THE PROBE, 5 METER, 2WIRE, LOOP POWERED

SINGLE POINT LEVEL MEASUREMENT SYSTEM (ULTRASONIC)

Part 1. General

1.1 Scope

A. This section describes the requirements for an ultrasonic, single-point level controller with integral transducer and temperature compensator.

B. Under this item, the contractor shall furnish and install the single-point level 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 the integral transducer and transceiver.

2. Interconnection and dimensional drawings.

Part 2. ULTRASONIC SINGLE-POINT LEVEL SYSTEM

A. Transmitter

The single-point level transmitter shall be a microprocessor based echo-time measuring type providing an electronic output signal proportional to the level of the material or the distance to the material being measured. It shall consist of an integral transmitter, transducer and temperature sensor package.

B. Operating principle

Acoustic impulses emitted from an ultrasonic sensor are reflected back from the material surface and are received by the same sensor. The transit time of the pulse from transmission generation to echo reception is recorded. The elapsed time is proportional to the distance between the

sensor and material surface based on the speed of sound for that application.

C. Primary Sensor

The acoustic sensor/transducer shall be a Milltronics Ultrason™ transducer with a polarized zirconium crystal with acoustic impedance matching face and transformer.

1. Range is 1 to 16 feet

2. System housing

   Main case material is CPVC and the transducer portion is Tefzel™. Connection is 2" NPT.

3. Operating temperature

   - 40^{o} to 140^{o} F

4. Power supply

   12 - 28 VDC

5. Output

   4 - 20 mA DC non-isolated into 750 ohms maximum

6. Programming

   Via dual buttons with data entry prompts displayed

7. EEPROM memory retains parameters during power loss.

8. Weight - 3.3 lbs

9. Cable entry through dual 7/8" ports

10. Enclosure rating IP65, Nema 4X, CSA Type 4
    Approvals: FM and CSA

11. Transmitter shall process all echos from stored memory which is continually updated after echo enhancement.

12. 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.

D. Sensor and transmitter performance

1. Range: 1 - 16 feet

2. Accuracy: 0.25% of full scale

3. Resolution: 0.125”

E. Indication

1. Three (3) digit LCD

F. Equipment

1. The single point level controller shall be a Milltronics brand The Probe, 5 meter, 2-wire, Loop Powered.

Part 3. Operator Functions

3.1 Calibration

A. Calibration of this single-point level controller shall be accomplished by the entry of all operating parameters through two buttons with prompts.

3.2 Transmitter Function Details

The following functions shall be provided:

A. The controller shall provide a 4-20 ma or 20-4 man signal proportional to distance into a maximum of 750 ohms.

B. Operational range shall be adjustable via push buttons.

C. The controller shall have EEPROM memory and shall not require a battery to ensure protection of stored data.

D. There shall be no internal potentiometers or switches used in programming or adjusting the controller.

E. The controller shall be capable of automatically compensating for temperature variations.

F. The controller shall be capable of compensating for chemical atmospheres which very the speed of sound.

Part 4. Execution

4.1 Installation

A. Follow manufacturers recommendation for the maximum separation between the transducer face and the closest point of target approach.

B. Mount the device to ensure a clear path to the target surface.

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.

THE PROBE, 5 METER, INTRINSICALLY SAFE, LOOP POWERED

SINGLE POINT LEVEL MEASUREMENT SYSTEM (ULTRASONIC)

Part 1. General

1.1 Scope

A. This section describes the requirements for an ultrasonic, single-point level controller with integral transducer and temperature compensator.

B. Under this item, the contractor shall furnish and install the single-point level 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 the integral transducer and transceiver.

2. Interconnection and dimensional drawings.

Part 2. ULTRASONIC SINGLE-POINT LEVEL SYSTEM

A. Transmitter

The single-point level transmitter shall be a microprocessor based echo-time measuring type providing an electronic output signal proportional to the level of the material or the distance to the material being measured. It shall consist of an integral transmitter, transducer and temperature sensor package.

B. Operating principle

Acoustic impulses emitted from an ultrasonic sensor are reflected back from the material surface and are received by the same sensor. The transit time of the pulse from transmission generation to echo reception is recorded. The elapsed time is proportional to the distance between the

sensor and material surface based on the speed of sound for that application.

C. Primary Sensor

The acoustic sensor/transducer shall be a Milltronics Ultrason™ transducer with a polarized zirconium crystal with acoustic impedance matching face and transformer.

