

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

- Torque motor 45 in-lb [5 Nm]
- Nominal voltage AC/DC 24 V
- Control MFT/programmable
- Position feedback 2...10 V



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     | 2.5 W                                                                                               |
|                 | Power consumption in rest position | 1.2 W                                                                                               |
|                 | Transformer sizing                 | 5 VA                                                                                                |
|                 | Electrical Connection              | 18 GA plenum cable with 1/2" conduit connector, degree of protection NEMA 2 / IP54, 1 m 3 m and 5 m |
|                 | Overload Protection                | electronic throughout 0...95° rotation                                                              |
| Functional data | Torque motor                       | 45 in-lb [5 Nm]                                                                                     |
|                 | Operating range Y                  | 0...135 Ω                                                                                           |
|                 | Operating range Y note             | Honeywell Electronic Series 90, input 0...135 Ω                                                     |
|                 | 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                                                                          |
|                 | Manual override                    | external push button                                                                                |
|                 | Angle of rotation                  | Max. 95°                                                                                            |
|                 | Angle of rotation note             | adjustable with mechanical stop                                                                     |
|                 | Running Time (Motor)               | 150 s / 90°                                                                                         |
|                 | Running time motor variable        | 30...150 s                                                                                          |
|                 | Noise level, motor                 | 35 dB(A)                                                                                            |
| Safety data     | Position indication                | Mechanical, 30...65 mm stroke                                                                       |
|                 | Power source UL                    | Class 2 Supply                                                                                      |
|                 | Degree of protection IEC/EN        | IP54                                                                                                |
|                 | Degree of protection NEMA/UL       | NEMA 2                                                                                              |
|                 | Enclosure                          | 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                                                                                    |

|                  |                  |                   |
|------------------|------------------|-------------------|
| <b>Weight</b>    | Weight           | 0.71 lb [0.32 kg] |
| <b>Materials</b> | Housing material | UL94-5VA          |

**Footnotes** †Rated Impulse Voltage 800V, Type of Action 1, Control Pollution Degree 2.

## Product features

|                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Application</b>           | <p>For proportional modulation of dampers in HVAC systems. Actuator sizing should be done in accordance with the damper manufacturer's specifications.</p> <p>The actuator is mounted directly to a damper shaft from 1/4" up to 5/8" in diameter by means of its universal clamp. Shafts up to 3/4" diameter can be accommodated by an accessory clamp.</p> <p>The default parameters for 0 to 135 <math>\Omega</math> 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.</p>                                                                                                                                                                                                                                                                               |
| <b>Operation</b>             | <p>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.</p> <p>The LMX series 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.</p> <p>The LMX24-MFT95 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.</p> <p>Add-on auxiliary switches or feedback potentiometers are easily fastened directly onto the actuator body for signaling and switching functions.</p> |
| <b>Typical specification</b> | <p>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 from 1/4" to 5/8" diameter. Actuators must provide 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. 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.</p>                                                                                                                                                                                                                                                                 |

## Accessories

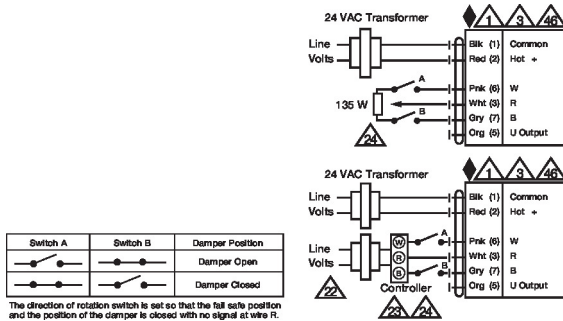
| Gateways | Description                | Type    |
|----------|----------------------------|---------|
|          | Gateway MP to BACnet MS/TP | UK24BAC |
|          | Gateway MP to Modbus RTU   | UK24MOD |
|          | Gateway MP to LonWorks     | UK24LON |

