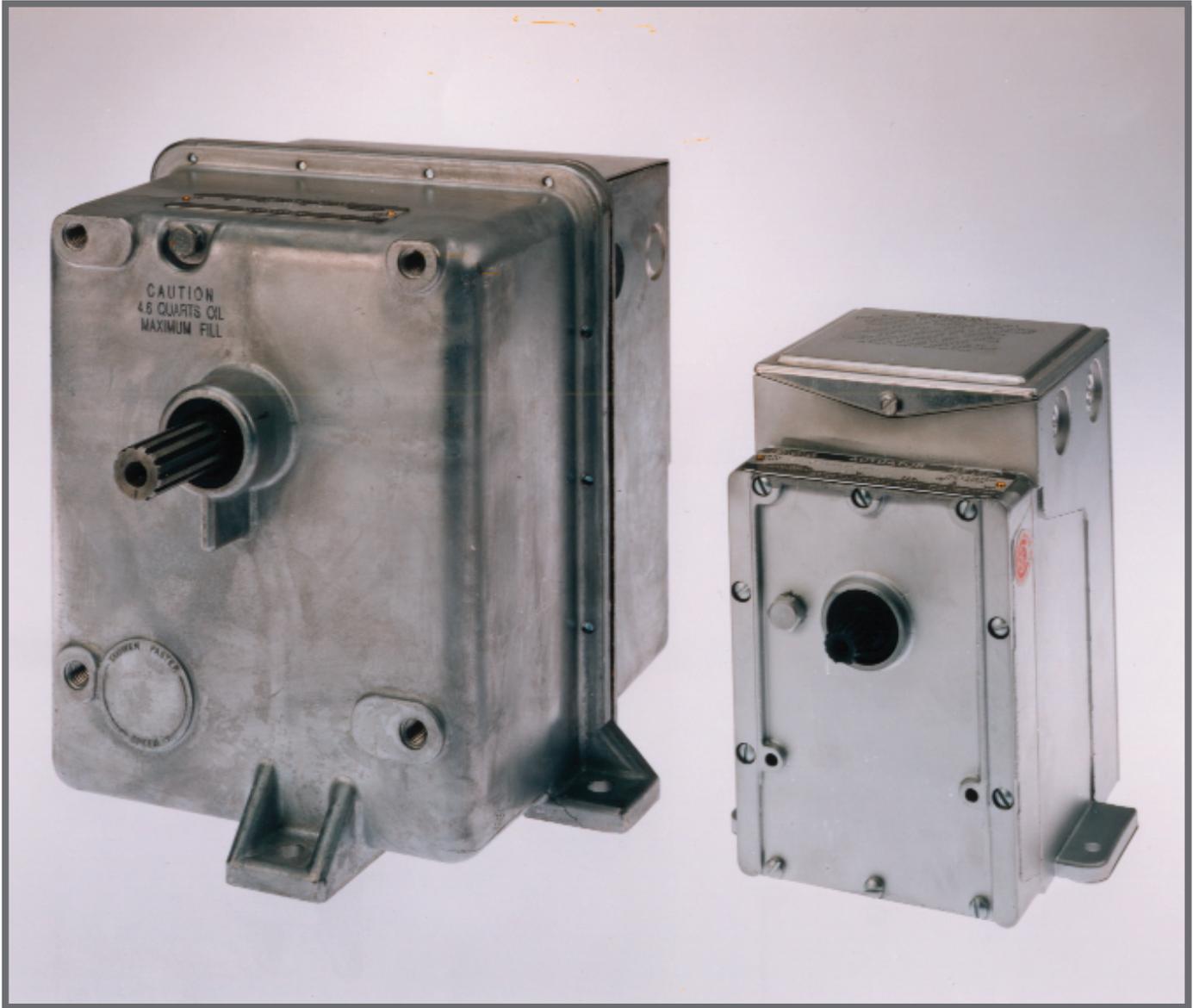


invenys
Eurotherm

EA Series

Actuators





Series EA Actuators

For use with VB-7000 Series or VB-9000 Series valve bodies from Barber-Colman and many other commercially available rotary shaft valve bodies with crankarms. Also for use with HVAC and combustion air dampers

Used for two position floating and proportional control of dampers and valves in industrial applications. Typical applications are heat treat furnaces, ovens, heat recovery systems, water or oil cooling systems. These actuators provide the requirements of both damper control and valve control applications where it is desirable to move the load in either direction or to stop it at any point in the stroke, All models contain feedback slidewires for true position-proportional control.

