

Rotary Position Sensors

Rotary position sensors are used for precision measurement of angles. Typical applications are: throttle position, steering wheel angle, gear drum position, accelerator pedal position and clutch pedal/paddle position.

McLaren Electronic Systems offers two types of rotary position sensor using different technologies. These are:

- Potentiometer .
- Non Contact Hall Effect

Potentiometer

The sensing element of a rotary potentiometer is a circular track made of conductive plastic. A wiper, attached to the operating shaft, contacts the track. As the shaft is rotated, the resistance between the end of the track and the wiper changes in a linear manner. Typically, a constant voltage is supplied across the ends of the conductive track and the potentiometer is used as a voltage divider. When used in this way, the voltage at the wiper is proportional to the shaft angle.

The drawings in the Product Summaries show the relative position of the shaft and the centre of the electrically active part of the track (the "Half Voltage Position"). This information is important because the potentiometers do not have internal end stops to give a location datum for the track.

Sensor Design

Rotary potentiometers have robust, black anodised, aluminium bodies. No internal end stops are fitted and all models offer 360° continuous rotation. Various lengths of electrically active track are available, up to a maximum of 348°.

Three size ranges are available

- Standard
- Mini
- Micro

Several mounting styles are offered in the Standard range using either a flange on the body or a thread concentric with the shaft. The threaded model is usually used for steering wheel angle measurement with a gear drive to the steering wheel shaft. Flanges are available with rotation adjustment, with lateral adjustment, or with Some of the adjustable flanges no adjustment. incorporate a notch which can locate with a dowel to lock the adjustment. Some models have leaf springs incorporated into the shaft to help isolate the potentiometer from vibration.

For applications where space is at a premium, the more compact Mini and Micro models are available.

All ranges have a shaft seal which prevents the ingress of dust and dirt. This seal is splash resistant but will not prevent the ingress of fluids if the potentiometer is immersed.

A twin output version of the Mini potentiometer is available. This has two independent wipers operating on separate tracks deposited onto a common substrate. Each track has separate supply and signal wires.

On all models the angle of the cable outlet relative to the body can be changed.

McLAREN TECHNOLOGY CENTRE CHERTSEY ROAD, WOKING SURREY GU21 4YH, UNITED KINGDOM W: www.mclarenelectronics.com

T: +44 (0) 1483 261400 F: +44 (0) 1483 261402 USA: MCLAREN ELECTRONICS INCORPORATED T: +1 (704) 660 3181 Email: sales@mclarenelectronics.com

12/8/08 ASIA: TOKYO R&D CO. LTD T: +81 (0) 46 226 5501 Email: mes@r-d.co.ip



Rotary Position Sensors

Non Contact Hall Effect

The Non Contact Hall Effect sensor consists of a stationary Hall element, a shaft and a magnet. When the angular position of the element changes relative to the magnet, the change in magnetic field sensed at the element results in a linear change in the output voltage from the sensor. The sensor has an internal voltage regulator and can therefore be connected to a battery supply.

The sensors are available with an electrical angle of up to 360°.

Sensor Design

Non Contact Rotary Hall Sensors have robust, hard anodised black, aluminium bodies. An 'O' ring seal is provided on the stainless steel shaft to prevent ingress of dust and dirt. This seal is splash resistant but will not prevent the ingress of fluids if the sensor is immersed.

There are no wiping contact parts, as in a conventional potentiometer, therefore minimising electrical noise, wear and the possibility of contact bounce. No internal end stops are fitted and all models offer 360° continuous shaft rotation. The sensor is dimensionally similar to the miniature potentiometer, and can replace it in some applications.

The sensors can be supplied as an all-in-one package, with the shaft mounted into a bearing inside the sensor housina.



Alternatively the magnet can be remotely mounted from the sensing assembly so it can fit inside the actuator assembly.



The following parameters can be programmed to meet specific application requirements: start/end voltage, half voltage position, shaft rotation relating to rising or falling output voltage.

The sensor can be reprogrammed after encapsulation, for example to change the measurement angle. This enables adjustments to be made at the factory if required by the customer.

The standard version of the Non Contact Rotary Hall Sensor is a single element output. Also available, on request, are the options to have dual elements configured with a twin output (dual redundancy) with either a common or separate Supply and Ground.

It is important that the sensor is not exposed to strong magnetic fields, which would cause permanent damage to the sensor. The sensor should be kept clear of any stray magnetic fields and ferro-magnetic materials during operation. The housing incorporates ferromagnetic shield to prevent interference from stray magnetic fields.

McLAREN TECHNOLOGY CENTRE CHERTSEY ROAD, WOKING SURREY GU21 4YH, UNITED KINGDOM W: www.mclarenelectronics.com

T: +44 (0) 1483 261400 F: +44 (0) 1483 261402

USA: MCLAREN ELECTRONICS INCORPORATED T: +1 (704) 660 3181 Email: sales@mclarenelectronics.com

12/8/08 ASIA: TOKYO R&D CO. LTD T: +81 (0) 46 226 5501 Email: mes@r-d.co.ip