Neutral Loss Protection Relay

Loss of Neutral conductor will cause neutral floating condition at the distribution side. This floating neutral condition in an unbalanced network can cause over voltages and lead to catastrophic damage.

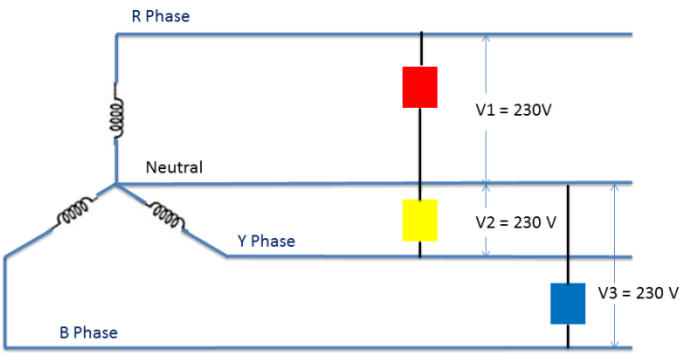
Neutral loss conditions at distribution end arise due to the following reasons:

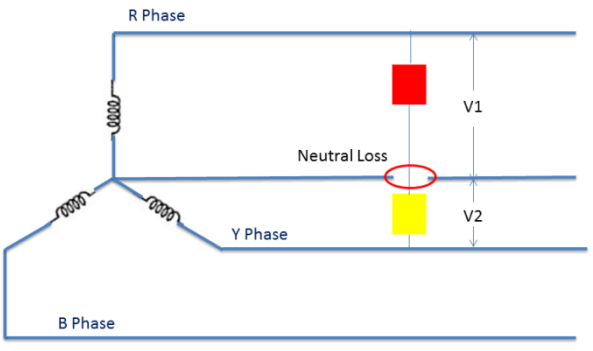
1. Loose termination of neutral conductor due to poor workmanship.
2. Theft of neutral conductor
3. Environmental conditions, poor maintenance
4. Over loading and Load unbalancing

Distribution network overloading combined with poor load distribution is one of the reasons of neutral failure. In overloaded unbalanced network the magnitude of current that flows through neutral is high which may break it at its weakest point.

By convention, a solidly earthed neutral conductor is at zero potential to earth. The potential on a correctly installed neutral conductor may rise slightly above this theoretical zero value depending upon the load current that is carried by the neutral in unbalanced condition.

In a single phase system a break in the neutral conductor will simply result in a loss of the power supply. However, in a three phase four wire system a break in the neutral conductor may result in undesirable variations of phase to neutral voltages in all three phases.



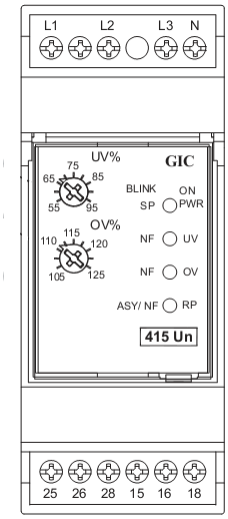


In Fig 2, magnitude of V1 and V2 will depend upon the load impedance causing under voltages or over voltages across the load.

A system that has a large number of unequally distributed single phase loads will have asymmetrical loading. Neutral loss will damage the single phase equipment due to over voltages. It is essential to find the root cause of fault to reduce the system downtime. Therefore it is crucial that a Neutral loss detection relay is installed at the incomer of distribution boards to detect floating neutral condition.

Application includes loads with large installations in industry and buildings in IT parks.

Neutral loss protection relay (MAC04D0100) from L&T detects the loss of neutral, de-energises the relay instantly (500-750ms) and protects the system. In addition to this feature, the device also detects Phase loss, Phase sequence, Under voltage, Over voltage and Phase Unbalance faults with separate LED indications. It requires no auxiliary power and automatically recovers after fault conditions are removed from the system.



Please note that the above solution is best applicable for unbalanced 3 phase system.