

Fire Pump Controller

For Diesel Driven Fire Pumps

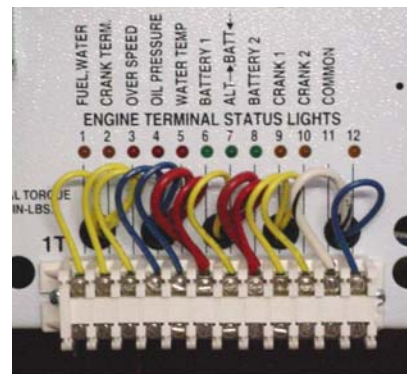


Series FD2

The Metron Series **FD2** Fire Pump Controller for engine driven fire pumps is designed to automatically start the engine upon a drop in pressure in the water supply, or from a number of other demand signals. The controller provides automatic cycled cranking and alarm protection for various engine failures when running. The engine may be stopped after the demand period is terminated either manually or automatically. Several optional features are available which the local authority having jurisdiction may require. These options are described further in this bulletin.

Metron is a world leader in the manufacture of automatic control equipment for all types of engine applications. Our policy has always been to stress dependable operation in field use because of the inherent vital nature of these installations. These controllers are for use with all approved types of engine driven fire pumps.

Manufactured in accordance with the standards established by the National Fire Protection Association, Pamphlet 20, they are designed and constructed to provide the highest measure of reliability.



Field Wiring Terminal Bar. Light Emitting Diodes are installed above terminals 1 through 12 to indicate status of each terminal. For example, terminal one will light when the engine is called upon to start indicating that voltage is being applied to fuel solenoid and water cooling valve. Terminal 2 will light when engine has started indicating that voltage from the speed switch is being applied to terminate cranking. Terminal 3 will light indicating that the engine has shut down from overspeed, etc.

FD2 Fire Pump Controller

Standard and Optional Features

Standard Features

Starting

The controller will start the engine from any or all of the following demand signals: Drop in water line pressure. The pressure switch has independently adjustable (25-300 PSI) high and low set points. Higher range available, see Option "L". The controller will also start the engine from remote start stations, deluge value switches, dry pipe valve switches, etc.

Selector Switch Positions

TEST - momentarily drops water pressure closing pressure switch, starting engine.

AUTO - controller in standby mode, all automatic functions ready for operation.

OFF - disconnects automatic and manual start functions. Battery power still available to controller.

MANUAL - all automatic functions of the controller are by-passed when started with the manual pushbutton. Two manual start pushbuttons are provided for manually cranking the engine from either set of batteries. Both switches may be depressed simultaneously, increasing battery potential to starter in event of adverse battery condition. All alarms are operative in the manual mode.

Manual Stop Pushbutton

Mounted outside of controller. Bypasses selector switch allowing engine shutdown after starting demands have returned to normal. Controller is automatically reset for standby mode.

Automatic Weekly Test

Includes a seven-day program clock, which can be set to give automatic test runs on any day of the week and any time of the day desired. Any demand signal will override the automatic shutdown of this feature. The clock opens the solenoid drain valve momentarily, relieving pressure to the pressure switch. This drop in pressure starts the engine and the length of the test run is timed by the clock (30 minutes is recommended). Since the valve is opened only momentarily, only a very small amount of water is released.

Integral Battery Charger

(See option "J") Included with each controller as standard unless otherwise indicated.

Recording Pressure Gauge

A recording pressure gauge with a seven-day chart provides a permanent record of water

pressure fluctuations, which may also indicate engine starts.

Solid State Crank Control and Battery Alternating Circuit

Six 15 second fixed crank periods separated by five 15 second fixed rest periods are provided. These controls are fail-safe in that should a failure occur within the crank control, the engine will be cranked continuously until it starts or the batteries fail. Should the engine fail to start during any given crank cycle the controller will automatically switch to the other set of batteries for the next starting attempt after the rest period. The controller will continue this alternating until the engine starts. If the engine fails to start at the end of the six crank attempts, the Failure to Start (Overcrank) lamp will light up and the audible alarm will sound.

Battery Failure Lockout

Should one set of batteries fall below 60% of its rated voltage during cranking, the controller will automatically lock on to the other set of batteries for the remaining cranking cycles. The appropriate battery lamp will go out.

Failure Alarms on Controller

Circuits are supplied to provide local lights and alarm for the following: (1) Failure to Start (overcrank), (2) Low Oil Pressure, (3) High Water Temperature, (4) Overspeed (alarm and shutdown), (5) Loss of Battery Charger Output. This last alarm also provides a means of monitoring loss of A.C. power (115 VAC). Loss of 115 VAC results in loss of charger output and missing battery detection.

Failure Alarms For Remote Indication

Dry contacts (NO. & N.C.) are wired to the field wiring terminal bar for remote indication of the following: Pump Running (2 sets), Switch in Off or Manual, Battery Failure, and System Failure. The System Failure contacts provide a common alarm for Failure to Start (Overcrank), Low Oil Pressure, High Water Temperature, Overspeed, Loss of Battery 1 or Battery 2, and Loss of Battery Charger / A.C. Individual dry contacts for each alarm are available, see Option "A".

