

# Rotary Position Sensors in Various Applications



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## ROTARY POSITION SENSORS IN VARIOUS APPLICATIONS

Non-contacting Hall-effect rotary position sensors are designed for the most demanding applications in the material handling, process automation, and transportation markets. With over 20 years of experience in non-contacting solutions for automotive applications, CTS is using this technology to design industrial grade rotary position sensors; their efforts are showcased with the release of the Series 285 family of Non-Contacting Rotary Position Sensors. Quality, performance and reliability are core aspects of this product series.

Precision rotary position sensors with traditional contacting technologies have been used in many applications over the years. The introduction of non-contacting technology into rotary position sensors has improved product performance and provided longer life and compatibility in harsh environments. Improved performance results in higher reliability, better quality and longer deployment in the field while reducing associated maintenance, service and replacement costs.

### HALL-EFFECT TECHNOLOGY

Rotary position sensors are electro-mechanical devices used to measure the displacement and position of an object. Rotary sensors measure the rotation angles by providing feedback in the form of voltage or other types of outputs. These measuring devices can be constructed with contacting or non-contacting technologies. CTS Series 285 flange mount rotary position sensor uses “Hall-effect” non-contacting technology for high reliability and extended deployment.

Hall-effect technology offers a reliable and high-quality solution where performance characteristics of contacting technology falls short. Discovered by Edwin Hall in 1879, Hall-effect refers to the potential difference on opposite sides of a bar-shaped conducting or semi-conducting material. This is known as the Hall element. The potential difference (voltage) is produced by a magnetic field

applied perpendicular to the Hall element through which electric current flows. Figure 1 is provided to illustrate this concept.

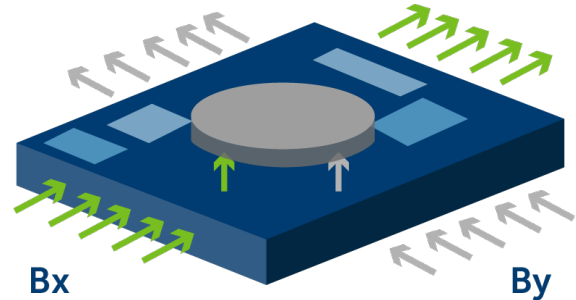


Figure 1: Hall Concept

Hall-effect technology produces an analog output similar to contacting potentiometers without the aid of the physical wiper contact. There are no internal contacting parts subject to mechanical wear or failure, making this technology ideal for use in harsh environments where extreme levels of shock, vibration, temperature changes, moisture and dust particles are present. Figure 2 demonstrates the typical configuration for the Hall-effect sensor where a magnet is rotated over a pre-programmed integrated circuit (IC), thereby producing the analog signal output.

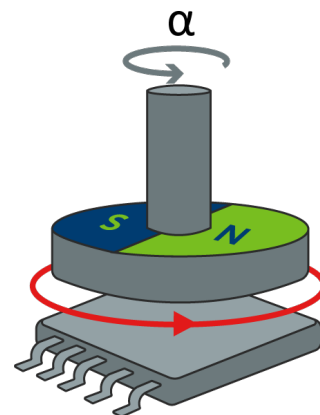


Figure 2: Hall Configuration

## A VARIETY OF APPLICATIONS

### **Material Handling**

There are a variety of material handling applications where the non-contacting rotary position sensor can enhance end-product performance and field deployment. Traditional contacting rotary position sensors used in pedal position (acceleration and brake applications), steering sensor, mast sensor and fork tilt sensors can all benefit by changing to non-contacting rotary position sensors. Benefits include reduced calibration, maintenance and service replacement, and equipment down time resulting in cost savings.



### **Process Automation**

In the process automation industry, typical applications include valve controllers and valve actuators. Manually actuated valves can be replaced by non-contacting rotary position sensors to enable remote actuation and flow adjustment. The main benefit for retrofitting manual valves with an electro-mechanical counterpart is control of the valve from a remote location. Although a contacting rotary position sensor is suitable for valve controllers and actuators, a non-contacting rotary position sensor provides additional benefits. Non-contacting technology reduces calibration, maintenance and system down time, resulting in cost savings and automation throughput efficiency.



### **Transportation, Off-Road and Marine**

Typical applications in the transportation and off-road vehicles include throttle-position sensor and throttle body for EFI, gate lifts, cranes, various construction, mining and agriculture machinery, and small engine applications. Marine applications include boat throttle controls, ship propulsion, and rudder position feedback. Non-contacting rotary position sensors provide a more reliable solution when compared to contacting rotary position sensors, increasing field deployment and reducing equipment service down time translating into increased efficiency and cost savings.



### **Medical**

Applications in the medical field include patient table positioning for laser treatment, radiation or x-ray; dental chairs and dental 180° x-ray scan equipment; and patient chairs for eye laser surgery. Non-contacting rotary position sensors provide position accuracy that is critical for some medical procedures. Length of deployment is also beneficial, translating into reduced equipment preventative maintenance and reduced down time.



## CTS NON-CONTACTING ROTARY POSITION SENSOR OPTIONS

CTS offers non-contacting Hall-effect rotary position sensors that are great industrial grade solutions for the applications mentioned prior.

Series 285 standard and flange mount non-contacting Hall-effect rotary position sensors provide Industrial grade performance in extreme environmental conditions. The wide operating temperature range of -40°C to +85°C, extended life of up to 10 million cycles, and variety of IP seal rating options provide reliability and durability at a competitive price. Series 285 is based on Hall-effect technology and has no internal contacting parts to wear. Extended life of Series 285 products with ball bearing option can reach 50 million cycles greatly reducing service replacement cost and equipment down time. In addition, Series 285 can be used in wide operating temperatures and humid environments without sacrificing product performance.

