Spring Return Actuator Product Range
Multi-Function Technology

BELIMO®

Series	Model	Cable Options: 10 ft (3m) / 16 ft (5m) cable	Running Time: Motor Drive (Default) (Fully programmable by Belimo or in field)	Spring Return	Power Supply: 24 VAC +/- 20%, VDC +/- 10%, 50/60 HZ	VA Rating, Transformer Sizing	Wattage Running (Holding)	2-10 VDC (Default) / 4-20 mA* (w/500 Ω Resistor)	6-9 VDC, 20 VDC Output Voltage	Honeywell Series 90, 0-135 Ω	On/Off	Floating Point	Start and Span adj., Start 0.5 to 30 VDC, Span 2.5 to 32 VDC	PWM adj., 0.02 to 50.0 Seconds	2-10 VDC (Default)	VDC Variable, Start 0 to 8, Span 2 to 10 VDC	1 SPDT, 3 A (0.5 A inductive) @ 250V	2 SPDT, 3 A (0.5 A inductive) @ 250V	2 SPDT, 7 A (2.5 A inductive) @ 250V	NEMA 4: Enclosure (Part Number + N4)
New Generation AFX Series 180 in-lb [20 Nm] Approx. 45 sq. ft.*	AFX24-MFT†	●	70…220 (150)	<20♦	●	10	7.5 (3.0)	●			●	●	●	●	●	●				●
	AFX24-MFT-S†	●	70…220 (150)	<20♦	●	10	7.5 (3.0)	●			●	●	●	●	●	●		●		●
	AFX24-MFT95†		70…220 (150)	<20♦	●	10	7.5 (3.0)	●		●				●	●	●				●
Original AF Series 133 in-lb [15 Nm] Approx. 33 sq. ft.*	AF24-MFT US†		75…300 (150)	<20	●	10	6.0 (2.5)	●			●	●	●	●	●	●				
	AF24-MFT-S US†		75…300 (150)	<20	●	10	6.0 (2.5)	●			●	●	●	●	●	●			●	
	AF24-MFT95 US†		75…300 (150)	<20	●	10	6.0 (2.5)	●		●				●	●	●				
New Generation NFX Series 90 in-lb [10 Nm] Approx. 22 sq. ft.*	NFX24-MFT	●	40…220 (150)	<20♦	●	9	6.5 (3.0)	●			●	●	●	●	●	●				●
	NFX24-MFT-S	●	40…220 (150)	<20♦	●	9	6.5 (3.0)	●			●	●	●	●	●	●		●		●
Original NF Series 60 in-lb [7 Nm] Approx. 15 sq. ft.*	NF24-MFT US		75…300 (150)	<60♦	●	6	3.0 (1.8)	●			●	●	●	●	●	●				
LF Series 35 in-lb [4 Nm] Approx. 8 sq. ft.	LF24-MFT US		75…300 (150)	<25♦	●	5	2.5 (1.0)	●			●	●	●	●	●	●				
	LF24-MFT-S US		75…300 (150)	<25♦	●	5	2.5 (1.0)	●			●	●	●	●	●	●	●			
	LF24-MFT-20 US		150	<25♦	●	6	3.5 (1.5)		●		●	●	●	●	●	●				
	LF24-MFT-S-20 US		150	<25♦	●	6	3.5 (1.5)		●		●	●	●	●	●	●	●			
TF Series 18 in-lb [2 Nm] Approx. 4.5 sq. ft.*	TF24-MFT US		75…300 (150)	<25♦	●	4	2.0 (1.0)	●			●	●	●	●	●	●				

♦ <60 seconds @ -22°F [-30°C].

† Dual mounting on a single shaft-MFT wired master slave. Please refer to page XX or call Belimo customer service for details.

* Parallel blade without edge seals and 1000 FPM face velocity.

NOTE: Some spring and non-spring damper actuators are also used for water applications. A linkage connects the actuators to the valve. Some of the valves, such as the PICCV use a running time of 100 seconds. Some actuators end with an X1 such as AMX24-MFTX1.

Series	Model	10 ft (3m) cable / 16 ft (5m) cable	Terminal strip NEMA 1/IP20 / 2/IP54	Running Time — Motor Drive Range, (Default) ...-MFT Fully Programmable	24 VAC +/- 20%, VDC +/- 10%	100 to 240 VAC	VA Rating	Wattage Running (Holding)	2-10 VDC (Default) 4-20 mA (w/500 Ω Resistor)	Honeywell Series 90, 0-135 Ω	On/Off	Floating Point	Start and Span adj., Start 0.5 to 30 VDC, Span 2.5 to 32 VDC	PWM adj., 0.02 to 50.0 Seconds	2-10 VDC (Default)	VDC Variable, Start 0 to 8, Span 2 to 10 VDC	Add-on	Enclosure (Part No. +N4 or +N4H)
GMX Series 360 in-lb [40 Nm] Approx. 90 sq. ft.**	GMX24-MFT†	●		75-300 (150)	●		7	4.0 (1.5)	●		●	●	●	●	●	●	●	
	GMX24-MFT95†	●		100-300 (150)	●		7	4.0 (1.5)		●					●	●	●	
AMX Series 180 in-lb [20 Nm] Approx. 45 sq. ft.**	AMX24-MFT	●		90-300 (150)	●		6	3.5 (1.3)	●		●	●	●	●	●	●	●	●
	AMCX24-MFT	●		35-120 (35)	●		6	3.5 (1.3)	●		●	●	●	●	●	●	●	
	AMX24-MFT95	●		90-150 (150)	●		6	3.5 (1.3)		●					●	●	●	
AMQ Series 140 in-lb [16Nm]	AMQX24-MFT	●		7-15 (7)	●		18	12 (1.5)	●		●	●	●	●	●	●	●	
NMX Series 70 in-lb [8 Nm] Approx. 22 sq. ft.**	NMX24-MFT	●		45-150 (150)	●		6	3.5 (1.3)	●		●	●	●	●	●	●	●	●
	NMX24-MFT95	●		45-150 (150)	●		6	3.5 (1.3)		●					●	●	●	
	NMCX24-MFT	●		20-75 (20)	●		5	3.0 (0.6)	●						●	●	●	
NMQ Series 70 in-lb [8Nm]	NMQX24-MFT	●		4-20 (4)	●		18	12 (1.5)	●		●	●	●		●	●	●	
LMX Series 35 in-lb [4 Nm] Approx. 11 sq. ft.**	LMX24-MFT	●		35-200 (150)	●		5	2.5 (1.2)	●		●	●	●	●	●	●	●	
	LMX24-MFT95	●		35-150 (150)	●		5	2.5 (1.2)		●					●	●	●	
LMQ Series 35 in-lb [4Nm]	LMQX24-MFT	●		2.5-10 (2.5)	●		18	12 (1.5)	●		●	●	●		●	●	●	
AHX Series 101 lbf [450 N Force] 4" or 8" stroke	AHX24-MFT*	●		150*	●		6	3.5 (1.3)	●		●	●	●	●	●	●		
AHQ Series 44 lbf [200 N Force]	AHQX24-MFT-100	●		7-30 (7)*	●		18	12 (1.5)	●		●	●	●	●	●	●		
LHX Series 34 lbf [150 N Force] 4" or 8" stroke	LHX24-MFT*	●		75-150 (150)*	●		5	2.5 (1.2)	●		●	●	●	●	●	●		
LHQ Series 22 lbf [100 N Force]	LHQX24-MFT-100	●		3.5-15 (3.5)*	●		18	12 (1.5)	●		●	●	●		●	●		
LUX Series 27 in-lb [3 Nm]	LUX24-MFT	●		75-150 (150)	●		5	2.5 (1.2)	●		●	●	●	●	●	●		

* The LH and AH linear series actuators come in three different stroke lengths [4, 8 or 12 in]. The part number is followed by -100, -200, -300 respectively. The default running time is 150 seconds per 4 inches [100 mm]. Running time is adjustable depending on model:
LH Series: 70-270, 140-540, 200-810, on the -100, -200, -300 models respectively.
AH Series: 150-600, 300-1200, 450-1800, on the -100, -200, -300 models respectively.

LHQ and AHQ available in 4 inch version only.

† Dual mounting on a single shaft is possible for higher torque (-3 and -SR wired in parallel), (-MFT wired Master-Slave). Please call Belimo customer service for details.

** Parallel blade without edge seals and 1000 FPM face velocity.

Pre-Set MFT Configurations
DC Voltage Control

BELIMO®

Spring Return Actuators

AFX24-MFT(-S)	180 in-lb
AF24-MFT(-S) US	133 in-lb
NFX24-MFT(-S)	90 in-lb
NF24-MFT US	60 in-lb
LF24-MFT(-S) US	35 in-lb
LF24-MFT(-S)-20 US	35 in-lb
TF24-MFT US	18 in-lb

Non-Spring Return Actuators

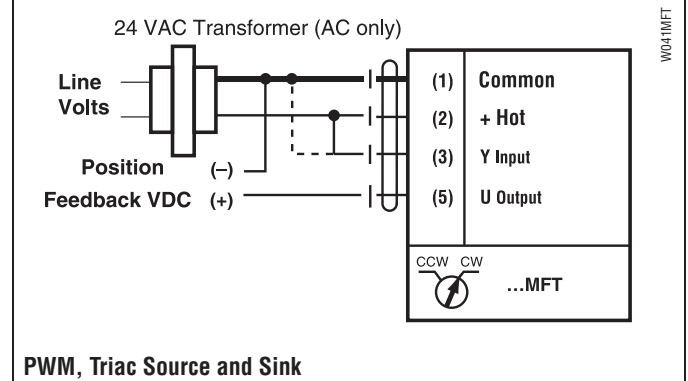|	
GMX24-MFT	360 in-lb
AMX24-MFT	180 in-lb
NMX24-MFT	90 in-lb
LMX24-MFT	45 in-lb
AMQX24-MFT	140 in-lb
NMQX24-MFT	70 in-lb
LMQX24-MFT	35 in-lb
AHX24-MFT	101 lbf
AHQX24-MFT-100	44 lbf
LHX24-MFT	34 lbf
LHQX24-MFT-100	22 lbf
LUX24-MFT	27 in-lb

Application

How the MFT actuator performs is determined by the configuration (P-10001, A01). The old generation actuators used a P-code (P-10001). The new generation actuators use a shorter 3 digit code. This shorter code is displayed on the reorder number.

P-1000... configuration types are used for control voltage applications.

