

How to select an actuator

The "10 questions" method for sizing and selection is recommended as the best method for your actuation requirements. Use the 'Application Data' column in this chart as a worksheet

to help in the selection process. This data, along with the 'Actuator Product Range' charts on pages 4 and 5, allow for the best selection of a Belimo actuator.

Criteria		Application Data
1 What is the total area of the damper?		sq. ft.
2 Opposed blade or Parallel blade control construction?	<p>L' x W" = Total sq inches/144 = total sq feet</p> <p>Opposed Blade w/o seals 3 in-lb/sq feet Opposed Blade w/ seals 5 in-lb/sq feet</p> <p>If unknown, use a worst case scenario, parallel blade with seals.</p> <p>Parallel Blade w/o seals 4 in-lb/sq feet Parallel Blade w/ seals 7 in-lb/sq feet</p>	<input type="checkbox"/> Opposed Blade <input type="checkbox"/> Parallel Blade
3 Are there blade and edge seals on the damper?	<p>This will impact the proper selection as the seals add resistance requiring more torque.</p>	<input type="checkbox"/> YES <input type="checkbox"/> NO
4 For the damper in question, what does the manufacturer specify as the torque rating?	<p>If this information is not available refer to the "typical damper requirements" chart.</p>	in-lb/sq. ft.
5 What is the air velocity, static pressure, or design CFM?	<p>Systems above 1,000 FPM require additional actuator torque</p>	_____ W.G. _____ CFM _____ FPM

Criteria		Application Data
6 Is fail-safe required?	<p>Consider the application. Is the actuator/damper exposed to outside air? Use spring return.</p>	<input type="checkbox"/> YES <input type="checkbox"/> NO
7 What is the supply voltage to the actuator?	<p>Do you need a step down transformer? If replacing an oil immersed gear train actuator, is the transformer in the defective actuator? You may need to purchase one.</p> <ul style="list-style-type: none"> • 24 VAC/DC • 120 VAC • 230 VAC single phase 	<input type="checkbox"/> 24 VAC <input type="checkbox"/> 120 VAC <input type="checkbox"/> 230 VAC
8 What is the control signal to the actuator?	<p>Controller</p> <ul style="list-style-type: none"> • Two position • Floating point • Modulating • Sequencing • "Non-standard" voltage signals <p>This will be a critical component to the damper selection of an actuator. Consider the ...MFT US actuator and the flexibility of its application.</p>	<input type="checkbox"/> On/Off <input type="checkbox"/> Floating Point <input type="checkbox"/> 2-10 VDC <input type="checkbox"/> 0-10 VDC <input type="checkbox"/> 4-20 mA <input type="checkbox"/> PWM _____ range
9 Can you direct couple to a damper shaft?	<p>Jackshaft mounted</p> <p>Direct coupling has become the industry standard. Some retrofit applications do not allow direct coupling. Refer to the Belimo Mounting Methods guide for application details.</p>	<input type="checkbox"/> YES <input type="checkbox"/> NO, see accessories page
10 Are there additional accessories required?	<p>Some applications require the addition of an auxiliary switch for proof of position; or a retrofit application may require an additional mounting bracket and linkage kit. You must identify these needs prior to leaving the job site or ordering products.</p>	<input type="checkbox"/> NO <input type="checkbox"/> YES, see accessories section or actuator series for details

Typical damper requirements and sizing

Damper with square shape: ft ² = h x w /144; (h= high, w= width)				
Damper Area (8 ft ²) x Rated Torque Loading of Damper (4 in-lb/ft ²) = Total in-lb Required (32 in-lb) <i>Belimo LF/LM 35 in-lb</i>				
SQUARE	Torque Loading in-lb/ft ²			
		< 1000 FPM	FPM	
	Damper Blade	2 inch water column	FPM	
	Parallel blade/edge seals	7	10.5	14
	Opposed blade/edge seals	5	7.5	10
	Parallel blade/no edge seals	4	6	8
Opposed blade/no edge seals	3	4.5	6	
Round	10	14	20	

Control signal overview:

Belimo actuators are compatible with many control inputs. There are many signals to select from with today's controllers.

