FIRE PUMP

ELECTRICAL CONFIGURATIONS UNDER 600 VOLTS
San Diego Area
Electrical Newsletters

January 2008
Based on the
2007 edition of the
California Electrical Code
(2005 National Electrical Code)
Two taps at Generator: fire pump and other
Fire Pump Meter and Disconnect in Metering Room Busway Fed Main Pull Section
Tap in Main Pull Section, Six Foot Disconnect Separation
Fire Pump Meter and Disconnect in Metering Room, Wire Fed Main Pull Section
Tap in Separate Section, Six Foot Disconnect Separation
Fire Pump Meter only in Metering Room Busway Fed Main Pull Section
Meter Section on Other Side of Pull Section
Fire Pump Meter only in Metering Room Wire Fed Main Pull Section

Meter Section on Other Side of Pull Section
Fire Pump Meter only in Metering Room Busway Fed Main Pull Section

FP Meter Section Between Main Pull Section and Main Disconnect

- Overhead Busway Feed From SDG&E Transformer Vault
- Special Signage Required
- Caution: Unfused Fire Pump Service Conductors
- Factory Barrier
- Factory Fire Pump Tap
- Busway Terminating Enclosure

Main SWB 277/480 v 3 ph 4 w

GFI Main

Slgnage per 700.8

Feeder Sized for 125% FLA

NEC 695
Fire Pump Meter only in Metering Room Wire Fed Main Pull Section
FP Meter Section Between Main Pull Section and Main Disconnect
NORMAL POWER
Normal Power Requirements (utility power)

- Normal (utility) power must be connected ahead of the building disconnecting means.

- Fire pump feeder connection within a separate compartment in the service equipment, ahead of the main, on taps provided by the manufacturer, is acceptable. (less than 600 volts)

- When the fire pump feeder is connected to a building normal power metering enclosure, it shall be connected in a compartment completely separate from the metering equipment and the building normal power disconnecting means.

- Voltage drop may not exceed 5% at the motor under normal running conditions.

- Voltage drop may not exceed 15% at the fire pump controller under starting conditions.

- The fire pump controller must be listed for the purpose and must be installed outside or in a room that provides protection from fire or damage.

- Ground fault protection of equipment shall not be permitted for fire pumps.

- The supply conductors shall be sized at 125% FLA.
Normal Power Requirements (utility power)

Metering requirements:

- Supply conductors must be metered.
- The meter may be within a separate fire pump metering enclosure.
- They may be metered through the building normal power metering enclosure.
- The fire pump controller location shall be accessible to the Utility if there is no meter service disconnect located at the meter location controlling the fire pump supply conductors.
Fire Pump Disconnecting Means NOT Installed in Electric Meter Room (utility power)

Supply Conductors must be located in conduit:
- Outside the building
- Under a building slab a minimum of 2” thick or Encased within 2” of concrete

Methods when buried outside of the building or under the slab:
- Rigid Nonmetallic conduit, Rigid metal conduit PVC coated, or Rigid metal conduit encased in concrete
- No direct bury metallic conduit allowed in San Diego Area due to corrosive soils
Supply Conductor Installation Exceptions:

- Electrical Equipment Rooms
- Fire Pump Room
- Generator Room
- Outside of the building

Methods w/ Exceptions:

- Rigid Metal Conduit, Intermediate metal conduit or Liquid tight flexible metal conduit
Additional requirements:

- The supply conductors shall connect directly to a listed fire pump controller. (single conductor fire rated MC transition?)

- A plaque is required on the building electrical service with:
  - Warning about the unfused fire pump supply conductors
  - Stating the location of the fire pump controller
  - Diagram of the building showing locations:
    - Electrical Service Room
    - Fire Pump Controller Room
Fire Pump Disconnecting Means IS Installed in Electric Meter Room (utility power)

Location fire pump disconnect:
- Equipment separate from other building disconnects
- Marked as suitable for use as service equipment
- Capable of being locked in the “ON” position
- Be identified as “Fire Pump Disconnecting Means” in 1” or larger block letters
- Be red or have the required identification on a red plaque.
- Minimum six foot separation between handles of fire pump and other building disconnects.
Fire Pump Disconnecting Means IS Installed in Electric Meter Room (utility power)

Overcurrent Protection:
- Sized to carry locked rotor currents of the fire pump motor(s), jockey pump and associated fire pump accessory equipment.

