

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



### Features

- Thin 11mm angle/position sensor with 4-wire harness and connector offered as a standard assembly
- Dual output, durable magnetic circuit, Hall IC technology
- Long life of 30 million cycles
- Dual output detection settings configured at factory to meet user's requirements
- 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
- 0.16W 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

- Dual 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
- Dual outputs offer flexibility, i.e. redundancy and back-up, clamp voltage range, or indicator/control systems
- Other applications for dual output angle/position sensors requiring reliability and very long life

### Specifications

#### Basic Characteristics

Supply Voltage	5 ± 0.5V	Mechanical Rotational Angle	130°
Supply Current	16mV max.	Electrical Rotational Angle	100.8° (0.4V to 4.6V)
Power Rating	0.16W	Output Guaranteed Range	96° (0.5V to 4.5V)
Output Characteristics	See Figure 1	Output Inclination	0.042V/degree
Measurement Circuit	See Figure 2	Output Resolution	5/4096V (V <sub>dd</sub> /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 output guaranteed range); deviation of output voltage from referenced straight line (inclination of 0.042V/degree connecting 0.5V to 4.5V (see Figure 1))		
Hysteresis	±20mV before test; <b>±50mV after test</b> ; results based on difference of output voltage from hysteresis loop (origin curve and return curve) between reference point (0.5V) and 96°		
Relative Deviation	5 ± 0.08V before test; <b>5 ± 0.1V after test</b> ; to calculate relative deviation use $\Delta V = V_1 + V_2$ where V <sub>1</sub> is main output and V <sub>2</sub> is sub-output		
Output Noise	±10mV before test, <b>±10mV 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	96° (17° ⇄ 113°)	0.5 to 4.5	4	5V
+125	10 million	96° (17° ⇄ 113°)	0.5 to 4.5	4	5V
-40	10 million	96° (17° ⇄ 113°)	0.5 to 4.5	4	5V
+125	100 million	6° (62° ⇄ 68°)	2.4 to 2.6	30	5V

**Sweep Vibration** 2.5V reference point at +25°C, 30G, 50 to 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-D0203-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)

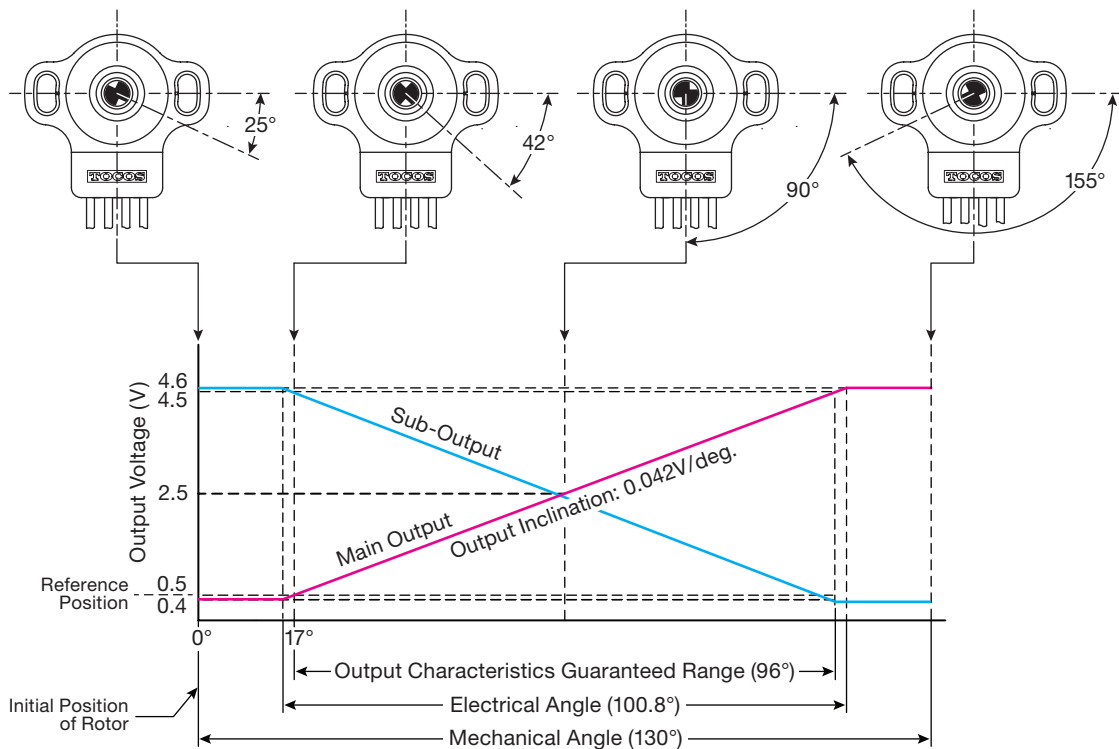
**Electromagnetic Susceptibility** 200 V/m, 1MHz to 1GHz

