Conductor and Cable Sizing

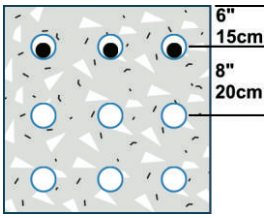
VOLTS™ from Dolphins software

The purpose of Conductor and Cable Sizing is to determine how best to transport a given current, determined by voltage, through an insulated conductive material. Calculations for conductor and cable size must take into account specified distances and raceways, and they must allow for various environmental conditions, which includes minimizing heat generated from resistance or impedance of the cable itself.

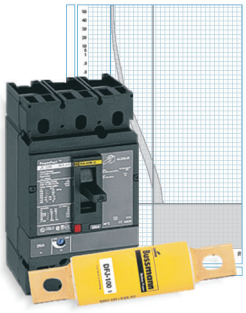
Automated Ampacity Table Selection

Volts automatically selects the correct NEC® ampacity table based on values you put in. With every ampacity table supported – 310.1 through 310.86 – the appropriate table is referenced, taking any or all of the following into account:

- Cable configuration
- Conductor material
- Electrical duct configuration
- Insulation type
- Raceway type
- Voltage



Automated Protection Sizing



Once user-defined protection increase factors are applied based on an items rated ampacity, Volts selects the correct circuit breaker or fuse protection size from a user-defined database, whichever best fits the increase in ampacity.

Automated Conductor or Cable Sizing

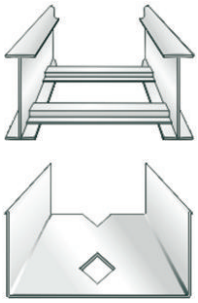
Oversized cables are often the result of putting too many computational elements together too soon. When calculations begin, if all of the various derating factors are lumped in with the cable's ending terminal temperature details, a "double-derating" will result. With the high cost of copper today, miscalculation can result in tremendous expense, particularly on large projects.

To avoid costly errors, **correct** cable size computations must be derived by getting two cable size figures: 1) terminal temperature size, and 2) derated size.

To calculate terminal temperature size you need:

- Ambient temperature adjustment
- Terminal temperature in ºC
- Correct NEC® ampacity table

To calculate derated size you need:



- Ambient temperature adjustment
- Altitude
- Covered or uncovered cable tray
- Depth buried
- Multiconductor cable
- Number of current-carrying conductors in a single raceway
- Soil resistivity (RHO)
- Correct NEC® ampacity table

Once these two figures have been determined, the larger of the two cable sizes is utilized, at which time voltage drop is considered. The sequence is the key.

This dual-figures process of calculating cable size is complicated, we admit, and it is often misunderstood by companies to the detriment of their bottom line. But with Volts, cable sizing is quick and simple to calculate and right on the money every time.

Automated Ground Conductor Sizing

Based on the item's protection size, Volts selects the correct ground conductor size utilizing NEC® tables 250.122 or 250.66. If the current-carrying conductor size was increased from its minimum size to compensate for voltage drop, Volts adjusts the ground size by the ratio of the minimum vs. current conductor's area, making these computations easy.

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continued