What does 'on/off', 'open-close', '3-point', 'tri-state', 'floating point', 'proportional modulation', 'phase cut', 'PWM' or 'MFT' mean?

Belimo will help you understand more on this control signal jungle with a quick overview:

On/Off or Open-Close: The actuator is able to drive either to its full open position, or to its full closed position. The same indication is used for Spring return type actuators. However, the actuator will drive to its full open position and spring return to its zero position. This can also be reversed.

3-point, tri-state, floating point: The actuator has both clockwise (CW) and counter-clockwise (CCW) control inputs. One drives the actuator to its open, the other to its close position. If there is no signal (Null point) on either input the actuator simply stays in its last position.

Proportional control: The actuator drives proportional to its control input and modulates throughout its angle of rotation. This control type is usually a variation of VDC. Common values are:

0-10 VDC 2-10 VDC

It is common to also have a 0-20 mA output from a controller. This can be very easily converted to 0-10 VDC or 2-10 VDC with a 500 ohm resistor.

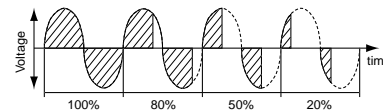
Pulse Width Modulation (PWM): The actuator drives to a specified position according to a pulse duration, the "length" of signal. The pulse can originate from a dry contact closure or a triac sink or source controller. An example of PWM control:

Time base: 0 to 10 seconds

Output pulse: 5 seconds

Actuator position: 50%

Phasecut: An actuator drives depending on the power result of a remaining wave. This signal type cuts the amplitude of the wave and the actuator recognizes this signal as a proportional movement.



Multifunctional Technology (MFT): This technology was developed by Belimo for incorporation into our damper and valve actuator. MFT provides the ability to program characteristics of the actuator. Some of the key characteristics to change are:

Control input: selectable On/Off, VDC, PWM or Floating point

Motion values: selectable Running time torque adjustment

Feedback: selectable feedback values

Replacement of discontinued Belimo products

When replacing an actuator, whether Belimo or other, be sure to consider the application parameters before selecting the replacement. The new product may not be the best fit for the application. An example would be an existing SM24-SR US mounted to a valve linkage. The direct replacement of the actuator is the AM24-MFT US. However, the SM... and AM... are different

lengths, the linkage would need to be replaced as well. When retrofitting or replacing actuators, it is always best to select the new product based on application parameters. This ensures the selected actuator is fit for the application. Never only use a part number cross-reference when replacing defective actuators.

Discontinued	Correct Replacement	Page	Discontinued	Correct Replacement	Page
Spring Return			Non-Spring Return		
Airside only					
AF24-3 US	AFR24-3 US	6	AM24-S US	AM24 US w/SA1 US or SA2 US	11
AF24-3-S US	AFR24-3-S US	6	AM24-PWM-A US	AM24-MFT US + P-20002	11
AF24-SR-S US	AF24-MFT-S US	6	AM24-PWM-B US	AM24-MFT US + P-20003	11
AF24-SR95 US	AF24-MFT95 US	6	AM24-PWM-C US	AM24-MFT US + P-20001	11
AF24-PWM US	AF24-MFT US + P-20...	6	AM24-SRS-A US	AM24-MFT US + P-10004	11
FM24 US	AFR24 US	6	AM24-SRS-B US	AM24-MFT US + P-10005	11
FM24-SR US	AFR24-SR US	6	AM24-SRS-C US	AM24-MFT US + P-10006	11
FM24-SR90 US	AF24-MFT95 US	6	KM24	LM24-3 US	13
FM24-SR95 US	AF24-MFT95 US	6	KM24-3	LM24-3 US	13
FS24	AF24 US	6	KM24-SL	LM24-SR-2.0 US	13
FS24-S	AF24-S US	6	KM24-SR	LM24-SR-2.0 US	13
LF24-SR-MP US	LF24-MFT-20 US	8	LM24-SR US	LM24-SR-2.0 US	13
LF24-SR-S-MP US	LF24-MFT-S-20 US	8	LM24-SR-T US	LM24-SR-T-2.0 US	13
SF120 US	AFR120 US	6	NM24-1 US	NM24 US	12
SF120-S US	AF120-S US	6	NM24 EU	NM24 US	12
SF24 US	AFR24 US	6	NM24-1/200 US	NM24 US	12
SF24-S US	AF24-S US	6	NM24-1/300 US	NM24 US	12
			NM24-SRS US	NM24-MFT US + P-10...	12
			NM24-PWM US	NM24-MFT US + P-20...	12
			NMV24-D US	NMV-D2M US, contact Belimo for support	
			NMV24-V US	NMV-D2M US, contact Belimo for support	
			SM24 US	AM24 US	11
			SM24-SR US	AM24-MFT US	11
			SM24-SRS US	AM24-MFT US + P-10...	11
			SM24-SR94 US	AM24-MFT95 US	11

