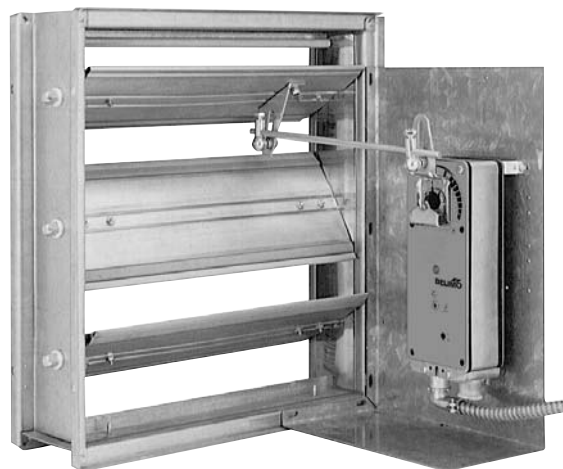


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The Belimo Difference

- **Customer Commitment.**
Extensive product range. Competitive project pricing. Application assistance.
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Easy installation. Accuracy and repeatability.
Low power consumption. No maintenance.
- **Long Service Life.**
Components tested before assembly. Every product tested before shipment.
20+ years direct coupled actuator design.

	Part Number	Description	AFB	AF	NFB	LF	TF	GM	AM	NM	LM	AH	LH	LU
Clamp / Positioner Indicators	IND-AFB	Damper Position Indicator	●		●									
	IND-AF2	Damper Position Indicator		●										
	IND-LF	Damper Position Indicator				●								
	IND-TF	Damper Position Indicator					●							
	K7-2	Standard AFB/NFB Clamp (1/2" to 1.05")	●		●									
	K4-2 US	Standard AF/NF Clamp (1/2" to 1.05")		●										
	K4-1 US	Jackshaft Clamp (Up to 1.05')		●										
	K4-H US	Hex Shaft Clamp (3/8" to 5/8")		●										
	K6 US	Standard LF Clamp (3/8" to 1/2")				●								
	K6-1	Jackshaft Clamp (1/2" to 3/4")				●								
	K8 US	Standard TF Clamp					●							
	K-GM20	Reversible Clamp (1/2" to 1.05")						●						
	K-AM25	Standard Clamp (1/2" to 1")							●					
	K-SA	Reversible AM Clamp (2/5" to 3/4")							●					
	K-NA	Reversible NM Clamp (5/16" to 3/4")								●				
	K-LM20	Clamp (3/4")									●			
	K-LM16	Standard Clamp (5/8")									●			
	K-LM13	Clamp (1/2")									●			
	K-LM10	Clamp (3/8")									●			
	K-LU	Spindle Clamp (5/16" to 1/2")												●
Linkage Accessories	KH-AFB	Crank Arm	●		●									
	KH-AF	Crank Arm		●										
	KH-AF-1 US	Crank Arm for Jackshaft Applications		●										
	KH-AFV	V-Bolt Kit for KH-AF (-1) Crank Arms		●										
	KH-LF	Crank Arm				●								
	KH-LFV	V-Bolt Kit for KH-LF Crank Arms				●								
	KH-TF US	Crank Arm					●							
	AH-GMA	GMB(X) Crank Arm						●						
	AH-25	AMB(X) and NMB(X) Crank Arm							●	●				
	KH6	Universal Crank Arm (For KG6 Ball Joint)		●	●	●	●	●	●	●		●	●	
	KH8	Universal Crank Arm (For KG8 Ball Joint)		●	●	●	●	●	●	●		●	●	
	KH10	Universal Crank Arm (For KG10A Ball Joint)	●	●	●	●	●	●	●	●				
	KH12	Universal Crank Arm (For KG10A Ball Joint)	●	●	●	●	●	●	●	●				
	KG6	Ball Joint (5/16")		●	●	●	●	●	●	●		●	●	
	KG8	Ball Joint (5/16", 90)		●	●	●	●	●	●	●	●	●		
	KG10	Ball Joint for KH6 (3/8")		●	●	●	●	●	●	●		●	●	
	SH8	Push Rod for KG6 & KG8 Ball Joints (36", 5/16" Dia.)		●	●	●	●	●	●	●		●	●	
	SH10	Push Rod for KG10 Ball Joints (36", 3/8" Dia.)		●	●	●	●	●	●	●		●	●	
	ZG-DC1	Damper Clip for Damper Blade		●	●	●	●	●	●	●		●	●	
	ZG-DC2	Damper Clip for Damper Blade		●	●	●	●	●	●	●		●	●	

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	Part Number	Description	AFB	AF	NFB	LF	TF	GM	AM	NM	LM	AH	LH	LU
Brackets	ZG-100	Universal Mounting Bracket	●	●	●			●	●					
	ZG-101	Universal Mounting Bracket	●	●	●			●	●					
	ZG-102	Multiple Actuator Mounting Bracket	●	●				●	●					
	ZG-103	Universal Mounting Bracket						●	●	●				
	ZG-104	Universal Mounting Bracket						●	●	●				
	ZG-106	Universal Mounting Bracket		●										
	ZG-107	Universal Mounting Bracket		●										
	ZG-108	Universal Mounting Bracket		●										
	ZG-109	Mounting Bracket for ZS-260 Housings	●	●	●	●		●	●					
	ZG-110	Mounting Bracket for ZS-260 Housings	●	●	●	●		●	●					
	ZG-112	Universal Mounting Bracket for LF				●								
	ZG-113	Universal Mounting Bracket for TF					●							
	ZG-118	Universal Mounting Bracket for AFB, NFB	●		●									
	Z-GMA	GM to GMB(X) Retrofit Mounting Bracket						●						
	Z-SMA	AM, SM to AMB(X) Retrofit Mounting Bracket							●					
	Z-NMA	NM to NMB(X) Retrofit Mounting Bracket								●				
Crank arm Adaptor Kits	ZG-AFB	Crank Arm Adaptor Kit	●		●									
	ZG-AFB118	Crank Arm Adaptor Kit	●		●									
	ZG-AF US	Crank Arm Adaptor Kit (includes mounting hardware)		●										
	ZG-AF108	Crank Arm Adaptor Kit (includes ZG-108 & KH-AF US)		●										
	ZG-LF112	Crank Arm Adaptor Kit (includes ZG-112 & KH-LF)				●								
	ZG-LF2	Crank Arm Adaptor Kit (includes mounting hardware)				●								
	ZG-LFC114	Trane Voyager Retrofit Kit (includes retrofit bracket)				●								
	ZG-ECON1	Honeywell Economizer Retrofit Kit (includes retrofit bracket)				●								
	ZG-ECON2	Honeywell Economizer Retrofit Kit				●								
	ZG-TF112	Crank Arm Adaptor Kit (includes ZG-113 & KH-TF US)					●							
	ZG-TF2	Crank Arm Adaptor Kit (includes mounting hardware)					●							
	ZG-GMA	Crank Arm Adaptor Kit (includes mounting hardware)						●						
	ZG-NMA	Crank Arm Adaptor Kit (includes mounting hardware)							●	●				
Shaft Adaptors	AV6-20	Shaft Extension fits 1/4" to 3/4" Diameter Shafts				●	●				●			
	AV8-25	Shaft Extension fits 5/16" to 1" Diameter Shafts	●	●	●	●		●	●	●				
	ZG-JSA (-1,2,3)	Jackshaft Adaptors for Hollow Jackshafts	●	●	●			●	●	●				
	ZG-LMSA(-1)	Shaft Adaptor									●			
	ZG-NMSA-1	Shaft Adaptor								●				
Rotation Limiters	ZDB-AF2 US	Angle of Rotation Limiter for AF/NF		●										
	ZDB-LF	Angle of Rotation Limiter for LF				●								
	ZDB-TF	Angle of Rotation Limiter for TF					●							
	ZDB-LU	Angle of Rotation Limiter for LU												●
Housings	ZS-100	Weather Shield - Galvaneal	●	●	●	●		●	●					
	ZS-101	Base for ZS-100	●	●	●	●		●	●					
	ZS-150	Weather Shield - Polycarbonate	●	●	●	●		●	●					
	ZS-260	Explosion Proof Housing	●	●	●	●		●	●					
	ZS-300 (-1) (-5)	NEMA 4X Housing	●	●	●	●		●	●					
	ZS-T	Protective Terminal Strip Cover (-T Models Only)						●	●	●	●			

	Part Number	Description	AFB	AF	NFB	LF	TF	GM	AM	NM	LM	AH	LH	LU
Miscellaneous	AF-CC US	Conduit Connector		●										
	TF-CC US	Conduit Connector	●		●		●	●	●	●	●	●	●	●
	AF-P	Anti-Rotation Bracket (11414)	●	●	●									
	LF-P	Anti-Rotation Bracket (11695)				●								
	TF-P	Anti-Rotation Bracket (11533)					●				●			
	Z-DS1	Rotary Support for Lateral Force Compensation										●	●	
	Tool-06	8 mm and 10 mm Wrench	●	●	●	●	●		●	●	●	●	●	
	Tool-07	13 mm Wrench						●						

Clamps / Position Indicators / Rotation Limiters

K7-2 Standard Clamp. Fits shafts 1/2" to 1.05".



IND-AFB Damper Position Indicator.
For damper position indication in short shaft installations



Shaft Adaptors / Extensions

AV8-25 Shaft Extension. For damper operating shafts.
Approx. 6-5/8" [170 mm] extension for shafts
1/4" to 3/4" [6 to 20 mm].



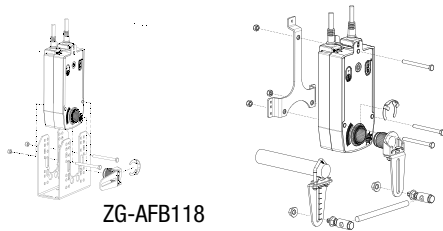
The shaft adaptors listed below may be used with AFB, AFX, NFB, NFX actuators.
For more information see page 448.

ZG-JSA-1 ZG-JSA-2 ZG-JSA-3

Non-Direct Mounting

ZG-AFB Crank Arm Adaptor Kit
For more information see page 439.

ZG-AFB118 Crank Arm Adaptor Kit
For more information see page 434.



KH-AFB Crank Arm
Fits round shafts up to 3/4".



Mounting Brackets

The mounting brackets listed below may be used with AFB, AFX, NFB, NFX actuators.
For more information see pages 433, 434 and 443.

ZG-100 ZG-101 ZG-102 ZG-118

Housings

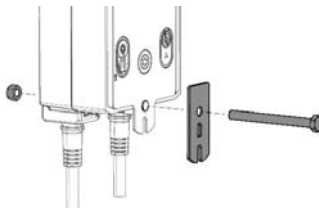
The housings listed below may be used with AF/NF actuators.
For more information see pages 449 to 453.

ZS-100 ZS-150 ZS-260 ZS-300

Miscellaneous

AF-P Anti-Rotation T-Bracket for AF/NF.

Z-AF AF, NF to AFB, AFX, NFB, NFX Retrofit Mounting Bracket



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Clamps / Position Indicators / Rotation Limiters

K4 US	Clamp. Fits shafts 3/8" to 3/4".
K4-1 US	Jackshaft Clamp. Fits jackshafts up to 1.05".
K4-2 US	Standard Clamp. Fits shafts 1/2" to 1.05".
K4-H	Hex Shaft clamp. Fits hex shafts 3/8" to 5/8".
IND-AF2	Damper Position Indicator. For damper position indication in short shaft installations.



ZDB-AF2 US	Angle of Rotation Limiter for AF/NF actuators. Includes IND-AF2.
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KH-AFV	V-Bolt Kit allows for direct coupling with KH-LF. Contains V-Bolt and 2 nuts.
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Shaft Adaptors / Extensions

AV8-25	Shaft Extension. For damper operating shafts. Approx. 6-5/8" [170 mm] extension for shafts 1/4" to 3/4" [6 to 20 mm].
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The shaft adaptors listed below may be used with AF/NF actuators.
For more information see page 448.

ZG-JSA-1	ZG-JSA-2	ZG-JSA-3
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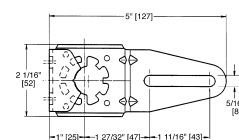
Non-Direct Mounting

ZG-AF US	Crank Arm Adaptor Kit For more information see page 440.
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ZG-AF108	Crank Arm Adaptor Kit For more information see page 436.
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KH-AF	Crank Arm Fits round shafts up to 3/4".
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KH-AF-1 US	Crank Arm for Jackshaft Applications Fits round shafts up to 1.05".
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Mounting Brackets

The mounting brackets listed below may be used with AF/NF actuators.
For more information see pages 433, 436, 438 and 443.

ZG-100	ZG-101	ZG-102	ZG-106	ZG-107	ZG-108
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Housings

The housings listed below may be used with AF/NF actuators.
For more information see pages 449 to 453.

ZS-100	ZS-150	ZS-260	ZS-300
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Miscellaneous

AF-P	Anti-Rotation T-Bracket for AF/NF.
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Clamps / Position Indicators / Rotation Limiters

K6 US Clamp. Fits shafts 3/8" to 1/2".

K6-1 Clamp. Fits shafts 1/2" to 3/4".

IND-LF Damper Position Indicator



ZDB-LF Angle of Rotation Limiter for LF actuators

KH-LFV V-Bolt Kit allows direct coupling with KH-LF. Contains V-Bolt and 2 nuts.



Shaft Adaptors / Extensions

ZG-LMSA-1 Shaft Adaptor (See LM Accessories)

AV6-20 Shaft Extension. For damper operating shafts. Approx. 6 5/8" [170 mm] extension for shafts 1/4" to 3/4" [6 to 20 mm] (must use K6-1 clamp).



AV8-25 Shaft Extension. For damper operating shafts. Approx. 9.8" [170 mm] extension for shafts 5/16" to 1" [8 to 10 mm].

Non-Direct Mounting

ZG-LF112 Crank Arm Adaptor Kit
For more information see page 444.

ZG-LF2 Crank Arm Adaptor Kit
For more information see page 445.

ZG-LFC114 Crank Arm Adaptor Kit
Specifically for Trane Voyager unit retrofit
For more information see page 446.

ZG-ECON1 Crank Arm Adaptor Kit
Specifically for Honeywell economizer retrofit
For more information see page 447.

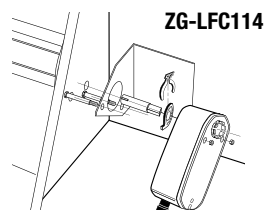
ZG-ECON2 Crank Arm Adaptor Kit
Specifically for Honeywell economizer retrofit
For more information see page 447.

KH-LF Crank Arm

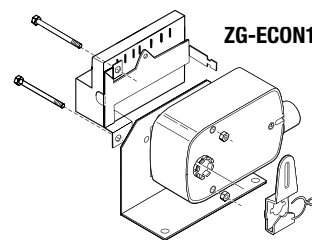
ZG-LF112



ZG-LF2



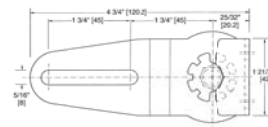
ZG-LFC114



ZG-ECON1



KH-LF



Mounting Brackets

The mounting brackets listed below may be used with LF actuators.
For more information see page 444.

ZG-112

Housings

The housings listed below may be used with LF actuators.
For more information see pages 449 to 451.

ZS-100 ZS-150 ZS-260

Miscellaneous

LF-P Anti-Rotation T-Bracket for LF.

Clamps / Position Indicators / Rotation Limiters

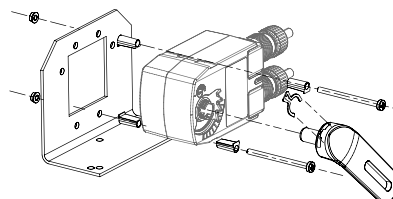
IND-TF	Damper Position Indicator
ZDB-TF	Angle of Rotation Limiter for TF actuators.

Shaft Adaptors / Extensions

AV6-20	Shaft Extension. For damper operating shafts. Approx. 6-5/8" [170 mm] extension for shafts 1/4" to 3/4" [6 to 20 mm].
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Non-Direct Mounting

ZG-TF112	Crank Arm Adaptor Kit. For more information see page 444.
ZG-TF2	Crank Arm Adaptor Kit. For more information see page 445.
KH-TF US	Crank Arm. With 5/16" slot (can be used with KG8 or KG10A Ball Joint).
KH-TF-1 US	Crank Arm. With 1/4" slot (can be used with KG6 Ball Joint).


Mounting Brackets

The mounting brackets listed below may be used with TF actuators.
For more information see page 444.

ZG-113
Housings

The housings listed below may be used with TF actuators.
For more information see page 449.

ZS-100 ZS-150
Miscellaneous

TF-CC US	Conduit Connector for AFB(X) / NFB (X) / TF / GM / AM / NM / LM
TF-P	Anti-Rotation T-Bracket for TF / LM.

Clamps / Position Indicators / Rotation Limiters

K-GM20 Reversible Clamp. Fits shafts up to 1.05".



Shaft Adaptors

AV8-25 Shaft Extension. For damper operating shafts.
Approx. 9.8" [170 mm] extension for shafts
5/16" to 1" [8 to 10 mm].



The shaft adaptors listed below may be used with GM actuators.
For more information see page 448.

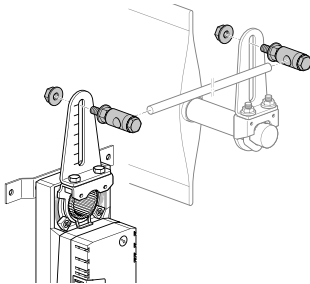
ZG-JSA-1 ZG-JSA-2 ZG-JSA-3

Non-Direct Mounting

ZG-GMA Crank Arm Adaptor Kit
For more information see page 441.

AH-GMA Crank Arm

23681-00001 GK Adaptor. For short shafting to connect to
auxiliary switch or potentiometer.



Mounting Brackets

The mounting brackets listed below may be used with GM actuators.
For more information see pages 433 and 443.

ZG-100 ZG-101 ZG-102 ZG-103 ZG-104

Housings

The housings listed below may be used with GM actuators.
For more information see pages 449 to 453 and page 410.

ZS-100 ZS-150 ZS-260 ZS-300 ZS-T

Miscellaneous

TF-CC US Conduit Connector for AFB, AFX / NFB, NFX / TF / GM / AM / NM / LM

Z-GMA GM to GMB, GMX Retrofit Mounting Bracket.

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Clamps / Position Indicators / Rotation Limiters

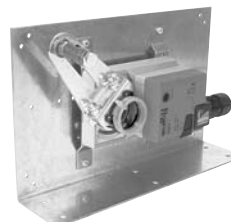
K-AM25 Standard Reversible Clamp. Fits shafts up to 1.05".

K-SA Reversible Clamp. Fits shafts up to 3/4".


Non-Direct Mounting

ZG-NMA Crank Arm Adaptor Kit
For more information see page 442.

AH-25 Crank Arm


Shaft Adaptors / Extensions

AV8-25 Shaft Extension. For damper operating shafts.
Approx. 9.8" [170 mm] extension for shafts
5/16" to 1" [8 to 10 mm].



The shaft adaptors listed below may be used with AM actuators.
For more information see page 448.

ZG-JSA-1 ZG-JSA-2 ZG-JSA-3

Mounting Brackets

The mounting brackets listed below may be used with AM actuators.
For more information see page 443.

ZG-100 ZG-101 ZG-103 ZG-104

Housings

The housings listed below may be used with AM actuators.
For more information see pages 449 to 453 and page 410.

ZS-100 ZS-150 ZS-260 ZS-300 ZS-T

Miscellaneous

TF-CC US Conduit Connector for AFB, AFX / NFB, NFX / TF / GM / AM / NM / LM

Z-SMA AM, SM to AMB, AMX Retrofit Mounting Bracket

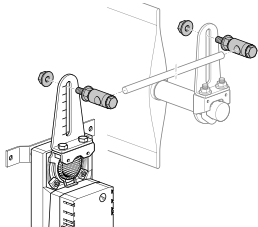
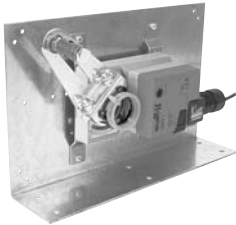
Clamps / Position Indicators / Rotation Limiters

K-AM25	Standard Reversible Clamp. Fits shafts up to 1.05".
K-NA	Reversible Clamp. Fits shafts up to 3/4".



Non-Direct Mounting

ZG-NMA	Crank Arm Adaptor Kit For more information see page 442.
AH-25	Crank Arm



Shaft Adaptors / Extensions

ZG-NMSA-1	Short Shaft Extension
AV8-25	Shaft Extension. For damper operating shafts. Approx. 9.8" [170 mm] extension for shafts 5/16" to 1" [8 to 10 mm].



The shaft adaptors listed below may be used with NM actuators.
For more information see page 448.

ZG-JSA-1 ZG-JSA-2 ZG-JSA-3

Mounting Brackets

The mounting brackets listed below may be used with NM actuators.
For more information see page 443.

ZG-103 ZG-104

Housings

The housings listed below may be used with NM actuators.
For more information see pages 449 and page 410.

ZS-100 ZS-150 ZS-T

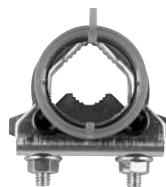
Miscellaneous

TF-CC US	Conduit Connector for AFB, AFX / NFB, NFX / TF / GM / AM / NM / LM
Z-NMA	NM to NMB, NMX Retrofit Mounting Bracket

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Clamps / Position Indicators / Rotation Limiters

K-LM20	Clamp. Fits shafts up to 3/4".
K-LM16	Standard Clamp. Fits shafts up to 5/8".
K-LM12	Clamp. Fits shafts up to 1/2".
K-LM10	Clamp. Fits shafts up to 3/8".


Shaft Adaptors / Extensions

ZG-LMSA	Shaft Extension
ZG-LMSA-1	Shaft Extension
AV6-20	Shaft Extension. For damper operating shafts. Approx. 6 5/8" [170 mm] extension for shafts 1/4" to 3/4" [6 to 20 mm] (must use K6-1 clamp).


