



# TORNATECH

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

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

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

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

## Technical Data Submittal Document

### VPx Series

Full Service - Variable Speed  
Electric Fire Pump Controller  
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.



October 2023



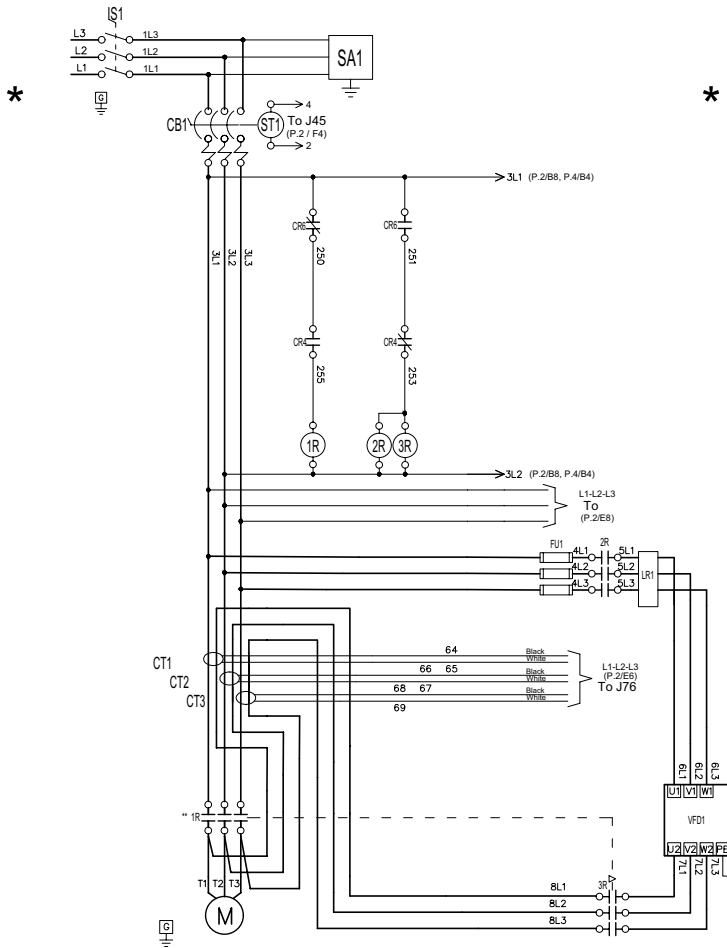
# TORNATECH

## Technical Data

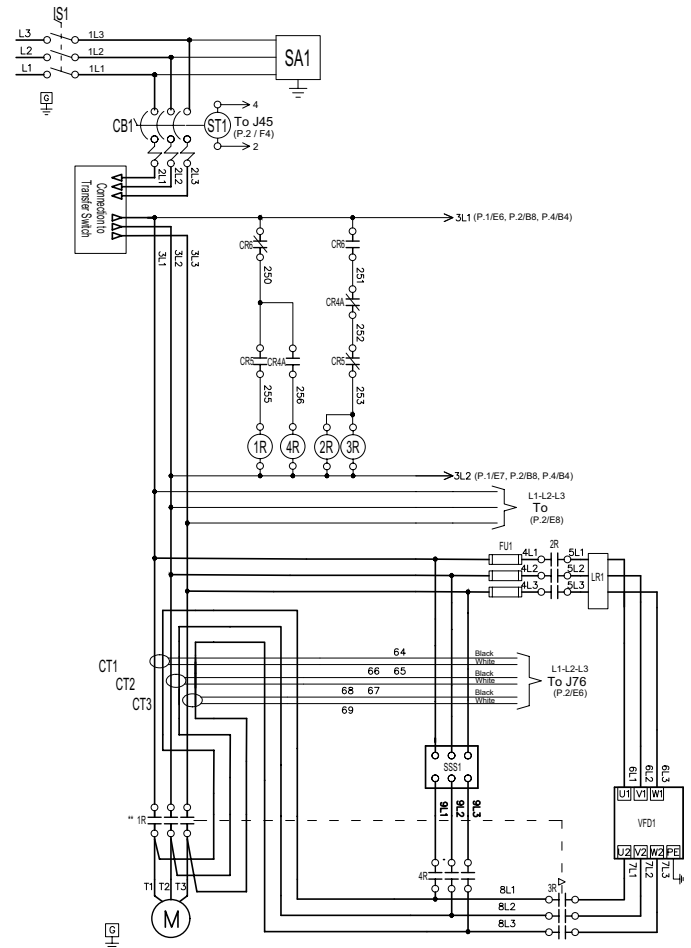
### VPx Series Full Service Variable Speed Electric Fire Pump Controller with Automatic Power Transfer Switch

#### Select Bypass starting method

#### Model VPA Across the line

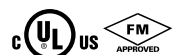


#### Model VPS Soft Start Soft Stop



\*From normal incoming power through Disconnecting Means (IS/CB)

\*For Disconnecting Means details see page 3





## VPx Series Full Service Variable Speed Electric Fire Pump Controller with Automatic Power Transfer Switch

Standard, Listings, Approvals and Certifications	<b>Built to NFPA 20 (latest edition)</b>	
	<b>Underwriters Laboratory (UL)</b>	<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>
	<b>FM Global</b>	Class 1321/1323
Enclosure	<b>Protection Rating</b>	
	Standard: NEMA 12 ventilated assembly	
	<b>Accessories</b> <ul style="list-style-type: none"> <li>• Gland plate(s)</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	<b>200V 60Hz</b>	<b>208V to 240V 60Hz</b>	<b>380V to 415V 50 Hz / 60Hz</b>	<b>440V to 480V 60Hz</b>	<b>575V to 600V 60Hz</b>
	<b>HP (kw)</b>				
	5 to 75	5 to 100	5 to 350	5 to 450	5 to 100
	Standard 100kA				Standard 50kA

<b>Ambient Temperature Rating</b>	<b>Standard:</b> 4°C to 40°C / 39°F to 104°F	
<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>• Constant pressure output set-point</li> <li>• Cut-in and Cut-out pressure settings</li> </ul>	



## VPx Series Full Service Variable Speed Electric Fire Pump Controller with Automatic Power Transfer Switch

<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>• Under regular maintained operation, events are stored in memory for the life of the controller.</li> <li>• Data viewable on operator interface display screen</li> <li>• Downloadable by USB port to external memory device</li> </ul>		
<b>Pressure Sensing</b>	<ul style="list-style-type: none"> <li>• Pressure transducers and run test solenoid valve assembly for fresh water application</li> <li>• Pressure sensing line connection 1/2" Female NPT</li> <li>• Drain connection 3/8"</li> <li>• Rated for 0-500PSI working pressure (standard display at 0-300PSI)</li> <li>• Externally mounted with protective cover</li> </ul>		
<b>Variable Speed Drive Circuit</b>	<ul style="list-style-type: none"> <li>• Variable speed drive (VFD)</li> <li>• Line reactor 5%</li> <li>• Mode selector switch <ul style="list-style-type: none"> <li>• VFD</li> <li>• Bypass</li> </ul> </li> </ul>		
<b>Audible Alarm</b>	Alarm buzzer - 85dB at 3 meters		
<b>Visual Indications</b>	<ul style="list-style-type: none"> <li>• Power available</li> <li>• Motor run</li> <li>• Periodic test</li> <li>• Manual start</li> <li>• Deluge valve start</li> <li>• Remote automatic start</li> <li>• Remote manual start</li> <li>• Emergency start</li> <li>• Pump on demand/Automatic start</li> <li>• Pump room temperature (°F or °C)</li> <li>• Lockout</li> <li>• VFD fault</li> <li>• VFD bypass</li> <li>• VFD Hertz</li> </ul>		
<b>Visual &amp; Audible Alarms</b>	<p>Visual</p> <ul style="list-style-type: none"> <li>• Control voltage not healthy</li> <li>• Invalid cut-in</li> <li>• Lock rotor current</li> <li>• Loss of power</li> <li>• Low ambient temperature</li> <li>• Low water level</li> <li>• Motor trouble</li> <li>• Phase reversal (normal power)</li> <li>• Overcurrent</li> <li>• Overvoltage</li> <li>• Phase loss L1</li> <li>• Phase loss L2</li> <li>• Phase loss L3</li> <li>• Phase unbalanced</li> <li>• Pressure transducer fault detected</li> <li>• Pump on demand</li> <li>• Pump room alarm</li> <li>• Service required</li> <li>• Undercurrent</li> <li>• Undervoltage</li> <li>• Check weekly test solenoid</li> <li>• Weekly test cut-in reached</li> </ul> <p>Visual and audible</p> <ul style="list-style-type: none"> <li>• Fail to start</li> </ul>		
<b>Remote Alarm Contacts</b>	<p>DPDT-8A-250V.AC</p> <ul style="list-style-type: none"> <li>• Power available</li> <li>• Phase reversal</li> <li>• Motor run</li> <li>• Common pump room alarm (field re-assignable)** <ul style="list-style-type: none"> <li>• Overvoltage</li> <li>• Undervoltage</li> <li>• Phase unbalance</li> <li>• Low pump room temperature</li> <li>• High Pump room temperature</li> </ul> </li> <li>• Common motor trouble (field re-assignable)** <ul style="list-style-type: none"> <li>• Overcurrent</li> <li>• Fail to start</li> <li>• Undercurrent</li> <li>• Ground fault</li> </ul> </li> <li>• Overpressure</li> <li>• Bypass mode</li> <li>• VFD failure</li> </ul>		

\*\*Tornatech reserves the right to use any of these three alarm points for special specific application requirements.



