

## **SECTION 13310**

### **SCADA SYSTEM FIELD INSTRUMENTS**

#### **PART 1 - GENERAL**

##### **1.01. Scope of Work**

- A. This Specification Section covers work related to the various field instruments to be supplied with the SCADA.
- B. Field instrumentation, as specified herein, shall be furnished by the same SYSTEM SUPPLIER furnishing services and equipment as outlined in 13300.

##### **1.02. Related Work**

- A. Specification Section 13300 defines work associated with the overall SCADA.
- B. Specification Section 13315 defines work associated with control panels and enclosures housing the various elements of the SCADA.
- C. Specification Section 13325 defines work associated with the PLC-based RTU that will interface the system with the field instruments defined hereunder.
- D. Physical Installation of field instruments is performed under Division 15, Mechanical.
- E. Provision of all field and power wiring except manufacturer-supplied cables and installation of all such wiring is performed under Division 16, Electrical.

##### **1.03. Submittals**

- A. Submit the following Field Instrumentation Shop Drawings in a single package:
  - 1. Catalog information, descriptive literature, wiring diagrams, and shop drawings on all components of the field instruments, including all miscellaneous electrical and mechanical devices furnished under this section.
  - 2. Individual data sheets for all components of the field instruments to supplement the above information by citing all specific features for each specific component (e.g. scale range, materials of construction, special options included, etc.). Each component data sheet shall bear the component name and instrument tag number designation shown in the Drawings and Specifications.
  - 3. Installation details for all field mounted devices to show conformance with the Contract Documents.

4. Configuration documentation for all programmable devices to indicate actual settings used to set the device scale, range, trip points, and other control parameters.
5. Proposed tag numbers for each specific instrument.

## **PART 2 - PRODUCTS**

### **2.01. General Requirements**

- A. Equipment to be installed in a hazardous area shall meet Class, Group, and Division classification as shown on the Contract Electrical Drawings, or comply with the local or National Electrical Code, whichever is the most stringent requirement.
- B. All instruments shall be provided with mounting hardware and floor stands, wall brackets, or instrument racks.
- C. Instrument cable lengths shall be determined by the SYSTEM SUPPLIER based on actual field installation requirements.
- D. All transmitters shall be provided with either integral indicators or conduit mounted indicators in process units, accurate to two percent. Indicator readouts shall be linear in process units.
- E. Electronic equipment shall utilize printed circuitry suitably coated to prevent contamination by dust, moisture and fungus. Solid-state components shall be conservatively rated for their purpose, to assure optimum long-term performance and dependability over ambient atmosphere fluctuations and 0 to 100 percent relative humidity. The field mounted equipment and system components shall be designed for installation in dusty, humid, and slightly corrosive service conditions.

### **2.02. Lightning/Surge Suppression**

- A. Surge suppressors and arrestors meeting the requirements of IEEE/ANSI Standard C-62.41 (latest revision) shall be provided on all electronic field instruments.
- B. AC Powered Instruments. Lightning and surge protection shall be provided on both the AC power supply and signal lines. The instrument, a breaker and the surge suppressor shall be mounted on a ½-inch aluminum plate equipped with 1/8 inch sun shields on top and both sides with front panel facing north wherever practical. The mounting plate shall be connected to a ground rod via a #10 gauge wire. The protectors shall meet the following criteria:
  1. NEMA 4X small case.
  2. Response time of less than five nanoseconds.
  3. AC Power protection: IEEE/ANSI Std. C-62.41 rated C3 at 330 Volts clamping level.