Housings

The housings listed below may be used with LM actuators.
For more information see pages 449 and 410.

ZS-100 ZS-150 ZS-T

Miscellaneous

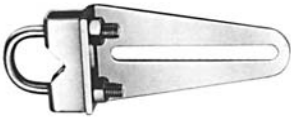
TF-CC US	Conduit Connector for TF / GM / AM / NM / LM
TF-P	Anti-Rotation T-Bracket for TF / LM.

AH/LH Accessories

Crank arms / Ball Joints / Push Rods

KH6 Universal Crank Arm
 (For more information see Universal Accessories).

KH8 Universal Crank Arm
 (For more information see Universal Accessories).



KG6 Ball Joint (Zinc Plated)
 (For more information see Universal Accessories).



KG8 Ball Joint (Galvanized)
 (For more information see Universal Accessories).

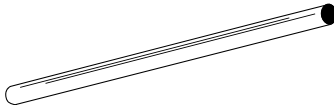


KG10 Ball Joint (Zinc Plated)
 (For more information see Universal Accessories).



SH8 Push Rod
 (For more information see Universal Accessories).

SH10 Push Rod
 (For more information see Universal Accessories).



Miscellaneous

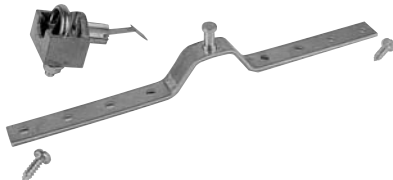
TF-CC US Conduit Connector for TF / GM / AM / NM / LM

Z-DS1 Rotary Support for Lateral Force Compensation

LU Accessories

Clamps / Position Indicators / Rotation Limiters

K-LU Spindle Clamp. Fits shafts 5/16" to 1/2".



ZDB-LU Angle of Rotation Limiter for LU.

Z-DS1 Rotary Support for Lateral Force Compensation

Z-KSA 5/16" Shaft Clevis

Z-KSC 3/8" Shaft Clevis

Housings

The housings listed below may be used with LU actuators.
 For more information see pages 449 and 410.

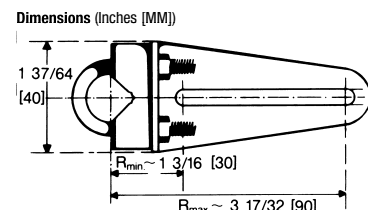
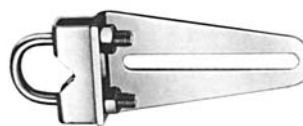
ZS-100 ZS-150 ZS-T

Miscellaneous

TF-CC US Conduit Connector for TF / GM / AM / NM / LM

Universal Crank arms

KH6	Zinc plated steel. Slot width 1/4" (6.2mm). For damper shafts: 3/8" to 11/16" dia. (10 to 18mm) or 3/8" to 9/16" sq. (10 to 14mm). Uses KG6 Ball Joint.
KH8	Zinc plated steel. Slot width 21/64" (8.2mm). For damper shafts: 3/8" to 11/16" dia. (10 to 18mm) or 3/8" to 9/16" sq. (10 to 14mm). Uses KG8 or KG10A Ball Joint.
KH10	Zinc plated steel. Slot width 21/64" (8.2mm). For damper shafts: 9/16" to 1.05" dia. (14 to 25mm). Uses KG10A Ball Joint.
KH12	Zinc plated steel. Slot width 21/64" (8.2mm). For damper shafts: 3/4" to 1" dia. (20 to 25mm). Uses KG10A Ball Joint.



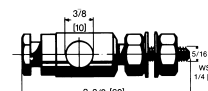
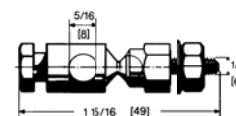
KH10



KH12

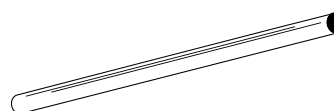
Ball Joints

KG6	For KH6 Universal Crank Arm. Zinc plated steel. For 5/16" dia. rod (8mm). The KG6 ball joint is only recommended up to 70 in-lbs. (8Nm)
KG8	For KH8 Universal Crank Arm Galvanized steel. 90° angle. For 5/16" dia. rod (8mm).
KG10A	Zinc Plated Steel Used with following crank arms: KH8 = 5/16" (8mm)



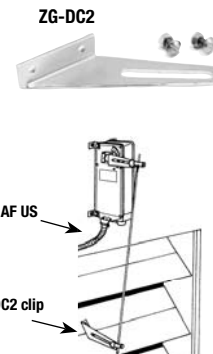
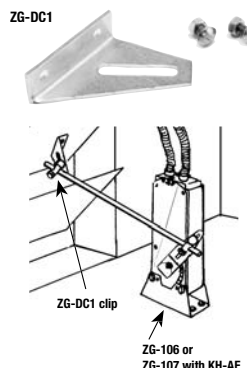
Push Rods

SH8	For KG6 and KG8 Ball Joints. 36" length, 5/16" dia.
SH10	For KG10 Ball Joints. 36" length, 3/8" dia.



Damper Clips

ZG-DC1	Mounts to Damper Blades – 3.5"
ZG-DC2	Mounts to Damper Blades – 6" The ZG-DC1 and ZG-DC2 damper clips are designed to mount to damper blades and work as crank arms in damper linkage applications. The ZG-DC1 is designed to be used in applications where the actuator is located in front of the damper. The ZG-DC2 is designed to be used when the actuator is located above or below the damper.



ZG-102 Multiple Actuator Mounting Bracket

For AFB, AFX, AF and GM Series Actuators



Application

The ZG-102 multiple actuator mounting bracket is designed for cases where it is necessary to mount two actuators to one shaft to provide extra torque. The dual mounting bracket is typically used with the AFB, AFX, AF and GM series actuators. This is due to the fact that each of these series are the highest torque range available.

Figures A and B demonstrates two different mounting configurations using the ZG-102 mounting bracket.

Accessory

AV10 - 25 Universal shaft extension

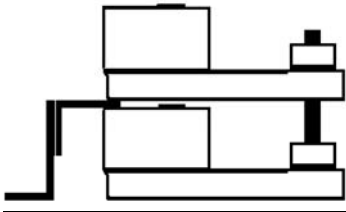


FIGURE A

The major advantage with this method is it requires less mounting area. The manual override, if available, cannot be used in this configuration.

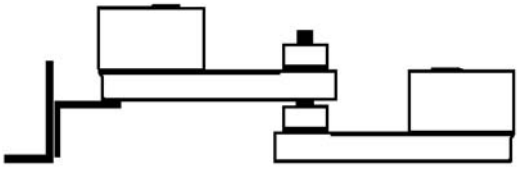
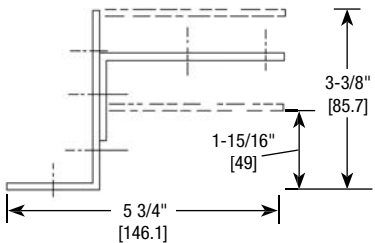
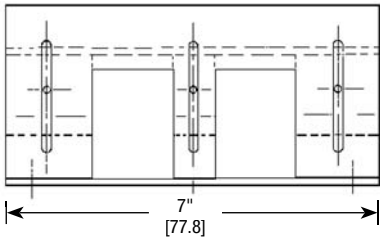
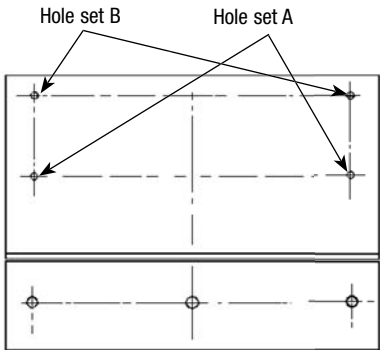


FIGURE B

The major advantages are that a shorter shaft is required and a lower profile is achieved.

Dimensions (Inches [mm])

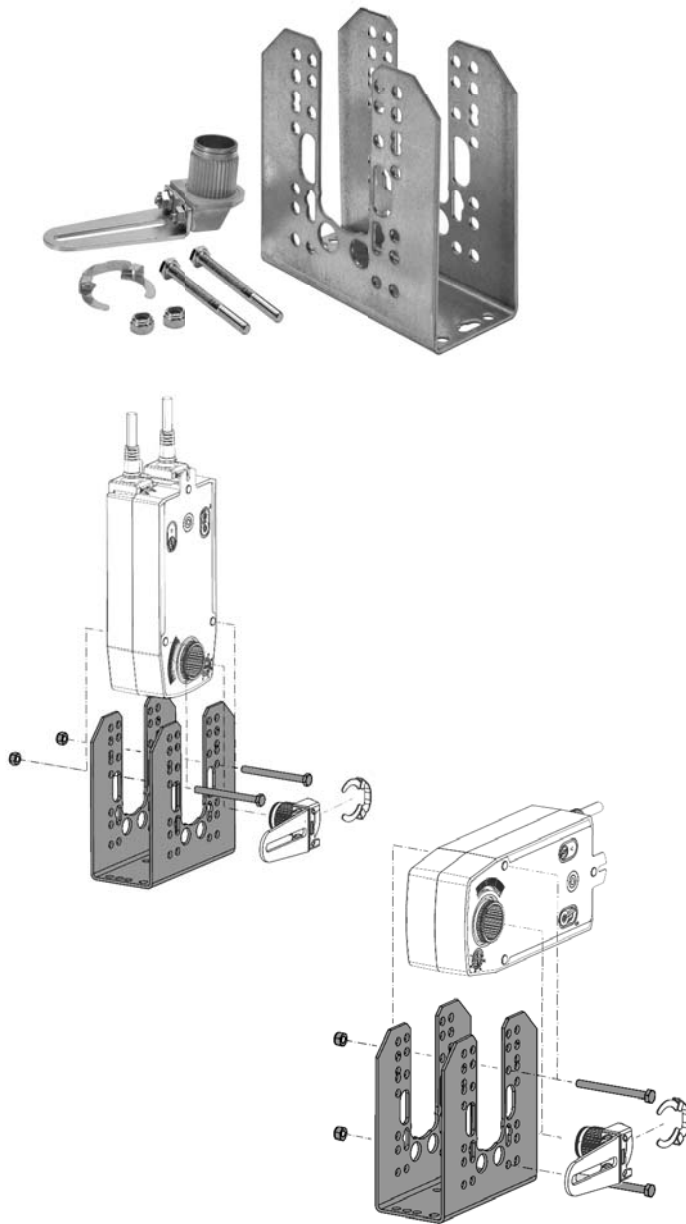


Material	12 GA Galvanized
Weight	1.8 lbs.

OTHER CRANK ARM ADAPTOR KITS AND UNIVERSAL MOUNTING BRACKETS		
KIT	MOUNTING BRACKET*	ACTUATOR USED WITH
ZG-AFB	NA	AFB, AFX, NFB, NFX
ZG-AFB118	ZG-118	AFB, AFX, NFB, NFX
ZG-AF108	ZG-108 (Included)	AF
ZG-AF US	ZG-100, ZG-101	AF
ZG-LF112	ZG-112 (Included)	LF
ZG-LF2	NA	LF
ZG-LFC114	NA	LF
ZG-ECON1	ZG-112 (Included)	LF
ZG-ECON2	ZG-112 (Included)	LF
ZG-TF112	ZG-113 (Included)	TF
ZG-TF2	NA	TF
ZG-GMA	ZG-101, ZG-101, ZG-103, ZG-104	GM
ZG-NMA	ZG-101, ZG-101, ZG-103, ZG-104	NM, AM
NA	ZG-106	AF
NA	ZG-107	AF

*Unless otherwise noted, mounting brackets are not included in crank arm adaptor kits.

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Application

The ZG-AFB118 Crank Arm Adaptor Kit is designed for applications where the actuator cannot be mounted directly to the damper shaft. It may be used for outside or inside the duct mounting.

The ZG-AFB118 Crank Arm Adaptor Kit includes:

- 1 ZG-118 Mounting Bracket
- 1 KH-AFB Crank Arm with Retaining Clip
- 2 Bolts with Nuts

NOTE: May require crank arm and ball joints

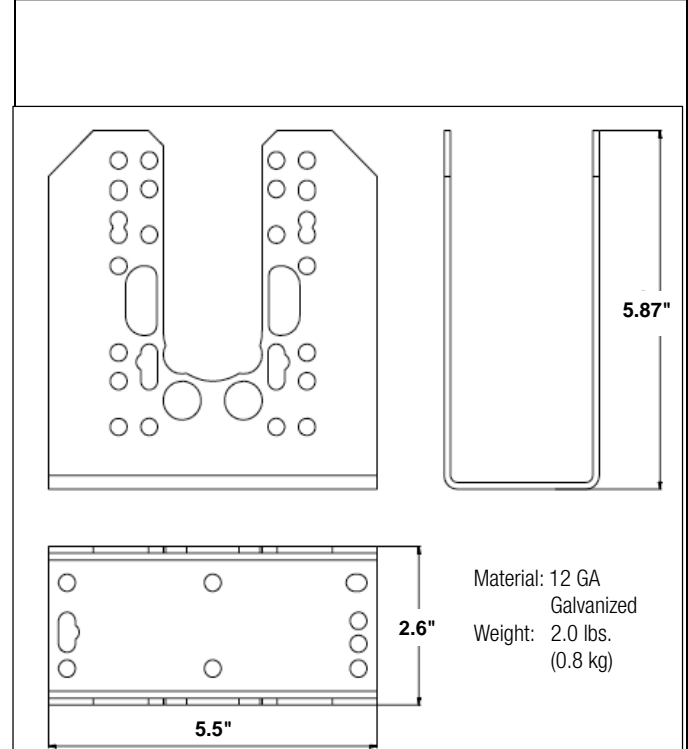
The ZG-118 is provided with hole patterns to mount the AFB, AFX, NFB and NFX actuators in either a horizontal or vertical position to meet space requirements. The KH-AFB crank arm is required to fully convert the AFB, AFX, NFB or NFX for crank arm operation.

The ZG-118 is designed to mount the AFB, AFX, NFB and NFX actuators in the same mounting locations as common foot mounted, crank arm style actuators. Hole patterns in the base match common Honeywell™, Siebe™ (Barber Colman™) and Johnson Controls™ actuators for easy retrofit.

USE WHEN REPLACING THESE ACTUATORS

Honeywell	M91...	M955...	M975...
	M945...	M965...	M8...
Johnson	M110...	M130...	M150...
	M120...	M140...	
Barber Coleman	MA3...	MA4...	MA5...

Dimensions (Inches [mm])



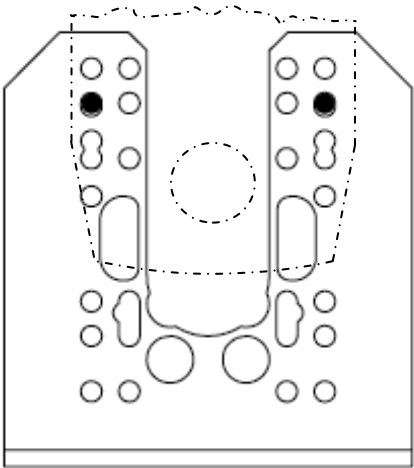
OTHER CRANK ARM ADAPTOR KITS AND UNIVERSAL MOUNTING BRACKETS

KIT	MOUNTING BRACKET*	ACTUATOR USED WITH
ZG-AFB	NA	AFB, AFX, NFB, NFX
ZG-AFB118	ZG-118	AFB, AFX, NFB, NFX
ZG-AF108	ZG-108 (Included)	AF
ZG-AF US	ZG-100, ZG-101	AF
ZG-LF112	ZG-112 (Included)	LF
ZG-LF2	NA	LF
ZG-LFC114	NA	LF
ZG-ECON1	ZG-112 (Included)	LF
ZG-ECON2	ZG-112 (Included)	LF
ZG-TF112	ZG-113 (Included)	TF
ZG-TF2	NA	TF
ZG-GMA	ZG-101, ZG-101, ZG-103, ZG-104	GM
ZG-NMA	ZG-101, ZG-101, ZG-103, ZG-104	NM, AM
NA	ZG-106	AF
NA	ZG-107	AF

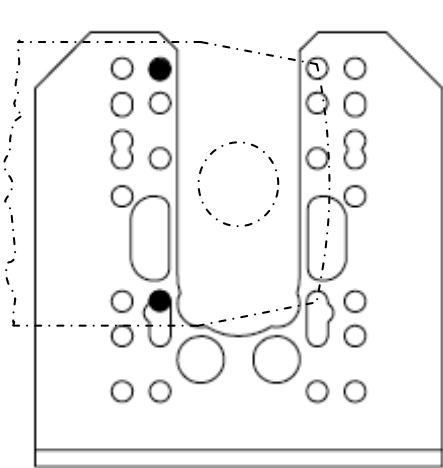
*Unless otherwise noted, mounting brackets are not included in crank arm adaptor kits.

ZG-AFB118 Crank Arm Adaptor Kit

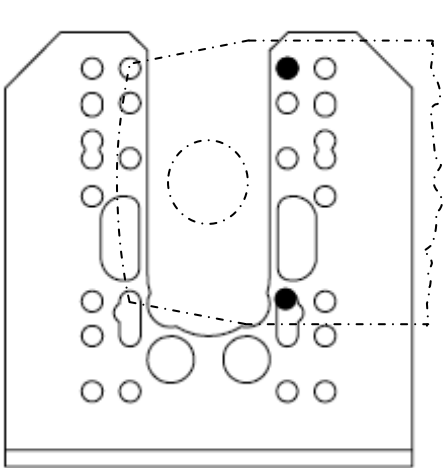
Mounting Positions for Typical Replacements



Barber Colman™ MA Type - Vertical

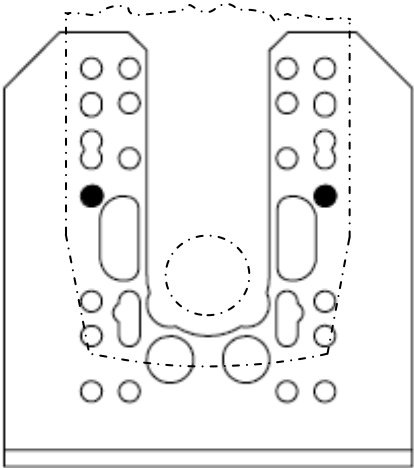


Barber Colman™ MA Type - Horizontal (left)

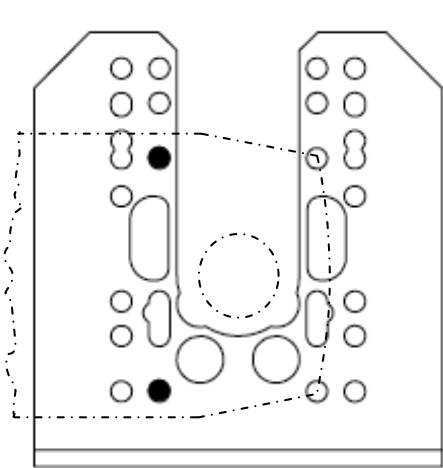


Barber Colman™ MA Type - Horizontal (right)

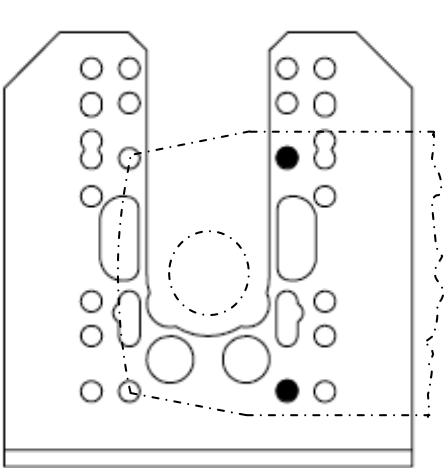
Black holes represent correct bolt locations



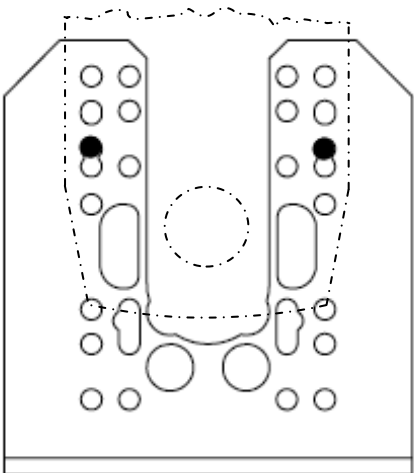
Honeywell™ Mod. IV Type - Vertical



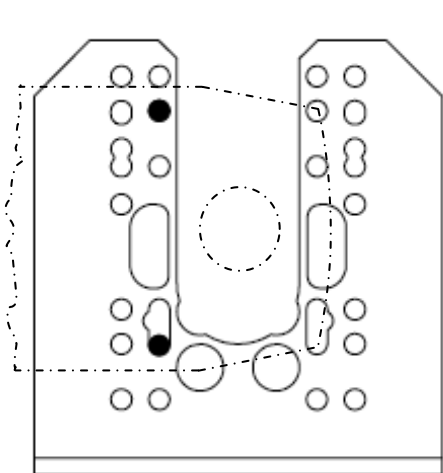
Honeywell™ Mod. IV Type - Horizontal (left)



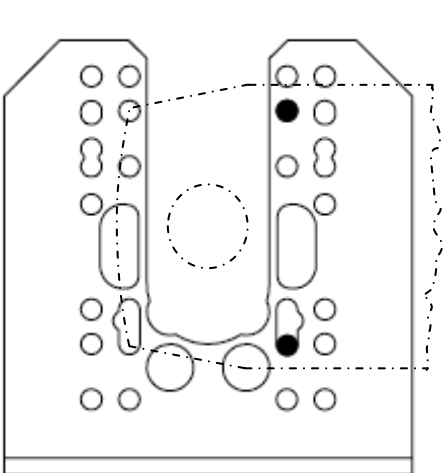
Honeywell™ Mod. IV Type - Horizontal (right)



