



## Spring Return Electronic Actuators 24 VAC Modulating Control ES62B2(-S), ES62B2-ZS(-S), ES142B2(-S) & ES142B2-ZS(-S)



### Description

The ES62B2(-S), ES62B2-ZS(-S), ES142B2(-S) & ES142B2-ZS(-S) direct coupled 24 VAC spring return electronic actuators are designed for modulating control of building HVAC dampers and valves.

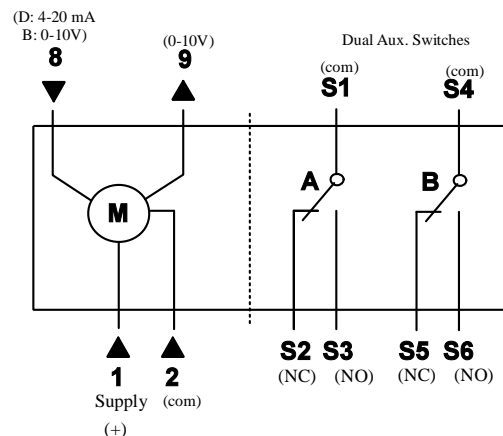
### Features

- Brushless DC motor technology with stall protection
- Bidirectional fail-safe spring return
- Unique self-centering shaft coupling
- All metal housing
- Access to all functions from either side of the actuator
- Manual override
- 5° pre-load as shipped from factory
- Offset and span adjustment models available (-ZS option)
- Models with independently adjustable dual auxiliary switches available (-S option)
- UL, CSA approved; plenum versions pending CE rating

### 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 valves or dampers 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.

### Wiring



| Actuator Part Number Table |                            |              |                          |                        |                                                    |                              |
|----------------------------|----------------------------|--------------|--------------------------|------------------------|----------------------------------------------------|------------------------------|
| Torque                     | Input Signal               | Cabling      | 24 VAC Operating Voltage |                        |                                                    |                              |
|                            |                            |              | Standard                 | Span/Offset Adjustable | Dual Auxiliary Switches and Span/Offset Adjustable | Dual Auxiliary Switches Only |
| 62 in-lb (7 N-m)           | 0 to 10 VDC<br>0 to 20 mA* | Plenum Cable | ES62B2                   | ES62B2-ZS              | ES62B2-ZS-S                                        | ES62B2-S                     |
| 142 in-lb (16 N-m)         | 0 to 10 VDC<br>0 to 20 mA* | Plenum Cable | ES142B2                  | ES142B2-ZS             | ES142B2-ZS-S                                       | ES142B2-S                    |

### Notes:

- \* 0-20 mA requires 500  $\Omega$  (1 %, 1/4 W) resistor across pins 2 and 8
- "-ZS" versions can be calibrated to 4 to 20 mA.



