

# Fire Pump Controller

For Electric Motor Driven Fire Pumps



## High Voltage Controllers

### Series MP600 - Combined Manual and Automatic

The Metron Series MP600 High Voltage Fire Pump Controllers are a modular concept system, which utilize "state-of-the-art" vacuum bottle technology. The primary control element in the MP600 is a fixed mount style vacuum bottle contactor with isolating disconnect switch. Integral to the disconnect switch are "R" rated current limiting cartridge style fuses. Space is provided for storage of three spare fuses on the rear of the outer door. Two fused potential/control transformers (PTs) are also contained within the cabinet. These transformers provide both input signals to the monitor circuits as well as control power for the MP600. For testing purposes, it is possible to supply 120VAC power directly to the control section through a built-in test receptacle and test switch.

The MP600 has both front and rear access. Front access is for easy access to the control circuits. Rear access is provided for termination of the incoming power and termination of the motor connections. Incoming power and motor connections enter through the bottom of the controller enclosure.

Locked rotor motor protection is provided by the microprocessor control unit per the requirements of NFPA 20, Chapter 10.

The microprocessor control unit also provides contacts for remote alarm of phase reversal, low voltage, single phase, loss of voltage, motor tripped, and motor overload. The Operator Interface Device (OID) has LED lamps for Power On, Power Failure, System Failure, Motor Overload, and Motor Tripped. The OID also displays three phase voltage and current along with system water pressure.

The standard MP600 is supplied in a NEMA type 2 enclosure which is fabricated from 12 gauge steel. Minimum floor clearance of 12 inches (304.8 mm) is provided with allowances for floor anchoring. The MP600 is protected with two hinged removable, gasketed doors, equipped with a 3-point latch, one door for the control section and one door for the high voltage section. Access to the vacuum contactor is provided by a lockable and interlocked second door, which requires the contactor to be disengaged from the bus prior to opening the door. Control wiring and components are accessible behind their own access door. Access to control components does not require motor de-energization.

A solid copper ground bus is provided through the incoming high voltage and motor termination compartments.



MP600 Fire Pump Controller



# Standard and Optional Features

## Standard Features

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



- NEMA Type 2 drip proof metal freestanding enclosure
- Vacuum Bottle Contactor
- "R" Rated Current Limiting Fuses
- Emergency Mechanical Start Mechanism
- Rated Voltage 2300-6600
- Rated Current 400A
- Built-in Spare Fuse Storage
- UL Listed to 7.2Kv
- 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.
- 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
- RS485 Communications Port
- MODBUS Communication Protocol via RS485 port

#### **Standard Auxiliary alarms:**

The controller includes as standard six (6) discrete auxiliary inputs, seven (7) 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.

Seven (7) 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 TEMP.
- LOW FIREWATER PRESSURE
- LOW PURGE PRESSURE
- LOW GEAR OIL PRESSURE
- HIGH GEAR OIL TEMP.
- GAS DETECTION
- HIGH VIBRATION
- PUMP ROOM DOOR OPEN
- LOW INTAKE

**Data logging:**

The controller includes two (2) separate data logs for storing system data that is readable through the OID or copied to a computer equipped with an SD card reader. The 2 data logs are as follows:

**Pressure Log:** The pressure log provides a continuous pressure record for 30 days. The pressure log samples shall be time and date stamped and stored in permanent non-volatile SD memory card. The pressure log can be searched by each sample, by minute, or by hour through the OID.

**Event Log:** The event log will store up to 3000 of the most current events. These events can include, but is not limited to, any of the following events/alarms:

- PUMP RUNNING
- POWER AVAILABLE
- PHASE REVERSAL
- MOTOR OVERLOAD
- MOTOR TRIPPED
- REMOTE START
- LOCAL START
- PUMP ON DEMAND
- SYSTEM FAULT
- AUTO MODE
- 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

**Options**

**Option H: Space Heater**

If the ambient atmosphere is especially damp, a space heater rated at 100 watts may be supplied to reduce moisture in the cabinet. A thermostat is supplied as standard with this option. A humidistat may be substituted if specified.

