

# Non-Contact Angular Sensor

## RSC24

TOCOS now offers a low cost, one piece body design, high performance inductance method sensor with the RSC24 Series Non-Contact Angular Sensor.



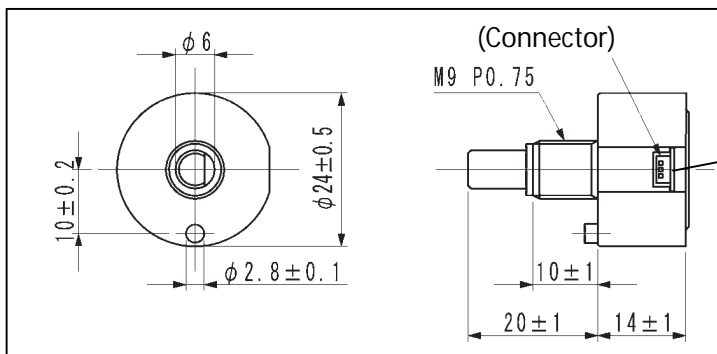
### Features

1. Non-Contact construction provides long rotational life and no noise.
2. Excellent cost performance.
3. High linearity.
4. Small hysteresis.

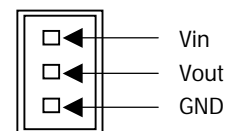
### Applications

1. Angular sensor for automotive applications.
2. Joystick control for gaming industry.
3. Electronic musical instruments.
4. Position sensor for robotics, building construction equipment and HVAC.
5. Valve position sensor.
6. For any application where angle detection is needed and which requires a long life, highly durable sensor.

### Appearance



### Pin layout



Using connector  
(J.S.T. Mfg. Co., Ltd.)  
Compatible connectors  
(J.S.T. Mfg. Co., Ltd.)

**Electrical characteristics**

Item	Condition	Criteria
Applied voltage	—	5VDC±5%
Current consumption	Applied voltage=5VDC, Non load	8mA Max.
Output voltage	—	10 - 90%Vin
Load resistance	—	10KΩ Min.
Effective electrical angle	Output voltage=10 - 90%Vin	120° ±10°
Independent linearity	Within the range of effective electrical angle.	±1.5%FS Max.
Temp. coefficient	Relative to 25°C, effective elec. angle Temp. range=-25 - +85°C	±2.5%FS Max
Insulation resistance	DC500V, 25°C, 60%RH	100MΩ Min.
Dielectric strength	AC500V, 25°C, 60%RH, 1 minute	No anomalies to be seen
Resolution	—	Infinitesimal (Analog output)