Low Torque, Medium Torque, and Spring Return

(Series EA40, EA50, and EA60)

Features:

- Proportional Actuators with Built-in Feedback Potentiometer
- Spring Return and Non-spring Return Models Available
- 24 Vac, 120 Vac and 240 Vac Models Available
- Oil Immersed Motor and Gear Train
- SPDT Auxiliary Switch Standard

High Torque

(Series EA70)

Features:

- Proportional Actuators with Built-in Feedback Potentiometer
- 120 Vac and 240 Vac Models Available
- Die Cast Housings with Four 1/2" Conduit Openings
- Oil Immersed Motor and Gear Train
- SPDT Auxiliary Switch Standard

Current to Position Converters and Resistance to Position Converters for Electric Actuators

(Series 658, 659)

Features:

- Solid State Switching Output
- Fast Response
- Adjustable Zero, Span and Deadband
- Two Wire Input from Controller
- Operates with 90 to 1000 Ω Feedback Slidewire in Electric Actuator
- Burner Purge (Optional)

The Series 658 is a current to position converter which is typically located electrically between a primary controller and an electric actuator. The Series 659 is a resistance to position converter which is typically located electrically between a retransmitting slidewire and an electric actuator. Models 658A and 659A are designed for mounting directly to the side of the actuator; models 658B and 659B are designed with a mounting flange for securing it to any flat surface.

EA40 Series

EA40 Series

The spring return actuator will proportionally position a fuel valve, butterfly valve, damper and similar devices which require return to a normal position on power interruption. The output shaft is power operated in both directions. An internal electrical holding circuit maintains the proper damper position at setpoint. The enclosed spring drives the output shaft and gear train to return the damper to a normal position on power interruption. Power consumption is 28 W. Standard features includes 100 Ω internal feedback slidewire and single internal SPDT switch. Shipping weight, 8 lbs.



- Spring Return Actuator
- Low torque

Specifications

Control Action:	1) Floating. Requires SPDT switch with floating (center off) position rated at 0.9 amps. 2) Proportional, electric. 3) Proportional, electronic. Requires 658A converter.
Connections:	Coded screw terminals.
Shaft Rotation:	Reversible proportional can stop at any point in the stroke.
Spring Return:	To normal position on power interruption.
Auxiliary Switch:	Adjustable SPDT snap acting. Factory set to close one contact and open the other at end of clockwise rotation.
Ambient Temperature Limits:	-40 to 136°F (-40 to 58°C).
Humidity:	5 to 95% rh, non-condensing.
Case:	Die cast aluminum with two 1/2" conduit knockouts each side.
Mounting:	Damper - upright. Valve - upright with actuator above centerline of valve body.
Dimensions:	7" H x 5-3/8" W x 8-1/8" D (178 mm x 137 mm x 206 mm)

EA50, EA60 Series



EA50 & EA60 Series

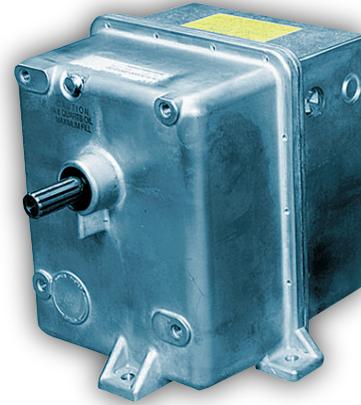
The medium torque actuator is ideal for proportional positioning of a fuel valve, butterfly valve, damper and similar applications. Units are available with either fixed or adjustable speed. Timing of adjustable speed units can be increased (decreasing the speed) by turning a slotted adjustment screw on the outside of the case. Adjust range is approximately ten times rated. Power consumption is 40 W. 100 Ω feedback slidewire and a single SPDT switch are standard features. Shipping weight, 8 lbs.