**Option T: Weekly Test Start Solenoid**

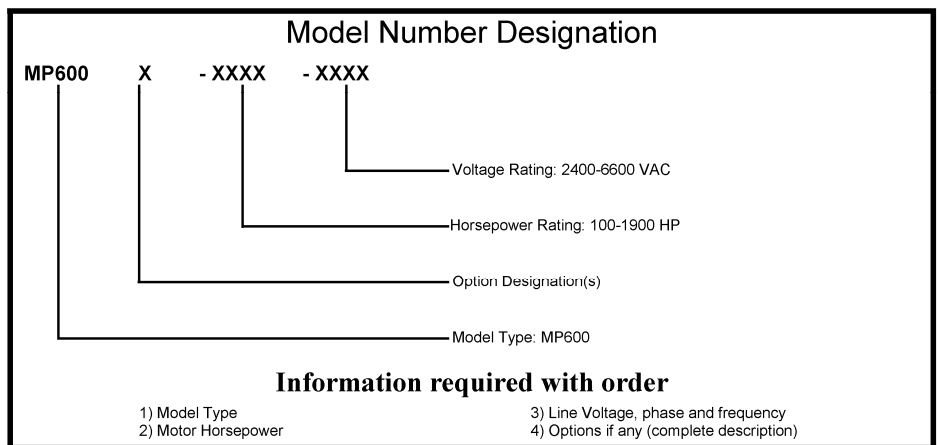
In some cases it may be desirable to have the electric motor run at a preset time each week for approximately 30 minutes. The controller includes a built in weekly test function. This option complements the standard function by simulating a loss of pressure. Simulation of pressure loss is accomplished by opening a solenoid valve, which reduces the system pressure below the starting pressure of the controller.

**Option W: Omit Legs**

For systems where the controller is mounted on a common skid with the pump and motor, the legs of the controller may be omitted, 3" (76.2mm) channels may be substituted in lieu of standard legs. If specified, lifting eyes may also be supplied.

**Enclosure**

The following NEMA type enclosures are also available: 3R, 4, 4X (Painted Cold Rolled Steel), 4X (304 or 316 Stainless Steel), and 12



<b>Standard Short Circuit Ratings: Model MP600</b>	
2400 Volts	50KA
3300 Volts	50KA
4160 Volts	50KA
6600 Volts	50KA

# Fire Pump Controller

## For Electric Motor Driven Fire Pumps



### Model MP600 Across-the-line Start Microprocessor Electric Motor Fire Pump Controller

## Specifications

#### General Controller Description

The fire pump controller shall be listed by Underwriters Laboratories and approved by Factory Mutual for fire pump service. The fire pump shall be completely factory wired, assembled, and tested prior to shipment.

The motor contactor shall be rated at least 400 amps, 7200 VAC, be of the vacuum type, and shall be suitable for use on a circuit capable of delivering not more than 50KA at 7200 VAC short circuit current. The contactor shall be interlocked with the controller door to prohibit the door from being opened while the contactor is racked in. The main disconnect switch shall contain integral fuse clips capable of holding "R" rated motor protection type fuses. Suitable high voltage fuses shall be supplied and sized to hold motor locked rotor current as per NFPA 20. Internal space shall be provided for spare fuse storage.

#### Controller Equipment Features

The controller shall include the following standard features:

- NEMA Type 2 drip proof metal freestanding enclosure
- 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
- LED's for alarm and status 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
- 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
- RS485 Communications Port
- MODBUS Communication Protocol via RS485 port
- All wiring terminals on PCB's shall be removable type

#### Auxiliary alarms

As standard the controller shall include 6 discrete auxiliary inputs, 7 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 7 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
- PUMP ROOM DOOR OPEN
- LOW INTAKE

#### 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
- MOTOR TRIPPED
- REMOTE START
- LOCAL START
- PUMP ON DEMAND
- SYSTEM FAULT
- AUTO MODE
- 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.