

Andhra Pradesh State Skill Development Corporation (APSSDC)





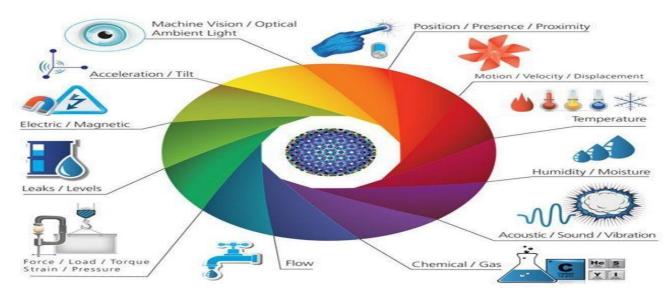
Introduction to sensors:

A sensor is a device that measures a physical quantity and converts it into a signal which can be read by an observer or by an instrument

Different Types of sensors:



We are giving our world a digital nervous system. Location data using GPS sensors. Eyes and ears using cameras and microphones, along with sensory organs that can measure everything from temperature to pressure changes.



Properties of Sensor:-

- > Accuracy
- ➤ Resolution
- ➤ Output Type
- ➤ Linearity
- ➤ Repeatability, Dead Bands, & Dead Bands,
- > Temperature
- ➤ Usable Temperature What is the min/max temperature that the sensor can be used at?
- ➤ Storage Temperature What is the min/max the sensors can be before it gets damaged?
- ➤ Field of View (FOV)

2.1.2) Introduction to Actuator:

An Actuator is a component of a machine that is responsible for moving or controlling a mechanism or system. An actuator requires a control signal and a source of energy. The control signal is relatively low energy and maybe electric voltage or current, pneumatic or hydraulic pressure or human power.





Andhra Pradesh State Skill Development Corporation (APSSDC)



- Hydraulic Actuators
- Pneumatic Actuators
- Electric Actuators

Hydraulic Actuators:-

• Hydraulic systems are used to control and transmit power.

Different Types of Sensors Thermistor IR Sensor IR Sensor Accelerometer Gyroscope (Temperature Sensor) (Transmissive Type) (Reflective Type) Ultrasonic Sensor Sensor Sensor Phototransistor Rain Sensor Soil Moisture Sensor Water Flow Sensor Heartbeat Sensor Alcohol Sensor (Light Sensor) LDR (Light LM35 (Temperature Smoke Sensor Color Sensor PIR Sensor Gas Sensor Receiver Sensor) www.electricaltechnology.org Flex Solar Cell Metal

- An actuator is used to convert the energy of fluid back into mechanical power.
- The amount of output power developed depends upon the flow rate, the pressure drop across the actuator, and its overall Efficiency.

Light Sensor

Dedector

Pneumatic Actuators:-

Humidity Sensor

- Their chief limitation is that the elastic nature of the compressed air makes them unsuitable for powering movement where steady forces or motions are required applied against a fluctuating load, or where extreme accuracy of feed is necessary.
- Pneumatic cylinders can be used to get linear, rotary, and Oscillatory motion. There are three types of pneumatic actuator: they are
 - i) Linear Actuator or Pneumatic cylinders

Touch Sensor

- ii) Rotary Actuator or Air motors
- iii) Limited angle Actuators

Electric Actuators:-

- An electric actuator is a geared motor.
- The motor can be of various voltages and is the primary torque-generating component.
- To prevent heat damage from overwork or excessive current draw, electric actuator motors are usually equipped with a thermal overload sensor embedded in the motor windings.



Real Time

Clock Sensor



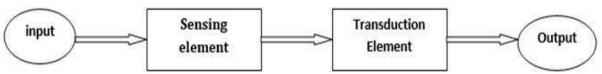
Andhra Pradesh State Skill Development Corporation (APSSDC)



SKIII AP Learn Anytime Anywhere

2.1.3) Introduction to Transducers:-

• The transducer is divided into two parts as shown on the part is the Sensing element/Detector/Sensor and the other part is the Transduction element. The sensing element is sensing any physical quantity.



• The transduction element is Measurably used for converting the non- electrical quantity to the electrical quantity. So broadly in electrical instrumentation, the Transducer is a device that can convert nonelectrical quantity to the electrical quantity.

The workflow of Transducer in a system

Types of Transducers:-

- Electrochemical Transducers
- Electroacoustic Transducers
- Electromagnetic Transducers
- Electromechanical Transducers
- Other types of Transducers
 - o Photoelectric Transducers
 - Thermoelectric Transducers
 - o Geiger-Muller tube
 - Quartz Crystal

Classification of Transducers:

- Primary transducer
- Secondary transducer
- Analog transducer
- Digital transducer
- Electrical transducer
- Mechanical transducer
- Active transducer
- Passive transducer

