

Question	Answer
Q How accurately can I measure?	A The <u>measurement-accuracy</u> will be $\pm 0.25\%$ of the full span distance at 20°C and 1 Atmosphere pressure. On still liquids with no vapors this is also the accuracy of the displayed level. There is no accuracy guarantee on conversion to other units of display. On bulk solid materials with an angle of repose (not flat and horizontal) the amount of material and its density will produce an unknown conversion accuracy. These conversions are not part of any KM accuracy specifications. This conversion error can be as high as 25%.
Q Which transducer do I use?	A Depends upon material, fill method, and vessel size <ul style="list-style-type: none"> • Longer ranges, sound absorbent materials require lower frequencies. • Higher accuracies require higher frequencies. • High temperatures (>180F) require stainless steel bodies. • Chemical and vapors determine CPVP, S.S., PVC, or Teflon flange. • Look at compatibility of chemical, temperatures, distance, and mounting.
Q Can a flange face transducer be used on a solid with an angle of repose?	A No, it cannot be aimed. Only exception is in the center straight down, and measurements are taken during empty, never when filling.
Q Where should I locate the transducer?	A The transducer should be located <ol style="list-style-type: none"> 1. Out of fill stream(s) 2. Where it can be aimed (down for liquids, angle for bulk solids) 3. 1/2 way between fill point and edge of vessel 4. Do not locate between dust collector and fill point or incoming air vent.
Q Can I use an existing hole?	A Sometimes, but it must meet the requirements for locating transducers. Using an existing hole or mount is economics not engineering and a successful application may be compromised.
Q How high do I have to raise the transducer? (How close to the sensor can I be?)	A Distance from transducer to highest material in front of the transducer must be: <ul style="list-style-type: none"> • 43 Khz = 1 foot (12 inches) • 24 Khz = 2 feet (24 inches) • 22 Khz = 2 feet (24 inches) • 14 Khz = 3 feet (36 inches)
Q If I make a standpipe to raise the sensor, how big do I make the standpipe?	A The diameter is normally 1/3 of raised height.
Q Can I fill material to the transducer face?	A No, invalid data will result.

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Q How do I convert my measurement (feet, inches, meters) to display units (pounds, gal, lit, miles, etc.)?	A Example: - Take the Cal Span value (example: inches), multiply it by the sensitivity (example: gal/inch) and enter it as the Max value under the CAL/Special display/Max V. Then set the Special display units (label) and format (decimal point).
Q Why do I need a temperature probe?	A High accurate measurements must correct for the change in the speed of sound (1% for every 10°F) so time of echo can be correctly converted.
Q Can I use only one temperature probe?	A Yes, if the temperature is the same for all the vessels on the same ultra-wave™.
Q Why can't I measure when I am filling?	A <ol style="list-style-type: none"> 1. The material disperses the sound wave. <u>Result: Echo loss.</u> 2. Air turbulence is created. <u>Result: Echo loss.</u> 3. The material blocks or reflects the sound back. <u>Result: False Echo.</u> 4. Foam on liquids. <u>Result: Echo loss.</u>
Q Can I read through foam?	A In general-NO. Most foams absorb sound waves, no echo. Some very thick foam films will reflect weakly off of the top layer. In general, you will not get a reading through a foam layer. Use ping pong balls.
Q Why do my readings jump around?	A <ol style="list-style-type: none"> 1. Sensor aimed through fill stream. 2. Excessive gain settings. 3. Air turbulence. 4. Transducer location. 5. External electrical noise or ground loops. 6. External acoustic (sound) noise in the bin.
Q Why do I have to aim the transducer?	A To use the strongest part of the beam to track the angle of response of the material. On liquids this is vertical (straight down).
Q What happens if I don't aim the transducer?	A System will not track the material in some parts of the bin.
Q What is your beam angle in degrees?	A <ul style="list-style-type: none"> <5° for 24 Khz 8° for 43 Khz 12° for 22 Khz 14° for 14 Khz
Q Will this angle cause a problem?	A It might be a problem in bins with seams, material build-up, or very narrow-tall, or if it has reinforcing cables, wall stiffeners, etc. Anything in the bin that can return an echo might potentially create a target strong enough to cause a false echo.

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Q Why is my unit stuck on a reading in the middle of my bin?	A The bin has something attached or protruding on the wall. The gain was set for this bin when the bin was full. Retune the ultra-wave™ with the vessel <u>almost</u> empty. Re-aim the transducer, then retune.
Q How many transducers can I have on one unit?	A <ol style="list-style-type: none">1. A maximum of two 8 channel scanner cards can be in one ultra-wave™.2. A total of three options cards (including) scanners can be in one ultra-wave™.
Q How many ultra-wave's™ can you connect to a RS-422 serial cable?	A 20 ultra-wave™'s via built in multi-drop serial data. Any system of KM devices has a maximum of 256 addressable sensors.
Q How far can you return a RS-422 cable without repeaters?	A 4000 ft.
Q What kind of wire should I use?	A For serial data, two twisted pair with shield (Belden 9729). For transducers, single twisted pair shielded (Belden 8760). For temperature probes, Belden 8790.
Q How far can I run my sensors from the ultra-wave™?	A <ol style="list-style-type: none">1. 43 KHz – 750 ft.2. 22 KHz – 1000 ft.3. 14 KHz – 1200 ft.4. 24 KHz – 1000 ft.
Q My display shows the words 'Lo' and 'Hi'. What do they mean?	A Point Level inputs have been activated. If the vessel is at low level, 'Lo' will be displayed. If the vessel is at high level, 'Hi' will be displayed.
Q Can I default the unit and start over?	A Yes, however you will lose all existing data. Power the unit down and while holding the Enter Key, turn the unit back on.

Question

Q Can I use ultrasonic to measure ... ?

Answer

	Yes	No	?	Watch out for
Flour	X			
Wheat	X			Fill streams, interstice bins
Midlins			X	Aeration, fluffy top layer
Soybeans	X			
Corn seeds	X			Acoustic noise
Corn meal	X			Aiming
Cheese			X	Foam, heat
Yeast, Dry	X			
Yeast, wet		X		Top layer is foam bubbles
Sugar	X			Aiming
Water	X			
Milk			X	Unless filling causes foaming
Nitric Acid			X	Sometimes, flange face , limited life
Ammonia			X	Teflon flange face only, not hot
Alcohols		X		Vapors produce unknown error
Hydrochloric acid	X			
Chlorine	X			Teflon flange face only
Caustic	X			Teflon flange face only
Fatty acids	X			No stainless
Coarse salt	X			Aiming
Fine salt		X		Very high angle of repose
Toothpaste	X			Will not read when under vacuum
Fly Ash			X	Not hot, must be cool
Asphalt			X	Open bins only, not liquid too hot
Alcohol		X		Vapors produce unknown error
Gasoline		X		Vapors produce unknown error
Cement	X			Only high level tracking on filling
Rocks	X			High noise levels and reinforcing ribs
Casting sand		X		Very high angle of repose
Building sand	X			Aiming
Plastic Pellets	X			Use ultra-cell