<b>ViZiTouch V2.1 Operator Interface</b>	<ul style="list-style-type: none"> <li>• Embedded microcomputer with software PLC logic</li> <li>• 7.0" color touch screen (HMI technology)</li> <li>• Upgradable software</li> <li>• Multi-language</li> </ul>		
<b>Communication Protocol Capability</b>	<ul style="list-style-type: none"> <li>• Protocol: Modbus</li> <li>• Connection type: Shielded female connector RJ45</li> <li>• Frame Format: TCP/IP</li> <li>• Addresses: See Technical Bulletin - Modbus TCP/IP Communication Protocol for Electric Fire Pump Controllers with Automatic Transfer Switch</li> </ul>		
<b>Operation</b>	<b>Automatic Start</b>	<ul style="list-style-type: none"> <li>• Start on pressure drop</li> <li>• Remote start signal from automatic device</li> <li>• Deluge valve start</li> </ul>	
	<b>Manual Start</b>	<ul style="list-style-type: none"> <li>• Start pushbutton</li> <li>• Run test 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> <li>• Non-pressure</li> </ul>
	<b>Mode</b>		<ul style="list-style-type: none"> <li>• Automatic</li> <li>• Non-automatic</li> </ul>

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



A4	Flow switch provision	C19	Emergency start alarm contact (DPDT)
A8	Foam pump application w/o pressure transducer and run test solenoid valve.	C20	Manual start alarm contact (DPDT)
A9	Low zone pump control function	C21	Deluge valve start alarm contact (DPDT)
A10	Middle zone pump control function	C22	Remote automatic start alarm contact (DPDT)
A11	High zone pump control function	C23	Remote manual start alarm contact (DPDT)
A13	Non-pressure actuated controller w/o pressure transducer and run test solenoid valve	C24	High pump room temperature alarm contact (DPDT)
A16	Lockout/interlock circuit from equipment installed inside the pump room	C25	Second set of standard alarm contacts (DPDT) (Typical for city of Los Angeles and Denver)
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	Cx	Additional visual and alarm contact (Specify function) (DPDT)
B11B	Built in alarm panel same as B11 but 220-240VAC supervisory power	D1	Low suction pressure transducer for fresh water rated at 0-300PSI with visual indication and alarm contact
B19A	High motor temperature c/w thermostat relay and alarm contacts (DPDT)	D1A	Low suction pressure transducer for sea water rated at 0-300PSI with visual indication and alarm contact
B19B	High motor temperature c/w PT100 relay and alarm contacts (DPDT)	D5	Pressure transducer and run test solenoid valve for fresh water rated for 0-500PSI (for factory calibration purposes only)
B21	Ground fault alarm detection c/w visual indication and alarm contact (DPDT)	D5D	Pressure transducer and run test solenoid valve for sea water rated for 0-500PSI
C1	Extra motor run alarm contact (DPDT)	D14	Anti-condensation heater & thermostat
C4	Periodic test alarm contact (DPDT)	D14A	Anti-condensation heater & humidistat
C6	Low discharge pressure alarm contact (DPDT)	D14B	Anti-condensation heater & thermostat & humidistat
C7	Low pump room temperature alarm contact (DPDT)	D15	Tropicalization
C10	Low water reservoir level alarm contact (DPDT)	D26	Modbus with RTU frame format and RS485 connection
C11	High electric motor temperature alarm contact (DPDT)	D27	Motor heater connection (external single phase power source and heater on/off contact)
C12	High electric motor vibration c/w visual indication and alarm contact (DPDT)	D27A	Motor heater connection (internal single phase power source and heater on/off contact)
C14	Pump on demand / automatic start alarm contact (DPDT)	D28	Customized drawing set
C15	Pump fail to start alarm contact (DPDT)	D34A	Field programmable I/O board - 5 Input / 5 output
C16	Control voltage healthy alarm contact (DPDT)	D36	Redundant pressure transducer for fresh water rated for 0-500PSI
C17	Flow meter valve loop open c/w visual indication and alarm contact (DPDT)	D36A	Redundant pressure transducer for sea water rated for 0-500PSI
C18	High water reservoir level c/w visual indication and alarm contact (DPDT)		

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



E1	Permanent load shedding contacts
E2	Temporary pump motor start period load shedding contacts
E3	Temporary & permanent load shedding contacts
F2	Anti condensation heater & thermostat (alternate power section)
F2A	Anti condensation heater & humidistat (alternate power section)
F2B	Anti condensation heater & thermostat & humidistat (alternate power section)

Additional Options:

---

---

---

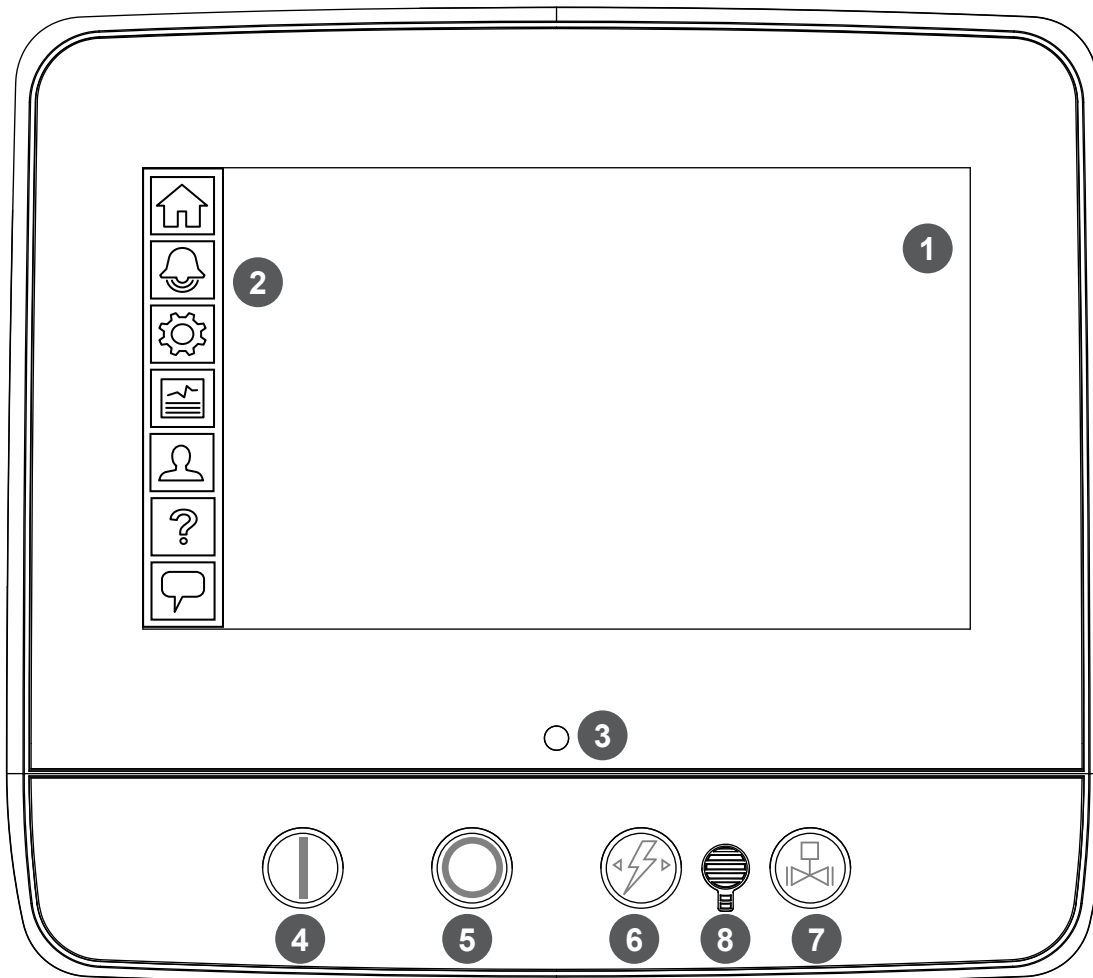
---

---

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
- 2 - Onscreen menu
  - HOME page
  - ALARM page
  - CONFIGURATION page
  - HISTORY page
  - SERVICE page
  - MANUAL page
  - LANGUAGES page

- 3 - Power LED (3 colors)
- 4 - START button
- 5 - STOP button
- 6 - TRANSFER SWITCH TEST button
- 7 - RUN TEST button
- 8 - Alarm buzzer





© Tornatech, Inc. Not for construction.  
Subject to change without notice.

