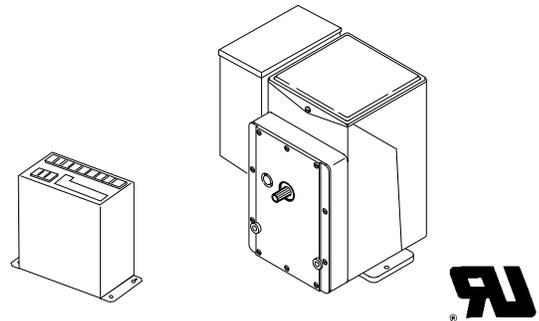


# Model 658 Current to Position Converter

## Model 659 Resistance to Position Converter

For use with EA Series  
Low, Medium and High Torque Actuators



Model 65XB shown at left; Model 65XA shown mounted to left side (standard) of a medium torque electric actuator.

### 1. INTRODUCTION

This instrument has been carefully manufactured, inspected and packed at the factory. Check the contents against the packing slip. If the equipment is damaged in transit, immediately report the extent of the damage to the carrier and the manufacturer. Repack the instrument in the original packing box until ready for installation. Handle with care.

The converter is available with or without mounting flanges as specified in the model number. Models without flanges are designed for mounting directly to the side of the actuator. Models with flanges can be mounted to any flat surface.

#### Model 658

The Model 658 is typically located electrically between a primary controller and an electric actuator. The actuator's position is proportional to the input current from the primary controller. The actuator has a built-in 100 to 1000 ohm potentiometer with its wiper arm driven by the output shaft. The potentiometer provides a feedback signal to the converter to produce the proportional action. A change in current from the primary controller drives the actuator in the direction to restore balance and return the process to the setpoint.

As shipped, the signal input is set as specified on the order, but it is adjustable. The standard input impedance is 250 ohms for current output primary controllers.

#### Model 659

The Model 659 is typically located electrically between the re-transmitting slidewire and an electric actuator. The primary application is for tandem operation of actuators. Actuator position is proportionally controlled by the position of the transmitting slidewire. The actuator has a built-in 100 to 1000 ohm potentiometer with its wiper arm driven by the output shaft. The potentiometer provides a feedback signal to the converter to produce the proportional action. The Model 659 outputs rotate the actuator until balance is achieved. Deadband (the difference between the input signal that drives the motor one way and that which drives it the other way) is adjustable from 0.1% to 8.0% of the master control slidewire span. A deadband is recommended for less critical processes since it will reduce mechanical wear on the actuator.

**Instruction Manual**

# Current, Resistance Converters

## 2. SPECIFICATIONS

	<b>Model 658 Current Converter</b>	<b>Model 659 Resistance Converter</b>
<b>Input Signal</b>	0 to 20 mA <sub>dc</sub> ; 0 to 15 V <sub>dc</sub>	100 to 1000 ohms slidewire
<b>Zero Range</b>	2 to 16 mA <sub>dc</sub> ; 0 to 10 V <sub>dc</sub>	n/a
<b>Span Range</b>	7 to 22 mA <sub>dc</sub> ; 4 to 15 V <sub>dc</sub>	n/a
<b>Input Impedance</b>	250 ohms. 10k voltage unit	n/a
<b>I/O Connections</b>	Color coded lead wires on actuator side mount versions (65XA) Numbered barrier terminal strip on flange mount versions (65XB)	
<b>Load</b>	Low, medium and high torque electric actuators, except EA12, 31	
<b>Feedback S/W Inputs</b>	90 to 1000 ohms	100 to 1000 ohms to match input resistance
<b>Grounded Input</b>	Grounding any input wire will not cause damage	
<b>Overranging</b>	No affect from 100% overrange signal	n/a
<b>Deadband</b>	0.1 to 8%	
<b>Linearity</b>	0.15%	
<b>Temperature</b>	Ambient: -13 to 136° F (-25 to 58° C)	
<b>Power Consumption</b>	7.0 VA @ 120 or 240 Vac, 50 or 60 Hz	
<b>Maximum Continuous Output Current Rating</b>	2.0 A @ 24 to 240 Vac rms	
<b>Line Regulation</b>	120 or 240 Vac, ±10%, with fixed input signal offset of 0.5%	
<b>Mounting</b>	Upright position recommended; others acceptable	
<b>Shipping Weight</b>	3 lbs.	

# Current, Resistance Converters

Model: 6 5   - 0 0 0   - 0 0 0 -  -    
Field: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

## Fields 1, 2, 3. MODEL

- 658 - Current to Position Converter
- 659 - Resistance to Position Converter

## Field 4. MOUNTING STYLE

- A - Actuator Side Mount
- B - Flange Mount

## Fields 5, 6, 7. RESERVED

## Field 8. ENCLOSURE

- 0 - Standard
- 1 - Rain Tight (side mount models only)

If converter is to be mounted a high torque (EA7X) actuator manufactured before August 1, 1984, use these options\*

- 2 - Standard, with EA7X Mount
- 3 - Rain Tight, with EA7X Mount

## Field 9. INPUT SIGNAL

### Model 659

- 0 - None

### Model 658

- 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 Fields 14 and 15

## Fields 10, 11, 12, 13. RESERVED

## Fields 14, 15. SPECIALS

- 00 - None

## Input Signal, Model 658 Only

(Applicable only if Field 9 is Option 8)