| Electrical accessories | Description                                                                                                                           | Type          |
|------------------------|---------------------------------------------------------------------------------------------------------------------------------------|---------------|
|                        | Auxiliary switch 1 x SPDT add-on                                                                                                      | S1A           |
|                        | Auxiliary switch 2 x SPDT add-on                                                                                                      | S2A           |
|                        | Auxiliary switch, mercury-free                                                                                                        | P475          |
|                        | Auxiliary switch, mercury-free                                                                                                        | P475-1        |
|                        | Feedback potentiometer 140 Ω add-on, grey                                                                                             | P140A GR      |
|                        | Feedback potentiometer 500 Ω add-on, grey                                                                                             | P500A GR      |
|                        | Feedback potentiometer 1 kΩ add-on, grey                                                                                              | P1000A GR     |
|                        | Feedback potentiometer 2.8 kΩ add-on, grey                                                                                            | P2800A GR     |
|                        | Feedback potentiometer 5 kΩ add-on, grey                                                                                              | P5000A GR     |
|                        | Feedback potentiometer 10 kΩ add-on, grey                                                                                             | P10000A GR    |
|                        | Feedback potentiometer 15 kΩ gray                                                                                                     | P15000A-F GR  |
|                        | Battery backup system, for non-spring return models                                                                                   | NSV24 US      |
|                        | Battery, 12 V, 1.2 Ah (two required)                                                                                                  | NSV-BAT       |
|                        | Transformer, AC 120 V to AC 24 V, 40 VA                                                                                               | ZG-X40        |
|                        | Cable conduit connector 1/2"                                                                                                          | TF-CC US      |
|                        | Cable Gland<br>(NEMA 4 models)                                                                                                        | 43442-00001   |
| Mechanical accessories | Description                                                                                                                           | Type          |
|                        | Damper crank arm Slot width 6.2 mm, clamping range ø10...18 mm                                                                        | KH6           |
|                        | Damper crank arm Slot width 8.2 mm, clamping range ø10...18 mm                                                                        | KH8           |
|                        | 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          |
|                        | Ball joint suitable for damper crank arm KH8, Multipack 10 pcs.                                                                       | KG6           |
|                        | Ball joint suitable for damper crank arm KH8, Multipack 10 pcs.                                                                       | KG8           |
|                        | Ball joint suitable for damper crank arm KH8 / KH10, Multipack 10 pcs.                                                                | KG10A         |
|                        | Push rod for KG6 & KG8 ball joints (36" L, 5/16" diameter).                                                                           | SH8           |
|                        | Push rod for KG10A ball joint 36" L, 3/8" diameter                                                                                    | SH10          |
|                        | Damper clip for damper blade, 3.5" width.                                                                                             | ZG-DC1        |
|                        | Damper clip for damper blade, 6" width.                                                                                               | ZG-DC2        |
|                        | Weather shield 13x8x6" [330x203x152 mm] (LxWxH)                                                                                       | ZS-100        |
|                        | Base plate, for ZS-100                                                                                                                | ZS-101        |
|                        | Weather shield 406x213x102 mm [16x8-3/8x4"] (LxWxH)                                                                                   | ZS-150        |
|                        | Shaft extension 240 mm ø20 mm for damper shaft ø8...22.7 mm                                                                           | AV8-25        |
|                        | Anti-rotation bracket TF/NKQ/AM/NM/LM.                                                                                                | TF-P          |
|                        | Mounting bracket for AF..                                                                                                             | ZG-100        |
|                        | Mounting bracket                                                                                                                      | ZG-101        |
|                        | Wrench 0.32 in and 0.39 in [8 mm and 10 mm]                                                                                           | TOOL-06       |
|                        | Adapter for auxiliary switch and feedback potentiometer                                                                               | Z-SPA         |
|                        | LMB(X) clamp (3/8")                                                                                                                   | K-LM10        |
|                        | LMB(X) clamp (1/2").                                                                                                                  | K-LM12        |
|                        | Standard LMB(X) clamp (5/8").                                                                                                         | K-LM16        |
|                        | LMB(X) clamp (3/4").                                                                                                                  | K-LM20        |
|                        | Shaft extension for 1/2" diameter shafts (3" L).                                                                                      | ZG-LMSA       |
|                        | Shaft extension for 3/8" diameter shafts (4" L).                                                                                      | ZG-LMSA-1     |
|                        | Shaft extension for 1/2" diameter shafts (5" L).                                                                                      | ZG-LMSA-1/2-5 |
|                        | Shaft extension 170 mm ø10 mm for damper shaft ø6...16 mm                                                                             | AV6-20        |
| Tools                  | Description                                                                                                                           | Type          |
|                        | Signal simulator, Power supply AC 120 V                                                                                               | PS-100        |
|                        | Connecting cable 16 ft [5 m], A: RJ11 6/4 ZTH EU, B: 6-pin for connection to service socket                                           | ZK1-GEN       |
|                        | Connecting cable 10 ft [3 m], A: RJ11 6/4 ZTH EU, B: 3-pin Weidmüller and supply connection                                           | ZK4-GEN       |
|                        | Service Tool, with ZIP-USB function, for programmable and communicative Belimo actuators, VAV controller and HVAC performance devices | ZTH US        |

## Electrical installation

-  Provide overload protection and disconnect as required.
-  Actuators may also be powered by DC 24 V.
-  Actuators and controller must have separate transformers.

