

MPT Electric Fire Pump Controller

This manual provides general information, installation, operation, maintenance, and system setup information for Metron MPT Electric Fire Pump Controllers and MPT Electric Fire Pump Controllers with Metron Transfer Switch.

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History of Changes

Rev. No.	Date	Description of Changes
A	October 2015	Initial Release
B	July 2016	Added “Unloaded Run Time” set point.
C	October 2016	Update text so manual can be used with non-MTS controllers Changed “Alternate” to “Emergency” Removed “top entry” restriction
D	September 2017	Updated Eledyne contact info

Introduction

Metron MPT Electric Fire Pump Controllers are microprocessor based controllers intended for use with electric motor driver fire pumps. The controller's purpose is to automatically start the fire pump electric motor upon a drop in pressure in the water main or from a number of other demand signals. The MPT provides alarm and/or alarm shutdown protection for various motor and power failures. Stopping the motor after the demand period is over may be performed either manually or automatically.

Approvals

Metron MPT controllers are listed by Underwriter's Laboratories, Inc., in accordance with UL218, Standard for Industrial Controls; and CSA, Standard for Industrial Control Equipment (cUL); and Approved by Factory Mutual and New York City. They are built to meet or exceed the requirements of NFPA 20 (Installation of Centrifugal Fire Pumps).

NOTICE Read these instructions thoroughly before installing and operating the controller. If there are still questions, contact your Metron factory representative for assistance.

Installation

The controller has been assembled and wired at the factory with the highest workmanship standards. All wiring and functions have been thoroughly tested to ensure correct operation when properly installed. The installed should be completely familiar with the external hookup of the pump junction box to the fire pump controller. All national and local electric codes should be used for proper installation, wiring, and grounding of the controller prior to startup.

Receiving, Handling, and Storage

1. Immediately upon receipt, carefully unpack and inspect the controller for damage that may have occurred in shipment. If damage or rough handling is evident, file a damage claim with the transportation carrier immediately.
2. If the controller must be stored, cover it and then place it in a clean, dry location. Avoid unheated locations, where condensation can result in damage to the insulation or corrosion of metal parts.

Precautions

CAUTION



To avoid risk of **SERIOUS INJURY or DEATH**, and to avoid damage to the controller, **READ THIS SECTION CAREFULLY**. If questions or concerns still exist, contact the Metron factory for further clarification.

ARC FLASH



Do not operate controls or open covers without appropriate personal protection equipment. Failure to comply may result in **SERIOUS INJURY or DEATH!** Refer to NFPA70E for PPE requirements.

HAZARD

If work must be carried out on the motor or controller, ensure the controller is **ISOLATED AND LOCKED OFF** from the AC mains supply before work commences. Lockout/Tag out procedures should be followed in accordance with NFPA standard and any local standards that may apply.

During installation and maintenance, to prevent automatic starting of the motor press and hold the **STOP** key. The system will be in a configuration mode and

will not start the motor. Configuration mode will last for five (5) minutes, unless the on-screen "Exit Config Mode" button is pressed.

Installation Instructions

Mounting

The controller should be mounted using appropriate fixing methods:

- A. If the controller is mounted directly to the pump skid, anti-vibration mounts should be used.
- B. If the controller is mounted to a wall, it should use the four (4) external mounting holes of the controller cabinet. Suitable fixings to the wall should be used taking into consideration the weight of the controller. It is recommended that the controller be mounted at least 12 inches (300mm) above floor level.

Electrical Connections

DANGER



Electric shock may result in **SERIOUS INJURY OR DEATH**. Electrical connections should be made by a qualified electrical engineer only.

SHOCK HAZARD

Refer to Field Connection drawing supplied with the controller.