- **Medium Torque, Gear Train**
- **Non-Spring Return Actuator**

Specifications

Control Action:	1) Floating. Requires SPDT switch with floating (center off) position rated at 0.9 amps. 2) Proportional, electric. 3) Proportional, electronic. Requires 658A converter.
Connections:	Coded screw terminals.
Shaft Rotation:	Reversible proportional can stop at any point in the stroke.
Spring Return:	To normal position on power interruption.
Auxiliary Switch:	Adjustable SPDT snap acting. Factory set to close one contact and open the other at end of clockwise rotation.
Ambient Temperature	
Limits:	-40 to 136°F (-40 to 58°C)
Humidity:	5 to 95% rh, non-condensing.
Case:	Die cast aluminum with two 1/2" conduit knockouts each side
Mounting:	Damper - upright. Valve - upright with actuator above centerline of valve body.
Dimensions:	7" H x 5-3/8" W x 8-1/8" D (178 mm x 137 mm x 206 mm)

EA70 Series



EA70 Series

The high torque actuator will position a heavy damper, globe valve, blast gate, air or gas valve. It can be used for vortex control and hydraulic coupling, and will drive a speed changing screw or slide gate requiring a torque proportional actuator. Power consumption is 190 W. Standard features include 100 Ω feedback slidewire and a single SPDT switch. Shipping weight, 30 lbs. Weather resistant models are NEMA 4.

- High Torque Actuator

Specifications

Control Action:	Requires SPDT switch with neutral (floating) or two position and proportional
Connections:	Coded screw terminals.
Shaft Rotation	Reversible proportional can stop at any point in the stroke.
Auxiliary Switch:	Adjustable SPDT snap acting. Factory set to close one contact and open the other at end of clockwise rotation.
Ambient Temperature Limits:	-40 to 130 °F (-40 to 54 °C).
Humidity:	5 to 95% rh, non-condensing
Mounting:	Damper - upright recommended Valve - any upright position with actuator above centerline of valve body.
Dimensions:	9-9/16" H x 9-1/2" W x 10-1/2"D (243 mm x 241 mm x 267 mm)

Option Kits

(Fields 7 and 8 of Actuator Model No.)

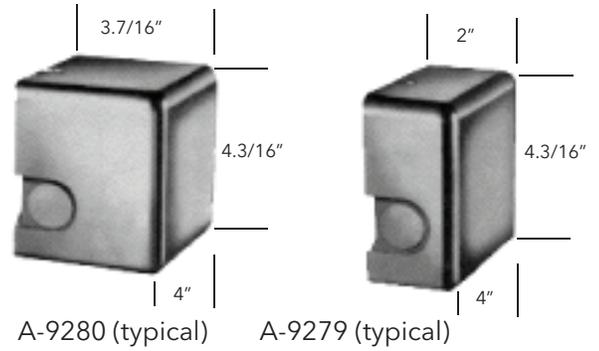
All kits mount in place of the back plate on the actuator. The following options are available for the high torque, medium torque and low torque actuators.

Actuator Option	Kit for 90° Unit	Kit for 180° Unit
02	A-9280	
05	A-9284	A-9283
07	n/a	71-589

Actuator Option	Kit for 90° Unit	Kit for 180° Unit
01	A-9279	
04	A-9282	A-9281
06	71-586	71-588

NEMA 4 Weather Resistant Cover Kit:

Kit No. AM-369 (option 37) for EA70 Series;
Kit No. A-9301 for EA 40, 50 and 60 Series.



Auxiliary Switch:

A built-in, cam operated, snap acting, SPDT switch is normally included. The point of switch actuation is readily adjustable, but is factory set to close one contact and open the other at the end of the clockwise stroke. The auxiliary switch housing is not weather resistant.

Rating:	120 Vac	240 Vac
Running Current	5.8 Amps	2.9 Amps
Locked Rotor	34.8 Amps	17.4 Amps
Non-Inductive	12 Amps	6 Amps
Maximum total load not to exceed 2000 VA.		

Rear Slidewire:

(Retransmitting Slidewire)

5 W variable resistor for driving other actuators in parallel. Slidewire housing is weather resistant. Plate size for all kits is 4-1/8" W x 6-7/8" H. Box depth as shown in photo caption. When ordering rear slidewire kit (actuator model no. option 31, 32, 33, 41, 42 or 43), write complete part number as shown.

