

DAF1.03(S)(Z) / DAF2.03(S)(Z) / DMF1.03(S)(Z) / DBF1.03(S)(Z)

Electric Spring Return Actuators

Product Bulletin

The 3 Nm Series Electric Spring Return Actuators are direct-mount actuators. These bidirectional actuators do not require a damper linkage, and are easily installed on round shafts or square shafts using the standard shaft clamp included with the actuator.

A single Series Electric Spring Return Actuator provides 3 Nm running and spring return torque.

An integral line voltage auxiliary switch indicates end stop position, or performs switching functions within the selected rotation range.

This Joventa Series Actuators provide 95° of rotation.

A graduated scale from -5° to 90° and a position indicator provide visual indication of stroke.

When power fails during service, the mechanical spring return system provides rated torque to the connected equipment, returning it to the home position.

The series includes the following control options:

- ON/OFF, 24 V, 100 to 240 VAC power
- ON/OFF and Floating Point, 24 V power
- Proportional, 24 V power, for 0(2) to 10 VDC or 0(4) to 20 mA Control Signal

■ 3 Nm Rated Torque

Provides high torque in a compact package size to expand the range of damper applications in HVA system.

■ Direct-Coupled Design

Requires non crankarm or linkage and is capable of direct mounting to a shaft up to 12 mm diameter and centered on a 12 mm shaft.

■ Reversible Mounting

Provides either clockwise or counterclockwise operation.

■ Electronic Stall Detection

Protects from overload at all angles of rotation. Power consumption is reduced in holding mode. The actuator may be stalled anywhere in its rotation range without the need for mechanical end switches.

■ Double-Insulated Construction

Eliminates need for electrical ground connection for regulatory agency compliance.

■ Microprocessor-controlled Brushless DC Motor (DBF and DMF types)

Provides constant runtime independent of torque.

■ External Mode Selection Switch (DBF and DMF types)

Permits control logic reversal for Floating Control. Permits calibration, input signal range selection and control logic reversal for Proportional Control.

■ Integral Cables with Colored and Numbered Conductors

Simplify installation and field wiring.

■ Optional Integrated Auxiliary Switch

Provides one integrated, line-voltage-capable Single-Pole, Double-Throw (SPDT) switch with continuously adjustable switch point. Facilitates safety interfacing or signaling.

■ Override Control (Proportional Models Only)

Supports manual control system override applications through field wiring.

■ Manufactured under International Standards Organization (ISO) 9001 Quality Control Standards

Ensures quality.



Installation

The Joventa Series Proportional Electric Spring Return Actuators mount directly to the surface in any convenient orientation using two No. M3.5 x 9.5 mm self drilling sheet metal screws and the anti-rotation bracket (parts included with the actuator). No additional linkages or couplers are required. Electrical connections are color coded and identified with numbers permanently marked on the actuator cable. A tag on the actuator cable identifies the electrical connections and wiring details are included on the actuator housing.

This Spring Return Actuators can be easily installed on dampers with round shafts from 6 to 12 mm or square shafts from 6 to 8 mm using the standard shaft coupler included with the actuator. If the damper shaft extends less than 84 mm, see the Removable Coupler section for further instructions. If the damper shaft extends less than 20 mm, install a shaft extension recommended by the damper manufacturer.

Counterclockwise (CCW) Spring Return Direction - Clockwise (CW) Powered Operation

For CCW spring return direction, mount the actuator to the damper shaft so that Side A of the actuator is away from the damper as illustrated in Figure 1. With power applied, the actuator drives CW from the 0° position and spring returns CCW.

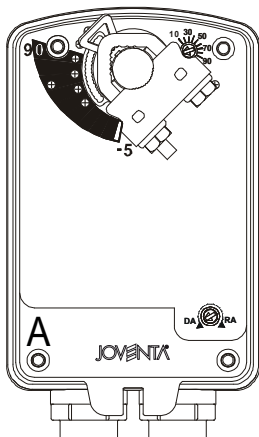


Figure 1: Actuator Side A

Clockwise (CW) Spring Return Direction – Counterclockwise (CCW) Powered Operation

For CW spring return direction, mount the actuator to the damper shaft so that Side B of the actuator is away from the damper as illustrated in Figure 2. With power applied, the actuator drives CCW from the 0° position and spring returns CW.

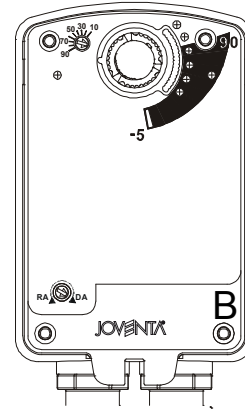


Figure 2: Actuator Side B

Removable Coupler

If the damper shaft extends less than 84 mm, mount the coupler on the face of the actuator closest to the damper. If the damper shaft extends less than 20 mm, a shaft extension is required to mount the actuator.

To change the coupler's position, see Figure 3 and proceed as follows:

1. Mount the coupler on either Side A or Side B of the actuator as determined by the shaft length.
2. Snap the locking clip securely into the coupler retention groove to retain the coupler.