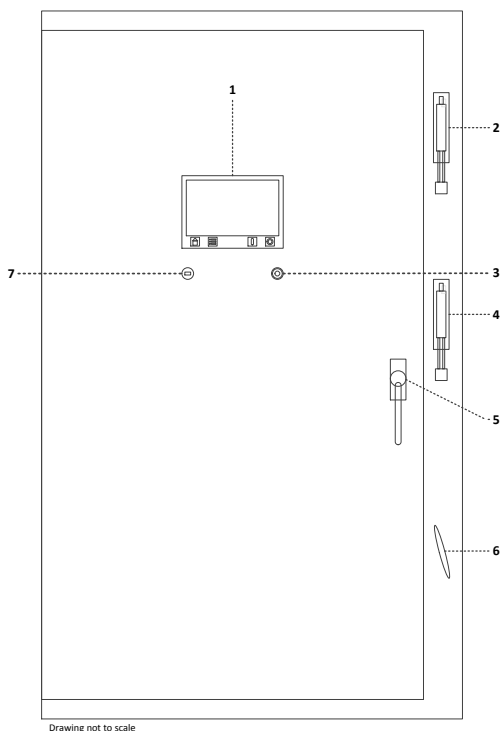
- All national and local electric codes should be used for proper installation, wiring, and grounding of the controller prior to startup.
- **Warning:** The installer is responsible for ensuring no metallic foreign objects (such as drilling chips, etc.) fall inside the controller onto the electrical circuit. Failure to observe this could result in damage to the controller and will void the controller warranty.
- The cabinet should be properly grounded per the requirements of NFPA 70.
- NOTE: It is highly recommended, although not essential, that the following recommendations are considered:
 - All signal wiring should be separated from power feeds and supplies. Where the two must be in close proximity, it is advisable that they are located at right angles to each other.
 - Signal wiring will be less prone to disturbances if contained within grounded conductive conduit or trunking. Avoid

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- passing signal cables in close proximity of known interference sources, or high power electrical equipment where possible.
- Refer to the Field Connection diagram for wiring sizes.

Installation

Cabinet Overview



Item	Description
1	Operator Interface Device (OID)
2	Normal Power Source Isolation Switch Circuit Breaker
3	USB Port
4	Emergency Power Source Isolation Switch Circuit Breaker (MTS Only)
5	Cabinet Door Handle
6	Emergency Start Handle
7	Horn/Sounder

Powering On the Controller

After electrical connections have been made, follow these steps to power on the controller.

1. Press and hold the hold the **STOP** key to prevent automatic starting of the motor upon power up. The system will remain in configuration mode for five (5) minutes.
2. Turn the Normal Power Source Isolation Switch Circuit Breaker to the On position.
3. Turn the Emergency Power Source Isolation Switch Circuit Breaker to the On position. (MTS Only)

Opening the Cabinet Door

ARC FLASH



HAZARD

Do not open door or cover without appropriate personal protection equipment. Failure to comply may result in **SERIOUS INJURY or DEATH!** Refer to NFPA70E for PPE requirements.

DANGER



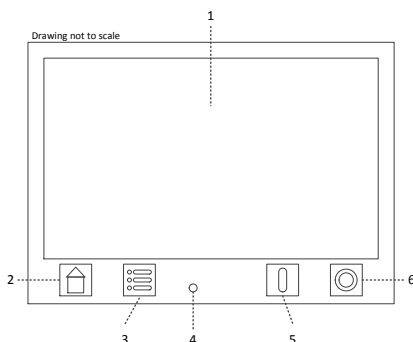
ARC FLASH

Arc Flash or electric shock may result in **SERIOUS INJURY OR DEATH.** Always wear an arc flash suit when opening the cabinet door.

In order to open the door, both the normal power source and emergency power source isolation switch circuit breakers must be in the off position.

Operator Interface Device (OID) Use and Navigation

The Operator Interface Device (OID) provides visual indication of the alarms, status of system parameters, and an interface for adjusting set points to configure the MPT.



