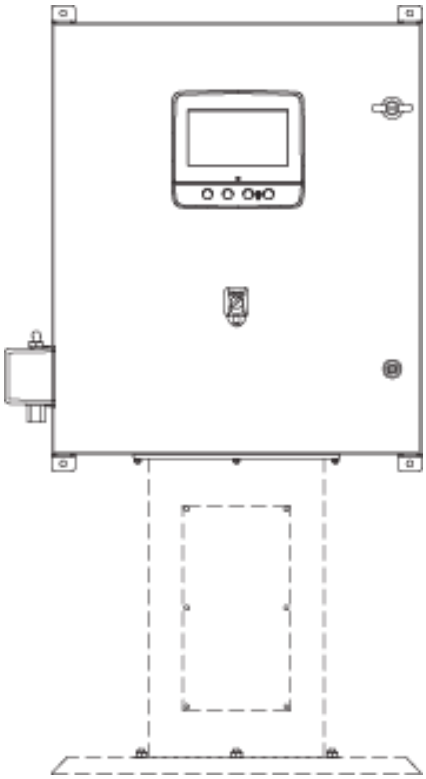
Submittal Package

FTA1100J

MARK^{III+} Diesel Engine Fire Pump Controllers

Project Information



(DRAWINGS INCLUDED IN THIS PACKAGE ARE FOR STANDARD CONTROLLERS. ACTUAL "AS BUILT" DRAWINGS MAY DIFFER FROM THOSE SEEN HERE).

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Publication SBP1100J-800 Rev. B

Firetrol MARK^{III+} Diesel Engine Fire Pump Controller

FTA1100J - 12 or 24 Volt

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 diesel engine operation of the fire pump. The controller shall be rated for an Ambient Temperature Operating Range of 39ºF (4ºC) to 104ºF (40ºC).

1.1 Standards, Listings & Approvals

The controller shall conform to all the requirements of the latest editions of:

· NFPA 20
· UL (UL218 and CSA C22.2 No. 14)
· FM Global (Class 1321/1323)
· 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 with bottom entry gland plate.

1.3 Operator Interface (HMI)

7.0" LCD capacitive type color touch screen (HMI technology) operator interface powered by an embedded microcomputer with software PLC logic. Included shall be keypad type push-buttons for Crank from Battery #1, Crank from Battery #2, Stop and run test.

The screen shall include menus for: *Home · Alarms · Configuration · History · Service · Manuals · Language*.

The HMI shall graphically display the following: *AC Power Present · Charger #1 & #2 Charging Mode · Battery #1 & #2 Voltage and Amperage · System Pressure · Cut In and Cut Out Pressure Settings · Starter #1 and #2 Cranking or Resting · Engine Running · Starting Cause · Fuel Valve Energized · Timers Operation · H-O-A Switch Position · Actuation Mode · Controller Type · Shutdown Mode · Time & Date · Pump Room Temperature · System Pressure*

System pressure shall be capable of being displayed as: *PSI, kPa, Bar, Feet of Head or Meters of Water.*

The HMI shall allow programming and display of: *Cut In & Cut Out Pressure Settings · Minimum Run Timer · Sequential Start Timer · Periodic Test Timer*

The HMI allows the user to select the language of the system and download the manual or view the manual on screen.

1.4 State and Alarm Visual Indication

The digital display shall visually indicate and color code by criticalness the following:

AC Fail · DC Fail · Battery 1/2 Fail · Charger 1/2 Fail · Engine Trouble · Pump Room Trouble · Controller Trouble · Service Required · Battery 1/2 Weak · Loss of Continuity with Starting Contactor 1/2 · Weekly Test Start Pressure Not Reached · Weekly Test Check Solenoid Valve · Faulty Pressure Transducer · Low Raw Water Flow · Engine Fail When Running · Engine Fail To Start · Engine Overspeed · Low Ambient Temp. · Pump On Demand · Invalid Cut-In · Overpressure · Underpressure · Battery 1/2 Overvoltage · Water Reservoir Low · Fuel Tank Leak · Low Fuel Level · High Fuel Level · Engine ECM In Alternate Position · Engine Fuel Injection Malfunction · Engine High Temperature · Engine Low Temperature · Engine ECM Warning · Engine ECM Fault · Engine Low Oil Pressure · High Raw Water Temperature · Low Suction Pressure · Engine Run · Main Switch In Auto · Pump Room Temperature · Periodic Test · Main Switch in Hand · Cranking Cycle · Main Switch In Off · AC Power Available

1.5 Pressure and Event Recording

The system shall be capable of logging pressure data and operational events with time/date stamp. The system shall display operational events for the lifetime of the controller and display the pressure data in text or graphical form. The controller shall log the Date/Time of the first start-up and the controller total power on time from that date. The controller shall log first and last statistics for: *First Setup · On Time · Engine On Time · Engine Start Count · Engine Last Start Time · Min/Max/Average System Pressure · Min/Max/Average Pump Room Temp · Jockey Pump On Time · Jockey Pump Start Count · Jockey Pump Last Start Time*

1.6 USB Host Controller

A USB port capable of accepting a USB Flash Memory Disk shall be provided for downloading pressure and event logs.

1.7 Serial Communications

The controller shall feature Modbus with TCP/IP frame format and a shielded female RJ45 connector.