Fire Pump Feeder Conductors:
- Shall be permitted to be routed through the building using listed electrical protective systems with a minimum of 1-hour fire resistance.
- Must have an ampacity equal to 125% of the total fire pump motor and equipment load.
GENERATOR POWER
Generator Power Requirements

Generator Location:

- Outside of the building or in a room designed to provide equivalent protection from fire or damage.
- Room shall be identified “Emergency Room Generator” in 1 inch block letters on a red plaque.

Miscellaneous:

- Voltage drop may not exceed 5% at the motor under normal running conditions.
- Voltage drop may not exceed 15% at the fire pump controller under starting conditions.
- The transfer of power must take place in the fire pump room. No other transfer switches are permitted in the generator feed to the fire pump.
- The supply or feeder conductors from the generator to the fire pump controller must be sized to carry 125% of the total fire pump motor, pressure maintenance motor and 100% of the associated equipment.
Fire Pump Disconnecting Means NOT Installed At Generator

Supply Conductors must be located in conduit:
- Outside the building
- Under a building slab a minimum of 2” thick or encased within 2” of concrete

Methods when buried outside of the building or under the slab:
- Rigid Nonmetallic conduit, Rigid metal conduit PVC coated or Rigid metal conduit encased in concrete
- (no direct bury metallic conduit allowed in San Diego Area due to corrosive soils)
Fire Pump Disconnecting Means NOT Installed
At Generator

Supply Conductor Installation Exceptions:

- Electrical Equipment Rooms
- Fire Pump Room
- Generator Room
- Outside of the building

Methods w/ Exceptions:

- Rigid Metal Conduit
- Intermediate metal conduit
- Liquidtight flexible metal conduit
Fire Pump Disconnecting Means NOT Installed At Generator

Additional requirements:

- The supply conductors shall connect directly to a listed fire pump controller. **NOTE:** This could be problematic with large sizes of single conductor fire rated mc cable.

- A plaque is required on the generator equipment:
  - Warning about the unfused fire pump supply conductors
  - Stating the location of the fire pump controller
  - Diagram of the building showing locations:
    - Generator (Room)
    - Fire Pump Controller Room
Fire Pump Main IS Installed At Generator

Location fire pump disconnect:
- In an enclosure separate from other building disconnects
- Marked as suitable for use as service equipment
- Capable of being locked in the “ON” position
- Be identified as “Fire Pump Disconnecting Means” in 1” or larger block letters
- Be red or have the required identification on a red plaque
Fire Pump Main IS Installed At Generator

Overcurrent Protection:

- Sized to carry locked rotor currents of the fire pump motor(s),
  jockey pump and associated fire pump accessory equipment.
- **Exception for on-site generators with continuous rating over 225% of fire pump motor FLA:**
  1. The overcurrent protection shall be sized at short circuit ratings NEC 430.52 **OR**
  2. The conductor installation shall meet 695.6(B):
     - 1 hour rated dedicated shaft
     - 1 hour fire rated assembly
   outside

Fire Pump Feeder Conductors:

- Shall be permitted to be routed through the building using listed electrical protective systems with a minimum of 1-hour fire resistance.
Electric Fire Pump Control Wiring Methods

Protected from physical damage using:

- Rigid metal conduit
- Intermediate metal conduit
- Liquidtight flexible metal conduit
- Liquidtight flexible nonmetallic conduit type B (LFNC_B)
- Listed type MC cable with an impervious covering
- Type MI cable
Generator Control Wiring Methods
Between Fire Pump transfer switch and Generator

- Entirely independent of all other wiring.
- Protected to resist potential damage by fire or structural failure.

Methods:

- Through a building encased in 2” of concrete
- Within enclosed construction dedicated to the fire pump circuits with minimum 1 hour fire resistive rating
- Circuit protective systems with a minimum 1 hour fire resistance – installed per manufacturer’s instructions