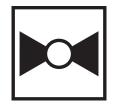






5-year warranty



# **Technical data**

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Valve Size	0.75" [20]
Fluid	chilled or hot water, up to 60% glycol
Fluid Temp Range (water)	0250°F [-18120°C]
Body Pressure Rating	600 psi
Close-off pressure Δps	200 psi
Flow characteristic	equal percentage
Servicing	maintenance-free
Flow Pattern	2-way
Leakage rate	0% for A – AB
Controllable flow range	75°
Cv	24
Body pressure rating note	600 psi
No Characterized Disc	TRUE
Cv Flow Rating	A-port: as stated in chart B-port: 70% of A – AB Cv
Valve body	Nickel-plated brass body
Stem seal	EPDM (lubricated)
Seat	PTFE
Pipe connection	NPT female ends
O-ring	EPDM (lubricated)
Ball	stainless steel
Non-Spring	LRB(X)

# Safety notes



Suitable actuators

Materials

WARNING: This product can expose you to lead which is known to the State of California to cause cancer and reproductive harm. For more information go to www.p65warnings.ca.gov

NR

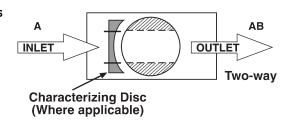
# **Product features**

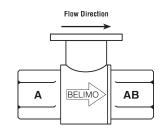
# **Application**

This valve is typically used in air handling units on heating or cooling coils, and fan coil unit heating or cooling coils. Some other common applications include Unit Ventilators, VAV box re-heat coils and bypass loops. This valve is suitable for use in a hydronic system with variable flow.

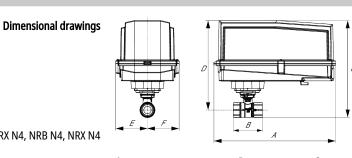
**Technical data sheet** B221

# Flow/Mounting details

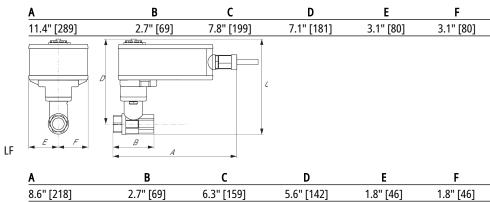




# **Dimensions**



ARB N4, ARX N4, NRB N4, NRX N4





Modulating, Spring Return, 24 V, Multi-Function Technology®

Proportional, Spring Return, Multi-Function Technology®, Torque min. 35 in-lb, Control 2 to 10 VDC (DEFAULT), Feedback 2 to 10 VDC (DEFAULT)

# **Technical data sheet**





LF24-MFT US

5-year warranty





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Electrical data	Nominal voltage	AC/DC 24 V
	Nominal voltage frequency	50/60 Hz
	Power consumption in operation	2.5 W
	Power consumption in rest position	1 W
	Transformer sizing	5 VA (class 2 power source)
	Electrical Connection	18 GA appliance cable, 3 ft [1 m], with 1/2" conduit connector
	Overload Protection	electronic throughout 095° rotation
	Electrical Protection	actuators are double insulated
Functional data	Torque motor	35 in-lb [4 Nm]
	Operating range Y	210 V
	Operating range Y note	420 mA w/ ZG-R01 (500 $\Omega$ , 1/4 W resistor)
	Input Impedance	100 k $\Omega$ for 210 V (0.1 mA), 500 $\Omega$ for 420 mA, 1500 $\Omega$ for PWM, On/Off and Floating point
	Operating range Y variable	Start point 0.530 V
		End point 2.532 V
	Options positioning signal	variable (VDC, PWM, on/off, floating point)
	Position feedback U	210 V
	Position feedback U note	Max. 0.5 mA
	Position feedback U variable	VDC variable
	Direction of motion motor	selectable with switch 0/1
	Direction of motion fail-safe	reversible with cw/ccw mounting
	Angle of rotation	Max. 95°, adjustable with mechanical stop
	Angle of rotation note	adjustable with mechanical stop
	Running Time (Motor)	default 150 s, variable 75300 s
	Running time motor variable	75300 s
	Running time fail-safe	<25 s @ -4122°F [-2050°C], <60 s @ -22°F [-30°C]
	Angle of rotation adaptation	off (default)
	Override control	MIN (minimum position) = 0%
		MID (intermediate position) = 50%
	McCorlord accepts	MAX (maximum position) = 100%
	Noise level, motor	30 dB(A)
	Noise level, fail-safe	62 dB(A)
	Shaft Diameter	3/81/2" round, centers on 1/2"
	Position indication	Mechanical
Safety data	Degree of protection IEC/EN	IP54
	Degree of protection NEMA/UL	NEMA 2 UL Enclosure Type 2
	Agency Listing	cULus acc. To UL 873 and CAN/CSA C22.2 No. 24-93
	Quality Standard	ISO 9001



Technical data sheet		LF24-MFT US
Ambient temperature	-22122°F [-3050°C]	
Storage temperature	-40176°F [-4080°C]	
Ambient humidity	max. 95% r.H., non-condensing	
Servicing	maintenance-free	
Weight	3.3 lb [1.5 kg]	
Housing material	galvanized steel	

#### **Product features**

# Default/Configuration

Default parameters for 2 to 10 VDC applications of the LF..-MFT actuator are assigned during manufacturing. If required, custom versions of the actuator can be ordered. The parameters are variable and can be changed by three means: Factory pre-set or custom configuration, set by the customer using PC-Tool software or the handheld ZTH US.

#### **Application**

Weight

Materials

For fail-safe, modulating control of dampers in HVAC systems. Actuator sizing should be done in accordance with the damper manufacturer's specifications. A feedback signal is provided for position indication.

#### Operation

The LF24-MFT US actuator provides 95° of rotation and is provided with a graduated position indicator showing 0° to 95°. The actuator will synchronize the 0° mechanical stop or the damper or valves mechanical stop and use this point for its zero position during normal control operations. The actuator uses a brushless DC motor which is controlled by an Application Specific Integrated Circuit (ASIC) and a microprocessor. The microprocessor provides the intelligence to the ASIC to provide a constant rotation rate and to know the actuator's exact position. The ASIC monitors and controls the brushless DC motor's rotation and provides a Digital Rotation Sensing (DRS) function to prevent damage to the actuator in a stall condition. The position feedback signal is generated without the need for mechanical feedback potentiometers using DRS. The actuator may be stalled anywhere in its normal rotation without the need of mechanical end switches. The LF24-MFT US is mounted directly to control shafts up to 3/4" diameter (K6-1 clamp) and anti-rotation bracket. A crank arm and several mounting brackets are available for damper applications where the actuator cannot be direct coupled to the damper shaft. The spring return system provides minimum specified torque to the application during a power interruption. The LF24-MFT US actuator is shipped in the zero position, compression against seats or gaskets for tight shut-off is accomplished manually.

# Typical specification

Spring return control damper actuators shall be direct coupled type which require no crank arm and linkage and be capable of direct mounting to a shaft up to a 3/4" diameter and center on a 1/2" shaft (default). Actuator shall deliver a minimum output torque of 35 in-lbs. The actuator must provide modulating damper control in response to a 2 to 10 VDC or, with the addition of a  $500\Omega$  resistor, a 4 to 20 mA control input from an electronic controller or positioner. The actuators must be designed so that they may be used for either clockwise or counter clockwise fail-safe operation. Actuators shall use a brushless DC motor controlled by a microprocessor and be protected from overload at all angles of rotation. Run time shall be constant, and independent of torque. A 2 to 10 VDC feedback signal shall be provided for position feedback. Actuators with auxiliary switches must be constructed to meet the requirements for Double Insulation so an electrical ground is not required to meet agency listings. Actuators shall be cULus listed and have a 5 year warranty, and be manufactured under ISO 9001 International Quality Control Standards. Actuators shall be as manufactured by Belimo.

#### **Factory settings**

Default parameters for 2 to 10 VDC applications of the LF..-MFT actuator are assigned during manufacturing. If required, custom versions of the actuator can be ordered. The parameters are variable and can be changed by three means: Factory pre-set or custom configuration, set by the customer using PC-Tool software or the handheld ZTH US.