Additional pre-set configurations are listed which offer solutions for non-standard control application for:

• Adjustable Start and Stop points

• Sequencing actuators

• Combination for master slave (see page 19.)
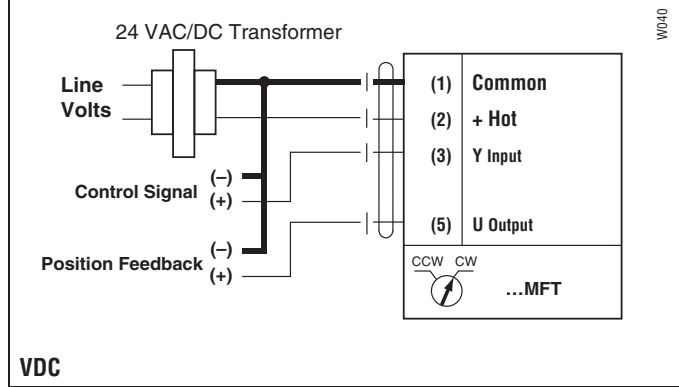
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Wiring Diagram

W040

24 VAC/DC Transformer

Line Volts

(1) Common
(2) + Hot
(3) Y Input
(5) U Output

Control Signal (–) (+)

Position Feedback (–) (+)

CCW CW

...MFT

VDC

Select Configuration

Configuration	Code	Input Range	Position Feedback	Running Time	Torque %	Adaptation
P-10001*	**A01**	**2.0 to 10.0 VDC**	**2.0 to 10.0 VDC**	**150**	**100**	**MANUAL**
P-10002	A02	0.5 to 10.0 VDC	0.5 to 10.0 VDC	150	100	MANUAL
P-10003	A03	2.0 to 10.0 VDC	0.5 to 5.0 VDC	150	100	MANUAL
P-10004	A04	4.0 to 7.0 VDC	2.0 to 10.0 VDC	150	100	MANUAL
P-10005	A05	6.0 to 9.0 VDC	2.0 to 10.0 VDC	150	100	MANUAL
P-10006	A06	10.5 to 13.5 VDC	2.0 to 10.0 VDC	150	100	MANUAL
P-10007	A07	0.5 to 5.0 VDC	2.0 to 10.0 VDC	150	100	MANUAL
P-10008	A08	0.5 to 5.0 VDC	0.5 to 10.0 VDC	150	100	MANUAL
P-10009	A09	5.0 to 10.0 VDC	2.0 to 10.0 VDC	150	100	MANUAL
P-10010	A10	5.0 to 10.0 VDC	0.5 to 10.0 VDC	150	100	MANUAL
P-10013	A13	0.5 to 10.0 VDC	2.0 to 10.0 VDC	150	100	MANUAL
P-10015	A15	2.0 to 5.0 VDC	2.0 to 10.0 VDC	150	100	MANUAL
P-10016	A16	2.0 to 6.0 VDC	2.0 to 10.0 VDC	150	100	MANUAL
P-10017	A17	6.0 to 10.0 VDC	2.0 to 10.0 VDC	150	100	MANUAL
P-10018	A18	14.0 to 17.0 VDC	2.0 to 10.0 VDC	150	100	MANUAL
P-10020	A20	9.0 to 12.0 VDC	2.0 to 10.0 VDC	150	100	MANUAL
P-10031	A31	0.5 to 4.0 VDC	2.0 to 10.0 VDC	150	100	MANUAL
P-10063	A63	0.5 to 4.5 VDC	0.5 to 4.5 VDC	150	100	MANUAL
P-10064	A64	5.5 to 10.0 VDC	5.5 to 10.0 VDC	150	100	MANUAL
P-10091	A91	2.0 to 10.0 VDC	2.0 to 10.0 VDC	95	100**	MANUAL

* P-10001 (A01) is the default configuration code.
** Reduced torque in Spring Return (see page 19)

Spring Return Actuators

AFX24-MFT(-S)	180 in-lb
AF24-MFT(-S) US	133 in-lb
NFX24-MFT(-S)	90 in-lb
NF24-MFT US	60 in-lb
LF24-MFT(-S) US	35 in-lb
LF24-MFT(-S)-20 US	35 in-lb
TF24-MFT US	18 in-lb

Non-Spring Return Actuators

GMX24-MFT	360 in-lb
AMX24-MFT	180 in-lb
NMX24-MFT	90 in-lb
LMX24-MFT	45 in-lb
AH24-MFT	101 lbf
LH24-MFT	44 lbf
LUX24-MFT	27 in-lb

Application

How the MFT actuator performs is determined by the configuration (P-10001, A01). The old generation actuators used a P-code (P-10001). The new generation actuators use a shorter 3 digit code. This shorter code is displayed on the reorder number.

P-2000… configuration types are used for Pulse Width Modulation control outputs. Most D.D.C. controllers have digital outputs which incorporate a default PWM range.

This enables a D.O. to be used as a proportional output when needed. Simply select the appropriate configuration code according to your application.

Wiring Diagram

24 VAC Transformer (AC only)

Line Volts

Position Feedback VDC (−) (+)

(1)	Common
(2)	+ Hot
(3)	Y Input
(5)	U Output

CCW CW …MFT

W041MFT

PWM, Triac Source and Sink

Select Configuration

Configuration	Code	Input Range	Position Feedback	Running Time	Torque %	Adaptation
P-20001	W01	0.59 to 2.93 sec	2.0 to 10.0 VDC	150	100	MANUAL
P-20002	W02	0.02 to 5.00 sec	2.0 to 10.0 VDC	150	100	MANUAL
P-20003	W03	0.10 to 25.50 sec	2.0 to 10.0 VDC	150	100	MANUAL
P-20004	W04	0.10 to 25.60 sec	2.0 to 10.0 VDC	150	100	MANUAL
P-20005	W05	0.10 to 5.20 sec	0.5 to 5.0 VDC	150	100	MANUAL
P-20012	W12	0.50 to 25.50 sec	0.5 to 10.0 VDC	150	100	MANUAL
P-20013	W13	0.50 to 2.93 sec	0.5 to 5.0 VDC	150	100	MANUAL
P-20014	W14	0.10 to 10.00 sec	2.0 to 10.0 VDC	150	100	MANUAL

Pulse Width Modulation

Spring Return Actuators

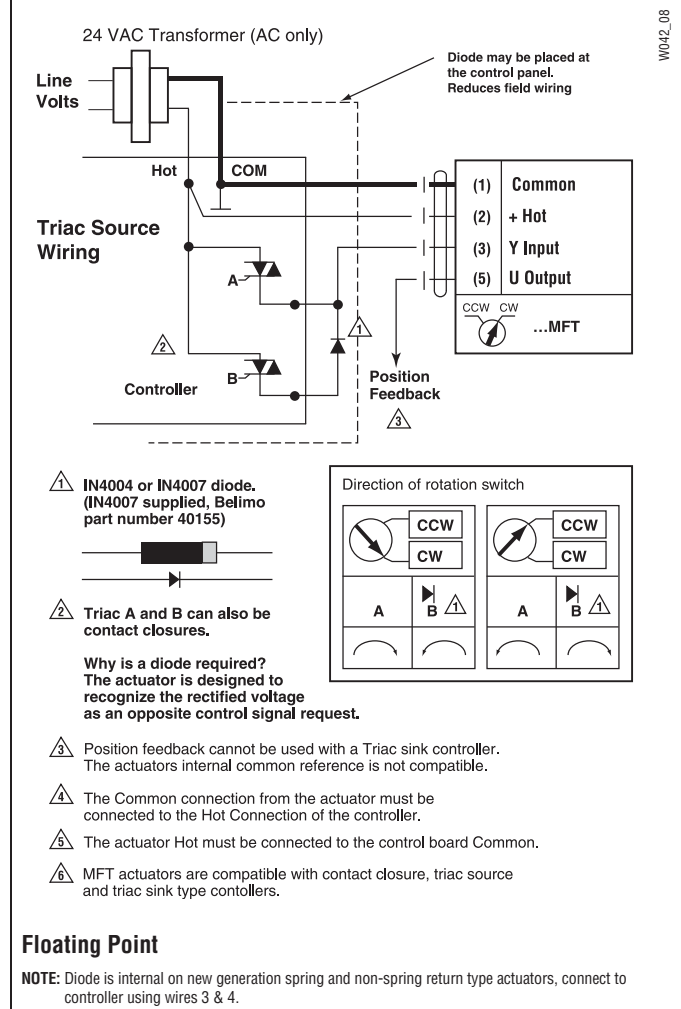|	
AFX24-MFT(-S)	180 in-lb
AF24-MFT(-S) US	133 in-lb
NFX24-MFT(-S)	90 in-lb
NF24-MFT US	60 in-lb
LF24-MFT(-S) US	35 in-lb
LF24-MFT(-S)-20 US	35 in-lb
TF24-MFT US	18 in-lb

Non-Spring Return Actuators

GMX24-MFT	360 in-lb
AMX24-MFT	180 in-lb
NMX24-MFT	90 in-lb
LMX24-MFT	45 in-lb
AHX24-MFT	101 lbf
LHX24-MFT	34 lbf
LUX24-MFT	27 in-lb

Wiring Diagram

NOTE: Diode is internal on new generation spring return and non-spring return type actuators, connect to controller using wires 3 & 4.
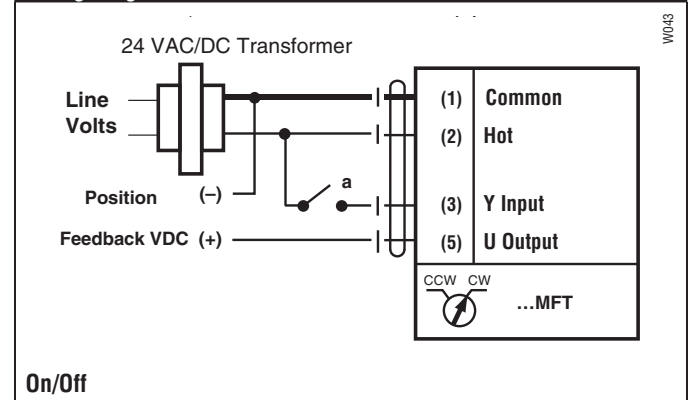
Application

How the MFT actuator performs is determined by the configuration (P-10001, A01). The old generation actuators used a P-code (P-10001). The new generation actuators use a shorter 3 digit code. This shorter code is displayed on the reorder number.

P-3000… configuration types are used for floating point control outputs. In this application MFT actuators offer constant running time and standard feedback options. A IN4004 or IN4007 diode is required for original spring return actuators only.

Wiring Diagram

1. **IN4004 or IN4007 diode. (IN4007 supplied, Belimo part number 40155)**

2. **Triac A and B can also be contact closures.**

   Why is a diode required? The actuator is designed to recognize the rectified voltage as an opposite control signal request.

3. Position feedback cannot be used with a Triac sink controller. The actuators internal common reference is not compatible.

4. The Common connection from the actuator must be connected to the Hot Connection of the controller.

5. The actuator Hot must be connected to the control board Common.

6. MFT actuators are compatible with contact closure, triac source and triac sink type controllers.

Floating Point

NOTE: Diode is internal on new generation spring and non-spring return type actuators, connect to controller using wires 3 & 4.

Select Configuration

Configuration	Code	Input Range	Position Feedback	Running Time	Torque %	Adaptation
P-30001	F01	Floating Point	2.0 to 10.0 VDC	150	100	MANUAL
P-30002	F02	Floating Point	0.5 to 10.0 VDC	150	100	MANUAL
P-30003	F03	Floating Point	2.0 to 10.0 VDC	100	100	MANUAL
P-30004	F04	Floating Point	0.5 to 5.0 VDC	100	100	MANUAL
P-30005	F05	Floating Point	0.5 to 10.0 VDC	100	100	MANUAL
P-30006	F06	Floating Point	0.5 to 5.0 VDC	150	100	MANUAL
P-30007	F07	Floating Point	2.0 to 10.0 VDC	300	100	MANUAL
P-30008	F08	Floating Point	2.0 to 10.0 VDC	75	100*	MANUAL
P-30009	F09	Floating Point	2.0 to 10.0 VDC	85	100*	MANUAL
P-30010	F10	Floating Point	0.5 to 2.5 VDC	150	100	MANUAL

Floating Point Control

* Reduced torque in Spring Return (see page 19)

Spring Return Actuators

AFX24-MFT(-S)	180 in-lb
AF24-MFT(-S) US	133 in-lb
NFX24-MFT(-S)	90 in-lb
NF24-MFT US	60 in-lb
LF24-MFT(-S) US	35 in-lb
TF24-MFT US	18 in-lb

Non-Spring Return Actuators

GMX24-MFT	360 in-lb
AMX24-MFT	180 in-lb
NMX24-MFT	90 in-lb
LMX24-MFT	45 in-lb
AMQX24-MFT	140 in-lb
NMQX24-MFT	70 in-lb
LMQX24-MFT	35 in-lb
AHX24-MFT	101 lbf
AHQX24-MFT-100	44 lbf
LHX24-MFT	34 lbf
LHQX24-MFT-100	22 lbf
LUX24-MFT	27 in-lb

Application

How the MFT actuator performs is determined by the configuration (P-10001, A01). The old generation actuators used a P-code (P-10001). The new generation actuators use a shorter 3 digit code. This shorter code is displayed on the reorder number.

P-4000… configuration types are used for on/off control outputs. The configuration allows for service replacement of on/off actuators when a true on/off actuator is not available.

In addition the MFT actuator offers additional functionality in the on/off mode, such as configuration P-40003 with minimum position and 2 to 10 VDC feedback.