Johnson Controls™ 100 Series Type and
Honeywell™ Mod. III Type - Vertical

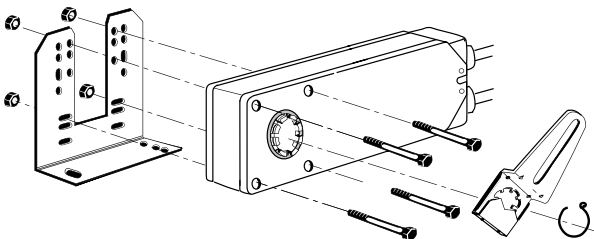
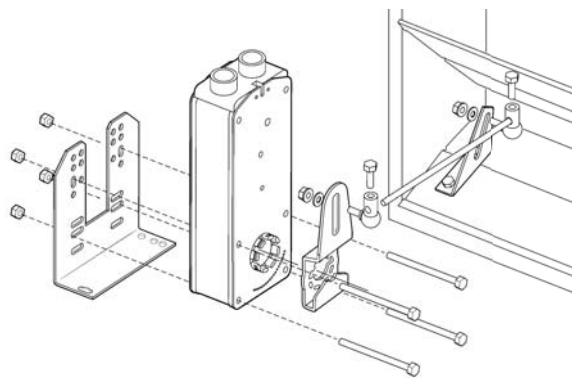
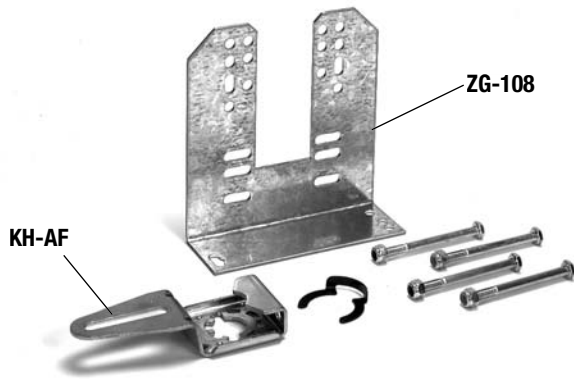


Johnson Controls™ 100 Series Type and
Honeywell™ Mod. III Type - Horizontal (left)



Johnson Controls™ 100 Series Type and
Honeywell™ Mod. III Type - Horizontal (right)

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OTHER CRANK ARM ADAPTOR KITS AND UNIVERSAL MOUNTING BRACKETS

KIT	MOUNTING BRACKET*	ACTUATOR USED WITH
ZG-AFB	NA	AFB, AFX, NFB, NFX
ZG-AFB118	ZG-118	AFB, AFX, NFB, NFX
ZG-AF108	ZG-108 (Included)	AF
ZG-AF US	ZG-100, ZG-101	AF
ZG-LF112	ZG-112 (Included)	LF
ZG-LF2	NA	LF
ZG-LFC114	NA	LF
ZG-ECON1	ZG-112 (Included)	LF
ZG-ECON2	ZG-112 (Included)	LF
ZG-TF112	ZG-113 (Included)	TF
ZG-TF2	NA	TF
ZG-GMA	ZG-101, ZG-101, ZG-103, ZG-104	GM
ZG-NMA	ZG-101, ZG-101, ZG-103, ZG-104	NM, AM
NA	ZG-106	AF
NA	ZG-107	AF

*Unless otherwise noted, mounting brackets are not included in crank arm adaptor kits.

Application

The ZG-AF108 Crank Arm Adaptor Kit is designed for applications where the actuator cannot be mounted directly to the damper shaft. It may be used for outside or inside the duct mounting.

The ZG-AF108 Crank Arm Adaptor Kit includes:

- 1 ZG-108 Mounting Bracket
- 1 KH-AF Crank Arm with Retaining Ring
- 4 Bolts with Nuts

NOTE: May require crank arm and ball joints

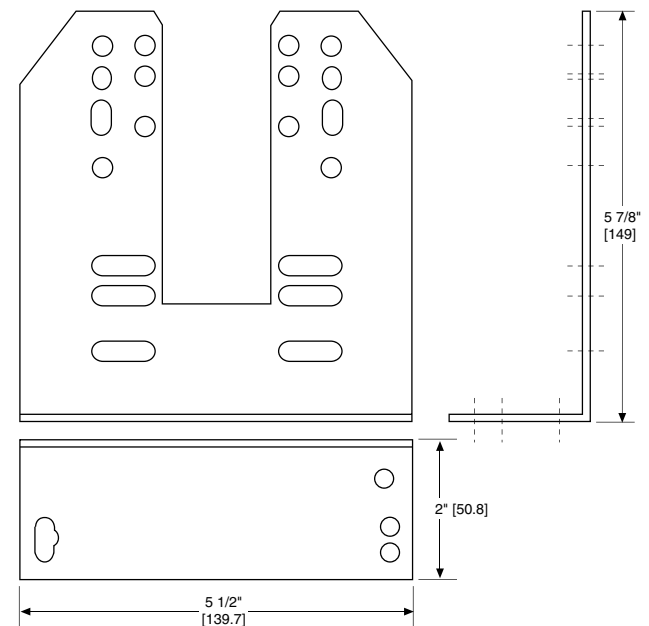
The ZG-108 is provided with hole patterns to mount the AF series actuators in either a horizontal or vertical position to meet space requirements.

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

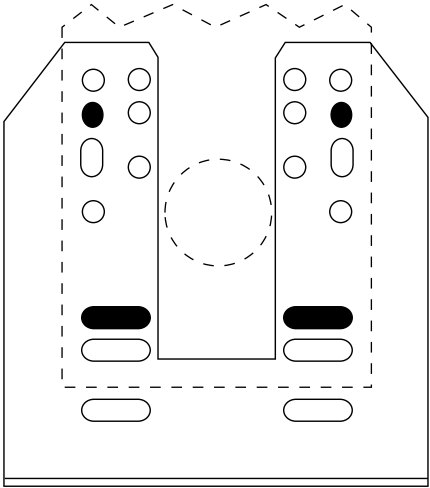
USE WHEN REPLACING THESE ACTUATORS

Honeywell	M91...	M955...	M975...
	M945...	M965...	M8...
Johnson	M110...	M130...	M150...
	M120...	M140...	
Barber Coleman	MA3...	MA4...	MA5...

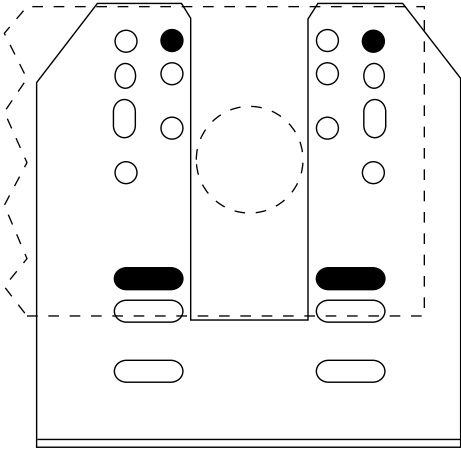
Dimensions (Inches [mm])



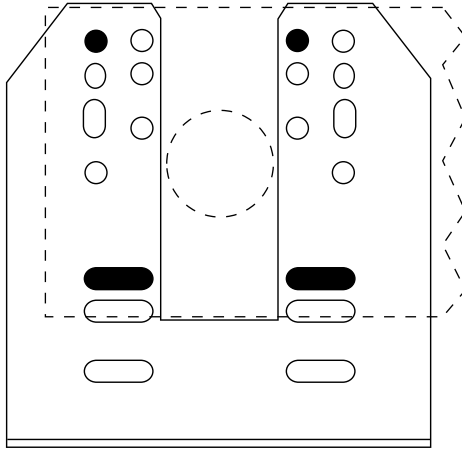
Material	12 GA Galvanized
Weight	1.0 lbs. (0.45 kg)



Barber Colman™ MA Type - Vertical

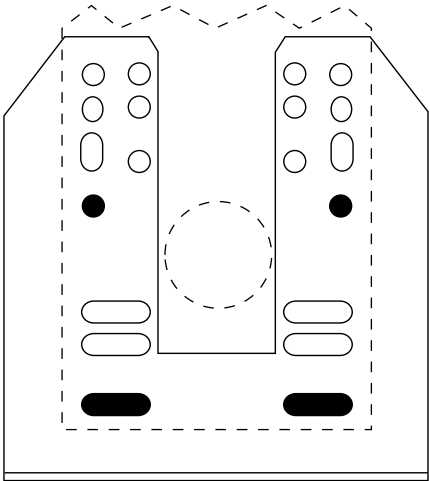


Barber Colman™ MA Type - Horizontal (left)

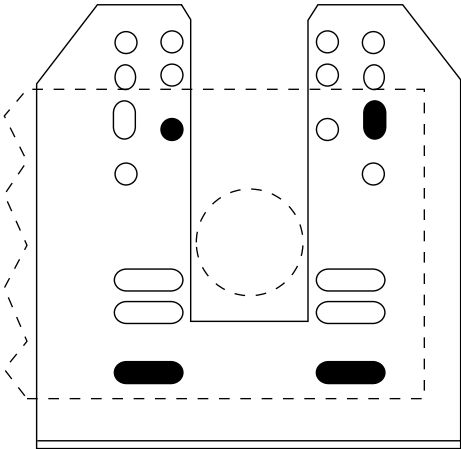


Barber Colman™ MA Type - Horizontal (right)

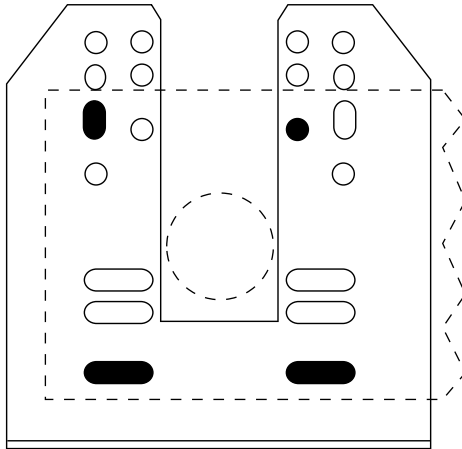
Black holes represent correct bolt locations.



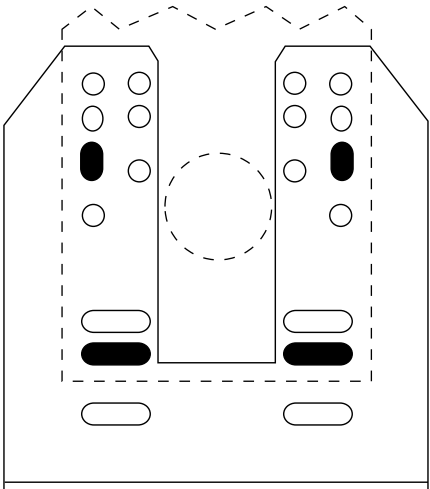
Honeywell™ Mod. IV Type- Vertical



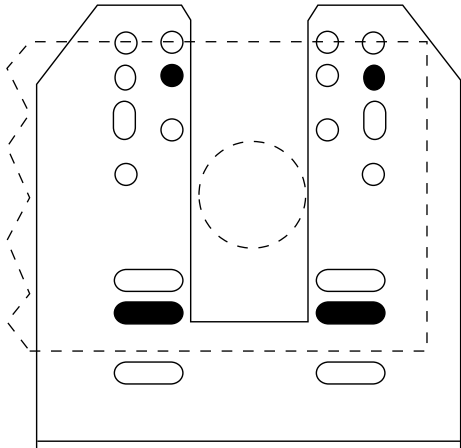
Honeywell™ Mod. IV Type - Horizontal (left)



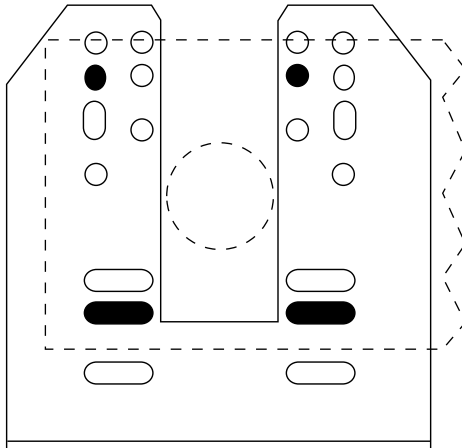
Honeywell™ Mod. IV Type - Horizontal (right)



Johnson Control™ 100 Series Type
and Honeywell™ Mod. III Type
Vertical

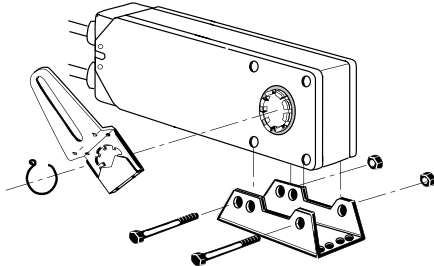
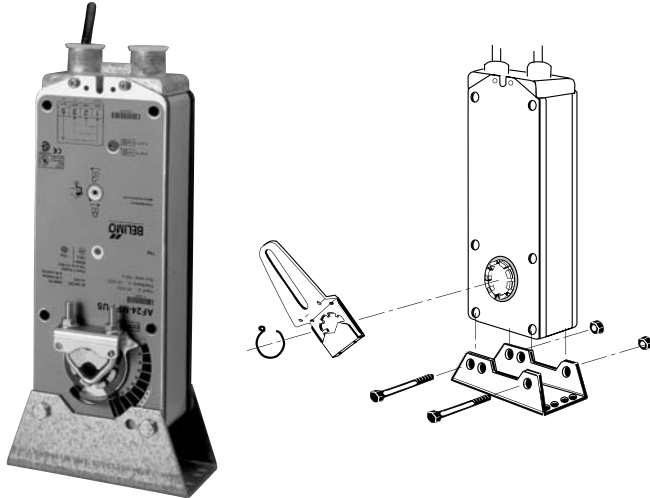


Johnson Control™ 100 Series Type
and Honeywell™ Mod. III Type
Horizontal (left)



Johnson Control™ 100 Series Type
and Honeywell™ Mod. III Type
Horizontal (right)

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Application

The ZG-106 and ZG-107 Universal Mounting Brackets are designed for applications where the actuator cannot be mounted directly to the damper shaft. They may be used for outside or inside the duct mounting.

The ZG-106 and ZG-107 is provided with hole patterns to mount the AF series actuators in either a horizontal or vertical position to meet space requirements.

The KH-AF crank arm is required to fully convert the AF for crank arm operation.

The ZG-106 and ZG-107 are designed to mount the AF series actuators in the same mounting locations as common foot mounted, crank arm style actuators. Hole patterns in the base match common Honeywell™, Siebe™ (Barber Coleman™), and Johnson Controls™ actuators for easy retrofit.

The ZG-106 is designed to place the KH-AF crank arm in the same relative position as the Honeywell™ Mod IV actuators. The ZG-107 is designed to place the crank arm in the same relative position as the Honeywell™ Mod III actuators.

USE THE ZG-106 WHEN REPLACING THESE ACTUATORS

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

USE THE ZG-107 WHEN REPLACING THESE ACTUATORS

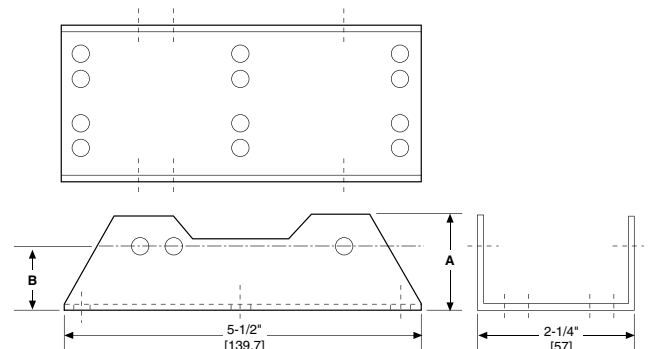
Honeywell	Mod III
-----------	---------

OTHER CRANK ARM ADAPTOR KITS AND UNIVERSAL MOUNTING BRACKETS

KIT	MOUNTING BRACKET*	ACTUATOR USED WITH
ZG-AFB	NA	AFB, AFX, NFB, NFX
ZG-AFB118	ZG-118	AFB, AFX, NFB, NFX
ZG-AF108	ZG-108 (Included)	AF
ZG-AF US	ZG-100, ZG-101	AF
ZG-LF112	ZG-112 (Included)	LF
ZG-LF2	NA	LF
ZG-LFC114	NA	LF
ZG-ECON1	ZG-112 (Included)	LF
ZG-ECON2	ZG-112 (Included)	LF
ZG-TF112	ZG-113 (Included)	TF
ZG-TF2	NA	TF
ZG-GMA	ZG-101, ZG-101, ZG-103, ZG-104	GM
ZG-NMA	ZG-101, ZG-101, ZG-103, ZG-104	NM, AM
NA	ZG-106	AF
NA	ZG-107	AF

*Unless otherwise noted, mounting brackets are not included in crank arm adaptor kits.

Dimensions (Inches [mm])



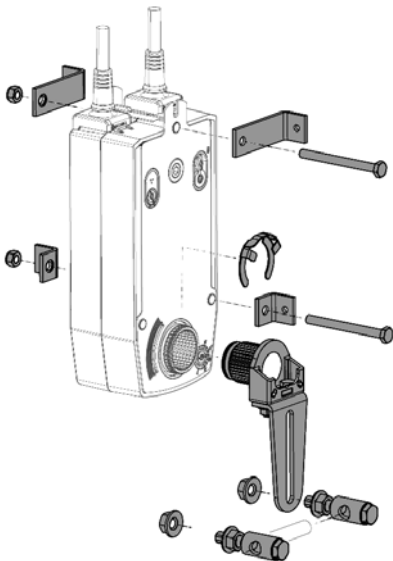
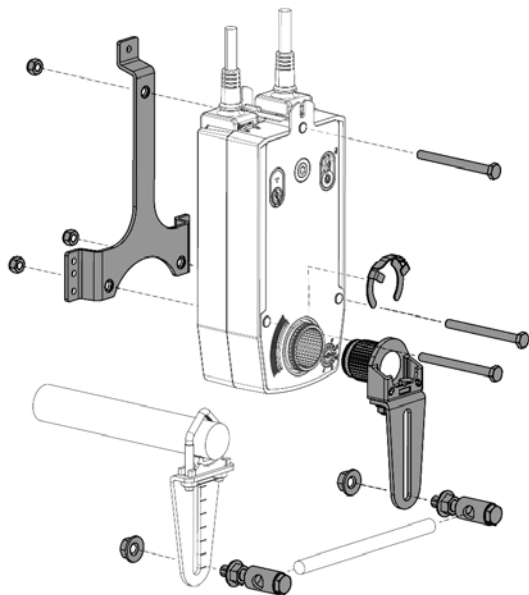
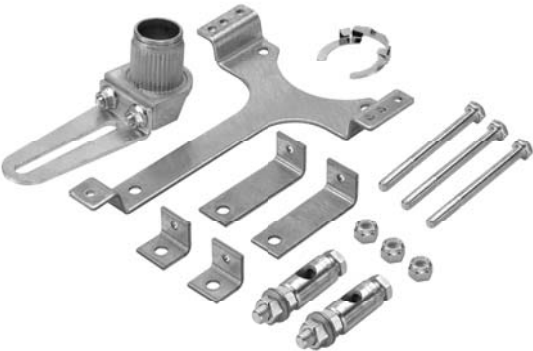
	A	B
ZG-106	1.50"	1.02"
ZG-107	2.25"	1.77"
Material	12 GA Galvanized	
Weight	ZG-106	0.7 lbs.
	ZG-107	0.9 lbs.

ZG-AFB Crank Arm Adaptor Kit

For AFB, AFX, NFB and NFX Series Actuators



ZG-AFB



Application

The ZG-AFB Crank Arm Adaptor Kit is designed for applications where the actuator cannot be mounted directly to the damper shaft.

The ZG-AFB Crank Arm Adaptor Kit includes:

- 1 KH-AFB Crank Arm with Retaining Clip
- 1 "T" Bracket
- 4 Mounting Feet
- 3 Bolts with Nuts
- 2 KG10A Ball Joints

The following Universal Mounting Brackets are needed to fully convert to crank arm operation:

- ZG-100
- ZG-101

The ZG-100 and ZG-101 Universal Mounting Brackets are designed for applications where the actuator cannot be mounted directly to the shaft, and no proper mounting surface is available. It may be used for outside or inside the duct mounting, fastened to the ductwork or directly to the damper assembly. It may also be used to mount to other surfaces rather than the duct.