BY	DD/MM/YY
DRAWN BY	ZS 10/07/23
FINAL APPROVAL	FC 10/07/23

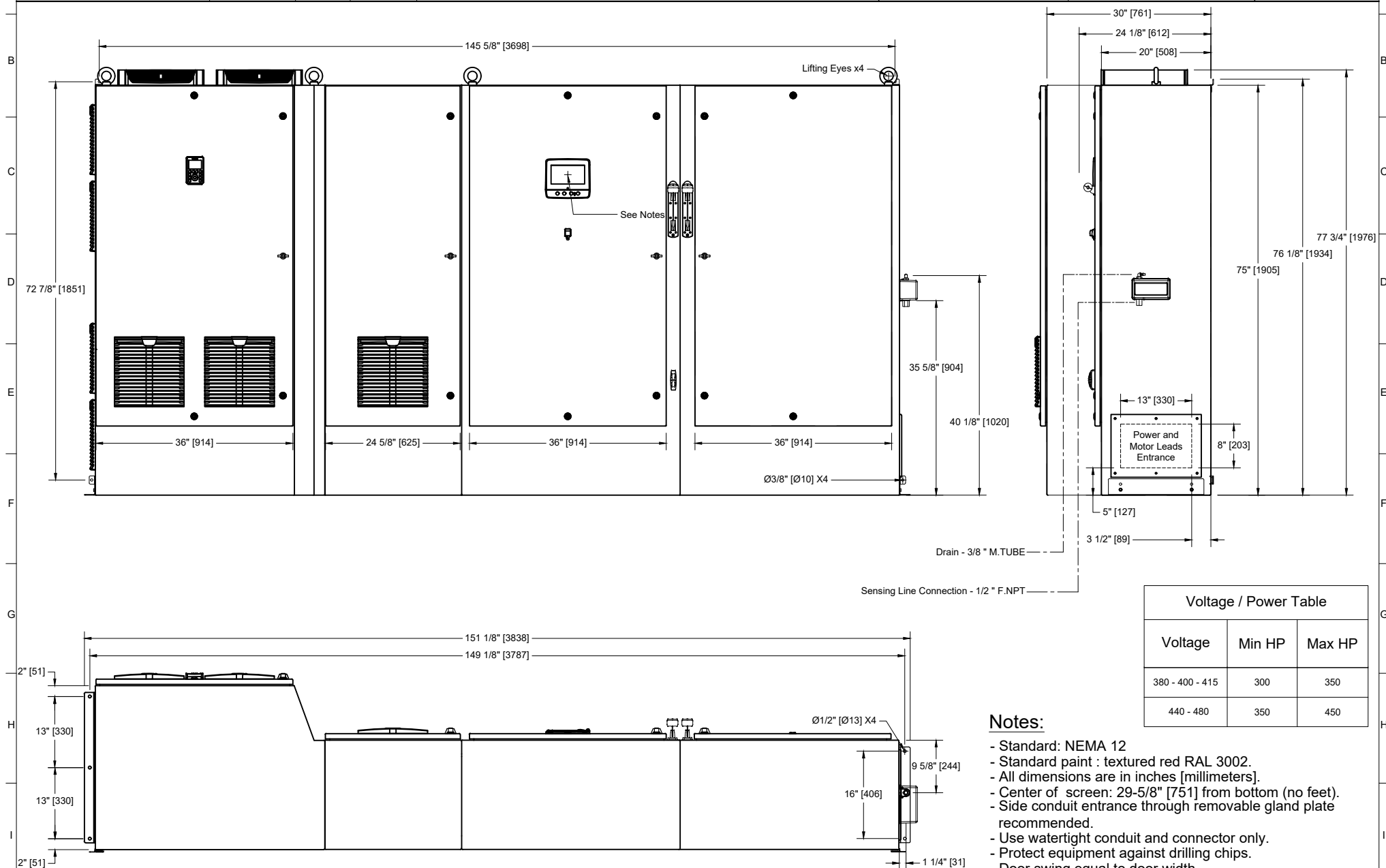
## ELECTRIC FIRE PUMP CONTROLLER WITH AUTOMATIC TRANSFER SWITCH

### VPA / VPS + VPU

BUILT TO THE LATEST EDITION OF THE NFPA20 & NFPA70



DRAWING NUMBER	VPX-DI815 /E
DWG REV. 0	
SHEET 1 OF 1	





© Tornatech, Inc. Not for construction.  
Subject to change without notice.

BY		DD/MM/YY
DRAWN BY	ZS	10/07/23
FINAL APPROVAL	FC	10/07/23

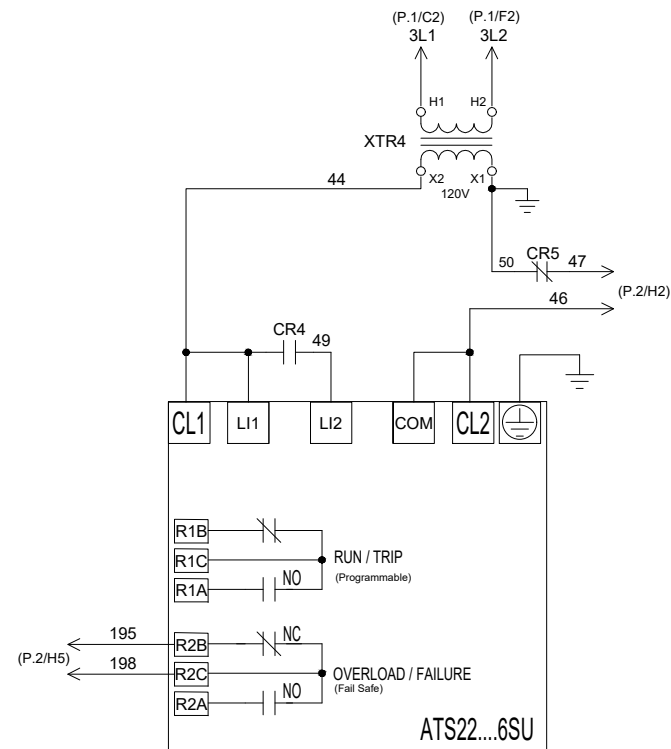
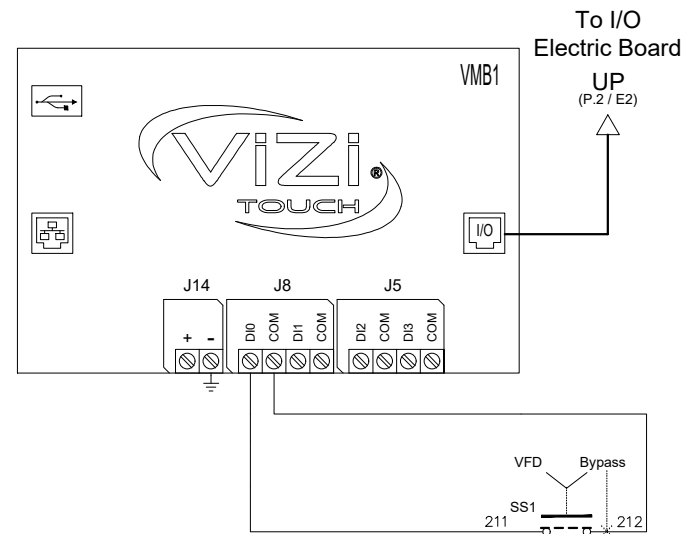
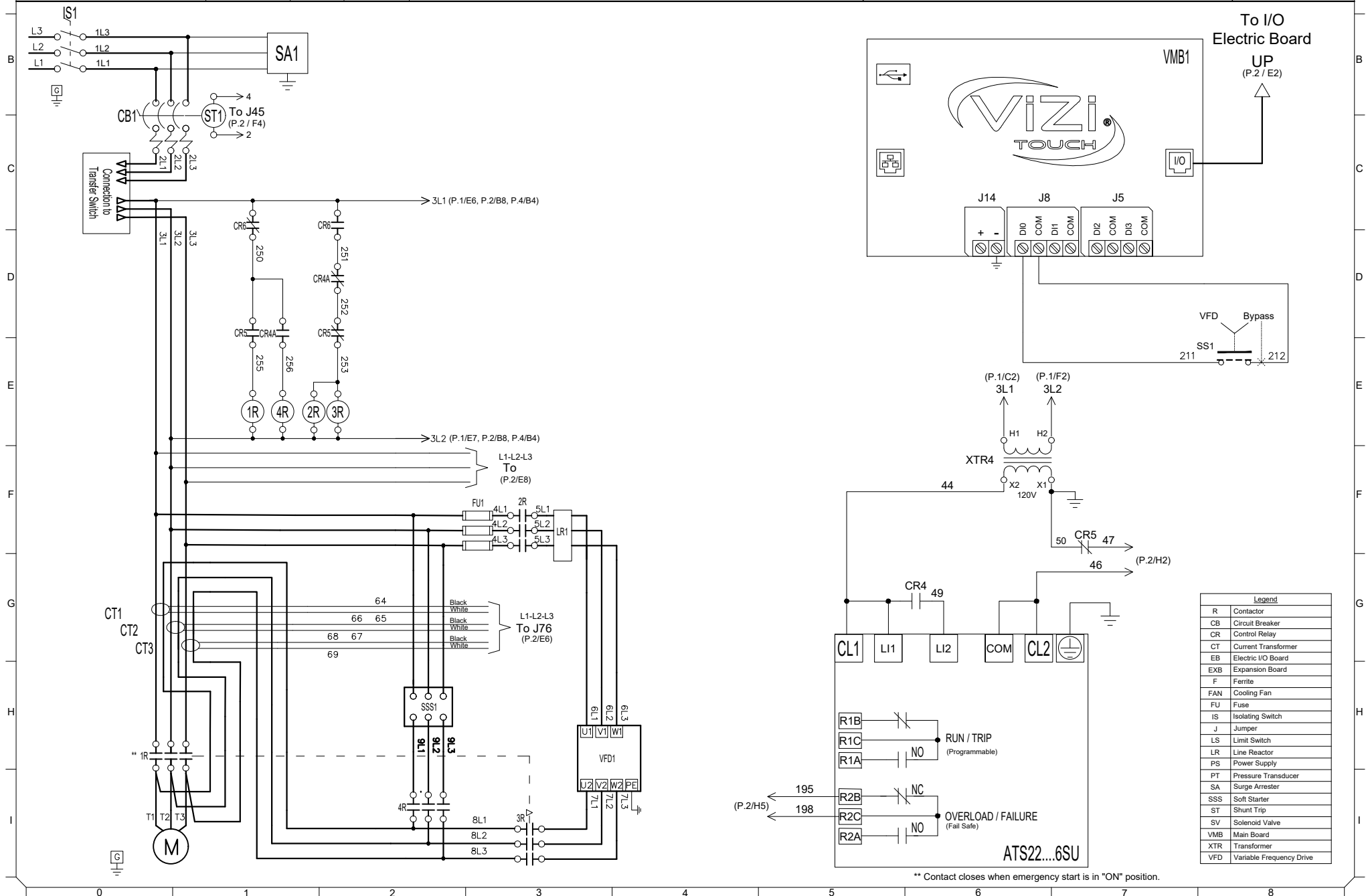
# ELECTRIC FIRE PUMP CONTROLLER VARIABLE SPEED / SOFT STARTER BYPASS STARTING WITH AUTOMATIC TRANSFER SWITCH

