DODGE ENGINEERING
& CONTROLS, INC.

Installation Instructions
Issue Date December 3, 2004

EN35C2-T and EN35C2-P Series Electric Non-Spring Return Actuators

Applications

The EN35C2-T and EN35C2-P Series Actuators are direct-mount, non-spring return electric actuators that operate on AC 24 V power. These synchronous, motor-driven actuators provide floating (three-wire) control. All models are compact in size, and are easily installed on Variable Air Volume (VAV) boxes, Variable Air Volume and Temperature (VVT) two-position zone applications, or small to medium-sized dampers with a round shaft up to 1/2 in. (13 mm) in diameter or a 3/8 in. (10 mm) square shaft.

The EN35C2-T and EN35C2-P Series Electric Non-Spring Return Actuators provide a running torque of 35 lb·in (4 N·m), and the nominal travel time is 60 seconds at 60 Hz (72 seconds at 50 Hz) for 90° of rotation.

IMPORTANT: Use this EN35C2-T and EN35C2-P Series Electric Non-Spring Return Actuator only to control equipment under normal operating conditions. Where failure or malfunction of the electric actuator could lead to personal injury or property damage to the controlled equipment or other property, additional precautions must be designed into the control system. Incorporate and maintain other devices such as supervisory or alarm systems or safety or limit controls intended to warn of, or protect against, failure or malfunction of the electric actuator.

Installation for Damper Application:

The EN35C2-T and EN35C2-P Series Electric Non-Spring Return Actuators mount directly to the surface in any convenient orientation using a single No. 10 self-drilling sheet metal screw (included with the actuator). No additional linkages or couplers are required. Electrical connections on the actuator are clearly labeled to simplify installation.

IMPORTANT: Before specifying this Series Electric Non-Spring Return Actuators for plenum applications, verify acceptance of exposed plastic materials in plenum areas with the local building authority. Building codes for plenum requirements vary by location. Some local building authorities accept compliance to UL 1995, Heating and Cooling Equipment, while others use different acceptance criteria.

IMPORTANT: Do not install or use this Series Electric Non-Spring Return Actuator in or near environments where corrosive substances or vapors could be present. Exposure of the electric actuator to corrosive environments may damage the internal components of the device, and will void the warranty.

Parts Included for Damper Applications:

- one electric non-spring return actuator with M3 screw terminals
- one No. 10 self-drilling sheet metal screw

Special Tools Needed

- 5/16 in. (8 mm) square socket
- 3/8 in. (10 mm) 12-point socket
- drill with a 5/16 in. (8 mm) hex nut driver
- digital voltmeter and control signal generator

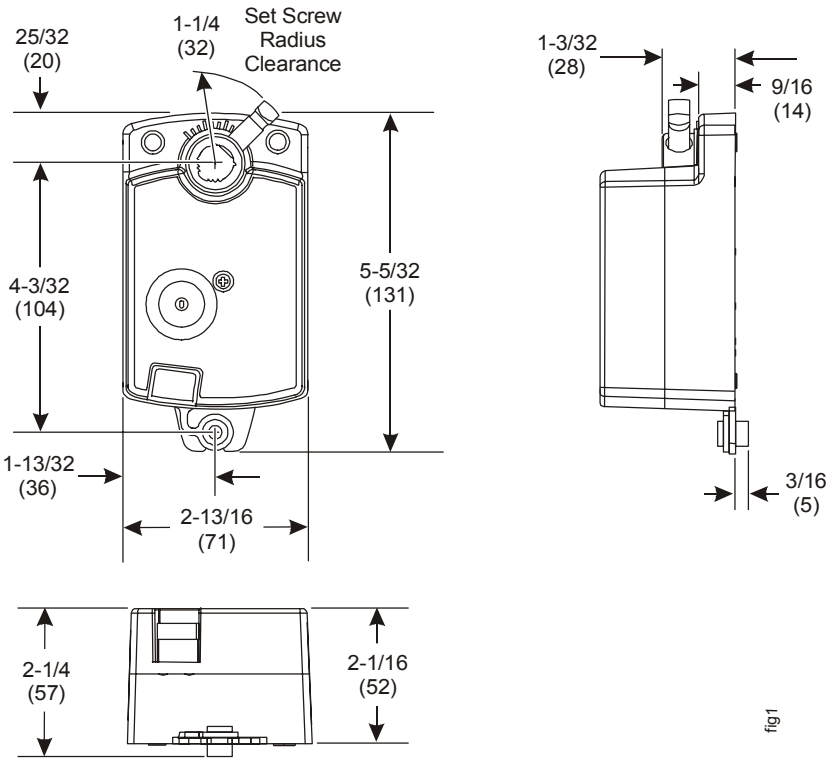

Figure 1: EN35C2-T and EN35C2-P Series
Electric Non-Spring Return Actuator Dimensions, in. (mm)

Damper Applications Mounting

To mount the actuator to a damper:

1. Check that the damper blade is visually accessible or its position is permanently marked on the end of the damper shaft as illustrated in Figure 2.