- 50 - 1 to 5 mAdc into 1k  $\Omega$
- 51 - 0 to 5 mAdc into 250  $\Omega$
- 52 - 2 to 42 mAdc into 100  $\Omega$
- 53 - 5 to 10 mAdc into 250  $\Omega$
- 54 - 16 to 20 mAdc into 250  $\Omega$
- 55 - 0 to 5 Vdc
- 56 - 1 to 5 Vdc
- 57 - 6 to 9 Vdc
- 58 - 3 to 15 Vdc
- 59 - 0 to 10 mAdc into 250  $\Omega$
- 60 - 10 to 50 mAdc into 100  $\Omega$
- 62 - 0 to 10 Vdc
- 63 - 4 to 14 mAdc into 250  $\Omega$
- 64 - 10 to 20 mAdc into 250  $\Omega$

## Purge/Mount Option, Model 658A Only

- 65 - Purge option, left side mount
- 66 - Purge option, right side mount
- 67 - No Purge, right side mount

\*Before mounting the converter to an early production actuator, the standard top plate and rear plate must be removed. Install in their place mounting plate number 13-4406 and terminal cover number 13-4407. Other accessories (rear slidewires, auxiliary switches, etc.) cannot be mounted on the actuator.

The unused line voltage wire of the actuator transformer should either be clipped or carefully insulated.

## 3. MOUNTING

Locate the converter so as to avoid dust or oil accumulation and moisture. If installed outdoors, it must be protected from moisture (or ordered with the rain tight enclosure option), and kept within ambient temperature limits – see specifications. See mounting dimensions on back page.

## 4. POWER WIRING

Power is supplied from the actuator to a side mounted converter. Power for a remote (flange mounted) converter should be taken from the same source that supplies the actuator. The violet lead is power line common. The blue lead is for 120 Vac; the black/white lead is for 240 Vac. A converter attached to an electric actuator at the factory can be changed in the field to a different line voltage. If a converter is attached to an electric actuator in the field, the unused line voltage wire of the transformer should either be clipped or carefully insulated.

# Current, Resistance Converters

## 5. INPUT/OUTPUT WIRING

### Model 658

Using the connections shown in the table below, increasing input causes CCW actuator rotation. To reverse actuator rotation, invert leads at actuator terminals 7 and 8, and also at terminals 2 and 3.

A special 65 or 66 on the 658A provides a (white) lead wire for activation of the purge option used on a burner control. A dry contact closure between the purge wire and the input + (red) wire will drive the actuator full open to provide 100% flow for air purge of a gas burner. Converters with special 65 are wired for mounting on the left side of the actuator; converters with special 66 are wired for the right side of the actuator.