Wiring Diagram

W043

24 VAC/DC Transformer

Line Volts

Position (–)

Feedback VDC (+)

(1) Common
(2) Hot
(3) Y Input
(5) U Output

a

CCW CW

…MFT

On/Off

Select Configuration

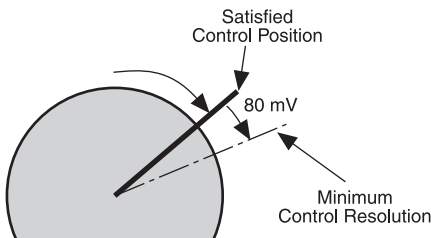|	Configuration	Code	Input Range	Position Feedback	Running Time	Torque %	Adaptation
On/Off Control	P-40001	J01	On/Off	2.0 to 10.0 VDC	75	100*	MANUAL
	P-40002	J02	On/Off	2.0 to 10.0 VDC	150	100	MANUAL
	P-40003	J03	On/Off	2.0 to 10.0 VDC	75	100*	MANUAL
	P-40004	J04	On/Off	0.5 to 5.0 VDC	100	100	MANUAL
	P-40005	J05	On/Off	0.5 to 10.0 VDC	100	100	MANUAL

* Reduced torque in Spring Return (see page 19)

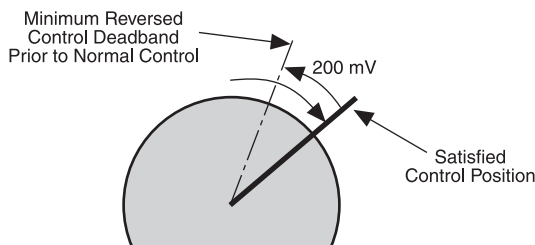# All MFT actuators have built-in brushless DC motors which provide better accuracy and longer service life.

Control Accuracy and Stability (AF / NF / LF / TF)

The …MFT US actuators are designed with a unique non-symmetrical deadband. The actuator follows an increasing or decreasing control signal with a 80 mV resolution. If the signal changes in the opposite direction, the actuator will not respond until the control signal changes by 200 mV. This allows these actuators to track even the slightest deviation very accurately, yet allowing the actuator to "wait" for a much larger change in control signal due to control signal instability.

AF / NF / LF / TF Actuators responds to a 80 mV signal when not changing direction from stop position.

Satisfied Control Position

80 mV

Minimum Control Resolution

AF / NF / LF / TF Actuators responds to a 200 mV signal when reversing direction from stop position.

Minimum Reversed Control Deadband Prior to Normal Control

200 mV

Satisfied Control Position

Control Accuracy and Stability (GM / AM / NM / LM / AH / LH / LU / GR / AR / LR)

Belimo non-spring return actuators are designed with a unique non-symmetrical deadband. The actuator follows an increasing or decreasing control signal with a 75 mV resolution. If the signal changes in the opposite direction, the actuator will not respond until the control signal changes by 175 mV. This allows these actuators to track even the slightest deviation very accurately, yet allowing the actuator to "wait" for a much larger change in control signal due to control signal instability.

Actuator responds to a 75 mV signal when not changing direction from stop position.

Satisfied Control Position

75 mV

Minimum Control Resolution
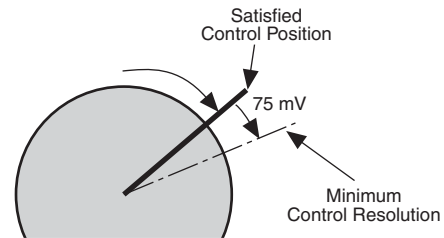
Actuator responds to a 175 mV signal when reversing direction from stop position.

Minimum Reversed Control Deadband Prior to Normal Control
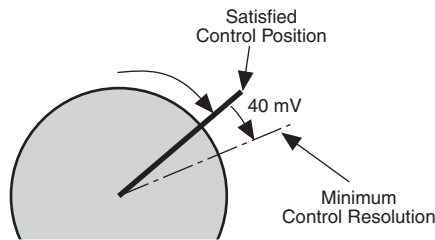
175 mV

Satisfied Control Position
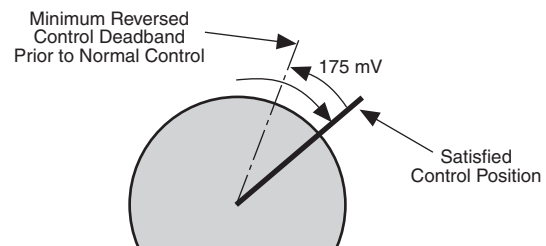
M40035 - 05/10 - Subject to change. © Belimo Aircontrols (USA), Inc.

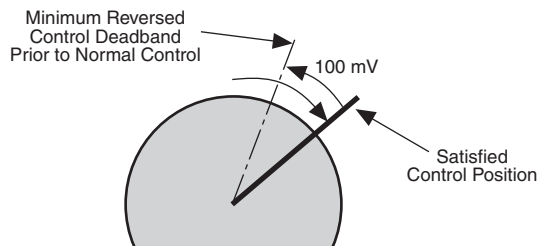# All Belimo actuators have built-in brushless DC motors which provide better accuracy and longer service life.

Control Accuracy and Stability
(AMQ / NMQ / LMQ / AHQ / LHQ)

Belimo Quick Running non-spring return actuators are designed with a unique non-symmetrical deadband. The actuator follows an increasing or decreasing control signal with a 40 mV resolution. If the signal changes in the opposite direction, the actuator will not respond until the control signal changes by 100 mV. This allows these actuators to track even the slightest deviation very accurately, yet allowing the actuator to "wait" for a much larger change in control signal due to control signal instability.

Actuator responds to a 40 mV signal when not changing direction from stop position.

Satisfied Control Position
40 mV
Minimum Control Resolution

Actuator responds to a 100 mV signal when reversing direction from stop position.

Minimum Reversed Control Deadband Prior to Normal Control
100 mV
Satisfied Control Position

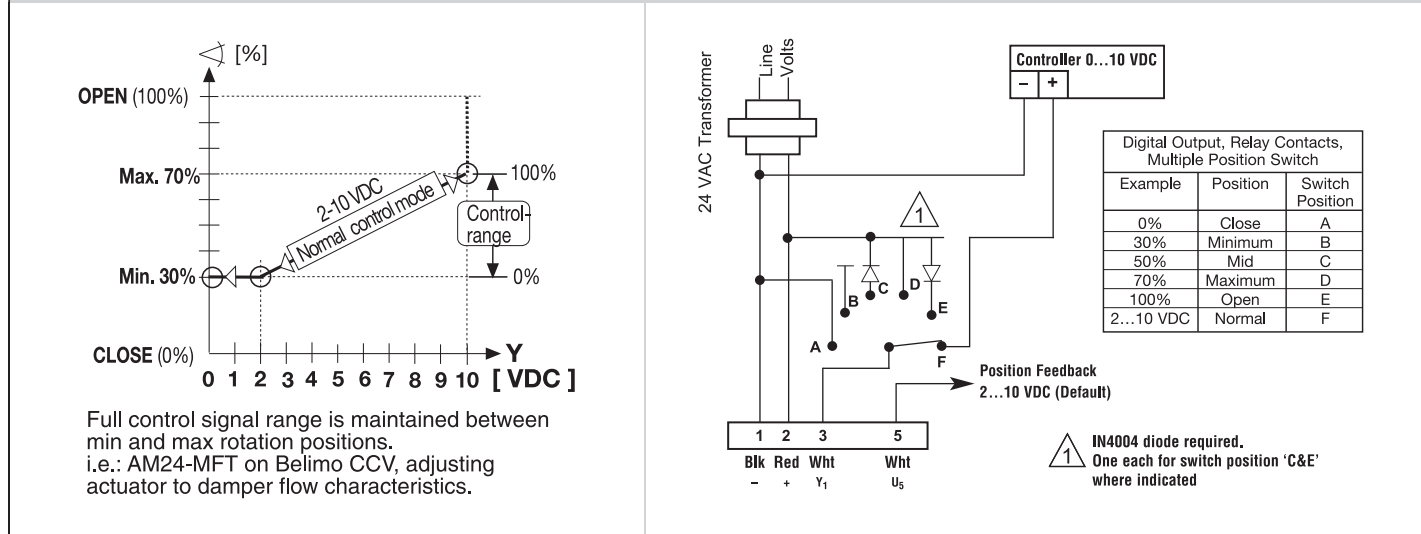|	Motion	Parameter Variables	Description
Running Time	New Generation AF	70 to 220 seconds	Running time is selectable allowing for customizing the actuator for the application at hand. Adjustable running time allows for: • Matching HVAC system sequence of operation. • Improving control loop stability. • Reducing actuating noise (slower running). • Retrofit applications
	New Generation NF	40 to 220 seconds	
	AF / NF / LF / TF	75 to 300 seconds	
	GM	75 to 300 seconds	
	AM*	90 to 350 seconds	The running time is constant and independent of load.
	NM*	45 to 150 seconds	
	AH*	75 to 150 seconds	
	LM*	35 to 150 seconds	
	LH*	75 to 150 seconds	
	LU	75 to 150 seconds	
Rotation	Direction of Rotation	Default or Reversed	The direction of rotation can be "Direct" or "Reverse" acting of the control signal. The direction of rotation is selected from a CW and CCW switch located on the actuator. An alternative method of changing the direction of rotation is to use the PC-Tool software. This option allows you to make remote set-up corrections without having the need to be at the actuator. Selection of the direction of rotation is only possible via the PC-Tool software or manually with the switch on the actuator. Selection via a preset configuration is not an option.
	Intermediate Position Control (Override Control)	• Minimum Position (Default 0%) • Intermediate Position (Default 50%) • Maximum Position (Default 100%) Intermediate Positions are achieved through 'forced override' positions. **SEE FIGURE A – FORCED OVERRIDES.**	All intermediate settings are adjustable from 0 to 100%. Programmed as default, these control positions are possible by using the wiring diagram in **FIGURE A.** The override functions can be used as a means to test the actuator's functionality during equipment servicing or troubleshooting. Intermediate positions can also be integrated into the control circuit as a part of the sequence of operation. The Min, Mid, and Max positions can be used in any MFT control mode. • VDC: For stand-alone controllers where a minimum position is needed. • PWM: Eliminate add-on accessories. • Floating Point: New functionality to a common application. • On/Off: New functionality to a common application. – Satisfy combustion air requirements or boiler sequencing with O/A damper. – Eliminates secondary minimum position dampers.

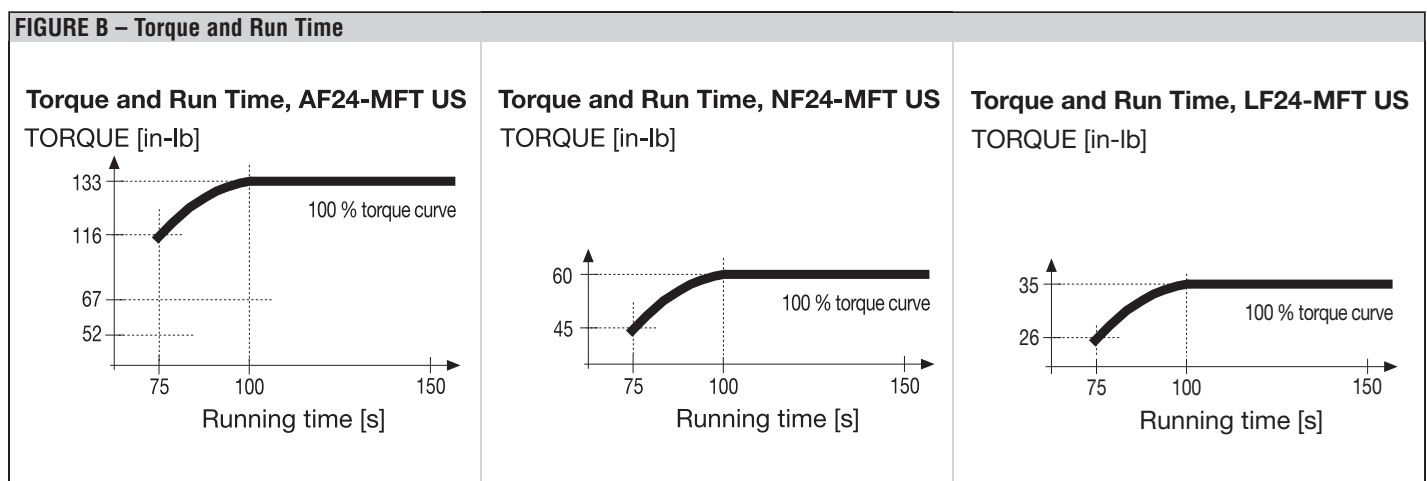* Quicker running actuators are available. Contact Belimo Customer Service for details.