Cross Reference

The following cross-reference list was as accurate as possible at the time of printing. It is meant as a guide ONLY. Please consult control company's literature and Belimo's individual data sheets for more specific product information.

The best replacement solution for non-direct coupled products is to replace the existing product with a direct coupled solution. If direct coupling is not possible, Belimo offers specific retrofit solutions or universal linkage solutions.

Many products listed are not 'direct' replacements based on

the product nomenclature, as in the case of non-direct coupled actuators where you may need additional add-on accessories, such as mounting brackets, crank-arms and ball joints. Actuators with built-in auxiliary equipment, such as switches or potentiometers, need to be evaluated for compatibility as well.

Belimo suggests to use the 10-step selection process, on page 22, in order to select the absolute best product for the application requirements.

On/Off Applications

		Siemens	Johnson Controls	Invensys (Siebe, Barber Colman)	Honeywell	Neptronics	See Page Number	Belimo List Price	
SPRING RETURN	35 in-lb (4 Nm)	LF24 US	GMA121.1U		MA40-7043	ML8175	8	\$ 250.00	
		LF24-S US	GMA126.1U		MA40-7043-501		8	\$ 300.00	
		LF120 US	GMA221.1U		MA40-7040		8	\$ 280.00	
		LF120-S US	GMA226.1U		MA40-7040-501		8	\$ 330.00	
		LF230 US			MA40-7041		8	\$ 310.00	
		LF230-S US			MA40-7041-501		8	\$ 360.00	
	60 in-lb (7 Nm)	NF24 US	GMA121.1U	M9206-BGA-2, M9206-AGA-2	MA40-7073, MA41-7073	ML8185A ML8185D	BBTS1060 BBT1060 A	7	\$ 270.00
		NF24-S US	GMA126.1U	M9206-BGC-2, M9206-AGC-2		ML8185C, ML8185F		7	\$ 340.00
		NF24-S2 US		M9206-BGC-2, M9206-AGC-2	MA40-7073-502, MA41-7073-502			7	\$ 345.00
		NF120 US	GMA221.1U		MA40-7070, MA41-7070		BBTHV1160 A	7	\$ 310.00
		NF120-S US	GMA226.1U		MA40-7070-502, MA41-7070-502		BBTHV1180 A	7	\$ 380.00
		NF230 US			MA40-7071, MA41-7071		BBTHV1260 A	7	\$ 360.00
	133 in-lb (15 Nm)	NF230-S US			MA40-7071-502, MA41-7071-502		BBTHV1280 A	7	\$ 430.00
		AF24 US	GCA121.1U	M9216-BGA-2 M9216-AGA-2	MA40-7153, MA41-7153, MA40-7173 MA305, MA318, MA5213	ML8195A	LDT3060 A TBT3060 A	6	\$ 375.00
