M9108, M9116, M9124 and M9132 Series

LIT-1922030

Electric Non-spring Return Actuators

Description

The M91xx Series includes M9108, M9116, M9124 and M9132 models. All of these direct-mount line of electric actuators operate on AC/DC 24 V power. The M91xx actuators are available for use with on-off, floating, proportional, or resistive controllers. These bidirectional actuators do not require a damper linkage, and are easily installed on a damper with a round shaft up to a 3/4 in. (20 mm) in diameter or a square shaft up to 5/8 in. (16 mm). They may be direct or remote mounted to a damper, or mounted to a valve using one of the M9000-5xx Valve Linkage Kits.

A single M91xx model delivers up to 280 lb·in (32 N·m) of torque. Two AGx, GGx, or HGx models in tandem deliver twice the torque or 560 lb·in (64 N·m). The angle of rotation is mechanically adjustable from 0 to 90° in 5-degree increments. Integral auxiliary switches are available to indicate end-stop position or to perform switching functions at any angle within the selected rotation range. Position feedback is available through switches, a potentiometer, or a DC 0(2)...10 V signal.

Features

- simple direct coupling reduces installation and commissioning time while improving reliability by eliminating damper linkages
- six torques: 70 to 560 lb·in (8 to 64 N·m) offer the most suitable choice for the application
- four control inputs meet the needs of most applications
- output position feedback provides simple closed-loop control with accurate position sensing
- electronic stall detection ensures higher reliability by deactivating the actuator motor when a stall condition is detected
- master/slave operation allows synchronized control for two actuators
- stacked for tandem applications
- zero and span adjustment (HGx models) allows sequential operation of dampers from a single input signal of DC 0(2)...10 V, DC 0(4)...20 V, or DC 0(4)...20 mA
- jumper-selectable rotation direction and manual gear release simplify installation, setup, and field adjustments
- NPT threaded housing provides easy connection for electrical fittings
- manual gear release simplifies damper / valve setup and commissioning

Applications

M91xx actuators are designed to position air dampers and valves in HVAC systems. Applications include: positioning return air or exhaust dampers, controlling face and bypass dampers, positioning blades for variable volume fans, positioning VF4000 and VF5000 series butterfly valves, positioning VG1000 Series ball valves and VG7000 Series globe valves when used with the M9000-5xx Series Valve Linkages. Two each of the following models provide twice the amount of running torque of a single unit when mounted in tandem: M9116-GGx or HGx, M9124-AGx, GGx or HGx, and M9132-AGx or GGx.

Refer to the manufacturer's information to properly size the damper, valve, and/or actuator. Spring return actuators, such as Johnson Controls M9206 and M9216 Series actuators, are recommended for use with outdoor air dampers in cold climates. These compact M91xx actuators use a DC motor with stall detection circuitry that operates throughout the entire stroke. The GGx, HGx, and JGx models employ noise-filtering techniques on the control signal to eliminate repositioning due to line noise. Rotation is mechanically limited to 93° by integral end-stops. The position of the actuator is visually indicated from 0 to 90° on the cover. An anti-rotation bracket prevents lateral movement of the actuator. Pressing the spring-loaded gear release on the actuator cover disengages the gear train for manual repositioning of the coupler. For more information, refer to the *M9108, M9116, M9124, M9132 Series Electric Non-spring Return Actuators Product Bulletin, LIT-2681058* or the *M9108, M9116, M9124, M9132 Series Electric Non-spring Return Actuators Installation Instructions, Part No. 34-636-399*.

