



# SIEMENS

Building Technologies

## OpenAir™ Electronic Damper Actuators Selection Guide



# More experience

150 years of innovations and industry experience speaks for itself



Siemens Building Technologies deliver the products and services that you depend on for outstanding quality, reliability and performance.

**Delivered ready to install.**

With standardized footprints, wiring configurations and checkout procedures, OpenAir electronic damper actuators are designed for fast installation resulting in lower installed cost.

**Quality first.** OpenAir damper actuators are 100% factory-assembled and tested at our state-of-the-art, ISO9001:2000 certified manufacturing facility located in Buffalo Grove, Illinois.

**Need it fast?** Same day shipping is no problem for rush orders. Helpful customer service representatives can input your order and ship within three business days for standard shipping.

**Support when you need it.** Technical support is just a phone call away. For Customer Care call: **1.888.593.7876**.

**Instant Information Access.** Go on-line for technical documentation and installation instructions at our web site to locate information faster than ever before at [www.siemens.com/hvp/components](http://www.siemens.com/hvp/components).

**Get more. Specify Siemens.**

# More solutions

Expanded product line delivers power and flexibility



## **GDE/GLB Series Small Non-Spring Return**

Terminal Units  
Face and By-Pass Dampers  
Multi-zone Mixing Boxes  
By-pass Dampers (VAV)  
Make-up Air Dampers  
Unit Ventilators

## **GMA/GEB Series Medium Spring Return/ Non-Spring Return**

Outside Air Dampers  
Mixing Boxes  
Return Air Dampers  
Zone Isolation Dampers  
Make-up Air Dampers  
Unit Ventilators  
Economizer Units

## **GCA/GBB/GIB Series Large Spring Return/ Non-Spring Return**

Outside Air Dampers  
Rooftop Units  
Mixing Boxes  
Vortex Dampers  
Inlet Vane Dampers  
Return Air Dampers  
Zone Isolation Dampers  
Economizer Units

## **GND/GGD Series Fast acting 15 sec. operation**

**Designed to meet UL555  
and UL555S**

Smoke Dampers  
Combination Fire/Smoke  
Dampers

# Spring Return actuators

## GMA Series

62 lb.-in.  
~16 ft.\*  
damper area



Control signal	Power supply	Standard model	Feedback potentiometer (1kΩ)	Adjustable start/span	Adj. start/span with 2 auxiliary switches	2 auxiliary switches	Elec. tandem control
On/Off, 2-position	24 VAC/DC	GMA121.1U GMA121.1P					GMA126.1U GMA126.1P
On/Off, 2-position	120 VAC	GMA221.1U					GMA226.1U
Floating, 3-position	24 VAC/DC	GMA131.1U GMA131.1P	GMA132.1U				GMA136.1U
Modulating, 0-10 VDC	24 VAC/DC	GMA161.1U GMA161.1P		GMA163.1U GMA163.1P	GMA164.1U		GMA166.1U GMA166.1P
Modulating, 2-10 VDC/10-2 VDC Signal inversion capability	24 VAC/DC	GMA151.1U GMA151.1P					GMA156.1U GMA156.1P

## GCA Series

142 lb.-in.  
~36 ft.\*  
damper area



On/Off, 2-position	24 VAC/DC	GCA121.1U GCA121.1P					GCA126.1U GCA126.1P
On/Off, 2-position	120 VAC	GCA221.1U					GCA226.1U
Floating, 3-position	24 VAC/DC	GCA131.1U GCA131.1P	GCA132.1U GCA132.1P				GCA136.1U GCA136.1P
Modulating, 0-10 VDC	24 VAC	GCA161.1U GCA161.1P		GCA163.1U GCA163.1P	GCA164.1U GCA164.1P		GCA166.1U GCA166.1P GCA161.1P/MAS GCA161.1P/SLA
Modulating, 2-10 VDC/10-2 VDC Signal inversion capability	24 VAC/DC	GCA151.1U GCA151.1P					GCA156.1U GCA156.1P

## GND Series

53 lb.-in.  
~12 ft.\*  
damper area



On/Off, 2-position	24 VAC/DC	GND121.1U					GND126.1U
On/Off, 2-position	120 VAC	GND221.1U					GND226.1U
On/Off, 2-position	230 VAC	GND321.1U					GND326.1U

**NEW!**

UL listed smoke dampers or combination fire/smoke rated dampers  
Refer to technical instructions for full range of options and part numbers.

## GGD Series

142 lb.-in.  
~36 ft.\*  
damper area



On/Off, 2-position	24 VAC	GGD121.1U					
On/Off, 2-position	115 VAC	GGD221.1U					
On/Off, 2-position	230 VAC	GGD321.1U					

UL listed smoke dampers or combination fire/smoke rated dampers

\*Based on 4 lb.-in./ft.<sup>2</sup>

### Key

- U Standard cable
- P Plenum rated
- T Terminal strip (no cable)

### Ordering Note

Bulk packs are available; refer to the individual product submittal summary in this brochure for availability.

# Non-Spring Return actuators

Control signal	Power supply	Standard model	Feedback potentiometer (1k $\Omega$ )	Adjustable start/span	Adj. start/span with 2 auxiliary switches	Terminal strip (no cable)	2 auxiliary switches
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## GDE Series

44 lb.-in.  
~11 ft.\*  
damper area



Floating, 3-position	24 VAC	GDE131.1U GDE131.1P	GDE132.1P			GDE131.1T	GDE136.1P
Modulating, 0-10 VDC	24 VAC	GDE161.1P		GDE163.1P	GDE164.1P	GDE161.1T	GDE166.1P

## GLB Series

88 lb.-in.  
~22 ft.\*  
damper area



Floating, 3-position	24 VAC	GLB131.1P	GLB132.1P				GLB136.1P
Modulating, 0-10 VDC	24 VAC	GLB161.1P		GLB163.1P	GLB164.1P		GLB166.1P

## GEB Series

132 lb.-in.  
~32 ft.\*  
damper area



Floating, 3-position	24 VAC	GEB131.1U GEB131.1P	GEB132.1U				GEB136.1U
Modulating, 0-10 VDC (or 2-10 VDC selectable)	24 VAC	GEB161.1U GEB161.1P			GEB164.1U		

## GBB Series

221 lb.-in.  
~44 ft.\*  
damper area



Floating, 3-position	24 VAC	GBB131.1U GBB131.1P	GBB132.1U GBB132.1P				GBB136.1U GBB136.1P
Modulating, 0-10 VDC	24 VAC	GBB161.1U GBB161.1P		GBB163.1U GBB163.1P	GBB164.1U GBB164.1P		GBB166.1U GBB166.1P

## GIB Series

310 lb.-in.  
~77 ft.\*  
damper area



Floating, 3-position	24 VAC	GIB131.1U GIB131.1P	GIB132.1U GIB132.1P				GIB136.1U GIB136.1P
Modulating, 0-10 VDC	24 VAC	GIB161.1U GIB161.1P		GIB163.1U GIB163.1P	GIB164.1U GIB164.1P		GIB166.1U GIB166.1P

# More benefits

## Spring Return

Self-centering shaft coupling with patented design relieves strain on the actuator for longer motor life and increased reliability.

Position indicators are universally located for at-a-glance verification.

Rugged housing on all models for added durability and longevity

Manual override allows actuator to be mounted and commissioned before power is available for quick installation.

Optional built-in adjustable start/span is available factory-installed for flexible control signal options.



Single-bolt fastening for easy installation and reduced installed cost

AC/DC operation for added flexibility

Dual adjustable auxiliary switches for built-in position indication or relay contact

Compact footprint for ease of installation

UL, cUL and CE approved

Enhanced functionality with signal inversion capability and 4-20 mA applications are available on 15x types.

Integral conduit adapter designed for easy installation.

Direct-coupled connection for on-the-go installation

All modulating actuators provide built-in feedback capability.

Full-stroke overload protection kicks in automatically to protect motor and components.

Pre-cabled with plenum-rated actuator options that can eliminate the need for conduit.

Consistent wiring detail across product family for faster installs and lower installed cost.

GMA model shown.

# More performance

## Non-Spring Return

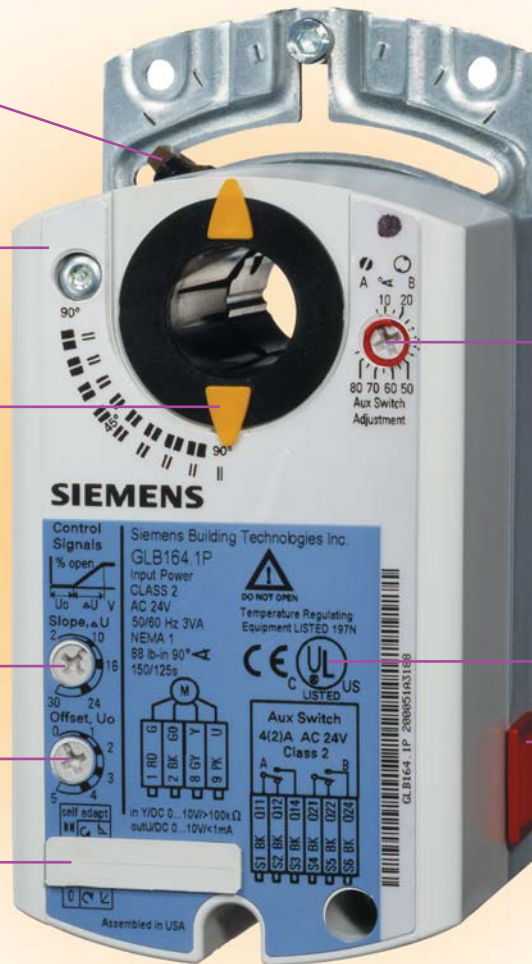
Single-bolt fastening for easy installation and reduced installed cost

Rugged housing on all models for added durability and longevity

Position indicators are universally located for at-a-glance verification.

Optional built-in adjustable start/span available factory-installed for flexible control signal options

Enhanced control options, such as signal inversion and self-adaptive feature



Dual adjustable auxiliary switches for built-in position indication or relay contact

UL, cUL and CE approved

Manual override allows actuator to be mounted and commissioned before power is available for quick installation.

Direct-coupled connection snap on for on-the-go, fast installation.

Full-stroke protection kicks in automatically to protect motor and components.

Pre-cabled with plenum-rated actuator options that can eliminate the need for conduit.

All modulating actuators provide built-in feedback capability.

Small footprint delivers powerful performance.

Consistent wiring detail across product family for faster installs and lower installed cost.

Brushless motor technology used across the entire product family for quiet, low noise operation.

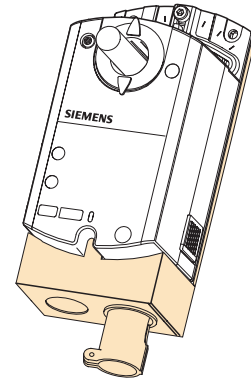
GLB model shown.

# More mounting alternatives

## Conduit Adapter Bracket

The Conduit Adapter Bracket, ASK76.1U, is a convenient choice when 1/2" electrical conduit or flex cabling is required by job specifications or local code (GDE/GLB models only).

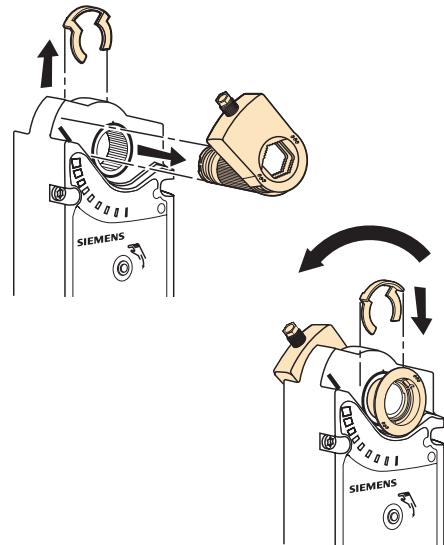
Conduit adapters are standard on other models.



