



Low Voltage Electrical System Inspection & Verification of Installation

Verification of L.V electrical installation is mandatory in several countries. This is done during erection, as far as reasonably possible and on completion, before being put into service. IEC 60364-6 provides clear requirements about the verifications required.

IS 732 (Code of practice for electrical wiring installations) follows design philosophy as per IEC 60364. The new draft IS732-2016 is adopted from IEC 60364. Every electrical installation designed as per IEC 60364 shall be tested and verified as per IEC 60364-6 for safety against fire and accidents as well as to enhance the life of installation.

Verification shall be made to confirm that electrical equipment which is part of the fixed installation is:

- in compliance with the safety requirements of the relevant equipment standards
- correctly selected and erected according to the IEC 60364 series and taking into account the manufacturer's instructions
- not visibly damaged or defective so as to impair safety.

Inspection shall include at least checking of the following, if relevant:

- a) method of protection against electric shock
- b) presence of fire barriers and other precautions against propagation of fire and protection against thermal effects
- c) selection of conductors for current-carrying capacity
- d) choice, setting, selectivity and coordination of protective and monitoring devices
- e) selection, location and installation of suitable overvoltage protective devices (SPD) where Specified

- f) selection, location and installation of suitable isolating and switching devices
- g) selection of equipment and protective measures appropriate to external influences and mechanical stresses
- h) identification of neutral and protective conductors
- i) presence of diagrams, warning notices or similar information
- j) identification of circuits, overcurrent protective devices, switches, terminals etc.
- k) adequacy of termination and connection of cables and conductors
- l) selection and installation of earthing arrangements, protective conductors and their Connections
- m) accessibility of equipment for convenience of operation, identification and maintenance
- n) measures against electromagnetic disturbances
- o) exposed-conductive-parts are connected to the earthing arrangement
- p) selection and erection of the wiring systems
- q) Inspection on particular requirements for special installations or locations such as Hospitals, Explosive atmosphere, DATA center etc

Following tests shall be carried out where relevant and should preferably be made in the following sequence:

- a) continuity of protective conductors, main and supplementary conductor and equipotential bonding
- b) insulation resistance of the electrical installation
- c) protection by SELV, PELV or electrical separation

Solutions

- d) insulation resistance of non conducting floors and walls
- e) polarity & phase sequence
- f) effectiveness of automatic disconnection of supply (fault loop impedance, earth resistance, RCD test, calculation of fault current, fault clearance time)
- g) testing to confirm the effectiveness of additional protection
- h) functional and operational tests
- i) voltage drop

In the event of any failure to comply, that test and any preceding tests shall be repeated after rectification of the fault. Verification report shall include details of the extent of the installation covered by the report, together with a record of the inspection and the results of testing.

The interval of inspection may be, fixed by the authorities, however in the absence of a regulation, need to be done every four years. Shorter inspection periods may be required in following cases

- ▶ workplaces or locations where risks of electric shock, fire or explosion exist due to degradation
- ▶ workplaces or locations where both high and low voltage installations exist
- ▶ communal facilities
- ▶ construction sites
- ▶ safety installations (e.g. emergency luminaires).

For dwellings, longer periods (e.g. ten years) may be appropriate.

Verification of LV electrical system is an unknown subject in India. This verification needs a high level of knowledge & skills, measuring systems & software programs. LPCI's expertise in the subject is used by several industrial/commercial establishments all over Asia for the last 5 years.

Conclusion

L.V electrical system is designed as per the guidelines and practices followed for several decades. Switchgear and cable selections are appropriate in most installations. However, poor quality installation or some time selection of a wrong component reduces the reliability of the installation. An LV system verified for its functionality reduces the chance of accident and fire substantially. ■

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