requires a connection to the premises fire alarm system. A fire alarm system initiating device circuit will generate a supervisory signal at the fire alarm control unit on loss of voltage to the fire pump controller. For more information on this interface with the fire alarm system, see *NFPA 72®, National Fire Alarm and Signaling Code®*.

Calculation Example

A fusible service disconnect switch supplies power to a 100-hp, 460-V, 3-phase fire pump and to a 1½-hp, 460-V, 3-phase jockey pump. Determine the sizes of the disconnecting means and the OCPD for the system. Also determine the minimum ampacity of the feeder conductors.

Solution

Step 1. Determine the minimum ratings of the disconnecting means and the OCPD.

According to the motor nameplates, the locked-rotor current (LRC) is 725 A for the 100-hp motor and 20 A for the 1½-hp motor. If the locked-rotor amperes are not on the nameplates, the LRCs found in Table 430.251(B) must be used. Calculate the size by summing the LRC of both motors and then going to the next larger standard-size OCPD, as follows:

100-hp, 3-phase LRC = 725 A
1½-hp, 3-phase LRC = 20 A
Total LRC = 745 A

The next larger standard-size disconnect switch and overcurrent device is 800 A. An adjustable-trip circuit breaker of 750 A also is permitted, because it, too, will carry the LRC indefinitely.

Step 2. Determine the minimum ampacity for the fire pump feeder conductor.

Even though the disconnect switch and the overcurrent device are sized according to LRCs, the feeder conductors to the fire pump and associated equipment are required to have an ampacity not less than 125 percent of the full-load current (FLC) rating of the fire pump motor(s) and pressure maintenance pump motor(s), plus 100 percent of associated accessory equipment. Calculate the size of the feeder to the fire pump controller using 430.6(A)(1) and Table 430.250 for the FLC of the motors:

100-hp, 3-phase FLC

$$124\text{ A} \times 1.25 = 155.0\text{ A}$$

1½-hp, 3-phase FLC

$$3\text{ A} \times 1.25 = 3.75\text{ A}$$

Total FLC = 158.75 A or 159 A

Thus, the minimum ampacity for the feeder conductors is 159 A. Using the 75°C column, per 110.14(C)(1)(b), from Table 310.16, a 2/0 copper conductor is the minimum size required.

695.5 Transformers. Where the service or system voltage is different from the utilization voltage of the fire pump motor, transformer(s) protected by disconnecting means and overcurrent protective devices shall be permitted to be installed between the system supply and the fire pump controller in accordance with 695.5(A) and (B), or with (C). Only transformers covered in 695.5(C) shall be permitted to supply loads not directly associated with the fire pump system.

(A) Size. Where a transformer supplies an electric motor driven fire pump, it shall be rated at a minimum of 125 percent of the sum of the fire pump motor(s) and pressure maintenance pump(s) motor loads, and 100 percent of the associated fire pump accessory equipment supplied by the transformer.

(B) Overcurrent Protection. The primary overcurrent protective device(s) shall be selected or set to carry indefinitely the sum of the locked-rotor current of the fire pump motor(s) and the pressure maintenance pump motor(s) and the full-load current of the associated fire pump accessory equipment when connected to this power supply. Secondary overcurrent protection shall not be permitted. The requirement to carry the locked-rotor currents indefinitely shall not apply to conductors or devices other than overcurrent devices in the fire pump motor circuit(s).

The sizing of dedicated transformers and overcurrent protection can be broken down into three basic requirements. Generally stated, they are as follows:

1. The transformer must be sized to at least 125 percent of the sum of the loads.
2. The transformer primary overcurrent device must be the sum of locked-rotor current (LRC) of the fire pump motor(s) and the pressure maintenance pump motor(s) and the full-load current (FLC) of the associated fire pump accessory equipment. This differs from the general requirements of sizing overcurrent protection for fire pump motors.
3. The transformer secondary must not contain any overcurrent devices.

See Exhibit 695.4 for a one-line diagram on applying the dedicated fire pump transformer overcurrent protection requirements. Alternately, the jockey pump could be supplied by a separate panelboard.

Calculation Example

A 4160/480-V, 3-phase, dedicated transformer supplies power to a 100-hp, 460-V, 3-phase, code letter G fire pump and to a 1½-hp, 460-V, 3-phase, code letter H jockey pump. Determine the sizes of the dedicated transformer and its primary overcurrent protection.

Solution

Step 1. Determine the minimum standard-size transformer. First, to determine the minimum current value for use in the 3-phase power calculation, add the FLCs of the fire pump motor(s) and jockey pump motor(s). The FLCs of the two motors, using the FLC values from Table 430.250, are as follows: