

Damper Actuators **Spring Return** **On/Off • Floating • Modulating**



Application

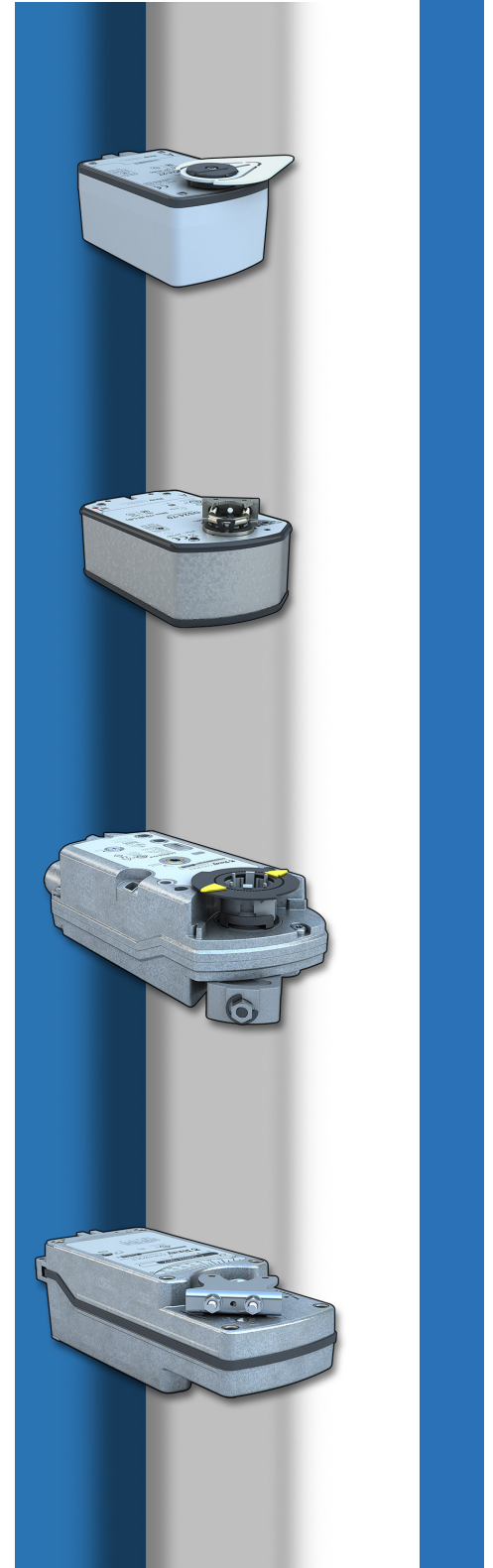
Bray's wide variety of damper electric actuator choices increases flexibility when choosing peripheral products for Building Automation Systems.

We offer many different torque outputs and optional features to ensure you have the best actuator for the application. Jumper or DIP switch selectable features allow versatility in the field. The actuators are maintenance-free, which means fewer call backs after installation and start-up. In addition, our actuators are manufactured to ISO 9001 and Six Sigma Standards making them the highest quality on the market today.

All of our damper electric actuators are linkage free when applied to dampers ranging for small VAV box dampers all the way up to large outdoor air and return air dampers.

Options include:

- Spring return operation
- Auxiliary switches (optional)
- Weather Shields for outdoor use
- 24V and line voltage models
- On/Off, Floating, or Modulating operation
- Analog feedback on all modulating models
- UL, CSA and CE listings
- 5-year warranty on selected models
- Flying lead or terminal strip electrical connections



Spring Return Damper Actuators - DS-27 Series



Technical Specifications - DS-27 Series Actuator					
Type	Actuator Models	DS24-27-(A)	DS24-27-T-(A)	DMS24-27-(A)	DSU20-27-(A)
			Spring Return On/Off with optional Auxillary Switches (-A)	Spring Return On/Off & Floating with optional Auxillary Switches (-A)	Spring Return Modulating with optional Auxillary Switches (-A)
	Torque	27 lb-in. (3 Nm)			
Electrical	Operating Voltage	24 VAC 19.2 to 28.8 V) at 50/60 Hz 24 VDC (21.6 to 28.8 V)			AC 100 to 240 V (85 to 264 V) at 50/60 Hz:
	Power Consumption	VAC - 5 VA Running, 1.6 VA Holding	VAC - 4.7 VA Running, 2.7 VA Holding		0.06 A Running, 0.02 A Holding
		VDC - 2.8 W Running, 0.8 W Holding	VDC - 1.8 W Running, 1 W Holding		
	Min. Transformer Size	6 VA per actuator			N/A
	Input Signal Adjustments	N/A	AC 19.2 to 28.8 V at 50/60 Hz or DC 24 V +20%/-10% Class 2 or SELV. Minimum Pulse Width: 500 m sec.	Factory Setting - DC 0 to 10 V, CW Rotation with Signal Increase Selectable DC 0 (2) to 10 V or 0 (4) to 20 mA with Field-Furnished 500 ohm 0.25 W Min. Resistor Switch Selectable - Direct or Reverse Action with Signal Increase	N/A
	Control Input Impedance	N/A	4,700 Ohms	100k Ohms, Current Input: 500 Ohms with Field Furnished 500 Ohm Resistor	N/A
	Feedback Signal	N/A		DC 0 (2) to 10 V for Desired Rotation Range up to 95°. Corresponds to Rotation Limits, 0.5 mA at 10 V Maximum	N/A
	Auxillary Switch Rating	(-A) Models) One Single-Pole, Double-Throw (SPDT), double-insulated switch with silver contacts: AC 24 V, 50 VA pilot duty AC 120 V, 5.8 A Resistive, 1/4 hp, 275 VA pilot duty AC 240 V, 5.0 A Resistive, 1/4 hp, 275 VA pilot duty			(-A) Models) One Single-Pole, Double-Throw (SPDT), Double-Insulated Switch with Silver Contacts: AC 24 V, 50 VA Pilot Duty AC 120 V, 5.8 A Resistive, 1/4 hp, 275 VA Pilot Duty AC 240 V, 5.0 A Resistive, 1/4 hp, 275 VA Pilot Duty
	Equipment Rating	Class 2 or Safety Extra-Low Voltage (SELV)			N/A
	Electrical Connection	48 in. UL 758 Type AWM Halogen-Free Cable with 18 AWG (0.85 mm ²) Conductors & 0.25 in. (6 mm) Ferrule Ends	Without Aux Switches 120 in. UL 444 Type CMP Plenum Rated Cable w/ 19 AWG (0.75 mm ²) Conductors & 0.25 in. (6 mm) Ferrule Ends With Aux Switches 48 in. UL 758 Type AWM Halogen-Free Cable w/ 18 AWG (0.85 mm ²) Conductors & 0.25 in. (6 mm) Ferrule Ends		48 in. UL 758 Type AWM Halogen-Free Cable with 18 AWG (0.85 mm ²) Conductors & 0.25 in. (6 mm) Ferrule Ends
Conduit Connections	Integral 1/2 in. (13 mm) Threaded Conduit Connector(s)				

