

Airborne Ultrasonic Sensor

The ultrasonic sensor radiates ultrasonic waves in the air, receives a reflected wave from the object, and measures the distance to the presence detection. Ultrasonic is reverberated also in the transparent objects that cannot be detected by light.

Features of the ultrasonic sensors

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

Functions of the ultrasonic sensors

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

Mounting methods of the sensor

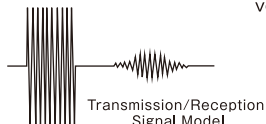
- One sensor reflection method (T/R, dual-purpose)
 - Two sensor reflection method (T/R, single-purpose)
 - Two sensor opposed method (T/R, single-purpose)
- [Notes, T: transmitted, R: received]



High-Frequency Type



Low-Frequency Type



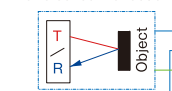
Typical Applications

- 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

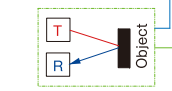
Placement method of the ultrasonic sensor

Sensor placements method

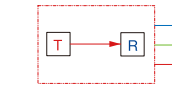
One sensor reflection



Two sensor reflection

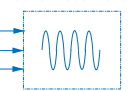


Two sensor opposed

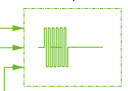


Signal waveforms

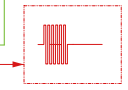
Continuous wave



Wave pulse



Communications signal waveform



Application Examples

- Proximity switch in the FA
- Object counting on the conveyors
- Fluid level & Water level sensors
- Flow sensor of liquid or gas
- Equipment remote control sensors
- Paper double-feed detection sensors

T:Transmitting R:Receiving T/R:Transmitting & Receiving

Items		FUS-40BT-B	FUS-40BR-B	FUS-40E	FUS-110A	FUS-200A	FUS-300A	FUS-400A	FUS-300A-PB
Designs		Drip-proof type		Open type	Matching layer type				Matching layer type
Transducers		For transmitting	For receiving	T/R dual-purpose	T/R dual-purpose				T/R dual-purpose
Nominal frequency	kHz	40		40	110	200	300	400	300
Transmitting SPL	≥ dB	105	—	—	—				—
(0dB=2×10 ⁻⁵ Pa)									
Receiver sensitivity	≥ dB	—	-57	—	—				—
(0dB=1V/Pa)									
T/R sensitivity	≥ dB	—		-43	-54	-56	-66	-74	130mVp-p
				at.30cm	at.40cm	at.20cm	at.15cm	at.10cm	at.15cm
SPL & sensitivity band	≥ kHz	2	2	—	—				—
		(100dB)	(-60dB)						
Capacitance	pF	2600		2000	600	380	260	200	1700
Directional	deg.	80		40	7	7	6	6	9 ~ 13
Maximum input voltage	V	15	—	100	80	60	40	40	50
		(r.m.s)		(Pulse Vp.p.)	(Pulse Vp.p.)				(Pulse Vp.p.)
Detection distance	m	0.2~3		0.2~4	0.4~2.5	0.2~1.2	0.1~0.6	0.08~0.3	—
Resolutions	mm	9		9	3	2	1.2	1	1.2
Operating temp. limits	℃	-20~70		-25~70	-20~60				-20~70
Storage temp. range		-35~80		-40~85	-35~70				-30~70
High-temp. preservation	Sensitivity variation within 3dB	80℃ 500h		—	70℃ 500h				85℃ 240h
Low-temp. preservation		-35℃ 500h		—	-35℃ 500h				-40℃ 240h
Humidity resistance		60℃ 90~95%RH 500h							60℃ 90~95%RH 240h
Durability		60℃ 85% 10Vr.m.s 500h		—	—				70℃ 12Vp-p 500h
Impact resistance		Dropped from a height of 1m on the hard-wooden board 3 times							100G, three directions, three times each
Vibration resistance		Freq: 10Hz → 55Hz → 10Hz, Cycle: 1 min, Total amplitude: 1.5 mm, Conditions: XYZ each 1 h							55-500 Hz, 6 minutes, 10G, 5 hours each
Outer diameter	mm	φ17.8		φ16	φ37	φ19	φ13	φ10	φ9.9
Height		11		12	17.2	10.8	8.8	7.4	7.3

Notes on use

Please contact us for other custom-made products as well.

- Sensors have directivity, so please pay attention to mounting orientation.
- The negative terminal is connected to the case and shielded, so please handle connections with care (except for FUS-40E, FUS-300A-PB).
- Shock may generate noise; use cushioning materials such as foam rubber for mounting.
- Prolonged application of DC voltage may degrade insulation resistance; avoid continuous DC voltage.
- This sensor is not suitable for underwater use.
- Specifications are subject to change without notice for product improvement.