



TORNATECH

Project: _____

Customer: _____

Engineer: _____

Pump Manufacturer: _____

Technical Data Submittal Document

Model GFD

Diesel Engine Driven Fire Pump Controller



Contents:

Data Sheets
Dimensional Data
Wiring Schematics
Field Connections

Note: The drawings included in this package are for controllers covered under our standard offering. Actual AS BUILT drawings may differ from what is shown in this package.



April 2024



Standard, Listings, Approvals and Certifications	Built to NFPA 20		
	CE & UKCA Mark	Various EN, IEC & CEE directives and standards	
	Built in Canada or U.A.E	Built in Europe	
	CE Mark (only) Option	Supplied as Standard	
Enclosure	Protection Rating: Standard: IP55		
	Optional		
	NEMA 12	NEMA 4X-304 sst painted	IP65
	NEMA 3	NEMA 4X-304 sst brushed finish	
	NEMA 3R	NEMA 4X-316 sst painted	IP66
	NEMA 4	NEMA 4X-316 sst brushed finish	
	Accessories	Paint Specifications	
<ul style="list-style-type: none"> • Bottom entry gland plate • Lifting Lugs • Keylock handle 	<ul style="list-style-type: none"> • Red RAL3002 • Powder coating • Glossy textured finish 		
Ambient Temperature Rating	Standard 4°C to 40°C / 39°F to 104°F Optional 4°C to 55°C / 39°F to 131°F		
General	AC	120V / 1ph / 60hz 208V to 240V / 1ph / 50-60hz	
	DC	12VDC 24VDC	
	Grounding system	• Negative	
	Battery chargers	<ul style="list-style-type: none"> • Two independent fully automatic • 10A continuous charge • 500mA trickle charge 	
Electrical Reading	<ul style="list-style-type: none"> • Battery 1 & Battery 2 voltage • Battery 1 & Battery 2 charging amperage • Charging mode 		
Pressure Reading	<ul style="list-style-type: none"> • Continuous system pressure display • Cut-in and cut-out pressure setting 		
Pressure and Event Recorder	<ul style="list-style-type: none"> • Pressure readings with date stamp • Event recording with date stamp • Under regular maintained operation, events are stored in memory for the life of the controller. • Data viewable on operator interface display screen • Downloadable by USB port to external memory device 		





<p>Pressure sensing</p>	<ul style="list-style-type: none"> • Pressure transducer and run test solenoid valve assembly for fresh water application • Pressure sensing connection 1/2" Female NPT • Drain connection 3/8" • Rated and calibrated for 0-500psi working pressure (calibrated at 0-300psi) • Externally mounted with protective cover
<p>Audible Alarm</p>	<p>Alarm buzzer - 85dB at 3 meters</p>
<p>Visual Indications</p>	<ul style="list-style-type: none"> • Engine run • Main switch AUTO • Main switch in OFF • Main switch in HAND • Periodic test • Cranking Cycle • AC Power available • Pump room temperature (°F or °C)
<p>Visual & Audible Alarms</p>	<p>Visual only</p> <ul style="list-style-type: none"> • Pump room trouble • Pump on demand • AC Failure • Weak battery 1 & 2 • Battery 1 & 2 overvoltage • High fuel level • PLD low suction pressure • Low pump room temperature • Service required • ECM warning • Weekly test cut-in not reached • Check weekly test solenoid • Pressure transducer fault • Invalid Cut-In <p>Visual and Audible</p> <ul style="list-style-type: none"> • Engine trouble • Controller trouble • Engine low oil pressure • Engine high temperature • Engine low temperature • 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 • Charger 1 & 2 Failure • Loss of continuity 1 & 2 • Fuel tank leak • High raw water temperature
<p>Remote Alarm Contacts</p>	<p>DPDT-8A-250V.AC</p> <ul style="list-style-type: none"> • Engine run • Common controller trouble <ul style="list-style-type: none"> • Charger #1 & Charger #2 failure • Pressure transducer fault • Common engine trouble <ul style="list-style-type: none"> • High engine temperature • Fail to start • Fuel injection malfunction** • ECM selector switch in alternate position*** • Battery #1 & battery #2 failure • DC failure • Loss of continuity (starter) #1 and/or #2 • PLD low suction pressure • Overspeed • Fail when running • Low oil pressure • Common pump room trouble (field re-assignable)* <ul style="list-style-type: none"> • Low fuel level • High fuel level • Fuel tank leak • Low pump room temperature • High pump room temperature • AC Failure • H-O-A selector switch in OFF or HAND • Free (field programmable)*

*Except if option C13 is ordered. Tornatech reserves the right to use any of these four alarm points for special specific application requirements

