

TYPICAL FIRE PUMP CONTROL SPECIFICATIONS

SECTION **XXXXXX** - ELECTRIC-DRIVE, CENTRIFUGAL FIRE PUMPS

1.1 ELECTRIC FIRE-PUMP CONTROLLER AND TRANSFER SWITCH

- A. Fire-Pump Controllers, General: UL 218 and NFPA 20; listed for electric-drive, fire-pump service and service entrance; combined automatic and manual operation; factory assembled and wired; and factory tested for capacities and electrical characteristics. The transfer switch assembly shall be pre-mounted and wired in a separate barriered compartment of the main fire pump controller.
1. Manufacturer - Basis of Design: Firetrol, Inc. Model FTA1930 and FTA900.
 2. Alternate Suppliers
 - a. Hubbell
 - b. Joslyn Clark.
 - c. Master Controls
 3. Alternate manufacturers may be submitted for approval. With submittal provide name and address of authorized factory controls representative located within 150 miles of jobsite. Representative shall have factory trained technicians and local emergency parts inventory. **OHIO ONLY: In addition, start-up and service representative shall be licensed by The State of Ohio to work on fire pump controllers.**
 4. The controller shall be of the combined manual and automatic type designed for Solid State Soft Starting of the fire pump motor having the horsepower, voltage, phase and frequency rating shown on the plans and drawings. The controller components shall be housed in a NEMA Type 2 (IEC IP11) drip-proof, wall mounted enclosure.
 5. All controller components shall be front mounted, wired and front accessible for maintenance. The minimum withstand rating of the controllers shall not be less than 100,000 Amps RMS Symmetrical at 600 Volts on the normal utility power source.
 6. The controller shall include a motor rated combination isolating disconnect switch/circuit breaker, mechanically interlocked and operated with a single, externally mounted handle. When moving the handle from OFF to ON, the interlocking mechanism shall sequence the isolating disconnect switch ON first, and then the circuit breaker. When the handle is moved from ON to OFF, the interlocking mechanism shall sequence the circuit breaker OFF first, and then the isolating disconnect switch.
 7. The isolating disconnect switch/circuit breaker shall be mechanically interlocked so that the enclosure door cannot be opened with the handle in the ON position except by a hidden tool operated defeater mechanism. The isolating disconnect switch/circuit breaker shall be capable of being padlocked in the OFF position for installation and maintenance safety, and shall also be capable of being locked in the ON position without affecting the tripping characteristics of the circuit breaker. The controller door shall have a locking type handle and three-point cam and roller vault type hardware. The circuit breaker trip curve adjustment shall be factory set, tested and sealed for the full load amps of the connected motor. The circuit breaker shall be capable of being field tested to verify actual

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pick up, locked rotor, and instantaneous trip points after field installation without disturbing incoming line and load conductors.