Spring Return Damper Actuators - DS-27 Series - Continued



Technical Specifications - DS-27 Series Actuator - Continued					
Type	Actuator Models	DS24-27-(A)	DS24-27-T-(A)	DMS24-27-(A)	DSU20-27-(A)
			Spring Return On/Off with optional Auxillary Switches (-A)	Spring Return On/Off & Floating with optional Auxillary Switches (-A)	Spring Return Modulating with optional Auxillary Switches (-A)
Operation	Spring Return	Direction is Selectable with Mounting Position of Actuator: Actuator Side A is away from damper or valve: CCW Spring Return Actuator Side B is away from damper or valve: CW Spring Return			
	Rotation Range	Maximum Full Stroke: 95° - (Adjustable Stop: 35 to 95° Maximum Position (Modulating Only))			
	Electric Stall Detection	Protects from overload at all angles of rotation			
	Runtime for 90° of Rotation	Power On (Running) 53 to 71 Seconds for 0 to 27 lb-in. (3 N-m) Load, at Room Temperature 60 Seconds Nominal at Full Rated Load (0.25 rpm) Power Off (Returning) 19 to 23 Seconds for 0 to 27 lb-in. (3 N-m) Load, at Room Temperature 22 Seconds Nominal at Full Rated Load 28 Seconds Maximum with 27 lb-in. (3 N-m) Load at -22°F (-30°C)	Power On (Running) 150 Seconds Constant for 0 to 27 lb-in. (3 N-m) Load, at All Operating Conditions Power Off (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)		Power On (Running) 24 to 28 Seconds for 0 to 27 lb-in. (3 N-m) Load, at Room Temperature 27 Seconds Nominal at Full Rated Load (0.5 rpm) Power Off (Returning) 19 to 23 Seconds for 0 to 27 lb-in. (3 N-m) Load, at Room Temperature 22 Seconds Nominal at Full Rated Load 28 Seconds Maximum with 27 lb-in. (3 N-m) Load at -22°F (-30°C)
	Cycle Life	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			
	Mechanical Connections	Round Shafts - 1/4 in. to 1/2 in. (6 to 12 mm) Square Shafts - 1/4 in. to 5/16 in. (6 to 8 mm)			
	Enclosure	NEMA 2 (IP54) for all mounting orientations			
Environmental	Ambient Conditions (Non-Condensing)	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			
	Audible Noise Rating	Running — <36 dBA at 27 lb-in. (3 N-m) Load, at a Distance of 39-13/32 in. (1 m) Holding — <20 dBA at a Distance of 39-13/32 in. (1 m) Returning — <51 dBA at 27 lb-in. (3 N-m) Load, at a Distance of 39-13/32 in. (1 m)	Running — <28 dBA at 27 lb-in. (3 N-m) Load, at a Distance of 39-13/32 in. (1 m) Holding — <20 dBA at a Distance of 39-13/32 in. (1 m) Returning — <56 dBA at 27 lb-in. (3 N-m) Load, at a Distance of 39-13/32 in. (1 m)		Running — <45 dBA at 27 lb-in. (3 N-m) Load, at a Distance of 39-13/32 in. (1 m) Holding — <20 dBA at a Distance of 39-13/32 in. (1 m) Returning — <51 dBA at 27 lb-in. (3 N-m) Load, at a Distance of 39-13/32 in. (1 m)
	Dimensions	6-3/8" (L) x 3-15/16" (W) x 2-1/4" (H)			
	Weight	2.0 lb. (2.4 lb w/ Aux. Switches)			
Conditions	Agency Certifications	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: Ed. 1, Part 2, Particular Requirements for Electric Actuators. 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 CE Mark - This product is in compliance with the essential requirements and other relevant provisions of the EMC Directive 2004/108/EC and Low Voltage Directive 2006/95/EC.			
	Warranty	C-Tick Mark, Australia/NZ Emissions Compliant 5 Years limited from time of shipment.			