Ordering Information

MODEL A - 1 0 9 4 6 - E - -
Field No. 4 - 5 6 7 8 9 - 10 11 12 - 13 - 14 15

Fields 4 through 9. Model Series

Fields 10, 11. Actuator Torque

10 - Low and medium

20 - High

Field 12. Reserved

E

Field 13. Number of Slidewires

1 - One slidewire (actuator option 31 or 41)

2 - Two slidewires (actuator option 32 or 42)

3 - Three slidewires (actuator option 33 or 43)

Fields 14, 15. Slidewire Value

01 - 100 Ω, 90°

02 - 100 Ω, 180°

03 - 135 Ω, 90°

07 - 1 kΩ, 90°

08 - 1 kΩ, 180°



Accessories

Medium Torque, Low Torque and Spring Return Actuators

	Crank Arm— (for motor shaft) A-3767 with round hole; A-13120 with spindled hole 17/64" slot; Radius adjustable from 7/8" to 3-1/8"
	Connecting Link (rod only) A-3768; 20"x 5/16" diameter
	Linkage Connector A-3795 - straight; A-13053 - swivel; 5/16" diameter hole
	90° Angle Bracket Damper Mount 13-1187

High Torque Actuators

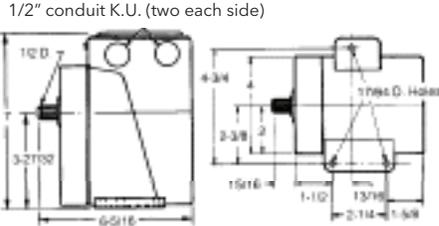
	Crank Arm A-4120; 33/64" slot; Radius adjustable from 1" to 5"
	Connecting Link (rod only) A-4122; 1/2" diameter rods, adjustable from 15-3/4" to 24-3/4"

For Millimeters multiply inches by 25.4 (Inches x 25.4 = Millimeters)

Mounting Dimensions

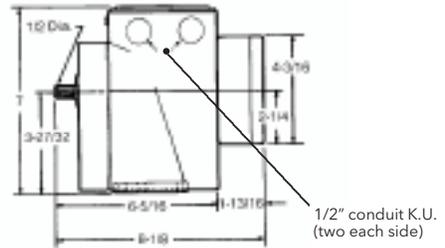
MEDIUM TORQUE AND LOW TORQUE

Side View Bottom View



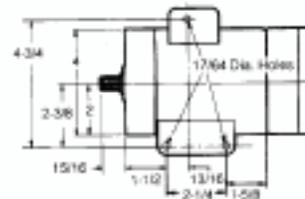
SPRING RETURN

Side View



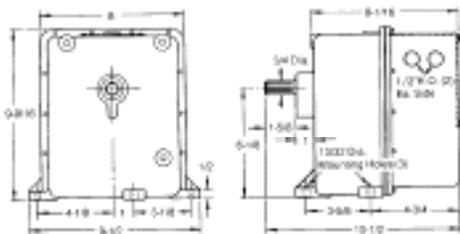
Low and medium torque and spring return output shafts have a standard 12 tooth spline. Reference ANSIB5.15. Mounting should be upright for the longest life. Models with adjustable speed must not be mounted upside down or with the output shaft upward.

Bottom View



HIGH TORQUE

Front View Side View



For Millimeters multiply inches by 25.4 (inches x 25.4 = Millimeters).

658 Series

658 Series Current to Position Converters for Electric Actuators

The Series 658 is a current to position converter which is typically located electrically between a primary controller and an electric actuator. Model 658A is designed for mounting directly to the side of the actuator; model 658B is designed with a mounting flange for securing it to any flat surface.

The electric actuator's position is proportional to the input current from the primary controller. A built-in potentiometer in the electric actuator, with wiper arm driven by the output shaft, provides a feedback signal to the Series 658 to produce the proportional action. A change in current from the source drive the electric actuator in a direction to restore balance and return the process to the setpoint.

The signal input ordered is factory set, but is adjustable in the field to accept spans such as 4 to 20, 2 to 12, 7 to 12, 4 to 12, and 12 to 20mA. The Series 658 has a standard input impedance of 250 Ω for current output primary controllers.

A special option (65 or 66 in the model number) is available on Model 658A that provides an extra input lead (white) for activation of the purge option used on a burner control. A dry contact closure between the purge input and the input+ (red) wires will drive the actuator full open to provide 100% flow for air purge of a gas burner.