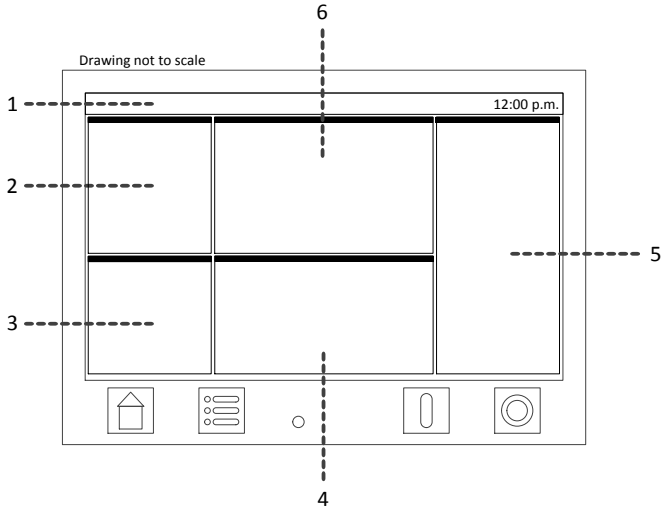
Item	Description
1	LCD Touchscreen
2	Home key This key will always return the on-screen window to the Home window.
3	Main Menu key This key will always return the on-screen window to the Main Menu window.
4	Alarm LED The LED will illuminate when an alarm occurs.
5	Manual Start key This key will manually start the pump. The motor will continue to run until it is stopped using the Manual Stop key.
6	Manual Stop key This key will stop the pump only after all starting causes have returned to normal.

ATTENTION



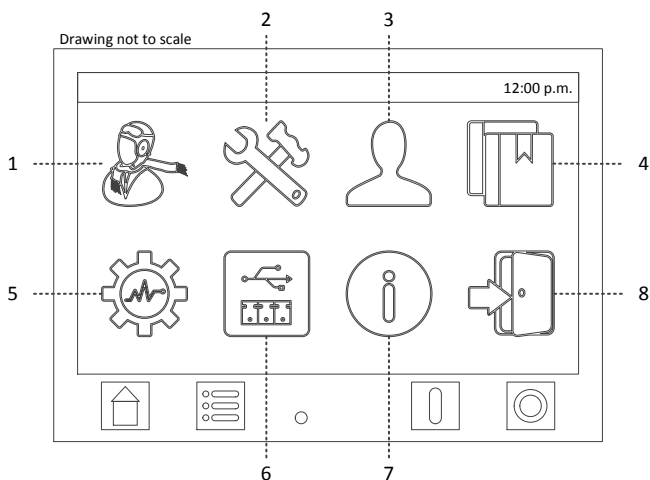
Touch one button at a time. Touching the touchscreen with multiple fingers may result in unintended operation.

Home Window



Item	Description
1	Window Status Bar Displays the date, time, and background activity such as downloading to a USB memory stick.
2	Motor Status Panel Displays the status of the motor: Idle, Starting, Running, Stopping. Also displays the motor run time and the remaining minimum run time.
3	System Pressure Panel Displays the system pressure, start pressure set point, stop pressure set point, and the automatic stop option set point.
4	Power Panel Displays the voltage and current for all three phases of the connected power source (normal or emergency).
5	Alarm Panel Displays the list of active and recent alarms. Touching a "cleared" alarm will remove it from the list.
6	Controller Status Panel Displays status information about the controller.

Main Menu Window



Item	Description
1	Quick Start Begins the Quick Start set point configuration process for start up of controller.
2	System Set Points Displays a list of all controller, motor, power, and alarm set points.
3	User Preferences Displays a list of all user preference set points.
4	Data Log Lists options for viewing the data log, motor startup graph, and motor run stats.
5	Diagnostics & Tests Lists options for calibrations, test starts, and PCB info.
6	Devices Lists options for connected devices, such as Modbus and USB Memory Sticks.
7	About
8	Log In/Log Out

User Log In

Navigating and viewing set point configurations is allowed at all times; however, changing any set point configuration requires the user password. The user password is shown below. This password is also on a label affixed to the cabinet door on the inside.

When prompted for the user password, enter the following pin number:

1 2 3 3 3 3

Logging Out

If there is no user activity on the OID after five minutes, the login state is automatically logged out.

