

IS2201 Inductive Position Sensor With Analog Output

Product data

Features

- Differential inductive sensing principle
- Differential analog output signal
- Insensitive to magnetic interference fields
- Robust against oil, water, dust, particles
- Ultra-thin package, 0.8 mm thick
- Pads for surface-mount soldering of cable
- Detection of nearly any metallic structure

Applications

- Gear tooth counting
- Detection of reference position or end-stop
- Linear stages and X-Y tables
- Assembly / Pick & Place equipment
- Machine tools

Description

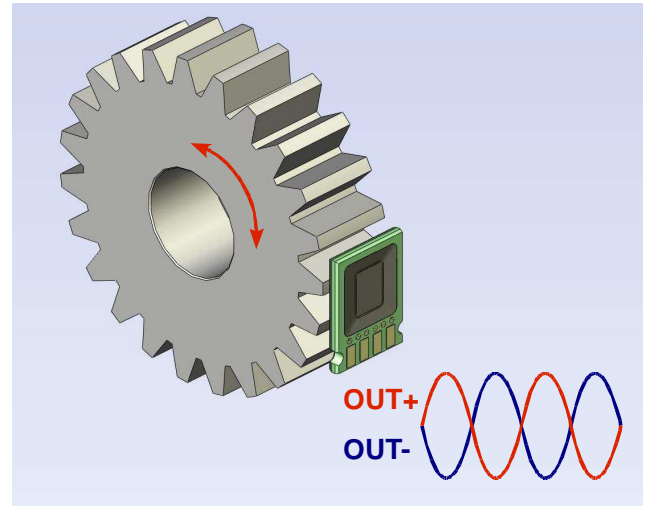
The IS2201 sensor is a single channel differential inductive position sensor with a differential analog output. A primary coil generates an AC magnetic field, which is sensed by a differential secondary coil pair. Variations in a metallic surface like teeth, ribs, grooves or holes lead to an analog signal excursion.

General Specifications

Airgap up to 1 mm
 Supply..... 5.0 ± 0.5 V, 15 mA typ
 Temperature 0 – 100°C
 Output format..... Analog differential
 Target material..... Ferromagnetic and/or conducting
 Frequency range..... 0 – 40 kHz

Targets

The IS2201 sensors can be used for a wide variety of targets of different materials, dimensions and shapes. Virtually any metallic object (steel, aluminum, copper, brass ...) with a structure on its surface (teeth, grooves, holes, slits, ribs) can be detected. Transitions between materials (from metal to air or from ferromagnetic to conducting) can be measured as well.



Output signals

A repetitive target, like a gear, cogwheel, rack or spokedwheel with a period length between 1.5 and 3.0 mm typically leads to an output signal with a sine-shape. The exact form of the signal depends on the material parameters (magnetic permeability, electrical conductivity), shape and dimensions. The sine-wave signal from a repetitive target is illustrated in Fig. 1a.

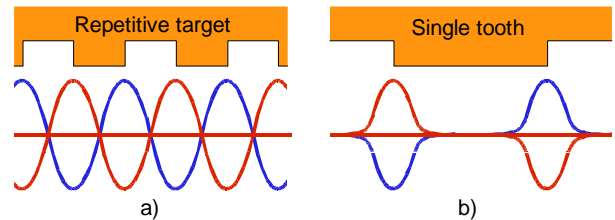


Fig. 1 a) Repetitive and b) single tooth targets.

A single-period target with a length above approximately 5 mm leads to a pulse at each edge of the target shape, as illustrated in Fig. 1b. Between the two tooth-edges, the differential signal goes back to zero.

The effect of the tooth size on the output signal is illustrated in Fig. 2. It is clear that a small tooth, rib, groove or slit is ideal for the detection of the center of the tooth.

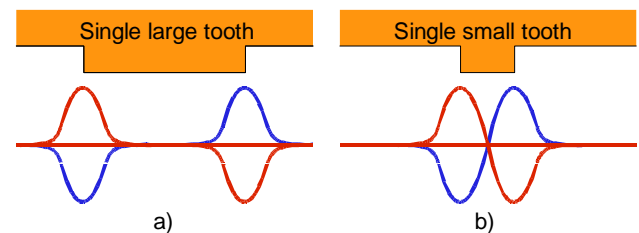


Fig. 2 a) Large tooth and b) small tooth signals.

Ferromagnetic vs electrically conducting targets

The two main differences between ferromagnetic and electrically conducting targets are illustrated in Fig. 3:

- The signal changes sign between a ferromagnetic and an electrically conducting target
- Single-period ferromagnetic targets often create an “overshoot” before and/or after the main signal at the edge of the target, see Fig. 3a. This effect depends on the dimensions, shape and material of the target and does typically not appear with electrically conducting materials.

