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# E1R and E9R Rotary Position Transducers

## Instruction & Operation Manual

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# E1R and E9R Rotary Position Transducers

## Instruction Manual

### **Rugged and Reliable**

The resolver is a highly accurate and highly dependable device for absolute position shaft encoding. Resolvers have a reliable track record of applications in aerospace, military, and industry, where they have been used for decades for position sensing. The resolver is designed to operate reliably under extremely hostile environments, such as; continuous mechanical shock, vibration, extreme temperature and humidity changes, oil mist, coolants and solvents.

The resolver is a brushless rotary transformer with one rotor and two stator windings. The stator windings are electrically 90 degrees out of phase with each other. As the shaft rotates, the relative position of the rotor and the stator windings change, producing a varying AC signal corresponding to shaft position.

### **E1R and E9R Resolvers**

Autotech's E1R and E9R resolvers use corrosion resistant engineering plastic for housing. E1R has 6 lbs. radial load and NEMA 13 rating while E9R has 36 lbs. radial load and NEMA 4X rating. In all other respects the two are the same.

## Specifications

### **Electrical**

Frequency: 2250 Hz	Open circuit Zro: 180+j256 Ohms
Input Voltage: 1.88 V	DC resistance (Rotor): 18.3 Ohms
Input Current: 6 mA	Output voltage (Stator): 2.63 V 5%
Input Power: 6.5 mW	Transformation ratio: 1.4

### **Mechanical**

Maximum Starting Torque @ 25°C (oz-in)	5.0
Moment of Inertia (gm/cm <sup>2</sup> )	45
Maximum Slew Speed (RPM)	5000
Shaft Sizes	3/8"
Maximum Shaft Load:	
Axial (lbs)	40
Radial (lbs)	6 (E1R); 36 (E9R)
Bearing Life at Max. Mfr. Spec. (Rev.)	2x 10 <sup>8</sup>
Weight (lbs.)	2

### **Environmental**

Shock:	200g for 11 mSec.
Vibrations:	20g to 2000 Hz
Operating Temperature (Ambient):	35 to 130°F
Storage Temperature:	-85 to +150°F
Enclosure:	NEMA 3 (E1R); NEMA 4x (E9R)

## How to Order

**EX R-RL 101-000 X X**      Brushless resolver, single-turn, NEMA 13,  
**1**                                **2 3**      3/8" shaft dia.

### *1. Mechanical Characteristics*

- 1:** Engineered plastic housing, corrosion resistant, light duty NEMA 13. Light duty bearing, 6 lbs radial load (Must use external flexible coupling)
- 9:** Engineered plastic housing, corrosion resistant, medium duty bearing, 36 lbs radial load, NEMA 4X

### *2. Mounting*

- F:** Flange Mount
- S:** Servo Mount

### *3. Connector Position*

- E:** Back-end
- S:** Side

### Cable

In following part numbers, replace xxx by desired length in feet. Length ordered must be 010, 020, 050 feet or in increments of 50 feet (i.e., 100, 150, etc.)

CBL-10T22-M xxx	22 AWG, 10 conductor (5 twisted pairs) overall foil shielded cable, with MS connector
CBL-10T22-x xxx	22 AWG, 10 conductor (5 twisted pairs) overall foil shielded cable