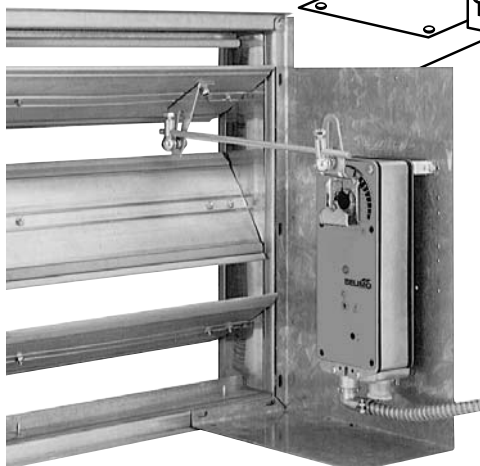
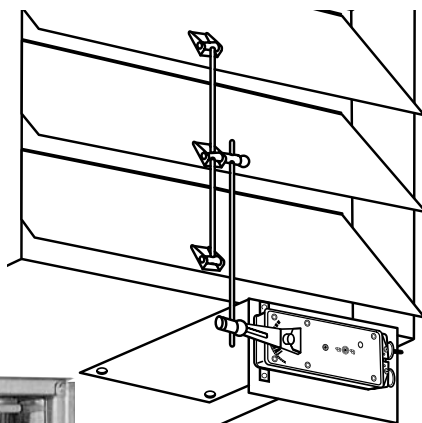
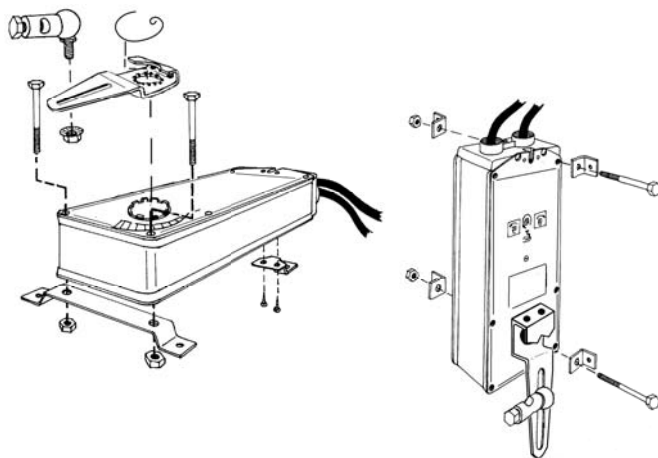
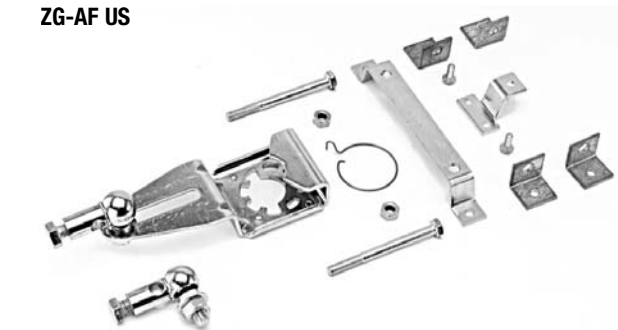
The ZG-100 and ZG-101 are provided with pre-punched hole patterns for the AM, SM, GM, AF, AFB(X) and NFB(X) series actuators. The ZG-100 hole pattern layout allows mounting these actuators in three different, mounting orientations. The ZG-101 hole pattern layout allows mounting these actuators in two different, mounting orientations. The ZG-100 and ZG-101 may also be field drilled for special or more exact mounting of linkage components.

For technical data and dimensions on ZG-100 and ZG-101 Universal Mounting Brackets, see page 443.

OTHER CRANK ARM ADAPTOR KITS AND UNIVERSAL MOUNTING BRACKETS		
KIT	MOUNTING BRACKET*	ACTUATOR USED WITH
ZG-AFB	NA	AFB, AFX, NFB, NFX
ZG-AFB118	ZG-118	AFB, AFX, NFB, NFX
ZG-AF108	ZG-108 (Included)	AF
ZG-AF US	ZG-100, ZG-101	AF
ZG-LF112	ZG-112 (Included)	LF
ZG-LF2	NA	LF
ZG-LFC114	NA	LF
ZG-ECON1	ZG-112 (Included)	LF
ZG-ECON2	ZG-112 (Included)	LF
ZG-TF112	ZG-113 (Included)	TF
ZG-TF2	NA	TF
ZG-GMA	ZG-101, ZG-101, ZG-103, ZG-104	GM
ZG-NMA	ZG-101, ZG-101, ZG-103, ZG-104	NM, AM
NA	ZG-106	AF
NA	ZG-107	AF

*Unless otherwise noted, mounting brackets are not included in crank arm adaptor kits.

ZG-AF US



Application

The ZG-AF US Crank Arm Adaptor Kit is designed for applications where the actuator cannot be mounted directly to the damper shaft.

The ZG-AF US Crank Arm Adaptor Kit includes:

- 1 KH-AF Crank Arm with Retaining Ring
- 2 Standoff Brackets
- 4 Mounting Feet
- 2 Bolts with Nuts
- 2 Self-Tapping Screws
- 2 KG8 Ball Joints

The following Universal Mounting Brackets are needed to fully convert to crank arm operation:

ZG-100 ZG-101

The ZG-100 and ZG-101 Universal Mounting Brackets are designed for applications where the actuator cannot be mounted directly to the shaft, and no proper mounting surface is available. It may be used for outside or inside the duct mounting, fastened to the ductwork or directly to the damper assembly. It may also be used to mount to other surfaces rather than the duct.

The ZG-100 and ZG-101 are provided with pre-punched hole patterns for the AM, SM, GM, AF, AFB(X) and NFB(X) series actuators. The ZG-100 hole pattern layout allows mounting these actuators in three different, mounting orientations. The ZG-101 hole pattern layout allows mounting these actuators in two different, mounting orientations. The ZG-100 and ZG-101 may also be field drilled for special or more exact mounting of linkage components.

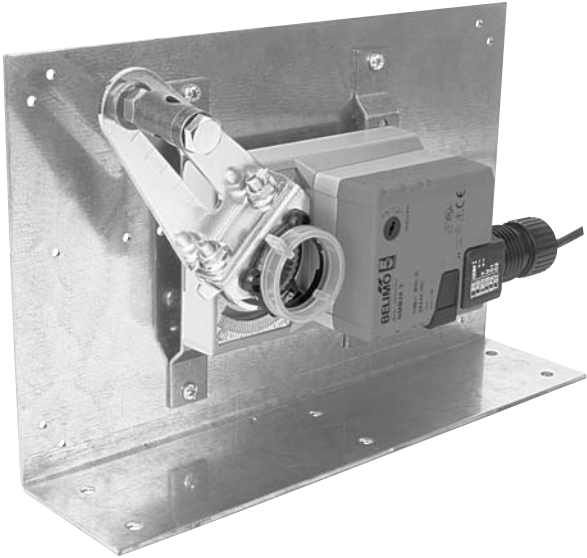
For technical data and dimensions on ZG-100 and ZG-101 Universal Mounting Brackets, see page 443.

OTHER CRANK ARM ADAPTOR KITS AND UNIVERSAL MOUNTING BRACKETS

KIT	MOUNTING BRACKET*	ACTUATOR USED WITH
ZG-AFB	NA	AFB, AFX, NFB, NFX
ZG-AFB118	ZG-118	AFB, AFX, NFB, NFX
ZG-AF108	ZG-108 (Included)	AF
ZG-AF US	ZG-100, ZG-101	AF
ZG-LF112	ZG-112 (Included)	LF
ZG-LF2	NA	LF
ZG-LFC114	NA	LF
ZG-ECON1	ZG-112 (Included)	LF
ZG-ECON2	ZG-112 (Included)	LF
ZG-TF112	ZG-113 (Included)	TF
ZG-TF2	NA	TF
ZG-GMA	ZG-101, ZG-101, ZG-103, ZG-104	GM
ZG-NMA	ZG-101, ZG-101, ZG-103, ZG-104	NM, AM
NA	ZG-106	AF
NA	ZG-107	AF

*Unless otherwise noted, mounting brackets are not included in crank arm adaptor kits.

ZG-GMA Crank Arm Adaptor Kit
For GM Series Actuators



Application

The ZG-GMA Crank Arm Adaptor Kit is designed for applications where the actuator cannot be mounted directly to the damper shaft.

The ZG-GMA Crank Arm Adaptor Kit includes:

- 1 AH-25 Crank Arm
2 KG10 Ball Joints
2 Mounting Brackets
1 Spacer
Mounting Hardware

The following Universal Mounting Brackets are needed to fully convert to crank arm operation:

- ZG-100
ZG-101
ZG-103
ZG-104

The ZG-100, ZG-101, ZG-103, and ZG-104 Universal Mounting Brackets are designed for applications where the actuator cannot be mounted directly to the shaft, and no proper mounting surface is available. It may be used for outside or inside the duct mounting, fastened to the ductwork or directly to the damper assembly. It may also be used to mount to other surfaces rather than the duct.

The ZG-100, ZG-101, ZG-103, ZG-104 are provided with pre-punched hole patterns for the NM, AM, SM, GM, AFB(X), NFB(X), and AF series actuators. The ZG-100 hole pattern layout allows mounting these actuators in three different, mounting orientations. The ZG-101, ZG-103, and ZG-104 hole pattern layout allows mounting these actuators in two different, mounting orientations. The ZG-100 and ZG-101 may also be field drilled for special or more exact mounting of linkage components.

For technical data and dimensions on ZG-100 , ZG-101, ZG-103, and ZG-104 Universal Mounting Brackets, see page 443.

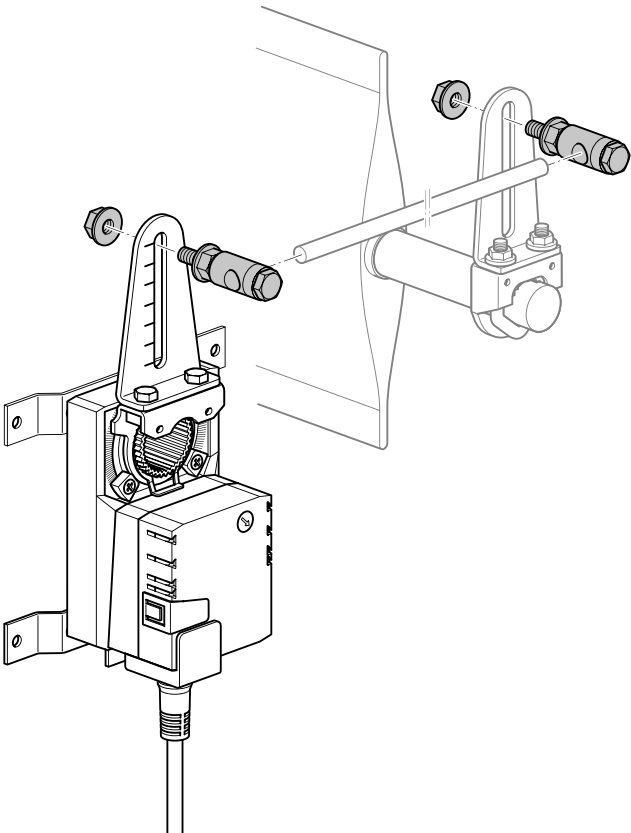
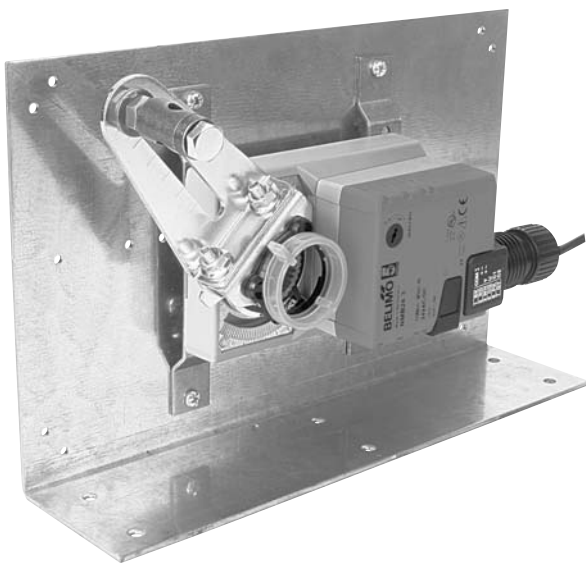


Table with 3 columns: KIT, MOUNTING BRACKET*, and ACTUATOR USED WITH. It lists various adaptor kits and their corresponding mounting brackets and actuators.

*Unless otherwise noted, mounting brackets are not included in crank arm adaptor kits.

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Application

The ZG-NMA Crank arm Adaptor Kit is designed for applications where the actuator cannot be mounted directly to the damper shaft.

The ZG-NMA Crank Arm Adaptor Kit includes:

- 1 Crank Arm
- 2 KG10 Ball Joints
- 2 Mounting Brackets
- 1 Spacer
- Mounting Hardware

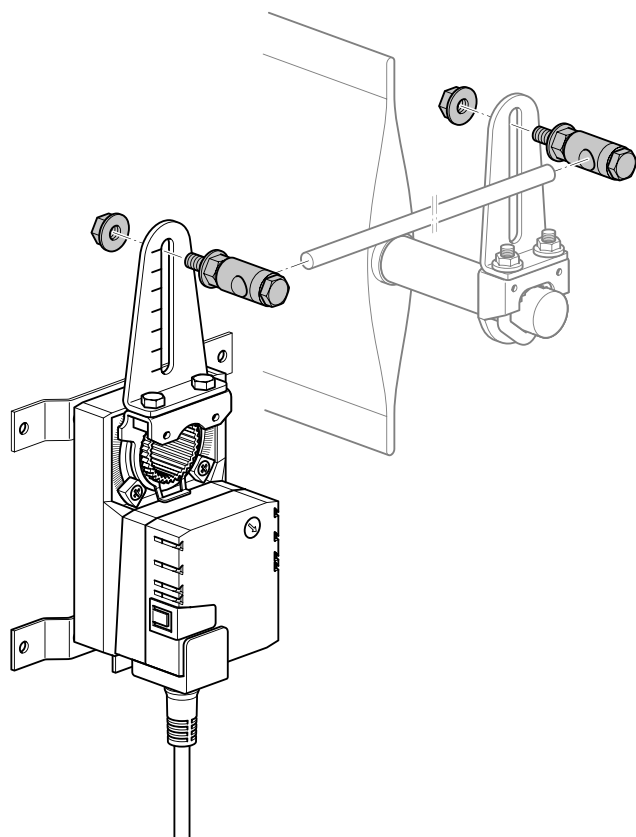
The following Universal Mounting Brackets are needed to fully convert to crank arm operation:

- ZG-100**
- ZG-101**
- ZG-103**
- ZG-104**

The ZG-100, ZG-101, ZG-103, and ZG-104 Universal Mounting Brackets are designed for applications where the actuator cannot be mounted directly to the shaft, and no proper mounting surface is available. It may be used for outside or inside the duct mounting, fastened to the ductwork or directly to the damper assembly. It may also be used to mount to other surfaces rather than the duct.

The ZG-100, ZG-101, ZG-103, ZG-104 are provided with pre-punched hole patterns for the NM, AM, SM, GM, AFB(X), NFB(X), and AF series actuators. The ZG-100 hole pattern layout allows mounting these actuators in three different, mounting orientations. The ZG-101, ZG-103, and ZG-104 hole pattern layout allows mounting these actuators in two different, mounting orientations. The ZG-100 and ZG-101 may also be field drilled for special or more exact mounting of linkage components.

For technical data and dimensions on ZG-100, ZG-101, ZG-103, and ZG-104 Universal Mounting Brackets, see page 443.



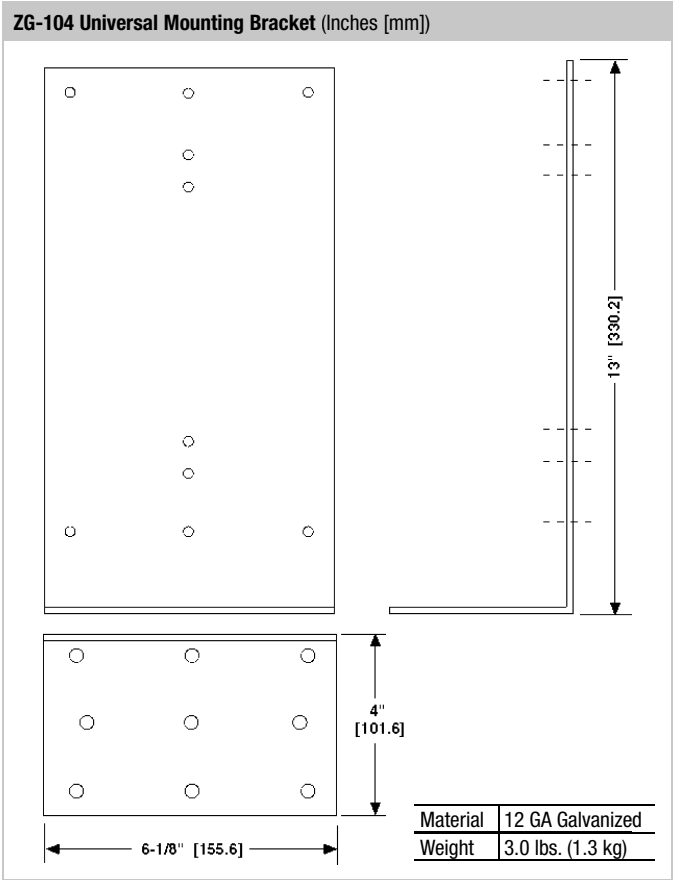
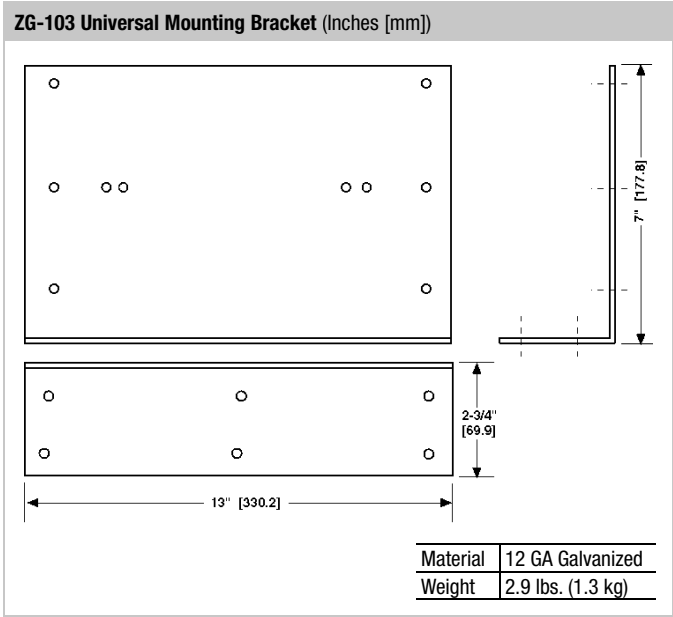
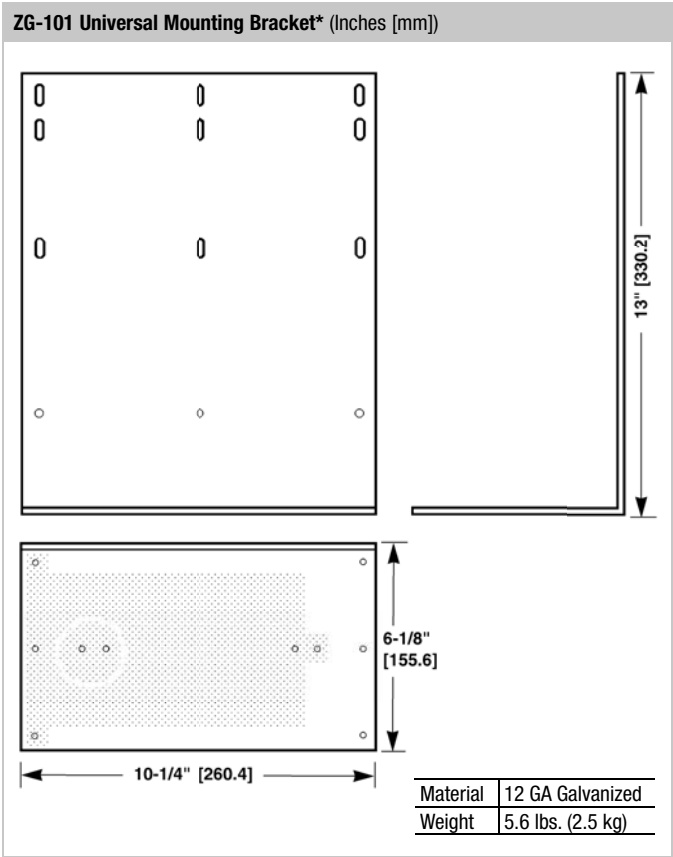
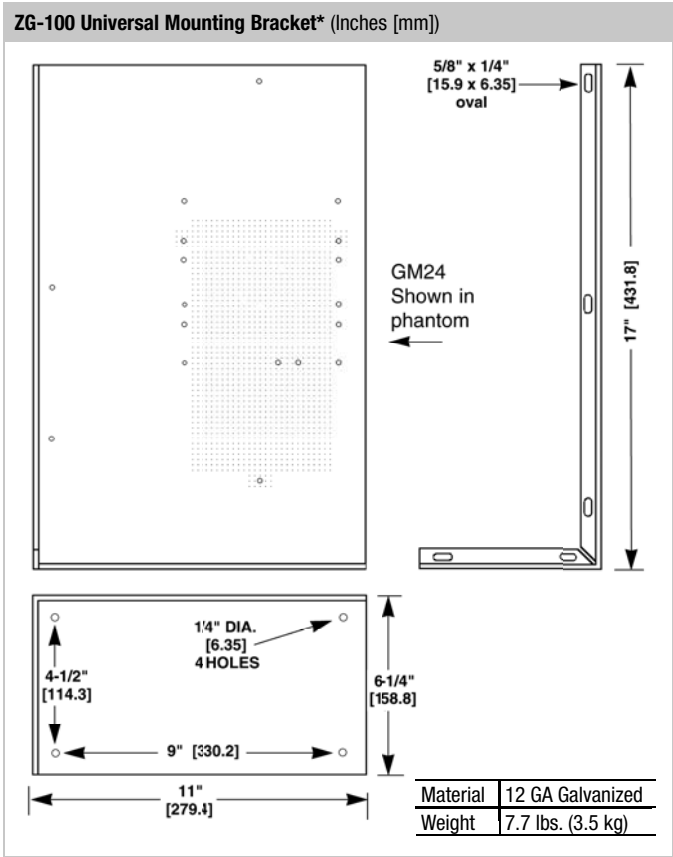
OTHER CRANK ARM ADAPTOR KITS AND UNIVERSAL MOUNTING BRACKETS

KIT	MOUNTING BRACKET*	ACTUATOR USED WITH
ZG-AFB	NA	AFB, AFX, NFB, NFX
ZG-AFB118	ZG-118	AFB, AFX, NFB, NFX
ZG-AF108	ZG-108 (Included)	AF
ZG-AF US	ZG-100, ZG-101	AF
ZG-LF112	ZG-112 (Included)	LF
ZG-LF2	NA	LF
ZG-LFC114	NA	LF
ZG-ECON1	ZG-112 (Included)	LF
ZG-ECON2	ZG-112 (Included)	LF
ZG-TF112	ZG-113 (Included)	TF
ZG-TF2	NA	TF
ZG-GMA	ZG-101, ZG-101, ZG-103, ZG-104	GM
ZG-NMA	ZG-101, ZG-101, ZG-103, ZG-104	NM, AM
NA	ZG-106	AF
NA	ZG-107	AF
NA	ZG-107	AF

*Unless otherwise noted, mounting brackets are not included in crank arm adaptor kits.

