Installation and Operating Instructions

Series 505-2400
Universal Sonic™ Level Transmitter
using 405-9000-003 Electronics
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Series 505-2400
Universal Sonic™ Level Transmitter
using 405-9000-003 Electronics
SECTION 1
INTRODUCTION

1.1 Product Description

The Drexelbrook Series 505-2400 UniversalSonic Transmitter is a two-wire integral assembly that accurately measures continuous level up to a range of 30 feet, using ultrasonic technology. The level measurement output is a 4-20 mA current signal.

1.2 Models Available

5 0 5 - 2 4 0 0 - 0 0 X - Continuous UniversalSonic Instrument

Transducer material:
2 - CPVC
6 - PFA and 316 SS
7 - PFA Sealtyte™

The diagram on the following page identifies the components of the 405-9000-003 UniversalSonic Instrument.
—Legend

① Rotary Switch S1
  Time Delay/Rep Rate/Units Selection
  see section 3.1

② Calibration Switches (Zero/Span)
  see sections 3.5 and 3.6

③ Slide Switch S2
  Near Zone/Lost Echo Fault/Diagnostic
  see section 3.2

④ Acquire Button for Return Signal

⑤ Level Sensor and Temperature Sensor
  Connections
  see section 2.4

⑥ Rotary Switch S3
  High Discrimination Mode/Gain
  Adjustment
  see section 3.3

⑦ 4-20 mA Loop Connections
  see section 2.4

⑧ Slide Switch S4
  Level/V-notch Weir Selection
  see section 3.1.4.
1.3 Definition of Terms

Zero: The point at which the output is to equal 4 mA (0% level) measured from the transducer face down (↓).

Span: The point at which 20 mA (100%) occurs measured from the zero point.

Range: Maximum distance from the transducer face.

Near Zone: The distance just below the transducer face where the transmitter cannot make a level measurement (12 inches).

Lost Echo: A condition that occurs when the ultrasonic energy is not being returned to the transducer. Loss of echo may occur when large amounts of foam are present.

1.4 Types of Output

Level Mode: Output increases as level increases. Level mode output is the most common type of output measurement. (Forward-acting)

Distance Mode: Output decreases as level increases. (Reverse-acting)


Fault Indication: Output goes to 3.7 or 22 mA. (field-selectable)
SECTION 2
INSTALLATION

2.1 Unpacking

Carefully remove the contents of the shipping carton and check each item against the packing list before destroying any packing material. If there is any shortage or damage, report it to the factory immediately.

2.2 Mounting the Transmitter

The 505-2400 Series transmitter is available with the electronic unit and transducer as a single integral assembly. Extended sensing element lengths and special mountings can be provided to fit specific mounting applications. Refer to Figure 2-2 for standard mounting dimensions.

• The 505-2400 Series transmitter is designed for field mounting, but it should be mounted in a location as free as possible from vibration, corrosive atmospheres, and any possibility of mechanical damage.

• For convenience when adjusting, place the electronic unit in a reasonably accessible location. Ambient temperature should be between -40°F and 160°F (-40°C to 70°C).

2.3 Mounting the Transducer

• The transducer axis must be mounted perpendicular to the liquid surface.

• When mounting the transducer, consideration must be given to the 12-inch Near Zone. If the level rises to within 12 inches of the sensing element face, a 3.7 or 22 mA signal will be generated. See 3.2 Slide Switch S2, Near Zone.

• Refer to Appendix A for further examples of installation guidelines.
Figure 2-1
Mounting Recommendations
(Also refer to Appendix A)
All dimensions in inches (mm).

Figure 2-2
505-2X00 Series Mounting Dimensions
Integral Electronic Housing
2.4 Wiring the Transmitter

CAUTION
If the Series 505-2400 is located in a hazardous environment, do not open the enclosure cover or make/break any electrical connections without first disconnecting electrical power at the source. Ensure that the wiring, electrical fittings and conduit connections conform to the electrical codes for the specific location and hazard level.

