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.
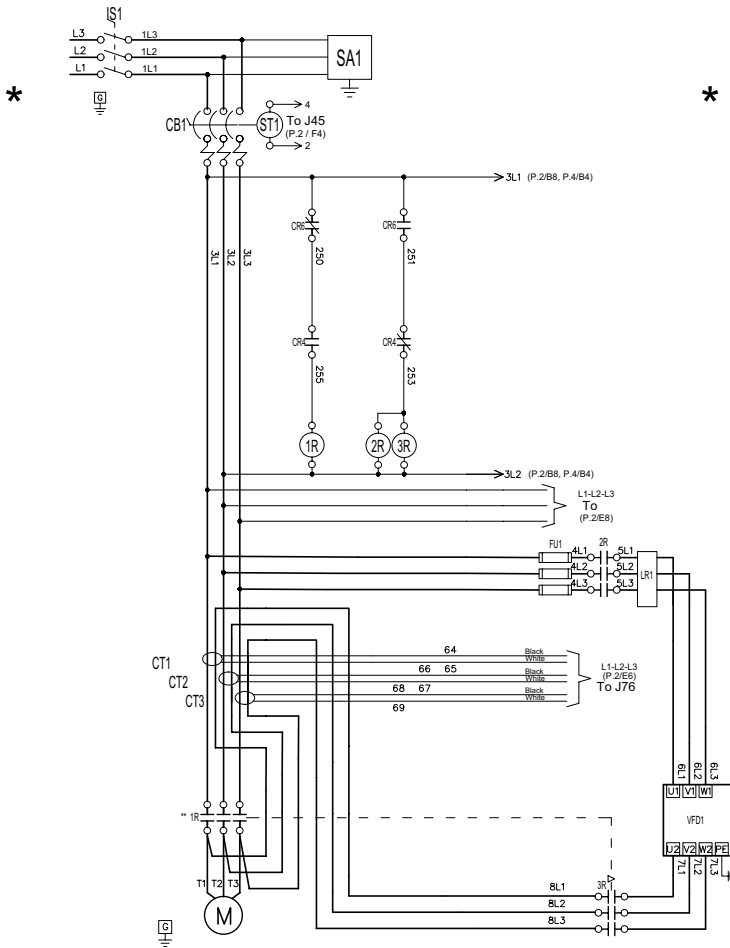
c(UL)us FM APPROVED
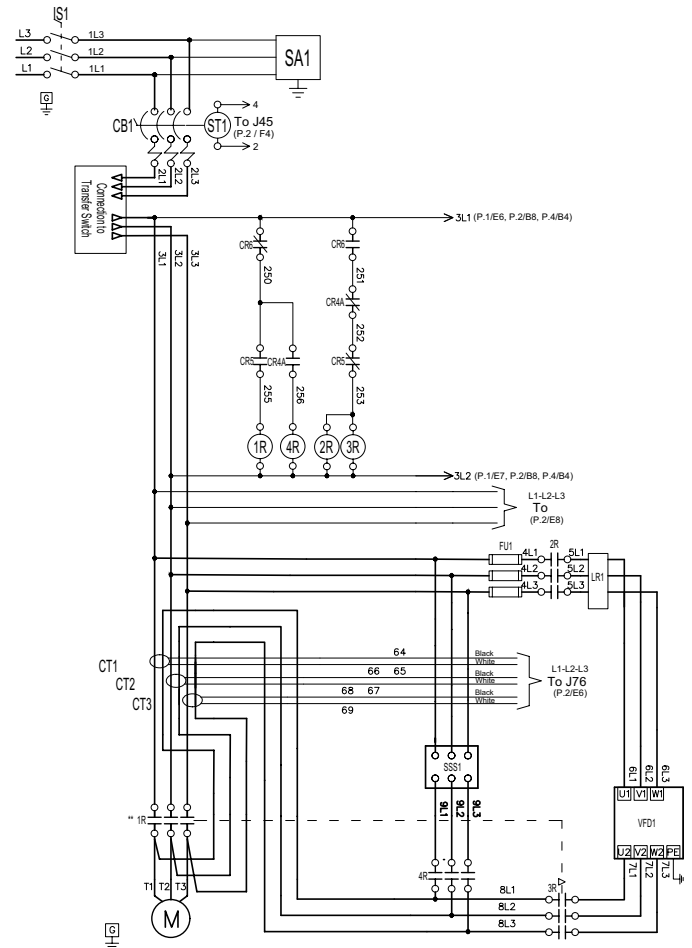
Select Bypass starting method

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

October 2023

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Manufacturer reserves the right to modify this information without notice

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TORNATECH

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

Standard, Listings, Approvals and Certifications	**Built to NFPA 20 (latest edition)**	
	Underwriters Laboratory (UL)	• UL218 - Fire Pump Controllers • UL 1008 - Automatic power transfer switches for fire pump controllers
	FM Global	Class 1321/1323

Enclosure	**Protection Rating**	
	Standard: NEMA 12 ventilated assembly	
	Accessories • Gland plate(s) • Lifting Lugs • Keylock handle	**Paint Specifications** • Red RAL3002 • Powder coating • Glossy textured finish

Shortcircuit Withstand Rating	200V 60Hz	208V to 240V 60Hz	380V to 415V 50 Hz / 60Hz	440V to 480V 60Hz	575V to 600V 60Hz
	HP (kw)				
	5 to 75	5 to 100	5 to 350	5 to 450	5 to 100
	Standard 100kA				Standard 50kA

Ambient Temperature Rating	**Standard**: 4°C to 40°C / 39°F to 104°F
Surge Suppression	Surge arrestor rated to suppress surges above line voltage

Disconnecting Means	• Isolating switch and circuit breaker assembly:
	    - Door interlocked in the ON position
	    - Isolating switch rated not less than 115% of motor full load current
	    - Circuit breaker continuous rating not less than 115% of motor full load current
	    - Overcurrent sensing non-thermal type, magnetic only
	    - Instantaneous trip setting of not more than 20 times the motor full load current
	• Common flange mounted operating handle