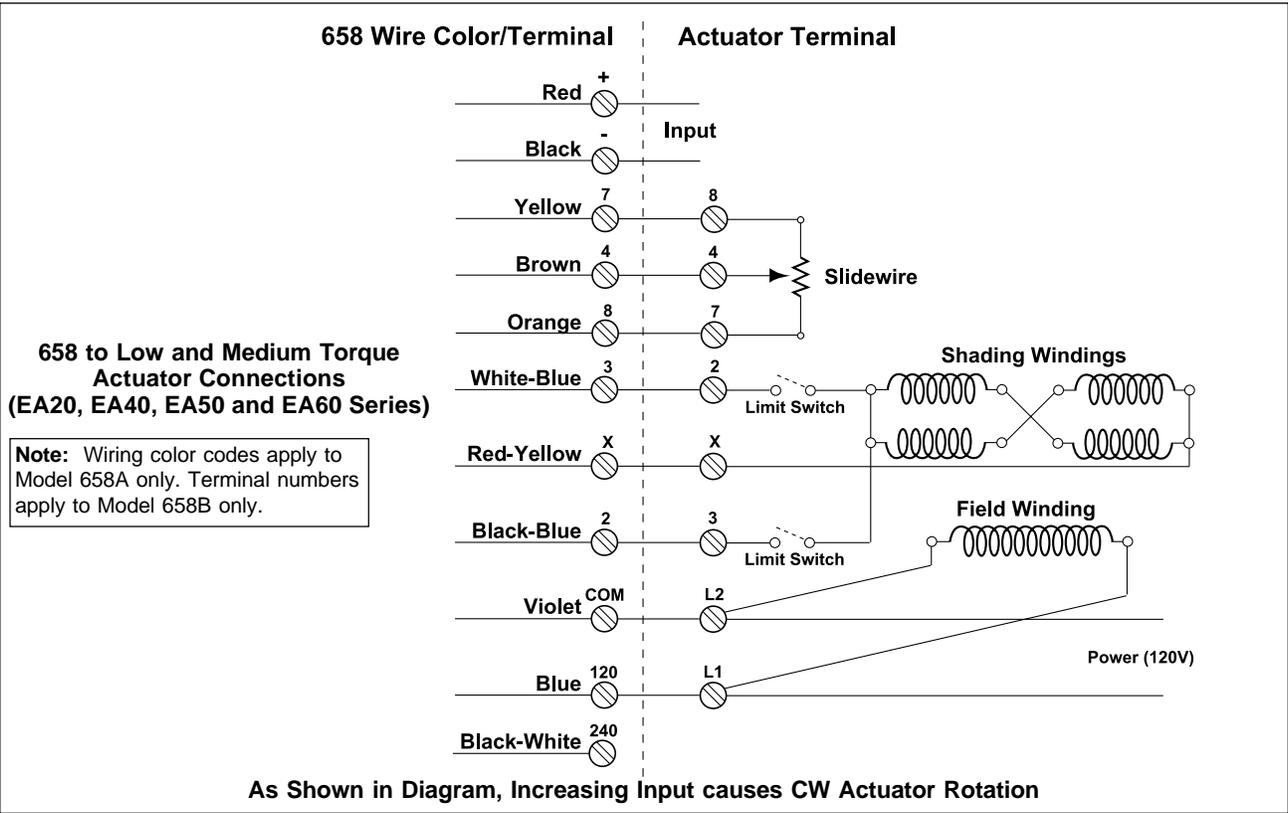
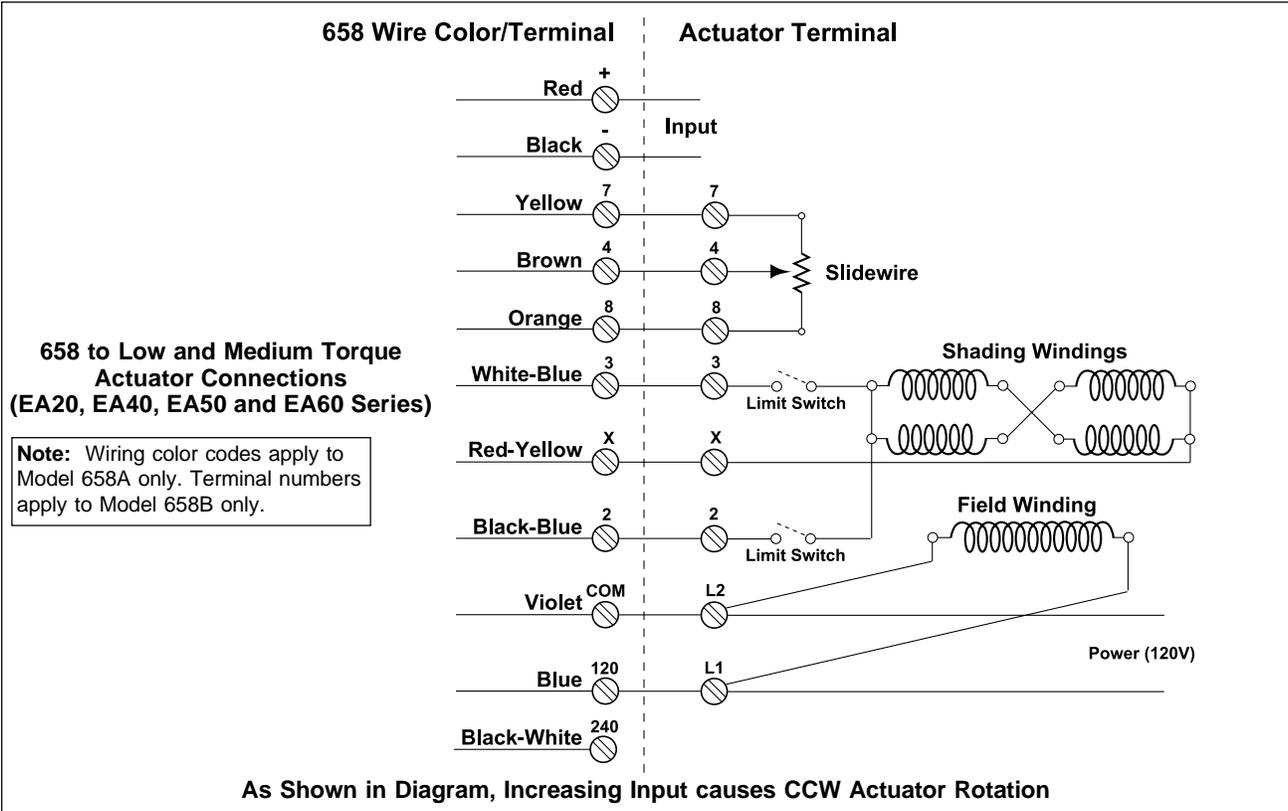
### Model 659

Using the connections shown in the tables below, CW rotation of the slidewire (or potentiometer) causes CW actuator rotation. To reverse actuator rotation, invert leads A and B.

