

Chapter-4 (The concept of instrument transformer)

Hasan Murad Munna (Jr. Instructor of Electrical Dept.)

Introduction:

Instrument transformers are current and voltage transformation devices that are used to step down the transmission and distribution line voltages and currents to levels that can safely operate measuring instruments, protection devices and control relays by isolating it from the supply voltages.

Current & Potential Transformer:

Current Transformer (C.T):

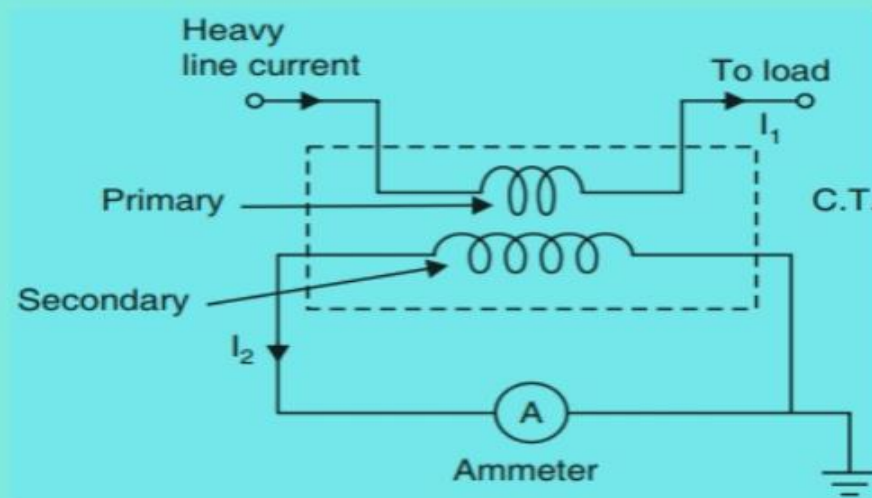
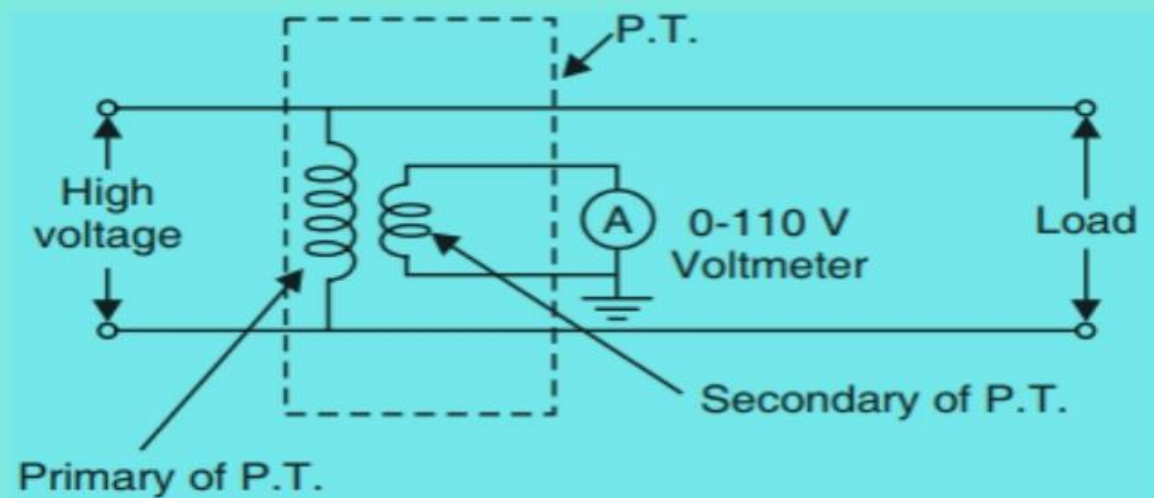
A current transformer (CT) is a type of transformer that is used to reduce or multiply an alternating current (AC). ... Current transformers are the current-sensing units of the power system and are used at generating stations, electrical substations, and in industrial and commercial electric power distribution.

Potential Transformer (P.T):

The working principle of a potential transformer mainly depends on mutual induction. The primary and secondary winding of the transformer are electrically insulated from each other but magnetically interconnected through the minimal reluctance path of the core.

Current & Potential Transformer Circuit Diagram:

Current Transformer And Potential Transformer



Advantages and Disadvantages of C.T & P.T

The advantages of instrument transformers can be listed as:

1. The normal range voltmeter and ammeter can be used along with these transformers to measure high voltage and currents.
2. The rating of low range meter can be fixed irrespective of the value of high voltage or current to be measured.
3. Those transformers isolate the measurement from high voltage and current circuits. This ensures safety of the operator and makes the handling of the equipments very easy and safe.
4. These can be used for operating many types of protecting devices such as relays or pilot limits.
5. Several instruments can be fed economically by single transformer.

Disadvantages:

Disadvantages of Instrument Transformers:

The only disadvantage of these instrument transformers is that they can be used only for a.c circuits and not for d.c. circuits.

Application of Instrument Transformers:

The C.Ts and P.T.s are used for,

1. Circulating current differential protection
2. Over current phase fault protection
3. Distance protection
4. Intermediate CTs for feeding protective devices, measuring systems, relays etc.