Service Entrance Rating	Suitable as service entrance equipment
Emergency Start Handle	• Flange mounted • Integrated limit switch • Pull and latch activation • Across the line start (direct on line)
Locked Rotor Protector	• Operate shunt trip to open circuit breaker • Trip between 8 and 20 seconds • Factory set at 600% of motor full load current
Electrical Readings	• Voltage phase to phase (normal power) • Amperage of each phase when motor is running
Pressure Readings	• Continuous system pressure display • Constant pressure output set-point • Cut-in and Cut-out pressure settings

October 2023

This is a Marketing document. Please consult factory for more information.
Manufacturer reserves the right to modify this information without notice

3

Pressure and Event recorder	• 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
Pressure Sensing	• Pressure transducers and run test solenoid valve assembly for fresh water application • Pressure sensing line connection 1/2" Female NPT • Drain connection 3/8" • Rated for 0-500PSI working pressure (standard display at 0-300PSI) • Externally mounted with protective cover

Variable Speed Drive Circuit	• Variable speed drive (VFD)
	• Line reactor 5%
	• Mode selector switch
	    • VFD
	    • Bypass

Audible Alarm	Alarm buzzer - 85dB at 3 meters
Visual Indications	• Power available • Deluge valve start • Pump on demand/Automatic start • VFD fault • Motor run • Remote automatic start • Pump room temperature (ºF or ºC) • VFD bypass • Periodic test • Remote manual start • Lockout • VFD Hertz • Manual start • Emergency start

Visual & Audible Alarms	Visual
	  • Control voltage not healthy • Overcurrent • Pump on demand
	  • Invalid cut-in • Overvoltage • Pump room alarm
	  • Lock rotor current • Phase loss L1 • Service required
	  • Loss of power • Phase loss L2 • Undercurrent
	  • Low ambient temperature • Phase loss L3 • Undervoltage
	  • Low water level • Phase unbalanced • Check weekly test solenoid
	  • Motor trouble • Pressure transducer fault detected • Weekly test cut-in reached
	  • Phase reversal (normal power)
	Visual and audible
	  • Fail to start

Remote Alarm Contacts	DPDT-8A-250V.AC
	    • Power available • Overpressure
	    • Phase reversal • Bypass mode
	    • Motor run • VFD failure
	    • Common pump room alarm (field re-assignable)**
	        • Overvoltage
	        • Undervoltage
	        • Phase unbalance
	        • Low pump room temperature
	        • High Pump room temperature
	    • Common motor trouble (field re-assignable)**
	        • Overcurrent
	        • Fail to start
	        • Undercurrent
	        • Ground fault

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

ViZiTouch V2.1 Operator Interface	• Embedded microcomputer with software PLC logic • 7.0" color touch screen (HMI technology) • Upgradable software • Multi-language		
