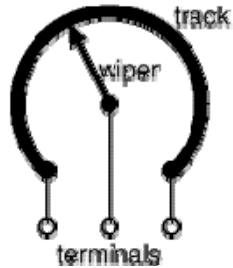
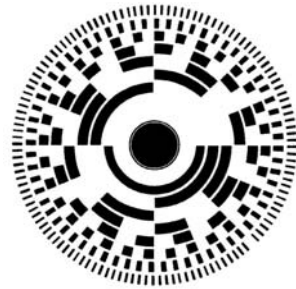


Measuring Movement



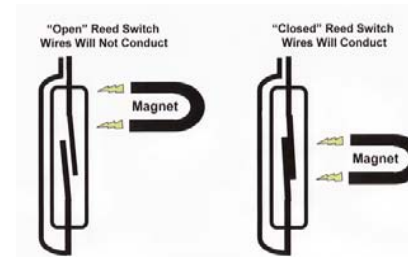
Variable Resistors (Potentiometers)

Variable resistors are made of a resistance track, with connections at both ends (one would go to 0v, and the other to +v). They also have a wiper, which uses a rotary force to move along the track, and change the resistance. They are usually rotary, but straight versions (sliders) can also be used. Rotary versions are used in things like volume control on speakers.



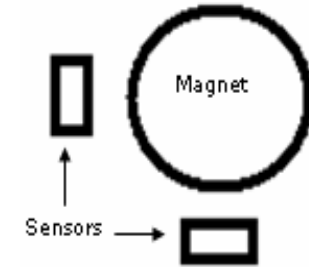
Rotary Encoders

Encoders are devices that convert the angular position of a shaft or axle to an analogue or digital code. They are used in mice with trackballs – where there are two encoders, one taking the values of left to right, the other up and down. Optical encoders can be made of glass or plastic, and have some opaque or transparent sections. On one side of the disk is a light source, and on the other side is a photo detector that reads the pattern resulting from the position of the disk.



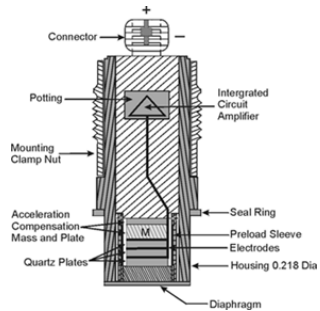
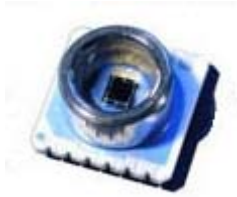
Reed Switches

Reed switches are electronic switches controlled by a magnetic field. There are two contacts encased in a glass envelope which prevents corrosion. When a magnet is placed next to the contacts, the switch is activated, and once it moves away it goes back to its original position. A coil could also be used which creates a reed relay, switching it on and off. They can be used for things like burglar alarms, when used as proximity switches, activating when a door is opened.



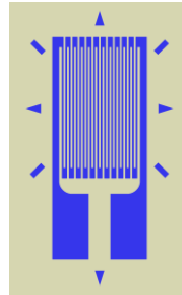
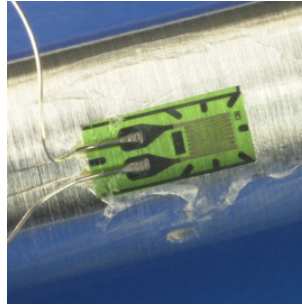
Hall Effect Sensors

Hall Effect sensors are dependent on a magnet that is twisting around between them. This gives an output that depends on where the poles of the magnet are in comparison to the sensors. One of the sensors then gives off a cosine reading, and the other a sine reading, which can be put together to find the tangent.



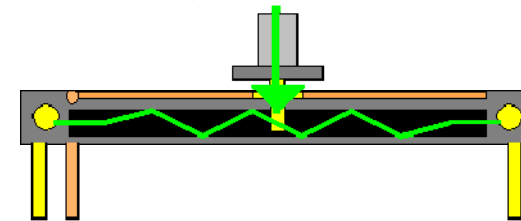
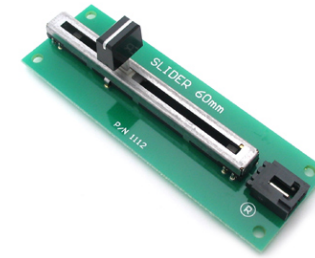
Pressure Transducer

Pressure sensors measure the pressure of an item, typically liquids or gasses. Sensors tend to act as transducers, generating a signal depending on the pressure imposed. Some sensors, like those used in speed cameras, use binary, so are either on or off. Pressure sensors can also be used to monitor pressure, so that by comparing the pressure on a pipe over time, they can check for leaks.



Strain Gauge

Strain gauges consist on an insulating flexible backing, which supports a foil pattern. The gauge is then attached to an object. As the object deforms, the foil does also, causing the resistance to change. They are connected to Wheatstone Bridge circuits, which relate the strain by a quantity known as 'gauge factor'.



Overlay of schematic symbol on drawing of potentiometer

Linear Movement

Similar to variable resistors, **sliders** can be used to measure linear movement. Instead of being rotary, the track goes in a straight line, and the wiper is moved along it.