



PORT & MARINE SERVICES

201 William Street
Key West, FL
33040

ADDENDUM NO. 1

MARGARET STREET FIRE PUMP BUILDING KEY WEST HISTORIC SEAPORT ITB #22-008

The information contained in this Addendum adds information to be included in the Bid and is hereby made a part of the Contract Documents. The referenced bid package is hereby addended in accordance with the following items:

GENERAL NOTES:

1. Mandatory Pre-Bid sign-in sheet attached.
2. Construction activities are allowed on Saturdays, 9am – 5pm.
3. Bid date has been extended to August 3, 2022 @ 3:30pm

QUESTIONS & CLARIFICATIONS:

1. What is the City's construction budget?

The construction budget is \$250,040.00

2. Verify the check-valve size at backflow preventor.

Check-valve to be min. 6" per sheet FP-1

3. Will a temporary fire pump or Fire Watch be required during disconnection?

All connections shall be installed and tested up to existing fire pump system. Once tested and approved, connection can be made. System down time must be limited to less than 24 hours. If down time is great than 24 hrs. It shall be contractors' responsibility to provide Fire Watch at contractor's expense. Coordinate any fire watch needs with Derek Berger 305-809-3935.

4. None of the drawings show Fire Alarm System details inside new Fire Pump Building. Does the new Fire Pump Building need to be equipped with Fire Alarm System?

Refer to sheet E-3 for "FIRE ALARM NOTE" and "NOTES TO CONTRACTOR"

there is also a note in the controller to connect to the Fire Alarm panel.

5. Clarify who is the City's Internet Provider

Connection to City data network will no longer be through data vault. Provide (2) data conduits in electrical trench to panel location. Conduits to run up "Waterfront Brewery" building into existing second floor data closet. Data conduit run approximately 300 ft. for bid purposes.

6. Clarify size of electrical conductors and raceways From: Existing pad mounted transformer to New 600A Utility meter to 3P-500A Disconnect.

Please note we have designed the conductor sizes per NEC sections that apply to Fire Pumps. (relevant articles attached). The contractor should review the sizes with the Fire Department, Building Department and Keys Energy. If they want wire sizes upgraded, 2 sets of 4-250 KCMIL will be required.

Please see below:

- 1- NEC art. 695.3(A)(1) permits to have a separate service to the fire pump.**
- 2- Per NEC 695 all fire pump controllers are suitable for use as service equipment (SUSE)**
- 3- NEC art. 695.4(A) allows to make a direct connection (service entrance feeder) between the power source and the fire pump controller, which is not our design since it is installed with a single disconnect before the fire pump controller.**
- 4- NEC art. 695.4(B)(2)(a)(1) permit to install a single disconnecting means between the power source and the fire pump controller which shall be capable to carry indefinitely the sum of the locked-motor current of the fire pump motor and the jockey pump (which we have done). This requirement shall not apply to the conductors in the fire pump circuit. The key is that the utility company and the Fire/ Bldg Departments allow this installation as per construction drawings. If they do not allow, and the equipment remains as per construction drawings a (2) sets of 4-250kcmil would be required.
Also, contractor should verify with AHJ if a single disconnecting means 3phase-480V without fuses is allowed, then # 1 AWG would be used.**
- 5- NEC art. 695.4(B)(2)(a)(2) permit to install a single disconnecting means ("upstream disconnecting means)) between the power source and the fire pump controller that comply with items a, b, c & d indicated on that article. Contractor shall verify with manufacturer to provide the disconnect means in NEMA 4XSS and size the disconnect based on the sum of HPs of fire pump motor and jockey pump. FIRETROL has an upstream disconnecting means but NEMA 2 enclosure and should be located inside the fire pump room and not outside close to the utility meter. This is too similar that is explained in item 2 above (see attachment).**
- 6- NEC art. 695.6(B)(1) indicates that the conductor size of supply conductors shall be sized not less than 125% of the sum of the fire pump motor and jockey pump full-load currents (which is on the plans).**

See attachments provided for further clarification.

7. Clarify if fire pump is design/build as stated on sheet E-4 or are we to use the design provided on sheets FP-1 and FP-2.

Sheet E-4's intent is to provide parameters to the fire pump design. The fire pump shall be constructed according to FP-1 and FP-2, if the contractor desires to use a different manufacturer they can be accepted if equal or better.

8. Provide Additional information on lattice structure.

See attached SK-1 LATTICE INFORMATION for more information on lattice construction.

9. Asphalt Resurface Work C-1: Are we to remove the existing asphalt from the areas shaded in grey and place new limerock base and asphalt pavement in this area or only within the limits of the diagonal arrows?

In addition to the area highlighted in grey, asphalt resurfacing will also be necessary along the trench to the electrical transformer. The resurfacing need only be 6' wide along the electrical trench only. We have provided a rough yardage estimate in the bid schedule for all resurfacing.

10. Provide electrical trench detail.

See attached SK-2 ELECTRICAL TRENCH DETAIL for more information on lattice construction.

11. The existing WM from the existing pump to the RPDA on A-1 does not match the existing WM on C-1. Please designate which one is correct.

WM line is diagrammatic in nature on the civil drawings. On A-1 this was provided to us from an old survey. We do not know exact locations; contractor will need to verify the exact location of this water line along with all other services in the ground in the area of work.

BID FORM:

ADD:

SUBSTITUTIONS

Any material or equipment that will fully perform the duties specified will be considered 'equal,' provided the bidder submits proof that such material or equipment is of equivalent substance and function and is approved, in writing. Requests for the approval of 'or equal' shall be made in writing at least five business days prior to bid opening. During the bidding period, all approvals shall be issued by the Architect/Engineer in the form of addenda at least two business days prior to the bid opening date."

INSTRUCTIONS TO BIDDERS:

1. CONTRACT DOCUMENTS B. DOCUMENT INTERPRETATION

DELETE: "(at least 10 calendar days prior to Bid opening)"

REPLACE with: "(at least 8 days prior to Bid opening (EOB July 13, 2022))"

17. TIME OF COMPLETION

ADD: "Contractor shall perform limited activities, coordinated through Port & Marine Services, Fantasy Fest (October 19 – 29, 2022), the Poker Run (November 8 – 14, 2022), Thanksgiving (November 23 – 24, 2022), Christmas and New Years Eve, Memorial Day (May 29, 2023) and Independence Day (July 4, 2023)".

BID SCHEDULE:

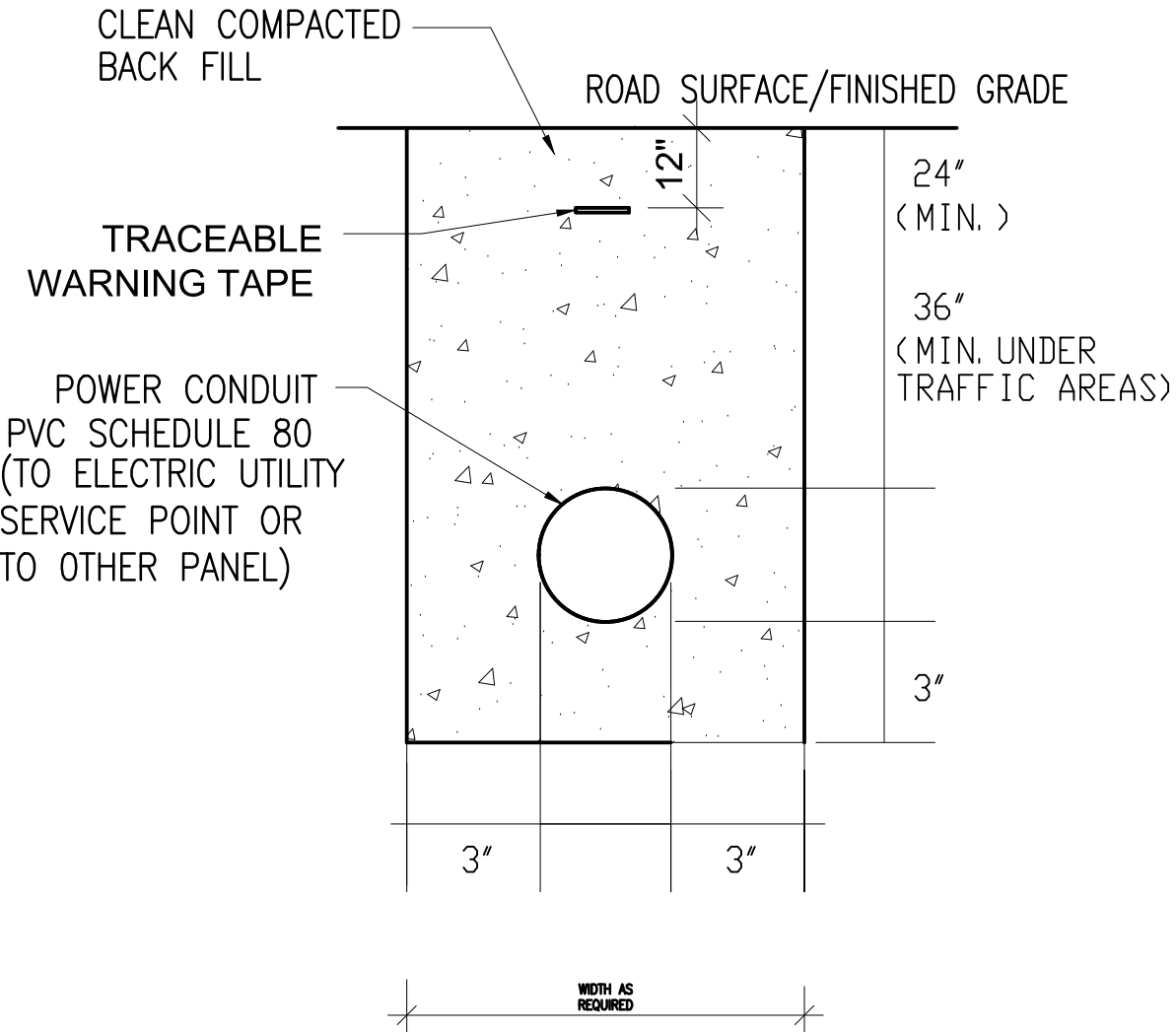
DELETE Bid Schedule and REPLACE with attached

All other elements of the Contract and Bid documents shall remain unchanged.

All Bidders shall acknowledge receipt and acceptance of this **Addendum No. 1** by submitting the addendum with their proposal. Proposals submitted without acknowledgement or without this Addendum may be considered non-responsive.

