Spring Return Electronic Actuators
24 VAC Modulating Control
ES62M2(-S) & ES142M2(-S)

Description

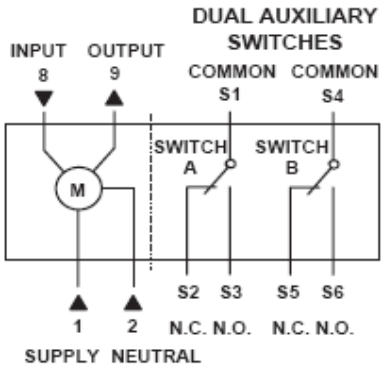
The ES62M2(-S) & ES142M2(-S) direct coupled 24 VAC spring return electronic actuators are designed for modulating control of building HVAC dampers and valves.

Features

- Brushless DC motor technology with stall protection
- Bidirectional fail-safe spring return
- Unique self-centering shaft coupling
- All metal housing
- Manual override
- 5° pre-load as shipped from factory
- Input signal inversion option (direct or inverse acting)
- Feedback signal inversion option
- Models with independently adjustable dual auxiliary switches available (-S option)
- UL and cUL listed

Application

This actuator is used in constant or variable air volume installations for the control of return air, mixed air, exhaust, and face and bypass dampers or valves requiring up to 62 in-lb (7 N-m) or 142 in-lb (16 Nm) torque. It is designed for applications that require the valve or damper to return to a fail-safe position when there is a power failure.



III
Class 2

Standard Symbol	Function	Terminal Designations	Color
1	Supply (SP)	G	Red
2	Neutral (SN)	G0	Black
8	Input signal	Y	Gray
9	Position output	U	Pink
S1	Switch A – Common	Q11	Gray/red
S2	Switch A – N.C.	Q12	Gray/blue
S3	Switch A – N.O.	Q14	Gray/pink
S4	Switch B – Common	Q21	Black/red
S5	Switch B – N.C.	Q22	Black/blue
S6	Switch B – N.O.	Q24	Black/pink

Actuator Part Number Table

Torque	Input Signal	Cabling	Standard	Dual Auxiliary Switches
62 in-lb (7 N-m)	2 to 10 VDC 4 to 20 mA*	Plenum Cable	ES62M2	ES62M2-S
142 in-lb (16 N-m)	0(2) to 10 VDC 0(4) to 20 mA*	Plenum Cable	ES142M2	ES142M2-S

Notes:

* 0(4)-20 mA requires a 500 Ω (1%, 1/4W) resistor across pins 2 & 8

Spring Return Electronic Actuators
24 VAC Modulating Control
ES62M2(-S) & ES142M2(-S)

Technical Data	ES62M2(-S)	ES142M2(-S)
Power supply	24 VAC ± 20%; 24 VDC ± 15%, 50/60 Hz	24 VAC +20%; 24 VDC ±10%, 50/60 Hz
Transformer sizing	running: 5 VA (3.5 W) holding: 4 VA (3 W) (class 2 power source req. for UL/CSA)	running: 9 VA (7 W) holding: 5 VA (4 W) (class 2 power source req. for UL/CSA)
Electrical connection	3 ft, 18 AWG plenum cable	
Overload protection	0° to 95° rotation, with stall protection	
Control signal	2-10 VDC (max. 35 VDC)	0-10 VDC or 2-10 VDC (max. 35 VDC)
Input impedance	>100 Kohm	>100 Kohm
Feedback output "U"	2-10 VDC (+1 mA, -.5 mA max.)	0-10 VDC or 2-10 VDC (+1 mA, -.5 mA max.)
Angle of rotation	95°	
Minimum torque	62 in-lb (7 N-m)	142 in-lb (16 N-m)
Direction of rotation	spring return: selectable when ordering valve, selectable for damper control direction with dip switch control: selectable by dip switch	
Position indication	visual indicator, 0° to 95° (0° is spring return position)	
Manual override	3 mm hex crank (shipped with actuator)	
Shaft size	1/4" to 3/4" (6.4 mm to 20.5 mm) diameter 1/4" to 1/2" (6.4 mm to 13 mm) square	3/8" to 1" (8 mm to 25.6 mm) diameter 1/4" to 5/8" (6.4 mm to 18 mm) square
Minimum shaft length	3/4" (20 mm)	
Auxiliary switches (-S option)	AC: 24 VAC to 250 VAC 4A resistive 2A general purpose DC: 12 VDC to 30 VDC 2A	AC: 24 VAC 4A resistive 2A, FLA, 12 LRA DC: 12 VDC to 30 VDC 2A
Switch range (-S option)*		
– Switch A	0° to 90° with 5° intervals	
– Recommended range usage	0° to 45°	
– Factory setting	5°	
– Switching hysteresis	2°	
Switch range (-S option)*		
– Switch B	0° to 90° with 5° intervals	
– Recommended range usage	45° to 90°	
– Factory setting	85°	
– Switching hysteresis	2°	
Running time (90°) (nominal)	90 secs spring return: 15 secs typical (60 secs max. @ -25°F (-32°C))	90 secs spring return: 15 secs typical (30 secs max.)
Humidity	95% RH, noncondensing	
Ambient temperature	-25°F to 130°F (-32°C to 55°C)	
Storage temperature	-40°F to 158°F (-40°C to 70°C)	
Housing type**	NEMA 1/IP54 according to EN60 529	NEMA 2 in vertical to horizontal 90°
Housing material	Die cast aluminum alloy, Gear Lubrication - silicone free	
Agency ratings	UL Listed to 60730 (to replace UL 873 listed, cUL certified to CSA C22.2 No. 24-93	
CE conformity***	Australian Electromagnetic Compatibility (EMC): 89/336/EEC per AS/NZS 4251.1/2:1999 (C-tick)	–
Noise level	40 dBA	<45 dBA (running)
Servicing	maintenance free	
Weight	2.9 lbs (1.3 kg)	4.85 lbs (2.2 kg)