Spring Return Damper Actuators - DS-27 Series Wiring



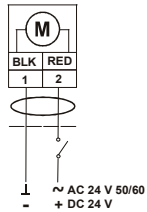
-(A) AUXILIARY SWITCH WIRING

(-A) Auxiliary Switches



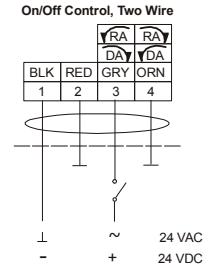
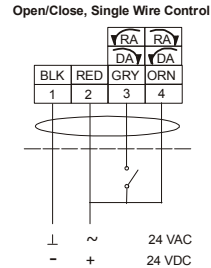
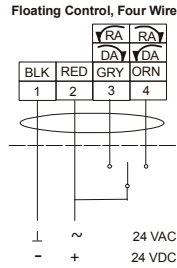
DS24-27-(A) CABLE

On/Off



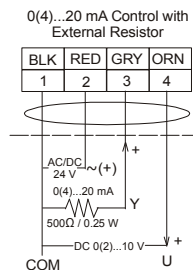
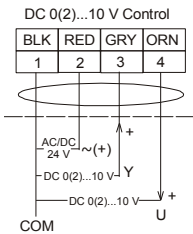
DS24-27-T-(A) CABLE

On/Off and Floating



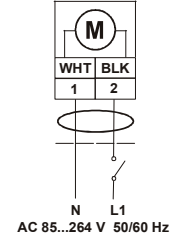
DMS24-27-(A) CABLE

Modulating



DSU20-27-(A) CABLE

On/Off



Important - Do not install multiple DS-27 Series actuators connected to the same mechanical load. Master-Slave application of DS-27 Series Actuators requires that each actuator be connected to independent loads.

Warning - These actuators are designed for use only in conjunction with operating controls. Where an operating control failure would result in personal injury and/or loss of property, it is the responsibility of the installer to add safety devices or alarm systems that protect against, and/or warn of, control failure.

To avoid excessive wear or drive time on the motor, use a controller and/or software that provides a time-out function to remove the signal at the end of rotation (stall).

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

Spring Return Damper Actuators - DS-70 Series



Technical Specifications - DS-70 Series Actuator					
Type	Actuator Models	DS24-70-(A)	DS24-70-T-(A)	DMS24-70-(A)	DS120-70-(A)
			Spring Return On/Off with optional Auxillary Switches (-A)	Spring Return On/Off & Floating with optional Auxillary Switches (-A)	Spring Return Modulating with optional Auxillary Switches (-A)
	Torque	70 lb-in. (8 Nm)			
Electrical	Operating Voltage	24 VAC (18 to 30 V) at 50/60 Hz 24 VDC (21.6 to 28.8 V)	24 VAC (19.2 to 28.8 V) at 50/60 Hz 24 VDC (21.6 to 28.8 V)		AC 120 V (102 to 132 V) at 60 Hz
	Power Consumption	VAC - 6.1 VA Running, 1.2 VA Holding	VAC - 7.9 VA Running, 5.5 VA Holding		0.05 A Running, 0.03 A Holding
		VDC - 3.5 W Running, 0.5 W Holding	VDC - 3.5 W Running, 1.9 W Holding		
	Input Signal	N/A	N/A	0(2) to 10 VDC 0(4) to 20 mA (with 500-ohm Resistor)	N/A
	Min. Transformer Size	7 VA per Actuator	8 VA per Actuator		N/A
	Control Input Impedance	N/A	3000 Ohms	100k Ohms, Current Input: 500 Ohms with Field Furnished 500 Ohm Resistor	N/A
	Feedback Signal	N/A		DC 0 (2) to 10 V for Desired Rotation Range up to 95°. Corresponds to Rotation Limits, 0.5 mA at 10 V Maximum	N/A
	Auxillary Switch Rating	(-A) Models) Two Single-Pole, Double-Throw (SPDT), Double-Insulated Switches with Gold over Silver Contacts: AC 24 V, 50 VA Pilot Duty			(-A) Models) Two Single-Pole, Double-Throw (SPDT), Double-Insulated Switches with Gold over Silver Contacts: AC 120 V, 5.8 A Resistive, 1/4 hp, 275 VA Pilot Duty
	Equipment Rating	Class 2 or Safety Extra-Low Voltage (SELV)			N/A
	Electrical Connection	48 in. UL 758 Type AWM Halogen-Free Cable w/ 18 AWG (0.85 mm ²) Conductors & 0.25 in. (6 mm) Ferrule Ends			
Conduit Connections	Integral Connectors for 3/8 in. (10 mm) Flexible Metal Conduit				
Operation	Manual Override	Manual Override Crank			
	Spring Return	Direction is Selectable with Mounting Position of Actuator: Actuator Side A is away from damper or valve: CCW Spring Return Actuator Side B is away from damper or valve: CW Spring Return			
	Rotation Range	Maximum Full Stroke: 95° - (Adjustable Stop: 35 to 95° Maximum Position (Modulating Only))			
	Electric Stall Detection	Protects from overload at all angles of rotation			

