

# DOMESTIC CIRCUITS

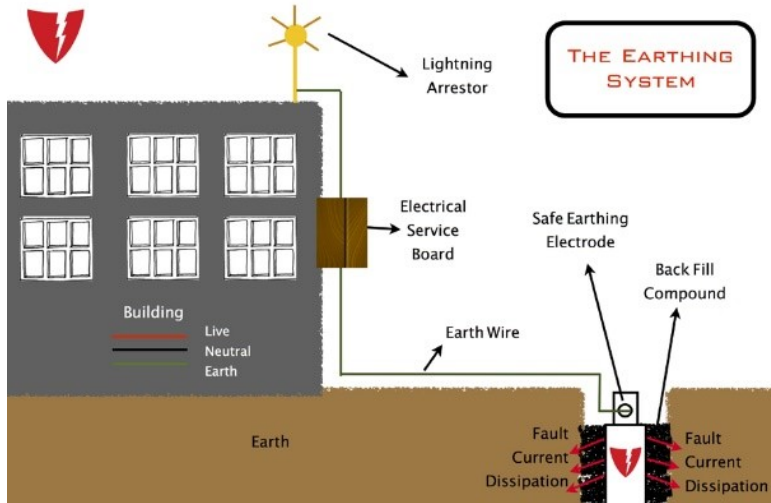
## Domestic Circuit

1. Most power stations constructed these days produce AC current. In India, the AC changes direction after every  $1/100$  second, that is, the frequency of AC is 50 Hz.
2. In our homes, we receive supply of electric power through a main supply (also called mains), either supported through overhead electric poles or by underground cables.
3. One of the wires in this supply, usually with red insulation cover, is called **live wire** (or **positive**). Another wire, with black insulation, is called **neutral wire** (or **negative**). In our country, the potential difference between the two is 220 V.
4. At the metre-board in the house, these wires pass into an electricity meter through a **main fuse**.
5. Through the main switch they are connected to the line wires in the house. These wires supply electricity to separate circuits within the house.

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6. Often, two separate circuits are used, one of **15A current** rating for appliances with **higher power ratings** such as geysers, air coolers, etc. The other circuit is of **5A current** rating for bulbs, fans, etc.
7. The **earth wire**, which has insulation of green colour, is usually connected to a metal plate deep in the earth near the house. This is used as a safety measure, especially for those appliances that have a metallic body, for example, electric press, toaster, table fan, refrigerator, etc. The metallic body is connected to the earth wire, which provides a low-resistance conducting path for the current. It ensures that **any leakage of current** to the metallic body of the appliance keeps its potential to that of the earth, and the user may not get a severe electric shock.

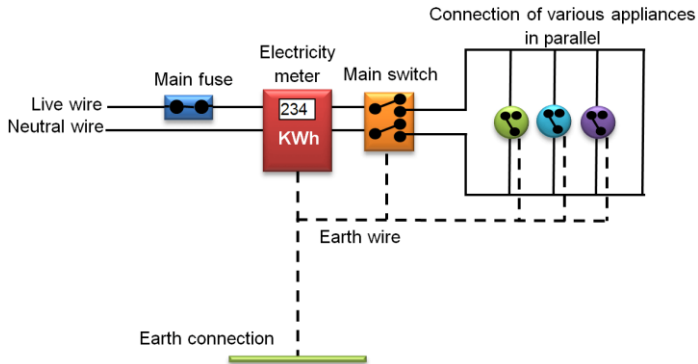
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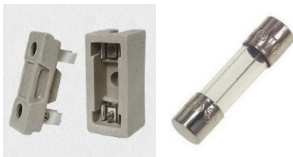
8. **Figure below gives a schematic diagram of one of the common domestic circuits.**

In each separate circuit, different appliances can be connected across the live and neutral wires. Each appliance has a separate switch to 'ON'/'OFF' the flow of current through it. In order that each appliance has equal potential difference, they are **connected parallel** to each other.



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9. **Electric fuse** is an important component of all domestic circuits. A fuse is a device used for preventing damage to the appliances and the circuit due to overloading.



10. **Overloading** can occur when the live wire and the neutral wire come into direct contact. (This occurs when the insulation of wires is damaged or there is a fault in the appliance.) In such a situation, the current in the circuit abruptly increases. This is called **short-circuiting**. The **use of an electric fuse** prevents the electric circuit and the appliance from a possible damage by stopping the flow of unduly high electric current. The Joule heating that takes place in the fuse melts it to break the electric circuit. Overloading can also occur due to an accidental hike in the supply voltage. Sometimes overloading is caused by connecting too many appliances to a single socket.