Refer to Figures 2-3 for the wiring diagrams of the 505-2400 transmitter. The level measuring cable and temperature compensation wires are prewired.

Figure 2-3
Loop Wiring
SECTION 3
ANALOG SWITCH MODE

Section 3.1 describes the switches and selection of settings.

Section 3.2 describes calibrating the 405-9000-003 instrument in inches (for level measurement) using the calibration switches.

Section 3.3 describes calibrating the 405-9000-003 instrument in tenths of inches (for v-notch measurement) using the calibration switches.

3.1 Switch Settings

3.1.1 Rotary Switch S1

—Rotary Switch S1 controls:
  • repetition rate
  • time delay
  • selection of english (inches) or metric (centimeters) units

The unit is shipped with S1 in the default setting: switch position zero which sets no time delay, 250 msec repetition rate, and english units (inches).

—Time Delay/Repetition Rate

An application might require time delay or a longer repetition rate depending on the type of vessel and material being measured. For instance:

• Increasing time delay to either 15 or 45 seconds will smooth out a jumpy output signal caused by wave action or turbulence in the tank.

• Increasing the repetition rate to 400 ms is required any time that the tank roof is curved (domed tanks). A longer repetition rate ensures that transmitter is not affected by reflected sound waves from the curved roof.

• A lengthened repetition rate may help reduce loss of echo due to foam.

If your application is similar to one described above, change the time delay or repetition rate using a small screwdriver and switch S1. Table 3-1 details the switch settings. Each setting controls both time delay and repetition rate.
The 505-2400 UniversalSonic transmitter can be used in English or metric modes of operation.

- When S1 is in position 0-5, the zero and span calibration switches are set in inches.

- When S1 is in position 6-9,A,B, the zero and span switches are set in centimeters.

<table>
<thead>
<tr>
<th>Switch S1 Position</th>
<th>Time Delay</th>
<th>Pulse Rate</th>
<th>Units Selection</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0 seconds</td>
<td>250 msec</td>
<td>English</td>
</tr>
<tr>
<td>1</td>
<td>15 seconds</td>
<td>250 msec</td>
<td>English</td>
</tr>
<tr>
<td>2</td>
<td>45 seconds</td>
<td>250 msec</td>
<td>English</td>
</tr>
<tr>
<td>3</td>
<td>0 seconds</td>
<td>400 msec</td>
<td>English</td>
</tr>
<tr>
<td>4</td>
<td>15 seconds</td>
<td>400 msec</td>
<td>English</td>
</tr>
<tr>
<td>5</td>
<td>45 seconds</td>
<td>400 msec</td>
<td>English</td>
</tr>
<tr>
<td>6</td>
<td>0 seconds</td>
<td>250 msec</td>
<td>Metric</td>
</tr>
<tr>
<td>7</td>
<td>15 seconds</td>
<td>250 msec</td>
<td>Metric</td>
</tr>
<tr>
<td>8</td>
<td>45 seconds</td>
<td>250 msec</td>
<td>Metric</td>
</tr>
<tr>
<td>9</td>
<td>0 seconds</td>
<td>400 msec</td>
<td>Metric</td>
</tr>
<tr>
<td>A</td>
<td>15 seconds</td>
<td>400 msec</td>
<td>Metric</td>
</tr>
<tr>
<td>B</td>
<td>45 seconds</td>
<td>400 msec</td>
<td>Metric</td>
</tr>
<tr>
<td>C-F</td>
<td>not used</td>
<td>not used</td>
<td>not used</td>
</tr>
</tbody>
</table>
3.1.2 Slide Switch S2

---Slide Switch S2 controls:
- level/distance mode (S2-1)
- near zone fault output (S2-2)
- lost echo fault output (S2-3)
- diagnostics (S2-4)

---Level or Distance Mode
The selection of either level or distance mode is accomplished by changing the position of the slide switch S2-1.

- When S2-1 is switched to the left, the unit will measure in the level mode.