ZG-100, ZG-101, ZG-103, ZG-104 Universal Mounting Brackets

For AM, SM, GM, NFB(X), and AFB(X) Series Actuators

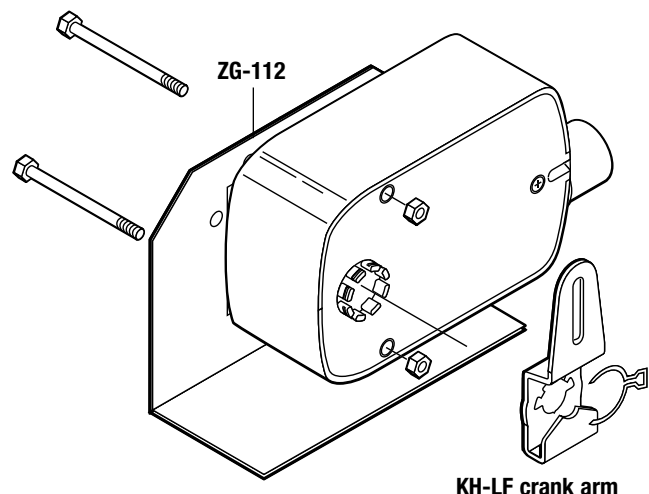


* NOTE: ZG-AFB, ZG-AF US, ZG-GMA, or ZG-NMA Required

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ZG-LF112 Crank Arm Adaptor Kit

For LF Series Actuators



Application

The ZG-LF112 Crank Arm Adaptor Kit is designed for applications where the actuator cannot be mounted directly to the damper shaft. It may be used for outside or inside the duct mounting.

The ZG-LF112 Crank Arm Adaptor Kit includes:

- 1 ZG-112 Mounting Bracket
- 1 KH-LF Crank Arm with Retaining Clip
- 2 Bolts with Nuts

NOTE: May require crank arm and ball joints

The ZG-112 is provided with hole patterns to mount the LF series actuators in either a horizontal or vertical position to meet space requirements.

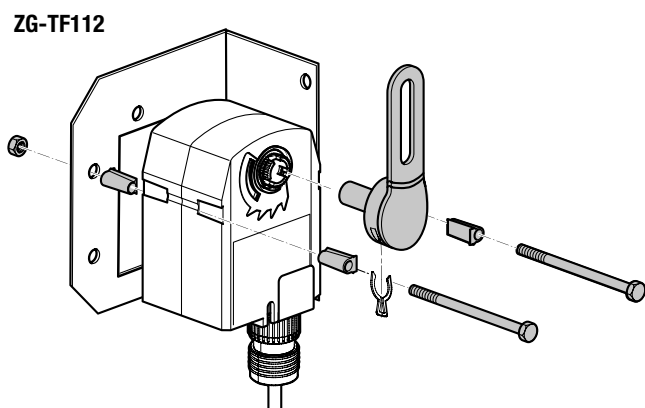
The ZG-112 Mounting Bracket is designed to mount the NF and AF series actuator in the same mounting locations as common foot mounted, crank arm style actuators. Hole patterns in the base match common Honeywell™, Siebe™ (Barber Coleman™), and Johnson Controls™ actuators for easy retrofit.

USE WHEN REPLACING THESE ACTUATORS

Honeywell	M84...	M7

ZG-TF112 Crank Arm Adaptor Kit

For TF Series Actuators



Application

The ZG-TF112 Crank Arm Adaptor Kit is designed for applications where the actuator cannot be mounted directly to the damper shaft. It may be used for outside or inside the duct mounting.

The ZG-TF112 Crank Arm Adaptor Kit includes:

- 1 ZG-113 Mounting Bracket
- 1 KH-TF-1 Crank arm with Retaining Clip
- 2 Bolts with Nuts

NOTE: May require crank arm and ball joints

The ZG-113 is provided with hole patterns to mount the TF series actuators in either a horizontal or vertical position to meet space requirements.

The ZG-113 Mounting Bracket is designed to mount the TF series actuator in the same mounting locations as common foot mounted, crank arm style actuators. Hole patterns in the base match common Honeywell™, Siebe™ (Barber Coleman™), and Johnson Controls™ actuators for easy retrofit.

USE WHEN REPLACING THESE ACTUATORS

Honeywell	M84...	M7...

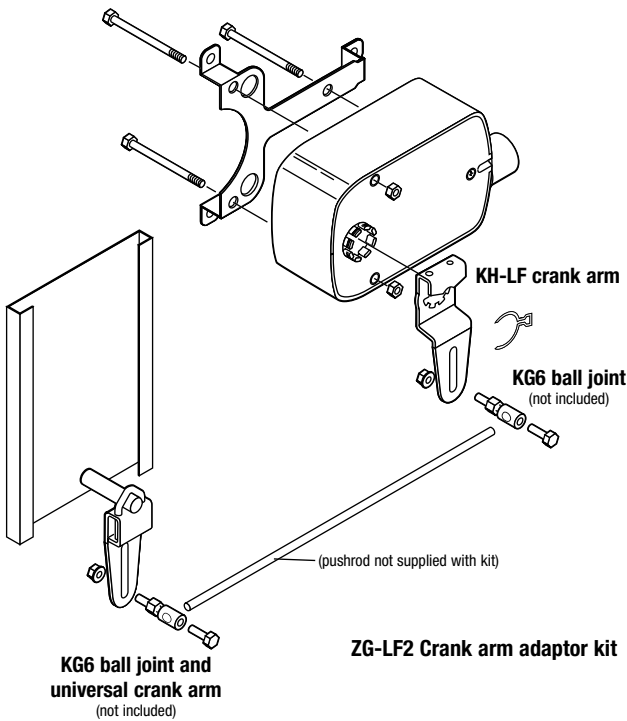
ZG-LF2 and ZG-TF2 Crank Arm Adaptor Kits

For LF and TF Series Actuators



ZG-LF2 Crank Arm Adaptor Kit

For LF Series Actuators



Application

The ZG-LF2 Crank Arm Adaptor Kit is designed for applications where the actuator cannot be mounted directly to the damper shaft. It may be used for outside or inside the duct mounting.

The ZG-LF2 Crank Arm Adaptor Kit includes:

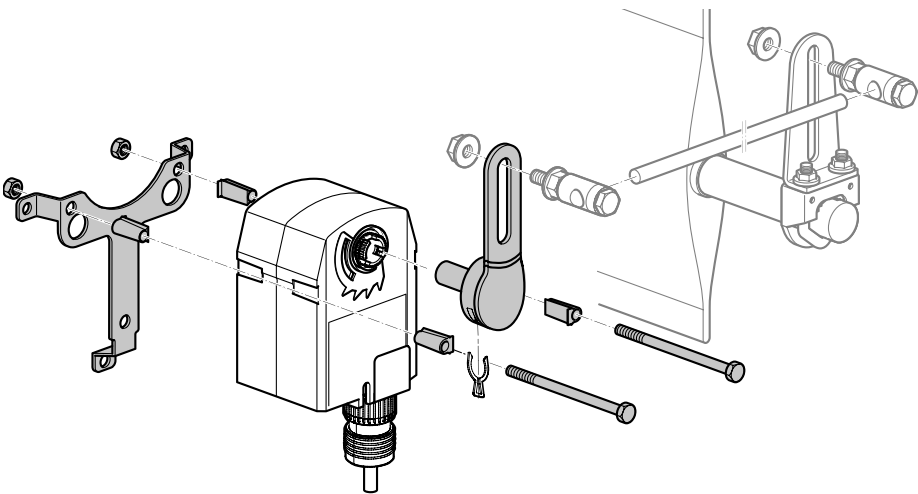
- 1 Mounting Bracket
- 1 KH-LF Crank Arm with Retaining Ring
- 3 Bolts with Nuts

NOTE: May require crank arm and ball joints

The ZG-LF2 Crank Arm Adaptor Kit can be used to replace foot mounted, crank arm style actuators. The ZG-LF2 allows for easy retrofit of Honeywell™, Siebe™ (Barber Coleman™), and Johnson Controls™ actuators.

ZG-TF2 Crank Arm Adaptor Kit

For TF Series Actuators



Application

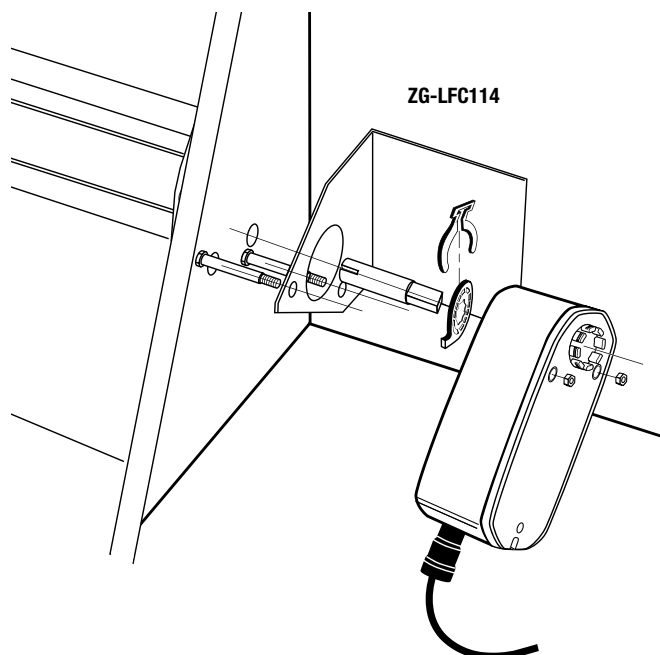
The ZG-TF2 Crank Arm Adaptor Kit is designed for applications where the actuator cannot be mounted directly to the damper shaft. It may be used for outside or inside the duct mounting.

The ZG-TF2 Crank Arm Adaptor Kit includes:

- 1 Mounting Bracket
- 1 KH-TF-1 Crank Arm with Retaining Clip
- 3 Bolts with Nuts

NOTE: May require crank arm and ball joints

The ZG-TF2 Crank Arm Adaptor Kit can be used to replace foot mounted, crank arm style actuators. The ZG-TF2 allows for easy retrofit of Honeywell™, Siebe™ (Barber Coleman™), and Johnson Controls™ actuators.



Application

The ZG-LFC114 Crank Arm Adaptor Kit is designed for Trane voyager economizer actuator retrofit.

The ZG-LFC114 Crank Arm Adaptor Kit includes:

- 1 Mounting Bracket
- 1 Shaft Adaptor
- 2 Bolts with Nuts
- 4 Female Spade Connectors

Note: May require crank arm and ball joints

USE WHEN REPLACING THESE ACTUATORS

Honeywell	M84...	M7...

OTHER CRANK ARM ADAPTOR KITS AND UNIVERSAL MOUNTING BRACKETS

KIT	MOUNTING BRACKET*	ACTUATOR USED WITH
ZG-AFB	NA	AFB, AFX, NFB, NFX
ZG-AFB118	ZG-118	AFB, AFX, NFB, NFX
ZG-AF108	ZG-108 (Included)	AF
ZG-AF US	ZG-100, ZG-101	AF
ZG-LF112	ZG-112 (Included)	LF
ZG-LF2	NA	LF
ZG-LFC114	NA	LF
ZG-ECON1	ZG-112 (Included)	LF
ZG-ECON2	ZG-112 (Included)	LF
ZG-TF112	ZG-113 (Included)	TF
ZG-TF2	NA	TF
ZG-GMA	ZG-101, ZG-101, ZG-103, ZG-104	GM
ZG-NMA	ZG-101, ZG-101, ZG-103, ZG-104	NM, AM
NA	ZG-106	AF
NA	ZG-107	AF
NA	ZG-107	AF

*Unless otherwise noted, mounting brackets are not included in crank arm adaptor kits.

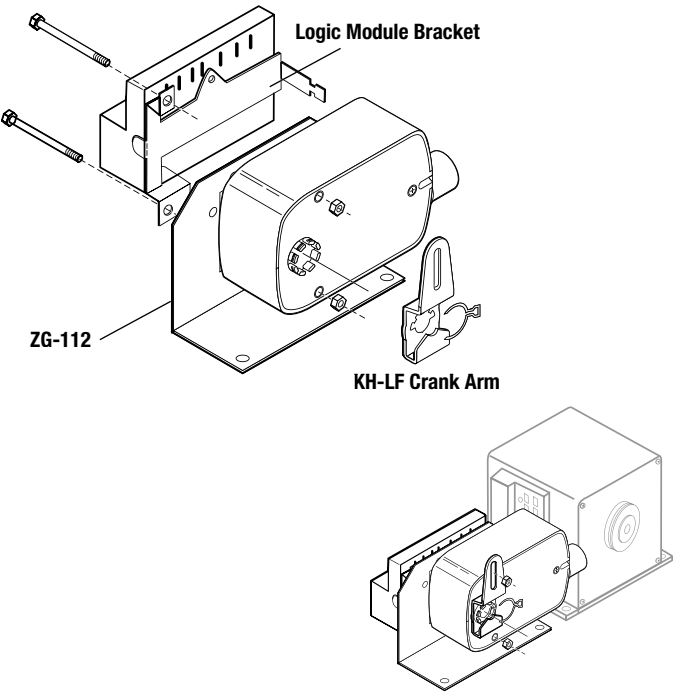
ZG-ECON1 and ECON2 Crank Arm Adaptor Kits

For LF and Series Actuators



ZG-ECON1 Crank Arm Adaptor Kit

For LF Series Actuators



Application

The ZG-ECON1 Crank Arm Adaptor Kit is designed for applications where the actuator cannot be mounted directly to the damper shaft. It may be used for outside or inside the duct mounting.

The ZG-ECON1 Crank Arm Adaptor Kit includes:

- 1 ZG-112 Mounting Bracket
- 1 Logic Module Mounting Bracket (20477-00001)
- 1 KH-LF Crank Arm with Retaining Ring
- 1 KG6 Ball Joint
- 4 Male Spades
- 2 Bolts with Nuts

NOTE: May require crank arm and ball joints

The ZG-112 is provided with hole patterns to mount the LF series actuators in either a horizontal or vertical position to meet space requirements.

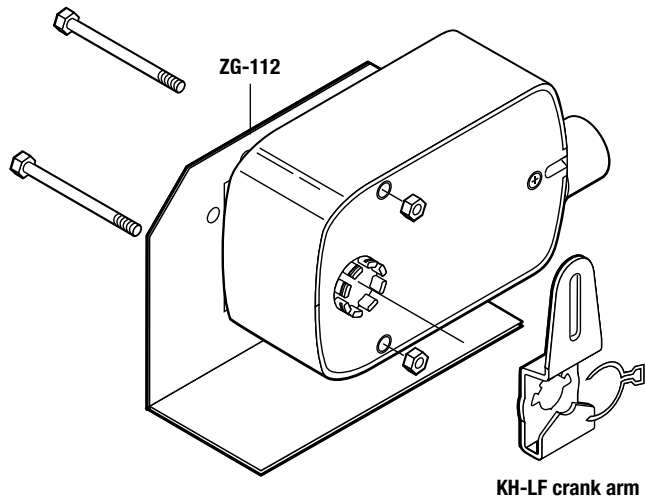
The ZG-112 Mounting Bracket is designed to mount the TF and LF series actuator in the same mounting locations as common foot mounted, crank arm style actuators. Hole patterns in the base match common Honeywell™, Siebe™ (Barber Coleman™), and Johnson Controls™ actuators for easy retrofit.

USE WHEN REPLACING THESE ACTUATORS

Honeywell	M84...	M7...
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ZG-ECON2 Crank Arm Adaptor Kit

For LF Series Actuators



Application

The ZG-ECON2 Crank Arm Adaptor Kit is designed for applications where the actuator cannot be mounted directly to the damper shaft. It may be used for outside or inside the duct mounting.

The ZG-ECON2 Crank Arm Adaptor Kit includes:

- 1 ZG-112 Mounting Bracket
- 1 KH-LF Crank Arm with Retaining Ring
- 1 KG6 Ball Joint
- 4 Female Spades
- 2 Bolts with Nuts

NOTE: May require crank arm and ball joints

The ZG-112 is provided with hole patterns to mount the LF series actuators in either a horizontal or vertical position to meet space requirements.

The ZG-112 Mounting Bracket is designed to mount the TF and LF series actuator in the same mounting locations as common foot mounted, crank arm style actuators. Hole patterns in the base match common Honeywell™, Siebe™ (Barber Coleman™), and Johnson Controls™ actuators for easy retrofit.

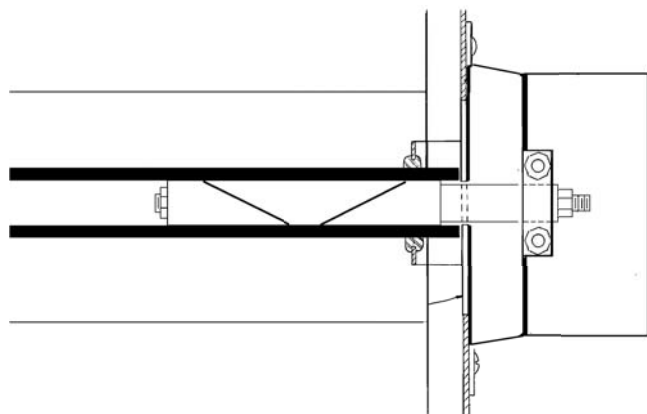
USE WHEN REPLACING THESE ACTUATORS

Honeywell	M84...	M7...
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Application

The ZG-JSA jack shaft adaptors are designed to be inserted into hollow jack shafts which have an outside diameter greater than 3/4 inch and provide a 3/4 inch shaft for mounting Belimo actuators.

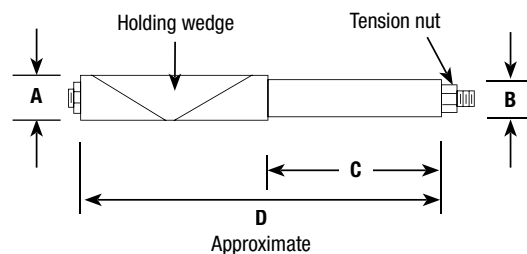


Technical Data		ZG-JSA-1
Jack Shaft Size	Outside diameter	1.00"
	Inside diameter	3/4"
Weight		1.3 lbs.
Material		Cold rolled steel, nickel plated

Technical Data		ZG-JSA-2
Jack Shaft Size	Outside diameter	1-5/16"
	Inside diameter	1-3/32"
Weight		2.3 lbs.
Material		Cold rolled steel, nickel plated

Technical Data		ZG-JSA-3
Jack Shaft Size	Outside diameter	1.05"
	Inside diameter	27/32"
Weight		1.6 lbs.
Material		Cold rolled steel, nickel plated

Dimensions (Inches [mm])



	A (Diameter)	B (Diameter)	C	D
ZG-JSA-1	3/4"	3/4"	—	10-3/4"
ZG-JSA-2	1-1/16"	3/4"	6"	12-1/2"
ZG-JSA-3	13/16"	3/4"	6"	12-1/4"

ZS-100 Weather Shield



Application

The ZS-100 weather shield provides moderate protection to actuators which are mounted outdoors. This product is not designed as a water tight enclosure. The weather shield will work with all damper actuators.

Installation

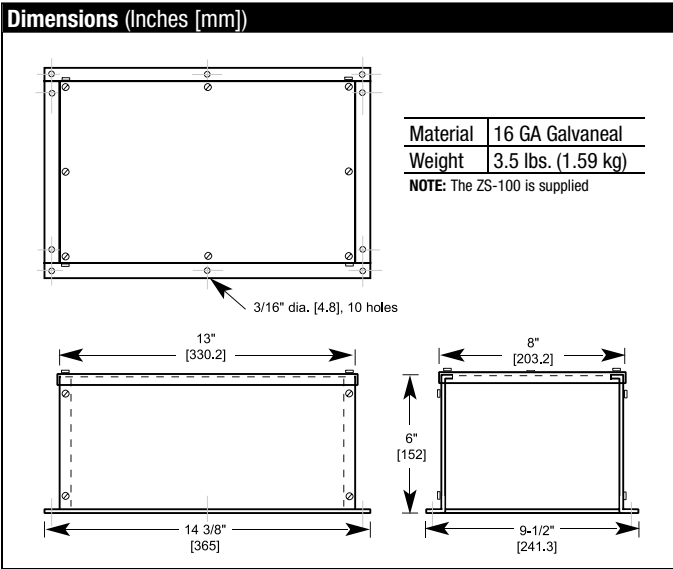
The ZS-100 weather shield is supplied disassembled. Supplying it in this manner makes it applicable to a wider range of field applications.

It may be assembled with 2 sides, 2 ends and the cover to completely conceal the actuator. A hole punch can be used to provide a hole to mount a wire conduit. A foam gasket is also provided to achieve a better seal between the cover and sides or from the base to the mounting surface.

If desired, a side or end can be deleted from the assembly to provide easy access from the bottom of the enclosure.