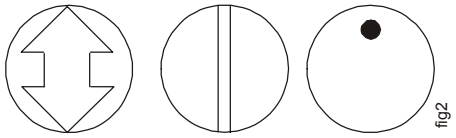

Figure 2: Damper Position Icons

2. Grasp the damper shaft firmly with pliers and rotate the damper fully closed as illustrated in Figure 3.

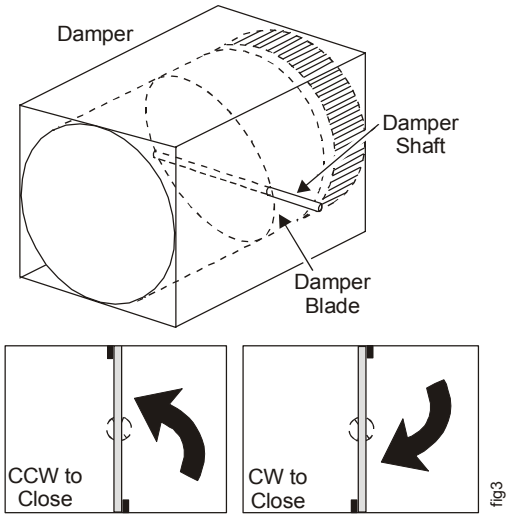

Figure 3: Damper Rotation

3. Press and hold the gear release lever, and rotate the actuator coupler to the fully closed position.
4. Make a note of the rotation range and direction, either Clockwise (CW) or Counterclockwise (CCW), required to close the damper.
5. Position the actuator onto the damper shaft so that the damper shaft protrudes through the actuator coupler as illustrated in Figure 4.

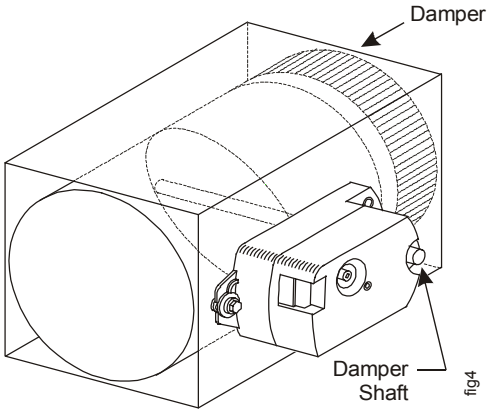

Figure 4: Mounting the Actuator onto the Damper Shaft

6. Be certain that the actuator is in the desired mounting position, parallel to the mounting surface as illustrated in Figure 5.

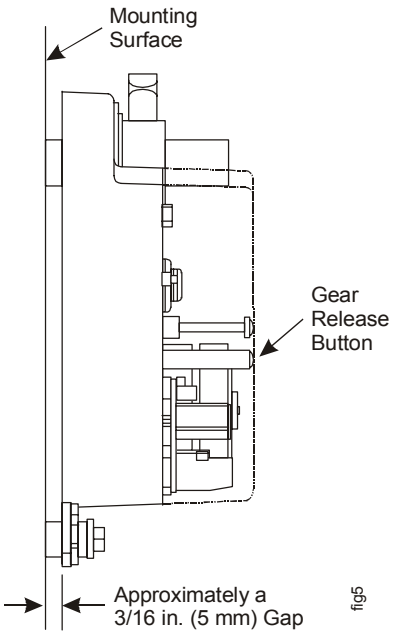

Figure 5: Positioning the Actuator

7. Hold the actuator in place on the damper shaft, and insert the No. 10 self-drilling sheet metal screw through the shoulder washer as illustrated in Figure 6.

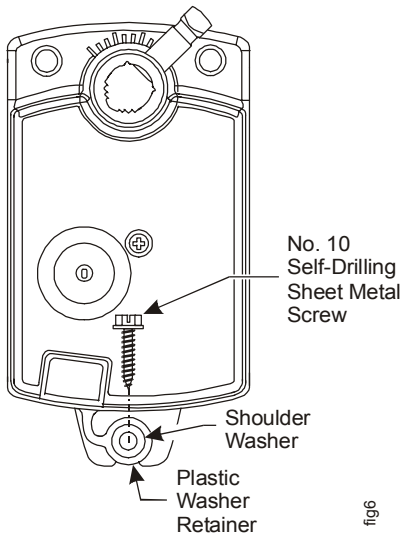

Figure 6: Inserting the Screw into the Shoulder Washer

8. Place a 5/16 in. (8 mm) socket on the screw and use a drill and extension to drill the screw into the mounting surface. Drive the screw until it is tight against the washer.

