

# Fire Pump Controller

For Electric Motor Driven Fire Pumps



## Part Winding Reduced Current Types

### Series MP420 - Combined Manual and Automatic

Metron Fire Pump Controllers conform to the latest requirements of Chapter 10, National Fire Protection Association Pamphlet 20, Standard for Centrifugal Fire Pumps as adopted by Underwriters Laboratories and Factory Mutual. They are withstand rated and listed by Underwriters' Laboratories and approved by Factory Mutual Research Corporation.

Sizes range from 15 to 700 horsepower, 200 to 600 volts, 60 Hz. These controllers are for use on Reduced Voltage type installations.

Only the highest quality components, all UL listed or UL recognized, are used throughout to assure the best possible reliability. The cabinet is fabricated of heavy gauge reinforced steel with drip-proof hood. All field wiring and service connections may be made from the front, allowing the controller to be mounted flush against a wall.

The controller is completely wired, assembled, and tested at the factory before shipment, and ready for immediate installation.



MP420 Fire Pump Controller



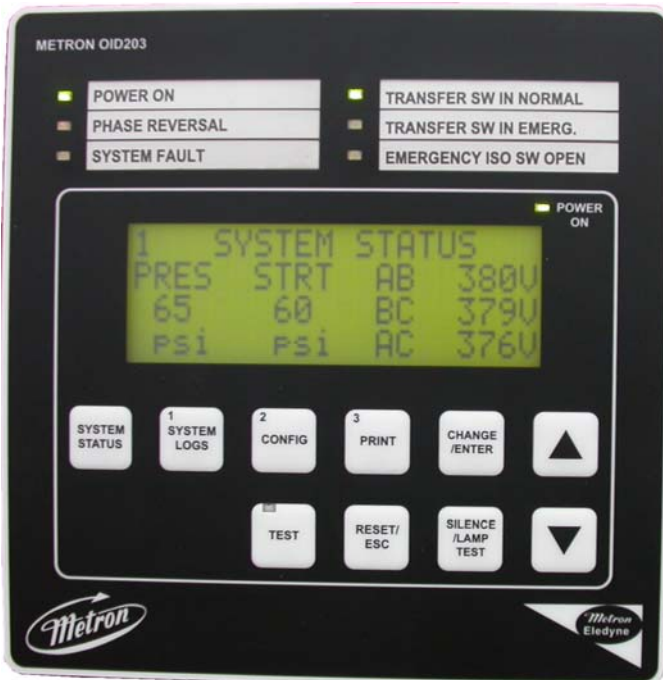
# Standard and Optional Features

## Standard Features

### Series M420

Part Winding Fire Pump controllers can be used when full voltage starting may not be desired or practical. Starting contactors operate in sequence to energize a portion of the motor windings on start which reduces inrush current to approximately 65% of normal. An adjustable timing relay is provided to control time between reduced current start and normal running operation. An emergency start lever to close starting contactor independent of automatic control circuits is also supplied as standard. When used, this lever will bypass the reduced voltage start feature and start the motor with full inrush current drawn from the power source.

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



- NEMA Type 2 drip proof metal freestanding enclosure
- Operator Interface Device (OID) with 4 lines by 20 character display with large character backlit Liquid Crystal Display (LCD) capable of being read in both direct sunlight or dark lighting conditions
- 10 pushbuttons for easy screen navigation, LED lamp test, alarm reset, controller test and horn silencing
- Removable labels to allow for easy field language changes
- All controller settings are programmable through the OID. All features are enabled or disabled through the OID, no

jumpers or external wires are needed allowing easy field modification

- The system status data is displayed on the OID. The displayed items include: System pressure, Phase to Phase (AB, BC, AC) voltage, Phase current (A, B, C), Current time and date, System Events and Notifications such as Remote Start, Local Start etc., Number of starts, Total motor run hours, Time remaining on sequential motor start and motor stop timers, Status of automatic stop setting.
- Auxiliary alarm functions displayed on the OID LCD screen
- Audible horn with silence feature for silencable alarms
- Lamp test feature
- Foreign languages selectable through the OID
- Microprocessor based logic with real time/date clock capable of running a minimum of 14 days without AC power connected to controller
- SD Memory card used to record pressure log, event and log, and auxiliary user programs. Pressure log is stored in separate comma delimited ASCII text files with each file containing data for one day. The SD card is removable and can be read by any PC equipped with an SD card reader.
- Input and output status LED's provide visual indication of each discrete input's or output's on/off status
- One RS485 Serial Port
- MODBUS Communication Protocol via RS485 port
- Service Entrance Rated

### Standard Auxiliary alarms:

The controller includes as standard six (6) discrete auxiliary inputs, nine (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 Display can be field programmed through the OID.