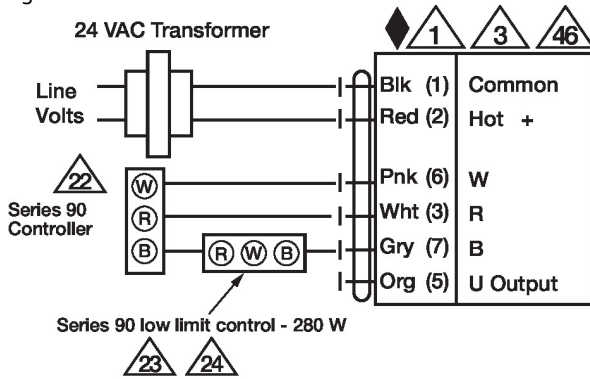
- 23 Consult controller instruction data for more detailed information.
- 24 Resistor value depends on the type of controller and the number of actuators. No resistor is used for one actuator. Honeywell® resistor kits may also be used.
- 25 To reverse control rotation, use the reversing switch.
- 46 Actuators may be controlled in parallel. Current draw and input impedance must be observed.



Typical and Override Control

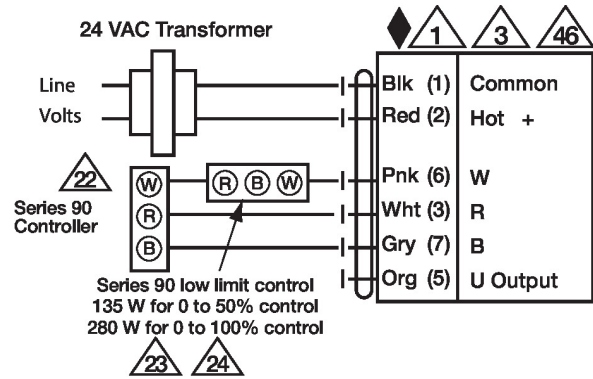
### Wiring diagrams

#### High Limit Control

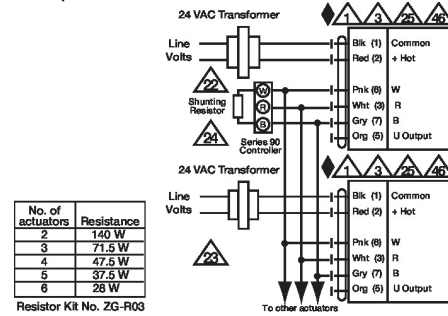


Typical and Override Control

#### Low Limit Control



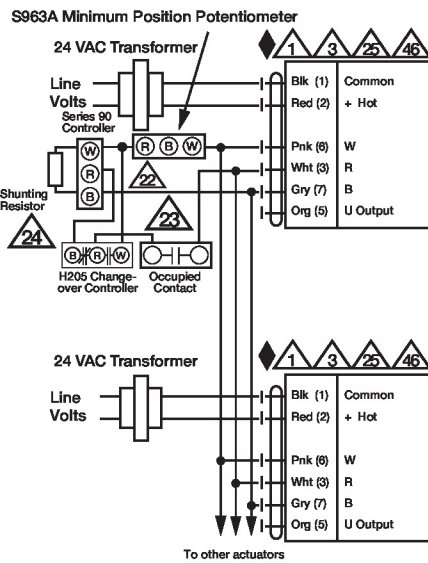
#### Multiple Actuators



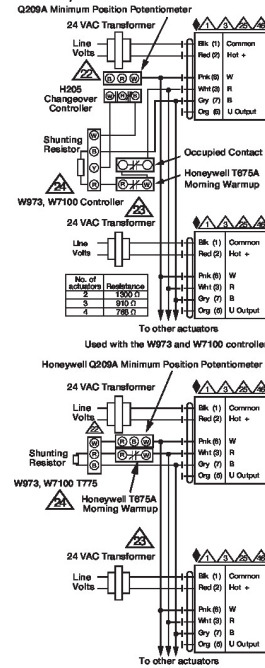
| No. of actuators | Resistance |
|------------------|------------|
| 2                | 140 W      |
| 3                | 71.5 W     |
| 4                | 47.5 W     |
| 5                | 37.5 W     |
| 6                | 28 W       |

Resistor Kit No. ZG-R03

Multiple Actuators with Minimum Position Potentiometer



Multiple Actuators Used with W973, W7100 and T775



Dimensions

Ø 1/4" to 3/4" [6 to 20]

□ 5/16" to 3/4" [8 to 26]

