34-1791-83, Rev. -

M9205-GGA-YK10 Series Proportional Electric Spring Return Actuators

Installation Instructions

M9205-GGA-YK10

Part No. 34-1791-83, Rev. —
Issued September 2016

Applications

The M9205-GGA-YK10 Series Proportional Electric Spring Return Actuators are direct-mount actuators that operate on AC/DC 24 V power. These bidirectional actuators do not require a damper linkage, and are easily installed on round shafts from 1/4 to 1/2 in. (6 to 12 mm) or square shafts from 1/4 to 5/16 in. (6 to 8 mm) using the standard shaft clamp included with the actuator.

A single M9205-GGA-YK10 Series Proportional Electric Spring Return Actuator provides 44 lb·in. (5 N·m) stall torque and 27 lb·in. (3 N·m) running and spring return torque.

M9205-GGA-YK10 actuators include plenum-rated cables and are specially configured for installation in spaces used for environmental air-handling purposes other than ducts and plenums as specified in National Fire Protection Association (NFPA) 70: National Electrical Code section 300.22(C), Other Space Used for Environmental Air. The space over a hung ceiling used for environmental air handling purposes is an example of the type of space for which these actuators are configured.

IMPORTANT: Use this M9205-GGA-YK10 Series Proportional Electric Spring Return Actuator only to control equipment under normal operating conditions. Where failure or malfunction of the actuator could lead to personal injury or property damage to the controlled equipment or other property, additional precautions must be designed into the control system. Incorporate and maintain other devices, such as supervisory or alarm systems or safety or limit controls, intended to warn of or protect against failure or malfunction of the actuator.

IMPORTANT : Utiliser ce M9205-GGA-YK10 Series Proportional Electric Spring Return Actuator uniquement pour commander des équipements dans des conditions normales de fonctionnement. Lorsqu'une défaillance ou un dysfonctionnement du actuator risque de provoquer des blessures ou d'endommager l'équipement contrôlé ou un autre équipement, la conception du système de contrôle doit intégrer des dispositifs de protection supplémentaires. Veiller dans ce cas à intégrer de façon permanente d'autres dispositifs, tels que des systèmes de supervision ou d'alarme, ou des dispositifs de sécurité ou de limitation, ayant une fonction d'avertissement ou de protection en cas de défaillance ou de dysfonctionnement du actuator.

Installation

The M9205-GGA-YK10 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.

IMPORTANT: Do not install or use this M9205-GGA-YK10 Series Proportional Electric Spring Return Actuators in or near environments where corrosive substances or vapors could be present. Exposure of the electric actuator to corrosive environments may damage the internal components of the device, and will void the warranty.

