specified in 695.4(B)(2)(a)(1), provided that it is part of a transfer switch assembly listed for fire pump service that complies with 695.4(B)(2)(a)(2).

A listed fire pump transfer switch with a factory-installed instantaneous circuit breaker provides ground-fault and short-circuit protection. Overcurrent protection is provided by the circuit breaker in the fire pump controller.

(I) Phase Converters. Phase converters shall not be used to supply power to a fire pump. [**20:**9.1.7]

A phase converter used in a fire pump circuit would be in continuous operation because the controller has to be constantly powered. Voltage imbalance between phases under unloaded or lightly loaded conditions could adversely affect electronics integral to the controller. This is the reason phase converters are not permitted for fire pump service.

695.4 Continuity of Power. Circuits that supply electric motor–driven fire pumps shall be supervised from inadvertent disconnection as covered in 695.4(A) or (B).

(A) Direct Connection. The supply conductors shall directly connect the power source to a listed fire pump controller, a listed combination fire pump controller and power transfer switch, or a listed fire pump power transfer switch.

(B) Connection Through Disconnecting Means and Overcurrent Device.

Section 695.4(B) permits, but does not require, the installation of a disconnecting means and associated overcurrent protection between a power source and the fire pump control devices described in 695.4(B)(1). Other *NEC* requirements — such as 230.70 and 225.31 — could necessitate the installation of the disconnecting means and overcurrent protection covered in the requirements of 695.4(B). While not always possible, the best method to provide continuity of power is the direct connection of the source to the fire pump control equipment in accordance with 695.4(A). The permitted additional disconnect facilitates the creation of an electrically safe work condition as required by *NFPA 70E®, Standard of Electrical Safety in the Workplace®*, while maintenance of the fire pump controller is being performed.

(1) Number of Disconnecting Means.

(a) *General.* A single disconnecting means and associated overcurrent protective device(s) shall be permitted to be installed between the fire pump power source(s) and one of the following: [**20:**9.2.3]

(1) A listed fire pump controller
(2) A listed fire pump power transfer switch
(3) A listed combination fire pump controller and power transfer switch

(b) *Feeder Sources.* For systems installed under the provisions of 695.3(C) only, additional disconnecting means and the associated overcurrent protective device(s) shall be permitted.

(c) *On-Site Standby Generator.* Where an on-site standby generator is used to supply a fire pump, an additional disconnecting means and an associated overcurrent protective device(s) shall be permitted.

An on-site standby generator equipped with an integral disconnecting means and overcurrent protection is allowed in addition to a disconnecting means and overcurrent protection installed elsewhere in the alternate supply circuit to the fire pump. The second disconnecting means and overcurrent device could be located in distribution equipment and is required to comply with the requirements of 695.4(B)(2)(b) and 695.4(B)(3)(b) through (3)(e).

(2) Overcurrent Device Selection. Overcurrent devices shall comply with 695.4(B)(2)(a) or (B)(2)(b).

(a) *Individual Sources.* Overcurrent protection for individual sources shall comply with the following:

(1) Overcurrent protective device(s) shall be rated to carry indefinitely the sum of the locked-rotor current of the largest fire pump motor and the full-load current of all of the other pump motors and accessory equipment. [**20:**9.2.3.4] Where the locked-rotor current value does not correspond to a standard overcurrent device size, the next standard overcurrent device size shall be used in accordance with 240.6. 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).

Exception: The requirement to carry the locked-rotor currents indefinitely shall not apply to feeder overcurrent protective devices installed in accordance with 695.3(C).

A key factor in the reliable power source equation is sizing the overcurrent protection in a supervised fire pump disconnecting means so it is able to carry locked-rotor current (LRC) indefinitely. Opening of the circuit by an overcurrent device installed in a fire pump circuit cannot be tolerated, except under short circuits or ground faults. The circuit has to perform as if a direct connection exists to the power source. Sizing for LRC applies only to OCPDs and not to the conductors or other devices in the fire pump motor circuit. Similar requirements are contained in 695.5(B) and 695.5(C)(2). Alternately, a listed fire pump assembly complying with 695.4(B)(2) is permitted.

It is unlikely that all fire pumps on a circuit will be under simultaneous locked-rotor conditions. Therefore, only the LRC of the largest fire pump motor is required. Full-load current is used for all other pump motors and accessory equipment.

(2) Overcurrent protection shall be provided by an assembly listed for fire pump service and complying with the following:

a. The overcurrent protective device shall not open within 2 minutes at 600 percent of the full-load current of the fire pump motor(s).