

ACTUATORS & DAMPERS

DIRECT COUPLED ACTUATORS SPRING RETURN

TFB, LF, NFB, AFB, EFB SERIES

ACTUATORS & DAMPERS

1

DESCRIPTION

The Belimo TFB, LF, NFB, AFB, and EFB Series direct coupled actuators provide control of dampers and valves for spring return applications. They come in two-position, tri-state, proportional, and Multi-Function Technology (MFT) models. All include a spring return to drive the damper or valve to a "normal" position when power is lost. Unique universal power supply models work with 24 to 240 VAC or 24 to 125 VDC. The new EFB Series is true spring return with a high 270 in-lb torque output and most models are available with optional NEMA 4 housing. Dual-mount EF actuators on one shaft is possible for a total of 540 in-lb.

FEATURES

- Symmetrical, reversible rotation design for installation flexibility
- ISO 9001 manufacturing facility assures high quality
- NEMA 4 Enclosure Rating for outdoor locations available on AFB, EFB and NFB models
- Low power consumption for high efficiency and smaller transformer sizing
- MFT models offer flexibility to customize and adapt a single actuator to various controllers and applications

BELIMO



COMMON SPECIFICATIONS	
Input Impedance	
-SR Models	100 kΩ @ 0/2-10 VDC; 500Ω @ 4-20 mA
-MFT Models	100 kΩ @ 0/2-10 VDC; 500Ω @ 4-20 mA; 1500Ω @ PWM, float, on/off
Motor	Brushless DC
Manual Override	Manual crank (except TF)
Wiring	
TFB,LF	3' (0.9 m) cable, 18 AWG, plenum rated (modulating models) 3' (0.9 m) appliance cable (on/off, MFT, -S models)
NFB, AFB, EFB	3' (0.9 m) appliance cable, 18 AWG
NEMA 4	Terminal blocks inside housing
Conduit Connection	
w/Cables	1/2" NPT
NEMA 4	Four knockouts for waterproof conduit fittings
Feedback	2-10 VDC (-SR and -MFT models only)
Auxiliary Switch	
TFB, LF (-S)	1 SPDT, 3A @ 250V
NFB, AFB, EFB (-S)	2 SPDT, 3A @ 250V
Action	
2-Position	CW/CCW reversible mounting
Float/Prop.	DA/RA switch, CW/CCW rev. mt.
Spring Return Time	<60 seconds
Rotation	95°
Noise	
TFB, LF, NFB	<62 db
AFB	<45 db
EFB	<71.4 db
Resolution	100 steps
Life Expectancy	
2-Position	60,000 cycles
Float/Prop.	60,000 cycles; 500,000 repositions
Operating Temperature	-22° to 122°F (-30° to 50°C); NEMA 4 models with heater option can go down to -40°F (-40°C)
Operating Humidity	5 to 95% RH
Enclosure Rating	
TFB	NEMA 2 (IP42)
LF, NFB, AFB, EFB	NEMA 2 (IP54)
NEMA 4	NEMA 4 (IP66)
Approvals	cULus, CE, RoHS
Warranty	5 years