Parts Included

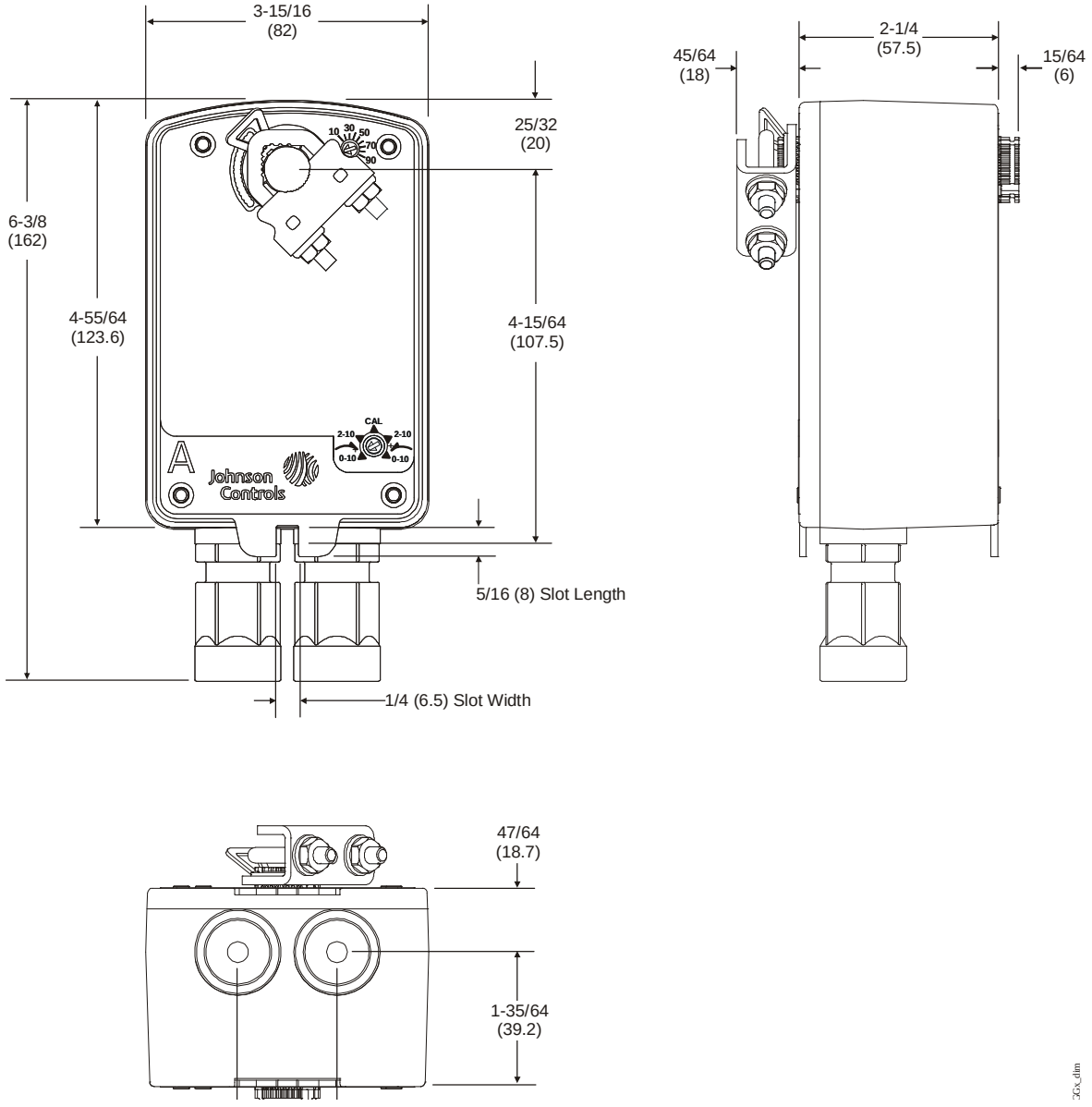
- M9205-GGA-YK10 actuator
- two No. M3.5 x 9.5 mm self-drilling sheet metal screws
- anti-rotation bracket

Special Tools Needed

- 10 mm wrench/socket
- drill with Phillips bit, driver size 1

Dimensions

Figure 1: M9205-GGA-YK10 Series Proportional Electric Spring Return Actuator Dimensions, in. (mm)



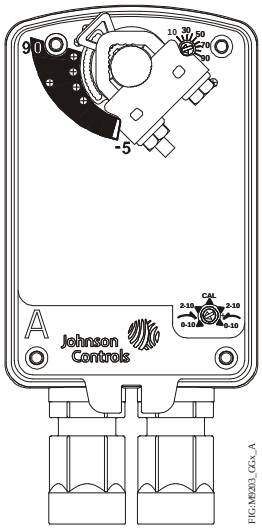
Mounting

The M9205-GGA-YK10 Series Proportional Electric Spring Return Actuators can be easily installed on dampers with round shafts from 1/4 to 1/2 in. (6 to 12 mm) or square shafts from 1/4 to 5/16 in. (6 to 8 mm) using the standard shaft coupler included with the actuator. If the damper shaft extends less than 3.31 in. (84 mm), see the Removable Coupler section for further instructions. If the damper shaft extends less than 0.79 in. (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 2. With power applied, the actuator drives CW from the 0° position and spring returns CCW.

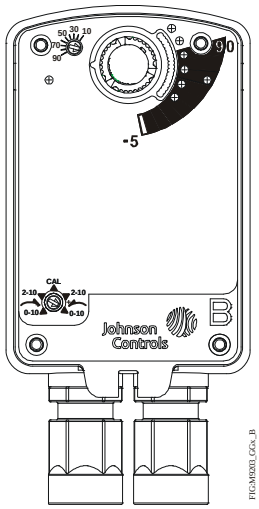
Figure 2: Actuator Side A



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 3. With power applied, the actuator drives CCW from the 0° position and spring returns CW.

Figure 3: Actuator Side B

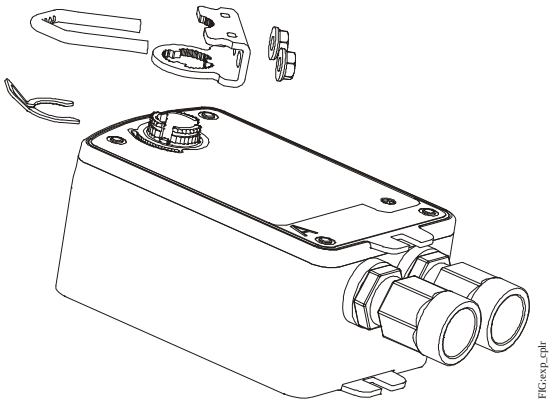


Removable Coupler

If the damper shaft extends less than 3.31 in. (84 mm), mount the coupler on the face of the actuator closest to the damper.