## Short Shaft Mounting Option

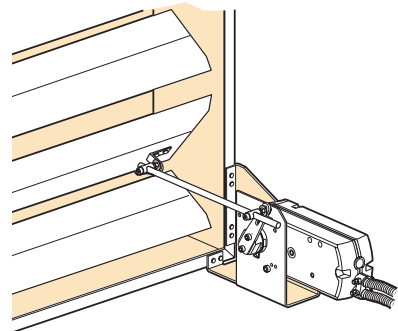
For easy mounting on short shafts without special accessories, the self-centering shaft adapter can be mounted on the backside of the actuator.

Each actuator includes an adapter so that the position indicator is still easily viewed.



## Mounting Option

The Frame Mounting Kit is used when actuator cannot be directly mounted on damper shaft due to space limitations.



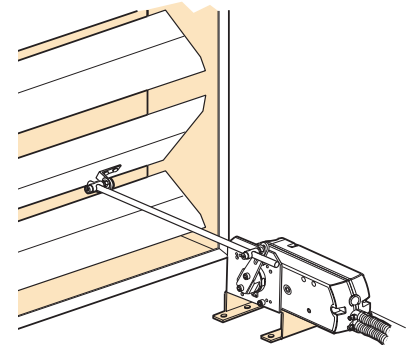
GCA actuator frame mounted with ASK 71.2U kit



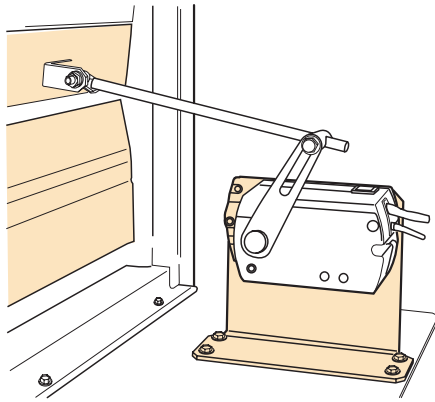
## Mounting Options *(continued)*

Easily replace existing Honeywell, Johnson, and Barber-Colman modulating motors using the Foot Mounting Kit.

The Foot Mounting Kit, ASK71.U, can also be used for placing the actuator in the air stream and linking to the damper blades.



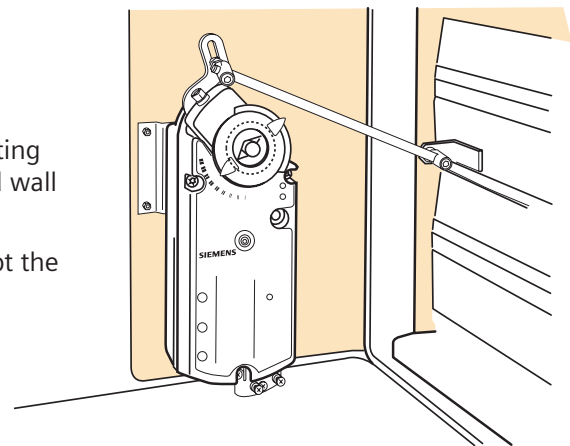
GCA actuator foot mounted with ASK71.2U kit



GDE actuator floor mounted with ASK71.6 kit

Other kits provide additional mounting options such as floor mounting and wall mounting.

For all kits parts are included, except the damper rod.



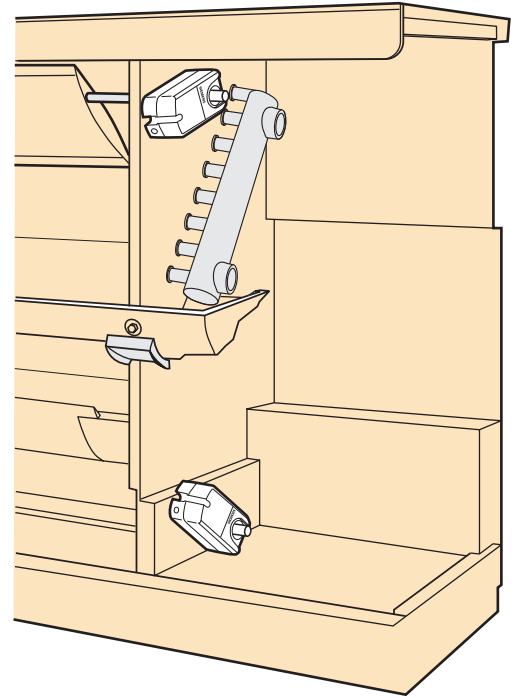
GCA actuator wall mounted with ASK71.4 kit

# More applications expertise

## Unit Ventilator Applications

Excellent when space is limited, the GMA and GDE have a small footprint for easy mounting.

High torque, full features, and a small footprint make the GMA and GDE actuators a perfect choice for Unit Ventilator Applications.

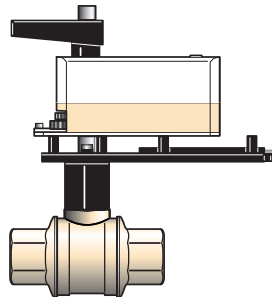


## Valve Applications

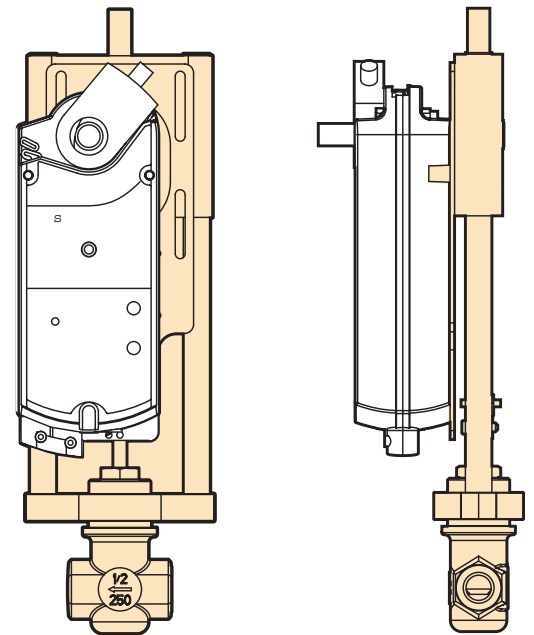
GDE, GLB, and GMA actuators can be used with Powermite Ball Valves.

GCA models can be mounted on a 599 Flowrite basket trim globe valve using Siemens linkage, Part No. 599-03609.

Factory assembly is recommended and available at no charge.



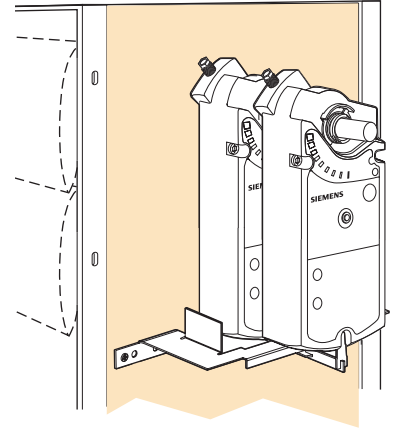
1/2 to 2-inch  
Ball Valve with  
actuator



1/2 to 2-inch Globe Valve with  
Rack and Pinion and GCA actuator

## Actuators Mounted in Tandem

OpenAir actuators can be mounted in tandem to effectively double the torque of a single actuator. This unique feature allows OpenAir actuators to operate in a wider range of applications.

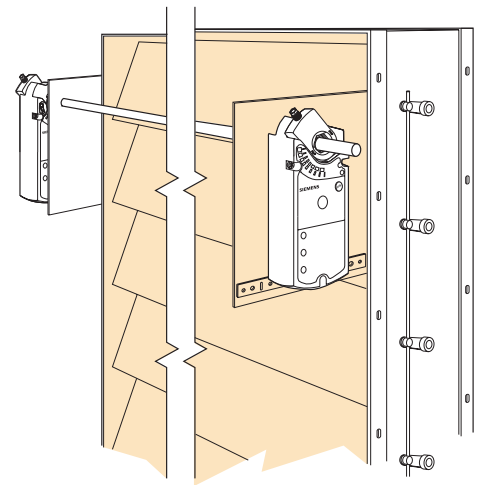


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## Electronic Tandem Control



When critical control is needed in a modulating application, one control signal can control two actuators in a master-slave configuration. The secondary unit can be mounted up to 15 feet away from the primary actuator.

This feature is available on the GCA (master/slave types).



# OpenAir accessories

Description	GDE/ GLB	GEB/ GMA	GCA/GIB/ GBB	Quantity	Part No.
 <p><b>Actuator Commissioning Tool</b> A portable instrument for exercising, calibrating, and testing resistive, proportional (voltage/current), incremental(floating), and On/Off actuators.</p>	•	•	•	1	985-047
 <p><b>Hex Key</b></p>	•			24	985-054P24
 <p><b>Adjustment Key</b></p>		•		10	985-098P10
 <p><b>Rotary to Linear Kit</b> Allows a rotary actuator to provide a linear drive.</p>	•			1	ASK71.5
 <p><b>Crank Arm Kit</b> Allows a direct-coupled actuator to provide an auxiliary linear drive; can be used to simultaneously drive a set of opposing or adjacent dampers with a single actuator.</p>		•	•	1	ASK71.13 ASK71.3
 <p><b>Rotary to Linear Kit with Universal Mounting Bracket</b> For use in applications where the actuator can be rigidly surface-mounted and a linear stroke output is required.</p>	•			1	ASK71.6
 <p><b>Crank Arm Kit with Bracket</b> For use in applications where the actuator can be rigidly surface-mounted and a linear stroke output is required.</p>		•	•	1 1	ASK71.14 ASK71.4

Description		GDE/ GLB	GEB/ GMA	GCA/GIB/ GGB	Quantity	Part No.
	<p><b>Universal Crank Arm</b></p> <p>For use with all OpenAir rotary to linear kits for linear applications requiring connection to damper louver shaft when joint connection is not possible.</p> <p>For 3/8 to 1" (8 to 25.6 mm) Dia. or 3/8 to 5/8" (8 to 16 mm) Sq.</p>	•	•	•	1	ASK71.9
	<p><b>Tandem Mounting Bracket for 2-position, floating and elec. Master/Slave GCA and all GIB types</b></p> <p><b>Tandem Mounting Bracket for modulating GCA model</b></p>			•	1	ASK73.1
	<p><b>Floor Mount Kit</b></p> <p>For airstream applications and where a foot-mounted actuator can be used. Ideal replacement of a Honeywell MOD motor. Includes crank arm, Teflon support-bearing ring, and mounting fasteners.</p>			•	1	ASK71.1U
	<p><b>Combined Foot/Frame Mount Kit</b></p>		•		1	ASK71.11
	<p><b>Frame Mount Kit</b></p> <p>For direct direct mounting to damper frame. Includes a crank arm to generate a linear stroke, a Teflon support-bearing ring to minimize side-loading on the actuator's output bearing, and other mounting fasteners.</p>			•	1	ASK71.2U
	<p><b>5/16" (8 mm) Dia. Damper Push Rods</b></p> <p>12" (30 cm) Length 15" (38 cm) Length 18" (46 cm) Length 24" (61 cm) Length 36" (91 cm) Length 48" (122 cm) Length</p>	•	•	•	1	338-041 338-042 338-043 338-044 338-045 338-046

# OpenAir accessories (continued)

Description		GDE/ GLB	GEB/ GMA	GCA/GIB/ GGB	Quantity	Part No.
 <p><b>Anti-Rotation Bracket</b></p> <ul style="list-style-type: none"> <li>• Mounting Screws</li> </ul> <p><b>Anti-Rotation Bracket</b></p> <p><b>Anti-Rotation Bracket</b></p>	•			24	<b>985-055P24</b>	
	•			48	<b>985-053P48</b>	
		•		1	<b>985-092</b>	
			•	1	<b>985-006</b>	
 <p><b>Replacement Standard Shaft Adapter</b></p> <ul style="list-style-type: none"> <li>• up to 3/4" shaft</li> <li>• up to 1" shaft</li> </ul>				1	<b>985-093</b>	
			•	1	<b>985-004</b>	
 <p><b>Large Shaft Adapter</b></p> <ul style="list-style-type: none"> <li>• up to 1.05" shaft</li> </ul> <p>Accepts up to 1-1/20" (27 mm) diameter shaft and can be used for coupling to 1.05" (27 mm) jackshafts that are slightly oversized. Note: When used with a GIB, accepts shaft diameters from 3/4 to 1-1/20" (19 to 27 mm)</p>			•	1	<b>ASK74.1U</b>	
 <p><b>3/8" Actuator Shaft Insert for small shaft diameters</b></p> <ul style="list-style-type: none"> <li>• up to 3/8"</li> </ul>	•			1	<b>ASK78.3U</b>	
 <p><b>5/8 to 3/4" Actuator Shaft Insert for high force, small shaft diameters</b></p> <p>For ASK74.1U with GIB models</p>			•	1	<b>985-052P20</b>	
 <p><b>Replacement Standard Visual Position Indicators</b></p>	•	•	•	10	<b>985-051P10</b>	
				10	<b>985-094P10</b>	
				10	<b>985-003</b>	
 <p><b>Shaft Adapter Clips (Replacement)</b></p>		•	•	20	<b>985-242P20</b>	
				20	<b>985-241P20</b>	