**Mechanical specifications**

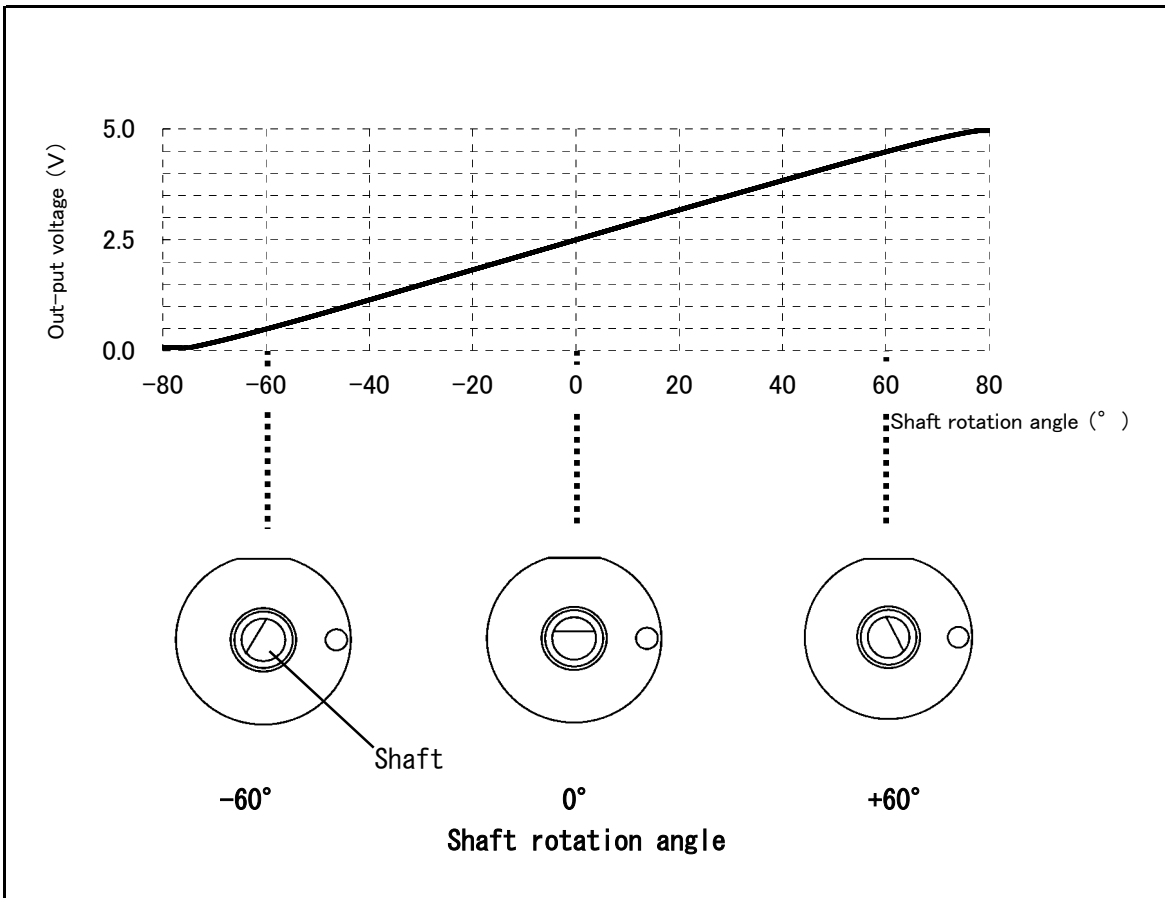
Item	Condition	Criteria
Rotation angle	—	160° ±5°
Rotation torque	25°C	9.8mN·m Max.
Mass	—	13.2g
Shaft stopper strength	—	147mN·m Min.
Shaft strength (Push)	Static load	29.4N Min.
Shaft strength (Pull)	Static load	29.4N Min.
Nut tightening torque	25°C	294mN·m Max.
Rotation life (Bushing life)	Room temp. rated load, Continuous 240 cycles/1minute	20 million cycle Min.

**Recommended nut tightening torque: 196mN·m**

**Environmental specifications**

Item	Condition	Criteria
Operating Temp. range	—	-25 – +85°C
Operating moisture range	—	35 – 85%RH
Vibration	10 – 55Hz (1.5mm) 56 – 500Hz (20G) Cycles 15 minutes. XYZ each 2hrs.	Satisfies elec. Specs.
Load life	85°C, 1000hrs Rated load (1.5hrs. ON, 0.5hr OFF)	Satisfies elec. Specs.
Moisture and load life	40°C, 90 – 95%RH (No condensation to occur), 1000hrs Rated load (1.5hr ON, 0.5hr OFF)	Satisfies elec. Specs.
Thermal shock	-25°C (30 minutes) → 85°C (30 minutes) 100 cycles	Satisfies elec. Specs.

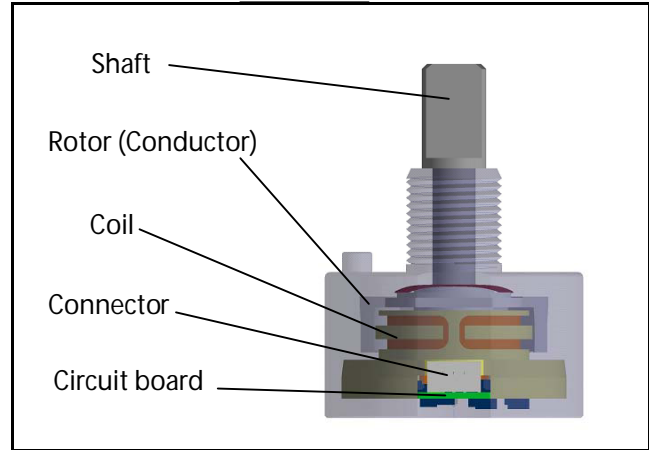
Rotation angle vs. output voltage characteristics



**Structure**

Rotation of conductive rotor brings impedance value changes of coils and this impedance value changes can be converted to an electrical signal.

