9.2 Voltages [220.5(A)]

Unless other voltages are specified, branch-circuit, feeder, and service loads must be calculated using the nominal system voltage such as 120, 120/240, 120/208, 240, 347, 277/480, 480, 347/600, or 600. For single-family dwelling unit calculations, the nominal voltage is typically 120/240V. Figure 9–2

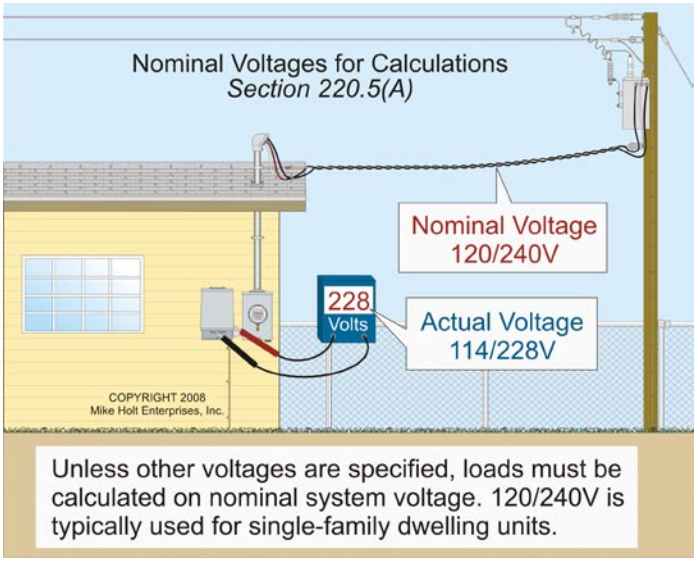

Figure 9–2

Author's Comments:

- A nominal value is assigned to a circuit for the purpose of conveniently designating its voltage class. The actual voltage at which a circuit operates can vary from the nominal within a range that permits satisfactory operation of equipment [100].
- Motor VA is based on motor table voltage and current values, such as 115V, 230V, or 460V—not 120V, 240V, or 480V [430.248 and 430.250].

9.3 Fraction of an Ampere [220.5(B)]

Where calculations result in a fraction of less than 0.50A, the fractions can be dropped.

Author's Comment: When do you round—after each calculation, or at the final calculation? The *NEC* isn't specific on this issue, so I guess it all depends on the answer you want to see!

Rounding

The *NEC* defines a continuous load as a load where the maximum current is expected to continue for 3 hours or more [Article 100]. When sizing branch-circuit conductors and overcurrent devices for a continuous load, the continuous load is first taken times 125 percent [210.19(A)(1) and 210.20(A)]. Figure 9-3

According to 424.3(B), fixed electric heating is considered to be a continuous load, and therefore the branch-circuit conductors and overcurrent device for electric space-heating equipment must be sized no less than 125 percent of the total load.

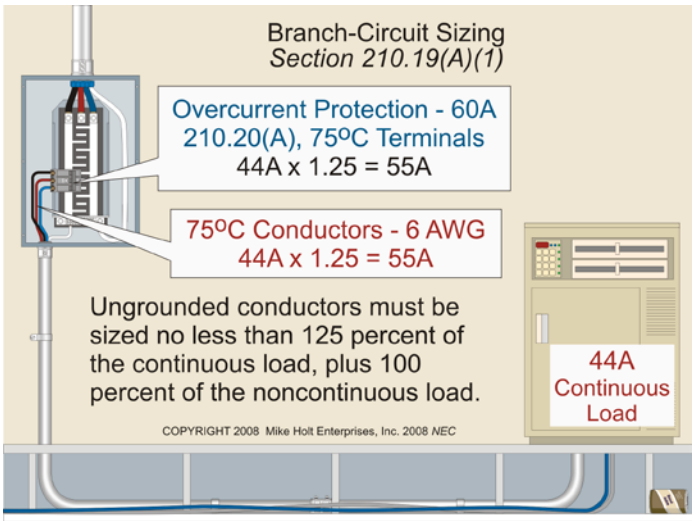

Figure 9–3

▶ Electric Space Heating Conductor Sizing Example

Question: *What size conductor is required to supply a 9 kVA (37.50A), 240V, single-phase fixed space heater with a 3A blower motor if equipment terminals are rated 75ºC?* Figure 9–4

(a) 10 AWG (b) 8 AWG (c) 6 AWG (d) 4 AWG

Answer: *(c) 6 AWG*

Step 1: Determine the total load.

$I = VA/E$

$I = 9{,}000\ VA/240V$

$I = 37.50A$

(continued in next column)