# Accessories

Gateways	Description	Туре
	Gateway MP to BACnet MS/TP	UK24BAC
	Gateway MP to LonWorks	UK24LON
	Gateway MP to Modbus RTU	UK24MOD
Electrical accessories	Description	Туре
	DC Voltage Input Rescaling Module	IRM-100
	Belimo PC-Tool, Software for adjustments and diagnostics	MFT-P



Auxiliary switch, mercury-free Auxiliary switch, mercury-free Auxiliary switch, mercury-free Signal Sumulator, Power supply AC 230 V Convert Pubse Width Modulated Signal to a 210 V Signal for Belimo Proportional PTA-50 ACUADOTS Positioner for wall mounting SoE74 Gateway MP to BACHE MSCTP Gateway MP to BACHE MSCTP Gateway MP to LonWork Gateway MP to Modebus RTU Resistor, 500 01, 1/4" wire resistor with 6" pigtail wires Resistor, 500 01, 1/4" wire resistor with 6" pigtail wires Resistor, 500 woltage divider Resistor, Act 120 V to AC 24 V, 40 VA Connection cable 16 ft 15 mil, A: RIT 16 /42 THE U, B: free wire end for connection to MP/P Berminal Service Tool, with ZPU-55 function, for parametrisable and communicative Reliance Actions, Walv Controller and HVAC performance devices  Mechanical accessories  Mechanica		Technical data sheet	LF24-MFT US
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Connection cable 16 ft [5 m], A: R]11 6/4 ZTH EU, B: free wire end for connection to MP/PP terminal Service Tool, with ZPUSB function, for parametrisable and communicative Belimo actuators, VAV controller and HVAC performance devices  Mechanical accessories  Pescription  Shaft extension 170 mm Ø10 mm for damper shaft Ø 616 mm AV6-20 End stop indicator Shaft clamp for LE. Shaft clamp reversible, clamping range Ø1620 mm Ball joint suitable for damper crank arm KHB / KH10 Ball joint suitable for damper crank arm KHB / KH10 Ball joint suitable for damper crank arm KHB / KH10 Ball joint suitable for damper crank arm KHB / KH10 Ball joint suitable for damper crank arm KHB / KH10 Ball joint suitable for damper crank arm KHB / KH10 Ball joint suitable for damper crank arm KHB / KG6 Ball joint suitable for damper crank arm KHB / KG8 Ball joint suitable for damper crank arm KHB / KH10 Ball joint suitable for damper crank arm KHB / KG8 Ball joint suitable for damper crank arm KHB / KG8 Ball joint suitable for damper crank arm KHB / KG8 Ball joint suitable for damper crank arm KHB / KH10 Ball joint suitable for damper crank arm KHB / KG8 Ball joint suitable for damper crank arm KHB / KG8 Ball joint suitable for damper crank arm KHB / KH10 Bamper crank arm Slot width 8.2 mm, damping range Ø1018 mm KH1E Damper crank arm Slot width 8.2 mm, clamping range Ø1018 mm KH6 Damper crank arm Slot width 8.2 mm, clamping range Ø1018 mm KH6 Band for KG6 & KG8 ball joints (36° L, 5/16° diameter). SH10 Push rod for KG6 t010 ball joint (36° L, 5/16° diameter). SH1 Wrench 8 mm and 10 mm Mounting Bracket Form fit adapter 8x8 mm Mounting Bracket: Z5-260 Right Angle Linkage kit C6-101 Linkage kit Damper clip for damper blade, 3.5° width. Damper clip for damper shalts (x10 LUXH) Lic			ZG-X40
to MP/PP terminal Service Tool, with ZIP-USB function, for parametrisable and communicative Belimo actuators, VMV controller and HVAC performance devices  Mechanical accessories  Description  Shaft extension 170 mm Ø10 mm for damper shaft Ø 616 mm AV6-20 End stop indicator Shaft clamp for LF Shaft clamp reversible, clamping range Ø1620 mm Ball joint suitable for damper crank arm KH8 / KH10 Ball joint suitable for damper crank arm KH8 / KH10 Ball joint suitable for damper crank arm KH8 / KH10 Ball joint suitable for damper crank arm KH8 / KG6 Ball joint suitable for damper crank arm KH8 / KG6 Ball joint suitable for damper crank arm KH8 / KG6 Ball joint suitable for damper crank arm KH8 / KG6 Ball joint suitable for damper crank arm KH8 / KG6 Ball joint suitable for damper crank arm KH8 / KG6 Ball joint suitable for damper crank arm KH8 / KG6 Ball joint suitable for damper crank arm KH8 / KG6 Ball joint suitable for damper crank arm KH8 / KH10 Damper crank arm Slot width 6.2 mm, for Ø1.05" KH12 Damper crank arm Slot width 6.2 mm, clamping range Ø1018 mm KH8 Anti-rotation bracket LF. Push rod for KG10-A bull joint (36" L, 3/6" diameter). SH10 Push rod for KG10-A bull joint (36" L, 5/16" diameter). SH10 Push rod for KG10-A bull joint (36" L, 5/16" diameter). SH10 Push rod for KG10-A bull joint (36" L, 5/16" diameter). SH2 Wrench 8 mm and 10 mm To00-10 Angle of rotation limiter, with end stop ZD8-LF Form fit adapter 8/8 mm ZP8-LF Mounting Bracket: ZS-260 Right Angle Linkage kit ZG-112 Linkage kit ZG-			ZK2-GEN
Mechanical accessories         Description         Type           Shaft extension 170 mm Ø10 mm for damper shaft Ø 616 mm         AV6-20           End stop indicator         IND-LF           Shaft clamp         K6 US           for LF         K6-1           Shaft clamp reversible, clamping range Ø1620 mm         K6-1           Ball joint suitable for damper crank arm KH8 /KH10         KG10A           Ball joint suitable for damper crank arm KH8         KG6           Ball joint suitable for damper crank arm KH8         KG6           Actuator arm, clamping range Ø816 mm, Slot width 8.2 mm         KH-LF           V-botk Kit for KH-LF         KH-LF V           Damper crank arm Slot width 8.2 mm, clamping range Ø1018 mm         KH6           Actuator arm, clamping range Ø1018 mm         KH6           Damper crank arm Slot width 8.2 mm, clamping range Ø1018 mm         KH6           Anti-rotation bracket LF         Push rod for KG6 & KG8 ball joint (36° L, 3/8° diameter).         SH10           Wench 8 mm and 10 mm         TO0-L06           Angle of rotation limiter, with end stop         ZD8-LF           Form fit adapter 8x8 mm         ZP8-LF           Mounting Bracket: ZS-260 Right Angle         Zinch           Linkage kit         Zinch           Mounting bracket			
Mechanical accessories         Description         Type           Shaft extension 170 mm Ø10 mm for damper shaft Ø 616 mm         AV6-20           End stop indicator         IND-LF           Shaft clamp         K6 US           for LF.         Shaft clamp reversible, clamping range Ø1620 mm         K6-1           Ball joint suitable for damper crank arm KH8 K810         KG6           Ball joint suitable for damper crank arm KH8         KG6           Ball joint suitable for damper crank arm KH8         KG6           Actuator arm, clamping range Ø816 mm, Slot width 8.2 mm         KH-LF           V-bolt Kit for KH-LF.         KH-LF           Damper crank arm Slot width 8.2 mm, clamping range Ø1018 mm         KH6           Damper crank arm Slot width 8.2 mm, clamping range Ø1018 mm         KH6           Damper crank arm Slot width 8.2 mm, clamping range Ø1018 mm         KH6           Anti-rotation bracket LF.         LF-P           Push rod for KG6 & KG8 ball joints (36° L, 3/8° diameter).         SH10           Wrench 8 mm and 10 mm         T001-06           Angle of rotation limiter, with end stop         ZD-LF           Form fit adapter 8x m         ZG-DC           Linkage kit         ZG-110           Mounting Bracket: ZS-260 Right Angle         ZG-DC           LiF cra		Service Tool, with ZIP-USB function, for parametrisable and communicative	ZTH US
Shaft extension 170 mm Ø10 mm for damper shaft Ø 616 mm AV6-20 End stop indicator Shaft clamp For LF Shaft clamp For LF Shaft clamp reversible, clamping range Ø1620 mm Ball joint suitable for damper crank arm KH8 / KH10 Ball joint suitable for damper crank arm KH8 / KG6 Ball joint suitable for damper crank arm KH8 / KG6 Ball joint suitable for damper crank arm KH8 / KG6 Ball joint suitable for damper crank arm KH8 / KG6 Ball joint suitable for damper crank arm KH8 / KG6 Ball joint suitable for damper crank arm KH8 / KG8 Actuator arm, clamping range Ø816 mm, Slot width 8.2 mm / KH-LFV Damper crank arm Slot width 8.2 mm, for Ø1.05" / KH-LFV Damper crank arm Slot width 8.2 mm, clamping range Ø1018 mm / KH6 Damper crank arm Slot width 8.2 mm, clamping range Ø1018 mm / KH8 Anti-rotation bracket LF. LF-P Push rod for KG10 Abil joint (36" L, 3/8" diameter). SH10 Push rod for KG6 & KG8 ball joints (36" L, 5/16" diameter). SH10 Wrench 8 mm and 10 mm		Belimo actuators, VAV controller and HVAC performance devices	