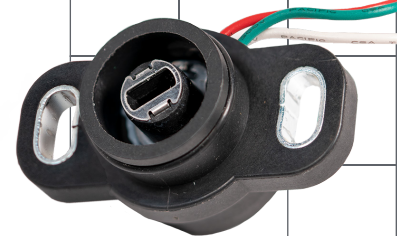
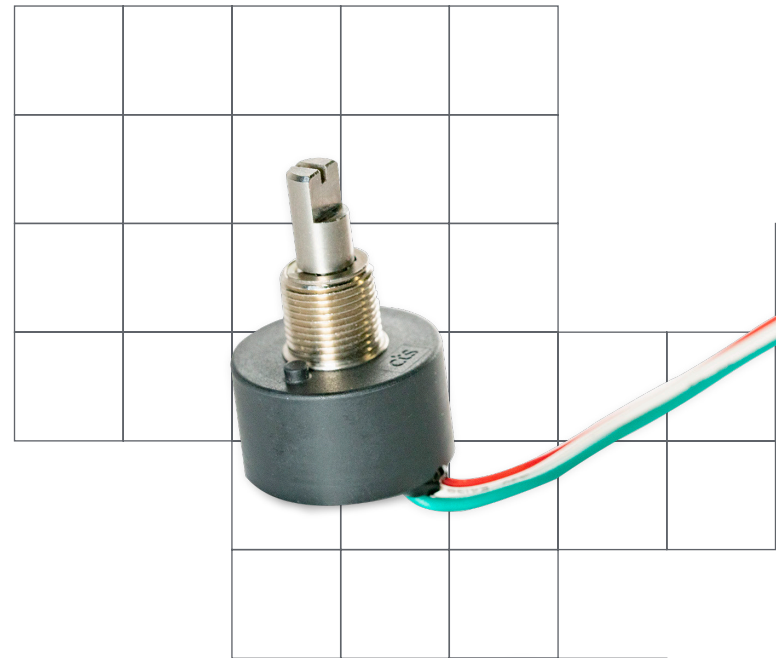
Elimination of internal component wear also provides stable and consistent performance in applications where vibration and shock are typically encountered. In addition, the product performance is constant and stable over the life of the product unlike contacting potentiometers that require periodic calibration to maintain accuracy. Standard flying leads offered on Series 285 rotary position sensors eliminate the need for soldering wires to the unit, making installation or replacement a quick procedure.

By transitioning from traditional contacting technology to non-contacting technology, the need for periodic calibration, maintenance and service checks are virtually eliminated or greatly reduced translating into maintenance and service cost savings, and reduced equipment down time as well. Custom configurations with redundant dual output, PWM, SPI and SSI outputs are also available on request.

## ABOUT CTS

CTS (NYSE: CTS) is a leading designer and manufacturer of products that Sense, Connect, and Move. The company manufactures sensors, actuators, and electronic components in North America, Europe, and Asia. CTS provides solutions to OEMs in the aerospace, communications, defense, industrial, information technology, medical, and transportation markets.

For more information on CTS Corporation and products, please visit [www.ctscorp.com](http://www.ctscorp.com).





## Contact

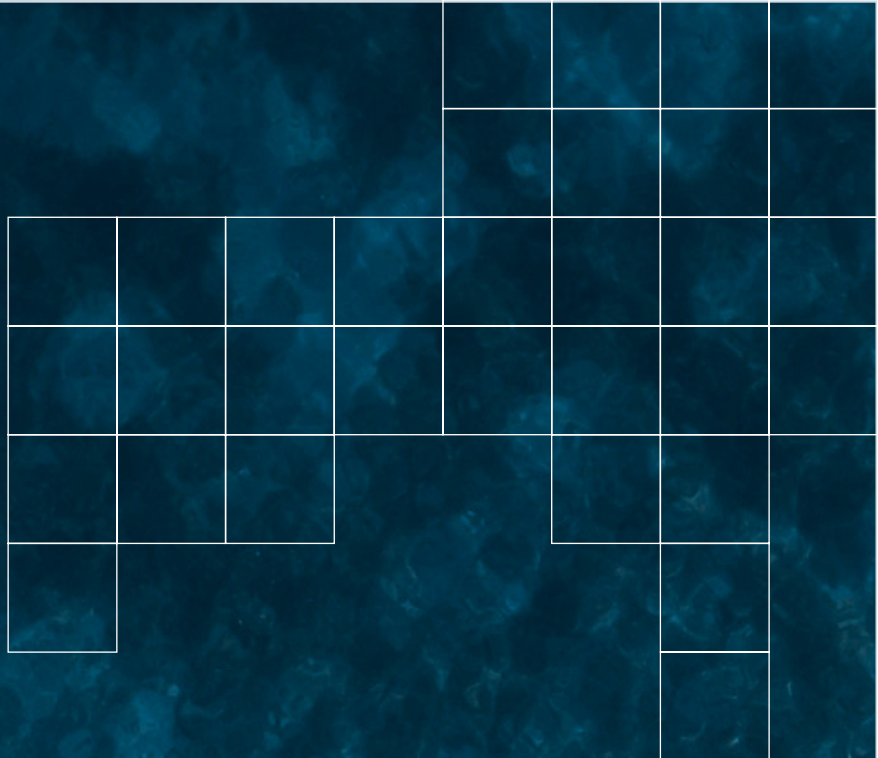
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