1. Range is 1 to 16 feet

2. System housing

   Main case material is CPVC and the transducer portion is Tefzel™. Connection is 2" NPT

3. Operating temperature

   - 40^{o} to 140^{o} F

4. Power supply

   12 - 28 VDC

5. Output

   4 - 20 mA DC non-isolated into 750 ohms maximum with 24 Vdc supply

6. Programming

   Via dual buttons with data entry prompts displayed

7. EEPROM memory retains parameters during power loss.

8. Weight - 3.3 lbs

9. Cable entry through dual 7/8" ports

10. Enclosure rating IP65, NEMA 4X, CSA Type 4

    Approvals: FM and CSA rated Intrinsically Safe for Class I and II, Div. 1, Gr. A,B,C,D,E,F,G hazardous location.

11. Transmitter shall process all echos from stored memory which is continually updated after echo enhancement.

12. 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.

D. Sensor and transmitter performance

1. Range: 1 - 16 feet

2. Accuracy: 0.25% of full scale

3. Resolution: 0.125”

E. Indication

1. Three (3) digit LCD

F. Equipment

1. The single point level controller shall be a Milltronics brand The Probe, 5 meter, Intrinsically Safe.

Part 3. Operator Functions

3.1 Calibration

A. Calibration of this single-point level controller shall be accomplished by the entry of all operating parameters through two buttons with prompts.

3.2 Transmitter Function Details

The following functions shall be provided:

A. The controller shall provide a 4-20 ma or 20-4 man signal proportional to distance into a maximum of 750 ohms with 24 Vdc power supply.

B. Operational range shall be adjustable via push buttons.

C. The controller shall have an EEPROM memory and shall not require a battery to ensure protection of stored data.

D. There shall be no internal potentiometers or switches used in programming or adjusting the controller.

E. The controller shall be capable of automatically compensating for variances in temperature.

F. The controller shall be capable of compensating for chemical atmospheres which very the speed of sound.

Part 4. Execution

4.1 Installation

A. Follow manufacturers recommendation for the maximum separation between the transducer face and the closest point of target approach.

B. Mount the device to ensure a clear path to the target surface.

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.

THE PROBE, 5 METER, HART

SINGLE POINT LEVEL MEASUREMENT SYSTEM (ULTRASONIC)

Part 1. General

1.1 Scope

A. This section describes the requirements for an ultrasonic, single-point level controller with integral transducer and temperature compensator.

B. Under this item, the contractor shall furnish and install the single-point level 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 the integral transducer and transceiver.

2. Interconnection and dimensional drawings.

Part 2. ULTRASONIC SINGLE-POINT LEVEL SYSTEM

A. Transmitter

The single-point level transmitter shall be a microprocessor based echo-time measuring type providing an electronic output signal proportional to the level of the material or the distance to the material being measured. It shall consist of an integral transmitter, transducer and temperature sensor package.

B. Operating principle

Acoustic impulses emitted from an ultrasonic sensor are reflected back from the material surface and are received by the same sensor. The transit time of the pulse from transmission generation to echo reception is recorded. The elapsed time is proportional to the distance between the

sensor and material surface based on the speed of sound for that application.

C. Primary Sensor

The acoustic sensor/transducer shall be a Milltronics Ultrason™ transducer with a polarized zirconium crystal with acoustic impedance matching face and transformer.

1. Range is 1 to 16 feet

2. System housing

   Main case material is CPVC and the transducer portion is Tefzel™. Connection is 2" NPT

3. Operating temperature

   - 40^{o} to 140^{o} F

4. Power supply

   18 - 30 VDC

5. Output

   4 - 20 mA DC non-isolated into 750 ohms maximum

6. Programming

   a. Via dual buttons with data entry prompts displayed
   b. Via Hart protocol

7. Alarming

   Single 5 Amp 220 VAC dry contact relay for setpoint or fault indication

8. EEPROM memory retains parameters during power loss.

9. Weight - 3.7 lbs

10. Cable entry through dual 7/8" ports

11. Enclosure rating IP65, Nema 4X, CSA Type 4
Approvals: FM and CSA

12. Transmitter shall process all echos from stored memory, which is continually updated after echo enhancement.

13. 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.

D. Sensor and transmitter performance

1. Range: 1 - 16 feet

2. Accuracy: 0.25% of full scale

3. Resolution: 0.125”

E. Indication

1. Three (3) digit LCD

F. Equipment

1. The single point level controller shall be a Milltronics brand The Probe, 5 meter, 2-wire.

Part 3. Operator Functions

3.1 Calibration

A. Calibration of this single-point level controller shall be accomplished by the entry of all operating parameters through two buttons with prompts or remotely over the 4–20mA leads using a Hart communications terminal.

