



SNS COLLEGE OF TECHNOLOGY

Coimbatore-35
An Autonomous Institution



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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

19EET304/ IOT FOR ELECTRICAL SCIENCES
III YEAR VI SEM

UNIT 4 – ACTIVATION DEVICES

TOPIC 1 – Digital Energy Meter





OUTLINE OF THE TOPIC



1. Introduction
2. Basic Working Principle
3. Block Diagram Explanation
4. Key Components
5. Features of Digital Energy Meters
6. Advantages over Analog Meters
7. Applications





Activation devices

- An activation device converts a signal into an action
- **Key components** : sensor, processor, actuator, and power source.
- **Signal types** :Electrical, mechanical, thermal, optical, or chemical.
- **Examples** :switches, relays, valves, and triggers.



Smart Locks





Consider an example,

Mr. Alex has vehicle with some small parcel to calculate the weight of all



A



B



C

What strategy Alex used to know correct weight.





ENERGY METER

Energy Meter or **Watt-Hour Meter** is an electrical instrument that measures the amount of electrical energy used by the consumers.

The basic unit of power is watts and it is measured by using a watt meter. One thousand watts make one kilowatt.

one kilowatt in one-hour duration, one unit of energy gets consumed. So energy meters measure the rapid voltage and currents, calculate their product and give instantaneous power.

This power is integrated over a time interval, which gives the energy utilized over that time period.





DIGITAL ENERGY METER

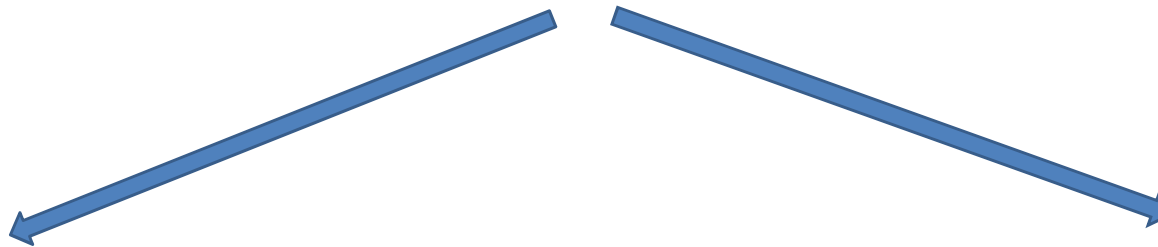
- The digital energy meter working principal operates by continuously measuring the instantaneous voltage (volts) and current (amperes) and finding the product of these to give instantaneous electrical power (watts) which is then integrated against time to give energy used (Joules, Kilowatt-hours etc.)
- Meters for smaller services (such as small residential customers) can be connected directly in-line between source and customer.
- For larger loads, more than about 200 amps of load, current transformers are used, so that the meter can be located other than in line with the service conductors





TYPES OF DIGITAL ENERGY METER

Types of Digital Energy Meters



Electromechanical Meters

Electronic Meters





Electromechanical Meters

It has a spinning disc and a mechanical counter display. This type of meter operates by counting the revolutions of a metal disc that rotates at a speed proportional to the power drawn through the main fuse box.

Nearby coils spin the disc by inducing eddy currents and a force proportional to the instantaneous current and voltage. A permanent magnet exerts a damping force on the disc, stopping its spin after power has been removed.

This class of meters has a number of limitations that has made it grossly irrelevant for use in smart energy initiative environment which include but not limited to its degree of accuracy.





Electromechanical Meters

There are many methods of error correction in digital electricity meters which are usually based on the known methods of A/D converters error correction.

Most of these methods use software correction based on calibration process. While in digital electricity meter, percentage error could be as low as 0.01%, in analogue meters it is usually above 0.05%.