8. The fire pump controller shall feature an operator interface with user keypad. The interface shall monitor and display motor operating conditions, including all alarms, events, and pressure conditions. All alarms, events, and pressure conditions shall be displayed with a time and date stamp. The display shall be a 2-line, 20-character, vacuum fluorescent, dot matrix type designed to allow easy viewing from all angles and in all light conditions. The display and interface shall be NEMA rated for Type 2, 3R, 4, 4X, and 12 protections and shall be fully accessible without opening the controller door. The display and user interface shall utilize multiple levels of password protection for system security. A minimum of 3 password levels shall be provided. The display shall be capable of being programmed for any language.
9. The fire pump controller operator interface shall be capable of displaying true RMS digital motor voltage and current measurements for all three phases simultaneously. Displays requiring push-button and selector switches to toggle between phases or current and voltage shall not be accepted.
10. Voltage and current shall be measured by True RMS technology to provide the most accurate measurement for all sine waves, including non-sinusoidal waveforms. Average responding meters will not be accepted.
11. Digital Status/Alarm Messages: The digital display shall indicate text messages for the status and alarm conditions of: Motor On, Sequential Start Time, Minimum run Time, Off Delay Time, Local Start, Remote Start, Fail to Start, System Battery Low, Under Voltage, Over Voltage, Locked Rotor Trip, Low Suction Pressure, Over Frequency, Emergency Start, Motor Over 320%, Drive not Installed, Motor Overload, Pressure Error.
12. The Sequential Start Timer and Minimum Run Timer/ Off Delay Timer shall be displayed as numeric values reflecting the value of the remaining time.
13. LED indicators, visible with the door closed, shall indicate: Power On, Emergency Isolating Switch Open, Pump Running, Low System Pressure Alarm, Transfer Switch Normal, Deluge Open, Transfer Switch Emergency, Phase Failure, Phase Reversal, Interlock On.
14. In addition to the standard alarm contacts required by NFPA20, the digital display module shall have N.O. and N.C. contacts for remote indications of any digitally displayed alarm and N.O. and N.C. contacts for remote indication up to EIGHT, specified, programmable alarm.
15. The digital display shall monitor the system and log the following data: Motor Calls/Starts, Elapsed Motor Run Time, Last Trip Current, Elapsed Power On Time, Last Breaker Trip, Maximum Run Currents, Minimum Voltages, Minimum Run Currents, Maximum Voltages, Last Motor Run Time, Last Phase Failure, Last Start Currents, Last Phase Reversal, Min/Max Frequency, Min/Max Pressure
16. Memory - The controller shall record all operational and alarm events to system memory. All events shall be time and date stamped and includes an index number. The system memory shall have the capability of storing 3000 events and allow the user access to the

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event log via the user interface. The user shall have the ability to scroll through the stored messages in groups of 1, 10, or 100.

17. Jockey Pump Monitoring - The fire pump controller shall be provided data logging and monitoring of jockey pump starts and stops. The installing electrical contractor shall provide control wires between the jockey pump controller and main fire pump controller for this purpose.
18. Flash Drive - The controller shall include a USB Host drive to save all operational and alarm events. Each event shall be time and date stamped. The controller shall also have the capability to save settings and values to a standard flash disk through the user interface. In addition, software updates may be loaded through the use of the flash drive.
19. Communications - The controller shall feature two independent communications ports to allow connectivity via RS485 Modbus or to computers, modems, or building management systems.
20. **[OPTIONAL]** Ethernet Adapter Communications Module shall be included in the fire pump controller for remote monitoring of alarm conditions.
21. Solid State Pressure Transducer - The controller shall be supplied with a solid state pressure transducer with a range of 0-300 psi (0-20.7 bar) ± 1 psi. The solid state pressure switch shall be used for both display of the system pressure and control of the fire pump controller. Systems using analog pressure devices or mercury switches for operational control will not be accepted.
22. The START, STOP and SYSTEM PRESSURE shall be digitally displayed and adjustable through the user interface. The pressure transducer shall be mounted inside the controller to prevent accidental damage. The pressure transducer shall be directly pipe mounted to a bulkhead pipe coupling without any other supporting members. Field connections shall be made externally at the controller coupling to prevent distortion of the pressure switch element and mechanism.
23. A digitally set On Delay (Sequential Start) timer shall be provided as standard. Upon a call to start, the user interface shall display a message indicating the remaining time value of the On Delay timer.
24. A pressure switch shall be factory pre-mounted and wired on the side of the fire pump controller. The contractor shall run a brass sensing line complying with NFPA20 to the discharge side of the pump. The controller shall have software for pump alarm and shutdown upon critical loss of tank supply water. Adjustable time delays for stop and automatic reset shall be included as well as audible and visual alarms. Contacts shall be provided for remote monitoring.
25. A low pump room temperature thermostat shall be factory pre-mounted and wired to the side of the fire pump controller. Normally open and closed dry contacts shall be provided for remote indication of low pump room temperature. The fire pump controller shall have local indication of condition and log the condition into the permanent data and event log.
26. The controller shall be field programmable for manual stop automatic stop. If set for automatic stop-ping, the controller shall allow the user to select either a Minimum Run

