts the 4 to 20 mA control signal to 2 to 10 VDC.

△8 Control signal may be pulsed from either the Hot (Source) or Common (Sink) 24 VAC 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).

24 VAC Transformer (AC Only)

◆ Ⓐ △1 △5

	Blk (1)	Common
Line Volts	Red (2)	+ Hot
Control Signal (–)	Wht (3)	Y₁ Input
VDC / mA (+)	Pnk (4)	Y₂ Input
	Org (5)	U Output

	Functions	a	b	c
Min	0%			
Mid	50%			
Max	100%			
Normal	Control mode acc. to Y₁			

Override Control