

# Firetrol Mark II<sub>XG</sub> Electric Fire Pump Controller

## FTA1000 – Full Voltage Starting

### Specifications

#### 1.0 Main Fire Pump Controller

The main fire pump controller shall be a factory assembled, wired and tested unit. The controller shall be of the combined manual and automatic type designed for full voltage starting of the fire pump motor having the horsepower, voltage, phase and frequency rating shown on the plans and drawings.

#### 1.1 Standards, Listings & Approvals

The controller shall conform to all the requirements of the latest editions of: NFPA 20, *Standard for the Installation of Stationary Pumps for Fire Protection* NFPA 70, *National Electrical Code*.

The controller shall be listed by:

Underwriters Laboratories, Inc., in accordance with UL218, *Standard for Fire Pump Controllers* Canadian Standards Association CSA-C22.2, *Standard for Industrial Control Equipment (cUL)*

CE – Low Voltage Directive

The controller shall be approved by:

Factory Mutual (IEC 62091)

The City of New York for fire pump service

#### 1.2 Enclosure

The controller components shall be housed in a NEMA Type 2 (IEC IP22) drip-proof, wall mounted enclosure.

#### 1.3 Withstand Ratings (Short Circuit Current Ratings)

All controller components shall be front mounted, wired and front accessible for maintenance. The minimum withstand rating of the controllers shall not be less than 100,000 Amps RMS Symmetrical at 200–600 Volts\*. If the available system fault current exceeds these ratings, the controllers shall be supplied with a withstand rating of 150,000 or 200,000 Amps RMS Symmetrical, as required.

\*Note: 100,000 Amp withstand rating not available in some larger horsepowers. Consult factory for details.

#### 1.4 Isolation Switch and Circuit Breaker

The controller shall include a motor rated combination isolating disconnect switch/circuit breaker, mechanically interlocked and operated with a single, externally mounted handle. When moving the handle from OFF to ON, the interlocking mechanism shall sequence the isolating disconnect switch ON first, and then the circuit breaker. When the handle is moved from ON to OFF, the interlocking mechanism shall sequence the circuit breaker OFF first, and then the isolating disconnect switch.

The isolating disconnect switch/circuit breaker shall be mechanically interlocked so that the enclosure door cannot be opened with the handle in the ON position except by a hidden tool operated bypass mechanism. The isolating disconnect switch/circuit breaker shall be capable of being padlocked in the OFF position for installation and maintenance safety, and shall also be capable of being locked in the ON position without affecting the tripping characteristics of the circuit breaker. The controller door shall have a locking type handle and three point cam and roller vault type hardware. The circuit breaker trip curve adjustment shall be factory set, tested and sealed for the full load amps of the connected motor. The circuit breaker shall be capable of being field tested to verify actual pick up, locked rotor, and instantaneous trip points after field installation without disturbing incoming line and load conductors.

## 1.5 Operator Interface

The fire pump controller shall feature an operator interface with user keypad. The interface shall monitor and display motor operating conditions, including all alarms, events, and pressure conditions. All alarms, events, and pressure conditions shall be displayed with a time and date stamp. The display shall be a 128x64 Backlit LCD capable of customized graphics. The display and interface shall be NEMA rated for Type 2, 3R, 4, 4X, and 12 protection and shall be fully accessible without opening the controller door. The display and user interface shall utilize multiple levels of password protection for system security. A minimum of 3 password levels shall be provided.

## 1.6 Ammeter/Voltmeter

The fire pump controller operator interface shall be capable of displaying true RMS digital motor voltage and current measurements for all three phases simultaneously. Displays requiring push-button and selector switches to toggle between phases or current and voltage shall not be accepted.

Voltage and current shall be measured by True RMS technology to provide the most accurate measurement for all sine waves, including non-sinusoidal waveforms. Average responding meters will not be accepted.

## 1.7 Digital Status/Alarm Messages

The digital display shall indicate text messages for the status and alarm conditions of:

- Motor On
- Local Start / Off Delay Time
- Fail to Start
- Over Voltage
- Emergency Start
- Motor Overload
- Disk Near Full
- Sequential Start Time
- System Battery Low
- Locked Rotor Trip
- Motor Over 320%
- Disk Error
- Pressure Error
- Minimum Run Time
- Remote Start
- Under Voltage
- Over Frequency
- Drive Not Installed
- Printer Error

The Sequential Start Timer and Minimum Run Timer/Off Delay Timer shall be displayed as numeric values reflecting the value of the remaining time.