Communication Protocol Capability	• Protocol: Modbus • Connection type: Shielded female connector RJ45 • Frame Format: TCP/IP • Addresses: See Technical Bulletin - Modbus TCP/IP Communication Protocol for Electric Fire Pump Controllers with Automatic Transfer Switch		
Operation	**Automatic Start**	• Start on pressure drop • Remote start signal from automatic device • Deluge valve start	
	Manual Start	• Start pushbutton • Run test pushbutton • Remote start from manual device	
	Stopping	• Manual with Stop pushbutton • Automatic after expiration of minimum run timer ***	
	Timers	Field Adjustable & Visual Countdown	• Minimum run timer ***(off delay) • Sequential start timer (on delay) • Periodic test timer
	Actuation	Visual Indication	• Pressure • Non-pressure
	Mode		• Automatic • Non-automatic

***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)
			D1	Low suction pressure transducer for fresh water rated at 0-300PSI with visual indication and alarm contact
B11B	Built in alarm panel same as B11 but 220-240VAC supervisory power		D1A	Low suction pressure transducer for sea water rated at 0-300PSI with visual indication and alarm contact
B19A	High motor temperature c/w thermoster 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)
B19B	High motor temperature c/w PT100 relay and alarm contacts (DPDT)		D5D	Pressure transducer and run test solenoid valve for sea water rated for 0-500PSI
B21	Ground fault alarm detection c/w visual indication and alarm contact (DPDT)		D14	Anti-condensation heater & thermostat
C1	Extra motor run alarm contact (DPDT)		D14A	Anti-condensation heater & humidistat
C4	Periodic test alarm contact (DPDT)		D14B	Anti-condensation heater & thermostat & humidistat
C6	Low discharge pressure alarm contact (DPDT)		D15	Tropicalization
C7	Low pump room temperature alarm contact (DPDT)		D26	Modbus with RTU frame format and RS485 connection
C10	Low water reservoir level alarm contact (DPDT)		D27	Motor heater connection (external single phase power source and heater on/off contact)
C11	High electric motor temperature alarm contact (DPDT)		D27A	Motor heater connection (internal single phase power source and heater on/off contact)
C12	High electric motor vibration c/w visual indication and alarm contact (DPDT)		D28	Customized drawing set
C14	Pump on demand / automatic start alarm contact (DPDT)		D34A	Field programmable I/O board - 5 Input / 5 output
C15	Pump fail to start alarm contact (DPDT)		D36	Redundant pressure transducer for fresh water rated for 0-500PSI
C16	Control voltage healthy alarm contact (DPDT)		D36A	Redundant pressure transducer for sea water rated for 0-500PSI
C17	Flow meter valve loop open c/w visual indication and alarm contact (DPDT)			
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
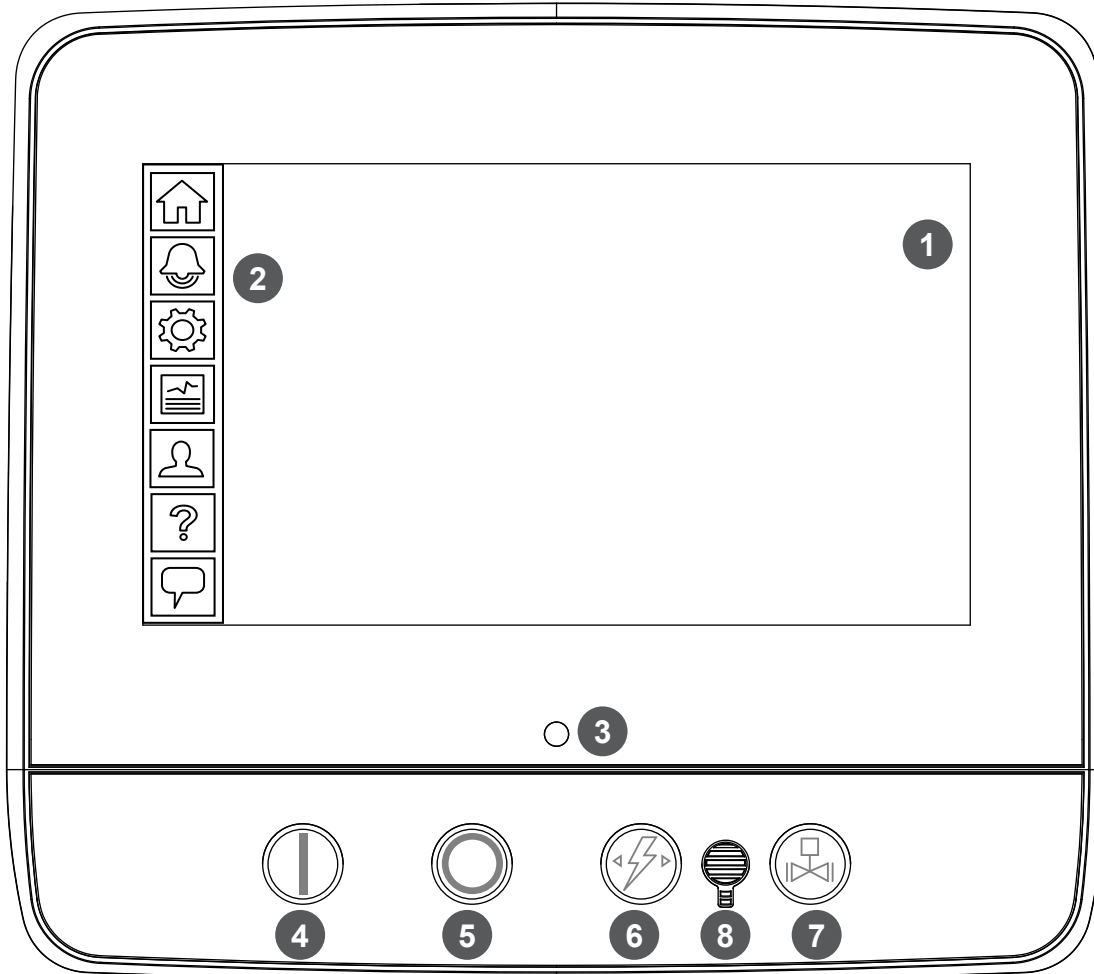
1 - Color touch screen
2 - Onscreen menu
  • HOME page
  • ALARM page
  • CONFIGURATION page
  • HISTORY page
  • SERVICE page
  • MANUAL page
  • LANGUAGES page