		AF24-S US	GCA126.1U	M9216-BGC-2 M9216-AGC-2	MA40-7153-502, MA41-7153-502 MA318-500, MA5213-500 MMR500/MMC468	M8175 M8185C, M845 ML8195C	TBT3080 A	6	\$ 450.00
AF120 US		GCA221.1U	M9216-BAA-2	MA40-7170, MA40-7150, MA41-7050 MA405, MA418, MA5210, MA5330	M445, ML4195A ML4465A	LDTHV3360 A TBTHV3360 A	6	\$ 425.00	
AF120-S US		GCA226.1U	M9216-BAC-2	MA40-7150-502, MA41-7150-502 MA418-500, MA5210-500 MA5330-500	M4185 ML4195C	TBTHV3380 A	6	\$ 500.00	
AF230 US				MA40-7171, MA40-7151, MA41-7151			6	\$ 500.00	
AF230-S US				MA40-7151-502, MA41-7151-502			6	\$ 570.00	
AFR24 US							6	\$ 350.00	
AFR24-S US							6	\$ 425.00	
AFR120 US							6	\$ 400.00	
AFR120-S US						6	\$ 475.00		
70 in-lb (8 Nm)	FSNF24 US	GGD121.1U		MA318	ML8202, ML8302, ML8105A1006 ML8105B1005, ML8115A1005 ML8115B1004, MS8209F MS8309F		15	\$ 350.00	
	FSNF24-S US						15	\$ 420.00	
	FSNF120 US	GGD221.1U		MA418, MA220, MA230, MA240	ML4105A1000, ML4105B1009 ML4115A1009, ML4115B1008 ML4202, ML4302, MS4209F MS4309F		15	\$ 400.00	
	FSNF120-S US						15	\$ 470.00	
	FSNF230 US	GGD321.1U		MA-220	M4105C1008, ML4105D1007 ML4115C, ML4115D, ML4702 ML4802, MS4709F, MS4809F		15	\$ 412.00	
35 in-lb (4 Nm)	LM24 US		M9104-AGA-2N, M9106-AGA-2N01 M9106-AGA-2N02 M9106-AGA-2, M9106-IGA-2				13	\$ 150.00	
	LM24.1 US						13	\$ 140.00	
	LM24-T US		M9104-AGA-2N, M9106-AGA-2N01 M9106-AGA-2N02 M9106-AGA-2, M9106-IGA-2				13	\$ 114.00	
	LM24-T.1 US						13	\$ 100.00	
	LM24-S US		M9106-AGC-2, M9106-IGC-2	MF40-6043-502	ML6161B2019		13	\$ 190.00	
	LMC24 US (fast running)						13	\$ 160.00	
	LM24-10P US				MF40-6043-510		13	\$ 200.00	
	LM24-5PO-T US		M9106-AGF-2				13	\$ 170.00	
	LM24-5PO-T.1 US						13	\$ 160.00	
	NM24 US	GLB131.1P	M9108-AGA-2 M9108-AGC-2	MP381, MP382 MF40-6083	M644, ML6174 ML6464	BBTS1000 BBT1000 A	12	\$ 170.00	
	NM24.1 US						12	\$ 166.00	
	AM24 US	GBB171.1U	M9116-AGA-2, M9116-AGC-2 M9116-AGD-2, M9116-AGE-2	MF40-6153 MMR400/MMC468	M6184D, ML6184 ML6284	LDT3000 A TBT3000 A	11	\$ 250.00	
	AM24-S US	GEB131.1U	M9116-AGC-2				11	\$ 320.00	
SM24-S US (fast running)						11	\$ 320.00		
320 in-lb (36 Nm)	GM24 US	GIB171.1U	M9132-AGA-2, M9132-AGE-2 M9132-AGC-2, M9124-AGA-2 M9124-AGD-2, M9124-AGE-2 M9124-AGC-2	MC351, MC421 MP485 MF40-6343	M6191A, M6191B M6191C, M6194D	RBT5000 A	10	\$ 370.00	