**MODEL: VPS+VPU**

BUILT TO THE LATEST EDITION OF THE NFPA20 & NFPA70

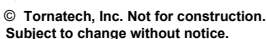


DRAWING NUMBER	VPS-WS810 /E
DWG REV. 0	
SHEET 1 OF 4	



Legend	
R	Contact
CB	Circuit Breaker
CR	Control Relay
CT	Current Transformer
EB	Electric I/O Board
EXB	Expansion Board
F	Ferrite
FAN	Cooling Fan
FU	Fuse
IS	Isolating Switch
J	Jumper
LS	Limit Switch
LR	Line Reactor
PS	Power Supply
PT	Pressure Transducer
SA	Surge Arrester
SSS	Soft Starter
ST	Shunt Trip
SV	Solenoid Valve
VMB	Main Board
XTR	Transformer
VFD	Variable Frequency Drive

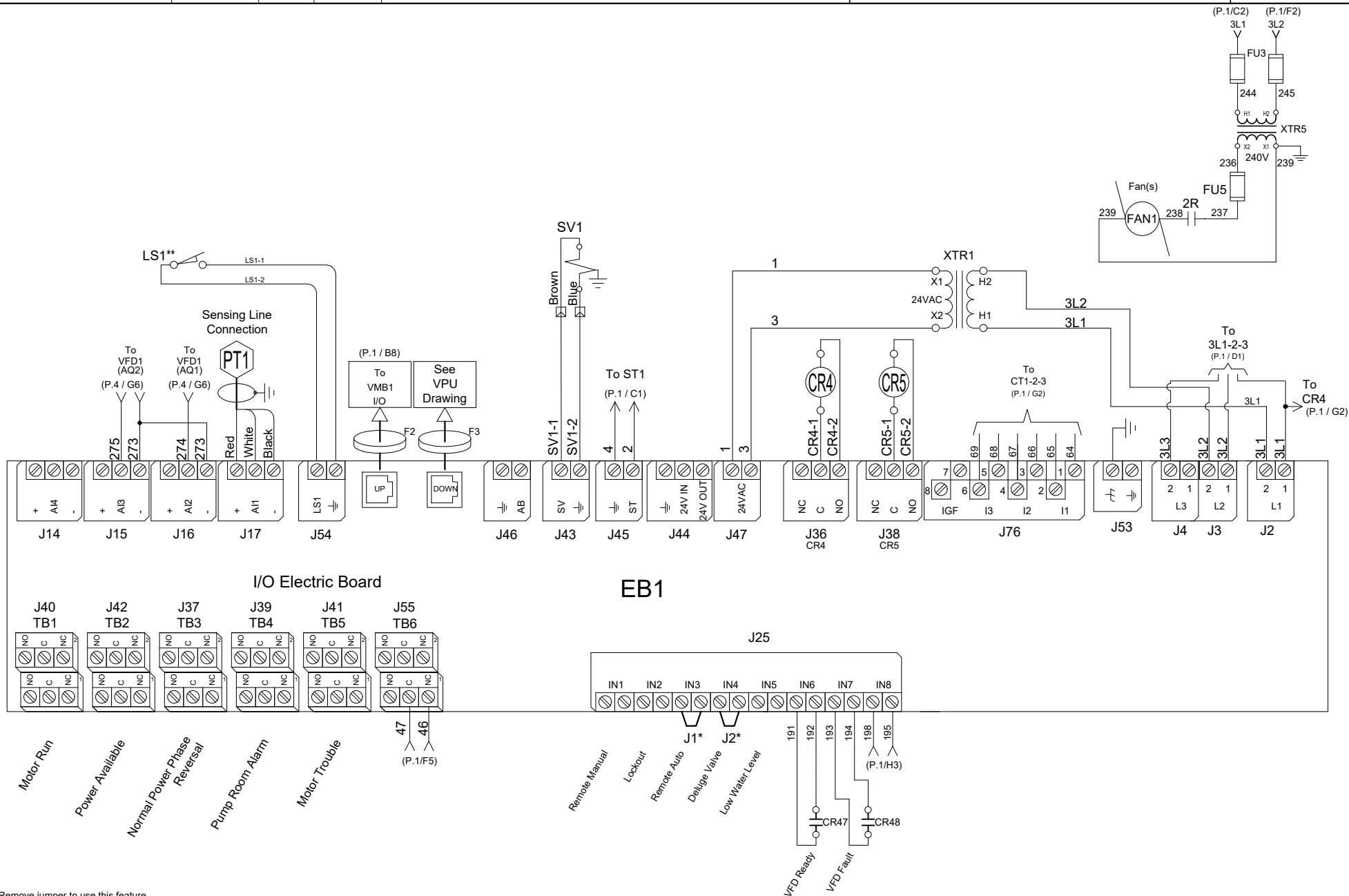
\*\* Contact closes when emergency start is in "ON" position.



**ELECTRIC FIRE PUMP CONTROLLER  
VARIABLE SPEED / SOFT STARTER BYPASS STARTING  
WITH AUTOMATIC TRANSFER SWITCH**

BUILT TO THE LATEST EDITION OF THE NFPA20 & NFPA70

SHEET 2 OF 4



\* Remove jumper to use this feature

\*\* Contact closes when emergency start is in "ON" position



© Tornatech, Inc. Not for construction.  
Subject to change without notice.