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- Timer or an Off Delay Timer. Both timers shall be programmable through the user interface.
27. The controller shall be fully programmable to allow up to 8 custom alarm messages to be displayed on the user interface.
 28. A nonadjustable restart delay timer shall be provided to allow the residual voltage of the motor to decay prior to restarting the motor. At least 2 seconds, but no more than 3 seconds, shall elapse between stopping and restarting the pump motor.
 29. A weekly test timer shall be provided as standard. The controller shall have the ability to program the time, date, and frequency of the weekly test. In addition, the controller shall have the capability to display a preventative maintenance message for a service inspection. The message text and frequency of occurrence shall be programmable through the user interface.
 30. A Lamp Test feature shall be included. The user interface shall also have the ability to display the status of the system inputs and outputs.
 31. The controller shall not start the fire pump motor under a single-phase condition. If the motor is already running when a phase loss occurs, the controller shall continue to run the motor, but still display a Phase Failure alarm.
 32. The power transfer switch shall be housed within the fire pump controller enclosure or in a NEMA Type 2 (IEC IP11) drip-proof enclosure attached directly to the fire pump controller. Where the power transfer switch is provided in an attached enclosure, the enclosures shall be fitted so that the assembly constitutes a single unit. The fire pump controller/power transfer switch shall be factory assembled, wired and tested as a unit prior to shipment.
 33. The power transfer switch shall include a motor rated disconnect/isolating switch capable of interrupting the motor locked rotor current. The disconnect/isolating switch shall be mechanically interlocked so that the enclosure door cannot be opened with the handle in the ON position except by a hidden tool operated defeater mechanism. The disconnect/isolating switch shall be capable of being padlocked in the OFF position with up to three padlocks for installation and maintenance safety, and shall also be capable of being locked in the ON position. The enclosure door shall have a locking type handle and three-point cam and roller type vault hardware.
 34. An auxiliary contact shall be provided on the transfer switch to prevent starting of the emergency generator set when the transfer switch or the main fire pump controller are being serviced.
 35. The transfer switch circuitry shall be capable of sensing both the normal power source and the emergency power source. The normal power source pickup shall be set at 95 nominal voltage. The emergency power source shall be set to pick up at 90 nominal voltage and 95 nominal frequency. All voltage sensing, frequency sensing, and time delays shall be field adjustable to accommodate individual installation requirements. The transfer signal shall be delayed for one second, delaying the transfer and engine start signals so as to compensate for momentary, normal power outages. An automatic delay of three seconds shall be provided upon transfer to or from the emergency power source.

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to allow the motor to slow sufficiently, preventing line disturbances that could trip either the generator set or fire pump circuit breakers.

36. The transfer switch shall have TRANSFER SWITCH NORMAL, TRANSFER SWITCH EMERGENCY and EMERGENCY ISOLATING SWITCH OFF LED's, TEST and TRANSFER BYPASS switches, an audible alarm device and SILENCE ALARM pushbutton mounted on the flange of the enclosure. The power transfer switch shall be furnished with both normally open and normally closed auxiliary contacts for an engine start signal when normal power failure occurs. Auxiliary contacts shall also be provided and wired to terminals to indicate the transfer switch position. The transfer switch shall be electrically operated and mechanically held, and shall be capable of being operated by a manual transfer mechanism located on the switch.
37. The power transfer switch shall be a Firetrol FTA900 for normal utility power and engine generator set emergency power.
38. The fire pump controller and automatic transfer switch shall be Model FTA1930/FTA900 as manufactured by ASCO Power Technologies/Firetrol Brand Products.

1.2 CONNECTIONS

- A. Connect fire pump motor to the controller per the motor manufacturer diagram.
- B. Connect utility power and generator power to combination fire pump controller and integral transfer switch.
- C. Connect start wires from fire pump transfer switch to generator.
- D. Connect Jockey Pump Run Contacts to main fire pump controller for logging into data history.

END OF SECTION