Spring Return Damper Actuators - DS-70 Series Continued

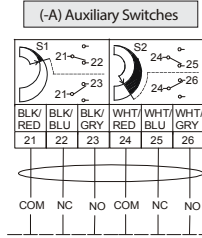


Technical Specifications - DS-70 Series Actuator - Continued					
Type	Actuator Models	DS24-70-(A)	DS24-70-T-(A)	DMS24-70-(A)	DS120-70-(A)
	Operation		Spring Return On/Off with optional Auxillary Switches (-A)	Spring Return On/Off & Floating with optional Auxillary Switches (-A)	Spring Return Modulating with optional Auxillary Switches (-A)
Runtime for 90° of Rotation		Power On (Running) 55 to 71 Seconds for 0 to 70 lb-in (8 N-m) Load, at All Operating Conditions 60 Seconds Nominal at Full Rated Load (0.25 rpm) Power Off (Spring Returning) 13 to 26 Seconds for 0 to 70 lb-in (8 N-m) Load, at Room Temperature 21 Seconds Nominal at Full Rated Load, 39 Seconds Maximum with 70 lb-in (8 N-m) Load at -4°F (-20°C) 108 Seconds Maximum with 53 lb-in (6 N-m) Load at -40°F (-40°C)	Power On (Running) 150 Seconds Constant for 0 to 70 lb-in (8 N-m) Load, At All Operating Conditions Power Off (Spring Running) 17 to 25 Seconds for 0 to 70 lb-in (8 N-m) Load, at Room Temperature 22 Seconds Nominal at Full Rated Load, 94 Seconds Maximum with 70 lb-in (8 N-m) Load, at -40°F (-40°C)		Power On (Running) 55 to 71 Seconds for 0 to 70 lb-in (8 N-m) Load, at All Operating Conditions 60 Seconds Nominal at Full Rated Load (0.25 rpm) Power Off (Spring Returning) 13 to 26 Seconds for 0 to 70 lb-in (8 N-m) Load, at Room Temperature 21 Seconds Nominal at Full Rated Load, 39 Seconds Maximum with 70 lb-in (8 N-m) Load at -4°F (-20°C) 108 Seconds Maximum with 53 lb-in (6 N-m) Load at -40°F (-40°C)
Cycle Life		60,000 Full Stroke Cycles with 70 lb-in. (8 N-m) Load, 1,500,000 Repositions with 70 lb-in. (8 N-m) Load			
Mechanical Connections		Round Shafts - 5/16 to 5/8 in. (8 to 16 mm) Square Shafts - 1/4 to 1/2 in. (6 to 12 mm)			
Enclosure		NEMA 2 (IP54) for all mounting orientations			N/A
Environmental	Ambient Conditions (Non-Condensing)	Operating — -40° to 140°F (-40° to 60°C); 90% RH Maximum, Non-condensing Storage — -40° to 185°F (-40° to 85°C); 95% RH Maximum, Non-condensing			
	Audible Noise Rating	Running — < 47 dBA at 70 lb-in (8 N-m) Load, at a Distance of 39-13/32 in. (1 m) Holding — < 20 dBA at a Distance of 39-13/32 in. (1 m) Returning — <52 dBA at 70 lb-in. (8 N-m) Load - (All at a Distance of 39-13/32 in. (1 m))	Running — 35 dBA at 70 lb-in (8 N-m) Load, at a Distance of 39-13/32 in. (1 m) Holding — < 20 dBA at a Distance of 39-13/32 in. (1 m) Returning — <52 dBA at 70 lb-in. (8 N-m) Load - (All at a Distance of 39-13/32 in. (1 m))		Running — < 47 dBA at 70 lb-in (8 N-m) Load, at a Distance of 39-13/32 in. (1 m) Holding — < 20 dBA at a Distance of 39-13/32 in. (1 m) Returning — <52 dBA at 70 lb-in. (8 N-m) Load - (All at a Distance of 39-13/32 in. (1 m))
	Dimensions	6.33" (L) x 3.90" (W) x 2.26" (H)			
	Weight	3.5 lb. (3.9 lb w/ Aux. Switches)			4.2 lb.
Conditions	Agency Certifications	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: Ed. 1, Part 2, Particular Requirements for Electric Actuators. 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 CE Mark - This product is in compliance with the essential requirements and other relevant provisions of the EMC Directive 2004/108/EC and Low Voltage Directive 2006/95/EC. RCM Mark, Australia/NZ Emissions Compliant.			
	Warranty	5 Years limited from time of shipment.			

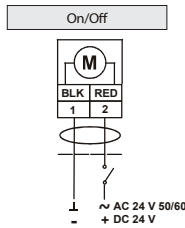
Spring Return Damper Actuators - DS-70 Series Wiring



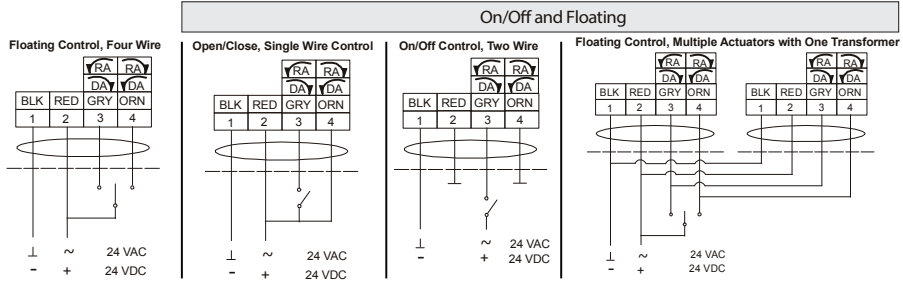
(A) AUXILIARY SWITCH WIRING



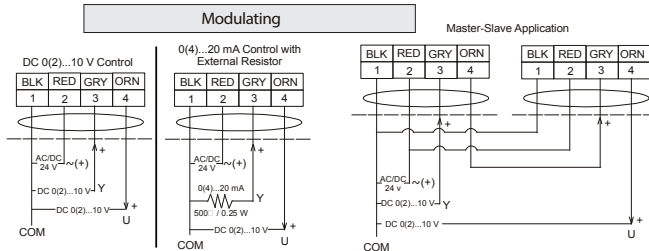
DS24-70-(A) STANDARD CABLE



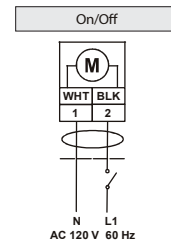
DS24-70-T(A) STANDARD CABLE



DMS24-70-(A) STANDARD CABLE



DS120-70-(A) STANDARD CABLE



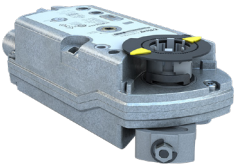
IMPORTANT: Do not install multiple DMS series actuators connected to the same mechanical load. Master-slave application of DMS or VAMS series actuators requires that each actuator be connected to independent loads.