Nine (9) of the following auxiliary alarms can be programmed and recorded in the event/alarm logs and annunciated on the OID display screen and/or output relay contact(s). These alarm conditions include:

- LOW PUMP ROOM TEMP
- RESERVOIR LOW
- RESERVOIR EMPTY
- RESERVOIR HIGH
- FLOW METER ON
- RELIEF VALVE OPEN
- LOW SUCTION PRESSURE
- HIGH PUMP ROOM TEMPERATURE LOW
- FIREWATER PRESSURE
- LOW PURGE PRESSURE
- LOW GEAR OIL PRESSURE





# Fire Pump Controller

## For Electric Motor Driven Fire Pumps



### Model MP420 Part Winding Start Microprocessor Electric Motor Fire Pump Controller

## 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 be Third Party Listed by Underwriters Laboratories (UL) and Approved by Factory Mutual (FM). The controller shall be available for 208, 230, 380-415, or 480 volt three phase power.

#### Controller Equipment Features

The controller shall include the following standard features:

- NEMA Type 2 drip proof metal freestanding enclosure
- The Controller shall be designed for Part Winding starting. The starting contactors shall operate in sequence to energize a portion of the motor windings on start which reduces inrush current to approximately 65% of normal. An adjustable timing relay shall be provided to control time between reduced current start and normal running 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
- 10 pushbuttons for easy screen navigation, system test, lamp test, 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 of 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, Phase to Phase (AB, BC, AC) voltage, Phase current (A, B, C), System Events and Notifications, Current time and date, Number of starts, Total motor run hours, Displayed countdown timers for: Sequential motor start and motor stop, Status of Automatic Stop Setting.

- Audible horn with silence feature for silencable alarms
- Lamp test feature
- Foreign languages selectable through the OID
- Microprocessor based logic with real time/date clock capable of running a minimum of 14 days without AC 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 RS485 Serial Port
- MODBUS Communication Protocol via RS485 port
- All wiring terminals on PCB's shall be removable type
- Service Entrance Rated

#### 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 screens shall be field programmable through the OID. This permits a multitude of customizable controller configurations to meet each installations unique needs without adding cost to the controller. The use of jumpers, soldering, or other external components are not allowed.

The user can select any 9 of the following auxiliary alarms that can be programmed and recorded in the event log and annunciated with an OID screen and output relay contact for conditions such as but not limited to:

LOW PUMP ROOM TEMP  
RESERVOIR LOW  
RESERVOIR EMPTY  
RESERVOIR HIGH  
FLOW METER ON  
RELIEF VALVE OPEN  
LOW SUCTION PRESSURE  
HIGH PUMP ROOM TEMPERATURE  
LOW FIREWATER PRESSURE  
LOW PURGE PRESSURE  
LOW GEAR OIL PRESSURE  
HIGH GEAR OIL TEMPERATURE  
GAS DETECTION  
HIGH VIBRATION  
EMERGENCY POWER ON  
PUMP ROOM DOOR OPEN

#### Data logging

The controller shall have separate data logs for storing system data that is readable through the OID.

**Pressure Log:** The controller shall have a Pressure log with continuous pressure recording of 30 days of data. The pressure log samples shall be time and date stamped and stored on a removable SD card memory. The pressure log shall be searchable by each sample, by minute, or by hour. Each days entries shall be stored in a separate file on the SD card. SD memory shall be readable by any PC equipped with an SD memory card reader.

**Event Log:** The event log shall be capable of storing no less than 3000 events. These events shall include, but is not limited to, any of the following events/alarms:

PUMP RUNNING  
POWER AVAILABLE  
PHASE REVERSAL  
MOTOR OVERLOAD  
REMOTE START  
LOCAL START  
PUMP ON DEMAND  
SYSTEM FAULT  
PRESSURE TRANSDUCER FAULT  
PUMP FAILED TO START  
LOW INTAKE SHUTDOWN ALARM  
SUPERVISORY POWER FAILURE  
LOW PRESSURE  
AUTO WEEKLY TEST START  
UNDER FREQUENCY  
OVER FREQUENCY  
LOW ZONE / HIGH ZONE CONTACTS  
HIGH DISCHARGE PRESSURE  
NO LOAD CONDITION

Each event or alarm recorded in the event log 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
- Motor Running Status
- Phase to Phase Volts
- Phase Amps

The internal logic of the controller shall be capable of operation in a temperature range of 4.4°C to 40°C and high, non-condensing, humidity levels.

The controller shall be manufactured by Metron.