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

Output Analysis

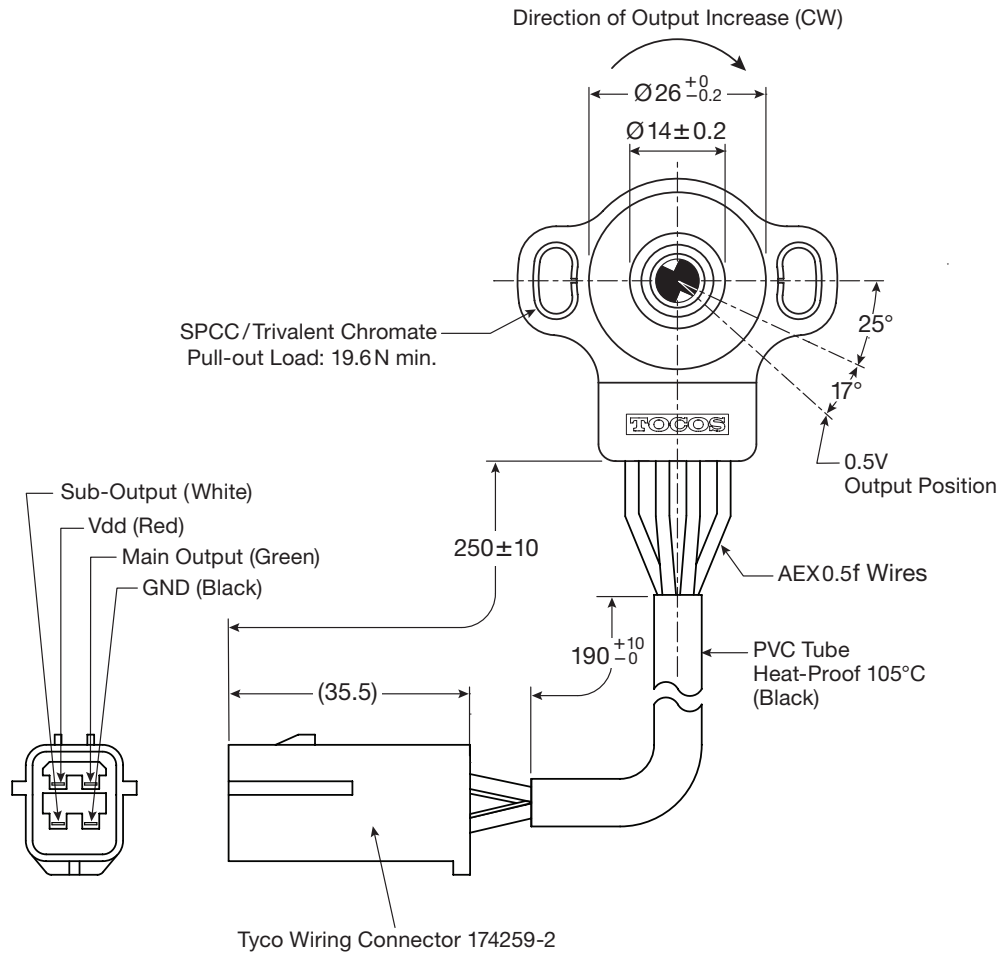
Figure 1: Output Characteristics

Unit: mm



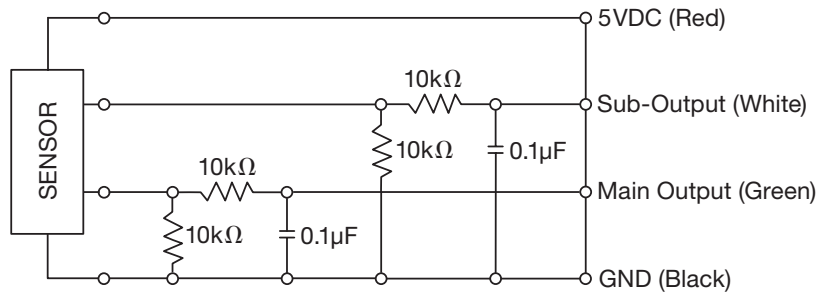
Dimensional Drawings of Front View A with Wire Harness and Connector

