

# AMX24-MFT95 Technical Data Sheet

## Modulating, Non-Spring Return, 24 V, 135 $\Omega$ Input



Technical Data	
Power Supply	24 VAC, $\pm 20\%$ , 50/60 Hz, 24 VDC, $\pm 10\%$
Power consumption in operation	3.5 W
Power consumption in rest position	1.3 W
Transformer sizing	6 VA (class 2 power source)
Shaft Diameter	1/2...1.05" round, centers on 1/2" and 3/4" with insert, 1.05" without insert
Electrical Connection	18 GA plenum cable with 1/2" conduit connector, degree of protection NEMA 2 / IP54, 3 ft [1 m] 10 ft [3 m] and 16ft [5 m]
Overload Protection	electronic throughout 0...95° rotation
Operating Range	0...135 $\Omega$ , Honeywell Electronic Series 90, input 0...135 $\Omega$
Position Feedback	2...10 V, Max. 0.5 mA
Angle of rotation	Max. 95°, adjustable with mechanical stop
Torque motor	180 in-lb [20 Nm]
Direction of motion motor	selectable with switch 0/1
Position indication	Mechanically, 30...65 mm stroke
Manual override	external push button
Running Time (Motor)	default 150 s, variable 90...350 s
Ambient humidity	max. 95% r.H., non-condensing
Ambient temperature	-22...122°F [-30...50°C]
Storage temperature	-40...176°F [-40...80°C]
Degree of Protection	IP54, NEMA 2, UL Enclosure Type 2
Housing material	UL94-5VA
Agency Listing	cULus acc. to UL60730-1A/-2-14, CAN/CSA E60730-1:02, CE acc. to 2014/30/EU and 2014/35/EU
Noise level, motor	45 dB(A)
Servicing	maintenance-free
Quality Standard	ISO 9001
Weight	1.5 lb [0.68 kg]

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

**Torque min. 180 in-lb, for control of damper surfaces up to 45 sq. ft.**

### 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 default parameters for 0 to 135 $\Omega$  input applications of the ...MFT95 actuator are assigned during manufacturing. If necessary, custom versions of the actuators can be ordered. The parameters can be changed by two means: pre-set and custom configurations from Belimo or on-site configurations using the Belimo PC-Tool software.

### Operation

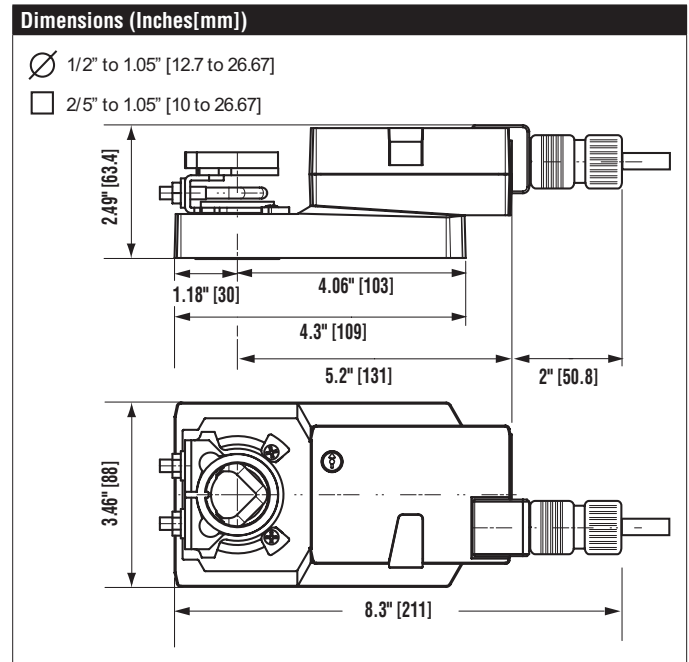
The actuator is not provided with and does not require any limit switches, but is electronically protected against overload. The anti-rotation strap supplied with the actuator will prevent lateral movement.

The actuator provides 95° of rotation and a visual indicator indicates position of the actuator. When reaching the damper or actuator end position, the actuator automatically stops. The gears can be manually disengaged with a button on the actuator cover.

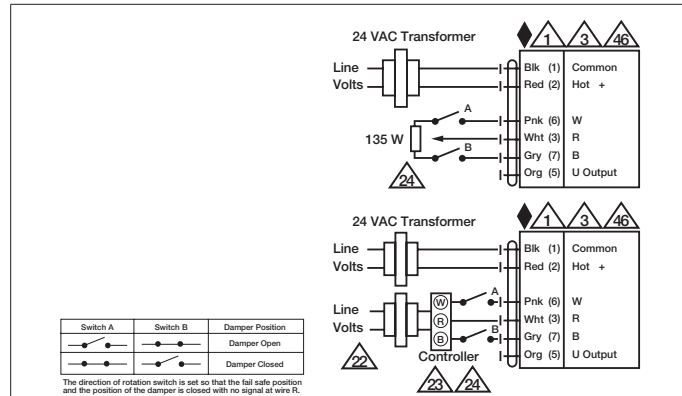
The actuators use a brushless DC motor, which is controlled by an Application Specific Integrated Circuit (ASIC). The ASIC monitors and controls the actuator's rotation and provides a digital rotation sensing (DRS) function to prevent damage to the actuator in a stall condition. Power consumption is reduced in holding mode.