BY		DD/MM/YY
DRAWN BY	ZS	10/07/23
FINAL APPROVAL	FC	10/07/23

# ELECTRIC FIRE PUMP CONTROLLER VARIABLE SPEED / SOFT STARTER BYPASS STARTING WITH AUTOMATIC TRANSFER SWITCH

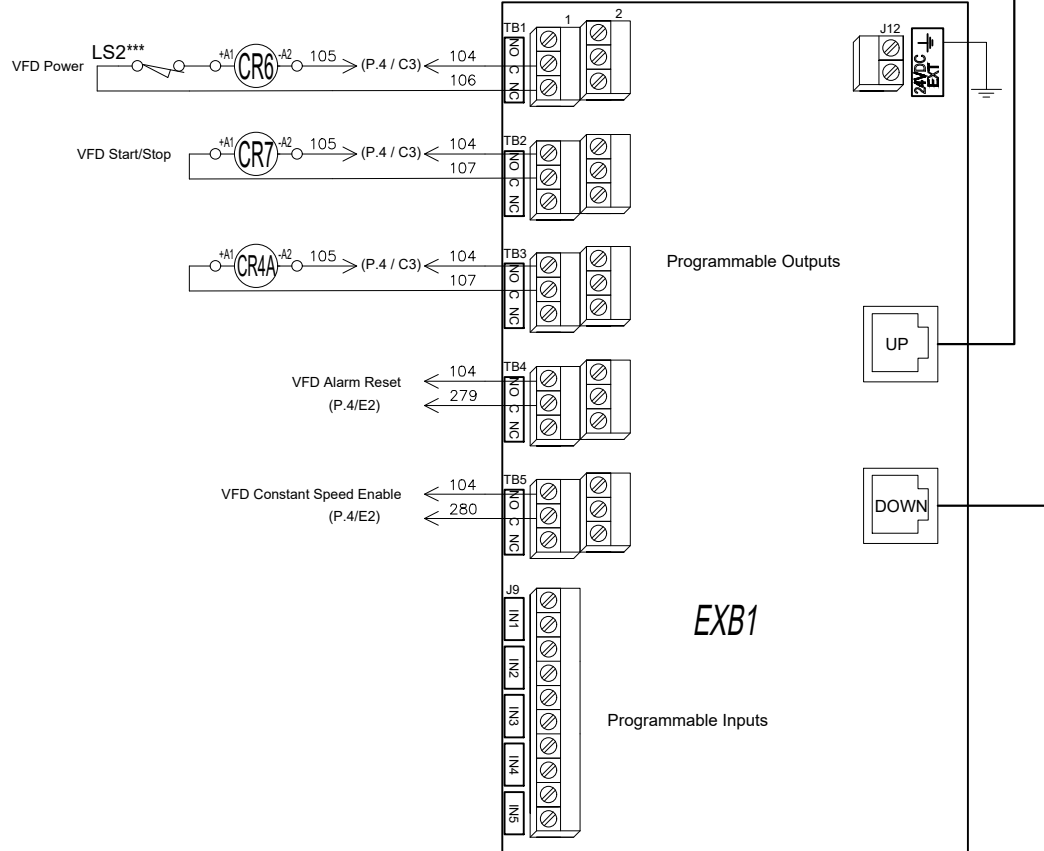
**MODEL: VPS+VPU**

BUILT TO THE LATEST EDITION OF THE NFPA20 & NFPA70

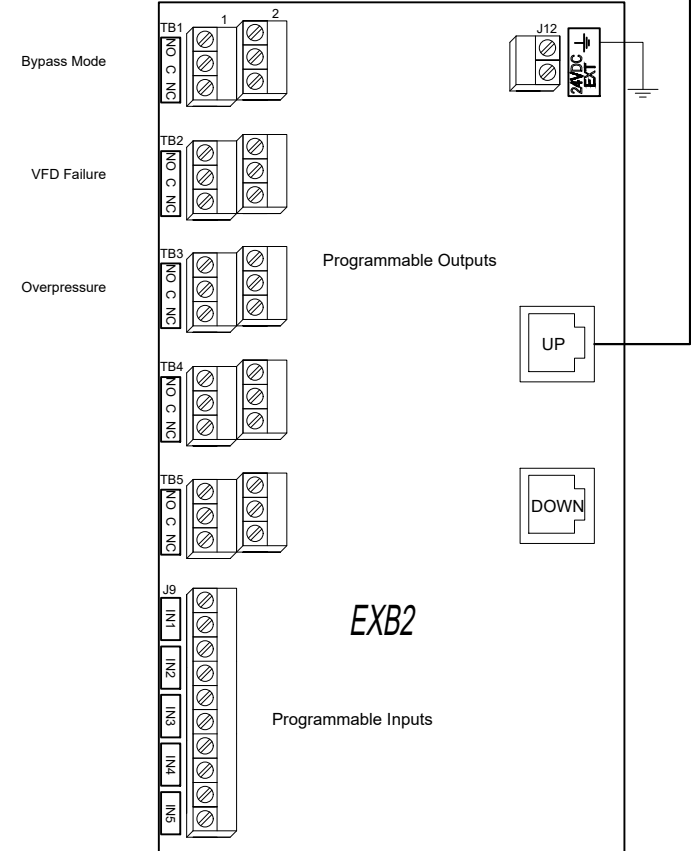


DRAWING NUMBER	VPS-WS810 /E
DWG REV. 0	
SHEET 3 OF 4	

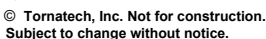
## Expansion Board 1



## Expansion Board 2



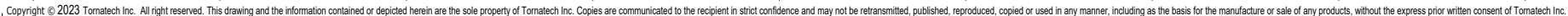
\*\*\* Contact opens when emergency start is in "ON" position



FINAL APPROVAL	FC	10/07/23
-------------------	----	----------

BUILT TO THE LATEST EDITION OF THE NFPA20 & NFPA70

DRAWING NUMBER	VPS-WS810 /E
DWG REV. 0	
SHEET 4 OF 4	





© Tornatech, Inc. Not for construction.  
Subject to change without notice.

BY DD/MM/YY	
DRAWN BY	ZS 21/07/23
FINAL APPROVAL	FC 21/07/23

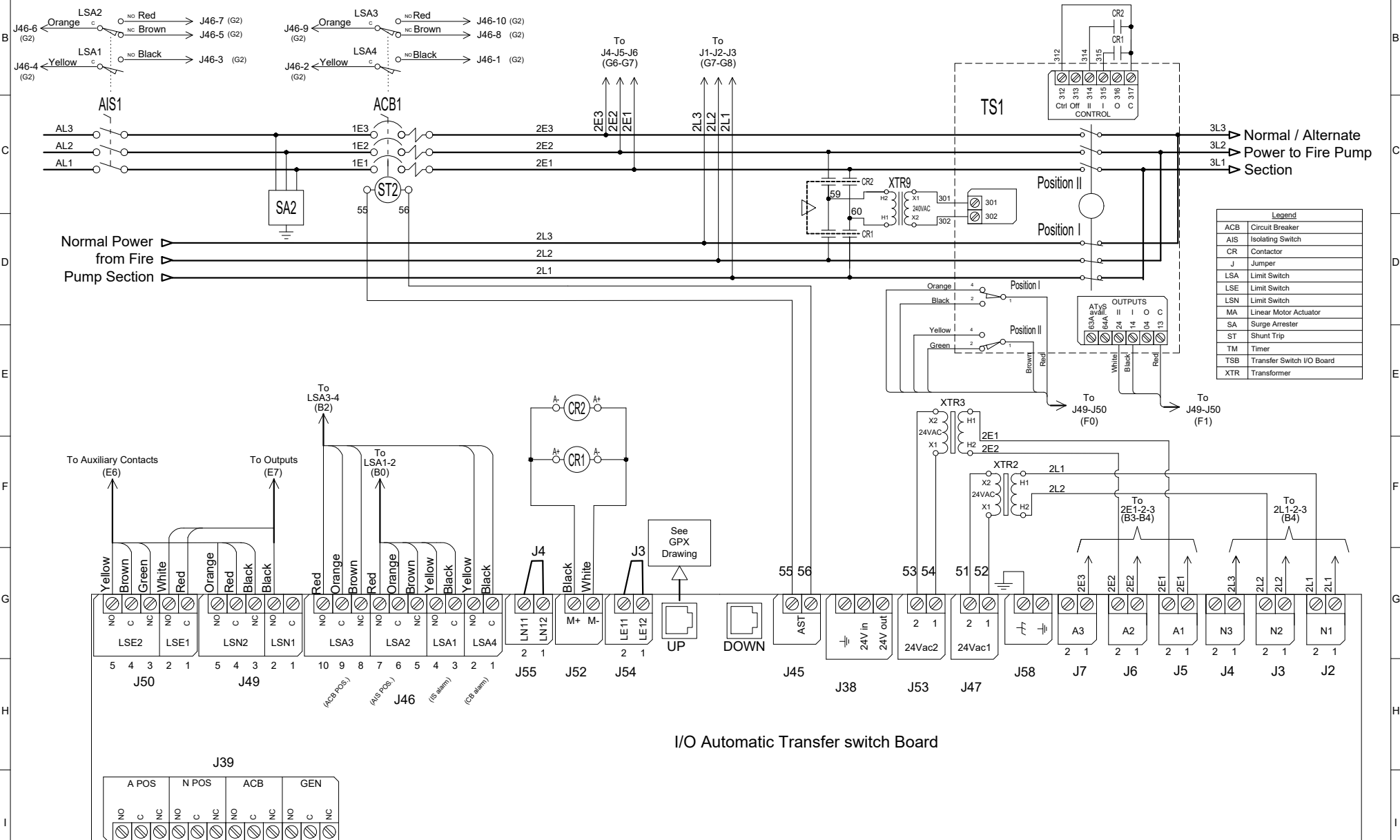
## AUTOMATIC TRANSFER SWITCH FOR ELECTRIC FIRE PUMP CONTROLLER

**MODEL: VPU**

BUILT TO THE LATEST EDITION OF THE NFPA20 & NFPA70



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





© Tornatech, Inc. Not for construction.  
Subject to change without notice.

