

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 2k Ω ; resistance tolerance of $\pm 30\%$
- Compatible female F6189-0027 connector recommended to connect with integral male connector
- Operating temperature range of -30°C to $+120^{\circ}\text{C}$
- Screw mount flange with two round ($\varnothing 4.6\text{mm}$) 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	$\pm 50.6^{\circ}$ (0.2V to 4.8V)
Maximum Supply Voltage	16VDC	Electrical Rotational Angle	$110^{\circ} \pm 5^{\circ}$
Power Rating	0.12W	Mechanical Rotational Angle	$150^{\circ} \pm 5^{\circ}$
Output Characteristics	See Figure 1	Operating Temperature Range	-30°C to $+120^{\circ}\text{C}$
Electrical Circuits	See Figures 3 and 4	Mounting Hole Pitch	41mm

Significant Characteristics

Total Resistance	$2\text{k}\Omega \pm 30\%$ before test; $2\text{k}\Omega \pm 40\%$ after test; when measuring between input and output terminals
Output Linearity	$\pm 3\%$ ($\pm 150\text{mV}$) max. before test; $\pm 5\%$ ($\pm 250\text{mV}$) 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	$\pm 1^{\circ}$ ($\pm 45.5\text{mV}$) before test; $\pm 1.5^{\circ}$ ($\pm 68.2\text{mV}$) after test; where output characteristics fall between the guaranteed range of 0.2V to 4.8V
Insulation Resistance	100M Ω 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 $\pm 20\%$ before test; 12.8N•cm $\pm 30\%$ 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

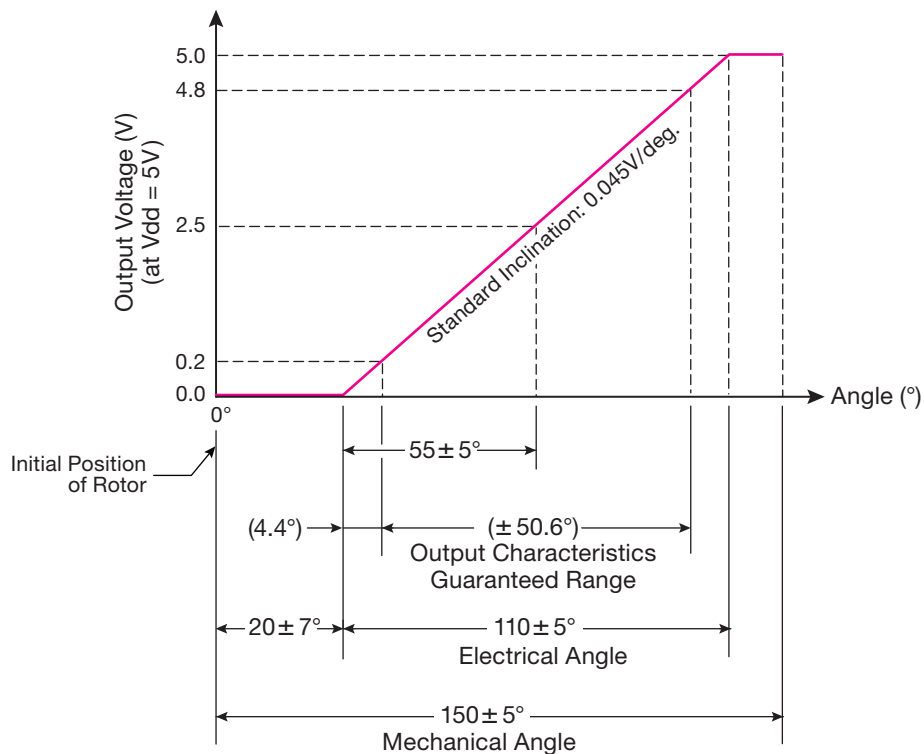
Moisture Resistance 40°C, 90-95%RH, 240 hours