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

TORNATECH

	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

THIRD ANGLE PROJECTION

DRAWING NUMBER
VPX-DI814 /E
DWG REV. 0
SHEET 1 OF 1

125 3/8" [3185]
122 1/8" [3101]
120 5/8" [3063]
Ø3/8" [Ø10] X4

72 7/8" [1851]

36" [914]   36" [914]   36" [914]

See Notes

35 5/8" [904]
40 1/8" [1020]

30" [761]
24 1/8" [612]
20" [508]
Ø7/8" [Ø23] X2

77 3/4" [1976]
76 1/8" [1934]
75" [1905]

13" [330]
Power and Motor Leads Entrance
8" [203]

5" [127]
3 1/2" [89]

Sensing Line Connection - 1/2 " F.NPT

Drain - 3/8 " M.TUBE

126 1/8" [3203]
124 1/8" [3152]

2" [51]
13" [330]
13" [330]
2" [51]

Ø1/2" [Ø13] X4
9 5/8" [244]
16" [406]
1 1/4" [31]
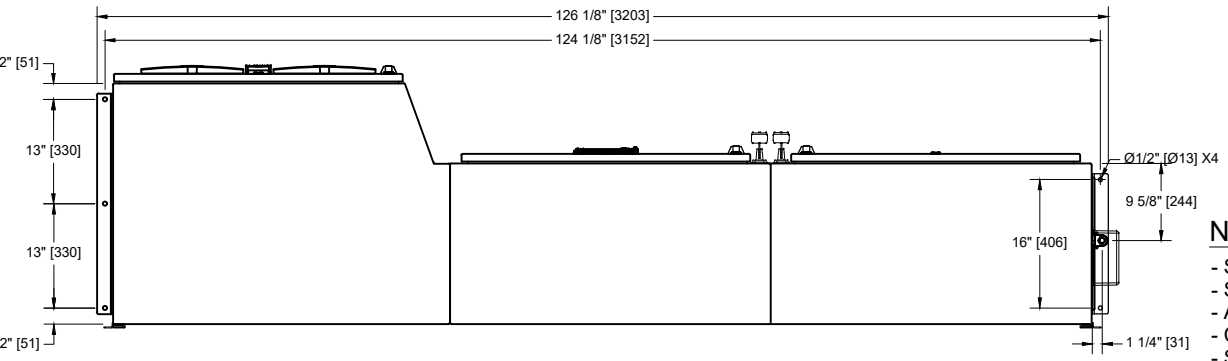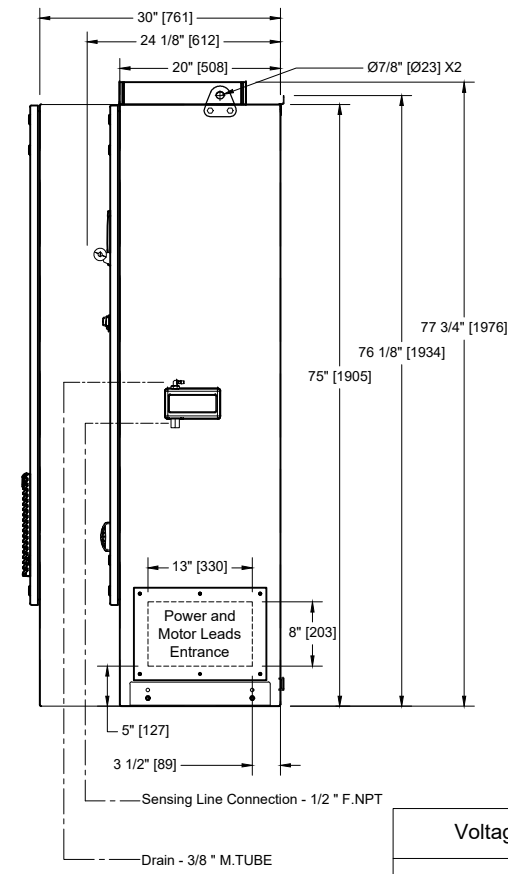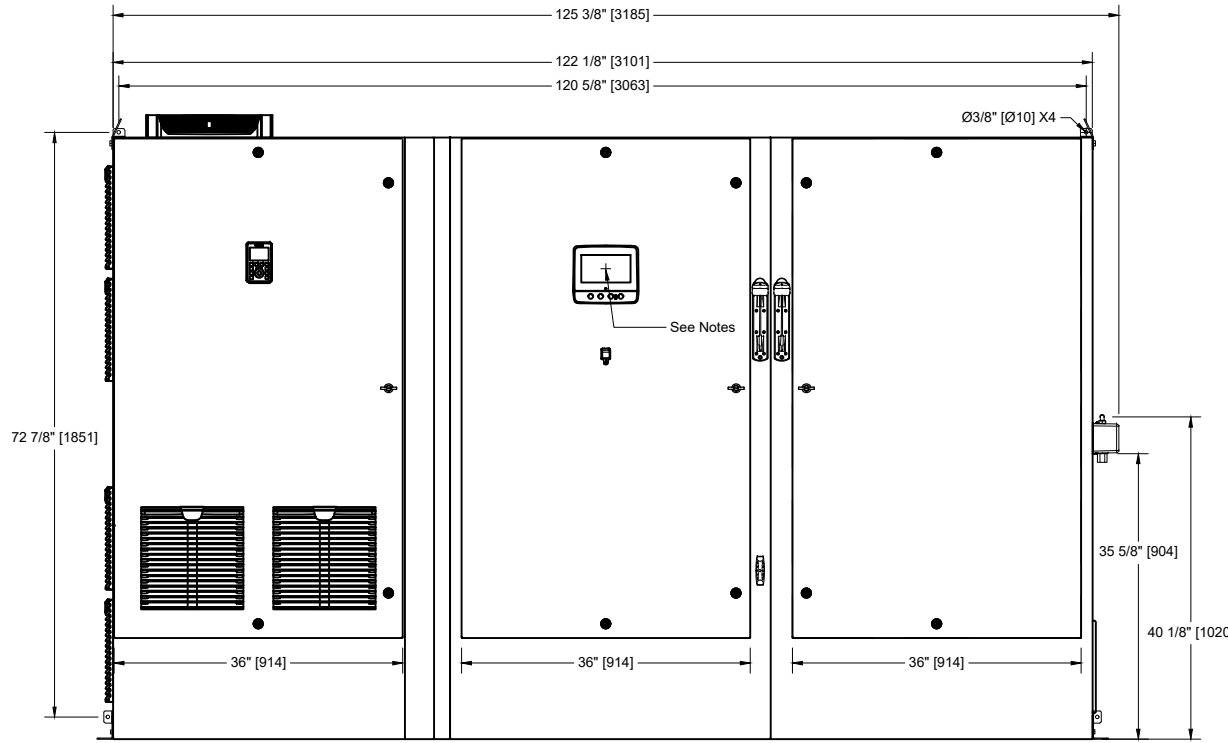
Voltage / Power Table		
Voltage	Min HP	Max HP
380 - 400 - 415	200	250
440 - 480	250	300

Notes:
- Standard: NEMA 12
- Standard paint : textured red RAL 3002.
- All dimensions are in inches [millimeters].
- Center of screen: 29-5/8" [751] from bottom (no feet).
- Side conduit entrance through removable gland plate recommended.
- Use watertight conduit and connector only.
- Protect equipment against drilling chips.
- Door swing equal to door width.

	BY	DD/MM/YY	**ELECTRIC FIRE PUMP CONTROLLER**	**MODEL:VPA+VPU**
DRAWN BY	ZS	10/07/23	**FULL VOLTAGE / ACROSS THE LINE**	BUILT TO THE LATEST EDITION OF THE NFPA20 & NFPA70
FINAL APPROVAL	FC	10/07/23	**WITH AUTOMATIC TRANSFER SWITCH**	

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

To I/O Electric Board
UP
(P.2 / E2)

VMB1

ViZi TOUCH

J14 J8 J5

+ − | DI0 COM DI1 COM | DI2 COM DI3 COM

VFD   Bypass
SS1
211 ○——○ 212

SA1

IS1
L3 1L3
L2 1L2
L1 1L1

G

CB1
ST1 To J45
(P.2 / F4)
4
2

2L1 2L2 2L3

Connection to Transfer Switch

3L1 (P.2/B8, P.4/B4)

3L1 3L2 3L3

CR6 250 CR6 251
CR4 255 CR4 253

1R   2R 3R

3L2

L1-L2-L3
To
(P.2/E8)

FU1   2R
4L1 5L1
4L2 5L2
4L3 5L3
LR1

CT1
CT2
CT3

64   Black/White
66 65   Black/White
68 67   Black/White
69

L1-L2-L3
(P.2/E6)
To J76

6L1 6L2 6L3
U1 V1 W1
VFD1
U2 V2 W2 PE

** 1R

T1 T2 T3
M
G

8L1 3R
8L2
8L3
7L1 7L2 7L3

	Legend
R	Contactor
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.