**Applicable to electronic engines only.

*** Applicable to electronic engines only. Alarms when ECM selector switch on the engine is in alternate mode.



Terminals for Field Connections for External Devices	<ul style="list-style-type: none"> • Low fuel level • Remote AUTOMATIC start • Water reservoir low (re-assignable) • Fuel tank leak (re-assignable) • High fuel level (re-assignable) 			
ViZiTouch V2.1 Operator Interface	<ul style="list-style-type: none"> • Embedded microcomputer with software PLC logic • 7.0" color touch screen (HMI technology) • Upgradable software • Multi-language 			
Operation	Selector Switch	<ul style="list-style-type: none"> • Hand-Off-Auto • Behind lockable and breakable cover 		
	Automatic Start	<ul style="list-style-type: none"> • Start on pressure drop • Remote start signal from automatic device 		
	Manual Start	<ul style="list-style-type: none"> • Crank 1 and Crank 2 start pushbuttons • Run test pushbutton 		
	Crank Cycle	<ul style="list-style-type: none"> • 6 consecutive cycle attempts <ul style="list-style-type: none"> • 3 X 15s crank from battery 1 or 2 alternatively • 15s rest in between each crank attempt 		
	Stopping	<ul style="list-style-type: none"> • Manual with Stop pushbutton • Automatic after expiration of minimum run timer **** 		
	Timers	Field Adjustable & Visual Countdown	<ul style="list-style-type: none"> • Minimum run timer ****(off delay) • Sequential start timer (on delay) • Periodic test timer 	
	Actuation	Visual Indication	<ul style="list-style-type: none"> • Pressure • Non-pressure 	
	Mode		<ul style="list-style-type: none"> • Automatic • Non-automatic 	
Communication Protocol Capability	<ul style="list-style-type: none"> • Protocol: Modbus • Connection type: Shielded female connector RJ45 • Frame Format: TCP/IP • Addresses: See bulletin MOD-GPD 			

Alarm and shutdown schedule		Automatic Start	Manual or Remote Start	Run Test or Periodic Test
	High Coolant	Alarm only	Alarm only	Shutdown
	Low Oil Pressure	Alarm only	Alarm only	Shutdown
	Overspeed	Shutdown	Shutdown	Shutdown

**** Automatic shutdown shall be approved by the AHJ.



A1	Periodic test alarm contact (Form C-SPDT)
A2	Overspeed alarm contact (Form C-SPDT)
A3	Low oil pressure alarm contact (Form C-SPDT)
A4	High coolant temperature alarm contact (Form C-SPDT)
A5	Failure to start alarm contact (Form C-SPDT)
A6	Battery 1 & 2 failure alarm contact (2 x Form C-SPDT)
A7	Charger 1 & 2 failure alarm contact (2 x Form C-SPDT)
A8	AC failure alarm contact (Form C-SPDT)
A11	Extra controller trouble alarm contact (Form C-SPDT)
A12	Extra engine trouble alarm contact (Form C-SPDT)
Ax	Additional engine alarm contact alarm contact (Form C-SPDT) (specify function)
AX45	Engine coolant NO FLOW alarm
B1	Low fuel level alarm contact (Form C-SPDT)
B2	Water reservoir level low alarm contact (Form C-SPDT)
B3	Water reservoir empty alarm contact (Form C-SPDT)
B4	Low pump room temperature alarm contact (Form C-SPDT)
B5	High fuel level alarm contact (Form C-SPDT)
B6	Low system pressure alarm contact (Form C-SPDT)
B7	Low suction pressure alarm contact (Form C-SPDT)
B8	Pump on demand alarm contact (Form C-SPDT)
B9	Fuel tank leak alarm contact (Form C-SPDT)
B10	Main relief valve open alarm contact (Form C-SPDT)
B11	Flow meter loop valve open alarm contact (Form C-SPDT)
B12	Water reservoir level high alarm contact (Form C-SPDT)
B13	High pump room temperature alarm contact (Form C-SPDT)
Bx	Other addition alarm contact alarm contact (Form C-SPDT) (specify function)
C5	CE Mark with factory certificate
C6	Nickel – cadmium battery chargers
C7	Engine block heater circuit (same voltage as battery charger primary)

C9	Non pressure actuated controller w/o pressure transducer and run test solenoid valve
C13	Louver activation circuit (battery power specific)
C13A	Louver activation circuit when engine is not running 24VDC controller with 24VDC louver motor
C13F	Louver activation circuit when engine is not running 24VDC controller with 12VDC louver motor
C14	Delayed automatic start on AC power failure (factory set at 15 minutes)
C19	Lockout/interlock circuit from equipment installed inside the pump room
D4A	Addition of run test solenoid valve for fresh water rated for 0-500psi
D6A	Addition of run test solenoid valve for sea water rated for 0-500psi
D7B	Low fuel level float 1-1/2" (supplied as separate item)
D8B	High fuel level float 1-1/2" (supplied as separate item)
D9A	Anti-condensation heater & thermostat
D9B	Anti-condensation heater & humidistat
D9C	Anti-condensation heater & thermostat & humidistat
D11	Low suction pressure transducer for fresh water rated for 0-300psi with visual indication and alarm contact
D11A	Low suction pressure transducer for sea water rated for 0-300psi with visual indication and alarm contact
D12	Tropicalization
D25	Mounting stand (steel, painted)
D25A	Mounting stand stainless steel-304 painted
D25B	Mounting stand stainless steel-304 brushed finish
D25C	Mounting stand stainless steel-316 painted
D25D	Mounting stand stainless steel-316 brushed finish
D28A	Field programmable i/o board - 5 input /5 output (NOTE: If more than 5 input or 5 output are required, please order this option as many times as required (max.8))
D30	Redundant pressure transducer for fresh water rated for 0-500psi
D31	Redundant pressure transducer for sea water rated for 0-500psi
D32A	Modbus TCP/IP provision
I01	Gauge option package c/w tachometer, speed switch, oil pressure and coolant temperature (senders by others)
I02	Fuel level gauge (sender by others)