BY		DD/MM/YY
DRAWN BY	ZS	10/07/23
FINAL APPROVAL	FC	10/07/23

## ELECTRIC FIRE PUMP CONTROLLER

**MODEL: VPA / VPS**

BUILT TO THE LATEST EDITION OF THE NFPA20 & NFPA70



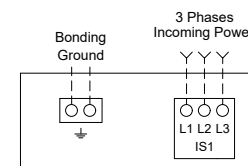
DRAWING NUMBER	VPX-TD800 /E
DWG REV. 0	
SHEET 1 OF 1	

### COPPER CONDUCTORS for Isolating Switch (IS1).

Field Wiring According to Bending Space (AWG or MCM). Terminals L1 - L2 - L3

Bending Space	5 " (127 mm)							8 " (203 mm)			12 " (305 mm)	
HP Voltage	5	7.5	10	15	20	25	30	40	50	60	75	100
200	1x (10 to 1/0)	1x (8 to 1/0)	1x (8 to 1/0)	1x (6 to 1/0)	1x (4 to 1/0)	1x (3 to 1/0)	1x (2 to 1/0)	1x (1/0 to 3/0)	1x (3/0 to 250)	1x (4/0 to 250)	2x (1/0 to 500)	-----
208	1x (10 to 1/0)	1x (8 to 1/0)	1x (8 to 1/0)	1x (6 to 1/0)	1x (4 to 1/0)	1x (3 to 1/0)	1x (2 to 1/0)	1x (1/0 to 3/0)	1x (3/0 to 250)	1x (4/0 to 250)	2x (1/0 to 500)	2x (2/0 to 500)
220 to 240	1x (10 to 1/0)	1x (10 to 1/0)	1x (8 to 1/0)	1x (6 to 1/0)	1x (4 to 1/0)	1x (4 to 1/0)	1x (3 to 1/0)	1x (1 to 3/0)	1x (2/0 to 3/0)	1x (3/0 to 250)	1x (250)	2x (2/0 to 500)
380 to 416	1x (10 to 1/0)	1x (10 to 1/0)	1x (10 to 1/0)	1x (8 to 1/0)	1x (8 to 1/0)	1x (6 to 1/0)	1x (6 to 1/0)	1x (4 to 1/0)	1x (3 to 1/0)	1x (3 to 1/0)	1x (1/0 to 3/0)	1x (3/0 to 250)
440 to 480	1x (10 to 1/0)	1x (10 to 1/0)	1x (10 to 1/0)	1x (10 to 1/0)	1x (8 to 1/0)	1x (8 to 1/0)	1x (6 to 1/0)	1x (6 to 1/0)	1x (4 to 1/0)	1x (3 to 1/0)	1x (1 to 3/0)	1x (2/0 to 3/0)
600	1x (10 to 1/0)	1x (10 to 1/0)	1x (10 to 1/0)	1x (10 to 1/0)	1x (10 to 1/0)	1x (8 to 1/0)	1x (8 to 1/0)	1x (6 to 1/0)	1x (6 to 1/0)	1x (4 to 1/0)	1x (3 to 1/0)	1x (1 to 3/0)
											5 " (127 mm)	8 " (203 mm)

### Power Terminals



Bending Space	12 " (305 mm)		16 " (406 mm)					
HP Voltage	125	150	200	250	300	350	400	450
380 to 416	1x (250)	2x (1/0 to 500)	2x (3/0 to 500)	2x (4/0 to 500)	2x (300 to 500)	2x (400 to 500)	-----	-----
440 to 480	1x (3/0 to 250)	1x (4/0 to 250)	2x (1/0 to 500)	2x (3/0 to 500)	2x (4/0 to 500)	2x (300 to 500)	2x (350 to 500)	2x (400 to 500)
Bending Space	8 " (203 mm)		12 " (305 mm)					

### ALUMINUM CONDUCTORS for Isolating Switch (IS1).

Field Wiring According to Bending Space (AWG or MCM). Terminals L1 - L2 - L3

Bending Space	5 " (127 mm)							8 " (203 mm)		10 " (254 mm)	12 " (305 mm)	
HP Voltage	5	7.5	10	15	20	25	30	40	50	60	75	100
200	1x (10 to 1/0)	1x (6 to 1/0)	1x (6 to 1/0)	1x (4 to 1/0)	1x (3 to 1/0)	1x (1 to 1/0)	1x (1/0)	1x (3/0)	1x (4/0 to 250)	1x (300) ** or 1x (250) 90°C *	2x (2/0 to 500)	-----
208	1x (10 to 1/0)	1x (6 to 1/0)	1x (6 to 1/0)	1x (4 to 1/0)	1x (3 to 1/0)	1x (1 to 1/0)	1x (1/0)	1x (3/0)	1x (4/0 to 250)	1x (300) ** or 1x (250) 90°C *	2x (2/0 to 500)	2x (4/0 to 500)
220 to 240	1x (10 to 1/0)	1x (8 to 1/0)	1x (6 to 1/0)	1x (4 to 1/0)	1x (3 to 1/0)	1x (2 to 1/0)	1x (1 to 1/0)	1x (2/0 to 3/0)	1x (3/0) 90°C *	1x (250)	1x (350) ** N/A	2x (3/0 to 500)
380 to 416	1x (10 to 1/0)	1x (10 to 1/0)	1x (10 to 1/0)	1x (6 to 1/0)	1x (6 to 1/0)	1x (4 to 1/0)	1x (4 to 1/0)	1x (2 to 1/0)	1x (1 to 1/0)	1x (1/0)	1x (3/0)	1x (250 to 350)
440 to 480	1x (10 to 1/0)	1x (10 to 1/0)	1x (10 to 1/0)	1x (8 to 1/0)	1x (6 to 1/0)	1x (6 to 1/0)	1x (6 to 1/0)	1x (4 to 1/0)	1x (2 to 1/0)	1x (1 to 1/0)	1x (1/0 to 3/0)	1x (3/0)
600	1x (10 to 1/0)	1x (10 to 1/0)	1x (10 to 1/0)	1x (10 to 1/0)	1x (8 to 1/0)	1x (6 to 1/0)	1x (6 to 1/0)	1x (4 to 1/0)	1x (4 to 1/0)	1x (2 to 1/0)	1x (1 to 1/0)	1x (2/0 to 3/0)
											5 " (127 mm)	8 " (203 mm)

Bending Space	12 " (305 mm)		16 " (406 mm)					
HP Voltage	125	150	200	250	300	350	400	450
380 to 416	1x (350) **	2x (3/0 to 500)	2x (4/0 to 500)	2x (300 to 500)	2x (500)	3x (300 to 500) ** 2x (500) 90°C *	-----	-----
440 to 480	1x (250)	1x (300 to 350) ** 1x (250) 90°C *	2x (3/0 to 500)	2x (250 to 500)	2x (300 to 500)	2x (400 to 500)	2x (500)	2x (500) 90°C *
Bending Space	8 " (203 mm)		12 " (305 mm)					

\*For standard enclosure, use 90°C aluminium wire. Consult Factory for Use of Conductors Rated Lower than 90°C.

\*\* Consult Factory

#### Notes:

- 1 - For proper wire sizing, refer to NFPA70 and NEC (USA) or CEC (Canada) or local code.
- 2 - Controller suitable for service entrance in USA.
- 3 - For more accurate motor connections refer to motor manufacturer or motor nameplate.
- 4 - Controller is phase sensitive. Incoming lines must be connected in ZS sequence.

Drawing for information only.  
Manufacturer reserves the right to modify this drawing without notice.  
Contact manufacturer for "As Built" drawing.



© Tornatech, Inc. Not for construction.  
Subject to change without notice.