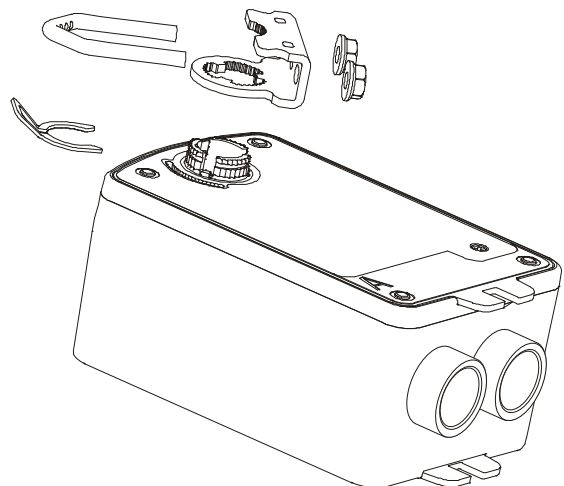


Figure 3: Changing the Coupler Position

Mounting the Actuator

To mount the actuator, proceed as follows:

1. See the dimensions in Figure 4 and Table 1 to ensure the correct positioning of the anti rotation bracket.

Table 1: Dimensions from Anti-Rotation Bracket to Shaft Center

Shaft Diameter mm	Dimension A mm	Dimension B mm
6 to 12	123	92

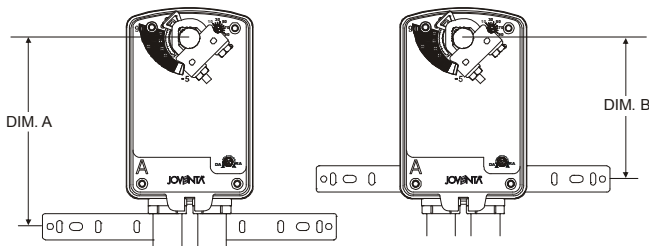


Figure 4: Positioning the Anti-Rotation Bracket

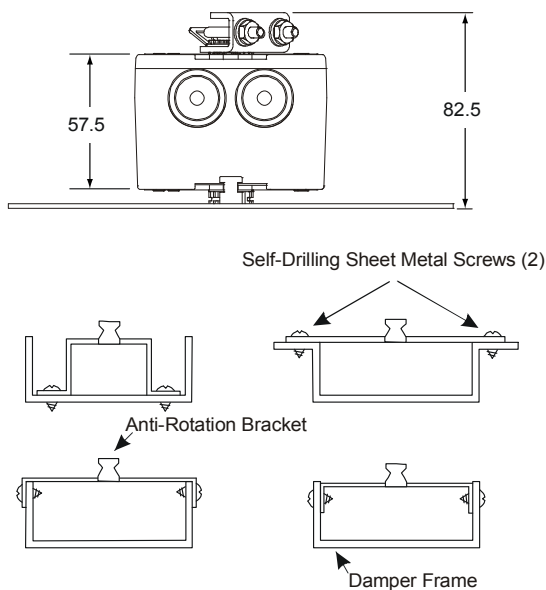


Figure 5: Anti-rotation Mounting Bracket Positions

2. Bend or cut the anti-rotation bracket to fit the damper frame or duct as illustrated in Figure 5.

Note: The anti-rotation bracket can be bent to fit a round damper.

3. Mark or drill mounting holes in the damper frame or duct using the anti-rotation bracket as a guide (based on the measurements obtained in Table 1 and Figure 4).
4. Secure the anti rotation bracket to the damper frame or duct using the two No. M3.5 x 9.5 mm self-drilling sheet metal screws provided.
5. Slide the actuator onto the damper shaft, and position the anti-rotation bracket tab into the slot at the bottom of the actuator as illustrated in Figure 5.

6. Rotate the damper blade(s) to the desired position if the power is lost.
7. Hold the actuator perpendicular to the damper shaft. Evenly hand-tighten each nut on the coupler U bolt, then torque the coupler U bolt nuts to 11 to 14 Nm.
8. Apply power long enough for the actuator to travel a full stroke. Verify that the actuator rotates freely throughout the range.

Limiting Rotation Range Using M9203 603 Adjustable Stop Kit

The actuator is factory set for 95° rotation, and its range is limited in 5° increments to a minimum of 35°. A stroke-limiting stop can be attached in the field to the shaft coupler side of the actuator to reduce the rotation range. Attaching the stroke limiting stop in the furthest mounting position reduces the rotation range of the actuator by 5°. Each progressive mounting position reduces the rotation range an additional 5° (see Fig. 6).

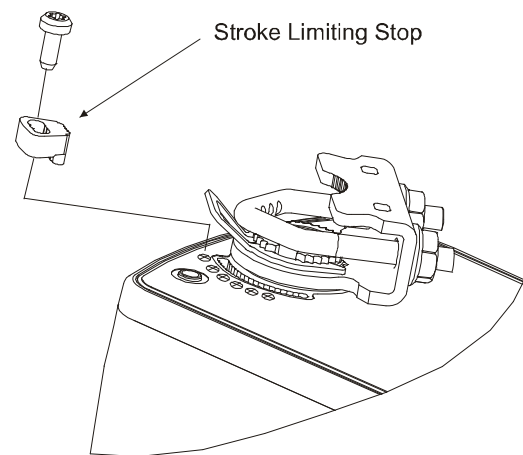


Figure 6: Limiting Rotation Range

Auxiliary Switch

The Dx.Fx.03S(Z) models include one integral auxiliary switch with a switch adjuster accessible on either face of the actuator. The factory setting for the Auxiliary Switch is 11° closing (relative to the 0 to 90° rotation range as printed on the product label). The switch point continuously adjustable throughout the actuator's rotation range. For the most accurate switch positioning, see Figure 7 and use the method in the following example.

To change the switch point, proceed as follows:

1. Position the actuator in the full spring return position.
Note: The switch is factory set to trip when the actuator reaches the 11° position.
2. Rotate the switch adjuster until it points to the desired switch point.
3. Connect the Auxiliary Switch to a power source or an ohmmeter and apply power to the actuator. The actuator moves to the fully open position and holds while power is applied.
4. Observe the switch point. If required, repeat Step 1 through Step 3.

