APPLICATIONS - SIGNAL QUALITY

What conditions hinder ultrasonic level measurement?

Ultrasonic level sensors are specified to measure liquids where the acoustic conditions are good, i.e. the air path above the reflecting surface and the reflecting surface are good, ensuring a strong return a good echo. Conditions which hinder the ultrasonic transmission are excessive dust, vapor, wind, rain surface movement or foam.

Can ultrasonic level sensor still be used even under difficult conditions?

The exact measuring capability of an ultrasonic level transmitter will depend on the condition of the air path and the reflective capability of the surface. As a rule, closed tanks with "clean" liquid surfaces will measure distances as indicated in the specifications. As a guide to transmitter choice: if the quality of the surface is in doubt, choose a bigger measuring Ultrix transmitter . For example, for measuring distances less than 17 feet with difficult measurement conditions, use the Ultrix 100-8 transmitter.

What is a "stilling well" and can one be used?

A stilling well is built into the side of a tank or flume to minimize turbulence, shield the air path, or protect the sensor. A "stand-pipe" may be inserted into a tank and fixed onto the inside wall of the tank, the transmitter can be mounted into the top of the stand-pipe and measure the liquid level in the stand-pipe. With the use of a stand-pipe the echoes travel along the inside surface of the pipe so the transmitter beam angle is not relevant.
A successful installation must follow the these guidelines.

- Always use a pipe with a smooth internal surface , PVC is a good choice. A rough internal surface will destroy both the transmitted and returning echo and may cause "loss of echo" conditions.
- We recommend a 6" pipe.
- Avoid applications which can result in solids depositing on the internal surface of the standpipe. Solids destroy echoes and large enough solids will be sensed as false echoes.
- Remember to cut openings into the bottom of the stand-pipe to allow the liquid to enter the standpipe.
- Remember to drill holes at the top of the standpipe to allow the air in the standpipe to escape and the liquid in the standpipe to rise up.

Can the ULTRIX level transmitter work in liquids with high levels of suspended solids (40 - 50%) by weight?

Yes, the non-contact Ultrix 100 level transmitter will measure the level of anything as long as the surface of the liquid or sold media reflects the sound echo. Most surfaces will reflect echoes, including liquids, fuels, suspended solids, solids, grain, flour, oil, etc , foam on the surface of the liquid is the one surface that absorbs most of the echo and reflects little of the echo. A little foam may be overcome by increasing the size of the Ultrix 100.

What is the effect of wind on the ULTRIX transmitter if it is hanging from its cable?

The Ultrix transmitter must be secured at the top of its cable and as near to the cable gland as possible to avoid the transmitter "swinging" in the wind. This installation will withstand most wind effects. Excessive wind conditions may effect the accuracy of the transmitter or cause a "loss of signal."

Can the ULTRIX 100 transmitter measure the levels of corn or other solids or powders?

Yes, the Ultrix transmitters can reliably measure the level of flour, corn, etc. As a general rule, the Ultrix 100 can measure solids to a distance of 50% of its liquid distance measuring capability.

APPLICATIONS - MOUNTING

What is the maximum submersion depth the ULTRIX 100 can withstand before damage is experienced?
The ULTRIX 100 is totally encased in epoxy. This feature is unique to the ULTRIX 100. The Ultrix transmitter has been tested to a depth of 30 feet of water without harmful effect.

How can I mount the transmitter to allow the liquid to be measured right up to the roof of a closed tank?
Use a pipe standoff mounting. This effectively "lifts" the transmitter out of the tank. A stand-off pipe longer than 6 inches must have the bottom end of the pipe cut off at an angle of 45 degrees to prevent the transmitter sensing the bottom edge of the pipe as a level. If the tank floods and the level rises into the blanking distance, the transmitter will hold the output at "tank full" level for two minutes before defaulting the output.

What happens to the signal if the tank fills to the ULTRIX's transducer?
If the tank level rises into the blanking distance, the transmitter will hold the output at the "tank full" level for two minutes before defaulting the output. If the level moves out of the blanking distance within the 2 minutes the transmitter will simply go back to measuring.

Can the ULTRIX 100 transmitters measure liquid levels in underground tanks?
Yes, the Ultrix level transmitters are equipped with special "multiple echo" software and will confidently measure the levels of liquids in most any shape of tank . The Teflon nose is also ideal for use with aggressive chemicals.

