Ultrasonic Air Transducers

Residential, Commercial, and Industrial Gas Flow Measurement

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Unictron's ultrasonic transducers have been implementing our in-house piezoceramics and acoustic matching layer as well as the novel patented technologies. The ultrasonic transducers are suitable for gas flow detection, gas concentration detection, etc., along with high sensitivity, low noise, low ZFD (zero flow drift), high precision and reliability.

	Commercial	Commercial	Industrial	Industrial	Industrial	Residential
Model Name	A200D1	A200M3	A200M7	A200M8	A200M9	A500B1
						
Frequency (kHz)	200	200	200	200	200	500
Dimensions (mm)	OD 19.0 H 16.0	OD 17.6 H 8.4	OD 16.0 H 19.0	OD 12.0 H 10.8	OD 16.0 H 19.0	OD 15.35 H 6.35
Capacitance (@1 kHz, 1 Vrms) (pF)	500	2000	500	500	500	320
Max. Operation Pressure	1.0 MPa	100 kPa	1.6 MPa	6.3 MPa	6.3 MPa	100 kPa
Housing Material	PVDF	Elastomer	Titanium alloy	Titanium alloy	Titanium alloy	Elastomer
Operating Temperature (°C)	-30 to +70	-25 to +55	-30 to +70	-30 to +70	-30 to +70	-25 to +55

Features

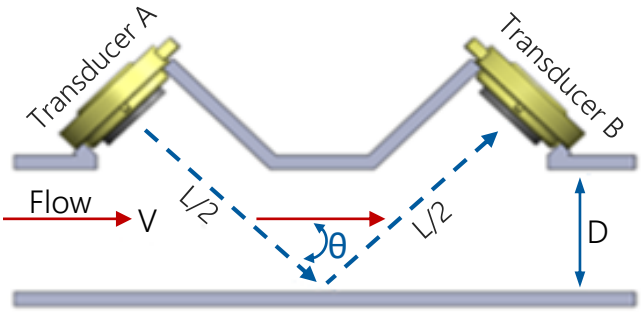
- Patented technologies
- Good chemical resistance
- High precision: meet AGA-9, JIS B8571 standard
- High sensitivity
- Good reliability
- Waterproof IP68
- Low noise

Industries & Applications

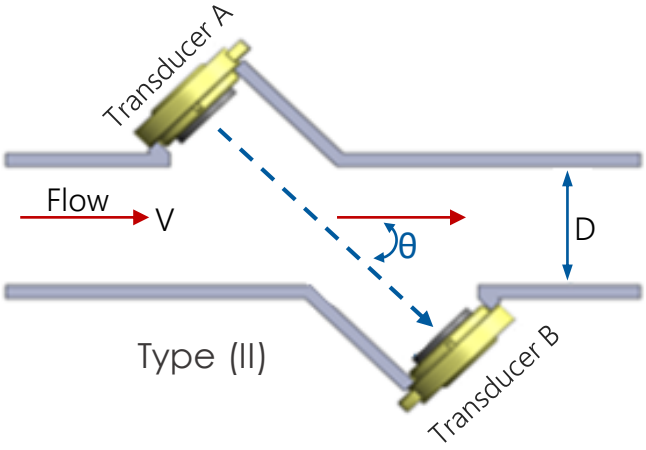
- Gas flow meter
- Gas concentration measurement

Principle of Ultrasonic Gas Flow Detection

The flow rate/volume of gas can be measured using ultrasonic transducers, based on the ToF (time of flight), which is the ultrasound traveling time difference between downstream and upstream in gas. In the mean time, the speed of sound of the gas can also be obtained. The principle is shown in the figure below:



Type (I)



Type (II)

$$T_{up} = \frac{L}{C - v\cos\theta}$$

$$T_{down} = \frac{L}{C + v\cos\theta}$$

$$Q = kA\frac{L}{2\cos\theta}\left(\frac{1}{t_{down}} - \frac{1}{t_{up}}\right)$$

$$v = \frac{L}{2\cos\theta}\left(\frac{1}{t_{down}} - \frac{1}{t_{up}}\right)$$

$$C = \frac{L}{2}\left(\frac{1}{t_{down}} + \frac{1}{t_{up}}\right)$$

V: flow velocity

C: speed of sound

Q: flow rate

K: correlation factor

A: cross-sectional area