Signature

Name of Business



POWER DUCT BANK

N.T.S.

Informational Note: Guy wires supporting grounded towers are unlikely to become energized under normal conditions, but partial lightning currents could flow through guy wires when exposed to a lightning environment. Grounding of metallic guy wires may be required by lightning standards. For information on lightning protection systems, see NFPA 780-2014, *Standard for the Installation of Lightning Protection Systems*.

Part VI. Marking

694.50 Interactive System Point of Interconnection. All interactive system points of interconnection with other sources shall be marked at an accessible location at the disconnecting means and with the rated ac output current and the nominal operating ac voltage.

694.52 Power Systems Employing Energy Storage. Wind electric systems employing energy storage shall be marked with the maximum operating voltage, any equalization voltage, and the polarity of the grounded circuit conductor.

694.54 Identification of Power Sources.

(A) Facilities with Stand-Alone Systems. Any structure or building with a stand-alone system and not connected to a utility service source shall have a permanent plaque or directory installed on the exterior of the building or structure at a readily visible location. The plaque or directory shall indicate the location of system disconnecting means and shall indicate that the structure contains a stand-alone electrical power system.

(B) Facilities with Utility Services and Wind Electric Systems. Buildings or structures with both utility service and wind electric systems shall have a permanent plaque or directory providing the location of the service disconnecting means and the wind electric system disconnecting means.

694.56 Instructions for Disabling Turbine. A plaque shall be installed at or adjacent to the turbine location providing basic instructions for disabling the turbine.

Part VII. Connection to Other Sources

694.60 Identified Interactive Equipment. Only inverters that are listed, labeled, and identified as interactive shall be permitted in interactive systems.

694.62 Installation. Wind electric systems, where connected to utility electric sources, shall comply with the requirements of Article 705.

694.66 Operating Voltage Range. Wind electric systems connected to dedicated branch or feeder circuits shall be permitted to exceed normal voltage operating ranges on these circuits, provided that the voltage at any distribution equipment supplying other loads remains within normal ranges.

Informational Note: Wind turbines might use the electric grid to dump energy from short-term wind gusts. Normal operating voltages are defined in ANSI C84.1-2006, *Voltage Ratings for Electric Power Systems and Equipment* (60 Hz).

694.68 Point of Connection. Points of connection to interconnected electric power sources shall comply with 705.12.

ARTICLE 695 Fire Pumps

695.1 Scope.

Informational Note: Text that is followed by a reference in brackets has been extracted from NFPA 20-2013, *Standard for the Installation of Stationary Pumps for Fire Protection*. Only editorial changes were made to the extracted text to make it consistent with this Code.

(A) Covered. This article covers the installation of the following:

- (1) Electric power sources and interconnecting circuits
- (2) Switching and control equipment dedicated to fire pump drivers

(B) Not Covered. This article does not cover the following:

- (1) The performance, maintenance, and acceptance testing of the fire pump system, and the internal wiring of the components of the system
- (2) The installation of pressure maintenance (jockey or makeup) pumps

Informational Note: For the installation of pressure maintenance (jockey or makeup) pumps supplied by the fire pump circuit or another source, see Article 430.

- (3) Transfer equipment upstream of the fire pump transfer switch(es)

Informational Note: See NFPA 20-2013, *Standard for the Installation of Stationary Pumps for Fire Protection*, for further information.

695.2 Definitions.

Fault-Tolerant External Control Circuits. Those control circuits either entering or leaving the fire pump controller enclosure, which if broken, disconnected, or shorted will not prevent the controller from starting the fire pump from all other internal or external means and may cause the controller to start the pump under these conditions.

On-Site Power Production Facility. The normal supply of electric power for the site that is expected to be constantly producing power.

On-Site Standby Generator. A facility producing electric power on site as the alternate supply of electric power. It differs from an on-site power production facility, in that it is not constantly producing power.

695.3 Power Source(s) for Electric Motor-Driven Fire Pumps. Electric motor-driven fire pumps shall have a reliable source of power.

Informational Note: See Sections 9.3.2 and A.9.3.2 from NFPA 20-2013, *Standard for the Installation of Stationary Pumps for Fire Protection*, for guidance on the determination of power source reliability.

(A) Individual Sources. Where reliable, and where capable of carrying 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, the power source for an electric motor driven fire pump shall be one or more of the following.

(1) Electric Utility Service Connection. A fire pump shall be permitted to be supplied by a separate service, or from a connection located ahead of and not within the same cabinet, enclosure, vertical switchgear section, or vertical switchboard section as the service disconnecting means. The connection shall be located and arranged so as to minimize the possibility of damage by fire from within the premises and from exposing hazards. A tap ahead of the service disconnecting means shall comply with 230.82(5). The service equipment shall comply with the labeling requirements in 230.2 and the location requirements in 230.72(B). [20:9.2.2(1)]

(2) On-Site Power Production Facility. A fire pump shall be permitted to be supplied by an on-site power production facility. The source facility shall be located and protected to minimize the possibility of damage by fire. [20:9.2.2(3)]

(3) Dedicated Feeder. A dedicated feeder shall be permitted where it is derived from a service connection as described in 695.3(A)(1). [20:9.2.2(3)]

(B) Multiple Sources. If reliable power cannot be obtained from a source described in 695.3(A), power shall be supplied by one of the following: [20:9.3.2]

(1) Individual Sources. An approved combination of two or more of the sources from 695.3(A).

(2) Individual Source and On-site Standby Generator. An approved combination of one or more of the sources in 695.3(A) and an on-site standby generator complying with 695.3(D). [20:9.3.4]

Exception to (B)(1) and (B)(2): An alternate source of power shall not be required where a back-up engine-driven or back-up steam turbine-driven fire pump is installed. [20:9.3.3]

(C) Multibuilding Campus-Style Complexes. If the sources in 695.3(A) are not practicable and the installation is part of a multibuilding campus-style complex, feeder sources shall be permitted if approved by the authority having jurisdiction and installed in accordance with either (C)(1) and (C)(3) or (C)(2) and (C)(3).

(1) Feeder Sources. Two or more feeders shall be permitted as more than one power source if such feeders are connected to, or derived from, separate utility services. The connection(s), overcurrent protective device(s), and disconnecting means for such feeders shall meet the requirements of 695.4(B)(1) (b).

(2) Feeder and Alternate Source. A feeder shall be permitted as a normal source of power if an alternate source of power independent from the feeder is provided. The connection(s), overcurrent protective device(s), and disconnecting means for such feeders shall meet the requirements of 695.4(B)(1) (b).

(3) Selective Coordination. The overcurrent protective device(s) in each disconnecting means shall be selectively coordinated with any other supply-side overcurrent protective device(s).

(D) On-Site Standby Generator as Alternate Source. An on-site standby generator(s) used as an alternate source of power shall comply with (D)(1) through (D)(3). [20:9.6.2.1]

(1) Capacity. The generator shall have sufficient capacity to allow normal starting and running of the motor(s) driving the

fire pump(s) while supplying all other simultaneously operated load(s). [20:9.6.1.1]

Automatic shedding of one or more optional standby loads in order to comply with this capacity requirement shall be permitted.

(2) Connection. A tap ahead of the generator disconnecting means shall not be required. [20:9.6.1.2]

(3) Adjacent Disconnects. The requirements of 430.113 shall not apply.

(E) Arrangement. All power supplies shall be located and arranged to protect against damage by fire from within the premises and exposing hazards. [20:9.1.4]

Multiple power sources shall be arranged so that a fire at one source does not cause an interruption at the other source.

(F) Transfer of Power. Transfer of power to the fire pump controller between the individual source and one alternate source shall take place within the pump room. [20:9.6.4]

(G) Power Source Selection. Selection of power source shall be performed by a transfer switch listed for fire pump service. [20:10.8.1.3.1]

(H) Overcurrent Device Selection. An instantaneous trip circuit breaker shall be permitted in lieu of the overcurrent devices 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).

(I) Phase Converters. Phase converters shall not be permitted to be used for fire pump service. [20:9.1.7]

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.

(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: [20:9.1.2]

- (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.

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

(a) *Individual Sources.* Overcurrent protection for individual sources shall comply with 695.4(B)(2)(a)(1) or (2).

- (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 pressure maintenance pump motor(s) and the full-load current of all of the other pump motors and associated fire pump accessory equipment when connected to this power supply. 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). The requirement to carry the locked rotor currents indefinitely shall not apply to feeder overcurrent protective devices installed in accordance with 695.3(C). [20:9.2.3.4]
- (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).
 - b. The overcurrent protective device shall not open with a re-start transient of 24 times the full-load current of the fire pump motor(s).
 - c. The overcurrent protective device shall not open within 10 minutes at 300 percent of the full-load current of the fire pump motor(s).
 - d. The trip point for circuit breakers shall not be field adjustable. [20:9.2.3.4.1]
- (b) *On-Site Standby Generators.* Overcurrent protective devices between an on-site standby generator and a fire pump controller shall be selected and sized to allow for instantaneous pickup of the full pump room load, but shall not be larger than the value selected to comply with 430.62 to provide short-circuit protection only. [20:9.6.1.1]

(3) Disconnecting Means. All disconnecting devices that are unique to the fire pump loads shall comply with items (a) through (e).

(a) *Features and Location — Normal Power Source.* The disconnecting means for the normal power source shall comply with all of the following: [20:9.2.3.1]

- (1) Be identified as suitable for use as service equipment.
- (2) Be lockable in the closed position. The provision for locking or adding a lock to the disconnecting means shall be installed on or at the switch or circuit breaker used as the disconnecting means and shall remain in place with or without the lock installed.
- (3) Not be located within the same enclosure, panelboard, switchboard, switchgear, or motor control center, with or without common bus, that supplies loads other than the fire pump.
- (4) Be located sufficiently remote from other building or other fire pump source disconnecting means such that inadvertent operation at the same time would be unlikely.

Exception to 695.4(B)(3)(a): For a multibuilding campus-style complex(s) installed under the provisions of 695.3(C), only the requirements in 695.4(B)(3)(a)(2) shall apply for normal power source disconnects.

(b) *Features and Location — On-Site Standby Generator.* The disconnecting means for an on-site standby generator(s) used as the alternate power source shall be installed in accordance

with 700.10(B)(5) for emergency circuits and shall be lockable in the closed position. The provision for locking or adding a lock to the disconnecting means shall be installed on or at the switch or circuit breaker used as the disconnecting means and shall remain in place with or without the lock installed.

