RPA132 Series

TOCOS SENSORS

All-in-One, Single Output, Contact Angle/Position Sensors

Features

- All-in-one housing with angle/position sensor, threaded flat shaft, and integral male connector
- Detection of objects through direct physical contact resulting in conversion to electrical signals for processing
- Long life of 2 million cycles
- Flat threaded shaft actuated in the CCW direction for angle/position detection with automatic CW spring return
- 0.12W power rating
- Waterproof and dustproof with an IP65 rating
- Overall size: 54mm wide including flanges, 58mm long, and 44mm deep from back to end of threaded shaft
- Resistance value of 2kΩ; resistance tolerance of ±30%
- Compatible female F6189-0027 connector recommended to connect with integral male connector
- Operating temperature range of −30°C to +120°C
- Screw mount flange with two round (Ø4.6mm) mounting holes (hardware not included)
- RoHS compliant

Applications

- Electric vehicles where speed, steering, orientation, and other movements are controlled by contact sensors
- Contact sensors for controlling various operations in off-road vehicles, i.e. golf carts, ATVs, and snowmobiles
- Angle/position detection by contact sensors for controlling various robotic systems
- Agricultural/construction vehicles where contact sensors control operating functions under harsh conditions

Specifications

Basic Characteristics

Supply Voltage	5VDC	**Output Guaranteed Range**	±50.6° (0.2V to 4.8V)
Maximum Supply Voltage	16VDC	**Electrical Rotational Angle**	110°±5°
Power Rating	0.12W	**Mechanical Rotational Angle**	150°±5°
Output Characteristics	See *Figure 1*	**Operating Temperature Range**	−30°C to +120°C
Electrical Circuits	See *Figures 3 and 4*	**Mounting Hole Pitch**	41mm

Significant Characteristics

Total Resistance	2kΩ±30% before test; 2kΩ±40% after test; when measuring between input and output terminals
Output Linearity	±3% (±150mV) max. before test; ±5% (±250mV) max. after test; where deviation of output voltage from referenced straight line (inclination of 0.045V/degree from 0.2V to 4.8V) falls at reference point 2.5V (see *Figure 1*)
Hysteresis	±1° (±45.5mV) before test; ±1.5° (±68.2mV) after test; where output characteristics fall between the guaranteed range of 0.2V to 4.8V
Insulation Resistance	100MΩ min. before test; 100MΩ min. after test; when 500VDC is applied between the terminals and exposed conducting surfaces (shaft and sleeve)
Rotary Friction Torque	12.8N•cm±20% before test; 12.8N•cm±30% after test

Specifications Continued

Endurance Performance

Operating Endurance

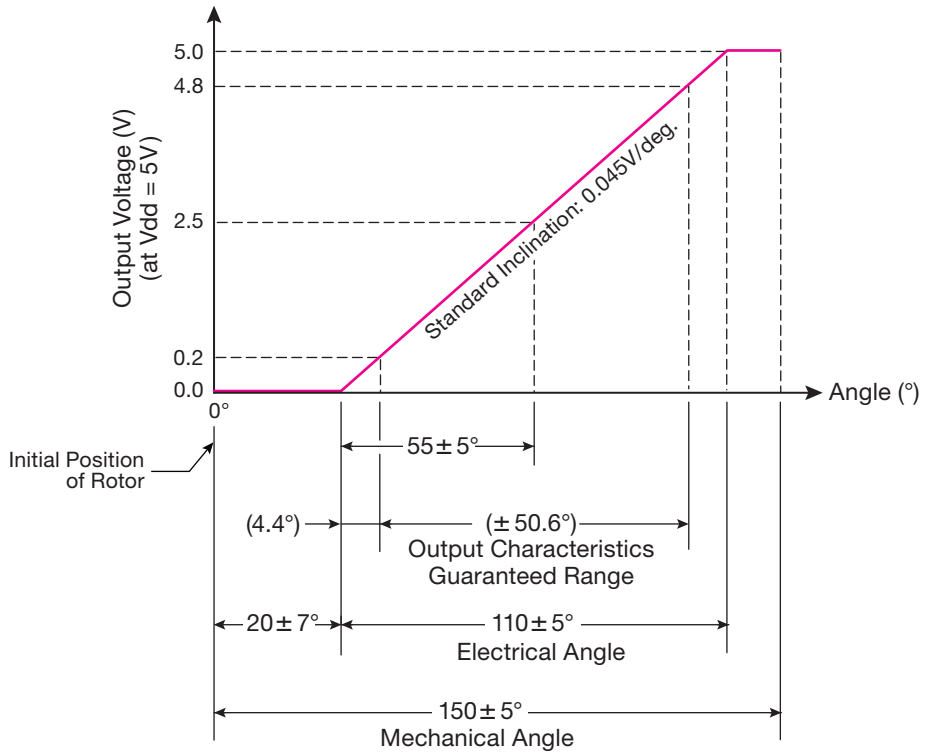
Operating Temperature (°C)	Tested Rotational Cycles	Tested Operating Angle	Output Voltage Range (V)	Frequency Rate (Hz)	Applied Voltage To Vin Terminal Pin
+25	2 million	75°	0.2 to 4.8	3	5V