Notes:

† Add 500 Ω (1 %, 1/4 W) resistor across pins 2 & 8 for mA signal.

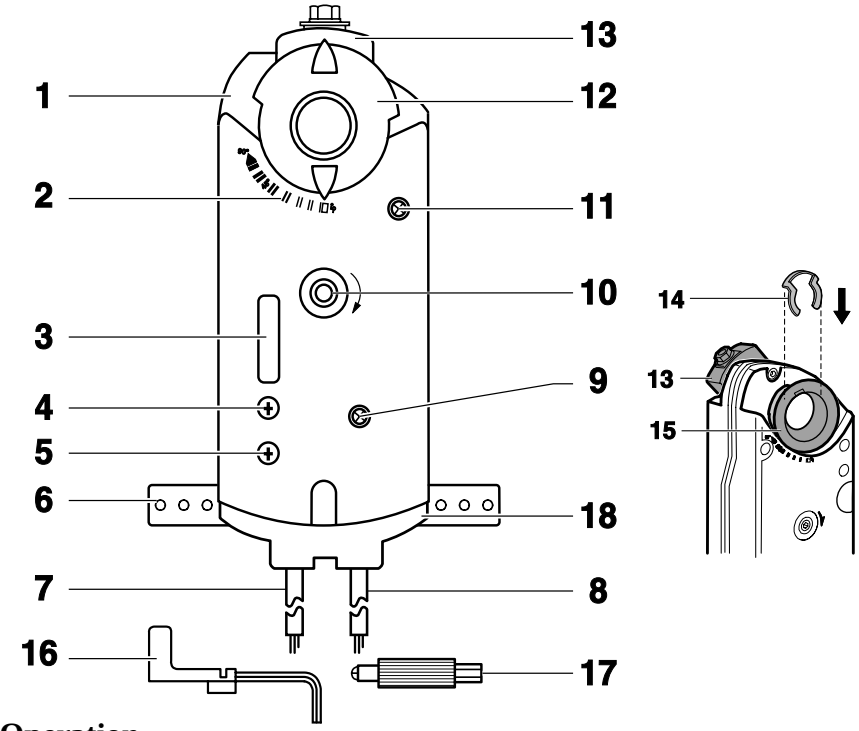
! * SWITCH WARNING: Apply only line voltage from the same phase or only UL Class 2 voltage to the switching outputs of both auxiliary switches A and B. Mixed operation is not permissible.

** DEI has optional NEMA 4/4X type housings for these actuators. Call DEI for information.

! *** CE WARNING: When wiring these actuators, only UL-Class 2 voltage (SELV/PELV for CE) is permitted.

Spring Return Electronic Actuators
24 VAC Modulating Control
ES62M2(-S)

Actuator Components



Legend

1. Actuator housing
2. Positioning scale for angle of rotation
3. DIP switches and cover
4. N/A
5. N/A
6. Mounting bracket
7. Connection cable for power and control signals
8. Connection cable for auxiliary switches or feedback potentiometer
9. Gear train lock pin
10. Manual override wrench opening and direction of rotation arrow
11. Auxiliary switches A and B
12. Position indicator
13. Self-centering shaft adapter
14. Shaft adapter locking clip
15. Position indicator adapter
16. Key for manual adjustment
17. Adjustment tool for: auxiliary switches (11) and lock pin (9)
18. 1/2-inch NPT conduit connections

Operation

Apply a continuous 2 to 10 VDC* control signal between wire 8 (Y) and wire 2 (G0) to operate the damper actuator. The angle of rotation is proportional to the control signal.
A 2 to 10 VDC position feedback output signal is available between wire 9 (U) and wire 2 (G0) to monitor the position of the damper motor.
In the event of a power failure or when the operating voltage is shut off, the actuator returns to the "0" position.