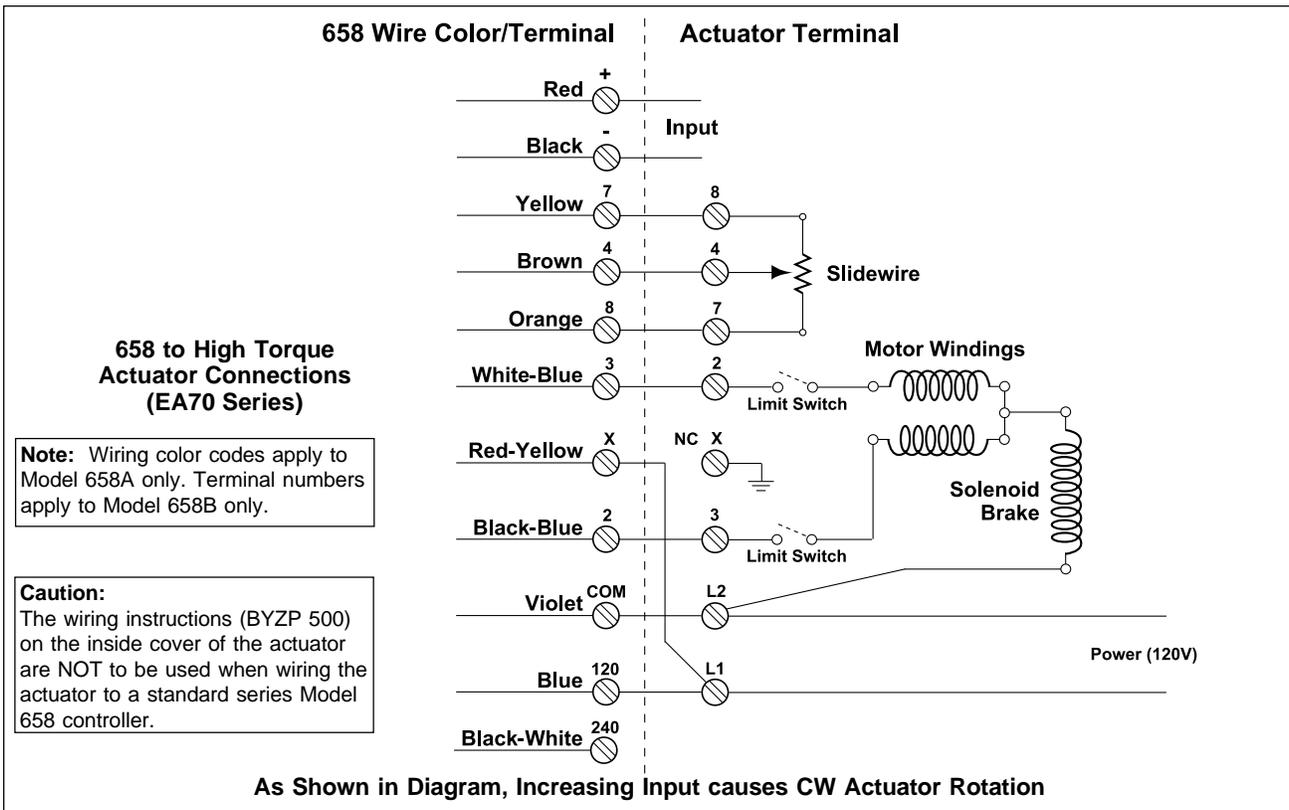
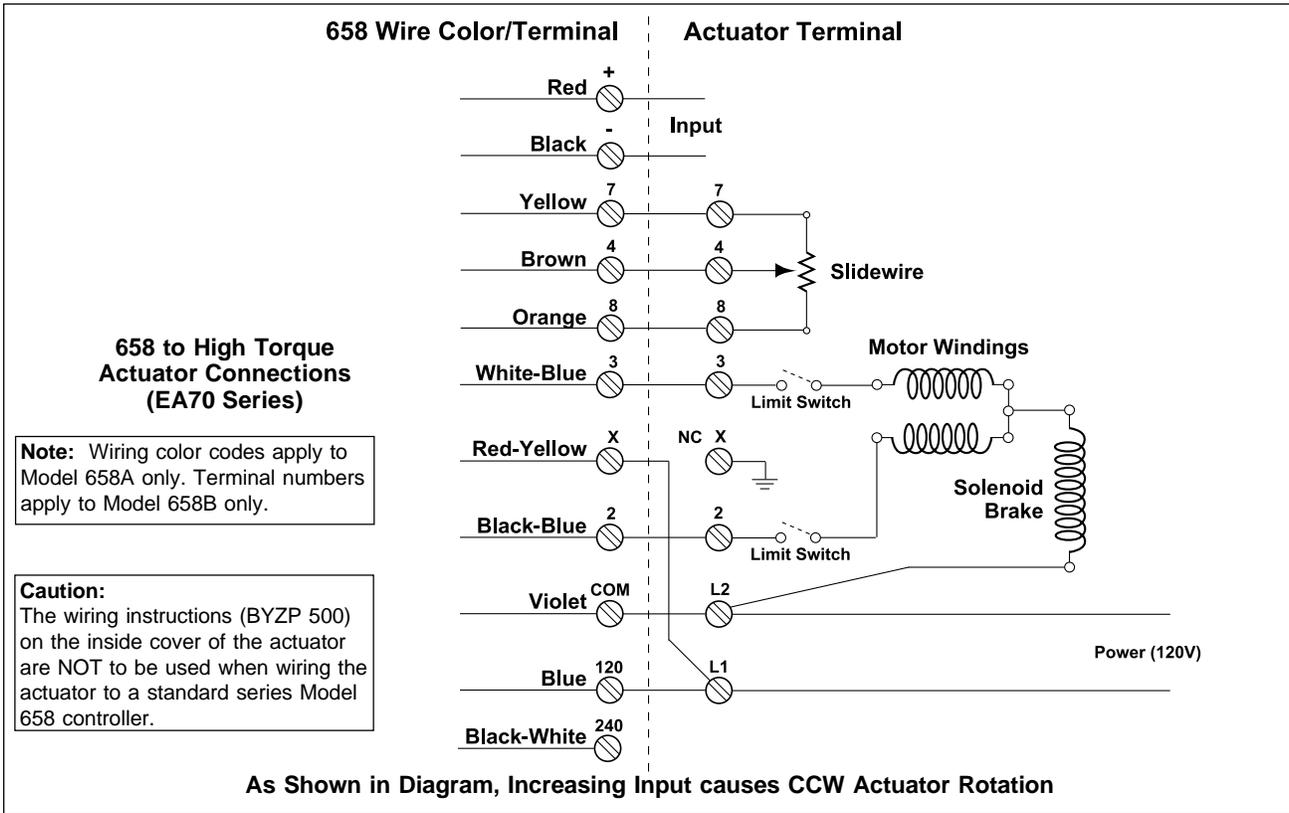
Note: Direction of rotation is determined by looking at the actuator output shaft.

