

**SLIMVIEW
120 VOLT FLOAT SERIES
DUPLEX PUMP CONTROL PANEL
SPECIFICATION
for**

CITY OF

DATE: 11/13/06



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SECTION 16695 – PUMP CONTROL SYSTEMS: Duplex Slim View Float Constant Speed Control System

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1. General

1.1 Scope Of Work

The contractor shall furnish and install a Solid State Pump Control System designed to operate sewage pumps in a sewage lift station as described herein. The utility power supply at the pump station shall be XXX volts, X phase, 4 wire. The duplex submersible pump motors shall be rated at ___ HP, ___ FLA'S each and shall be equipped with internal probes to detect the presence of moisture inside the motor housing

The Solid State Control System shall be designed to operate two submersible pumps based on level in the wet well. Float level sensors shall be used to monitor the level in the wet well. Four normally open float level sensors shall be required for automatic operation of the duplex pump station. The control panel shall be designed for the float level sensors to operate on 120 VAC, to provide the following functions; stop pumps, start lead pump, start lag pump, and high level alarm. The panel shall require solid state components for interface with wet well level sensors, built-in pump sensors, and to meet control requirements.

The Solid State Control system shall be a logic control unit with a multi-line alphanumeric display with 18 front panel input keys provided for operator interface with the CPU. The Solid State Control System shall be pre-programmed to operate up to 2 pumps in a duplex float panel configuration. The Solid State Control System shall be a standard product of the manufacture and shall not require any in field programming changes to be made.

The operator shall be able to view all system status and alarms on the Solid State Control System display and shall be able to input his operational choices via the systems function keys. Eight (8), user friendly, display screens shall be available to the operator to allow him to be aware of and monitor the control systems current operational status.

This specification describes the Slim-View Float series pump control system as manufactured by EG Controls, Inc.

1.2 Codes and Standards

Electrical equipment, materials and workmanship shall comply with all applicable codes, safety and fire law regulations at the location of the work and shall conform to applicable codes and standards of the organizations listed below.

1. Institute of Electrical and Electronic Engineers. (IEEE)
2. National Electric Code. (NEC)
3. International Electrotechnical commission (IEC)
4. American National Standards Institute. (ANSI)
5. Underwriters Laboratories. (UL-508A)

All equipment and materials shall be new and shall bear the manufacturers name and trade name. In cases where the standard has been established for the particular material, the material shall be so labeled. The equipment to be furnished shall essentially be the standard product of a manufacturer regularly engaged in the production of the required type of equipment for this type of work and shall be the manufacturers latest approved design. Equipment and material shall be suitably delivered and

stored and shall be readily accessible for inspection. All items subject to moisture damage shall be stored in dry spaces. All material and equipment shall be protected against dirt, dust, water and chemical or mechanical injury, vandalism and theft.

2. Products

2.1 Construction

2.1.1 Enclosure

The described equipment shall be housed in a single NEMA 4X enclosure fabricated from Fiberglass with a gray finish inside and outside.

Enclosure shall be pad-lockable. Fiberglass enclosure shall also be gasketed. Enclosure sizing shall be the responsibility of the system panel manufacturer.

The following items shall be mounted to the top or side of the enclosure.

1. Alarm Beacon (Top Mount)
2. Generator Receptacle
3. Alarm Horn
4. Lightning Arrestor
5. N4X Silence Pushbutton.

2.1.2 Hinged Inner Door

A hinged inner door, fabricated from, 5052-H32.080, marine alloy aluminum, shall be provided. The hinged inner door shall contain a cutout for the Manual Transfer Switch. Control switches and indicators shall be labeled and mounted to the hinged inner door to keep operators from entering the live electrical compartment as much as possible. It shall be completely removable for ease of service and shall be held closed by at least (2) hand operated 1/4 turn fasteners.

The following items shall be mounted on the inner door:

1. ETM for each pump to monitor pump run time.
2. Seal leak indication for each pump.
3. Run indication for each pump.
4. GFCI Duplex Convenience Receptacle
5. Main Power Manual Transfer Switch operating handle
6. Hand-Off-Automatic switch to select the operating mode for each pump.

2.1.3 Back-panel

The control system enclosure shall include a removable back-panel. The back-panel shall be fabricated from .125 thick Type 5052-H32 marine alloy aluminum.

Components shall be fastened to the back-panel using stainless steel pan-head machine screws. All devices shall be clearly labeled in accordance with the schematic diagram.

2.2 Control Circuit Wiring

Control circuit wiring shall be (16) gauge minimum, type MTW or THW, rated for 300 volts. All power wiring shall be rated for 600 volts. Conductors shall be color coded in the same colors throughout the entire panel.

All conduit entries shall be sealed to prevent moisture and gas vapors from entering the control system enclosure.