1.8 Pressure Sensing / Wet Parts

The controller shall be supplied with a solid state pressure transducer with a range of 0-500 psi calibrated for 0-300 psi (0-20.7 bar) and a run test solenoid valve. The wet parts shall be externally mounted and include a protective cover. The pressure sensing line connection to the transducer shall be 1/2-inch FNPT. Provisions for a redundant pressure transducer shall be provided.

1.9 Controller Operation

On a call to start, the controller will crank from battery 1 for 15 seconds then rest for 15 seconds before cranking on battery 2. This cranking cycle shall repeat 3 times. If a running signal is not received from the engine, the controller will alarm "Fail To Start".

The controller shall have the capability to schedule service reminders. The controller also provides for inputting of pump flow test data, generating and displaying the pump curve and permanently storing this data in memory.

Provisions shall be available for connection of external devices for Manual Remote Start, Automatic Remote Start and Deluge Valve Start.
DPDT dry contacts rated 8A - 250VAC shall be provided for remote indication of:
Engine Run · Main Switch in Hand or Off · Controller Trouble (common) · Engine Trouble (common) · Pump Room Trouble (common)
An audible alarm device shall be provided on the controller.

2.0 Manufacturer

The controller shall be a Firetrol brand.

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Publication SP1100-60 Rev .C

Product Description

FTA1100J

MARK^{III+} Diesel Engine Fire Pump Controller



Description – Firetrol® combined automatic and manual MARK^{III} based diesel engine fire pump controllers are intended for starting and monitoring fire pump diesel engines. They are suitable for use with both mechanical and electronic type engines. The controller is available for 12 or 24 volt negative ground systems, using lead acid or Nickel-Cadmium batteries. The controller monitors, displays and records fire pump system information.

Approvals – Firetrol fire pump controllers are listed by Underwriters' Laboratories, Inc., in accordance with UL218, *Standard for Fire Pump Controllers*, CSA, *Standard for Industrial Control Equipment* (cUL), and approved by Factory Mutual. They are built to meet or exceed the requirements of the approving authorities as well as NEMA and the latest editions of NFPA 20, *Installation of Centrifugal Fire Pumps*, and NFPA 70, *National Electrical Code*.

Standard Features – The following are included as standard with each controller:

- NEMA Type 2 (IP22) Enclosure with Bottom Entry Gland Plate, Lifting Lugs and Locking Door Handle
- AC Line & Battery circuit breakers
- Two independent battery chargers, 10A continuous charge - 500mA Trickle Charge
- 7.0" LCD capacitive type color touch screen (HMI technology) software upgradeable operator interface powered by an embedded microcomputer with software PLC logic.
- Push-buttons for Crank from Battery #1, Crank from Battery #2, Stop and Run Test
- 500 PSI Pressure Transducer (calibrated for 300 PSI (20.7 Bar) and Test Solenoid for fresh water applications, externally mounted with protective cover
- Audible alarm buzzer embedded in the MarkIII+
- Pressure and Event Recording with Date Stamp to System Memory Accessible VIA The User Interface and Downloadable to a USB Flash Drive
- Visual Indication for: Engine Run • Main Switch Position • Periodic Test • Cranking Cycle • AC Power Available • Pump Room Temperature
- Visual Alarm Indication for: Pump Room Trouble • Pump On Demand • AC Power Failure • Charger 1-2 Failure • Battery 1-2 Weak • Battery 1-2 Overvoltage • Loss of Continuity on Starter 1-2 • High Fuel Level • Fuel Tank Leak • PLD Low Suction Pressure • High Raw Water Temp. • Low Pump Room Temp. • High Pump Room Temp. • ECM Warning • Weekly Test Cut-In Pressure Not Reached • Check Weekly Test Solenoid • Pressure Transducer Fault • Invalid Cut-In Pressure • Service Required

- Audible and Visible Alarm Indication for: Engine Trouble • Controller Trouble • Engine Low Oil Pressure • Engine High Temp. • Engine Low Temp. • Engine Overspeed • DC Failure • Battery 1-2 Failure • Engine Fail To Start • Low Fuel Level • ECM Fault • ECM SS In Alternate Position • Fuel Injection Malfunction
- DPDT 8A 250V Remote Alarm Contacts Are Provided For:
  - Engine Run
  - Common Controller Trouble (Charger Failure, Pressure Transducer Fault)
  - Common Engine Trouble (High Engine Temp., Fail To Start, Fuel Injection Malfunction, ECM Selector Switch in Alternate Position, Battery 1-2 Failure, DC Failure, Loss of Continuity to Starter 1-2, Engine Overspeed, Fail When Running, Low Oil Pressure, PLD Low Suction Pressure)
  - Common Pump Room Trouble (Low Fuel Level, High Fuel Level, Fuel Tank Leak, Low / High Pump Room Temperature, AC Power Failure, H-O-A Selector Switch in OFF or HAND)
- Modbus Communications with TCP/IP frame format and a shielded female RJ45 connector.
- Input Terminals for Connection to External Devices:
  - Low Fuel Level
  - Remote AUTOMATIC Start
  - Deluge Valve Start (re-assignable)
  - Fuel Tank Leak (re-assignable)
  - High Fuel Level (re-assignable)
- Pump Room Ambient Temperature Switch, Display and Alarms

For Model # Information See Publication SD1100-60
For Options and Modifications See Publication OP1100-60