Note: Options chosen from this page are not electrically represented on the wiring schematics in this submittal package.

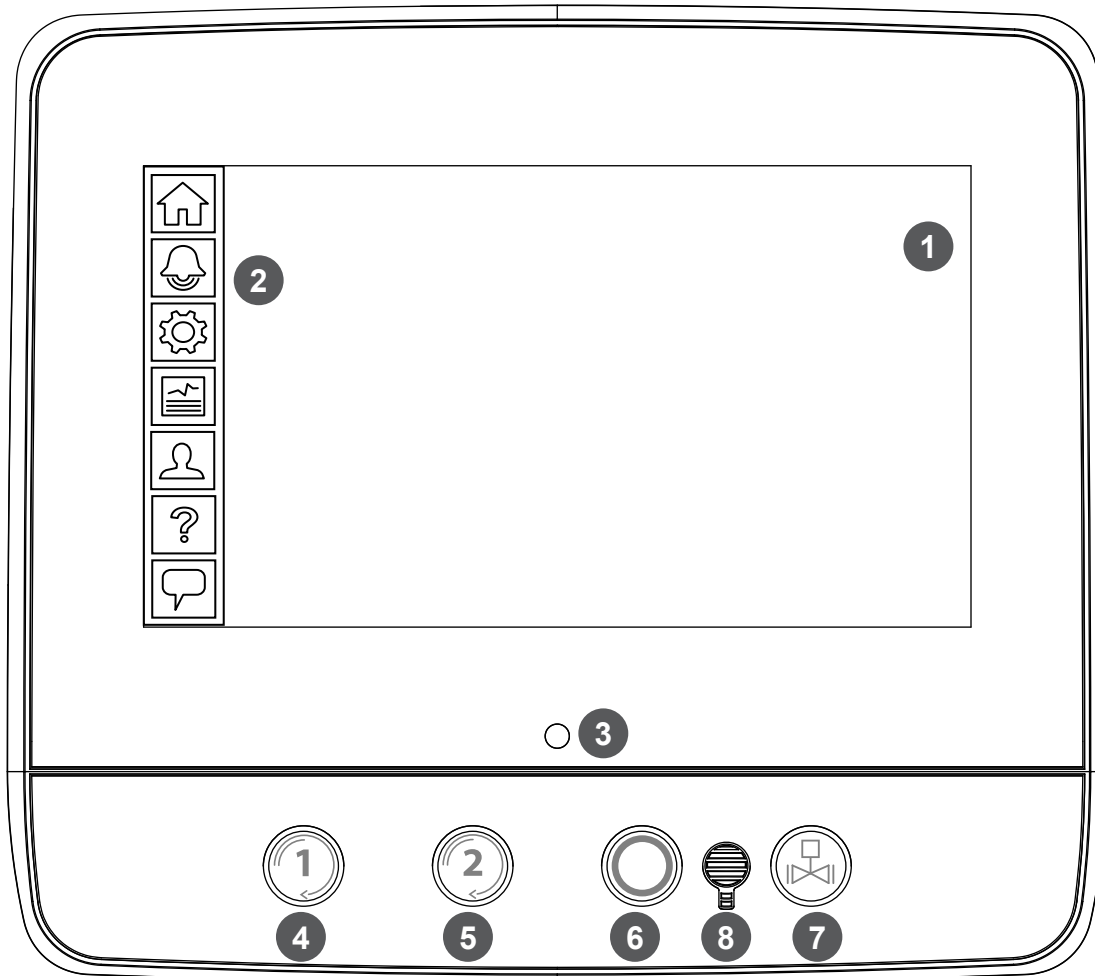


L01	Other language and English (bilingual)
L02	French
L03	Spanish
L04	German
L05	Italian
L06	Polish
L07	Romanian
L08	Hungarian
L09	Slovakian
L10	Croatian
L11	Czech
L12	Portuguese
L13	Dutch
L15	Turkish
L16	Swedish
L21	Danish
L25	Chinese
L28	Finnish
L29	Norwegian
L30	Vietnamese

Additional Options:

- _____
- _____
- _____
- _____
- _____

Note: Options chosen from this page are not electrically represented on the wiring schematics in this submittal package.

