



# TORNATECH

**Project:** \_\_\_\_\_

**Customer:** \_\_\_\_\_

**Engineer:** \_\_\_\_\_

**Pump Manufacturer:** \_\_\_\_\_

## Technical Data Submittal Document

### **Model VPR + VPU**

Pressure Limiting (VFD)  
Electric Fire Pump Controller  
with Autotransformer Bypass  
with Automatic Power Transfer Switch



#### **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.



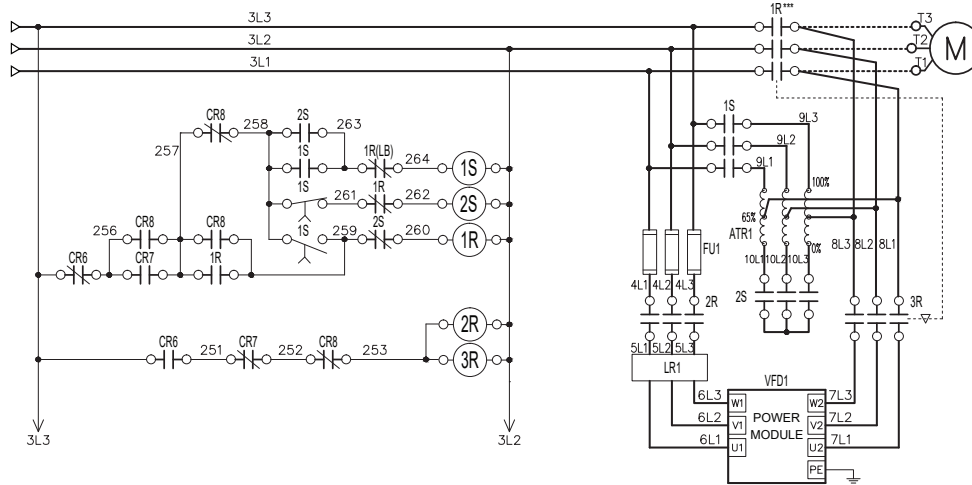
**N.Y.C.**  
APPROVED

November 2018

# Technical Data

## Model VPR + VPU Pressure Limiting (VFD) Electric Fire Pump Controller with Automatic Power Transfer Switch

From Automatic Power Transfer Switch\*



<b>Standard, Listings and Certifications</b>	Built to NFPA 20	
	Underwriters Laboratory (UL)	<ul style="list-style-type: none"> <li>• UL218 - Fire Pump Controllers</li> <li>• UL 1008 - Automatic power transfer switches for fire pump controllers</li> </ul>
	New York City	Accepted for use in the City of New York by the Department of Buildings

<b>Enclosure</b>	<b>Protection Rating</b> <input type="checkbox"/> Standard: NEMA 2 (IP31) <b>Optional</b> <input type="checkbox"/> NEMA 12 <input type="checkbox"/> NEMA 3 <input type="checkbox"/> NEMA 3R <input type="checkbox"/> IP54	
	<b>Accessories</b> <ul style="list-style-type: none"> <li>• Bottom entry gland plate</li> <li>• Lifting lugs</li> <li>• Keylock handle</li> </ul>	<b>Paint Specifications</b> <ul style="list-style-type: none"> <li>• Red RAL3002</li> <li>• Powder coating</li> <li>• Glossy textured finish</li> </ul>

Shortcircuit Withstand Rating	200V to 208V 60Hz		220V to 240V 60Hz		380V to 416V 50 Hz / 60Hz		440V to 480V 60Hz		600V 60Hz	
	Normal Power	Alternate Power	Normal Power	Alternate Power	Normal Power	Alternate Power	Normal Power	Alternate Power	Normal Power	Alternate Power
	HP									
<input type="checkbox"/> Standard 100kA	5-60		5-60		5-300		5-400		n/a	
<input type="checkbox"/> Optional 150kA	n/a		n/a		n/a		n/a		5-500	
<input type="checkbox"/> Standard 50kA	n/a		n/a		n/a		n/a		5-500	
<input type="checkbox"/> Optional 100kA	n/a		n/a		n/a		n/a		5-500	

\*Please see Disconnecting Means details on page 3.