FIGURE A – Forced Overrides

Full control signal range is maintained between min and max rotation positions.
i.e.: AM24-MFT on Belimo CCV, adjusting actuator to damper flow characteristics.

Digital Output, Relay Contacts, Multiple Position Switch		
Example	Position	Switch Position
0%	Close	A
30%	Minimum	B
50%	Mid	C
70%	Maximum	D
100%	Open	E
2…10 VDC	Normal	F

IN4004 diode required.
One each for switch position 'C&E' where indicated

Motion	Parameter Variables	Description
Adaptation	OFF	When the manual override button is depressed, and released, the actuator will perform synchronization. The actuator will simply drive to the mechanical zero position and return to its last control position.
	ON – Manual	The default setting for adaptation is "ON – Manual". When the ON-Manual setting is selected, adaptation is initiated by: • Pressing the manual override button twice (GM / AM / NM / LM). • Clicking the CW/CCW switch twice (AF, NF, LF and TF). When adaptation is selected, (On-Manual or Automatic) the actuator will drive one full cycle to its mechanical end stops OR the valves mechanical seats. Upon completion of this cycle the actuators working range (input, feedback and running time) will be adapted to the actual mechanical angle of rotation.
	ON – Automatic	When the ON-Automatic setting is selected at every power-up the actuator will automatically adapt to the mechanical angle of rotation. Also upon pressing the manual override button or CW/CCW switch, adaptation is initiated (See above).
Sound and Running Time	All Actuators	As the speed of the actuator increases, there is an increase in the sound power level.
Torque and Running Time	Original Spring Return (AF / NF / LF)	Though the running time remains constant, at approximately the 100-second range there is a loss in output torque. This is due to the association of runtime to torque. To gain a faster running time there is a loss in torque. **SEE FIGURE B.**

Mechanical Relationship

FIGURE B – Torque and Run Time

Torque and Run Time, AF24-MFT US
TORQUE [in-lb]

Torque and Run Time, NF24-MFT US
TORQUE [in-lb]

Torque and Run Time, LF24-MFT US
TORQUE [in-lb]

NOTE: All new generation spring return and non-spring return actuators are torque independent of speed.

Specifications	Parameter Variables	Description
Alarms - Fault A fixed voltage of 8.5 VDC is present when Alarm 'sounds'.	Hunting $$\frac{A_t(h) \times 100}{O_t(h)} = \text{Motion Percentage}$$ $$\frac{140 \times 100}{700} = 20\%$$	Alarm criteria: Actuator is hunting due to unstable control loop. This fault occurs when the ratio of Active time to Operating time exceeds 20%. Operating time: Total number of hours connected to power supply Active time: Total number of hours the actuator is in mechanical motion.
	Mechanical Overload	Alarm criteria: Actuator is in a position and not responding to the control input. An alarm will 'sound' when an object or circumstance is preventing the motion of the actuator, damper or valve. The actuator has initiated its own overload protection after a period of 13 seconds.
	Mechanical Travel	Alarm criteria: Actuator is adapted to the working angle of a damper or to the stroke of a valve and is less than 95-degree actuator rotation (eg. 75° adapted angle). An alarm will 'sound' when the actuator detects a mechanical travel difference of 10% above the adapted angle (eg. 82.6°).
Alarm - Maintenance A fixed voltage of 5.5 VDC is present when Alarm 'sounds'.	Mechanical load limit (Non-Sprlng Return Only)	Alarm criteria: The torque load of the application has exceeded the actuator's torque. A typical scenario – the torque requirements has increased due to: • Lack of lubrication • Increased flow • Improper installation • Damage • Dirt and debris build-up The alarm 'sounds' when the specified torque rating of the actuator has been exceeded for a period of 5 seconds.

Service	Parameter Variables	Description
Identification	Serial Number	Displays the actuators internal serial number.
	Actuator Type / Software Version	Displays the actuator nomenclature (AFX24-MFT US) and MFT software version.
	Assembly Location	Displays the where the actuator was assembled.
	Setpoint	Displays the actual control input position as a percentage. As signal input changes you will see the setpoint percentage change accordingly.
Actual Values	Actual Position	Displays the actual position as a percentage. As the setpoint changes the actual position percentage will increase or decrease accordingly. If the actuator is capable of rotating the damper or valve, this can be of benefit when troubleshooting an application.
Function	Control Type & Setting	Displays the actual control type and operating range.
	Feedback Type & Setting	Displays the actual feedback signal type and operating range.
	Torque % Setting	Displays the actual torque setting, as a percentage of minimum torque.
	Running Time	Displays the actual running time as programmed in seconds.
	Direction of Rotation	Displays the status of the direction of rotation option (Normal or Reversed).
	Min, Mid, Max Position	Displays the actual position setting of the Intermediate position control.
	Adaptation	Displays the actual setting of the adaptation function (OFF, ON-Manual, ON-Automatic).
	Sensitivity / Hysteresis	Displays the actual setting of the sensitivity (Normal or Reduced).
	Synchronization	Displays the actual setting of the synchronization function (Normal, Sync at 0%, Sync at 100%).
Data Log	Total Time / Operating Time	Total number of hours the actuator is connected to a power supply.
	Active Time	Total number of hours the actuator is in motion.
	Stop / Go Ratio (Hunting %)	Displays a percentage the total number of hours the actuator has spent in mechanical motion, comparing the total time to the active time.
Sensitivity	Normal, Reduced	Displays the setting of the sensitivity function.
Messages		Displays all messages present. Messages can be deleted as well.
Function Test		This function enables you to check for complete opening and closing of the actuator. The test report contains: • Information on the Project • Identification on the Actuator • A list of fault messages pending before the start of the test • The test steps and results • The current actuator settings This is of benefit when troubleshooting an application, as the actuator will drive the damper or valve. This gives an opportunity to observe the installation to identify any possible problems.
Adaptation	**See Adaptation on page 13.**	Initiates the adaptation feature of the MFT actuator. The actuators working range (input, feedback, and running time) will be adapted to the actual angle of rotation. This is of benefit when troubleshooting an application, as the actuator will drive the damper or valve. This gives you an opportunity to observe the installation to identify any possible problems.
Synchronization	Normal	At initial commissioning, when the manual override button is pressed, the actuator runs to a default position defined by the position of the CW/CCW direction of rotation switch.
	Sync at 0%	At each power-up (includes power failures), the actuator runs to a default position defined by the position of the CW/CCW direction of rotation switch.
	Sync at 100%	At each power-up (includes power failures), the actuator runs to a default position of the CW/CCW direction of rotation switch.

Displays (vertical label)

Functions (vertical label)

⚠ **WARNING** The wiring technician must be trained and experienced with electronic circuits. Disconnect power supply before attempting any wiring connections or changes. Make all connections in accordance with wiring diagrams and follow all applicable local and national codes. Provide disconnect and overload protection as required. Use copper, twisted pair, conductors only. If using electrical conduit, the attachment to the actuator must be made with flexible conduit.

Always read the controller manufacturer's installation literature carefully before making any connections. Follow all instructions in this literature. If you have any questions, contact the controller manufacturer and/or Belimo.

Transformer(s)

Non-spring return actuators require a 24 VAC class 2 transformer and draws a maximum of 5 VA per actuator. The actuator enclosure cannot be opened in the field, there are no parts or components to be replaced or repaired.

  – EMC directive: 89/336/EEC
  – Software class A: Mode of operation type 1
  – Low voltage directive: 73/23/EEC

CAUTION: It is good practice to power electronic or digital controllers from a separate power transformer than that used for actuators or other end devices. The power supply design in our actuators and other end devices use half wave rectification. Some controllers use full wave rectification. When these two different types of power supplies are connected to the same power transformer and the DC commons are connected together, a short circuit is created across one of the diodes in the full wave power supply, damaging the controller. Only use a single power transformer to power the controller and actuator if you know the controller power supply uses half wave rectification.

Typical Transformer Sizing

Actuator Series	Voltage	Required VA Per Actuator
New Generation AF	24	10*
Original AF	24	10
New Generation NF	24	9**
Original NF	24	6
LF	24	6
TF	24	4
GMB/GRB	24	7
AMB/ARB	24	6
NMB	24	6
LMB/LRB	24	5
AHB	24	6
LHB	24	5
LUB	24	5
AMQB	24	18
NMQB	24	18
LMQB	24	18
AHQB	24	18
LHQB	24	18

* @ 70 second run time
** @ 40 second run time

Multiple Actuators, One Transformer

Multiple actuators may be powered from one transformer provided the following rules are followed:
1. The TOTAL current draw of the actuators (VA rating) is less than or equal to the rating of the transformer.
2. Polarity on the secondary of the transformer is strictly followed. *This means that all No. 1 wires from all actuators are connected to the common leg on the transformer and all No. 2 wires from all actuators are connected to the hotleg.* Switching wire No. 1 & 2 on one leg of the transformer will result in erratic operation or failure of the actuator and/or controls.

Multiple Actuators, Multiple Transformers

Multiple actuators positioned by the same control signal may be powered from multiple transformers provided the following rules are followed:
1. The transformers are properly sized.
2. All No. 1 wires from all actuators are tied together and tied to the negative leg of the control signal. See wiring diagram on page 11.

Wire Lengths for Actuators

Keep power wire runs below the lengths listed in the **Figure H.** If more than one actuator is powered from the same wire run, divide the allowable wire length by the number of actuators to determine the maximum run to any single actuator.

Example: 3 actuators, 16 Ga wire
                350 Ft ÷ 3 Actuators = 117 Ft. Maximum wire run

LH-24…/LU-24…

Wire Size	Max. Feet.
16 Ga	1175 Ft.
18 Ga	1075 Ft.
20 Ga	575 Ft.
22 Ga	300 Ft.

LM-24…/CM24

Wire Size	Max. Feet
16 Ga	1125 Ft.
18 Ga	750 Ft.
20 Ga	400 Ft.
22 Ga	200 Ft.

NM-24…/AH-24…/LMX120…

Wire Size	Max. Feet.
12 Ga	1250 Ft.
14 Ga	1130 Ft.
16 Ga	900 Ft.
18 Ga	575 Ft.
20 Ga	300 Ft.
22 Ga	150 Ft.

AM-24…

Wire Size	Max. Feet
12 Ga	1150 Ft.
12 Ga	925 Ft.
16 Ga	550 Ft.
18 Ga	375 Ft.
20 Ga	200 Ft.
22 Ga	100 Ft.

GM…/NMX120…/AMX120…

Wire Size	Max. Feet.	Wire Size	Max. Feet
12 Ga	1125 Ft.	18 Ga	325 Ft.
14 Ga	800 Ft.	20 Ga	175 Ft.
16 Ga	500 Ft.	22 Ga	90 Ft.

FIGURE H – Maximum Wire Lengths

Wire Type and Wire Installation Tips

For most installations, 18 or 16 Ga. cable works well with the non-spring return actuators. Use code-approved wire nuts, terminal strips or solderless connectors where wires are joined. It is good practice to run control wires unspliced from the actuator to the controller. If splices are unavoidable, make sure the splice can be reached for possible maintenance. Tape and/or wire-tie the splice to reduce the possibility of the splice being inadvertently pulled apart.