ViZiTouch V2.1 Operator Interface


- | | |
|------------------------|--------------------------|
| 1 - Color touch screen | 3 - Power LED (3 colors) |
| 2 - Onscreen menu | 4 - CRANK 1 button |
| • HOME page | 5 - CRANK 2 button |
| • ALARM page | 6 - STOP button |
| • CONFIGURATION page | 7 - RUN TEST button |
| • HISTORY page | 8 - Alarm buzzer |
| • SERVICE page | |
| • MANUAL page | |
| • LANGUAGES page | |



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

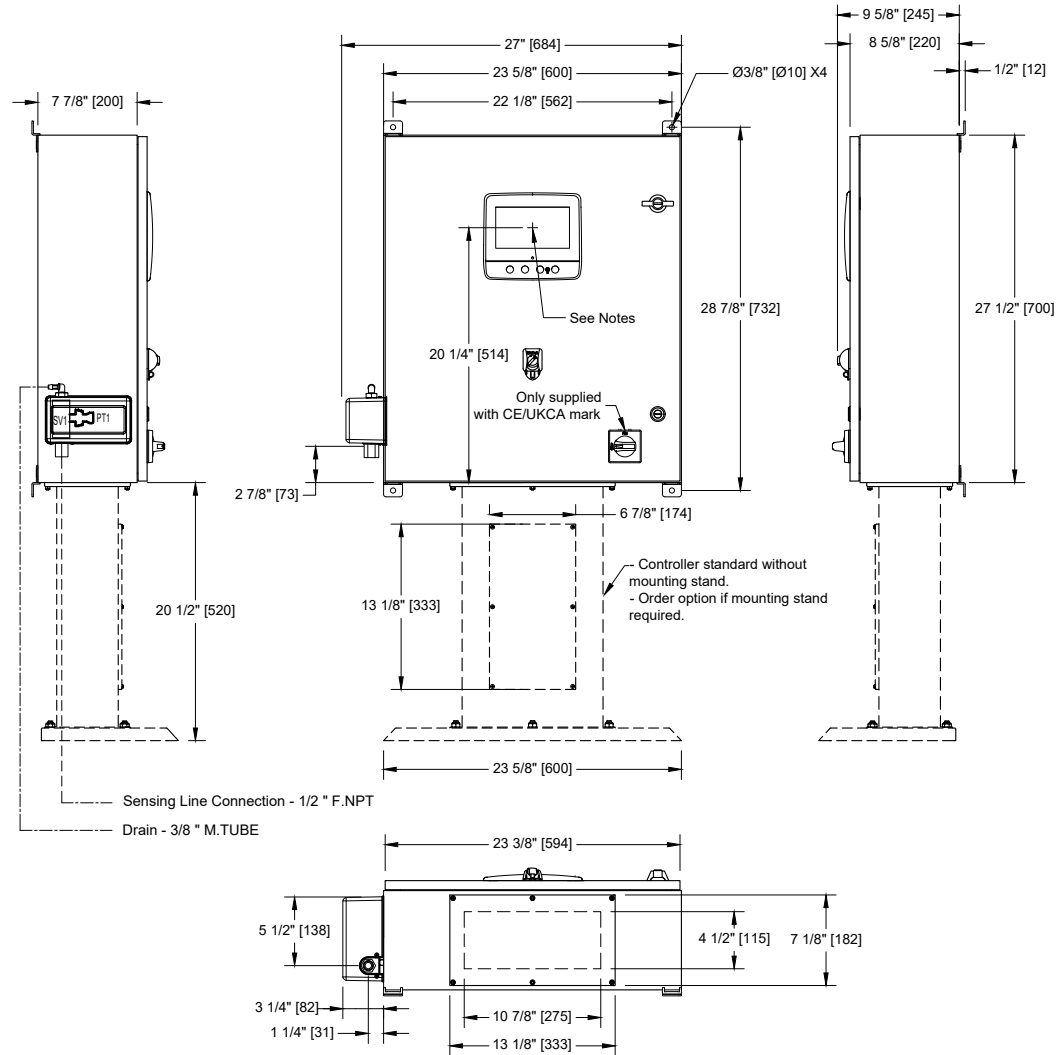
MODEL: GFD

BUILT TO NFPA20



THIRD ANGLE
PROJECTION

DRAWING NUMBER	GFD-DI800/E
DWG REV. 0	
SHEET 1 OF 1	



- Notes:**
- Standard: IP55
 - Standard paint : textured red RAL 3002.
 - All dimensions are in inches [millimeters].
 - Center of ViZiTouch 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