## 1.8 LED Visual Indicators

LED indicators, visible with the door closed, shall indicate:

- Power Available
- Remote Start
- Transfer Switch Emergency
- Phase Reversal
- Motor Overload
- Overvoltage
- Alarm
- Pump Running
- Transfer Switch Normal
- Interlock On
- Emerg. Iso. Switch Off
- Undervoltage
- System Pressure Low
- Deluge Open
- Phase Failure
- Fail To Start
- Automatic Shutdown Disabled

## 1.9 Data Logging

The digital display shall monitor the system and log the following data:

- Motor Calls/Starts
- Total Controller Pwr On Time
- Min/Max System Pressure
- Last Locked Rotor Trip
- Max Starting Currents
- Min/Max Voltage per Phase while idle (not running)
- Min/Max Voltage per Phase during Run
- Pump Total Run Time
- Last Locked Rotor Current
- Max Run Currents
- Pump Last Run Time
- Last Pump Start
- Last Phase Fail/Reversal
- Min/Max Frequency
- Min Voltage per Phase during Start

## 2.0 Event Recording

Memory – The controller shall record all operational and alarm events to system memory. All events shall be time and date stamped and include an index number. The system memory shall have the capability of storing 3000 events and allow the user access to the event log via the user interface. The user shall have the ability to scroll through the stored messages in groups of 1 or 10.

## 2.1 USB Host Controller

The controller shall have a built-in USB Host Controller. A USB port capable of accepting a USB Flash Memory Disk shall be provided. The controller shall save all operational and alarm events to the flash memory on a daily basis. Each saved event shall be time and date stamped. The total amount of historical data saved shall solely depend on the size of the flash disk utilized. The controller shall have the capability to save settings and values to the flash disk on demand via the user interface.

## 2.2 Serial Communications

The controller shall feature a RS485 serial communications port for use with 2 or 4 wire Modbus RTU communications.

## 2.3 Solid State Pressure Transducer

The controller shall be supplied with a solid state pressure transducer with a range of 0–300 psi (0–20.7 bar)  $\pm 1$  psi. The solid state pressure switch shall be used for both display of the system pressure and control of the fire pump controller. Systems using analog pressure devices or mercury switches for operational control will not be accepted. The START, STOP and SYSTEM PRESSURE shall be digitally displayed and adjustable through the user interface. The pressure transducer shall be mounted inside the controller to prevent accidental damage. The pressure transducer shall be directly pipe mounted to a bulkhead pipe coupling without any other supporting members. Field connections shall be made externally at the controller coupling to prevent distortion of the pressure switch element and mechanism.

## 2.4 Seismic Certification

The controller shall be certified to meet or exceed the requirements of the 2012 International Building Code and the 2013 California Building Code for Importance Factor 1.5 Electrical Equipment for Sds equal to 1.88 or less severe seismic regions. Qualifications shall be based upon successful tri-axial shake-table testing in accordance with ICC-ES AC-156. Certification without testing shall be unacceptable. Controller shall be clearly labeled as rated for installation in seismic areas and a Certificate of Conformance shall be provided with the controller.

NOTE: Not available on Model FTA1500 Controllers

## 2.5 Controller Operation

A digitally set On Delay (Sequential Start) timer shall be provided as standard. Upon a call to start, the user interface shall display a message indicating the remaining time value of the On Delay timer.

The controller shall be field programmable for manual stop or automatic stop. If set for automatic stopping, the controller shall allow the user to select either a Minimum Run Timer or an Off Delay Timer. Both timers shall be programmable through the user interface.

A nonadjustable restart delay timer shall be provided to allow the residual voltage of the motor to decay prior to restarting the motor. At least 2 seconds, but no more than 3 seconds, shall elapse between stopping and restarting the pump motor.

A weekly test timer shall be provided as standard. The controller shall have the ability to program the time, date, and frequency of the weekly test. In addition, the controller

shall have the capability to display a preventative maintenance message for a service inspection. The message text and frequency of occurrence shall be programmable through the user interface.

A Lamp Test feature shall be included. The user interface shall also have the ability to display the status of the system inputs and outputs.

An Audible Test feature shall be included to test the operation of the audible alarm device.

The controller shall not start the fire pump motor under a single-phase condition. If the motor is already running when a phase loss occurs, the controller shall continue to run the motor, but still display a Phase Failure alarm.

The fire pump controller software shall be automatically upgraded through the USB port by simply inserting a flash disk with the new software. Fire pump controllers that require laptop computers, handheld equipment or specialized devices for software upgrades shall be prohibited.

## 2.6 Manufacturer

The controller shall be a Firetrol brand.

### ***Firetrol, Inc.***

3412 Apex Peakway  
Apex, North Carolina 27502  
P +1 919 460 5200  
F +1 919 460 5250  
[www.firetrol.com](http://www.firetrol.com)

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