Warning - These actuators are designed for use only in conjunction with operating controls. Where an operating control failure would result in personal injury and/or loss of property, it is the responsibility of the installer to add safety devices or alarm systems that protect against, and/or warn of, control failure.

To avoid excessive wear or drive time on the motor, use a controller and/or software that provides a time-out function to remove the signal at the end of rotation (stall).

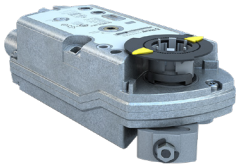
Disclaimer - The performance specifications are nominal and conform to acceptable industry standards. For application at conditions beyond these specifications, consult the nearest Bray office. Bray controls shall not be liable for damages resulting from misapplication or misuse of its products.

Spring Return Damper Actuators - DCS-62 Series



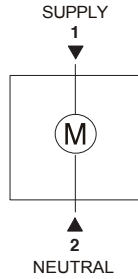
Technical Specifications - DCS-62 Series Actuator				
Type	Actuator Models	DCS24-62-P DCS24-62-A DCS24-62-AP	DCMS24-62-P DCMS24-62-A	
	Torque	Spring Return On/Off Plenum Cable (-P) Auxillary Switches (-A)	Spring Return Modulating Plenum Cable (-P) Auxillary Switches (-A)	
Electrical	Operating Voltage	62 lb-in. (7 Nm)		
	Power Consumption	24 VAC ±20% 24 VDC ±15% at 50/60 Hz		
	Input Signal	120 VAC ±10% at 50/60 Hz		
	Control Input Impedance	VAC - 5 VA Running, 3.5 VA Holding		
	Feedback Signal	VDC - 4 W Running, 3 W Holding		
	Auxillary Switch Rating (-A Models Only)	N/A	0 to 10 VDC (max. 35 VDC)	N/A
	Switch Range (-A Models Only)	N/A	>100k Ohms	N/A
	Switching Hysteresis (-A Models Only)	N/A	Voltage output signal 0 to 10 VDC; Maximum output current +1 mA, -0.5 mA	N/A
	Equipment Rating	(-A) Models Only Control signal adjustment - Offset (start point) Between 0 to 5 VDC; Span Between 2 to 30 VDC AC Rating (standard cable) 24 to 250 VAC, AC 6A resistive, AC 2A general purpose DC Rating (Standard/Plenum cable) 12 to 30 VDC, DC 2A		
	Electrical Connection	(-A) Models Only Switch A - 0° to 90° with 5° intervals; Recommended range usage 0° to 45°; Factory setting 5° Switch B - 0° to 90° with 5° intervals; Recommended range usage 45° to 90°; Factory setting 85°		
	Conduit Connections	(-A) Models Only 2°		
	Manual Override	Class 2, in accordance with UL/CSA, Class III per EN 60730		N/A
	Operation	Spring Return	(-P or -AP) Models Only - 36 in. (.9 m) Plenum Cable with 18 AWG (0.75 mm ²) Wire Leads (-A) Models Only - 36 in. (.9 m) Standard Cable with 18 AWG (0.75 mm ²) Wire Leads	
Rotation Range		Integral Connectors for 1/2 in. NPT		
Runtime for 90° of Rotation		3mm Hex Wrench		
Cycle Life		Direction is Selectable with Mounting Position of Actuator		
Mechanical Connections		Nominal angle of rotation 90°; Maximum angular rotation 95°		
Enclosure		Power On (Running) 90 Seconds for 62 lb-in (7 Nm) at (60 seconds max. at -25°F (-32°C)) Power Off (Returning) 15 Seconds Typical for 62 lb-in (7 Nm) at (60 seconds max. at -25°F (-32°C))		
Environmental	Ambient Conditions (Non-Condensing)	60,000 Full stroke cycles (1,500,000 repositions)		
	Audible Noise Rating	Round Shafts - 1/4 to 3/4-inch (6.4 to 20.5 mm) Square Shafts - 1/4 to 1/2-inch (6.4 to 13 mm)		
	Dimensions	NEMA 1 (IP54) limited mounting orientations		
	Weight	Operating — -25°F to 130°F (-32°C to 55°C); 95% RH Maximum, Noncondensing Storage — -40°F to 158°F (-40°C to 70°C); 95% RH Maximum, Noncondensing		
Conditions	Agency Certifications	40 dBA		
	Warranty	8-3/8" (L) x 3-1/4" (W) x 2-2/3" (H)		
		2.9 lb (1.3 kg)		
		UL listed to UL60730 (to replace UL873) cUL certified to Canadian Standard C22.2 No. 24-93 Low voltage directive (LVD) 2006/95/EC - EN 60 730-2-14 (Type 1)		
		UL listed to UL60730 (to replace UL873) cUL certified to Canadian Standard C22.2 No. 24-93		
		5 Years limited from time of shipment.		

