1. STANDARD, LISTING AND APPROVAL
    1. NFPA 20
    2. UL (UL218, UL1008)
    3. FM Global (Approvals Class 1321/1323)
    4. City of New York for fire pump service
2. MANUFACTURER AND MODEL
    1. Tornatech model GPW+GPU
3. SEISMIC CERTIFICATION
    1. Test criteria
        a. ICC-ES AC156
    2. Building Code
        a. IBC 2015
        b. CBC 2016
        c. OSHPD Special Seismic Certification Preapproval – OSP
    3. Seismic Parameters
        a. ASCE 7-10 Chapter 13
4. OPERATION AND STARTING METHOD
    1. Full service combined manual and automatic
    2. Reduced voltage wye-delta closed transition starting
5. SHORT CIRCUIT WITHSTAND RATING
    1. 200V - 480V = 100 kA / 600V = 50kA
6. ENCLOSURE
    1. NEMA 2
    2. Bottom conduit entry gland plate
    3. Lifting lugs
7. POWER CIRCUIT COMPONENTS
    1. Voltage surge arrestor
    2. Isolating switch and circuit breaker assembly rated not less than 115% of the motor FLC.
    3. Circuit breaker overcurrent sensing shall be non-thermal type, magnetic only.
    4. Locked rotor protector to trip circuit breaker within 8 to 20 seconds at 600% of FLC.
    5. Wye-delta closed transition starter
    6. Automatic power transfer switch electrically and manually operated and mechanically held.
8. OPERATIONAL COMPONENTS
    1. Externally flange mounted common operating handles for both normal and alternate power isolating switch and circuit breaker assemblies.
    2. Mechanically interlocked with enclosure door to prohibit access in the "ON" position.
    3. Emergency Start and run handle mechanism latchable in the “ON” position
9. TOUCH SCREEN OPERATOR INTERFACE
    1. 7.0” LCD color touch screen (HMI technology) powered by an embedded microcomputer with software PLC logic.
    2. Keypad type pushbuttons:
        a. Start
        b. Stop
        c. Run test
        d. Transfer switch test
    3. On-Screen Menu:
        a. Home
        b. Alarms
        c. Configuration
        d. History
        e. Service
        f. Manuals
        g. Language
    4. Shall graphically display:
        a. Normal and alternate voltage and amperage readings of all three phases simultaneously and independently displayed with true RMS technology.
        b. Transfer switch status
        c. Motor starting transition
        d. Motor stopped / running
        e. Type of starting cause
        f. Actuation mode
        g. Type of controller
        h. Method of shutdown
        i. Time and date
        j. Pump room temperature (^{o}F or ^{o}C)
        k. Digital pressure gauge
    5. System pressure selectable units of measure:
        a. PSI
        b. kPA
        c. Bar
        d. Feet of head
        e. Meter of water
    6. Shall allow programming and display of:
        a. Cut-In and Cut-Out pressure settings
        b. Minimum run period timer
        c. Sequential start timer
        d. Periodic test timer
    7. Shall allow selection of the language of operation.

8. Shall allow on-screen viewing and downloading of the corresponding Operation Manual in the chosen language.

10. COMMUNICATION PROTOCOL CAPABILITY
    1. Modbus with TCP/IP frame format and shielded female RJ45 connector
11. STATE AND ALARM VISUAL INDICATORS
    1. Shall visually indicate and differentiate the criticalness by color:
        a. Locked rotor current
        b. Fail to start
        c. Under current
        d. Over current
        e. Under voltage
        f. Over voltage
        g. Phase unbalance
        h. Check weekly test solenoid valve
        i. Weekly test cut-in not reached
        j. Transducer fault
        k. Control voltage not healthy
        l. Motor trouble
        m. Pump room alarm
        n. Invalid cut-in
        o. Phase reversal
        p. Power loss
        q. Phase Loss L1
        r. Phase Loss L2
        s. Phase Loss L3
        t. Low water level
        u. Pump on demand
        v. Low ambient temp
        w. Service required
        x. Transfer switch trouble
        y. Alternate power phase reversal
        z. Alternate isolating switch Open/Tripped
        aa. Alternate circuit breaker Open/Tripped
        bb. Alternate side locked rotor current
12. PRESSURE AND EVENT RECORDING
    1. Shall be capable of logging pressure data and operational events with time and date stamp.
    2. Shall be able to display operational events for the life of the controller, and display the pressure data in text and/or graphic form.
    3. Data shall be retrievable and downloadable to a USB drive or mobile app.
        a. All time statistics
            (1) First start up
            (2) On time
        b. First and last service statistics
            (1) First setup
            (2) On time
            (3) Motor Statistics:
                (a) On time
                (b) Start count
                (c) Last start time
            (4) Minimum, maximum, average system pressure
            (5) Minimum, maximum, average pump room temperature
            (6) Jockey Pump controller
                (a) On time
                (b) Start count
                (c) Last start time
            (7) Generator:
                (a) On time
                (b) Start count
                (c) Last start time
        c. Power statistics
            (1) Voltage between phases with date stamp
            (2) Amperage per phase with date stamp
13. WETTED PARTS
    1. Shall be supplied with a pressure transducer and run test solenoid valve assembly rated for 500psi working pressure (calibrated at 0-300psi) and be externally mounted with a protective cover.
    2. Pressure sensing line connection to shall be ½” FNPT.
14. SERVICE/FLOW TESTING CAPABILITIES
    1. Shall have capability of scheduling maintenance reminders.
    2. Shall have capability of inputting pump flow test data, generate and display the pump curve and store this information in memory for the lifetime of the controller.
15. CONNECTION FOR EXTERNAL DEVICES
    1. Manual remote start device
    2. Automatic remote start device
    3. Deluge valve start
    4. Generator start signal
16. DPDT DRY CONTACTS FOR REMOTE INDICATION OF ALARM CONDITIONS (8A – 250VAC)
    1. Power or phase failure and/or circuit breaker in open position

2. Phase reversal
3. Pump run
4. Common pump room alarm (field re-assignable)
5. Common motor trouble (field re-assignable)
6. Alternate power isolating switch in the OFF position
7. Transfer switch in the normal position
8. Transfer switch in the alternate position
9. Field programmable

17. AUDIBLE ALARM
    1. Alarm buzzer - 85dB at 3 meters
        a. Alternate isolating switch Open/Tripped
        b. Alternate circuit breaker Open/Tripped