(c) *Disconnect Marking.* The disconnecting means shall be marked “Fire Pump Disconnecting Means.” The letters shall be at least 25 mm (1 in.) in height, and they shall be visible without opening enclosure doors or covers. [20:9.2.3.1(5)]

(d) *Controller Marking.* A placard shall be placed adjacent to the fire pump controller, stating the location of this disconnecting means and the location of the key (if the disconnecting means is locked). [20:9.2.3.2]

(e) *Supervision.* The disconnecting means shall be supervised in the closed position by one of the following methods:

- (1) Central station, proprietary, or remote station signal device
 - (2) Local signaling service that causes the sounding of an audible signal at a constantly attended point
 - (3) Locking the disconnecting means in the closed position
- (f) Sealing of disconnecting means and approved weekly recorded inspections when the disconnecting means are located within fenced enclosures or in buildings under the control of the owner [20:9.2.3.3]

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).

(C) Feeder Source. Where a feeder source is provided in accordance with 695.3(C), transformers supplying the fire pump system shall be permitted to supply other loads. All other loads shall be calculated in accordance with Article 220, including demand factors as applicable.

(1) Size. Transformers 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 remaining load supplied by the transformer.

(2) Overcurrent Protection. The transformer size, the feeder size, and the overcurrent protective device(s) shall be coordinated such that overcurrent protection is provided for the transformer in accordance with 450.3 and for the feeder in accordance with 215.3, and such that the overcurrent protec-

tive device(s) is selected or set to carry indefinitely the sum of the locked-rotor current of the fire pump motor(s), the pressure maintenance pump motor(s), the full-load current of the associated fire pump accessory equipment, and 100 percent of the remaining loads supplied by the transformer. 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).

695.6 Power Wiring. Power circuits and wiring methods shall comply with the requirements in 695.6(A) through (J), and as permitted in 230.90(A), Exception No. 4; 230.94, Exception No. 4; 240.13; 230.208; 240.4(A); and 430.31.

(A) Supply Conductors.

(1) Services and On-Site Power Production Facilities. Service conductors and conductors supplied by on-site power production facilities shall be physically routed outside a building(s) and shall be installed as service-entrance conductors in accordance with 230.6, 230.9, and Parts III and IV of Article 230. Where supply conductors cannot be physically routed outside of buildings, the conductors shall be permitted to be routed through the building(s) where installed in accordance with 230.6(1) or (2).

(2) Feeders. Fire pump supply conductors on the load side of the final disconnecting means and overcurrent device(s) permitted by 695.4(B), or conductors that connect directly to an on-site standby generator, shall comply with all of the following:

- (a) *Independent Routing.* The conductors shall be kept entirely independent of all other wiring.
- (b) *Associated Fire Pump Loads.* The conductors shall supply only loads that are directly associated with the fire pump system.
- (c) *Protection from Potential Damage.* The conductors shall be protected from potential damage by fire, structural failure, or operational accident.
- (d) *Inside of a Building.* Where routed through a building, the conductors shall be protected from fire for 2 hours using one of the following methods:

- (1) The cable or raceway is encased in a minimum 50 mm (2 in.) of concrete.
- (2) The cable or raceway is a listed fire-resistive cable system.

Informational Note 1: Fire-resistive cables are tested to ANSI/UL 2196, *Tests for Fire Resistive Cables*.

Informational Note 2: The listing organization provides information for fire-resistive cable systems on proper installation requirements to maintain the fire rating.

- (3) The cable or raceway is a listed electrical circuit protective system.

Informational Note 1: Electrical circuit protective systems could include, but are not limited to, thermal barriers or a protective shaft and are tested in accordance with UL 1724, *Fire Tests for Electrical Circuit Protection Systems*.

Informational Note 2: The listing organization provides information for electrical circuit protective systems on proper installation requirements to maintain the fire rating.

Exception to (A)(2)(d): The supply conductors located in the electrical equipment room where they originate and in the fire pump room shall not be required to have the minimum 2-hour fire separation or fire-resistance rating, unless otherwise required by 700.10(D) of this Code.

(B) Conductor Size.

(1) Fire Pump Motors and Other Equipment. Conductors supplying a fire pump motor(s), pressure maintenance pumps, and associated fire pump accessory equipment shall have a rating not less than 125 percent of the sum of the fire pump motor(s) and pressure maintenance motor(s) full-load current(s), and 100 percent of the associated fire pump accessory equipment.

(2) Fire Pump Motors Only. Conductors supplying only a fire pump motor shall have a minimum ampacity in accordance with 430.22 and shall comply with the voltage drop requirements in 695.7.

(C) Overload Protection. Power circuits shall not have automatic protection against overloads. Except for protection of transformer primaries provided in 695.5(C)(2), branch-circuit and feeder conductors shall be protected against short circuit only. Where a tap is made to supply a fire pump, the wiring shall be treated as service conductors in accordance with 230.6. The applicable distance and size restrictions in 240.21 shall not apply.

Exception No. 1: Conductors between storage batteries and the engine shall not require overcurrent protection or disconnecting means.

Exception No. 2: For an on-site standby generator(s) rated to produce continuous current in excess of 225 percent of the full-load amperes of the fire pump motor, the conductors between the on-site generator(s) and the combination fire pump transfer switch controller or separately mounted transfer switch shall be installed in accordance with 695.6(A)(2).

The protection provided shall be in accordance with the short-circuit current rating of the combination fire pump transfer switch controller or separately mounted transfer switch.

(D) Pump Wiring. All wiring from the controllers to the pump motors shall be in rigid metal conduit, intermediate metal conduit, electrical metallic tubing, liquidtight flexible metal conduit, or liquidtight flexible nonmetallic conduit, listed Type MC cable with an impervious covering, or Type MI cable. Electrical connections at motor terminal boxes shall be made with a listed means of connection. Twist-on, insulation-piercing-type, and soldered wire connectors shall not be permitted to be used for this purpose.

(E) Loads Supplied by Controllers and Transfer Switches. A fire pump controller and fire pump power transfer switch, if provided, shall not serve any load other than the fire pump for which it is intended.

(F) Mechanical Protection. All wiring from engine controllers and batteries shall be protected against physical damage and shall be installed in accordance with the controller and engine manufacturer's instructions.

(G) Ground-Fault Protection of Equipment. Ground-fault protection of equipment shall not be installed in any fire pump power circuit. [20:9.1.8.1]

(H) Listed Electrical Circuit Protective System to Controller Wiring. Electrical circuit protective system installation shall comply with any restrictions provided in the listing of the electrical circuit protective system used, and the following also shall apply:

- (1) A junction box shall be installed ahead of the fire pump controller a minimum of 300 mm (12 in.) beyond the fire-rated wall or floor bounding the fire zone.

- (2) Where required by the manufacturer of a listed electrical circuit protective system or by the listing, or as required elsewhere in this *Code*, the raceway between a junction box and the fire pump controller shall be sealed at the junction box end as required and in accordance with the instructions of the manufacturer. [20:9.8.2]
- (3) Standard wiring between the junction box and the controller shall be permitted. [20:9.8.3]

(I) Junction Boxes. Where fire pump wiring to or from a fire pump controller is routed through a junction box, the following requirements shall be met:

- (1) The junction box shall be securely mounted. [20:9.7(1)]
- (2) Mounting and installing of a junction box shall not violate the enclosure type rating of the fire pump controller(s). [20:9.7(2)]
- (3) Mounting and installing of a junction box shall not violate the integrity of the fire pump controller(s) and shall not affect the short-circuit rating of the controller(s). [20:9.7(3)]
- (4) As a minimum, a Type 2, drip-proof enclosure (junction box) shall be used where installed in the fire pump room. The enclosure shall be listed to match the fire pump controller enclosure type rating. [20:9.7(4)]
- (5) Terminals, junction blocks, wire connectors, and splices, where used, shall be listed. [20:9.7(5)]
- (6) A fire pump controller or fire pump power transfer switch, where provided, shall not be used as a junction box to supply other equipment, including a pressure maintenance (jockey) pump(s).

(J) Raceway Terminations. Where raceways are terminated at a fire pump controller, the following requirements shall be met: [20:9.9]

- (1) Listed conduit hubs shall be used. [20:9.9.1]
- (2) The type rating of the conduit hub(s) shall be at least equal to that of the fire pump controller. [20:9.9.2]
- (3) The installation instructions of the manufacturer of the fire pump controller shall be followed. [20:9.9.3]
- (4) Alterations to the fire pump controller, other than conduit entry as allowed elsewhere in this *Code*, shall be approved by the authority having jurisdiction. [20:9.9.4]

695.7 Voltage Drop.

(A) Starting. The voltage at the fire pump controller line terminals shall not drop more than 15 percent below normal (controller-rated voltage) under motor starting conditions.

Exception: This limitation shall not apply for emergency run mechanical starting. [20: 9.4.2]

(B) Running. The voltage at the load terminals of the fire pump controller shall not drop more than 5 percent below the voltage rating of the motor connected to those terminals when the motor is operating at 115 percent of the full-load current rating of the motor.

695.10 Listed Equipment. Diesel engine fire pump controllers, electric fire pump controllers, electric motors, fire pump power transfer switches, foam pump controllers, and limited service controllers shall be listed for fire pump service. [20:9.5.1.1, 10.1.2.1, 12.1.3.1]

695.12 Equipment Location.

(A) Controllers and Transfer Switches. Electric motor-driven fire pump controllers and power transfer switches shall be located as close as practicable to, and within sight of, the motors that they control.

(B) Engine-Drive Controllers. Engine-drive fire pump controllers shall be located as close as is practical to, and within sight of, the engines that they control.

(C) Storage Batteries. Storage batteries for fire pump engine drives shall be supported above the floor, secured against displacement, and located where they are not subject to physical damage, flooding with water, excessive temperature, or excessive vibration.

(D) Energized Equipment. All energized equipment parts shall be located at least 300 mm (12 in.) above the floor level.

(E) Protection Against Pump Water. Fire pump controller and power transfer switches shall be located or protected so that they are not damaged by water escaping from pumps or pump connections.

(F) Mounting. All fire pump control equipment shall be mounted in a substantial manner on noncombustible supporting structures.

