

### 665.7 Remote Control.

**(A) Multiple Control Points.** Where multiple control points are used for applicator energization, a means shall be provided and interlocked so that the applicator can be energized from only one control point at a time. A means for de-energizing the applicator shall be provided at each control point.

**(B) Foot Switches.** Switches operated by foot pressure shall be provided with a shield over the contact button to avoid accidental closing of a foot switch.

**665.10 Ampacity of Supply Conductors.** The ampacity of supply conductors shall be determined by 665.10(A) or (B).

**(A) Nameplate Rating.** The ampacity of conductors supplying one or more pieces of equipment shall be not less than the sum of the nameplate ratings for the largest group of machines capable of simultaneous operation, plus 100 percent of the standby currents of the remaining machines. Where standby currents are not given on the nameplate, the nameplate rating shall be used as the standby current.

**(B) Motor-Generator Equipment.** The ampacity of supply conductors for motor-generator equipment shall be determined in accordance with Article 430, Part II.

**665.12 Disconnecting Means.** A readily accessible disconnecting means shall be provided to disconnect each heating equipment from its supply circuit. The disconnecting means shall be located within sight from the controller or be lockable open in accordance with 110.25.

The rating of this disconnecting means shall not be less than the nameplate rating of the heating equipment. Motor-generator equipment shall comply with Article 430, Part IX. The supply circuit disconnecting means shall be permitted to serve as the heating equipment disconnecting means where only one heating equipment is supplied.

## Part II. Guarding, Grounding, and Labeling

**665.19 Component Interconnection.** The interconnection components required for a complete heating equipment installation shall be guarded.

**665.20 Enclosures.** The converting device (excluding the component interconnections) shall be completely contained within an enclosure(s) of noncombustible material.

**665.21 Control Panels.** All control panels shall be of dead-front construction.

**665.22 Access to Internal Equipment.** Access doors or detachable access panels shall be employed for internal access to heating equipment. Access doors to internal compartments containing equipment employing voltages from 150 volts to

1000 volts ac or dc shall be capable of being locked closed or shall be interlocked to prevent the supply circuit from being energized while the door(s) is open. The provision for locking or adding a lock to the access doors shall be installed on or at the access door and shall remain in place with or without the lock installed.

Access doors to internal compartments containing equipment employing voltages exceeding 1000 volts ac or dc shall be provided with a disconnecting means equipped with mechanical lockouts to prevent access while the heating equipment is energized, or the access doors shall be capable of being locked closed and interlocked to prevent the supply circuit from being energized while the door(s) is open. Detachable panels not normally used for access to such parts shall be fastened in a manner that makes them inconvenient to remove.

**665.23 Hazard Labels or Signs.** Labels or signs that read "DANGER — HIGH VOLTAGE — KEEP OUT" shall be attached to the equipment and shall be plainly visible where persons might come in contact with energized parts when doors are open or closed or when panels are removed from compartments containing over 150 volts ac or dc. Hazard signs or labels shall comply with 110.21(B).

**665.24 Capacitors.** The time and means of discharge shall be in accordance with 460.6 for capacitors rated 600 volts, nominal, and under. The time and means of discharge shall be in accordance with 460.28 for capacitors rated over 600 volts, nominal. Capacitor internal pressure switches connected to a circuit-interrupter device shall be permitted for capacitor overcurrent protection.

Enhanced protection against rupture of capacitor cases is needed when capacitors are operated at the higher frequencies used for induction and dielectric heating. A high-resistance fault condition can cause case pressure to build up inside the capacitor over a very short time. Capacitor internal pressure switches are the preferred method to detect this type of failure.

Consider a 5000-kVAR (kilovolt-ampere reactive), 2500-volt, 300-hertz capacitor. Nominal current is 2000 amperes. A "high-resistance" fault of 10 ohms results in 250 amperes of resistive current, or a total capacitor current of 2016 amperes root-mean square (rms). This small increase in rms current will not result in the opening of an overcurrent device even though 625 kilowatts of thermal energy are being generated inside the capacitor, which is designed to dissipate about 1.5 kilowatts of losses.

**665.25 Dielectric Heating Applicator Shielding.** Protective cages or adequate shielding shall be used to guard dielectric heating applicators. Interlock switches shall be used on all hinged access doors, sliding panels, or other easy means of access to the applicator. All interlock switches shall be connected in such a manner as to remove all power from the applicator when any one of the access doors or panels is open.