- When S2-1 is in switched to the right, the unit will measure in the distance mode.

Level and distance modes are explained in sections 1.4, 3.2 and 3.3.
3.1.2 Slide Switch S2 (cont.)

—Near Zone Fault Output
Slide switch S2-2 determines the output current of a near zone fault condition.

• When S2-2 is switched to the left, the unit will output **22 mA** during a near zone condition.

• When S2-2 is in switched to the right, the unit will output **3.7 mA** during a near zone condition.

See Table 3-2 for application information when setting near zone and lost echo switches.

### Table 3-2
Application Notes for Near Zone and Lost Echo Settings

<table>
<thead>
<tr>
<th>Application requires Overfill Prevention (no spills)</th>
<th>Application requires Low Level Prevention (pump will not run dry)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Material cannot go over high point</td>
<td>Material cannot go below low point</td>
</tr>
<tr>
<td>Near Zone typically set 22 mA</td>
<td>Near Zone typically set 22 mA</td>
</tr>
<tr>
<td>Lost Echo typically set 22 mA</td>
<td>Lost Echo typically set 3.7 mA</td>
</tr>
</tbody>
</table>
3.1.2 Slide Switch S2 (cont.) —Lost Echo Fault Output
Slide switch S2-3 determines the output current of a lost echo fault condition.

- When S2-3 is switched to the left, the transmitter will produce **22 mA output during a lost echo condition**.

- When S2-3 is switched to the right, the transmitter will produce **3.7 mA output during a lost echo condition**.

See Table 3-2 for application information when setting near zone and lost echo switches.

—Diagnostics
Slide switch S2-4 is used for diagnostics, discussed in Section 4 Troubleshooting.

3.1.3 Rotary Switch S3 —Rotary Switch S3 controls:
- high discrimination mode
- gain adjustment settings

—High Discrimination
Position zero on rotary switch S3 activates the high discrimination mode.

- High discrimination mode automatically reduces the effect of nuisance echos created when mounting the transducer in a nozzle or mounting the transducer inside a pipe up to 14 inches above the tank opening.

- The high discrimination mode lessens any effect from agitator blades and/or small obstructions and reduces interference caused by electrical noise.

- The high discrimination mode should **not** be used in applications where foam is present.
3.1.3 Rotary Switch S3
(cont.)

---Gain Adjustment
The step gain positions can be used to decrease the ultrasonic return signal and avoid noise interference.

For example, the power produced to shoot the 30-foot signal could possibly cause nuisance reflections from irregular sidewalls, tank obstructions, or agitator blades. By reducing the gain of the transmitter using the step gain switch positions, the effect of nuisance reflections can be eliminated.

See Table 3-3 for gain settings using rotary switch S3.

Table 3-3
High Discrimination and Gain Adjustment

<table>
<thead>
<tr>
<th>Switch S3 Position</th>
<th>Mode/Gain Adjustment</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>high discrimination</td>
</tr>
<tr>
<td></td>
<td>(automatic gain control)</td>
</tr>
<tr>
<td>1</td>
<td>100% gain</td>
</tr>
<tr>
<td>2</td>
<td>84% gain</td>
</tr>
<tr>
<td>3</td>
<td>67% gain</td>
</tr>
<tr>
<td>4</td>
<td>50% gain</td>
</tr>
<tr>
<td>5</td>
<td>32% gain</td>
</tr>
<tr>
<td>6</td>
<td>17% gain</td>
</tr>
<tr>
<td>7</td>
<td>8% gain</td>
</tr>
<tr>
<td>8-9</td>
<td>not used</td>
</tr>
<tr>
<td>A-F</td>
<td>not used</td>
</tr>
</tbody>
</table>

3.1.4 Slide Switch S4

For level/distance measurement, switch S4-2 should be set to the left.
For v-notch weir measurement, switch S4-2 should be set to the right.
Switches S4-1, S4-3, S4-4 should be set to the left at all times and for both types of measurements.
Two Wire Universal Sonic™ Switch Function Quick Reference