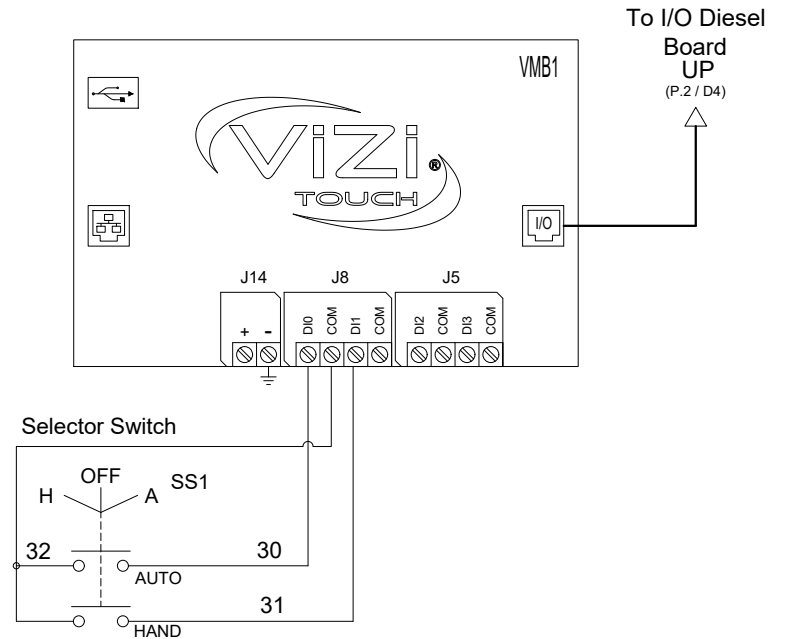
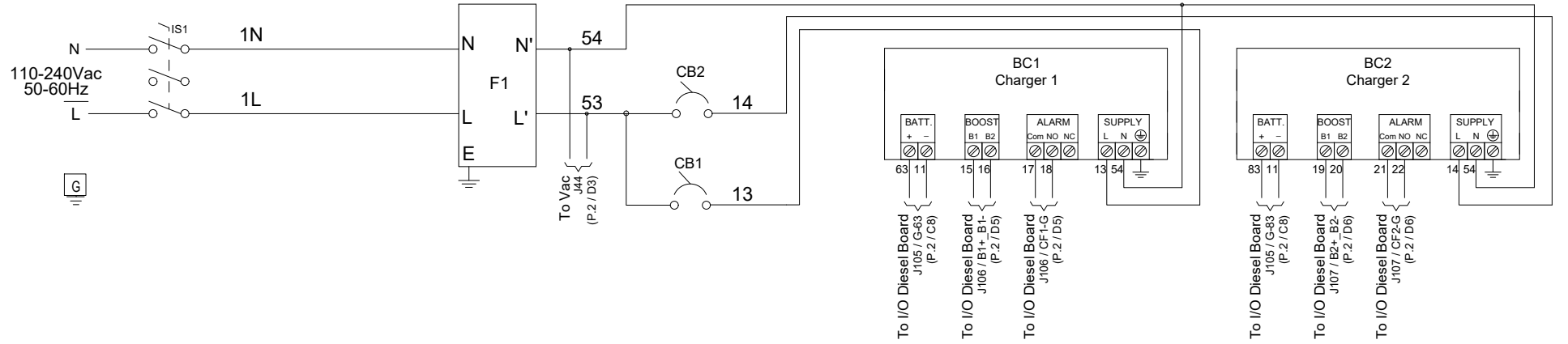
12VDC OR 24VDC NEGATIVE GROUND