If the damper shaft extends less than 0.79 in. (20 mm), a shaft extension is required to mount the actuator.

Figure 4: Changing the Coupler Position



To change the coupler's position, see Figure 4 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.

Mounting the Actuator

To mount the actuator, proceed as follows:

1. See the dimensions in Figure 5 and Table 1 to ensure the correct positioning of the anti-rotation bracket.

Figure 5: Positioning the Anti-Rotation Bracket

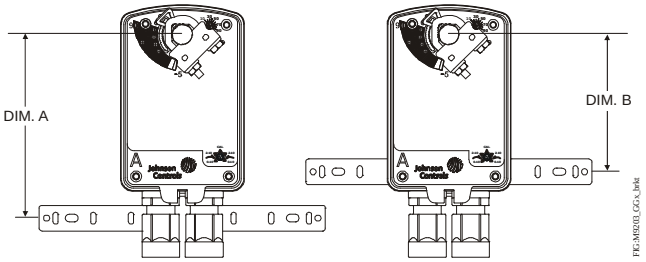


Table 1: Dimensions from Anti-Rotation Bracket to Shaft Center

Shaft Diameter, in. (mm)	Dimension A, in. (mm)	Dimension B, in. (mm)
1/4 to 1/2 (6 to 12)	4-27/32 (123)	3-5/8 (92)

IMPORTANT: The tab on the anti-rotation bracket must fit midpoint in the actuator slot. Positioning the tab midpoint in the slot prevents actuator binding and premature wear, and makes actuator removal easier.

2. Bend or cut the anti-rotation bracket to fit the damper frame or duct as illustrated in Figure 6.

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

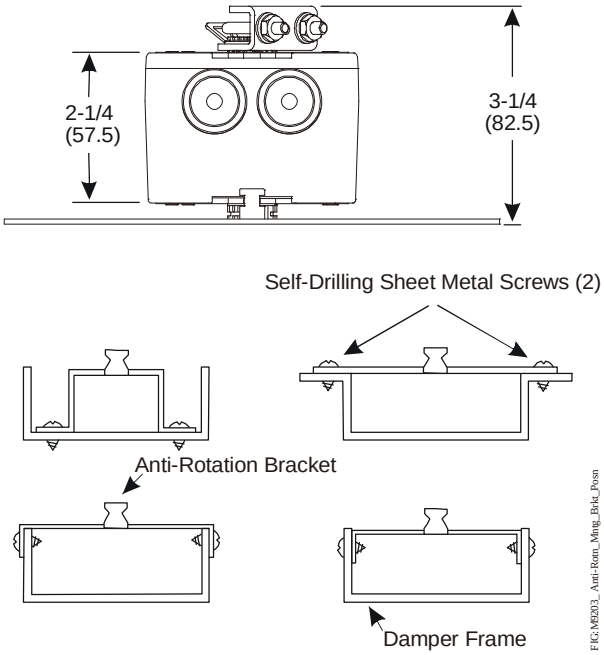
3. Mark or drill mounting holes in the damper frame or duct using the anti-rotation bracket as a guide (based on the measurements obtained in Table 1 and Figure 5).

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.

IMPORTANT: Do not overtighten the mounting screws to avoid stripping the threads. Be certain that the tab on the anti-rotation bracket remains properly positioned in the slot on the actuator, and that the actuator remains parallel to the mounting surface.

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 6.

Figure 6: Anti-Rotation Mounting Bracket Positions



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 100 to 125 lb·in. (11 to 14 N·m).

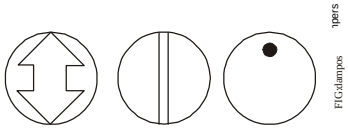
8. Apply power long enough for the actuator to travel a full stroke. Verify that the actuator rotates freely throughout the range.

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°.

1. Check that the damper blade is visible or its position is permanently marked on the end of the damper shaft, as illustrated in Figure 7.

Figure 7: Damper Position Icons



2. Position the stroke-limiting stop in the serrated slot with its leading edge at the scale position matching the desired stroke.
3. The product label marks hole positions for the M3-0.5 x 8 mm self-tapping screw provided with the adjustable stop kit. Drive the screw through the slot in the adjustable stop and into the actuator face over a marked hole position. (See Figure 8.)

   Note: The minimum rotation range is 35°.