Rotary Switch S1

<table>
<thead>
<tr>
<th>Position</th>
<th>Time Delay</th>
<th>Repeat Rate</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>#0 =</td>
<td>None</td>
<td>250ms</td>
<td>Inches</td>
</tr>
<tr>
<td>#1 =</td>
<td>15 Seconds</td>
<td>250ms</td>
<td>Inches</td>
</tr>
<tr>
<td>#2 =</td>
<td>45 Seconds</td>
<td>250ms</td>
<td>Inches</td>
</tr>
<tr>
<td>#3 =</td>
<td>None</td>
<td>400ms</td>
<td>Inches</td>
</tr>
<tr>
<td>#4 =</td>
<td>15 Seconds</td>
<td>400ms</td>
<td>Inches</td>
</tr>
<tr>
<td>#5 =</td>
<td>45 Seconds</td>
<td>400ms</td>
<td>Inches</td>
</tr>
<tr>
<td>#6 =</td>
<td>None</td>
<td>250ms</td>
<td>Centimeters</td>
</tr>
<tr>
<td>#7 =</td>
<td>15 Seconds</td>
<td>250ms</td>
<td>Centimeters</td>
</tr>
<tr>
<td>#8 =</td>
<td>45 Seconds</td>
<td>250ms</td>
<td>Centimeters</td>
</tr>
<tr>
<td>#9 =</td>
<td>None</td>
<td>400ms</td>
<td>Centimeters</td>
</tr>
<tr>
<td>#A =</td>
<td>15 Seconds</td>
<td>400ms</td>
<td>Centimeters</td>
</tr>
<tr>
<td>#B =</td>
<td>45 Seconds</td>
<td>400ms</td>
<td>Centimeters</td>
</tr>
<tr>
<td>C - F =</td>
<td>Future</td>
<td>Future</td>
<td>Future</td>
</tr>
</tbody>
</table>

When rotary switch S1 is set on position 6, through 9, A, B, the Zero and Span settings are in centimeters.

Rotary Switch S3
- #0 = High Discrimination
- #1 = 100% Gain
- #2 = 84% Gain
- #3 = 67% Gain
- #4 = 50% Gain
- #5 = 32% Gain
- #6 = 17% Gain
- #7 = 8% Gain
- #8,9 = Future
- #A-F = Future

Slide Switch S2
- 1 Left = Level
- 1 Right = Distance
- 2 Left = Near Zone High (22mA)
- 2 Right = Near Zone Low (3.5mA)
- 3 Left = Lost Echo High (22mA)
- 3 Right = Lost Echo Low (3.5mA)
- 4mA forced (1L, 2R, 3R, 4R)

Slide Switch S4
- Slide #1 - Left
- Slide #2 - Left for level/distance measurement.
- Right for v-notch weir measurement.
- Slide #3 - Left
- Slide #4 - Left
3.2 Calibrating the 405-9000-003 Instrument for Level or Distance Measurement

Use this procedure to set the Zero and Span switches for calibration of a 405-9000-003 electronic unit when used for level or distance measurement. See 3.3 Calibrating the 405-9000-003 Instrument for calibrating the electronic unit for v-notch weir measurement.

—Level Mode (Forward-acting)

Verify that slide switch S2-1 is set to the left. Refer to section 3.1.2.

Set the Zero calibration switches to equal the distance in inches (or centimeters) from the transducer face down to the **minimum level** (usually tank bottom—0% or 4 mA). Refer to the calibration example in Figure 3-1. For this example, the switches are set to 1-6-8 starting with the top switch.

Set the Span calibration switches to equal the distance in inches (or centimeters) from the **minimum level** to the **maximum level**—100% point or 20 mA (e.g. 1-5-6 starting with top switch).

—Distance Mode (Reverse-acting)

Verify slide switch S2-1 is set to the right. Refer to section 3.1.2.