MODEL: GFD

BUILT TO NFPA20



DRAWING NUMBER	GFD-WS800/E
DWG REV. 0	
SHEET 1 OF 2	





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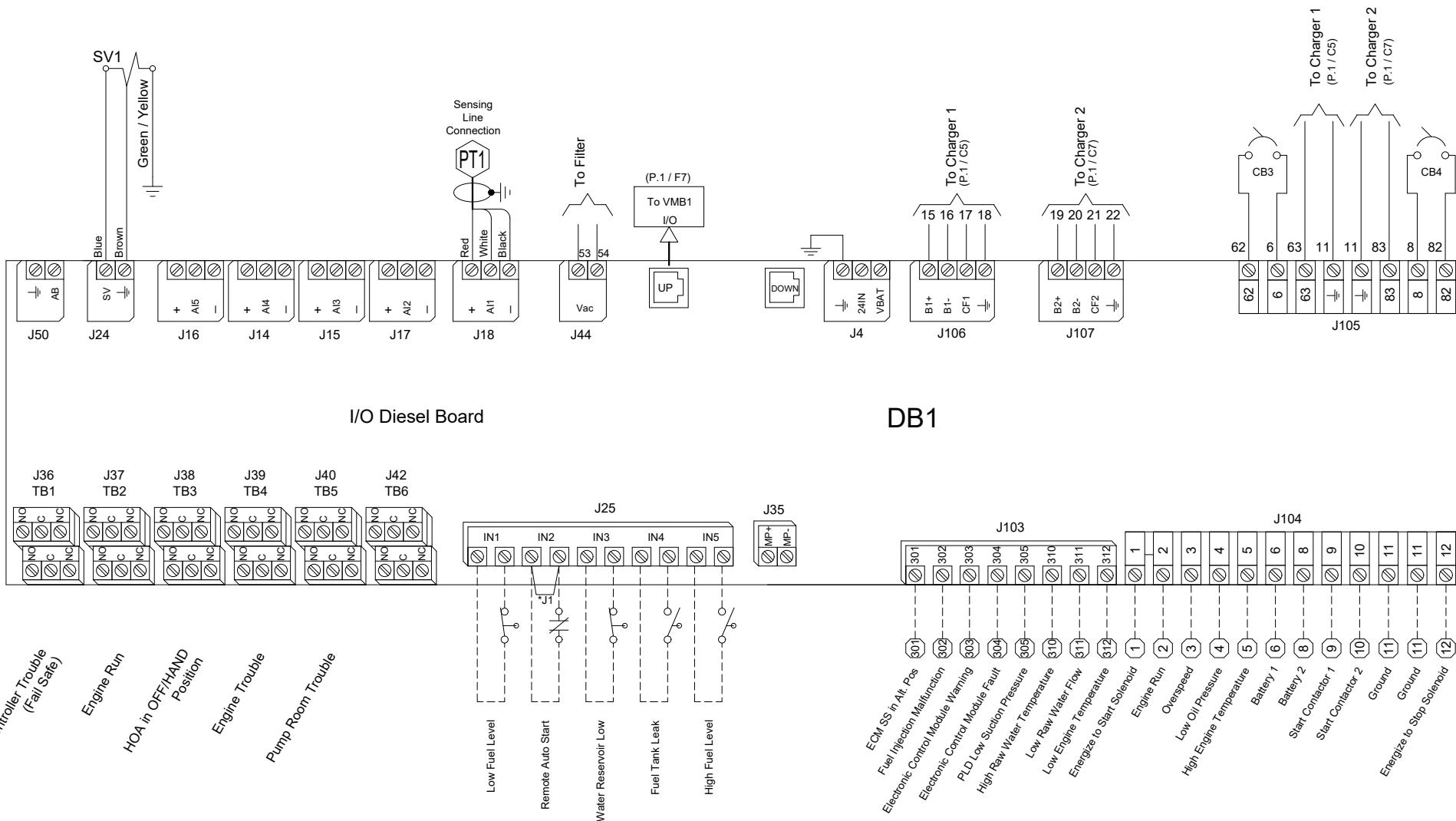
DIESEL ENGINE FIRE PUMP CONTROLLER 12VDC OR 24VDC NEGATIVE GROUND

MODEL: GFD

BUILT TO NFPA20



DRAWING NUMBER	GFD-WS800/E
DWG REV. 0	
SHEET 2 OF 2	



Controller Trouble (Fail Safe)
Engine Run
HOA in OFF/HAND Position
Engine Trouble
Pump Room Trouble

Low Fuel Level
Remote Auto Start
Water Reservoir Low
Fuel Tank Leak
High Fuel Level

301 ECM SS in Alt. Pos
302 Fuel Injection Malfunction
303 Electronic Control Module Warning
304 PLD Low Suction Pressure
305 High Raw Water Temperature
310 Low Raw Water Temperature
311 Low Engine Temperature
312 Energize to Start Solenoid
1 Engine Run
2 Overspeed
3 Low Oil Pressure
4 High Engine Temperature
5 Battery 1
6 Battery 2
8 Start Contact 1
9 Start Contact 2
10 Ground
11 Ground
12 Energize to Stop Solenoid

