

## Low Profile, Single Output, Non-Contact Angle/Position Sensors



### Features

- Thin 11mm angle/position sensor with 3-wire harness and connector offered as a standard assembly
- Reliable, durable magnetic circuit, Hall IC technology
- Long life of 30 million cycles
- Single output angle/position detection can be set within the F.S. measurement range
- Waterproof as standard with an IP64 rating
- Resistant to dither input, temperature variables, vibration impact and other external environmental factors
- Built-in magnet shield reduces interference from external magnetic field and isolates sensors from magnetic noise found in nearby motors
- 0.08W power rating
- Low impedance allows low load resistance
- Blind shaft-fitting design for front insertion of a blade shaft
- Popular screw mount flange with two oval mounting holes (hardware not included)
- RoHS compliant

### Applications

- Angle/position detection in electronically controlled devices found in automobiles, construction/agricultural machinery, snowmobiles, and marine vessels
- Various actuators such as valve opening/closing detection
- Angle/position settings for controlling electronic games and various entertainment systems
- Other applications for single output angle/position sensors requiring reliability and very long life

### Specifications

#### Basic Characteristics

|                             |                 |                             |                       |
|-----------------------------|-----------------|-----------------------------|-----------------------|
| Supply Voltage              | 5 ± 0.5V        | Mechanical Rotational Angle | 130°                  |
| Supply Current              | 16mA max.       | Electrical Rotational Angle | 100.8° (0.4V to 4.6V) |
| Power Rating                | 0.08W           | Dustproof and Waterproof    | IP64 rating           |
| Output Characteristics      | See Figure 1    | Output Inclination          | 0.042V/degree         |
| Measurement Circuit         | See Figure 2    | Output Resolution           | 5/4096V (Vdd/12 bit)  |
| Operating Temperature Range | -40°C to +125°C | Mounting Hole Pitch         | 36mm                  |

#### Significant Characteristics

|                            |   |  |  |
|----------------------------|---|--|--|
| Output Linearity           | ±1% before test; <b>±2% after test</b> ; (in percentage of F.S. measurement range); deviation of output voltage from referenced straight line (inclination of 0.042V/degree) connecting 0.4V to 4.6V (see Figure 1) |  |  |
| Hysteresis                 | ±0.5° before test; <b>±0.5° after test</b> ; results based on difference of output voltage from hysteresis loop (origin curve and return curve)   |  |  |
| Output Noise               | ±0.2% F.S. before test, <b>±0.2% F.S. after test</b>  |  |  |
| Insulation Resistance      | 100MΩ min. before test; <b>10MΩ min. after test</b> ; 500VDC, MEGA between each lead and shaft fitting  |  |  |
| Operating Torque - Minimum | 0.0049N•m min. before test; <b>0.0010N•m min. after test</b> (see Figure 3)   |  |  |
| Operating Torque - Maximum | 0.0588N•m max. before test; <b>0.0883N•m max. after test</b> (see Figure 3)   |  |  |

Specifications Continued

## Endurance Performance

## Operating Endurance

| Operating Temperature (°C) | Tested Rotational Cycles | Tested Operating Angle | Output Voltage Range (V) | Frequency Rate (Hz) | Applied Voltage To Vcc Connector Pin |
|----------------------------|--------------------------|------------------------|--------------------------|---------------------|--------------------------------------|
| +25                        | 30 million               | 100.8°                 | 0.4 to 4.6               | 4                   | 5V                                   |
| +125                       | 10 million               | 100.8°                 | 0.4 to 4.6               | 4                   | 5V                                   |
| -40                        | 10 million               | 100.8°                 | 0.4 to 4.6               | 4                   | 5V                                   |
| +125                       | 100 million              | 5°                     | 2.4 to 2.6               | 30                  | 5V                                   |

**Sweep Vibration** 2.5V reference point at +25°C, 30G, 50-250Hz, X, Y, Z direction, 12 hours

**Shock** 100G, 3 minutes, 18 times

**Humidity** 80 ± 3°C, 95 ± 5%RH, 1,000 hours

**Temperature Cycle** -40°C for 1 hour ↔ +125°C for 1 hour, 1,000 cycles

**Low Temperature Shelf Life** -40°C, 1,000 hours

**High Temperature Shelf Life** +125°C, 1,000 hours

**Moisture, Rain, and Spray** JIS-D-0203-D1, temperature of water shall be 10°C lower than temperature of test sample, D1 dip test time: 5 minutes, 10 cycles (installation side of part is sealed using an assembly tool)