M9116 Series
Electric Non-spring Return Actuataors

Selection Charts

M9108, M9116, M9124, and M9132 Electric Non-spring Return Actuators (Part 1 of 2)

Code Number	Control Type	Torque / Voltage	Auxiliary Switches	Comments
M9108 Electric Non-spring Return Actuators				
M9108-AGA-2	On-Off, Floating	70 lb-in (8 Nm) 25 to 50 seconds timing AC 24 V 50/60 Hz DC 24 V	None	
M9108-AGC-2			2-SPDT	
M9108-AGD-2			None	135 ohm potentiometer
M9108-AGE-2			2-SPDT	1000 ohm potentiometer
M9108-GGA-2	DC 0(2)…10 V DC 0(4)…mA proportional	70 lb-in (8 Nm) 25 to 50 seconds timing AC 24 V 50/60 Hz DC 24 V	None	DC 0(2)…10 V Feedback
M9108-GGC-2			2-SPDT	
M9108-HGA-2	DC 0…10 V DC 0…20 mA proportional Adjustable start and span		None	DC 0...10 V Feedback
M9108-HGC-2			2-SPDT	
M9108-JGA-2	100 to 10,000 ohm potentiometer		None	
M9108-JGC-2			2-SPDT	

M9108, M9116, M9124 and M9132 Series Electric Non-spring Return Actuators (Continued)

M9108, M9116, M9124, and M9132 Electric Non-spring Return Actuators (Part 2 of 2)

Code Number	Control Type	Torque / Voltage	Auxiliary Switches	Comments
M9116 Electric Non-spring Return Actuators				
M9116-AGA-2	On-Off, Floating	140 lb-in (16 Nm) 70 to 115 seconds timing AC 24 V 50/60 Hz DC 24 V	None	
M9116-AGC-2			2-SPDT	
M9116-AGD-2			None	135 ohm potentiometer
M9116-AGE-2			2-SPDT	1000 ohm potentiometer
M9116-GGA-2	DC 0(2)…10 V DC 0(4)…mA proportional		None	DC 0(2)…10 V Feedback
M9116-GGC-2			2-SPDT	
M9116-HGA-2	DC 0…10 V DC 0…20 mA proportional Adjustable start and span		None	DC 0...10 V Feedback
M9116-HGC-2			2-SPDT	
M9116-JGA-2	100 to 10,000 ohm potentiometer		None	
M9116-JGC-2			2-SPDT	
M9124 Electric Non-spring Return Actuators				
M9124-AGA-2	On-Off, Floating	210 lb-in (24 Nm) 115 to 175 seconds timing AC 24 V 50/60 Hz DC 24 V	None	
M9124-AGC-2			2-SPDT	
M9124-AGD-2			None	135 ohm potentiometer
M9124-AGE-2			2-SPDT	1000 ohm potentiometer
M9124-GGA-2	DC 0(2)…10 V DC 0(4)…mA proportional		None	DC 0(2)…10 V Feedback
M9124-GGC-2			2-SPDT	
M9124-HGA-2	DC 0…10 V DC 0…20 mA proportional Adjustable start and span		None	DC 0...10 V Feedback
M9124-HGC-2			2-SPDT	
M9124-JGA-2	100 to 10,000 ohm potentiometer		None	
M9124-JGC-2			2-SPDT	
M9132 Electric Non-spring Return Actuators				
M9132-AGA-2	On-Off, Floating	280 lb-in (32 Nm) 115 to 205 seconds timing AC 24 V 50/60 Hz DC 24 V	None	
M9132-AGC-2			2-SPDT	
M9132-AGE-2			None	1000 ohm potentiometer
M9132-GGA-2	DC 0(2)…10 V DC 0(4)…mA proportional		None	DC 0(2)…10 V Feedback
M9132-GGC-2			2-SPDT	

M9108, M9116, M9124 and M9132 Series Electric Non-spring Return Actuators (Continued)

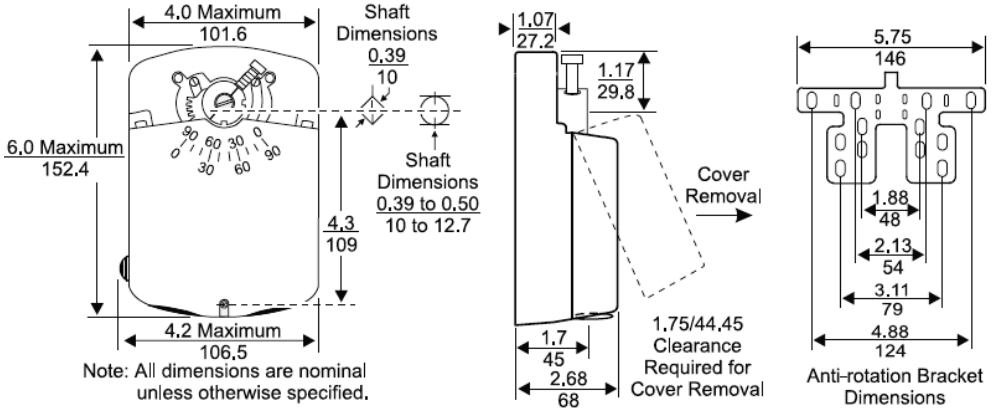
Accessories for M9108, M9116, M9124, and M9132 Series Actuators