## Spring Return Electronic Actuators 24 VAC Modulating Control ES62B2(-S), ES62B2-ZS(-S), ES142B2(-S) & ES142B2-ZS(-S)

| Technical Data                         | ES62B2(-S)<br>ES62B2-ZS(-S)                                                                                                                                  | ES142B2(-S)<br>ES142B2-ZS(-S)                                                                                                         |
|----------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|
| Power supply                           | 24 VAC $\pm$ 20% 50/60 Hz, 24 VDC $\pm$ 15%                                                                                                                  |                                                                                                                                       |
| Transformer sizing                     | running: 5 VA (3.5 WDC)<br>holding: 4 VA (3 WDC)<br>(class 2 power source req. for UL)                                                                       | running: 9 VA<br>holding: 5 VA<br>(class 2 power source req. for UL)                                                                  |
| Electrical connection                  | 3 ft, 18 AWG plenum cable                                                                                                                                    |                                                                                                                                       |
| Overload protection                    | Electronic throughout 0° to 95° rotation                                                                                                                     |                                                                                                                                       |
| Control signal                         | 0 to 10 VDC (max. 35 VDC), 0 to 20 mA†                                                                                                                       | 0 to 10 VDC, 0 to 20 mA†                                                                                                              |
| Input impedance                        | >100 Kohm                                                                                                                                                    | 100 Kohm (0.1 mA)                                                                                                                     |
| Operating range                        | 0 to 10 VDC (max. 35 VDC), 0 to 20 mA†                                                                                                                       | 0 to 10 VDC, 0 to 20 mA†                                                                                                              |
| Feedback output "U"                    | 0 to 10 VDC ( $\pm$ 1 mA max.) for 95°                                                                                                                       |                                                                                                                                       |
| 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<br>control: selectable by dip switch (on some models) |                                                                                                                                       |
| 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<br>1/4" to 1/2" (6.4 mm to 13 mm) square                                                                           | Standard: 3/8" to 1" (8 mm to 25.6 mm) diameter<br>1/4" to 5/8" (6.4 mm to 18 mm) square<br>Oversize: 1.05" (26.6 mm) special adapter |
| Minimum shaft length                   | 3/4" (20 mm)                                                                                                                                                 |                                                                                                                                       |
| Auxiliary switches (-S option)         | AC: 24 VAC to 250 VAC<br>6A resistive<br>2A general purpose use<br>DC: 12 VDC to 30 VDC<br>2A                                                                | plenum: 4 A resistive, 24 VAC<br>plenum: 2 A inductive, 24 VAC                                                                        |
| Switch range (-S option)*              | 0° to 90° with 5° intervals                                                                                                                                  |                                                                                                                                       |
| – Switch A                             | 0° to 45°                                                                                                                                                    |                                                                                                                                       |
| – Recommended range usage              | 5°                                                                                                                                                           |                                                                                                                                       |
| – Factory setting                      | 2°                                                                                                                                                           |                                                                                                                                       |
| – Switching hysteresis                 |                                                                                                                                                              |                                                                                                                                       |
| Switch range (-S option)*              | 0° to 90° with 5° intervals                                                                                                                                  |                                                                                                                                       |
| – Switch B                             | 45° to 90°                                                                                                                                                   |                                                                                                                                       |
| – Recommended range usage              | 85°                                                                                                                                                          |                                                                                                                                       |
| – Factory setting                      | 2°                                                                                                                                                           |                                                                                                                                       |
| – Switching hysteresis                 |                                                                                                                                                              |                                                                                                                                       |
| Control signal adjustment (-ZS option) | 0-5 VDC                                                                                                                                                      |                                                                                                                                       |
| – Offset (startpoint)                  | 0 VDC                                                                                                                                                        |                                                                                                                                       |
| – Factory setting (offset)             | 30 V                                                                                                                                                         |                                                                                                                                       |
| – Factory setting (span)               | 2-30 VDC                                                                                                                                                     |                                                                                                                                       |
| – Span                                 |                                                                                                                                                              |                                                                                                                                       |
| Running time (90°) (nominal)           | 90 secs constant<br>spring return: 15 secs typical<br>(60 secs max. @ -25°F)                                                                                 | 90 secs constant<br>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                    | -25°F to 158°F (-32°C to 70°C)                                                                                                                               |                                                                                                                                       |
| Housing type**                         | NEMA type 1/IP40 according to EN60529                                                                                                                        |                                                                                                                                       |
| Housing material                       | Die cast aluminum alloy                                                                                                                                      |                                                                                                                                       |
| Agency ratings                         | UL 60730 or UL 873 listed, C-UL certified to CSA C22.2 No. 24-93, pending CE approval for plenum models                                                      |                                                                                                                                       |
| CE conformity***                       | Electromagnetic Compatibility (EMC):<br>89/336/EEC<br>Emissions standards: EN50081-1<br>Immunity standards: EN50082-2                                        | –                                                                                                                                     |
| Noise level                            | 20 dBA                                                                                                                                                       | <45 dBA (running)                                                                                                                     |
| Servicing                              | maintenance free                                                                                                                                             |                                                                                                                                       |
| Quality standard                       | ISO 9002                                                                                                                                                     |                                                                                                                                       |
| Weight                                 | 2.86 lbs (1.3 kg)                                                                                                                                            | 4.85 lbs (2.2 kg)                                                                                                                     |

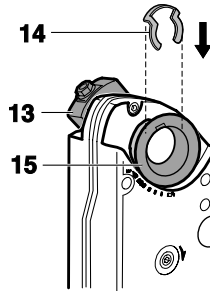
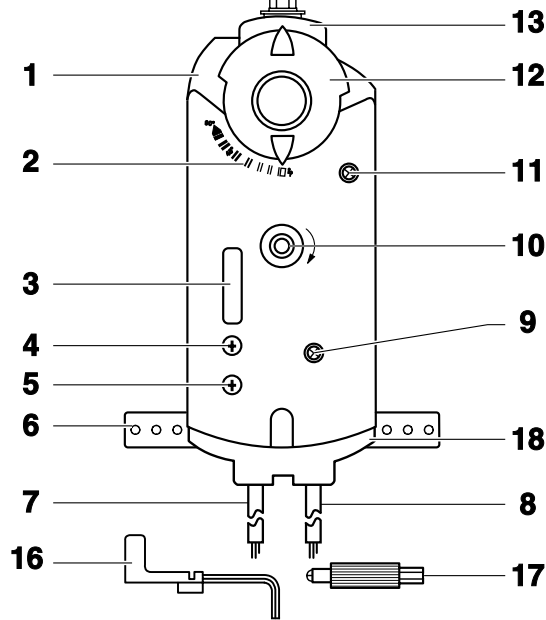
**Notes:**

- † Add 500  $\Omega$  (1 %, 1/4 W) resistor across pins 2 & 8 for 0-20 mA signal.
- ! \* **SWITCH WARNING:** Apply only line voltage or only 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:** All wiring of these actuators must be safety extra-low voltage (SELV/PELV) in accordance with EN60730.