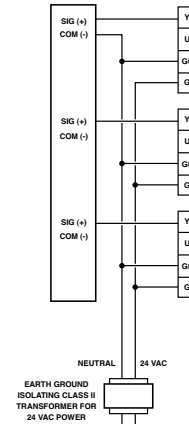
Description		GDE/ GLB	GEB/ GMA	GCA/GIB/ GGB	Quantity	Part No.
 <p>ASK76.1U</p> <p>985-008P25</p>	<p><b>1/2" Conduit Adapter</b></p> <p><b>1/2" Conduit Adapters</b></p> <p><b>1/2" Conduit Adapters</b></p> <p><b>1/2" Male Conduit Adapters</b></p>	<ul style="list-style-type: none"> <li>•</li> <li>•</li> </ul>			<p>1</p> <p>20</p> <p>20</p> <p>25</p>	<p>ASK76.1U</p> <p>ASK76.1/UP20</p> <p>985-008P20</p> <p>985-035P25</p>
	<p><b>500 Ohm Restrictor Kit</b></p> <p>Converts 4-20 mA signal to 2-10 Vdc</p>	<ul style="list-style-type: none"> <li>•</li> </ul>	<ul style="list-style-type: none"> <li>•</li> </ul>	<ul style="list-style-type: none"> <li>•</li> </ul>	1	985-124
	<p><b>NEMA 3R Rated Weathershield</b></p> <p>Includes cover, base plate with factory-installed gasketing, 15 TEK self-drilling screws, and anti-rotation (mounting) bracket. Knockouts for connection of 1/2" conduit also included.</p>		<ul style="list-style-type: none"> <li>•</li> </ul>	<ul style="list-style-type: none"> <li>•</li> </ul>	<p>1</p> <p>1</p>	<p>ASK75.3U</p> <p>ASK75.1U</p>
	<p><b>Heater/Weathershield</b></p> <p>Includes weathershield listed above and heater assembly for operation in temps as low as -58°F; NEMA 3R rated.</p>		<ul style="list-style-type: none"> <li>•</li> </ul>	<ul style="list-style-type: none"> <li>•</li> </ul>	<p>1</p> <p>1</p>	<p>985-107</p> <p>985-106</p>
	<p><b>Heater Only</b></p> <p>Includes replacement heater assembly.</p>		<ul style="list-style-type: none"> <li>•</li> </ul>	<ul style="list-style-type: none"> <li>•</li> </ul>	<p>1</p> <p>1</p>	<p>985-108</p> <p>985-105</p>
	<p><b>External Auxiliary Switch</b></p> <p>Includes dual switch package rated to 250 Vac, mounting screws and adapter rings.</p>		<ul style="list-style-type: none"> <li>•</li> </ul>	<ul style="list-style-type: none"> <li>•</li> </ul>	1	ASC77.2U

# More wiring options

## 0 to 10 V Actuators Powered by One Transformer

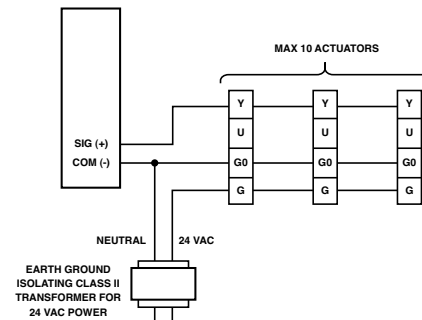
Multiple OpenAir 0 to 10 V actuators can be powered off of one transformer.

Power up to ten actuators off of one transformer (except GGD Series).



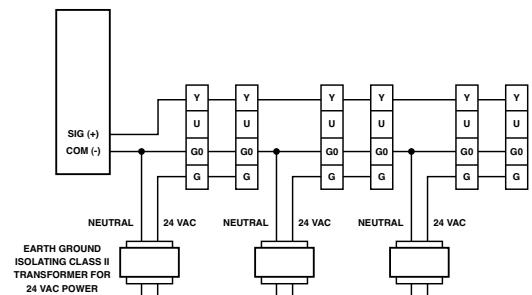
## 0 to 10 V Actuators Wired in Parallel with One Signal

OpenAir 0 to 10 V actuators can be wired in parallel with one signal driving up to ten actuators. Feedback should not be wired together and can be read off of one of the actuators.



## 0 to 10 V Actuators Wired in Parallel with Multiple Transformers

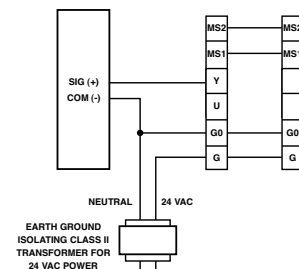
OpenAir 0 to 10 V actuators can be wired in parallel with one signal driving a bank of up to ten actuators. Multiple transformers can power multiple actuators. Feedback should not be wired together and can be read off of one of the actuators.



## 0 to 10 V Master-Slave Actuators

Master and slave actuators can be tandem mounted for 0 to 10 V applications.

This effectively doubles the torque produced by one actuator. This unique feature allows OpenAir actuators to operate in a wider range of applications

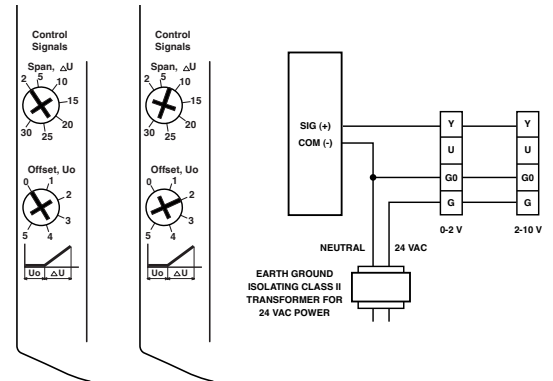




## Sequencing of 0 to 10 V Actuators

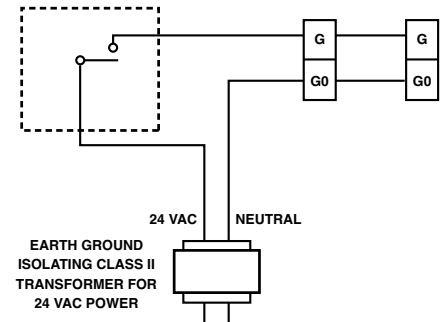
With the settings shown, two 0 to 10 V actuators can be sequenced such that the first one will operate at 0 to 2 V and the second at 2 to 10 V.

This feature is perfect for specialized applications, such as staging or minimum required airflow.



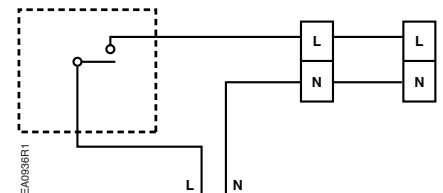
## 2-position 24 V Actuators Wired in Parallel

Two actuators can be wired in parallel to effectively double the torque or may be mounted separately and operated in parallel.



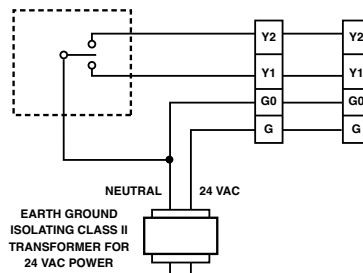
## 2-position 120 V Actuators Wired in Parallel

Two actuators can be wired in parallel to effectively double the torque or may be mounted separately and operated in parallel.

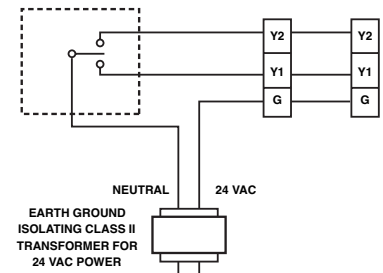


## 3-position Actuators Wired in Parallel

Two actuators can be wired in parallel to effectively double the torque or may be mounted separately and operated in parallel.



GMA/GCA Series

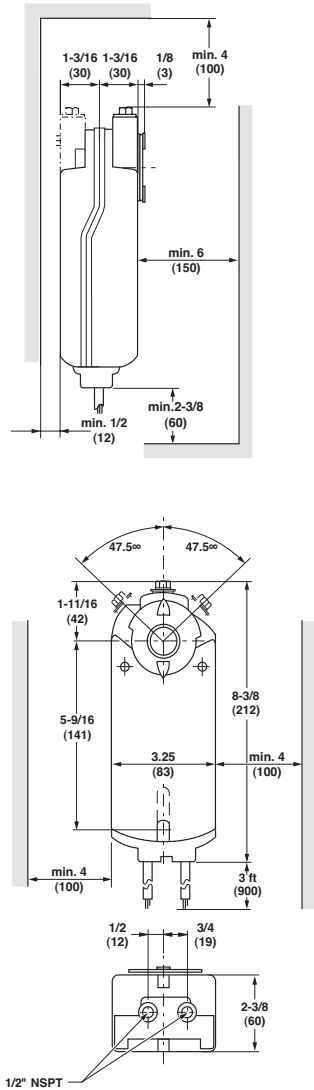


GDE/GLB/GEB/GBB/GIB Series

# Submittal summary

## OpenAir GMA Series Spring Return, Direct-Coupled Electronic Damper Actuators

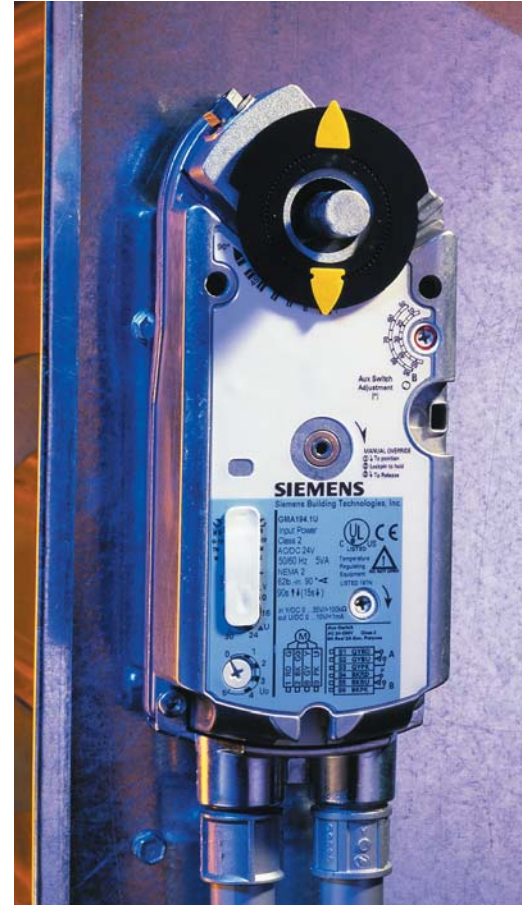
### Dimensions



Dimensions shown in inches (mm).