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Modulating Applications

		Siemens	Johnson Controls	Invensys (Siebe, Barber Colman)	Honeywell	Neptronics	See Page Number	Belimo List Price
SPRING RETURN	Airside Products	LF24-SR US GMA161.1U	M9206-GGA-2	MS40-7043	ML7275	MDMS2060	8	\$ 350.00
		LF24-SR-E US			M8405A	MDMS2080	8	\$ 380.00
		LF24-SR-S US GMA166.1U	M9206-GGC-2	MS40-7043-501			8	\$ 400.00
		LF24-MFT US GMA163.1U					8	\$ 400.00
		LF24-MFT-S US					8	\$ 450.00
		LF24-MFT-20 US	M9206-GGA-2MP	MP-52..., MS40-7043			8	\$ 440.00
		LF24-MFT-S-20 US	M9206-GGC-2MP	MP-52...,5, MS40-7043-MP5			8	\$ 490.00
		LF24-3 US GMA131.1U	M9206-AGA-2	MF40-7043	ML6175, ML6275	MTDS1060	8	\$ 310.00
		LF24-3-S US GMA136.1U	M9206-AGC-2	MF40-7043-502		MTDS1080	8	\$ 360.00
		LFC24-3-R US					8	\$ 360.00
	LFC24-3-S US					8	\$ 410.00	
	NF24-SR US GMA161.1U	M9206-GGA-2	MS4X-7073	ML7285, ML7285A1007	BBMS2060	7	\$ 370.00	
	NF24-SR-S US		MS4X-7073-502		BBMS2080	7	\$ 440.00	
	NF24-MFT US GMA163.1U GMA131.1U GMA191.1U				BBTS1060, BBT1060 A BBM2060 A, BBM2080 A BBM2060 NA	7	\$ 450.00	
	NF24-MFT-S US GMA166.1U GMA136.1U GMA194.1U			ML7285D	BBTS1080 BT1080 A	7	\$ 520.00	
	AFR24-SR US					6	\$ 450.00	
	AF24-SR US GCA161.1U	M9216-GGA-2	MS40-7173, MS4X-7153 MP361, MP371, MP5230 MP5233, MP5430, MP5433	ML7295A, ML7474 ML7475A, ML8565A		6	\$ 475.00	
	AF24-PC US					6	\$ 580.00	
	AF24-MFT US GCA163.1U	M9216-HGA-2	MS-83053		LDM4060 A TBM4060 A, TBM4060 NA	6	\$ 525.00	
	AF24-MFT-S US GCA166.1U	M9216-GGC-2 M9216-HGC-2	MF4X-7073-502 MS4X-7153-502 MP5230-500	ML7285C1005 ML7285F, ML7295C ML7295H	TBM4080 A	6	\$ 600.00	
	AF24-MFT95 US	M9216-JGA-2	MMR500/MMC90	M9175D, M9185A, C M9185D, M945 M945A1017, M945F M955, M965, M975 ML9175, ML9185A		6	\$ 580.00	
	AFR24-3 US GCA131.1P	M9216-AGA-2	MF4X-7153 MF4X-7073	ML6185A1000, ML6185F ML6195A, ML6474A		6	\$ 430.00	
	AFR24-3-S US GCA135.1P	M9216-AGC-2	MF4X-7153-502			6	\$ 485.00	
	AF24LON US					14	\$ 700.00	
	LM24-3 US GDE131.1P		MF40-6043			13	\$ 150.00	