The non-spring return proportional actuators have a digital circuit that is designed to ignore most unwanted input signals (pickup). In some situations the pickup may be severe enough to cause erratic running of the actuator. For example, a large inductive load (high voltage AC wires, motors, etc.) running near the power or control wiring may cause excessive pickup. To solve this problem, make one or more of the following changes:
1. Run the wire in metallic conduit.
2. Re-route the wiring away from the source of pickup.
3. Use shielded wire (Belden 8760 or equal). Ground the shield to an earth ground. Do not connect it to the actuator common.

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ATTENTION

Master-Slave is the correct method for wiring multiple Belimo MFT actuators to a single load. For example, you can have up to three AFX24-MFT on a single damper jackshaft or two GMX24-MFT on a large butterfly valve.

The current Belimo solution is to mount multiple actuators onto the damper or valve. In the past this required the installer to wire the actuators in a "master-slave" arrangement. This was typical for the AF24-SR US actuator.

By adding more actuators you can effectively increase the torque proportional to the minimum specified torque times the number of actuators. This is normal as seen on the following installations.

- **Large dampers or valves**
- **Large multiple section dampers**
- **Rack and Pinion style globe valves**
- **Ball or Butterfly valves**

Multiple actuators mounted to one control shaft

Model	Max. Qty Per Shaft	Torque Generated
AFX24-MFT(-S)	3	432 in-lb
NFX24-MFT(-S)	1	90 in-lb
LF24-MFT(-S) US	1	35 in-lb
GMX24-MFT	2	640 in-lb
AMX24-MFT	1	180 in-lb
NMX24-MFT	1	90 in-lb
LMX24-MFT	1	45 in-lb
GKX24-MFT	2	720 in-lb

The wiring method for multiple actuators mounted to shafts which are **not** mechanically connecting other actuators is to wire the control signal in parallel with each actuator.

Multiple XM24-MFT95…

EXCEPTION   No mechanical dual mounting of AFX24-MFT US is possible. Electrical parallel wiring of AFX24-MFT95 is possible only for mechanically separate applications.

SOLUTION   For increased torque requirement use AFX24-MFT95 as a master and the slave must be an AFX24-MFT. The masters feedback must match the slaves input signal. (Both are default 2-10 VDC.)

Wiring Diagrams

⚒ INSTALLATION NOTES

△1 Provide overload protection and disconnect as required.

△2 **CAUTION** *Equipment damage!*
Actuators may be connected in parallel if not mechanically mounted to the same shaft. Power consumption and input impedance must be observed.

△3 Actuators may also be powered by 24 VDC.

△5 Control signal may be pulsed from either the Hot (source) or the Common (sink) 24 VAC line.

📋 APPLICATION NOTES

◆ The ZG-R01 500 Ω resistor may be used.

⚠ 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.
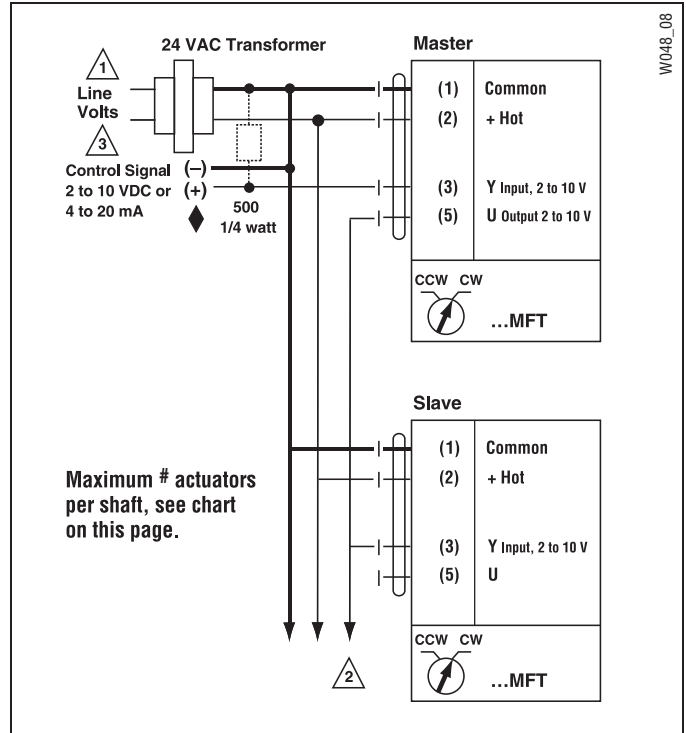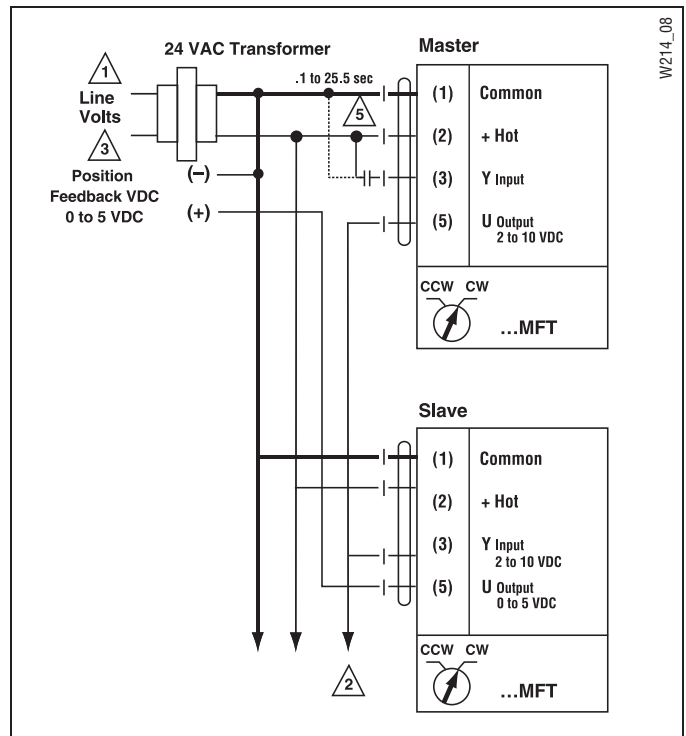
Wiring multiple …MFT actuators to one shaft.
All MFT actuators are wired in master-slave configuration.

Wiring of multiple …MFT actuators on valves must be master-slave (wires 3-5).
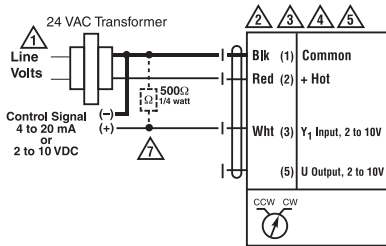
MFT actuator configurations should also co-ordinate with each other. Meaning the master input = controllers output. Master output = slave input. Slave output = controller input.
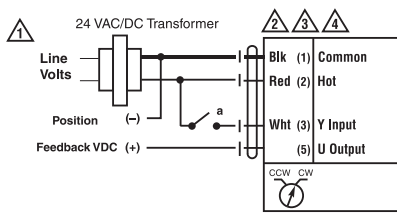

Controller Output	Master Feedback	Slave Input	Slave Feedback
0.1 to 25.5 sec	2 to 10 VDC	2 to 10 VDC	0 to 5 VDC

Spring Return Actuator with MFT

VDC / 4 to 20mA
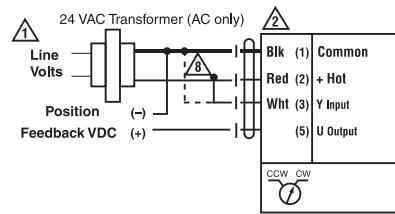
Two Position

PWM

Original AF, NF, LF, TF
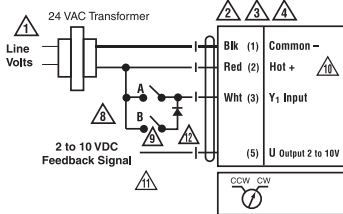
New Generation AF, NF

Floating Point

Override control to min, mid, max positions

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

* Default selectable 0-100%. See Configuration Data Sheet
** Customizable. See Configuration Data Sheet.

1. Provide overload protection and disconnect as required.
2. Actuators may be connected in parallel if not mechanically mounted to the same shaft. Power consumption and input impedance must be observed.
3. Actuators may also be powered by 24 VDC.
4. Meets cULus requirements without the need of an electrical ground connection.
5. Actuators with plenum rated cable do not have numbers on wires; use color codes instead. Actuators with appliance cables are numbered.
7. A 500Ω resistor 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.
9. Contact closures A & B also can be triacs. A & B should both be closed for triac source and open for triac sink.
10. For triac sink the Common connection from the actuator must be connected to the Hot connection of the controller.
11. Position feedback cannot be used with a Triac sink controller. The actuator internal common reference is not compatible.
12. IN4004 or IN4007 diode. (IN4007 supplied, Belimo part number 40155)

W425_08

Non-Spring Return Actuator with MFT
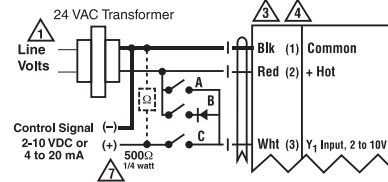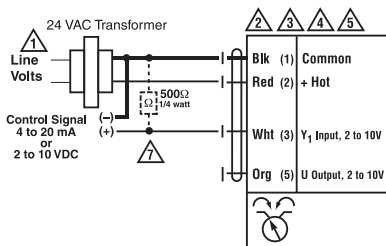

VDC / 4 to 20mA

Two Position

PWM

Floating Point

Override control to min, mid, max positions

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

* Default selectable 0-100%. See Configuration Data Sheet
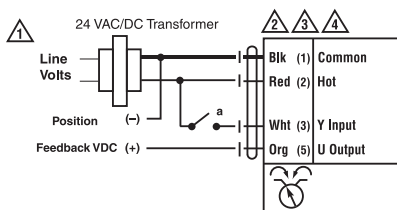** Customizable. See Configuration Data Sheet.

1. Provide overload protection and disconnect as required.
2. Actuators may be connected in parallel if not mechanically mounted to the same shaft. Power consumption and input impedance must be observed.
3. Actuators may also be powered by 24 VDC.
4. Meets cULus requirements without the need of an electrical ground connection.
5. Actuators with plenum rated cable do not have numbers on wires; use color codes instead. Actuators with appliance cables are numbered.
7. A 500Ω resistor 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.
9. Contact closures A & B also can be triacs. A & B should both be closed for triac source and open for triac sink.
10. For triac sink the Common connection from the actuator must be connected to the Hot connection of the controller.
11. Position feedback cannot be used with a Triac sink controller. The actuator internal common reference is not compatible.

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0 to 135 Ω Control (MFT95)

Switch A	Switch B	Damper Position
		Damper Open
		Damper Closed

The direction of rotation switch is set so that the fail safe position and the position of the damper is closed with no signal at wire R.
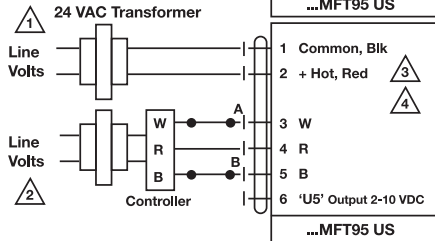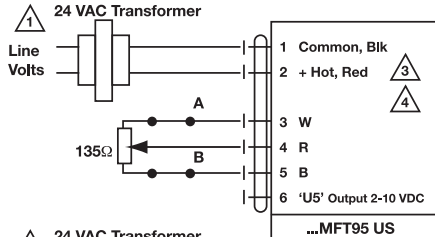
Override

Low Limit Control
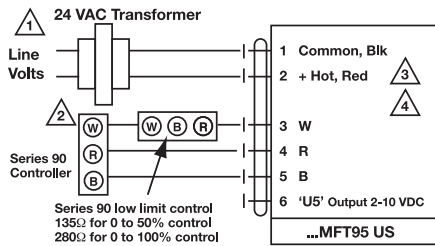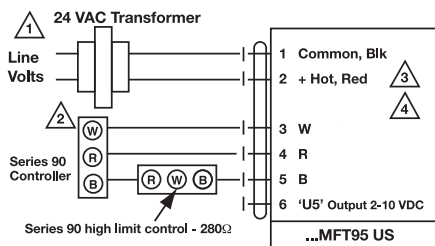
Series 90 low limit control
135Ω for 0 to 50% control
280Ω for 0 to 100% control

High Limit Control
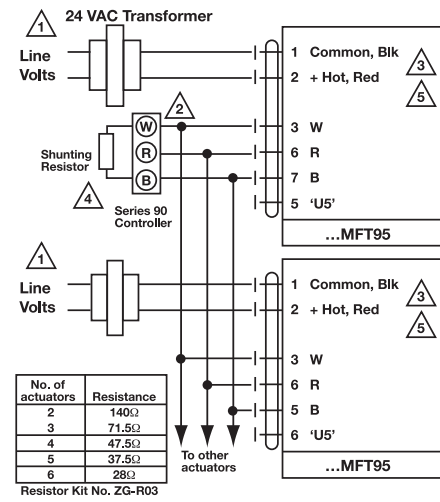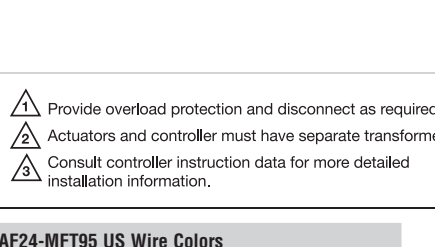
Series 90 high limit control - 280Ω

⚠1 Provide overload protection and disconnect as required.