* Remove this jumper to use this feature



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

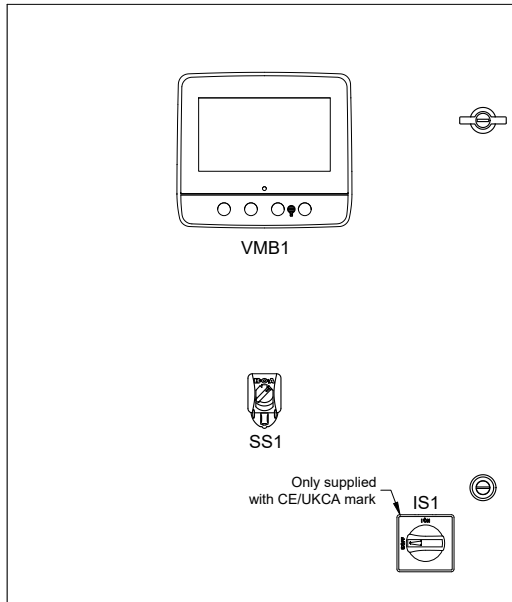
MODEL: GFD

BUILT TO NFPA20

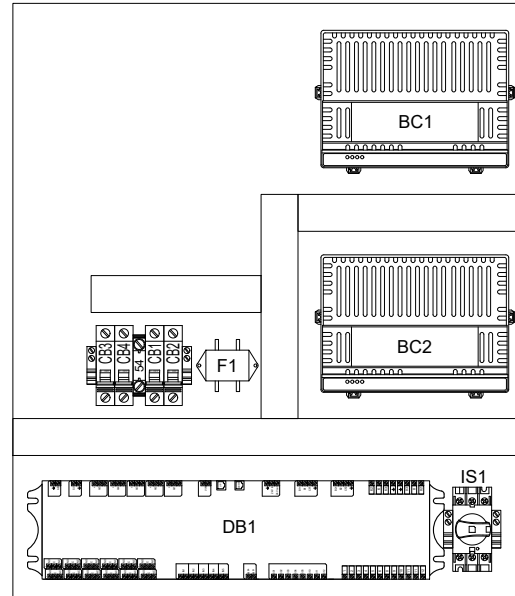


DRAWING NUMBER
GFD-LY800/E
DWG REV. 0
SHEET 1 OF 1

Designation	Description
BC1-BC2	Battery Charger #1 and #2
CB1-2	Magnetic Breaker 1 Pole 10 A
CB3-4	Magnetic Breaker 1 Pole 16 A
DB1	I/O Diesel Board
F1	Filter
IS1	Isolating Switch
SS1	Lockable 3 Position Selector Switch
VMB1	Main Board



Front Door Layout



Internal Layout



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DIESEL ENGINE FIRE PUMP CONTROLLER

12VDC OR 24VDC NEGATIVE GROUND

MODEL: GFD

BUILT TO NFPA20

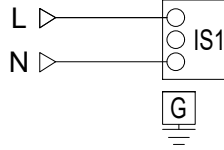


DRAWING NUMBER
GFD-TD800/E
DWG REV. 0
SHEET 1 OF 1

Power Supply

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

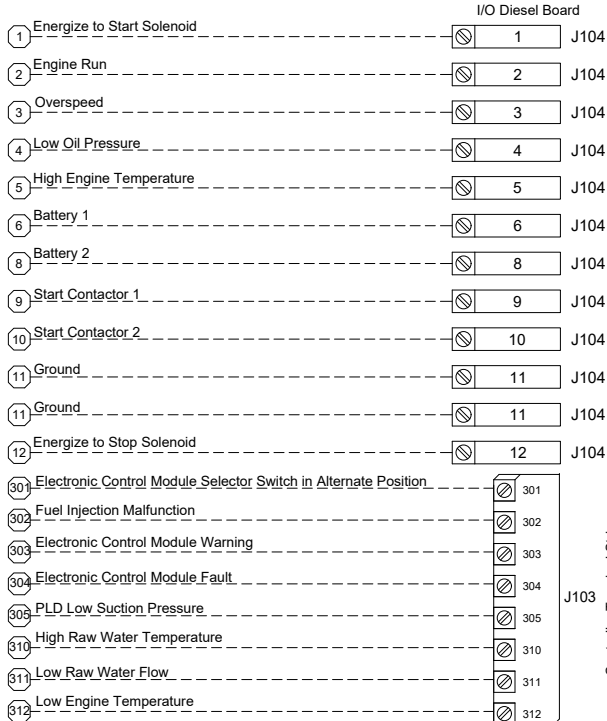
110-240Vac
50-60Hz



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.

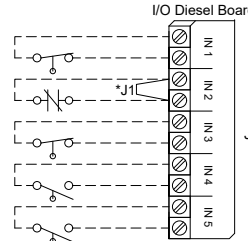
0-5' (0-1.5m) - 12 AWG (4 mm2)
6-10' (1.8-3m) - 10 AWG (6 mm2)
11-15' (3.3-4.5m) - 8 AWG (10 mm2)
16-20' (4.8-6m) - 2x10 AWG (2x6 mm2)
21-32' (6.4-9.75m) - 2x8 AWG (2x10 mm2)



Field Connections

Terminals Wire Size:
24 - 12 AWG
0.5 Nm

- Low Fuel Level
- Remote Auto Start
- Water Reservoir Low
- Fuel Tank Leak
- High Fuel Level