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

**ELECTRIC FIRE PUMP CONTROLLER
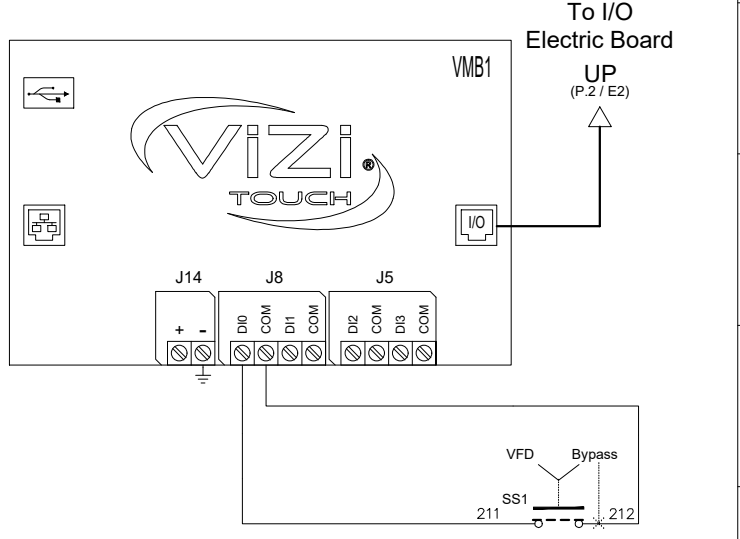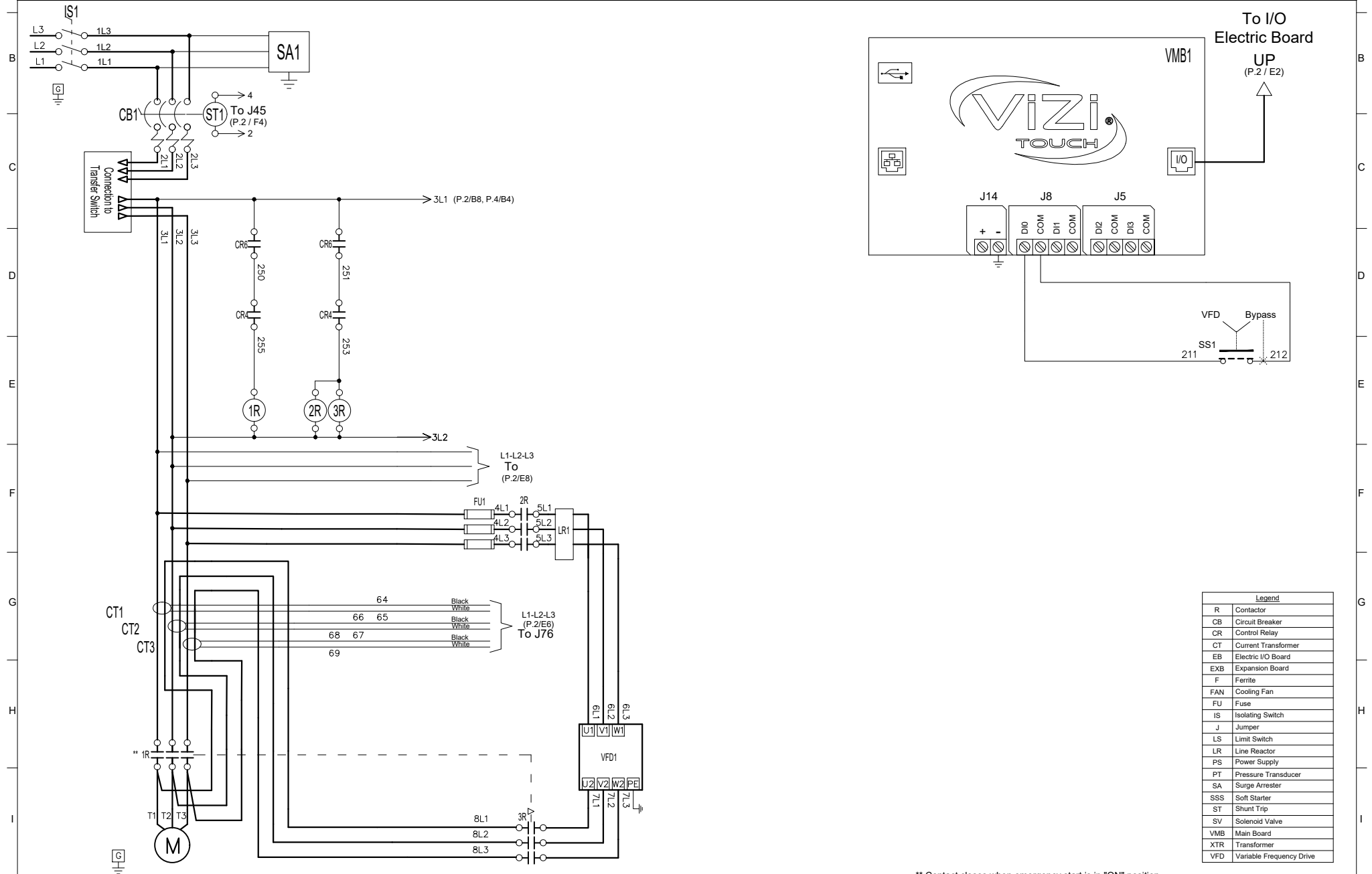FULL VOLTAGE / ACROSS THE LINE
WITH AUTOMATIC TRANSFER SWITCH**

MODEL: VPA+VPU
BUILT TO THE LATEST EDITION OF THE NFPA20 & NFPA70

c UL us   FM APPROVED

DRAWING NUMBER
VPA-WS810 /E
DWG REV. 0
SHEET 2 OF 4

I/O Electric Board

EB1

J40 TB1 — Motor Run
J42 TB2 — Power Available
J37 TB3 — Normal Power Phase Reversal
J39 TB4 — Pump Room Alarm
J41 TB5 — Motor Trouble
J55 TB6 — Overpressure

J25
IN1 — Remote Manual
IN2 — Lockout
IN3 — Remote Auto
IN4 — Deluge Valve
IN5 — Low Water Level
IN6 — 191 / 192 — VFD Ready — CR47
IN7 — 193 / 194 — VFD Fault — CR48
IN8

* Remove jumper to use this feature
** Contact closes when emergency start is in "ON" position

TORNATECH

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ELECTRIC FIRE PUMP CONTROLLER
FULL VOLTAGE / ACROSS THE LINE
WITH AUTOMATIC TRANSFER SWITCH

MODEL: VPA+VPU
BUILT TO THE LATEST EDITION OF THE NFPA20 & NFPA70

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

Expansion Board 1

Bypass Mode

TB1

VFD Start/Stop   +A1 CR7 -A2   105 (P.4 / C3)   104 TB2
                                           107