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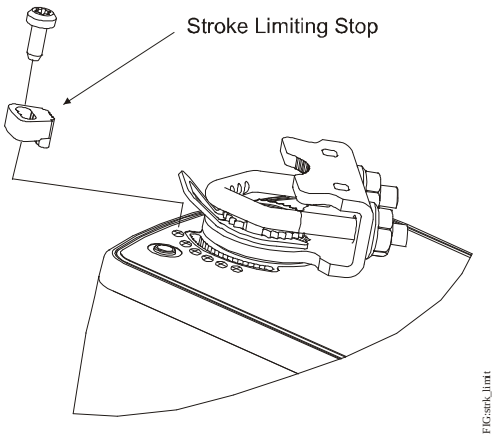
Figure 8: Limiting Rotation Range



Wiring

See Figure 9 and Figure 10 to wire the applicable M9205-GGA-YK10 Series model.

Figure 9: Control Wiring Diagrams

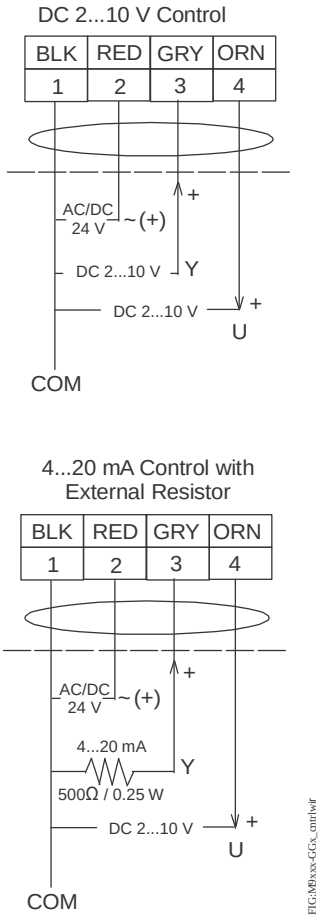


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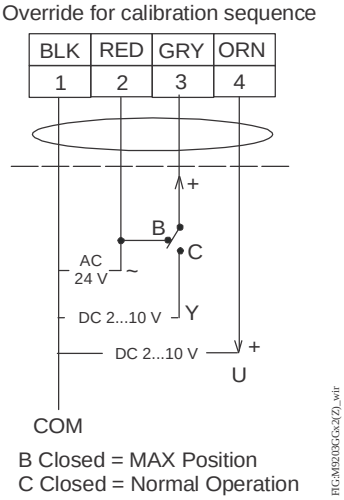
Figure 10: Control Wiring Diagram (Override)



WARNING: Risk of Electric Shock.
Disconnect or isolate all power supplies before making electrical connections. More than one disconnection or isolation may be required to completely de-energize equipment. Contact with components carrying hazardous voltage can cause electric shock and may result in severe personal injury or death.

AVERTISSEMENT : Risque de décharge électrique.
Débrancher ou isoler toute alimentation avant de réaliser un branchement électrique. Plusieurs isolations et débranchements sont peut-être nécessaires pour -couper entièrement l'alimentation de l'équipement. Tout contact avec des composants conducteurs de tensions dangereuses risque d'entraîner une décharge électrique et de provoquer des blessures graves, voire mortelles.

CAUTION: Risk of Property Damage.
Do not apply power to the system before checking all wiring connections. Short circuited or improperly connected wires may result in permanent damage to the equipment.

MISE EN GARDE : Risque de dégâts matériels.
Ne pas mettre le système sous tension avant d'avoir vérifié tous les raccords de câblage. Des fils formant un court-circuit ou connectés de façon incorrecte risquent d'endommager irrémédiablement l'équipement.

CAUTION: Risk of Property Damage.
Insulate and secure each unused wire lead before applying power to the actuator. Failure to insulate and secure each unused wire lead may result in property damage.

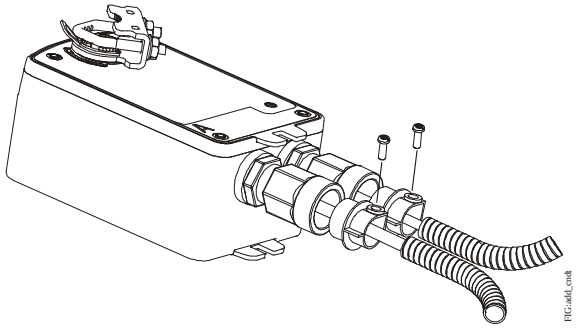
MISE EN GARDE : Risque de dégâts matériels.
Isoler et protéger chaque fil non utilisé avant de mettre l'actuator sous tension. Le non-respect de cette obligation d'isolation et de protection de chaque fil non utilisé risque d'entraîner des dégâts matériels.