ACTUATORS & DAMPERS

DIRECT COUPLED ACTUATORS SPRING RETURN

TFB, LF, NFB, AFB, EFB SERIES



1

ACTUATORS & DAMPERS

INDIVIDUAL SPECIFICATIONS						
Model	Torque	Supply Voltage	Supply VA	Control Signal	Feedback	Drive Time
TFB24	22 in-lb (2.5 Nm)	24 VAC $\pm 20\%$ 50/60 Hz, 24 VDC $\pm 10\%$	5.0 VA	Two-position		75 seconds
TFB120	22 in-lb (2.5 Nm)	120 VAC 50/60 Hz	5.0 VA	Two-position		75 seconds
TFB24-3	22 in-lb (2.5 Nm)	24 VAC $\pm 20\%$ 50/60 Hz, 24 VDC $\pm 10\%$	4.0 VA	Floating		95 seconds
TFB24-SR	22 in-lb (2.5 Nm)	24 VAC $\pm 20\%$ 50/60 Hz, 24 VDC $\pm 10\%$	4.0 VA	Prop. 2-10 VDC, 4-20 mA	2-10 VDC	95 seconds
TFB24-MFT	22 in-lb (2.5 Nm)	24 VAC $\pm 20\%$ 50/60 Hz, 24 VDC $\pm 10\%$	4.0 VA	Prop. (default 2-10 VDC)	2-10 VDC	150 seconds
LF24	35 in-lb (4 Nm)	24 VAC $\pm 20\%$ 50/60 Hz, 24 VDC $\pm 10\%$	7.0 VA	Two-position		40-75 seconds
LF120	35 in-lb (4 Nm)	120 VAC 50/60 Hz	7.5 VA	Two-position		40-75 seconds
LF24-3	35 in-lb (4 Nm)	24 VAC $\pm 20\%$ 50/60 Hz, 24 VDC $\pm 10\%$	5.0 VA	Floating		150 seconds
LF24-SR	35 in-lb (4 Nm)	24 VAC $\pm 20\%$ 50/60 Hz, 24 VDC $\pm 10\%$	5.0 VA	Prop. 2-10 VDC, 4-20 mA	2-10 VDC	150 seconds
LF24-MFT	35 in-lb (4 Nm)	24 VAC $\pm 20\%$ 50/60 Hz, 24 VDC $\pm 10\%$	5.0 VA	Prop. (default 2-10 VDC)	2-10 VDC	150 seconds
NFB24	90 in-lb (10 Nm)	24 VAC $\pm 20\%$ 50/60 Hz, 24 VDC $\pm 10\%$	8.5 VA	Two-position		75 seconds
NFBUP	90 in-lb (10 Nm)	24-240 VAC, 24-125 VDC	6.5 VA @ 120 VAC	Two-position		75 seconds
NFB24-SR	90 in-lb (10 Nm)	24 VAC $\pm 20\%$ 50/60 Hz, 24 VDC $\pm 10\%$	6.0 VA	Prop. 2-10 VDC, 4-20 mA	2-10 VDC	95 seconds
NFB24-MFT	90 in-lb (10 Nm)	24 VAC $\pm 20\%$ 50/60 Hz, 24 VDC $\pm 10\%$	9.0 VA	Prop. (default 2-10 VDC)	2-10 VDC	150 seconds
AFBUP	180 in-lb (20 Nm)	24-240 VAC, 24-125 VDC	8.5 VA @ 120 VAC	Two-position		75 seconds
AFB24-MFT	180 in-lb (20 Nm)	24 VAC $\pm 20\%$ 50/60 Hz, 24 VDC $\pm 10\%$	10 VA	Prop. (default 2-10 VDC)	2-10 VDC	150 seconds
AFB24-MFT95	180 in-lb (20 Nm)	24 VAC $\pm 20\%$ 50/60 Hz, 24 VDC $\pm 10\%$	10 VA	Prop. (default 0-135 ohms)	2-10 VDC	150 seconds
EFB24	270 in-lb (30 Nm)	24 VAC $\pm 20\%$ 50/60 Hz, 24 VDC $+20\%/-10\%$	16 VA	Two-position		75 seconds
EFB120	270 in-lb (30 Nm)	100-240 VAC $+10\%/-20\%$ 50/60 Hz	21 VA	Two-position		75 seconds
EFB24-SR	270 in-lb (30 Nm)	24 VAC $\pm 20\%$ 50/60 Hz, 24 VDC $+20\%/-10\%$	14 VA	Prop. 2-10 VDC, 4-20 mA	2-10 VDC	95 seconds
EFB24-MFT	270 in-lb (30 Nm)	24 VAC $\pm 20\%$ 50/60 Hz, 24 VDC $+20\%/-10\%$	16 VA	Prop. (default 2-10 VDC)	2-10 VDC	150 seconds

For models not shown please contact Kele for more information.

NOTE: MFT Models available in Proportional, PWM, Floating, or 2-Pos configuration
Select code from **MFT Selection Chart**

ACTUATORS & DAMPERS

DIRECT COUPLED ACTUATORS SPRING RETURN

TFB, LF, NFB, AFB, EFB SERIES

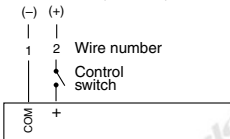
ACTUATORS & DAMPERS

DIMENSIONS

Model	Dimensions	Maximum Shaft Diameter	Minimum Shaft Length	Weight
TFB	3.3"H x 3.0"W x 6.3"L (8.4 x 7.6 x 15.9 cm)	0.5" (1.3 cm)	3.5" (8.9 cm)	1.4 lb (0.64 Kg)
LF	3.2"H x 3.9"W x 7.7"L (8.1 x 9.8 x 19.5 cm)	0.5" (1.3 cm)	3.5" (8.9 cm)	3.4 lb (1.5 Kg)
NFB	3.4"H x 3.9"W x 9.7"L (8.7 x 9.8 x 24.6 cm)	1.05" (2.7 cm)	3.5" (8.9 cm)	4.1 lb (1.8 Kg)
AFB	3.4"H x 3.9"W x 9.7"L (8.7 x 9.8 x 24.6 cm)	1.05" (2.7 cm)	3.5" (8.9 cm)	4.2 lb (1.9 Kg)
EFB	4.7"H x 5.4"W x 13.1"L (12.1 x 13.8 x 33.3 cm)	1.05" (2.7 cm)	3.5" (8.9 cm)	9.8 lb (4.5 kg)

WIRING

24 VAC/VDC or (120 VAC)

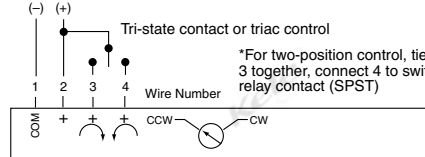


Parallel connection of several actuators is possible.

TFB24, AFB24, NFB24, LF24, EFB24
TFB120, LF120, NF120, AF120, EFB120
Two-position

(See Note 1)

24 VAC/VDC



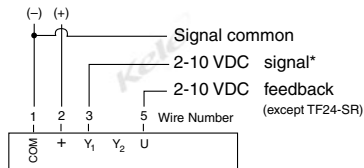
*For two-position control, tie 2 and 3 together, connect 4 to switch or relay contact (SPST)

For each direction of rotation left or right selection switch, arrows on actuator show rotation selected.