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

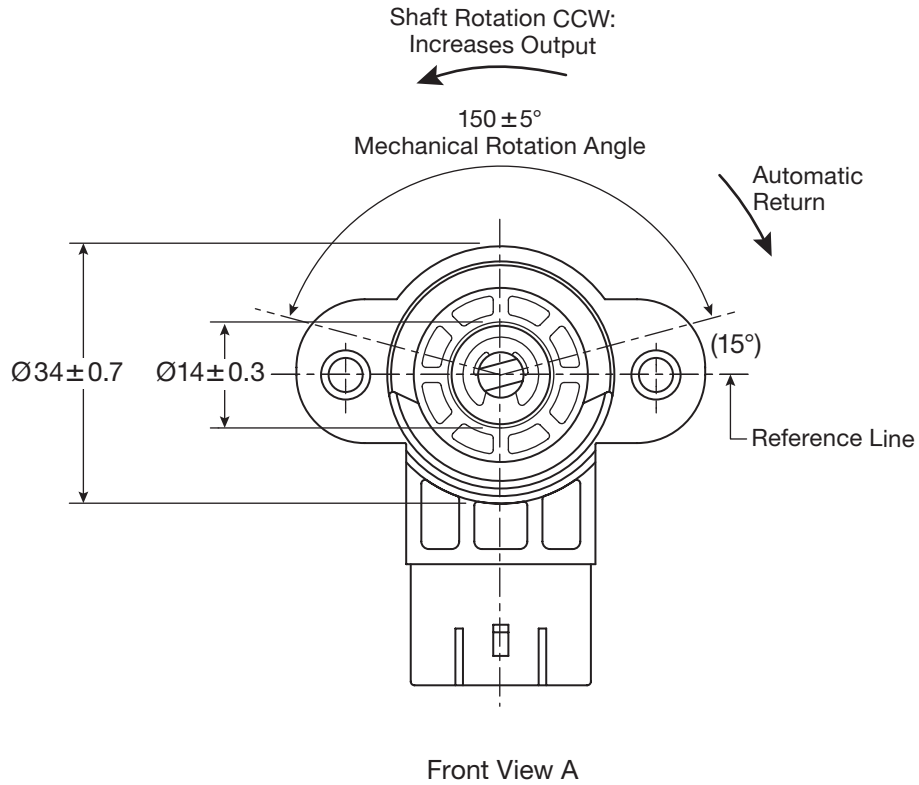
Unit: mm



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

Dimensional Drawing of Front View A with Integral Connector

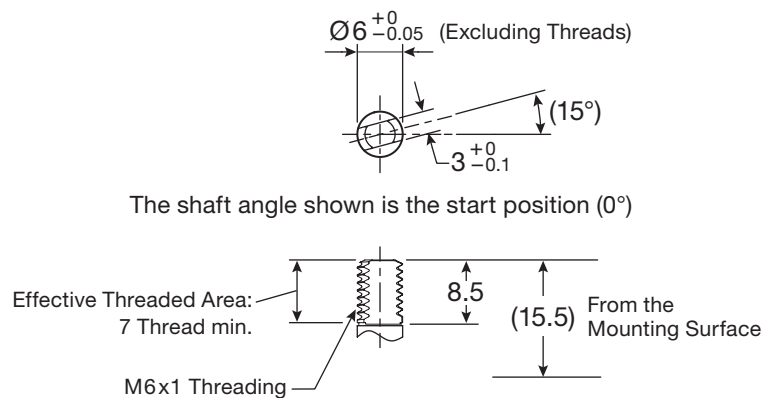
Unit: mm



Shaft Specifications

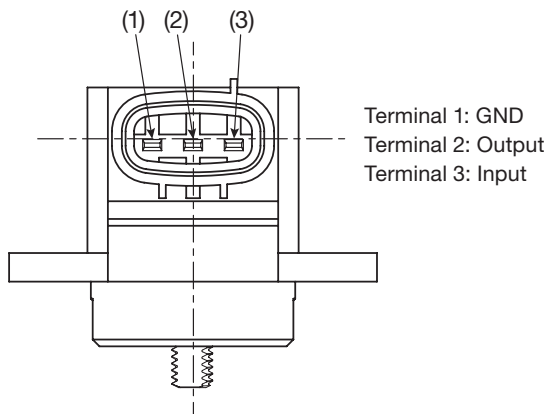
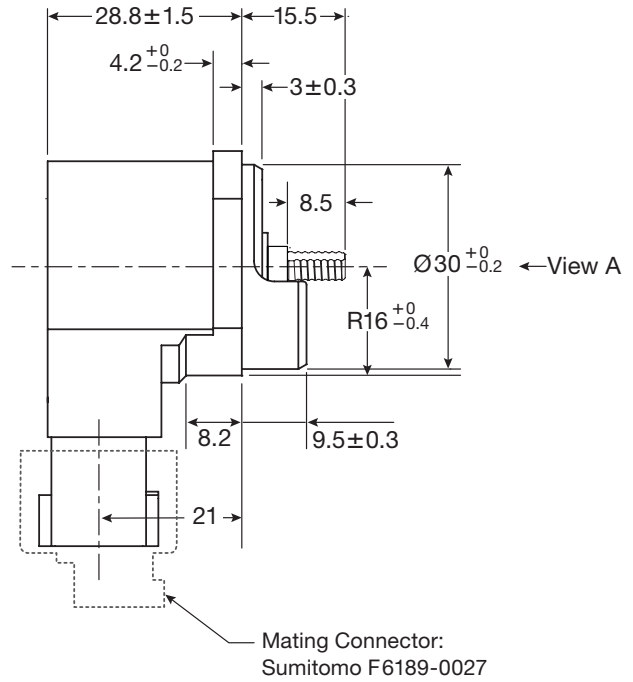
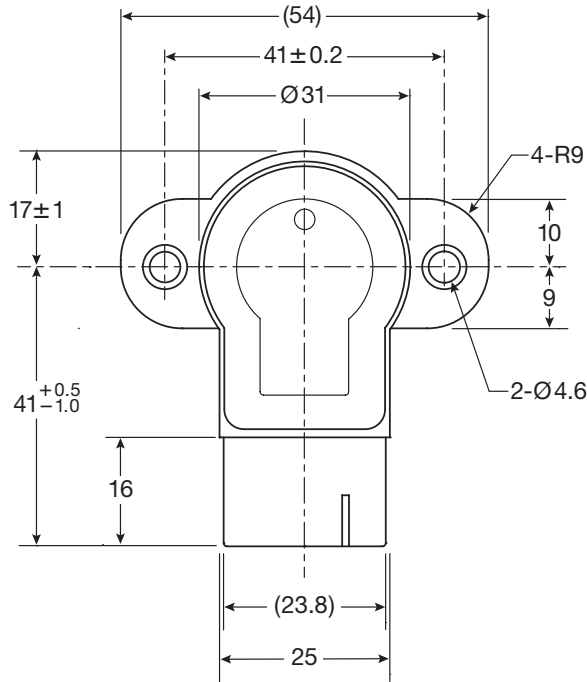
Figure 2: Detail of Shaft Shape and Threading

Unit: mm

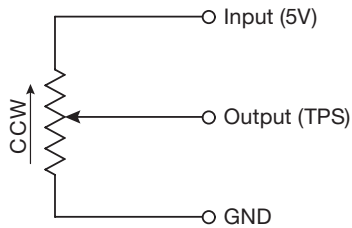
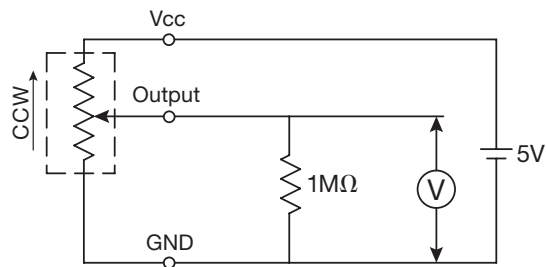


Unit: mm

Dimensional Drawings of Back, Side, and Terminal End Views



Tolerance: ± 0.5 , $\pm 5^\circ$
 (unless otherwise specified)

Figure 3: Circuit Configuration**Electrical Schematic****Figure 4: Evaluation Circuit****TOCOS AMERICA, INC.**

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