### Model VPR + VPU Pressure Limiting (VFD) Electric Fire Pump Controller with Automatic Power Transfer Switch

<b>Ambient Temperature Rating</b>	<b>Standard:</b> 5°C to 40°C / 41°F to 104°F
<b>Operating Modes</b>	<p>The controller shall have the capability of running the pump motor in the following three (3) modes via a speed mode selector switch:</p> <ul style="list-style-type: none"> <li>• Variable mode: Upon an automatic or manual start, the controller shall start the pump through the variable frequency drive (VFD) and instantly regulate the motor speed in reference to the discharge pressure</li> <li>• Preset mode: Upon an automatic or manual start, the controller shall start the pump through the variable frequency drive (VFD) and run the pump motor at a pre-determined speed. This pre-determined speed shall be adjustable on the variable frequency drive (VFD) itself</li> <li>• Bypass mode: Upon an automatic or manual start, the controller shall start the pump through the reduced voltage autotransformer bypass circuit.</li> </ul>
<b>Surge Suppression</b>	Surge arrestor rated to suppress surges above line voltage
<b>Disconnecting Means</b>	<ul style="list-style-type: none"> <li>• Isolating switch and circuit breaker assembly: <ul style="list-style-type: none"> <li>- Door interlocked in the ON position</li> <li>- Isolating switch rated not less than 115% of motor full load current</li> <li>- Circuit breaker continuous rating not less than 115% of motor full load current</li> <li>- Overcurrent sensing non-thermal type, magnetic only</li> <li>- Instantaneous trip setting of not more than 20 times the motor full load current</li> </ul> </li> <li>• Common flange mounted operating handle</li> </ul>
<b>Service Entrance Rating</b>	Suitable as service entrance equipment
<b>Emergency Start Handle</b>	<ul style="list-style-type: none"> <li>• Flange mounted</li> <li>• Pull and latch activation</li> <li>• Integrated limit switch</li> <li>• Across the line start (direct on line)</li> </ul>
<b>Locked Rotor Protector</b>	<ul style="list-style-type: none"> <li>• Operate shunt trip to open circuit breaker</li> <li>• Factory set at 600% of motor full load current</li> <li>• Trip between 8 and 20 seconds</li> </ul>
<b>Electrical Readings</b>	<ul style="list-style-type: none"> <li>• Voltage phase to phase (normal power)</li> <li>• Amperage of each phase when motor is running</li> </ul>
<b>Pressure Readings</b>	<ul style="list-style-type: none"> <li>• Continuous system pressure display</li> <li>• Cut-in and Cut-out pressure settings</li> </ul>
<b>Pressure and Event recorder</b>	<ul style="list-style-type: none"> <li>• Pressure readings with date stamp</li> <li>• Event recording with date stamp</li> <li>• The recorder will register and keep in memory pressure fluctuations over time that have occurred over the previous seven (7) days and events, alarms, general system information that have occurred over the previous fifteen (15)</li> <li>• Information is retrievable through DB9 communication port accessible without having to open the controller door.</li> </ul>
<b>Pressure Sensing</b>	<ul style="list-style-type: none"> <li>• Pressure transducers (2) for reading of discharge pressure</li> <li>• Pressure sensing line connection (1/2" Female NPT)</li> <li>• Rated for 0-600PSI working pressure</li> <li>• Externally mounted with protective cover</li> </ul>



Technical Data
Model VPR + VPU Pressure Limiting (VFD)
Electric Fire Pump Controller
with Automatic Power Transfer Switch

Table with 2 columns: Feature Name and Description. Rows include Audible Alarm, Visual Indications, Visual & Audible Alarms, and Remote Alarm Contacts.