Spring Return Damper Actuators - DCS-62 Series Wiring



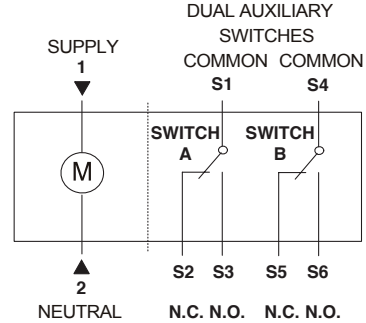
DCS24-62-(P)
CABLE

On/Off



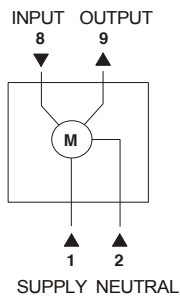
DCS24-62-(A), (AP)
CABLE

On/Off with AUX Switches



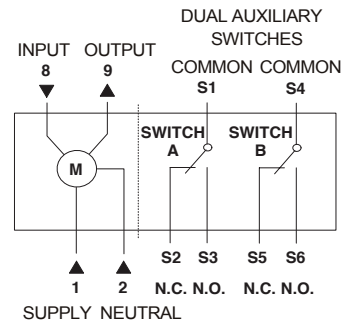
DCMS24-62-(P)
CABLE

Modulating



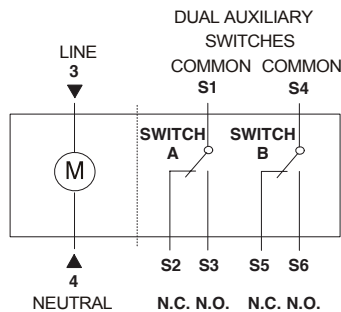
DCMS24-62-(A)
CABLE

Modulating with AUX Switches



DCS120-62-(A)
CABLE

120 V On/Off with AUX Switches

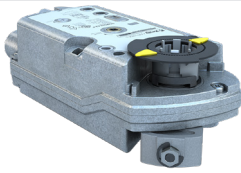


Warning - These actuators are designed for use only in conjunction with operating controls. Where an operating control failure would result in personal injury and/or loss of property, it is the responsibility of the installer to add safety devices or alarm systems that protect against, and/or warn of, control failure.

To avoid excessive wear or drive time on the motor, use a controller and/or software that provides a time-out function to remove the signal at the end of rotation (stall).

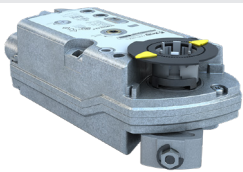
Disclaimer - The performance specifications are nominal and conform to acceptable industry standards. For application at conditions beyond these specifications, consult the nearest Bray office. Bray controls shall not be liable for damages resulting from misapplication or misuse of its products.

Spring Return Damper Actuators - DCS-140 Series



Technical Specifications - DCS-140 Series Actuator					
Type	Actuator Models	DCS24-140-(A)	DCS24-140-T-(A)	DCMS24-140-(A)	DCS120-140-(A)
			Spring Return On/Off Opt. Auxillary Switches (-A)	Spring Return Floating Opt. Auxillary Switches (-A)	Spring Return Modulating Opt. Auxillary Switches (-A)
	Torque	160 lb-in. (18 Nm)			
Electrical	Operating Voltage	24 VAC ±20%; 24...48 24 VDC ±10% at 50/60 Hz			120 VAC ±10% at 50/60 Hz
	Power Consumption	VAC - 7 VA Running, 5 VA Holding VDC - 4 W Running, 3 W Holding			Running: 8 VA; Holding: 6 VA
	Control Input Impedance	N/A	N/A	>100K Ohms	N/A
	Control Signal	N/A	N/A	2 to 10 VDC or 0 to 10 VDC	N/A
	Feedback Signal	N/A	0 to 1000 Ohms <10 mA	0 to 10 VDC; maximum output current ±1 mA	N/A
	Auxillary Switch Rating (-A Models Only)	AC Rating 24 VAC to 250 VAC; AC 6 A Resistive, AC 2A FLA, 12 LRA DC Rating 12 VDC to 30 VDC; DC 2A			AC Rating AC 6 A Resistive, AC 2A FLA, 12 LRA
	Switching Hysteresis (-A Models Only)	2°			
	Equipment Rating	Class 2 per UL/CSA			N/A
	Electrical Connection	36 in. (.9 m) Standard Cable with 18 AWG (0.75 mm ²) Wire Leads			
	Conduit Connections	Integral Connectors for 3/8 in. Flex			
Operation	Manual Override	Hex Head Screw			
	Spring Return	Direction is Selectable with Mounting Position of Actuator			
	Rotation Range	Nominal angle of rotation 90°; Maximum angular rotation 95°			
	Runtime for 90° of Rotation	Power On (Running) 90 Seconds Power Off (Returning) 15 Seconds			
	Cycle Life	60,000 Full stroke cycles (1,500,000 repositions)			
	Mechanical Connections	Round Shafts - 3/8-in to 1-in (8 to 25.6 mm) Square Shafts - 1/4-in to 3/4-in (6 to 18 mm)			
Environmental	Enclosure	NEMA 2, IP54 per EN 60 529 - in vertical to horizontal 90°			
	Ambient Conditions (Non-Condensing)	Operating — -25°F to 130°F (-32°C to 55°C); 95% RH Maximum, Noncondensing Storage — -40°F to 158°F (-40°C to 70°C); 95% RH Maximum, Noncondensing			
	Audible Noise Rating	45 dBA			
	Dimensions	11-13/16" (L) x 4-3/4" (W) x 2-7/8" (H)			
Conditions	Weight	4.85 lb (2.2 kg)			
	Agency Certifications	UL listed to UL60730 (to replace UL873) cUL certified to Canadian Standard C22.2 No. 24-93			
	Warranty	5 Years limited from time of shipment.			