695.14 Control Wiring.

(A) Control Circuit Failures. External control circuits that extend outside the fire pump room shall be arranged so that failure of any external circuit (open or short circuit) shall not prevent the operation of a pump(s) from all other internal or external means. Breakage, disconnecting, shorting of the wires, or loss of power to these circuits could cause continuous running of the fire pump but shall not prevent the controller(s) from starting the fire pump(s) due to causes other than these external control circuits. All control conductors within the fire pump room that are not fault tolerant shall be protected against physical damage. [20:10.5.2.6, 12.5.2.5]

(B) Sensor Functioning. No undervoltage, phase-loss, frequency-sensitive, or other sensor(s) shall be installed that automatically or manually prohibits actuation of the motor contactor. [20:10.4.5.6]

Exception: A phase-loss sensor(s) shall be permitted only as a part of a listed fire pump controller.

(C) Remote Device(s). No remote device(s) shall be installed that will prevent automatic operation of the transfer switch. [20:10.8.1.3]

(D) Engine-Drive Control Wiring. All wiring between the controller and the diesel engine shall be stranded and sized to continuously carry the charging or control currents as required by the controller manufacturer. Such wiring shall be protected against physical damage. Controller manufacturer's specifications for distance and wire size shall be followed. [20:12.3.5.1]

(E) Electric Fire Pump Control Wiring Methods. All electric motor-driven fire pump control wiring shall be in rigid metal conduit, intermediate metal conduit, liquidtight flexible metal conduit, electrical metallic tubing, liquidtight flexible nonmetallic conduit, listed Type MC cable with an impervious covering, or Type MI cable.

(F) Generator Control Wiring Methods. Control conductors installed between the fire pump power transfer switch and the standby generator supplying the fire pump during normal power loss shall be kept entirely independent of all other wiring. The integrity of the generator control wiring shall be continuously monitored. Loss of integrity of the remote start circuit(s) shall initiate visual and audible annunciation of generator malfunction at the generator local and remote annunciator(s) and start the generator(s).

Informational Note: See NFPA 20-2013, *Standard for the Installation of Stationary Pumps for Fire Protection*, Section 3.3.7.2, for more information on fault-tolerant external control circuits.

The control conductors shall be protected to resist potential damage by fire or structural failure. They shall be permitted to be routed through a building(s) using one of the following methods:

- (1) Be encased in a minimum 50 mm (2 in.) of concrete.

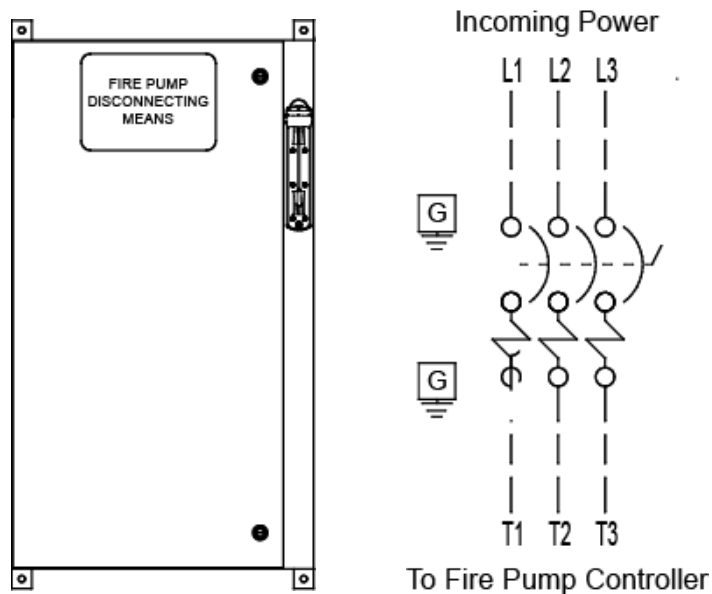
- (2) Be protected by a fire-rated assembly listed to achieve a minimum fire rating of 2 hours and dedicated to the fire pump circuits.
- (3) Be a listed electrical circuit protective system with a minimum 2-hour fire rating. The installation shall comply with any restrictions provided in the listing of the electrical circuit protective system used.

Informational Note: The listing organization provides information for electrical circuit protective systems on proper installation requirements to maintain the fire rating.

N 695.15 Surge Protection. A listed surge protection device shall be installed in or on the fire pump controller.

Electric Fire Pump Controller – Upstream Disconnecting Means

Project Information



DRAWINGS INCLUDED IN THIS PACKAGE ARE FOR STANDARD CONTROLLERS. ACTUAL "AS BUILT" DRAWINGS MAY DIFFER FROM THOSE SHOWN HERE.

Firetrol, Inc.

3412 Apex Peakway
Apex, North Carolina 27502
P +1 919 460 5200
F +1 919 460 5250

www.firetrol.com

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UL Listed Disconnecting Means for Use With Electric Fire Pump Controllers

FTA990

Specifications

1.0 Disconnecting Means

The UL Listed disconnecting means shall be a model FTA990, manufactured by Firetrol, Inc. The unit shall be factory assembled and tested. The FTA990 shall be specifically designed to assure complete upstream overcurrent protection coordination with the electric fire pump controller. A flange mounted disconnect handle lockable in the closed (ON) position shall be standard.

1.1 Standards, Listings & Approvals

The FTA990 shall be:

- Suitable for use as service equipment
- UL Listed for fire pump service per:
 - NFPA70 (*National Electrical Code*) 695.4(B)(2)(a)(2) - Normal Power Circuit
 - NFPA70 (*National Electrical Code*) 695.4(B)(3)(c) - Markings
 - NFPA70 (*National Electrical Code*) 695.3(F)(2) - Alternate Power Circuit
- NFPA20 (*Standard for the Installation of Stationary Pumps for Fire Protection*) 9.2.3.4.1

1.2 Enclosure

The components shall be housed in a NEMA Type 2 (IEC IP22) enclosure.

1.3 Overcurrent Protection Characteristics:

- The protective device shall NOT open within 2 minutes at 600% of the full load current of the fire pump motor(s).
- The protective device shall NOT open with a re-start transient of 24 times the full load current of the fire pump motor(s).
- The protective device shall NOT open within 10 minutes at 300% of the full load current of the fire pump motor(s).
- The trip point for circuit breaker shall NOT be field adjustable.

3412 Apex Peakway
Apex, North Carolina 27502
P +1 919 460 5200
F +1 919 460 5250
www.firetrol.com

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Publication SP990-01

Electric Fire Pump Controllers – Upstream Disconnecting Means



Standard Features—The following are included as standard with each controller:

- Suitable for use as service equipment
- NEMA Type 2 (IP22) Enclosure
- Flange mounted disconnect handle lockable in the “ON” position

Overcurrent Protection Characteristics:

- The protective device shall NOT open within 2 minutes at 600% of the full load current of the fire pump motor(s).
- The protective device shall NOT open with a re-start transient of 24 times the full load current of the fire pump motor(s).
- The protective device shall NOT open within 10 minutes at 300% of the full load current of the fire pump motor(s).
- The trip point for circuit breaker shall NOT be field adjustable.

Description—Firetrol FTA990 Disconnecting Devices provide a UL Listed means of disconnecting and isolating the fire pump controller from the incoming power source. The FTA990 gives overcurrent protection coordination upstream of the fire pump controller.

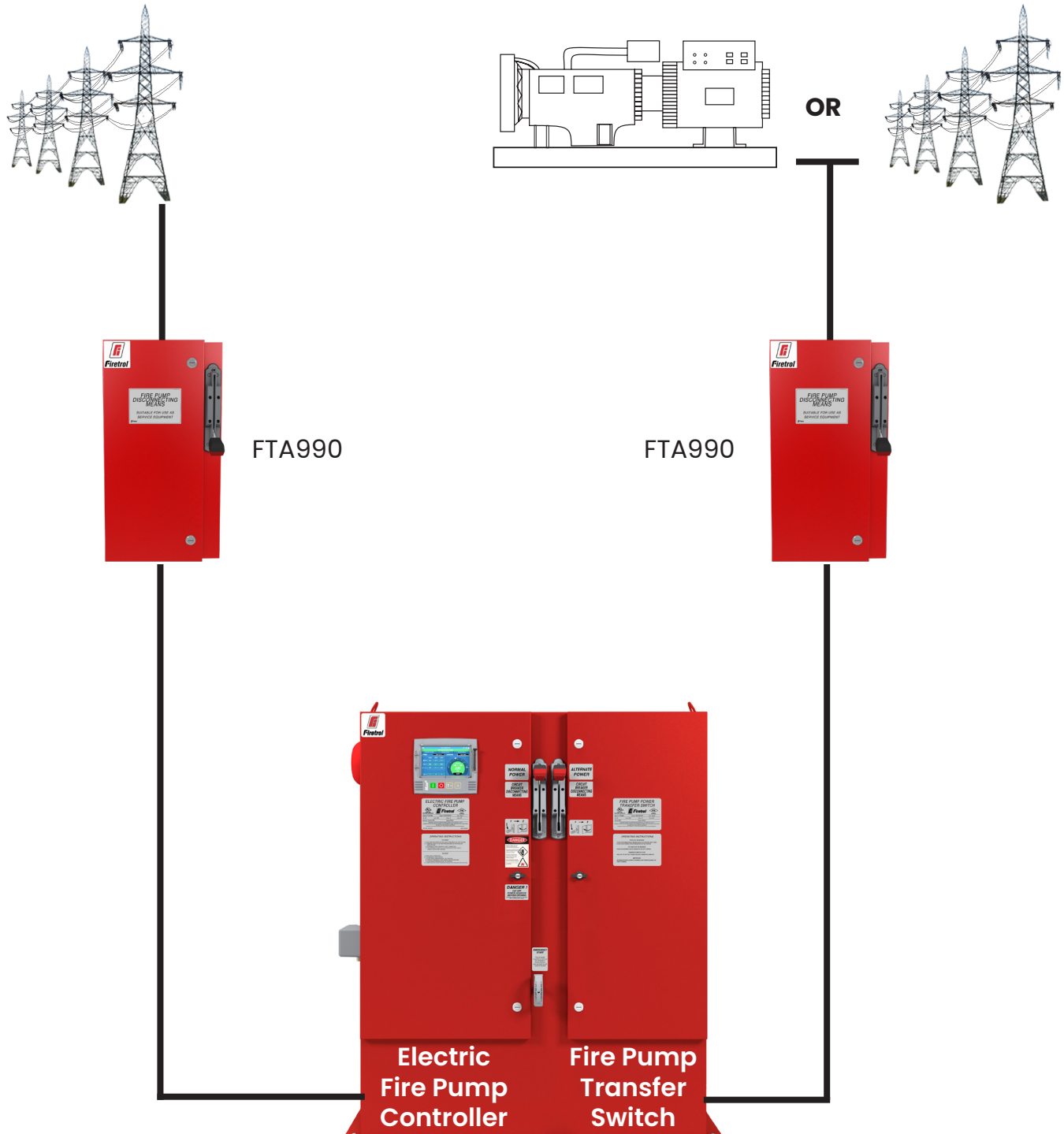
Approvals

- UL Listed for fire pump service per:
 - NFPA70 (*National Electrical Code*) 695.4(B)(2)(a)(2) - Normal Power Circuit
 - NFPA70 (*National Electrical Code*) 695.4(B)(3)(c) - Markings
 - NFPA70 (*National Electrical Code*) 695.3(F)(2) - Alternate Power Circuit
- NFPA20 (*Standard for the Installation of Stationary Pumps for Fire Protection*) 9.2.3.4.1

For Model Number Information and Options & Modifications see Publication SD990-01

NORMAL POWER

EMERGENCY POWER



Firetrol, Inc.

