

Piezo applications product group

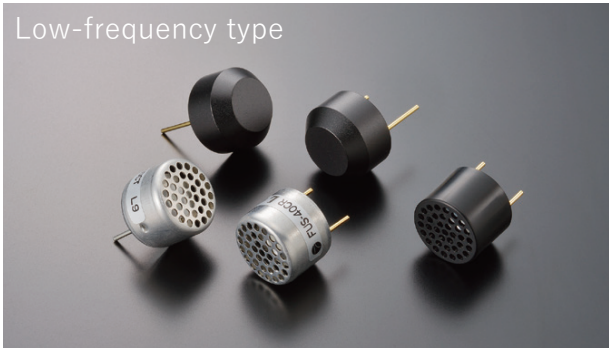
Airborne ultrasonic sensors

This ultrasonic sensor will radiated ultrasonic waves in the air. Then it, receiving a reflected wave from the object, measure the distance to the presence detection and object of the object. Ultrasonic is reverberated also in the transparent objects. That means it can be applied to those that can not be detected by light. Since the method of the transmission and reception can be selected, it offers a wide sensor of applications.

Features of the ultrasonic sensors

- High sound pressures & sensitivity
- Small & lightweight
- High accuracy & reliability
- Low power consumption
- Temperature, humidity, dirt, etc. environment resistance

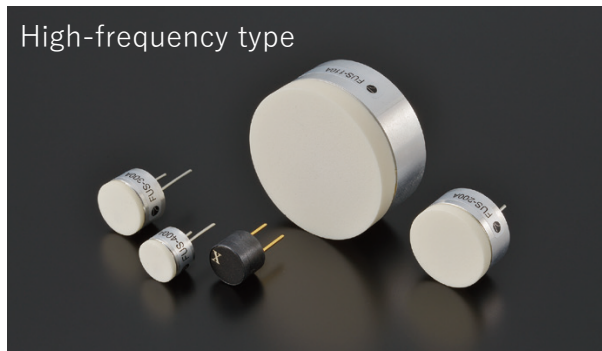
Low-frequency type



Functions of the ultrasonic sensors

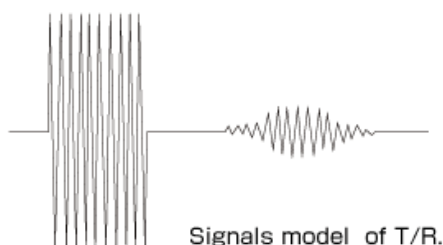
- Space transfer of the signals
- Measurements of transfer times
- Detections of the continuous signals
- Apply of the Dopplereffects
- Pulse reflection time measurement
- Measurements of Karman vortexflows

High-frequency type



Mounting methods of the sensor

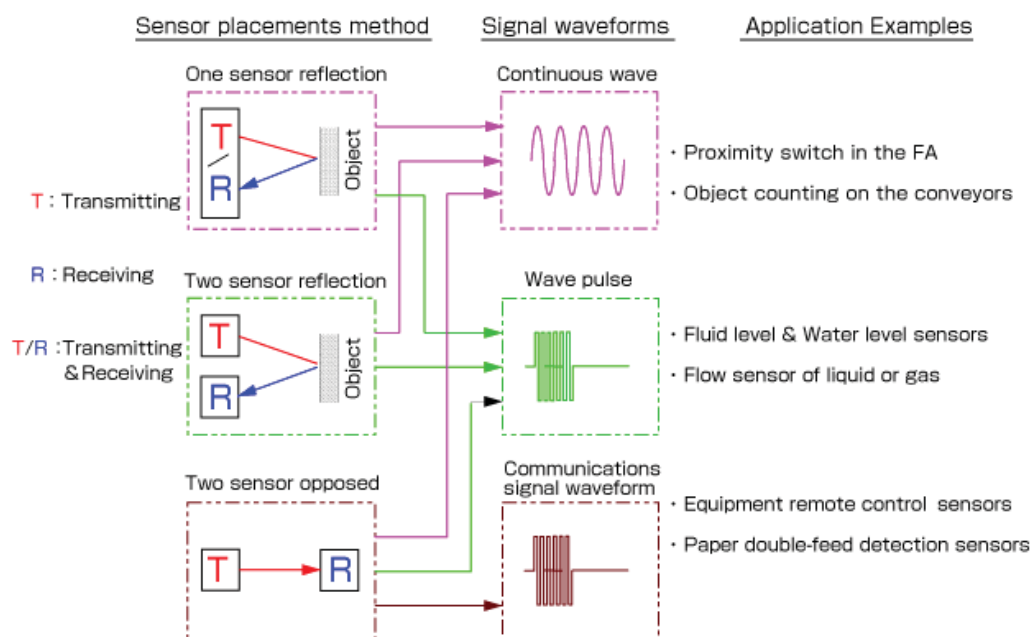
- One sensor reflection method (T/R, dual-purpose)
 - Two sensor reflection method (T/R, single-purpose)
 - Two sensor opposed method (T/R, single-purpose)
- [Notes, T; transmitted, R; received]