Status Lights

Three green lights are provided on the controller indicating battery power is available from Battery 1 and Battery 2. The third lamp indicates that the control switch is in "Auto" position.

Voltage Surge Arresters

Surge arresters complying with ANSI C62.1.

Enclosure

NEMA 2, heavy duty (14 gauge steel), moisture resistant drip-proof, free standing with locking door (gasketed) and break glass panel over control switch and manual start pushbuttons.

Swing out hinged relay panel is provided for ease of servicing and ease of field modifications.

Control Relays

Relays are dust-tight plug-in for ease of servicing from front of cabinet.

Testing

Each controller is factory wired, tested, and ready for immediate installation.

Options

Option A: Individual Alarm Contacts

This option provides N.O. / N.C. dry contacts for remote indication of any failure. This option distinguishes between the five common failure alarms (LOW OIL PRESSURE, HIGH WATER TEMPERATURE, OVERSPEED, FAILURE TO START, and LOSS OF CHARGER / AC FAILURE) which are combined in the "System Failure" alarm. In addition, other individual pump room alarm contacts can be supplied. Please consult the factory.

Option E: Engine Lockout Circuit

This option is used with multiple pump installations when only one pump should be running. Upon receipt of an external signal, this option will prevent the engine from starting or will stop it if running. It is also used with Low Suction Cutoff Panels when authorized. When used for this purpose, power to the Low Suction Cutoff Panel is provided by the controller.



Option F: Low Fuel Level Alarm

This option provides an audible and visual alarm in the event the fuel in the storage tank reaches a preset level. Remote indication of a low fuel condition is provided through the "System Failure" contacts. A hermetically sealed float switch can be supplied with this option which must be mounted in a threaded two inch opening on the top of the tank. The dimensions of the tank must be specified so that the depth of the float switch in the tank can be determined. This switch will be factory set to alarm when the fuel level drops to 60% of tank capacity unless otherwise specified. This alarm cannot be silenced unless the fuel level in the tank is increased. If a silenceable alarm is required, order Low Fuel as an option "K" but use option "F" pricing. Available with or without float switch.

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 J: Integral Battery Charger

(For Batteries up to 220 Amp Hour Capacity)
An integral dual-output battery charger simultaneously charges both sets of batteries. This is a solid state charger, which continuously monitors both batteries. The rate of charge, up to 25 amperes, is dependent on the state of charge of the batteries and tapers to less than 500 milliamperes at full charge. The charger is line voltage regulated and current limited to provide full protection during engine cranking. Also provided are two ammeters which indicate the rate of charge, two voltmeters which indicate the state of the batteries, and circuitry to operate the "LOSS OF CHARGER/AC" failure and "MISSING BATTERY" alarm.

Option JJ: Dual Integral Battery Chargers

(For batteries up to 440 Amp Hour Capacity)
This option provides two battery chargers for charging large batteries. Specifications of chargers same as Option J. Consists of one charger mounted inside the controller cabinet and one charger mounted in separate cabinet on top of the controller.

Option K: Pump Room Alarms

NFPA Pamphlet 20 allows additional alarms to be provided in the controller to monitor various pump room conditions. Example: RESERVOIR LOW, RESERVOIR EMPTY,

LOW SUCTION PRESSURE, RELIEF VALVE OPEN, FLOW METER ON, etc. These alarms will automatically reset when conditions return to normal. An Alarm Silence pushbutton is also provided. If dry contacts for remote indication are required, order Option "A" in conjunction with this option.

Option N: Step-down Transformer

When 120 V.A.C. single phase is not available, an integral transformer may be provided for operations from 200 to 600 V.A.C. 50/60 Hz input. Exact voltage and frequency must be specified when ordering.

Option P: Automatic Start on Loss of D.C. Output of Charger

This option serves a dual purpose since either a CHARGER FAILURE or LOSS OF AC will start the engine. The time delay is field adjustable.

Option R: Automatic Stop

After a specified minimum run time (field adjustable, factory set for 30 minutes), the engine will stop automatically if starting causes have returned to normal. Controllers are shipped with a jumper wire installed on a convenient terminal block, which bypasses this automatic stop feature. To activate the automatic stop, simply remove the jumper wire.

Option S: Sequential Start

This option is for use on multiple pump installations to keep the pumps from starting simultaneously. It is accomplished by use of an adjustable timer supplied in all controllers except the lead controller. The standard timer is field adjustable. These timers should be adjusted at a 5 to 10 second interval in order to allow for the starting of the preceding pump. Failure of a preceding pump to start will not prevent a subsequent pump from starting.

