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Installation Requirements for Permanently Installed Generators based on the 2017 National Electrical Code

The following represents an explanation of the National Electrical Code (NEC) NFPA 70, 2017 Edition requirements for the disconnecting means for an Outdoor Generator Set. Following the dialogue are the associated code articles for quick reference.

When applying the disconnecting means for a generator, electricians and even some inspectors have misunderstood the NEC disconnecting requirements for a generator installation. Two installation requirements must be met for generators to comply with the NEC. The requirements relate to the feeder disconnect (all associated ungrounded conductors) and the shutdown of the prime mover. For Outdoor Generator Sets, whether for Emergency, Legally Required Standby, or Optional Standby applications, the following code sections describing the disconnecting means for each of the areas are identical. NEC 700.12(B)(6), 701.12(B)(5), and 702.12(A), and in accordance with 445.18. The focus of this explanation will highlight optional standby systems as relating to 702.12(A). The other two sections maintain the same, similar, or other special requirements.

As per NEC 225.31 & 225.32, when a feeder supplies a building or structure, a disconnecting means for the ungrounded conductors is required on the building or structure, or at the nearest point of entry. As per NEC 702.12(A), Where an outdoor housed generator set is equipped with a readily accessible disconnecting means in accordance with 445.18, and the disconnecting means is located within sight of the building or structure supplied, (50'), an additional disconnect is not required. Some have misinterpreted this section as the "generator" being in sight. It is the disconnecting means that must be "in sight" from the building or structure being served. This disconnect must also be installed in accordance with NEC 445.18. NEC 445.18(A) requires this disconnect to be lockable in the open position as per NEC 110.25. For example, if this disconnect were mounted on a 4 x 4 post, readily accessible, in sight within 50' of the building or structure, and lockable in the open position, no additional disconnect would be required on the building or nearest point of entry.

Many have considered that the circuit breaker inside of the generator housing is the disconnecting means. While it will open the ungrounded conductors as NEC 445.18(A) requires, it usually has no means of being lockable in the open position. A listed locking mechanism could be installed on that circuit breaker, however, it would not satisfy the “in sight from” requirement as outlined in NEC 702.12(A). An additional disconnect would be required. It is also important to note that the housing of a generator is not recognized as a disconnect, it is simply the assembly that contains all the components of the generator.

Part B of NEC 445.18 requires a provision to shut down the prime mover of the generator. This means that the device that is employed must render the generator from producing any supply voltage. If this device or switch assembly is capable of being locked in the open position, the disconnect requirement in NEC 445.18(A) is considered satisfied and would not have to be installed. This lockable switch assembly for the prime mover can also satisfy the requirement for the building or structure disconnect if it meets the “in sight” definition. With the introduction of the prime mover shut down, a mechanical reset must also occur before the generator can restart. (A momentary contact type switch would not qualify.)

Also per NEC 445.18(B), generators greater than 15KW are required to have an additional means to shut down the prime mover. This additional shutdown means shall be located outside the equipment room or generator enclosure and shall also meet the requirements of 445.18(B)(1) and (B)(2).

2017 NEC CODE SECTIONS REFERENCED

225.31 Disconnecting Means.

Means shall be provided for disconnecting all ungrounded conductors that supply or pass through the building or structure.

225.32 Location.

The disconnecting means shall be installed either inside or outside of the building or structure served or where the conductors pass through the building or structure. The disconnecting means shall be at a readily accessible location nearest the point of entrance of the conductors. For the purposes of this section, the requirements in 230.6 shall be utilized.

702.12(A) Outdoor Generator Sets.

(A) Portable Generators Greater Than 15 kW and Permanently Installed Generators.

Where an outdoor housed generator set is equipped with a readily accessible disconnecting means in accordance with 445.18, and the disconnecting means is located within sight of the building or structure supplied, an additional disconnecting means shall not be required where ungrounded conductors serve or pass through the building or structure. Where the generator supply conductors terminate at a disconnecting means in or on a building or structure, the disconnecting means shall meet the requirements of 225.36.

100 In Sight From (Within Sight From, Within Sight).

Where this Code specifies that one equipment shall be “in sight from,” “within sight from,” or “within sight of,” and so forth, another equipment, the specified equipment is to be visible and not more than 15 m (50 ft.) distant from the other. (CMP-1)

445.18 Disconnecting Means and Shutdown of Prime Mover.

(A) Disconnecting Means.

Generators other than cord-and plug- connected portable shall have one or more disconnecting means. Each disconnecting means shall simultaneously open all associated ungrounded conductors. Each disconnecting means shall be lockable in the open position in accordance with 110.25.

(B) Shutdown of Prime Mover.

Generators shall have provisions to shut down the prime mover. The means of shutdown shall comply with all of the following:

(1) Be equipped with provisions to disable all prime mover start control circuits to render the prime mover incapable of starting.

(2) Initiate a shutdown mechanism that requires a mechanical reset. The provisions to shut down the prime mover shall be permitted to satisfy the requirements of 445.18(A) where it is capable of being locked in the open position in accordance with 110.25.

The provisions to shut down the prime mover shall be permitted to satisfy the requirements of 445.18(A) where it is capable of being locked in the open position in accordance with 110.25.

Generators with greater than 15 kW rating shall be provided with an additional requirement to shut down the prime mover. This additional shutdown means shall be located outside the equipment room or generator enclosure and shall also meet the requirements of 445.18(B)(1) and (B)(2).

110.25 Lockable Disconnecting Means.

If a disconnecting means is required to be lockable open elsewhere in this Code, it shall be capable of being locked in the open position. The provisions for locking shall remain in place with or without the lock installed.