



Diesel Engine Fire Pump Controller Type EFP/FD4e



Approved

The Metron Eledyne type FD4e controller is designed to specifically meet the latest NFPA 20 and UL 218 standards for Diesel Engine Fire Pump Controllers.

This controller implements the latest component and microprocessor logic technology available. It incorporates years of experience in the design and manufacture of fire pump control systems.

The components are installed in a NEMA 2 dust and drip proof enclosure with optional NEMA 4 or 4X ratings available. The Operator Interface Device (OID) and manual start pushbuttons are located on the front door and used in conjunction with the key operated mode switch. For emergency use, the mode switch key is located in a break glass box. The stop pushbutton is also mounted on the door.

The controller's logic is based on discrete components using the latest technology with high quality, highly reliable printed circuit boards (PCBs) and PCB mounted relays. The controller uses a microprocessor to control automatic engine and alternation between batteries during cranking. It also monitors and records system alarms and pressure, battery voltage and engine functions. This controller is suitable for all engine types with either 'energized to run' or 'energize to stop' fuel solenoids.

Inside the controller are two independent fully automatic microprocessor controlled battery chargers rated at 10 Amps each. The battery chargers operate in such a manner as to ensure that the engine batteries are fully charged within 24 hours.

The controller is supplied with lifting eyes as standard. It may be supplied with optional plinths for free standing floor mounting.

Optionally UL Listed:



Standard Features

Operator Interface Device (OID) with LED Annunciator and Digital Display:



General Controller Description

The Fire Pump Controller conforms to all requirements of the latest edition of NFPA 20, NFPA 70 and UL218 and is approved by Factory Mutual (FM).

The controller shall be available for either 12VDC or 24VDC operation. Included as standard, the controller is suitable for 230VAC or 120VAC input power at no additional cost.

Controller Standard Features

- The controller includes two 10 Amp battery chargers that are fully automatic.
- Two crank pushbuttons and two battery circuit breakers for protection and on/off operation.
- Key operated mode switch used with the OID mode push buttons
- AUTO, MANUAL, TEST, and OFF mode buttons illuminated with colored LED's for controller mode operation.
- Operator Interface Device (OID) with 4 lines by 20 character display with large character backlit LCD capable of being read in both direct sunlight or dark lighting conditions. English or Spanish languages are standard and selectable through the OID.
- The OID includes 12 pushbuttons for easy screen navigation, system mode changes, alarm reset, horn silencing, and lamp test.
- The built in annunciator includes multicolored LED's for alarm and mode indications. The annunciation LED's have removable labels that allow the user to easily make changes, if additional alarms and/or language changes are needed.
- All controller settings can be programmable through the OID. Programming changes are protected by two levels of passwords to prevent unauthorized modification.
- All features are enabled or disabled through the OID, so no jumpers or external wires are needed, making control logic field modification very easy.
- The OID displays System Pressure, Start Pressure, Battery 1 Voltage, Battery 2 Voltage, Battery 1 Charger Amps, and Battery 2 Charger Amps providing the operator instant system status. Other information that is displayed on the OID is the Lead starting battery, Current time and date, Number of starts, Total engine run hours, displayed countdown timers for: Sequential engine start and engine stop, and Time until AC Power fail start.
- The state of the art microprocessor based logic includes a real time/date clock that can operate for a minimum of 14 days without DC power connected to controller. The continuous pressure log, event log, alarm log and all user changeable set points and system data is stored in non-volatile flash memory and permanently stored and not lost even during extended power losses.
- One RS232 Serial Port, One RS485 Serial Port and One USB 1.0 Port are included as standard.
- If there is ever a need to change the internal components all wiring to the internal board is removable without the use of any special tools or soldering.