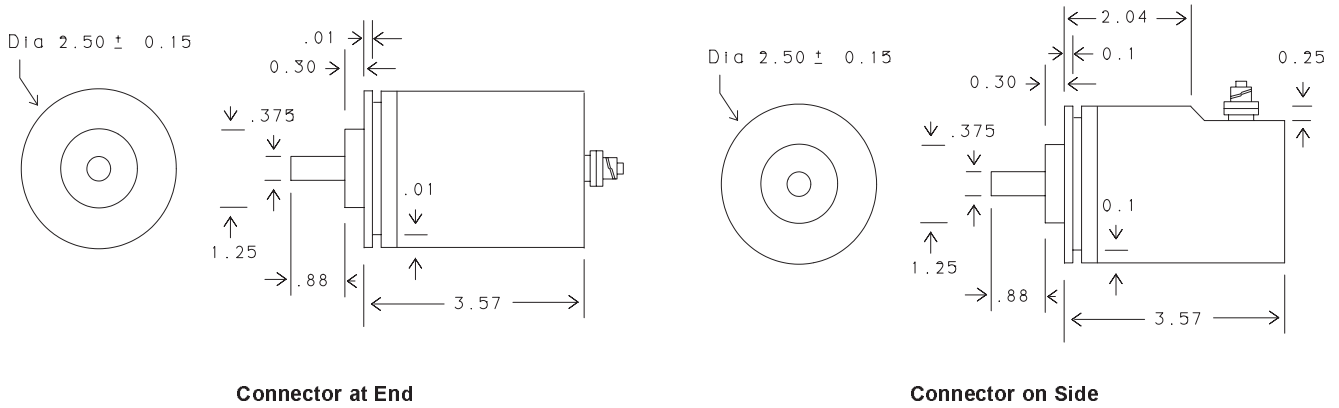
### Connector

ECM-10REC-ITT	E1R/E9R mating connector
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# Mounting Dimensions