### Specifications

Torque	62 lb.-in. (7 Nm) running and spring return min.
Runtime for 90°	90 sec. operating, 15 sec. typical (<60 sec. max at -25°F)
Frequency	50/60 Hz
Power consumption	24 Vac/dc
Running	5 VA/3.5W dc
Holding	4 VA/3W dc
Power consumption	120 Vac
Running and Holding	< 7 VA/5 W
Equipment rating (24 Vac)	Class 2 per UL/CSA
Angle of rotation	90° nominal, 95° max.
Shaft dimensions	1/4 to 3/4-in. (6.4 to 20.5 mm) Dia. ● 1/4 to 1/2-in. (6.4 to 13 mm) Sq. ■ 1-in. (25.4 mm) min. length
Operating temperature	-25 to +130°F (-32 to +55°C)
Storage temperature	-40 to +158°F (-40 to +70°C)
Ambient humidity	95% RH, non-condensing
Enclosure	NEMA 1
Pre-cabled connection	18 AWG, 3 ft. (0.9 m) long
Agency listings	UL60730 (replacing UL873) C-UL C22.2 No. 24-93 CE
Material	Die cast aluminum alloy
Gear Lubrication	Silicone free
Dimensions	8-3/8" H x 3-1/4" W x 2-2/3" D (212 mm H x 83 mm W x 68 mm D)
Weight	2.9 lbs. (1.3 kg)

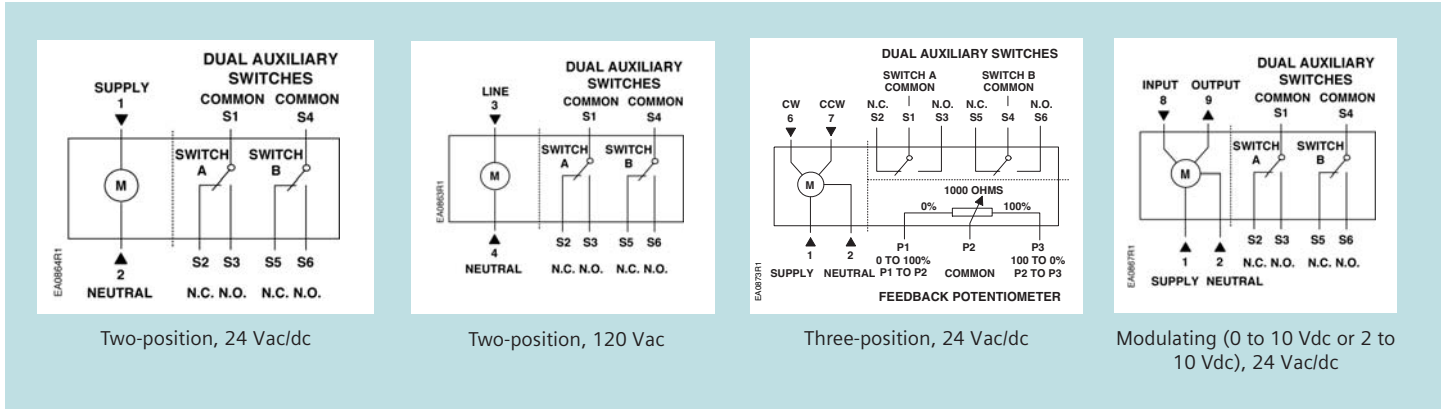


62 lb.-in.

24 Vac/dc and 120 Vac  
Modulating  
2-position  
3-position



## Wiring diagrams



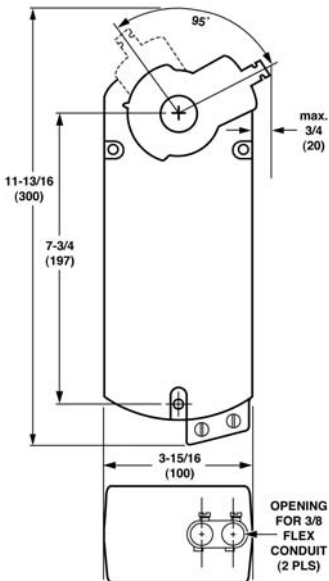
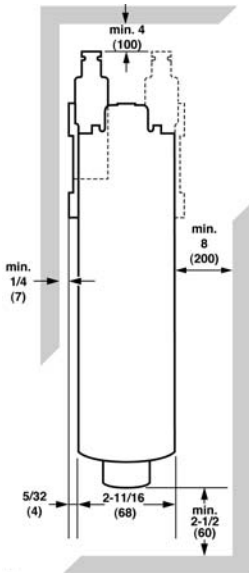
Input Signal	Cabling	Standard	Options			
			Span/Offset Adjustable	Dual Aux. Switches & Span/Offset Adjustable	Dual Aux. Switches Only	Position Feedback Only
Modulating, 0 to 10 Vdc, 24 Vac/dc	Plenum Cable	<b>GMA161.1P</b>	<b>GMA163.1P</b>	—	<b>GMA166.1P</b>	—
	Standard	<b>GMA161.1U</b>	<b>GMA163.1U</b>	<b>GMA164.1U</b>	<b>GMA166.1U</b>	—
Modulating, 24 Vac/dc 2 to 10 Vdc/10 to 2 Vdc (Signal inversion)	Plenum Cable	<b>GMA151.1P</b>	—	—	<b>GMA156.1P</b>	—
	Standard	<b>GMA151.1U</b>	—	—	<b>GMA156.1U</b>	—
2-pos., 24 Vac/dc	Plenum Cable	<b>GMA121.1P</b>	—	—	<b>GMA126.1P</b>	—
	Plenum Cable/Bulk	<b>GMA121.1P/B</b>	—	—	—	—
	Standard	<b>GMA121.1U</b>	—	—	<b>GMA126.1U</b>	—
	Standard/Bulk	<b>GMA121.1U/B</b>	—	—	—	—
2-pos., 120 Vac	Standard	<b>GMA221.1U</b>	—	—	<b>GMA226.1U</b>	—
	Standard/Bulk	<b>GMA221.1U/B</b>	—	—	—	—
3-pos., 24 Vac/dc	Plenum Cable	<b>GMA131.1P</b>	—	—	—	—
	Standard	<b>GMA131.1U</b>	—	—	<b>GMA136.1U</b>	<b>GMA132.1U</b>

**Ordering Note** Bulk packages contain 10 actuators.

# Submittal summary

## OpenAir GCA Series Spring Return, Direct-coupled Electronic Damper Actuators

### Dimensions



Dimensions shown in inches (mm).

### Specifications

Torque	142 lb.-in. (16 Nm) running and spring return
Runtime for 90°	90 sec. operating, 15 sec. typical (30 sec. max.) closing
Frequency	50/60 Hz
Power consumption	
Running	9 VA (0 to 10 V, modulating), 8 VA (24 Vac, 2-position), 9 VA (120 Vac, 2-position), 8 VA (3-position)
Holding	3 VA (24 Vac, 2-position), 5 VA (0 to 10 V, modulating), 5 VA (24 Vac, 3-position), 9 VA (120 Vac, 2-position)
Equipment rating (24 Vac)	Class 2 per UL/CSA
Noise level	<45 dBA (running)
Angle of rotation	90° nominal, 95° max.
Shaft dimensions	3/8 to 1-in. (8 to 25.6 mm) Dia. ● 1/4 to 3/4-in. (6 to 18 mm) Sq. ■ 3/4-in. (20 mm) min. length
Operating temperature	-25 to +130°F (-32 to +55°C)
Storage temperature	-40 to +158°F (-40 to +70°C)
Ambient humidity	95% RH, non-condensing
Pre-cabled connection	18 AWG, 3 ft. (0.9 m) long
Enclosure	NEMA 2, IP40 per EN60529
Material	Die-cast aluminum alloy
Agency listings	UL873, C-UL C22.2 No. 24-93
Gear Lubrication	Silicone free
Dimensions	12" H x 4-3/4" W x 2-7/8" D (305 mm H x 120 mm W x 72 mm D)
Weight	4.85 lb. (2.2 kg)

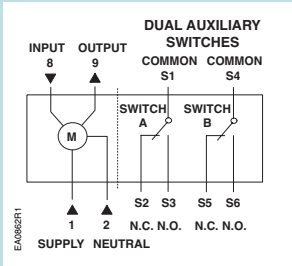


142 lb.-in.

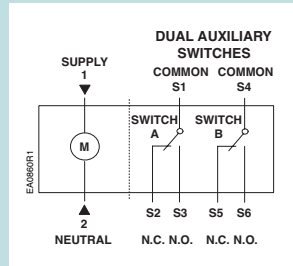
24 Vac/dc and 120 Vac  
Modulating  
2-position  
3-position



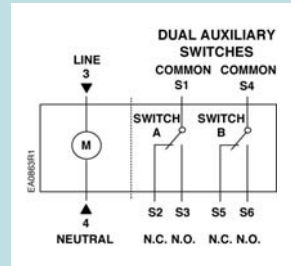
## Wiring diagrams



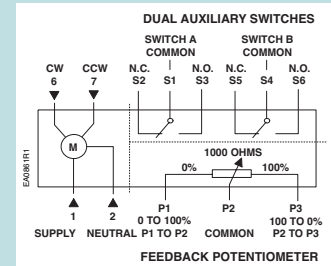
Mod. 0 to 10 Vdc, 24 Vac or  
2 to 10 Vdc, 24 Vac/dc



Two-position, 24 Vac/dc



Two-position, 120 Vac



Three-position, 24 Vac/dc

Input Signal	Cabling	Standard	Options			
			Span/Offset Adjustable	Dual Aux. Switches & Span/Offset Adjustable	Dual Aux. Switches Only	Position Feedback
0 to 10 Vdc, 24 Vac	Standard	<b>GCA161.1U</b>	<b>GCA163.1U</b>	<b>GCA164.1U</b>	<b>GCA166.1U</b>	—
	Plenum Cable	<b>GCA161.1P</b>	<b>GCA163.1P</b>	<b>GCA164.1P</b>	<b>GCA166.1P</b>	—
2-10 Vdc/ 10-2 Vdc Modulating 24 Vac/dc, (Signal Inversion)	Standard	<b>GCA151.1U</b>	—	—	<b>GCA156.1U</b>	—
	Plenum Cable	<b>GCA151.1P</b>	—	—	<b>GCA156.1P</b>	—
2-pos., 24 Vac/dc	Standard	<b>GCA121.1U</b>	—	—	<b>GCA126.1U</b>	—
	Standard/Bulk	<b>GCA121.1U/B</b>	—	—	—	—
	Plenum Cable	<b>GCA121.1P</b>	—	—	<b>GCA126.1P</b>	—
2-pos., 120 Vac	Standard	<b>GCA221.1U</b>	—	—	<b>GCA226.1U</b>	—
	Standard/Bulk	<b>GCA221.1U/B</b>	—	—	—	—
3-pos., 24 Vac/dc	Standard	<b>GCA131.1U</b>	—	—	<b>GCA136.1U</b>	<b>GCA132.1U</b>
	Plenum Cable	<b>GCA131.1P</b>	—	—	<b>GCA136.1P</b>	<b>GCA132.1P</b>
0 to 10 V, 24 Vac Elec. Tandem Control	Plenum Cable	<b>GCA161.1P/MAS</b>	—	<b>GCA164.1P/MAS</b>	—	—
		<b>GCA161.1P/SLA</b>	—	—	—	—

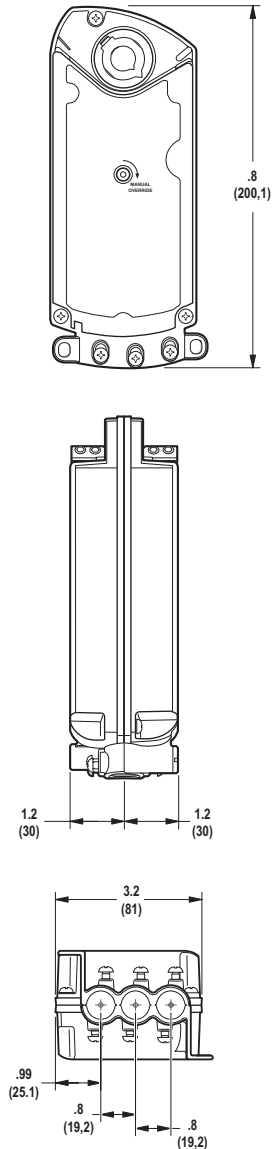
**Ordering Note** Bulk packages contain 8 actuators.

# Submittal summary

## GND Series Spring Return Electronic Damper Actuator

*Designed for UL Listed Fire/Smoke and Smoke Control Dampers*

### Dimensions



Dimensions shown in inches (mm).

