

How We Calculate MCA and MOP

These two values are published on the nameplate to insure proper wire sizing and safe operation. Supply wiring must be rated to carry at least the amps shown as MCA. The overcurrent protection device, either a breaker or fuses, must be sized to prevent the unit from drawing more current than the MOP.

Minimum Circuit Ampacity (MCA) for both fan-powered and heater-only products is calculated with the following equation:

$$\text{MCA} = 1.25 \times [\text{Motor Rated Current} + \text{Heater Current}]$$

The “Motor Rated Current” is sometimes referred to as the FLA (full load amps) of the unit. This can be a source of confusion because this rated current is not the same as the motor FLA shown on the nameplate of the motor itself. Our “Motor Rated Current” is determined during worst-case, high-current test conditions of the complete terminal unit, in accordance with UL1995. The FLA on the motor nameplate is a rating from the motor manufacturer and is of no use in our calculations.

Motor Rated Current values for current Titus products are shown in our catalog or by clicking “Titus Motor Amps” on the calculator screen.

Maximum Overcurrent Protection (MOP) is a bit more complicated. First, a basic calculation is made, and then a number of filters or conditions will alter the computed MOP value to arrive at the final value that appears on a product nameplate.

In short, the basic MOP is calculated by multiplying the rated current of the largest motor times 2.25, and adding in all other loads of 1.0 amp or more that could be in operation at the same time.

$$\text{MOP} = [2.25 \times (\text{Rated Current of Largest Motor})] + (\text{Other Motor Loads}) + (\text{All Heater Loads})$$

Filter 1: If the MOP value is not an even multiple of 5, the MOP is rounded down to the nearest standard fuse size.

Filter 2: If the MOP is less than the MCA, the MOP is made equal to the MCA and then rounded up to the nearest standard fuse size, typically a multiple of 5. In other words, the MOP shall not be less than the MCA.

Final Filter 3: If the MOP is less than 15, it shall be rounded up to 15 amps. This is the minimum size of fuse or circuit breaker permitted by code.

The methods of calculation shown above are appropriate to Titus products and may be appropriate to other products. Calculations are dictated by the national standard for Heating & Cooling Equipment, UL1995, a.k.a. CSA-C22.2 No. 236.