3412 Apex Peakway
Apex, North Carolina 27502
P +1 919 460 5200
F +1 919 460 5250
www.firetrol.com

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Publication PD990-01

Model Number Selection Guide



FTA990

Electric Fire Pump Controllers - Upstream Disconnecting Means

ELECTRIC FIRE PUMP CONTROLLER UPSTREAM DISCONNECTING MEANS

Example: **FTA990-N100B-xxx**

Controller Model Number

Short Circuit Current Rating

200 - 208V

Standard SCCR

5-150 HP - "N" 50-65kA

200 HP - "N" 65kA@208V only

High SCCR

5-60 HP - "P" 150kA

220 - 240V

Standard SCCR

5-200 HP - "N" 50-65kA

250 HP - "N" 50kA

High SCCR

5-75 HP - "P" 150kA

380 - 415V

Standard SCCR

5-7.5 HP - "M" 25kA

10-350 HP - "N" 50-65kA

400-450 HP - "N" 50kA

High SCCR

5-125 HP - "P" 150kA

440 - 480V

Standard SCCR

5-7.5 HP - "M" 25kA

10-350 HP - "N" 50-65kA

400-450 HP - "N" 50kA

High SCCR

5-125 HP - "P" 150kA

600V

Standard SCCR

5-40 HP - "M" 18kA

50-75 HP - "N" 22kA

100-250 HP - "N" 25kA

300-450 HP - "P" 50kA

High SCCR

5-200 HP - "P" 100kA

Options

-MZN - Neutral Lug, Service Entrance, Non-Insulated, Bonded to Enclosure

Three Phase Voltage

A - 220-240 Volt, 60 Hertz (230 V)

AZ - 220-230 Volt, 50 Hertz

B - 440-480 Volt, 60 Hertz (460 V)

BZ - 415 Volt, 50 Hertz

C - 550-600 Volt, 60 Hertz (575 V)

F - 380 Volt, 60 Hertz

FZ - 380 Volt, 50 Hertz

FF - 400 Volt, 60 Hertz

FX - 400 Volt, 50 Hertz

H - 208 Volt, 60 Hertz

HH - 200 Volt, 60 Hertz

Horsepower Rating

03 - 3 HP

05 - 5 HP

07 - 7 1/2 HP

10 - 10 HP

15 - 15 HP

20 - 20 HP

25 - 25 HP

30 - 30 HP

40 - 40 HP

50 - 50 HP

60 - 60 HP

75 - 75 HP

100 - 100 HP

125 - 125 HP

150 - 150 HP

200 - 200 HP

250 - 250 HP

300 - 300 HP

350 - 350 HP

400 - 400 HP

450 - 450 HP

500 - 500 HP

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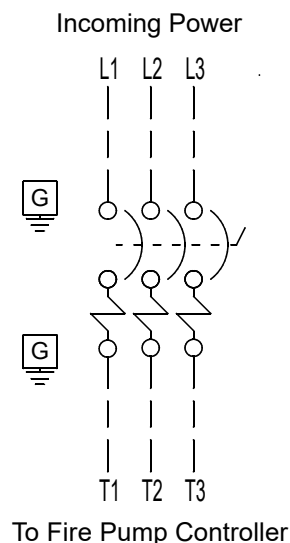
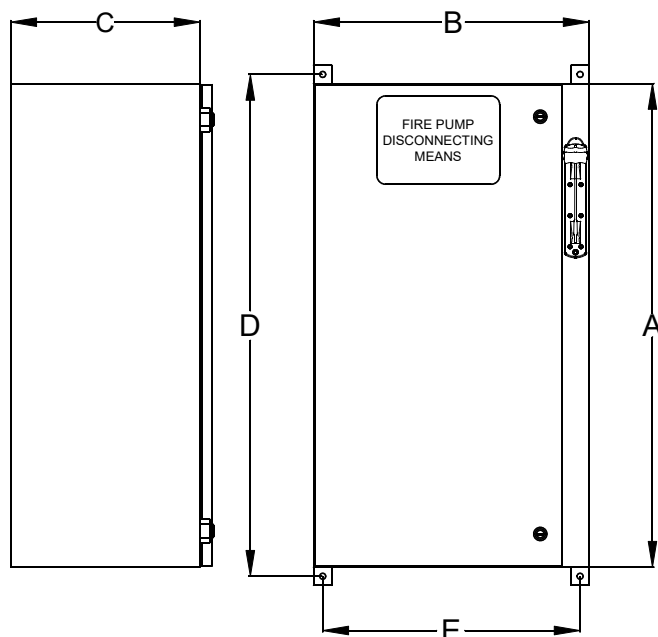
Publication SD990-01

Dimensions, Field Connections & Wiring Information



FTA990

Electric Fire Pump Controllers - Upstream Disconnecting Means





Notes:

- NEMA 2 Assembly
- Paint : Textured Red RAL 3002.
- All Dimensions are in Inches.
- Use Watertight Conduit and Connector Only.
- Protect Equipment Against Drilling Chips.

Drawing for information only.
Manufacturer reserves the right to modify this drawing without notice.
Contact manufacturer for "As Built" drawing.

Terminals (L1,L2,L3,T1,T2,T3)						Wire (Lug) Size (Copper Only)	Torque	Ground Lug Size (Copper Only)	Dimensions	Bending Space
Maximum Motor Horsepower									A x B x C x D x E	
200V	208V	220-240V	380-415V	440-480V	575-600V					
5-10 HP	5-10 HP	5-15 HP	5-25 HP	5-30 HP	5-40 HP	8-1/0 AWG	4-8 Nm (3-6 ft-lb)	6 AWG	22 x 12 x 11 x 23 ½ x 10½	5"
15-25 HP	15-25 HP	20-30 HP	30-50 HP	40-60 HP	50-75 HP	4-1/0 AWG	30 Nm (22.1 ft-lb)	4 AWG	26 x 14 x 11 x 27 ½ x 12½	5"
30-40 HP	30-40 HP	40-50 HP	60-75 HP	75-100 HP	100-125 HP	1/0 AWG-250 kcmil	34 Nm (25 ft-lb)	4 AWG	28 x 16 x 11 x 29 ½ x 14½	8"
50-60 HP	50-60 HP	60-75 HP	100-125 HP	125-150 HP	150-200 HP	3/0 AWG-250 kcmil	34 Nm (25 ft-lb)	4 AWG	28 x 16 x 11 x 29 ½ x 14½	8"
75 HP	75 HP	100 HP	150 HP	200 HP	250 HP	300-500 kcmil	43 Nm (31.7 ft-lb)	4 AWG	40 x 18 x 11 x 41 ½ x 16½	12"
100-150 HP	100-150 HP	125-150 HP	200-250 HP	250-350 HP	300-450 HP	2x(4/0 AWG-500 kcmil)	42 Nm (31 ft-lb)	3/0 AWG	40 x 18 x 11 x 41 ½ x 16½	12"
--	200 HP	200 HP	300-350 HP	400-450 HP	500 HP	TBD Consult Factory	TBD Consult Factory	TBD Consult Factory	TBD Consult Factory	TBD Consult Factory
--	--	250 HP	400-450 HP	500 HP	--	TBD Consult Factory	TBD Consult Factory	TBD Consult Factory	TBD Consult Factory	TBD Consult Factory

 THIRD ANGLE PROJECTION	SIZE	A	BY	DATE	 Firetrol, Inc. © Firetrol, Inc. Not for construction. Subject to change without notice.	REVISION DESCRIPTION				REV	ECN NO	BY	APP	DATE
	DRAWN BY	TEF	09-30-20	DIMENSIONS, FIELD CONN., WIRING INFO		FTA990		DRAWING NUMBER						
	FINAL APPROVAL	TEF	09-30-20	UL LISTED DISCONNECTING MEANS FOR FIRE PUMP APPLICATIONS				WS990-01						
								DWG REV -		ECN NO -		SHEET 1 OF 1		

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Fire pump disconnect.

 Andy1099 ·  Feb 6, 2018



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 Not open for further replies.

A

Andy1099

Member

Feb 6, 2018

 #1

Fire pump disconnect.

A disconnect is being installed between the fire pump controller and the power source (a utility transformer) as allowed by NEC 695.4(B)(1). The code reads "A single disconnecting means and associated overcurrent protective devices shall be permitted..." Does this requirement mean that a disconnect ahead of the controller must have overcurrent protection? If overcurrent protection is not required, is 125% the size of the full load current the size for the disconnect rating and not locked rotor current like it would be for overcurrent protection?



gadfly56

Senior Member

Feb 6, 2018

 #2

Andy1099 said: 

Fire pump disconnect.

A disconnect is being installed between the fire pump controller and the power source (a utility transformer) as allowed by NEC 695.4(B)(1). The code reads "A single disconnecting means and associated overcurrent protective devices shall be permitted..." Does this requirement mean that a disconnect ahead of the controller must have overcurrent protection? If overcurrent protection is not required, is 125% the size of the full load current the size for the disconnect rating and not locked rotor current like it would be for overcurrent protection?

The disconnect doesn't have to be fused, but it does have to be rated for the LRC. IFF it is fused, then the



necGuru

Member

Feb 6, 2018

 #3

Most people that design and/or install a disconnect for a fire pump will do it incorrectly and then get burned by the inspector. Why do you need this disconnect? Most of the time, a fire pump service doesn't need a disconnect. If you choose to use one it must be:

- SUSE (Suitable for use as service equipment)
- Lockable in the closed position (this would be the **"ON"** position) and no, you can't drill your own hole for this purpose.
- Independent and sufficiently far away from other service disconnects to make it obvious that this is an entirely different animal.
- Marked with 1-inch lettering that states, FIRE PUMP DISCONNECTING MEANS.
- Signage placed at the controller stating the location of the fire pump disconnecting means.