## Spring Return Electronic Actuators 24 VAC Modulating Control ES62B2(-S), ES62B2-ZS(-S)

### Actuator Components



### Legend

1. Actuator housing
2. Positioning scale for angle of rotation
3. DIP switches and cover
4. Span adjustment
5. Offset (start point) adjustment
6. Mounting bracket
7. Connection cables for power and positioning signal
8. Connection cables for auxiliary switches or feedback potentiometer
9. Gear train lock pin
10. Manual override wrench opening and direction of rotation arrow
11. Locking shaft for 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), potentiometers (4 and 5), and locking shaft (9)

### Operation

A continuous 4 to 20 mA signal or a 0 to 10 VDC (0-20 mA\*\*) signal from a controller to wire Y operates the actuator. The angle of rotation is proportional to the control signal. A 0 to 10 VDC position feedback output signal is available between wires U and Comm (system neutral) to monitor the position of the 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.

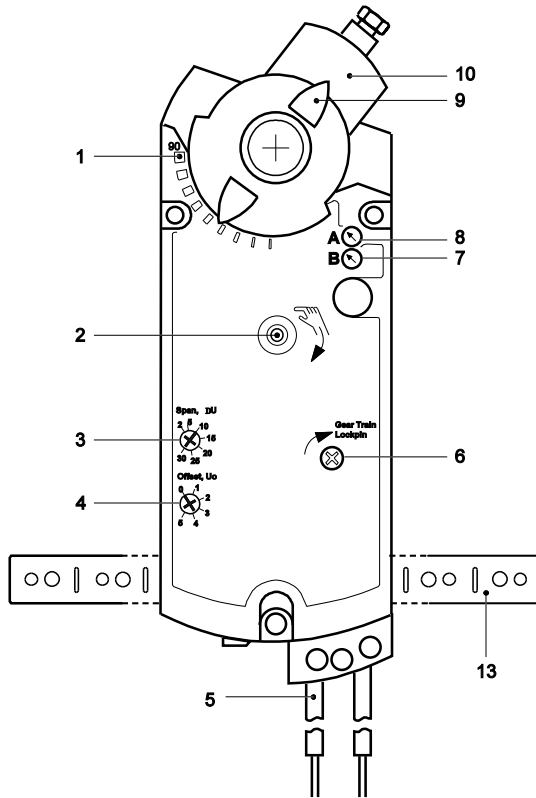
### Notes:

- For installation, option (-ZS, -S) and accessory information, see installation guide.
- \* Self-centering shaft adapter shown.
- \*\* 0-20 mA with addition of 500Ω (1 %, 1/4 W) resistor.



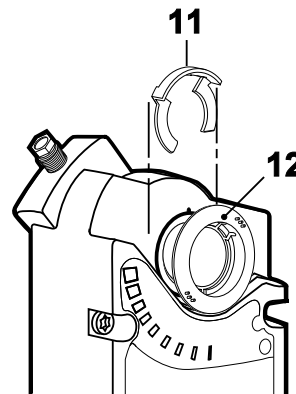
## Spring Return Electronic Actuators 24 VAC Modulating Control ES142B2(-S) & ES142B2-ZS(-S)

### Actuator Components



### Legend

1. Positioning scale for angle of rotation
2. Manual override wrench opening and direction of rotation arrow
3. Span adjustment (-ZS version)
4. Offset (start point) adjustment (-ZS version)
5. Connection cables
6. Gear train lock pin
7. Auxiliary switch B
8. Auxiliary switch A
9. Position indicator
10. Standard or self-centering shaft adapter\*
11. Shaft adapter locking clip
12. Position indicator adapter
13. Mounting bracket



### Operation

A continuous 4 to 20 mA signal or a 0 to 10 VDC (0-20 mA\*\*) signal from a controller to wire Y operates the actuator. The angle of rotation is proportional to the control signal. A 0 to 10 VDC position feedback output signal is available between wires U and Comm (system neutral) to monitor the position of the 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.

### Notes:

- For installation, option (-ZS, -S) and accessory information, see installation instructions.
- \* Self-centering shaft adapter shown.
- \*\* 0-20 mA with addition of 500  $\Omega$  (1 %, 1/4 W) resistor across pins 2 & 8.