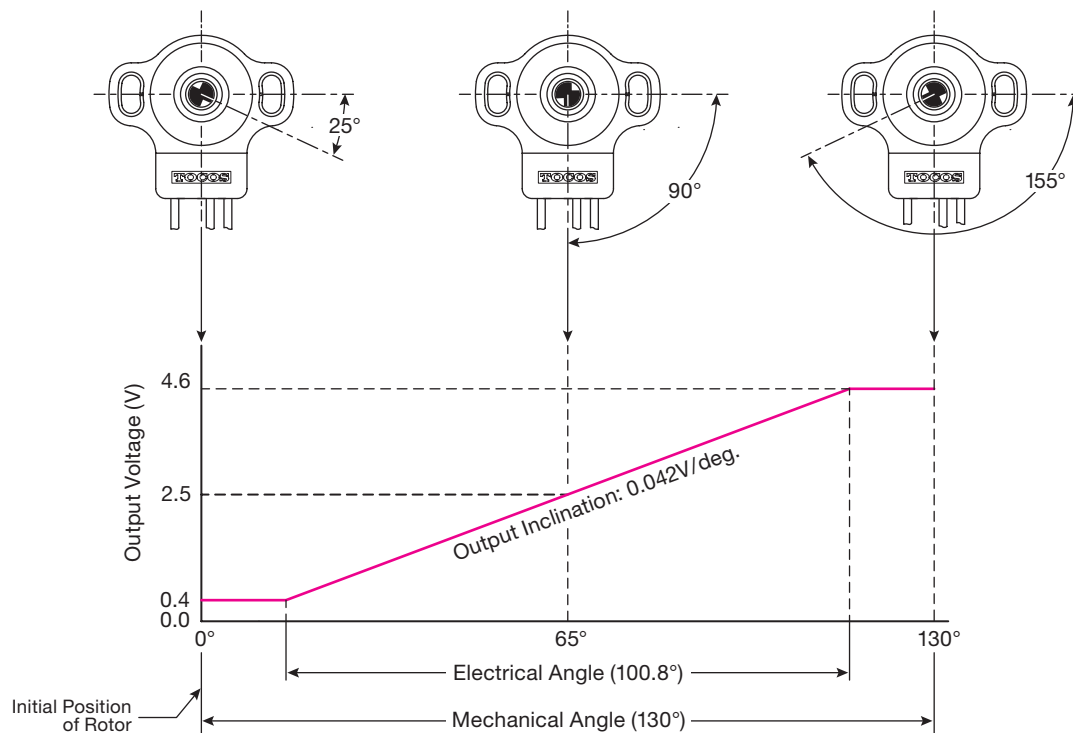
**Electromagnetic Susceptibility** 200 V/m, 1MHz to 1GHz

