

SCOPE: This specification covers a non-contacting ultrasonic Pump Station Level Controller as manufactured by Greyline Instruments, Massena New York / Long Sault, Ontario. This instrument shall provide for indicating, transmitting of wet well or tank level, and control of up to six pumps or alarms.

### **1. GENERAL**

- 1.1 Pump Station Level Controller to consist of an non-contacting ultrasonic sensor, connecting cable, and a remote enclosure with indicating, transmitting and controlling electronics.
- 1.2 Measurement accuracy shall be  $\pm 0.25\%$  of Range or 2 mm (0.08"), whichever is greater, and shall be automatically temperature compensated.
- 1.3 Sensor cable length shall be as required by installation, not to exceed 500' (152 m).
- 1.4 System shall have no moving parts and shall not contact the material being measured.
- 1.5 Shall include a built-in keypad and simple menu system for calibration.
- 1.6 Shall include a non-contacting ultrasonic level sensor plus hybrid sensor function for dual-technology redundant level sensing with input from a 4-20mA level transmitter.

### **2. TRANSDUCER/SENSOR**

- 2.1 Non-contacting ultrasonic sensor shall be constructed of PVC.
- 2.2 The sensor shall have a minimum deadband or blanking of 16" (407 mm) and a maximum range of 32 ft. (10 m), and have an operating frequency of 46 kHz with an ultrasonic beam angle of 8 Degrees.
- 2.3 Sensor shall withstand accidental submersion to 20 psi.
- 2.4 Sensor operating temperature shall be from -40°F to 150°F (-40°C to 65°C).
- 2.5 Sensor shall include integral temperature sensor. Temperature sensors requiring separate mounting and wire runs shall not be accepted.
- 2.6 Sensor cable shall be installed in plastic or grounded metal conduit.

### **3. SENSOR CONNECTING CABLE**

- 3.1 Provide RG62AU coaxial cable 25' (7.6m) continuous length, with waterproof, potted bond to the Sensor head.
- 3.2 Extended sensor cable shall be RG62AU coaxial to a maximum of 500' (152m). Cable shall be spliced with screw terminal connections in manufacturer's recommended Junction Box.
- 3.3 Level and temperature signals shall be conducted on one single coaxial cable. Separate or multiple-conductor cables shall not be accepted.
- 3.4 Sensor cable shall be installed in grounded metal conduit.

### **4. TRANSMITTER**

- 4.1 The Pump Station Level Controller shall accept 4-20mA input from an external level transmitter for redundancy. The redundant sensor shall be continuously auto-calibrated by the Pump Station Level Controller's ultrasonic sensor.
- 4.2 The transmitter shall provide for password-protected calibration in Range or Level modes and user-selected engineering units. Field calibration shall allow selection and automatic conversion of measurement units, measurement span and control relays. Systems requiring calibration by Parameter codes, BCD switches or external calibrators shall not be accepted.
- 4.3 The transmitter power input shall be 100-240VAC 50/60Hz requiring less than 3 Watts.

- 4.4 Calibration data shall be password protected and permanently stored through power interruptions for a minimum of 12 months.
- 4.5 Transmitter shall permit field programmable damping to smooth output in turbulent level conditions, and programmable rejection time to disregard false signals from turbulence, waves and spurious echoes.
- 4.6 Transmitter operating temperature shall be from -5° to 140°F (-20° to 60°C).
- 4.7 Transmitter shall have an isolated 4-20mA output into a 1000 ohm maximum load.
- 4.8 Provide 6 Form 'C' dry contact control relays rated 5 ampere SPDT. Relays shall be individually programmable for High or Low level alarms, dual set point pump control, pump alternation, sensor temperature alarm and echo loss alarm. Relays shall permit user-adjustable On time delay settings to prevent pump or motor power surges. Relays may be individually configured to hold state, energize or de-energize in the event of an echo-loss condition.
- 4.9 Provide a white, backlit LCD display indicating level and relay states in user-selected engineering units.
- 4.10 Transmitter display indicating level, units of calibration and relay states, shall be visible without opening the instrument cover.
- 4.11 The instrument shall include a relay run time reporting system and display hours of pump, alarm and failsafe sensor operation on the backlit LCD display.
- 4.12 Transmitter shall be housed in a wall-mount, watertight NEMA4X (IP 66) polycarbonate enclosure with hinged, clear cover. Mounting hardware shall be included.
- 4.13 Transmitter electronics shall be surge protected on AC power input, sensor and 4-20mA outputs.
- 4.14 The transmitter shall permit plug-in field installation and auto-detection of optional accessories including data logger.

### **5. OPTIONAL FEATURES FOR INSERTION IN SPECIFICATION AS REQUIRED:**

- 5.1 Sensor, connecting cable and junction boxes shall be rated intrinsically safe to Class I,II,III, Div. I,II, Groups C,D,E,F,G.
- 5.2 Have a thermostat controlled enclosure heater for Transmitter operation at temperatures below freezing.
- 5.3 Have an all-Teflon sensor Model PZ32TE rated intrinsically safe when connected through an approved safety barrier, and rated for operation from -40°F to 170°F (-40°C to 76°C).
- 5.4 Have a PVC and Teflon sensor Model PZ52T rated for measurement range on liquids up to 50 ft. (15.6 m).
- 5.5 Have a Teflon-faced flange mount sensor model PZ34TxF rated for 32 ft (10 m) measurement range. Specify flange size of 4", 6" or 8".
- 5.6 Have manufacturer's recommended enclosure sunscreen to permit Transmitter mounting in direct sunlight.
- 5.7 Have manufacturer's recommended Sensor sunscreen to permit temperature-compensated Sensor mounting in direct sunlight.
- 5.8 Have manufacturer's recommended Panel Mount Flange assembly for enclosure installation.
- 5.9 Have a built-in 20 million point Data Logger with USB output to flash drive or mass storage device. Include Windows software.
- 5.10 Have power input of 9-32VDC and power consumption of less than 3.5 Watts.

### **6. MANUFACTURER**

Pump Station Level Controller shall be model PSL 5.0 as manufactured by Greyline Instruments Inc. and shall be warranted against defects in materials and workmanship for one year.