Set the Zero calibration switches to equal the distance in inches (or centimeters) from the sensing element face to the **maximum level** (0% or 4 mA). Refer to the calibration example in Figure 3-1. For this example, the switches are set to 0-1-2 starting with the top switch.

Set the Span calibration switches to equal the distance in inches (or centimeters) from the **maximum level** to the **minimum level**—100% or 20 mA (e.g. 1-5-6 starting with the top switch).

**NOTE**

For linear outputs, it is possible to calibrate into the near zone. However, unit will fault when level gets within 12 inches of transducer face.
**Figure 3-1**
Calibration Example
3.6 Calibrating the 405-9000-003 Instrument for V-notch Weir Measurement

The 405-9000-003 instrument supports the flow equation for v-notch weir measurement. Set the instrument as follows:

- Locate switch S4 on the front of the instrument.
- Move slide switch S4-2 to the right.

—Setting Zero

Setting the Zero (minimum flow) and Span (maximum flow) calibration points is done using the rotary switches.

The Zero point is measured from the face of the transducer to the minimum flow point on the weir. Set the rotary switches to the nearest $\frac{1}{10}$th inch. See Figure 3-2.

—Setting Span

The Span point is measured from the Zero point up to the maximum flow point on the weir. Set the rotary switches to the nearest $\frac{1}{10}$th inch. See Figure 3-2.

NOTE

Span must be at least 12 inches less than the Zero point to allow for the 12-inch Near Zone of the transducer.

Figure 3-2
V-notch Weir Measurement
The 505-9000-003 UniversalSonic instrument is designed to give years of unattended service. No periodic or scheduled maintenance is required.

If a problem should occur with the operation of the transmitter, use the following procedure for troubleshooting.

a. Ensure wiring connections are correct.

b. If the liquid surface has severe turbulence in the area where the ultrasonic beam hits, consider increasing damping time.

c. Splashing of material or condensation on the transducer face could cause unreliable measurements.

d. Any continuous ultrasonic transmitter signal/echo can be adversely affected by significant foam on the liquid level surface. If this condition exists, please consult the factory for further application review and advice.

e. Ensure that the transducer face is not recessed into a mounting nozzle, unless high discrimination setting is used. Spurious reflections from the nozzle can cause faulty operation.

f. To indicate a fault condition, the 4-20 signal locks to 22 mA. If output is locked at 22 mA, check that:
   1) the level of the material has not violated the near zone (12 inches [30 cm]) from the transducer face.
   2) the low calibration setting is not more than 360 inches (610 cm) or 99.9 inches (405-2100 unit).

g. Test for 4 mA and 20 mA.
   S2-1 left S2-1 left
   S2-2 right S2-2 left
   S2-3 right S2-3 right
   S2-4 right S2-4 right

h. If attempts to locate the difficulty fail, notify the local factory representative, or call the factory toll-free at 1-800-527-6297. To aid in troubleshooting, please complete the information on Table 5-1 before calling the factory service department.
4.2 Field Calibration

Slide switch S2-4 runs a field calibration program that allows the calibration to be optimized.

**CAUTION**
The field calibration procedure permanently overwrites the factory calibration.

1. Write down the current zero calibration switch settings.

2. Measure the distance from the transducer face to the tank level.

3. Using a screwdriver, enter this number (step 2) on the three zero calibration switches.

4. Place S2-4 to the right, S2-1 to the right, and rotary switch S1 to zero.

5. Connect instrument to a milliamp meter and observe the 4-20 mA loop current. A 10 mA current indicates field calibration.

6. Press and release the red **ACQUIRE** button.

7. Observe current.
   - If meter displays 16 mA, unit is operating normally.
   - If meter displays 18 mA, Lost Echo fault exists.
   - If meter displays 14 mA, Near Zone fault exists.
   - If meter displays 12 mA, calibration is incorrect (greater than 25% error).