TFB24-3, LF24-3

Tri-state (may also be wired two-position)

24 VAC/VDC



Parallel connection of up to four motors is possible. Power consumption and polarity must be observed.

TFB24-SR, NFB24-SR, LF24-SR, EFB24-SR
2-10 VDC

*4-20 mA signal with 500Ω resistor across terminals 1 and 3.

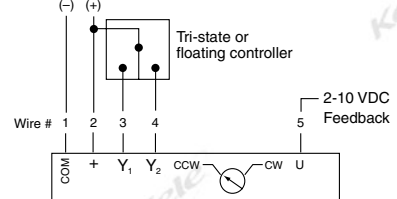
Note 1: See new Belimo NFB//AFB/EFB literature for complete wiring information on those models.

MFT Selection Chart

Code	Signal	Feedback
A01	2-10 VDC (proportional)	2-10 VDC
A02	0-10 VDC (proportional)	0-10 VDC
A07	0-5 VDC (proportional)	2-10 VDC
A09	5-10 VDC (proportional)	2-10 VDC
A16	2-6 VDC (proportional)	2-10 VDC
A17	6-10 VDC (proportional)	2-10 VDC
W01	PWM 0.59 - 2.95 sec	2-10 VDC
W02	PWM 0.02 - 5.00 sec	2-10 VDC
F01	Floating	2-10 VDC
J2	Two-position	2-10 VDC

MFT Function Codes

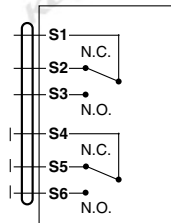
24 VAC/VDC



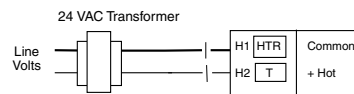
MFT Code = F01 (Pre-programmed at Kele)

NFB24-MFT, AFB24-MFT, EFB24-MFT
Tri-state

(See Note 1)



Auxiliary Switch Wiring
3 A @ 250V maximum load



Heater Wiring - NEMA 4
models with heater

ACTUATORS & DAMPERS

DIRECT COUPLED ACTUATORS SPRING RETURN

TFB, LF, NFB, AFB, EFB SERIES



1

ACTUATORS & DAMPERS

ORDERING INFORMATION

ORDERING INFORMATION	
MODEL	TORQUE
EFB	270 in-lbs (30 Nm)
AFB	180 in-lbs (20 Nm)
NFB	90 in-lbs (10 Nm)
LF	35 in-lbs (4 Nm)
TFB	22 in-lbs (2.5 Nm)
POWER SUPPLY	
24	24 VAC/DC
120	120 VAC*
230	230 VAC
UP	24 to 240 VAC or 24 to 125 VDC **
CONTROL TYPE	
Blank	On/Off
-SR	2-10 VDC
-3	Floating Point (LF and TFB only)
-MFT	Multifunction***
-MFT95	0 to 135K ohm (AFB models only)
-MFT-20	6 to 9 VDC, 20 VDC Power Supply (LF models only)
OPTIONAL AUXILIARY	
-S	Built In Auxiliary
NEMA OPTION	
-N4	NEMA 4 Rated****
-N4H	NEMA 4 Rated w/Internal Heater****

EFB 24 -SR -S -N4 Example: EFB24-SR-S-N4

* EFB, LF and TFB Models only. Use UP option for AFB and NFB to get 120 VAC.
EFB and TFB models have 100 to 240 Nominal Power Supply

** Only available on AFB and NFB models

*** MFT option can be Proportional (default), PWM, Floating/Tri-State, or 2-Pos.
Select proper code from MFT Selection Chart. See Note 3 below for more information

**** Only available on certain AFB, EFB, NFB models

NOTES: 1) All functions and options are not available with all versions

2) Most models available with internal auxiliary switches; order with -S suffix (N4 models are shown with -S included).

3) MFT models can be ordered pre-configured at Kele if other than default configuration is needed; add -C suffix and specify custom configuration parameters or MFT code.

ACCESSORIES

AV6-20	Shaft extension for 1/4" to 3/4" diameter shafts, 6.7" length, for LF/TF actuators
AV8-25	Shaft extension for 5/16" to 1" diameter shafts, 9.8" length, for LF, NFB, AFB actuators
KH-AFB	Crank arm for shafts to 3/4", for AFB/NFB actuators
KH-LF	Crank arm for shafts to 1/2", for LF actuators
ZG-100	Right angle mounting bracket for AFB/NFB and AMB/GMB actuators
ZG-102	Tandem actuator mounting bracket for AF/AFB/GMB actuators
ZG-112	Floor mount bracket, vertical, for LF actuators
ZG-113	Floor mount bracket for TF actuators
ZG-118	Channel mounting bracket for NFB/AFB actuators
ZG-JSL	Jackshaft linkage for AFB/NFB and AMB/NMB
ZG-R01	500Ω, 1/2W, 1% resistor