Code Number	Description
DMPR-KR003[1]	Sleeve Pin Kit for Johnson Controls round dampers with a 5/16 in. (8 mm) diameter shaft
DMPR-KC003[1]	Square Head Blade Pin Extension without Bracket for Johnson Controls CD-1300 direct-mount applications
DMPR-KC011	Hex Head Blade Pin Extension without Bracket
DMPR-KC012	Hex Head Blade Pin Extension with Bracket
DMPR-KC210	Damper Jackshaft 1" Diameter, 1 Panel
DMPR-KC211	Damper Jackshaft 1" Diameter, 2 Panel
DMPR-KC212	Damper Jackshaft 1" Diameter, 3 Panel
DMPR-KC213	Damper Jackshaft ½" Diameter, 1 Panel
DMPR-KC214	Damper Jackshaft ½" Diameter, 2 Panel
M9000-103	14 VA Transformer, 120/24 VAC, 60 Hz, Class 2
M9000-104	14 VA Transformer, 230/24 VAC, 60 Hz, Class 2
M9000-105	Pluggable 3-terminal block
M9000-151	Base Mount Linkage Kit for remote inside duct mounting (not intended for M9132 actuators or any tandem application)
M9000-153	Crank Arm Kit for remote mounting (not intended for M9132 actuators or any tandem application)
M9000-154	1 in. Jackshaft Coupler for mounting on a 1 in. diameter damper shaft
M9000-155	Manual Handle for positioning a damper or valve when power is removed from an M91xx actuator
M9000-158	Mounting Kit to tandem mount two M9116 GGx or HGx models; two M9124 AGx, GGx, or HGx; or two M9132 AGx or GGx models on a damper
M9000-160	Replacement anti-rotation bracket for M91xx Series actuators
M9000-200	Commissioning Tool provides a control signal to drive on/off, floating, proportional, or resistive actuators.
M9000-500	Valve Linkage Kit for mounting M9116 actuators to 1/2 to 2 in. VG7000 Series globe valves
M9000-516	Valve Linkage Kit for mounting M9108 and M9116 to 1/2 through 2 in. 2-way and 3-way VG1000 Series ball valves
M9000-518	Valve Linkage Kit for mounting M9124 actuators to 2-1/2 in. to 4 in. VG1xA5 Series flange body ball valves and M9116 actuators to VG1x43 1-1/2 in. valves

1. Furnished with the damper and may be ordered separately.

Repair Information

If the M9108, M9116, M9142, or M9132 Electic Actuator fails to operate within its specifications, replace the unit. For a replacement actuator, contact the nearest Johnson Controls® representative.



Dimensions, in./mm

M9108, M9116, M9124 and M9132 Series Electric Non-spring Return Actuators (Continued)