Converter		Actuator Terminal Numbers	
Terminal Number Model 658/659B	Wire Color Model 658/659A	Low, Medium Torque (EA2X, 4X, 5X, 6X)	High Torque (EA7X)
4	Brown	4	4
7	Yellow	7	7
8	Orange	8	8
X	Red-Yellow	X	L1
2	Black-Blue	2	2
3	White-Blue	3	3
COM	Violet	L2	L2
120 Vac	Blue	L1	L1
240 Vac	Black-White	L1*	L1*
+	Red	<b>Model 658:</b> Connect to positive output terminal of controller (see purge option below). <b>Model 659:</b> Connect to wiper of remote slidewire or potentiometer (see below).	
-	Black	<b>Model 658:</b> Connect to negative output terminal of controller. <b>Model 659:</b> Not connected.	
n/a	White	<b>Model 658A:</b> Purge option: (Special 65 or 66), dry contact that closes to red lead.	
*Check motor voltage rating			
<b>Remote Slidewire or Potentiometer</b> (with Model 659 Resistance Converter)			

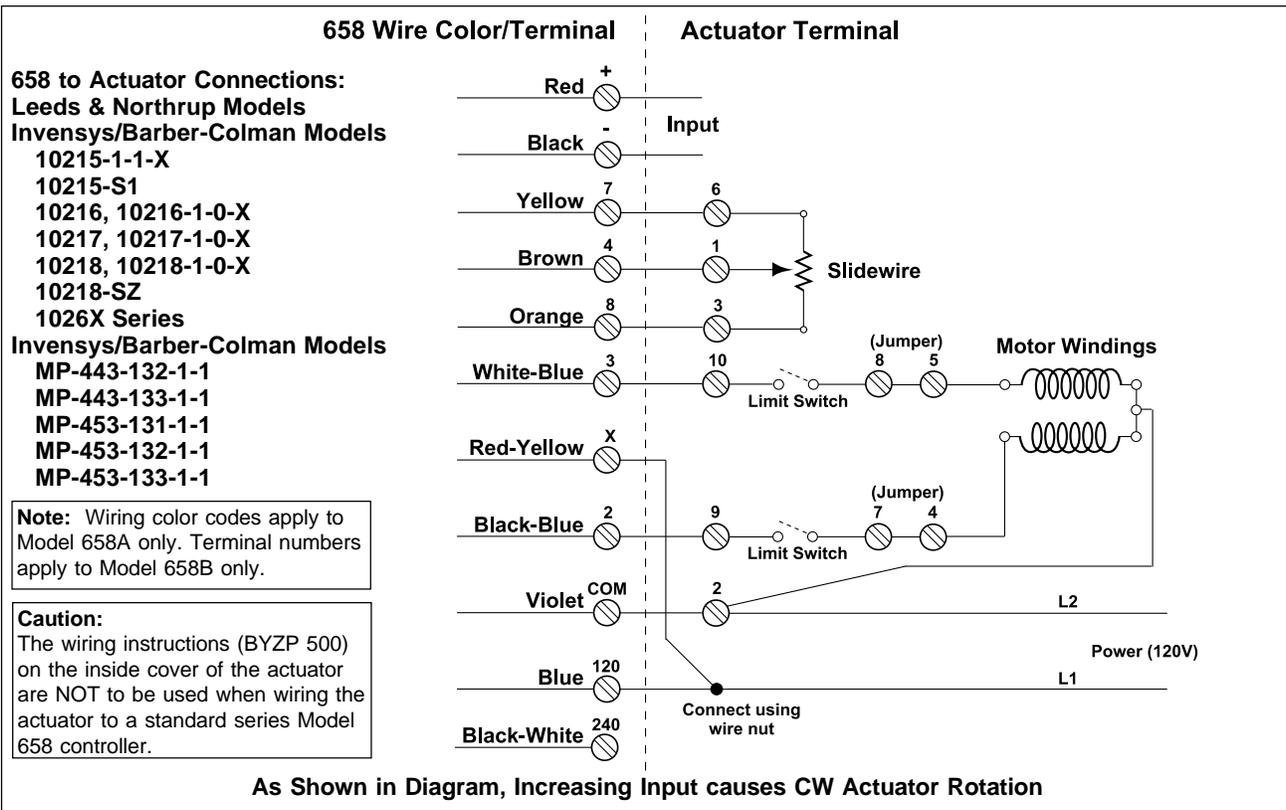
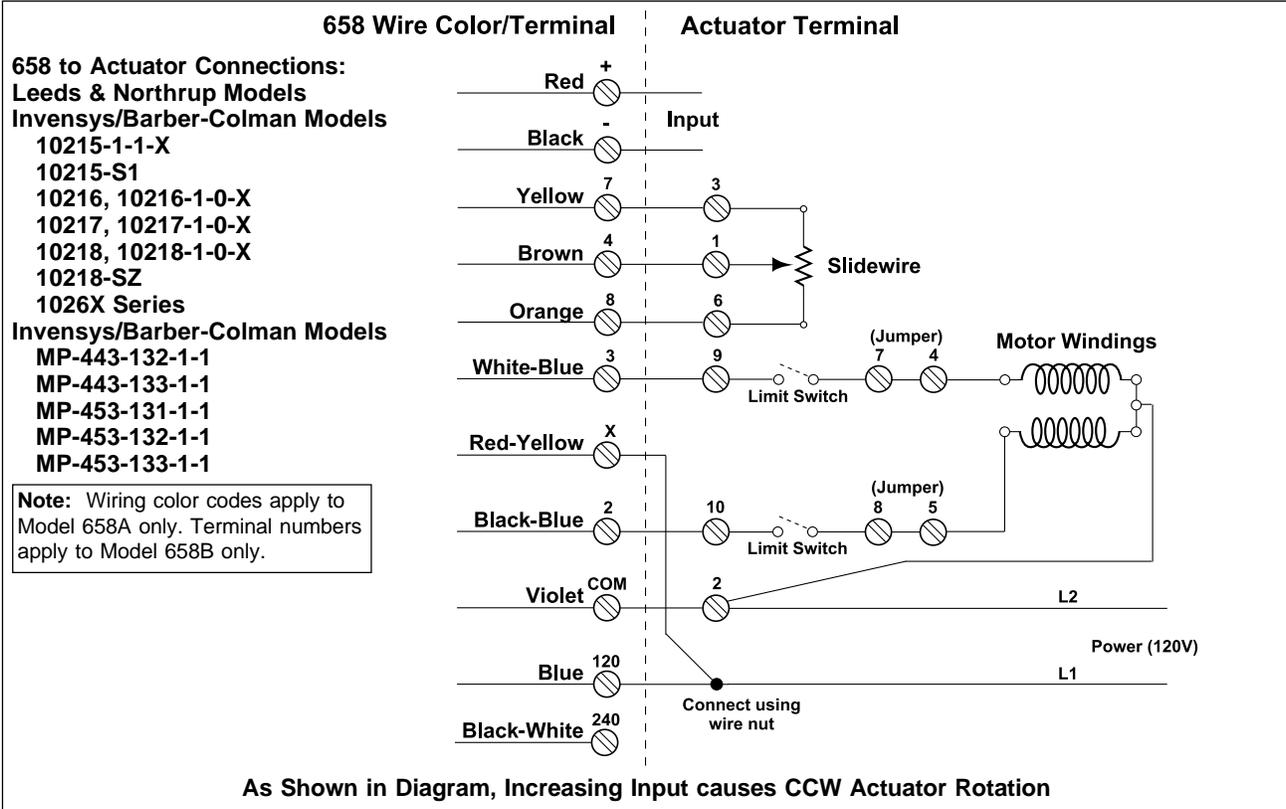
# Current, Resistance Converters