Converters with special "option 65" are wired for mounting on the left side of the actuator; converters with "option 66" are wired for the right side of the actuator.



Model 658B with in-Panel Flange mounts

Model 658A mounted on the left side (standard) of an electric actuator



UL recognized under the Components Program (except specials)

- Solid State Switching Output
- Adjustable Zero, Span and Deadband
- Two Wire Input from Controller
- Operates with 90 to 1000 Ω Feedback Slidewire in Electric Actuator
- Burner Purge (Optional Feature)

Specifications

Input Signal:	Adjustable to controller spans ranging from 4 to 16 mAdc. Input circuit is isolated from both output circuit and ground.	Overranging:	No effect from 100% overrange signal.
Input Signal Zero:	Adjustable from 2 to 16 mAdc.	Deadband:	Deadband is the difference between the input signal which will drive the motor one way and the level which will drive it the other way. The percent of deadband adjustment is dependent on the input signalspan. For example, 2 to 12 mA – 2% to 8% of input span; 4 to 20 mA – 1.2% to 4.8% of input span.
Input Impedance:	250 Ω. Other impedances obtained by adding external series or parallel resistors.	Linearity:	0.15% of slidewire.
I/O Connections:	Color coded pigtail leads on Model658A. Numbered barrier terminal strip on Model 658B.	Ambient Temperature Limits:	-25 to 58°C.
Load:	Low, medium or high torque electric actuators.	Power Consumption:	7.0 VA at 120 or 240 Vac, 50 or 60 Hz.
Feedback Slidewire Inputs:	90 to 1000. Ω	Maximum Continuous Output Current Rating:	2.0 Amp at 24 to 240 Vac rms.
Grounded Input:	Grounding any input wire will not cause damage.	Line Regulation:	120 or 240 Vac, ±10% variation, with fixed input signal offset of 1% maximum.
Open Circuit Input:	Will drive actuator to low position.	Mounting:	Upright recommended (as shown) for Model 658A, but other positions are acceptable.
Series Operation:	No offset in control point when operated in tandem.	Shipping Weight:	Series 658 only, three pounds.

Ordering Information

MODEL 6 5 8 0 0 0 - 0 0 0 - E -

Field No. 1 2 3 4 - 5 6 7 8 9 - 10 11 12 - 13 - 14 15

Fields 1, 2, 3. Base Model

Field 4. Mounting Style:

- A - Actuator
- B - In-panel (flange)

Fields 5, 6, 7. Reserved

Field 8. Enclosure

- 0 - Standard Mount, Standard Housing
- 1 - Standard Mount, Rain Tight Housing (658A only)
- 2 - EA7X Mount, Standard Housing (658A only)
- 3 - EA7X Mount, Rain Tight Housing (658A only)

Field 9. Input Signal

- 1 - 4 to 20 mAdc
- 2 - 4 to 12 mAdc
- 3 - 12 to 20 mAdc
- 4 - 2 to 12 mAdc
- 5 - 2 to 7 mAdc
- 6 - 7 to 12 mAdc
- 8 - Other. See "special" fields 13, 14, 15.

