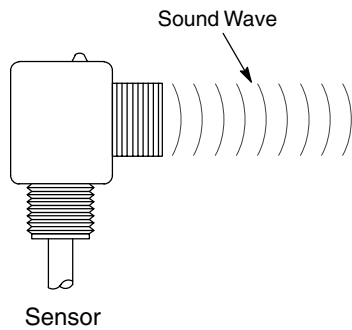


Technical Definitions and Terminology

Principles of Operation

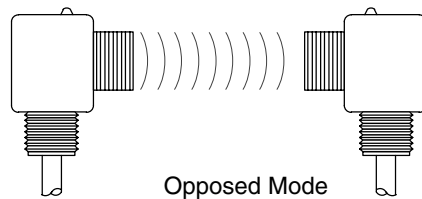


Ultrasonic sensors operate by emitting and receiving high-frequency sound waves. The frequency is usually in the order of 200kHz, which is too high for the human ear to hear.

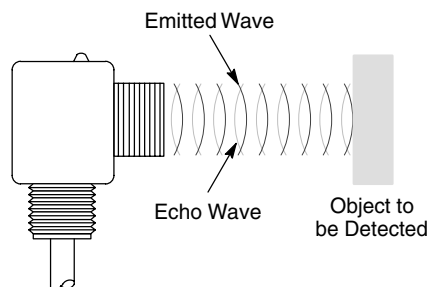
Modes of Operation

There are two basic modes of operation: opposed mode and diffuse (echo) mode.

In opposed mode, one sensor emits the sound wave and another, mounted opposite the emitter, receives the sound wave.

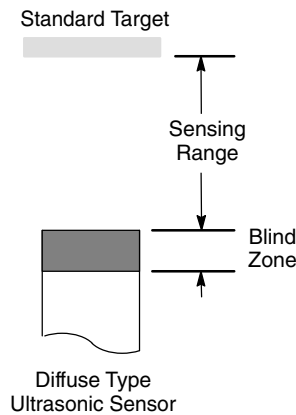


In diffuse mode, the same sensor emits the sound wave and then listens for the echo that bounces off an object.



Sensing Range

The sensing range is the distance within which the ultrasonic sensor will detect a target under fluctuations of temperature and voltage.



Blind Zone

Ultrasonic sensors have an inherent blind zone located at the sensing face. The size of the blind zone depends on the frequency of the transducer. Objects located within the blind spot can not be reliably detected.

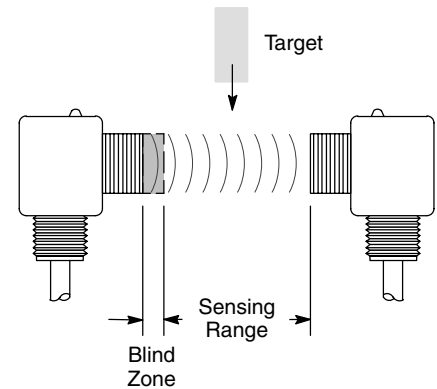
Target Considerations

Certain characteristic of targets must be considered when using ultrasonic sensors. These include target shape, material, temperature, size and positioning.

Soft materials such as fabric or foam rubber are difficult to detect by diffuse ultrasonic technology because they are not sound-reflective.

The standard target for a diffuse type ultrasonic sensor is established by the International Electrotechnical Commission standard IEC 60947-5-2. The standard target is a square shape, having a thickness of 1mm and made from metal with a rolled finish. The size of the target is dependent upon the sensing range.

For opposed mode ultrasonic sensors, there is no established standard.



Standard targets are used to establish the performance parameters of the sensors. The user must take into consideration differences in performance due to nonstandard targets.

