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18/ENGO2/086 Computer Engineering

1.) A Sensor is a device whose purpose is to detect or measure a physical property and records, indicates, or otherwise responds to it.

Examples :-

Proximity Sensor

Light Sensor

Temperature Sensor

Pressure Sensor

1.2.) An actuator is a component of a machine that is responsible for controlling a mechanism or system, for example by opening a valve. In simple terms, it is a 'mover'. An actuator requires a control signal and a force of energy. Examples are :-

Hydraulic Cylinder

Electroactive Polymer

Digital Micrometer Device

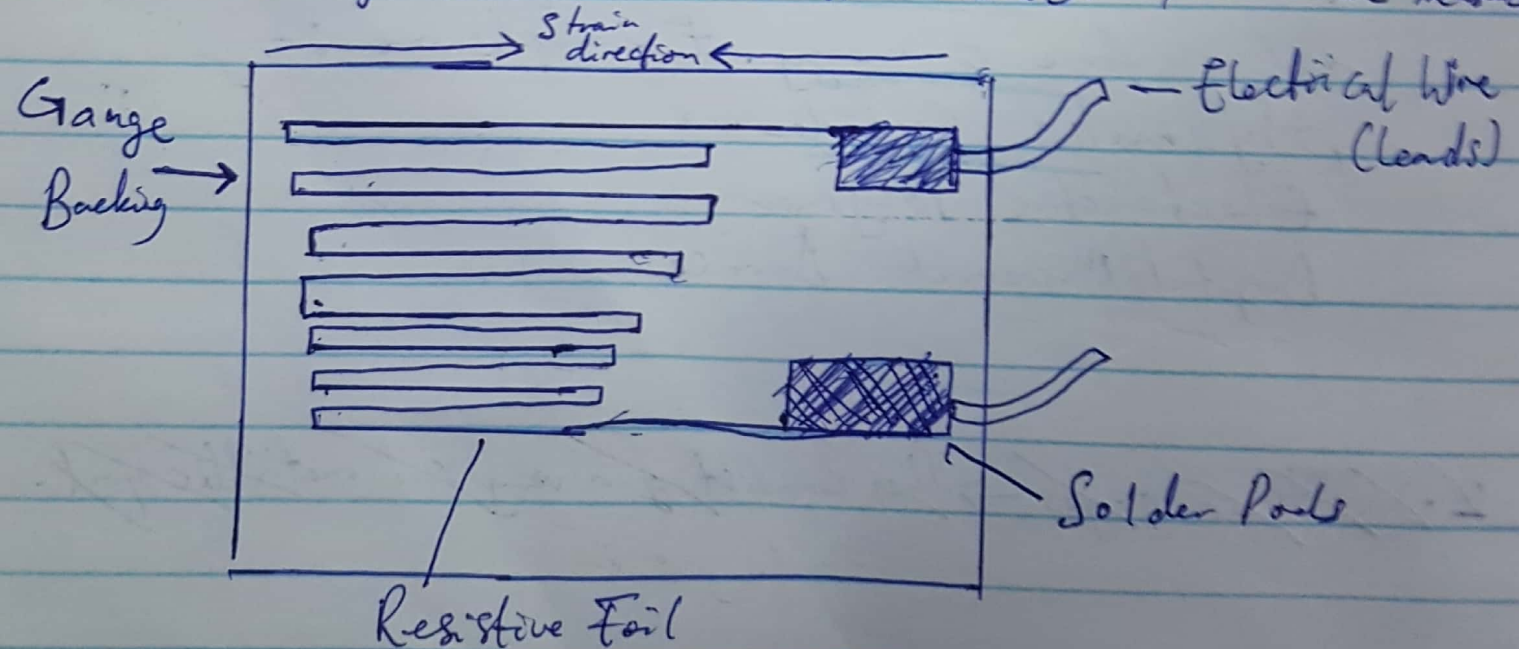
2.) Strain gages \rightarrow They consist of a very fine metallic foil.

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2a.) Digital indicators: They are used to view diverse parameters e.g. Humidity, temperature, Vibration, etc.

