Non-Spring Return, 24 VAC/VDC Electronic Actuators, Modulating EN53B2(-S), EN70B2(-S)(-ZS), EN140B2(-S)(-ZS), EN210B2(-S)(-ZS) & EN280B2(-S)

EN53 Series Actuator

EN70, 140, 210, 280 Series Actuator

The "EN" Series is a direct-mount line of actuators that operates on 24 VAC (for all models) or 24 VDC for the EN70, 140, 210 and 280 models and is available for use with proportional controllers. The EN53 actuators are easily installed on a Variable Air Volume (VAV) box, a round a damper shaft up to 1/2" (13 mm) diameter, and a 3/8" (10 mm) square shaft. The EN70, 140, 210 and 280 bidirectional actuators do not require a damper linkage and are easily installed on a round shaft up to 3/4" (20 mm) diameter or a square shaft up to 5/8" (16 mm). All actuators can also be mounted to valves (ball, globe, and butterfly) using one of the many valve linkage kits available through Dodge Engineering & Controls.

The EN models deliver up to 280 in-lb (32 N-m) of torque. The angle of rotation is mechanically adjustable from 0° to 90° in 5° increments. Integral auxiliary switches are available to indicate end-stop position or to perform switching functions at any angle within the selected rotation range. Position feedback is available through switches or a 0 (2) to 10 VDC signal.

Torque Minimum: EN53B2: 53 in-lb; EN70B2: 70 in-lb; EN140B2: 140 in-lb; EN210B2: 210 in-lb; EN280B2: 280 in-lb

Application: EN Series actuators are designed to position air dampers and valves in HVAC systems. Applications include: positioning return air or exhaust dampers; controlling face and bypass dampers; positioning blades for variable volume fans; positioning ball, butterfly or globe valves. Refer to the manufacturer's information to size properly the damper, valve and/or actuator. Spring return actuators, such as Dodge Engineering's ES Series, are recommended for use with outdoor air dampers in cold climates.

Operation (EN53): The EN53 Series provides a 53 in-lb (6 N-m) running torque for proportional control of dampers, VAV box dampers or control valves. The EN53 Series mounts directly on the duct surface, round damper or small rectangular damper with an anti-rotation bracket and two sheet metal screws (included). Additional linkages or couplers are not required. A controller provides a control signal to the actuator depending upon the desired movement of the damper blade. This signal causes the motor to rotate in the proper direction and moves the damper blade open or closed.

Note: 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).

The actuator rotates at a nominal rate of 1.5° per second (90° in 60 seconds) at 60 Hz input.
The actuator rotation is field adjustable from 30° to 90°. Actual rotation time for actuators using less than 90° rotation should be determined and that value used with the controller software. For example, 40 seconds would be used for 60° rotation.

Operation (EN70, 140, 210, 280): EN Series actuators operate on 24 VAC at 50/60 Hz or 24 VDC. These compact actuators use a DC motor with stall detection circuitry that operates throughout the entire stroke. The proportional actuators employ noise filtering techniques on the control signal to eliminate response to spurious noise. Rotation is mechanically limited to 93° by integral end-stops. The position of the actuator is visually indicated from 0° to 90° on the cover. An anti-rotation bracket prevents lateral movement of the actuator. For hand positioning the coupler, pressing the spring-loaded gear release on the actuator cover can manually disengage the gear train.

