Methods of Carrier Current Protection

The different methods of current carrier protection and the basic form of the carrier current protection are

1. Directional Comparison protection
2. Phase Comparison Protection

These types are explained below in details

1. Directional Comparison Protection

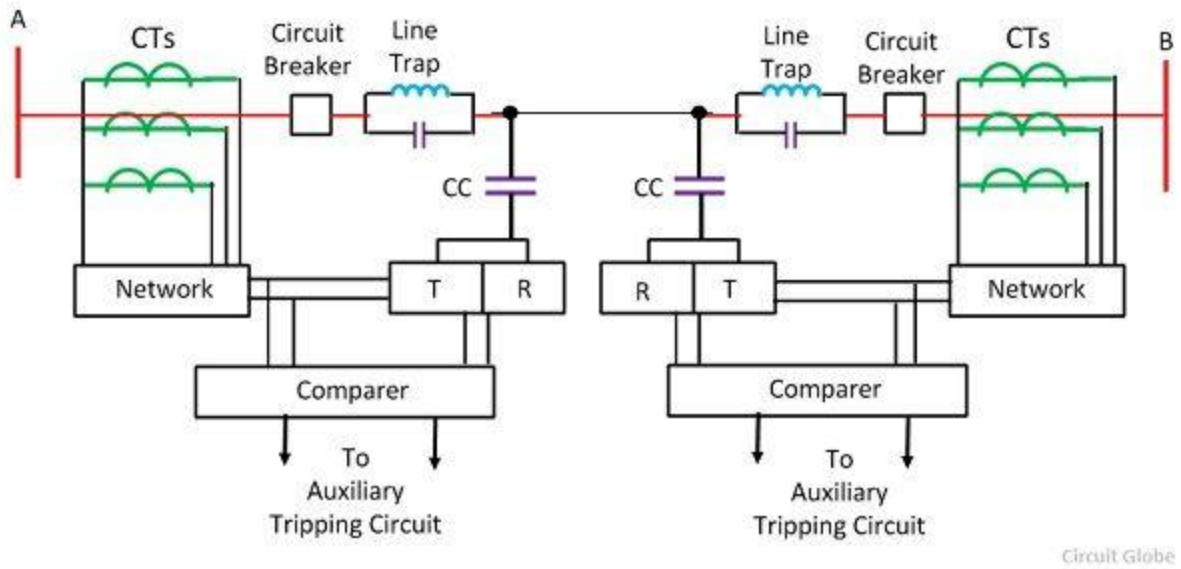
In this protection schemes, the protection can be done by the comparison of a fault of the power flow direction at the two ends of the line. The operation takes place only when the power at both the end of the line is on the bus to a line direction. After the direction comparison, the carrier pilot relay informs the equipment how a directional relay behaves at the other end to a short circuit.

The relay at both the end removes the fault from the bus. If the fault is in protection section the power flows in the protective direction and for the external fault power will flow in the opposite direction. During the fault, a simple signal through carrier pilot is transmitted from one end to the other. The pilot protection relaying schemes used for the protection of transmission are mainly classified into two types. They are

- **Carrier Blocking Protection Scheme** – The carrier blocking protection scheme restricts the operation of the relay. It blocks the fault before entering into the protected section of the system. It is one of the most reliable protecting schemes because it protects the system equipment from damage.
- **Carrier Permitting Blocking Scheme** – The carrier, protective schemes allows the fault current to enter into the protected section of the system.

2. Phase Comparison Carrier Protection

This system compares the phase relation between the current enter into the pilot zone and the current leaving the protected zone. The current magnitudes are not compared. It provided only main or primary protection and backup protection must be provided also. The circuit diagram of the phase comparison carrier protection scheme is shown in the figure below.



The transmission line CTs feeds a network that transforms the CTs output current into a single phase sinusoidal output voltage. This voltage is applied to the carrier current transmitter and the comparer. The output of the carrier current receiver is also applied to the comparer. The comparer regulates the working of an auxiliary relay for tripping the transmission line circuit breaker.

Advantage of Carrier Current Protection

The following are the advantage of the carrier current protection schemes. These advantages are

1. It has a fast and simultaneous operation of circuit breakers at both the ends.
2. It has a fast, clearing process and prevents shock to the system.
3. No separate wires are required for signalling because the power line themselves carry the power as well as communication signalling.
4. It's simultaneously tripping of circuit breakers at both the end of the line in one to three cycles.
5. This system is best suited for fast relaying also with modern fast circuit breakers.

The main operation of power line carrier has been for the purpose of supervisory control, telephone communication, telemeter and relaying.