

## **AiRanger SPL Plus**

### **Single-Point Ultrasonic Level Measurement System**

#### **Part 1. General**

##### **1.1 Scope**

- A.** This section describes the requirements for an ultrasonic single-point level scanner controller with transceiver and transducer sensors.
- B.** Under this item, the contractor shall furnish and install the single-point level scanning system as indicated on the plans and as herein specified.

##### **1.2 Submittals**

- A.** The following information shall be included in the submittal for this section:
  - 1. Data sheets and catalog literature for microprocessor transceiver electronics and ultrasonic transducers.
  - 2. Interconnection and dimensional drawings.

#### **Part 2. Products**

##### **2.1 Ultrasonic Single-Point Level Controller**

- A.** The controller shall provide one 4-20 maDC output signal proportional to material level in one vessel into a maximum of 350 ohms non-isolated or 750 ohms with optional isolator.
- B.** The controller shall provide optional RS-232C and/or RS-422 communication over a bi-polar 20 ma current loop with the use of a buffered interface converter.
- C.** The controller shall provide optional two-way infrared adapter and software to facilitate programming and troubleshooting.

- D.** The output signal shall be proportional to material level from 0 to 100% for an optimum accuracy of +/- 0.25% of range or 0.24", whichever is greater.
- E.** The resolution shall be 0.1% of range or 0.08", whichever is greater.
- F.** Programming shall be accomplished via a removable, infrared programmer without the need to open the enclosure for programming thus maintaining the Nema 4 integrity of the enclosure. There shall be no internal potentiometers or switches used in programming the controller.
- G.** The indicator display shall be a graphic 2" x 5" LCD for measurement readings and operational status. Features include two four-digit numeric displays with floating decimal point, level bar graph, alarm status, point being scanned, data communication indication, filling/emptying indication, temperature and rate of change.
- H.** The controller shall have an EEPROM memory and shall not require a battery to ensure protection of entered parameters and operational data.
- I.** Automatic temperature compensation shall be accomplished through internally mounted temperature sensors located in the ultrasonic transducers. Optional temperature sensing may also be accomplished through an external TS-3 temperature sensor.
- J.** Communications Protocol
  - a. Shall be compatible to accept two-way infrared / RS232 communications for parameter input and data acquisition. Communications software shall be Windows 3.1 (trademark of Microsoft Corp) based. Software will be capable of downloading, storing and uploading data. Communications module shall be portable.
  - b. The integrated level controller shall have the ability to interface to popular industry standard Fieldbus communications protocols such as Profibus DP, DeviceNet, Modbus RTU and AB RIO via plug-in

modules. The customer shall have the ability to install these modules in the field.

- K.** Transmitter shall process all echos from stored memory which is continually updated after echo enhancement.
- L.** The echos shall be processed comparing returns for largest area echo, tallest echo spike and first echo returned. The patented **Sonic Intelligence™** shall compare the various returns and select the echo with the greatest confidence factor.
- M.** The equipment shall be the Milltronics model SPL with application associated ultrasonic transducer.

## 2.2 Ultrasonic Transducers

- A.** The ultrasonic transducer shall be permanently mounted at the measuring point and shall be installed according to the manufacturer's recommendations.
- B.** The ultrasonic transducers shall be a Milltronics EchomaX™ model:

<u>Range</u>	<u>Model</u>
1.5-26.0' High Temp	XCT-8
1.0-33.0' Low Temp	XPS-10
1.5-40.0' High Temp	XCT-12
1.0-50.0' Low Temp	XPS-15
2.0-100.0' Low Temp	XPS-30
3.0-100.0' Low Temp	XLS-30
3.0-100.0' High Temp	XLT-30
2.0-130.0' Low Temp	XLS-40
4.0-200.0' Low Temp	XLS-60
4.0-200.0' High Temp	XLT-60

- C.** The transducers shall function over the following temperatures:

<u>Transducer</u>	<u>Temperature</u>
XPS	-40° to 203° F
XCT	-40° to 293° F
XLS	-40° to 194° F
XLT	-40° to 300° F

## **Part 3. Operator Functions**

### **3.1 Calibration**

- A.** Calibration of the single-point controller shall be accomplished by the entry of all operating data through the removable keypad via infrared link. No additional equipment shall be required.
- B.** Internal self diagnostics shall be available to assist in maintenance of the single-point controller.

## **Part 4. Execution**

### **4.1 Installation**

- A.** Follow manufacturers recommendations for the minimum separation between the sensor and the maximum expected material level.
- B.** Mount the sensor to ensure a clear path to the material surface.
- C.** Optional transducer mounting configurations will be available for special applications.
- D.** Wiring between the transceiver and the ultrasonic transducer shall be routed in grounded metal conduit with no power lines located in the same conduit.
- E.** Flange mounted ultrasonic transducers shall be mounted at least one foot from the tank sidewall for every ten feet of tank height.
- F.** Standpipes for flange mounted transducers shall be a maximum of 3” in height for every 1” of internal diameter to prevent sonic pulses from intersecting the standpipe sidewalls.
- G.** Splices of additional cable should be soldered or connected via a terminal block.

**Part 5. Warranty**

**5.1 Terms**

- A.** The manufacturer of the above specified equipment shall guarantee for twenty four (24) months from equipment startup or thirty (30) months from date of shipment, whichever occurs first, that the equipment shall be free from defects in design, workmanship or materials.
- B.** In the event a component fails to perform as specified or is proven defective in service during the warranty period, the manufacturer shall promptly repair or replace the defective part at no cost to the owner.

**Part 6. Options**

**6.1 Related Equipment**

- A.** TS-3 Temperature Sensor
- B.** Easy Aimer II Aiming Kit
- C.** PVC, Aluminum, and Stainless Steel flanges for transducers
- D.** Teflon, Vinyl, and Polypropylene facings for transducers
- E.** RG62U cable for transducers
- F.** Dolphin two-way communications package
- G.** LIS-1 Isolator

**Part 7. Spare Parts**

**7.1 Recommended Spare Parts**

- A.** Box of 5 fuses