LMR Plus Electric Fire Pump Controllers

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. Starting Type

A. The controller shall be of the combined manual and automatic type designed for [Full Voltage Starting] [Part Winding Starting] [Primary Resistor Starting] [Autotransformer Starting] [Wye-Delta (Star-Delta) Open Transition Starting] [Wye-Delta (Star-Delta) Closed Transition Starting] [Solid State Soft Start Starting]

3. Ratings

A. The Controller shall have a withstand rating of 100,000 RMS symmetrical amperes @ [208V] [240V] [380V] [400V] [415V] [480V] [25,000 @ 600VAC].

4. Construction

A. The controller shall include a motor rated combination isolating switch and circuit breaker, mechanically interlocked and operated with a single externally mounted handle.

B. The isolating switch shall be rated to disconnect the motor load.

C. The isolating switch/circuit breaker combination shall be mechanically interlocked such that the enclosure door cannot be opened when the handle is in the on position except by a tool operated defeater mechanism.

D. The controller manufacturer shall manufacture the contactor, isolating switch, circuit breaker, pushbuttons, and enclosures. Brand-labeled components will not be accepted.

5. Enclosure

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

B. Optional Enclosures:
   1. NEMA 3R (IEC IP14) rain-tight enclosure.
   2. NEMA 4 (IEC IP66) watertight enclosure.
   3. NEMA 4X (IEC IP66) watertight 304 stainless steel enclosure.
   4. NEMA 4X (IEC IP66) watertight 316 stainless steel enclosure.
   5. NEMA 4X (IEC IP66) watertight corrosion resistant enclosure.
   6. NEMA 12 (IEC IP52) dust-tight enclosure.

6. Microprocessor Control

A. The controller shall come complete with a 4 line by 40 character LCD display mounted on a panel opening in the front door. The LCD display shall indicate the following:
   1. Main screen displaying system pressure, three-phase voltage and amperage readings, system frequency, date, and time.
   2. Set point review screen displaying the programmed pressure start and stop points, and weekly test time.
   3. Controller statistics screen, including:
      a. Powered Time
      b. Motor Run Time
      c. Number of Calls to Start
      d. Number of Starts
      e. Last Motor Start Time
      f. Last Motor Run Time
      g. Last Low Pressure Start
      h. Minimum System Voltage
      i. Maximum System Voltage
      j. Minimum System Frequency
      k. Maximum System Frequency
      l. Minimum System Pressure
      m. Maximum System Pressure
      n. Last System Startup
      o. Last Phase Failure
      p. Last Phase Reversal
      q. Last Locked Rotor Trip
      r. Maximum Run Current
      s. Last Locked Rotor Current
   4. Controller diagnostics screen, including:
      a. Date & Time
      b. Firmware Version
      c. Shop Order Number
      d. Customer Order Number
      e. Transformer Output Voltage
      f. Current Transformer Outputs
      g. Pressure Transducer Calibrated Settings
      h. Input Status
      i. Output Status
   5. Display last messages screen that will display up to 10,000 alarms/messages stored in the controllers' memory.
   6. Display up to ten (10) custom messages of up to 100 characters each, which will continually scroll across the fourth line of the display.
   7. Remaining time left on active timers.

B. The controller shall be supplied with ten (10) green status LED's for the following:
   1. Power On
   2. Pump Running
   3. Local Start
   4. Remote Start
   5. Deluge Valve
   6. Emergency Start

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7. Interlock On
8. Low Pressure
9. Auto Shutdown Enabled
10. Programmable LED #1

C. The controller shall be supplied with ten (10) red alarm LED's to indicate the following:
1. Phase Reversal
2. Phase Failure
3. Fail to Start
4. Undervoltage
5. Overvoltage
6. Low Room Temperature
7. Locked Rotor Trip
8. Low Suction Pressure
9. Source 2 Disconnected
10. Programmable LED #2

D. The microprocessor logic board shall be available with:
1. A USB port for transference of message history, controller status, diagnostics, and statistics and the ability to update firmware.
2. An optional Ethernet port for direct connection to a computer for data transfer.
3. An optional RS485 Serial port for communication to various external software programs.

E. The controller shall be available with an embedded web page to allow viewing of the controllers' current status, data values, programmed set points, and history.

F. 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 1-90 seconds.

G. Locked rotor protection shall be provided. After a trip condition and restoration of power, the LCD display shall indicate "LOCKED ROTOR TRIP".

H. A sequential start timer and weekly test timer shall be provided as standard.

I. A restart time delay of two (2) seconds 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.

J. Overvoltage (5-20%) and undervoltage (5-30%) sensing and alarming shall be provided as standard.

K. The controller shall be supplied with interlock and shutdown circuits as standard. A flashing green LED shall indicate an interlock on condition.

L. 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 LCD display shall indicate low suction shutdown. Resetting of the condition shall be automatic or manual as selected by the user.

M. Means shall be provided to test the operation of all LED's to ensure their functionality.

7. Programming Menu

A. The programming menu shall have the ability to enable an entry password.

B. The programming menu shall be limited to two (2) levels of password protection.

C. The controller shall have three (3) languages as a standard, English, French, and Spanish, with the ability to add a fourth language.

D. The programming menu shall be grouped into 6 main menu headings as follows:
1. Regional Settings
2. Pressure Settings
3. Timer Values
4. Alarm Set points
5. Input/Output Menu
6. System Configuration (password protected)

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. A low pressure pre-alarm, indicated with a flashing green LED, shall denote a potential pump starting condition and will remain lit once the pump has started to indicate the starting cause.

9. Custom Inputs/Outputs

A. The controller shall come standard with nine (9) future inputs, two (2) future LED indicators, and one (1) future output, with the ability to add up to another 8 outputs via optional relay boards.

B. The user shall be able to program the future inputs/outputs through the main programming menu.

C. The inputs shall be selectable based on the following criteria:
1. User selected message or thirteen (13) predetermined messages.
2. Energize the common alarm relay when the input is received.
3. Link to a future relay and/or LED indicator.
4. Alarm latched until reset.
5. Normally open or closed input.
6. On-delay timer.

D. The LED indicators shall be selectable based on the following criteria:
1. Indication based on a minimum of twelve (12) predetermined alarms or a custom input.

E. The future relays shall be selectable based on the following criteria:
1. Output based on a minimum of twenty-seven (27) predetermined alarms, controller status or a custom input.
2. Latched until reset.
3. Energized under normal conditions.
4. On or off delay timer on the output.

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10. Alarm Relays

A. All relays shall be of the plug-in type. 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. Phase Reversal
   2. Phase Failure
   3. Common Alarm
   4. Future #1
   5. Pump Run.

B. The Common Alarm and 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 LMR Plus type as manufactured by Eaton Corporation.