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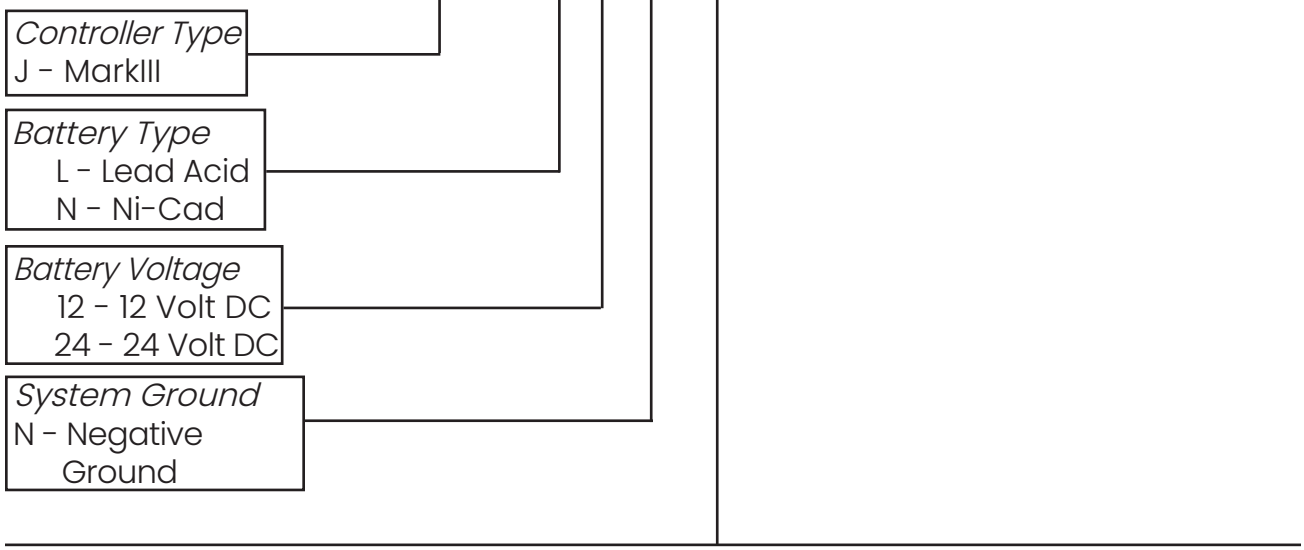
Publication PD1100-60 Rev. C

Model Number Selection Guide

FTA1100J

MARK^{III+} Diesel Engine Fire Pump Controller

FTA1100-J _ __ N- __ (Example: FTA1100-JL24N-G-AM)



For Options and Modifications see Publication OP1100-60

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Publication SD1100-60 Rev. B

MARK^{III+} Diesel Engine Fire Pump Controller

SPECIAL ENCLOSURES

Option	Description
☐ ---	Enclosure, NEMA Type 2 (IEC IP22), Painted Steel (Standard)
◉ -E	Enclosure, NEMA Type 4 (IEC IP65), Painted Steel
○ -F	Enclosure, NEMA Type 4X (IEC IP66), #304 Stainless Steel, Brushed Finish
○ -FD	Enclosure, NEMA Type 4X (IEC IP66), #316 Stainless Steel, Brushed Finish
○ -FDB	Enclosure, NEMA Type 4X (IEC IP66), #316 Stainless Steel, Seam Welded, Brushed Finish
○ -FDP	Enclosure, NEMA Type 4X (IEC IP66), #316 Stainless Steel, Painted Finish
○ -FXP	Enclosure, NEMA Type 4X (IEC IP66), #304 Stainless Steel, Painted Finish
○ -G	Enclosure, NEMA Type 12 (IEC IP54), Painted Steel
○ -T	Enclosure, NEMA Type 3R (IEC IP24), Painted Steel
○ -U	Enclosure, NEMA Type 3 (IEC IP54), Painted Steel

ENCLOSURE MOUNTING STANDS

Option	Description
☐ None	
○ -N30	Mounting Stand, Painted Steel
○ -N30FXP	Mounting Stand, #304 Stainless Steel, Painted Finish
○ -N30F	Mounting Stand, #304 Stainless Steel, Brushed Finish
○ -N30DP	Mounting Stand, #316 Stainless Steel, Painted Finish
○ -N30FD	Mounting Stand, #316 Stainless Steel, Brushed Finish

ANTI-CONDENSATION SPACE HEATERS

Option	Description
☐ None	
○ -J	Space Heater, 120V Externally Powered with Circuit Breaker and Thermostat
○ -K	Space Heater, 120V Externally Powered with Circuit Breaker and Humidistat
○ -M	Space Heater, 240V Externally Powered with Circuit Breaker and Thermostat
○ -N	Space Heater, 240V Externally Powered with Circuit Breaker and Humidistat
○ -JKP	Space Heater, 120V Externally Powered with Circuit Breaker and Thermostat / Humidistat in Parallel
○ -MNP	Space Heater, 240V Externally Powered with Circuit Breaker and Thermostat / Humidistat in Parallel

PRESSURE TRANSDUCERS, SOLENOID VALVES, PLUMBING

Option	Description
☐ ---	Wetted Parts including Pressure Sensor and Test Solenoid, 300 PSI (20.4 Bar) Fresh Water
○ -B1	Wetted Parts including Pressure Sensor and Test Solenoid, 500 PSI (34.5 Bar) Fresh Water (For Factory Calibration Purposes Only)
○ -C1	Wetted Parts including Pressure Sensor and Test Solenoid, 300 PSI (20.4 Bar), Sea Water
○ -D1	Wetted Parts including Pressure Sensor and Test Solenoid, 500 PSI (34.5 Bar), Sea Water
☐ -SP1	Low Suction Pressure Transducer, Fresh Water, 0-300 PSI (20.4 Bar) with Visible Indication and Output Contacts
○ -SP2	Low Suction Pressure Transducer, Sea Water, 0-300 PSI (20.4 Bar) with Visible Indication and Output Contacts

