_Sensors from SMC :)

What is a sensor?

A sensor is device that collect information about the world around it. Sensor operate on the principle of transduction: the conversion of energy from one form to another.

Classification of sensors

Level 1: Propioceptive / Exteroceptive

Level 2: Contact / Non-contact

Level 3: Active / Passive

Level 4: Type of detection (contact, sound, electromagnetic spectrum or chemical concantracion)

What can they detect?

- Presence



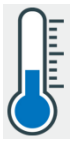
- Location or dimension



- Chemical composition



- Temperature

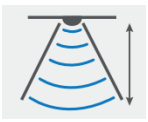


- Color

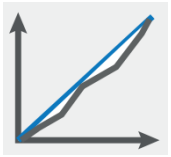


Characteristics of sensors

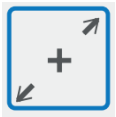
- Measuring range



- Linearity



- Resolution



- Response time



- Sensivity



- Offset or Zero deviation



- Repeatability

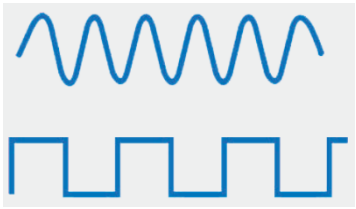


- Drift

- Precision and accuracy



- Types of signal output: Analog or digital



Types of sensors

Proximity sensors

Contact proximity sensors

Contact proximity sensors must make physical contact with an object to determine if it is present or absent.

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Normally open sensor



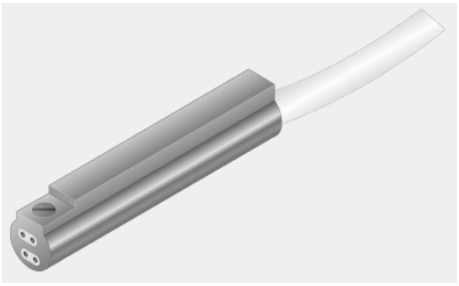
Normally closed sensor



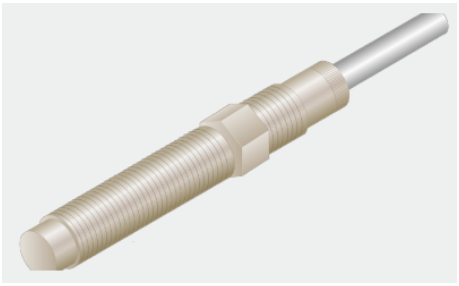
Non-contact proximity sensors

They are able to detect the presence of nearby object without any contact.