Technical Specifications

M9108, M9116, M9142, and M9132 Series Non-spring Return Actuators	
Power Requirement	M9108- and M9116-AGx: AC 20...30 V at 50/60 Hz or DC 24 V ±10%; 6.5 VA supply minimum All Other Models: AC 20...30 V at 50/60 Hz or DC 24 V ±10%; 7.5 VA supply minimum
Control Type	AGx: On-Off and Floating GGx: DC 0(2)…10 V or DC 0(4)…20 mA proportional HGx: DC 0…10 V or DC 0…20 mA proportional with adjustable start and span JGx: Proportional from 100 to 10,000 ohm potentiometer controller
Input Signal	AGx: V 24 AC at 50/60 Hz or DC 24 V GGx and HGx: DC 0(2)...10 V, DC 0(4)...20 V, or DC 0(4)...20 mA JGx: Potentiometer value is 100 ohms minimum to 10,000 ohms maximum
Input Signal Adjustments	AGx: Factory Setting, Terminals 1 and 2, CW rotation; Terminals 1 and 3, CCW rotation GGx and HGx (Voltage Input or Current Input): Jumper selectable: DC 0(2)...10 V, DC 0(4)...20 V, or DC 0(4)...20 mA Adjustable: Zero, DC 0...6 V, DC 0...12 V, or DC 0...12 mA Span, DC 2...10 V, DC 4...20 V, or DC 4...20 mA Factory Setting: DC 0...10 V, DC 0..20 mA, CW rotation with signal increase GGx, HGx, and JGx: Action is jumper selectable Direct (CW) or Reverse (CCW) with signal increase.
Input Impedance	GGx and HGx: Voltage Input, 205,000 ohms for 0 (2) to 10 V and 410,000 ohms for 0 (4) to 20 V; Current Input, 500 ohms JGx: 1.8 Megohms
Feedback Signal	AGD: 135 ohm feedback potentiometer AGE: 1,000 ohm feedback potentiometer GGx and HGx: DC 0...10 V or DC 2...10 V for 90° (10 VDC at 1 mA) Corresponds to input signal span selection. JGx: DC 0...10 V for 90° (10 VDC at 1 mA)
Auxiliary Switch Rating	xGC: Two Single-Pole, Double-Throw (SPDT) switches rated at 24 VAC 1.5 A inductive, 3.0 A resistive, 35 VA maximum per switch, Class 2
Torque Rating	M9108: 70 lb·in (8 N·m) for one unit; not intended for tandem use M9116: 140 lb·in (16 N·m) for one unit, 280 lb·in (32 N·m) for two in tandem (GGx, HGx) M9124: 210 lb·in (24 N·m) for one unit, 420 lb·in (48 N·m) for two in tandem (AGx, GGx, HGx) M9132: 280 lb·in (32 N·m) for one unit, 560 lb·in (64 N·m) for two in tandem (AGx, GGx)
Cycle Life	M9108, M9116 and M9124 60,000 cycles at rated load M9132 30,000 cycles at rated load
Audible Noise Rating	45 dBA at 1 m
Rotation Range	0 to 90° in 5-degree increments, mechanically limited to 93° - rotation range is adjusted by repositioning the output hub
Rotation Time	M9108: 30 seconds at 50% rated load, 25 to 50 seconds for 0 to 70 lb·in (0 to 8 N·m) M9116: 80 seconds at 50% rated load, 70 to 115 seconds for 0 to 140 lb·in (0 to 16 N·m) M9124: 130 seconds at 50% rated load, 115 to 175 seconds for 0 to 210 lb·in (0 to 24 N·m) M9132: 140 seconds at 50% rated load, 115 to 205 seconds for 0 to 280 lb·in (0 to 32 N·m)
Electrical Connection	M9124- and M9132-AGx: 1/4 in. spade terminals with pluggable 3-terminal blocks (See Accessories chart.) All Other Models: Screw terminals for 22 to 14 AWG; maximum of two 18, 20, or 22 AWG per terminal
Mechanical Connection	3/8 to 3/4 in. (10 to 20 mm) diameter round shaft or 3/8 to 5/8 in. (10 to 16 mm) square shaft 1 in. (25.4 mm) diameter jackshaft with M9000-154 coupler
Enclosure Rating	NEMA 2, IP42
Ambient Operating Rating	-4 to 122°F (-20 to 50°C); 0 to 95% RH, non-condensing
Ambient Storage Rating	-40 to 186°F (-40 to 86°C); 0 to 95% RH, non-condensing
Shipping Weight	2.9 lb (1.3 kg)
Agency Compliance	UL 873 Listed, File E27734, CCN XAPX CSA C22.2 No. 139 Certified, File LR85083, Class 3221 02 CE Mark, EMC Directive 89/336/EEC