Vibration	87.2 m/s acceleration (8.9G), 67Hz, X, Y, Z directions, 8 hours each (see *Figure 1*)
Thermal Shock	−25°C for 1 hour ⇄ +70°C for 1 hour, 10 cycles
Low Temperature Shelf Life	−40°C, 72 hours
High Temperature Shelf Life	+120°C, 72 hours
Moisture Resistance	40°C, 90 - 95% RH, 240 hours
Water Resistance	Expose sensor to +80°C for 0.5 hour ⇄ immerse in water at +25°C for 0.5 hour, 10 cycles Attach compatible female connector F6189-0027 during test.

Output Analysis

Figure 1: **Output Characteristics**

Unit: mm

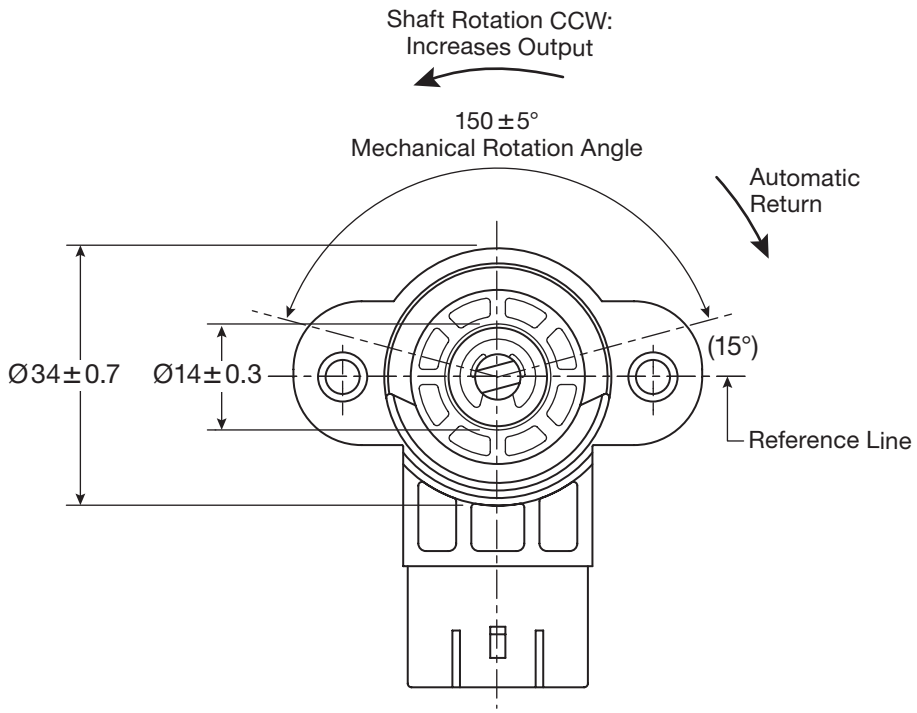


When the applied voltage changes within the rated voltage range,
the output voltage changes at the same rate.

TOCOS AMERICA, INC.
1177 East Tower Road, Schaumburg, IL 60173 Tel: 847-884-6664 Fax: 847-884-6665 E-mail: sales@tocos.com www.tocos.com

