

Figure 11-3

Nominal Voltages for Article 220 Calculations

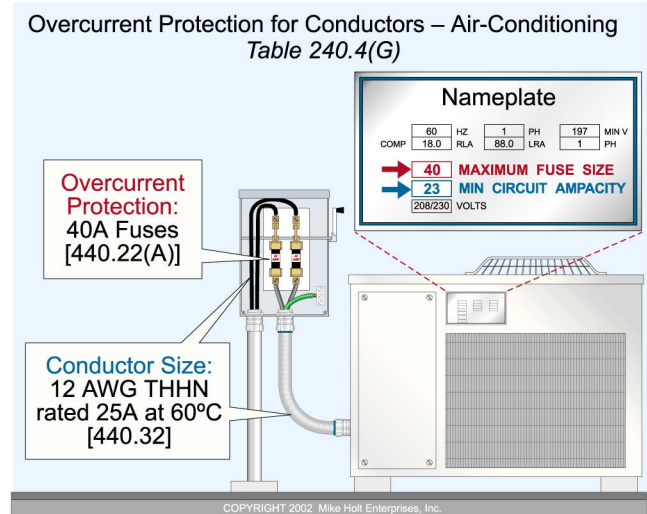


Figure 11-4

Overcurrent Protection for Conductors – Air Conditioning

□ **Air-Conditioning Branch Circuit [240.4(G)]**

An air conditioner has a motor-compressor rated-load amperage of 18A. The nameplate indicates the minimum circuit ampacity of 23A and the maximum fuse size of 40A. What size conductor and protection are required? Figure 11–4.

- (a) 12 AWG with a 40A breaker
- (b) 12 AWG with a 40A fuse
- (c) 14 AWG with a 30A breaker
- (d) 10 AWG with a 40A breaker

• Answer: (b) 12 AWG with a 40A fuse

Conductor [440.32]. The conductor must be sized at no less than 125% of the motor-compressor rated-load current. $18A \times 1.25 = 22.5A$, 12 AWG THHN rated at 25A at 60°C

Short-Circuit Protection [440.22(A)]. The short-circuit protection must be a fuse [110.3(B)] because the nameplate specified “fuse.” However, the protection device shall not be greater than 225% of the motor-compressor current. $18A \times 2.25 = 40.5A$, next size down, 40A [240.6(A)]

Note: I know many feel the conductor should be larger or the short-circuit protection smaller, but this is not the *NEC* requirement.

Air-Conditioning Feeder/Service Conductors. Feeder circuit conductors that supply air-conditioning equipment must be sized no less than 100%.

VA Rating – The VA rating of an air conditioner is determined by multiplying the voltage rating of the unit by its ampere rating. For the purpose of this book, we will determine the unit ampere rating by using motor FLC ratings as listed in Article 430, Table 430.148 and Table 430.150.

□ **Air-Conditioning Feeder/Service Conductor**

What is the demand load required for the A/C equipment of a 12 unit office building where each unit contains a 5-hp, 230V A/C?

- (a) 77 kVA
- (b) 73 kVA
- (c) 45 kVA
- (d) none of these

• Answer: (a) 77 kVA

A/C 5-hp, $230V \times 28A = 6,440 VA$.

$6,440 VA \times 12 \text{ units} = 77,280 VA / 1,000 = 77.28 kVA$.

11-7 DRYERS

The branch-circuit conductors and overcurrent protection device for commercial dryers are sized to the appliance nameplate rating. The feeder demand load for dryers is calculated at 100% of the appliance rating. Table 220.18 demand factors do not apply to commercial dryers.