Fields 10, 11, 12. Reserved

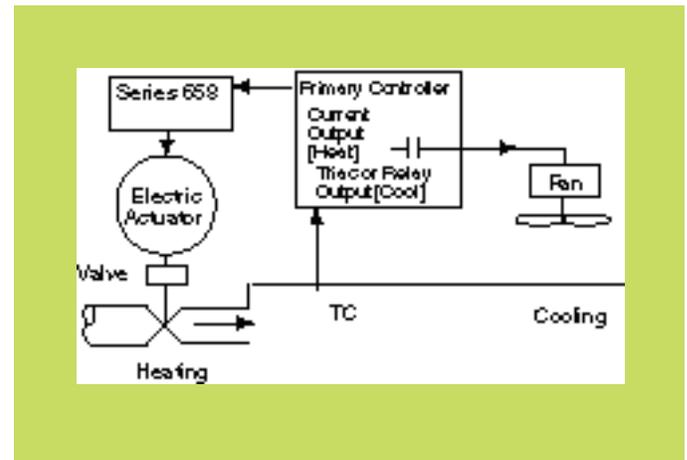
Fields 13 Reserved

E

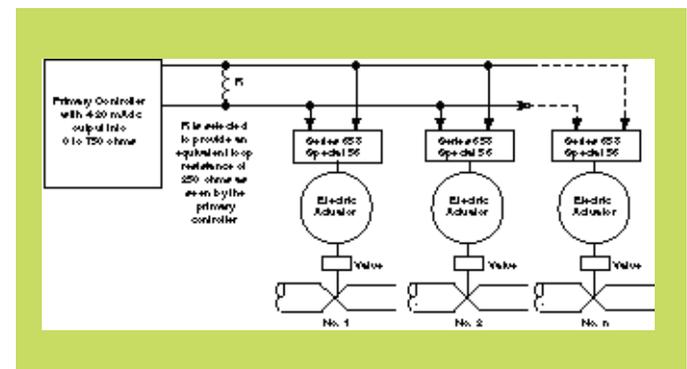
Fields 14, 15. Special

- 0 - 00 None
- 0 - 50 1 to 5 mAdc into 1 k Ω
- 0 - 51 0 to 5 mAdc into 250 Ω
- 0 - 52 2 to 42 mAdc into 100 Ω
- 0 - 53 5 to 10 mAdc into 250 Ω
- 0 - 54 16 to 20 mAdc into 250 Ω
- 0 - 55 0 to 5 Vdc input signal
- 0 - 56 1 to 5 Vdc input signal
- 0 - 57 6 to 9 Vdc input signal
- 0 - 58 3 to 15 Vdc input signal
- 0 - 59 0 to 10 mAdc input signal into 250 Ω
- 0 - 60 10 to 50 mAdc input signal into 100 Ω
- 0 - 62 0 to 10 Vdc input signal
- 0 - 63 4 to 14 mAdc input signal into 250 Ω
- 0 - 64 10 to 20 mAdc input signal into 250 Ω
- 0 - 65 Purge option, left side mount (Model 658A only)
- 0 - 66 Purge option, right side mount (Model 658A only)
- 0 - 67 Right side mount, no purge (Model 658A only)

Typical Applications



Dual output heat/cool controllers with outputs of 2 to 12 mAdc or 4 to 20 mAdc constant current and on/off.



One primary controller can drive up to 12 electric actuators by means of the Series 658, special 56 converters. Input impedance is 127 Ω

Mounting Dimensions

(see page 15)

659 Series

659 Series Resistance to Position Converters for Electric Actuators

The Series 659 is a resistance to position converter which is typically located electrically between a retransmitting slidewire and an electric actuator. The primary application of the Series 659 is in tandem operation of electric actuators.

Triac switching in the Series 659 drives the actuator through an angular direction corresponding to the position of the master control slidewire. A built-in potentiometer in the actuator, with wiper arm driven by the output shaft, provides a correctional feedback signal to the Series 659 to provide proportional action. The triac switching and feedback continues until balance is reached. Deadband, which is the difference between the input signal which will drive the motor one way and the level which will drive it the other way, is adjustable from 0.1% to 8% of the master control slidewire span. A deadband is recommended for less critical processes, since it will reduce mechanical wear on the actuator.



Model 659B with in-Panel Flange mounts

Model 659A mounted on the left side (standard) of an electric actuator



UL recognized under the Components Program (except specials)

- **Solid State Switching Output**
- **Fast Response**
- **Adjustable Deadband**
- **Input from 100 to 1000 Ω Slidewire**

Specifications

Input Signal:	100 to 1000 Ω slidewire
Zero and Span:	no adjustment
Input/Output Connections:	Color coded pigtail leads on Model 659A. Numbered barrier terminal strip on Model 659B.
Load:	Low, medium or high torque electric actuators.
Feedback Slidewire Inputs:	100 to 1000 Ω to match input resistance.
Grounded Input:	Grounding either or both input wires will not cause damage.
Deadband:	Adjustable from 0.1% to 8% of input signal span
Linearity:	0.15% of slidewire.
Ambient Temperature Limits:	-25 to 58°C.
Power Consumption:	7.0 VA at 120 or 240 Vac, 50 or 60 Hz.
Maximum Continuous Output Current Rating:	2.0 Amp at 24 to 240 Vac rms.
Line Regulation:	120 or 240 Vac, ±10% variation, with fixed input signal offset of 0.5% maximum.
Mounting:	Upright position recommended (as shown) for Model 659A, but other positions are acceptable.