	LM24-3.1 US GDE131.1P/B					13	\$ 140.00	
	LM24-3-T US GDE131.1P			ML6161A1001 ML6161B2024		13	\$ 130.00	
	LM24-3-T.1 US GDE131.1P/B					13	\$ 116.00	
	LM24-SR US GDE161.1P	M9106-GGA-2	MS40-6043			13	\$ 220.00	
	LM24-SR.1 US GDE161.1P					13	\$ 210.00	
	LM24-SR-T US GDE161.1P	M9106-GGA-2		ML7161A2008		13	\$ 200.00	
	LM24-SR-T.1 US GDE161.1P					13	\$ 190.00	
	LMC24-SR US (fast running)					13	\$ 230.00	
	LM24-MFT US GDE163.1P		MS40-6043-520			13	\$ 300.00	
	LM24-MFT.1 US					13	\$ 290.00	
	NM24 US GLB131.1P	M9108-AGA-2 M9108-AGC-2	MP381, MP382 MF40-6083	M644, ML6174, ML6464	BBTS1000, BBT1000 A	12	\$ 170.00	
	NM24-SR US GLB161.1P	M9108-GGA-2, M9108-GGC-2	MS40-6083	ML7174A2001	BBMS2000	12	\$ 254.00	
	NM24-SR.1 US					12	\$ 250.00	
	NM24-MFT US	M9108-HGA-2, M9108-HGC-2		ML7474A1015	BBM2000 A, BM2000 NA	12	\$ 330.00	
	NM24-MFT.1 US					12	\$ 320.00	
	NMQ24-MFT US				BBMFF2000	12	\$ 400.00	
	AM24 US GBB171.1U GEB131.1U	M9116-AGA-2, M9116-AGC-2 M9116-AGD-2, M9116-AGE-2	MF40-6153	M6184D, ML6184 ML6284	LDT3000 A TBT3000 A	11	\$ 250.00	
	AM24-S US					11	\$ 320.00	
	AM24-SR US GBB161.1U GEB161.1U	M9116-GGA-2, M9116-GGC-2	MS40-6153	M745, M944B		11	\$ 360.00	
	AM24-PC US					11	\$ 485.00	
	AM24-MFT US GBB163.1U	M9116-HGA-2 M9116-HGC-2		M734H, J, M744D M9184, M934, ML7284 ML7474A1007	LDM4000 A TBM4000 A TBM4000 NA	11	\$ 400.00	
	AM24-MFT95 US	M9116-AGD-2	MMR400/MMC90	M9164, M9164D, M9174C M934A1034, M934A1284 M934A1318, M934A1342 M944, M944A1010 M954, ML9184		11	\$ 485.00	
	AM24LON US					14	\$ 550.00	
	GM24 US GIB171.1U	M9132-AGA-2, M9132-AGE-2 M9132-AGC-2, M9124-AGA-2 M9124-AGD-2, M9124-AGE-2 M9124-AGC-2	MP485 MF40-6343	M6191A, M6191B M6191C, M6194D	RBT5000 A	10	\$ 350.00	
	GM24-SR US (266 in-lb) GIB161.1U	M9132-GGA-2, M9124-GGA-2 M9132-GGC-2, M9124-GGC-2	MS40-6343			10	\$ 475.00	
	GM24-MFT US GIB163.1U	M9124-HGA-2, M9116-HGA-2 M9124-HGC-2, M9116-HGC-2			RBM6000 A RMBHV6300 A RBM6000 NA	10	\$ 540.00	
	GM24LON US					14	\$ 750.00	