IMPORTANT: Make all wiring connections in accordance with the National Electrical Code and local regulations. Use proper Electrostatic Discharge (ESD) precautions during installation and servicing to avoid damaging the actuator's electronic circuits.

Using Conduit

All M9205-GGA-YK10 Series Actuators accept 1/2 in. threaded electrician's fittings.

Figure 11: Adding Flexible Metal Conduit



1. Feed the actuator cables through the field supplied electrician's fitting and conduit.
2. Thread the electrician's fitting into the actuator and secure the conduit to the fitting in accordance with local building code requirements.

Setup and Adjustments

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. Apply power to the actuator using Figure 10 as a guideline. The actuator begins rotating until the end-stops are found.
2. Once the last end-stop is found, the actuator will remain there until power is removed. Once power is removed, the actuator can be driven as desired. The input signal is proportionally reconfigured to the reduced rotation range.

Note: The actuator must finish calibrating before the power can be removed.

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.

Repair Information

A number of replacement parts are available; see Table 1 for more details. If an M9205-GGA-YK10 Series Proportional Electric Spring Return Actuator fails to operate within its specifications, replace the unit. For a replacement electric actuator, contact the nearest Johnson Controls representative.

Technical Specifications

M9205-GGA-YK10 Series Proportional Electric Spring Return Actuator (Part 1 of 2)

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), 5.1 VA running, 2.8 VA holding position DC 24 V (DC 19.2 V to 28.8 V): Class 2 (North America) or SELV (Europe), 1.9 W running, 1.1 W holding position Minimum Transformer Size: 6 VA per actuator
Input Signal		Factory Set at DC 2 to 10 V, direct acting
Control Input Impedance		Voltage Input: 100,000 ohm Current Input: 500 ohm with field-furnished 500 ohm resistor
Feedback Signal		DC 2 to 10 V for desired rotation range up to 95° Corresponds to rotation limits, 0.5 mA at 10 V maximum
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)**	44 lb·in. (5 N·m) stall torque and 27 lb·in. (3 N·m) running torque, all operating temperatures
	Power Off (Spring Returning)	44 lb·in. (5 N·m) stall torque and 27 lb·in. (3 N·m) running torque, all operating temperatures
Rotation Range		Maximum Full Stroke: 95°
Rotation Time for 90 Degrees of Travel	**Power On (Running)**	90 seconds constant for 0 to 27 lb·in. (3 N·m) load, at all operating conditions
	Power Off (Spring Returning)	12 to 17 seconds for 0 to 27 lb·in. (3 N·m) load, at room temperature 16 seconds nominal at full-rated load 22 seconds maximum with 27 lb·in. (3 N·m) load, at -22°F (-30°C)
Life Cycles		60,000 full stroke cycles with 27 lb·in. (3 N·m) load 1,500,000 repositions with 27 lb·in. (3 N·m) load
Audible Noise Rating	**Power On (Running)**	<37 dBA at 27 lb·in. (3 N·m) load, at a distance of 39-13/32 in. (1 m)
	Power On (Holding)	<20 dBA at a distance of 39-13/32 in. (1 m)
	Power Off (Spring Returning)	<56 dBA at 27 lb·in. (3 N·m) load, at a distance of 39-13/32 in. (1 m)
Electrical Connections		17-1/2 in. (0.44 m) UL 444 Type CMP plenum-rated cable with 18 AWG (0.75 mm²) conductors and 0.25 in. (6 mm) ferrule ends
Conduit Connections		Integral 1/2 in. Threaded Conduit Connector(s)
Mechanical Connections	**Round Shafts**	Range of Sizes: 1/4 to 1/2 in. (6 to 12 mm)
	Square Shafts	Range of Sizes: 1/4 to 5/16 in. (6 to 8 mm)
Enclosure Rating		NEMA 2 (IP54) for all mounting orientations
Ambient Conditions	**Standard Operating**	-22 to 140°F (-30 to 60°C); 90% RH maximum, noncondensing
	Storage	-40 to 185°F (-40 to 85°C); 95% RH maximum, noncondensing

M9205-GGA-YK10 Series Proportional Electric Spring Return Actuator (Part 2 of 2)

Dimensions		6.38 x 3.23 x 2.26 in. (162 x 82 x 57.5 mm)
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. (Models: All) Plenum Rated (UL 2043). Suitable for use in other environmental air space (plenums) in accordance with Section 300.22 (C) of the National Electric Code
	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. (Models: All)
Shipping Weight		2.0 lb (0.9 kg)

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