

Non-spring return damper actuators

Electric Non-spring return actuators

Product Bulletin

The New Joventa Standard Series of Electric Non-Spring Return Actuators provide control of dampers in HVAC Systems from 8 to 35 Nm rated torque.

These bidirectional actuators do not require a damper linkage and are easily installed on round shafts or square shafts.

An optional line voltage auxiliary switch kit can be field installed to indicate an end-stop position or perform switching functions within the selected rotation range.



- **Automatic Signal Input Detection model On/Off, Floating and Proportional**
Increase availability at distributors. Simplify retrofit.
- **High speed actuator model**
Allow applications in loop that require a quick response time.
- **Optional Auxiliary Switch & potentiometer feedback**
Provides line voltage capable single Pole Double-Throw (SPDT) switch and 140Ω, 1KΩ, 2KΩ or 10KΩ feedback potentiometric.
- **From 8 to 35 Nm Rated Torque**
Provides high torque in a compact package size to expand the range of damper applications in HVAC systems.
- **Self-Calibrating to Adjust Stroke**
Eliminates need of complex calibration procedure when adjusting stops.
- **Electronic Stall Detection**
Protects from overload at all angles of rotation. The actuator may be stalled anywhere in its rotation range without the need for mechanical end switches.
- **Microprocessor-controlled Brushless DC Motor**
Provides constant runtime independent of torque and increases life cycle by reducing wear.

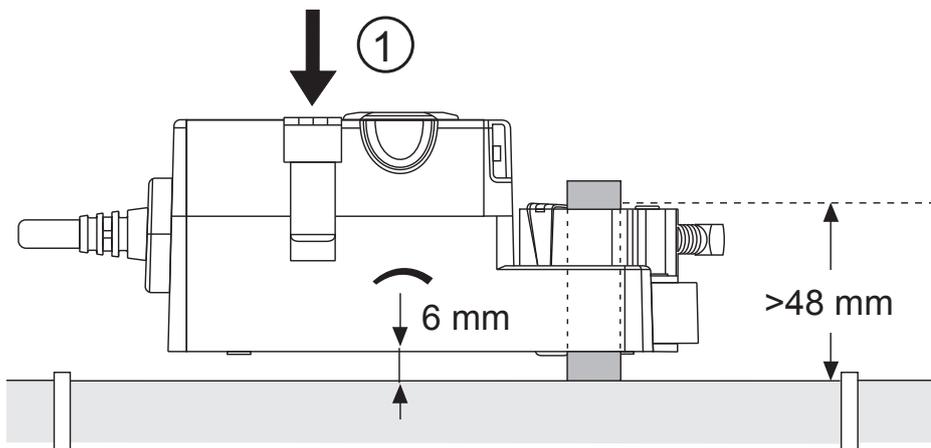
Installation

The New Joventa Standard Series of Electric Non Spring Return Actuators are mounted directly to the surface in any convenient orientation using the anti-rotation bracket (parts included with the actuator).

No additional linkages or couplers are required. Electrical connections are identified with numbers and colors permanently marked on the actuator and in a label on the cable.

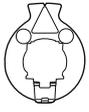
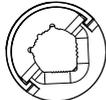
The Actuators can be easily installed on dampers with round shafts or square shafts (*see tables*).

A push button disengages the internal gears letting the actuator to be manually override.



DA1.08Z / DA2.10
DM1.10

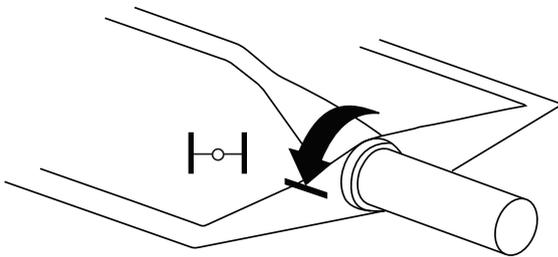
DM1.20 / DA2.20
DM1.35

Shaft diameter mm					
	MIN	MAX	MAX		
	9.5	16	19	19	27
	8	12.7	16	16	19
Required wrench torque (Nm)	14				

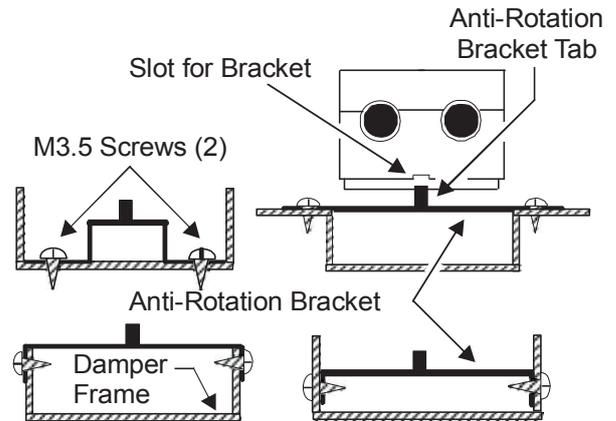
Mounting the Actuator

To mount the actuator, proceed as follows:

1. Position the damper until it is fully closed.

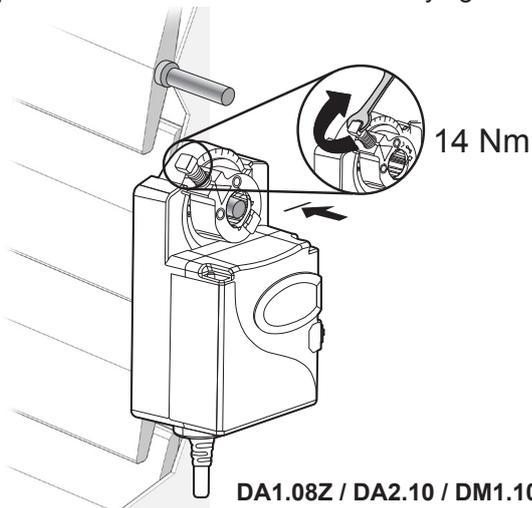


2. Bend or cut the anti-rotation bracket to fit the damper frame or duct as illustrated in figure below.

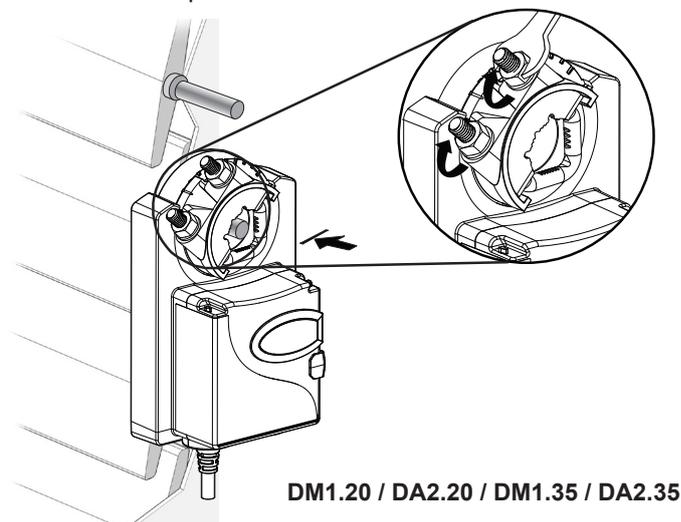


3. Load the actuator seal by rotating the shaft using the actuator (about 5 degrees).

4. Slip the actuator onto the shaft and fully tighten the set screw on the coupler.

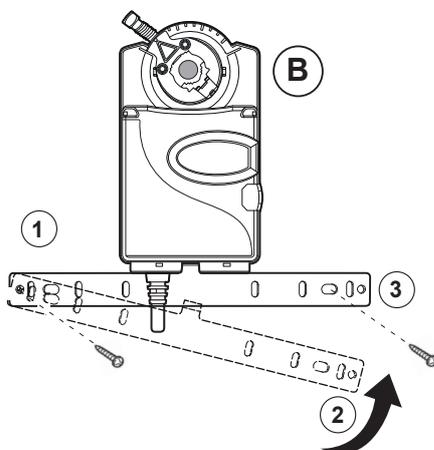


(A)

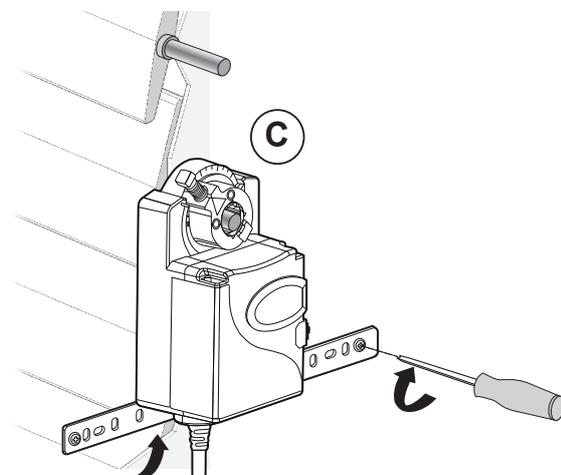


DM1.20 / DA2.20 / DM1.35 / DA2.35

5. Lightly tighten one side of the anti-rotation bracket to the mounting surface. Swing the anti-rotation bracket under the actuator until it reaches the middle of the slot on the bottom of the actuator.