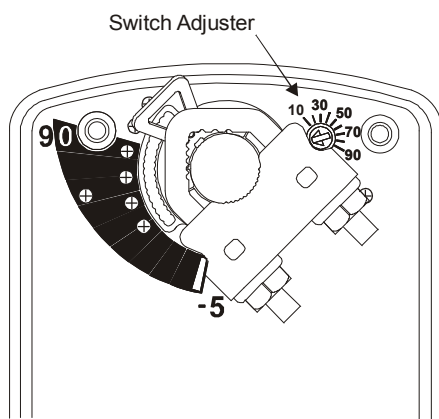


Figure 7: Switch Trip Point Settings

DMF1.03(S)(Z) Series Proportional Actuators

DMF1.03(S)(Z) Series Actuators provide proportional modulation of dampers in HVAC systems that are controlled by an electronic controller or positioner. The actuator responds to 0 to 10 VDC or 2 to 10 VDC control signals. With the addition of a 500 ohm resistor, the actuator responds to a 0 to 20 mA or 4 to 20 mA signal. A 0 to 10 VDC or 2 to 10 VDC feedback signal indicates position and provides support for master slave applications.

Manual control system override applications are supported through field wiring, and include:

- override to MIN position
- override to MAX position
- override to MIN, MID, and MAX position

The DMF1.03(S) actuators have 150 second constant runtime for 90° rotation. The DMF1.03(S)(Z) actuators have 90 second constant runtime for 90° rotation. When combined with other actuators in a control system, this choice provides flexibility in synchronizing the movement of equipment driven from a single proportional command.

DMF Series Actuators use a brushless DC motor controlled by a microprocessor. The microprocessor drives the motor at constant speed, independent of torque. The microprocessor also monitors the brushless DC motor's rotation to prevent damage to the actuator in a stall condition. The actuator can be stalled anywhere within its rotation range without the need for mechanical end switches. Power consumption is reduced in the holding mode.

Setup and Adjustments

Mode Selection Switch

Actuators have an external mode selection switch to calibrate, select input signal range, and reverse control logic. The switch is accessible from both A and B sides of the actuator as illustrated in Figure 8. Actuators are delivered in Direct Acting (DA), DC 0 to 10 V input signal mode. To change to Reverse Acting (RA) mode, move the mode selection switch from DA to RA.

The input signal range is selectable between DC 0 to 10 V or DC 2 to 10 V. If the CAL function is not used, both input signal ranges are proportioned across the full rotation range of 0 to 95° rotation.

For example, if a DC 0 to 10 V input signal is selected and the rotation range is limited to 75°, the rotation range limit will be reached at DC 8.3 V.

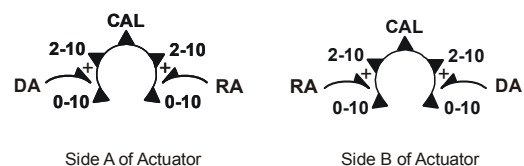


Figure 8: Mode Selection

Control Response

The installation side of the actuator and the position of the mode selection switch combine to determine control response from the actuator. See Figure 9.

		Installation Side							
		A				B			
Input Signal									
Increasing									
Decreasing									
		Rotation Position							
Direction	Feedback	0°*	15°	30°	45°	60°	75°	90°	
Direct Acting	0-10 V	0.0 V	1.7 V	3.3 V	5.0 V	6.7 V	8.3 V	10.0 V	
	2-10 V	2.0 V	3.3 V	4.7 V	6.0 V	7.3 V	8.7 V	10.0 V	
Reverse Acting	0-10 V	10.0 V	8.3 V	6.7 V	5.0 V	3.3 V	1.7 V	0.0 V	
	2-10 V	10.0 V	8.7 V	7.3 V	6.0 V	4.7 V	3.3 V	2.0 V	

* 0° is the Spring Return Position.

Figure 9: Control Response

Calibration (CAL) Function

The CAL function enables the actuator to redefine the selected input signal range proportionally across a reduced rotation range. The actuator maintains calibration when power is lost or removed.

Follow these steps to calibrate the input signal range:

1. With power applied to the actuator, move the mode selection switch to the CAL position and leave it in this position for approximately 5 seconds. The actuator begins rotating until the end-stops are found.
2. Move the mode selection switch to the desired input signal range. Selection can be made while the calibration process is in progress, or after it is complete. The selected input signal is proportionally reconfigured to the reduced rotation range.

Note: During normal operation, if the actuator stroke increases due to seal or seat wear, input signals are automatically reconfigured to the increased rotation range in approximately 0.5° increments.

3. If the actuator mounting position is changed or if the linkage is adjusted, repeat Step 1 and Step 2 to repeat the CAL function.

Note: The mode selection switch must remain out of the CAL position for at least 2 seconds before re-initiating the CAL function.

Note: If the mode selection switch is left in the CAL position, the actuator defaults to 0-10 V input signal range, DA.

DBF1.03(S)(Z) Series On/Off and Floating Point Actuators

DBF1.03(S)(Z) Series Actuators provide on/off control or floating modulation of in HVAC systems. Floating point control is provided from a triac or relay. On/off control can be provided from a manual switch, controller, auxiliary switch from a fan motor contactor, or similar device.

The DBF1.03(S) actuators have 150 seconds constant runtime for 90° rotation. The DBF1.03(S)Z actuators have 90 second constant runtime for 90° rotation. When combined with other actuators in a control system, this choice provides flexibility in synchronizing the movement of equipment driven from a single proportional command.

