value and "locked-rotor amperes" is a line value as opposed to a phase value.

Exception No. 2: Where part of the concurrent load is resistance load, and where the disconnecting means is a switch rated in horsepower and current, the switch used shall be permitted to have a horsepower rating not less than the combined load of the motor(s) if the current rating of the switch is not less than the locked-rotor current of the motor(s) plus the resistance load.

(2) Current Rating. The current rating of the disconnecting means shall not be less than 115 percent of the sum of all currents at the full-load condition determined in accordance with 430.110(C)(1).

Exception: A listed nonfused motor-circuit switch having a horsepower rating equal to or greater than the equivalent horsepower of the combined loads, determined in accordance with 430.110(C)(1), shall be permitted to have a current rating less than 115 percent of the sum of all currents at the full-load condition.

(3) Small Motors. For small motors not covered by Table 430.247, Table 430.248, Table 430.249, or Table 430.250, the locked-rotor current shall be assumed to be six times the full-load current.

Listed circuit breakers and molded case switches are tested under overload conditions at six times their rating, to cover motor circuit applications, and are suitable for use as a motor disconnecting means.

Calculation Example

An installation consists of one 5-hp, one 3-hp, and two ½-hp motors, plus a 10-kW heater, all rated 240 V, 3 phase. All motors are Design B motors. Determine the size of the disconnecting means required for this combination load.

Solution

Use the appropriate tables to select the full-load and locked-rotor current equivalents from the tables in Article 430 as follows:

Equivalent Full-Load and Locked-Rotor Current Rating.

Motor or Other Load	Full-Load Current Amperes from Table 430.250	Locked-Rotor Current Amperes from Table 430.251(B)
5-hp motor	15.2	92
3-hp motor	9.6	64
½-hp motor	2.2	20
½-hp motor	2.2	20
10-kW heater	24.1	24.1
$\left[\frac{10 \times 1{,}000}{(240 \times 1.732)} = 24.1\text{A}\right]$		
	Total 53.3	Total 220.1

To determine the minimum horsepower rating for the disconnecting means, a comparison between the full-load horsepower equivalent and the locked-rotor equivalent of the combined loads must be considered.

Step 1a. Using the combined full load current 53.3 amperes and Table 430.250, the horsepower equivalent is 20 hp based on the 54-ampere value from the table.

Step 1b. Using the combined locked-rotor current of 220.1 amperes and Table 430.251 (B), the horsepower equivalent is 15 hp based on the 232-ampere value from the table.

Step 1c. Comparing the horsepower ratings determined in Steps 1a and 1b, the horsepower equivalent for the FLC (20 hp) is larger than the horsepower equivalent for the locked-rotor current (15 hp). Therefore, the disconnecting means must be rated not less than 20 hp.

Step 2. It is also necessary to determine the minimum ampere rating of the disconnecting means. Circuit breakers are rated in amperes, and many safety switches have both an ampere and horsepower rating. Using the 53.3 FLC, the minimum ampere rating is determined as follows:

$$53.3\text{ A} \times 1.15 = 61.295\text{ amperes}$$

Conclusion

The minimum rating of a disconnecting means would be as follows:

1. Circuit Breaker — Using standard ampere ratings for circuit breakers, a 70-ampere circuit breaker is the minimum size required.

2. Safety Switch — Using standard ratings of safety switches, a 100-ampere switch is the minimum size required. If the switch also has a horsepower rating, it will have to be not less than 20 hp. In addition, see the exception to 430.110(C)(2), which permits listed nonfused motor-circuit switches having the minimum horsepower rating to have an ampacity rating less than 115% of the FLC of the combined loads.

430.111 Switch or Circuit Breaker as Both Motor Controller and Disconnecting Means. A switch or circuit breaker shall be permitted to be used as both the motor controller and disconnecting means if it complies with 430.111(A) and is one of the types specified in 430.111(B).

(A) General. The switch or circuit breaker complies with the requirements for motor controllers specified in 430.83, opens all ungrounded conductors to the motor, and is protected by an overcurrent device in each ungrounded conductor (which shall be permitted to be the branch-circuit fuses). The overcurrent device protecting the motor controller shall be permitted to be part of the motor controller assembly or shall be permitted to be separate. An autotransformer-type motor controller shall be provided with a separate disconnecting means.