(B)



(C)

6. Apply power long enough for the actuator to travel a full stroke. Verify that the actuator rotates freely throughout the range.

Limiting the Rotation

The actuator is factory set for 95° rotation, and its rotation range can be limited in 5° increments to a minimum of 35°.

To limit the starting point proceed as follow:

If necessary, set the shaft coupler, as shown in the pictures, by pushing the manual override button (see A).

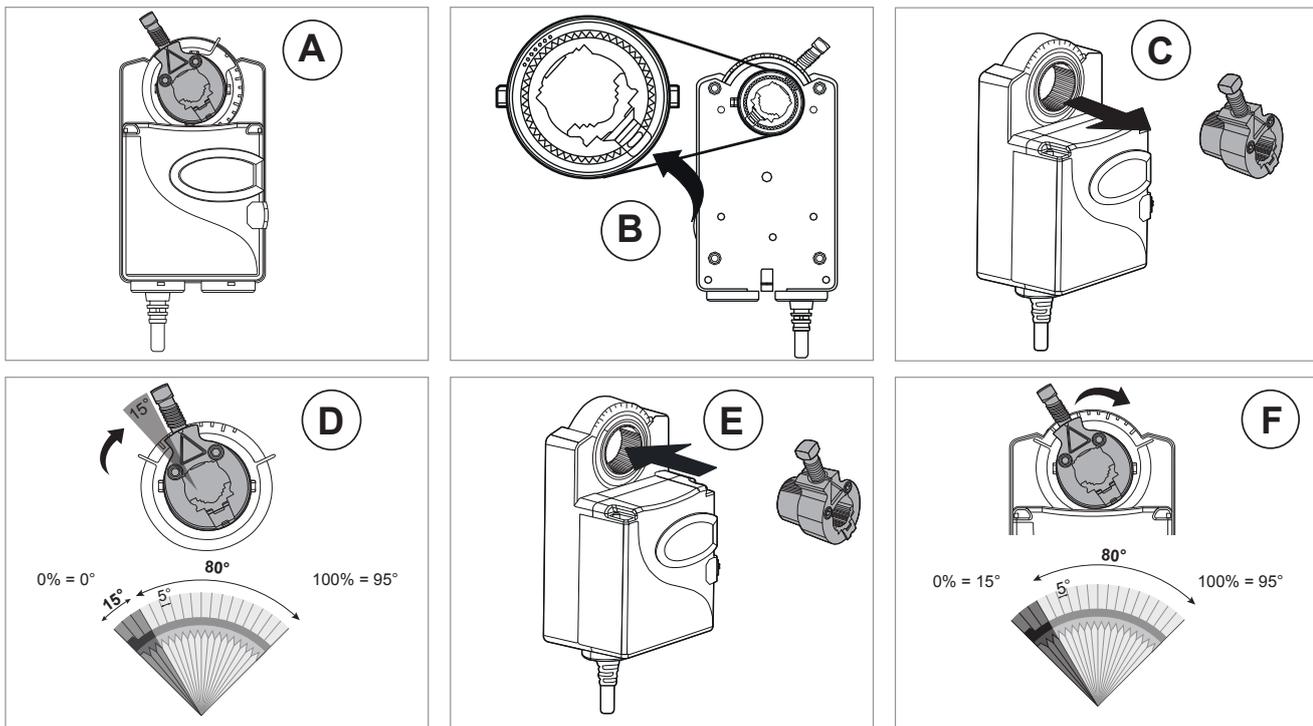
Remove the coupler pushing the little lever or clip on the bottom of the actuator (see B and C).

Rotate clockwise the coupler (15° degree in the sample below) and insert it in the actuator (see D and E).

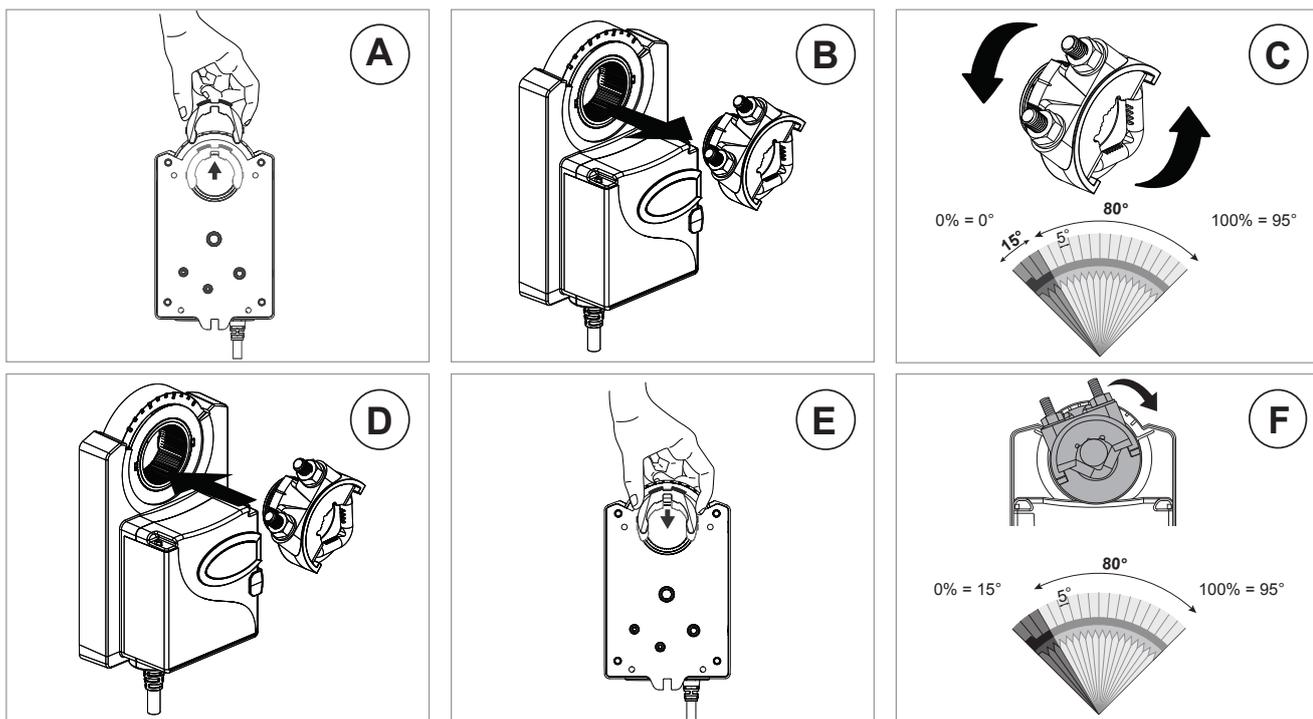
Every tooth of the coupler housing correspond to 5° of rotation.

The actuator pointer shows the starting position. The actuator now perform a rotation from 15° to 95° (see F).