End stop indicator Shaft clamp for LF. Shaft clamp reversible, clamping range Ø1620 mm Ball joint suitable for damper crank arm KH8 / KH10 Ball joint suitable for damper crank arm KH8 / KG6 Ball joint suitable for damper crank arm KH8 KG6 Ball joint suitable for damper crank arm KH8 KG8 Actuator arm, clamping range Ø816 mm, Slot width 8.2 mm KH-LF V-bolt Kit for KH-LF. Damper crank arm Slot width 8.2 mm, for Ø1.05" KH12 Damper crank arm Slot width 8.2 mm, clamping range Ø1018 mm KH8 Damper crank arm Slot width 8.2 mm, clamping range Ø1018 mm KH8 Anti-rotation bracket LF. Push rod for KG10 ball joint (36" L, 3/8" diameter). SH10 Push rod for KG10 ball joint (36" L, 5/16" diameter). SH8 Wrench 8 mm and 10 mm TOOL-06 Angle of rotation limiter, with end stop Form fit adapter 8x8 mm ZF8-LF Mounting Bracket: ZS-260 Right Angle Linkage kit GG-110 Mounting bracket TG-112 LF crankarm adaptor kit (includes ZG-112). Weather shield 15x8x6" [330x.02x152 mm] (LxWxH) Base Plate, for ZS-100 Weather shield 15x8x6" [330x.02x152 mm] (LxWxH) Base Plate, for ZS-100 Weather shield 15x8x6" [330x.02x152 mm] (LxWxH), NEMA 4X, with mounting brackets Weather shield 17-1/4x8-3/4x5-1/2" [438x222x140 mm] (LxWxH), NEMA 4X, with mounting brackets Weather shield 17-1/4x8-3/4x5-1/2" [438x222x140 mm] (LxWxH), NEMA 4X, with mounting brackets Weather shield 17-1/4x8-3/4x5-1/2" [438x222x140 mm] (LxWxH), NEMA 4X, with mounting brackets Weather shield 17-1/4x8-3/4x5-1/2" [438x222x140 mm] (LxWxH), NEMA 4X, with mounting brackets Weather shield 17-1/4x8-3/4x5-1/2" [438x222x140 mm] (LxWxH), NEMA 4X, with mounting brackets Weather shield 17-1/4x8-3/4x5-1/2" [438x222x140 mm] (LxWxH), NEMA 4X, with mounting brackets Weather shield 17-1/4x8-3/4x5-1/2" [438x222x140 mm] (LxWxH), NEMA 4X, with S-300-C1 Shaft extension 1/2" Shaft extension	Mechanical accessories	Description	Туре
Shaft clamp for LF Shaft clamp reversible, clamping range Ø1620 mm  Ball joint suitable for damper crank arm KH8 / KH10 Ball joint suitable for damper crank arm KH8 / KH10 Ball joint suitable for damper crank arm KH8   KG6 Ball joint suitable for damper crank arm KH8   KG6 Ball joint suitable for damper crank arm KH8   KG8 Actuator arm, clamping range Ø816 mm, Slot width 8.2 mm   KH-LF   V-bolk Kit for KH-LF.   KH-LFV Damper crank arm Slot width 8.2 mm, for Ø1.05"   KH12 Damper crank arm Slot width 8.2 mm, clamping range Ø1018 mm   KH6   Damper crank arm Slot width 8.2 mm, clamping range Ø1018 mm   KH8   Anti-rotation bracket LF.   LF-P   Push rod for KG10A ball joint (36" L, 3/8" diameter).   SH10   Push rod for KG6 & KG8 ball joints (36" L, 5/16" diameter).   SH8   Werench 8 mm and 10 mm   TOOL-06   Angle of rotation limiter, with end stop   ZDB-LF   Form fit adapter 8x8 mm   ZF8-LF   Mounting Bracket Z5-260 Right Angle   Z6-109   Linkage kit   Z6-110   Mounting Bracket Z5-260 Right Angle   Z6-110   Linkage kit   Z6-112   For LF Damper clip for damper blade, 3.5" width.   Z6-DC1   Damper clip for damper blade, 6" width.   Z6-DC2   LF crankarm adaptor kit (includes Z6-112).   Z6-LF112   LF crankarm adaptor kit (includes Z6-112).   Z6-LF12   Shaft extension for 3/8" diameter shafts (5" L).   Z6-LMSA-1/2-5   Weather shield 13x8x6" [330x203x152 mm] (LxWxH)   Z5-100   Weather shield 16x8-3/8x4" [406x213x102 mm] (LxWxH), NEMA 4X, with mounting brackets   Weather shield 17-1/4x8-3/4x5-1/2" [438x222x140 mm] (LxWxH), NEMA 4X, with mounting brackets   Weather shield 17-1/4x8-3/4x5-1/2" [438x222x140 mm] (LxWxH), NEMA 4X, with mounting brackets   Shaft extension 3/4"   Z5-300-C1   Shaft extension 3/4"   Z5-300-C1   Shaft extension 17"   Sand Call San		Shaft extension 170 mm Ø10 mm for damper shaft Ø 616 mm	AV6-20
for LF  Shaft clamp reversible, clamping range Ø1620 mm  Ball joint suitable for damper crank arm KH8 / KH10  Ball joint suitable for damper crank arm KH8   KG6  Ball joint suitable for damper crank arm KH8   KG6  Ball joint suitable for damper crank arm KH8   KG8  Actuator arm, clamping range Ø816 mm, Slot width 8.2 mm   KH-LF   V-bolt Kit for KH-LF.   KH-LFV   Damper crank arm Slot width 8.2 mm, for Ø1.05"   KH12  Damper crank arm Slot width 6.2 mm, clamping range Ø1018 mm   KH6   Damper crank arm Slot width 8.2 mm, clamping range Ø1018 mm   KH8   Anti-rotation bracket LF.   LF-P   Push rod for KG10A ball joint (36" L, 3/8" diameter).   SH10  Push rod for KG6 & KG8 ball joints (36" L, 5/16" diameter).   SH8   Wrench 8 mm and 10 mm   TOOL-06   Angle of rotation limiter, with end stop   ZD8-LF   Form fit adapter 8x8 mm   ZF8-LF   Mounting Bracket ZS-260 Right Angle   ZG-109   Linkage kit   ZG-110   Mounting bracket   ZG-112   Tor LF  Damper clip for damper blade, 3.5" width.   ZG-DC1   Damper clip for damper blade, 6" width.   ZG-DC2   LF crankarm adaptor kit (includes ZG-112).   ZG-LF12   LF crankarm adaptor kit (includes ZG-112).   ZG-LF12   Shaft extension for 1/2" diameter shafts (4" L),   ZG-LMSA-1   Shaft extension for 1/2" diameter shafts (5" L).   ZG-LMSA-1   Shaft extension for 1/2" diameter shafts (5" L).   ZG-LMSA-1   Sz-100   Weather shield 17-1/4x8-3/4x5-1/2" [438x222x140 mm] (LxWxH), NEMA 4X, with mounting brackets   Weather shield 17-1/4x8-3/4x5-1/2" [438x222x140 mm] (LxWxH), NEMA 4X, with mounting brackets   Weather shield 17-1/4x8-3/4x5-1/2" [438x222x140 mm] (LxWxH), NEMA 4X, with mounting brackets   Shaft extension 1/2"   S-300-C1   Shaft extension 1/2"   S-300-C2   Shaft extension 1/4"   S-300-C2   Shaft exten		End stop indicator	IND-LF
Shaft clamp reversible, clamping range Ø1620 mm Ball joint suitable for damper crank arm KH8 / KH10 KG10A Ball joint suitable for damper crank arm KH8 KG8 Ball joint suitable for damper crank arm KH8 KG8 Actuator arm, clamping range Ø816 mm, Slot width 8.2 mm KH-LF V-bolt Kit for KH-LF. Damper crank arm Slot width 8.2 mm, for Ø1.05" KH12 Damper crank arm Slot width 8.2 mm, for Ø1.05" Samper crank arm Slot width 8.2 mm, for Ø1.05" Shaft extension bracket LF. Push rod for KG10A ball joint (36" L, 3/8" diameter). Push rod for KG10A ball joint (36" L, 3/8" diameter). Sh10 Push rod for KG6 & KG8 ball joints (36" L, 5/16" diameter). Sh10 Push rod for KG10A ball joint (36" L, 5/16" diameter). Sh10 Push rod for KG6 & KG8 ball joints (36" L, 5/16" diameter). Sh10 Angle of rotation limiter, with end stop Form fit adapter 8x8 mm Mounting Bracket: 25-260 Right Angle Linkage kit GG-112 for LF Damper clip for damper blade, 3.5" width. Damper clip for damper blade, 6" width. LF crankarm adaptor kit (includes ZG-112). LF crankarm adaptor kit (includes ZG-112). ZG-LF112 LF crankarm adaptor kit (includes ZG-112). Shaft extension for 1/2" diameter shafts (4" L). Shaft extension for 3/8" diameter shafts (5" L). Weather shield 15x8x6" [330x203x152 mm] (LxWxH) Base Plate, for ZS-100 Weather shield 16x8-3/8x4" [406x213x102 mm] (LxWxH), VL and CSA, C3-500 Class I, Zone 18.2, Groups B, C, D, (NEMA 7), Class III, Hazardous (classified) Locations Weather shield 17-1/4x8-3/4x5-1/2" [438x222x140 mm] (LxWxH), NEMA 4X, with mounting brackets Weather shield 17-1/4x8-3/4x5-1/2" [438x222x140 mm] (LxWxH), NEMA 4X, with mounting brackets Shaft extension 1/2" Shaft extension 17"		Shaft clamp	K6 US