As the previous person mentioned, if there is overcurrent protection it must be rated at locked-rotor. The value comes out to be very LARGE and most architects and electrical engineers usually get this value wrong on the plan review. By "most" I would estimate that more than 50% of plans are incorrect. For more information, visit NFPA-20. It is very interesting.

 Not open for further replies.

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Model OPD

UL Listed Disconnecting Device For UL Listed and FM Approved Electric Fire Pump Applications

Main Characteristics

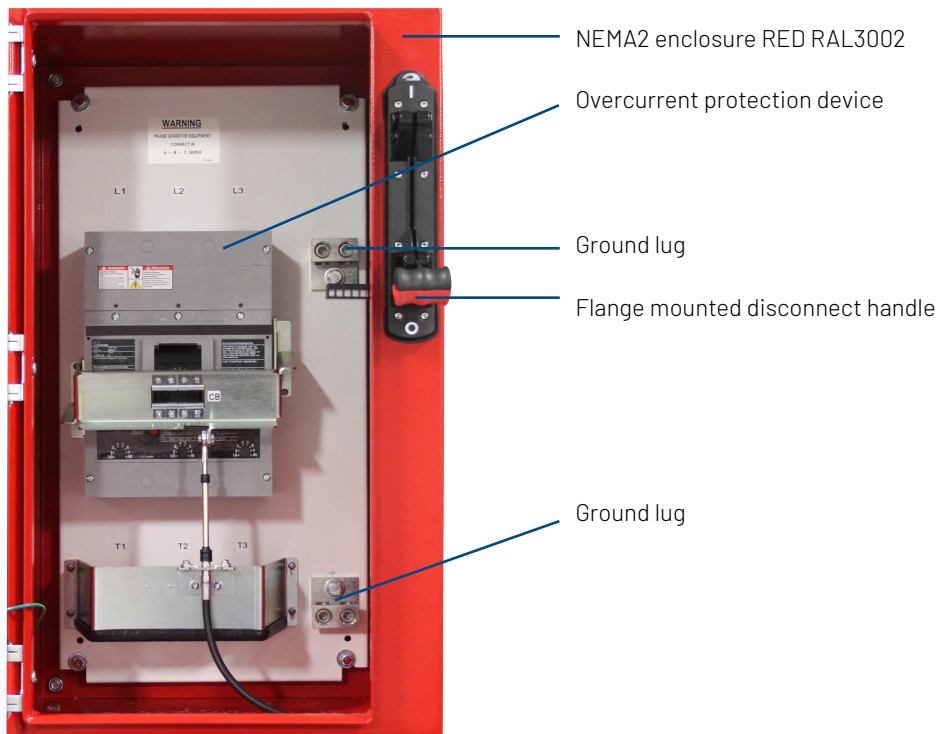
- UL Listed means of disconnecting the fire pump controller from incoming power
- Completely removes the risk of arc flash in the fire pump controller
- Complete overcurrent protection coordination upstream of the fire pump controller
- Acceptable for installation in the U.S.A
 - UL Listed for fire pump service as per
 - NFPA70 (NEC): 695.4 (B)(2)(a)(2)
 - NFPA20 9.2.3.4.1
 - Alternate Power circuit
 - NFPA70 (NEC): 695.3 (F)(2)
- Acceptable for installation in Canada as per
 - Normal power circuit: CEC 32.206 (5)
 - Alternate power circuit: recommended and acceptable alternative to CEC 32.206 (4)

Standard Features

- Suitable as service equipment
- NEMA 2 enclosure
- Flange mounted disconnect handle lockable in the ON (closed) position as per NFPA70 (NEC) 695.4 (B)(3)(a)(2)
- Disconnect markings as per NFPA70 (NEC) 695.4 (B)(3)(c)



The Tornatech Model OPD electric fire pump disconnecting device provides a UL listed means of disconnecting and consequently isolating the fire pump controller from incoming power. It also assures complete overcurrent protection coordination upstream of the fire pump controller. The selection of the overcurrent protective device is based on the voltage and horsepower of the electric fire pump motor and the requirements of NFPA70 (NEC) 695.4 (B)(2)(a)(2), NFPA20 9.2.3.4.1 and as a recommended and acceptable alternative for CEC 32-206 (4) and (5).



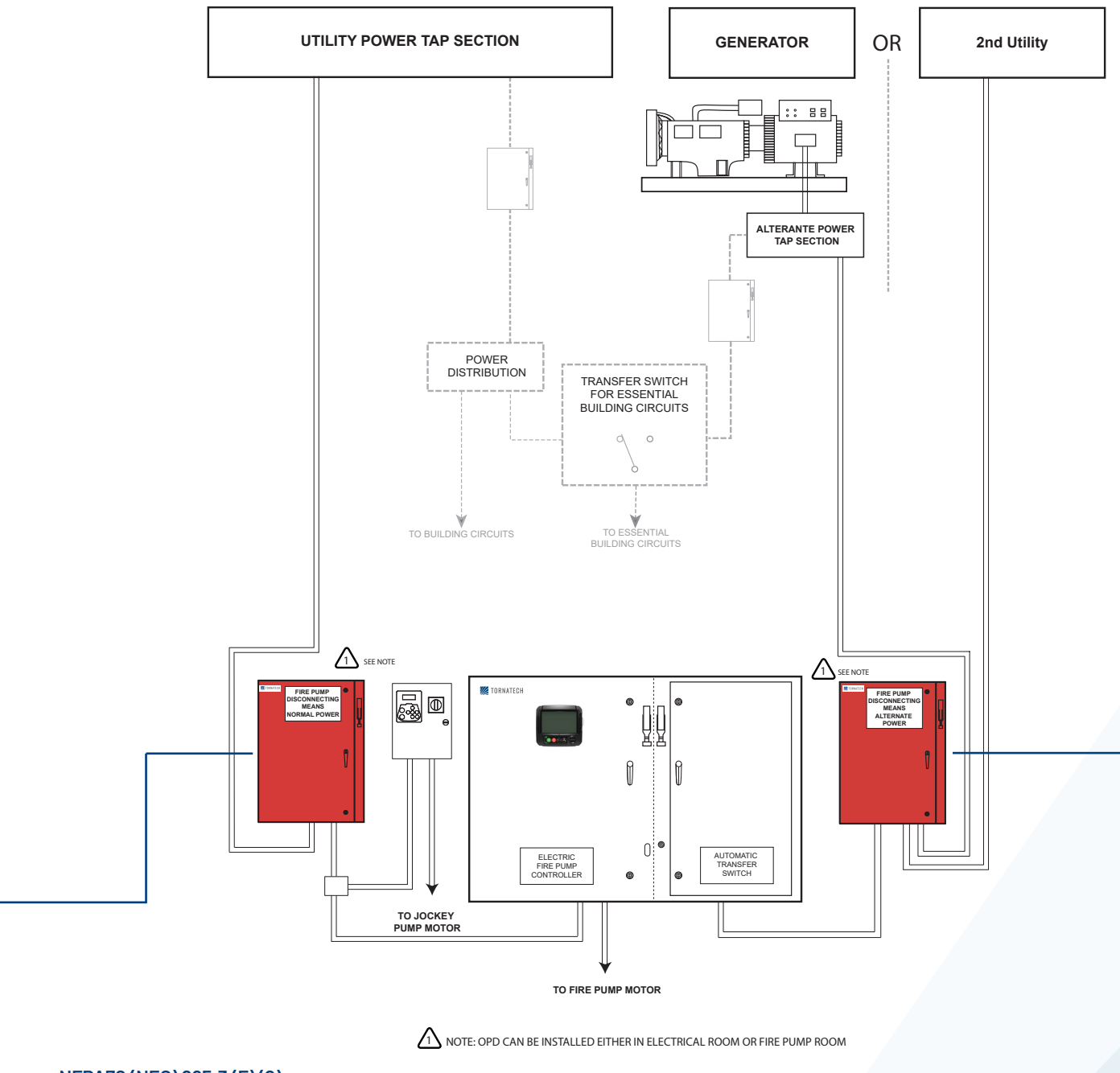
NFPA70 (NEC) 695.4 (B)(2)(a)(2)

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).
- b. The overcurrent protective device shall not open with a re-start transient of 24 times the full-load current of the fire pump motor(s).
- c. The overcurrent protective device shall not open within 10 minutes at 300 percent of the full-load current of the fire pump motor(s).
- d. The trip point for circuit breakers shall not be field adjustable.

OR

Recommended and acceptable alternative to: **CEC 32-206 (5)** Where the circuit breaker conforming to this rule is installed in a normal supply circuit upstream of the fire pump controller, the rating or setting of the circuit breaker shall be not less than the overcurrent protection that is provided integral with the fire pump controller



NFPA70 (NEC) 695.3 (F) (2)

Overcurrent Device Selection

An instantaneous trip circuit breaker shall be permitted in lieu of the overcurrent devices specified in **695.4 (B) (2) (a) (1)**, provided that it is part of a transfer switch assembly for a fire pump service that complies with **695.4 (B) (2) (a) (2)**.

OR

Recommended and acceptable alternative to: **CEC 32.206 (4)** Where the circuit breaker conforming to this Rule is installed in an emergency supply circuit between the emergency power source and the fire pump transfer switch, the rating or setting of the circuit breaker shall comply with Rule 28-200.

HOW TO ORDER: OPD - V / HP / Ph / Hz
Ex.: OPD - 208 / 10 / 3 / 60

AMERICAS
Tornatech Inc.
Head Office
Laval, Quebec, Canada
Tel: + 1 514 334 0523
Toll free: + 1 800 363 8448

EUROPE
Tornatech Europe SPRL
Wavre, Belgium
Tel: + 32 (0) 10 84 40 01

MIDDLE EAST
Tornatech FZE
Dubai, United Arab Emirates
Tel: + 971 (0) 4 887 0615

ASIA
Tornatech Pte Ltd.
Singapore
Tel: + 65 6795 8114
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Overcurrent Protection, Disconnecting Means and Mo

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By [George W. Flach \(/contributing-authors/george-w-flach\)](/contributing-authors/george-w-flach)

Disconnecting means

Q: Disconnecting means for circuits supplied by a generator are required where the circuits enter a building or structure. Are these disconnects from an outdoor generator required to meet the rules in Article 225? Is there a maximum number of disconnects permitted?