DA1.08Z / DA2.10 / DM1.10

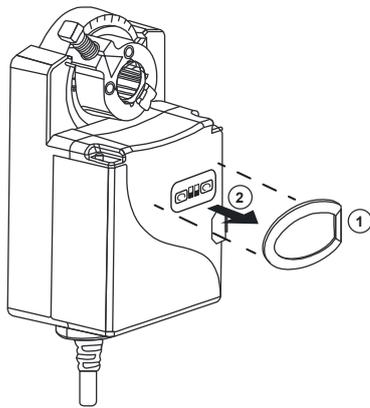


DM1.20 / DA2.20 / DM1.35

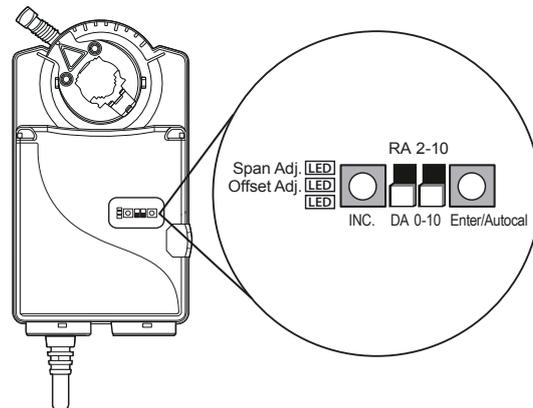


Accessing the DIP Switches

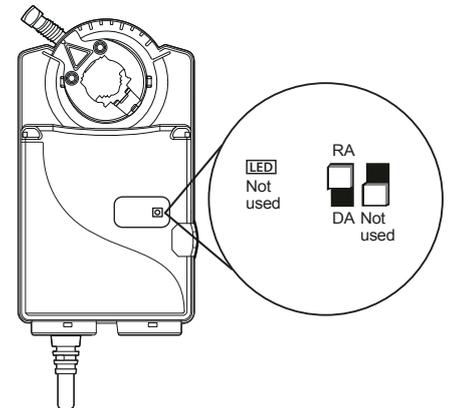
Locate the oval cover on the front of the unit and pull the cover outward. See further paragraph for viewing the DIP switches and LEDs meaning.



Remove the oval cover



DM1.10
DIP Switches and LEDs Placement



DA1.08Z / DA2.10
DIP Switches and LEDs Placement

Automatic Signal Input Detection model

DM1.10, DM1.20 and DM1.35 Actuators operate with 24 VAC/DC to provide 10, 20 and 35 Nm rated torque. The actuators can be used with on/off, floating, or proportional controllers in HVAC systems that are controlled by an electronic controller or positioner.

When the Actuators work in proportional mode, 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.

DIP Switches Settings

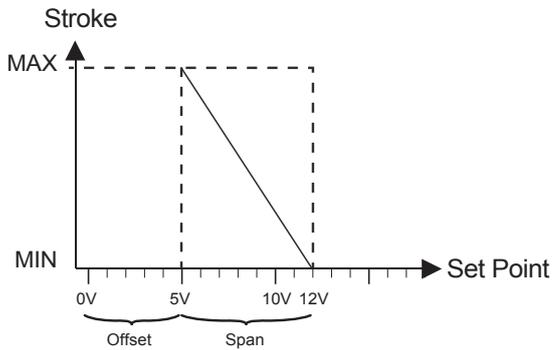
Command Signal	Feedback Signal	Setting User Interface	
0 to 10 VDC	Direct 0 to 10 VDC		
24 VAC Floating or ON/OFF			
0 to 10 VDC	Reverse 0 to 10 VDC		
24 VAC Floating or ON/OFF			
2 to 10 VDC	Direct 2 to 10 VDC		
24 VAC Floating or ON/OFF			
2 to 10 VDC	Reverse 2 to 10 VDC		
24 VAC Floating or ON/OFF			

Auto Calibration Mode

The actuator enters auto calibration mode and positions the coupler to the maximum and minimum end stops to identify the range of travel. To complete the auto calibration process, press **Enter/Autocal** until all three LEDs are on.

Setting the SPAN and OFFSET Proportional Command Signal to Other Values

The actuator has the possibility to adjust the input signal changing the working range and the starting point of the signal. The valid Offset values are 0 to 10 VDC and the valid Span values are 2 to 10 VDC. Adjusting span and offset the feedback voltage of the actuator is automatically set as 2-10 VDC.



Example

Command Signal	Feedback Signal	Setting User Interface
Offset = 5 Span = 7	Active 2 - 10 VDC	

1. Connect a digital multimeter between the orange (feedback) and black (common) wires. See Wiring for more wiring information.

2. Press **Enter/Autocal**.

Note: To adjust the span and offset, press but not hold **Enter/Autocal**.

Holding **Enter/Autocal** for longer than three seconds triggers an autocal.

The Offset Adj. LED turns on, and the multimeter displays the current offset value.

3. Press **INC**.

The Offset Adj. LED flashes. The voltage reading on the multimeter increases 0.5 VDC each time you press the button. Press **INC**. until you reach the desired voltage.

Once you press **INC**., if no further action is required, the Offset Adj. LED stops flashing after 10 seconds. The actuator exits the program mode and the original offset value remains unchanged.

4. Press **Enter/Autocal**.

The Offset Adj. LED turns off indicating that the desired Offset Adj. value was recorded. The Span Adj. turns on, and the multimeter displays the present SPAN value.

5. Press **INC**.

The Span Adj. LED flashes. The voltage reading on the multimeter increases by 0.5 VDC each time you press the button. Press **INC**. until you reach the desired voltage.

Once you press **INC**., if no further action is required, the Offset and Adj. LED stops flashing after 10 seconds. The actuator exits the program mode and the original offset value remains unchanged.

6. Press **Enter/Autocal**.

The Span Adj. LED turns off indicating that the desired Span Adj. setting is recorded, and the actuator exits the program mode.

Reading the SPAN and OFFSET Proportional Command Signal Voltage Settings

1. Connect a digital multimeter between the orange (feedback) and black (common) wires. See Wiring for more wiring information.

2. Press **Enter/Autocal**.

The Offset Adj. LED turns on, and the multimeter displays the current offset value.

IMPORTANT: Do not press INC. Otherwise your observed offset voltage setting will change.

3. Press **Enter/Autocal**.

The Offset Adj. LED turns off, the Span Adj. LED turns on, and the multimeter displays the present SPAN value.

IMPORTANT: Do not press INC. Otherwise your observed SPAN voltage setting will change.

5. Press **Enter/Autocal**.

The Span Adj. LED turns off.

Clearing the SPAN and OFFSET Proportional Command Signal Voltage Setting

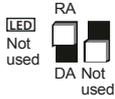
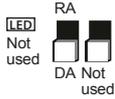
Cycle DIP switch two between 2 to 10 and 0 to 10. The active setting is the final state of DIP switch two.

Line voltage models and High Speed models (ON/OFF and Floating)

The **DA2.xx** operates with AC 100 to 240 V (AC 85 to 264 V). The actuator is design to be used with ON/OFF or Floating controls in HVAC systems.

The **DA1.08Z** operates with 24 V DC/AC.