Ball joint suitable for damper crank arm KH8 / KH10 Ball joint suitable for damper crank arm KH8 Ball joint suitable for damper crank arm KH8 KG6 Actuator arm, clamping range Ø816 mm, Slot width 8.2 mm KH-LF V-bolt Kit for KH-LF. Damper crank arm Slot width 8.2 mm, for Ø1.05" Chyolic Kit for KH-LF. Damper crank arm Slot width 8.2 mm, clamping range Ø1018 mm Chyolic Kit for KH-LF Damper crank arm Slot width 8.2 mm, clamping range Ø1018 mm Chyolic KH8 Anti-rotation bracket LF. Push rod for KG10A ball joint (36" L, 3/8" diameter). SH10 Push rod for KG6 & KG8 ball joints (36" L, 5/16" diameter). SH8 Wrench 8 mm and 10 mm TOOL-06 Angle of rotation limiter, with end stop Form fit adapter 8x8 mm ZF8-LF Mounting Bracket: ZS-260 Right Angle Linkage kit Mounting bracket For LF. Damper clip for damper blade, 3.5" width. Damper clip for damper blade, 6" width. ZG-DC1 LF crankarm adaptor kit (includes ZG-112). LF crankarm adaptor kit (includes ZG-112). LF crankarm adaptor kit (includes ZG-112). Shaft extension for 3/8" diameter shafts (4" L). Shaft extension for 1/2" diameter shafts (5" L). Weather shield 13x8/c6" (330x203x152 mm) (LxWxH) Base Plate, for ZS-100 Weather shield 16x8-3/8x4" (406x213x102 mm) (LxWxH), UL and CSA, Class I, Zone 182, Groups B, C, D, NEMA T), Class III, Hazardous (classified) Locations Weather shield 17-1/4x8-3/4x5-1/2" [438x222x140 mm] (LxWxH), NEMA 4X, with mounting brackets Weather shield 17-1/4x8-3/4x5-1/2" [438x222x140 mm] (LxWxH), NEMA 4X, with mounting brackets Shaft extension 1/2" Shaft extension 1/2" Shaft extension 1/2" Shaft extension 3/4" S-300-C2 Shaft extension 3/4" S-300-C3			
Ball joint suitable for damper crank arm KH8 KG8 Ball joint suitable for damper crank arm KH8 KG8 Actuator arm, clamping range Ø816 mm, Slot width 8.2 mm KH-LF V-bolt Kit for KH-LF. KH-LFV Damper crank arm Slot width 8.2 mm, for Ø1.05" Camper crank arm Slot width 8.2 mm, clamping range Ø1018 mm Camper crank arm Slot width 8.2 mm, clamping range Ø1018 mm Camper crank arm Slot width 8.2 mm, clamping range Ø1018 mm Camper crank arm Slot width 8.2 mm, clamping range Ø1018 mm Camper crank arm Slot width 8.2 mm, clamping range Ø1018 mm Camper crank arm Slot width 8.2 mm, clamping range Ø1018 mm Camper crank arm Slot width 8.2 mm, clamping range Ø1018 mm Camper crank arm Slot width 8.2 mm, clamping range Ø1018 mm Camper clamping crack U.F. Push rod for KG6 & KG8 ball joint (36" L, 5/16" diameter). SH8 Wrench 8 mm and 10 mm Col-06 Camper Slade Sk KG8 ball joints (36" L, 5/16" diameter). SH8 Wrench 8 mm and 10 mm Col-06 Camper Clamping rotation limiter, with end stop Form fit adapter 8x8 mm Capper Clamping Capper Cappe			
Ball joint suitable for damper crank arm KH8 Actuator arm, clamping range 0816 mm, Slot width 8.2 mm KH-LF V-bolt Kit for KH-LF. Damper crank arm Slot width 8.2 mm, for Ø1.05" Child Kit for KH-LF. Damper crank arm Slot width 8.2 mm, clamping range Ø1018 mm KH6 Damper crank arm Slot width 8.2 mm, clamping range Ø1018 mm Anti-rotation bracket LF. Push rod for KG10A ball joint (36" L, 3/6" diameter). SH10 Push rod for KG10A ball joint (36" L, 5/16" diameter). SH8 Wrench 8 mm and 10 mm TOOL-06 Angle of rotation limiter, with end stop Form fit adapter 8x8 mm ZF8-LF Mounting Bracket: Z5-260 Right Angle Linkage kit John Jamper clip for damper blade, 3.5" width. Damper clip for damper blade, 3.5" width. Damper clip for damper blade, 6" width. LF crankarm adaptor kit (Includes ZG-112). ZG-LF12 Shaft extension for 3/8" diameter shafts (5" L). Shaft extension for 1/2" diameter shafts (5" L). Weather shield 13x8x6" [330x203x152 mm] (LxWxH) Base Plate, for Z5-100 Weather shield 16x8-3/8x6" [406x213x102 mm] (LxWxH), UL and CSA, Class I, Zone 182, Groups B, C, D, (NEMA T), Class III, Hazardous (classified) Locations Weather shield 17-1/4x8-3/4x5-1/2" [438x222x140 mm] (LxWxH), NEMA 4X, with mounting brackets Weather shield 17-1/4x8-3/4x5-1/2" [438x222x140 mm] (LxWxH), NEMA 4X, with mounting brackets Shaft extension 1/2" Shaft extension 1/2" Shaft extension 3/4" S-300-C2 Shaft extension 3/4" S-300-C3			
Actuator arm, clamping range Ø816 mm, Slot width 8.2 mm V-botk Kit for KH-LF. V-botk Kit for KH-LF. Damper crank arm Slot width 8.2 mm, for Ø1.05" KH12 Damper crank arm Slot width 6.2 mm, clamping range Ø1018 mm KH6 Damper crank arm Slot width 8.2 mm, clamping range Ø1018 mm KH8 Anti-rotation bracket LF. Push rod for KG10A ball joint (36" L, 3/8" diameter). SH10 Push rod for KG6 & KG8 ball joint (36" L, 5/16" diameter). SH8 Wrench 8 mm and 10 mm TOOL-06 Angle of rotation limiter, with end stop Form fit adapter 8x8 mm T8-LF Mounting Bracket: ZS-260 Right Angle Linkage kit GG-110 Mounting bracket for LF Damper clip for damper blade, 3.5" width. Damper clip for damper blade, 6" width. LF crankarm adaptor kit (includes ZG-112). LF crankarm adaptor kit (includes ZG-112). LF crankarm adaptor kit (T bracket included). Shaft extension for 3/8" diameter shafts (4" L). Shaft extension for 1/2" diameter shafts (5" L). Weather shield 15x8-3/8x4" [406x213x102 mm] (LxWxH) Base Plate, for ZS-100 Weather shield 15x8-3/8x4" [406x213x102 mm] (LxWxH), UL and CSA, Class I, Zone 182, Groups B, C, D, (NEMA 7), Class III, Hazardous (classified) Locations Weather shield 17-1/4x8-3/4x5-1/2" [438x222x140 mm] (LxWxH), NEMA 4X, with mounting brackets Weather shield 17-1/4x8-3/4x5-1/2" [438x222x140 mm] (LxWxH), NEMA 4X, with mounting brackets Weather shield 17-1/4x8-3/4x5-1/2" [438x222x140 mm] (LxWxH), NEMA 4X, with mounting brackets Weather shield 17-1/4x8-3/4x5-1/2" [438x222x140 mm] (LxWxH), NEMA 4X, with mounting brackets Shaft extension 1/2" Shaft extension 3/4" S-300-C2 Shaft extension 1/2"		·	
V-bolt Kit for KH-LF. Damper crank arm Slot width 8.2 mm, for Ø1.05"  MH12 Damper crank arm Slot width 6.2 mm, clamping range Ø1018 mm KH6 Damper crank arm Slot width 8.2 mm, clamping range Ø1018 mm KH8 Anti-rotation bracket LF. Push rod for KG10A ball joint (36" L, 3/8" diameter).  Push rod for KG10A ball joint (36" L, 5/16" diameter).  Wrench 8 mm and 10 mm TOOL-06 Angle of rotation limiter, with end stop Form fit adapter 8x8 mm T8-LF Mounting Bracket: ZS-260 Right Angle Linkage kit Mounting bracket For LF.  Damper clip for damper blade, 3.5" width. Damper clip for damper blade, 6" width. ZG-DC1 Damper clip for damper blade, 6" width. ZG-DC2 LF crankarm adaptor kit (Includes ZG-112). LF crankarm adaptor kit (T bracket included). ZG-LF112 For Aff extension for 3/8" diameter shafts (4" L). Shaft extension for 1/2" diameter shafts (5" L). Weather shield 13x8x6" [330x203x152 mm] (LxWxH) ZS-100 Base Plate, for ZS-100 Weather shield 16x8-3/x8x4" [406x213x102 mm] (LxWxH), UL and CSA, Class I, Zone 182, Groups B, C, D, (NEMA 7), Class III, Hazardous (classified) Locations Weather shield 17-1/4x8-3/4x5-1/2" [438x222x140 mm] (LxWxH), NEMA 4X, with mounting brackets Weather shield 17-1/4x8-3/4x5-1/2" [438x222x140 mm] (LxWxH), NEMA 4X, with mounting brackets Weather shield 17-1/4x8-3/4x5-1/2" [438x222x140 mm] (LxWxH), NEMA 4X, with mounting brackets Weather shield 17-1/4x8-3/4x5-1/2" [438x222x140 mm] (LxWxH), NEMA 4X, with mounting brackets Shaft extension 1/2" Shaft extension 1/		·	