Option U: Weekly Test Stop

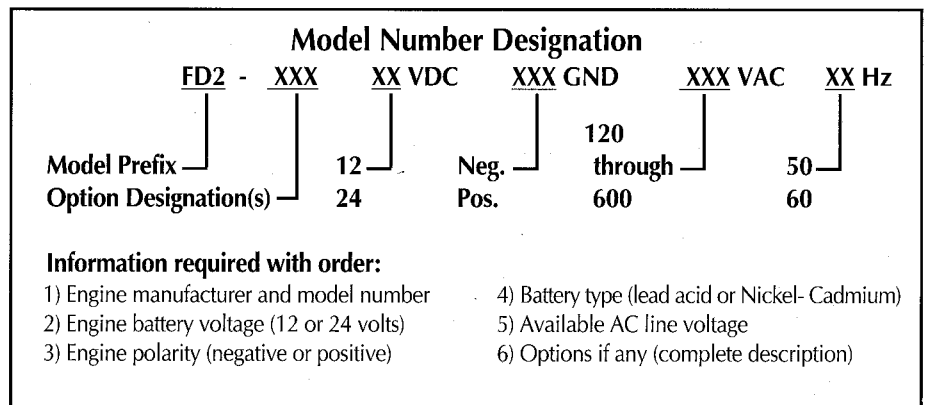
This option provides an engine shutdown during automatic weekly test should a LOW OIL PRESSURE or HIGH WATER TEMPERATURE failure occur. However, if a demand such as LOW WATER PRESSURE or DELUGE VALVE START occur, the shutdown will be overridden and the engine will continue to run. This feature is only activated in the automatic weekly test cycle and when activated by the program clock.

Option W: Omit Legs

For systems where the controller is mounted on a common skid with the pump and engine, the legs of the controller may be omitted, and 3" mounting channels or wall mounting brackets can be supplied. 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 (Unpainted 304 or 316 Stainless Steel), and 12



Fire Pump Controller

For Diesel Driven Fire Pumps



Specifications

The fire pump controller shall be listed by Underwriters Laboratories and approved by Factory Mutual Research for fire pump service. The controller shall meet the requirements of NFPA 20. It shall be completely factory wired, assembled, and tested prior to shipment.

The controller shall be housed in a NEMA Type-2 Drip-proof enclosure, fabricated from heavy gauge cold rolled steel per the requirements of UL 508. All controller components shall be UL listed or UL recognized, and shall be front mounted and wired allowing the controller to mount flush against a wall. The controller shall feature a swing-out relay panel allowing access to all wiring for easy repair or additions. All relays shall be dust-tight and of the plug-in type for long life and ease of maintenance.

The controller shall be of the combined automatic / manual type. Automatic starting shall be via an internally mounted pressure switch or remote pushbutton station. Local manual starting shall be via panel mounted pushbuttons.

The controller shall have a four-position selector switch for TEST, AUTO, OFF, and MANUAL. The selector switch shall be mounted inside the controller cabinet to prevent unauthorized operation. The selector switch and engine crank pushbuttons shall be located so that they can be operated with the door closed through a break glass in the door in case of emergency.

The Pressure switch shall have adjustable independent high and low set points. The switch shall be mounted inside the controller cabinet and plumbed to an external coupling for field connection.

The controller shall be capable of cycle

cranking the engine. Crank timing shall consist of six 15 second cranks with a 15 second rest between each crank cycle. The system shall alternate between the two battery sets on each successive crank cycle. Should the voltage of the battery being used to start the engine drop below approximately sixty (60) percent of nominal, the controller shall lockout said battery and continue to crank on the other good battery. This lockout shall remain in effect until manually reset. Should the engine fail to start after six 15 second crank cycles, the controller shall cease any further attempts to start and cause a visual and audible Failure to Start (Overcrank) alarm. This alarm shall not be capable of being silenced until the selector switch has been turned to the OFF position.

The controller shall have an externally mounted Stop pushbutton, which will stop the engine if all automatic start conditions have returned to normal. When the controller is stopped via the pushbutton it shall return to the automatic mode. A solid state weekly test timer shall be supplied which will automatically start the controller at a predetermined time each week. This timer shall be capable of being field adjustable. The timer shall energize an internally mounted solenoid valve which will momentarily drop the system pressure and initiate an automatic start of the engine. The controller shall continue to run until the timer has timed out. Should a subsequent drop of water pressure occur, the controller shall remain running until the demand has been satisfied.

Dry contacts shall be provided for remote annunciation of the following conditions: PUMP RUNNING (two sets), SYSTEM FAILURE, SELECTOR SWITCH in OFF or MANUAL, and BATTERY FAILURE or MISSING BATTERY. System failure contacts shall be a common alarm for: FAILURE

TO START, LOW OIL PRESSURE, HIGH WATER TEMPERATURE, OVERSPEED, and LOSS OF CHARGER OUTPUT.

The controller shall have front mounted indicating light for the following: BATTERY 1 ON (green), BATTERY 2 ON (green), SWITCH IN AUTO (green), LOSS OF A.C. / CHARGER OUTPUT (red), LOW OIL PRESSURE (red), HIGH WATER TEMPERATURE (red), FAILURE TO START (red), and OVER-SPEED (red).

The controller shall have light emitting diode (LED) type pilot lights above each field wiring terminal point which is used for interconnection to the engine. These indicating lights shall make it possible to verify proper operation of all normal automatic and manual functions along with the continuity of all dry contacts for remote alarms. The test shall also include a meg-ohm test of all field wiring terminal points and associated circuitry. The controller shall be manufactured by Metron, Inc.