A: An outdoor generator and its wiring must satisfy parts of Article 445—Generators and Article 225—Outside Branch Circuits and Feeders. It is assumed the generator will supply one or more of the loads mentioned in 225.26(A).

The maximum number of disconnects is covered by 225.33(A) and reads like this:

“(A) General. The disconnecting means for each supply permitted by 225.30 shall consist of not more than six switches or six circuit breakers mounted in a single enclosure in a group of separate enclosures, or in or on a switchboard. There shall be no more than six disconnects per supply grouped in any one location.”

The locations of these disconnects must comply with 225.32 and the exceptions require the disconnecting means to be readily accessible and located nearest the point of entrance of the conductors. Where this requirement cannot be met, they must be encased in at least 2 inches of concrete or comply with one of the other methods mentioned in 230.6.

Overcurrent protection for the generator must comply with 445.12; however, overcurrent protection is not required if the authority having jurisdiction determines that the generator is vital to the operation of the electrical system and the generator should operate to failure to prevent a greater hazard to persons. In this case overload sensing devices are permitted to be connected to an alarm that is supervised by authorized personnel instead of disconnecting the generator.

Circuits that supply or pass through a building(s) must be provided with disconnecting means that are marked “Suitable for Use as Service Equipment” to satisfy 225.36. A generator that supplies one or more of the following: a fire pump, emergency loads, legally required standby loads, and interconnected power production systems must also meet the additional requirements that are mentioned in Articles 695, 700, 701 and 705.

Fire pump overcurrent

Q: I did the wiring for a 75-horsepower, 480-volt, three-phase fire pump motor with a nameplate full-load current rating of 94 amperes. The feeder conductors to the fire pump are 1 AWG copper with THWN insulation in 1.25-inch rigid metal conduit and liquid-tight flexible metal conduit. Feeder conductors are protected by 100-ampere fuses in a 400-ampere discor

Related Video



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2021 NFPA 70E Major Changes
(<https://www.ecmag.com/live/2021-nfpa-70e-major-changes>)

Jim Phillips gives a rundown of the major changes for the 2021 NFPA 70E

job down with this comment: “Feeder overcurrent protection must be increased to 600-ampere.” I followed the rules in 430.52 and Table 430.52 to size the overcurrent protection, why should the overcurrent protection be increased to 600 amperes?

A: Fire pump motors must be installed to comply with Article 695—Fire Pumps. These requirements modify the rules in Article 430.

Where the fire pump controller or fire pump transfer switch is not supplied directly from the service, overcurrent devices are permitted, provided that they are selected or set to carry locked-rotor current of the fire pump motor indefinitely.

There is a table of locked rotor currents for various motor horsepower in NFPA 20-2003, “Standard for the Installation of Stationary Pumps for Fire Protection,” that is within one or two amperes of the values for every horsepower shown in Table 430.251(B) in the National Electrical Code (NEC). The intent of this requirement is to allow the motor to start under very severe starting conditions. The fire pump controller also has unique features. Among other things, the controller cannot open the branch circuit to the fire pump in less than 8 seconds and must open the circuit in not more than 30 seconds at 300 percent of motor full-load current.

According to Table 430.251(B) the locked rotor-current for a 75-horsepower, 460-volt, three-phase motor is 543 amperes; therefore, a 600-ampere disconnect switch with 600-ampere fuses or a 600-ampere circuit breaker is the minimum-size overcurrent protection allowed for this installation.

Apartment outdoor receptacles

Q: Outdoor receptacles are required for multifamily buildings by a new paragraph in 210.52(E). How many receptacles are required for an eight-unit apartment building? May the outdoor receptacles be supplied from the “house” meter or must a receptacle outlet be supplied from each tenant meter?

A: Where each dwelling unit is at grade level and each has an individual exterior entrance, an outdoor receptacle that is not more than 6 feet above grade must be installed. If one receptacle can be located on the exterior that is accessible to all occupants the requirement in 210.52(E) does not apply.

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Jun 15, 2022
abinets and

receptacles should be supplied from the "house" meter unless individual receptacles are supplied from each tenant meter. Connecting one or more receptacles to the "house" meter assures that the outdoor receptacle(s) will be energized at all times.



This new paragraph in the 2005 NEC also references 210.8(A)(3) to point out that GFCI protection is required.

Luminaires in suspended ceilings

Q: Where a two-by-four lay-in luminaire is supported independent of the ceiling grid, is it necessary to secure the fixture to the grid? Some manufacturers specify additional support wires from the luminaire (lighting fixture) to the structural member above, and provide tabs or clips to secure the fixture to the ceiling grid. Are both methods required by the NEC?

A: It appears that the luminaire (lighting fixture) manufacturer wants to make sure that the luminaire does not fall out of the ceiling should the suspended ceiling fail. This is the way part (C) of 410.16 reads: "Suspended Ceilings. Framing members of suspended ceiling systems used to support luminaires (fixtures) shall be securely fastened to each other and shall be securely attached to the building structure at appropriate intervals. Luminaires (fixtures) shall be securely fastened to the ceiling framing member by mechanical means such as bolts, screws, or rivets. Listed clips identified for use with the type of ceiling framing member(s) and luminaire(s) (fixture(s)) shall also be permitted."

Although 410.16(C) does not require both support wires and clips for installing lay-in luminaires (lighting fixtures), 110.3(B) has to be considered. This part requires the installation of electrical equipment in accordance with instructions supplied by the manufacturer. If support wires and clips are required by the manufacturer, they must be used.

Determining lighting track load

Q: How is the branch-circuit load determined for lighting track? How is the feeder load calculated for 120 to 240 volt three-wire lighting track?

(<https://www.ecmag.com/section/codes-standards/cabinets-and-panelboards-article-312-be-specific-when-it-comes-panelboards>).

Panelboards in Article 312: Be specific when it comes to 'panelboards,' part 2 (/section/codes-standards/cabinets-and-panelboards-article-312-be-specific-when-it-comes-panelboards).



(<https://www.ecmag.com/section/codes-standards/vaccination-room-requirements-service-conductors-over-pools-and-more>).

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Vaccination Room Requirements, Service Conductors Over Pools and More (/section/codes-standards/vaccination-room-requirements-service-conductors-over-pools-and-more).

A: No load is added for track lighting in dwelling units and guest rooms or suites in hotels or motels. Track lighting is included in the branch-circuit and feeder calculations for these occupancies at volt-amperes per square foot as listed in 220.12. For all other occupancies, 220.43(B) requires a load calculation of 150 volt-amperes for each 2 feet of track or fraction thereof. This load calculation is for the feeder and service conductors and overcurrent protection.



(<https://www.ecmag.com/section/codes-standards/transformer-overcurrent-protection-how-safeguard-1000v-and-less>)

The ampere rating of the lighting track determines the size of the overcurrent device and branch-circuit conductor ampacity. For example, 125-volt, 20-ampere lighting track requires 12 AWG copper branch circuit conductors and 20-ampere overcurrent protection.

If 50 feet of 125-volt, 20-ampere lighting track is required for a job, a load of (50 divided by 2 times 150Va) 3,750 volt-amperes must be added to the feeder and service calculations. For the multiwire branch-circuit track (120-240 volt), 50 feet of track would require that 7,500 volt-amperes be added to the service and feeder calculations.

There is no limit to the length of track permitted on a branch circuit; however, the ampere rating of the overcurrent device protecting the branch circuit cannot exceed the ampere rating of the track. Construction and installation rules are in 410.100 through 410.105 for lighting track.

Outdoor receptacles locations

Q: I installed one receptacle outlet at the front and back of a one-family dwelling. These receptacles are 15-ampere, 125-volt devices located about 3 feet above the ground. The central air conditioning unit is located on the roof of the carport. The inspector said I need a receptacle at the air conditioning unit even though one of the outdoor receptacles is not more than 20 feet from the unit. Is this additional receptacle required by the Code?

A: Yes it is. 210.63 requires a 15- or 20-ampere, 125-volt receptacle. This receptacle must be located on the same level and within 25 feet of the air conditioning equipment. Although at least one of the receptacles required by 210.52(E) is within 25 feet of the air conditioning unit, it is not the additional receptacle requested by the

Codes & Standards

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🕒 Jun 15, 2022

**Transformer
Overcurrent
Protection: How to
safeguard 1,000V and
less (/section/codes-
standards/transformer-
overcurrent-
protection-how-
safeguard-1000v-
and-less).**

EMT in Class II locations

Q: Is electrical metal tubing (EMT) with compression fittings permitted in Class II Division 2 locations? The contained conductors supply 480-volt branch circuits.

A: Article 502 applies to all voltages in Class II Division 1 and 2 locations, and electrical metallic conduit is a permitted wiring method in Class II Division 2 locations. Boxes and fittings are required to be dusttight. All wiring and equipment must be grounded and bonding jumpers are required at all raceway terminations (see 502.30). **EC**

FLACH, a regular contributing Code editor, is a former chief electrical inspector for New Orleans. He can be reached at 504.734.1720.

Tags:

[National Electrical Code \(/tags/national-electrical-code\)](/tags/national-electrical-code)

About the Author

[George W. Flach \(/contributing-authors/george-w-flach\)](/contributing-authors/george-w-flach)
Code Q&A Columnist

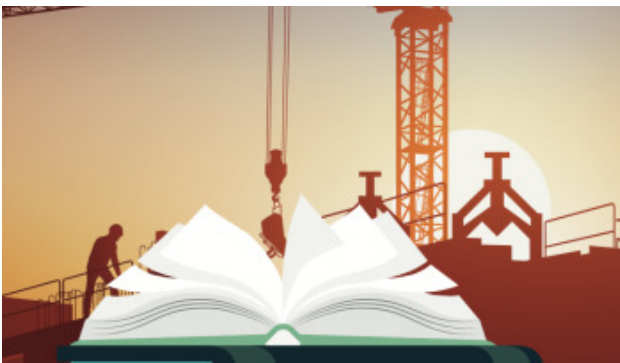
George W. Flach was a regular contributing Code editor for Electrical Contractor magazine, serving for more than 40 years. His long-running column, Code Q&A, is one of the most widely read in the magazine's history. He is a former chief electrical...

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Household Applications and the Code (/section/codes-standards/household- applications-and-code).

[Mark C. Ode \(/contributing-authors/mark-c-ode\)](/contributing-authors/mark-c-ode)

Providing branch-circuit overcurrent protection and subdividing electrical resistance-heating elements in appliances and fixed electric space heating equipment has been a long-standing requirement in the National Electrical Code (NEC). Recently, a discrepancy was discovered between the subdivision requirements in the NEC and those found in...