Damper crank arm Slot width 8.2 mm, for Ø1.05"  Damper crank arm Slot width 6.2 mm, clamping range Ø1018 mm  KH6  Damper crank arm Slot width 8.2 mm, clamping range Ø1018 mm  KH8  Anti-rotation bracket LF.  Push rod for KG10A ball joint (36" L, 3/8" diameter).  Push rod for KG6 & KG8 ball joints (36" L, 5/16" diameter).  SH10  Push rod for KG6 & KG8 ball joints (36" L, 5/16" diameter).  SH8  Wrench 8 mm and 10 mm  TOOL-06  Angle of rotation limiter, with end stop  Form fit adapter 8x8 mm  ZF8-LF  Mounting Bracket: ZS-260 Right Angle  Linkage kit  GG-110  Mounting bracket  TG-112  For LF  Damper clip for damper blade, 3.5" width.  Damper clip for damper blade, 6." width.  LF crankarm adaptor kit (includes ZG-112).  LF crankarm adaptor kit (T bracket included).  Shaft extension for 3/8" diameter shafts (4" L).  Shaft extension for 1/2" diameter shafts (5" L).  Weather shield 13x8x6" [330x203x152 mm] (LxWxH)  Explosion Proof Housing 16x10x6 435" [406x254x164 mm] (LxWxH), UL and CSA, Class I, Zone 182, Groups B, C, D, (NEMA 7), Class III, Hazardous (classified)  Locations  Weather shield 17-1/4x8-3/4x5-1/2" [438x222x140 mm] (LxWxH), NEMA 4X, with mounting brackets  Weather shield 17-1/4x8-3/4x5-1/2" [438x222x140 mm] (LxWxH), NEMA 4X, with mounting brackets  Weather shield 17-1/4x8-3/4x5-1/2" [438x222x140 mm] (LxWxH), NEMA 4X, with mounting brackets  Weather shield 17-1/4x8-3/4x5-1/2" [438x222x140 mm] (LxWxH), NEMA 4X, with mounting brackets  Weather shield 17-1/4x8-3/4x5-1/2" [438x222x140 mm] (LxWxH), NEMA 4X, with mounting brackets  Weather shield 17-1/4x8-3/4x5-1/2" [438x222x140 mm] (LxWxH), NEMA 4X, with mounting brackets  Shaft extension 1/2"  Shaft extension 3/4"  S-300-C2  Shaft extension 1"			
Damper crank arm Slot width 6.2 mm, clamping range Ø1018 mm Anti-rotation bracket LF. Push rod for KG10A ball joint (36" L, 3/8" diameter). SH10 Push rod for KG6 & KG8 ball joints (36" L, 5/16" diameter). SH10 Push rod for KG10A ball joint (36" L, 5/16" diameter). SH8 Wrench 8 mm and 10 mm Angle of rotation limiter, with end stop Form fit adapter 8x8 mm ZF8-LF Mounting Bracket: ZS-260 Right Angle Linkage kit John Mounting bracket For LF. Damper clip for damper blade, 3.5" width. Damper clip for damper blade, 6" width. Damper clip for damper blade, 6" width. LF crankarm adaptor kit (includes ZG-112). LF crankarm adaptor kit (includes ZG-112). LF crankarm adaptor kit (T bracket included). Shaft extension for 3/8" diameter shafts (4" L). Shaft extension for 1/2" diameter shafts (4" L). Shaft extension for 1/2" diameter shafts (5" L). Weather shield 13x8x6" (330x203x152 mm) (LxWxH) Explosion Proof Housing 16x10x6.435" [406x254x164 mm] (LxWxH), UL and CSA, Class I, Zone 182, Groups B, C, D, (NEMA 7), Class III, Hazardous (classified) Locations Weather shield 17-1/4x8-3/4x5-1/2" [438x222x140 mm] (LxWxH), NEMA 4X, with mounting brackets Weather shield 17-1/4x8-3/4x5-1/2" [438x222x140 mm] (LxWxH), NEMA 4X, with mounting brackets Shaft extension 1/2" Shaf			
Damper crank arm Slot width 8.2 mm, clamping range Ø1018 mm Anti-rotation bracket LF. Push rod for KG10A ball joint (36" L, 3/8" diameter). SH10 Push rod for KG6 & KG8 ball joints (36" L, 5/16" diameter). SH8 Wrench 8 mm and 10 mm TOOL-06 Angle of rotation limiter, with end stop Form fit adapter 8x8 mm ZF8-LF Mounting Bracket: Z5-260 Right Angle Linkage kit GG-110 Mounting bracket For LF Damper clip for damper blade, 3.5" width. Damper clip for damper blade, 6" width. Damper clip for damper blade, 6" width. LF crankarm adaptor kit (includes ZG-112). LF crankarm adaptor kit (T bracket included). Shaft extension for 3/8" diameter shafts (4" L). Shaft extension for 1/2" diameter shafts (4" L). Weather shield 13x8x6" [330x203x152 mm] (LxWxH) Base Plate, for Z5-100 Weather shield 16x8-3/8x4" [406x213x102 mm] (LxWxH) Explosion Proof Housing 16x10x6.435" [406x254x164 mm] (LxWxH), UL and CSA, Class I, Zone 18z, Groups B, C, D, (NEMA 7), Class III, Hazardous (classified) Locations Weather shield 17-1/4x8-3/4x5-1/2" [438x222x140 mm] (LxWxH), NEMA 4X, with mounting brackets Weather shield 17-1/4x8-3/4x5-1/2" [438x222x140 mm] (LxWxH), NEMA 4X, with mounting brackets Shaft extension 1/2" Shaft extension 1/2" Shaft extension 3/4" S-300-C2 Shaft extension 1/2" Shaft extension 1/2" S-300-C2 Shaft extension 1"			
Anti-rotation bracket LF. Push rod for KG10A ball joint (36" L, 3/8" diameter). SH10 Push rod for KG6 & KG8 ball joints (36" L, 5/16" diameter). Wrench 8 mm and 10 mm Angle of rotation limiter, with end stop Form fit adapter 8x8 mm ZF8-LF Mounting Bracket: Z5-260 Right Angle Linkage kit Mounting bracket For LF. Damper clip for damper blade, 3.5" width. Damper clip for damper blade, 6" width. LF crankarm adaptor kit (includes ZG-112). LF crankarm adaptor kit (T bracket included). ZG-LF2 Shaft extension for 1/2" diameter shafts (4" L). Shaft extension for 1/2" diameter shafts (5" L). Weather shield 13x8x6" [330x203x152 mm] (LxWxH) Explosion Proof Housing 16x10x6.435" [406x254x164 mm] (LxWxH), UL and CSA, CJass I, Zone 18z, Zone 18z, Cynop SB, C, D, (NEMA 7), Class III, Hazardous (classified) Locations Weather shield 17-1/4x8-3/4x5-1/2" [438x222x140 mm] (LxWxH), NEMA 4X, with mounting brackets Weather shield 17-1/4x8-3/4x5-1/2" [438x222x140 mm] (LxWxH), NEMA 4X, with mounting brackets Shaft extension 1/2" Shaft extension 1/2" Shaft extension 1/2" Shaft extension 1/2" S-300-C1 Shaft extension 1/2" S-300-C2 Shaft extension 1" SH10  EF-P SH10 SH10 SH10 SH10 SH10 SH2 SH10 SH2 SH10 SH2 SH10 SH2 SH10 SH2 SH2 SH10 SH2 SH2 SH2 SH3			
Push rod for KG10A ball joint (36" L, 3/8" diameter).  Push rod for KG6 & KG8 ball joints (36" L, 5/16" diameter).  Wrench 8 mm and 10 mm  Angle of rotation limiter, with end stop  Form fit adapter 8x8 mm  ZF8-LF  Mounting Bracket: ZS-260 Right Angle Linkage kit  Mounting bracket  For LF  Damper clip for damper blade, 3.5" width.  Damper clip for damper blade, 6" width.  LF crankarm adaptor kit (includes ZG-112).  LF crankarm adaptor kit (includes ZG-112).  LF crankarm adaptor kit (T bracket included).  Shaft extension for 3/8" diameter shafts (4" L).  Shaft extension for 1/2" diameter shafts (5" L).  Weather shield 13x8x6" [330x203x152 mm] (LxWxH)  Explosion Proof Housing 16x10x6.435" [406x254x164 mm] (LxWxH), UL and CSA, Class I, Zone 1&2, Groups B, C, D, (NEMA 7), Class III, Hazardous (classified)  Locations  Weather shield 17-1/4x8-3/4x5-1/2" [438x222x140 mm] (LxWxH), NEMA 4X, with mounting brackets  Weather shield 17-1/4x8-3/4x5-1/2" [438x222x140 mm] (LxWxH), NEMA 4X, with mounting brackets  Shaft extension 1/2"  Shaft extension 1/2"  Shaft extension 3/4"  ZS-300-C2  Shaft extension 1"  SH10  SH8  Weather shield 17-1/4x8-3/4x5-1/2" [438x222x140 mm] (LxWxH), NEMA 4X, with mounting brackets  Shaft extension 1/2"  Shaft extension 3/4"  ZS-300-C2  Shaft extension 1"			
Push rod for KG6 & KG8 ball joints (36" L, 5/16" diameter).  Wrench 8 mm and 10 mm  Angle of rotation limiter, with end stop  Form fit adapter 8x8 mm  Mounting Bracket: Z5-260 Right Angle Linkage kit  Mounting bracket  TG-109 Linkage kit  TG-110  Mounting bracket  TG-112  For LF  Damper clip for damper blade, 3.5" width. Damper clip for damper blade, 6" width.  LF crankarm adaptor kit (includes ZG-112). LF crankarm adaptor kit (T bracket included). SG-LF2  Shaft extension for 3/8" diameter shafts (4" L). Shaft extension for 3/8" diameter shafts (5" L). Weather shield 13x8x6" [330x203x152 mm] (LxWxH)  Base Plate, for Z5-100  Weather shield 16x8-3/8x4" [406x213x102 mm] (LxWxH), UL and CSA, Class I, Zone 18.2, Groups B, C, D, (NEMA 7), Class III, Hazardous (classified) Locations  Weather shield 17-1/4x8-3/4x5-1/2" [438x222x140 mm] (LxWxH), NEMA 4X, with mounting brackets  Weather shield 17-1/4x8-3/4x5-1/2" [438x222x140 mm] (LxWxH), NEMA 4X, with mounting brackets  Weather shield 17-1/4x8-3/4x5-1/2" [438x222x140 mm] (LxWxH), NEMA 4X, with mounting brackets  Shaft extension 1/2"  Shaft extension 1/2"  Shaft extension 1/2"  Shaft extension 1"  SH8  TG-109  LD-101  TG-110  TG-			
Wrench 8 mm and 10 mm Angle of rotation limiter, with end stop Form fit adapter 8x8 mm Mounting Bracket: ZS-260 Right Angle Linkage kit Mounting bracket TG-110 Mounting bracket For LF Damper clip for damper blade, 3.5" width. Damper clip for damper blade, 6" width. TG-DC2 LF crankarm adaptor kit (includes ZG-112). LF crankarm adaptor kit (T bracket included). Shaft extension for 3/8" diameter shafts (4" L). Shaft extension for 1/2" diameter shafts (5" L). Weather shield 13x8x6" [330x203x152 mm] (LxWxH) Explosion Proof Housing 16x10x6.435" [406x254x164 mm] (LxWxH), UL and CSA, Class I, Zone 18.2, Groups B, C, D, (NEMA 7), Class III, Hazardous (classified) Locations Weather shield 17-1/4x8-3/4x5-1/2" [438x222x140 mm] (LxWxH), NEMA 4X, with mounting brackets Weather shield 17-1/4x8-3/4x5-1/2" [438x222x140 mm] (LxWxH), NEMA 4X, with mounting brackets Shaft extension 1/2" Shaft extension 1"  TG-109 TG-109 TG-110 TG-			