BY DD/MM/YY	
DRAWN BY	ZS 10/07/23
FINAL APPROVAL	FC 10/07/23

## AUTOMATIC TRANSFER SWITCH FOR ELECTRIC FIRE PUMP CONTROLLER

**MODEL: VPU**

BUILT TO THE LATEST EDITION OF THE NFPA20 & NFPA70



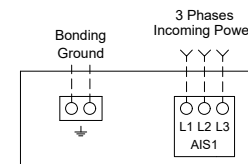
DRAWING NUMBER  
**VPU-TD802/E**  
DWG REV. 0  
SHEET 1 OF 1

### COPPER CONDUCTORS for Isolating Switch (AIS1).

Field Wiring According to Bending Space (AWG or MCM). Terminals AL1 - AL2 - AL3

Bending Space	5 " (127 mm)							8 " (203 mm)			12 " (305 mm)	
HP Voltage	5	7.5	10	15	20	25	30	40	50	60	75	100
200	1x (10 to 1/0)	1x (8 to 1/0)	1x (8 to 1/0)	1x (6 to 1/0)	1x (4 to 1/0)	1x (3 to 1/0)	1x (2 to 1/0)	1x (1/0 to 3/0)	1x (3/0 to 250)	1x (4/0 to 250)	2x (1/0 to 500)	-----
208	1x (10 to 1/0)	1x (8 to 1/0)	1x (8 to 1/0)	1x (6 to 1/0)	1x (4 to 1/0)	1x (3 to 1/0)	1x (2 to 1/0)	1x (1/0 to 3/0)	1x (3/0 to 250)	1x (4/0 to 250)	2x (1/0 to 500)	2x (2/0 to 500)
220 to 240	1x (10 to 1/0)	1x (10 to 1/0)	1x (8 to 1/0)	1x (6 to 1/0)	1x (4 to 1/0)	1x (4 to 1/0)	1x (3 to 1/0)	1x (1 to 3/0)	1x (2/0 to 3/0)	1x (3/0 to 250)	1x (250)	2x (2/0 to 500)
380 to 416	1x (10 to 1/0)	1x (10 to 1/0)	1x (10 to 1/0)	1x (8 to 1/0)	1x (8 to 1/0)	1x (6 to 1/0)	1x (6 to 1/0)	1x (4 to 1/0)	1x (3 to 1/0)	1x (3 to 1/0)	1x (1/0 to 3/0)	1x (3/0 to 250)
440 to 480	1x (10 to 1/0)	1x (10 to 1/0)	1x (10 to 1/0)	1x (10 to 1/0)	1x (8 to 1/0)	1x (8 to 1/0)	1x (6 to 1/0)	1x (6 to 1/0)	1x (4 to 1/0)	1x (3 to 1/0)	1x (1 to 3/0)	1x (2/0 to 3/0)
600	1x (10 to 1/0)	1x (10 to 1/0)	1x (10 to 1/0)	1x (10 to 1/0)	1x (10 to 1/0)	1x (8 to 1/0)	1x (8 to 1/0)	1x (6 to 1/0)	1x (6 to 1/0)	1x (4 to 1/0)	1x (3 to 1/0)	1x (1 to 3/0)
Bending Space											5 " (127 mm)	8 " (203 mm)

### Power Terminals



Bending Space	12 " (305 mm)		16 " (406 mm)					
HP Voltage	125	150	200	250	300	350	400	450
380 to 416	1x (250)	2x (1/0 to 500)	2x (3/0 to 500)	2x (4/0 to 500)	2x (300 to 500)	2x (400 to 500)	-----	-----
440 to 480	1x (3/0 to 250)	1x (4/0 to 250)	2x (1/0 to 500)	2x (3/0 to 500)	2x (4/0 to 500)	2x (300 to 500)	2x (350 to 500)	2x (400 to 500)
Bending Space	8 " (203 mm)		12 " (305 mm)					

### ALUMINUM CONDUCTORS for Isolating Switch (AIS1).

Field Wiring According to Bending Space (AWG or MCM). Terminals AL1 - AL2 - AL3

Bending Space	5 " (127 mm)							8 " (203 mm)		10 " (254 mm)	12 " (305 mm)	
HP Voltage	5	7.5	10	15	20	25	30	40	50	60	75	100
200	1x (10 to 1/0)	1x (6 to 1/0)	1x (6 to 1/0)	1x (4 to 1/0)	1x (3 to 1/0)	1x (1 to 1/0)	1x (1/0)	1x (3/0)	1x (4/0 to 250)	1x (300) ** or 1x (250) 90°C *	2x (2/0 to 500)	-----
208	1x (10 to 1/0)	1x (6 to 1/0)	1x (6 to 1/0)	1x (4 to 1/0)	1x (3 to 1/0)	1x (1 to 1/0)	1x (1/0)	1x (3/0)	1x (4/0 to 250)	1x (300) ** or 1x (250) 90°C *	2x (2/0 to 500)	2x (4/0 to 500)
220 to 240	1x (10 to 1/0)	1x (8 to 1/0)	1x (6 to 1/0)	1x (4 to 1/0)	1x (3 to 1/0)	1x (2 to 1/0)	1x (1 to 1/0)	1x (2/0 to 3/0)	1x (3/0) 90°C *	1x (250)	1x (350) ** N/A	2x (3/0 to 500)
380 to 416	1x (10 to 1/0)	1x (10 to 1/0)	1x (10 to 1/0)	1x (6 to 1/0)	1x (6 to 1/0)	1x (4 to 1/0)	1x (4 to 1/0)	1x (2 to 1/0)	1x (1 to 1/0)	1x (1/0)	1x (3/0)	1x (250 to 350)
440 to 480	1x (10 to 1/0)	1x (10 to 1/0)	1x (10 to 1/0)	1x (8 to 1/0)	1x (6 to 1/0)	1x (6 to 1/0)	1x (6 to 1/0)	1x (4 to 1/0)	1x (2 to 1/0)	1x (1 to 1/0)	1x (1/0 to 3/0)	1x (3/0)
600	1x (10 to 1/0)	1x (10 to 1/0)	1x (10 to 1/0)	1x (10 to 1/0)	1x (8 to 1/0)	1x (6 to 1/0)	1x (6 to 1/0)	1x (4 to 1/0)	1x (4 to 1/0)	1x (2 to 1/0)	1x (1 to 1/0)	1x (2/0 to 3/0)
Bending Space											5 " (127 mm)	8 " (203 mm)

Bending Space	12 " (305 mm)		16 " (406 mm)					
HP Voltage	125	150	200	250	300	350	400	450
380 to 416	1x (350) **	2x (3/0 to 500)	2x (4/0 to 500)	2x (300 to 500)	2x (500)	3x (300 to 500) **	-----	-----
	N/A					2x (500) 90°C *		
440 to 480	1x (250)	1x (300 to 350) **	2x (3/0 to 500)	2x (250 to 500)	2x (300 to 500)	2x (400 to 500)	2x (500)	2x (500) 90°C *
		1x (250) 90°C *						
Bending Space	8 " (203 mm)		12 " (305 mm)					

\*For standard enclosure, use 90°C aluminium wire. Consult Factory for Use of Conductors Rated Lower than 90°C.

\*\* Consult Factory

#### Notes:

1 - Controller is phase sensitive. Incoming lines must be connected in ZS sequence.

Drawing for information only.  
Manufacturer reserves the right to modify this drawing without notice.  
Contact manufacturer for "As Built" drawing.





© Tornatech, Inc. Not for construction.  
Subject to change without notice.

BY		DD/MM/YY
DRAWN BY	ZS	10/07/23
FINAL APPROVAL	FC	10/07/23

## ELECTRIC FIRE PUMP CONTROLLER

## MODEL: VPA / VPS

BUILT TO THE LATEST EDITION OF THE NFPA20 & NFPA70



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

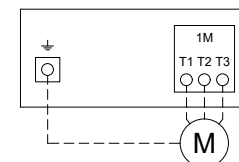
### COPPER CONDUCTORS for Motor Connection (1M).

Field Wiring According to Bending Space (AWG or MCM). Terminals T1 - T2 - T3

HP Voltage	5	7.5	10	15	20	25	30	40	50	60	75	100
200	1x (10 to 2)	1x (8 to 2)	1x (8 to 2)	1x (6 to 2)	1x (4 to 2)	1x (3 to 2/0)	1x (2 to 2/0)	1x (1/0 to 3/0)	1x (3/0)	1x (4/0 to 300)	1x (300)	-----
208	1x (10 to 2)	1x (8 to 2)	1x (8 to 2)	1x (6 to 2)	1x (4 to 2)	1x (3 to 2/0)	1x (2 to 2/0)	1x (1/0 to 3/0)	1x (3/0)	1x (4/0 to 300)	1x (300)	2x (2/0 to 300)
220 to 240	1x (10 to 2)	1x (10 to 2)	1x (8 to 2)	1x (6 to 2)	1x (4 to 2)	1x (4 to 2/0)	1x (3 to 2/0)	1x (1/0 to 3/0)	1x (2/0 to 3/0)	1x (3/0)	1x (250 to 300)	2x (2/0 to 300)
380 to 416	1x (10 to 2)	1x (10 to 2)	1x (10 to 2)	1x (8 to 2)	1x (8 to 2)	1x (6 to 2)	1x (6 to 1/0)	1x (4 to 2)	1x (3 to 2/0)	1x (1 to 2/0)	1x (1/0 to 3/0)	1x (3/0)
440 to 480	1x (10 to 2)	1x (10 to 2)	1x (10 to 2)	1x (10 to 2)	1x (8 to 2)	1x (8 to 2)	1x (6 to 2)	1x (6 to 2)	1x (4 to 2/0)	1x (3 to 2/0)	1x (1 to 1/0)	1x (2/0 to 3/0)
600	1x (10 to 2)	1x (10 to 2)	1x (10 to 2)	1x (10 to 2)	1x (10 to 2)	1x (8 to 2)	1x (8 to 2)	1x (6 to 2)	1x (6 to 2)	1x (4 to 2/0)	1x (3 to 1/0)	1x (1 to 1/0)