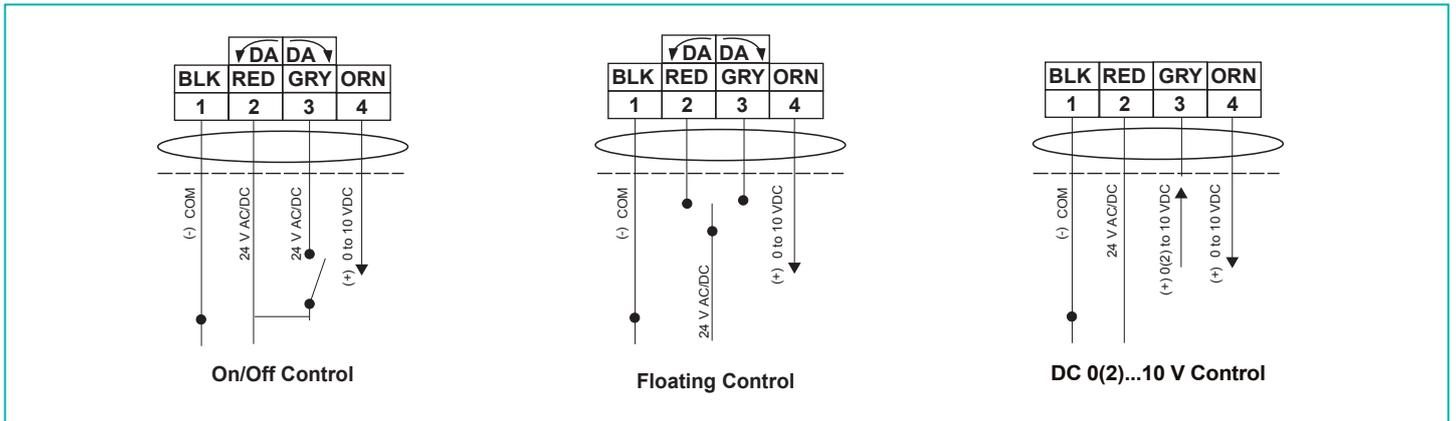
DIP Switch Settings

Command Signal	Setting User Interface
Reverse	
Direct	

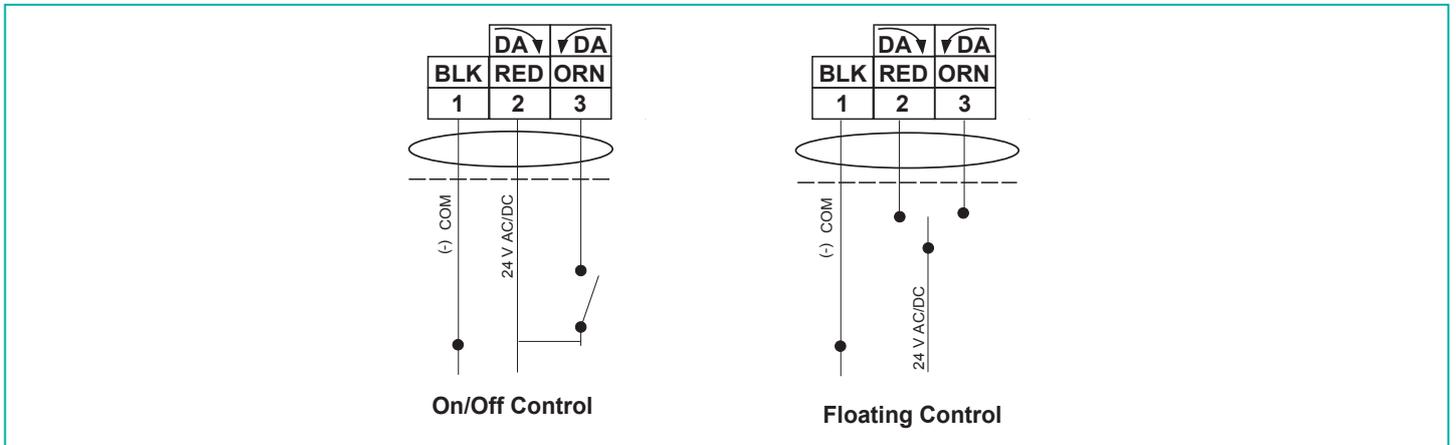
Ordering Informations

Code	Description
DA1.08Z	8 Nm, ON/OFF and Floating control, 24 V AC/DC power supply, 8 seconds run time
DA2.10	10 Nm, ON/OFF and Floating control, AC 100 to 240 V (AC 85 to 264 V) power supply, 35 seconds run time
DM1.10	10 Nm, All-in-one ON/OFF, Floating and Proportional control, 24 V AC/DC power supply, 35 seconds run time
DM1.20	20 Nm, All-in-one ON/OFF, Floating and Proportional control, 24 V AC/DC power supply, 90 seconds run time
DA2.20	20 Nm, ON/OFF and Floating control, AC 100 to 240 V (AC 85 to 264 V) power supply, 90 seconds run time
DM1.35	35 Nm, All-in-one ON/OFF, Floating and Proportional control, 24 V AC/DC power supply, 150 seconds run time