8. Place the zero calibration switches, S2-1 and S2-4 to the operation mode.

4.3 Checking the Transducer

An ohmmeter test is used to check the transducer crystal. It can also be used to verify that the wires from the transducer to the sensor (on a remote system) are not reversed, shorted, or open.

Using a digital ohmmeter, a reading of 9-13K ohms should be present between CW to SHIELD.

4.4 Checking the Temperature Sensor

—**Resistance Check**

a. Disconnect the temperature transducer wires (brown and orange) leading to the transducer.
b. Using a digital ohmmeter, a good transducer measures 12 to 35 megohms with the positive test lead on the orange lead and the negative test lead on the brown lead (standard sensor). The negative test lead attaches to the brown and white striped wire on the high temperature sensor (703-6-1).

c. Reverse the meter leads and an open circuit (infinite ohms) should be observed.

—Operation Check

A more precise way to check the temperature sensor is to measure the current flow while the unit is on. Refer to Figure 4-1.

---

a. Shut power off.

b. Loosen the screw holding the orange wire at the transmitter.

c. Remove the orange wire.

d. Place a multimeter (capable of measuring microamps) in series with the orange wire and empty screw.

e. Re-apply power.

f. The microammeter should read:
   273 µamps @ 32°F
   293 µamps @ 68°F
   311 µamps @ 100°F

Readings outside these listed ranges indicate a failed temperature sensor. Call Factory Service at 1-800-527-6297.
4.5 Checking the Loop

Specific transmitter loop connections vary with each installation, but in generally are connected in a similar manner to the typical transmitter loop in Figure 4-1. When troubleshooting the loop connection, verify the following items.

- Loop devices are wired in series.
- There is at least 19 Vdc available for the transmitter when a loop current of 4 mA is flowing.

Refer to Figure 4-2.
If you have questions about your Drexelbrook equipment:
• contact your local Drexelbrook representative,
• call the Service department toll-free at 1-800-527-6297 (in US and Canada) or 1-215-674-1234 (outside North America),
• fax the following information to the Service department at 1-215-443-5117.

To expedite assistance, please provide the following information:

Instrument Model Number _____________________
Sensing Element Model Number and Length ______
Coax Cable Length (remote systems) ____________
Original Purchase Order Number _______________
Material being measured _______________________
Temperature _________________________________
Pressure _____________________________________
Agitation_____________________________________
Brief description of the problem ________________
____________________________________________
Checkout procedures that have failed ____________
____________________________________________

In order to provide the best service, any equipment being returned for repair or credit must be pre-approved and have a return number issued by the factory.

In many applications, sensing elements are exposed to hazardous materials.
• OSHA mandates that our employees be informed and protected from hazardous chemicals.
• Material Safety Data Sheets (MSDS) listing the hazardous materials that the transducer has been exposed to must accompany any repair.
• It is your responsibility to fully disclose all chemicals and decontaminate the sensing element.
To obtain a return authorization number (RA#), contact the Service department at 1-800-527-6297 (US and Canada) or 1-215-674-1234 (outside North America). Please provide the following information:

Model Number of Return Equipment ____________

Serial Number _________________________________

Original Purchase Order Number _______________

Process Materials that equipment has been exposed to_____________________________________________

MSDS sheets for any hazardous materials

Billing Address ________________________________

Shipping Address ______________________________

Purchase Order Number for Repairs _____________

*Please include a purchase order even if the repair is under warranty. If repair is covered under warranty, you will not be charged.*

Ship equipment freight prepaid to:
AMETEK Drexelbrook
205 Keith Valley Road
Horsham, PA 19044
COD shipments will not be accepted.

Trained field service personnel are available on a time-plus-expense basis to assist in start-ups, diagnosing difficult application problems, or in-plant training of personnel. Preventative Maintenance and Calibration Certification service contracts are also available to maintain plant efficiency. Contact the Service department for further information.
505-9000-003 Series UniversalSonic™ Transmitter

SECTION 5
SPECIFICATIONS

5.1 Transmitter Specifications

—**Power Requirement**

Load resistance =

\[
\frac{(V_{\text{supply}} - 12.0)}{0.02}
\]

Minimum supply voltage is 19 volts at 4mA.