Auxiliary alarms and contacts

As standard the controller includes 6 discrete auxiliary inputs, 9 form 'C' auxiliary relay outputs. These auxiliary inputs and outputs are in addition to those mandated by NFPA 20. All auxiliary inputs, outputs, and OID LED's are field programmable making it very easy to make changes to the controller in the field. Through the OID the operator can select any 9 of the following auxiliary

alarms which will be recorded in the event/alarm logs and annunciated with an LED and/or output relay contact:

ENGINE QUIT FAULT	HIGH ENGINE OIL TEMPERATURE
PRESSURE TRANSDUCER FAULT	LOW JACKET WATER FLOW
PUMP ON DEMAND	LOW JACKET WATER LEVEL
LOW DISCHARGE PRESSURE	LOW HYDRAULIC PRESSURE
HIGH DISCHARGE PRESSURE	GAS DETECTION
REMOTE START SIGNAL	LOW FIREWATER PRESSURE
DELUGE VALVE START	AIR DAMPER CLOSED
HIGH FUEL LEVEL	AIR DAMPER OPEN
FUEL SPILL	LOW PURGE PRESSURE
FUEL TANK RUPTURE	LOW GEAR OIL PRESSURE
LOW PUMP ROOM TEMPERATURE	LOW COOLANT LEVEL
RESERVOIR LOW	HIGH GEAR OIL TEMPERATURE
RESERVOIR EMPTY	HIGH VIBRATION
RESERVOIR HIGH	LOW FUEL PRESSURE
FLOW METER ON	HIGH EXHAUST TEMPERATURE
RELIEF VALVE OPEN	HIGH FUEL TEMPERATURE
LOW SUCTION PRESSURE	PUMP ON DEMAND

Data logging:

The controller has three separate data logs for storing system data. The logs are readable through the OID or printable on the internal optional printer. These logs are as follows:

Pressure Log: The Pressure log provides a continuous pressure recording for a minimum of 7 days. Depending on settings determined by the operator the pressure log can store more than 30 days of data. Each time the pressure log records a pressure it includes the time and date of the reading and is stored in permanent non-volatile flash memory. The data recorded in the pressure log can be searched by each sample, by minute, or by hour allowing for easy access to specific data.

Event Log: The event log will store a minimum of 3000 events. These events include any of the following events/alarms:

BATTERY 1 FAULT	SYSTEM AUTO MODE
BATTERY 2 FAULT	ENGINE LOCKOUT SIGNAL
BATTERY 1 LOW VOLTAGE	SYSTEM AUTO MODE
BATTERY 2 LOW VOLTAGE	SYSTEM MANUAL MODE
CHARGER 1 FAULT	SYSTEM OFF MODE
CHARGER 2 FAULT	SYSTEM TEST RUN
AC POWER FAIL	ALARM RESET
ENGINE OVERSPEED	LOW PRESSURE CONDITION
ENGINE FAILED TO START	LOW PRESSURE START
ENGINE QUIT	DELUGE START
ENGINE LOW OIL PRESSURE	REMOTE START
ENGINE HIGH WATER TEMP	AC POWER FAIL START
PRESSURE TRANSDUCER FAULT	HORN SILENCED
STOP PUSHBUTTON PRESSED	PRESSURE DROP

Plus any of the 9 programmable auxiliary alarms listed above

Alarm Log: The Alarm Log is a separate subset of the event log and displays the last 10 alarms recorded in the system.

Every event or alarm that is recorded includes the following data with the recorded event or alarm:

- Time and Date of Event or Alarm
- System Pressure
- Descriptive Text Message of the Event/Alarm
- System Auto Mode Status
- Engine Running Status
- Charger 1 Status
- Charger 2 Status
- Battery 1 Status
- Battery 2 Status
- AC Power Status
- Fuel Level Status

Controller Operation

Automatic Mode:

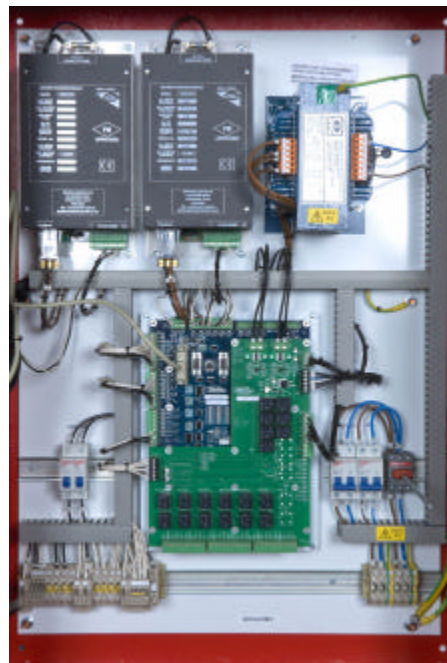
Starting conditions such as pressure drop, and deluge valve start, will cause the user adjustable sequential start delay timer to begin operation. After the start delay is completed the engine will start and the operation will be recorded in the event log. In addition to the sequential start timer the Automatic Weekly Test Start, AC Power Fail Start are programmable by the user through the OID. All system statistics are continuously monitored and changes are logged into the internal logs. System statistics include, but are not limited to, battery charger volts/amps, battery voltage, and system pressure is continuously monitored and changes are logged in memory.