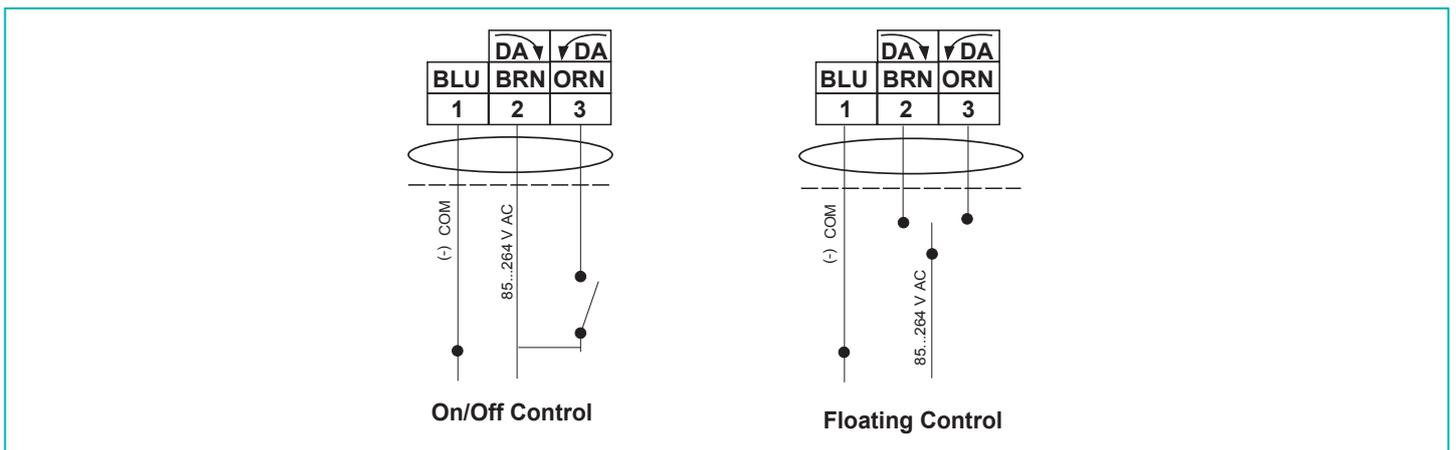
Wiring Diagrams



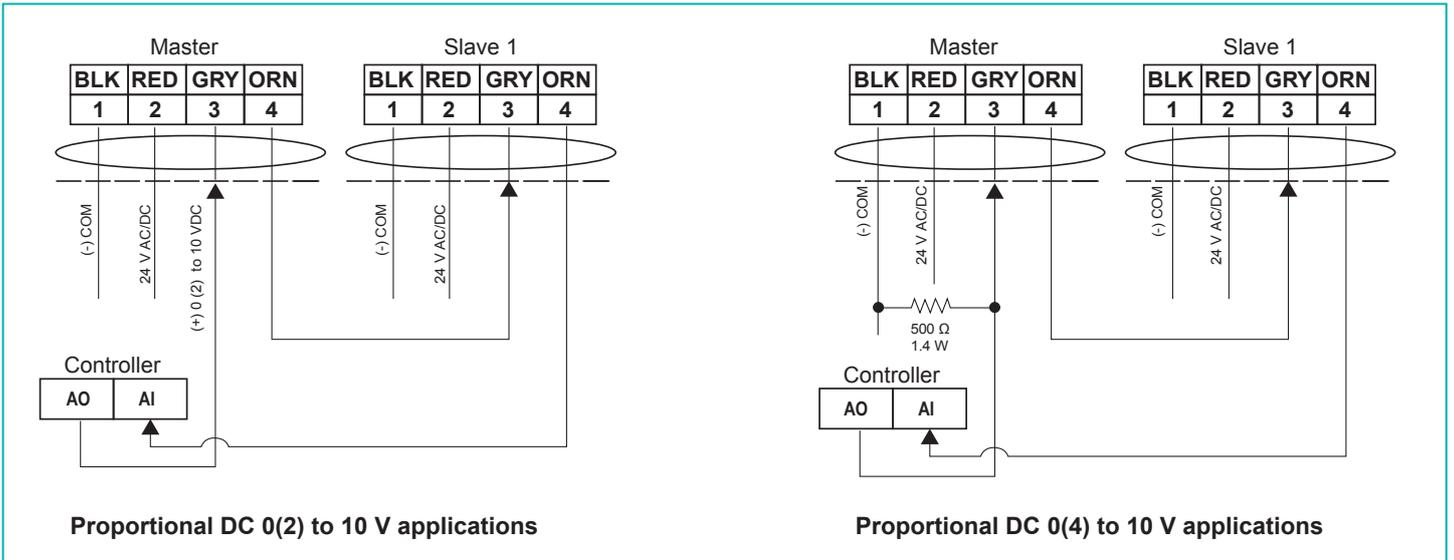
DM1.10 / DM1.20 / DM1.35



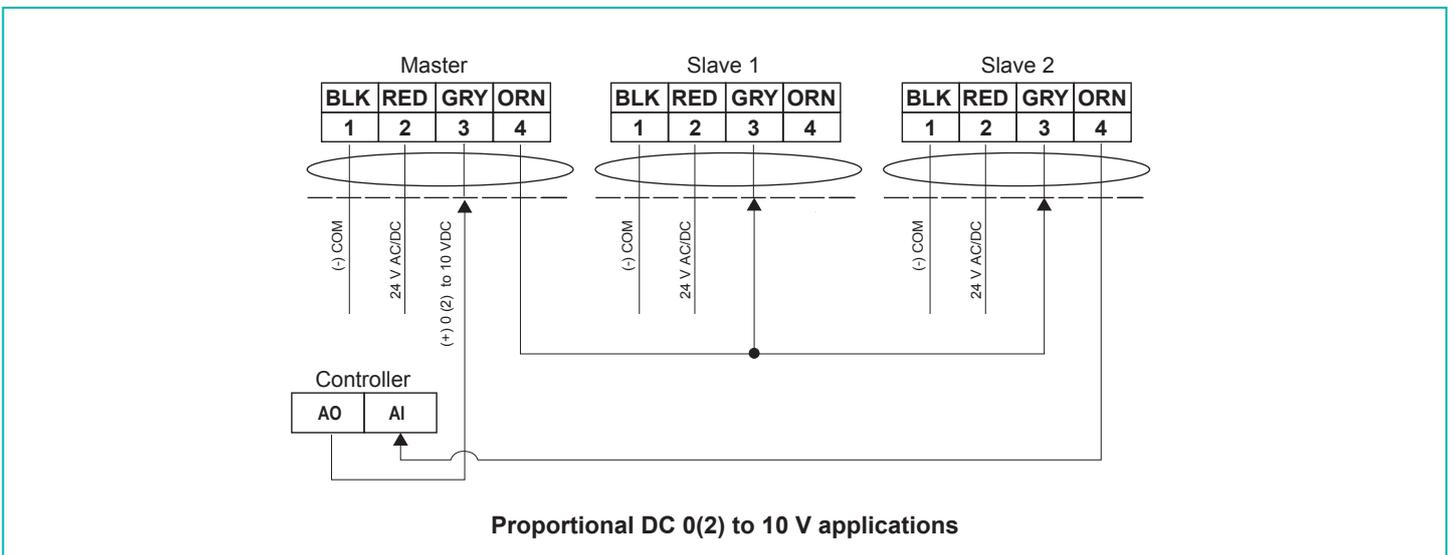
DA1.08Z



DA2.10 / DA2.20



Two DM1.35 Electric actuators wired in tandem



Three DM1.35 Electric actuators wired collectively

Technical Specifications

Product Code	DM1.10	
Control Type	On/Off and Floating Mode	Proportional Mode
Power Requirements	24 VAC (AC 19.2 to 28.8 V) at 50/60 Hz, Class 2 (North America) or SELV (Europe), 6.2 VA running 24 VDC (DC 21.6 to 26.4 V), Class 2 (North America) or SELV (Europe), 1.9 W running	
Transformer Sizing Requirements	≥6.5 VA	
Input Signal/Adjustments	19.2 to 28.8 VAC at 50/60 Hz or 24 VDC ±10% Class 2 (North America) or SELV (Europe)	0 (2) to 10 VDC or 0 (4) to 20 mA with field furnished 500 Ohm 1/4 W resistor Offset: 0 to 10 VDC Span: 2 to 10 VDC
Control Impedance	4.7k ohm	100k ohm
Feedback Signal	0 (2) to 10 VDC	
Running Torque	10 Nm (90 lb-in)	
Rotation Range	Mechanically Limited 35° to 95° ±3° in 5° increments	
Rotation Time	35 seconds	
Rotation Time Autocalibration	35 seconds	
Cycles	100.000 Full Stroke Cycles; 2.500.000 Repositions	
Audible Noise	<40 dBA at 1 m (39-13/32 in.)	
Electrical Connections	1.2 m (48 in.) Halogen Free Cable with 0.82 mm ² (18 AWG) conductors and 6 mm (0.25 in.) ferrule ends	
Ambient Conditions	Operating: -30 to 60 °C (-22 to 140 °F), 95% RH, noncondensing Storage: -40 to 85 °C (-40 to 185 °F), 95% RH, noncondensing	
Enclosure	IP54/NEMA 5	
Shipping Weight	0.9 kg (2 lb)	
Compliance	<p>United States: UL Listed, CCN XAPX, File E27734; to UL 60730-1: Automatic Electrical Controls for Household and Similar Use Part 1; and UL 60730-2-14: Part 2, Particular Requirements for Electric Actuators.Plenum Rated (UL 2043). Suitable for use in Other Environmental Air Space (Plenum) in accordance with section 300.22 (c) of the National Electrical Code.</p> <p>Canada: UL Listed, CCN XAPX7, File E27734; to CAN/CSA E60730-1:02: Automatic Electrical Controls for Household and Similar Use Part 1; and CAN/CSA-E60730-2-14: Part 2, Particular Requirements for Electric Actuators.</p> <p>Europe: CE Mark – Johnson Controls declares that this product is in compliance with the essential requirements and other relevant provisions of the EMC Directive and Low Voltage Directive.</p> <p>Australia and New Zealand: RCM, Australia/NZ Emissions Compliant</p>	



Technical Specifications

Product Code	DA1.08Z	DA2.10
Control Type	On/Off and Floating Mode	
Power Requirements	24 VAC $\pm 20\%$ at 50/60 Hz, Class 2 (North America) or SELV (Europe), 12.7 VA running 24 VDC $\pm 10\%$, Class 2 (North America) or SELV (Europe), 5.7 W running	Nominal AC 230V at 50/60 Hz: 0.03 A Running, 0.01 A Holding Position
Transformer Sizing Requirements	≥ 13 VA	---
Input Signal/Adjustments	19.2 to 28.8 VAC at 50/60 Hz or 24 VDC $\pm 10\%$ Class 2 (North America) or SELV (Europe)	AC 100 to 240 V (AC 85 to 264 V) at 50/60 Hz
Running Torque	8 Nm (70 lb·in)	10 Nm (90 lb·in)
Rotation Range	Mechanically Limited 35° to 95° $\pm 3^\circ$ in 5° increments	
Rotation Time for 90° of Travel	8 sec, constant for 0 to 8 Nm (70 lb·in) load, at all operating conditions	35 sec, constant for 0 to 10 Nm (90 lb·in) load, at all operating conditions
Cycles	60.000 Full Stroke Cycles; 1.500.000 Repositions	100.000 Full Stroke Cycles; 2.500.000 Repositions
Audible Noise	<52 dBA at 1 m	<35 dBA at 1 m
Electrical Connections	3.0 m (120 in) UL 444 type CMP plenum rated with 0.75 mm ² (19 AWG) conductors and 6 mm (0.25 in) ferrule ends	1.2 m (48 in) Halogen Free Cable with 0.82 mm ² (18 AWG) conductors and 6 mm (0.25 in.) ferrule ends
Ambient Conditions	Operating: -30 to 60 °C (-22 to 140 °F), 95% RH, noncondensing Storage: -40 to 85 °C (-40 to 185 °F), 95% RH, noncondensing	
Enclosure	IP54/NEMA 5	
Shipping Weight	0.9 kg (2 lb)	
Compliance	<p>United States: UL Listed, CCN XAPX, File E27734; to UL 60730-1: Automatic Electrical Controls for Household and Similar Use Part 1; and UL 60730-2-14: Part 2, Particular Requirements for Electric Actuators.Plenum Rated (UL 2043). Suitable for use in Other Environmental Air Space (Plenum) in accordance with section 300.22 (c) of the National Electrical Code.</p> <p>Canada: UL Listed, CCN XAPX7, File E27734; to CAN/CSA E60730-1:02: Automatic Electrical Controls for Household and Similar Use Part 1; and CAN/CSA-E60730-2-14: Part 2, Particular Requirements for Electric Actuators.</p> <p>Europe: CE Mark – Johnson Controls declares that this product is in compliance with the essential requirements and other relevant provisions of the EMC Directive and Low Voltage Directive.</p> <p>Australia and New Zealand: RCM, Australia/NZ Emissions Compliant</p>	