Unit: mm



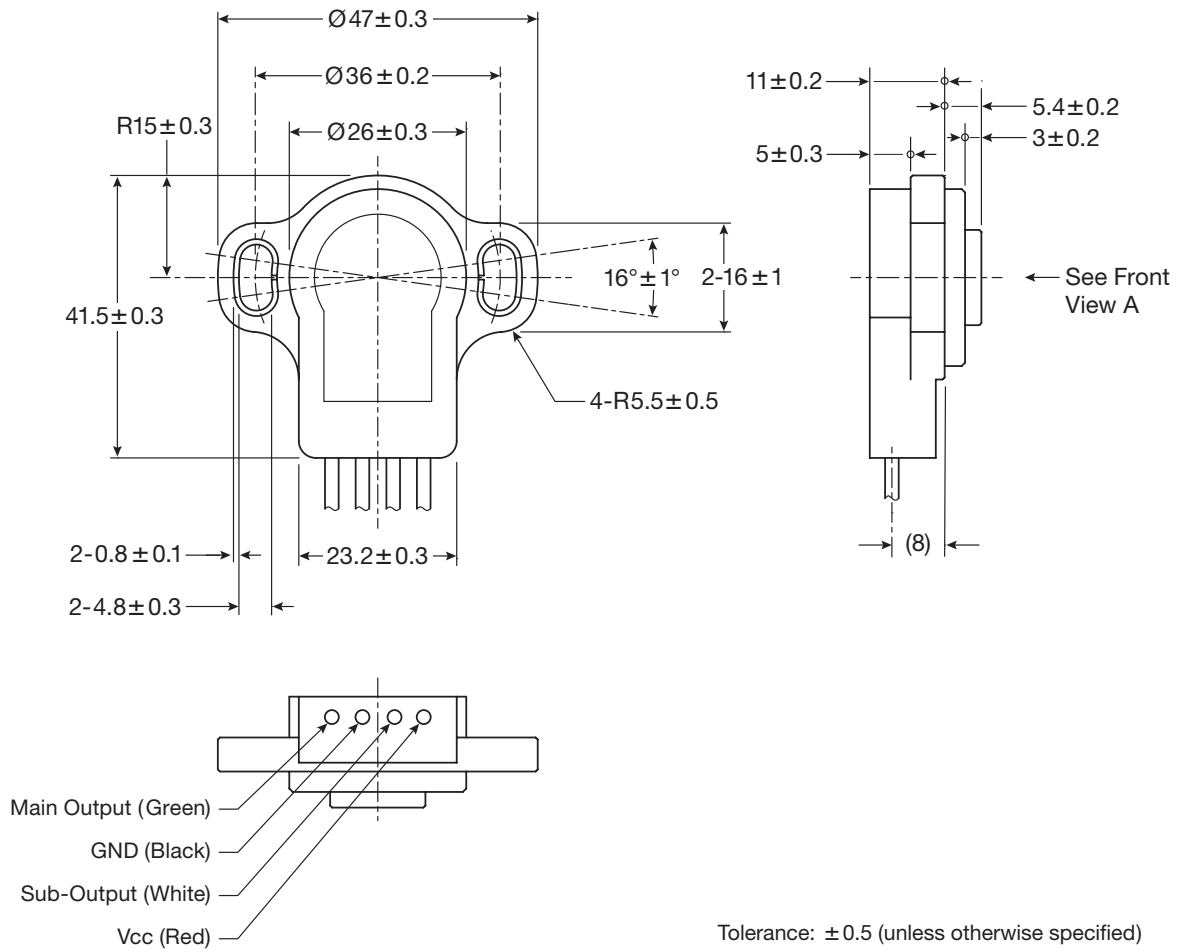
Electrical Schematic

Figure 2: Measurement Circuit



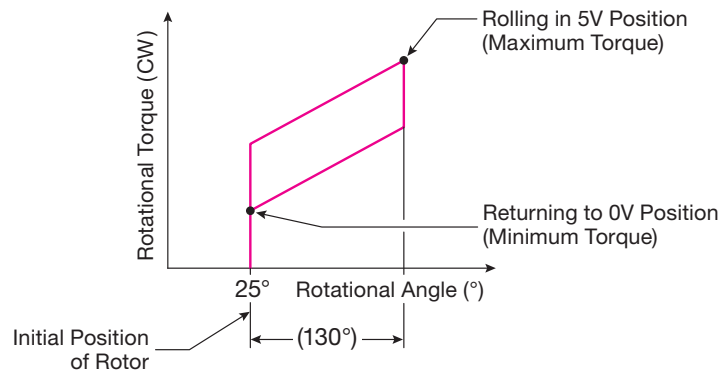
Dimensional Drawings of Back, Side, and Bottom Views

Unit: mm



Rotational Torque

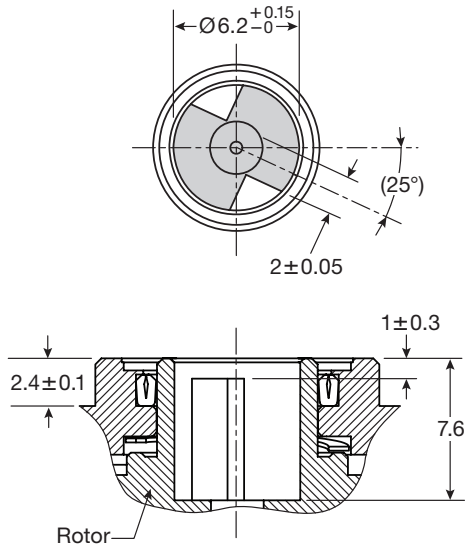