⚠2 Actuators and controller must have separate transformers.

⚠3 Consult controller instruction data for more detailed installation information.

Wiring multiple actuators to a Series 90 controller

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

Resistor Kit No. ZG-R03
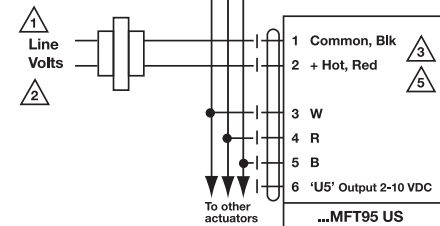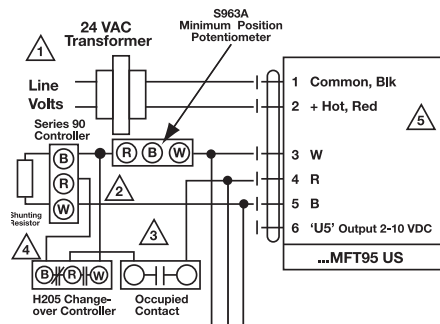
Wiring multiple actuators to a Series 90 controller using a minimum position potentiometer

⚠4 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.

⚠5 To reverse control rotation, use the reversing switch.

No. of actuators	Resistance
2	1300Ω
3	910Ω
4	768Ω

Resistor Kit No. ZG-R06
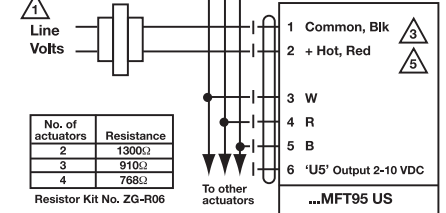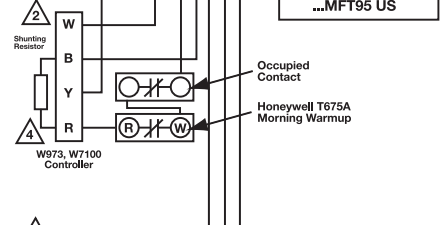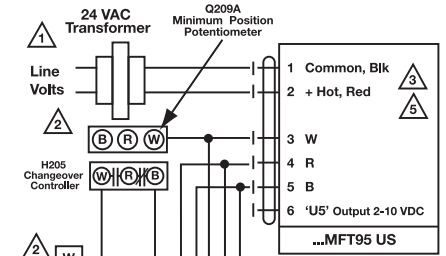
Used with the W973 and W7100 controllers.
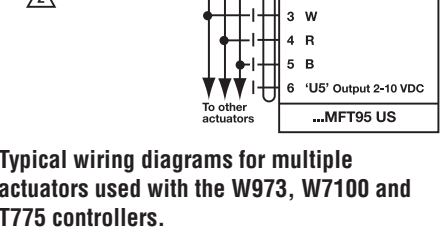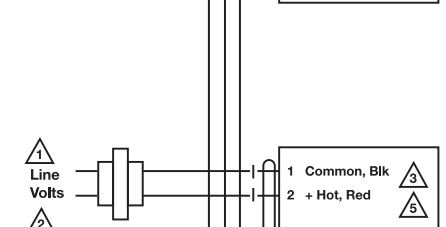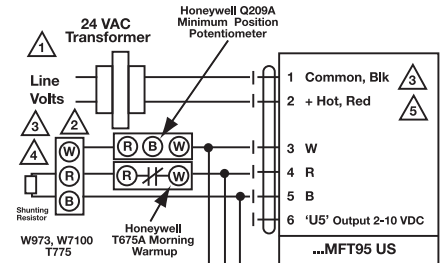
Typical wiring diagrams for multiple actuators used with the W973, W7100 and T775 controllers.

AF24-MFT95 US Wire Colors		
1=Black	3=White	5=White
2=Red	4=White	6=White
AFX24-MFT95 and Non-Spring Return Wire Colors		
1=Black	3=White	5=Gray
2=Red	4=Pink	6=Orange

Multi-Function Technology®

MFT VDC Proportional Control Program Codes

BELIMO®

*Note: Not every code works with every acuator

Programmable Code	Running Time	Control Range	Feedback	Feedback Range	Obsolete Code	MP Bus Logo	Adaption
A01	150s	2...10V	U5	U5 2...10V	P-10001	NO	manual
A02	150s	0.5...10V	U5	U5 0.5…10V	P-10002	NO	manual
A03	150s	2...10V	U5	U5 0.5…5V	P-10003	NO	manual
A04	150s	4...7V	U5	U5 2…10V	P-10004	NO	manual
A05	150s	6...9V	U5	U5 2…10V	P-10005	NO	manual
A06	150s	10.5...13.5V	U5	U5 2...10V	P-10006	NO	manual
A07	150s	0.5...5V	U5	U5 2…10V	P-10007	NO	manual
A08	150s	0.5...5V	U5	U5 0.5…10V	P-10008	NO	manual
A09	150s	5...10V	U5	U5 2…10V	P-10009	NO	manual
A10	150s	5...10V	U5	U5 0.5…10V	P-10010	NO	manual
A11	150s	0.5...5V	U5	U5 0.5…5V	P-10011	NO	manual
A12	150s	0.5...5V	U5	U5 0.5…2.5V	P-10012	NO	manual
A13	150s	0.5...10V	U5	U5 2…10V	P-10013	NO	manual
A14	100s	0.5…10V	U5	U5 0.5…2.5V	P-10014	NO	manual
A15	150s	2…5V	U5	U5 2…10V	P-10015	NO	manual
A16	150s	2…6V	U5	U5 2…10V	P-10016	NO	manual
A17	150s	6…10V	U5	U5 2…10V	P-10017	NO	manual
A18	150s	14…17V	U5	U5 2…10V	P-10018	NO	manual
A19	100s	2…10V	U5	U5 2…10V	P-10019	NO	manual
A20	150s	9...12V	U5	U5 2…10V	P-10020	NO	manual
A21	150s	2…10V	U5	U5 0.5…5V	P-10021	NO	manual
A22	150s	0.5…4.9V	U5	0.5…4.9V	P-10022	NO	manual
A23	150s	5.1…10V	U5	5.1…10V	P-10023	NO	manual
A24	150s	0.5…24V	U5	U5 2…10V	P-10024	NO	manual
A25	76s	2...10V	U5	U5 2…10V	P-10025	NO	manual
A26	150s	2…9V	U5	U5 2…10V	P-10026	NO	manual
A27	150s	5…9V	U5	U5 2…10V	P-10027	NO	manual
A28 PICCV ONLY	100s	0.5…10V	U5	U5 0.5…10V	P-10028	NO	manual
A29	150s	1…3V	U5	U5 2…10V	P-10029	NO	manual
A30	150s	3…9V	U5	U5 2…10V	P-10030	NO	manual
A31	150s	0.5…4V	U5	U5 2…10V	P-10031	NO	manual
A32	150s	6…14V	U5	U5 2…10V	P-10032	NO	manual
A33	150s	4…14V	U5	U5 2…10V	P-10033	NO	manual
A34	120s	2...10V	U5	U5 2…10V	P-10034	NO	manual
A35	78s	2...10V	U5	U5 2…10V	P-10035	NO	manual
A37	120s	0.5…10V	U5	U5 0.5…10V	P-10037	NO	manual
A38	150s	6...13V	U5	U5 2…10V	P-10038	NO	manual
A39	150s	10...14V	U5	U5 2…10V	P-10039	NO	manual
A40	150s	1...16V	U5	U5 2…10V	P-10040	NO	manual
A41	150s	3...6V	U5	U5 2…10V	P-10041	NO	manual
A42	75s	0.5…10V	U5	U5 2…10V	P-10042	NO	manual
A43	150s	0.5…2.5V	U5	U5 2…10V	P-10043	NO	manual
A44	150s	7…10V	U5	U5 2…10V	P-10044	NO	manual
A45	150s	13...17V	U5	U5 2…10V	P-10045	NO	manual
A46	150s	2...10V	U5	U5 2…10V	P-10046	NO	manual
A47	150s	0.5…20V	U5	U5 2…10V	P-10047	NO	manual
A48	150s	1…5V	U5	U5 1…5V	P-10048	NO	auto-adapt.
A49	150s	1…5V	U5	U5 1…5V	P-10049	NO	auto-adapt.
A51					P-10051		
A52	150s	2...10V	U5	U5 0.5…5V	P-10052	NO	manual
A53	120s	0.5…10V	U5	U5 2…10V	P-10053	NO	manual
A54	150s	0.5…2.5V	U5	U5 0.5…2.5V	P-10054	NO	manual
A55	75s	2…5V	U5	U5 2…10V	P-10055	NO	manual
A56	75s	6…9V	U5	U5 2…10V	P-10056	NO	manual
A57	150s	2…5.5V	U5	U5 2…10V	P-10057	NO	manual
A58	150s	6.5…10V	U5	U5 2…10V	P-10058	NO	manual
A59	150s	0.5…6V	U5	U5 2…10V	P-10059	NO	manual
A60	300s	2…10V	U5	U5 2…10V	P-10060	NO	manual
A61	150s	10…20V	U5	U5 2…10V	P-10061	NO	manual
A62	90s	2…10V	U5	U5 2…10V	P-10062	NO	manual
A63	150s	0.5…4.5V	U5	U5 0.5…4.5V	P-10063	NO	manual
A64	150s	5.5…10V	U5	U5 5.5…10V	P-10064	NO	manual
A65	150s	1…5V	U5	U5 1…5V	P-10065	NO	manual