For example,

\[V_{\text{supply}} = 24V\] and maximum load resistance=600 ohms.

—**Operating Temperature**

-40°F to 185°F (-40°C to 85°C) (Electronics)

—**Ambient Temperature Effect**

±0.1% per 1°F

—**Repeatability**

0.1 inch (3mm)

—**Resolution**

0.125 inch (3mm)

—**Response Time**

2 seconds (approximate)

—**Calibration**

Zero and Span:  
-Level: to nearest 1 inch (1 cm)  
-V-notch: to nearest 0.1 inch

Near Zone: 12 inches (0.3 meter)

Minimum Span: 3 inches (7.62 cm)

Maximum Span: 30 feet (9 meters) (405-2400 unit)

—**Output**

2-Wire Signal Loop: 4-20 mA DC (isolated)

—**Linearity**

0.5% of full scale for spans less than 3 feet.

0.25% of full scale for spans more than 3 feet.

—**Temperature Compensation**

Automatic (separate temperature sensor is available)

—**Damping**

0.15, or 45 seconds (switch mode)
5.1 Transmitter Specifications (cont.)

—Lost Echo
22 mA or 3.7 mA
field selectable

—Near Zone
22 mA or 3.7 mA
field selectable

—Pulse Repetition Rate
250 or 400 msec (field-selectable)

—Fail Safe
22 mA

—Approvals
FM, CSA, and CE Mark
for Explosionproof installations in indoor and outdoor hazardous locations in Class 1, Groups A,B,C,D; Groups E, F, and G; Class III using Enclosure type 1,4,4X,12, and 13.

5.2 Transducer Specifications

—Sensor
Material: CPVC, PFA, PFA Sealtyte
Pressure: -10 to 50 PSI

—Operating Temperature
-40°F to 160°F (CPVC Sensor)
-40°F to 200°F (PFA Sensor)

—Enclosure
Explosionproof Housing

—Beam Angle
Conical, 12° typical, 3db down
The following pages give examples of various ultrasonic installations. These installation guidelines are useful for optimal performance of the 405-9000-003 UniversalSonic instrument.

When there are no obstructions within the beam area, there is no chance of false echoes or readings.

Smooth wall in beam with no other obstructions will not cause false echoes.

Protrusions from the wall at an angle less than 45 degrees does not cause false echoes.

Protrusion from the wall at an angle greater than 45 degrees may cause false echoes.
When mounted in the center of domed roof tanks, reflected echoes can be redirected back to the transducer. Use 240 mSec. pulse repeat rate to allow these echoes to subside before transmitting the next pulse and/or move the transducer to another location.

Preferred location

When mounted off center in conical bottom tanks, reflected echoes can be redirected back to the transducer. Use 240mSec. pulse repeat rate to allow these echoes to subside before transmitting the next pulse and/or move the transducer to another location.

Preferred location

When mounted off center in conical bottom tanks, reflected echoes can reflect away from the transducer in the conical bottom resulting in a lost echo. Move the transducer to the center of the bin for best results.
Automapping using High Discrimination Setting

This technology allows the system to ignore many objects in the beam which cause false reading with other units.

Mounted close to a wall or obstructions are present. Ability to ignore obstructions will depend on the exact size and location of the obstructions.

10 feet maximum
Use standard electronics with high discrimination setting.

Agitators within the beam path

20 feet maximum range in 2”-3” pipe. 30 feet maximum range in 4” pipe.

2" diameter or larger nozzle

12-inch maximum
Recommended mounting when recessed in a nozzle.

Optional remote temperature sensor (703-6-1) recommended for best temperature compensation.

Still Well Installation
If multiple pipe sections are used, a smooth transition between sections is required.

Acceptable Pipe joints

Unacceptable

gap greater than 0.125"

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