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## ENGINEER'S SPECIFICATION

## EPG Series L960PT PumpMaster™ Controller Triplex 1Ø Control Panel

Furnish one EPG Companies Inc., UL listed 508A/698A, Series L960PT controller to alternate the operation of two pump motors plus a third independent pump motor and auxiliary equipment in manual or automatic mode. The control panel enclosure shall be NEMA type \_\_\_\_ .

The enclosure shall be equipped with a window in the outer door, an inner door, a stainless steel drip shield, and a tamper resistant latch. The NEMA 4 (standard) enclosure is finished with polyester urethane paint. The NEMA 4X (optional) enclosure can be either stainless steel or non-metallic.

The control system will operate from a \_\_\_\_ Volt, 60 Hertz, single phase power supply. Pump control components will be sized to operate pump motors of specified horsepower.

The control panel shall include the following as standard features:

**Main Disconnect Switch:** The main disconnect switch shall be \_\_\_\_ Amp rated and will prevent opening of control panel while power is on, and includes \_\_\_\_ Volt, \_\_\_\_ Amp dual element fuses.

**"Hand-Off-Auto" Selector Switches:** Allow manual or automatic operation. The selector switches shall be heavy duty, oil tight, NEMA 4 rated switches mounted on the inner door. The hand position shall be momentary with a spring return.

**Motor Contactors:** The motor contactors shall be sized to pump motor horsepower.

**Motor Start Winding Control with Start Capacitors and Start Winding Relays:** Capacitors are used to start motors. Relays are used to remove start winding from circuit when motors reach operating speed.

**Control Transformer:** Transformer with fused primary and secondary shall isolate control circuit from power circuit and provide easier and safer field wiring of accessories. It shall lower incoming voltage to 120 Volts.

**Run Lights:** Indicate energization of motor circuit. They shall be heavy duty, oil tight, NEMA 4 rated and shall have LED lamps with 100,000 hour life. The lights shall be mounted on the inner door and will be green in color.

**Electronic Alternator:** The electronic alternator shall include lead/lag pump operation to equalize wear on pump motors by alternating successive starts. The lag pump shall start after the lead pump starts if the liquid level continues to rise above the pump start level set point and both pumps will continue to run until the liquid level decreases to the pump stop level set point as sensed by the pressure transmitter.

**LevelMaster™ Level Controls:** The LevelMaster level control meters shall be mounted on the inner door. One level meter shall control the lead/lag alternating pumps and a second level meter shall control the third pump. The meters shall have a digital readout and the capability to monitor and maintain pumping operations as well as output a high level alarm. The second meter shall also provide high-high level alarm fail-safe features that shut off the pump motors. The high-high level alarms may indicate level sensor failure or a problem with the pump(s). Level control shall be accurate to within 0.1 inch.

**Level Simulators:** The level simulators shall be mounted on the inner door. One level simulator shall be provided for each level meter. The level simulators are built-in test circuits designed to simulate 4-20 mA loads to assist in level setup and troubleshooting.

**Intrinsically Safe Barriers:** The level sensor circuits shall be protected by intrinsically safe barriers.

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**Heater with Adjustable Thermostat:** A heater with adjustable thermostat shall promote even distribution of heat and elimination of hot spots and condensation. Heater element shall be mounted in space between the sub-panel and the back of the enclosure and provide a minimum of 100 inches square of heating area.

**Lightning Arrestor:** Shall be grounded, metal-to-metal, to water strata.

**Terminal Strip:** Labeled and numbered terminal strip provides easy connection of external components.

**Corrosion Inhibitor Emitter:** Inclusion of an industrial corrosion inhibitor emitter shall protect internal components of control panel from corrosion for up to one year and shall be replaceable.

**Options are available to meet specific needs.**

## SYSTEM LOGIC AND FUNCTION

The controller is designed to operate two pumps in lead/lag alternating mode and a third independent pump. In the lead/lag mode, the lead pump starts upon change in liquid level as sensed by a pressure transmitter. The pump will continue to run until the level decreases to the pump stop level set point. The lag pump will start if the liquid level continues to rise above the pump start level set point and will continue to run until the liquid level decreases to the pump stop level set point as sensed by the pressure transmitter. If the liquid level rises to the high level set point, a high level will be annunciated. If a motor trips while running due to an overload condition, the other pump will start automatically. The electric alternator provides equalized wear and usage of each pump by alternating successive starts. The pressure transmitter level sensor shall have a range of 0 to \_\_\_\_ feet with a 4-20 mA output signal.

The third independent pump is designed to start upon the change in liquid level as sensed by a pressure transmitter. The pump will continue to run until the pump stop level set point is reached. If the liquid level rises to the high level set point, a high level will be annunciated. If the liquid rises to the high-high level fail-safe set point, the pump will shut off. The pressure transmitter level sensor shall have a range of 0 to \_\_\_\_ feet with a 4-20 mA output signal.