IMPORTANT: Do not overtighten the mounting screw. Overtightening may strip the threads.

Wiring – Control Valves or Damper Applications

The EN35C2-T and EN35C2-P Series Electric Non-Spring Return actuators require an AC 24 V input signal, and are compatible with a variety of VAV units and controllers. These electric actuators include M3 screw terminals; see Figure 7 for proper wiring.

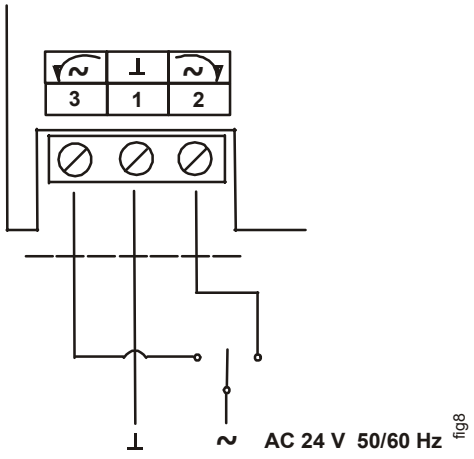

Figure 7: Control Wiring Diagram

Note: Use a controller and/or software that provides a timeout function at the end of rotation (stall) to avoid excessive wear or drive time on the actuator motor.

CAUTION: Risk of Electric Shock. Disconnect the power supply before making electrical connections to avoid electric shock.

CAUTION: Risk of Property Damage. Do not apply power to the system before checking all wiring connections. Short circuited or improperly connected wires may result in permanent damage to the equipment.

IMPORTANT: Make all wiring connections in accordance with local, national, and regional regulations. Do not exceed the electrical ratings of the EN35C2-T and EN35C2-P Series Electric Non-Spring Return Actuator.

Setup and Adjustments

Commissioning

After wiring is completed, apply power to the controller and provide input signals to the actuator to drive it at least one complete cycle open and closed.

Troubleshooting

If the EN35C2-T and EN35C2-P Series Electric Non-Spring Return Actuator is not responding or working properly:

- verify that the actuator assembly is properly secured
- check that all electrical connections are complete and that power is applied
- verify that the damper or valve fully opens and closes, using the gear release button on the actuator
- check that the actuator stroke is set for the desired application

Repairs and Replacement

If the EN35C2-T and EN35C2-P Series Electric Non-Spring Return Actuator fails to operate within its specifications, replace the unit. For a replacement electric actuator, contact Dodge Engineering & Controls, Inc.

Technical Specifications

Product		The EN35C2-T and EN35C2-P Series Electric Non-Spring Return Actuators
Power Requirements		AC 24 V +25%/-20% at 50/60 Hz, 2.1 VA Supply, Class 2 or Safety Extra-Low Voltage (SELV)
Input Signal		AC 24 V +25%/-20% at 50/60 Hz, Class 2 or SELV
Motor Input Impedance		200 ohms Nominal
Running Torque	**EN35C2-T and EN35C2-P Series**	35 lb·in (4 N·m)
Travel Time	**EN35C2-T and EN35C2-P**	60 Seconds at 60 Hz (72 Seconds at 50 Hz) for 90° of Rotation
Rotation Range		93° ±3°, CW or CCW
Cycles		100,000 Full Stroke Cycles; 2,500,000 Repositions at Rated Running Torque
Audible Noise Rating		35 dBA Nominal at 39-13/32 in. (1 m)
Electrical Connections		M3 Screw Terminals
Mechanical Connections		Up to 1/2 in. (13 mm) Diameter Round Damper Shaft or 3/8 in. (10 mm) Square Damper Shaft
Enclosure		NEMA 2, IP40
Ambient Conditions	**Operating**	32 to 125°F (0 to 52°C); 90% RH Maximum, Noncondensing
	Storage	-20 to 150°F (-29 to 66°C); 90% RH Maximum, Noncondensing
Compliance	**North America**	UL Listed, File E27734, CCN XAPX (United States) and XAPX7 (Canada)
		Actuator Housing is Plenum Rated per CSA C22.2 No. 236/UL 1995, Heating and Cooling Equipment
	European Union	CE Mark, EMC Directive 89/336/EEC
	Australia and New Zealand	C-Tick Mark, Australia/NZ Emissions Compliant
Shipping Weight		1.0 lb (0.5 kg)

The performance specifications are nominal and conform to acceptable industry standards. For application at conditions beyond these specifications, consult Dodge Engineering & Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products.

Dodge Engineering & Controls, Inc.
196 Riverneck Road
Chelmsford, MA 01824