

## M9106-IGx-4 Series Floating Electric Non-Spring Return Actuators

### Installation

**IMPORTANT:** The M9106-IGx-4 Series Electric Actuator is intended to provide an input to equipment under normal operating conditions. Where failure or malfunction of the electric 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 electric actuator.

**IMPORTANT :** Le M9106-IGx-4 Series Electric Actuator est destiné à transmettre des données entrantes à un équipement dans des conditions normales de fonctionnement. Lorsqu'une défaillance ou un dysfonctionnement du electric 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 electric actuator.

### Parts Included

- M9106-IGx-4 actuator
- spade terminals

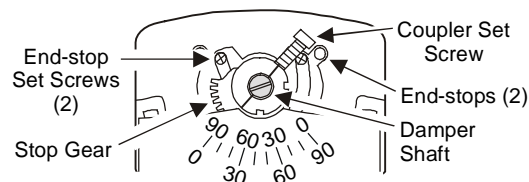
### Special Tools Needed

- wire/terminal crimper

### Mounting

The actuators are not position sensitive, and may be mounted in any convenient orientation onto VG1000 Series Ball Valves by the means of the M9000-520 Linkage Kit.

For more details, refer to the *M9000-520 Ball Valve Linkage Kit Mounting Instructions (P/N 14-1297-5)* or *M9000-512 Valve Linkage Kit Instructions (P/N 14-1201-13)*.



**Figure 1: Setting the Rotation Range**

Use the center of the coupler set screw as a pointer to observe the position on the scale when rotating the coupler from one side to the other.

**IMPORTANT:** Do not remove the end-stop set screws, as this could interfere with the actuator's operation.

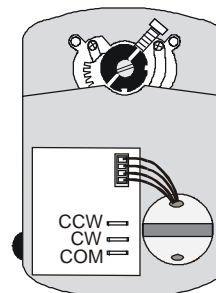
### Setup and Adjustments

#### Direction of Action

In the Direct Acting (DA) mode, a minimum control signal drives the actuator to the full Counterclockwise (CCW) position, and a maximum control signal drives it fully Clockwise (CW). For Reverse Acting (RA) operation, a minimum control signal drives the actuator to the full CW position, and a maximum control signal drives it fully CCW.

#### Floating Application

For CW rotation and RA operation, apply 24 VAC to the Common (COM) and CW Terminals. For CCW rotation and DA operation, apply 24 VAC to the COM and CCW Terminals. (See Figure 2.)



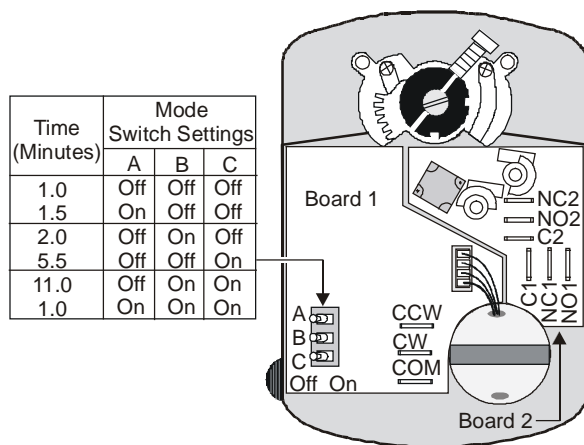
**Figure 2: Direction of Action on IGx Model**

## On/Off Application

Drive the IGx model as an On/Off actuator by wiring continuous 24 VAC power to the COM and CW Terminals. At the same time, command the actuator to open by powering the CCW Terminal with 24 VAC. To drive the actuator back to the full CW position, remove the 24 VAC signal from the CCW Terminal.

## Mode Switches

The M9106-IGx-4 models offer adjustable rotation times of 1, 1.5, 2, 5.5, and 11 minutes (factory set for 1 minute). Switch settings determine the rotation time of the IGx models. Refer to Figure 3 to position the mode switches for the desired rotation time.



Note: The IGA models have Board 1, and the IGC models have both Board 1 and Board 2.