Accessories

ZS-101	Base mounting plate
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ZS-150 Weather Shield

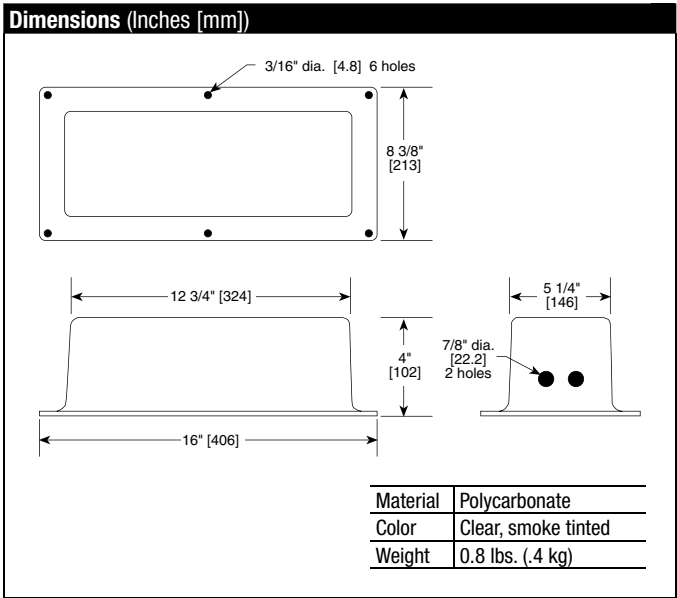


Application

The ZS-150 weather shield provides moderate protection to actuators which are mounted outdoors. This product is not designed as a water tight enclosure. The one piece, smoke tinted, polycarbonate housing allows easy mounting over all damper actuators. The tinted, clear housing allows easy viewing of the actuator in operation.

Installation

The ZS-150 weather shield is supplied as a one piece enclosure. Two 7/8 inch wiring holes are pre-drilled to allow easy connections of conduit to the housing. If connections must be made to a different spot on the enclosure or only one hole is required, two plastic plugs are provided to seal the holes. A foam gasket is also provided to achieve a better seal between the base of the enclosure to the mounting surface.



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Application

The ZS-260 explosion-proof housing may be used with the GM..., AM..., NFB..., NFX..., AFB..., AFX..., AF..., LF... series actuators. This housing is not designed for direct coupling. UL and CSA; Class I, Division 1&2, Groups B, C, D, (NEMA 7), Class II, Division 1&2, Groups E, F and G, (NEMA 9), Class III, Hazardous (classified) Locations, outdoor application NEMA 4X.

Operation

The ZS-260 enclosure is designed so that the required actuator may be easily field mounted into the enclosure. The actuator is fastened on to the internal portion of the operating shaft and secured at the end with an anti-rotation strap. A crank-arm, such as the KH8, is mounted to the external portion of the operating shaft for connection to the damper linkage. ZG-109 right angle, and ZG-110 standoff mounting brackets may be used (see back).

The ZS-260 is designed so that the operating shaft can be mounted on either the front or rear side of the housing.

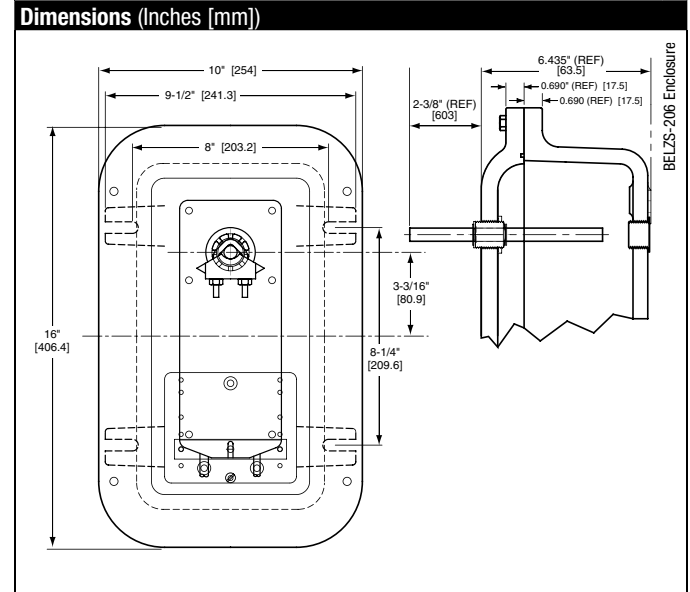
Accessories

KH8	Universal crank arm
KG8	Universal ball joint
KG10	Universal ball joint
ZG-109	Right angle mounting bracket
ZG-110	Stand-off mounting bracket

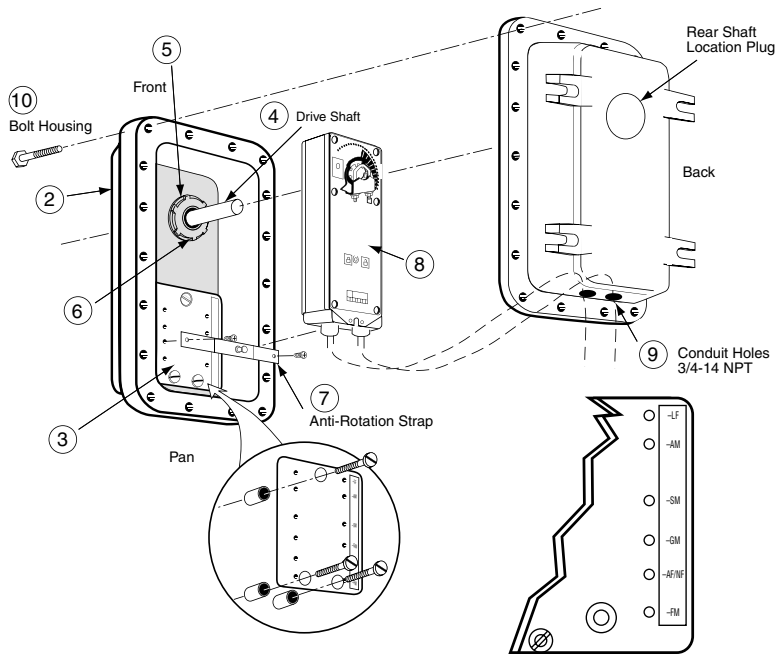
Technical Data		ZS-260
Material	Housing	cast, copper-free, aluminum,
	Cover Bolts	stainless steel
	Operating Shaft	stainless steel
Conduit holes		3/4"-14 NPT (2 supplied), see NOTE 1
Operating shaft diameter		1/2 inch [12.7]
Operating shaft location		front or rear side of housing (Field selected)
Approved applications		UL and CSA; Class I, Division 1&2, Groups B, C, D, (NEMA 7), Class II, Division 1&2, Groups E, F and G, (NEMA 9), Class III, Hazardous (classified) Locations, outdoor application NEMA 4X.
Weight		31.0 lb. (14.0 kg) without actuator

NOTE 1: Fittings that meet the requirements of the hazardous location must be used. All applications must comply with applicable local and/or national electric code.

NOTE: Since conditions of use of this product are outside the control of Belimo, the purchaser should determine suitability of the product for their intended use, and assumes all risk and liability in connection therewith.



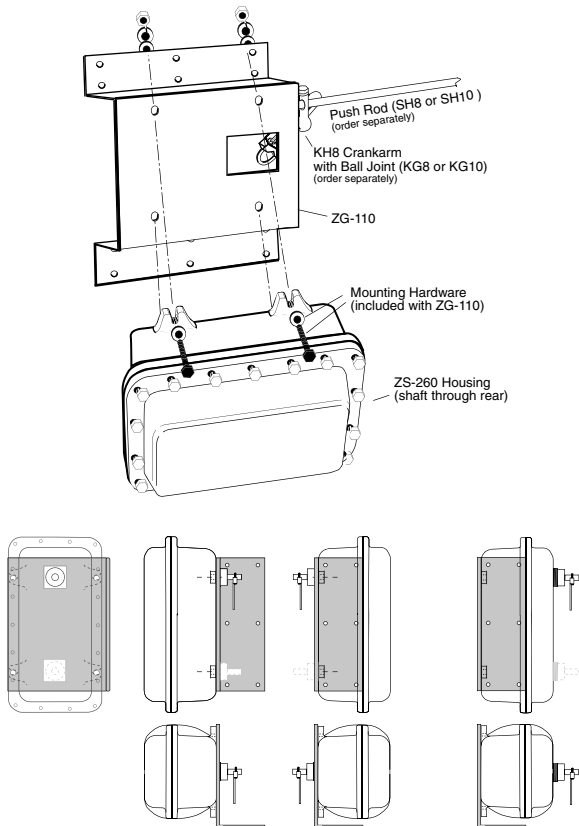
ZS-260 Shaft Thru Front



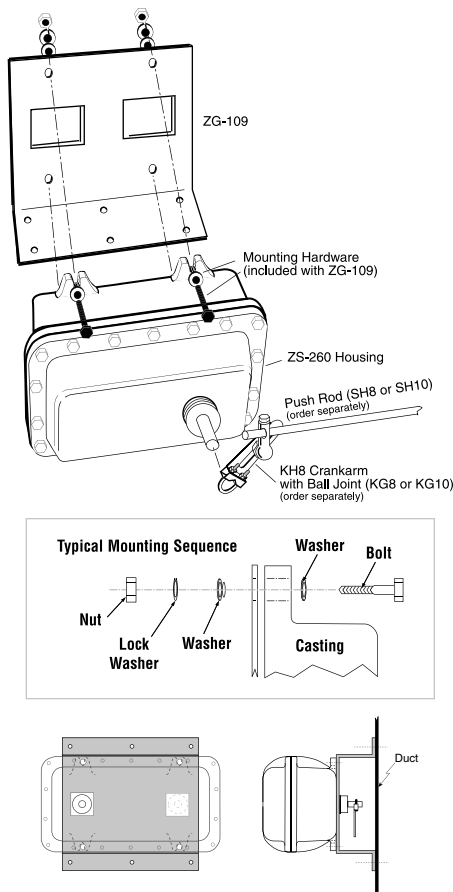
ZS-260 Mounting Instructions

1. Determine proper operating shaft location.
2. Remove threaded plug from the hole in which the operating shaft will be mounted.
3. Install the anti-rotation strap, mounting plate, to the side of the housing where the operating shaft will be mounted.
4. From the inside surface of the housing, insert the operating shaft, short length first, into the mounting hole.
5. Hand tighten the shaft bushing into the housing until the star nut/seal is in contact with the face of the housing.
6. Using a screw driver blade, drive the star nut/seal clockwise until the bushing is locked into place.
7. Install the anti-rotation strap into the mounting plate at the designated holes for the actuator to be used.
8. Install actuator.
9. Wire actuator (per electrical code).
10. Bolt housing together.

Typical ZG-109 Mounting



Typical ZG-110 Mounting





ZS-300

ZS-300 NEMA 4X Housing

For AMB, GMB, LF, NFB, NFX, AFB, AFX, AF Series Actuators

Application

The ZS-300 (-1) NEMA 4X enclosures may be used with AMB, GMB, LF, NF, and AF Belimo actuators. They are intended for use primarily to provide protection against corrosion, windblown dust and rain, splashing water, hose-directed water; undamaged by the formation of ice on the enclosure. Type 304 stainless steel enclosures resist moisture, dust, salt, and corrosive chemicals, and are easy to keep clean for sanitary applications.

Operation

The ZS-300 enclosures are designed so that the required actuator may be easily mounted in the enclosure. The operating shaft and coupling are inserted from the backside through the rotating shaft seal. The actuator is fastened on the end of the operating shaft and secured at the end with an anti-rotation strap. Adjustable mounting brackets, if supplied, are assembled to the fixed mounting holes at the top and bottom of the enclosure with stainless steel nuts, bolts and lock washers. The direct drive coupling is designed for a 1/2" round or hexagonal shaft and secured with two square head set screws. Mounting brackets are adjusted and secured in place.

Ordering Information

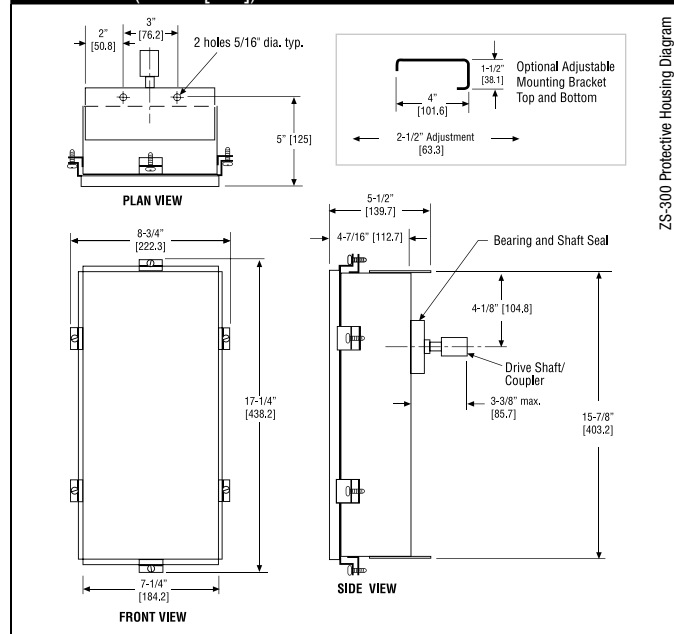
ZS-300	304 stainless steel housing with mounting brackets
ZS-300-1	304 stainless steel housing without mounting brackets
ZS-300-5	316L stainless steel housing with mounting brackets

Accessories

ZS-300-BK	Mounting bracket set
ZS-300-C1	1/2" shaft adaptor (standard with housing)
ZS-300-C2	3/4" shaft adaptor
ZS-300-C3	1" shaft adaptor

Technical Data	ZS-300 (-1) (-5)
Material	All stainless steel housing, door, (with microcellular urethane gasket), shaft, coupling, universal mounting plate, and hardware.
Conduit holes	Field drilled as required. UL listed electrical fittings for NEMA 4X conditions must be used.
Drive shaft/coupler	1/2" by 5 15/16" long stainless steel with integral coupling for direct mounting to 1/2" round or hexagonal drive shafts. Square head set screws are stainless steel.
Rotating shaft seal	6061 aluminium hub with black anodize plating, bronze oilite bearings, 10 PSI, Nitrile, bi-rotational, hydrodynamic, radial lip Wave seal.
Industry standards	The Belimo ZS-300 NEMA 4X enclosure and Belimo model AMB, GMB, LF, NFB(X), AF, and AFB(X) are UL listed. These enclosures conform to the NEMA standard for Type 4X (water-tight, dust-tight and corrosion resistant).
Weight	11 lbs. [5 kg] without actuator or mounting brackets.

Dimensions (Inches [mm])



ZS-300 Protective Housing Diagram

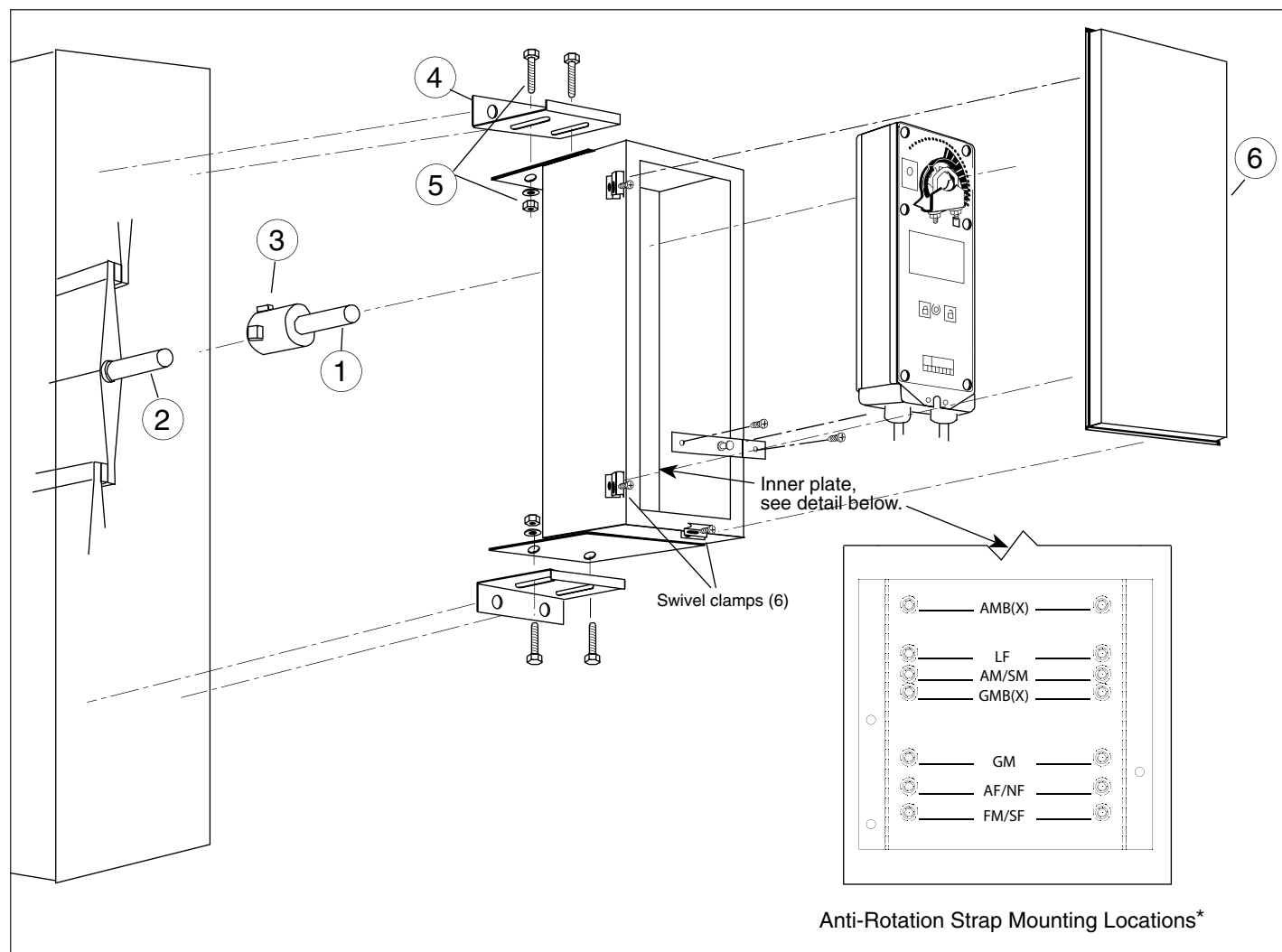
ZS-300 (-1, -5)

NEMA 4X, stainless steel, corrosion resistant enclosures for AM, GM, NFB, NFX, AFB, AFX and AF actuators



ZS-300 Mounting Instructions

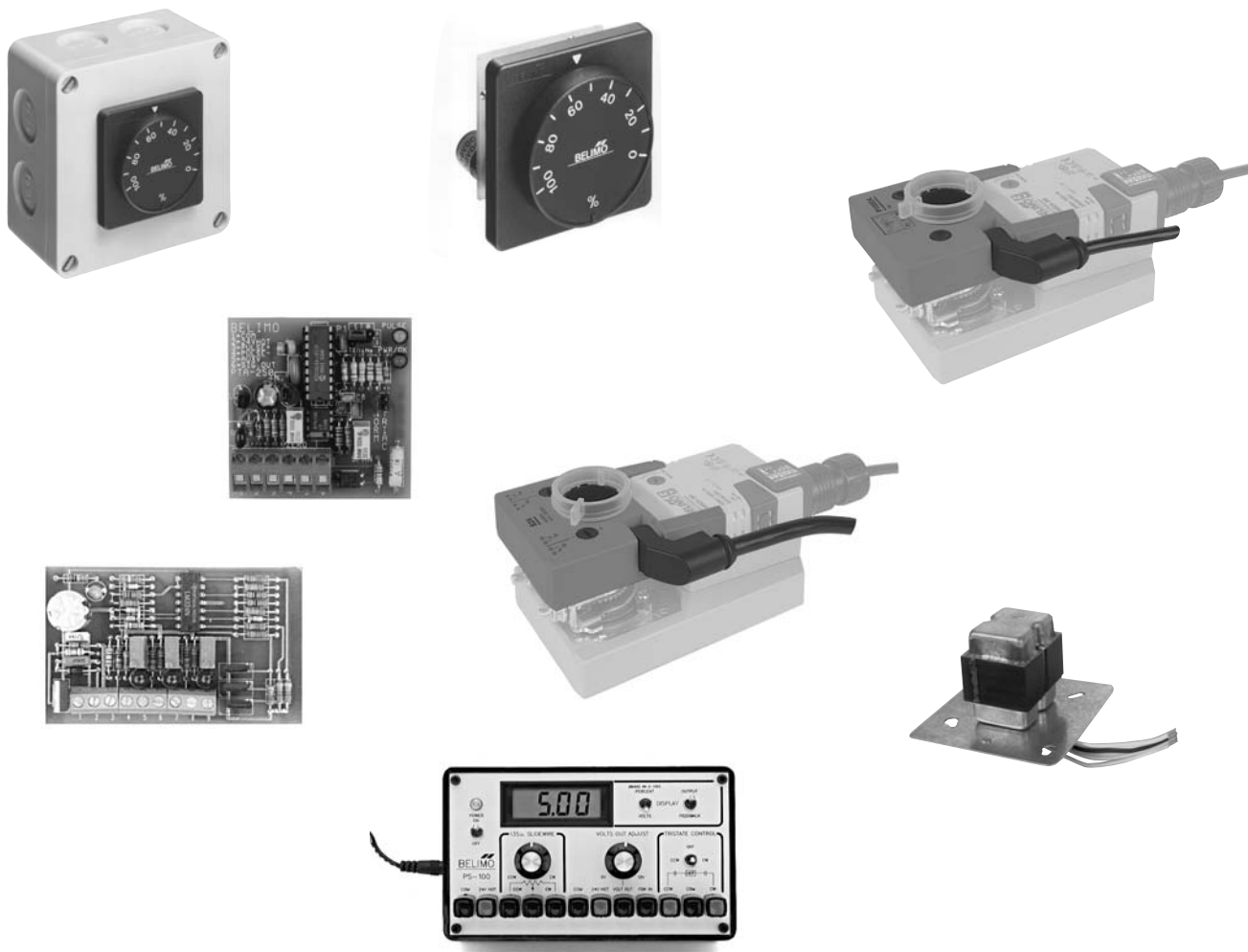
1. The damper operating shaft should extend approximately 1-1/2 inches from the damper assembly or duct side. Mount the drive shaft/coupler ① to the damper operating shaft ②. Fasten the coupler to the damper operating shaft by tightening the two 3/8 inch square head set screws ③.
2. Determine the housing mounting orientation for the application.
3. Locate the housing hole position(s) for the control wiring of the actuator.
4. Make the necessary holes in the housing for the electrical fittings. All fittings must be rated for use in NEMA 4X applications.
5. Install (if ordered with) the 2 mounting brackets ④ to the housing using the four 1/4-20 screws, washers, and nuts ⑤. Do not tighten.
6. Carefully slide the housing over the drive shaft.
7. Place the housing in the desired mounting position. Transfer the mounting hole locations from the mounting bracket to the mounting surface.
8. Drill the 4 holes and fasten the brackets to the surface.
9. Install the anti-rotation strap to the housing in the correct location for the actuator which is being used.
10. Mount the actuator to the drive shaft using the instructions for the actuator being used. Finger tighten the nuts of the universal clamp. Make sure the back of the actuator is parallel to the back of the housing.
11. The operating shaft must pass through the mounting clamp at least 3/8 of an inch. It must not extend beyond the front of the housing. Slide the actuator/housing assembly in the mounting brackets to obtain the proper position.
12. Tighten the mounting brackets to the housing. Verify that the back of the actuator is still parallel to the back of the housing. Tighten the nuts on the universal clamp.
13. Make all of the required electrical connections.
14. Test the actuator/damper operation.
15. Fasten the housing cover ⑥ using the 6 swivel clamps.