FOAM PUMP APPLICATIONS

Option	Description
Required For Foam	
☐ -LR1	Low Foam Level External Input, Visible Indications and Alarm Contacts, Additive with Provisions for Proof Pressure Switch Connection, With Lockout and Remote Alarm Indication For Interlock On (Locked Out)
Required For Foam	
☐ -LK1	Foam Pump Application With Pressure Transducer and Run Test Solenoid Valve
○ -LK2	Foam Pump Application With Pressure Transducer and Run Test Solenoid Valve, Stainless Steel
○ -LK3	Foam Pump Application Without Pressure Transducer and Run Test Solenoid Valve
Optional For Foam	
☐ -DVC	Operation, Dump Valve Control

ALARMS

Option	Description
● -AC	Extra Alarm Output Contacts, Engine Running (3 Sets)
☐ -AJ	Alarm Output Contacts, Engine Overspeed
☐ -AK	Alarm Output Contacts, Low Oil Pressure
☐ -AL	Alarm Output Contacts, High Water Temperature
☐ -AM	Alarm Output Contacts, Fail To Start
☐ -AN	Alarm Output Contacts, Battery / Charger Failure
☐ -AP1	Alarm Output Contacts, Main Switch in “Hand”
☐ -AR	Alarm Output Contacts, Main Switch in “Off”
☐ -AS1	Extra Alarm Output Contacts, Main Switch in “Auto”
☐ -AT1	Extra Alarm Output Contacts, Pump Room Trouble[1]
☐ -AU	Alarm Output Contacts, Low Fuel Level
☐ -AV	Alarm Output Contacts, Low Pump Room Temperature
☐ -AW	Alarm Output Contacts, Reservoir Low[1]
☐ -AY1	Configurable Low Suction Pressure Visible/Output Contacts with External Digital Input
☐ -BTC	Alarm Output Contacts, Battery #1 & #2 Failure (Form-C SPDT)(Individual Outputs)
☐ -CFC	Alarm Output Contacts, Battery Charger #1 & #2 Failure (Form-C SPDT)(Individual Outputs)
☐ -CPL1	Alarm, Visible/Output Contacts, Overpressure
☐ -CTS1	Configurable Low Suction Pressure, Visible/Output Contacts with Suction Pressure Transducer
☐ -ECMFR	Alarm Output Contacts, Electronic Engine ECM Failure
☐ -ECMWR	Alarm Output Contacts, Electronic Engine ECM Warning
☐ -EE	Extra Alarm Output Contacts, Engine Trouble (1 Set)
☐ -EF	Extra Alarm Output Contacts, Main Switch Not in “Auto” (1 Set)
☐ -EH1	Alarm Output Contacts, Main Relief Valve Open
☐ -EK1	Alarm, Visible/Output Contacts, Flow Meter On
☐ -GLS	Louver Activation Circuit (Battery Power Specific)
☐ -HRTR	Alarm Output Contacts, High Raw Water Temperature
☐ -LC	Alarm Output Contacts, High Fuel Level[1]
☐ -LE1	Alarm Output Contacts, Fuel Spill
☐ -LETR	Alarm Output Contacts, Low Engine Temperature
☐ -LG	Alarm Output Contacts, Reservoir High[1]
☐ -LRFR	Alarm Output Contacts, Low Raw Water Flow (Clogged Strainer)
☐ -LSPR	Alarm Output Contacts, Low Suction Pressure (at Variable Speed Suction Limiting Engine Controls)
☐ -PE	Alarm Output Contacts, Low System Pressure (Pump On Demand)

MISCELLANEOUS

Option		Description
●	-BA	AC Input, 220-240V
☐	-EJA	Provision for 4-20mA Flow Meter Signal Input with Monitoring and Display of Flow (Meter by Others) Do not use with option -EKA
☐	-EKA	Provision for 4-20mA Flow Meter Signal Input with Monitoring and Display of Flow and Adjustable Low and High Alarm Relays (Meter by Others) Do not use with option -EJA
☐	-EL	Series Pumping Operation, High Zone Controller
☐	-EM	Series Pumping Operation, Mid Zone Controller
☐	-EN	Series Pumping Operation, Low Zone Controller
☐	-IEC	Marking, CE with External Wet Parts
☐	-NZ	Input Terminals, Shutdown Interlock
☐	-OSP	Seismic Certification compliant to OSHPD (CA) for rigid base or wall mount only
☐	-S	Tropicalization
☐	-SEI	Seismic Certification compliant to CBC 2019, IBC 2018 for rigid base or wall mount only
☐	-USBX	Data Port, External USB
☐	-Y55	Controller Temperature Rating, 55°C (131°F) Ambient Temperature
☐	-XCR	Export Packaging (Wooden Crating to Conform to IPPC Standards)
☐	-ZPM1	Data Port, RS485 Modbus RTU
☐	FTA1100-K7A	Low Fuel Level Switch 1.25" NPT - Field Adjustable from 2.75" to 27.5"
☐	FTA1100-K7B	Low Fuel Level Switch 1.50" NPT - Field Adjustable from 2.75" to 27.5"
☐	FTA1100-K8A	High Fuel Level Switch 1.25" NPT - Field Adjustable from 2.75" to 10.5"
☐	FTA1100-K8B	High Fuel Level Switch 1.50" NPT - Field Adjustable from 2.75" to 10.5"
☐	FTA1100-K26A	Combined High/Low Fuel Level Switch 1.25" NPT - Specify Diameter of Fuel Tank
☐	FTA1100-K26B	Combined High/Low Fuel Level Switch 1.50" NPT - Specify Diameter of Fuel Tank