3.2 Transmitter Function Details

The following functions shall be provided:

A. The controller shall provide a 4-20 ma or 20-4 man signal proportional to distance into a maximum of 750 ohms.

B. Operational range shall be adjustable via push buttons.

C. The controller shall have an EEPROM memory and shall not require a battery to ensure protection of stored data.

D. There shall be no internal potentiometers or switches used in programming or adjusting the controller.

E. The controller shall be capable of automatically compensating for variances in temperature.

F. The controller shall be capable of compensating for chemical atmospheres which very the speed of sound.

G. Process and diagnostic information shall be available at remote locations via the 4-20mA leads to peripherals with Hart communications capability.

Part 4. Execution

4.1 Installation

A. Follow manufacturers recommendation for the maximum separation between the transducer face and the closest point of target approach.

B. Mount the device to ensure a clear path to the target surface.

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.

THE PROBE, 5 METER, 3 - WIRE

SINGLE POINT LEVEL MEASUREMENT SYSTEM (ULTRASONIC)

Part 1. General

1.1 Scope

A. This section describes the requirements for an ultrasonic, single-point level controller with integral transducer and temperature compensator.

B. Under this item, the contractor shall furnish and install the single-point level 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 the integral transducer and transceiver.

2. Interconnection and dimensional drawings.

Part 2. ULTRASONIC SINGLE-POINT LEVEL SYSTEM

A. Transmitter

The single-point level transmitter shall be a microprocessor based echo-time measuring type providing an electronic output signal proportional to the level of the material or the distance to the material being measured. It shall consist of an integral transmitter, transducer and temperature sensor package.

B. Operating principle

Acoustic impulses emitted from an ultrasonic sensor are reflected back from the material surface and are received by the same sensor. The transit time of the pulse from transmission generation to echo reception is recorded. The elapsed time is proportional to the distance between the

sensor and material surface based on the speed of sound for that application.

C. Primary Sensor

The acoustic sensor/transducer shall be a Milltronics Ultrason™ transducer with a polarized zirconium crystal with acoustic impedance matching face and transformer.

1. Range is 1 to 16 feet

2. System housing

   Main case material is CPVC and the transducer portion is Tefzel™. Connection is 2" NPT

3. Operating temperature

   - 40^{o} to 140^{o} F

4. Power supply

   18 - 30 VDC

5. Output

   Current - 4 to 20 mA DC non-isolated into 750 ohms maximum

6. Alarming

   Single 5 Amp 220 VAC dry contact relay for setpoint or fault indication

7. Programming

   Via dual buttons with data entry prompts displayed

8. EEPROM memory retains parameters during power loss.

9. Weight - 3.3 lbs

10. Cable entry through dual 7/8" ports

11. Enclosure rating IP65, Nema 4X, CSA Type 4
Approvals: FM and CSA

12. Transmitter shall process all echos from stored memory which is continually updated after echo enhancement.

13. 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.

D. Sensor and transmitter performance

1. Range: 1 - 16 feet

2. Accuracy: 0.25% of full scale

3. Resolution: 0.125”

E. Indication

1. Three (3) digit LCD

F. Equipment

1. The single point level controller shall be a Milltronics brand The Probe, 5 meter, 3-wire.

Part 3. Operator Functions

3.1 Calibration

A. Calibration of this single-point level controller shall be accomplished by the entry of all operating parameters through two buttons with prompts.

3.2 Transmitter Function Details

The following functions shall be provided:

A. The controller shall provide a 4-20 ma or 20-4 man signal proportional to distance into a maximum of 750 ohms.

B. Operational range shall be adjustable via push buttons.

C. The controller shall have a EEPROM memory and shall not require a battery to ensure protection of stored data.

D. There shall be no internal potentiometers or switches used in programming or adjusting the controller.

E. The controller shall be capable of automatically compensating for variances in temperature.

F. The controller shall be capable of compensating for chemical atmospheres which very the speed of sound.

G. The alarm relay shall be programmable for either a setpoint or loss of echo indication.

Part 4. Execution

4.1 Installation

A. Follow manufacturers recommendation for the maximum separation between the transducer face and the closest point of target approach.

B. Mount the device to ensure a clear path to the target surface.

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.