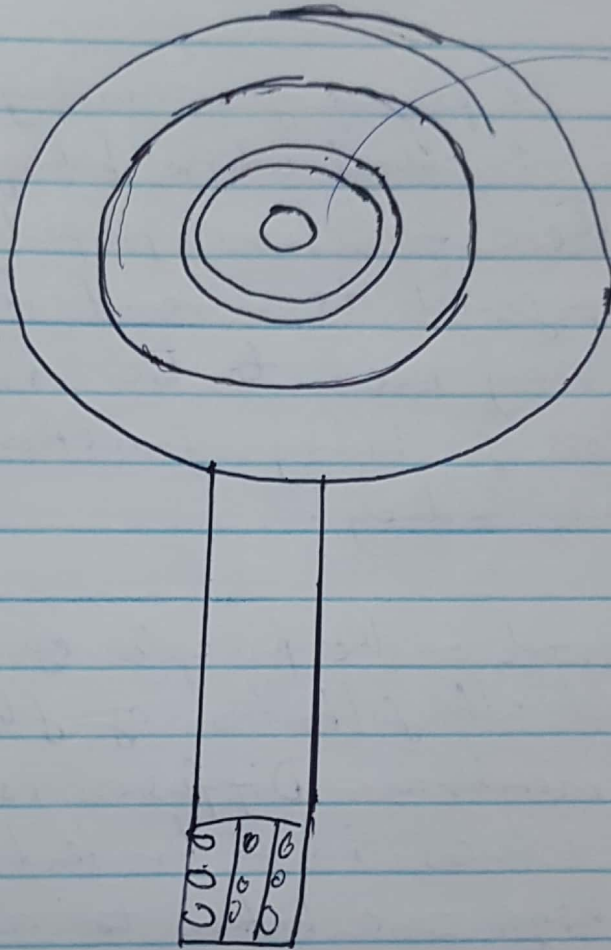


b.) A strain gauge: A sensor that converts tension, force, etc. into a change in electrical resistance which then can be measured

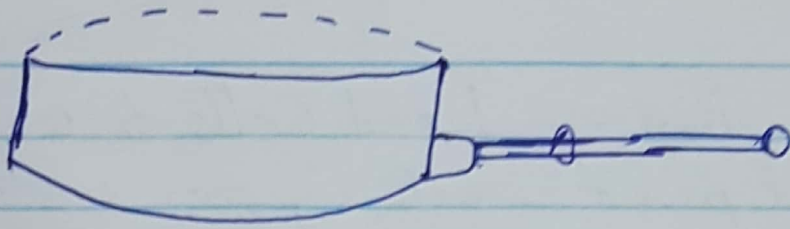


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Force Sensors: They use Load Cells to weigh objects and prevent machinery from overloading.



"Load Cells:- It converts an input mechanical force (load, weight, etc) into another physical variable, in this case into an electrical output signal that can be measured, converted and standardized.



3) Dialysis is the process of removing excess water solutes from the blood whose kidneys can no longer perform their functions properly.

This is referred to as renal replacement therapy. Dialysis may need to be invented when there is sudden loss of kidney function, which is known as acute kidney.

Principle

Dialysis work on the principles of the diffusion of solutes and ultrafiltration of fluid across a semi permeable membrane. Diffusion is a property of substances in water; substances in water tend to move from an area of high concentration to an area of low concentration.

Passive diffusion occurs when a high to low concentration gradient is present between the patients blood and dialysis solution (dialysate) used.

* Ultrafiltration ensures excess fluid is cleared from the body through the use of a positive (blood) or negative (dialysate) pressure gradient, moving fluid from a high to low pressure region.

The main types of RRT established renal failure are

- Haemodialysis (HD)
- Haemodiafiltration (HDF)
- Peritoneal dialysis (PD)
- Kidney transplantation.

3b) An endoscope is an illuminated optical, typically slender and tubular instrument (a type of borescope) used to look deep into the body and used in procedures called an endoscopy. Endoscopes use tubes which are only a few millimeters thick to transfer illumination in one direction and high resolution images in ~~may~~ real time in the other direction, resulting on minimally invasive surgeries.

Principle.

The endoscopy procedure uses an endoscope to examine the interior of a hollow organ cavity of the body.

Unlike many other medical imaging techniques, endoscopes are inserted directly into the organ. A patient may be fully conscious or anaesthetised during the process or procedure.

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Example include

Cystoscope (bladder)

Nephroscope (kidney)

Bronchoscope

Arthroscope (joints)

Colonoscope (colon)

and Laparoscope (abdomen or pelvis)