[1] - Initiating switches by others [2] - Shipped loose for installation by the customer

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Publication OP1100-60 Rev. G

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FINAL APPROVAL	FC	28/02/23

DIESEL ENGINE FIRE PUMP CONTROLLER
12VDC OR 24VDC NEGATIVE GROUND

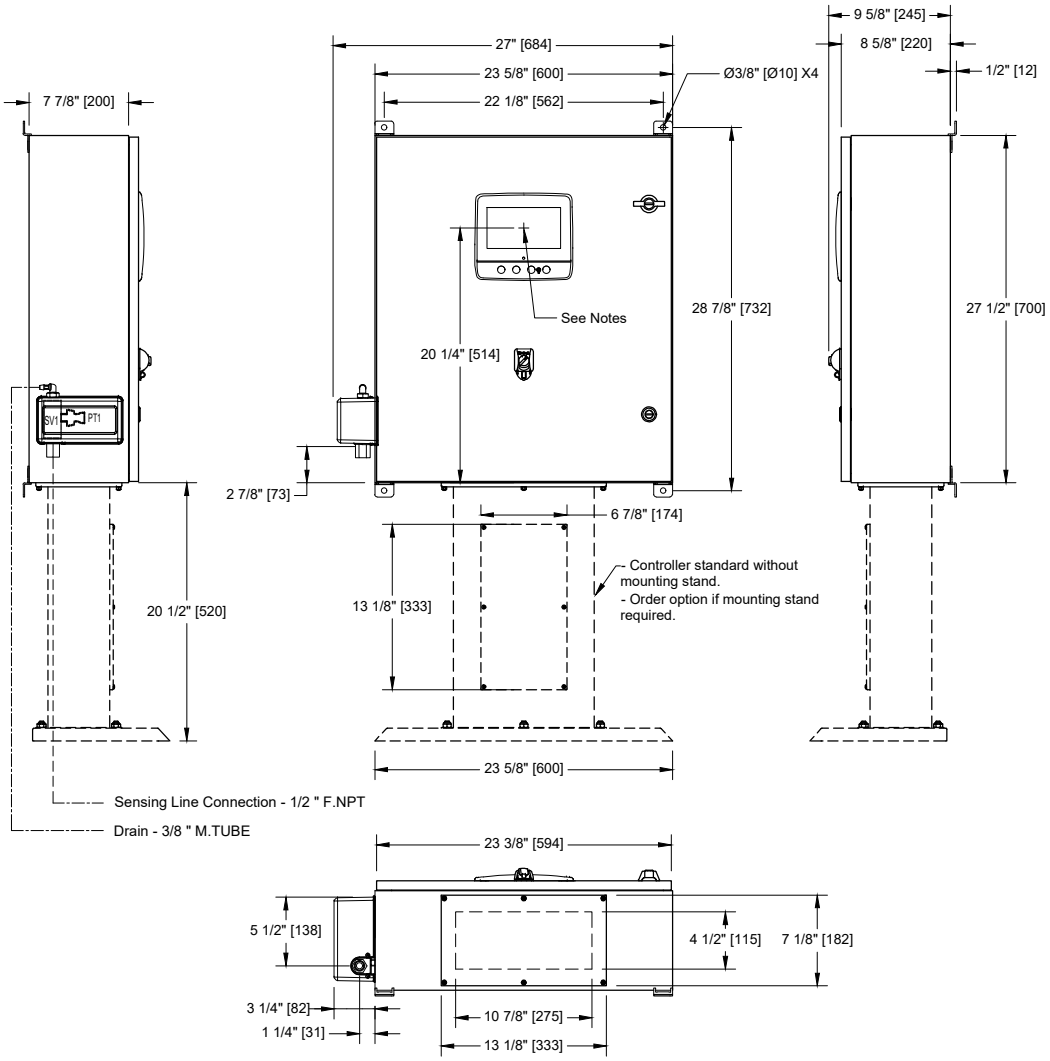
MODEL: FTA1100

BUILT TO THE LATEST EDITION OF THE NFPA20 & NFPA70

NYC Dpt of Building Approved

THIRD ANGLE PROJECTION

DRAWING NUMBER DD1100-800/E
DWG REV. 0
SHEET 1 OF 1



Notes:

- Standard: NEMA 2
- Standard paint : textured red RAL 3002.
- All dimensions are in inches [millimeters].
- Center of screen: 20-1/4" [514] from bottom (no feet).
- Bottom conduit entrance through removable gland plate recommended.
- Use watertight conduit and connector only.
- Protect equipment against drilling chips.
- Door swing equal to door width.