Typical Applications

- Distance measurement
- Object counting on the belt conveyors
- Proximity switch in the FA facilities
- Flow sensor of liquid or gas
- Fluid level sensors & Water level sensors
- Intrusion alarm sensors
- Automatic opening and closing door sensors
- Equipment remote control sensors
- Paper double-feed detection sensors

Placement method of the ultrasonic sensor



FUS Series / low-frequency type

| Types | | FUS-40BT-B | FUS-40BR-B | FUS-40E |
|-------------------------|--|--------------------------|----------------|---------------------|
| Designs | | Drip-proof type | | Open type |
| Transducers | | For transmitting | For receiving | T/R dual-purpose |
| Nominal frequency | kHz | 40 | | |
| Transmitting SPL | dB or more (0 dB = 2×10 ⁻⁵ Pa) | 105 | - | - |
| Receiver sensitivity | dB or more (0 dB = 1V/Pa) | - | -57 | - |
| T/R sensitivity | dB | - | - | -43±4 at 30 cm |
| SPL & sensitivity band | kHz or more | 2 (100dB) | 2 (-60dB) | - |
| Capacitance | pF | 2600 | | 2000 |
| Directionality | deg. | 80 | | 40 |
| Maximum input voltage | V | 15 (r. m. s) | - (r. m. s) | 100 (pulse Vp-p) |
| Detection distance | m | 0.2~3 | | 0.2~4 |
| Resolutions | mm | 9 | | |
| Operating temp. limits | °C | -20~70 | | -25~70 |
| Storage temp. range | | -35~80 | | -40~85 |
| High-temp. preservation | Sensitivity variation Within 3dB | 80°C 500h | | - |
| Low-temp. preservation | | -35°C 500h | | - |
| Humidity resistance | | 60°C 90~95%RH 500h | | |
| Durability | | 60°C 85% 10Vr. m. s 500h | | |
| Impact resistance | Dropped from a height of 1m on the hard wooden board 3 times | | | |
| Vibration resistance | Freq: 10Hz → 55Hz → 10Hz, Cycle: 1 min, Total amplitude: 1.5mm, Conditions: XYZ each 1 h | | | |
| Outer diameter | mm | φ17.8 | | φ16 |
| Height | | 11 | | 12 |

FUS Series / High-frequency type

| Types | | FUS-110A | FUS-200A | FUS-300A | FUS-400A | FUS-300A-PB |
|-------------------------|-------------------------------------|--|----------|----------|----------|----------------------------|
| Dsigs | | Matching layer type | | | | |
| Transducers | | T/R dual-purpose | | | | |
| Nominal frequency | kHz | 110 | 200 | 300 | 400 | 300 |
| T/R sensitivity | dB or more | -54 | -56 | -66 | -74 | 130mVp-p |
| | | at 40 cm | at 20 cm | at 15 cm | at 10 cm | at 15 cm |
| Capacitance | pF | 600 | 380 | 260 | 200 | 1700 |
| Directionality | deg. | 7 | 7 | 6 | 6 | 9~13 |
| Maximum input voltage | V | 80 | 60 | 40 | 40 | 50 |
| | | (pulse Vp-p) | | | | |
| Detection distance | m | 0.4~2.5 | 0.2~1.2 | 0.1~0.6 | 0.08~0.3 | - |
| Resolutions | mm | 3 | 2 | 1.2 | 1 | 1.2 |
| Operating temp. limits | °C | -20~60 | | | | -20~70 |
| Storage temp. range | | -35~70 | | | | -30~70 |
| High-temp. preservation | Sensitivity variation Within 3dB | 70°C 500h | | | | 85°C 240h |
| Low-temp. preservation | | -35°C 500h | | | | -40°C 240h |
| Humidity resistance | | 60°C 90~95%RH 500h | | | | 60°C 90~95%RH 240h |
| Durability | | - | | | | 70°C 12Vp-p 500h |
| Impact resistance | | Dropped from a height of 1m on the hard wooden board 3 times | | | | 100G, 3-axis, each 3 times |
| Vibration resistance | | Freq: 10Hz → 55Hz → 10Hz, Cycle: 1 min, Total amplitude: 1.5mm, Conditions: XYZ each 1 h | | | | 55~500Hz, 6min., 10G, 5h |
| Outer diameter | mm | φ37 | φ19 | φ13 | φ10 | φ9.9 |
| Height | | 17.2 | 10.8 | 8.8 | 7.4 | 7.3 |

Notes on use

- The sensor has directivity. Note the mounting and direction.
- The negative terminal is connects to the case, and have been shielded. Please note the connection method. (except for the FUS-40E,FUS-300A-PB.)
- The sensor may be caused the noise by the impacts. Please use to holds the sensors in buffer material as foamed rubber.
- There is a possibility that the insulation resistance is lowered. Avoid DC voltage is applied for a long time.
- This sensor can not be used in water.
- For improvement, it may want to change the specifications without notice.