

EPCT Fire electric fire pump controllers - medium voltage

Typical specifications

1. Approvals

- A. The Fire Pump Controller shall meet the requirements of the latest edition of NFPA 20 and shall be listed by [Underwriters Laboratories (UL)] and approved by [Factory Mutual Research (FM)] [Canadian Standards Association (CSA)] [New York Department of Buildings (NYSB)] and carry the CE marking for fire pump service.

2. Ratings

- A. The Controller shall have integral interrupting rating with current limiting fuses of 200MVA @ 2400, 400MVA @ 3000V-4160V, and 570MVA @ 4800V-6900V.
- B. Temperature:
4 to +50 deg. C (39 to +122 deg. F)
- C. The controller shall have a low altitude rating of -3500 to -1001 meters, a standard rating of -1000 to +2000 meters, and a high rating of +2001 to +4000 meters.

3. Construction

- A. Isolating switch and contactor assemblies, including current limiting fuses, shall be of the component-to-component design without any interconnecting cables or flexible shunts. The isolating switch shall be easily removed from the front of the enclosure by loosening two bolts. Line and load cable terminations shall be completely accessible from the front.
- B. The isolating switch shall be an externally operated manual three-pole draw-out type, such that in the open position it completely grounds and isolates the starter from the line connectors with a technically driven isolating shutter leaving no exposed high-voltage components. Integral mechanical interlocks shall prevent entry into the high-voltage areas while the starter is energized and shall block accidental opening or closing of the isolating switch when the door is open and the contactor is closed. The isolating switch handle shall have provisions for three (3) padlocks in the off position.
- C. Current limiting power fuses shall be of the self protecting type with visible fuse condition indicators. The power fuses shall be vertically mounted permitting easy inspection and replacement without starter disassembly. A fuse puller shall be provided with each controller. The controller manu-

facturer shall manufacture the power fuses.

- D. The vacuum contactor shall be of the slide-out design, rated 400 amperes with single- peak high-pressure type main contacts with weld resistant alloy contact faces. The vacuum contactor contact wear shall be easily checked with the use of a "go/no-go" feeler gauge, included with each contactor. The controller manufacturer shall manufacture the contactor.
- E. A built-in test circuit shall be included to permit checking of the start control and pilot circuit, with the high-voltage de-energized and isolated, and the contactor in its normal position or in the draw out position. The control circuit shall be capable of being energized through a polarized plug connector from an external [115-volt] [220-volt] supply while in the test mode.
- F. The low-voltage control compartment shall be isolated and barriered from the high-voltage area with a separate low-voltage access door.
- G. All components and connections in the low voltage and high-voltage compartments shall be accessible from the front. Side or rear access is not permitted.
- H. As per NFPA 20, there shall be provisions to store an extra set of fuses inside the enclosure. The spare fuses shall be accessible from the front and not from a side door.

5. Enclosure

- A. The controller shall be housed in a Type 2 (IEC IP11) drip-proof, powder baked finish, freestanding enclosure.



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Fire pump controllers Features