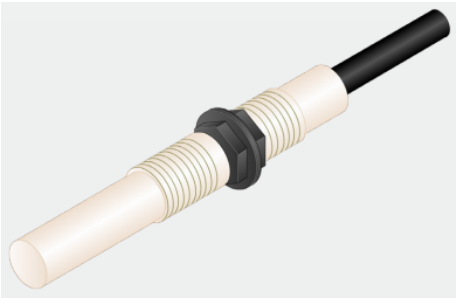
Magnetic sensors — Reed switch



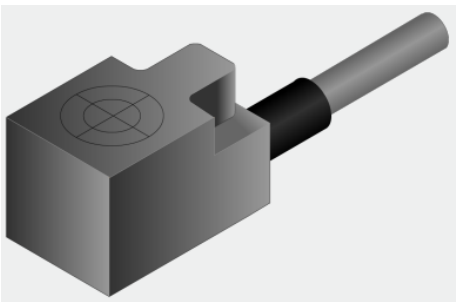
Hall effect sensor



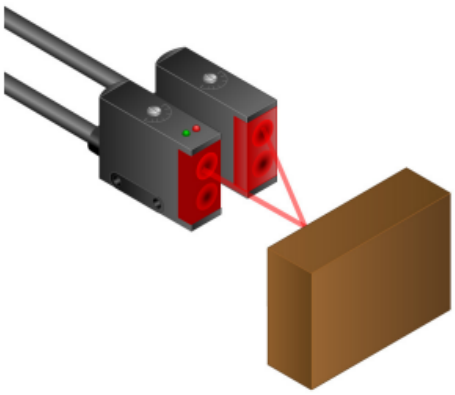
Capacitive sensors



Inductive sensors

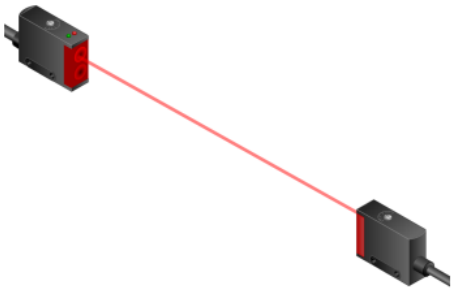


Photoelectric sensors — Diffuse sensor

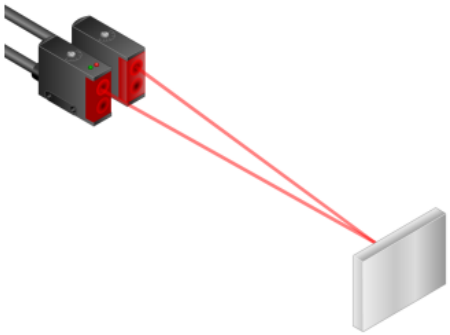


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Through beam sensor

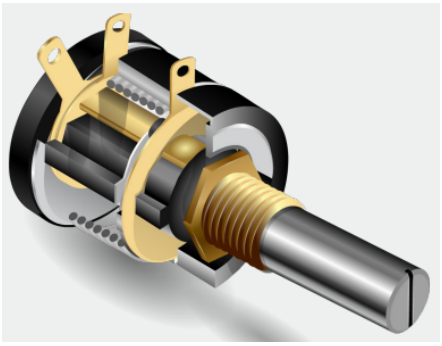


Retro-reflective sensor



Position, speed and acceleration sensors

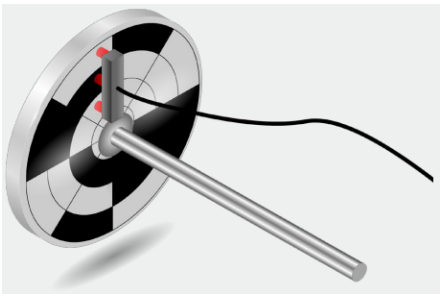
Position Potentiometer



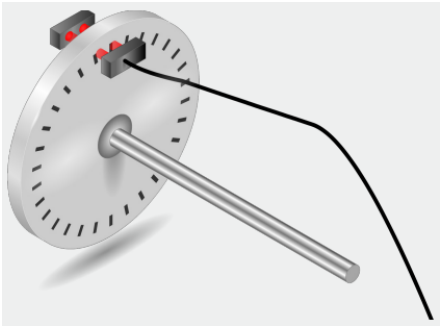
Linear encoder



Rotary encoder Absolute

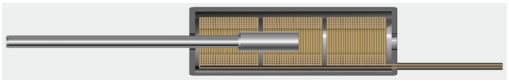


Incremental

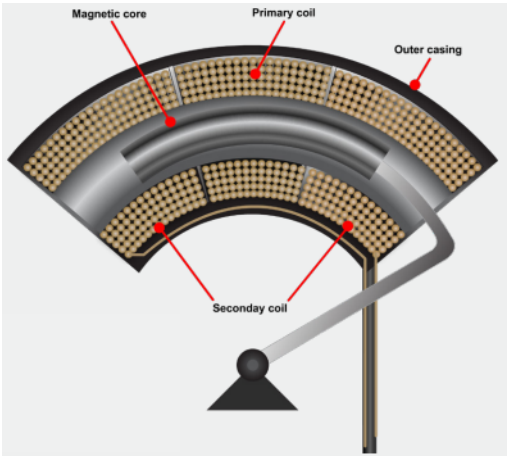


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Linear variable differential transformer (LVDT)



Rotary variable differential transformer (RVDT)



Speed

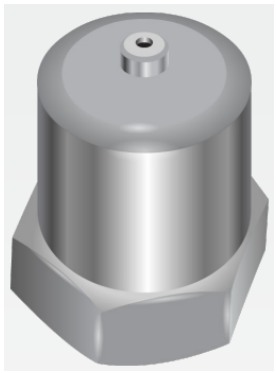
There are many sensors to measure the speed: Linear and rotary encoders, LVDT, RVDT, etc.

Acceleration

Acceleration sensors are used to measure forces on an object that are a result of:

- Fall
- Tap
- Tilt
- Shock
- Vibration

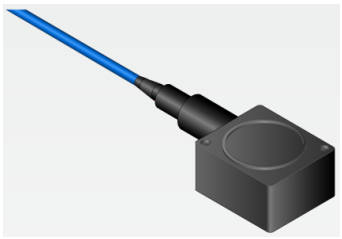
Piezoelectric



Hall effect



Capacitive



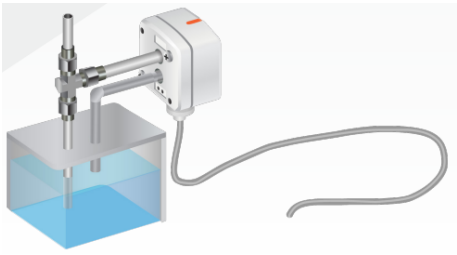
Process control sensors



Pressure sensor

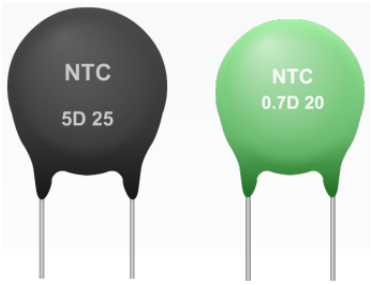


Flow sensor

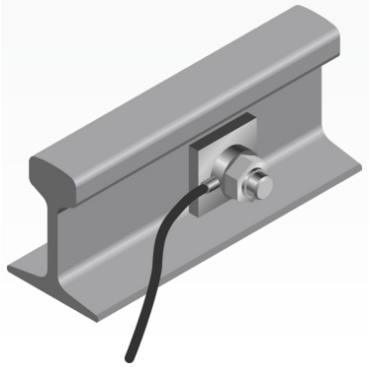


Level sensor

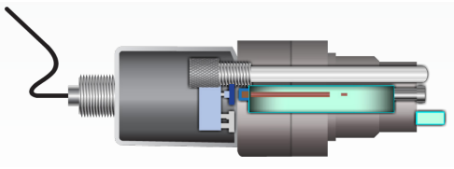
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Temperature sensor



Load sensor



pH sensor