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Passive technology for indicating presence of voltage - Visivolt™

Safety is one of key aspects in the operation of any distribution system. This is because MV systems, with their comparatively easy accessibility to live components, are usually the most involved in electrical accidents.

The electrical accidents often arise from the mistaken belief that no voltage was present due to improper communication, equipment malfunction or inadequate testing. Such incidents could be avoided, however, if the presence of voltage could somehow easily be visualized on the conductors.

Systems indicating the presence of voltage and which can be installed permanently on MV distribution installations are vital to ensuring the safety of operational staff. Such indicators would provide rapid information on the voltage status of each panel, help track faults and warn workers about the presence of voltage.

The possible causes of disastrous electrical accidents can be many. For example, the momentary distraction of a worker combined with equipment malfunction. Or, poor communication between the various service personnel. These types of situation could, for example, lead to someone approaching a distribution panel which, while thought to be disconnected from voltage, is in fact live. All such potentially serious accidents arise from the mistaken belief that no voltage was present.

It is perhaps impossible to fully avoid all such dangerous incidents. That is why service personnel would probably prefer to have an additional and independent source of information about voltage status, apart from the portable indicators they are required to use before entering a system for work.

There are a huge number of locations on a distribution system where voltage indication would be desirable. Typical examples include outdoor and indoor distribution transformer connections, open indoor distribution switchgear, outdoor cable ends which feed overhead systems and the terminals of outdoor switch-disconnecting units.



Example of Visivolt™ indoor installation



Example of Visivolt™ outdoor installation

Unfortunately, one typically does not find voltage indicators at such locations due to the additional complexity these would entail (i.e. the need for expensive outdoor compatible systems, lack of primary impedance, etc.). In all cases, this has been due to the lack of a simple, economic, and robust technology for voltage indication which could be broadly employed, especially in outdoor systems.

Aiming to satisfy this perceived need in the marketplace, ABB developed a passive voltage indicator VisiVolt™ which it says can be attached directly to busbars or conductors of any unscreened indoor or outdoor MV systems from 3 to 36 kV. The presence of voltage in this product is indicated by the prominent display of a large lightning arrow.

The threshold for this warning indicator has been adapted to meet current IEC standards, i.e., signaling the presence of AC voltage when it exceeds 45 percent of the nominal phase-to-phase voltage (DC voltage is not indicated). As with other types of busbar mounted indicators, the unit is sensitive to the presence of both phase-to-ground and phase-to-phase voltages.

Equipped LCD technology has the advantage of being able to operate at a very broad temperature range (-40° C to +85° C in the case of VisiVolt™) and continuous service lifetimes measured in tens of years. Any busbar-mounted indicator is a high impedance device and its internal components therefore require a high level of insulation. That is why a silicone enclosure was selected in which to permanently seal all internal components. As a result, after installation, the indicator hardly changes the geometry of the current track and does not influence the insulation properties of the distribution system.

VisiVolt™ innovative indicating technology represents an attractive solution to broadly introduce indicators with an active warning about the presence of voltage into systems where they have not been available up to now. This will contribute greatly to reducing the incidence of serious accidents.

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