Spring Return Damper Actuators - DCS-140 Series Wiring



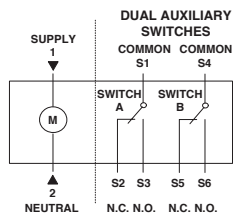
KEY		
Cable		Function
No.	Color	
1	Red (RD)	System potential AC 24 V / DC 24...48 V
2	Black (BK)	System neutral
6	Violet (VT)	Pos. signal AC 0 V / AC 24 V / DC 24...48 V, "open"
7	Orange (OG)	Pos. signal AC 0 V / AC 24 V / DC 24...48 V, "close"
8	Gray (GY)	Pos. signal DC 0...10 V, 0...35 V
9	Pink (PK)	Position indication DC 0...10 V
3	Brown (BN)	Phase AC 120/230 V
4	Blue (BU)	Neutral conductor

Auxiliary Switch - Factory Installed			
S1	S1	Gray/Red (GY RD)	Switch A Input
S2	S2	Gray/Blue (GY BU)	Switch A - N.C.
S3	S3	Gray/Pink (GY PK)	Switch A - N.O.
S4	S4	Black/Red (BK RD)	Switch B Input
S5	S5	Black/Blue (BK BU)	Switch B - N.C.
S6	S6	Black/Pink (BK PK)	Switch B - N.O.

DCS24-140-(A)

STANDARD CABLE

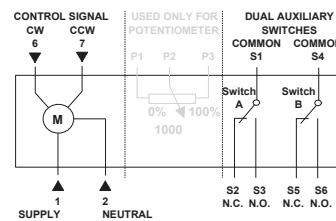
On/Off with Optional AUX Switches



DCS24-140-T(A)

STANDARD CABLE

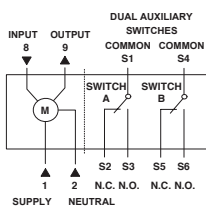
Floating with Optional AUX Switches



DCMS24-140-(A)

STANDARD CABLE

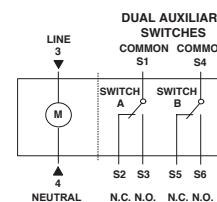
Modulating with Optional AUX Switches



DCS120-140-(A)

STANDARD CABLE

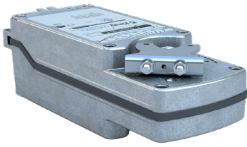
120 V On/Off with Optional AUX Switches



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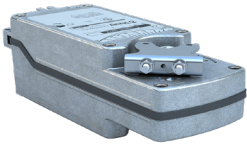
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Spring Return Damper Actuators - DS-180 Series



Technical Specifications - DS-180 Series Actuator					
Type	Actuator Models	DS24-180-(A)	DS24-180-T-(A)	DMS24-180-(A)	DS120-180-(A)
			Spring Return On/Off Opt. Auxillary Switches (-A)	Spring Return On/Off & Floating Opt. Auxillary Switches (-A)	Spring Return Modulating Opt. Auxillary Switches (-A)
	Torque	177 lb-in. (20 Nm)			
Electrical	Operating Voltage	24 VAC (19.2 to 30 V) at 50/60 Hz 24 VDC (21.6 to 26.4 V)			AC 120 V (102 to 132 V) at 60 Hz
	Power Consumption	VAC - 24.6 VA Running, 7.7 VA Holding	VAC - 15.5 VA Running, 7.7 VA Holding		0.25 A Running, 0.13 A Holding
		VDC - 17.6 W Running, 2.8 W Holding	VDC - 6.7 W Running, 2.9 W Holding		
	Min. Transformer Size	25 VA per Actuator	20 VA per Actuator		N/A
	Control Input Impedance	N/A		>100K Ohms	N/A
	Feedback Signal	N/A		0 (2) to 10 VDC for Desired Rotation Range up to 90°; Corresponds to Rotation Limits, 1 mA Maximum	N/A
	Auxillary Switch Rating (-A Models Only)	Two Single-Pole, Double-Throw (SPDT), Double-Insulated Switches with Gold Flash Contacts: AC 24 V, 50 VA Pilot Duty			Two Single-Pole, Double-Throw (SPDT), Double-Insulated Switches with Gold Flash Contacts: AC 120 V, 5.8 A Resistive, 1/4 hp, 275 VA Pilot Duty
	Equipment Rating	Class 2			N/A
	Transformer Sizing	25 VA Minimum per Actuator	20 VA Minimum per Actuator		25 VA Minimum per Actuator
	Electrical Connection	48 in. (1.2 m) Halogen-Free Cable with 18 AWG (0.75 mm ²) Wire Leads			
Conduit Connections	Integral Connectors for 3/8 in. Flexible Metal Conduit				
Manual Override	Manual override crank				
Spring Return	Direction is Selectable with Mounting Position of Actuator Side A - Actuator Face Away for CCW Spring Return Side B - Actuator Face Away for CW Spring Return				
Rotation Range	Adjustable from 30 to 90° CW or CCW with Optional Adjustable Stop Kit; Mechanically Limited to 90°				
Operation	Runtime for 90° of Rotation	Power On (Running) 24 to 57 Seconds for 0 to 177 lb-in (0 to 20 N-m) at All Operating Conditions; 35 Seconds Nominal at Full Rated Load Power Off (Returning) 11 to 15 Seconds for 0 to 177 lb-in (0 to 20 N-m) at Room Temperature; 35 Seconds Maximum for 0 to 177 lb-in (0 to 20 N-m) at -22°F (-30°C) 130 Seconds Maximum for 0 to 177 lb-in (0 to 20 N-m) at -40°F (-40°C)	Power On (Running) 150 Seconds for 0 to 177 lb-in (0 to 20 N-m) at All Operating Conditions; Independent of Load Power Off (Returning) 20 Seconds for 0 to 177 lb-in (0 to 20 N-m) at Room Temperature		Power On (Running) 24 to 57 Seconds for 0 to 177 lb-in (0 to 20 N-m) at All Operating Conditions; 35 Seconds Nominal at Full Rated Load Power Off (Returning) 11 to 15 Seconds for 0 to 177 lb-in (0 to 20 N-m) at Room Temperature; 35 Seconds Maximum for 0 to 177 lb-in (0 to 20 N-m) at -22°F (-30°C) 130 Seconds Maximum for 0 to 177 lb-in (0 to 20 N-m) at -40°F (-40°C)
		Electric Stall Detection	Protects from overload at all angles of rotation		
	Cycle Life	60,000 Full stroke cycles (1,500,000 repositions)			
	Mechanical Connections	Round Shafts - 1/2 to 3/4 in. or 12 to 19 mm Square Shafts - 3/8 and 1/2 in. or 10, 12, and 14 mm			