\*\*\*Can only be used if approved by the AHJ



## Technical Data

### Model VPR + VPU Pressure Limiting (VFD) Electric Fire Pump Controller with Automatic Power Transfer Switch

<b>Operator Interface</b>	<ul style="list-style-type: none"> <li>• Micro-processor based</li> <li>• Accessible without opening main door</li> <li>• Voltage and current indication</li> <li>• Pressure settings and system pressure indication</li> <li>• 15 day pressure and 15 day event</li> </ul>			
<b>Operation</b>	<b>Automatic Start</b>	<ul style="list-style-type: none"> <li>• Start on pressure drop</li> </ul>		
	<b>Manual Start</b>	<ul style="list-style-type: none"> <li>• Start pushbutton</li> <li>• Remote start from manual device</li> </ul>		
	<b>Stopping</b>	<ul style="list-style-type: none"> <li>• Manual with Stop pushbutton</li> <li>• Automatic after expiration of minimum run timer ***</li> </ul>		
	<b>Timers</b>	Field Adjustable & Visual Countdown	<ul style="list-style-type: none"> <li>• Minimum run timer ***(off delay)</li> <li>• Sequential start timer (on delay)</li> <li>• Periodic test timer</li> </ul>	
	<b>Actuation</b>	Visual Indication	<ul style="list-style-type: none"> <li>• Pressure</li> </ul>	
	<b>Mode</b>		<ul style="list-style-type: none"> <li>• Automatic</li> <li>• Non-automatic</li> </ul>	



**Technical Data**  
**Model VPR + VPU Pressure Limiting (VFD)**  
**Electric Fire Pump Controller**  
**with Automatic Power Transfer Switch**

<b>Automatic Power Transfer Switch</b>	<b>Surge Suppression</b>	Surge arrestor rated to suppress surges above line voltage
	<b>Disconnecting Means</b>	<ul style="list-style-type: none"> <li>• Isolating switch and circuit breaker assembly:               <ul style="list-style-type: none"> <li>- Door interlocked in the ON position</li> <li>- Isolating switch rated not less than 115% of motor full load current</li> <li>- Circuit breaker continuous rating not less than 115% of motor full load current</li> <li>- Overcurrent sensing non-thermal type, magnetic only</li> <li>- Instantaneous trip setting of not more than 20 times the motor full load current</li> </ul> </li> <li>• Common flange mounted operating handle</li> </ul>
	<b>Locked Rotor Protector</b>	<ul style="list-style-type: none"> <li>• Operate shunt trip to open circuit breaker</li> <li>• Factory set at 600% of motor full load current</li> <li>• Trip between 8 and 20 seconds</li> </ul>
	<b>Visual Indications</b>	<ul style="list-style-type: none"> <li>• Alternate (emergency) isolating switch in the OFF position</li> <li>• Alternate (emergency) voltage phase to phase + frequency</li> <li>• Transfer switch in normal or alternate position</li> </ul>
	<b>Visual and Audible Alarms</b>	<ul style="list-style-type: none"> <li>• Isolating switch in OFF position</li> </ul>
	Electrically operated and mechanically held in the normal or alternate position	
	Provision for manual operation	
	<b>Remote Alarm Contacts</b>	
	SPDT-8A-250VAC <ul style="list-style-type: none"> <li>• Isolating switch in the OFF position</li> <li>• Transfer switch in normal position</li> <li>• Transfer switch in alternate (emergency) position</li> </ul>	
	<b>Time Delays</b>	
	<ul style="list-style-type: none"> <li>• Momentary normal power outage override (factory set at 4 sec)</li> <li>• Alternate (emergency) power available delay (factory set at 1 sec)</li> <li>• Retransfer to normal (factory set at 5 min)</li> <li>• Generator cooldown (factory set at 5 min)</li> </ul>	
	<b>Voltage Sensing</b>	
	<ul style="list-style-type: none"> <li>• Transfer to alternate (normal power dropout) 85% of nominal</li> <li>• Phase reversal transfer to alternate</li> <li>• Retransfer to normal (normal power pickup) 90% of nominal</li> </ul>	
	<b>Audible Alarm (AIS Open)</b>	
Alarm buzzer		
<b>Generator Start Connection</b>		
SPDT-8A-250V.AC		



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### Model VPR + VPU Pressure Limiting (VFD) Electric Fire Pump Controller with Automatic Power Transfer Switch

