

- (3) Designed so that the circuit cannot be energized automatically after the device has been manually placed in the “off” position
- (4) Located as specified in 424.19
- (5) Located in an accessible location

**(B) Thermostats That Do Not Directly Interrupt All Ungrounded Conductors.** Thermostats that do not directly interrupt all ungrounded conductors and thermostats that operate remote-control circuits shall not be required to meet the requirements of 424.20(A). These devices shall not be permitted as the disconnecting means.

**424.21 Switch and Circuit Breaker to Be Indicating.** Switches and circuit breakers used as disconnecting means shall be of the indicating type.

#### 424.22 Overcurrent Protection.

**(A) Branch-Circuit Devices.** Electric space-heating equipment, other than motor-operated equipment required to have additional overcurrent protection by Parts III and IV of Article 430 or Parts III and VI of Article 440, shall be permitted to be protected against overcurrent where supplied by one of the branch circuits in Part II of Article 210.

**(B) Resistance Elements.** Resistance-type heating elements in electric space-heating equipment shall be protected at not more than 60 amperes. Equipment rated more than 48 amperes and employing such elements shall have the heating elements subdivided, and each subdivided load shall not exceed 48 amperes. Where a subdivided load is less than 48 amperes, the rating of the supplementary overcurrent protective device shall comply with 424.4(B). A boiler employing resistance-type immersion heating elements contained in an ASME-rated and stamped vessel shall be permitted to comply with 424.72(A).

The reason for subdividing the overcurrent protection is to minimize the amount of damaging energy — in the form of both heat and magnetic energy — released into the heating elements during a short circuit. The damaging short-circuit energy released at the element is greatly reduced by limiting the size of the overcurrent device protecting the individual heating elements, thereby greatly reducing the risk of fire. In addition, a second benefit may be continuity of service if equipment is only partially affected.

Historically, the subdivision size of 60 amperes was selected to use the maximum fuseholder size of 60 amperes while maintaining up to a 48-ampere heating element ( $48\text{ A} \times 125\% = 60\text{ A}$ ).

**Δ (C) Overcurrent Protective Devices.** The supplementary overcurrent protective devices for the subdivided loads specified in 424.22(B) shall meet all of the following conditions:

- (1) Be factory-installed within or on the heater enclosure or supplied for use with the heater as a separate assembly by the heater manufacturer
- (2) Be accessible
- (3) Be suitable for branch-circuit protection

Where cartridge fuses are used to provide overcurrent protection for the subdivided loads, a single disconnecting means shall be permitted to be used as the disconnecting means for all of the subdivided loads.

Informational Note No. 1: See 240.10.

Informational Note No. 2: See 240.10 for supplementary overcurrent protection.

Informational Note No. 3: See 240.40 for disconnecting means for cartridge fuses in circuits of any voltage.

**(D) Branch-Circuit Conductors.** The conductors supplying the supplementary overcurrent protective devices shall be considered branch-circuit conductors.

Where the heaters are rated 50 kW or more, the conductors supplying the supplementary overcurrent protective devices specified in 424.22(C) shall be permitted to be sized at not less than 100 percent of the nameplate rating of the heater, provided all of the following conditions are met:

- (1) The heater is marked with a minimum conductor size.
- (2) The conductors are not smaller than the marked minimum size.
- (3) A temperature-actuated device controls the cyclic operation of the equipment.

**(E) Conductors for Subdivided Loads.** Field-wired conductors between the heater and the supplementary overcurrent protective devices shall be sized at not less than 125 percent of the load served. The supplementary overcurrent protective devices specified in 424.22(C) shall protect these conductors in accordance with 240.4.

Where the heaters are rated 50 kW or more, the ampacity of field-wired conductors between the heater and the supplementary overcurrent protective devices shall be permitted to be not less than 100 percent of the load of their respective subdivided circuits, provided all of the following conditions are met:

- (1) The heater is marked with a minimum conductor size.
- (2) The conductors are not smaller than the marked minimum size.
- (3) A temperature-activated device controls the cyclic operation of the equipment.

## Part IV. Marking of Heating Equipment

### 424.28 Nameplate.

**(A) Marking Required.** Each unit of fixed electric space-heating equipment shall be provided with a nameplate giving the identifying name and the normal rating in volts and watts or in volts and amperes.

Electric space-heating equipment intended for use on alternating current only, direct current only, or both shall be marked to so indicate. The marking of equipment consisting of motors over  $\frac{1}{8}$  hp and other loads shall specify the rating of the motor in volts, amperes, and frequency, and the heating load in volts and watts or in volts and amperes.