Technical Specifications

Product Code	DM1.20		DA2.20
Control Type	On/Off and Floating Mode	Proportional Mode	On/Off and Floating Mode
Power Requirements	AC 24 V (AC 19.2 to 28.8 V) at 50/60 Hz, Class 2 (North America) or SELV (Europe), 5.7 VA running DC 24 V (DC 21.6 to 26.4 V) Class 2 (North America) or SELV (Europe), 2.1 W running		Nominal AC 230 V at 50 Hz 0.04 A Running
Transformer Sizing Requirements	≥7 VA		---
Input Signal/Adjustments	AC 19.2 to 28.8 V at 50/60 Hz or DC 24 V ±10% Class 2 (North America) or SELV (Europe)	DC 0 (2) to 10 V or 0 (4) to 20 mA with field furnished 500 ohm 1/4 W resistor Offset: DC 0 to 10 V Span: DC 2 to 10 V	AC 100 to 240 V (AC 85 to 264 V) at 50/60 Hz
Control Impedance	4.7k ohm	100k ohm	---
Feedback Signal	---	DC 0(2) to 10 V	---
Position Accuracy	<5%		---
Feedback Accuracy	<5%		---
Running Torque	20 Nm		
Rotation Range	Mechanically Limited 35° to 95° ±3° in 5° increments		
Rotation Time for 90° of Travel	90 seconds, constant for all operating conditions		
Rotation Time Auto-Calibration	35 seconds		
Cycles	100.000 Full Stroke Cycles; 2.500.000 repositions		
Audible Noise	<45 dBA at maximum load, at a distance of 1 m		
Electrical Connections	1.2 m halogen free cable with 1 mm diameter (18 AWG) conductors and 6 mm ferrule ends		
Conduit Connections	Optional 13 mm NPSM threaded conduit connectors with M9300-100 Conduit Connector		13 mm NPSM threaded conduit connectors with M9300-100 Conduit Connector
Mechanical connections	Round: 19 to 27 mm Square: 16 to 19 mm		
Ambient Conditions	Operating: -30 to 60 °C, 95% RH, noncondensing Storage: -40 to 85 °C, 95% RH, noncondensing		
Enclosure	IP54/NEMA 5		
Shipping Weight	1.36 kg		
Compliance	<p>United States: UL Listed, CCN XAPX, File E27734; to UL 60730-1: Automatic Electrical Controls for Household and Similar Use Part 1; and UL 60730-2-14: Part 2, Particular Requirements for Electric Actuators.Plenum Rated (UL 2043). Suitable for use in Other Environmental Air Space (Plenum) in accordance with section 300.22 (c) of the National Electrical Code.</p> <p>Canada: UL Listed, CCN XAPX7, File E27734; to CAN/CSA E60730-1:02: Automatic Electrical Controls for Household and Similar Use Part 1; and CAN/CSA-E60730-2-14: Part 2, Particular Requirements for Electric Actuators.</p> <p>Europe: CE Mark – Johnson Controls declares that this product is in compliance with the essential requirements and other relevant provisions of the EMC Directive and Low Voltage Directive.</p> <p>Australia and New Zealand: RCM, Australia/NZ Emissions Compliant</p>		