4. Signal line protection: 10,000 Amp 8 x 20 microsecond surge, clamped at 36 Volts clamping level.
  5. Test jacks for low level signal monitoring.
  6. Manufacturer/model: ASCO Model 265 or approved equal.
- C. Loop Powered Instruments. Lightning and surge protection shall be provided on the 4-20 mA DC signal line. The protectors shall meet the following criteria:
1. Encapsulated in Stainless Steel Pipe nipples for in-line conduit mounting.
  2. Response time of less than one nanosecond.
  3. Capable of withstanding up to 400 occurrences of 500 Amps at 10 x 1 millisecond.
  4. Series resistance of 5 ohms per line.
  5. Protection of both lines plus shield
- D. Manufacturer/model: ASCO Model 157 or approved equal

### **2.03. Field Instruments**

- A. Submerged Pressure Level Measurement System. The level measurement system shall comprise a submerged pressure transducer (Pressure Transmitter, PT), factory attached and sealed interconnecting cable, and junction/termination box with front panel mounted loop-powered indicator (Level Indicator, LI) that indicates the depth of process fluid in the vessel being monitored. Within the pressure transmitter, process pressure variations shall be sensed by a barrier diaphragm and transferred via a non-compressible fill liquid to a Wheatstones Bridge strain gage diffused onto a silicon diaphragm. The electronics within the element shall produce an analog signal proportional to the process pressure.
1. Performance:
    - a. Static accuracy of the pressure transmitter shall be less than or equal to 0.25% full scale including the combined effects of nonlinearity, hysteresis and non repeatability, based on a Best Fit Straight Line at 25 degrees C.
    - b. The pressure transmitter shall be temperature compensated between 0 and 50 degrees C.
    - c. The shielded and vented interconnecting cable shall be of sufficient length to allow the pressure transmitter to be properly located within the tank, basin, wetwell, etc. being monitored. The cable shall be able to withstand 200 pounds of tensile strength, allowing the transducer to be suspended directly by the cable.

- d. The cable shall be equipped with a dessicant filter at the surface end of the vent tube.
- e. Transducer shall include 304 stainless steel spacers, nuts, and bolts to protect and keep the diaphragm off the tank floor.
- f. Transducer shall be provided with a sealed air bag for compensating for atmospheric changes and to insure that no external moisture reaches the internal electronics.
- g. The level indicator shall be loop-powered, backlit and rated for operation at up to 65 degrees C. Provide intrinsically safe model, Precision Digital PD688 or approved equal.

2. Materials:

- a. Exterior pressure transmitter parts – 316 Stainless Steel and Viton.
- b. Fill liquid - NSF approved for use in drinking water applications.
- c. Interconnecting cable jacket – Polyurethane.
- d. Terminal junction box – 316 Stainless Steel.

3. Ratings:

- a. Terminal junction box – NEMA 4X.

4. Electrical:

- a. Transmitter excitation: Loop powered.

5. Manufacturer, Model series:

- a. Contegra STX 130.
- b. No equal.

B. Level Switch, Float. The level switch shall be a direct acting, weighted float suspended on its own cable. As the liquid level rises the float tilts and actuates a hermetically sealed switch inside the float. The cable shall be terminated within a junction box located outside the tank or basin. For multiple float applications, all cables shall terminate in a single junction box.

1. Materials:

- a. Float wetted part – Polypropylene
- b. Cable – PVC jacketed
- c. Junction box – 316 SS

2. Ratings:
  - a. Junction box – NEMA 4X
  - b. NSF approved for potable water.
3. Electrical:
  - a. Dry contact rated to 4.5 Amps at 120 VAC
  - b. Normally open or normally closed as required for the application
4. Options
  - a. Provide stainless steel hanging bar. Attach the float cables to the bar using Kellum grips.
  - b. Provide other supports/mounting accessories as required.
5. Manufacturer, model:
  - a. Anchor Scientific, Eco-float type G
  - b. Approved equal.

## **PART 3 - EXECUTION**

### **3.01. Installation**

- A. Install the SCADA field instruments in strict accordance with the respective manufacturer's instructions and recommendations, in locations as shown on the Drawings, and as indicated on the installation details of the Drawings.
- B. Fully calibrate each instrument.

### **3.02. Training**

- A. Two hours of on-site (field) training shall be conducted at the OWNER's plant site and shall provide detailed hands-on instruction to OWNER's personnel covering all supplied field instruments.
- B. Training shall include:
  1. calibration procedures.
  2. preventive maintenance methods and timing.
  3. fault-finding techniques.

**END OF SECTION**