

CONCEPT Analog input sensors are devices that measure physical quantities, such as temperature, pressure, light or sound, and convert them into an electrical signal that can be read and processed by a computer or microcontroller. One common type of analog input sensor is a voltage sensor, which measures the voltage level of a circuit or component.

To measure voltage using an analog input sensor, the sensor is connected to the circuit or component being measured, and the voltage signal is converted into a digital value using an analog-to-digital converter (ADC). The ADC takes samples of the voltage signal at regular intervals, and converts each sample into a binary number that can be read and processed by the computer or microcontroller.

Voltage sensors are commonly used in various applications, such as monitoring the output of a power supply or battery, measuring the voltage across a sensor or load, or detecting changes in voltage levels that can indicate a fault or malfunction in a circuit or system.

REAL WORLD CONNECTIONS

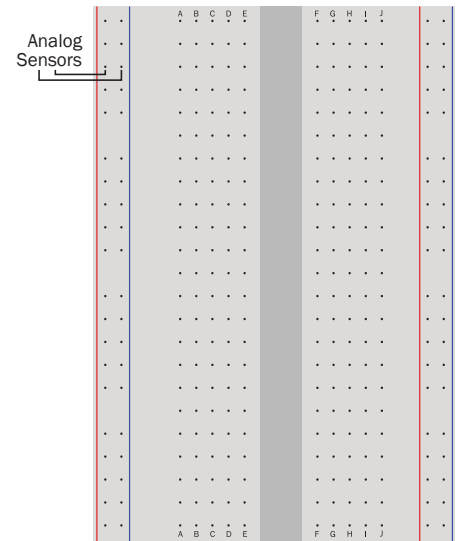
Voltage sensors are used to monitor the health and performance of most large industrial motor loads. These systems often rely on electric pumps and motors, which can be damaged by voltage spikes or drops. Voltage sensors can detect these fluctuations and alert operators to potential problems before they cause damage to the equipment or personnel.



Make sure it measures up

BACKGROUND

The history of analog input sensors and measuring voltage dates back to the early 19th century, when scientists and inventors began exploring the properties of electricity and developing devices to measure and control it. The first voltage measurement devices were simple galvanometers, which used a magnetic needle to indicate the presence and strength of an electrical current. As technology progressed, more sophisticated devices were developed, including potentiometers, which allowed for more precise voltage measurements, and vacuum-tube amplifiers, which increased the sensitivity and accuracy of voltage sensors. In the mid-20th century, solid-state electronics revolutionized the field of voltage measurement, with the development of transistors, operational amplifiers and integrated circuits. Today, analog input sensors and voltage measurement devices are used in a wide range of applications, from industrial process control and automation to consumer electronics and medical devices.



EXAMPLES

VOLTAGE SENSOR: A device that measures the voltage level of a circuit or component.

ANALOG-TO-DIGITAL CONVERTER (ADC): A device that converts an analog voltage signal into a digital value that can be read and processed by a computer or microcontroller.

SIGNAL CONDITIONING CIRCUITRY: A set of electronic components that process and filter the voltage signal before it is sent to the ADC to remove noise and improve the accuracy of the measurement.

MICROCONTROLLER OR COMPUTER: A device that receives and processes the digital value from the ADC, and performs any necessary calculations or actions based on the measured voltage level.

VOLTAGE DIVIDER: A circuit that divides the voltage level of a circuit or component to a level that can be measured by the ADC.

VOLTAGE REFERENCE: A stable voltage source used as a reference for the ADC to accurately convert the voltage signal into a digital value.

CALIBRATION EQUIPMENT: Equipment used to calibrate and verify the accuracy of the voltage sensor and ADC.



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