DBF1.03(S)(Z) Series Actuators use a brushless DC motor controlled by a microprocessor. The microprocessor drives the motor at constant speed, independent of torque. The microprocessor also monitors the brushless DC motor's rotation to prevent damage to the actuator in a stall condition. The actuator can be stalled anywhere within its rotation range without the need for mechanical end switches. Power consumption is reduced in the holding mode.

Actuators have an external mode selection switch to reverse control logic. The switch is accessible from both A and B sides of the actuator as illustrated in Figure 10. Actuators are delivered in Direct Acting (DA) mode and can be switched by the user to Reverse Acting (RA) mode.

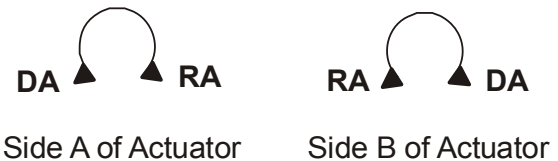


Figure 10: Mode Selection

The installation side of the actuator and the position of the mode selection switch combine to determine control response from the actuator. See Figure 11.

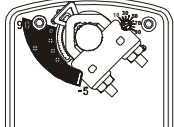















		Installation Side			
					
		A		B	
Control Inputs		Mode Selection Switch			
GRY	ORN				
3	4	DA	RA	RA	DA
CLOSED	OPEN				
OPEN	CLOSED				
OPEN	OPEN	STOP	STOP	STOP	STOP
CLOSED	CLOSED				

Figure 11: Control Response

DAF1.03(S) / DAF2.03(S)(Z) Series On/Off Actuators

DAFx.03(S)(Z) Series Actuators provide on/off control of dampers requiring up to 3 Nm in HVAC systems. On/off control can be provided from a manual switch, controller, auxiliary switch from a fan motor contactor, or similar device.

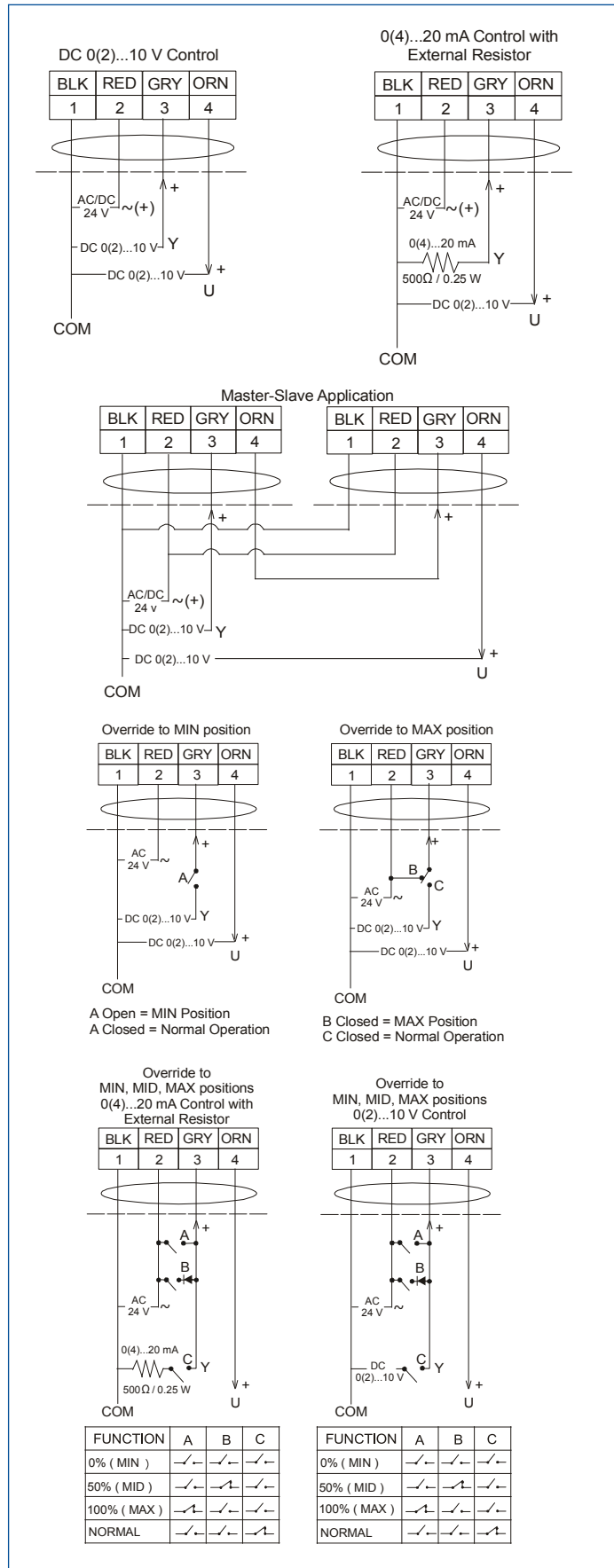
DAF Series Actuators use a DC brush motor controlled by analog electronics. The actuator can be stalled anywhere within its rotation range without the need for mechanical end switches. Power consumption is reduced in the holding mode. Two different voltage ratings are available for On/Off Actuators:

- DAF1.03(S): AC 24 V 50/60 Hz or DC 24 V power
- DAF2.03(S)(Z): AC 100 to 240 V 50/60 Hz power