VFD Failure   TB3

Programmable Outputs

VFD Alarm Reset   104   TB4
(P.4/E2)   279

VFD Constant Speed Enable   104   TB5
(P.4/E2)   280

See VPU Drawing

J12 24VDC EXT

UP

DOWN

J9

EXB1

Programmable Inputs

IN1
IN2
IN3
IN4
IN5

TORNATECH

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

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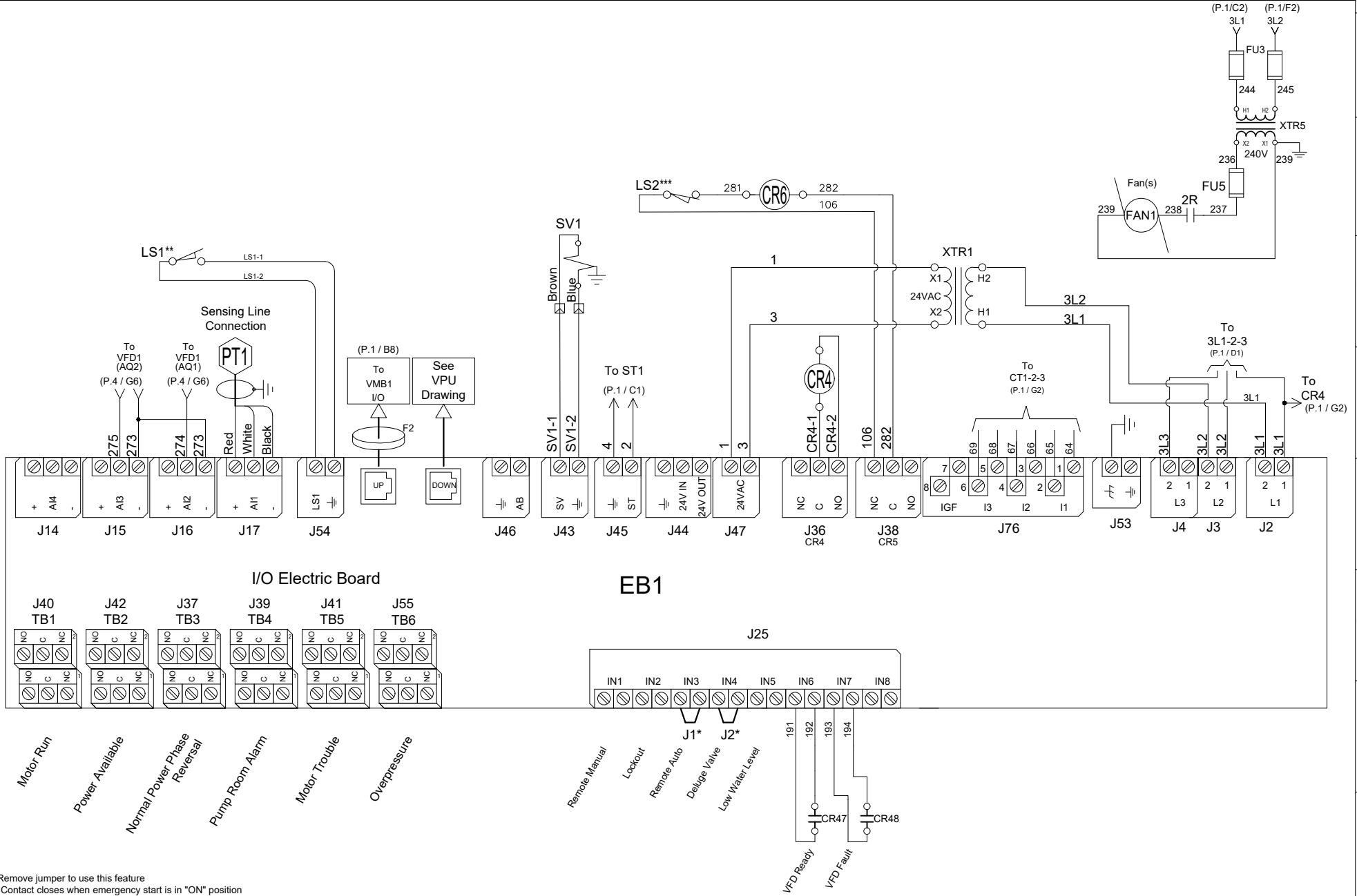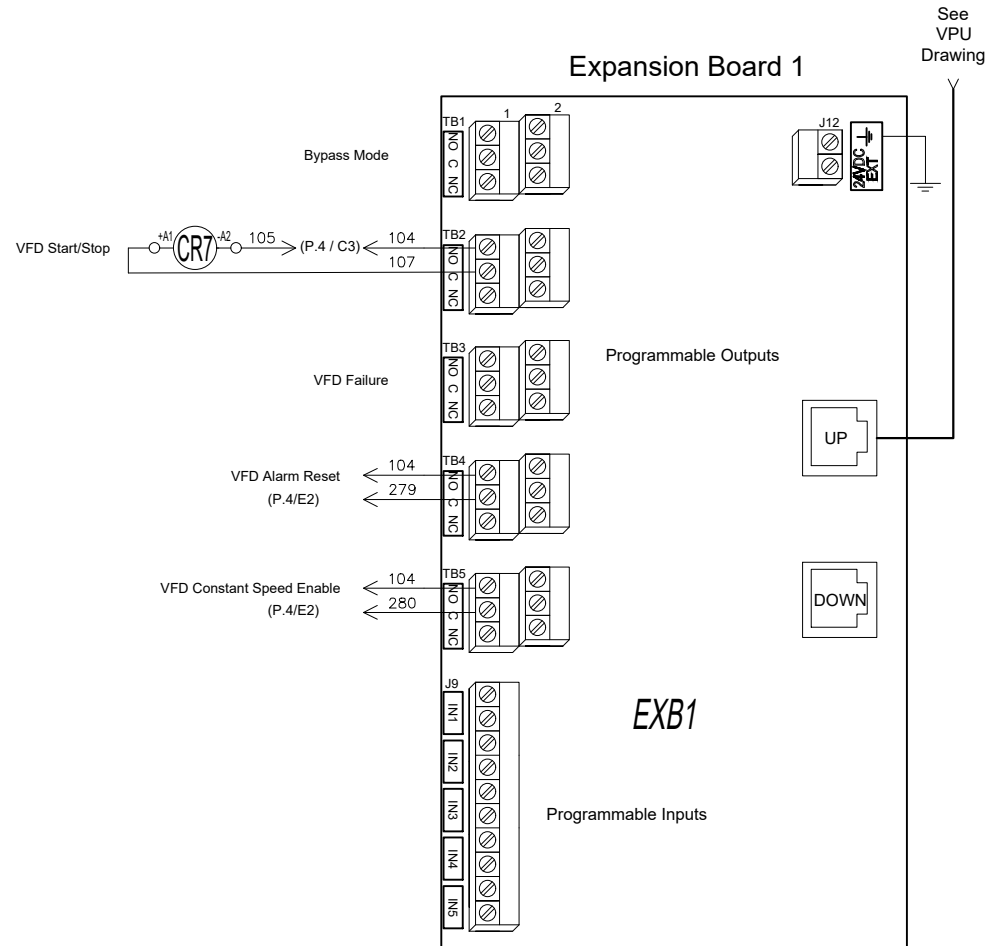Subject to change without notice.