Add-on auxiliary switches or feedback potentiometers are easily fastened directly onto the actuator body for signaling and switching functions.

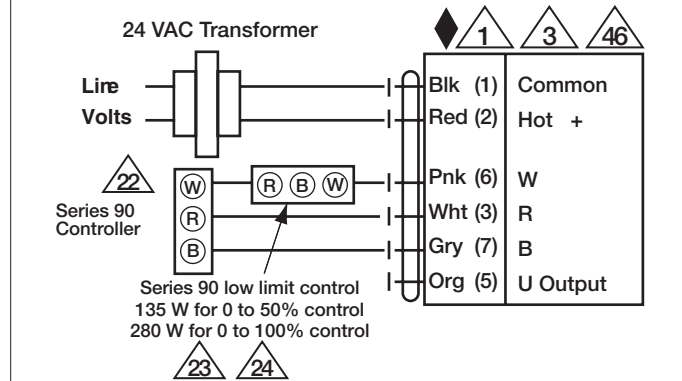
For low ambient temperatures, the optional supplemental (-H) Heater add-on is available.



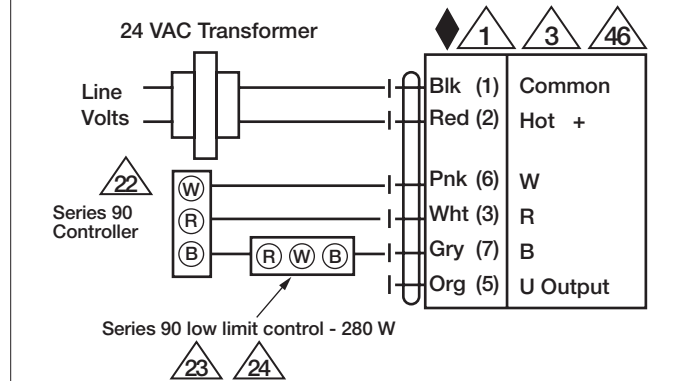
KH8	Damper crank arm
<b>Accessories</b>	
KH8	Damper crank arm
KG8	Ball joint
KG10A	Ball joint
SH8	Push rod for KG6 & KG8 ball joints (36" L, 5/16" diameter).
SH10	Push rod for KG10A ball joint (36" L, 3/8" diameter).
ZG-DC1	Damper clip for damper blade, 3.5" width.
ZG-DC2	Damper clip for damper blade, 6" width.
ZS-100	Weather shield - galvaneal 13x8x6" (LxWxD).
ZS-101	Base plate for ZS-100.
ZS-150	Weather shield - PC w/ foam seal 16x8-3/8x4" (LxWxD).
AV8-25	Shaft extension
TF-P	Anti-rotation bracket TF/NKQ/AM/NM/LM.
ZG-100	Univ. right angle bracket 17"x11-1/8"x6" (HxWxbase).
ZG-101	Univ. right angle bracket 13x11x7-7/16" (HxWxbase).
TOOL-06	8 mm and 10 mm wrench.
Z-SPA	Adapter
PS-100	Low voltage and control signal simulator.
AH-25	Actuator arm
K-AM25	Standard NKQ/AM/NM clamp (1/2" to 1.05").
K-SA	Shaft clamp reversible
ZG-109	Right angle bracket for ZS-260.
ZG-110	Stand-off bracket for ZS-260.
ZG-112	LF right angle bracket 4-1/2x5-1/2x2-1/2" (HxWxD).
ZG-JSA-1	1" diameter jackshaft adaptor (11" L).
ZG-JSA-2	1-5/16" diameter jackshaft adaptor (12" L).
ZG-JSA-3	1.05" diameter jackshaft adaptor (12" L).
ZG-NMA	Mounting kit for linkage operation
ZS-260	Explosion proof housing.
ZS-300	NEMA 4X, 304 stainless steel enclosure.
ZS-300-5	NEMA 4X, 316L stainless steel enclosure.
ZS-300-C1	1/2" shaft adaptor, standard with ZS-300(-5).
ZS-300-C2	3/4" shaft adaptor for ZS-300(-5).
ZS-300-C3	1" shaft adaptor for ZS-300(-5).
Z-SMA	Base plate extension
UK24LON	Gateway MP to LonWorks
UK24BAC	Gateway MP to BACnet MS/TP
UK24MOD	Gateway MP to Modbus RTU
ZTH US	Handheld programming tool w/ ZK1-GEN, ZK2-GEN, ZK6-GEN.
S1A	Auxiliary switch for damper actuators and rotary actuators
S2A	Auxiliary switch for damper actuators and rotary actuators
P475	Shaft mount, non-Mercury aux. switch for 1/2" dia. shafts.
P475-1	Shaft mount, non-Mercury aux. switch for 1" dia. shafts.
P140A GR	Feedback potentiometer for damper actuators and rotary actuators
P500A GR	Feedback potentiometer for damper actuators and rotary actuators
P1000A GR	Feedback potentiometer for damper actuators and rotary actuators
P2800A GR	Feedback potentiometer for damper actuators and rotary actuators
P5000A GR	Feedback potentiometer for damper actuators and rotary actuators
P10000A GR	Feedback potentiometer for damper actuators and rotary actuators
NSV24 US	Battery back-up module for non-spring return actuators.
NSV-BAT	12V 1.2AH battery (two required for NSV24 US).
ZG-X40	120 to 24 VAC, 40 VA transformer.
TF-CC US	Cable conduit connector, 1/2".
43442-00001	Cable gland (for NEMA 4 models).
ZK1-GEN	Connection cable
ZK2-GEN	Connection cable