## 1. Servo Mount

**Note:**  
 1. All dimensions in inches  
 2. Not to scale

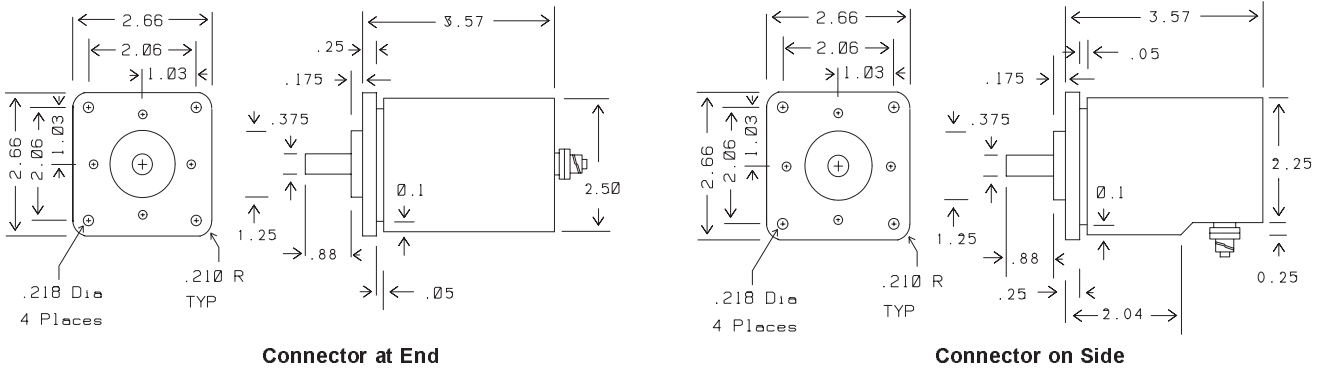


Connector at End

Connector on Side

## 2. Flange Mount

**Note:**  
 1. All dimensions in inches  
 2. Not to scale



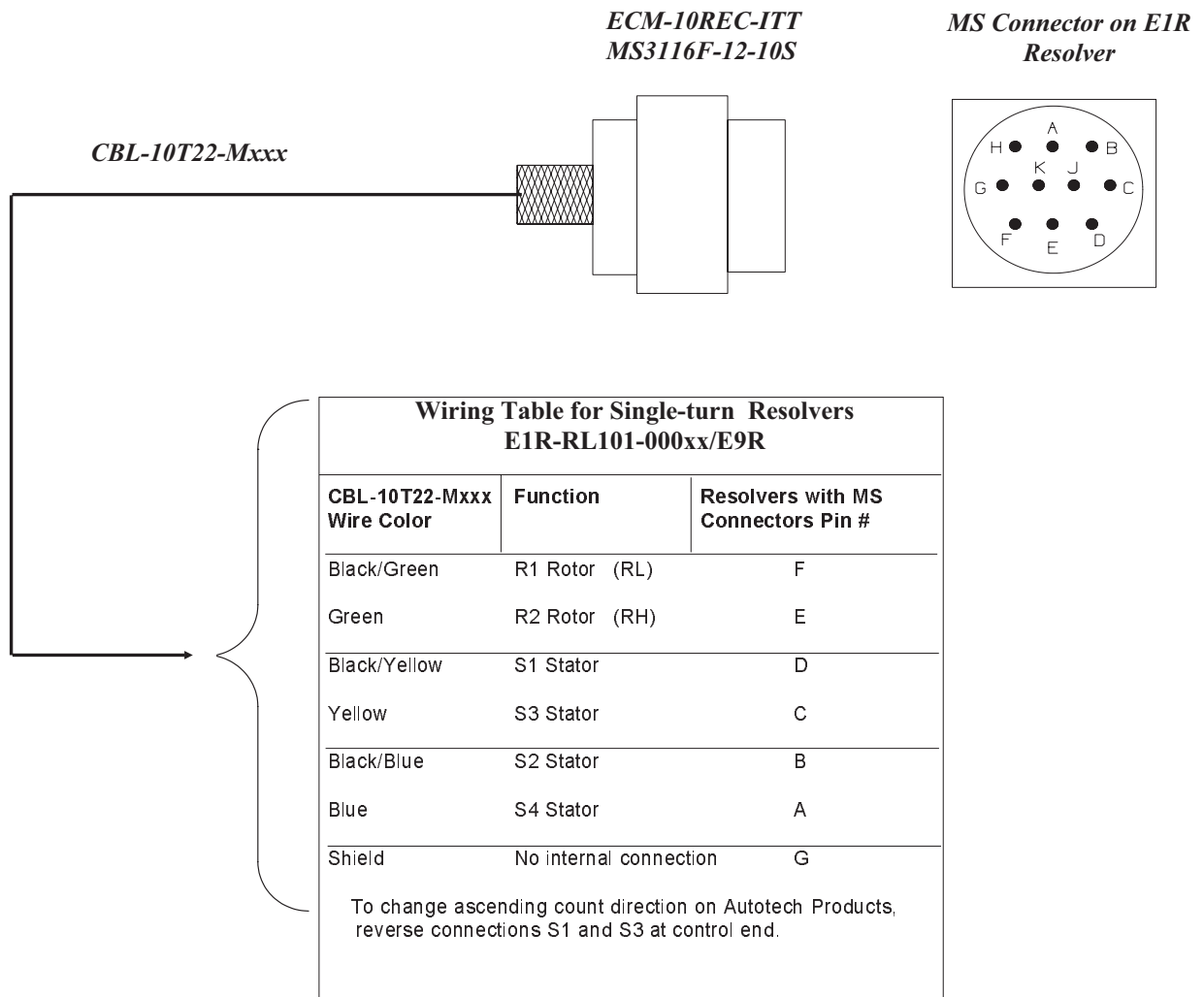
Connector at End

Connector on Side

**Notes:**

1. The **servo-mount** resolvers may be mounted either with traditional servo-clamps or through the four threaded mounting holes on the face of the resolver. The **flange-mount** resolvers are mounted using four mounting holes in the square flange.
2. If the resolver is to be axially shaft driven, be sure that the shafts are aligned. Misaligned shafts can destroy resolver bearings.
3. If a pulley, coupling or sprocket is mounted to the resolver shaft, DO NOT hammer or press on the shaft. DO NOT force fit anything onto or off of the resolver shaft.
4. The bearing seal must be checked once every six months and replaced if necessary. Lubricating the bearing seal periodically prolongs its life.

# Wiring Diagram



**Notes:**

1. Black/Green indicates a black wire with green stripe
2. An overall foil shielded cable with twisted pairs, (such as Autotech's cable CBL-10T22-xxxx) must be used for wiring the unit. The twisted pairs must be formed as follows: S1 & S3, S2 & S4, R1 & R2
3. MS connector: MS3112E-12-10P  
Mating connector: MS3116F-12-10S  
(Autotech part number: ECM-10REC-ITT)

## WARRANTY

Autotech Controls warrant their products to be free from defects in materials or workmanship for a period of one year from the date of shipment, provided the products have been installed and used under proper conditions. The defective products must be returned to the factory freight prepaid and must be accompanied by a Return Material Authorization (RMA) number. The Company's liability under this limited warranty shall extend only to the repair or replacement of a defective product, at The Company's option. The Company disclaims all liability for any affirmation, promise or representation with respect to the products.

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Autotech Controls' products are carefully engineered and rigorously tested to provide many years of reliable operation. However any solid-state device may fail or malfunction sometime. The user must ensure that his system design has built-in redundancies if Autotech Controls' product is being used in applications where a failure or malfunction of the unit may directly threaten life or cause human injury. The system should be so designed that a single failure or malfunction does not create an unsafe condition. Regularly scheduled inspections, at least once a week, should be made to verify that the redundant circuits are fully functional. All faults should be immediately corrected by repair or replacement of the faulty unit. In addition, the user may have to comply with OSHA, ANSI, state or local standards of safety. The user of Autotech Controls' products assumes all risks of such use and indemnifies Autotech Controls against any damages.

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