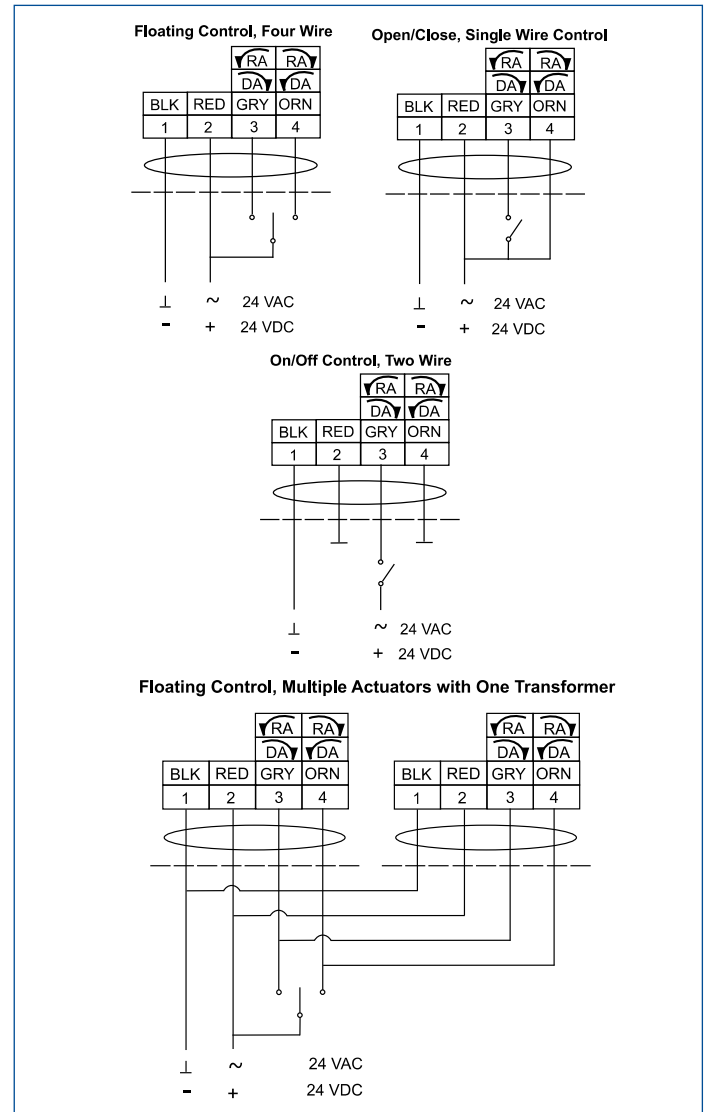
The DAF2.03(S)(Z) actuators are double-insulated so an electrical ground is not required.

The DBFx.03(S) actuators have 60 seconds constant runtime for 90° rotation. The DBFx.03(S)(Z) actuators have 27 second constant runtime for 90° rotation. When combined with other actuators in a control system, this choice provides flexibility in synchronizing the movement of equipment driven from a single proportional command.