Angle of rotation limiter, with end stop Form fit adapter 8x8 mm ZF8-LF Mounting Bracket: ZS-260 Right Angle Linkage kit ZG-110 Mounting bracket TG-1112 For LF Damper clip for damper blade, 3.5" width. Damper clip for damper blade, 6" width. ZG-DC1 Damper clip for damper blade, 6" width. ZG-DC2 LF crankarm adaptor kit (includes ZG-112). LF crankarm adaptor kit (T bracket included). Shaft extension for 3/8" diameter shafts (4" L). Shaft extension for 1/2" diameter shafts (5" L). Weather shield 13x8x6" [330x203x152 mm] (LxWxH) Base Plate, for ZS-100 Weather shield 16x8-3/8x4" [406x213x102 mm] (LxWxH), UL and CSA, Class I, Zone 1&2, Groups B, C, D, (NEMA 7), Class III, Hazardous (classified) Locations Weather shield 17-1/4x8-3/4x5-1/2" [438x222x140 mm] (LxWxH), NEMA 4X, with mounting brackets Weather shield 17-1/4x8-3/4x5-1/2" [438x222x140 mm] (LxWxH), NEMA 4X, with mounting brackets Shaft extension 1/2" S-300-C1 Shaft extension 3/4" S-300-C2 Shaft extension 1" ZDB-LF ZG-109 ZG-109 ZG-101 ZG-112 ZG-DC1 ZG-DC1 ZG-LMSA-1 ZG-DC2 ZG-LMSA-1 ZG-LMSA-1 ZG-DC2 ZG-LMSA-1 ZG-LMSA-1 ZG-DC2 ZG-LMSA-1 ZG-LMSA-1 ZG-LMSA-1 ZG-LMSA-1 ZG-LMSA-1 ZG-LMSA-1 ZG-DC2 ZG-LMSA-1 ZG-LMSA-1 ZG-LMSA-1 ZG-LMSA-1 ZG-DC2 ZG-LMSA-1 ZG-LMSA-1 ZG-DC2 ZG-LMSA-1 ZG-LMSA-1 ZG-DC2 ZG-LMSA-1 ZG-DC2 ZG-LMSA-1 ZG-LMSA-1 ZG-DC2 ZG-LMSA-1 ZG-DC1 ZG-LMSA-1 ZG-DC2 ZG-LMSA-1 ZG-DC2 ZG-LMSA-1 ZG-DC2 ZG-LMSA-1 ZG-DC2 ZG-LMSA-1 ZG-DC2 ZG-LMSA-1 ZG-DC1 ZG-LMSA-1 ZG-DC1 ZG-LMSA-1 ZG-DC2 ZG-LMSA-1 ZG-DC1 ZG-LMSA-1 ZG-DC1 ZG-LMSA-1 ZG-DC2 ZG-LMSA-1 ZG-DC1 ZG-LMSA-1 ZG-DC2 ZG-LMSA-1 ZG-DC2 ZG-LMSA-1 ZG-DC1 ZG-LMSA-		•	
Form fit adapter 8x8 mm  Mounting Bracket: ZS-260 Right Angle Linkage kit  ZG-109 Linkage kit  ZG-110  Mounting bracket  GG-112  for LF  Damper clip for damper blade, 3.5" width.  Damper clip for damper blade, 6" width.  ZG-DC2 LF crankarm adaptor kit (includes ZG-112).  LF crankarm adaptor kit (T bracket included).  SG-LF2  Shaft extension for 3/8" diameter shafts (4" L).  Shaft extension for 1/2" diameter shafts (5" L).  Weather shield 13x8x6" [330x203x152 mm] (LxWxH)  ZS-100  Base Plate, for ZS-100  Weather shield 16x8-3/8x4" [406x213x102 mm] (LxWxH), UL and CSA, Class I, Zone 1&2, Groups B, C, D, (NEMA 7), Class III, Hazardous (classified) Locations  Weather shield 17-1/4x8-3/4x5-1/2" [438x222x140 mm] (LxWxH), NEMA 4X, with mounting brackets Weather shield 17-1/4x8-3/4x5-1/2" [438x222x140 mm] (LxWxH), NEMA 4X, with mounting brackets Shaft extension 1/2"  SS-300-C1  Shaft extension 3/4"  ZS-300-C2  Shaft extension 1"			
Mounting Bracket: ZS-260 Right Angle Linkage kit ZG-110 Mounting bracket for LF  Damper clip for damper blade, 3.5" width. Damper clip for damper blade, 6" width. ZG-DC1 LF crankarm adaptor kit (includes ZG-112). LF crankarm adaptor kit (T bracket included). Shaft extension for 3/8" diameter shafts (4" L). Shaft extension for 1/2" diameter shafts (5" L). Weather shield 13x8x6" [330x203x152 mm] (LxWxH) Explosion Proof Housing 16x10x6.435" [406x254x164 mm] (LxWxH), UL and CSA, Class I, Zone 1&2, Groups B, C, D, (NEMA 7), Class III, Hazardous (classified) Locations Weather shield 17-1/4x8-3/4x5-1/2" [438x222x140 mm] (LxWxH), NEMA 4X, with mounting brackets Weather shield 17-1/4x8-3/4x5-1/2" [438x222x140 mm] (LxWxH), NEMA 4X, with mounting brackets Shaft extension 1/2" Shaft extension 3/4" S-300-C2 Shaft extension 1" ZG-LMSA-1/2 ZG-LF12 ZG-LF2 ZG-LF2 ZG-LHSA-1/2 ZG-LMSA-1/2 ZG-LMSA-1		· ·	
Linkage kit  Mounting bracket for LF  Damper clip for damper blade, 3.5" width.  Damper clip for damper blade, 6" width.  LF crankarm adaptor kit (includes ZG-112).  LF crankarm adaptor kit (T bracket included).  Shaft extension for 3/8" diameter shafts (4" L).  Shaft extension for 1/2" diameter shafts (5" L).  Weather shield 13x8x6" [330x203x152 mm] (LxWxH)  Base Plate, for ZS-100  Weather shield 16x8-3/8x4" [406x213x102 mm] (LxWxH)  Explosion Proof Housing 16x10x6.435" [406x254x164 mm] (LxWxH), UL and CSA, Class I, Zone 1&2, Groups B, C, D, (NEMA 7), Class III, Hazardous (classified)  Locations  Weather shield 17-1/4x8-3/4x5-1/2" [438x222x140 mm] (LxWxH), NEMA 4X, with mounting brackets  Weather shield 17-1/4x8-3/4x5-1/2" [438x222x140 mm] (LxWxH), NEMA 4X, with mounting brackets  Weather shield 17-1/4x8-3/4x5-1/2" [438x222x140 mm] (LxWxH), NEMA 4X, with mounting brackets  Shaft extension 1/2"  S-300-C1  Shaft extension 3/4"  ZS-300-C2  Shaft extension 1"		·	
for LF  Damper clip for damper blade, 3.5" width.  Damper clip for damper blade, 6" width.  ZG-DC2  LF crankarm adaptor kit (includes ZG-112).  LF crankarm adaptor kit (T bracket included).  SG-LF2  Shaft extension for 3/8" diameter shafts (4" L).  Shaft extension for 1/2" diameter shafts (5" L).  Weather shield 13x8x6" [330x203x152 mm] (LxWxH)  Base Plate, for ZS-100  Weather shield 16x8-3/8x4" [406x213x102 mm] (LxWxH)  Explosion Proof Housing 16x10x6.435" [406x254x164 mm] (LxWxH), UL and CSA, Class I, Zone 1&2, Groups B, C, D, (NEMA 7), Class III, Hazardous (classified)  Locations  Weather shield 17-1/4x8-3/4x5-1/2" [438x222x140 mm] (LxWxH), NEMA 4X, with mounting brackets  Weather shield 17-1/4x8-3/4x5-1/2" [438x222x140 mm] (LxWxH), NEMA 4X, with mounting brackets  Shaft extension 1/2"  Shaft extension 3/4"  ZS-300-C2  Shaft extension 1"  ZG-DC1  ZG-DC2  ZG-DC2  ZG-DC2  ZG-DC2  ZG-DC2  ZG-DC3  ZG-DC1  ZG-DC2  ZG-DC3  ZG-DC1  ZG-DC2  ZG-DC2  ZG-DC3  ZG-DC1  ZG-DC2  ZG-DC3  ZG-DC2  ZG-DC3  ZG-DC3  ZG-DC2  ZG-DC3  ZG-LF112  ZG-LMSA-1  ZG-LMSA-			
Damper clip for damper blade, 3.5" width.  Damper clip for damper blade, 6" width.  ZG-DC2  LF crankarm adaptor kit (includes ZG-112).  LF crankarm adaptor kit (T bracket included).  ZG-LF1  LF crankarm adaptor kit (T bracket included).  Shaft extension for 3/8" diameter shafts (4" L).  Shaft extension for 1/2" diameter shafts (5" L).  Weather shield 13x8x6" [330x203x152 mm] (LxWxH)  Base Plate, for ZS-100  Weather shield 16x8-3/8x4" [406x213x102 mm] (LxWxH)  Explosion Proof Housing 16x10x6.435" [406x254x164 mm] (LxWxH), UL and CSA, Class I, Zone 1&2, Groups B, C, D, (NEMA 7), Class III, Hazardous (classified)  Locations  Weather shield 17-1/4x8-3/4x5-1/2" [438x222x140 mm] (LxWxH), NEMA 4X, with mounting brackets  Weather shield 17-1/4x8-3/4x5-1/2" [438x222x140 mm] (LxWxH), NEMA 4X, with mounting brackets  Shaft extension 1/2"  S-300-C1  Shaft extension 3/4"  ZS-300-C2  Shaft extension 1"		Mounting bracket	ZG-112
Damper clip for damper blade, 6" width.  LF crankarm adaptor kit (includes ZG-112).  LF crankarm adaptor kit (T bracket included).  Shaft extension for 3/8" diameter shafts (4" L).  Shaft extension for 1/2" diameter shafts (5" L).  Weather shield 13x8x6" [330x203x152 mm] (LxWxH)  Base Plate, for ZS-100  Weather shield 16x8-3/8x4" [406x213x102 mm] (LxWxH)  Explosion Proof Housing 16x10x6.435" [406x254x164 mm] (LxWxH), UL and CSA, Class I, Zone 1&2, Groups B, C, D, (NEMA 7), Class III, Hazardous (classified)  Locations  Weather shield 17-1/4x8-3/4x5-1/2" [438x222x140 mm] (LxWxH), NEMA 4X, with mounting brackets  Weather shield 17-1/4x8-3/4x5-1/2" [438x222x140 mm] (LxWxH), NEMA 4X, with mounting brackets  Shaft extension 1/2"  Shaft extension 3/4"  ZS-300-C2  Shaft extension 1"  ZG-LF2  ZG-LF112  ZG-LF12  ZG-LHSA-1  ZG-LMSA-1  ZG-LMSA-1  ZS-100  ZS-100  ZS-101  ZS-101  ZS-101  ZS-101  ZS-101  ZS-101  ZS-101  ZS-101  ZS-200  ZS-200  ZS-200  ZS-200  ZS-200  ZS-200  ZS-200  ZS-200  ZS-200  ZS-300-C1  ZS-300-C2  Shaft extension 1"  ZS-300-C3		for LF	