**Electrostatic Discharge** ±8kV contact discharge; ±15kV air discharge; IEC-61000-4-2

## Output Analysis

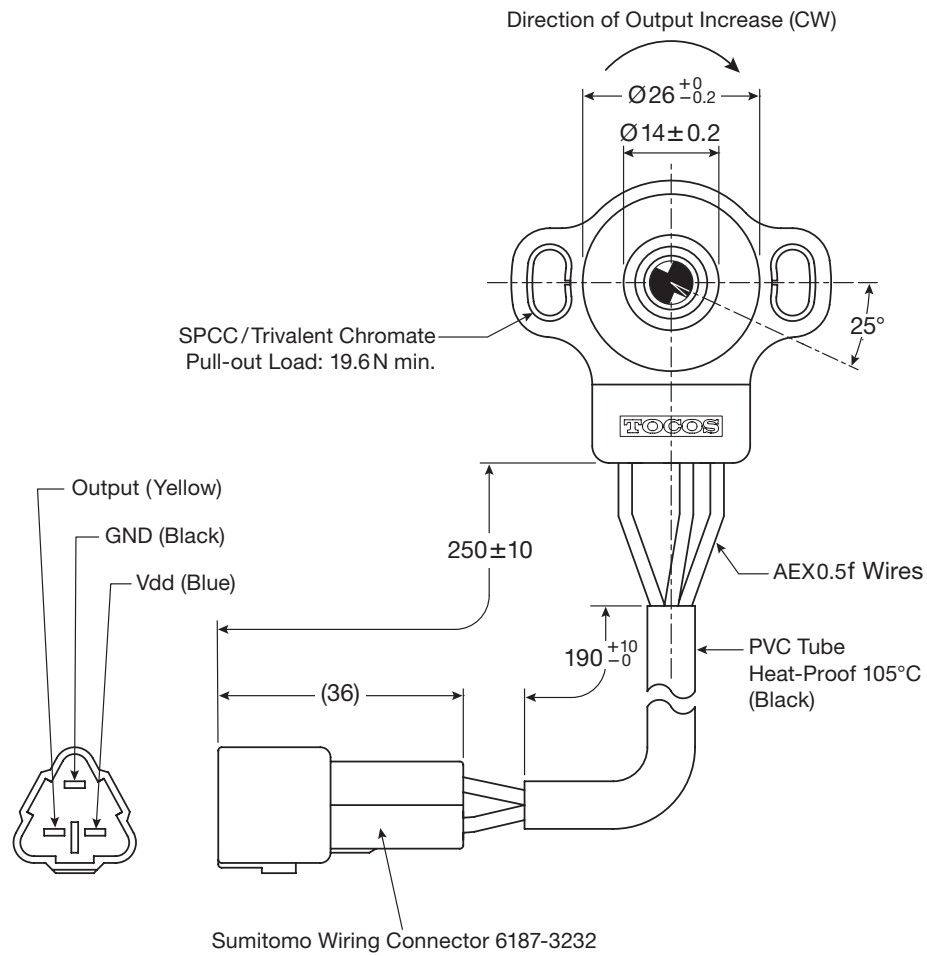
Figure 1: Output Characteristics

Unit: mm



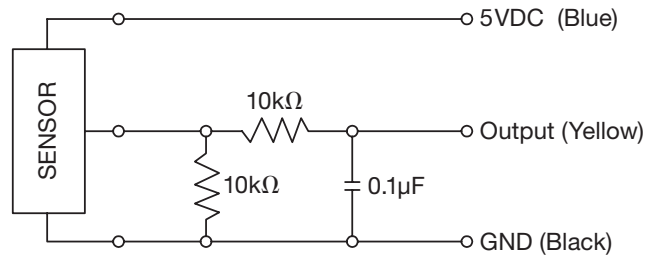
Dimensional Drawings of Front View A with Wire Harness and Connector