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Electric Fire Pump Controllers - Upstream Disconnecting Means

480V							
HP	FLA	6xFLA	24xFLA	Breaker Rating / Standard (SCCR)	Trip Setting (A)	Breaker Rating / High (SCCR)	Trip Setting (A)
5	8	48	192	40A (25kA)	255	40A (150kA)	255
7.5	11	66	264	40A (25kA)	325	40A (150kA)	325
10	14	84	336	150A (65kA)	450	100A (150kA)	540
15	21	126	504	150A (65kA)	540	100A (150kA)	540
20	27	162	648	150A (65kA)	750	100A (150kA)	740
25	34	204	816	150A (65kA)	900	125A (150kA)	920
30	40	240	960	150A (65kA)	1050	125A (150kA)	1100
40	52	312	1248	150A (65kA)	1350	250A (150kA)	1300
50	65	390	1560	250A (65kA)	1750	250A (150kA)	1700
60	77	462	1848	250A (65kA)	2100	250A (150kA)	1900
75	96	576	2304	400A (65kA)	2400	400A (150kA)	2570
100	124	744	2976	400A (65kA)	3200	400A (150kA)	3140
125	156	936	3744	600A (65kA)	3850	600A (150kA)	4290
150	180	1080	4320	600A (65kA)	4400	600A (150kA)	5140
200	240	1440	5760	800A (50kA)	6400	--	--
250	302	1812	7248	1200A (65kA)	8000	--	--
300	361	2166	8664	1200A (65kA)	9000	--	--
350	414	2484	9936	1200A (65kA)	10000	--	--
400	477	2862	11448	1600A (65kA)	14000	--	--
450	515	3090	12360	1600A (65kA)	14000	--	--
500	590	3540	14160	2000A (50kA)	10000	--	--

Model Number Selection Guide



FTA990

Electric Fire Pump Controllers - Upstream Disconnecting Means

ELECTRIC FIRE PUMP CONTROLLER UPSTREAM DISCONNECTING MEANS

Example: FTA990-N100B-xxx

Controller Model Number

Short Circuit Current Rating

200 - 208V

Standard SCCR

5-150 HP - "N" 50-65kA

200 HP - "N" 65kA@208V only

High SCCR

5-60 HP - "P" 150kA

220 - 240V

Standard SCCR

5-200 HP - "N" 50-65kA

250 HP - "N" 50kA

High SCCR

5-75 HP - "P" 150kA

380 - 415V

Standard SCCR

5-7.5 HP - "M" 25kA

10-350 HP - "N" 50-65kA

400-450 HP - "N" 50kA

High SCCR

5-125 HP - "P" 150kA

440 - 480V

Standard SCCR

5-7.5 HP - "M" 25kA

10-350 HP - "N" 50-65kA

400-450 HP - "N" 50kA

High SCCR

5-125 HP - "P" 150kA

600V

Standard SCCR

5-40 HP - "M" 18kA

50-75 HP - "N" 22kA

100-250 HP - "N" 25kA

300-450 HP - "P" 50kA

High SCCR

5-200 HP - "P" 100kA

Options

-MZN - Neutral Lug, Service Entrance, Non-Insulated, Bonded to Enclosure

Three Phase Voltage

A - 220-240 Volt, 60 Hertz (230 V)

AZ - 220-230 Volt, 50 Hertz

B - 440-480 Volt, 60 Hertz (460 V)

BZ - 415 Volt, 50 Hertz

C - 550-600 Volt, 60 Hertz (575 V)

F - 380 Volt, 60 Hertz

FZ - 380 Volt, 50 Hertz

FF - 400 Volt, 60 Hertz

FX - 400 Volt, 50 Hertz

H - 208 Volt, 60 Hertz

HH - 200 Volt, 60 Hertz

Horsepower Rating

03 - 3 HP

05 - 5 HP

07 - 7 1/2 HP

10 - 10 HP

15 - 15 HP

20 - 20 HP

25 - 25 HP

30 - 30 HP

40 - 40 HP

50 - 50 HP

60 - 60 HP

75 - 75 HP

100 - 100 HP

125 - 125 HP

150 - 150 HP

200 - 200 HP

250 - 250 HP

300 - 300 HP

350 - 350 HP

400 - 400 HP

450 - 450 HP

500 - 500 HP

Firetrol, Inc.

3412 Apex Peakway
Apex, North Carolina 27502
P +1 919 460 5200
F +1 919 460 5250
www.firetrol.com

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Publication SD990-01

BID SCHEDULE

MARGARET STREET FIRE PUMP BUILDING KEY WEST HISTORIC SEAPORT

UNIT PRICE BID

Bid unit prices stated in this proposal include all costs and expenses for labor, equipment, materials, disposal and contractor's overhead and profit. Unit prices for the various work items are intended to establish a total price for completing the project in its entirety. All work and incidental costs shall be included for payment under the several scheduled items of the overall contract, and no separate payment will be made therefore.

1. Mobilization, General/Supp Conditions and Demobilization

- | | | | | |
|-----------------------------|----|---------------------------------|----|-------|
| a. Mobilization | 1 | each | \$ | _____ |
| b. General/Supp. Conditions | 1 | each | \$ | _____ |
| c. Demobilization | 1 | each | \$ | _____ |
| 1 | LS | (10% of Construction Cost Max.) | \$ | _____ |

2. Payment and Performance Bonds

- | | | | |
|---|----|----|-------|
| 1 | LS | \$ | _____ |
|---|----|----|-------|

3. Permit Fees (to be paid at cost)

- | | | | |
|---|----|----|------------------|
| 1 | LS | \$ | 15,000.00 |
|---|----|----|------------------|

4. Demolition (Includes all labor, equipment, and disposal for a complete product)

- | | | | |
|---|----|----|-------|
| 1 | LS | \$ | _____ |
|---|----|----|-------|

5. Concrete Foundations (Includes all labor, equipment, and materials for a complete product)

- | | | | |
|---|----|----|-------|
| 1 | LS | \$ | _____ |
|---|----|----|-------|

6. Concrete Shell (Includes stairs, all labor, equipment, and materials for a complete product)

- | | | | |
|---|----|----|-------|
| 1 | LS | \$ | _____ |
|---|----|----|-------|

7. Exterior Finishes (Includes all labor, equipment, and materials for a complete product)

- | | | | |
|---|----|----|-------|
| 1 | LS | \$ | _____ |
|---|----|----|-------|

8. Roof Framing (Includes all labor, equipment, and materials for a complete product)

- | | | | |
|---|----|----|-------|
| 1 | LS | \$ | _____ |
|---|----|----|-------|

9. Thermal Insulation (Includes all labor, equipment, and materials for a complete product)

1 LS \$ _____

10. Waterproofing and sealants (Includes all labor, equipment, and materials for a complete product)

1 LS \$ _____

11. Roofing System (Includes soffits, fascia, strapping, all labor, equipment, and materials for a complete product)

1 LS \$ _____

12. Door and Hardware (Includes all labor, equipment, and materials for a complete product)

1 LS \$ _____

13. Louvers and Fans (Includes all labor, equipment, and materials for a complete product)

1 LS \$ _____

14. Flood Panels (Includes all labor, equipment, and materials for a complete product)

1 LS \$ _____

15. Railings (Includes all labor, equipment, and materials for a complete product)

1 LS \$ _____

16. Painting (Includes all labor, equipment, and materials for a complete product)

1 LS \$ _____

17. Lattice (Includes all labor, equipment, and materials for a complete product)

1 LS \$ _____

18. Fire Extinguisher (Includes all labor, equipment, and materials for a complete product)

1 LS \$ _____

19. Fire Pump, Jockey Pump, Valves, FDC, Test Header, Piping and Equipment (Includes all labor, equipment, and materials for a complete product)

1 LS \$ _____

20. Fire Backflow Preventor (Includes all labor, equipment, and materials for a complete product)

1 LS \$_____

21. New Water Meter and Associated Service Fees (Includes all labor, equipment, materials and new service fees for a complete product)

1 LS \$_____

22. General Plumbing not associated with Fire Pump (Includes all labor, equipment, and materials for a complete product)

1 LS \$_____

23. 6" Service Line w/ Trench (Includes all labor, equipment, and materials for a complete product)

330 +/- LF Unit Price \$_____ TOTAL \$_____

24. Electric Meter, Disconnect, Panel, Lighting, Outlets, Switches (Includes all labor, equipment, materials and new service fees for a complete product)

1 LS \$_____

25. All Electrical Conduits and Wires w/ Trench (Includes all labor, equipment, and materials for a complete product)

240 +/- LF Unit Price \$_____ TOTAL \$_____

26. Fire Alarm System including SS Permit Drawings (Includes all labor, equipment, materials and SS drawings for a complete product)

1 LS \$_____

27. Trench Restoration (Includes all labor, equipment, and materials for a complete product)

570 +/- LF Unit Price \$_____ TOTAL \$_____

28. Asphalt Restoration (Includes all labor, equipment, and materials for a complete product)

619 +/- SY Unit Price \$_____ TOTAL \$_____

29. Crosswalk and Curb Restoration (Includes all labor, equipment, and materials for a complete product)

1 LS \$_____

30. Brick Paver Replacement (Includes all labor, equipment, disposal and materials for a complete product)

1,600 +/- SF Unit Price \$_____ TOTAL \$_____

31. Landscaping w/ Irrigation and Maintenance (Includes all labor, equipment, & materials for a complete product)

1 LS \$_____

32. Allowance (only to be used with owner's written directive)

1 LS \$ \$25,000.00

TOTAL OF ALL EXTENDED LINE ITEMS LISTED ABOVE:

Total of lump sum items 1 - 32 \$_____

_____ Dollars & _____ Cents
(amount written in words)

NOTE: THE TOTAL BID WILL BE THE BASIS OF EVALUATING LOW BIDDER AND BASIS OF AWARD

The Bidder shall submit a Schedule of Values for Lump Sum items with the Bid. It shall be broken down by trade and type of work and it shall be used as a basis for payment. The Bidder will be considered non-responsive if Schedule of Values not included in Bid package.

Payment for materials and equipment authorized by the ENGINEER in a written Change Order but not listed in the above Bid will be provided at the supplier's invoice plus 10 %.

Total allowable cost for Mobilization, General/Supp Conditions and Demobilization (bid schedule line item 1) shall be 10% maximum of total construction costs (bid schedule line items 4 through 32).