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Technical Data	EN53B2(-S)	EN70B2(-S)(-ZS)	EN140B2(-S)(-ZS)	EN210B2(-S)(-ZS)	EN280B2(-S)
Power supply	20 to 30 VAC @ 50/60 Hz	20 to 30 VAC, 24 VDC ±10%, 50/60 Hz			
Transformer sizing	3.2 VA class 2 power source req. for UL	7.5 VA class 2 power source req. for UL			
Electrical connection	1/4" spade terminals**	screw terminals for 22 to 14 AWG (max. of two 18-22 AWG/terminals)			
Control signal	0(2) to 10 VDC, 0(2) to 20 VDC, or 0(4) to 20 mA (jumper selectable)				
Control signal (-ZS option)	–	zero; 0-6 VDC, 0-12 VDC, or 0-12 mA span; 2-10 VDC, 4-20 VDC, or 4-20 mA			–
Factory setting	0-10 VDC direct CW rotation with signal increase	0-10 VDC, 0-20 mA, CW rotation with signal increase			
Feedback signal	0-10 VDC or 2-10 VDC for 90° (1 mA @ 10 VDC) (corresponds to input and signal span selection)				
Input impedance	voltage: 150 kΩ, current: 500 Ω	voltage: 205 kΩ for 0(2) to 10 V, 410 kΩ for 0(4) to 20 V, current: 500 Ω			
Switch contact rating (-S option)	two SPDT rated at 24 VAC, 1.5 A inductive, 3 A resistive 35 VA max. per switch				
Mechanical connection (shaft size)	3/8" to 1/2" (10 mm to 12.7 mm) diameter round shaft 3/8" (10 mm) square shaft	3/8" to 3/4" (10 mm to 20 mm) diameter round shaft 3/8" to 5/8" (10 mm to 16 mm) square shaft			
Angle of rotation	adjustable from 30°-90°	0°-90° in 5° increments, mechanical limitation 93°			
Torque	53 in-lb (6 N-m)	70 in-lb (8 N-m) constant	140 in-lb (16 N-m)	210 in-lb (24 N-m)	280 in-lb (32 N-m)
Direction of rotation	CW or CCW	jumper selectable			
Position indication	clip-on indicator				
Running time	60 secs @ 60 Hz, 72 secs @ 50 Hz	25-50 secs for 0-70 in-lb (0-8 N-m)	70-115 secs for 0-140 in-lb (0-16 N-m)	115-175 secs for 0-210 in-lb (0-24 N-m)	115-185 secs for 0-280 in-lb (0-32 N-m)
Humidity	0 to 90% RH non-condensing	0 to 95% RH non-condensing			
Ambient temperature	-4°F to 125°F (-20°C to 52°C)	-4°F to 122°F (-20°C to 50°C)			
Storage temperature	-40°F to 176°F (-40°C to 80°C)	-40°F to 186°F (-40°C to 86°C)			
Housing type*	NEMA 2, IP32	NEMA 2, IP42			
Agency listing	UL873 listed, CSA C22.2, CE 89/336/EEC				
Noise level	≤ 35 dBA @ 1 m	≤ 45 dBA @ 1 m			
Servicing	maintenance free				
Quality standard	ISO 9002				
Weight	2.4 lbs (1.08 kg)	2.9 lbs (1.3 kg)			

Notes:

* Most commercial assemblies are available with an optional NEMA 4/4X type housing. See applicable data sheet for details.

** Optional pluggable terminal blocks.

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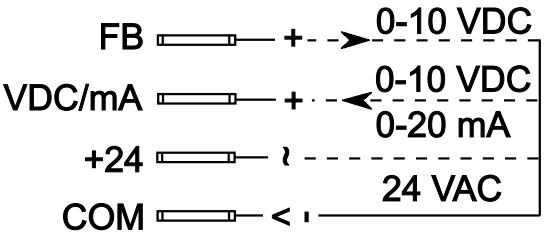
Wiring Diagrams

EN53B2(-S)*

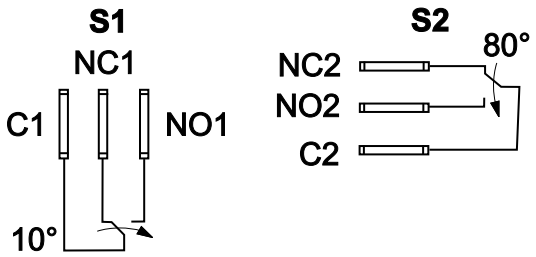
Proportional Control

Models: EN53B2 and EN53B2-S



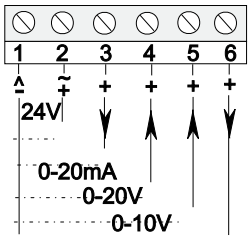
Auxiliary Switches

Model: EN53B2-S



EN70B2(-S)(-ZS), EN140B2(-S)(-ZS), , EN210B2(-S)(-ZS), & EN280B2(-S)

Terminal Block 1

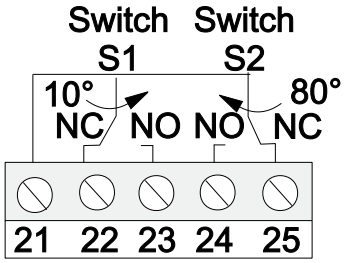


Proportional Control

Models: B2, B2-S, B2-ZS, and B2-ZS-S

1 = Common
2 = Power
3 = Calibration Out (for B2-ZS and B2-ZS-S models only)
4 = Current Input
5 = Voltage Input
6 = Feedback Output

Terminal Block 2



Auxiliary Switches

(Shown Factory Set)
Models: B2-S, B2-ZS-S

Note:

* If actuator is being powered continuously it requires (-S) option, as well as a Form C relay.