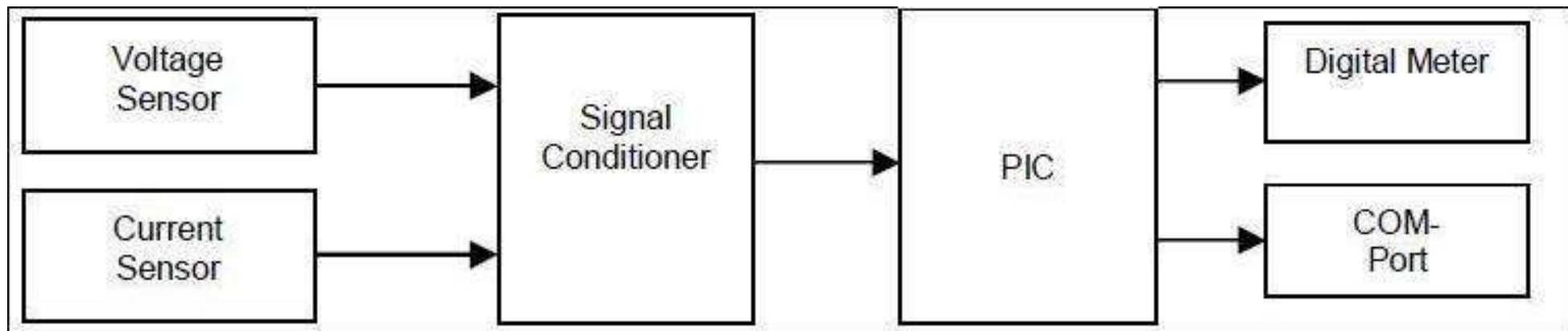
The user friendly display in the digital meters makes energy reading from time to time very easy.

The orientation problem associated with electromechanical energy meter is completely a nonissue in a digital energy meter. Hence installation is made easier



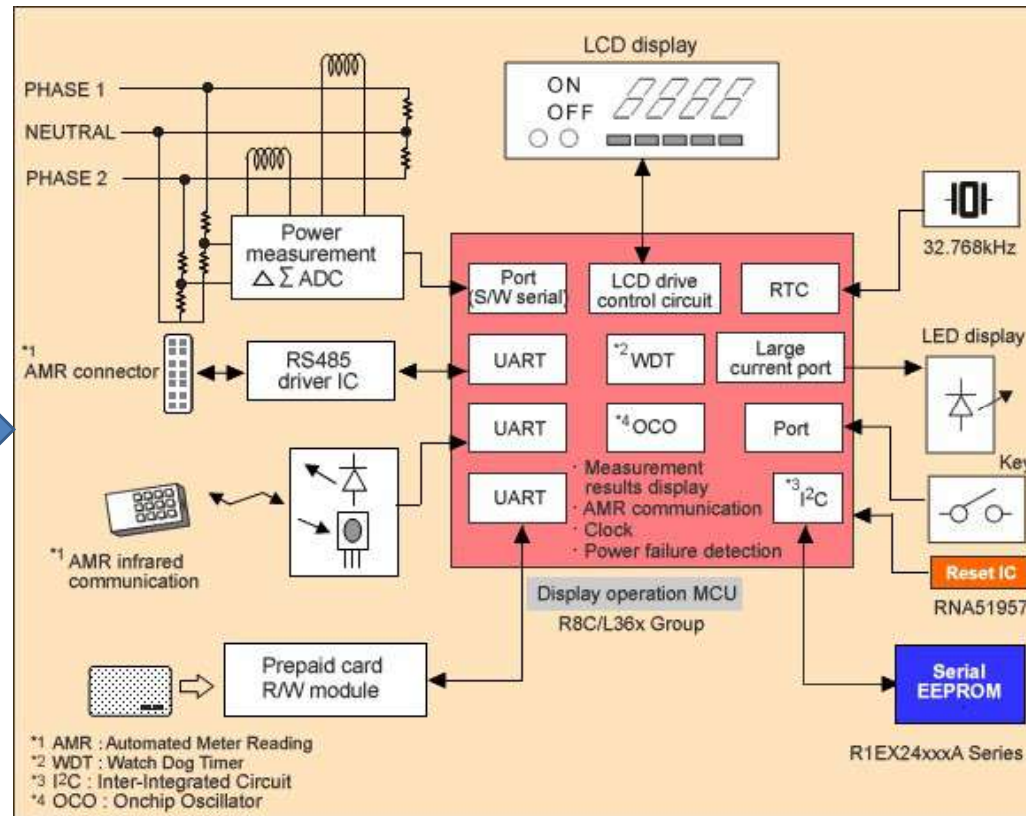


Construction





Inside Image of the Electronic Meter





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Thank You