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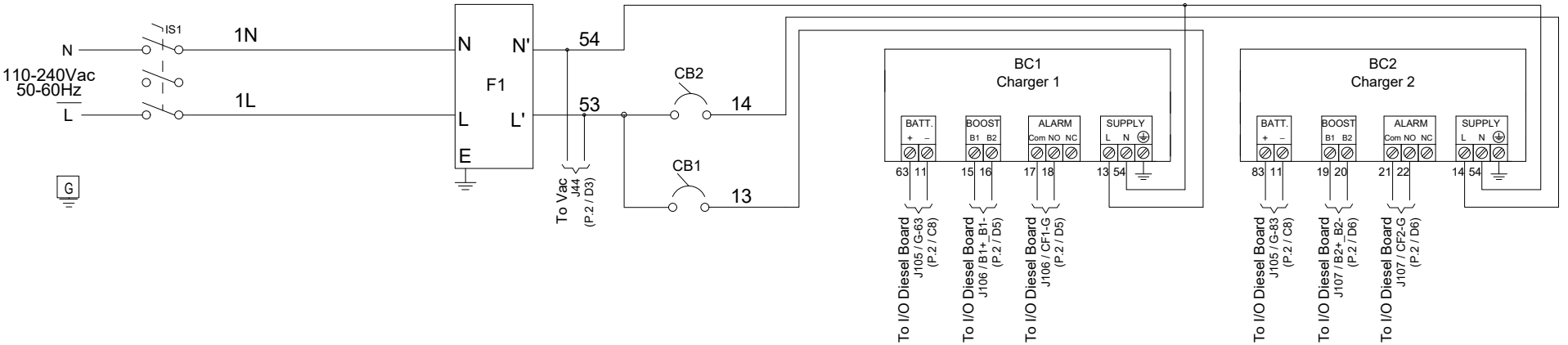
DIESEL ENGINE FIRE PUMP CONTROLLER
12VDC OR 24VDC NEGATIVE GROUND

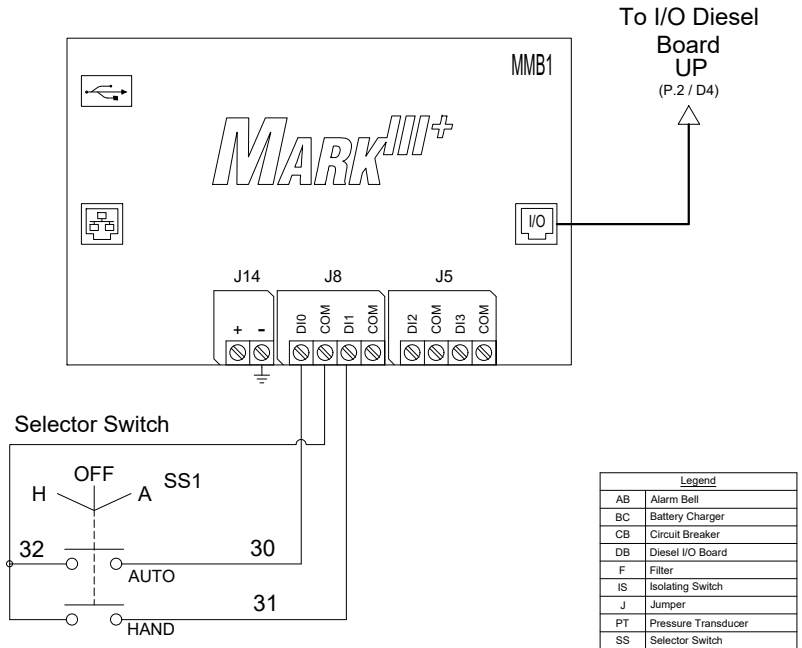
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DRAWING NUMBER WS1100-800/E
DWG REV. 0
SHEET 1 OF 2





Legend	
AB	Alarm Bell
BC	Battery Charger
CB	Circuit Breaker
DB	Diesel I/O Board
F	Filter
IS	Isolating Switch
J	Jumper
PT	Pressure Transducer
SS	Selector Switch
SV	Solenoid Valve
MMB	Main Board