Unit: mm



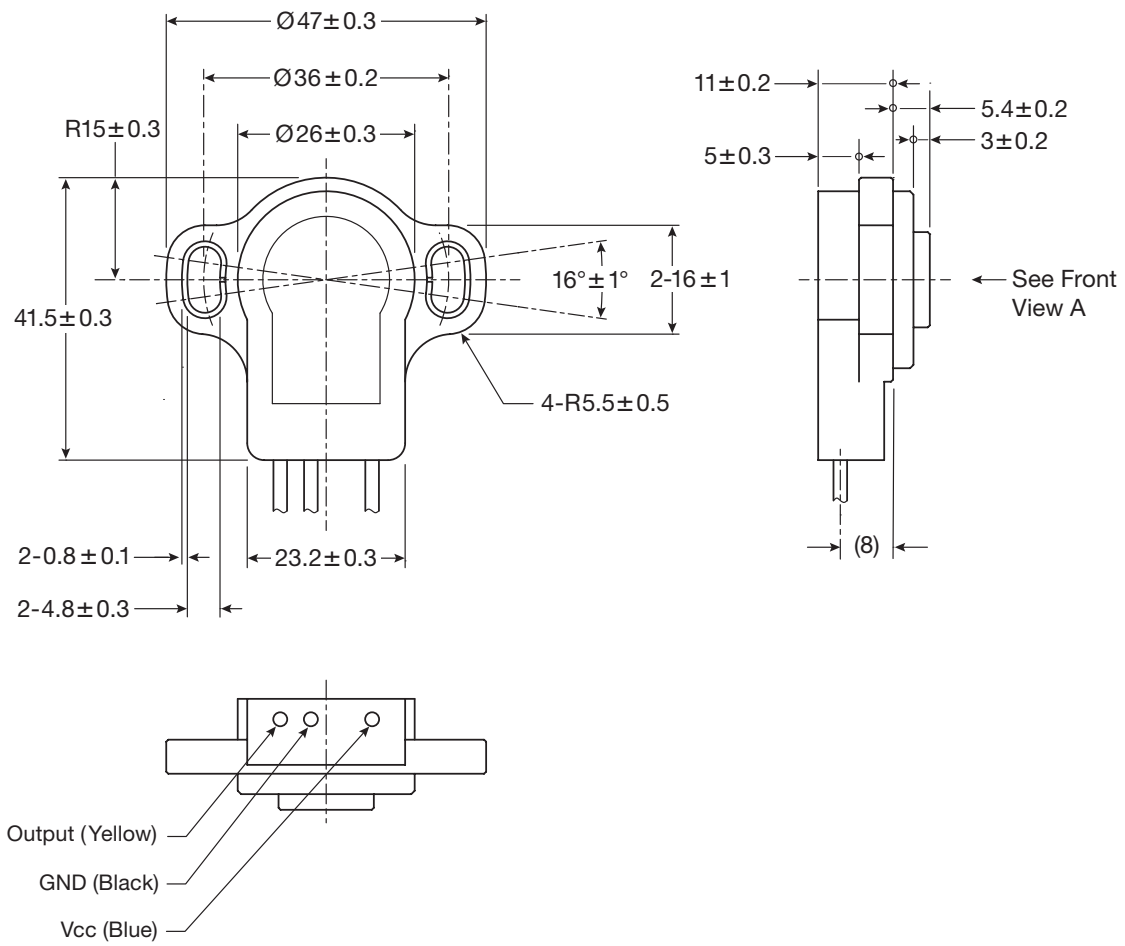
Electrical Schematic

Figure 2: Measurement Circuit



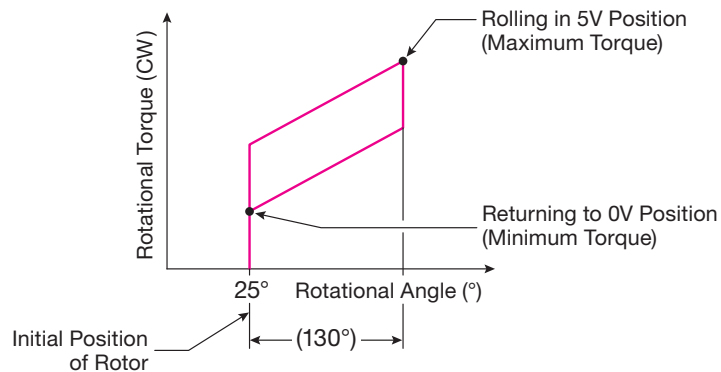
Dimensional Drawings of Back, Side, and Bottom Views

Unit: mm



Rotational Torque

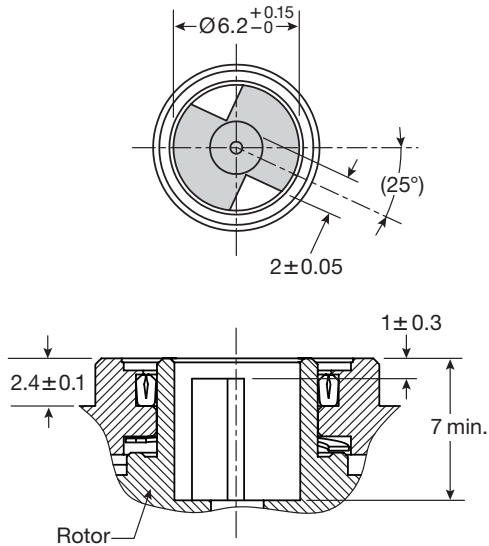
Figure 3: Operating Torque



## RSM011 Shaft Fitting

### Blind Shaft Fitting Detail from Front View A

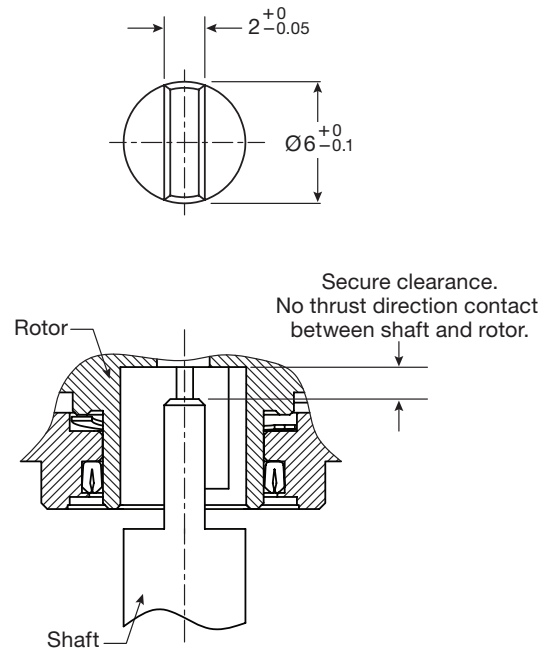
Unit: mm



## RSM011 Shaft Style

### Recommended Blade Shaped Shaft

Unit: mm



# TOCOSAMERICA, INC.

1177 East Tower Road, Schaumburg, IL 60173

Tel: 847-884-6664 Fax: 847-884-6665 E-mail: sales@tocos.com www.tocos.com

TocosAmerica, Inc.  
is affiliated with



The information in this publication is believed to be accurate and reliable with no guarantee as to its completeness. The components described herein are designed, tested and manufactured to meet and or exceed the specifications for each product. TOCOS reserves the right to make changes to the specifications without notice. It is the buyer's responsibility to determine suitable use and should test actual performance of TOCOS products in or for their specific application before final purchase agreement.