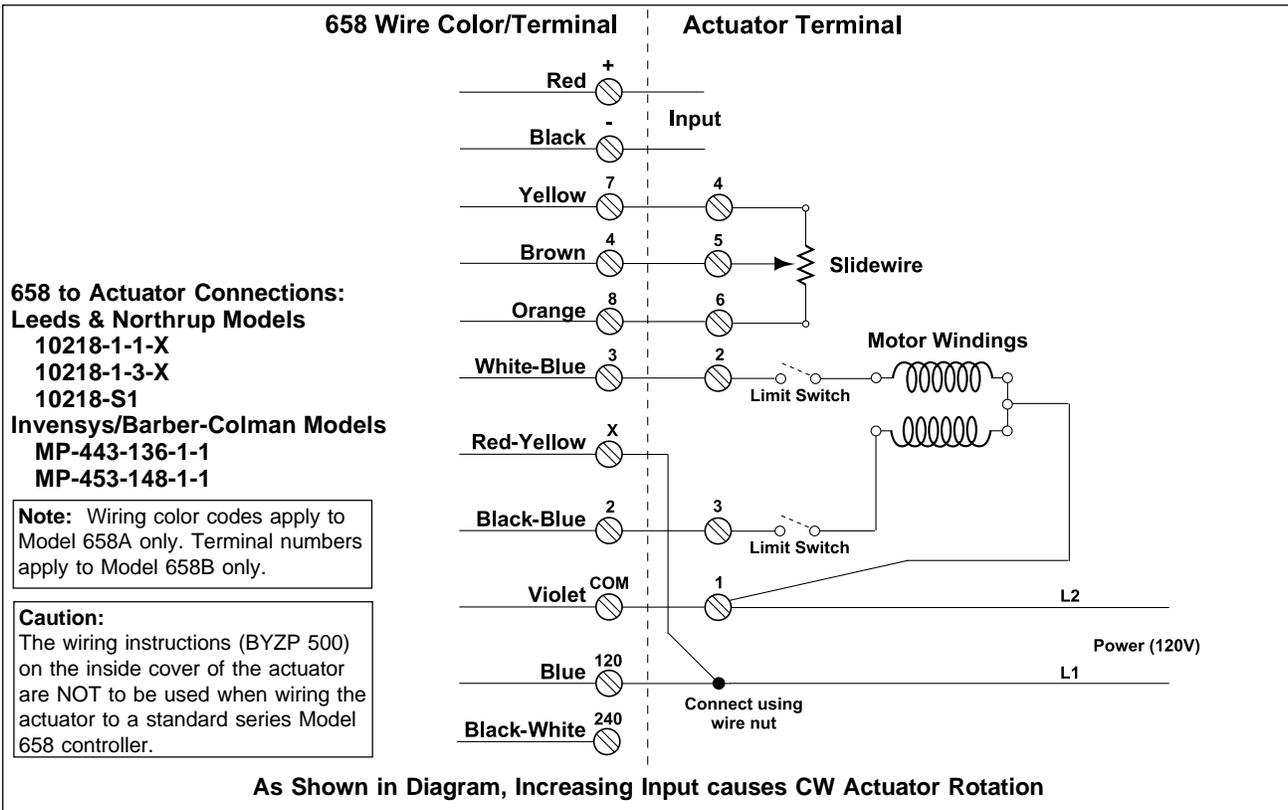
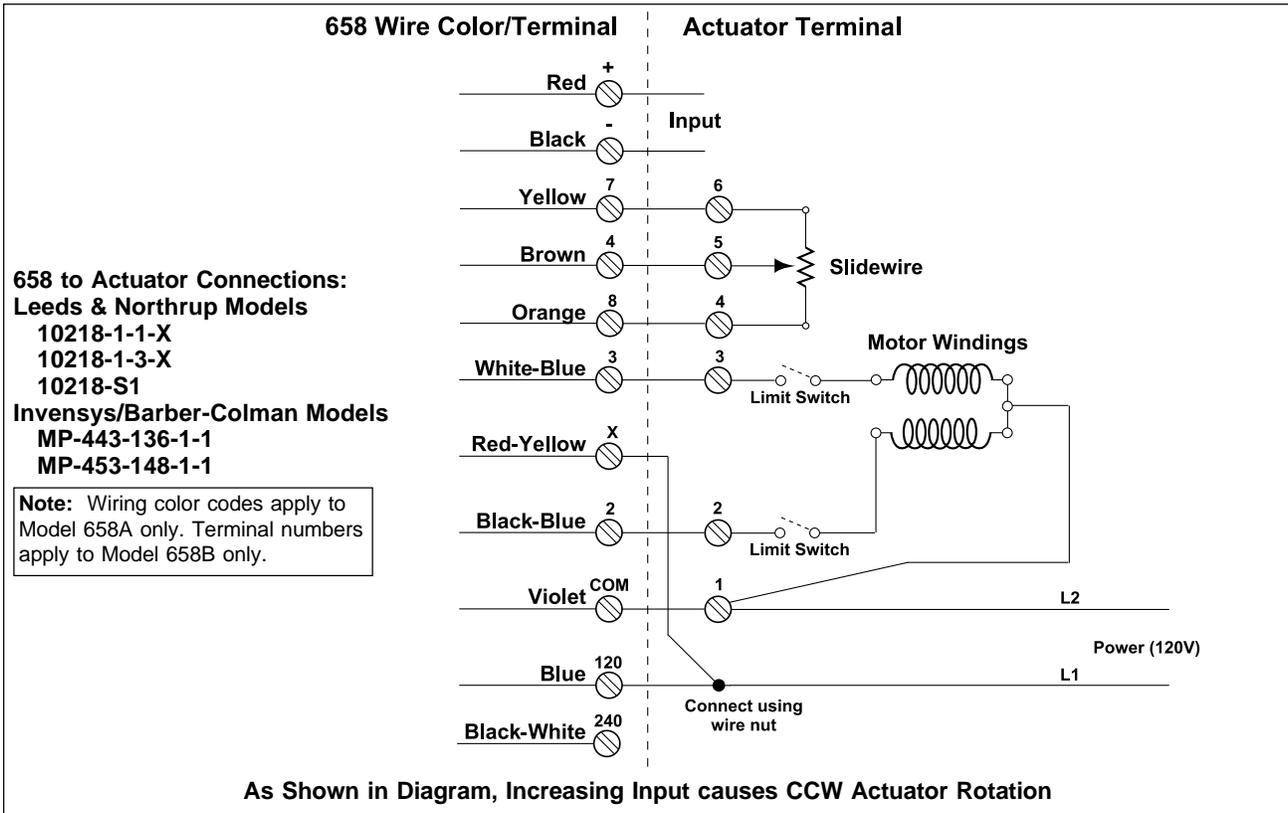
# Current, Resistance Converters