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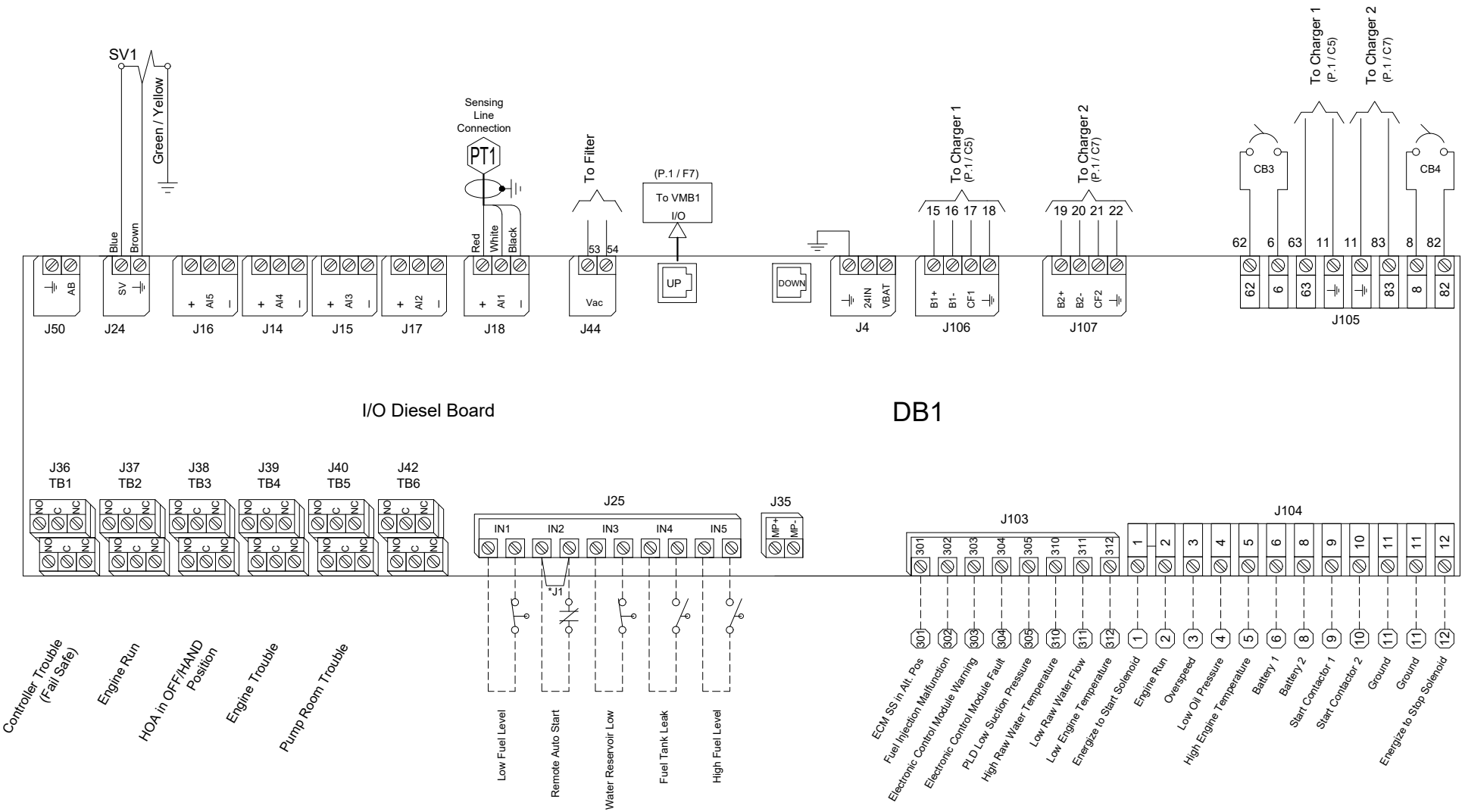
DIESEL ENGINE FIRE PUMP CONTROLLER
12VDC OR 24VDC NEGATIVE GROUND

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DRAWING NUMBER WS1100-800/E
DWG REV. 0
SHEET 2 OF 2



* Remove this jumper to use this feature

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DIESEL ENGINE FIRE PUMP CONTROLLER
12VDC OR 24VDC NEGATIVE GROUND

MODEL: FTA1100

BUILT TO THE LATEST EDITION OF THE NFPA20 & NFPA70

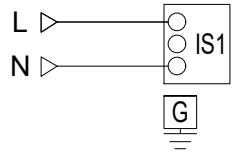
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DRAWING NUMBER FC1100-800/E
DWG REV. 0
SHEET 1 OF 1

Power Supply

Terminals Wire Size:
14 - 6 AWG
1.8-2 Nm

110-240Vac
50-60Hz



Engine Connections

All wiring between the controller and diesel engine shall be stranded (NFPA20)

Wiring between controller and engine (terminals 301, 302, 303, 304, 305, 310, 311, 312, 2, 3, 4, 5) must be #14AWG as minimum.

Wiring between controller and engine (terminals 12 [rated at 10A or 22A for 20 seconds] 1, 9, 10 [rated at 10A]) must be stranded #10AWG as minimum.

Wiring between controller and engine (terminals 6, 8, 11 [rated at 30A]) must be stranded and sized according to distance.

0-5' (0-1.5m) - 12 AWG (4 mm2)
6-10' (1.8-3m) - 10 AWG (6 mm2)
11-15' (3.3-4.5m) - 8 AWG (10 mm2)
16-20' (4.8-6m) - 2x10 AWG (2x6 mm2)
21-32' (6.4-9.75m) - 2x8 AWG (2x10 mm2)

I/O Diesel Board

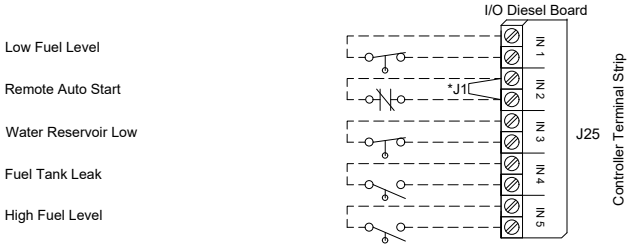
1	Energize to Start Solenoid	1	J104
2	Engine Run	2	J104
3	Overspeed	3	J104
4	Low Oil Pressure	4	J104
5	High Engine Temperature	5	J104
6	Battery 1	6	J104
8	Battery 2	8	J104
9	Start Contactor 1	9	J104
10	Start Contactor 2	10	J104
11	Ground	11	J104
11	Ground	11	J104
12	Energize to Stop Solenoid	12	J104

Controller Terminal Strip J103

301	Electronic Control Module Selector Switch in Alternate Position	301
302	Fuel Injection Malfunction	302
303	Electronic Control Module Warning	303
304	Electronic Control Module Fault	304
305	PLD Low Suction Pressure	305
310	High Raw Water Temperature	310
311	Low Raw Water Flow	311
312	Low Engine Temperature	312