Dimensional Drawing of Front View A with Integral Connector

Unit: mm

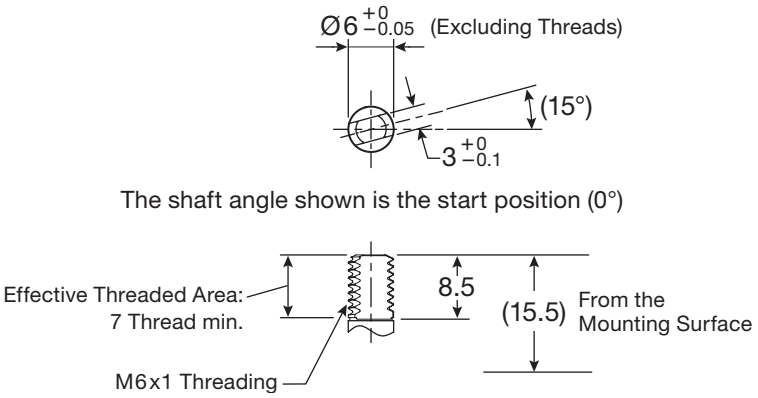


Front View A

Shaft Specifications

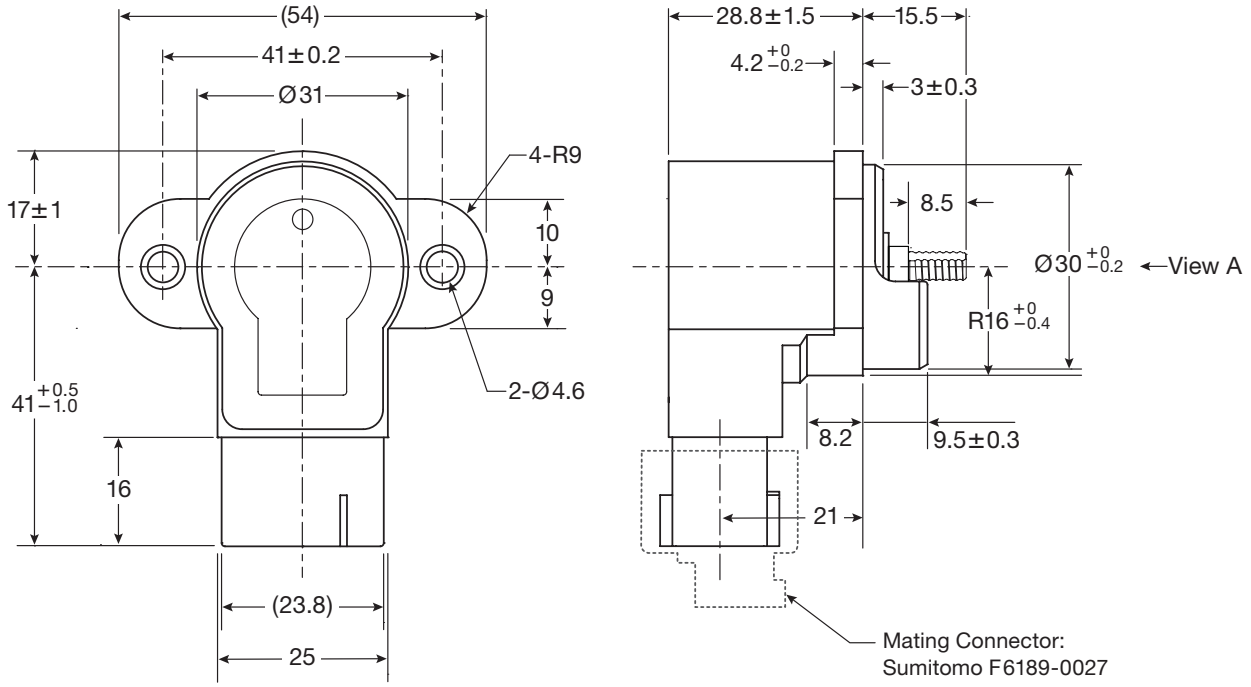
Figure 2: **Detail of Shaft Shape and Threading**

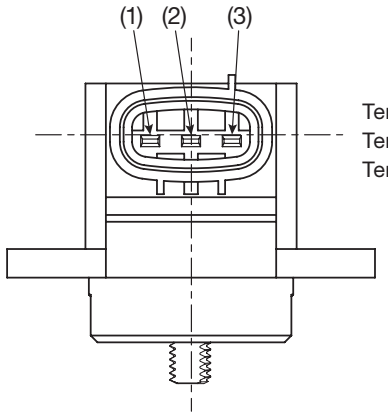
Unit: mm



Dimensional Drawings of Back, Side, and Terminal End Views

Unit: mm





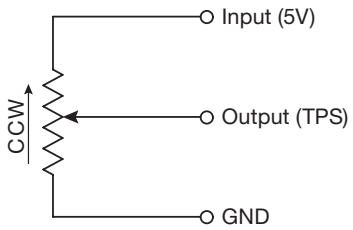
Terminal 1: GND
Terminal 2: Output
Terminal 3: Input

Tolerance: ±0.5, ±5°
(unless otherwise specified)

TOCOS AMERICA, INC.
1177 East Tower Road, Schaumburg, IL 60173 Tel: 847-884-6664 Fax: 847-884-6665 E-mail: sales@tocos.com www.tocos.com

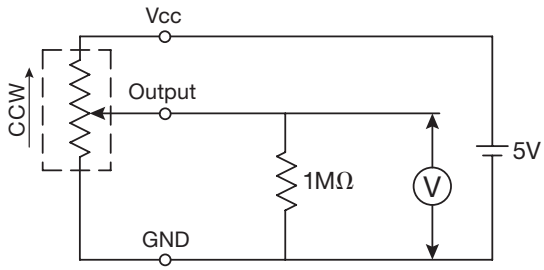
Circuit Configuration

Figure 3: **Circuit Configuration**



Electrical Schematic

Figure 4: **Evaluation Circuit**



TOCOS AMERICA, 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
COSMOS TOKYO

Rev. 6-1-2018