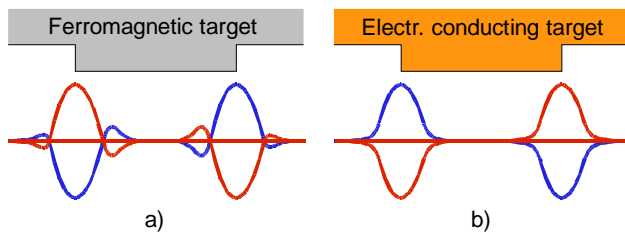


Fig. 3 a) Ferromagnetic, b) electrically conducting targets.

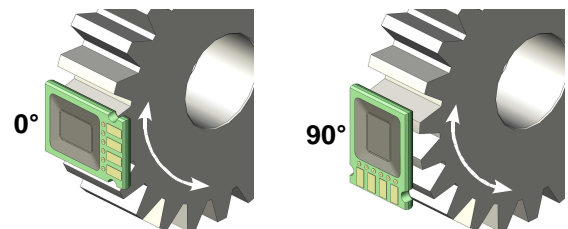
Suitable ferromagnetic target materials are almost all steels, suitable electrically conducting target materials are aluminium, copper, brass.

Ordering information

Sensor element

Ordering code: IS2201-A

A	Orientation
0	0°
1	90°



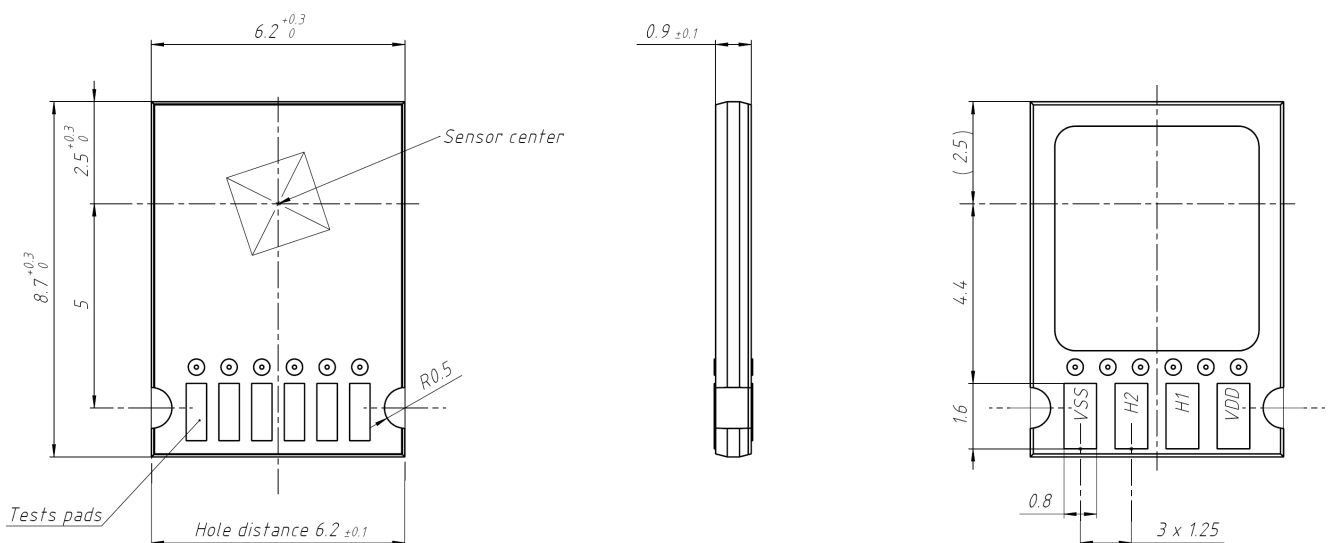
Evaluation kit

The evaluation kit for the IS2201 sensor contains 1 Sensor Interface Board, a linear and/or rotational PCB-target and two IS2201-1 sensors. The Sensor Interface Board contains an amplifier that transforms the differential sensor-signal to a single-ended analog signal and that filters the analog signal with a 2nd order 1 kHz low-pass filter (other bandwidth available upon request). Detailed information on the Evaluation Kit for incremental applications can be downloaded from POSIC’s website www.posic.com.

Sensor customization

Customization of a sensor (shape, dimensions, output signals) for a specific application is offered as an engineering service by POSIC.

Technical drawing



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