LF crankarm adaptor kit (includes ZG-112).  LF crankarm adaptor kit (T bracket included).  ZG-LF2  Shaft extension for 3/8" diameter shafts (4" L).  Shaft extension for 1/2" diameter shafts (5" L).  Weather shield 13x8x6" [330x203x152 mm] (LxWxH)  Base Plate, for ZS-100  Weather shield 16x8-3/8x4" [406x213x102 mm] (LxWxH)  Explosion Proof Housing 16x10x6.435" [406x254x164 mm] (LxWxH), UL and CSA, ZS-260  Class I, Zone 1&2, Groups B, C, D, (NEMA 7), Class III, Hazardous (classified)  Locations  Weather shield 17-1/4x8-3/4x5-1/2" [438x222x140 mm] (LxWxH), NEMA 4X, with mounting brackets  Weather shield 17-1/4x8-3/4x5-1/2" [438x222x140 mm] (LxWxH), NEMA 4X, with mounting brackets  Shaft extension 1/2"  ZS-300-C1  Shaft extension 3/4"  ZS-300-C2  Shaft extension 1"  ZG-LF12  ZG-LF2  ZG-LMSA-1  ZG-LMSA-1  ZG-LMSA-1  ZS-100  ZS-101  LxWxH), UL and CSA, ZS-200  Class I, Zone 1&2, Groups B, C, D, (NEMA 7), Class III, Hazardous (classified)  Locations  Veather shield 17-1/4x8-3/4x5-1/2" [438x222x140 mm] (LxWxH), NEMA 4X, with mounting brackets  Shaft extension 1/2"  ZS-300-C1  Shaft extension 3/4"  ZS-300-C2  Shaft extension 1"  ZS-300-C3		Damper clip for damper blade, 3.5" width.	ZG-DC1
LF crankarm adaptor kit (T bracket included).  Shaft extension for 3/8" diameter shafts (4" L).  Shaft extension for 1/2" diameter shafts (5" L).  Weather shield 13x8x6" [330x203x152 mm] (LxWxH)  Base Plate, for ZS-100  Weather shield 16x8-3/8x4" [406x213x102 mm] (LxWxH)  Explosion Proof Housing 16x10x6.435" [406x254x164 mm] (LxWxH), UL and CSA, Class I, Zone 1&2, Groups B, C, D, (NEMA 7), Class III, Hazardous (classified)  Locations  Weather shield 17-1/4x8-3/4x5-1/2" [438x222x140 mm] (LxWxH), NEMA 4X, with mounting brackets  Weather shield 17-1/4x8-3/4x5-1/2" [438x222x140 mm] (LxWxH), NEMA 4X, with mounting brackets  Shaft extension 1/2"  Shaft extension 3/4"  ZS-300-C2  Shaft extension 1"  ZG-LMSA-1  ZG-LMSA-1  ZG-LMSA-1  ZG-LMSA-1/2-5  ZG-LMSA-1/2-5  ZS-100  ZS-101  ZS-101  ZS-101  ZS-200  ZS-260  Class I, Zone 1&2, Groups B, C, D, (NEMA 7), Class III, Hazardous (classified)  Locations  Weather shield 17-1/4x8-3/4x5-1/2" [438x222x140 mm] (LxWxH), NEMA 4X, with mounting brackets  Shaft extension 1/2"  ZS-300-C1  Shaft extension 3/4"  ZS-300-C2  Shaft extension 1"		Damper clip for damper blade, 6" width.	ZG-DC2
Shaft extension for 3/8" diameter shafts (4" L).  Shaft extension for 1/2" diameter shafts (5" L).  Weather shield 13x8x6" [330x203x152 mm] (LxWxH)  Base Plate, for ZS-100  Base Plate, for ZS-100  Weather shield 16x8-3/8x4" [406x213x102 mm] (LxWxH)  Explosion Proof Housing 16x10x6.435" [406x254x164 mm] (LxWxH), UL and CSA, Class I, Zone 1&2, Groups B, C, D, (NEMA 7), Class III, Hazardous (classified)  Locations  Weather shield 17-1/4x8-3/4x5-1/2" [438x222x140 mm] (LxWxH), NEMA 4X, with mounting brackets  Weather shield 17-1/4x8-3/4x5-1/2" [438x222x140 mm] (LxWxH), NEMA 4X, with mounting brackets  Shaft extension 1/2"  Shaft extension 3/4"  ZS-300-C2  Shaft extension 1"  ZG-LMSA-1  ZG-LMSA-1  ZG-LMSA-1/2-5  ZS-100  ZS-100  ZS-101  ZS-260  ZS-260  ZS-260  ZS-300-C1  ZS-300-C1  ZS-300-C2  Shaft extension 1"  ZS-300-C3			ZG-LF112
Shaft extension for 1/2" diameter shafts (5" L). Weather shield 13x8x6" [330x203x152 mm] (LxWxH)  Base Plate, for ZS-100  Weather shield 16x8-3/8x4" [406x213x102 mm] (LxWxH)  Explosion Proof Housing 16x10x6.435" [406x254x164 mm] (LxWxH), UL and CSA, Class I, Zone 1&2, Groups B, C, D, (NEMA 7), Class III, Hazardous (classified)  Locations  Weather shield 17-1/4x8-3/4x5-1/2" [438x222x140 mm] (LxWxH), NEMA 4X, with mounting brackets  Weather shield 17-1/4x8-3/4x5-1/2" [438x222x140 mm] (LxWxH), NEMA 4X, with mounting brackets  Shaft extension 1/2"  Shaft extension 3/4"  ZS-300-C2  Shaft extension 1"  ZG-LMSA-1/2-5  ZS-100  ZS-101  ZS-150  ZS-260  ZS-260  ZS-260  ZS-260  ZS-300-C1  ZS-300-C1  Shaft extension 3/4"  ZS-300-C2  Shaft extension 1"  ZS-300-C3		·	
Weather shield 13x8x6" [330x203x152 mm] (LxWxH)  Base Plate, for ZS-100  Weather shield 16x8-3/8x4" [406x213x102 mm] (LxWxH)  Explosion Proof Housing 16x10x6.435" [406x254x164 mm] (LxWxH), UL and CSA, ZS-260  Class I, Zone 1&2, Groups B, C, D, (NEMA 7), Class III, Hazardous (classified)  Locations  Weather shield 17-1/4x8-3/4x5-1/2" [438x222x140 mm] (LxWxH), NEMA 4X, with mounting brackets  Weather shield 17-1/4x8-3/4x5-1/2" [438x222x140 mm] (LxWxH), NEMA 4X, with mounting brackets  Shaft extension 1/2"  Shaft extension 3/4"  ZS-300-C2  Shaft extension 1"  ZS-300-C3			
Base Plate, for ZS-100 Weather shield 16x8-3/8x4" [406x213x102 mm] (LxWxH) ZS-150 Explosion Proof Housing 16x10x6.435" [406x254x164 mm] (LxWxH), UL and CSA, Class I, Zone 1&2, Groups B, C, D, (NEMA 7), Class III, Hazardous (classified) Locations Weather shield 17-1/4x8-3/4x5-1/2" [438x222x140 mm] (LxWxH), NEMA 4X, with mounting brackets Weather shield 17-1/4x8-3/4x5-1/2" [438x222x140 mm] (LxWxH), NEMA 4X, with mounting brackets Shaft extension 1/2" ZS-300-C1 Shaft extension 3/4" ZS-300-C2 Shaft extension 1" ZS-300-C3			
Weather shield 16x8-3/8x4" [406x213x102 mm] (LxWxH) ZS-150 Explosion Proof Housing 16x10x6.435" [406x254x164 mm] (LxWxH), UL and CSA, Class I, Zone 182, Groups B, C, D, (NEMA 7), Class III, Hazardous (classified) Locations Weather shield 17-1/4x8-3/4x5-1/2" [438x222x140 mm] (LxWxH), NEMA 4X, with mounting brackets Weather shield 17-1/4x8-3/4x5-1/2" [438x222x140 mm] (LxWxH), NEMA 4X, with mounting brackets Shaft extension 1/2" ZS-300-C1 Shaft extension 3/4" ZS-300-C2 Shaft extension 1" ZS-300-C3			
Explosion Proof Housing 16x10x6.435" [406x254x164 mm] (LxWxH), UL and CSA, Class I, Zone 1&2, Groups B, C, D, (NEMA 7), Class III, Hazardous (classified) Locations  Weather shield 17-1/4x8-3/4x5-1/2" [438x222x140 mm] (LxWxH), NEMA 4X, with mounting brackets  Weather shield 17-1/4x8-3/4x5-1/2" [438x222x140 mm] (LxWxH), NEMA 4X, with mounting brackets  Weather shield 17-1/4x8-3/4x5-1/2" [438x222x140 mm] (LxWxH), NEMA 4X, with mounting brackets  Shaft extension 1/2" ZS-300-C1  Shaft extension 3/4" ZS-300-C2  Shaft extension 1" ZS-300-C3			
Class I, Zone 1&2, Groups B, C, D, (NEMA 7), Class III, Hazardous (classified) Locations Weather shield 17-1/4x8-3/4x5-1/2" [438x222x140 mm] (LxWxH), NEMA 4X, with mounting brackets Weather shield 17-1/4x8-3/4x5-1/2" [438x222x140 mm] (LxWxH), NEMA 4X, with mounting brackets Shaft extension 1/2" Shaft extension 3/4" ZS-300-C2 Shaft extension 1" ZS-300-C3			
Weather shield 17-1/4x8-3/4x5-1/2" [438x222x140 mm] (LxWxH), NEMA 4X, with mounting brackets  Weather shield 17-1/4x8-3/4x5-1/2" [438x222x140 mm] (LxWxH), NEMA 4X, with mounting brackets  Shaft extension 1/2"  Shaft extension 3/4"  ZS-300-C2  Shaft extension 1"  ZS-300-C3		Class I, Zone 1&2, Groups B, C, D, (NEMA 7), Class III, Hazardous (classified)	ZS-26U
mounting brackets Weather shield 17-1/4x8-3/4x5-1/2" [438x222x140 mm] (LxWxH), NEMA 4X, with zs-300-5 mounting brackets Shaft extension 1/2" zs-300-C1 Shaft extension 3/4" zs-300-C2 Shaft extension 1" zs-300-C3			76 200
Weather shield 17-1/4x8-3/4x5-1/2" [438x222x140 mm] (LxWxH), NEMA 4X, with zS-300-5 mounting brackets  Shaft extension 1/2" ZS-300-C1 Shaft extension 3/4" ZS-300-C2 Shaft extension 1" ZS-300-C3			ZS-300
mounting brackets Shaft extension 1/2" Shaft extension 3/4" Shaft extension 1" ZS-300-C2 Shaft extension 1" ZS-300-C3		-	75 300 E
Shaft extension 1/2" ZS-300-C1 Shaft extension 3/4" ZS-300-C2 Shaft extension 1" ZS-300-C3			£3-3UU-3
Shaft extension 3/4" ZS-300-C2 Shaft extension 1" ZS-300-C3			7S-300-C1
Shaft extension 1" ZS-300-C3			
Scrate tools Escription Type	Sanjica tools		
	Service tools	econ publi	.,,,,,