Figure 3: Operating Torque



## RSM012 Shaft Fitting

### Blind Shaft Fitting Detail from Front View A

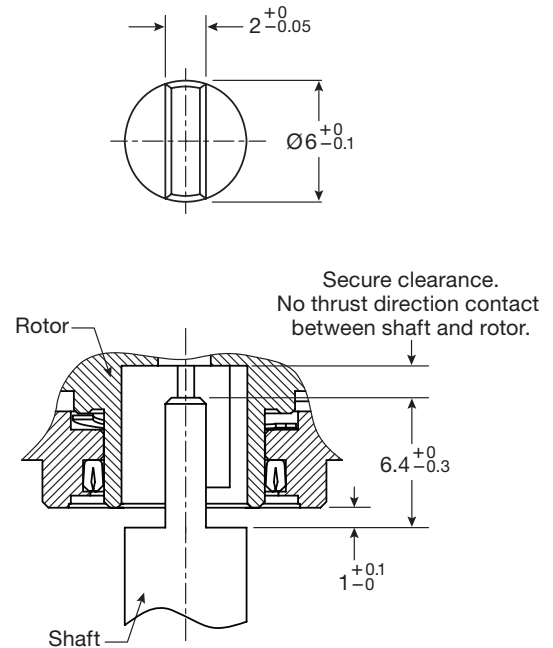
Unit: mm



## RSM012 Shaft Style

### Recommended Blade Shaped Shaft

Unit: mm



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