



# SNS COLLEGE OF ENGINEERING

(Autonomous)

DEPARTMENT OF MECHANICAL ENGINEERING



## SENSORS AND INSTRUMENTATION



Guess Today's Topic????





# SENSORS



- A **sensor** is a device that produces an output signal for the purpose of sensing a physical phenomenon.
- In the broadest definition, a sensor is a device, module, machine, or subsystem that detects events or changes in its environment and sends the information to other electronics, frequently a computer processor. Sensors are always used with other electronics.
- Sensors are used in everyday objects such as touch-sensitive elevator buttons ([tactile sensor](#)) and lamps which dim or brighten by touching the base, and in innumerable applications of which most people are never aware. With advances in [micromachinery](#) and easy-to-use [microcontroller](#) platforms, the uses of sensors have expanded beyond the traditional fields of temperature, pressure and flow measurement, for example into [MARG sensors](#).





# SENSORS



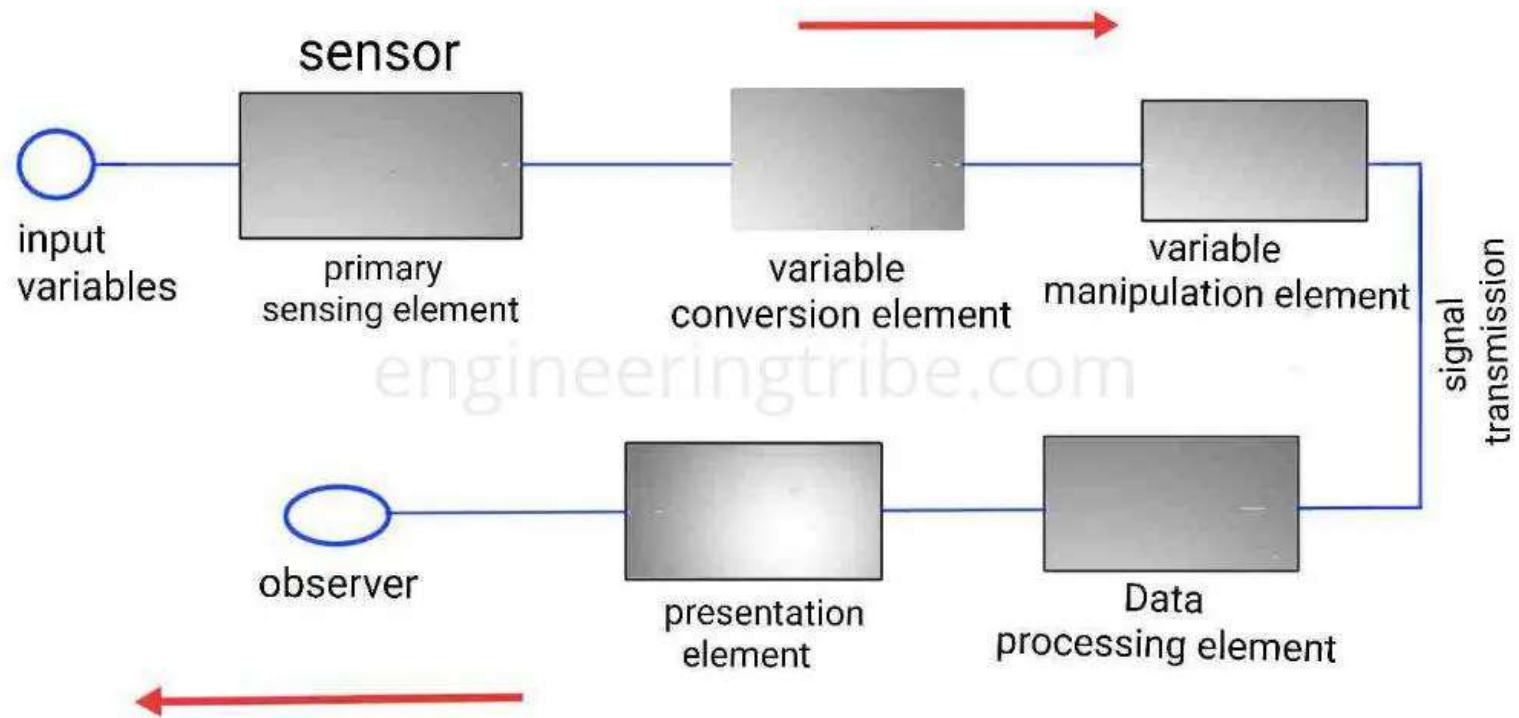
## Different Types of Sensors

- Temperature Sensor.
- Proximity Sensor.
- Accelerometer.
- IR Sensor (Infrared Sensor)
- Pressure Sensor.
- Light Sensor.
- Ultrasonic Sensor.
- Smoke, Gas and Alcohol Sensor.





# GENERALIZED MEASUREMENT SYSTEM





# GENERALIZED MEASUREMENT SYSTEM



## Elements of generalized measurement system

The elements of the measurement system are listed below,

- Input variables
- Primary sensing element
- Variable conversion element
- Variable manipulation element
- Data transmission element
- Data processing element
- Data presentation element
- Observer





# GENERALIZED MEASUREMENT SYSTEM



## **Input variables**

Input variables may be any unknown variable. Without any input variables, the final result can not be achieved by the system.

Inputs should be in a certain amount of measured quantity.

## **Primary sensing element**

The first element of the measurement system is the primary sensing element. The main function of the primary sensing element is to sense the input variable and gives the output according to the measurand.

This output will be the input of the next element. So this output is converted analogous electrical signal. This is achieved by using transducers.





# GENERALIZED MEASUREMENT SYSTEM



## **Variable conversion element**

It receives the output of the primary sensing element as input. As the name indicates, the conversion of the variable from one form to another form takes place. The conversion process is done without altering any data contained in the input.

The requirement of this element depends upon the measuring instruments, some may need and some may not because they are converted into a required form in the previous element (primary sensing element).

## **Variable manipulation element**

This element manipulates the input variable.

As per required magnification, the variables are manipulated by manipulation otherwise called as amplification. This is done for the required output from the input variable.

The manipulation process does not depend upon the variable conversion element, so the manipulation of variables can proceed directly without any conversion element in some cases.





# GENERALIZED MEASUREMENT SYSTEM



## **Data transmission element**

Transmission of data or information from one element to another element takes place in this data transmission element. Data transmission is the main function of this element.

Data transmission elements such as data cables, transmitters, and receivers, transmission shafts, etc are used to transmit the data from one element to another element.

## **Data processing element**

Data is modified and processed before the final result comes. The data processing element modifies the data for some reasons like,

- 1.Modification for final output form,
- 2.Modification for some final calculations,
- 3.Modification for errors in the instruments such as positive error, negative error, zero error, temperature error, etc.

For the following reasons, the data processing element is used in all measurement systems.







# GENERALIZED MEASUREMENT SYSTEM



## **Data presentation element**

Finally, data is present to the observer via the data presentation element. The presentation element is such as to monitor, recorders, needle pointers, LCD and LED display, alarms, indicators like the analog indicator and digital indicator, etc. Without data presentation element, data cannot be delivered to the observer.

## **Observer**

The measurement data is finally delivered to the observer via the data presentation element, for further clarification and calculation. The observer used to record these data for further clarification in the future. The recorded data are stored either in hard copy or digital copy.





*Thank  
you*