Stopping conditions: Auto Engine Stop delay, engine lockout, low suction shutdown, automatic stop during automatic weekly test for low oil pressure and high water temperature are all OID user programmable features.

Events and Alarms are recorded in the appropriate logs at the time of their occurrence. Pressure is continuously monitored and changes in voltage that exceed user programmed amounts are logged into memory.

Manual Mode:

If a control logic failure occurs, two crank pushbuttons are provided that will bypass all internal logic and allow manual operation of the engine.



Options

Option A: Alternator diode block

Allows both batteries to be charged simultaneously from the alternator output. Maximum current carrying capacity is 60A.

Option E1: Engine heater output

Circuit breaker protected mains engine heater output, up to a maximum of 3kW.

Option E2: Engine heater output

Second engine heater output.

Option G: Space Heater

Internally wired thermostat or humidistat and anti-condensation heater.

Option N: 24v Louvre Output

A special fuse protected output to generate a 24v louver control output on a 12V controller.

Option T1: Cabinet mounting lugs

External mounting lugs for easier installation and mounting.

Option T3: Plinth (Legs)

Suitably sized legs to enable the controller to be floor mounted.

Option T4: A.V Mounting kit

Anti-vibration kit for mounting the controller directly onto the engine skid.

Option Y : Printer

An internally mounted printer to enable the user to make hard copies of the various event and pressure logs.

Enclosure

The following NEMA type enclosures are also available: 4, 4X (Painted Cold Rolled Steel), 4X (Unpainted 304 or 316 Stainless Steel), and 12.

Type Designation

EFP/XX/YY/FD4e/ZZ

XX = Battery voltage

YY = AC mains supply voltage

ZZ = Letter of options fitted

Specifications

General Controller Description

The Fire Pump Controller shall be factory assembled, wired and tested as a unit and shall conform to all requirements of the latest edition of NFPA 20, NFPA 70 and UL218 and be Third Party approved by Factory Mutual (FM). The controller shall be available for either 12VDC or 24VDC systems.

Controller Equipment Features

The controller shall include the following standard features:

- Configurable for either 230VAC or 120VAC input power without additional parts or wiring.
- NEMA Type 2 drip proof metal wall mounting enclosure.
- Dual Battery chargers, 10A
- Two crank pushbuttons and battery circuit breakers.
- Key operated mode switch used in conjunction with the OID mode push buttons.
- AUTO, MANUAL, TEST, and OFF mode buttons illuminated with colored LED's for controller mode operation.
- Operator Interface Device (OID) with 4 lines by 20 character display with large character backlit LCD capable of being read in both direct sunlight or dark lighting conditions.
- 12 pushbuttons for easy screen navigation, system mode changes, alarm reset, and horn silencing.
- Multicolored LED's for alarm and mode annunciation.
- LEDs shall be labeled with removable labels to allow for easy field modification if additional alarms and/or language changes.
- All controller settings shall be programmable through the OID and shall be protected by two password levels.
- All features shall be enabled or disabled through the OID, no jumpers or external wires shall be needed or allowed to activate or deactivate a feature.
- The system status data shall be displayed on the OID.
The displayed items shall include: System pressure, Battery 1 Voltage, Battery 2 Voltage, Battery 1 Charger Amps, Battery 2 Charger Amps, Lead starting battery, Current time and date, Number of starts, Total engine run hours, Displayed countdown timers for: Sequential engine start and engine stop, and Time until AC Power fail start.
- Audible alarm with alarm silence feature for muteable alarms.
- Lamp test feature.