ELECTRIC FIRE PUMP CONTROLLER
FULL VOLTAGE / ACROSS THE LINE
WITH AUTOMATIC TRANSFER SWITCH

MODEL: VPA+VPU
BUILT TO THE LATEST EDITION OF THE NFPA20 & NFPA70

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

(P.1/C2) (P.1/F2)
3L1 3L2
H1 H2
XTR6
X2 X1
120V
201 203
L N
120VAC
PS1
24VDC
+V -V
104 105
F1

(P.3 / C1) (P.3 / D1) 104
(P.3 / C1) (P.3 / D1) 105

CONTROL UNIT
ATV630

VFD Start/Stop
104 CR7 278
To
EXB1
(P.3 / E1)
104 279
104 280

VFD Constant Speed Enable

To
EXB1
(P.3 / F1)

4-20mA
PT2

Red

Black

104	P24
105	0V
	DI1
	DI2
	DI3
	DI4
	DI5
	DI6
	24V
	10V
	AI1
	COM
	AI2
	AI3

R1A
R1B
R1C
271 -A2 CR48 +A1
105

R2A
R2C
272 -A2 CR47 +A1
105

R3A
R3C

STOA
STOB
24V
COM 273
AQ1 274
AQ2 275

VFD Failure

VFD Ready

To
EB1 / AI2
(P.2 / E1) Set Point Pressure

To
EB1 / AI3
(P.2 / E1) Frequency

RJ45

Modbus RJ45

Graphic
Display

	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

Legend

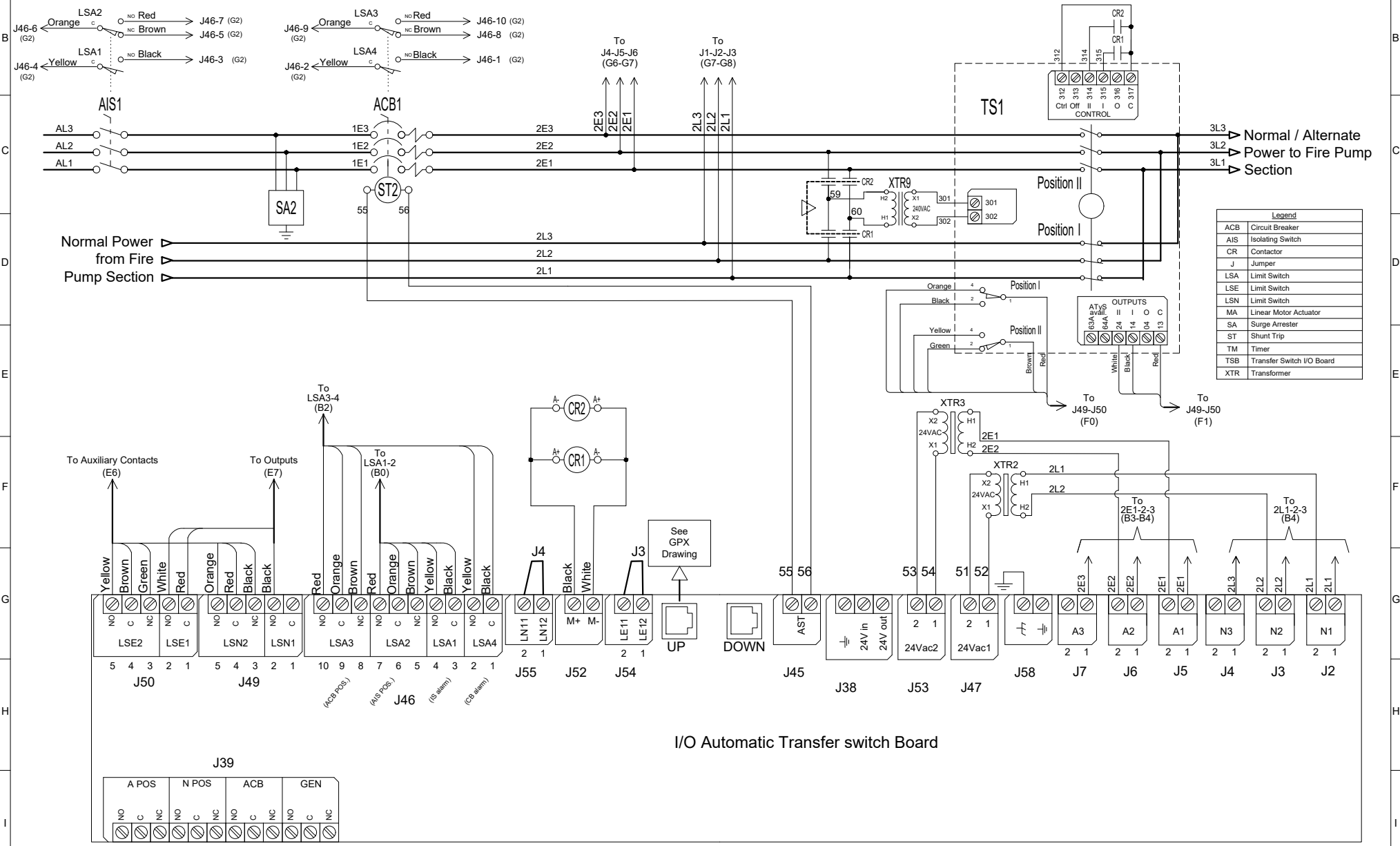| ACB	Circuit Breaker
AIS	Isolating Switch
CR	Contactor
J	Jumper
LSA	Limit Switch
LSE	Limit Switch
LSN	Limit Switch
MA	Linear Motor Actuator
SA	Surge Arrester
ST	Shunt Trip
TM	Timer
TSB	Transfer Switch I/O Board
XTR	Transformer

