Technical Bulletin

TB 0317 - LV Voltage Drop Limits Change

Purpose

To outline the changes to voltage drop limits used in LV network design.

Background

Efficient network design is required to optimise equipment costs, maintain the efficiency of network assets and distribution network design. A key limitation influencing distribution substation placement and network designs in greenfield development is the voltage drop (VD) for underground LV cables. VD in LV mains impacts distribution substation placement, the number of customers connected to distribution substations, LV feeder length and the distance between distribution substations.

The current VD requirements (captured in MDI 0030 Section 5.2 and MDI 0028 Section 4.3) state that in LV mains limit the maximum allowable voltage to 10V (and 15V for backup) for locations where the HV supply route length from the HV regulated supply source (zone substation or regulator) to the distribution transformer is less than 5km and maximum allowable voltage to 5V(and 10V backup) in non-urban areas where the HV supply route length from the regulated supply source to the distribution transformer exceeds a nominal value of 5km.

Actions

Moving forward an additional 5V will be allowed for both nominal and back-up voltage drops when assessing supplies as shown in Table 1.

Table 1: New Voltage Drop Limits - Line to Neutral

Connection type	Dist Tx Locations > 5km *	Dist Tx Locations <= 5km *
Res/Industrial/Commercial	Nominal: 10V Backup: 15V	Nominal: 15V Backup: 20V

*As measured at the MV (11/22kV) supply route length from the MV regulated supply source (zone substation or regulator) to the distribution transformer.

Implementation

All new designs following the release of this TB must comply with the new requirements outlined in Table 1. The new VD limits must be applied in LV distribution network design, for supply meeting the required criteria, in accordance with current Endeavour Energy Standards.

Impacted Standards

The contents of this technical bulletin will be included in the next update of the following standard(s):

- MDI 0030 – Method of calculating voltage drop in low voltage mains.
- MDI0028 – Underground distribution network design.
- Policy 9.2.5 – Network Asset Design

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Other administrative changes to consolidate voltage drop requirements into MDI 0030 when MDI0028 and MDI 0030 are next updated:

1. **Modified Clause 4.1.6 of MDI 0028 will be incorporated into MDI 0030.**

   4.1.6 LV backup

   - URD

   The distribution network must be designed to allow transfer of the load of any one transformer to neighbouring transformers under abnormal supply conditions without overloading the associated switchgear and cables, until the supply is normalised. In order to minimise disruption of supply to consumers under abnormal supply conditions, backup cross connections to LV feeders from adjacent distribution substations must be installed as stated in clause 4.8 of this instruction.

   In new URDs, all low voltage spur cable circuits (including cul-de-sacs) must (where practically feasible) be provided with an alternate supply from another feeder. The layout of the LV network must be arranged so as to allow the offloading of each LV feeder of a distribution substation to adjacent substations without exceeding conductor voltage drop of 20 Volts where the HV supply route length from the HV regulated supply source (zone substation or regulator) to the distribution transformer is less than 5km, or 15 Volts for locations greater than 5km, assuming the prevailing consumer demand is 60% of the design ADMD. Refer to clause 4.8 in relation to requirements at the periphery of the network.

   All such LV cross connections must include a neutral conductor permanently connected through (not switched) and is at least equally rated to its associated phase conductor/s.

   - UCD and UID

   New developments must be supplied by their own dedicated distribution substation, unless the existing network is capable of supplying the new load. LV reticulation must not be used in CBD areas for the above purpose, except for the LV ring mains supplying the existing LV consumers. However, where customers wish to fund additional parallel capability, approval must be granted for additional supply by the Manager Network Connections.

2. **Modified Clause 4.3 bullet point 3 of MDI 0028 will be incorporated into MDI 0030.**

   4.3 Voltage Drop

   3. The load on a distribution substation is offloaded onto adjacent substations so the calculated conductor voltage drop at any connection point does not exceed 20 Volts where the HV supply route length from the HV regulated supply source (zone substation or regulator) to the distribution transformer is less than 5km, or 15 Volts for locations greater than 5km when calculated using 60% of the design ADMD.