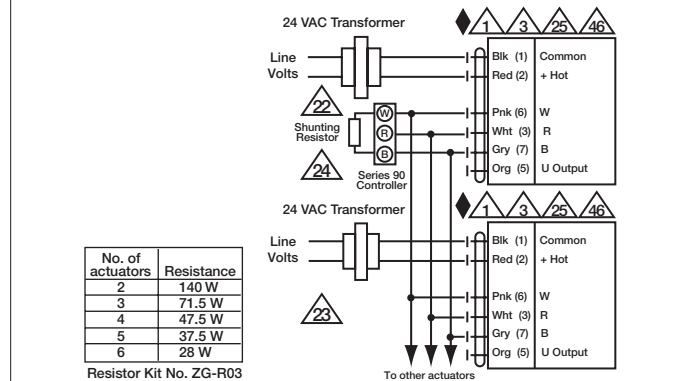
**Typical and Override Control**



**Low Limit Control**



**High Limit Control**



No. of actuators	Resistance
2	140 W
3	71.5 W
4	47.5 W
5	37.5 W
6	28 W

Resistor Kit No. ZG-R03

**Multiple Actuators**

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### Typical Specification

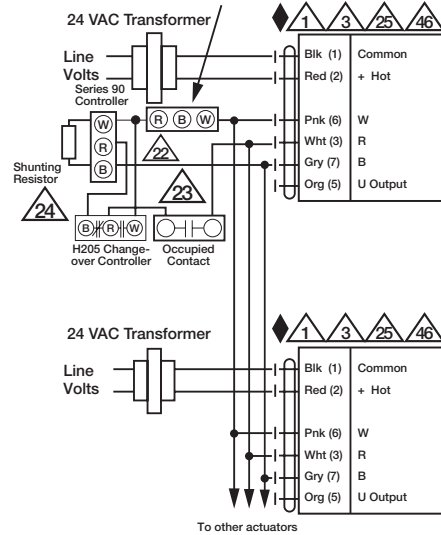
Proportional control damper actuators shall be electronic direct-coupled type, which require no crank arm and linkage and be capable of direct mounting to a shaft up to 3/4" diameter. Actuators must provide proportional damper control in response to a 2 to 10 VDC or, with the addition of a 500  $\Omega$  resistor, a 4 to 20 mA 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. If required, actuator will be provided with screw terminal strip for electrical connections (AMX24-SR-T and NMX24-SR-T). Run time shall be constant and independent of torque. A 2 to 10 VDC feedback signal shall be provided for position indication. 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.

### Wiring Diagrams

- 1 Provide overload protection and disconnect as required.
- 3 Actuators may also be powered by 24 VDC.
- 22 Actuators and controller must have separate transformers.
- 23 Consult controller instruction data for more detailed information.
- 24 Resistor value depends on the type of controller and the number of actuators. No resistor is used for one actuator. Honeywell® resistor kits may also be used.
- 25 To reverse control rotation, use the reversing switch.
- 46 Actuators may be controlled in parallel. Current draw and input impedance must be observed.

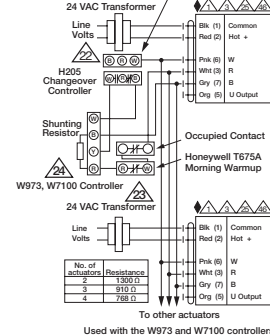
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S963A Minimum Position Potentiometer



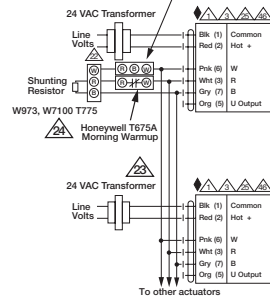
Multiple Actuators with Minimum Position Potentiometer

Q209A Minimum Position Potentiometer



Used with the W973 and W7100 controllers

Honeywell Q209A Minimum Position Potentiometer



Multiple Actuators Used with W973, W7100 and T775