


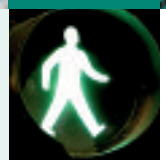

ELV Controllers

A Guide To Site Design

Introduction

An ELV controller is one that distributes power to the street equipment at less than 50Vac. For a detailed definition of ELV users should refer to BSEN7671, the “IEE Regulations”. Power from the local EB is connected to the controller and routed via appropriate isolation to a single internal transformer, the output(s) of which are ELV. This supply is then routed to the equipment driven by the controller.

The primary intention when operating at a lower voltage is to improve safety on site. Safety is improved for the road using public, for those staff and contractors who have to access or operate on the equipment and for any persons interacting with the traffic control equipment in any manner.

Currently where LV & ELV loads are required at one location, two separate independent cables have to be run to the same point, the ELV system eliminates the need for separate cabling to individual locations therefore saving on material, installation and maintenance costs

ELV has not been deployed previously as the power requirements of halogen signals caused excessive voltage drops in the field cabling. The advent of significantly lower powered LED signals that can now be fully monitored and are reliable alleviates this problem.

Site Considerations

The main consideration in operating an ELV site against an LV site is the voltage drops that occur along long cable runs. The use of lower powered LED signals does make the use of ELV possible on many sites a real alternative. The TSUK 3G ELV signal offers a very low current consumption, this allows longer runs or more signal aspects on each phase circuit than has been previously possible.

Some typical cable sizes and values are given below. In considering the cable layout there may be a need to run larger core sizes on longer runs. Neutrals need to be given particular care as multiple phase neutrals may return along the same cable. This will still lead to a net saving on cable compared with a site running both LV and ELV cables.

Core labelling will also need to be considered. Where previously core colours in the LV and ELV cables had different functions now with consolidation of cores it will be necessary to review core allocation. Cable marking is under discussion within EITAC AG15.

Installation

Savings can be made on installation and equipment as one cable can replace two and transformers are no longer required for individual pieces of equipment, thus reducing installation time and cable costs.

The signal controller is installed in the normal way as is currently practiced. The local 230V LV supply has to be terminated in the controller and this feeds the controller’s ELV transformer. The outputs from this feed the street equipment. The street installation of the controller does not differ from that for a 230V site, except in the cable core allocation and labelling.

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SUPPORTING DATA

Cable Voltage Drops

Depending on sources, the drop on normal field cabling is approximately:-

Area (mm^2)	Resistance (Ω/km)	Voltage Drop (mV/A/m)
1.0	18.2	46.5
1.5	12.1	31.0
2.5	7.41	19.0

A typical 3G signal uses 15W bright, 4W dim, so each signal will cause a drop of 0.97V per 100 m of cable run, but will also drop the same on the common return (neutral in LV systems).

Bearing in mind that common returns can carry more current there are cables available with one larger conductor surrounded by multiple standard ones. This may provide an alternative option when looking at cable choices for ELV site installation.

Power Savings

There is a suggestion from some suppliers that migrating to ELV can lead to power savings. Users should examine such claims with care and need to ask questions about where and how these savings are realised. TSUK suggest that users should consider this a secondary benefit, mainly brought about by the improved efficiency of a single transformer over multiple transformers for different items of ELV equipment.

The presence of a single large, ELV transformer, rather than distributed ELV transformers for different subsidiary facilities does offer savings in materials, labour, spares and has a small benefit to site reliability.

Summary

This note draws the user's attention to some factors to be considered when designing an ELV traffic control site.

There are significant health and safety benefits and site wiring and equipment cost reductions to be had in migrating to ELV. The user must assure themselves that cable runs and loads are sensibly balances to ensure effective site operation.