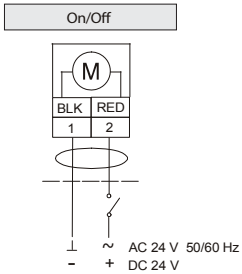
Spring Return Damper Actuators - DS-180 Series Continued



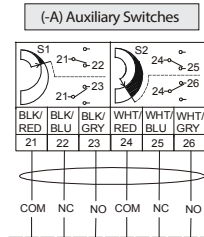
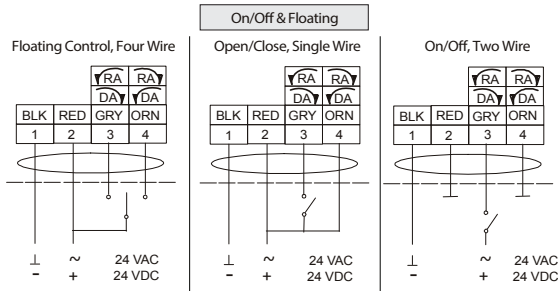
Technical Specifications - DS-180 Series Actuator					
Type	Actuator Models	DS24-180-(A)	DS24-180-T-(A)	DMS24-180-(A)	DS120-140-(A)
		Spring Return On/Off Opt. Auxillary Switches (-A)	Spring Return On/Off & Floating Opt. Auxillary Switches (-A)	Spring Return Modulating Opt. Auxillary Switches (-A)	Spring Return On/Off Opt. Auxillary Switches (-A)
Environmental	Enclosure	NEMA 2, IP54 - for all mounting directions			
	Ambient Conditions (Non-Condensing)	Operating — 40 to 131°F (-40 to 55°C); 90% RH Maximum, Noncondensing Storage — -85 to 185°F (-65 to 85°C); 95% RH Maximum, Noncondensing			
	Audible Noise Rating	Running < 66 dBA at 39-13/32 in. (1 m) Holding < 18 dBA at 39-13/32 in. (1 m) Returning < 66 dBA at 39-13/32 in. (1 m)	Running < 40 dBA at 39-13/32 in. (1 m) Holding < 20 dBA at 39-13/32 in. (1 m) Returning < 55 dBA at 39-13/32 in. (1 m)	Running < 66 dBA at 39-13/32 in. (1 m) Holding < 18 dBA at 39-13/32 in. (1 m) Returning < 66 dBA at 39-13/32 in. (1 m)	
	Dimensions	10" (L) x 4" (W) x 3-3/16" (H)			
	Weight	6.4 lb (2.9 kg)		7.6 lb (3.5 kg)	
Conditions	Agency Certifications	UL Listed, CCN XAPX, File E27734; to UL 60730-1, Automatic Controls for Household and Similar Use; and UL 60730-2-14 Part 2, Particular Requirements for Electric Actuators. UL Listed, CCN XAPX7, File E27734; to CAN/CSA E60730-1, Automatic Controls for Household and Similar Use; and CAN/CSA E60730-2-14 Part 2, Particular Requirements for Electric Actuators CE Mark - Johnson Controls, Inc. declares that this product is in compliance with the essential requirements and other relevant provisions of the EMC Directive and Low Voltage Directive. RCM Mark, Australia/NZ Emissions Compliant			
	Warranty	5 Years limited from time of shipment.			

-(A) AUXILIARY SWITCH WIRING

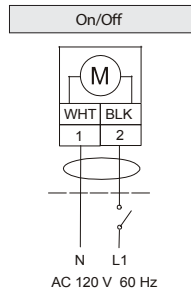
DS24-180-(A) STANDARD CABLE



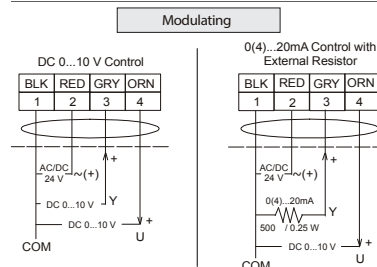
DS24-180-T-(A) STANDARD CABLE



DS120-180-(A) STANDARD CABLE



DMS24-180-(A) STANDARD CABLE



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