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Retrofit Solutions, Non-Direct Coupled



Universal Mounting Brackets

	List Price
ZG-106 and ZG-107 Mounting Brackets	\$ 29.00

The ZG-106 and ZG-107 are designed to mount the NF and AF series actuators in the same mounting locations as common foot mounted, crankarm style actuators. Hole patterns in the base match common Honeywell™ and Johnson Controls™ actuators for easy retrofit. The ZG-106 and ZG-107 are designed with different actuator mounting heights. The ZG-106 is designed to place the KH-AF US crankarm in the same relative position as the Honeywell™ Mod IV actuators. The ZG-107 will place the crankarm in the same relative position as the Honeywell™ Mod III actuators.

The ZG-106 and ZG-107 are provided with hole patterns to mount the NF and AF series actuators in either a horizontal or vertical position to meet space requirements. The KH-AF US crankarm is required to fully convert the NF or AF for crankarm operation.

Accessories	List Price
KH-AF US crankarm, see page 20	\$ 15.00
Refer to pages 19 and 20 for additional universal accessories such as ball joints, crankarms and pushrods.	

The ZG-106 – use when replacing these actuators:

Honeywell Mod IV	
M91...	M945...
M955...	M965...
M975...	M8...

The ZG-107 – use when replacing these actuators:

Honeywell Mod III

	List Price
ZG-108 Mounting Bracket	\$ 37.00

The ZG-108 is designed to mount the NF and AF series actuators in the same mounting locations as common foot mounted, crankarm style actuators. Hole patterns in the base match common Honeywell™, Siebe™ (Barber Colman™) and Johnson Controls™ actuators for easy retrofit.

The ZG-108 is provided with hole patterns to mount the NF and AF series actuators in either a horizontal or vertical position to meet space requirements. The KH-AF US crankarm is required to fully convert the NF or AF for crankarm operation.

Accessories	List Price
ZG-AF108 - for AF/NF actuators, complete kit includes ZG-108 bracket, KH-AF US crankarm and mounting hardware, see page 20	\$ 55.00

Refer to pages 19 and 20 for additional universal accessories such as ball joints, crankarms and pushrods.

The ZG-108 – use when replacing these actuators:

Johnson	M110...	M140...
	M120...	M150...
	M130...	

The ZG-108 – use when replacing these actuators:

Barber Colman	MA3...
	MA4...
	MA5...

The ZG-108 – use when replacing these actuators:

Honeywell	M91...	M945...
	M955...	M965...
	M975...	M8...



ZG-106



ZG-107



ZG-108



ZG-112

	List Price
ZG-112 Mounting Bracket	\$ 21.00

The ZG-112 is provided with prepunched hole patterns for the LF series actuator and its associated crankarm adaptor brackets. The hole pattern layout allows mounting these actuators in two different mounting orientations.

Accessories	List Price
ZG-LF112 - for LF actuators, complete kit includes ZG-112 bracket, KH-LF crankarm and mounting hardware, see page 20	\$ 36.00
ZG-LF2 - for LF actuators, includes mounting bracket, KH-LF crankarm and mounting hardware, see page 20	\$ 43.00

Refer to pages 19 and 20 for additional universal accessories such as ball joints, crankarms and pushrods.

The best replacement solution for non-direct coupled products is to replace the existing product with a direct coupled solution.

If direct coupling is not possible, Belimo offers specific retrofit solutions or universal linkage solutions.

List Price

ZG-100 and ZG-101 Universal Mounting Brackets \$ 57.00

Belimo universal mounting brackets are designed for applications where the actuator cannot be mounted directly to the damper shaft, and no proper mounting surface is available. They may be used for outside or inside the duct mounting, fastened to the ductwork or directly to the damper assembly. They may also be used to mount to other surfaces rather than the duct. A crankarm adaptor kit is also required.

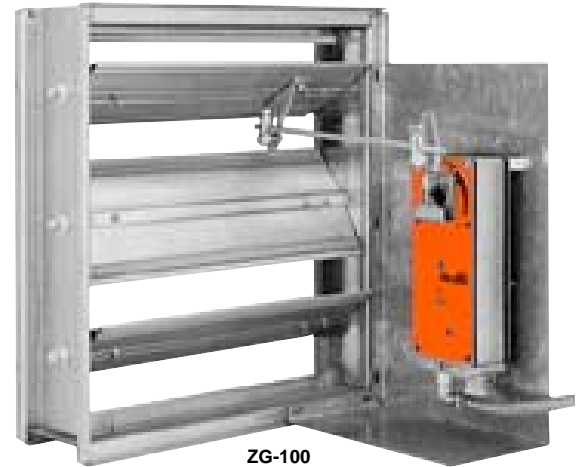
The ZG-100, and ZG-101 are provided with prepunched hole patterns for the SM, GM, NF and AF series actuators and their associated crankarm adaptor brackets. The hole pattern layout allows mounting these actuators in three different mounting orientations.