Life Expectancy
An improperly-tuned control loop will cause excessive repositioning that will shorten the life of the actuator.

Dip Switch Functionality
Input signal inversion allows inverting the control input signal. The arrow direction indicates opening or closing (closing or opening) when operating an actuator with a given control signal.
Feedback signal inversion allows inverting the position feedback output signal.

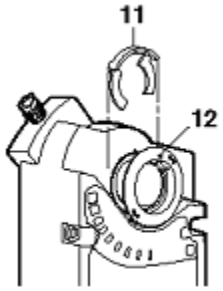
Description	Label			Description	Function
Inverse Acting	↺	▭	↻	Direct-Acting	Input Signal Inversion
Inverse-Acting Feedback	◺	▭	◿	Direct-Acting Feedback	Feedback Signal inversion
		▭			**Not In Use**

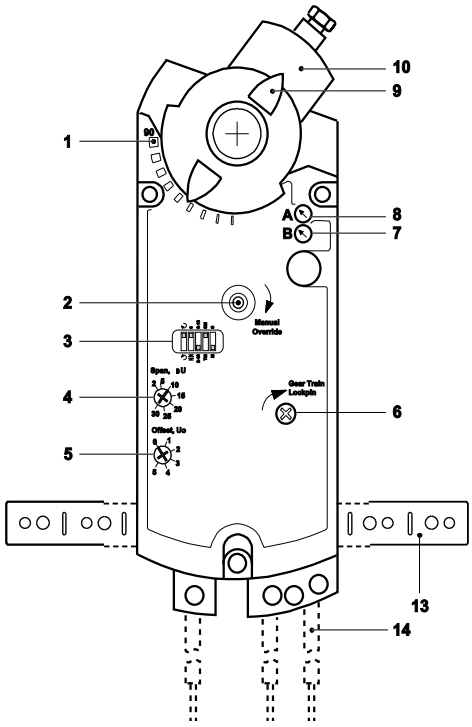
Notes:

– For installation, option (-S) and accessory information, see installation guide.
* 4-20 mA with addition of 500Ω (1 %, 1/4 W) resistor.

Spring Return Electronic Actuators
24 VAC Modulating Control
ES142M2(-S)

Actuator Components





Legend

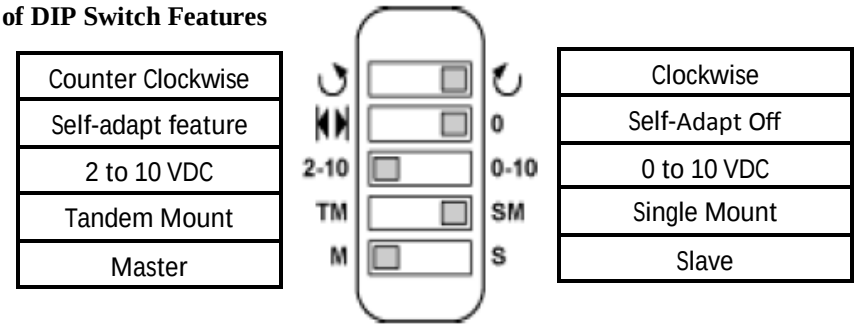
1. Positioning scale for angle of rotation
2. Manual override wrench opening and direction of rotation arrow
3. DIP switches
4. N/A
5. N/A
6. Gear train lock pin
7. Auxiliary switch B
8. Auxiliary switch A
9. Position indicator
10. Self-centering shaft adapter
11. Shaft adapter locking clip
12. Position indicator adapter
13. Mounting bracket
14. Connection cables

Operation

A continuous 0 to 10 VDC or 2 to 10 VDC* signal from a controller to wire Y operates the damper actuator. The angle of rotation is proportional (or inverse proportional) to the control signal. A 0 to 10 VDC or 2 to 10 VDC position feedback output signal is available between wires U and G0 (system neutral) to monitor the position of the damper actuator.
In the event of a power failure or when the operating voltage is shut off, all actuator models will return to the 0 position. In the event of a blockage in a damper, actuators are overload protected over the full range to prevent damage to the actuators.

Life Expectancy
An improperly-tuned control loop will cause excessive repositioning that will shorten the life of the actuator.

Implementation of DIP Switch Features



Notes:
– For installation, option (-S) and accessory information, see installation instructions.
* 0-20 mA/4-20 mA with addition of 500 Ω (1 %, 1/4 W) resistor across pins 2 & 8.