### Specifications

Operating Voltage	24 Vac ± 20%
	24 Vdc +20%, -10%
	120 Vac ± 10%
	230 Vac ± 10%
Frequency	50/60 Hz
Power Consumption	24 Vac/dc
Running	~20 VA/12W
Holding	~8 VA/6W
Power Consumption	120 Vac/230 Vac
Running and Holding	20 VA/9VA
Torque	
Running Torque	53 lb.-in. (6 Nm) (minimum)
Stall Torque (minimum)	160 lb.-in. (18 Nm)
Torque Reduction at Elevated Temp	<10%
Runtime for 90°	15 sec. nominal
Closing (on power loss)	
with Spring Return	15 sec. Max.
Nominal Angle of Rotation	95°
Life Expectancy	Min 35,000 full stroke cycles
Mounting	
Damper Shaft Size	0.5" (12.7 mm) round
Damper Shaft Length, Min	1.4" (36 mm)
Housing	
Enclosure	NEMA 1
Material	Die-cast Aluminum alloy
Temperature	
Operation	0 to 140°F (-18 to +60°C)
	One time 350°F (177°C)
Storage and Transport	-40 to +158°F
	(-40 to +70°C)
Humidity	Max. 95% RH, non-condensing
Teflon Cable	400°F (200°C)
Agency Listings	UL873, cUL C22.2 No. 24-93, AS/NZS 2064 1/2:1997, Conforms to CE requirements for the EMC and low voltage directives, Australian Electromagnetic, Compatibility (EMC) per AS/NZS, 4251.1/2:1999
Pre-cabled Connection	18 AWG, 3 ft. (0.9 m) 3/8" (0.5mm) flexible conduit connector
Dimensions	9" H X 3.25" W X 3" D (229 mm H X 83 mm W X 76 mm D)
Shipping Weight	0.4 lb. (1.8 kg)



53 lb.-in. torque

24 Vac/dc, 120 Vac, 230 Vac

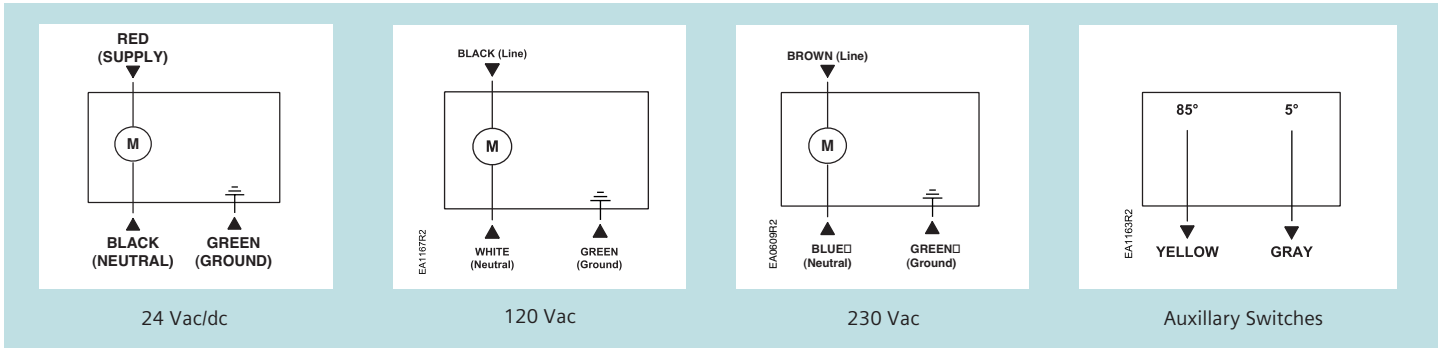
2-position

15-second Run Time

15-second Spring Return Time



## Wiring diagrams



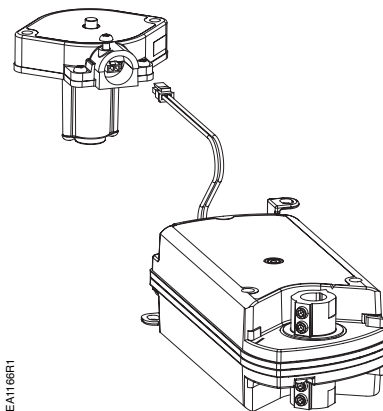
Description	Cabling	24 Vac/dc	120 Vac	230 Vac
2-position	Standard	<b>GND121.1U</b>	<b>GND221.1U</b>	<b>GND321.1U</b>
	EFL	<b>GND121.1U/F</b>	<b>GND221.1U/F</b>	<b>GND321.1U/F</b>
2-position with aux. switches	Standard	<b>GND126.1U</b>	<b>GND226.1U</b>	<b>GND326.1U</b>
	EFL	<b>GND126.1U/F</b>	<b>GND226.1U/B</b>	<b>GND326.1U/F</b>

### Ordering Note

- EFL Electronic Fusible Links must be ordered separately (see table below).
- All products are available in bulk packages of 10. Add **/B** to part number to order a bulk pack.

### Electronic Fusible Links (EFL)

Temperature Range	Part No.
165°F (74°C)	<b>ASK79.165</b>
212°F (100°C)	<b>ASK79.212</b>
250°F (121°C)	<b>ASK79.250</b>
350°F (177°C)	<b>ASK79.350</b>



EA1165R1

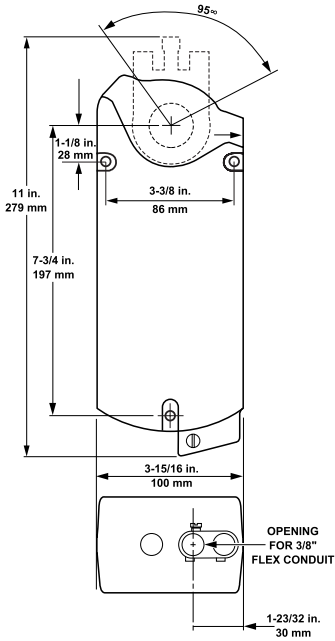
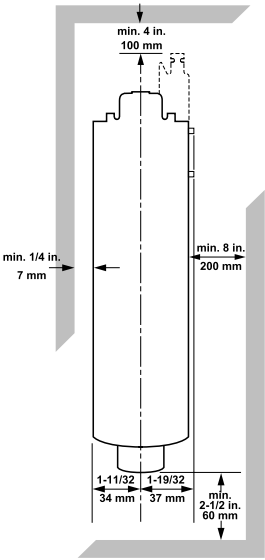
Electronic Fusible Link being connected to GND Series actuator

# Submittal summary

## GGD Series Spring Return Electronic Damper Actuator

*Designed for UL Listed Fire/Smoke and Smoke Control Dampers*

### Dimensions



Dimensions shown in inches (mm).

### Specifications

Operating Voltage ..... 24 Vac ± 20%  
 115 Vac ± 15%  
 230 Vac ± 10%

Frequency ..... 50/60 Hz

Power Consumption  
 Running ..... 150 VA  
 Holding ..... 10 VA

Torque  
 Running ..... 142 lb.-in. (16 Nm)  
 Spring Return ..... 108 lb.-in. (12 Nm)  
 Minimum Stall ..... 350 lb.-in. (39 Nm)

Torque reduction at elevated temperature .. < 10%

Runtime for 90°  
 Operating with motor at 60 Hz . 15 sec. nominal  
 Closing (on power loss)  
 with spring return ..... 15 seconds max.

Nominal Angle of Rotation ..... 95°

Life Expectancy . Minimum 35,000 full stroke cycles

Damper Shaft Size  
 Standard ..... 3/8 to 1 in. (8 to 25.6 mm)  
 Oversize ..... 1.05 in. max. (26.6 mm)

Minimum Shaft Length ..... 3/4-inch (20 mm)

Housing  
 Enclosure ..... NEMA 1  
 Material ..... Die-cast Aluminum alloy

Ambient Temperature  
 Operation ..... 0 to 130°F (-18 to +55°C)  
 One time 350°F (177°C)  
 for 1/2 hour (per UL555)

Storage and Transport ..... -25 to +158°F  
 (-32 to +70°C)

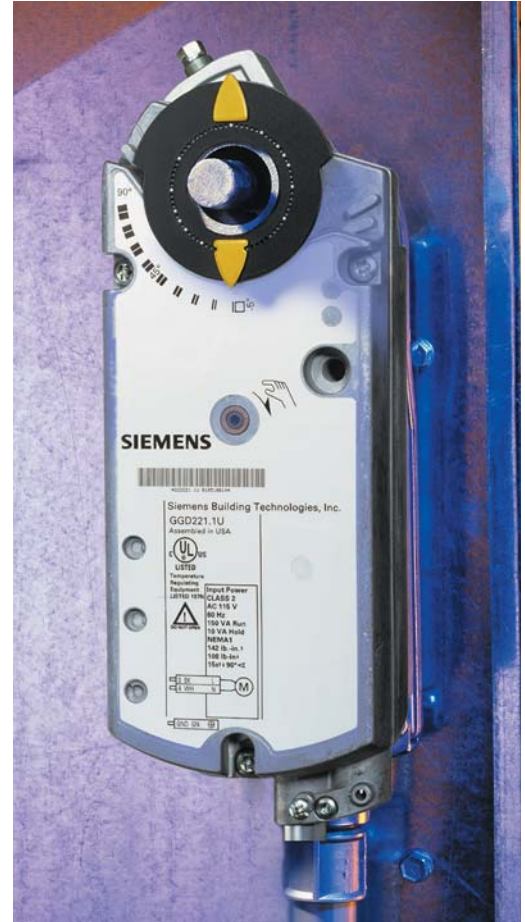
Ambient Humidity. . Max. 95% RH, non-condensing

Agency Certifications ..... UL listed to UL873  
 C-UL certified to Canadian standard  
 C22.2 No. 24-93  
 Australian EMC Framework (C-tick)  
 with the limits per AS/NZS 2064 1/2:1997

Pre-cabled Connection ..... AWG 18

Dimensions ..... 12" H x 4-3/4" W x 2-7/8" D  
 (305 mm H x 120 mm W x 72 mm D)

Weight  
 Single Pack ..... 7.0 lb. (3.2 kg)  
 Eight pack ..... 56 lb. (25.4 kg)



142 lb.-in. torque

2-position,

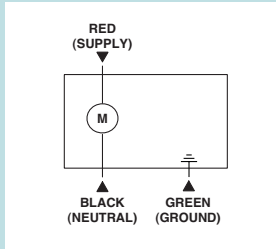
15-second Runtime

15-second Spring Return Time Max.

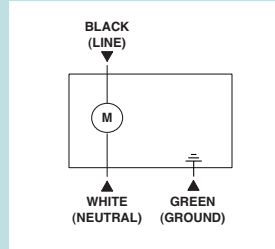




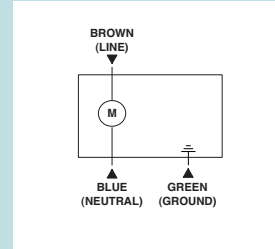
## Wiring diagrams



24 Vac



115 Vac



230 Vac

**Note:** Wire the 230 Vac line with respect to neutral and connect the ground lead for proper protection of the actuator.