To manually log out:

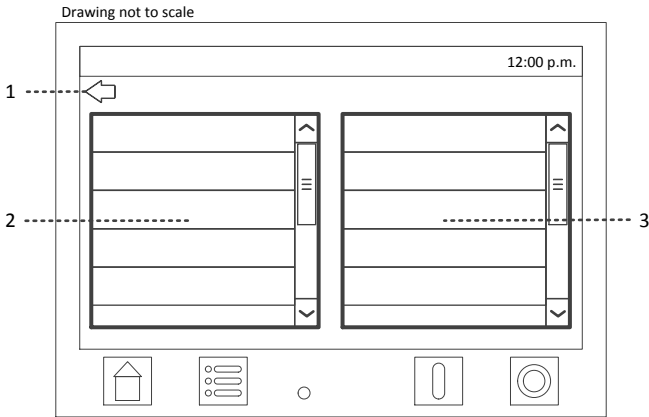
- From the Main Menu window, touch the *Log Out* button.

Configuring System Set Points

WARNING


Modifying set points may cause the motor to start unexpectedly. Adjustments should be performed by qualified personnel only.

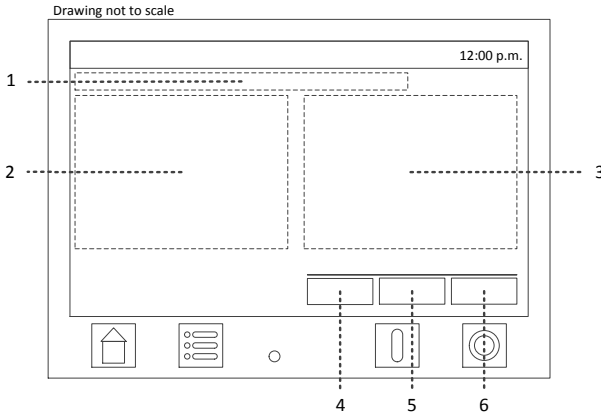
Touching the *System Set Points* button or the *User Preference* button on the *Main Menu Window* will load a new window with the following layout:



Item	Description
1	Back Button This button will return to the previous window.
2	Category List Contains a list of high level set point categories. Touching an item will populate the Settings List with category specific set points.
3	Settings List Contains a list of set points specific to the selected category. Touching an item will load the set point configuration window.

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The set point configuration window has the following layout:



Item	Description
1	Set Point Name
2	Description of Set Point
3	Configuration Area This area is specific to the set point being configured. It consists of standard user interface controls, such as list boxes, radio buttons, and spin lists, which are used to modify the set point value.
4	Default button Loads the default value for the set point, but does not close the window.
5	Cancel button Cancels any changes and returns to the previous window.
6	Set button Saves all changes and returns to the previous window.

Quick Start

The quick start feature is used to sequentially configure the primary system set points without having to navigate through the onscreen menu. The following set points are configured: *Language*, *Pressure Unit*, *Date & Time*, *Start Pressure*, *Stop Pressure*, *Start Delay*, *Automatic Stop*, *Min Run Time*, and *Auto Weekly Test Option*. Refer to Main Menu Window, Item 1, on page 11 above.

To perform a quick start:

1. From the Main Menu window, touch *Quick Start*.
2. Configure each set point one at a time, pressing the *Next* button to move to the next set point.
3. The window will return to the Main Menu after the last Quick Start set point has been configured.

NOTE: Canceling the Quick Start process will discard all changes.

Set Points List

System Set Point Window

Pressure Settings

- Start Pressure
- Stop Pressure
- High Pressure Option
- High Pressure Level
- High Pressure Alarm Delay
- Low Pressure Option
- Low Pressure Level
- Low Pressure Alarm Delay
- Pressure Change Data Log Event
- Max Time Between Pressure Event

Test Start Settings

- Dump Valve Timeout
- Shutdown on Alarm
- Auto Weekly Test Option
- Auto Weekly Test Day of Week
- Auto Weekly Test Start Time
- Auto Weekly Test Duration