*AFB, AFX, NFB and NFX can be installed using GM mounting location without the need of the Z-AF retrofit bracket.

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 Easy installation. Accuracy and repeatability.
 Low power consumption. No maintenance.
- Long Service Life.**
 Components tested before assembly. Every product tested before shipment.
 20+ years direct coupled actuator design.

SEE PAGE NUMBER		463	412	—	411	456	457	458	459	461	461	461	460	463	464	Refer to MFT Technical Documentation					
BELIMO ACTUATOR	PART NUMBER	PS-100	STA, S2A	P370	P... A GR	SGA24, SGF24	PTA-250	IRM-100	ADS-100	ZG-R01	ZG-R02	ZG-R03, ZG-R05, ZG-R06	NSV24	ZG-X40	ZG-HTR	MFT-P US	ZIP-RS232 US	ZIP-USB-MP US	ZK1-GEN	ZK2-GEN	ZK3-GEN
AF24 (-S) US		●		●										●	●						
AF120 (-S) US				●											●						
AF230 (-S) US				●											●						
AF24-SR US		●		●		●	●		●	●	●			●	●						
AFB24-MFT (-S), AFX24-MFT (-S)		●		●		●			●	●	●		●	●		●	●			●	
AFB24-MFT95, AFX24-MFT95		●		●								●		●		●	●			●	
AF24-PC US		●		●										●	●						
NFB24 (-S), NFX24 (-S)		●		●										●							
NFBUP (-S), NFXUP (-S)		●		●																	
NFB24-SR (-S), NFX24-SR (-S)		●		●		●	●		●	●	●			●							
NFB24-MFT (-S), NFX24-MFT (-S)		●		●		●			●	●	●		●	●		●	●			●	
LF24 (-S) US		●		●										●							
LF120 (-S) US				●																	
LF230 (-S) US				●																	
LF(C)24-3... US		●		●										●							
LF24-SR... US		●		●		●	●	●	●	●	●			●							
LF24-ECON... US		●		●		●								●							
LF24-MFT... US		●		●		●			●	●	●		●			●	●				
TF24 (-S) US		●												●							
TF120 (-S) US																					
TF24-3 (-S) US		●												●							
TF24-SR (-S) US		●				●	●	●	●	●	●			●							
GM_24-3		●	●	●	●								●	●							
GMX120-3			●	●	●								●								
GM_24-SR		●	●	●	●	●	●	●	●	●	●		●	●							
GMX24-MFT		●	●	●	●	●				●	●		●	●		●	●	●	●	●	●
GMX24-MFT95		●	●	●	●							●	●	●		●	●	●	●	●	●
GMX24-PC		●	●	●	●								●	●	●						
AM_24-3(-S)(-T)		●	●	●	●								●	●							
AM120-3			●	●	●								●								
AM_24-SR(-T)		●	●	●	●	●	●	●	●	●	●		●	●							
AMX120-SR			●	●	●	●	●	●	●	●	●		●								
AMX24-MFT		●	●	●	●	●				●	●		●	●		●	●	●	●	●	●
AMX24-MFT95		●	●	●	●							●	●	●		●	●	●	●	●	●
AMX24-PC		●	●	●	●								●	●	●						
NM_24-3(-T)		●	●	●	●								●	●							
NM120-3			●	●	●								●								
NM_24-SR(-T)		●	●	●	●	●	●	●	●	●	●		●	●							
NM120-SR			●	●	●	●	●	●	●	●	●		●								
NMX24-MFT		●	●	●	●	●				●	●		●	●		●	●	●	●	●	●
NMX24-MFT95		●	●	●	●							●	●	●		●	●	●	●	●	●
NMX24-PC		●	●	●	●								●	●							
NMQ24-MFT US		●	●	●	●								●	●							
LM_24-3 (-P5) (-P10) (-S) (-T)		●	●	●	●								●	●							
LMX120-3			●	●	●								●								
LM_24-SR(-T)		●	●	●	●	●	●	●	●	●	●		●	●							
LMX120-SR			●	●	●	●	●	●	●	●	●		●								
LMX24-MFT		●	●	●	●	●				●	●		●	●		●	●	●	●	●	●
LMX24-MFT95		●	●	●	●							●	●	●		●	●	●	●	●	●
LMX24-PC		●	●	●	●								●	●							



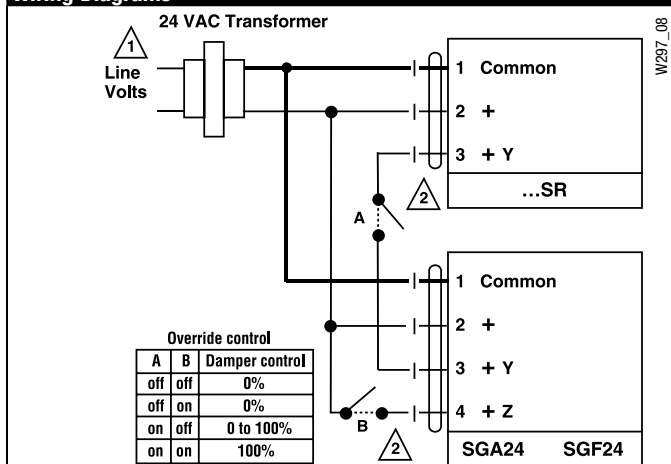
SGA24



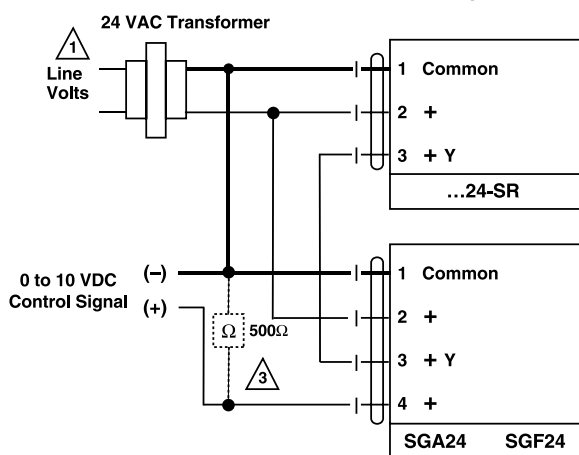
SGF24

Technical Data	SGA24, SGF24
Power supply	24 VAC \pm 20% 50/60 Hz, 24 VDC \pm 10%
Transformer sizing	1 VA
Control signal Y	0.5 to 10 VDC; 2 to 10 VDC (switchable)
Power output	up to 10 actuators (1 mA max)
Degree of protection	(SGA24 only NEMA 2 [IP54])
Connection	Terminals (14 ga. wire max)
Humidity	5 to 95% RH non-condensing

Wiring Diagrams



Minimum Position Setting



- 1 Provide overload protection and disconnect as required.
- 2 Override switches are optional.
- 3 A 500Ω resistor (ZG-R01) must be added for 4 to 20 mA control.

Application

These positioners are intended for the remote control of modulating actuators or for use as a minimum positioner (providing a minimum limit for the output signal from a modulating controller). The control range is 0 to 100% of the angle of rotation of the actuator.

Positioner SGA24 is for surface mounting with a NEMA 2 housing included. Positioner SGF24 is for flush mounting.

Operation

The positioner receives its supply voltage through terminals 1 and 2. A rotary knob is turned, producing a proportional control signal (Y) at the output (terminal 3) of either 0.5 to 10 VDC or 2 to 10 VDC and therefore a proportional change in the position of the actuator between 0 and 100%. When used for a minimum limit, the positioner works as a higher of 2 signal selector. This function allows only the signal from the controller or positioner, whichever is greater, to go to the actuator.

Function

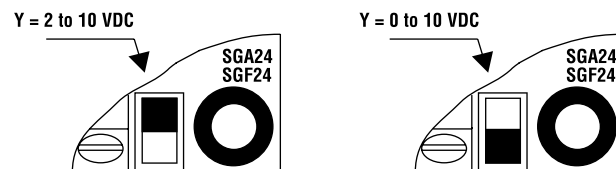
The changeover from 2 to 10 V to 0 to 10 V is selected by means of a slide switch on the printed circuit board.

The angle of rotation of the knob can be limited mechanically, by moving the adjustable stops under the knob.

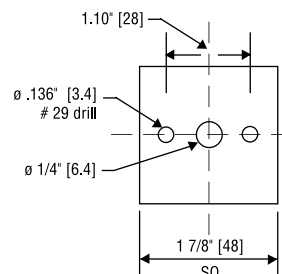
Accessory

ZG-SGF Mounting plate for single gang wiring box

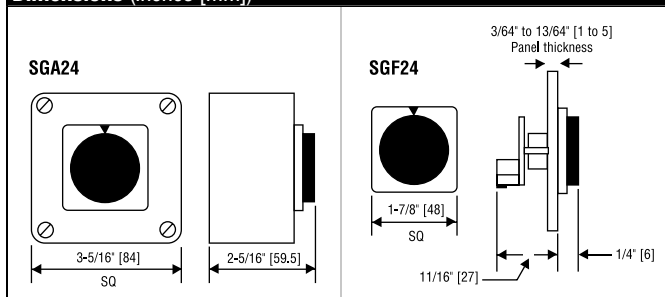
Changeover Switch



Drilling template for SGF24 (flush mount)

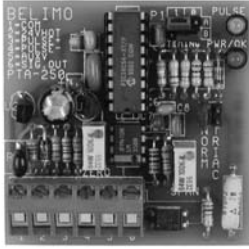


Dimensions (Inches [mm])



Pulse Width Modulation Interface PTA-250

To Convert a Pulse Width Modulated Signal to a 2 to 10 VDC Signal for Belimo Proportional Actuators
(Series 3)



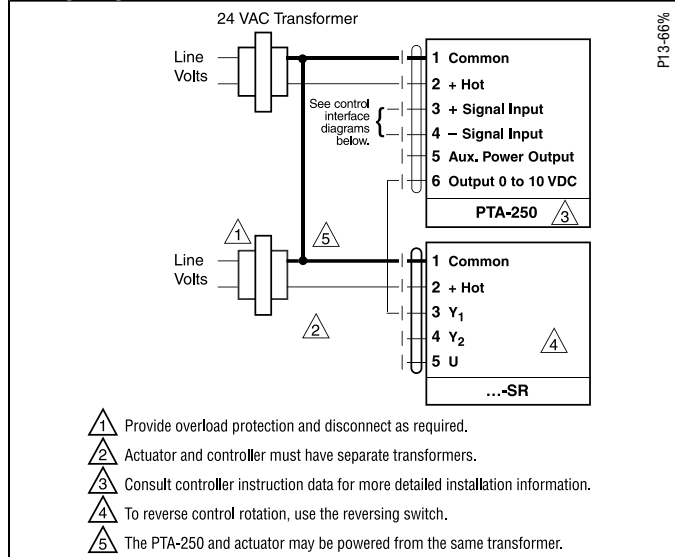
Technical Data	PTA-250
Power supply	24 VAC $\pm 15\%$ 24 VDC $\pm 15\%$
Power consumption	<1 W
Transformer sizing	2 VA

Input	
Isolation	optically isolated (when wired as such)
Type	normal or triac, jumper selectable
Trigger level	12 to 24 VAC/VDC or dry contact to com
Time between trigger pulses	12.5 milliseconds min
Impedance	VAC - 500 Ω , VDC - 10 k Ω
Pulse duration/resolution	four selectable ranges, in seconds of dry contact or SSR closure $\pm 40\%$ of signal increment
Range 1	0.0235 to 6 seconds/in 0.0235 sec increments
Range 2	0.0196 to 5 seconds/in 0.0196 sec increments
Range 3	0.1 to 25.5 seconds/in 0.100 sec increments
Range 4	0.59 to 2.93 seconds/in in 0.0092 increments

Output	
Voltage	2 to 10 VDC
Current	15 mA max
Accuracy	$\pm 2\%$

Electrical connection	wire terminals, 14 gauge max
Ambient temperature	-20°F to 150°F [-30°C to 65°C]
Operating humidity	5% to 95% non-condensing
Mounting	Snap-Track (provided)
Dimensions	board 2 3/16" x 2 3/16" x 9/16"
	with Snap-Track 2 3/8" x 2 1/4" x 15/16"
Weight	1.5 oz

Wiring Diagram



Application

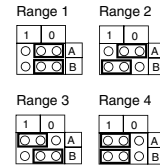
The PTA-250 converts a single pulse-width modulated input to an analog, 2 to 10 VDC, output to modulate a Belimo -SR actuator. The PTA-250 is available for replacement of existing installations. The ...MFT product can replace 100% of the PTA-250 applications, more effectively.

Operation

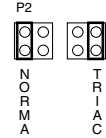
A timed contact or solid state closure from the controlling microprocessor controller is converted to a linear analog output with 256 steps of resolution. The last output is held until the PTA-250 receives the end of the next pulsed output. The PTA-250's output will not wrap around if an excessively long input pulse is received. Four input pulse clock rates are jumper selectable. Normal/Triac input positions are also jumper selectable. The input signal can be optically isolated from the PTA-250 circuit and can accept either positive or negative polarity. A red LED indicator is provided to indicate that power is applied to the PTA-250 and that the microprocessor is functioning. A green LED indicator is provided to indicate the presence of a pulse from the controller.

NOTE: The onboard zero and span adjustments are not for field use.

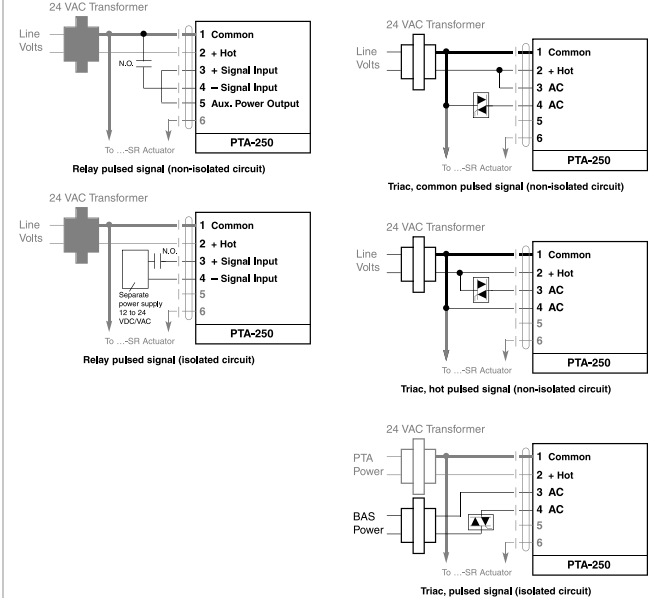
Pulse Timing Selection



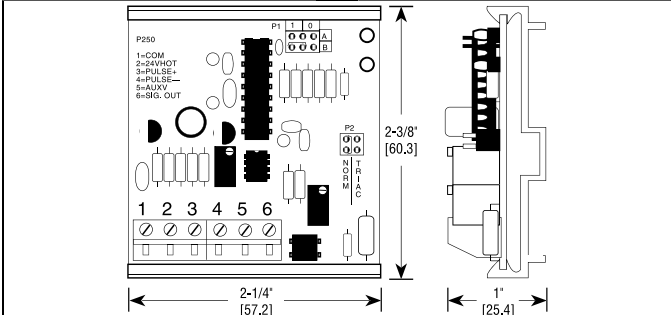
Normal/Triac Input Selection



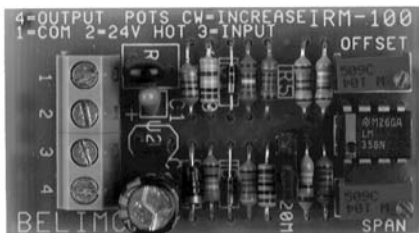
Control Interface Drawings



Dimensions (Inches [mm])

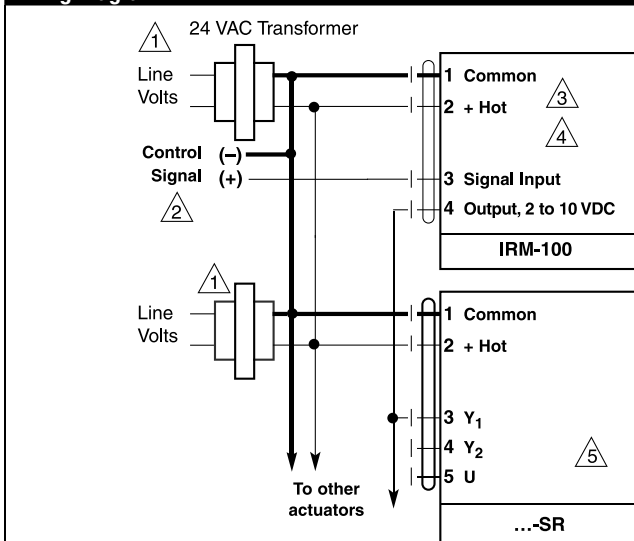


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Technical Data IRM-100	
Power supply	24 VAC ± 15% 24 VDC ± 15%
Power consumption	< 1 W
Transformer sizing	1 VA
Input	
Voltage (max)	25 VDC
Zero (starting point)	0 to 18 VDC
Span adjustment	2.6 to 17 VDC
Impedance	400 kΩ
Current	0 to 20 mA
Impedance	500 Ω
Output	
Voltage	2 to 10 VDC
Current	15 mA max
Electrical connection	wire terminals, 14 gauge max
Ambient temperature	-20° F to 150° F [-30° C to 65° C]
Humidity	5 to 95% RH non-condensing
Mounting	Snap-Track (provided)
Dimensions	board 1-3/16" x 2-3/16" x 9/16" with Snap-Track 1-7/8" x 2-3/8" x 15/16"
Weight	0.9 oz.

Wiring Diagram



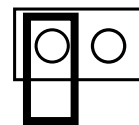
- 1 Provide overload protection and disconnect as required.
- 2 The controller should be powered from a separate transformer.
- 3 The actuator and IRM-100 may be powered from the same transformer.
- 4 Consult controller instruction data for more detailed installation information.
- 5 To reverse control rotation, use the reversing switch.

Application

The IRM-100 input rescaling module is designed to change non-standard voltage or current signal levels into a 2 to 10 VDC output to modulate Belimo ...SR type actuators. The IRM-100 is available for replacement of existing installations. The ...MFT product can replace 100% of the IRM-100 applications, more effectively.

Operation

The IRM-100 is installed between a controller and a Belimo ...SR actuator. The module can be adjusted to work with a zero offset of 0 to 18 VDC and a span range of 2.6 to 17 VDC. The IRM-100 has a 2 pin jumper mounted to the circuit board. When the jumper is connected between these 2 pins, a 4 to 20 mA signal can be fed directly into the IRM. The result being the conversion of a wide range of analog control signals to a 2 to 10 VDC range.



Jumper not connected to both pins for voltage applications (as shipped)



Jumper on both pins for 4 to 20 mA applications

The IRM may also be used to sequence several actuators from one signal source. This is done by adjusting the IRM units to work at different input ranges.

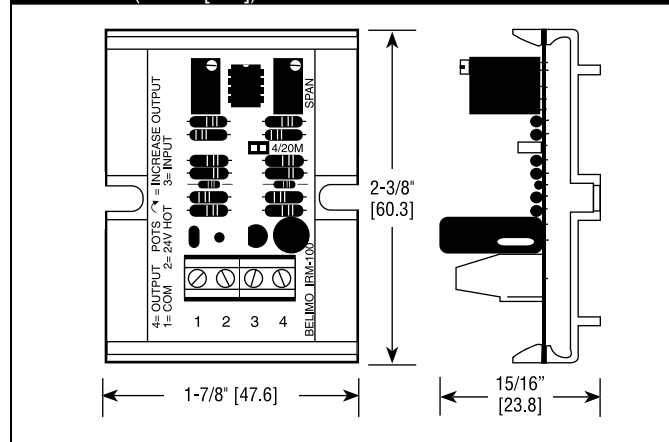
IRM-100 Used as a Current Amplifier

In some applications, the capacity of a controller output may not have current available to control multiple end devices. An example would be a controller which has an output current of .5 mA maximum. If 10 AF24-SR US actuators have to be driven from the same output, the current requirement would be $I = E/R = (10 \text{ volts})/(100000 \Omega) = .1 \text{ mA}$ for each actuator. For the 10 actuators, 1 mA of current would be necessary to properly control the actuators.

The IRM-100 may be used as an interface to provide a higher current capacity to the system. The IRM-100 has an output capacity of 15 mA. This higher level output can handle a greater number of actuators. By calibrating the IRM-100 for a 2 to 10 VDC input to achieve a 2 to 10 VDC output, IRM-100 provides this added capacity for the system.