- B. **Optional enclosures:**
 - 1. Type 3R (IEC IP14) rain-tight enclosure
 - 2. Type 3 (IEC IP55) water-resistant enclosure
 - 3. Type 4 (IEC IP66) watertight enclosure
 - 4. Type 4X (IEC IP66) watertight 304 stainless steel enclosure
 - 5. Type 4X (IEC IP66) watertight 316 stainless steel enclosure
 - 6. Type 4X (IEC IP66) watertight corrosion resistant enclosure
 - 7. Type 12 (IEC IP52) dust-tight enclosure
- 6. **Microprocessor control**
 - A. The controller shall come complete with a 7" 800x480, color touchscreen. The touchscreen shall be type 4X rated.
 - 1. Home tab capable of displaying system pressure, three phase voltage and amperage readings for both sources, system frequency, date, and time, configurable notifications in the notification area, displaying current start and stop set points, and visual representation of the transfer switch position, source 2 disconnect handle, and contactor.
 - 2. Virtual buttons to manually test the pump motor and/or the backup power supply engine.
 - 3. Controller statistics screen, including:
 - A. Total Powered Time
 - B. Total Motor Run Time
 - C. Last Motor Run Time
 - D. Calls to Start
 - E. Motor Starts
 - F. Maximum Starting Current A
 - G. Maximum Starting Current B
 - H. Maximum Starting Current C
 - I. Maximum Run Current A
 - J. Maximum Run Current B
 - K. Maximum Run Current C
 - L. Last LR Current A
 - M. Last LR Current B
 - N. Last LR Current C
 - O. Minimum System Pressure
 - P. Maximum System Pressure
 - Q. Minimum S1 Voltage AB
 - R. Minimum S1 Voltage BC
 - S. Minimum S1 Voltage CA
 - T. Maximum S1 Voltage AB
 - U. Maximum S1 Voltage BC
 - V. Maximum S1 Voltage CA
 - W. Minimum S1 Frequency
 - X. Maximum S1 Frequency
 - Y. Last System Startup
 - Z. Last Motor Start
 - AA. Last Low Pressure Start
 - AB. Last Locked Rotor Trip
 - AC. Last S1 Phase Failure
 - AD. Last S1 Undervoltage
 - AE. Last S1 Overvoltage
 - AF. Last S1 Under Frequency
 - AG. Last S1 Over Frequency
 - 4. Controller diagnostics screen, including:
 - A. Controller Serial Number
 - B. Logic Board Firmware Version
 - C. I/O Board Firmware Version
 - D. I/O Board Supply Voltage
 - E. I/O Board Communication
 - F. CT1 Secondary Amperage
 - G. CT2 Secondary Amperage
 - H. CT3 Secondary Amperage
 - I. Transducer Input Voltage
 - J. Transducer Output Current
 - K. Transducer Setpoint Current 2
 - L. Transducer Setpoint Current 1
 - M. All Input Status (Open or Closed) (Can be selected to override for one minute and manually change the state of the input)
 - N. All Output Relay Status (Energized or De-energized) (Can be selected to override for one minute and manually energize or de-energize the relay)
 - O. Test the display board's communication.
 - 5. Archive message screen that will display up to 65,000 alarms/messages stored in the controllers' memory
 - B. The microprocessor logic board shall be available with a USB port for transference of message history, controller status, diagnostics, startup and statistic files and the ability to update firmware.
 - C. A Fail-to-Start alarm shall occur if the motor controller sees less than 20% of the motor full load amps after an adjustable time delay of 1-99 seconds.
 - D. Locked rotor protection shall be provided. After a trip condition and restoration of power, the display shall indicate the voltage, current, and date and time at the moment that the controller tripped.
 - E. A sequential start timer and weekly test timer shall be provided as standard.
 - F. A restart time delay of one (1) second shall be provided to allow the residual voltage of the motor to decay prior to re-starting the motor. In the event that the pump motor continues to run after a request to stop, then the controller must display a fail to stop message to indicate this condition.
 - G. Overvoltage (0-100%) and undervoltage (0-100%) sensing and alarming shall be provided as standard.
 - H. The controller shall be supplied with interlock and

shutdown circuits as standard. A green LED in the notification area shall indicate an interlock on condition.

- I. Where shutdown of the pump(s) due to low suction pressure is required, it shall be accomplished without the addition of a separate panel or enclosure. The display shall indicate low suction shutdown. Resetting of the condition shall be automatic or manual as selected by the user.

7. Programming Menu

- A. The programming menu shall have the ability to enable an entry password.
- B. The controller shall have nine (9) languages as a standard: English, French, Spanish, Portuguese, Turkish, Italian, Dutch, Chinese, and Polish.
- C. The programming menu shall be grouped into ten (10) tabs as follows:
 1. Home
 2. Startup
 3. Panel Setup
 4. Help
 5. Pressure Settings
 6. Timer Values
 7. Alarm Setpoints
 8. Inputs/Outputs
 9. History/Statistics/Diagnostics

8. Pressure sensor

- A. A solid-state 4-20mA pressure sensor shall be provided. The pressure Start and Stop points shall be adjustable in increments of one (1) PSI.

9. Custom inputs/outputs

- A. The controller shall come standard with ten (10) programmable inputs, four (4) programmed outputs with the ability to add up to another sixteen (16) outputs via optional relay boards.
- B. The user shall be able to program the inputs/outputs through the main programming menu.
- C. The inputs shall be selectable based on the following criteria:
 1. User selected message or seventeen (17) predetermined messages
 2. Link to a future relay and/or LED indicator
 3. Alarm latched until reset
 4. Normally open or closed input
 5. On and/or off-delay timer
- D. The future relays shall be selectable based on the following criteria:

1. Output based on a minimum of sixty-one (61) predetermined alarms, controller status or a custom input
2. Latched until reset
3. Energized under normal conditions
4. On and/or off delay timer on the output

10. Alarm relays

- A. All relays shall be soldered on the PCB. An LED on the relay panel shall indicate the energized state of the relay. All relay contacts shall be rated @ 8A, 277VAC/30VDC. Two (2) sets of Form-C contacts shall be provided for each of the following:
 1. Common Alarm
 2. Power/Phase Failure
 3. Phase Reversal
 4. Pump Run
- B. The Common Alarm and Power/Phase Failure relays shall be energized under normal conditions.

11. Audible alarm buzzer

An audible alarm buzzer, capable of being heard while the motor is operating, shall operate if Fail to Start, Hardware Malfunction or any Common Alarm condition exists.

12. Manufacturer

- A. The controller shall be of the EPCT Fire type as manufactured by Eaton Corporation.