2.3 Slim-View Solid State Control System

The Slim-View Solid State Control System shall provide the automatic control as well as the alternation of the pump station pumps in order to maintain pump down control of the wet-well. The float control system shall sense the wet-well level through remote, level sensing float switches. Floats shall be mounted in the wet-well in a manner that precludes anything from obstructing the full travel of the float, including but not limited to the other floats. Four float switches shall be provided for pumps off level, lead pump on level, lag pump on level and high level alarm level. Terminal blocks shall be provided for each separate float switch connection and other remote devices if applicable

2.4 Slim-View Solid State Control System Screens:

2.4.1 Main Screen

The main screen shall display the overall pump status of the control system. The screen shall display the call to run condition of each pump by indicating yes or no next to the pumps position and the pump run condition of each pump by indicating yes or no next to each pump number. The Main Screen shall display an Allow Pumping condition. The Allow Pumping condition shall be determined, by the wet well level, in relationship to the stop float level. The display shall display a yes or no next to the Allow Pumping condition based on the level being above or below the stop pump float level.

2.4.2 Analog Display Screen

The Analog Display Screen shall display the value of any single analog input wired to the Slim-View, Control System.

2.4.3 Pump # 1 Status Screen

The Pump # 1 Status Screen shall indicate if pump # 1 has been designated the lead or lag pump. The screen shall indicate the run condition of the pump by indicating if the pump is running or stopped

2.4.4 Pump # 2 Status Screen

The Pump # 2 Status Screen shall indicate if pump # 2 has been designated the lead or lag pump. The screen shall indicate the run condition of the pump by indicating if the pump is running or stopped

2.4.5 Pump # 1 Alarm Screen

The Pump # 1 Alarm Screen shall display detailed alarm text for pump # 1

2.4.6 Pump # 2 Alarm Screen

The Pump # 2 Alarm Screen shall display detailed alarm text for pump # 2

2.4.7 Float Alarm Screen

The Float Alarm Screen shall display alarm text for a float alarm. The screen shall direct the operator to manually reset the alarm by pressing the, alarm reset button on the screen. The Float out of sequence alarm shall not be re-settable until all floats are deactivated and hanging free.

2.4.8 Alternation Set-Up Screen

The Alternation Set-Up Screen shall display the options of either Automatic or Manual alternation. The operator shall be able to select the type of preferred alternation by selecting yes or no next to alternation. The type of selected alternation shall be displayed on the screen.

3. Components and Features

3.1 Incoming Power Supply**3.1.1 Manual Transfer Switch**

Provide a XX amp manual transfer switch interlocked to the inner door. The manual transfer switch shall have three positions, emergency, off and normal. The switch must be in the OFF position to open the inner door.

When the Manual Transfer Switch is in the normal position utility power shall be the applied service. When the Manual Transfer Switch is in the Emergency position generator power, through its connection to the generator receptacle shall be the applied service.

3.2 Generator Receptacle

Provide a 3 pole, XX Amp 250 Volt 4 wire grounded generator power receptacle with a weatherproof cover mounted to the side of the control system enclosure.

3.3 Lightning Arrester

Provide a solid-state lightning arrester connected to the load side of the main power transfer switch. The lightning arrester shall be designed to protect control equipment from damage due to lightning strikes on the incoming power supply line.

3.4 Phase Monitor (3 phase) Relay (SPDT Contact)

A phase monitor relay shall be installed to monitor the incoming three-phase power supply. The voltage level shall be adjustable and a LED indicator shall glow to indicate that the incoming power supply conditions are acceptable. The phase monitor relay shall be used to disconnect all motor starter coil power when the following conditions exist; phase loss, under voltage and phase reversal. The phase monitor relay shall automatically reset when the fault condition has been corrected. The phase monitor relay shall be protected with an input fuse on each incoming power supply phase.

3.5 Combination Starter

Provide combination starters comprised of a Motor Protection Circuit Breaker (MPCB) and contactor assembled into a single compact starter with an integrated terminal block for each pump.

The Motor Protection Circuit Breaker (MPCB) shall provide short-circuit and overload protection for individual motor loads, with visual trip indication.

The assembly shall provide a disconnect function for individual motors.

Auxiliary contacts shall be pre-wired to the integrated terminal. Coil terminals shall be located at the bottom of the assembly for quick and easy access.

3.6 Control Power Circuit Disconnect

The Control Power Circuit shall be protected by a Q frame molded case circuit breaker. Each pole of this breaker shall provide inverse time delay overload protection and instantaneous short circuit protection by means of a thermal magnetic element. The breaker shall be operated by a toggle type handle and shall have a Quick-make, Quick-break over center switching mechanism that is mechanically trip free from the handle so that the contact cannot be held closed against short circuits and abnormal currents. Tripping due to overload or short circuit shall be clearly indicated by the handle automatically assuming a position midway between the manual “ON” and “OFF” position. The minimum interrupting rating of the breaker shall be 10,000 amps at 120/240 VAC.

3.7 Convenience Receptacle

A GFCI duplex receptacle shall be provided for convenience purposes offering protection against ground fault leakage and shock. The unit shall have a retractable ground pin and polarized blades for two (2) or three (3) wire receptacles. The unit shall require a reset after any ground fault interruption. The GFCI duplex receptacle shall include a test and reset button

3.8 Operating Mode Switch

The panel shall have a Hand-Off-Automatic rocker/toggle switch mounted on the inner door to select the operating mode for each pump.

