**Three Phase Simplex Control Panel**

**1.01 GENERAL**

A. Contractor shall furnish all labor, materials, equipment and incidentals required to provide a simplex motor control panel as specified herein.

B. The motor control panel shall be assembled and tested by a controls system manufacturer (SJE-Rhombus or pre-approved equal) meeting the Standards of UL 508A for industrial controls and be UL labeled and serialized accordingly. The motor control panel shall be assembled and tested by the same manufacturer so as to insure suitability in matching controls to motors and to insure single source responsibility for the equipment.

C. The panel shall contain all components required by the pump manufacturer for starting and protecting the motor as well as features required by the pump manufacturer for warranty of the pumps. Items such as thermal overload detection or seal failure detection shall be included when required.

D. Incoming pump power shall be three-phase, 60 Hz, 208/240/480 volts AC.

E. The control panel shall incorporate three (3) normally open, mercury or mechanically-activated control switches with pipe clamps. Floats shall be labeled in the panel as stop, start, and alarm. Floats shall be SJE-Rhombus control switches or approved equal.

**2.01 CONSTRUCTION**

A. The controls for the pump shall be housed in an engineered thermoplastic enclosure meeting NEMA 4X requirements with a hinged door and neoprene gasket. The enclosure shall have provisions for a padlock.

B. A nameplate shall be permanently affixed to the panel. A ratings label shall include the model number, voltage, phase, frequency, ampere rating and horsepower rating and shall be affixed to the inside of the enclosure. A warning label against electric shock shall be permanently affixed to the outer door. The interior of the enclosure shall have a clear envelope with "as built" schematics located within.

C. A removable aluminum back plate shall be provided for mounting all circuit breakers, motor starters, etc. All components mounted to the back plate shall be secured by type 25, self-tapping screws in extruded holes. Rivets shall not be acceptable for securing any component to the backplate.

D. A simplex pump controller shall be provided for control logic. The controller shall utilize a printed circuit board to avoid conventional wiring. The printed circuit board of the pump controller shall be manufactured using U.L. listed materials. There shall be separately fused control and alarm circuit protection. A run light and hand-off-auto switch shall be provided for the pump circuit. The run light and hand-off-auto switch shall be mounted on the printed circuit board. The run light shall be green.

E. The magnetic motor starter shall be IEC rated for the pump horsepower and include a contactor with a minimum mechanical life of 5,000,000 operations and a minimum contact life of 1,000,000 operations. A motor protective switch shall be used to provide adjustable overload protection, protect from line faults and disconnect the pump from the incoming power. The motor protective switch shall be adjustable to meet NEC requirements for motor controls.

F. A high-level alarm condition shall activate the main alarm light (red, mounted on the top of the panel)

and alarm horn. The alarm light shall remain illuminated until the problem is corrected. The alarm horn shall be rated 83-85 dB minimum. A Test-Normal-Silence toggle switch, labeled and placed adjacent to the horn shall be included.

G. Control/Alarm voltage shall be 120 VAC and shall be accomplished by the means of a transformer with primary and secondary fusing.

H. Wire ties shall be used to maintain panel wiring in neat bundles for maintenance and to prevent interference with operating devices. All grounding conductors shall be securely connected to assure a proper ground.

I. Provide a pump run elapsed time meter for the pump. The run time meter shall be non-resetable and record up to 99,999 hours to the nearest tenth or hundredth.

J. Auxiliary alarm contacts shall be provided. Contacts shall be type C.

K. The control panel shall be a 312 series panel as manufactured by SJE-Rhombus or approved equal.