Programmable Code	Running Time	Control Range	Feedback	Feedback Range	Obsolete Code	MP Bus Logo	Adaption
A66	150s	2…10V	U5	U5 1…5V	P-10066	NO	manual
A67	150s	2…8V	U5	U5 2…10V	P-10067	NO	manual
A68	150s	2…13V	U5	U5 2…10V	P-10068	NO	manual
A69	150s	1..4V	U5	U5 2…10V	P-10069	NO	manual
A70	150s	3.5…10V	U5	U5 2…10V	P-10070	NO	manual
A71	150s	2…15V	U5	U5 2…10V	P-10071	NO	manual
A72	95s	2…10V	U5	U5 2…10V	P-10072	NO	manual
A73	150s	6…18V	U5	U5 2…10V	P-10073	NO	manual
A74	150s	2…10V	U5	U5 2…10V	P-10074	NO	manual
A76	150s	0.5…3V	U5	U5 0.5…10V	P-10076	NO	manual
A77	76s	0.5…10V	U5	U5 0.5…10V	P-10077	NO	manual
A78	150s	2…10V	U5	U5 0.5…10V	P-10078	NO	manual
A79	150s	0.5…10V	U5	U5 0.5…5V	P-10079	NO	manual
A80	150s	0.5…3.5	U5	U5 2…10V	P-10080	NO	manual
A81	150s	4.5…10	U5	U5 2…10V	P-10081	NO	manual
A82	150s	3…10V	U5	U5 2…10V	P-10082	NO	manual
A83	150s	5…15V	U5	U5 2…10V	P-10083	NO	manual
A84	150s	13…20V	U5	U5 2…10V	P-10084	NO	manual
A85	150s	2…10V	U5	U5 2…10V	P-10085	NO	manual
A86	150s	5…10.5		U5 2…10V	P-10086	NO	manual
A88	150s	2…10V	U5	U5 2…10V	P-10088	NO	manual
A89	150s	12.5…22V	U5	U5 2…10V	P-10089	NO	manual
A90	150s	2…5V	U5	U5 2…5V	P-10090	NO	manual
A91	95s	2…10V	U5	U5 2…10V	P-10091	NO	manual
A92	150s	0.5…15V	U5	U5 0.5…10V	P-10092	NO	manual
A93	150s	2…10V	U5	U5 2…10V	P-10093	NO	manual
A94	85s	2…10V	U5	U5 2…10V	P-10094	NO	manual
A95	150s	0.5…5V	U5	U5 0.5…5V	P-10095	NO	manual
A96	150s	0.5…10V	U5	U5 2…10V	P-10096	NO	manual
A97	150s	5.25…7.25	U5	U5 2…10V	P-10097	NO	manual
A98	150s	2…10V	U5	U5 2…10V	P-10098	NO	auto-synch.
A99	150s	2…10V	U5	U5 2…10V	P-10099	NO	manual
AA0	150s	0.5…12.85	U5	U5 2…10V	P-10100	NO	manual
AA1	150s	3…15V	U5	U5 2…10V	P-10101	NO	manual
AA2	150s	0.5…14V	U5	U5 2…10V	P-10102	NO	manual
AA4	150s	0.5…22V	U5	U5 2…10V	P-10104	NO	manual
AA5	150s	0.5…4V	U5	U5 0.5…5V	P-10105	NO	manual
AA6	150s	6…10V	U5	U5 0.5…5V	P-10106	NO	manual
AA7	150s	2…7V	U5	U5 2…10V	P-10107	NO	manual
AA8	150s	4…10V	U5	U5 2…10V	P-10108	NO	manual
AA9					P-10109		
AAA	150s	2…22V	U5	U5 2…10V	P-10110	NO	manual
AAB	150s	0.5…20V	U5	U5 0.5…10V	P-10111	NO	manual
AAC	150s	0.5….29V	U5	U5 2…10V	P-10112	NO	manual
AAD	100s	0.5…4.5V	U5	U5 0.5…4.5V	P-10113	NO	manual
AAE	100s	5.5…10V	U5	U5 5.5…10V	P-10114	NO	manual
AAF	150s	0.5…28V	U5	U5 2…10V	P-10115	NO	manual
AAG	75s	0.5…10V	U5	U5 2…10V	P-10116	NO	auto-adapt.
AAH	150s	0.5…10V	U5	U5 4…5V	P-10117	NO	auto-adapt.
AAJ	100s	2…6V	U5	U5 2…10V	P-10118	NO	auto-adapt.
AAK	100s	6…10V	U5	U5 2…10V	P-10119	NO	manual
AAL	150s	8…20V	U5	U5 2…10V	P-10120	NO	manual
AAM	120s	0.5…10V	U5	U5 2…10V	P-10121	NO	auto-synch.
AAN	100s	0.5…10V	U5	U5 2…10V	P-10122	NO	manual
AAP	150s	2…10V	U5	U5 2…10V	P-10123	NO	manual
AAR	150s	2…10V	U5	U5 2…10V	P-10124	NO	auto-adapt.
AAS	150s	2…10V	U5	U5 2…10V	P-10125	NO	manual
AAT	20s	2…10V	U5	U5 2…10V	---	NO	manual
AAU	100s	6…9V	U5	U5 2…10V	---	NO	manual
AAV	150s	1.2…6V	U5	U5 2…10V	---	NO	manual
AAW							
AAX	35s	2…10V	U5	U5 2…10V	P-10130	NO	manual
AC0	45s	2…10V	U5	U5 2…10V	P-10131	NO	manual

Multi-Function Technology®

MFT VDC Proportional Control Program Codes

BELIMO®

Programmable Code	Running Time	Control Range	Feedback	Feedback Range	Obsolete Code	MP Bus Logo	Adaption
AC1	90s	2…10V	U5	U5 2...10V	P-10132	NO	manual
AC2	150s	0.5…10V	U5	U5 0.5…10V	---	NO	manual
000	150s	2…10V	U5	U5 2...10V	---	YES	manual
AC4	150s	0.5…10V	U5	U5 0.5…10V	---	YES	manual
AC5	75s	2…10V	U5	U5 2...10V	P-10133	NO	manual
AC6	450s	2…10V	U5	U5 2...10V	P-10134	NO	manual
AC7	150s	…	U5	U5 2...10V	---	NO	manual
AC8	35s	0.5…10V	U5	U5 0.5…10V	---	NO	manual
AC9	45s	0.5…10V	U5	U5 0.5…10V	---	NO	manual
ACA	90s	0.5…10V	U5	U5 0.5…10V	---	NO	manual
ACX	150s	2…10V	U5	U5 0.5…10V		NO	manual
AD0	100s	0.5...5V	U5	U5 2...10V	P-10135	NO	manual
AD1	100s	5…10V	U5	U5 2...10V	P-10136	NO	manual
AD2	90s	2…10V	U5	U5 2...10V	---	NO	auto-adapt.
AD3	35s	2…10V	U5	U5 2...10V	---	NO	auto-adapt.
AD4	150s	2…10V	U5	U5 2...10V	---	NO	manual
AD5	100s	2...5V	U5	U5 2...10V	P-10137	NO	manual
AD6							
AD7	100s	0.5...5V	U5	U5 2...10V	P-10140	NO	manual
AD8							
AD9							
ADA PICCV ONLY	100s	0.5...10V	U5	U5 0.5…10V	---	NO	manual
ADC							
ADD	150s	9…13V	U5	U5 2...10V	---	NO	manual
ADE							
ADF							
ADG							
ADH							
ADJ							
ADK							
ADL							
ADM							
ADN							
ADP							
ADR							
ADS							
ADT							
ADU							
ADV							
ADW	70s	2...10V	US	US 2...10V	---	NO	manual
ADX	40s	2...10V	US	US 2...10V	---	NO	manual
AE0							
AE1							
AE2							
AE3							

Programmable Code	Running Time	Control Range	Feedback	Feedback Range	Obsolete Code	MP Bus Logo	Adaption
AE4							
AE5							
AE6							
AE7							
AE8							
AE9							
AEA	120s	0.5…10V	U5	U5 0.5…10V	---	NO	manual
AEC	75s	0.5…10V	U5	U5 0.5…10V	---	NO	manual
AED	300s	0.5…10V	U5	U5 0.5…10V	---	NO	manual
AEE	450s	0.5…10V	U5	U5 0.5…10V	---	NO	manual
AEF							
AEG							
AEH							
AEJ							
AEK							
AEL							
AEM							
AEN							
AEP							
AER							
AES							
AET							
AEU							
AEV							
AEW							
AEX							
AF0							

Multi-Function Technology®

MFT 95 (Honeywell Series 90, 0-135Ω) Program Codes

BELIMO

Programmable Code	Running Time	Control Range	Feedback	Feedback Range	Obsolete Code	MP Bus Logo	Adaption
R01	150s	0…135 Ohm	U5	U5 2…10V	P-16001	NO	manual
R02	150s	0…135 Ohm	U5	U5 0.5…10V	P-16002	NO	manual
R03	150s	0…135 Ohm	U5	U5 0.5…5V	P-16003	NO	manual
R04	75s	0…135 Ohm	U5	U5 2…10V	P-16004	NO	manual
R05	100s	0…135 Ohm	U5	U5 0.5…10V	P-16028	NO	manual
R06					P-16029		
R07	35s	0…135 Ohm	U5	U5 2…10V		NO	manual
R08	45s	0…135 Ohm	U5	U5 2…10V		NO	manual
R09	90s	0…135 Ohm	U5	U5 2…10V		NO	manual
R0A	37s	0…135 Ohm	U5	U5 2…10V		NO	manual
R0C							
R0D							
R0E							
R0F							
R0G							
R0H							
R0J							
R0K							
R0L							
R0M							
R0N							
R0P							
R0R							
R0S							
R0T							
R0U							
R0V							
R0W							
R0X							
R10							
R11							

Programmable Code	Running Time	Control Range	Feedback	Feedback Range	Obsolete Code	MP Bus Logo	Adaption
W01	150s	0.59…2.93s	U5	U5 2…10V	P-20001	NO	manual
W02	150s	0.02…5s	U5	U5 2…10V	P-20002	NO	manual
W03	150s	0.1…25.5s	U5	U5 2…10V	P-20003	NO	manual
W04	150s	0.1…25.6s	U5	U5 2…10V	P-20004	NO	manual
W05	150s	0.1…5.2s	U5	U5 0.5…5V	P-20005	NO	manual
W06	150s	0.59…2.93s	U5	U5 0.5…10V	P-20006	NO	manual
W07	150s	0.02…5s	U5	U5 0.5…5V	P-20007	NO	manual
W08	150s	0.1…10s	U5	U5 2…10V	P-20008	NO	manual
W09	150s	1…11s	U5	U5 2…10V	P-20009	NO	manual
W10	150s	0.02…5s	U5	U5 2…10V	P-20010	NO	manual
W11	150s	0.02…5.6s	U5	U5 2…10V	P-20011	NO	manual
W12	150s	0.5…25.5s	U5	U5 2…10V	P-20012	NO	manual
W13	150s	0.5…2.93s	U5	U5 2…10V	P-20013	NO	manual
W14	150s	0.1…10s	U5	U5 2…10V	P-20014	NO	manual
W15	150s	1…11s	U5	U5 2…10V	P-20015	NO	manual
W16	150s	0.02…5s	U5	U5 2…10V	P-20016	NO	auto-adapt.
W17	150s	0.02…5.6s	U5	U5 2…10V	P-20017	NO	auto-adapt.
W18	150s	0.1…25.5s	U5	U5 2…10V	P-20018	NO	auto-adapt.
W19	150s	0.02…2.5s	U5	U5 2…10V	P-20019	NO	manual
W20	150s	2.7…5s	U5	U5 2…10V	P-20020	NO	manual
W21	150s	0.1…5.2s	U5	U5 2…10V	P-20021	NO	manual
W22	150s	0.1…12.85s	U5	U5 2…10V	P-20022	NO	manual
W23	150s	5.1…10.1s	U5	U5 2…10V	P-20023	NO	manual
W24	150s	0.59…1.76s	U5	U5 2…10V	P-20024	NO	manual
W25	150s	1.76…2.93s	U5	U5 2…10V	P-20025	NO	manual
W26	150s	0.02…12s	U5	U5 2…10V	P-20026	NO	manual
W27	150s	0.02…14s	U5	U5 2…10V	P-20027	NO	manual
W28	150s	12.5…22s	U5	U5 2…10V	P-20028	NO	manual
W29	150s	0.5…12.85s	U5	U5 2…10V	P-20029	NO	manual
W30	150s	0.1…24s	U5	U5 2…10V	P-20030	NO	manual
W31	100s	0.02…5s	U5	U5 Ω2…10V	P-20031	NO	off
W32	100s	0.1…25.5	U5	U5 2…10V	P-20032	NO	off
W33	150s	0.2…25.5	U5	U5 2…10V	P-20033	NO	manual
W34	100s	0.59…2.93s	U5	U5 2…10V	P-20034	NO	off
W35	150s	5.5…9.5s	U5	U5 2…10V	P-20035	NO	manual
W36	150s	0.5…4.5s	U5	U5 2…10V	P-20036	NO	manual
W37	150s	0.1…5.2s	U5	U5 0.5…10V	P-20037	NO	manual
W38	150s	0.02…6s	U5	U5 2…10V	P-20038	NO	manual
W39	150s	0.59…2.93s	U5	U5 2…10V	P-20039	NO	auto-adapt.
W3A	150s	0.5…5.0s	U5	U5 2…10V	P-20040	NO	auto-adapt.
W3C	150s	0.1…25.5s	U5	U5 2...10V	---	NO	manual
W3D	150s	0.2...5.2s	U5	U5 2...10V	P-20041	NO	manual
W3E							
W3F							
W3G							
W3H							
W3J							
W3K							
W3L							
W3M							
W3N							
W3P							
W3R							
W3S							
W3T							
W3U							
W3V							
W3W							
W3X							
W40							
W41							