3.9 Elapse Time Meters

A non re-settable 6 digit elapse time meter shall be mounted on the inner door to record the accumulated running time for each pump. The elapse time meter shall be rated 115 VAC. The unit shall include a quartz crystal time base sealed in a tamper resistant case.

3.10 Pilot-light Indicators

The panel shall have high brightness neon lamps with built in resistors to assure long life mounted on the inner door.

3.11 Alarms

The panel shall have a NEMA 4X rated red alarm beacon mounted on top of the panel. The alarm beacon shall be rated 120 VAC, 25W. The panel shall have a audible alarm and a silence push button mounted on the side of the panel. The audible alarm shall be rated 120 VAC, 95db at 2 feet (min.). The visual and audible alarm shall indicate if a high-level alarm condition exists.

4. Quality Assurance

4.1 Manufacturer Experience

4.1.1. UL Certification

The manufacturer, of the control system, shall be certified by Underwriters Laboratories (UL) as being a UL 508 listed manufacturing facility and certified to install a serialized label for quality control and insurance liability considerations.

4.1.2 Liability Insurance

The manufacturer of the control system must carry blanket liability insurance of at least two (2) million dollars.

4.1.3 Experience

The manufacturer of the control system must be able to document ten years of experience in successfully designing and manufacturing similar control systems for wastewater pumping applications.

4.2 Manufacturer Quality Control

The complete control system shall be functionally tested at the manufacturing facility and certified as a complete system to assure proper operation per specification. All components must be mounted with stainless steel hardware.

4.3 *Manufacturer Approval*

Manufacturers listed in this specification do not constitute approval. All controls must have the capabilities and functions as outlined in the specifications.

5. Submittal Requirements

5.1 Base Bid

The base bid control system shall be the Slim-View float control system as manufactured by EG Controls Inc. of Jacksonville Florida. All bidding contractors shall base their bid on the Slim-View float control system. Contract shall be awarded on the base bid control system. Alternative deductive systems will be considered only after contract award and must be specified with any applicable deducts at bid time in order to receive consideration. Bidders submitting alternate quotations shall submit appropriate cut sheets, circuit drawings

and a detailed bill of materials with their alternate bid packages. Approval of an alternative system shall be at the sole discretion of the engineer.

5.2 Substitutions

The Engineer will consider proposals for substitution of materials, equipment, methods and services only when proposals are accompanied by complete technical data and all other information required by the Engineer for the proposed substitution. Substitution of materials, equipment, methods and/or services is not allowed, unless, the substitution has been approved by the Engineer.

5.3 Shop Drawing Submittals

5.3.1 Drawing Requirements

All drawings are to be computer generated.

5.3.2 Engineering Approval

The Engineer reserves the right to approve or disapprove any and all equipment based upon his evaluation. Approval for fabrication and installation will be made only after submittal and review of all submittal documents. The information required for approval shall include the following items and be provided in Eight (8) sets as a minimum:

- (1) Appropriate cut sheets
- (2) Complete electrical schematics detailing the system
- (3) A complete bill of material
- (4) Detailed drawings of the enclosure (including back-panel and inner door)
- (5) Exploded detail of every control face plate, light, switch or meter mounted on the exterior of the enclosure.

5.4 Record Documents And Testing

5.4.1 Record Documents

- (1) Eight (8) sets of as built drawings as per Section 5.3.2, items 1 through 5 of this specification are to be supplied depicting “as built” conditions. This as built is to include any field modifications made by the authorized start-up personnel during installation, start-up or testing.
- (2) Original copy of the factory Quality Control report.

5.4.2 Testing

The control panel shall be thoroughly tested at the factory prior to shipment.

6. Warranties

All guarantees implied or stated by the control system manufacturer shall be passed in full force to the owner.

All components in the specified control system are warranted for defects in material and workmanship for a minimum of twelve (12) months from the date the control panel is shipped from the manufacturer.

The manufacturer of the control system shall warrant all components in the system for unit responsibility purposes.

7. Equipment Identification

All electrical equipment shall be identified in accordance with these specifications. All identification labels, both within the enclosure and external, shall be engraved nameplates attached with stainless steel machine screws, photo etched, silk screened, or laser-screened laminated mylar. All control wiring shall be numbered on each termination.

Engraved nameplates attached with stainless steel machine screws, photo etching, silk screened, or laser-screened laminated mylar shall be provided to identify all individually mounted push-buttons, rocker switches, lights, meters, circuit breakers, motor starters, transformers, relays, fuses, phase monitors, surge arrester and any other equipment for which identification is required for eventual service or replacement. This includes the appropriate equipment within the cabinet. Embossed tape is not acceptable.

8. Execution

8.1 Field Wiring

Field installed interior wiring shall be neatly grouped by circuit and bound by plastic tie wraps. Circuit groups shall be supported such that circuit termination points are not stressed.

8.2 Panel Protection

The pump control panel shall be protected at all times. Any damage to the paint shall be carefully repaired using touch up paint that can be identified by the pump control manufacturer.