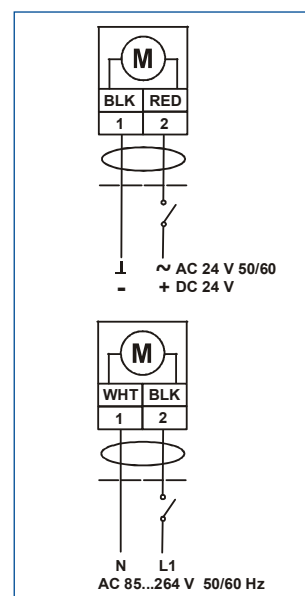
Wiring Diagrams



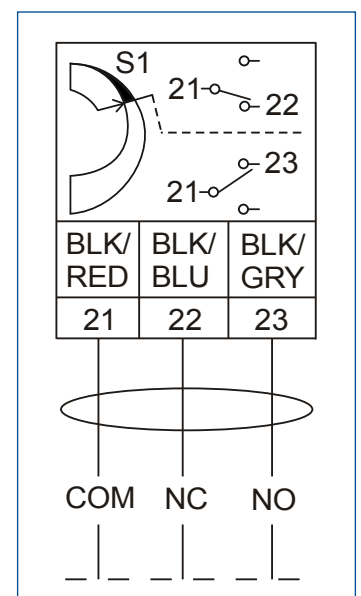
DMF



DBF

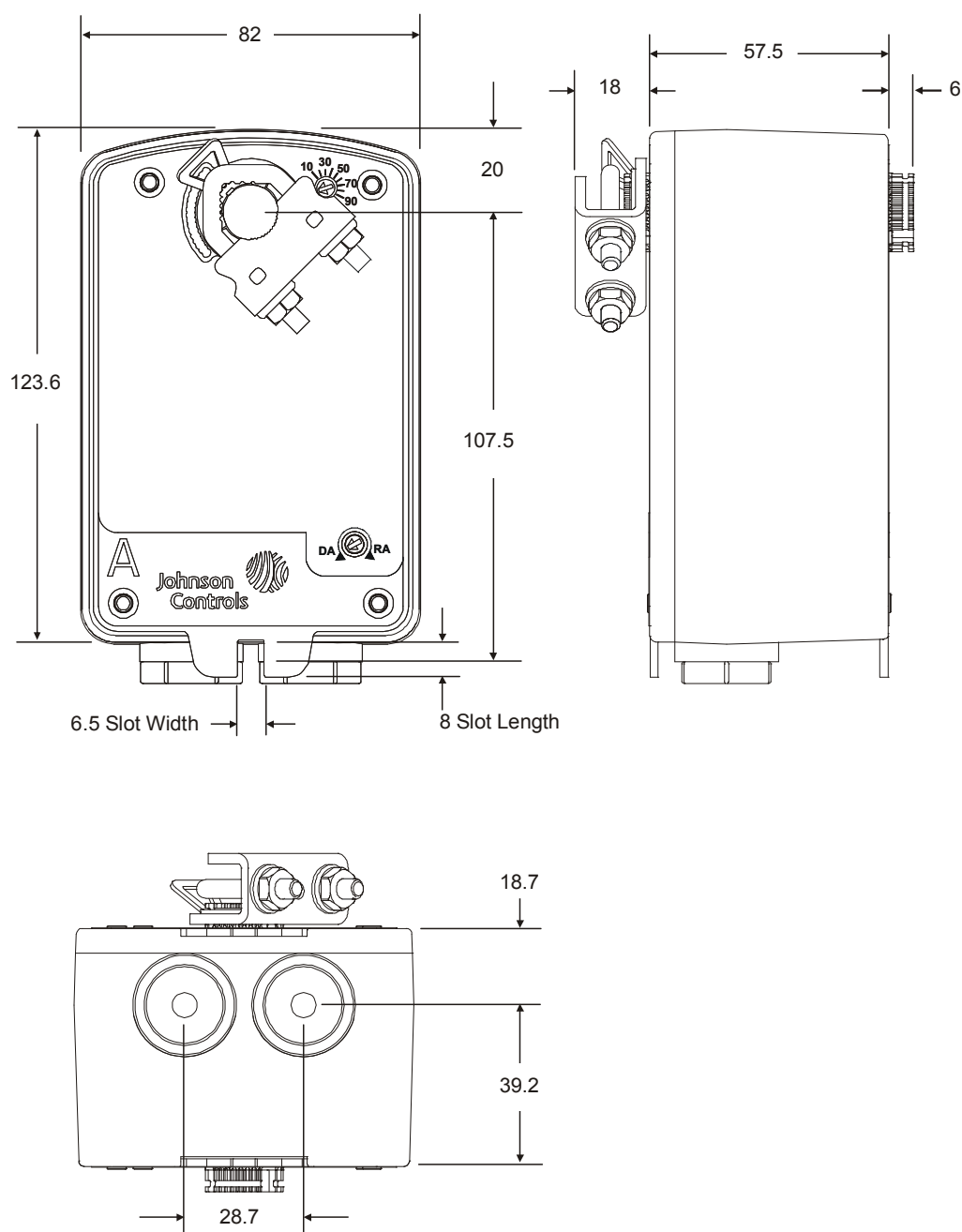


DAF



Auxiliary Switch

Dimensions



DxFx.03(S)(Z) Series Electric Spring Return Actuator dimensions in mm

Ordering Informations

Table 2: DxFx.03(S)(Z) Series Electric Spring Return Actuator Models

Code	Description
DBF1.03	3 Nm, 24 V AC/DC Floating and ON/OFF, 150 sec. running time
DBF1.03S	3 Nm, 24 V AC/DC Floating and ON/OFF, 150 sec. running time, 1 auxiliary switch
DBF1.03Z	3 Nm, 24 V AC/DC Floating and ON/OFF, 90 sec. running time
DBF1.03SZ	3 Nm, 24 V AC/DC Floating and ON/OFF, 90 sec. running time, 1 auxiliary switch
DAF1.03	3 Nm, 24 V AC/DC ON/OFF, 60 sec. running time
DAF1.03S	3 Nm, 24 V AC/DC ON/OFF, 60 sec. running time, 1 auxiliary switch
DAF2.03	3 Nm, 100-240 V AC ON/OFF, 60 sec. running time
DAF2.03S	3 Nm, 100-240 V AC ON/OFF, 60 sec. running time, 1 auxiliary switch
DAF2.03Z	3 Nm, 100-240 V AC ON/OFF, 27 sec. running time
DAF2.03SZ	3 Nm, 100-240 V AC ON/OFF, 27 sec. running time, 1 auxiliary switch
DMF1.03	3 Nm, 24 V AC/DC Proportional, 150 sec. running time
DMF1.03S	3 Nm, 24 V AC/DC Proportional, 150 sec. running time, 1 auxiliary switch
DMF1.03Z	3 Nm, 24 V AC/DC Proportional, 90 sec. running time
DMF1.03SZ	3 Nm, 24 V AC/DC Proportional, 90 sec. running time, 1 auxiliary switch

Table 3: Accessories and Replacement Parts (Order Separately)

Code Number	Description
M9000-200	Commissioning Tool that provides a control signal to drive 24 V On/Off, Floating, Proportional, and/or Resistive Electric Actuators (quantity 1)
M9000-321	Weathershield Kit for Damper Application of 3 Nm and 8 Nm Series Electric Spring Return Actuators (quantity 1)
M9000-341	Weathershield Kit for VG1000 Series Ball Valve application of 4 Nm, 3 Nm, and 8 Nm Series Electric Actuators (quantity 1)
M9000-400	Jackshaft Linkage Adapter Kit (quantity 1)
M9000-560	Ball Valve Linkage Kit for applying 4 Nm, 3 Nm, and 8 Nm Series Electric Actuators to Ball Valves Series (quantity 1)
M9000-561	Thermal Barrier Kit for M9000-560 Ball Valve Linkage. Extends 4 Nm, 3 Nm, and 8 Nm Series Electric Actuators applications to include low pressure steam (quantity 1)
M9000-604	Replacement Anti-Rotation Bracket Kit for 3 Nm, 8 Nm, 10 Nm and 20 Nm Series Electric Spring Return Actuators (quantity 1)
M9000-606	Position Indicator for Damper Applications (quantity 5)
M9000-607	Position Indicator for Ball Valve Applications (quantity 5)
M9203-100	Remote Mounting Kit with Crankarm Kit (quantity 1)
M9203-110	Universal Mounting Kit without Crankarm Kit (quantity 1)
M9203-115	Universal Mounting Kit with Crankarm Kit (quantity 1)
M9203-150	Crankarm Kit (quantity 1)
M9203-250	Remote Mounting Kit with Crankarm Kit and Damper Linkage for D1300 Dampers (quantity 1)
M9203-601	Replacement Standard Coupler Kit (with Retainer) for Mounting 3 Nm Series Electric Spring Return Actuators (quantity 1)
M9203-602	Replacement Retainer for 3 Nm Series Electric Spring Return Actuators (quantity 5)
M9203-603	Adjustable Stop Kit for 3 Nm Series Electric Spring Return Actuators (quantity 1)