Can the ULTRIX transmitters measure levels in pressurized tanks?
Yes, the transmitters can easily measure levels of liquids in pressurized tanks up to a maximum pressure inside the tank of 14 PSI. The pressure in the tank increases the density of the "air path" and therefore introduces an error of measurement. With tank pressure less than 14 PSI, the transmitters will maintain its accuracy rating of 0.25%.

ELECTRICAL

What is the maximum length cable run?
The Ultrix 100 is a two-wire loop powered device. The 4-20 mA output signal from the Ultrix has a low susceptibility to RF interference. The unit is provided with an integral 15 foot length of cable, which can be extended for a few hundred yards. The Ultrix has built in transient protection but it is best practice to lay the signal cable in steel conduit to protect from lightning. Also, external lightning protection may be added for further security.

What is the effect of lightning on the ULTRIX 100 transmitter?
The Ultrix is protected against transients by transorbs. A very high energy spike can, of course, disable the sensor. A strong surge could damage the transmitter, cause the LEDs to stop flashing and cause the mA to lock at the last level measured before the lightning hit.

Can you damage the ULTRIX 100 transmitter by oversupplying voltage?
Yes, the Ultrix will accept 30 VDC but cannot be guaranteed at higher voltages.

Can you damage the ULTRIX TRANSMITTER by under supplying voltage?
No, the Ultrix will simply not pulse. LED1 will turn on a dull green and LED2 will turn on a dull red.

Can you damage the ULTRIX transmitter by reversing the polarity of the supply voltage?
No, the LEDs on the Ultrix will simply stay off indicating a NO SUPPLY situation.

What is the surge current of the ULTRIX 100 on start-up? 26 mA

The ULTRIX 100 has a handy "distance measuring" feature during calibration.

Insert a mA meter in the loop to measure loop current. When setting the zero (Z) (4 mA) level, the mA meter will indicate 4.0 mA. As soon as the transmitter accepts this level, the mA meter will flash to a "different" value for 2 seconds. This "different" value indicates the distance from the ULTRIX 100 to the media.

"different" value = (total distance + 4.0) in meters
(subtract 4.0 from the "different" value to obtain the distance from transducer face to the level - in meters)

the same applies when calibrating the span (S) level

QUESTIONS REGARDING THE SPECIFICATIONS

If I lose power to the ULTRIX, will I lose the calibration or configuration?

The Ultrix transmitter saves its calibration and configuration in EEPROM, even on power loss the transmitter will retain all its calibration and configurations setups

What happens if the "empty level" is outside the measuring range of the ULTRIX when I set the Zero or Span?

The transmitter will continue to search but not find the empty level. Both LED1 and LED2 will continue to pulse green for two minutes . The transmitter output will then default to the pre-calibrated default mA setting.

What is the accuracy of the ULTRIX transmitters?

The stated accuracy is 0.25% of full span. The ultrasonic transmitter may experience environmental conditions which cause this accuracy to deteriorate. The shorter the selected span, the more accurate the transmitter will be within that span because environmental effects are reduced .

Can the ULTRIX level transmitters operate accurately across the whole temperature range?

Yes, the Ultrix 100 is temperature compensated. The Ultrix 100 has an accurate PT100 temperature sensor built into its nose section. This measures the temperature of the ultrasonic air path and compensates for temperature changes. An increased error may occur if the temperature sensed by the Ultrix 100 is different than the temperature across the measured span. This is because the speed of sound changes approximately 1% per 10 degrees F.

Why does the ULTRIX go into a default condition and what is the effect?

The measuring span on the Ultrix 100 has been calibrated from empty level to full level using the Z (zero) and S (span) targets. This is defined as the "level window" If the level moves above the maximum or below the minimum levels, the level transmitter will interpret this as a "lost level" fault condition, LED2 turns on RED and after two minutes the mA output will go to its default value. If the level returns into the level window within two minutes, the transmitter will simply go back to measuring the level and not default.

What's the effect of an impact to the transducer nose?

The ultrasonic transducer is ceramic. The transducer is bonded onto the TEFZEL housing. A side impact may not damage the transducer. A blow directly to the transducer face will damage the transmitter to the extent that it will stop pulsing or will be unable to measure to its full capability.