

Piezo applications product group

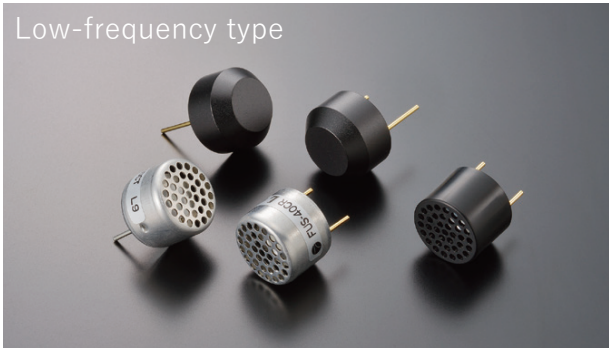
Airborne ultrasonic sensors

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

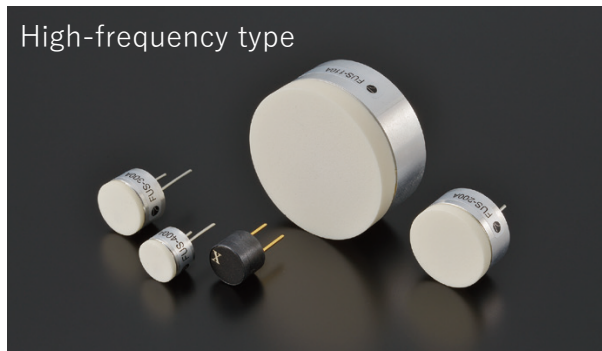
Low-frequency type



Functions of the ultrasonic sensors

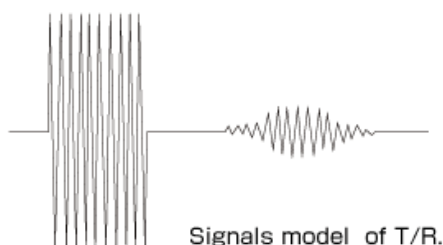
- Space transfer of the signals
- Measurements of transfer times
- Detections of the continuous signals
- Apply of the Dopplereffects
- Pulse reflection time measurement
- Measurements of Karman vortexflows

High-frequency type



Mounting methods of the sensor

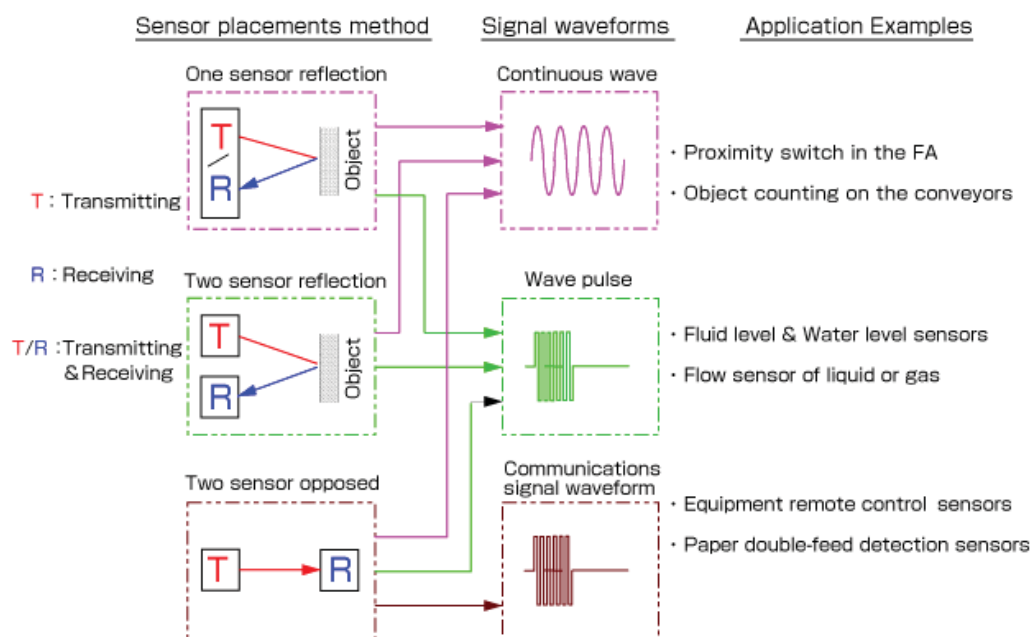
- One sensor reflection method (T/R, dual-purpose)
 - Two sensor reflection method (T/R, single-purpose)
 - Two sensor opposed method (T/R, single-purpose)
- [Notes, T; transmitted, R; received]



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
Dsings		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				
Storage temp. range		-35~70				
High-temp. preservation	Sensitivity variation Within 3dB	70°C 500h				
Low-temp. preservation		-35°C 500h				
Humidity resistance		60°C 90~95%RH 500h				
Durability		-				
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	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.