HP Voltage	125	150	200	250	300	350	400	450
380 to 416	1x (250 to 300)	1x (300)	2x (3/0 to 300)	2x (4/0 to 300)	2x (300)	2x (400 to 500)	-----	-----
440 to 480	1x (3/0)	1x (4/0 to 300)	2x (1/0 to 300)	2x (3/0 to 300)	2x (4/0 to 300)	2x (300)	2x (350 to 500)	2x (400 to 600)

### Motor Terminals



Models: VPA / VPS

### ALUMINUM CONDUCTORS for Contactor (1M).

Field Wiring According to Bending Space (AWG or MCM). Terminals T1 - T2 - T3

HP Voltage	5	7.5	10	15	20	25	30	40	50	60	75	100
200	1x (10 to 2/0) **	1x (10 to 2/0) **	1x (6 to 2/0) **	1x (4 to 2/0) **	1x (2 to 2/0) **	1x (1 to 2/0) **	1x (1/0 to 2/0) **	1x (2/0) 90°C *	Consult Factory	1x (300)	1x (300) 90°C *	-----
208	1x (10 to 2/0) **	1x (10 to 2/0) **	1x (6 to 2/0) **	1x (4 to 2/0) **	1x (2 to 2/0) **	1x (1 to 2/0) **	1x (1/0 to 2/0) **	1x (2/0) 90°C *	Consult Factory	1x (300)	1x (300) 90°C *	2x (4/0 to 300)
220 to 240	1x (10 to 2/0) **	1x (10 to 2/0) **	1x (8 to 2/0) **	1x (4 to 2/0) **	1x (3 to 2/0) **	1x (2 to 2/0) **	1x (1 to 2/0) **	1x (2/0)	1x (3/0) 90°C *	Consult Factory	1x (300) 90°C *	2x (3/0 to 300)
380 to 416	1x (12 to 2/0) **	1x (12 to 2/0) **	1x (10 to 2/0) **	1x (8 to 2/0) **	1x (6 to 2/0) **	1x (6 to 2/0) **	1x (4 to 2/0) **	1x (2 to 2/0) **	1x (1 to 1/0)	1x (1/0)	1x (3/0)	Consult Factory
440 to 480	1x (12 to 2/0) **	1x (12 to 2/0) **	1x (10 to 2/0) **	1x (10 to 2/0) **	1x (8 to 2/0) **	1x (6 to 2/0) **	1x (6 to 2/0) **	1x (4 to 2/0) **	1x (2 to 1/0)	1x (1 to 1/0)	1x (1/0)	1x (3/0)
600	1x (12 to 2/0) **	1x (12 to 2/0) **	1x (12 to 2/0) **	1x (10 to 2/0) **	1x (10 to 2/0) **	1x (8 to 2/0) **	1x (8 to 2/0) **	1x (4 to 2/0) **	1x (4 to 2/0) **	1x (2 to 1/0)	1x (1 to 1/0)	Consult Factory

HP Voltage	125	150	200	250	300	350	400	450
380 to 416	1x (300) 90°C *	Consult Factory	2x (4/0 to 300)	2x (300)	Consult Factory	2x (600)	-----	-----
440 to 480	Consult Factory	1x (300)	2x (3/0 to 300)	2x (250 to 300)	2x (300)	2x (300) 90°C *	2x (500)	2x (600)

\*For standard enclosure, use 90°C aluminium wire. Consult Factory for Use of Conductors Rated Lower than 90°C.

\*\* Option V659 required.

#### Notes:

- 1 - For proper wire sizing, refer to NFPA70 and NEC (USA) or CEC (Canada) or local code.
- 2 - Controller suitable for service entrance in USA.
- 3 - For more accurate motor connections refer to motor manufacturer or motor nameplate.
- 4 - Controller is phase sensitive. Incoming lines must be connected in ZS sequence.

Drawing for information only.  
Manufacturer reserves the right to modify this drawing without notice.  
Contact manufacturer for "As Built" drawing.



© Tornatech, Inc. Not for construction.  
Subject to change without notice.

BY DD/MM/YY

DRAWN BY ZS 10/07/23

FINAL APPROVAL FC 10/07/23

## ELECTRIC FIRE PUMP CONTROLLER

**MODEL: VPS**

BUILT TO THE LATEST EDITION OF THE NFPA20 & NFPA70



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

### Field Connections

Terminals Wire Size:  
24 - 12 AWG  
0.5 Nm

Remote Manual

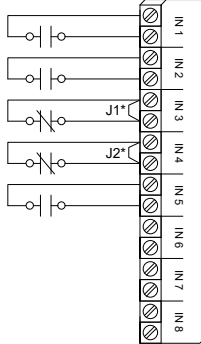
Lockout

Remote Auto

Deluge Valve

Low Water Level

I/O Electric Board



J25

Controller Terminal Strip

### Network Connections

Terminals Wire Size:  
Shielded Female Connector RJ45

Located on Main Board

Modbus TCP/IP RJ45



Motor Run

Power Available

Normal Power  
Phase Reversal

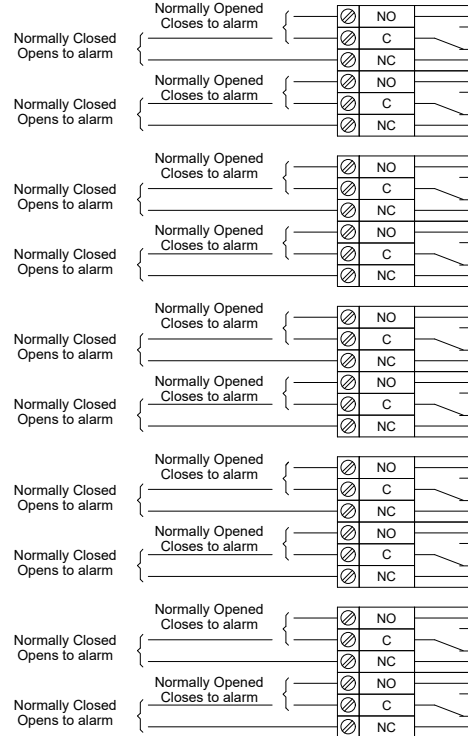
Pump Room Alarm

Motor Trouble

### Alarm Contacts

Terminals Wire Size:  
24 - 12 AWG  
0.5 Nm

I/O Electric Board



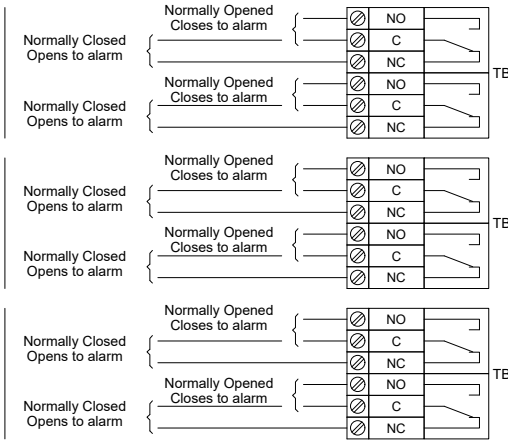
Bypass Mode

VFD Failure

Overpressure

24 - 12 AWG  
0.5 Nm

Expansion Board 2



\* Remove jumper to use this feature



© Tornatech, Inc. Not for construction.  
Subject to change without notice.

BY DD/MM/YY

DRAWN BY ZS 21/07/23

FINAL APPROVAL FC 21/07/23

# **AUTOMATIC TRANSFER SWITCH FOR ELECTRIC FIRE PUMP CONTROLLER**

**MODEL: VPU**

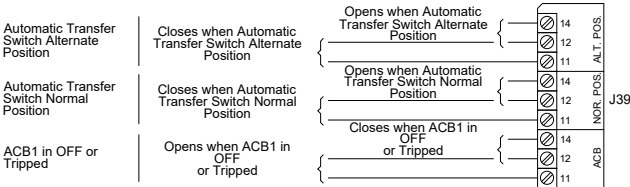
BUILT TO THE LATEST EDITION OF THE NFPA20 & NFPA70



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

## **Remote Alarm Terminals (TSB1)**

Terminals Wire Size:  
24 - 12 AWG  
0.5 Nm



## **Control Terminals (TSB1)**

Terminals Wire Size:  
24 - 12 AWG  
0.5 Nm

