1. STANDARD, LISTING AND APPROVAL
   1. NFPA 20
   2. UL (UL218 and CSA C22.2 No. 14)
   3. FM Global (Class 1321/1323)
   4. City of New York for fire pump service
2. MANUFACTURER AND MODEL
   1. Tornatech model GPD
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. ENCLOSURE
   1. NEMA 2
   2. Bottom conduit entry gland plate
5. OPERATIONAL COMPONENTS
   1. Hand-OFF-Auto selector switch installed behind lockable breakable cover.
6. TOUCH SCREEN OPERATOR INTERFACE
   1. 7.0" LCD color touch screen (HMI technology) operator interface powered by an embedded microcomputer with software PLC logic
   2. Keypad type pushbuttons:
      a. Crank from Battery #1
      b. Crank from Battery #2
      c. Stop
      d. Run test
   3. On-Screen Menu:
      a. Home
      b. Alarms
      c. Configuration
      d. History
      e. Service
      f. Manuals
      g. Language
   4. Shall graphically display:
      a. AC power present
      b. Charger #1 and #2 charging mode
      c. Battery #1 and #2 voltage and amperage

   d. System pressure
   e. Cut-out and cut-in pressure settings
   f. Starter #1 and #2 rest or cranking
   g. Engine stopped / running
   h. Type of starting cause
   i. Fuel solenoid valve energized / not energized
   j. Timers counting
   k. Hand-OFF-Auto selector switch position
   l. Actuation mode
   m. Type of controller
   n. Method of shutdown
   o. Time and date
   p. Pump room temperature (^{o}F or ^{o}C)
   q. 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.
7. COMMUNICATION PROTOCOL CAPABILITY
   1. Modbus with TCP/IP frame format and shielded female RJ45 connector
8. STATE AND ALARM VISUAL INDICATORS
   1. Shall visually indicate and differentiate the criticalness by color:
   a. AC fail
   b. DC fail

c. Battery fail 1, 2
d. Charger fail 1, 2
e. Engine trouble
f. Pump room trouble
g. Controller trouble
h. Service required
i. Weak battery 1
j. Weak battery 2
k. Loss of continuity with Contactor 1
l. Loss of continuity with Contactor 2
m. Weekly test Cut-In not reached
n. Weekly test check solenoid valve
o. Faulty pressure transducer
p. Low raw water flow
q. Engine fail when running
r. Engine fail to start
s. Engine overspeed
t. Low ambient temperature
u. Pump on demand
v. Invalid Cut-In
w. Overpressure
x. Underpressure
y. Battery 1 overvoltage
z. Battery 2 overvoltage
aa. Water reservoir low
bb. Water reservoir high
cc. Fuel tank Leak
dd. Low fuel level
ee. High fuel level
ff. Engine ECM in alternate position
gg. Engine fuel injection malfunction
hh. Engine high temperature
ii. Engine low temperature
jj. Engine ECM warning
kk. Engine ECM fault
ll. Engine low oil pressure
mm. High raw water temperature
nn. PLD low suction pressure
oo. Engine Run
pp. Main switch AUTO
qq. Pump room temperature (F or C)
rr. Periodic test
ss. Main switch in HAND
tt. Cranking cycle
uu. Main switch in OFF
vv. AC Power available

9. CRANK CYCLE
   1 Crank from battery 1 for 15 seconds
   2 Rest for 15 seconds
   3 Crank from Battery 2 for 15 seconds
   4 Shall repeat 3 times. Visual alarm "Fail TO Start" shall appear if the engine does not start after the completion of this cycle.

10. 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 flash memory disk via the USB port accessible to the user without having to open the controller door.
    a. All time statistics
       (1) First start up
       (2) On time
    b. First and last service statistics
       (1) First setup
       (2) On time
       (3) Engine 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

11. PRESSURE SENSING - WETTED PARTS
    1 Shall be supplied with a pressure transducer (system) 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 the pressure transducer shall be ½" FNPT

3   Provision for a redundant pressure transducer shall be provided

12. SERVICE/FLOW TESTING CAPABILITIES
   1   Shall have the capability of scheduling maintenance reminders
   2   Shall also have the 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.

13. CONNECTION FOR EXTERNAL DEVICES
   1   Manual remote start device
   2   Automatic remote start device
   3   Deluge valve start

14. DPDT DRY CONTACTS FOR REMOTE INDICATION (8A – 250VAC):
   1   Engine run
   2   Main switch in HAND or OFF
   3   Common controller trouble (fail safe)
   4   Common engine trouble (field re-assignable)
   5   Common pump room alarm (field re-assignable)
   6   Field programmable

15. AUDIBLE ALARM
   1   4" alarm bell rated for 85dB at 10ft (3m)