**Figure 3: Mode Switch Settings**

The 1-, 1.5-, and 2-minute settings are ideal for on/off and floating applications, and replace the M9104-xGx-2 1.5-minute models. The 5.5- and 11-minute settings are replacements for the 35 lb-in (4 N·m) EDA-2040 and the ATP-2040 models.

## Wiring



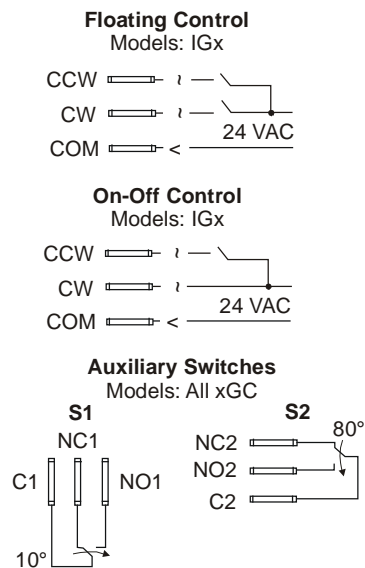
### CAUTION: Risk of Property Damage.

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.

**IMPORTANT:** Make all wiring connections in accordance with the National Electrical Code and all local regulations.



**Figure 4: Wiring for M9106-IGx Models**

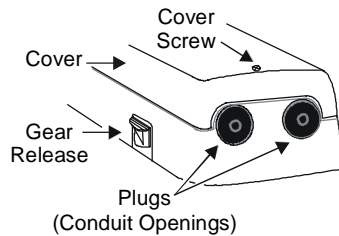
Note: The IGx models have an auto shutoff to avoid excessive wear or drive time on the motor.

Note: When using the VA9104-AGA-1S or VA9104-IGA-1S Series actuator with a controller featuring triac output, add a 4.7k ohm resistor one half watt between the COM and CCW terminals.

## Through the Conduit Openings

Depending on the M9106 model selected, one or both conduit openings are used.

1. Loosen the cover screw and remove the actuator cover.
2. Push the plastic conduit plug out of the conduit opening with fingertip. (See Figure 5.)



**Figure 5: Location of the Conduit Openings**

3. Use the Phillips No. 1 screwdriver to puncture a hole through the center of the plastic conduit plug. Reinsert the plug into the conduit opening.

**Note:** For applications requiring metal conduit, thread the conduit fitting into the conduit opening and hand tighten.

4. Insert the cable wires through the plastic plug, compression fitting, or conduit fitting, and connect to the terminals using the appropriate wiring diagram in Figure 4.

**IMPORTANT:** Install all quick-connect terminals in the same direction to prevent shorting. (See Figure 6.)



**Figure 6: Orientation of Terminals**

**Note:** If using optional pluggable terminal blocks (M9000-105 or M9000-106), insert the cable wires through the conduit opening, and then connect the wires to the terminals.

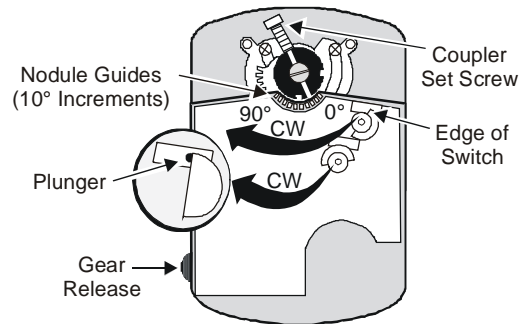
### Auxiliary Switches (IGC Model)

The M9106-IGC-4 models have two built-in auxiliary switches that may be set for any angle between 0 and 90° (factory set for 10 and 80°, nominal). Refer to the *Technical Data* section for auxiliary switch ratings.

The following procedures serve as examples to change the position of the auxiliary switch angles when starting at full CCW position.

### Switch S1

To change the angle of Switch S1 to 20°, refer to Figure 7 and proceed as follows:



**Figure 7: Switch Angle Settings**

1. Press and hold the gear release. Using the 0 to 90° nodule guides, rotate the coupler until the center of the coupler set screw is at 20°.
2. Rotate Switch S1 CW, and align the edge of the switch with the plunger until the plunger rises. (See Figure 7.)