I/O Automatic Transfer switch Board

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

c UL us   FM APPROVED

COPPER CONDUCTORS for Isolating Switch (IS1).
Field Wiring According to Bending Space (AWG or MCM). Terminals L1 - L2 - L3

Bending Space → HP / Voltage ↓	5 " (127 mm)							8 " (203 mm)			12 " (305 mm)	
	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)

Bending Space → HP / Voltage ↓	12 " (305 mm)		16 " (406 mm)					
	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 → HP / Voltage ↓	5 " (127 mm)							8 " (203 mm)		10 " (254 mm)	12 " (305 mm)	
	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 → HP / Voltage ↓	12 " (305 mm)		16 " (406 mm)					
	125	150	200	250	300	350	400	450
380 to 416	1x (350) ** N/A	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

Power Terminals

Bonding Ground

3 Phases Incoming Power

L1 L2 L3
IS1

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.

TORNATECH

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	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
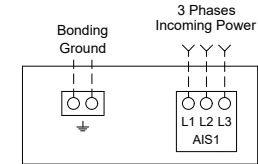BUILT TO THE LATEST EDITION OF THE NFPA20 & NFPA70

cULus   FM APPROVED

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)
											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 (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)
											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) ** N/A	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

Power Terminals

Bonding Ground

3 Phases Incoming Power

L1 L2 L3
AIS1

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

TORNATECH

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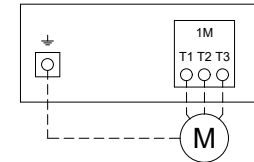
DRAWING NUMBER: VPX-TD801 /E
DWG REV. 0
SHEET 1 OF 1

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 (8 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

1M
T1 T2 T3

M

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 to1/0)	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.

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ELECTRIC FIRE PUMP CONTROLLER

MODEL: VPA
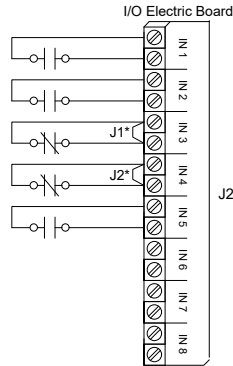BUILT TO THE LATEST EDITION OF THE NFPA20 & NFPA70

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

Field Connections
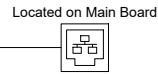
Terminals Wire Size:
24 - 12 AWG
0.5 Nm

I/O Electric Board

- Remote Manual — IN 1
- Lockout — IN 2
- Remote Auto — J1* — IN 3
- Deluge Valve — J2* — IN 4
- Low Water Level — IN 5

IN 6
IN 7
IN 8

J25

Controller Terminal Strip

Network Connections

Terminals Wire Size:
Shielded Female Connector RJ45

Located on Main Board

Modbus TCP/IP RJ45

Alarm Contacts

Terminals Wire Size:
24 - 12 AWG
0.5 Nm

I/O Electric Board

Motor Run
- Normally Opened Closes to alarm — NO
- Normally Closed Opens to alarm — C / NC
- Normally Opened Closes to alarm — NO
- Normally Closed Opens to alarm — C / NC
TB1

Power Available
- Normally Opened Closes to alarm — NO
- Normally Closed Opens to alarm — C / NC
- Normally Opened Closes to alarm — NO
- Normally Closed Opens to alarm — C / NC
TB2

Normal Power Phase Reversal
- Normally Opened Closes to alarm — NO
- Normally Closed Opens to alarm — C / NC
- Normally Opened Closes to alarm — NO
- Normally Closed Opens to alarm — C / NC
TB3

Pump Room Alarm
- Normally Opened Closes to alarm — NO
- Normally Closed Opens to alarm — C / NC
- Normally Opened Closes to alarm — NO
- Normally Closed Opens to alarm — C / NC
TB4

Motor Trouble
- Normally Opened Closes to alarm — NO
- Normally Closed Opens to alarm — C / NC
- Normally Opened Closes to alarm — NO
- Normally Closed Opens to alarm — C / NC
TB5

Overpressure
- Normally Opened Closes to alarm — NO
- Normally Closed Opens to alarm — C / NC
- Normally Opened Closes to alarm — NO
- Normally Closed Opens to alarm — C / NC
TB6

Alarm Contacts

Terminals Wire Size:
24 - 12 AWG
0.5 Nm

Expansion Board 1

Bypass Mode
- Normally Opened Closes to alarm — NO
- Normally Closed Opens to alarm — C / NC
- Normally Opened Closes to alarm — NO
- Normally Closed Opens to alarm — C / NC
TB1

VFD Failure
- Normally Opened Closes to alarm — NO
- Normally Closed Opens to alarm — C / NC
- Normally Opened Closes to alarm — NO
- Normally Closed Opens to alarm — C / NC
TB3

* Remove jumper to use this feature

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**AUTOMATIC TRANSFER SWITCH
FOR ELECTRIC FIRE PUMP CONTROLLER**
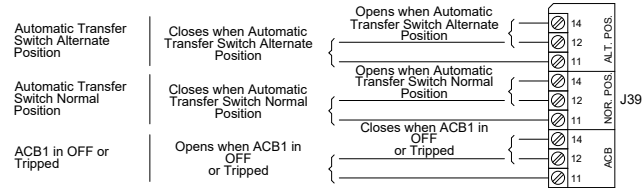
MODEL: VPU

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

Automatic Transfer Switch Alternate Position — Closes when Automatic Transfer Switch Alternate Position — Opens when Automatic Transfer Switch Alternate Position — 14 / 12 / 11 — ALT. POS.

Automatic Transfer Switch Normal Position — Closes when Automatic Transfer Switch Normal Position — Opens when Automatic Transfer Switch Normal Position — 14 / 12 / 11 — NOR. POS. — J39

ACB1 in OFF or Tripped — Opens when ACB1 in OFF or Tripped — Closes when ACB1 in OFF or Tripped — 14 / 12 / 11 — ACB

Control Terminals (TSB1)

Terminals Wire Size:
24 - 12 AWG
0.5 Nm

Generator — Normally Closed, Opens to Start Generator — Normally Open, Close to Start Generator — 14 / 11 / 12 — GEN — J39