Because of putting a fixed distance between rotor and coils, they never come into contact with each other. Therefore, there is no wear of element caused by sliding.



**Principle**

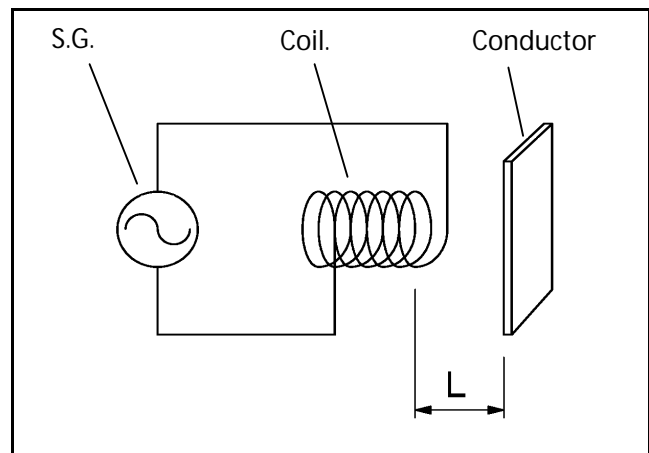
AC magnetic field is generated when AC is applied to coils.

When placing conductor near the coils where AC magnetic is generated, AC magnetic passes the conductor to generate eddy current.

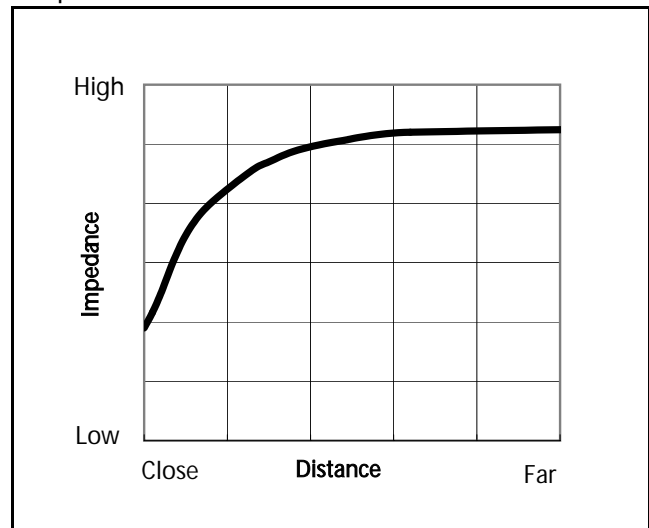
Eddy currents reduce impedance of coils.

Impedance of coils decrease as conductor comes near coils. (Graph 1)

The impedance changes linearly against rotational angles. Therefore, the TOCOS original structure provides accurate rotational angles to detect. Impedance changes are converted to electrical voltage and are output as data of angle.



Graph 1



**Important! (Storage & Use Environment)**

1. Avoid any strong impacts or shocks to sensor.

This could result in changes to the sensor's output level or cause the sensor malfunction.

2. Do not store or use the sensor in a corrosive gas or liquid environment.

3. Avoid excessive force to the sensor.

Such force could result in loss of electrical connection to mounting surface.

4. Do not store or use the sensor in an environment where condensation is present.

**Important! (Mounting Precautions)**

1. Do not wire the sensor when the power is on.

2. Do not place the sensor near a magnetic source.

3. Nut Tightening Torque: Max. 294mN.m

5. Avoid stress to shaft when mounting the Sensor.

Stress can result in shaft locking or shaft wobble.

** Important! (Handling Precautions)**

1. Keep the sensor away from any electronic medical devices, contact could result in malfunction.

TOKYO COSMOS ELECTRIC CO., LTD.