

TCN 009

Implementation of extra low voltage traffic signals

V2.0 August 2021

Purpose

This Technical Note was initially released to provide advice to industry of DoT (Roads) intention to adopt the use of Extra Low Voltage (ELV) at 42 volts AC for traffic signals as the standard arrangement for all new installations. Version 2.0 of this Technical Note is being released to provide an updated approach to the implementation of ELV and to bring the implementation of ELV dim-by-wire into line with other state road authorities.

Background

Traffic signals have traditionally switched 240 volts AC or low voltage (LV) to traffic signal lanterns and other traffic signal hardware. The use of ELV provides benefits such as:

- Safer voltage for technicians and the public
- Improved lamp monitoring
- Reduced risk of induced voltage issues
- Suitable for sites where minimum depth of cover is not possible

DoT (Roads) is adopting ELV (at 42 volts AC) with dim-by-wire dimming as the default standard for all new traffic signal installations. This will require changes to existing traffic signal hardware for operation on ELV.

This update of Technical Note TCN 009 is intended to provide further clarification and simplify the implementation of ELV, DBW. The use ELV DBW operation is restricted to approved VC6 traffic signal controllers only. The use of VC5 controllers shall be limited to LV operation.

See TCG 018, ITS Approved Products for details of approved traffic signal hardware and the approved combinations of controller and lanterns.

There are currently more than 3,000 LV traffic signal sites installed throughout Victoria. For this reason, LV hardware will continue to be required and in some situations LV sites may continue to be installed.

Hardware changes

Standard traffic signal hardware is designed for LV operation. To enable ELV operation current hardware may require modification or new ELV hardware may be needed. The following traffic signal hardware will be required in an ELV version:

- Controller VC6 (ONLY)
- Traffic signal lanterns
- Pedestrian detectors
- Audio tactile drivers
- Puffin WALK detectors

- Internally illuminated signs (e.g. give way to peds, no right turn, ramp control/metering signs)

Where existing sites cabled with the early version of multicore traffic signal cable (6mm neutral conductor), are undergoing a major remodel and being converted to ELV, the entire traffic signal site must be re-cabled with the new multicore traffic signal cable (with a 10mm neutral conductor) for correct ELV operation.

Referenced documents

This Technical Note should be read in conjunction with the following referenced DoT (Roads) specifications:

- TCS 038 – Traffic signal lanterns
- TCS 016 – Traffic signal controllers
- TCS 027 – PUFFIN Walk detectors
- TCS 032 – No right turn signs
- TCS 010 – Give way to peds signs
- TCS 003 – Ramp control/metering signs
- Standard Section 730 – Traffic signal installation

Note: At the time of release of this technical note some of the above specifications are still being updated to include ELV requirements.

Implementation

The implementation of ELV will be limited to installations using an approved, ELV, VC6 controller. The use of VC5 controllers for ELV is no longer an accepted arrangement.

Details of the proposed implementation timeline by works type are provided in Table 1 below. A guide recommending when to convert an existing site to ELV is provided in Table 2 below. It is recognised that conversion to ELV for existing LV sites may not be possible in every situation.

Site Type	Controller Type	Voltage	Dimming method
New traffic signal installation	VC6	ELV	Dim by wire ONLY
Major remodel (where a new controller and majority of lanterns being replaced and site being)	VC6	ELV	Dim by wire ONLY
	VC6	LV	Voltage dimming
	VC5	LV (ONLY)	Voltage dimming
Minor remodel / Controller replacement (existing LV site)	VC5 or VC6	LV	Voltage dimming

Table 1 – ELV implementation timeline

Type of works	Extent of works	Existing lanterns	Recommendation
Remodel	Controller replacement Small number of lanterns being added or replaced	LV lanterns	Remain LV
	Controller replacement with VC6 controller and majority of lanterns being replaced	LV Lanterns	Convert to ELV
Controller Replacement only	No additional works	LV lanterns	Remain LV

Table 2 – Recommendations when to convert existing sites to ELV

Additional information

If you would like additional information regarding the implementation of ELV, please email your enquiry to ITS_Improvements_and_Standards@roads.vic.gov.au