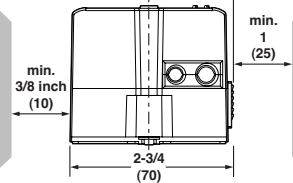
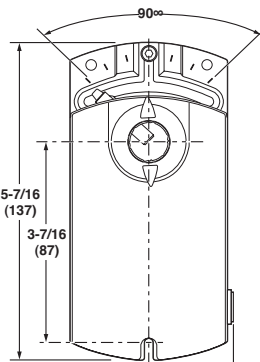
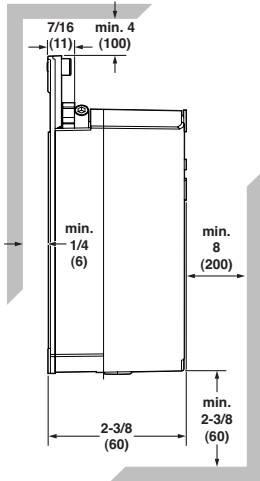
Description	Rotation	Shaft Adapter	24 Vac	115 Vac	230 Vac
Standard	95°	Self-centering	<b>GGD121.1U</b>	<b>GGD221.1U</b>	<b>GGD321.1U</b>
Standard/Bulk	95°	Self-centering	<b>GGD121.1U/B</b>	<b>GGD221.1U/B</b>	<b>GGD321.1U/B</b>
Standard	95°	Oversized	<b>GGD121.3U</b>	<b>GGD221.3U</b>	—
Standard/Bulk	105°	Self-centering	<b>GGD121.1U/BR/B</b>	<b>GGD221.1U/BR/B</b>	—

**Ordering Note** Bulk packages contain 8 actuators.

# Submittal summary

## OpenAir GDE Series Non-spring Return, Direct-coupled Electronic Damper Actuators

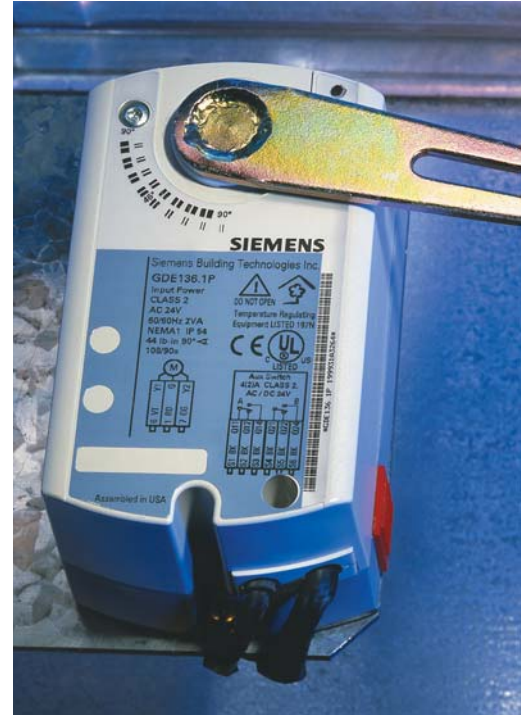
### Dimensions



Dimensions shown in inches (mm).

### Specifications

Torque	44 lb.-in. (5 Nm)
Runtime for 90°, opening and closing	
60 Hz	90 seconds
50 Hz	108 seconds
Frequency	50/60 Hz
Power consumption	3.3 VA (modulating) 2.3 VA (three-position)
Equipment rating (24 Vac)	Class 2 per UL/CSA
Noise level	<35 dBA (running)
Angle of rotation	90° nominal, 95° max.
Shaft dimensions	3/8 to 5/8-in. (8 to 16 mm) Dia. ● 1/4 to 1/2-in. (6 to 12.7 mm) Sq. ■ 3/4-in. (20 mm) min. length
Operating temperature	-25 to +130°F (-32 to +55°C)
Storage temperature	-40 to +158°F (-40 to +70°C)
Ambient humidity	95% RH, non-condensing
Pre-cabled connection	18 AWG, 3 ft. (0.9 m) long
Enclosure	NEMA 2, IP54 per EN60529
Material	Durable plastic
Agency listings	UL873, C-UL C22.2 No. 24-93
CE Conformity	Plenum models only
Electromagnetic Compatibility (EMC)	89/336/EEC
Emissions standards	EN 50081-1
Immunity standards	EN 50082-2
Gear Lubrication	Silicone free
Dimensions	5-7/16" H x 2-3/4" W x 2-3/8" D (137 mm H x 70 mm W x 60 mm D)
Weight	1.06 lb. (0.48 kg)

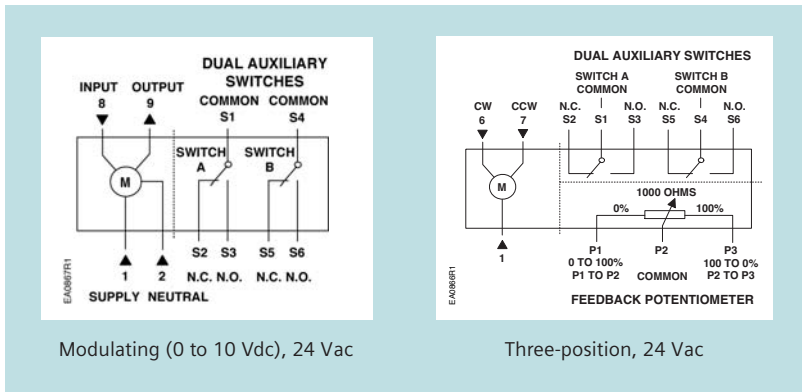


44 lb.-in.

24V  
Modulating  
3-position Control



## Wiring diagrams



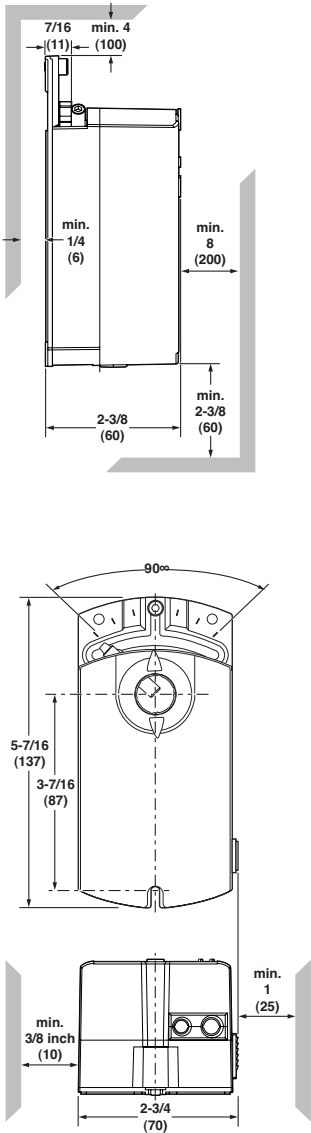
Input Signal	Cabling	Standard	Options			
			Span/Offset Adjustable	Dual Aux. Switches & Span/Offset Adjustable	Dual Aux. Switches Only	Position Feedback
0 to 10 Vdc	Plenum Cable	<b>GDE161.1P</b>	<b>GDE163.1P</b>	<b>GDE164.1P</b>	<b>GDE166.1P</b>	—
	Plenum Cable/Bulk	<b>GDE161.1P/B</b>	—	—	—	—
3-position	Plenum Cable	<b>GDE131.1P</b>	—	—	<b>GDE136.1P</b>	<b>GDE132.1P</b>
	Plenum Cable/Bulk	<b>GDE131.1P/B</b>	—	—	—	—
3-position	Standard	<b>GDE131.1U</b>	—	—	—	—
	Standard/Bulk	<b>GDE131.1U/B</b>	—	—	—	—
	6' Plenum Cable/ Bulk (12)	<b>GDE131.1Q/B</b>	—	—	—	—
0 to 10 Vdc	Terminal Strip	<b>GDE161.1T</b>	—	—	—	—
	Terminal Strip/Bulk	<b>GDE161.1T/B</b>	—	—	—	—
3-position	Terminal Strip	<b>GED131.1T</b>	—	—	—	—
	Terminal Strip/Bulk	<b>GED131.1T/B</b>	—	—	—	—

**Ordering Note** Bulk packages contain 24 actuators unless otherwise noted.

# Submittal summary

## OpenAir GLB Series Non-spring Return, Direct-coupled Electronic Damper Actuators

### Dimensions



### Specifications

Torque	88 lb.-in. (10 Nm)
Runtime for 90°, opening and closing	
60 Hz	125 seconds
50 Hz	150 seconds
Frequency	50/60 Hz
Power consumption	3.3 VA (modulating) 2.3 VA (three-position)
Equipment rating (24 Vac)	Class 2 per UL/CSA
Noise level	<35 dBA (running)
Angle of rotation	90° nominal, 95° max.
Shaft dimensions	3/8 to 5/8-in. (8 to 16 mm) Dia. ● 1/4 to 1/2-in. (6 to 12.7 mm) Sq. ■ 3/4-in. (20 mm) min. length
Operating temperature	-25 to +130°F (-32 to +55°C)
Storage temperature	-40 to +158°F (-40 to +70°C)
Ambient humidity	95% RH, non-condensing
Pre-cabled connection	18 AWG, 3 ft. (0.9 m) long
Enclosure	NEMA 2, IP54 per EN60529
Material	Durable plastic
Agency listings	UL873, C-UL C22.2 No. 24-93
CE conformity	Plenum models only
Electromagnetic Compatibility (EMC)	89/336/EEC
Emissions standards	EN 50081-1
Immunity standards	EN 50082-2
Gear lubrication	Silicone free
Dimensions	5-7/16" H x 2-3/4" W x 2-3/8" D (137 mm H x 70 mm W x 60 mm D)
Weight	1.06 lb. (0.48 kg)



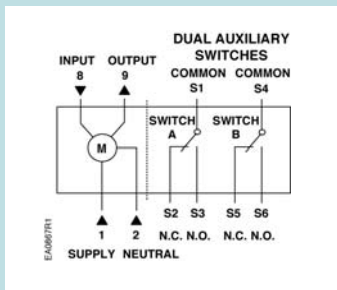
88 lb.-in.

24 V  
Modulating  
3-position Control

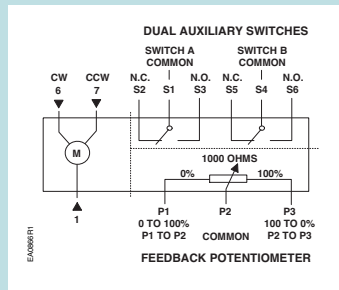


Dimensions shown in inches (mm).

## Wiring diagrams



Modulating (0 to 10 Vdc), 24 Vac



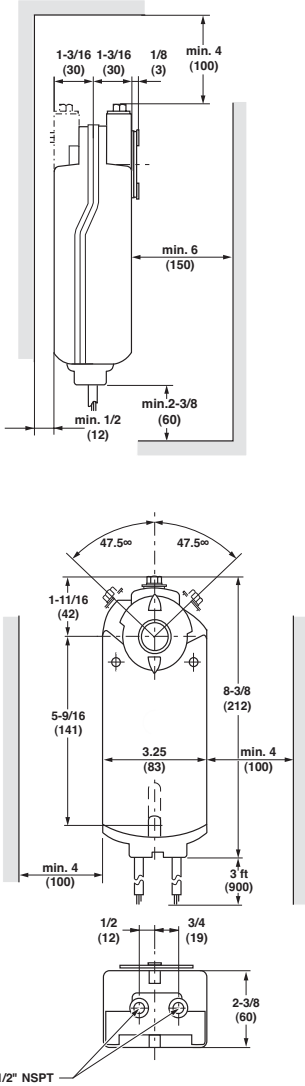
Three-position, 24 Vac

Input Signal	Cabling	Standard	Options			
			Span/Offset Adjustable	Dual Aux. Switches & Span/Offset Adjustable	Dual Aux. Switches Only	Potentiometer
3-position	Plenum Cable	<b>GLB131.1P</b>	—	—	<b>GLB136.1P</b>	<b>GLB132.1P</b>
0 to 10 Vdc	Plenum Cable	<b>GLB161.1P</b>	<b>GLB163.1P</b>	<b>GLB164.1P</b>	<b>GLB166.1P</b>	—

# Submittal summary

## OpenAir GEB Series, Non-spring Return, Direct-coupled Electronic Damper Actuators

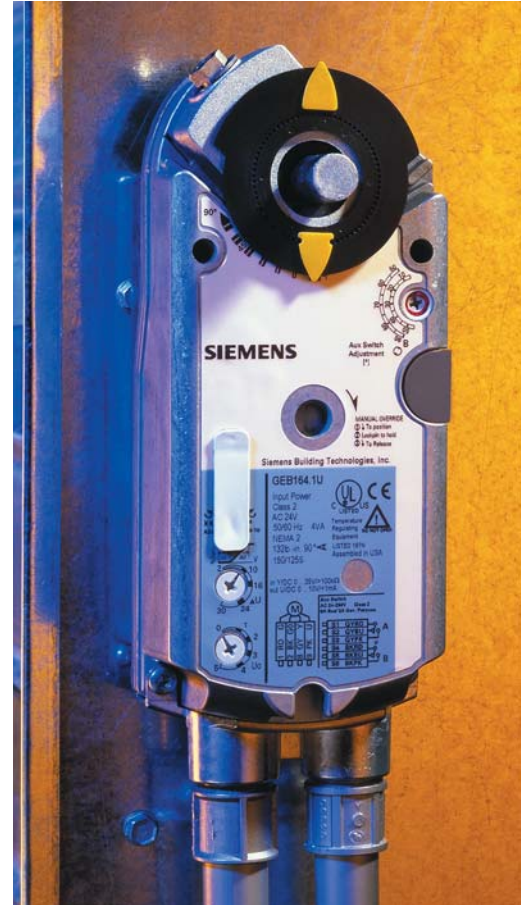
### Dimensions



Dimensions shown in inches (mm).