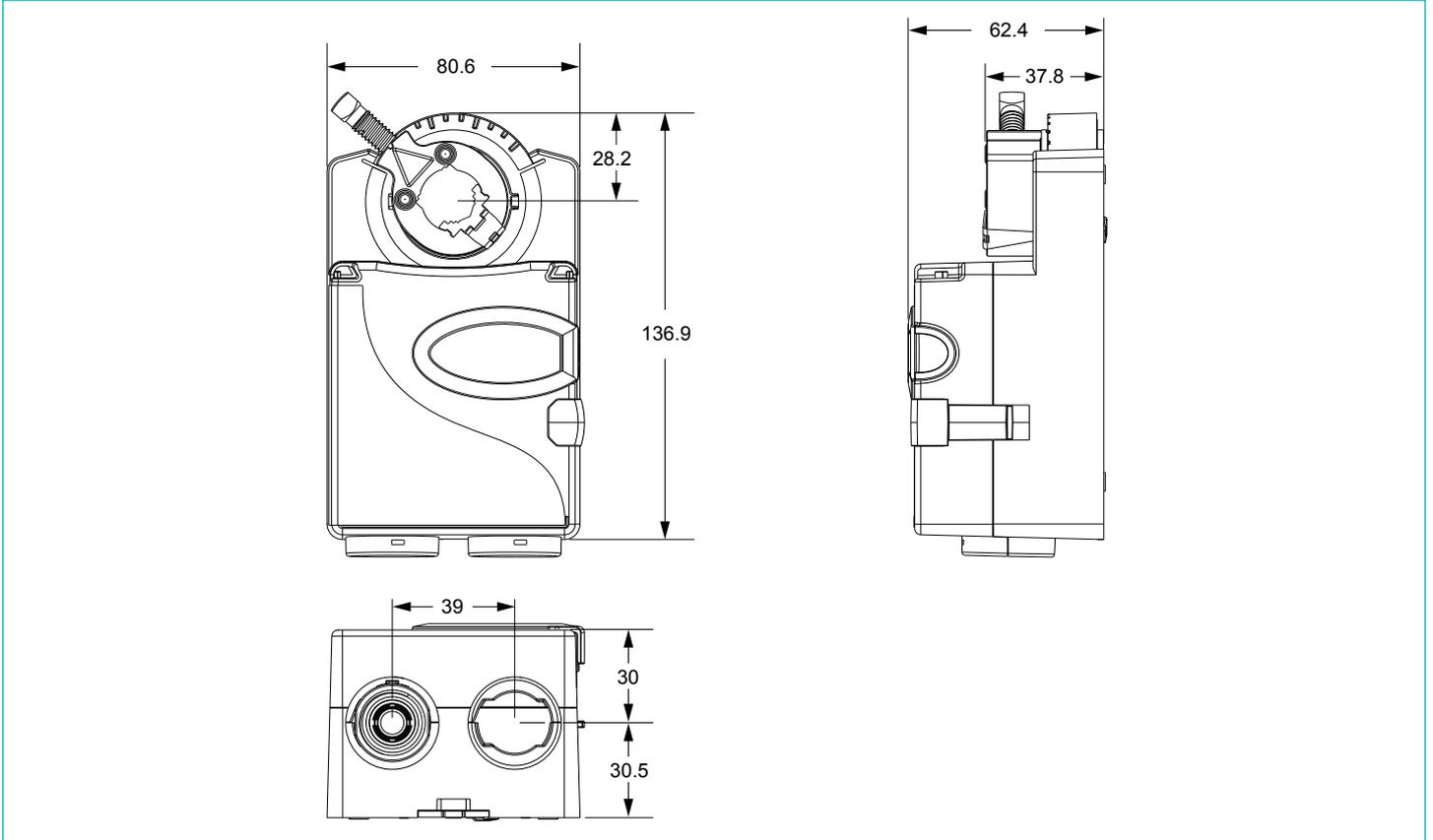


Technical Specifications

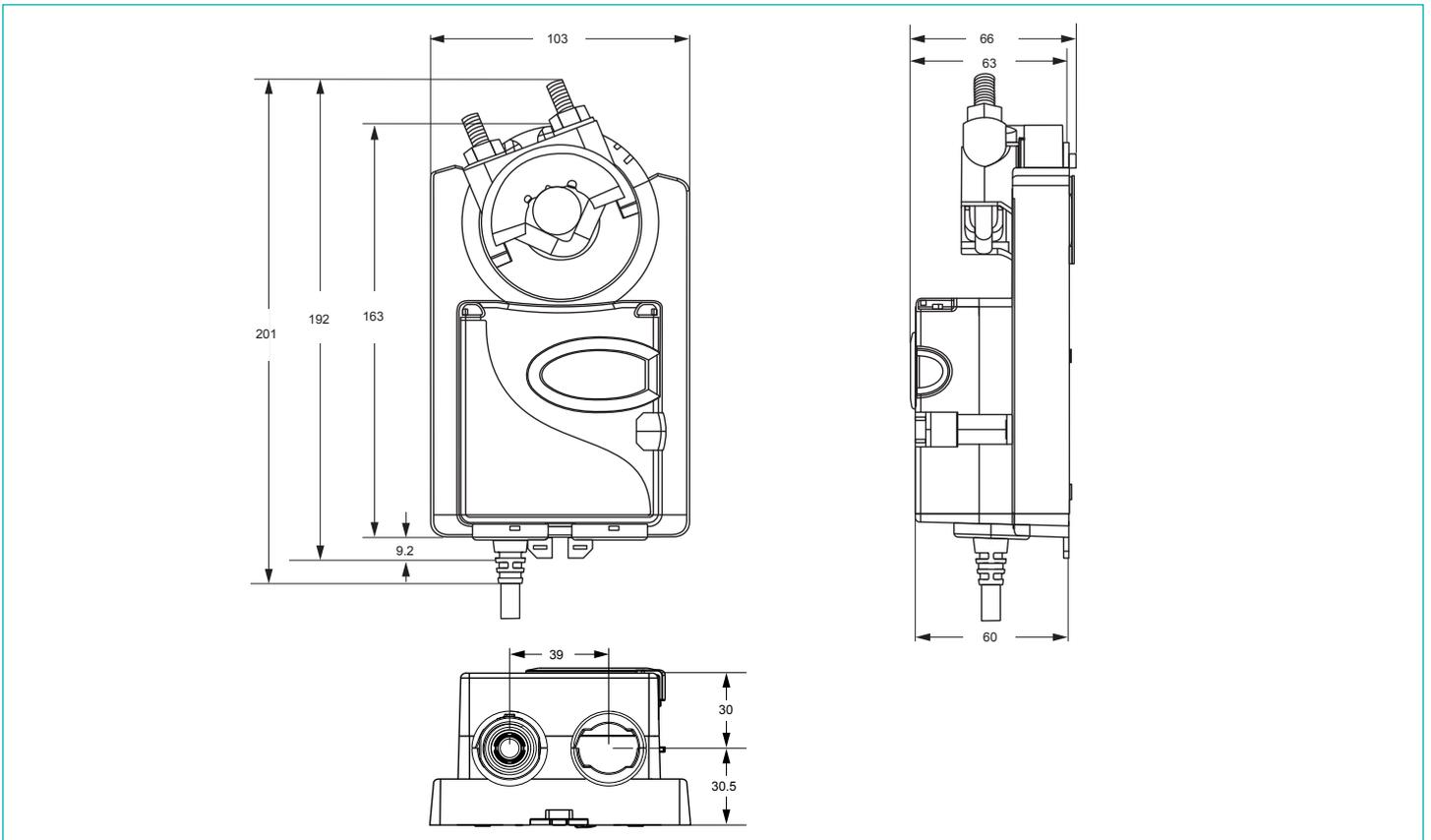
Product Code	DM1.35	
Control Type	On/Off and Floating Mode	Proportional Mode
Power Requirements	AC 24 V (AC 19.2 to 28.8 V) at 50/60 Hz, Class 2 (North America) or SELV (Europe), 6.1 VA running DC 24 V (DC 21.6 to 26.4 V) Class 2 (North America) or SELV (Europe), 2.1 W running	
Transformer Sizing Requirements	≥7 VA	
Input Signal/Adjustments	AC 19.2 to 28.8 V at 50/60 Hz or DC 24 V ±10% Class 2 (North America) or SELV (Europe)	DC 0 (2) to 10 V or 0 (4) to 20 mA with field furnished 500 ohm, 1/4 W resistor Offset: DC 0 to 10 V Span: DC 2 to 10 V
Control Impedance	4.7k ohm	100k ohm
Feedback Signal	---	DC 0(2) to 10 V
Position Accuracy	<5%	
Feedback Accuracy	<5%	
Running Torque	35 Nm	
Rotation Range	Mechanically Limited 35° to 95° ±3° in 5° increments	
Rotation Time for 90° of Travel	150 seconds, constant for all operating conditions	
Rotation Time Auto-Calibration	75 seconds	
Cycles	30.000 Full Stroke Cycles; 750.000 repositions	
Audible Noise	<45 dBA at maximum load, at a distance of 1 m	
Electrical Connections	1.2 m halogen free cable with 1 mm diameter (18 AWG) conductors and 6 mm ferrule ends	
Conduit Connections	Optional 13 mm NPSM threaded conduit connectors with M9300-100 Conduit Connector	
Mechanical connections	Round: 19 to 27 mm Square: 16 to 19 mm	
Ambient Conditions	Operating: -30 to 60 °C, 95% RH, noncondensing Storage: -40 to 85 °C, 95% RH, noncondensing	
Enclosure	IP54/NEMA 5	
Shipping Weight	1.36 kg	
Compliance	<p>United States: UL Listed, CCN XAPX, File E27734; to UL 60730-1: Automatic Electrical Controls for Household and Similar Use Part 1; and UL 60730-2-14: Part 2, Particular Requirements for Electric Actuators.Plenum Rated (UL 2043). Suitable for use in Other Environmental Air Space (Plenum) in accordance with section 300.22 (c) of the National Electrical Code.</p> <p>Canada: UL Listed, CCN XAPX7, File E27734; to CAN/CSA E60730-1:02: Automatic Electrical Controls for Household and Similar Use Part 1; and CAN/CSA-E60730-2-14: Part 2, Particular Requirements for Electric Actuators.</p> <p>Europe: CE Mark – Johnson Controls declares that this product is in compliance with the essential requirements and other relevant provisions of the EMC Directive and Low Voltage Directive.</p> <p>Australia and New Zealand: RCM, Australia/NZ Emissions Compliant</p>	



Dimensions (in mm)



DA1.08Z / DA2.10 / DM1.10



DM1.20 / DA2.20 / DM1.35

Accessories

The New Joventa Standard line has several kit and accessories that can be ordered separately and mounted on site.