Ordering Information

MODEL 6 5 9 0 0 0 0 - 0 0 0 - E -
 Field No. 1 2 3 4 - 5 6 7 8 9 - 10 11 12 - 13 -14 15

Fields 1, 2, 3. Base Model

Field 4. Mounting Style:

- A - Actuator
- B - In-panel (flange)

Fields 5, 6, 7. Reserved

Field 8. Enclosure

- 0 - Standard Mount, Standard Housing
- 1 - Standard Mount, Rain Tight Housing (659A only)
- 2 - EA7X Mount, Standard Housing (659A only)
- 3 - EA7X Mount, Rain Tight Housing (659A only)

Fields 9-12. Reserved

Field 13. Reserved

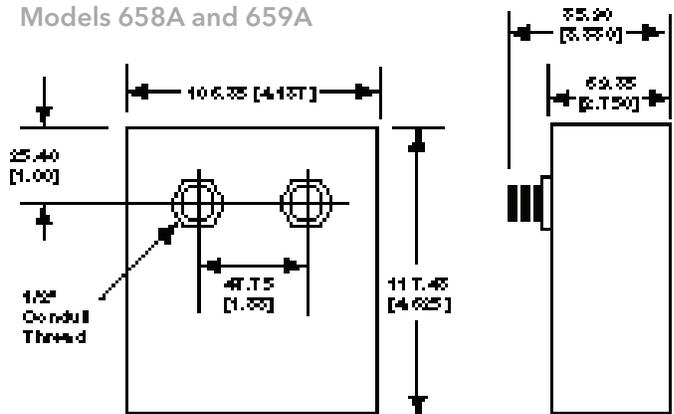
E

Fields 14, 15. Reserved

Mounting Dimensions for 658 Current to Position Converters and 659 Resistance to Position Converters

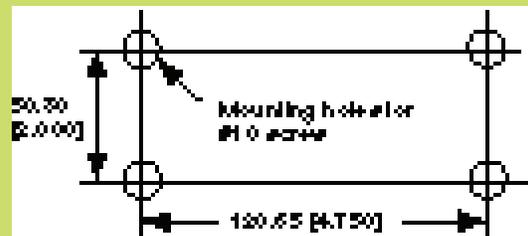
Overall Dimensions: in millimeters (inches).
 136.52[5.375] H x 139.7 [5.5] W x 69.85 [2.75] D.

Models 658A and 659A



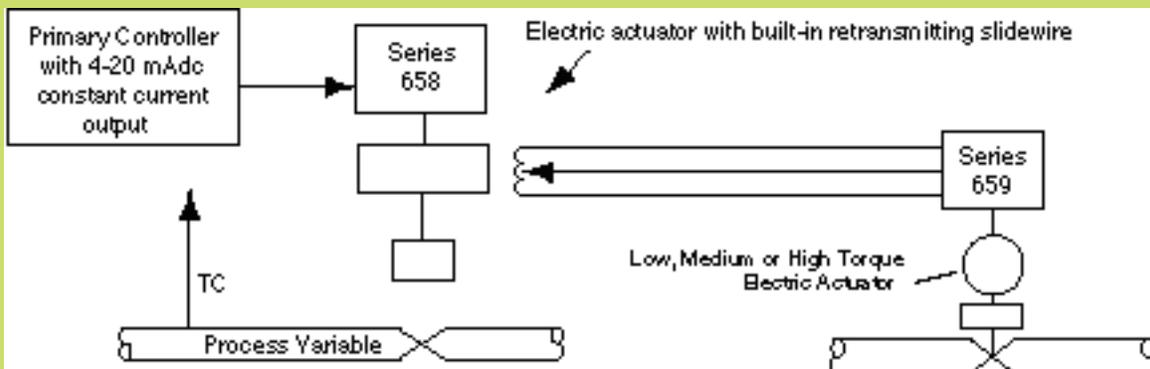
Note: Dimensions slightly different on units designed for mounting to high torque actuators

Models 658B and 659B



Typical Application

Two actuators driven in tandem. Position limiting resistors are on the second actuator.



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ED60

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Operations Management