Motor Start Settings

- Start Delay
- Pressure Sensor Failure Start
- Deluge Valve Start
- Restart Time Delay
- Start Transition Time Delay (MPT700)
- Allow Start with Phase Loss
- Remote Start Option
- Remote Start Normal Contact
- Supervisory Power Fail Start
- Supervisory Power Fail Start Delay

Motor Stop Settings

- Auto Stop
- Minimum Run Time
- Low Intake Shutdown
- Low Intake Trip Time
- Low Intake Auto Reset
- Low Intake Contact

Normal Power Settings

- Phase Order
- Low Voltage Trip Percent
- Low Voltage Time Delay
- High Voltage Trip Percent
- High Voltage Time Delay
- Phase Loss Time Delay
- Under Frequency Percent
- Under Frequency Time Delay
- Over Frequency Percent
- Over Frequency Time Delay

Emergency Power Settings¹

- Low Voltage Trip Percent
- Low Voltage Time Delay
- High Voltage Trip Percent
- High Voltage Time Delay
- Phase Loss Time Delay
- Under Frequency Percent
- Under Frequency Time Delay
- Over Frequency Percent
- Over Frequency Time Delay

Transfer Switch Settings¹

- Transfer to Emergency Delay
- Retransfer Delay
- Unloaded Run Time
- Emergency Source Type

High Zone Settings

- High Zone Option
- Start Contact to Low Zone
- Lockout Contact from Low Zone
- Start Delay
- Always Start

Aux Programs

- Aux Program 1–48

¹ MTS Only for all set points under category

User Preference Window

User Preferences

- Language
- GUI Theme
- Pressure Unit
- Temperature Unit
- Date Format
- Time Format
- Idle Timeout
- Change User Password

Date & Time

- Set Date
- Set Time
- Set Timezone
- Daylight Saving Time Option
- DST Start Date
- DST End Date

Screen Settings

- Brightness
- LCD Auto Dim
- Calibrate Touch Screen

Test Procedures

All of the following tests should be performed on each unit after installation. If each test is satisfactory, the operator may depend upon the controller operating properly when required. Any one of these tests may be carried out at any time after installation, if so desired.

Normal Source Phase Reversal Alarm

If upon initial power up the phase reversal alarm should sound, the following process can be used to correct the alarm:

- A. If a test of the motor rotation indicates that the motor is turning opposite of the correct direction:
 1. Turn the controller circuit breaker and isolation switch off.
 2. **Verify that incoming power on the load side of the controller isolation switch has been disconnected.**
 3. Reverse any two of the motor leads.
 - i. If there are multiple sets of motor leads, i.e., Part Winding start or Wye-Delta start, then both sets of leads must be reversed. Be certain to change the same set of wires at the two contactors.
 4. Turn the controller isolation switch and circuit breaker back on and check for correct rotation of the motor.
 5. Continue to part B below.
- B. If the motor is turning the correct direction, but a Phase Reversal alarm occurs, do the following:
 1. Press the **MENU** key on the OID.
 2. Touch the "System Set Points" icon on the LCD.
 3. On the left-hand side "Categories" listbox, touch the "Normal Power Parameters" item.
 4. On the right-hand side "Settings" listbox, touch the "Phase Order" item to load the set point configuration screen.
 5. Enter the user password, if prompted.
 6. Touch the desired set point value: ABC or BAC.
 7. Touch the **SET** button.

Automatic Pressure Start

1. Bleed off the system pressure until it drops below the *Start Pressure* set point.

2. The automatic start process should begin. Once the pump begins running, it will continue to run until:
 - a. the system pressure rises above the configured Stop Pressure, and
 - i. the **STOP** key is pressed, or
 - ii. if enabled, the Minimum Run Timer expires.

Manual Start

1. Pressing the **START** key to begin a manual start.
2. The pump will continue to run until the **STOP** key is pressed.

Note: pressing the **START** key while the pump is already running will disable the minimum run timer. The pump will continue to run until the **STOP** key is pressed.