Technical Specifications - DMF

Actuator	DMF1.03(S)	DMF1.03(S)Z
Power Requirements	AC 24 V (AC 19.2 V to 28.8 V) at 50/60 Hz: Class 2 (North America) or Safety Extra-Low Voltage (SELV) (Europe), 4.7 VA Running, 2.7 VA Holding Position DC 24 V (DC 21.6 V to 28.8 V): Class 2 (North America) or SELV (Europe), 1.8 W Running, 1 W Holding Position Minimum Transformer Size: 6 VA per Actuator	
Input Signal / Adjustment	Factory Set at DC 0 to 10 V, CW Rotation with Signal Increase Selectable DC 0 (2) to 10 V or 0 (4) to 20 mA with Field-Furnished 500 ohm 0.25 W Minimum Resistor Switch Selectable Direct or Reverse Action with Signal Increase	
Control Input Impedance	Voltage Input: 100,000 ohm Current Input: 500 ohm with Field Furnished 500 ohm Resistor	
Feedback Signal	DC 0 (2) to 10 V for Desired Rotation Range up to 95° Corresponds to Rotation Limits, 0.5 mA at 10 V Maximum	
Auxiliary Switch Rating	One Single-Pole, Double-Throw (SPDT), Double-Insulated Switch with Silver Contacts: AC 24 V, 50 VA Pilot Duty AC 120 V, 5.8 A Resistive, 1/4 hp, 275 VA Pilot Duty AC 240 V, 5.0 A Resistive, 1/4 hp, 275 VA Pilot Duty	
Spring Return	Direction is Selectable with Mounting Position of Actuator: Actuator Face Labeled A Is Away from Damper or Valve: CCW Spring Return Actuator Face Labeled B Is Away from Damper or Valve: CW Spring Return	
Rated Torque	- Power On (Running) - Power Off (Spring Returning)	
Rotation Range	Maximum Full Stroke: 95° Adjustable Stop: 35° to 95° Maximum Position	
Rotation Time for 90 Degrees of Travel	- Power On (Running) - Power Off (Spring Returning)	
Life Cycles	60,000 Full Stroke Cycles with 3 Nm Load 1,500,000 Repositions with 3 Nm Load	
Audible Noise Rating	- Power On (Running) - Power On (Holding) - Power Off (Spring Returning)	
Electrical Connections	1.2 m UL 758 Type AWM Halogen Free Cable with 18 AWG (0.85 mm ²) Conductors and 6 mm Ferrule Ends	
Conduit connections	Integral 13 mm Threaded Conduit Connector(s)	
Mechanical Connections	- Round Shafts - Square Shafts	
Enclosure Rating	NEMA 2 (IP54) for all Mounting Orientations	
Ambient Conditions	- Standard Operating - Storage	
Dimensions	162 x 82 x 57.5 mm	
Shipping Weight	- DMF1.03(Z) Models - DMF1.03S(Z) Models	





Technical Specifications - DBF

Actuator	DBF1.03(S)	DBF1.03(S)Z
Power Requirements	AC 24 V (AC 19.2 V to 28.8 V) at 50/60 Hz: Class 2 (North America) or Safety Extra-Low Voltage (SELV) (Europe), 4.7 VA Running, 2.7 VA Holding Position DC 24 V (DC 21.6 V to 28.8 V): Class 2 (North America) or SELV (Europe), 1.8 W Running, 1 W Holding Position Minimum Transformer Size: 6 VA per Actuator	
Input Signal	AC 19.2 to 28.8 V at 50/60 Hz or DC 24 V +20% / -10% Class 2 (North America) or SELV (Europe) Minimum Pulse Width: 500 msec	
Control Input Impedance	4,700 ohm	
Feedback Signal	DC 0 (2) to 10 V for Desired Rotation Range up to 95° Corresponds to Rotation Limits, 0.5 mA at 10 V Maximum	
Auxiliary Switch Rating	One Single-Pole, Double-Throw (SPDT), Double-Insulated Switch with Silver Contacts: AC 24 V, 50 VA Pilot Duty AC 120 V, 5.8 A Resistive, 1/4 hp, 275 VA Pilot Duty AC 240 V, 5.0 A Resistive, 1/4 hp, 275 VA Pilot Duty	
Spring Return	Direction Is Selectable with Mounting Position of Actuator: Actuator Face Labeled A Is Away from Damper or Valve: CCW Spring Return Actuator Face Labeled B Is Away from Damper or Valve: CW Spring Return	
Rated Torque	- Power On (Running) - Power Off (Spring Returning)	
Rotation Range	Maximum Full Stroke: 95° Adjustable Stop: 35° to 95° Maximum Position	
Rotation Time for 90 Degrees of Travel	- Power On (Running) - Power Off (Spring Returning)	
Life Cycles	60,000 Full Stroke Cycles with 3 Nm Load 1,500,000 Repositions with 3 Nm Load	
Audible Noise Rating	- Power On (Running) - Power On (Holding) - Power Off (Spring Returning)	
Electrical Connections	1.2 m UL 758 Type AWM Halogen Free Cable with 18 AWG (0.85 mm ²) Conductors and 6 mm Ferrule Ends	
Conduit connections	Integral 13 mm Threaded Conduit Connector(s)	
Mechanical Connections	- Round Shafts - Square Shafts	
Enclosure Rating	NEMA 2 (IP54) for all Mounting Orientations	
Ambient Conditions	- Standard Operating - Storage	
Dimensions	162 x 82 x 57.5 mm	
Shipping Weight	- DBF1.03(Z) Models - DBF1.03S(Z) Models	

