

To comply with the 1000 volt-ampere limitation of 522.10(A), the maximum output of power sources, other than transformers, shall be limited to 2500 volt-amperes, and the product of the maximum current and maximum voltage shall not exceed 10,000 volt-amperes. These ratings shall be determined with any overcurrent-protective device bypassed.

**(B) Non-Power-Limited Control Circuits.** Non-power-limited control circuits shall not exceed 300 volts. The power output of the source shall not be required to be limited.

**(1) Control Transformers.** Transformers used to supply non-power-limited control circuits shall comply with the applicable sections within Parts I and II of Article 450.

**(2) Other Non-Power-Limited Control Power Sources.** Non-power-limited control power sources, other than transformers, shall be protected by overcurrent devices rated at not more than 125 percent of the volt-ampere rating of the source divided by the rated voltage. The fusible overcurrent devices shall not be interchangeable with fusible overcurrent devices of higher ratings. The overcurrent device shall be permitted to be an integral part of the power source.

### Part III. Control Circuit Wiring Methods

**522.20 Conductors, Busbars, and Slip Rings.** Insulated control circuit conductors shall be copper and shall be permitted to be stranded or solid. Listed multiconductor cable assemblies shall be permitted.

*Exception No. 1: Busbars and slip rings shall be permitted to be materials other than copper.*

*Exception No. 2: Conductors used as specific-purpose devices, such as thermocouples and resistive thermal devices, shall be permitted to be materials other than copper.*

#### 522.21 Conductor Sizing.

**(A) Conductors Within a Listed Component or Assembly.** Conductors of size 30 AWG or larger shall be permitted within a listed component or as part of the wiring of a listed assembly.

**(B) Conductors Within an Enclosure or Operator Station.** Conductors of size 30 AWG or larger shall be permitted in a listed and jacketed multiconductor cable within an enclosure or operator station. Conductors in a non-jacketed multiconductor cable, such as ribbon cable, shall not be smaller than 26 AWG. Single conductors shall not be smaller than 24 AWG.

*Exception: Single conductors 30 AWG or larger shall be permitted for jumpers and special wiring applications.*

**(C) Conductors Outside of an Enclosure or Operator Station.** The size of conductors in a listed and jacketed,

multiconductor cable shall not be smaller than 26 AWG. Single conductors shall not be smaller than 18 AWG and shall be installed only where part of a recognized wiring method of Chapter 3.

**522.22 Conductor Ampacity.** Ampacities for conductors sized 16 AWG and smaller shall be as specified in Table 522.22.

**TABLE 522.22** Conductor Ampacity Based on Copper Conductors with 60°C and 75°C Insulation in an Ambient Temperature of 30°C

Conductor Size (AWG)	Ampacity	
	60°C	75°C
30	—	0.5
28	—	0.8
26	—	1
24	2	2
22	3	3
20	5	5
18	7	7
16	10	10

**Notes:**

1. For ambient temperatures other than 30°C, temperature correction factors provided in 310.15(B)(1) shall be used.
2. Ampacity for conductors with 90°C or greater insulation shall be based on ampacities in the 75°C column.

**522.23 Overcurrent Protection for Conductors.** Conductors 30 AWG through 16 AWG shall have overcurrent protection in accordance with the appropriate conductor ampacity in Table 522.22. Conductors larger than 16 AWG shall have overcurrent protection in accordance with the appropriate conductor ampacity in Table 310.16.

**522.24 Conductors of Different Circuits in the Same Cable, Cable Tray, Enclosure, or Raceway.** Control circuits shall be permitted to be installed with other circuits as specified in 522.24(A) and (B).

**(A) Two or More Control Circuits.** Control circuits shall be permitted to occupy the same cable, cable tray, enclosure, or raceway without regard to whether the individual circuits are alternating current or direct current, provided all conductors are insulated for the maximum voltage of any conductor in the cable, cable tray, enclosure, or raceway.

**(B) Control Circuits with Power Circuits.** Control circuits shall be permitted to be installed with power conductors as specified in 522.24(B)(1) through (B)(3).

**(1) In a Cable, Enclosure, or Raceway.** Control circuits and power circuits shall be permitted to occupy the same cable, enclosure, or raceway only where the equipment powered is functionally associated.