Automatic Weekly Test Start

1. System pressure must be up and all other demand switches deactivated.
2. When the current day and time of day matches the settings under "Test Start Settings", the solenoid drain valve will energize and the pump will start. The pump will continue to run for the configured run time, and then stop automatically.
3. Should a real demand to start occur, the test timer will be canceled and the pump will continue to run until:
 - a. the demand to start is cleared, and
 - i. the **STOP** key is pressed, or
 - ii. if enabled, the Minimum Run Timer expires.

Remote Start Switch

1. When the Remote Start Option set point is enabled, closing Input 52/53 will initiate a remote start and the pump should start. Refer to field connection diagram.
2. The pump will continue to run until the **STOP** key is pressed.

Deluge Valve Start Switch

1. When the Deluge Valve Option set point is enabled, opening Input 50/51 will initiate a deluge valve start demand. Refer to field connection diagram.
2. When the configured Start Delay timer expires, the pump should start.

- a. If Input 50/51 closes before the Start Delay timer expires, the demand will be cleared and the pump will not start.
3. Once the pump begins running, it will continue to run until:
 - a. the system pressure rises above the configured Stop Pressure, and
 - i. the **STOP** key is pressed, or
 - i. if enabled, the Minimum Run Timer expires.

AC Power Failure Starting

1. If this option has been installed, it can be tested by disconnecting the supervisory power 115 VAC to the controller.
 - a. After the preset time delay the horn will sound and the alarm message will be displayed on the Home window.
 - b. If the Supervisory Power Failure Start set point is enabled, the motor should start after the preset time delay expires.

Electric Motor Lockout

Closing Input 48/49 will prevent the controller from automatically starting the pump and will stop the pump if it is already running under an automatic start condition. When the lockout feature is energized it is still possible to start the motor manually by pressing the **START** key or when a remote start signal is received.

Test Transfer (MTS Only)

To perform a test transfer:

1. Press the **MENU** key on the OID.
2. Touch the "Diagnostics & Tests" icon.
3. Touch the "Test Transfer" icon.
4. When prompted, confirm the test transfer by touching the "OK" button.
5. The controller should start the Genset and then transfer the motor to the emergency source.

Emergency Source Phase Reversal Alarm (MTS Only)

If upon initial power up with the transfer switch connected to the emergency source, the phase reversal alarm should sound, the following process can be used to correct the alarm, assuming the motor rotation is correct on the Normal source and there is no phase reversal alarm on the Normal source:

- A. With the motor connected to the Emergency source, if a test of the motor rotation indicates that the motor is turning opposite of the correct direction:
1. Turn the controller circuit breaker and isolation switch off.
 2. Disconnect incoming Emergency power to the controller by opening an upstream disconnect and follow proper lockout/tagout procedures.
 3. Once the proper lockout/tagout procedures are confirmed, verify there is no voltage present on the line side of the controllers Emergency source Isolating Switch.
 4. Reverse any two of the three Emergency source power cables on the line side of the controllers Isolating Switch.
 5. Turn the controller isolation switch and circuit breaker back on and check for correct rotation of the motor.

Disposal

Metron Eledyne is a member of a compliance scheme under the Waste Electrical and Electronic Equipment regulations which is applicable in all EC countries. At the end of the service life of the equipment the company offers to collect and dispose of this equipment in accordance with regulations in force under the Registration Number WEE/CF0105WV. (Equipment must be suitably packed for collection by courier if outside the UK).

Contact:

Tel: +44 (0) 1476 516120

Fax: +44 (0) 1476 516121

Replacement Parts

For replacement parts, contact your local Metron sales office or the Metron factory at:

United States	Telephone: +1 (336) 434-2800 ext. 202 FAX: +1 (336) 434-2809 Email: salesmail@metroninc.com
Europe	Telephone: +44 (0) 7730 050 100 Email: jmcivor@hubbel-icd.com

Technical Support

United States	For 24-hour technical support: Telephone: +1 (336) 434-2800 ext. 183 Email: fpctechsupport@metroninc.com
Europe	Service & Commissioning Telephone: +44 (0) 1283 493 215 Email: djones@gai-tronics.co.uk Emergency Contact: Telephone: +44 (0) 7730 050100

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