### Specifications

Torque	132 lb.-in. (15 Nm)
Frequency	50/60 Hz
Runtime for 90°, opening and closing	
60 Hz	125 seconds
50 Hz	150 seconds
Power consumption GEB161x.1x	
Running	4 VA/4W
Holding	1 VA
Power consumption GEB131x.1x	
Running	3 VA/3W
Holding	1 VA
Equipment rating (24 Vac)	Class 2 per UL/CSA
Angle of rotation	90° nominal, 95° max.
Shaft dimensions	1/4 to 3/4-in. (6 to 20.5 mm) Dia. ● 1/4 to 1/2-in. (6.4 to 13 mm) Sq. ■ 3/4-in. (20 mm) min. length
Operating temperature	-25 to +130°F (-32 to +55°C)
Storage temperature	-40 to +158°F (-40 to +70°C)
Ambient humidity	95% RH, non-condensing
Pre-cabled connection	.18 AWG, 3 ft. (0.9 m) long
Enclosure	NEMA 1
Material	Die cast aluminum alloy
Agency listings	UL60730 (replacing UL873) C-UL C22.2 No. 24-93 CE
Gear lubrication	Silicone free
Dimensions	8-3/8" H x 3-1/4" W x 2-2/3" D (215 mm H x 83 mm W x 68 mm D)
Weight	2.2 lb. (1.0 kg)

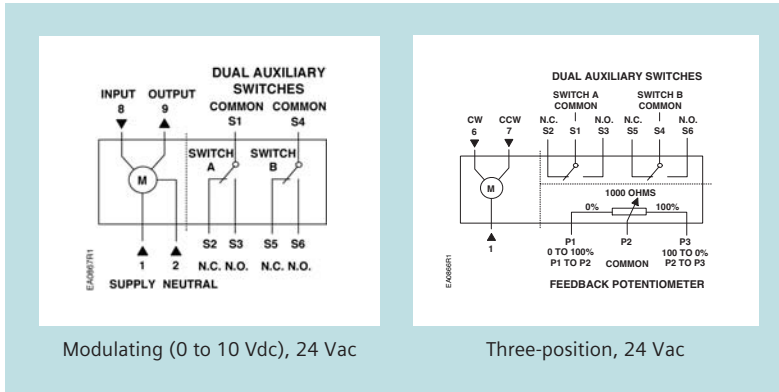


132 lb.-in.

24 V  
Modulating  
3-position Control



## Wiring diagrams

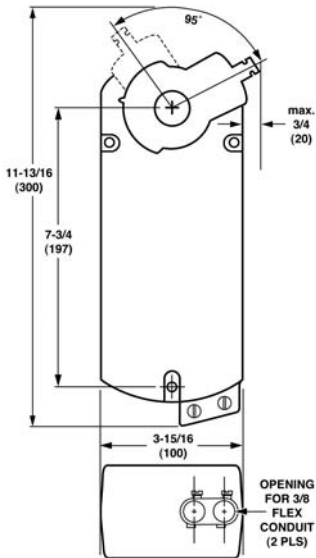
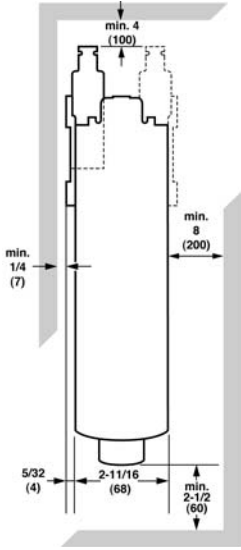


Input Signal	Cabling	Standard	Options		
			Dual Aux. Switches & Offset/Span Only	Position Feedback Only	Dual Aux. Switches Only
Modulating, 0 to 10 Vdc or 2 to 10 Vdc selectable	Plenum Cable	<b>GEB161.1P</b>	—	—	—
	Standard	<b>GEB161.1U</b>	<b>GEB164.1U</b>	—	—
3-pos., 24 Vac	Plenum Cable	<b>GEB131.1P</b>	—	—	—
	Standard	<b>GEB131.1U</b>	—	<b>GEB132.1U</b>	<b>GEB136.1U</b>

# Submittal summary

## OpenAir GBB Series Non-spring Return, Direct-coupled Electronic Damper Actuators

### Dimensions



### Specifications

Torque . . . . . 221 lb.-in. (20 Nm)

Runtime for 90°  
 50 Hz . . . . . 150 sec. opening and closing  
 60 Hz . . . . . 125 sec. opening and closing

Power consumption  
 0-10 V . . . . . 8 VA  
 3P . . . . . 7 VA

Equipment rating (24 Vac) . . . . . Class 2 per UL/CSA

Noise level . . . . . <45 dBA (running)

Angle of rotation . . . . . 90° nominal, 95° max.

Shaft dimensions . . 3/8 to 1-in. (8 to 25.6 mm) Dia. ●  
 or 1/4 to 5/8-in. (6 to 16 mm) Sq. ■  
 3/4-in. (20 mm) min. length

Operating temperature -25 to +130°F (-32 to +55°C)

Storage temperature . . -40 to +158°F (-40 to +70°C)

Ambient humidity . . . . . 95% RH, non-condensing

Pre-cabled connection . . 18 AWG, 3 ft. (0.9 m) long

Enclosure . . . . . NEMA 2, IP40 per EN60529

Material . . . . . Die-cast aluminum alloy

Agency listings . . UL873, C-UL C22.2 No. 24-93, CE

Gear lubrication . . . . . Silicone free

Dimensions . . . . . 12" H x 4-3/4" W x 2-7/8" D  
 (305 mm H x 120 mm W x 72 mm D)

Weight . . . . . 4.4 lb. (2.0 kg)



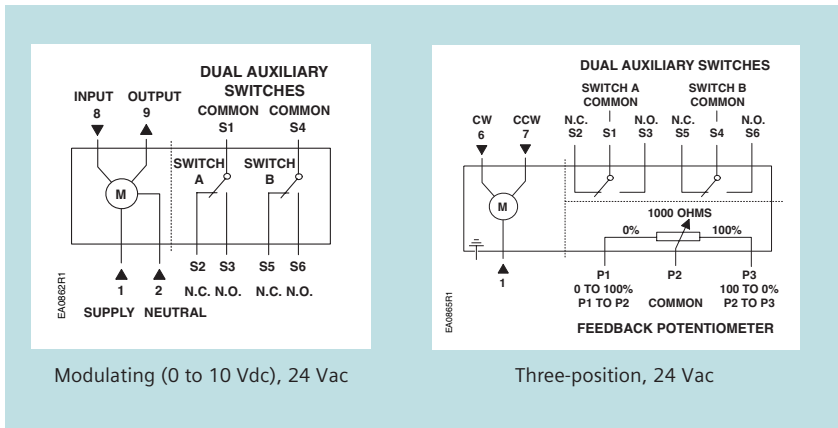
221 lb.-in.

24 V  
 Modulating  
 3-position





## Wiring diagrams

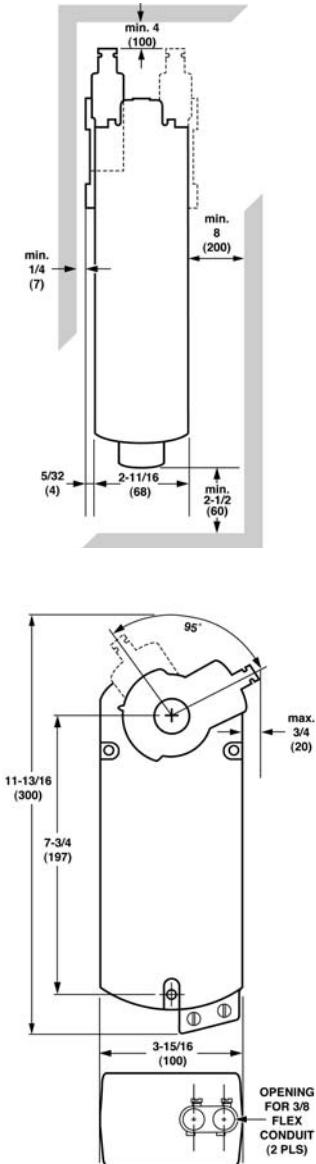


Input Signal	Cabling	Standard	Options			
			Span/Offset Adjustable	Dual Aux. Switches & Span/Offset Adjustable	Dual Aux. Switches Only	Position Feedback
0 to 10 Vdc	Standard	<b>GBB161.1U</b>	<b>GBB163.1U</b>	<b>GBB164.1U</b>	<b>GBB166.1U</b>	—
	Plenum Cable	<b>GBB161.1P</b>	<b>GBB163.1P</b>	<b>GBB164.1P</b>	<b>GBB166.1P</b>	—
3-position	Standard	<b>GBB131.1U</b>	—	—	<b>GBB136.1U</b>	<b>GBB132.1U</b>
	Plenum Cable	<b>GBB131.1P</b>	—	—	<b>GBB136.1P</b>	<b>GBB132.1P</b>

# Submittal summary

## OpenAir GIB Series Non-spring Return, Direct-coupled Electronic Damper Actuators

### Dimensions



### Specifications

Torque	310 lb.-in. (35 Nm)
Runtime for 90°	
50 Hz	150 sec. opening and closing
60 Hz	125 sec. opening and closing
Power consumption	
0-10 V	8 VA
3P	7 VA
Equipment rating (24 Vac)	Class 2 per UL/CSA
Noise level	<45 dBA (running)
Angle of rotation	90° nominal, 95° max.
Shaft dimensions	<ul style="list-style-type: none"> <li>• 3/8 to 1-in. (8 to 25.6 mm) Dia.</li> <li>■ 1/4 to 5/8-in. (6 to 16 mm) Sq.</li> <li>3/4-in. (20 mm) min. length</li> </ul>
Operating temperature	-25 to +130°F (-32 to +55°C)
Storage temperature	-40 to +158°F (-40 to +70°C)
Ambient humidity	95% RH, non-condensing
Pre-cabled connection	18 AWG, 3 ft. (0.9 m) long
Enclosure	NEMA 2, IP40 per EN60529
Material	Die-cast aluminum alloy
Agency listings	UL873, C-UL C22.2 No. 24-93, CE
Gear lubrication	Silicone free
Dimensions	12" H x 4-3/4" W x 2-7/8" D (305 mm H x 120 mm W x 72 mm D)
Weight	4.4 lb. (2.0 kg)

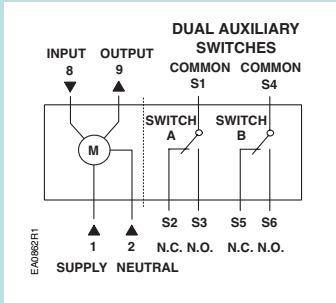


310 lb.-in.

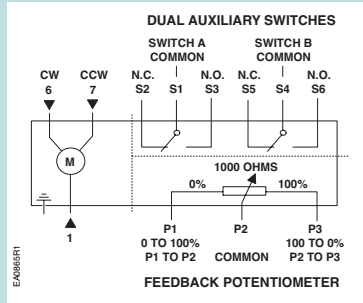
24 V  
Modulating  
3-position



## Wiring diagrams



Modulating (0 to 10 Vdc), 24 Vac



Three-position, 24 Vac

Input Signal	Cabling	Standard	Options			
			Span/Offset Adjustable	Dual Aux. Switches & Span/Offset Adjustable	Dual Aux. Switches Only	Position Feedback
0 to 10 Vdc	Standard	<b>GIB161.1U</b>	<b>GIB163.1U</b>	<b>GIB164.1U</b>	<b>GIB166.1U</b>	—
	Plenum Cable	<b>GIB161.1P</b>	<b>GIB163.1P</b>	<b>GIB164.1P</b>	<b>GIB166.1P</b>	—
3-position	Standard	<b>GIB131.1U</b>	—	—	<b>GIB136.1U</b>	<b>GIB132.1U</b>
	Plenum Cable	<b>GIB131.1P</b>	—	—	<b>GIB136.1U</b>	<b>GIB132.1P</b>

# More replacement options

To select a Siemens OpenAir product, locate the competitor's actuator in the left-hand column. Next, follow the row across to locate the appropriate OpenAir part number.