- English or Spanish languages selectable through the OID.
- Microprocessor based logic with real time/date clock capable of running a minimum of 14 days without DC power connected to controller and non-volatile flash memory to permanently store the continuous pressure log, event log, alarm log and all user changeable set points and system data. Battery backup of any kind not allowed.
- Input and output status LED's to provide visual indication of each discrete input's or output's on/off status.
- One RS232 Serial Port.
- One RS485 Serial Port.
- One USB 1.0 Port.
- All wiring terminals on PCB's shall be removable type.

Auxiliary alarms:

As standard the controller shall include 6 discrete auxiliary inputs, 9 form 'C' auxiliary relay outputs. These auxiliary inputs and outputs are in addition to those mandated by NFPA 20. All auxiliary inputs, outputs, and OID LED's shall be field programmable through the OID. This permits a multitude of customizable controller configurations to meet each installations unique requirements without adding cost to the controller. The use of jumpers, soldering, or other external components is not necessary.

The user can select any 9 of the following auxiliary alarms that can be programmed and recorded in the event/alarm logs and annunciated with an LED and output relay contact:

ENGINE QUIT FAULT	HIGH ENGINE OIL TEMPERATURE
PRESSURE TRANSDUCER FAULT	LOW JACKET WATER FLOW
PUMP ON DEMAND	LOW JACKET WATER LEVEL
LOW DISCHARGE PRESSURE	LOW HYDRAULIC PRESSURE
HIGH DISCHARGE PRESSURE	GAS DETECTION
REMOTE START SIGNAL	LOW FIREWATER PRESSURE
DELUGE VALVE START	AIR DAMPER CLOSED
HIGH FUEL LEVEL	AIR DAMPER OPEN
FUEL SPILL	LOW PURGE PRESSURE
FUEL TANK RUPTURE	LOW GEAR OIL PRESSURE
LOW PUMP ROOM TEMPERATURE	LOW COOLANT LEVEL
RESERVOIR LOW	HIGH GEAR OIL TEMPERATURE
RESERVOIR EMPTY	HIGH VIBRATION
RESERVOIR HIGH	LOW FUEL PRESSURE
FLOW METER ON	HIGH EXHAUST TEMPERATURE
RELIEF VALVE OPEN	HIGH FUEL TEMPERATURE
LOW SUCTION PRESSURE	PUMP ON DEMAND

Data logging:

The controller shall have three separate data logs for storing system data that is readable through the OID or printable on the internal printer. These logs shall be as follows:

Pressure Log: The controller shall have a Pressure log with continuous pressure recording of minimum of 7 days and be capable of storing more than 30 days of data. The pressure log samples shall be time and date stamped and stored in permanent non-volatile flash memory. The pressure log shall be searchable by each sample, by minute, or by hour.

Event Log: The event log shall be capable of storing no less than 3000 events.

These events shall include any of the following events/alerts:

BATTERY 1 FAULT	SYSTEM AUTO MODE
BATTERY 2 FAULT	ENGINE LOCKOUT SIGNAL
BATTERY 1 LOW VOLTAGE	SYSTEM AUTO MODE
BATTERY 2 LOW VOLTAGE	SYSTEM MANUAL MODE
CHARGER 1 FAULT	SYSTEM OFF MODE
CHARGER 2 FAULT	SYSTEM TEST RUN
AC POWER FAIL	ALARM RESET
ENGINE OVERSPEED	LOW PRESSURE CONDITION
ENGINE FAILED TO START	LOW PRESSURE START
ENGINE QUIT	DELUGE START
LOW OIL PRESSURE	REMOTE START
HIGH WATER TEMP	AC FAILURE START
TRANSDUCER FAULT	HORN SILENCED
STOP PB PRESSED	PRESSURE DROP

(Plus any of the 9 programmable auxiliary alarms listed above)

Alarm Log: The Alarm Log shall be a separate subset of the event log and shall display the last 10 alarms recorded in the system.

Each event or alarm recorded in the either event log or alarm logs shall have the following data recorded with the event/alarm:

- Time and Date of Event or Alarm
- System Pressure
- Descriptive Text Message of the Event/Alarm
- System Auto Mode Status
- Engine Running Status
- Charger 1 Status
- Battery 1 Status
- Fuel Level Status
- Charger 2 Status
- Battery 2 Status
- AC Power Status

The internal logic of the controller shall be capable of operation in a temperature range of 0°C to 50°C and high, non-condensing, humidity levels.

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