Code Number	Description
M9000-322	NEMA 4x, IP66 Weathershield Kit for damper application of DxD, DM1.10, DxFx.03 and DxFx.08 Series Electric Actuators (quantity 1)
M9000-400	Jackshaft Linkage Adapter Kit (quantity 1)
M9000-561	Thermal Barrier Kit. Extends the BxD, BMS1.10, BxF.03 and BxF.08 Series Electric Non-Spring Return Actuators applications to include low pressure steam (quantity 1)
M9000-604	Replacement Anti-Rotation Bracket Kit for DM1.10, DxFx.03, DxFx.08, DxFx.20 Series Electric Actuators
M9000-606	Position indicator for Auxiliary Switches and Feedback Potentiometer Kits (quantity 5)
JOV-SW1	Auxiliary Switch Kit (one single-pole, double-throw)
JOV-SW2	Auxiliary Switch Kit (two single-pole, double-throw)
M9300-100	Threaded Conduit Adapters for 12.7 mm (1/2 in.) electrician's fittings (quantity 5)
M9300-140	External Auxiliary Feedback Potentiometer 140k Ohm
M9000-151	Remote Mounting Kit, with crank arm and damper linkage for Damper Series Actuators
M9300-1K	External Auxiliary Feedback Potentiometer 1k Ohm
M9300-2K	External Auxiliary Feedback Potentiometer 2k Ohm
M9300-10K	External Auxiliary Feedback Potentiometer 10k Ohm
M9310-600	Standard Coupler Kit, DM1.10 Series (9.5 to 19 mm - 3/8 to 3/4 in.) (9.5 to 16 mm - 3/8 to 5/8 in.) (quantity 1)

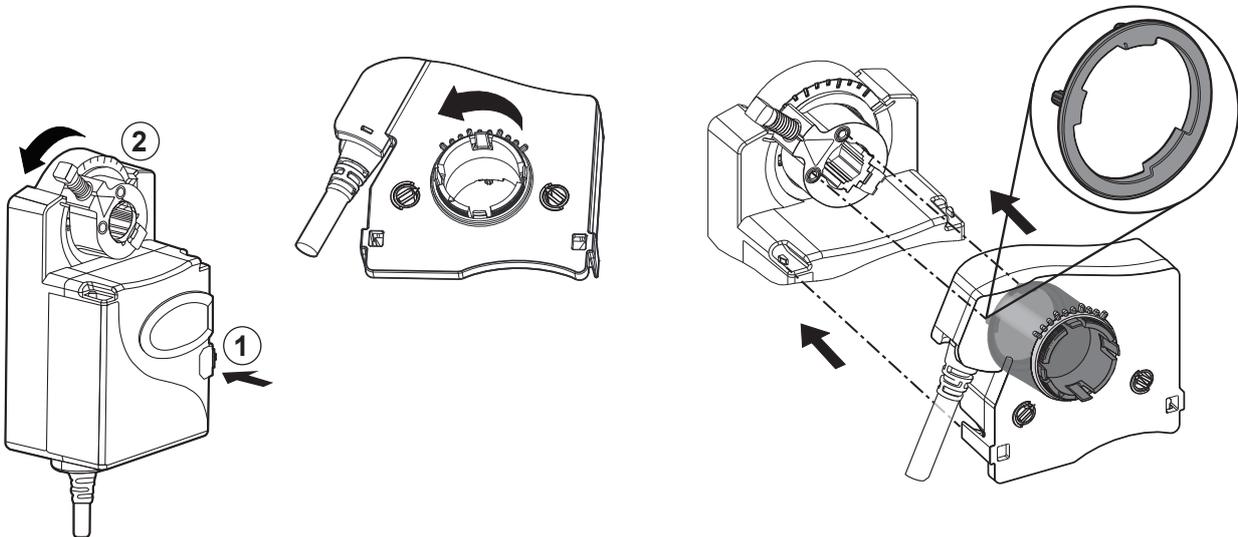
Auxiliary Switch & Potentiometer Feedback Kit

Mounting the kit, a connection is created between the shaft hub of the actuator and the kit.

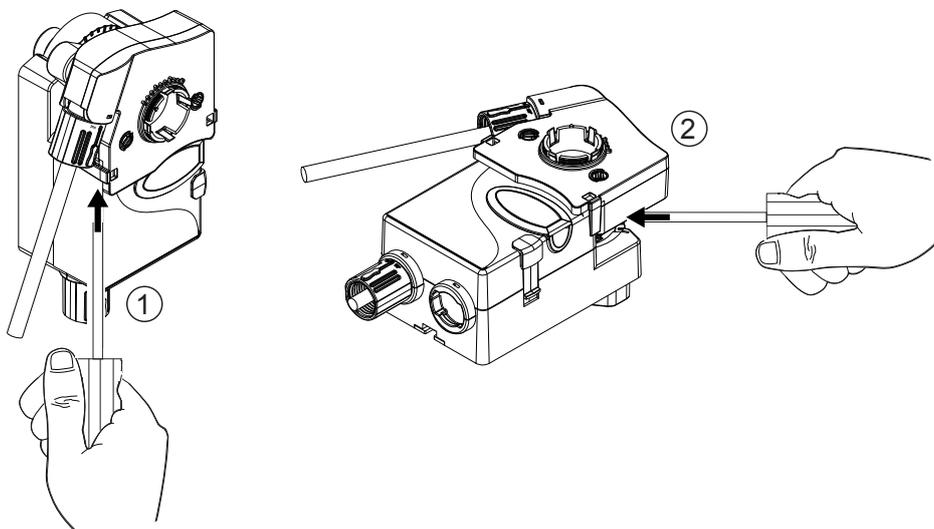
The position of the actuator is transferred to the gear's kit.



1. Before mounting the kit, rotate the actuator and the kit itself counter clock wise till the end position in order to align the holes on the coupler with the pins on the kit and snap the kit onto the M9300 actuators.

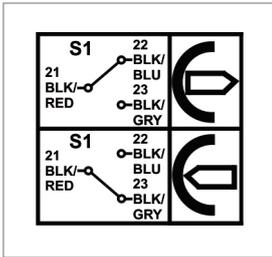


2. To remove the kit Place a screwdriver underneath the tab on each side of the actuator and firmly pull back the tab.

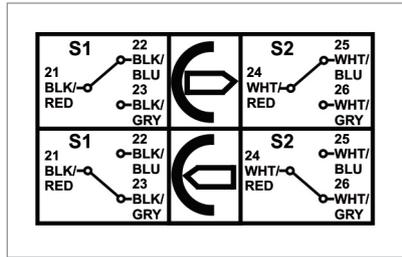


Auxiliary switches kits

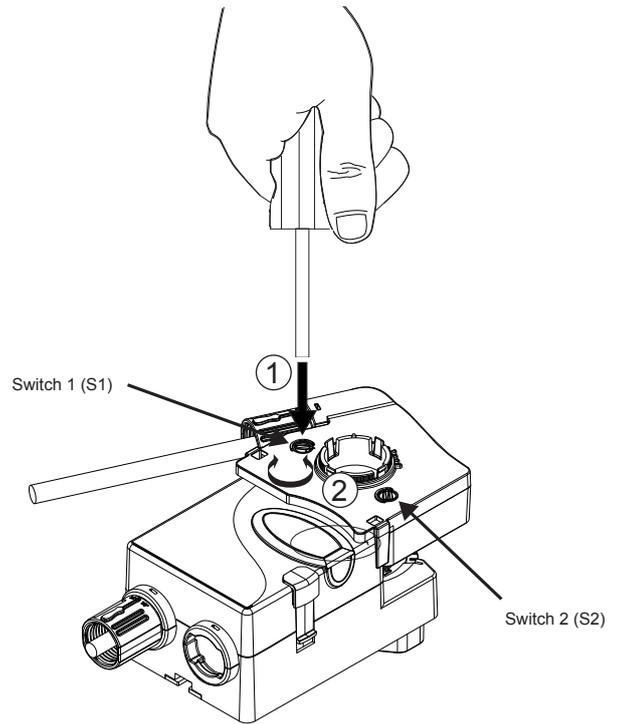
The auxiliary switches kits are used to notify starting and end position or to perform switching functions in any angular position. The switching points can be adjust by means of a dial.



M9300-1

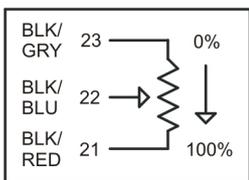


M9300-2



Feedback potentiometer kits

The feedback potentiometers are used as damper position indicators or as positioners for actuators operated in parallel.



Resistor Value

M9300-140	140 Ω
M9300-1K	1K Ω
M9300-2K	2K Ω
M9300-10K	10K Ω