Technical Specifications - DAF

Actuator	DAF1.03(S)	DAF2.03(S)	DAF2.03(S)Z
Power Requirements	AC 24 V (AC 19.2 V to 28.8 V) at 50/60 Hz: Class 2 (North America) or Safety Extra-Low Voltage (SELV) (Europe), 5 VA Running, 1.6 VA Holding Position DC 24 V (DC 21.6 V to 28.8 V): Class 2 (North America) or SELV (Europe), 2.8 W Running, 0.8 W Holding Position Minimum Transformer Size: 6 VA per Actuator	AC 100 to 240 V (AC 85 V to 264 V) at 50/60 Hz: 0.06 A Running, 0.02 A Holding Position	AC 100 to 240 V (AC 85 V to 264 V) at 50/60 Hz: 0.08 A Running, 0.02 A Holding Position
Auxiliary Switch Rating	One Single-Pole, Double-Throw (SPDT), Double-Insulated Switch with Silver Contacts: AC 24 V, 50 VA Pilot Duty AC 120 V, 5.8 A Resistive, 1/4 hp, 275 VA Pilot Duty AC 240 V, 5.0 A Resistive, 1/4 hp, 275 VA Pilot Duty		
Spring Return	Direction Is Selectable with Mounting Position of Actuator: Actuator Face Labeled A Is Away from Damper or Valve: CCW Spring Return Actuator Face Labeled B Is Away from Damper or Valve: CW Spring Return		
Rated Torque - Power On (Running) - Power Off (Spring Returning)	3 Nm All Operating Temperatures 3 Nm All Operating Temperatures		
Rotation Range	Maximum Full Stroke: 95° Adjustable Stop: 35° to 95° Maximum Position		
Rotation Time for 90 Degrees of Travel - Power On (Running) - Power Off (Spring Returning)	<div> <div>53 to 71 Seconds for 0 to 3 Nm Load, at Room Temperature 60 Seconds Nominal at Full Rated Load (0.25 rpm)</div> <div>24 to 28 Seconds for 0 to 3 Nm Load, at Room Temperature 27 Seconds Nominal at Full Rated Load (0.5 rpm)</div> </div> <div>19 to 23 Seconds for 0 to 3 Nm Load, at Room Temperature 22 Seconds Nominal at Full Rated Load 28 Seconds Maximum with 3 Nm Load at -30 °C (-22 °F)</div>		
Life Cycles	60,000 Full-Stroke Cycles with 3 Nm Load		
Audible Noise Rating - Power On (Running) - Power On (Holding) - Power Off (Spring Returning)	<div><36 dBA at 3 Nm Load, at a Distance of 1 m</div> <div><20 dBA at a Distance of 1 m</div> <div><51 dBA at 3 Nm Load, at a Distance of 1 m</div>		<45 dBA at 3 Nm Load, at a Distance of 1 m
Electrical Connections	1.2 m UL 758 Type AWM Halogen Free Cable with 18 AWG (0.85 mm ²) Conductors and 6 mm Ferrule Ends		
Conduit connections	Integral 13 mm Threaded Conduit Connector(s)		
Mechanical Connections - Round Shafts - Square Shafts	<div>Range of Sizes: 6 to 12 mm</div> <div>Range of Sizes: 6 to 8 mm</div>		
Enclosure Rating	NEMA 2 (IP54) for all Mounting Orientations		
Ambient Conditions - Standard Operating - Storage	<div>-30 to 60 °C (-22 to 140 °F); 90% RH Maximum, Noncondensing</div> <div>-40 to 85 °C (-40 to 185 °F); 95% RH Maximum, Noncondensing</div>		
Dimensions	162 x 82 x 57.5 mm		
Shipping Weight - DAFx.03(Z) Models - DAFx.03S(Z) Models	<div>0.9 kg</div> <div>1.1 kg</div>		

DxFx.03(S)(Z) Compliance

 - United States	UL Listed, CCN XAPX, File E27734; to UL 60730-1A: 2003-08, Ed. 3.1, Automatic Electrical Controls for Household and Similar Use; and UL 60730-2-14: 2002-02, Ed. 1, Part 2, Particular Requirements for Electric Actuators.
 - Canada	UL Listed, CCN XAPX7, File E27734; to UL 60730-1:02-CAN/CSA: July 2002, 3rd Ed., Automatic Electrical Controls for Household and Similar Use; and CSA C22.2 No. 24-93 Temperature Indicating and Regulating Equipment.
 - Europe	CE Mark – Johnson Controls, Inc., declares that this product is in compliance with the essential requirements and other relevant provisions of the EMC Directive 2004/108/EC and Low Voltage Directive 2006/95/EC.
 - Australia and New Zealand	C-Tick Mark, Australia/NZ Emissions Compliant