<input type="checkbox"/>	A06B	Lockout Circuit from other VPx
<input type="checkbox"/>	A07B	Interlock Circuit from other VPx
<input type="checkbox"/>	A9	Low zone pump control function
<input type="checkbox"/>	A10	Medium zone pump control function
<input type="checkbox"/>	A11	High zone pump control function
<input type="checkbox"/>	B11	Built in alarm panel (120V.AC supervisory power) providing indication for: • Audible alarm & silence pushbutton for motor run, phase reversal, loss of phase. • Pilot lights for loss of phase & supervisory power available
<input type="checkbox"/>	B11B	Built in alarm panel same as B11 but 220-240VAC supervisory power
<input type="checkbox"/>	B19A	High motor temperature c/w thermostat relay and alarm contacts (DPDT)
<input type="checkbox"/>	B19B	High motor temperature c/w PT100 relay and alarm contacts (DPDT)
<input type="checkbox"/>	C1	Extra motor run alarm contact (DPDT)
<input type="checkbox"/>	C4	Periodic test alarm contact (DPDT)
<input type="checkbox"/>	C7	Low pump room temperature alarm contact (DPDT)
<input type="checkbox"/>	C10	Low water reservoir level alarm contact (DPDT)
<input type="checkbox"/>	C14	Pump on demand / automatic start alarm contact (DPDT)
<input type="checkbox"/>	C15	Pump fail to start alarm contact (DPDT)
<input type="checkbox"/>	C18	High water reservoir level c/w visual indication and alarm contact (DPDT)
<input type="checkbox"/>	C19	Emergency start alarm contact (DPDT)
<input type="checkbox"/>	C21	Deluge valve start alarm contact (DPDT)
<input type="checkbox"/>	C22	Remote automatic start alarm contact (DPDT)
<input type="checkbox"/>	C23	Remote manual start alarm contact (DPDT)
<input type="checkbox"/>	C24	High pump room temperature alarm contact (DPDT)
<input type="checkbox"/>	Cx	Additional visual and alarm contact (Specify function) (DPDT)

<input type="checkbox"/>	D1	Low suction pressure transducer for fresh water rated at 0-300PSI with visual indication and alarm contact
<input type="checkbox"/>	D1A	Low suction pressure transducer for sea water rated at 0-300PSI with visual indication and alarm contact
<input type="checkbox"/>	D13	High withstand rating for (normal power section) • 208V to 480V = 150kA • 600V = 100kA
<input type="checkbox"/>	D14	Anti-condensation heater & thermostat
<input type="checkbox"/>	D14A	Anti-condensation heater & humidistat
<input type="checkbox"/>	D14B	Anti-condensation heater & thermostat & humidistat
<input type="checkbox"/>	D15	Tropicalization
<input type="checkbox"/>	D24	Audible Alarm
<input type="checkbox"/>	D26	Modbus with RTU frame format and RS485 connection
<input type="checkbox"/>	D26A	Modbus TCP / IP provision
<input type="checkbox"/>	D27	Motor heater connection (external single phase power source and heater on/off contact)
<input type="checkbox"/>	D27A	Motor heater connection (internal single phase power source and heater on/off contact)
<input type="checkbox"/>	D28	Customized drawing set
<input type="checkbox"/>	D37	Window kit for operator interface
<input type="checkbox"/>	E1	Permanent load shedding contacts
<input type="checkbox"/>	E2	Temporary pump motor start period load shedding contacts
<input type="checkbox"/>	E3	Temporary & permanent load shedding contacts
<input type="checkbox"/>	F2	Anti condensation heater & thermostat (alternate power section)
<input type="checkbox"/>	F2A	Anti condensation heater & humidistat (alternate power section)
<input type="checkbox"/>	F2B	Anti condensation heater & thermostat & humidistat (alternate power section)
<input type="checkbox"/>	F6	High withstand rating for (model GPU only) : • 208V to 480V=150kA • 600V=100kA
<input type="checkbox"/>	F10	IP55 assembly

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



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## Model VPR + VPU Pressure Limiting (VFD) Electric Fire Pump Controller with Automatic Power Transfer Switch

<input type="checkbox"/> L01	Other language and English (bilingual)
<input type="checkbox"/> L02	French
<input type="checkbox"/> L03	Spanish

Additional Options:

<input type="checkbox"/>	_____
<input type="checkbox"/>	_____
<input type="checkbox"/>	_____
<input type="checkbox"/>	_____
<input type="checkbox"/>	_____

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



# Technical Data

## Model VPR + VPU Pressure Limiting (VFD) Electric Fire Pump Controller with Automatic Power Transfer Switch

### Operator Interface