Field Connections

Terminals Wire Size:
24 - 12 AWG
0.5 Nm



Network Connections

Terminals Wire Size:
Shielded Female Connector RJ45

Modbus TCP/IP

Located on Main Board

* Remove this jumper to use this feature

Alarm Contacts

Terminals Wire Size:
24 - 12 AWG
0.5 Nm

I/O Diesel Board

Controller Trouble (Fail Safe)	Normally Closed Opens to alarm	Normally Opened Closes to alarm	TB1
	Normally Closed Opens to alarm	Normally Opened Closes to alarm	
Louver Activation Contact	Normally Opened Closes to activate	Normally Closed Opens to Activate	TB2
Engine Run	Normally Opened Closes to alarm	Normally Closed Opens to alarm	
HOA in OFF/HAND Position	Normally Opened Closes to alarm	Normally Closed Opens to alarm	TB3
	Normally Opened Closes to alarm	Normally Closed Opens to alarm	
Engine Trouble**	Normally Opened Closes to alarm	Normally Closed Opens to alarm	TB4
	Normally Opened Closes to alarm	Normally Closed Opens to alarm	
Pump Room Trouble**	Normally Opened Closes to alarm	Normally Closed Opens to alarm	TB5
	Normally Opened Closes to alarm	Normally Closed Opens to alarm	
(Field Programmable)	Normally Opened Closes to alarm	Normally Closed Opens to alarm	TB6
	Normally Opened Closes to alarm	Normally Closed Opens to alarm	

** Re-assignable

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	BY	DD/MM/YY
DRAWN BY	ACD	28/02/23
FINAL APPROVAL	FC	28/02/23

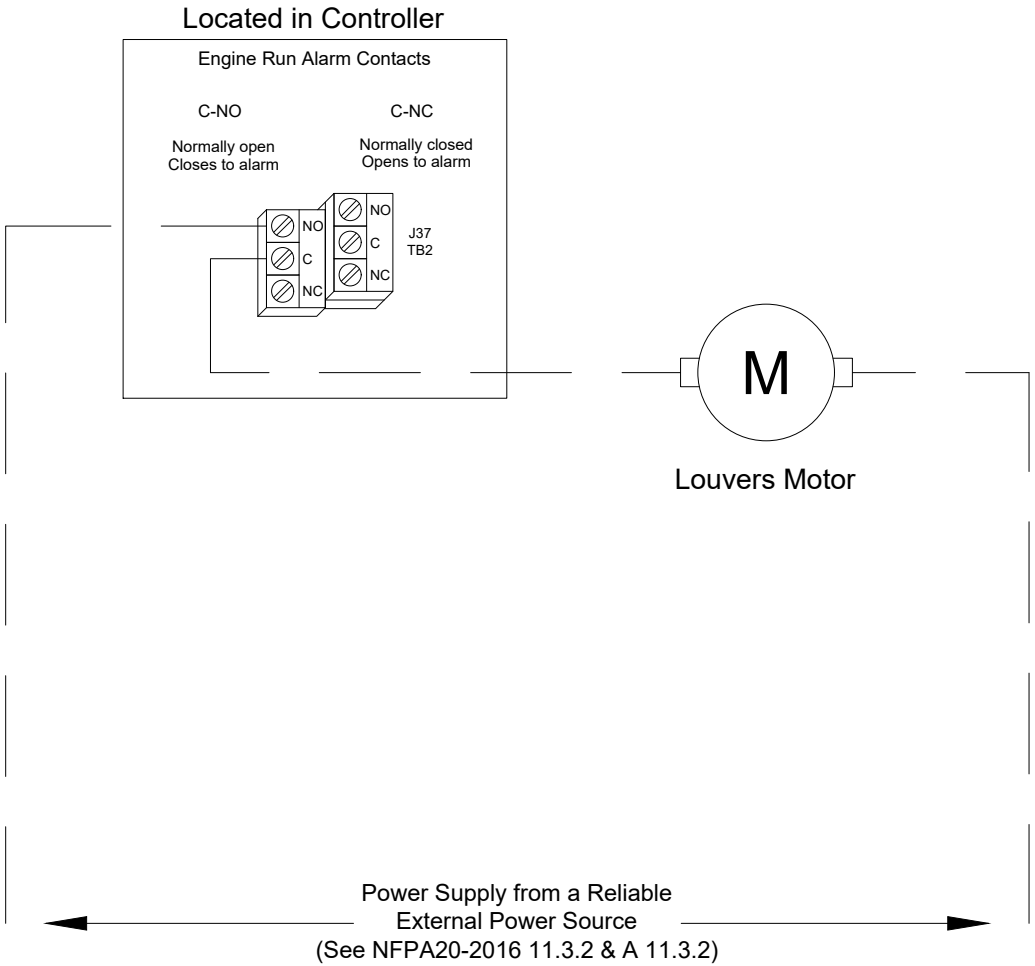
DIESEL ENGINE FIRE PUMP CONTROLLER
12VDC OR 24VDC NEGATIVE GROUND

MODEL: FTA1100

BUILT TO THE LATEST EDITION OF THE NFPA20 & NFPA70

NYC Dpt of Building Approved

DRAWING NUMBER FC1100-801/E
DWG REV. 0
SHEET 1 OF 1



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