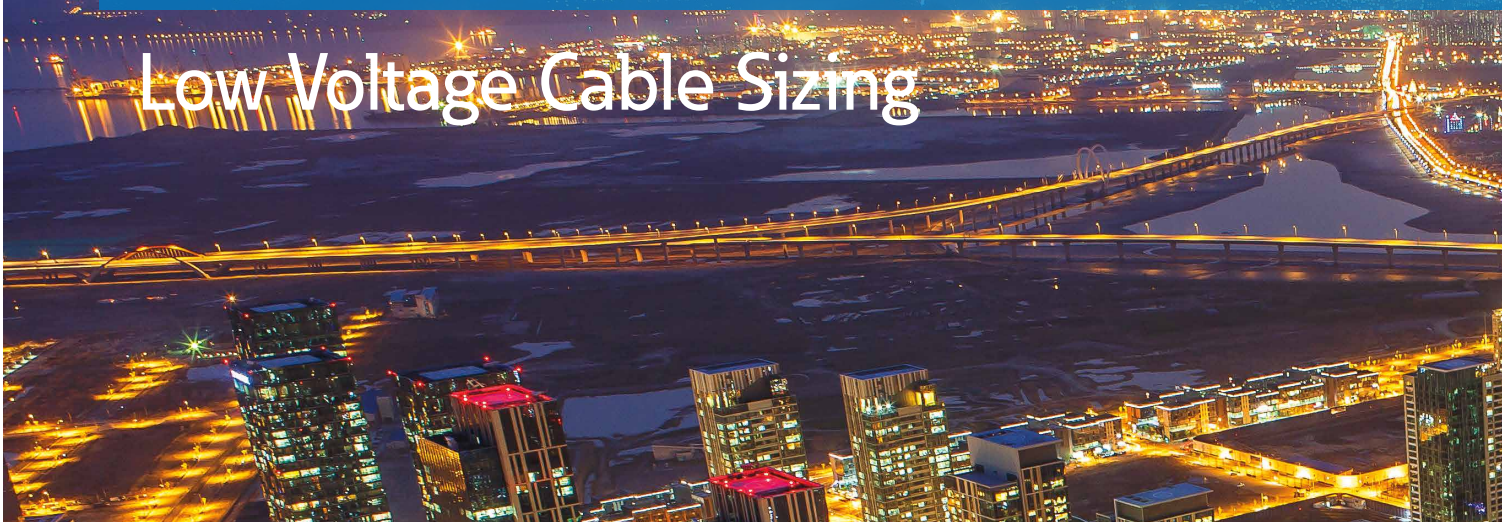
CYME
Power Engineering Software and Solutions

Low Voltage Cable Sizing



Identify the right type of cable for your low voltage installation

Low voltage cables are widely used in utility and industrial installations requiring AC voltages of 1 kV or less. Being able to select the proper cables based on clear criteria is key to ensure that the installation is safe and that the cables will operate reliably for their expected service time.

The CYME Low Voltage Cable Sizing module helps the power engineer do that selection while designing an installation, and simulate various operating conditions and cable loading.

The low voltage cables are those with a voltage rating equal or less than 1kV. The sizing of low voltage cable covers most of the common non-armored cable installations for utility, domestic, commercial and industrial systems. It is not suitable for distribution feeders.

Different installations require different cable design and materials. The CYME Low Voltage Cable Sizing module calculates the cable size at a given location on the network according to any one of the following standards:

- IEC 60364© 5-52 standard: Low-voltage electrical installations – Part 5-52: Selection and erection of electrical equipment – Wiring systems.
- NEC methodology: NFPA-70-2011© National Electricity Code.

Specifically, the module handles systems 3-phase or single-phase systems that are radial and balanced. The conductor materials supported by the calculations are copper or aluminum, while the insulation or cable types are as per the standards.

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Calculations

The calculations takes into account conductor material, insulation material and manufacturer:

- Ampacity level – taking into account the installation method of the cable, the software determines the cable size for the installed ampacity. It is executed based on factors that include the soil thermal resistivity and temperature along with the grouping of the circuits.
- Voltage drop limit during normal operating conditions – executed based on standard voltage drop formula. The software determines the cable size for the voltage drop constraints specified. It takes into account the resistance, the reactance and the length of the cable; and provides data on the maximum voltage drop allowed.
- Short-circuit withstand capability (IEC only) – calculates the short-circuit temperature rise based on the maximum fault current and fault duration, either user-defined or based on the short-circuit analysis just performed .
- When more than one calculation is performed for one installation, the software will determine an optimal size and will suggest a specific cable from the cable library of the software.
- The full load current and power factors can be based on a load flow analysis just performed or can be defined by the user.

Vast cable library

A key element in sizing cables is the cable type. The CYME software includes a comprehensive cable library that comprises a large number of low voltage cables from various manufacturers. These include one-core, three-core and three-core with ground conductor with all the nominal and cable construction data available for the calculations.

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