Accessories

For Actuator	Crankarm Adaptor Kit*	See Page	List Price
AF/NF	ZG-AF US	20	\$ 52.00
GM	ZG-GM2	10	\$ 59.00
AM	ZG-AM	11	\$ 49.00

*Includes crankarm and mounting hardware

Refer to pages 19 and 20 for additional universal accessories such as ball joints, crankarms and pushrods.



ZG-100



ZG-101

ZG-103 and ZG-104 Universal Mounting Brackets

The ZG-103 and ZG-104 are provided with prepunched hole patterns for the SM and GM series actuators and their associated crankarm adaptor brackets. The hole pattern layout allows mounting these actuators in two, different, mounting orientations.

Accessories

For Actuator	Crankarm Adaptor Kit*	See Page	List Price
GM	ZG-GM2	10	\$ 59.00
AM	ZG-AM	11	\$ 49.00

*Includes crankarm and mounting hardware

Refer to pages 19 and 20 for additional universal accessories such as ball joints, crankarms and pushrods.



ZG-103



ZG-104



ZG-105

ZG-105 Universal Mounting Brackets

The ZG-105 is provided with prepunched hole patterns for use with the NM series actuators with the ZG-NM3 crankarm adaptor kit. The hole pattern layout allows mounting these actuators in two different mounting orientations.

Accessories

For Actuator	Crankarm Adaptor Kit*	See Page	List Price
NM	ZG-NM3	12	\$ 41.00

*Includes crankarm and mounting hardware

Refer to pages 19 and 20 for additional universal accessories such as ball joints, crankarms and pushrods.

Control Signal-Based Retrofit Solutions

Honeywell Series 90, 0-135Ω, use:

Model	Torque	
AF24-MFT95 US	133 in-lb	see page 6
AM24-MFT95 US	160 in-lb	see page 11

Barber Colman - MP..., 6-9V, use:

Model	Torque	
LF24-MFT-20 US	35 in-lb	see page 8
LF24-MFT-S-20 US	35 in-lb	see page 8

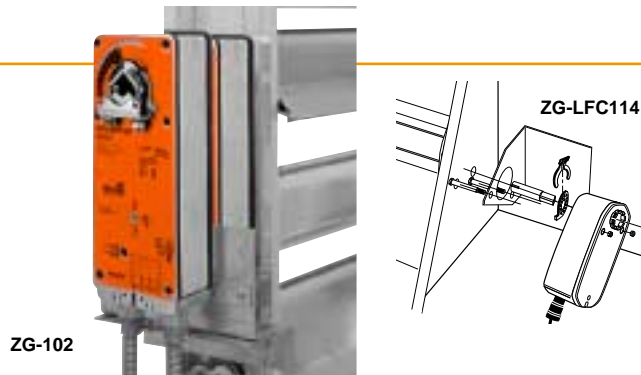
Staefa Control - 0-20 v. phasecut, use:

Model	Torque	
AF24-PC US	133 in-lb	see page 6
AM24-PC US	160 in-lb	see page 11



Installation - Based Solutions

ZG-102	Dual actuator mounting bracket see page 19
ZG-LFC114	Mounting kit, specifically for Trane Voyager unit retrofit



Replacing an M8405A actuator

The three-position control functionality of the LF24-SR-E US allows direct replacement of a Honeywell M8405A foot mounted economizer actuator.

Mounting

For non-direct coupled applications use the **ZG-LF112 HW** accessory kit, which includes the KH-LF crankarm and ZG112 bracket and an accessory logic module mounting kit. The ZG-112 aligns the plane of the crankarm with that of the Honeywell M8405A. ZG-112 has at least two mounting holes that match the M805A foot pattern. The logic module mounting kit allows for attachment to the end of the LF24-SR-E US actuator. It provides for installation flexibility to place the module where space is available.

Wiring

For proper control logic wiring always refer to the controller manufacturer's documentation. See page 55 of the 2003 Product Documentation Standard Actuation and Accessories for proper three-position wiring diagram.