Network Connections

Terminals Wire Size:
Shielded Female Connector RJ45

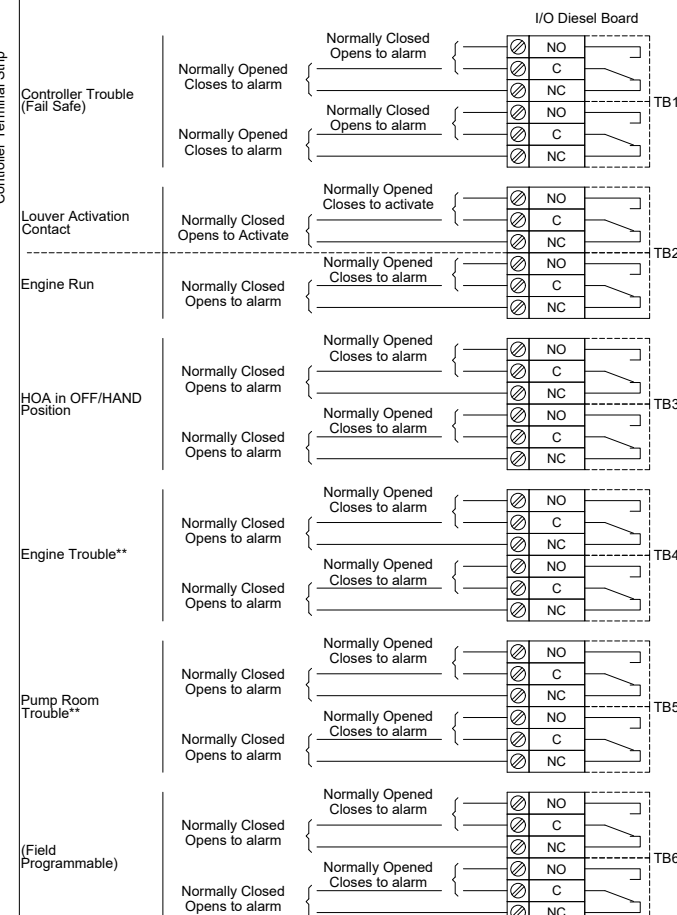
Modbus TCP/IP

Located on Main Board



Alarm Contacts

Terminals Wire Size:
24 - 12 AWG
0.5 Nm



* Remove this jumper to use this feature

** Re-assignable



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

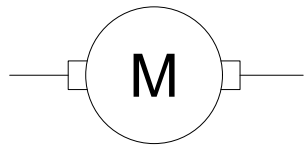
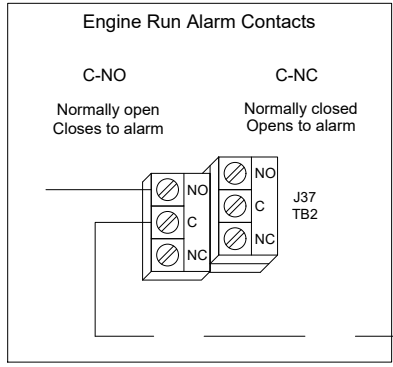
MODEL: GFD

BUILT TO NFPA20

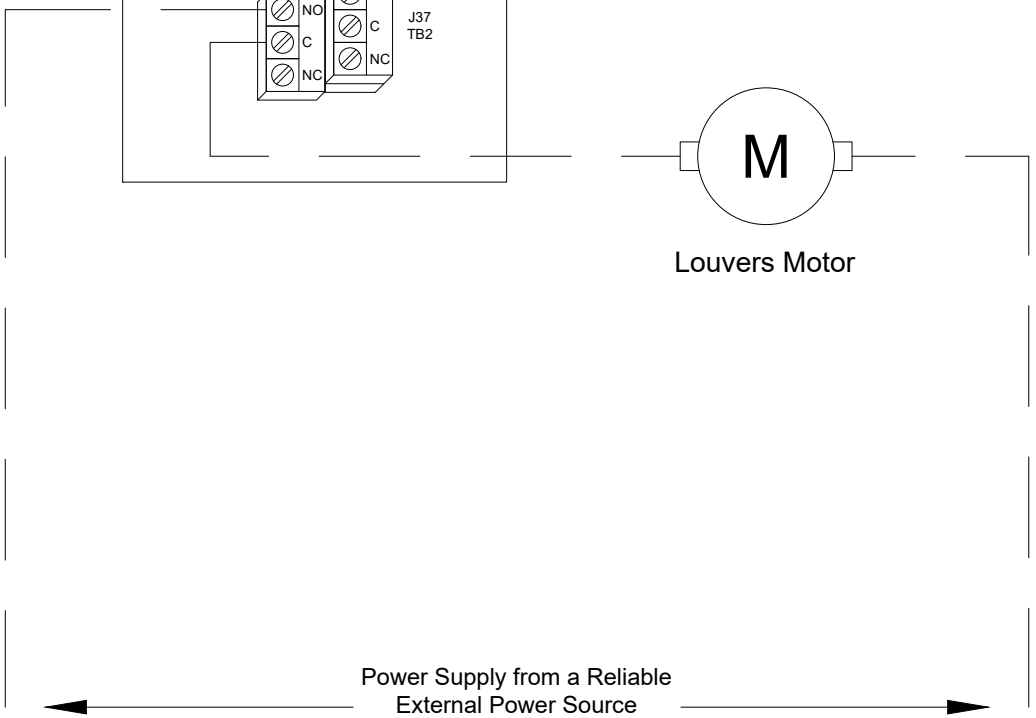


DRAWING NUMBER	GFD-TD801/E
DWG REV.	0
SHEET 1 OF 1	

Located in Controller



Louvers Motor



Power Supply from a Reliable
External Power Source
(See NFPA20-2016 11.3.2 & A 11.3.2)