Multi-Function Technology®

MFT Floating Point Program Codes

BELIMO®

Programmable Code	Running Time	Control Range	Feedback	Feedback Range	Obsolete Code	MP Bus Logo	Adaption
F01	150s	---	U5	U5 2…10V	P-30001	NO	manual
F02	150s	---	U5	U5 0.5…10V	P-30002	NO	manual
F03	100s	---	U5	U5 2…10V	P-30003	NO	manual
F04	100s	---	U5	U5 0.5…5V	P-30004	NO	manual
F05	100s	---	U5	U5 0.5…10V	P-30005	NO	manual
F06	150s	---	U5	U5 0.5…5V	P-30006	NO	manual
F07	300s	---	U5	U5 2…10V	P-30007	NO	manual
F08	75s	---	U5	U5 2…10V	P-30008	NO	manual
F09	85s	---	U5	U5 2…10V	P-30009	NO	manual
F10	150s	---	U5	U5 0.5…6V	P-30010	NO	manual
F11	75s	---	U5	U5 0.5…5V	P-30011	NO	manual
F13	120s	---	U5	U5 0.5…10V	P-30013	NO	manual
F14	90s	---	U5	U5 2…10V	P-30014	NO	manual
F15	150s	---	U5	U5 0.5…4.5V	P-30015	NO	manual
F16	150s	---	U5	U5 1…5V	P-30016	NO	manual
F17	90s	---	U5	U5 1…10V	P-30017	NO	manual
F18	60s	---	U5	U5 2…10V	---	NO	manual
F19	45s	---	U5	U5 2…10V	---	NO	manual
F1A	35s	---	U5	U5 2…10V	---	NO	manual
F1C							
F1D							
F1E							
F1F							
F1G	120s	---	U5	U5 2...10V	---	NO	manual
F1H	450s	---	U5	U5 2...10V	---	NO	manual
F1J							
F1K							
F1L							
F1M							
F1N							
F1P							
F1R							
F1S							
F1T							
F1U							
F1V							
F1W							
F1X							
F20							
F21							

Programmable Code	Running Time	Control Range	Feedback	Feedback Range	Obsolete Code	MP Bus Logo	Adaption
J01	75s	---	U5	U5 2…10V	P-40001	NO	manual
J02	150s	---	U5	U5 2…10V	P-40002	NO	manual
J03	75s	---	U5	U5 2…10V	P-40003	NO	manual
J04	100s	---	U5	U5 0.5…5V	P-40004	NO	manual
J05	100s	---	U5	U5 0.5…10V	P-40005	NO	manual
J06	120s	---	U5	U5 2…10V	P-40006	NO	manual
J07	45s	---	U5	U5 2…10V	P-40007	NO	manual
J08	200s	---	U5	U5 2…10V	P-40008	NO	manual
J09	120s	---	U5	U5 0.5…10V	P-40009	NO	manual
J10	300s	---	U5	U5 2…10V	P-40010	NO	manual
J11	150s	---	U5	U5 0.5…10V	P-40011	NO	manual
J13	100s	---	U5	U5 0.5…5V	P-40012	NO	manual (off)
J14							
J15							
J16							
J17							
J18							
J19							
J1A							
J1C							
J1D							
J1E							
J1F							
J1G							
J1H							
J1J							
J1K							
J1L							
J1M							
J1N							
J1P							
J1R							
J1S							
J1T							
J1U							
J1V							
J1W							
J1X							
J20							
J21							

Multi-Function Technology®
MFT Quick Actuators Proportional Control Program Codes

BELIMO

Programmable Code	Running Time	Control Range	Feedback	Feedback Range	Obsolete Code	MP Bus Logo	Adaption
T01	2.5s	2…10V	U5	U5 2...10V	---	NO	manual
T02	4s	2…10V	U5	U5 2...10V	---	NO	manual
T03	7s	2…10V	U5	U5 2...10V	---	NO	manual
T04	10s	2…10V	U5	U5 2...10V	---	NO	manual
T05	15s	2…10V	U5	U5 2...10V	---	NO	manual
T06	20s	2…10V	U5	U5 2...10V	---	NO	manual
T07	2.5s	0.5…10V	U5	U5 0.5...10V	---	NO	manual
T08	4s	0.5…10V	U5	U5 0.5...10V	---	NO	manual
T09	7s	0.5…10V	U5	U5 0.5...10V	---	NO	manual
T0A	10s	0.5…10V	U5	U5 0.5...10V	---	NO	manual
T0C	15s	0.5…10V	U5	U5 0.5...10V	---	NO	manual
T0D	20s	0.5…10V	U5	U5 0.5...10V	---	NO	manual
T0E							
T0F							
T0G							
T0H							
T0J							
T0K							
T0L							
T0M							
T0N							
T0P							
T0R							
T0S							
T0T							
T0U							
T0V							
T0W							
T0X							
T10							
T11							

Programmable Code	Running Time	Control Range	Feedback	Feedback Range	Obsolete Code	MP Bus Logo	Adaption
S01	150s	Phasecut	U5	U5 2…10V		NO	manual
S02	35s	Phasecut	U5	U5 2…10V		NO	manual
S03	45s	Phasecut	U5	U5 2…10V		NO	manual
S04	90s	Phasecut	U5	U5 2…10V		NO	manual
S05							
S06	150s	4…20mA	U5	U5 2…10V		NO	manual
S07							
S08	45s	4…20mA	U5	U5 2…10V		NO	manual
S09	90s	4…20mA	U5	U5 2…10V		NO	manual
S0A							
S0C	75s	4…20mA	U5	U5 2…10V		NO	manual
S0D	75s	Phasecut	U5	U5 2…10V		NO	manual
S0E							
S0F							
S0G							
S0H							
S0J							
S0K							
S0L							
S0M							
S0N							
S0P							
S0R							
S0S							
S0T							
S0U							
S0V							
S0W							
S0X							
S10							
S11							

Multi-Function Technology®

MFT NV/NVF Proportional Control Program Codes

Programmable Code	Running Time	Control Range	Feedback	Feedback Range	Obsolete Code	MP Bus Logo	Adaption
N01	150s	2…10V	U5	U5 2...10V	V-10001	NO	manual
N02	150s	0.5…10V	U5	U5 0.5…10V	V-10002	NO	manual
N03	150s	2…10V	U5	U5 0.5…5V	V-10003	NO	manual
N04	150s	4…7V	U5	U5 2...10V	V-10004	NO	manual
N05	150s	6…9V	U5	U5 2...10V	V-10005	NO	manual
N06	150s	10.5…13.5V	U5	U5 2...10V	V-10006	NO	manual
N07	150s	0.5…5V	U5	U5 2...10V	V-10007	NO	manual
N08	150s	0.5…5V	U5	U5 0.5…10V	V-10008	NO	manual
N09	150s	5…10V	U5	U5 2...10V	V-10009	NO	manual
N10	150s	5…10V	U5	U5 0.5…10V	V-10010	NO	manual
N11	150s	0.5…5V	U5	U5 0.5…5V	V-10011	NO	manual
N12	150s	0.5…5V	U5	U5 0.5…2.5V	V-10012	NO	manual
N13	150s	0.5…10V	U5	U5 2...10V	V-10013	NO	manual
N14	150s	0.5…10V	U5	U5 0.5…2.5V	V-10014	NO	manual
N15	150s	2…5V	U5	U5 2...10V	V-10015	NO	manual
N16	150s	2…6V	U5	U5 2...10V	V-10016	NO	manual
N17	150s	6…10V	U5	U5 2...10V	V-10017	NO	manual
N18	150s	14…17V	U5	U5 2...10V	V-10018	NO	manual
N19	100s	2…10V	U5	U5 2...10V	V-10019	NO	manual
N1A	150s	5.1…10V	U5	U5 5.1...10V	V-10023	NO	manual
N1C	75s	2…10V	U5	U5 2...10V	V-10025	NO	manual
N1D	150s	5…9V	U5	U5 2...10V	V-10027	NO	manual
N1E	100s	0.5…10V	U5	U5 0.5…10V	V-10028	NO	manual
N1F	150s	3…6V	U5	U5 2...10V	V-10041	NO	manual
N1G	150s	0.5…2.5V	U5	U5 2...10V	V-10043	NO	manual
N1H	150s	7…10V	U5	U5 2...10V	V-10044	NO	manual
N1J	150s	0.5…20V	U5	U5 2...10V	V-10047	NO	manual
N1K	150s	0.5…4.5V	U5	U5 0.5…4.5V	V-10063	NO	manual
N1L	150s	5.5…10V	U5	U5 5.5…10V	V-10064	NO	manual
N1M	150s	2…15V	U5	U5 2...10V	V-10071	NO	manual
N1N	76s	0.5…10V	U5	U5 0.5…10V	V-10077	NO	manual
N1P	75s	2…6V	U5	U5 2...10V	V-10078	NO	manual
N1R	75s	6…10V	U5	U5 2...10V	V-10079	NO	manual
N1S	150s	3…7V	U5	U5 2...10V	V-10082		manual
N1T	150s	0.59…2.93s	U5	U5 2...10V	V-20001	NO	manual
N1U	150s	0.02…5s	U5	U5 2...10V	V-20002	NO	manual
N1V	150s	0.1…25.5s	U5	U5 2...10V	V-20003	NO	manual
N1W	150s	0.1…25.6s	U5	U5 2...10V	V-20004	NO	manual
N1X	150s	0.1…5.2s	U5	U5 0.5…5V	V-20005	NO	manual
N20	150s	0.59…2.93s	U5	U5 0.5…5V	V-20006	NO	manual
N21	150s	0.02…5s	U5	U5 2...10V	V-20007	NO	manual
N22	150s	0.1…5.2s	U5	U5 2...10V	V-20021	NO	manual
N23	150s	0.5…4.5s	U5	U5 2...10V	V-20040	NO	manual
N24	150s	---	U5	U5 2...10V	V-30001	NO	manual
N25	150s	---	U5	U5 0.5…10V	V-30002	NO	manual
N26	150s	---	U5	U5 0.5…5V	V-30006	NO	manual
N27	75s	---	U5	U5 2...10V	V-30008	NO	manual
N28	75s	---	U5	U5 2...10V	V-40001	NO	manual
N29	150s	---	U5	U5 2...10V	V-40002	NO	manual
N30	100s	---	U5	U5 0.5…5V	V-40004	NO	manual
N3A	100s	---	U5	U5 0.5…10V	V-40005	NO	manual

Programmable Code	Loss of Control Signal	Input Signal	Feedback	Output Signal
ACE	stop	2…10V	U5	U5 2...10V
ACF	stop	0.5…10V	U5	U5 0.5...10V
ACG	stop	4…20mA	U5	U5 4…20mA
ACH	stop	4…20mA	U5	U5 2...10V
ACJ	open	2…10V	U5	U5 2...10V
ACK	open	0.5…10V	U5	U5 0.5...10V
ACL	open	4…20mA	U5	U5 4…20mA
ACM	open	4…20mA	U5	U5 2...10V
ACN	close	2…10V	U5	U5 2...10V
ACP	close	0.5…10V	U5	U5 0.5...10V
ACR	close	4…20mA	U5	U5 4…20mA
ACS	close	4…20mA	U5	U5 2...10V
W3E**	stop	0.02-5.00 seconds PWM	U5	U5 2...10V

Note: Runtime is fixed based on actuator model.
**Available only on -24MFT models.