**Note:** At this point, the normally closed contact closes, and the normally open contact opens. (See Auxiliary Switches in Figure 4.)

### Switch S2

To change the angle of Switch S2 to 70°, refer to Figure 7 and proceed as follows:

1. Press and hold the gear release. Using the 0 to 90° nodule guides, rotate the coupler until the center of the coupler set screw is at 70°.
2. Rotate Switch S2 CW, and align the edge of the switch with the plunger until the plunger rises. (See Figure 7.)

**Note:** At this point, the normally closed contact opens, and the normally open contact closes. (See Auxiliary Switches in Figure 4.)

3. Press and hold the gear release. Rotate the coupler until the center of the coupler set screw is back to 0°.
4. Check all the wiring and system settings, and apply power to the controller. Provide signals to the actuator to drive it at least one complete cycle open and closed to verify proper operation.

## Repairs and Replacement

If the M9106-IGx-4 Series Electric Actuator fails to operate within its specifications, unit replacement is required. For a replacement electric actuator, contact the nearest Johnson Controls representative.

## Technical Data

<b>Product</b>	M9106-IGx-4 Series Electric Non-Spring Return Actuators	
<b>Power Requirements</b>	20 to 30 VAC at 50/60 Hz; 2.8 VA supply, Class 2	
<b>Input Signal</b>	20 to 30 VAC at 50/60 Hz	
<b>Input Signal Adjustments</b>	CW and COM Terminals, CW rotation CCW and COM Terminals, CCW rotation	
<b>Input Impedance</b>	160 ohms, nominal	
<b>Auxiliary Switch Rating</b>	IGC:	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
<b>Mechanical Output (Running Torque)</b>	1-, 1.5-, and 2-minute settings: 53 lb-in (6 N·m) 5.5- and 11-minute settings: 35 lb-in (4 N·m)	
<b>Cycles</b>	100,000 full cycles; 2,500,000 repositions rated at 6 N·m (53 lb-in)	
<b>Audible Noise Rating</b>	35 dBA maximum at 1 m	
<b>Rotation Range</b>	Adjustable from 30 to 90°, CW or CCW	
<b>Rotation Time</b>	IGx:	Adjustable with switch settings (Factory set for 1 minute. See Figure 12.) 60, 90, 120, 330, or 660 seconds (1, 1.5, 2, 5.5 or 11 min.) at 60 Hz; and 72, 108, 144, 396, or 792 seconds (1.2, 1.8, 2.4, 6.6, or 13.2 minutes) at 50 Hz
<b>Electrical Connection</b>	1/4 in. spade terminals (Optional pluggable terminal blocks are available.)	
<b>Conduit Connection</b>	PG11 threaded	
<b>Mechanical Connection</b>	3/8 to 1/2 in. (10 to 12.7 mm) round shaft or 3/8 in. (10 mm) square shaft	
<b>Enclosure</b>	NEMA 2, IP32	
<b>Ambient Operating Conditions</b>	-4 to 125°F (-20 to 52°C); 90% RH maximum, non-condensing	
<b>Ambient Storage Conditions</b>	-40 to 186°F (-40 to 86°C); 90% RH maximum, non-condensing	
<b>Dimensions (H x W x D)</b>	5.9 x 4.2 x 2.64 in. (150.1 x 106.5 x 67 mm)	
<b>Shipping Weight</b>	2.4 lb (1.08 kg)	
<b>Agency Compliance</b>	UL 873 Listed, File E27734, CCN XAPX CSA C22.2 No. 139 Certified, File LR85083, Class 3221 02 CE Mark – Johnson Controls, Inc., declares that this product is in compliance with the essential requirements and other relevant provisions of the EMC Directive	



*The performance specifications are nominal and conform to acceptable industry standards. For application at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls shall not be liable for damages resulting from misapplication or misuse of its products.*

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