1. STANDARD, LISTING AND APPROVAL
   1 NFPA 20
   2 FM Global (Class 1321/1323)
   3 CE Mark
2. MANUFACTURER AND MODEL
   1 Tornatech model GPD-FM
3. ENCLOSURE
   1 IP55
   2 Bottom conduit entry gland plate
4. OPERATIONAL COMPONENTS
   1 Hand-OFF-Auto selector switch installed behind lockable breakable cover.
5. 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.
6. COMMUNICATION PROTOCOL CAPABILITY
   1. Modbus with TCP/IP frame format and shielded female RJ45 connector
7. 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. Fuel tank Leak
cc. Low fuel level
dd. High fuel level
ee. Engine ECM in alternate position
ff. Engine fuel injection malfunction
gg. Engine high temperature
hh. Engine low temperature
ii. Engine ECM warning
jj. Engine ECM fault
kk. Engine low oil pressure
ll. High raw water temperature
mm. Low suction pressure
nn. Engine Run
oo. Main switch AUTO
pp. Pump room temperature (F or C)
qq. Periodic test
rr. Main switch in HAND
ss. Cranking cycle
tt. Main switch in OFF
uu. AC Power available

8. 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.

9. 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) 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

10. 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

11. 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.

12. CONNECTION FOR EXTERNAL DEVICES (devices and switches by others)
   1 Low fuel level switch
   2 Remote auto start device
   3 Water reservoir low switch
   4 Fuel tank leak switch
   5 High fuel level switch

13. DPDT DRY CONTACTS FOR REMOTE INDICATION (8A – 250VAC):
   6 Engine run
   7 Main switch in HAND or OFF
   8 Common controller trouble (fail safe)
   9 Common engine trouble (field re-assignable)
   10 Common pump room alarm (field re-assignable)
   11 Field programmable

14. AUDIBLE ALARM
   1 Alarm buzzer - 85dB at 3 meters