# Current, Resistance Converters



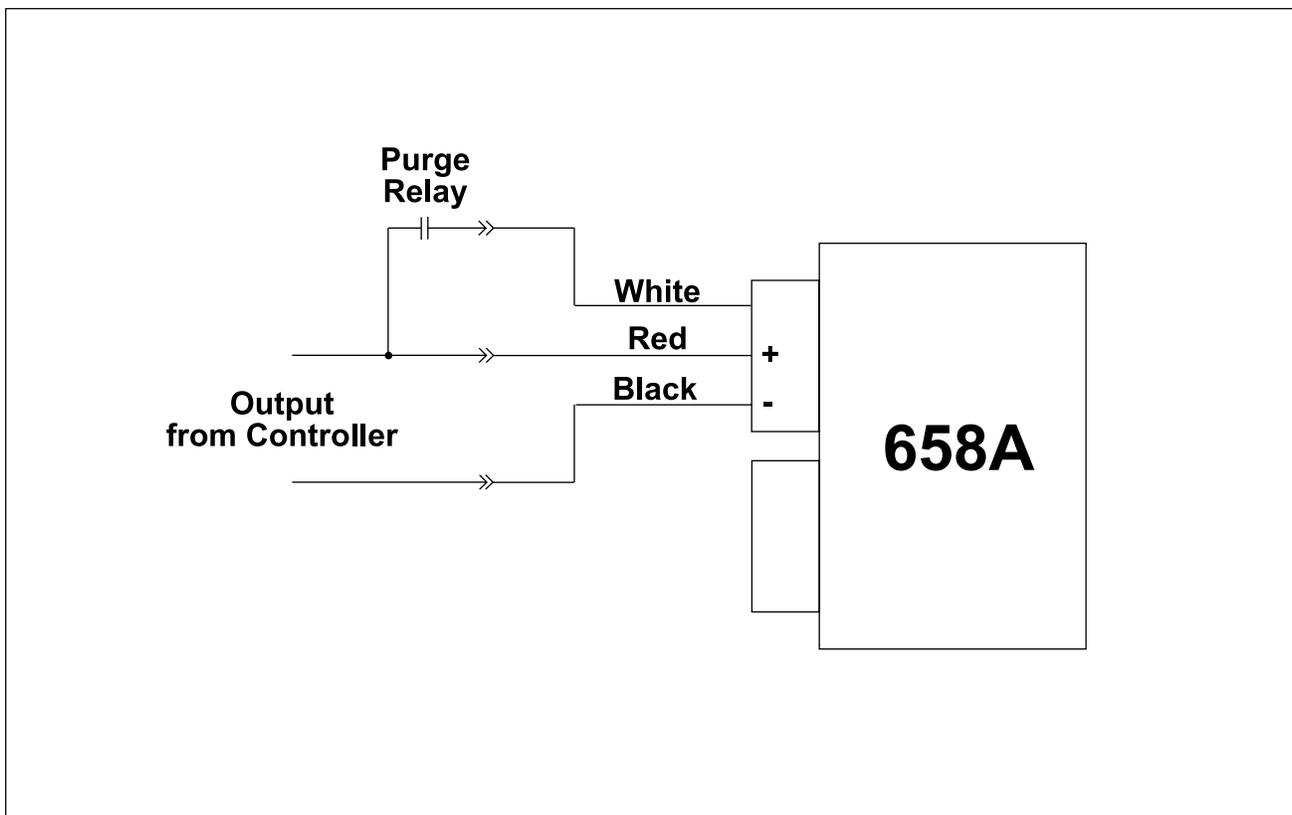
# Current, Resistance Converters



# *Current, Resistance Converters*

## **Wiring The Purge Option (658A Specials 65 and 66)**

Model 658A Specials 65 and 66 have an extra input to initiate purge action. A dry contact closure between the purge input (white wire) and the positive side of the input signal (red wire) will drive the actuator to the full open position. The actuator will return to the normal operation mode once the contact closure is relaxed. Note that a delay is required between the end of purge and the start of ignition in order to allow the actuator to move to a safe operating point before activating the main gas solenoid.



# *Current, Resistance Converters*

## 6. CALIBRATION

### **Model 658**

On the Model 658A, remove the top cover to adjust the potentiometers. On the Model 658B, loosen the locking screw and open the access door on top of the converter. The Model 658 is shipped with the span pot (R16) and zero pot (R13) adjusted for the signal input ordered. The deadband pot (R11) is normally factory adjusted to approximately 5% of span, depending on the range. Maximum deadband adjustment depends on the signal span: for a span of 10 mAdc, maximum deadband is 8%; for a span of 16 mAdc, maximum is 5%.

To adjust Zero and Span:

1. Connect power to the converter.
2. Connect the driving controller for the new range.
3. Connect the electric actuator.
4. Apply the maximum current signal for the new range (from the controller) to the input terminals.
5. Adjust span pot R16 so that the valve slidewire drives to its limit.
6. Apply the minimum current signal for new range (from the controller) to the input terminals.
7. Adjust zero pot R11 so that the valve slidewire drives to its limit.
8. Re-apply the maximum and minimum inputs and check the end points.

### **Model 659**

Since this converter tracks an external resistance, no calibration is available or required, but the deadband pot (R11) may need to be adjusted. Deadband is typically adjustable from approximately 0.1% with R11 fully CW to approximately 8% fully CCW. When shipped from the factory, deadband is set to approximately 5% of the slidewire.

# ***Current, Resistance Converters***

