FACULTY OF ENGINEERING & TECHNOLOGY

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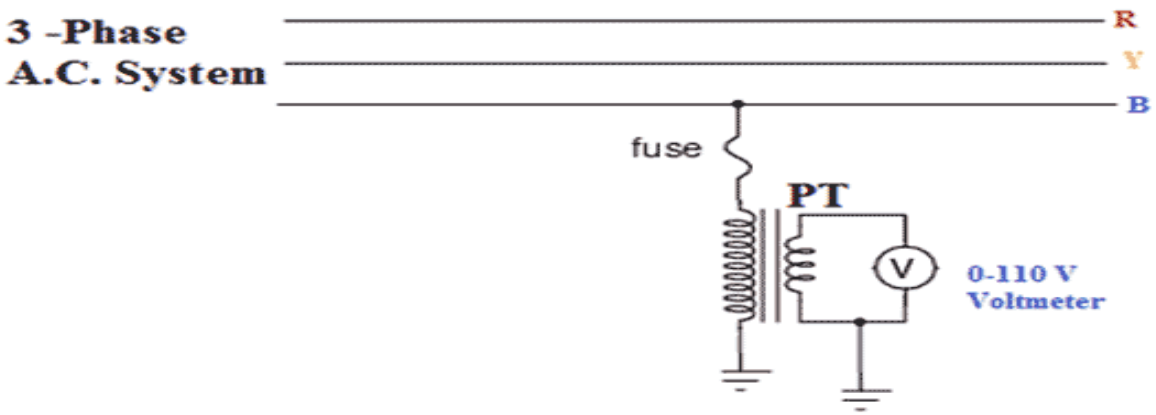
2. Potential Transformer (P.T.)

Potential transformer is used to step down the voltage of power system to a lower level to make is feasible to be measured by small rating voltmeter i.e. 110 – 120 V voltmeter. A typical connection diagram of a potential transformer is showing figure below.

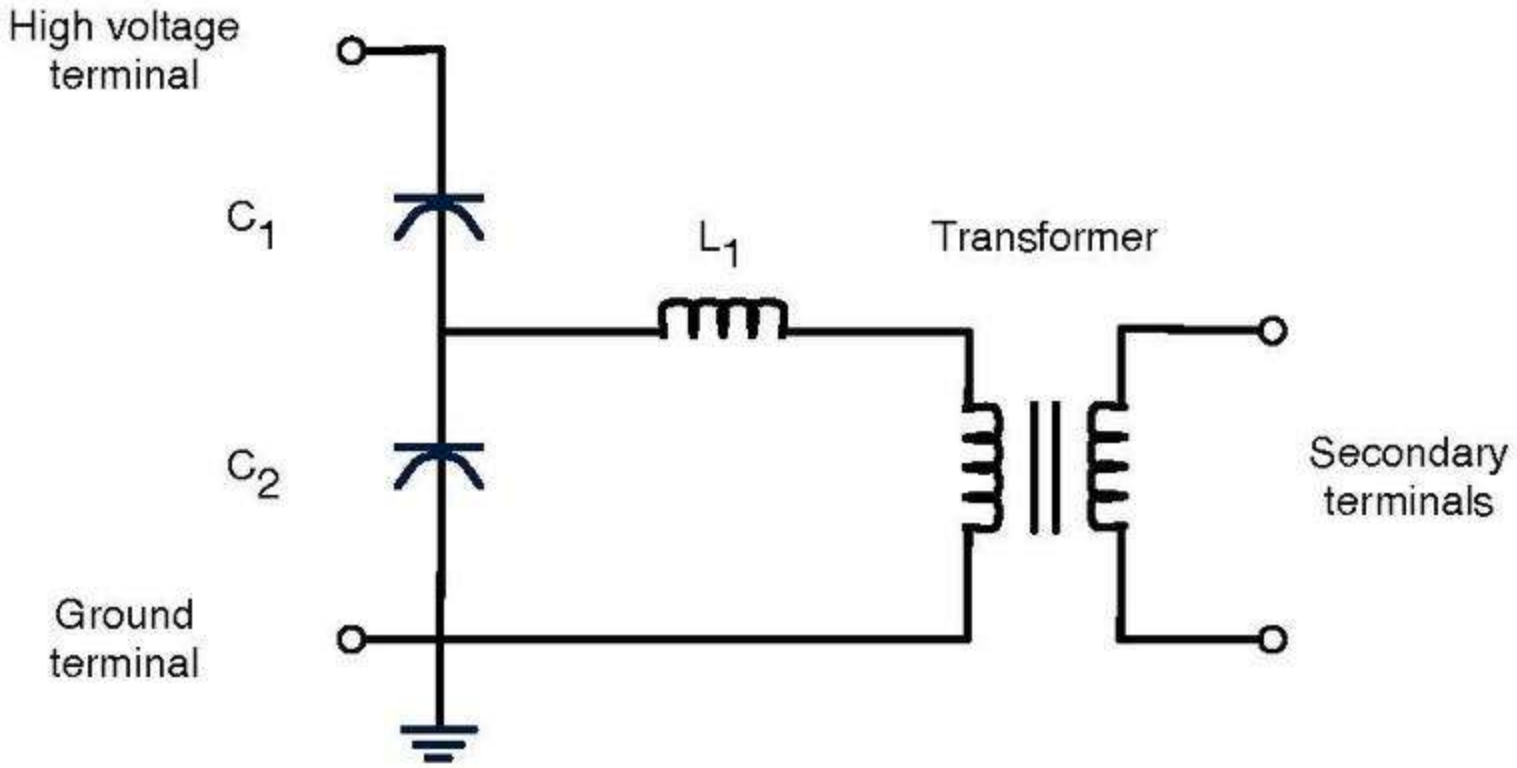
Primary of P.T. is having large no. of turns. Primary is connected across the line (generally between on line and earth). Hence, sometimes it is also called the parallel transformer. Secondary of P.T. is having few turns and connected directly to a voltmeter. As the voltmeter is having large resistance. Hence the secondary of a P.T. operates almost in open circuited condition. One terminal of secondary of P.T. is earthed to maintain the secondary voltage with respect to earth which assures the safety of operators.



Potential Transformer (P.T.)

Types of PTs

There are three primary types of potential transformers (PT): electromagnetic, capacitor, and optical. The electromagnetic potential transformer is a wire-wound transformer. The capacitor voltage transformer (CVT) uses a capacitance potential divider and is used at higher voltages due to a lower cost than an electromagnetic PT. An optical voltage transformer exploits the Faraday effect, rotating polarized light, in optical materials.



MISCELLANEOUS MEASURING INSTRUMENTS

Accuracy

Burden and accuracy are usually stated as a combined parameter due to being dependent on each other.

- Metering style PTs are designed with smaller cores and VA capacities than power transformers. This causes metering PTs to saturate at lower secondary voltage outputs saving sensitive connected metering devices from damaging large voltage spikes found in grid disturbances.
- A small PT (see nameplate in photo) with a rating of 0.3W, 0.6X would indicate with up to W load (12.5 watts) of secondary burden the secondary current will be within a 0.3 percent error parallelogram on both phase angle and ratio errors.
- The same technique applies for the X load (25 watts) rating except inside a 0.6% accuracy parallelogram.

Use

- Used in relay and metering circuits
- Uses in power line carrier communication circuits
- Used in protection systems electrically
- Used for protecting feeders
- Used for the protection of impedance in the generators
- Used in synchronization of generators and feeders.
- Used as protection voltage transformers