Transducer Encyclopedia Article

Transducer

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Transducer

Just about any device that is used to convert energy from one form into another can be called a transducer. Most electronic measuring devices use some type of transducer in order to display their measurements.

An example of one type of transducer is an automobile's fuel gauge. In this system a float within the fuel tank is allowed to rise and fall according to the amount of fuel beneath it. The rise and fall is measured by a potentiometer as relative displacement, and the electrical signal produced by the potentiometer is used to control the position of the dashboard's fuel gauge. Like most transducers, this system utilizes a two-step process by which first a mechanical and then an electrical element are used to produce an electrical signal.

The transducer described above would be called a potentiometric transducer, since it uses a potentiometer as its electrical element. Other types are the inductive and capacitive transducers, strain gauges, ultrasonic transducers, as well as anemometers, flowmeters, and accelerometers.

One of the first kinds of transducers was the microphone, developed in the late 1800s by the American inventor Thomas Edison. The microphone converts sound waves by allowing them to vibrate a sensitive cone, later changing that vibration into an electrical signal. In order to reproduce the sound, one must use a speaker (another type of transducer) to reverse the process; here, the same signal is used to vibrate a similar cone, thus creating sound waves.

Another, more recent variety of transducer is the photoelectric cell. These *solar* cells consist of certain elements--often selenium or silicon--that readily lose electrons when exposed to bright light, particularly sunlight. The liberated electrons will produce an electric current across the cell. Photoelectric cells are often employed as light meters, measuring the intensity of light by recording the strength of the electric current it produces. A cousin to the photoelectric cell, the photovoltaic cell, is also used to convert sunlight into usable energy; though usually encountered in watches and pocket calculators. Photovoltaic cells have shown promise as a potential replacement for fossil fuels when assembled into large solar arrays.