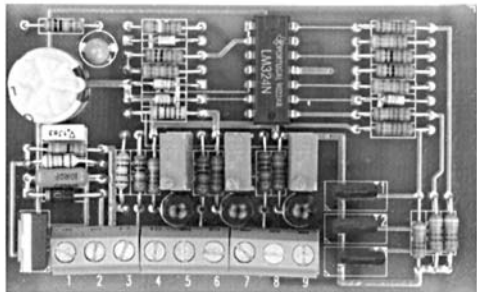
The same circuit will also work if a 4 to 20 mA signal is used. A 500 Ω resistor is placed across terminal #1 and #3 which converts the 4 to 20 mA to 2 to 10 VDC.

Dimensions (Inches [mm])

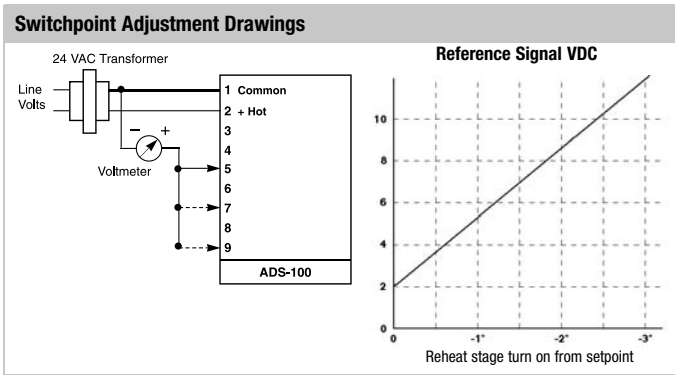
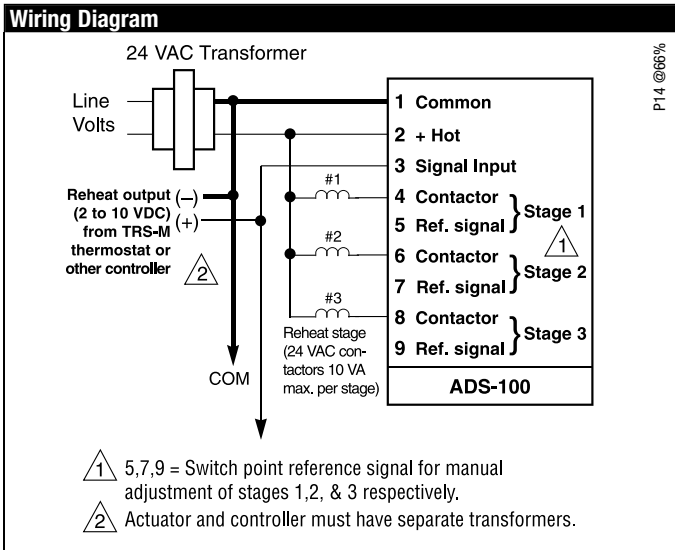


Analog to Digital Switch ADS-100

For Belimo Proportional (...-SR) Actuators



Technical Data	ADS-100
Power supply	24 VAC ± 20% 50/60 HZ
Power consumption	1.5 W
Transformer sizing	3 VA (not including contactors)
Electrical connection	9 pole wire-terminal
Control input	2 to 10 VDC
Input impedance	100 kΩ
Adjusting range	2.5 to 9.5 VDC
Dead band	0.3°F fixed
Switching capacity	24 VAC 10 VA max., (voltage sinking triac)
Mounting	Snap-Track (provided)
Dimensions	3-1/4" x 2"
	with Snap-Track 3-7/16" x 2"



Application

To control reheat coils and/or a fan stage in a fan-powered terminal unit. The ADS-100 is controlled by a 2 to 10 VDC reheat output of a temperature controller. (TRS-M)

Operation

The ADS-100 is designed to switch up to three independent stages of reheat on and off, according to a 2 to 10 VDC signal. The three output stages are furnished with a triac output. Each stage can be adjusted independently from each other over the 0 to 2.4° F throttling range of the TRS-M temperature controller.

The ADS-100 is shipped pre-adjusted, as shown in the following table. (Based on differential from setpoint)

	1st. stage	2nd. stage	3rd. stage
Switch ON	-0.45°F	-1.35°F	-2.25°F
Switch OFF	-0.15°F	-1.05°F	-1.95°F
Switch ON	2.8V	5.8V	8.8V
Switch OFF	0.4V	0.2V	0.4V

If desired, each stage may be field readjusted for special requirements. Three red LED indicators are provided to verify when the stages are energized.

Setpoint Readjustment

Tools required: small screwdriver, voltmeter.

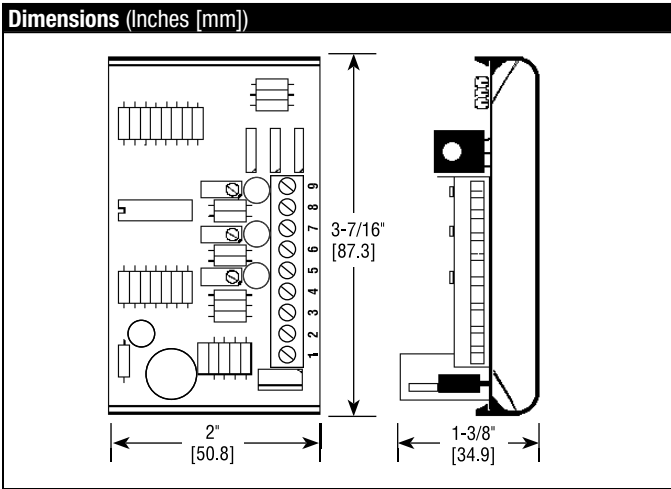
To readjust the output stages, the following procedure is used:

Connect the voltmeter to the desired switchpoint reference signal output and terminal 1 (COM). Readjust the switch point reference signal output with the corresponding potentiometer to your desired switch point. The adjustment range is 2.5 to 9.5 VDC. If you go below or above these values the ADS-100 may not switch off or on properly. If this occurs you have to increase or decrease your switching level until the ADS-100 works correctly.

ADS-100 Used as an Auxiliary Switch

The ADS-100 was originally designed as an accessory to switch on stages of electric reheat from an electronic thermostat. However, it can also function as an electronic auxiliary switch from any device which can provide 0 to 10 VDC signal, such as any feedback wire 5 from any ...SR or ...MFT type actuator.

The ADS-100 has 3 triac outputs rated at 10 VA maximum each which will turn on, in sequence, with an increasing voltage.

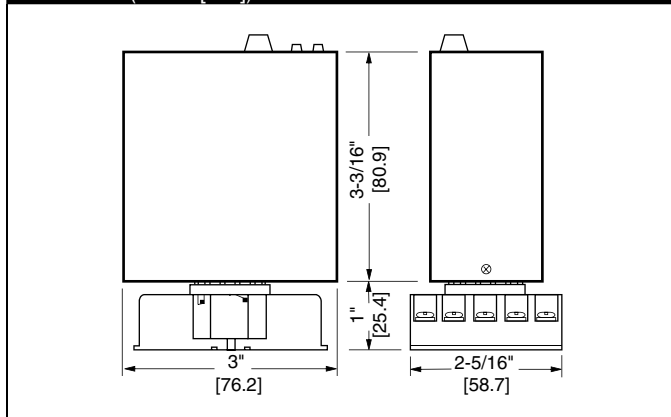


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Technical Data	
Power supply	24 VAC \pm 20% 50/60 Hz
Fusing	4A slow blow fuse
Power consumption	min. 5W (without actuator load)
Transformer	8 VA
Batteries	24 V Nominal 1.2 Ah (2-12 volt lead-acid batteries; batteries not supplied with module)
Maintenance	the batteries should be checked annually (approximate life is 6 years)
Charging circuit	charge current max. 150 mA charge voltage 24-27 V, temperature compensated
Battery back-up operation	24 V nominal 1.2 Ah, max. 60 W auto shut off after 250 seconds
Indication LED	green - main power source operation (battery will be charged) red - battery back-up operation
Mounting	mounted in the control panel with an 11 terminal plug-in base (not supplied with module)
Ambient temperature	14°F to 122°F [-10°C ... 50°C]

Dimensions (Inches [mm])



Application

Several Belimo damper actuators can be used either with 24 VAC or 24 VDC.

In case of a power failure, the NSV24 battery back-up unit switches the damper actuator from its main AC power supply over to the 24 VDC battery to drive the actuators to their safety position.

For easy maintenance, the battery back-up system is placed in the control panel, not in the actuator. Several actuators may be powered by one back-up module. The batteries are separate from the NSV24.

Operation

The NSV24 is connected to the same 24 VAC power source as the damper actuators. It also charges the 24 V (2-12 volt batteries) storage battery. Its charge current is limited to 150 mA maximum, and the maximum charge voltage is temperature compensated.

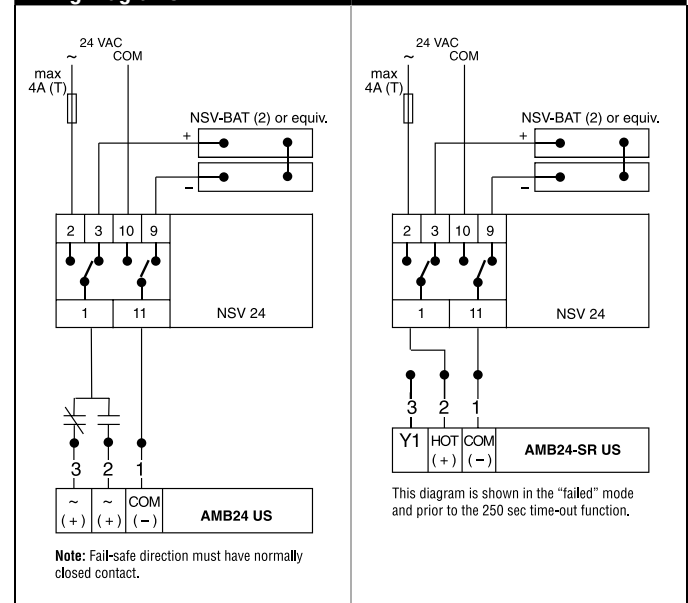
In case of a power failure, the NSV24 switches immediately over to the battery power source, and according to the control function, the actuators will move to their safety position. After 250 seconds, the batteries are disconnected from the actuators to prolong battery life. Because of this, a safe battery back-up can be provided for several short-term failures. The main power source operation is indicated by a green LED, and the battery power source by a red LED.

Connectable Actuator Models	Maximum per module
GMB24-3X1	20
GMX24-3	15
GMX24-MFTX1	15
GMB24-SR	15
AMB24-3	30
AMX24-MFT	30
AMB24-SR	30
NMB24-3	30
NMX24-MFT	30
NMB24-SR	30
LMB24-3	30
LMX24-MFT	30
LMB24-SR	30

Accessories

NSV-BAT	12 VDC 1.2 Ah battery (2 required)
---------	------------------------------------

Wiring Diagrams



NSV-BAT, ZGR01, ZGR02 and Resistor Kits for Multiple Actuators



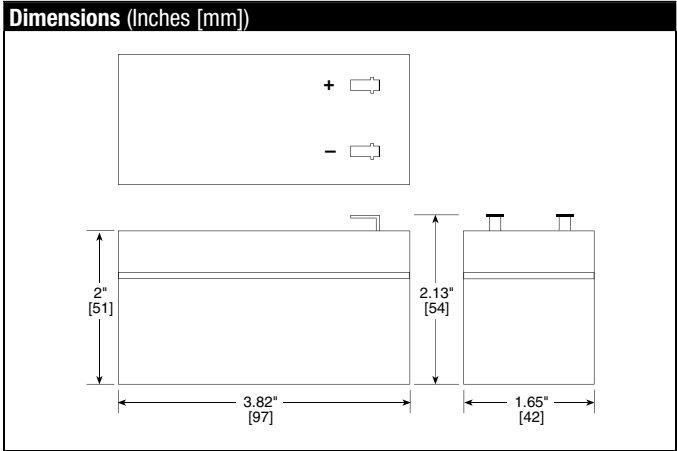
NSV-BAT 12V Battery



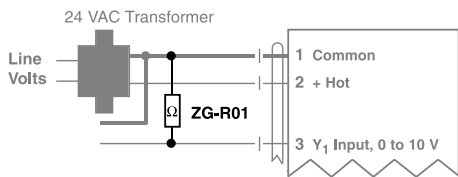
Technical Data	NSV-BAT
Battery type	lead-acid
Voltage	12 VDC
Nominal capacity	1.2 AH
Connections	.187 male spade
Weight	1.32 lb [.6 kg]

Application

The NSV-BAT battery is for use with the NSV24 battery back-up module. It is a sealed, maintenance free, lead-acid battery. Two NSV-BAT batteries are required for one NSV24.

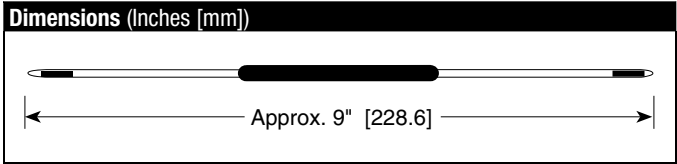


ZG-R01 Resistor for 4 to 20 mA conversions

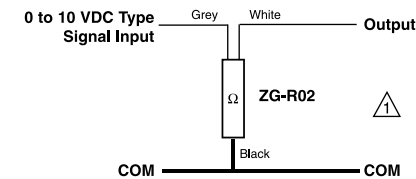


Application

The ZG-R01 is a 499 Ω Resistor which has been encased in a section of heat shrink tubing with short sections of hook up wire. The ZG-R01 is used to convert a 4 to 20mA signal into a 2 to 10 VDC control signal.



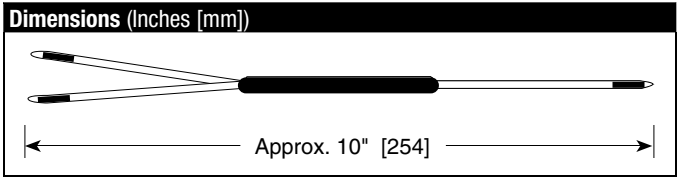
ZG-R02 50% Voltage Divider



The impedance of the device attached must be 100k Ω .

Application

The ZG-R02 is a voltage divider designed so that when connected to a 100 K Ω input impedance, the output signal is 50% if the input signal. The voltage divider circuit is encased in a short section of heat shrink tubing with three short sections of hook up wire.



Resistor kits for Multiple Actuator Applications

Resistor Kit No. ZG-R03

135 Ω Operation

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

Resistor Kit No. ZG-R05

4 to 20 mA Operation

No. of Actuators	Resistance Ω
1	237
2	150
3	124
4	113
5	105
6	97.6

Resistor Kit No. ZG-R06

For Honeywell® Electronic Series 90 Circuits (W7100, W973, T775)

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

Application

For use with the ...MFT95 actuators and Honeywell® controllers

ZG-R03 See table to left

ZG-R05 See table to left

ZG-R06 See table to left

ZG-CBNS Junction box



ZG-CBNS

Application

The ZG-CBNS accessory is used when the application requires the wiring terminations to be made at the actuator.

Operation

The ZG-CBNS serves as an electrical junction box. The products that can be used with this accessory are as follows:

AF24 US, AF120 US, AF230 US, AF24-SR US

* Due to the internal volume of this junction box, according to UL requirements, The ZG-CBNS CANNOT be used with the following products:

NF24-S2 US, AF24-S US, AF120-S US, AF230-S US

ZG-CBLS Junction box



ZG-CBLS

Application

The ZG-CBLS accessory is used when the application requires the wiring terminations to be made at the actuator.

Operation

The ZG-CBLS serves as an electrical junction box.

This product can be used with any standard LF product.

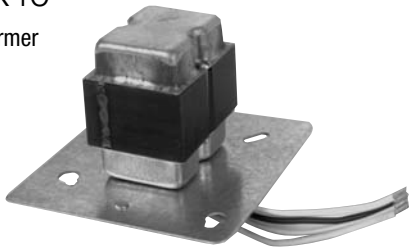
Technical Data	ZG-CBNS / ZG-CBLS
Voltage rating	250 VAC
Electrical connection	maximum 5 line voltage connection
Housing rating	UL94 5VA
Material type	FR/ABS CYCOLAC FR15
Ambient temperature	-22°F to 122°F [-30°C to 50°C]
Storage temperature	-40°F to 176°F [-40°C to 80°C]
Agency listing	UL pending
Quality standards	ISO 9001
Weight	<0.5 lbs

Transformer ZG-X40
Power Supply, Signal Simulator PS-100



Transformer ZGX40

40 VA, 120 to 24 VAC Transformer



Application

The ZG-X40 is a 40 VA, 120 to 24 VAC transformer. It is designed so that both the primary and secondary leads exit through the same side of a 4-1/4" square outlet box cover.

Table with 2 columns: Technical Data, ZG-X40. Rows include Primary voltage, Secondary voltage, Max VA rating, Connections, Type, Mounting method, Agency approvals.

Wire Specification

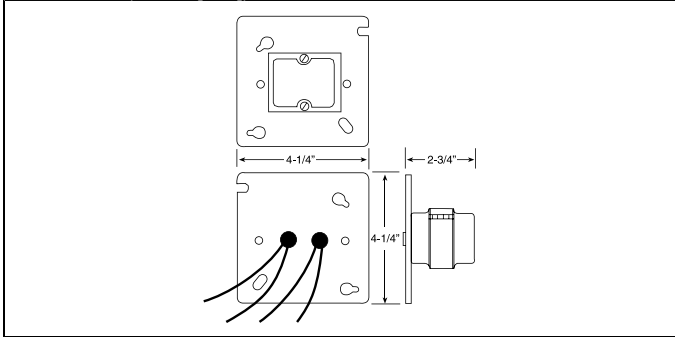
Table with 2 columns: Wire, No. 18 AWG leads, 6-1/2" length. Rows include Termination, Primary, Secondary.

Maximum Number of like Actuators per Transformer

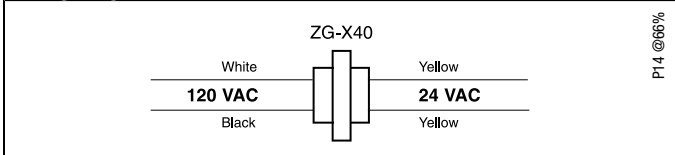
Table with 4 columns: Model #, Quantity, Model #, Quantity. Lists various actuator models and their quantities per transformer.

Refer to appropriate actuator documentation for specific VA ratings.

Dimensions (Inches [mm])



Wiring Diagram



Power Supply, Signal Simulator PS-100



Application

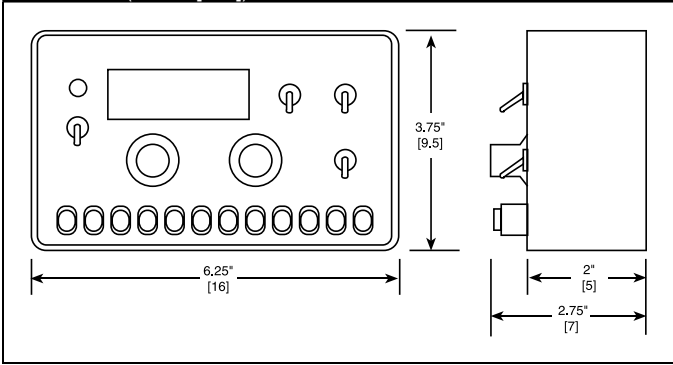
The PS-100 power supply and signal simulator is designed to operate most proportional, floating, and On/Off style actuators without the presence of a controller.

The PS-100 comes with a 120 to 24 VAC, plug into the wall transformer for power. Both the PS-100 and transformer are supplied in a black fabric carrying case.

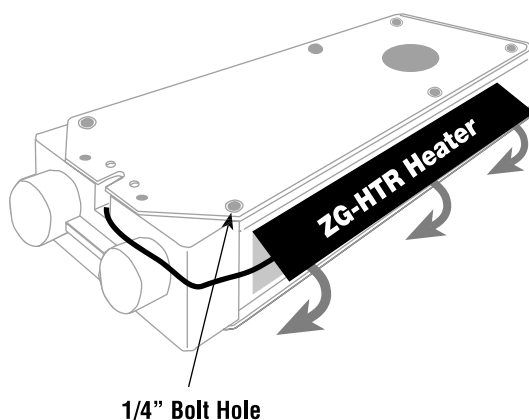
Replacement Power Supply: PS-XFMR

Table with 2 columns: Technical Data, PS-100. Rows include Power supply, Power consumption, Transformer, Terminal outputs, VDC output range, Display, Readouts, Weight.

Dimensions (Inches [mm])



N40103 - 09/11 - Subject to change. © Belimo Aircontrols (USA), Inc.



Technical Data	ZG-HTR
Power supply	24 VAC \pm 20% 50/60 Hz
Transformer sizing	35 VA
Heater output	35 watts
Actuator low ambient rating	
with enclosure	-40° F [-40° C]
enclosure with 1" insulation	-58° F [-50° C]
Weight	11 oz [320 g]

The ZG-HTR Thermostat/Heater kit is designed to be field installed to the original AF and NF series actuators. The ZG-HTR provides a thermostatically controlled heater which allows the original AF and NF actuators to be used below their normal low ambient temperature rating. At approximately 10° F [-12° C] the heater energizes to maintain the actuators internal temperature to within working limits. The rubberized heating element has an adhesive back which attaches to the side of the actuator housing. The thermostat assembly mounts to the rear of the actuator and provides for the connection of the 24 VAC supply voltage. The actuator/heater assembly should be contained in a housing, similar to the ZS-100 Weather Shield, to achieve best results.

- 1 Provide overload protection and disconnect as required.
- 2 The ZG-HTR may be wired to the same transformer as the actuator. Total VA ratings must be observed.
- 3 Power to the ZG-HTR must be applied continuously during the heating season. Do not wire the ZG-HTR to the on-off control signal when on-off type actuators are being used.

Standard:
 Ø 3/8" to 3/4"
 □ 3/8" to 5/8"
Optional*
 Ø 3/4" to 1.05"

*with K4-1 US clamp