Competitive Actuator	Torque (lb. -in.)	Power Supply	Control Signal	Auxiliary Switches	Feedback Signal	Offset/Span Adjust	OpenAir Part No.
AF120 US	142	120 VAC	On/Off				GCA221.1U
AF120-S US	142	120 VAC	On/Off	•			GCA226.1U
AF24 US	142	24 VAC/DC	On/Off				GCA121.1U/P
AF24-3	142	24 VAC/DC	Floating				GCA131.1U/P
AF24-S US	142	24 VAC/DC	On/Off	•			GCA126.1U/P
AF24-SR US	142	24 VAC	0-10 Vdc		•		GCA161.1U/P
AF24-SR-S US	42	24 VAC	0-10 Vdc	•	•		GCA166.1U/P
AM24	132	24 VAC	Floating				GEB131.1P
AM24-S US	132	24 VAC	0-10 Vdc	•	•		GEB166.1U
AM24-SR	132	24 VAC	0-10 Vdc		•		GEB161.1P
GM24 US	310	24 VAC/DC	Floating				GIB131.1U/P
GM24-SR US	10	24 VAC	0-10 Vdc		•		GIB161.1U/P
LF120 US	62	120 VAC	On/Off				GMA221.1U
LF120-S US	62	120 VAC	On/Off	•			GMA226.1U
LF24	62	24 VAC/DC	On/Off				GMA121.1P
LF24-3	62	24 VAC/DC	Floating				GMA131.1P
LF24-S US	62	24 VAC/DC	On/Off	•			GMA126.1U
LF24-SR US	62	24 VAC/DC	0-10 Vdc		•		GMA161.1P
LF24-SR-S US	62	24 VAC/DC	0-10 Vdc	•	•		GMA166.1U
LM24	44	24 VAC	Floating		•		GDE131.1U/P
LM24-S US	44	24 VAC	0-10 Vdc	•	•		GDE166.1P
LM24-SR	44	24 VAC	0-10 Vdc		•		GDE161.1P
M9104-AGA-2	44	24 VAC	Floating				GDE131.1U/P
M9104-GGA-2	44	24 VAC	0-10 Vdc		•		GDE161.1P
M9104-GGC-2	44	24 VAC	0-10 Vdc	•	•		GDE166.1P
M9108-AGA-2	88	24 VAC	Floating				GLB131.1P
M9108-GGA-2	88	24 VAC	0-10 Vdc		•		GLB161.1P
M9108-GGC-2	88	24 VAC	0-10 Vdc	•	•		GLB166.1P
M9108-HGA-2	88	24 VAC	0-10 Vdc		•	•	GLB163.1P
M9108-HGC-2	88	24 VAC	0-10 Vdc	•	•	•	GLB164.1P
M9116-AGA-2	132	24 VAC	Floating				GEB131.1P
M9116-AGE-2	132	24 VAC	Floating		•		GEB132.1U

Competitive Actuator	Torque (lb.-in.)	Power Supply	Auxiliary Switches	Control Signal	Feedback Signal	Offset/Span Adjust	OpenAir Part No.
M9116-GGA-2	132	24 VAC	0-10 Vdc		•		GEB161.1P
M9116-GGC-2	132	24 VAC	0-10 Vdc	•	•		GEB166.1U
M9116-HGA-2	132	24 VAC	0-10 Vdc		•	•	GEB163.1P
M9116-HGC-2	132	24 VAC	0-10 Vdc	•	•	•	GEB164.1U
M9124-AGA-2	310	24 VAC/DC	Floating				GIB131.1U/P
M9124-AGE-2	310	24 VAC/DC	Floating		•		GIB132.1U/P
M9124-GGA-2	310	24 VAC	0-10 Vdc		•		GIB161.1U/P
M9124-GGC-2	310	24 VAC	0-10 Vdc	•	•		GIB166.1U/P
M9124-HGA-2	310	24 VAC	0-10 Vdc		•	•	GIB163.1U/P
M9124-HGC-2	310	24 VAC	0-10 Vdc	•	•	•	GIB164.1U/P
M9206-AGA-2	62	24 VAC/DC	On/Off				GMA121.1P
M9206-AGC-2	62	24 VAC/DC	On/Off	•			GMA126.1U
M9206-GGA-2	62	24 VAC/DC	0-10 Vdc		•		GMA161.1P
M9206-GGC-2	62	24 VAC/DC	0-10 Vdc	•	•		GMA166.1P
M9216-AGA-2	142	24 VAC/DC	Floating				GCA131.1U/P
M9216-AGE-2	142	24 VAC/DC	Floating		•		GCA132.1U/P
M9216-BGA-2	142	24 VAC/DC	On/Off				GCA121.1U/P
M9216-BGC-2	142	24 VAC/DC	On/Off	•			GCA126.1U/P
M9216-HGA-2	142	24 VAC	0-10 Vdc		•		GCA161.1U/P
M9216-HGC-2	142	24 VAC	0-10 Vdc	•	•	•	GCA164.1U/P
ML6161B 2024	44	24 VAC	Floating				GDE131.1U/P
ML6174B 2019	88	24 VAC	Floating				GLB131.1P
ML6184A 1003	132	24 VAC	Floating				GEB131.1P
ML6185A 1000	62	24 VAC/DC	Floating				GMA131.1P
ML6194A 1002	310	24 VAC/DC	Floating				GIB131.1U/P
ML7161A 2008	44	24 VAC	0-10 Vdc		•		GDE161.1P
ML7174A 2001	88	24 VAC	0-10 Vdc		•		GLB161.1P
ML7284A 1018	132	24 VAC	0-10 Vdc		•		GEB161.1P
ML7284F 1013	132	24 VAC	0-10 Vdc	•	•		GEB166.1U
ML7285A 1007	62	24 VAC/DC	0-10 Vdc		•		GMA161.1P
ML7285C 1005	62	24 VAC/DC	0-10 Vdc	•	•		GMA166.1P
ML7294A 1009	310	24 VAC	0-10 Vdc		•		GIB161.1U/P
ML7294C 1007	310	24 VAC	0-10 Vdc	•	•		GIB166.1U/P
ML8185A 1008	62	24 VAC/DC	On/Off				GMA121.1P
ML8185C 1006	62	24 VAC/DC	On/Off	•			GMA126.1U
ML9264A 1000	310	24 VAC/DC	Floating		•		GIB132.1U/P
NF120 US	62	120 VAC	On/Off				GMA221.1U
NF24 US	62	24 VAC/DC	On/Off				GMA121.1P
NF24-SR US	62	24 VAC/DC	0-10 Vdc		•		GMA161.1P
NM24	88	24 VAC	Floating				GLB131.1P
NM24-SR	88	24 VAC	0-10 Vdc		•		GLB161.1P

## Wiring cross reference

Control Type	Belimo®		Siemens		
	Function	Terminal Designation	Standard Symbol	Wire Designation	Color
<b>Spring Return (GCA/GMA)</b>					
2-position 120 Vac	Neutral	1	4	N	White
	Hot	2	3	L	Black
2-position 24 Vac	Supply (SP)	2	1	G	Red
	Neutral (SN)	1	2	G0	Black
3-position 24 Vac	Supply (SP)	2	1	G	Red
	Neutral (SN)	1	2	G0	Black
	Control signal clockwise	3	6	Y1	Violet
	Control signal counterclockwise	4	7	Y2	Orange
<b>Non-Spring Return (GDE/GLB/GEB/GBB/GIB)</b>					
3-position 24 Vac	Supply (SP)	1	1	G	Red
	Control signal clockwise	2	6	Y1	Violet
GDE/GLB/GEB/GBB/GIB	Control signal counterclockwise	3	7	Y2	Orange
<b>SR/NSR</b>					
Modulating 0-10 V	Supply (SP)	2	1	G	Red
	Neutral (SN)	1	2	G0	Black
All	0 to 10 Vdc/2 to 10 Vdc input signal	3	8	Y	Gray
	Output for 0 to 10 Vdc position indication	5	9	U	Pink

## Switches and feedback

Function	Belimo®		Siemens	
	Terminal Designation	Standard Symbol	Terminal Designation	Color
Switch A Common	S1	S1	Q11	Gray/Red
Switch A NC	S2	S2	Q12	Gray/Blue
Switch A NO	S3	S3	Q14	Gray/Pink
Switch B Common	S4	S4	Q21	Black/Red
Switch B NC	S5	S5	Q22	Black/Blue
Switch B NO	S6	S6	Q24	Black/Pink
Position Feedback 0 to 100%	P1	P1	a	White/Red
Position Feedback Common	P2	P2	b	White/Blue
Position Feedback 100 to 0%	P3	P3	c	White/Pink

# Damper sizing

## Damper sizing

When determining the size and quantity of damper actuators needed, there are several factors to consider:

- Type of damper seals
- Quality of damper installation
- Number of damper sections
- Approach air velocity
- Static pressure

## Determining damper torque

1. Obtain the Damper Torque Rating (DTR) at the most severe operating conditions from the damper manufacturer.

If the damper torque rating is not available, use Table 1 for estimating purposes. However, the exact damper torque rating is required to ensure accurate torque calculations.

2. Calculate the damper area (DA) from the damper dimensions.
3. Calculate the Total Damper Torque (TDT) in lb.-in. using this formula:  
**TDT=DTR X DA**

If the damper torque rating is not available, use a torque wrench on the damper shaft while air is moving through the duct to measure the TDT.

## Determining actuator size

1. From the actuator literature, select the actuator type and size with the actuator torque rating (ATR) that is most appropriate for the application.

The ATR is normally based on 90° rotation of the damper. For torque ratings other than 90° rotation, use this formula:

$$\text{ATR @ } X^\circ = \text{ATR @ } 90^\circ \text{ rotation} \times (\text{Crank Radius @ } X^\circ / \text{Crank Radius @ } 90^\circ)$$

2. If the actuator is rated in pounds of thrust, convert to torque using this formula:

$$\text{Torque} = (*\text{Crank arm length} \times 0.707) \times \text{Thrust}$$

\* The crank arm length is for 90° shaft rotation at nominal actuator stroke.

## Determining the number of actuators

1. Calculate the number of actuators needed using this formula:

$$\text{Number of actuators} = \frac{\text{Total Damper Torque}}{\text{SF} \times \text{Actuator Torque Rating}}$$

$$\text{SF} = 0.80$$

Safety Factor, SF, accounts for variables such as slight misalignment.

2. If the number of actuators is too many, select a more powerful actuator or consider using a positioning relay (if pneumatic).

Table 1

Damper Type	Damper Leakage at 1" H <sub>2</sub> O (240 Pa) Static Pressure	Damper Torque for Approach Air of 1200 ft./min. (6 m/s) or less
Standard Leakage	More than 10 CFM/ft. <sup>2</sup> (50.8 l/s per m <sup>2</sup> )	2.5 lb.-ft. <sup>2</sup> (0.3 Nm/m <sup>2</sup> )
Low Leakage	5 to 10 CFM/ft. <sup>2</sup> (25.4 to 50.8 l/s per m <sup>2</sup> )	5.0 lb.-in./ft. <sup>2</sup> (0.6 Nm/m <sup>2</sup> )
Very Low Leakage	Less than 5 CFM/ft. <sup>2</sup> (Less than 25.4 l/s per m <sup>2</sup> )	7.0 lb.-in./ft. <sup>2</sup> (0.8 Nm/m <sup>2</sup> )

[www.siemens.com/hvp/components](http://www.siemens.com/hvp/components)

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