Connection cable 10 ft [3 m], A: RJ11 6/4 ZTH EU, B: 3-pin Weidmüller and supply ZK4-GEN

Service Tool, with ZIP-USB function, for parametrisable and communicative

Belimo actuators, VAV controller and HVAC performance devices

**ZTH US** 

# **Electrical installation**

# / Warning! Live Electrical Components!

During installation, testing, servicing and troubleshooting of this product, it may be necessary to work with live electrical components. Have a qualified licensed electrician or other individual who has been properly trained in handling live electrical components perform these tasks. Failure to follow all electrical safety precautions when exposed to live electrical components could result in death or serious injury.

Meets cULus requirements without the need of an electrical ground connection.

Actuators with appliance cables are numbered.

Provide overload protection and disconnect as required.

Actuators may also be powered by 24 VDC.

Only connect common to negative (-) leg of control circuits.

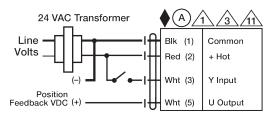
A 500  $\Omega$  resistor (ZG-R01) converts the 4...20 mA control signal to 2...10 V.

Control signal may be pulsed from either the Hot (Source) or Common (Sink) 24 V line. For triac sink the Common connection from the actuator must be connected to the Hot connection of the

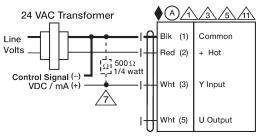
controller. Position feedback cannot be used with a triac sink controller; the actuator internal common reference is not compatible.

 $\uparrow_1$  Actuators may be connected in parallel if not mechanically linked. Power consumption and input impedance must be observed.

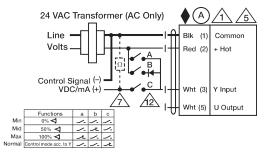
IN4004 or IN4007 diode. (IN4007 supplied, Belimo part number 40155).



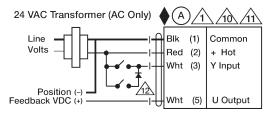
On/Off



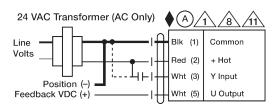
VDC/mA Control



Override Control



Floating Point



**PWM Control** 

### **Dimensions**



# **Dimensional drawings**

