

Piezoelectric Ceramic Sensors (PIEZOTITE®)



Ultrasonic Sensors

Open Structure Type

■ Features

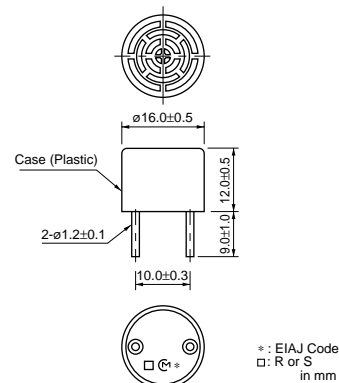
1. Compact and light weight.
2. High sensitivity and sound pressure.
3. Less power consumption.
4. High reliability.

■ Applications

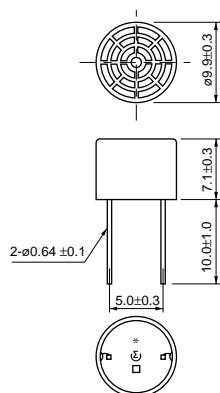
Burglar alarms, Range finders, Automatic doors, Remote control.



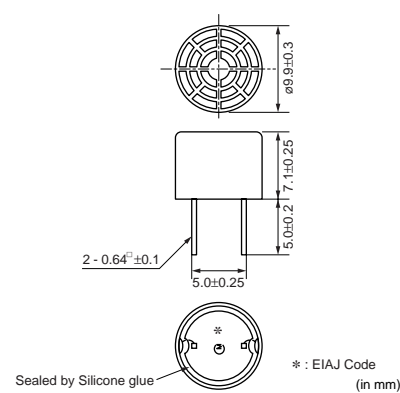
MA40B8R/S



MA40S4R/S



MA40S5



| Part Number | Construction | Using Method | Nominal Freq. (kHz) | Overall Sensitivity (mVp-p) | Sensitivity (dB) | S.P.L. (dB) | Directivity (°) | Cap. (pF) | Operating Temp. Range (°C) | Detectable Range (m) | Resolution (mm) | Max. Input Voltage (Vp-p) |
|-------------|--------------|--------------|---------------------|-----------------------------|--------------------------|---------------------------|-----------------|-----------|----------------------------|----------------------|-----------------|-------------------------------------------|
| MA40B8R | Open struct. | Receiver | 40 | - | -63 typ. (0dB=10V/Pa) | - | 50 | 2000 | -30 to 85 | 0.2 to 6 | 9 | - |
| MA40B8S | Open struct. | Transmitter | 40 | - | - | 120 typ. (0dB=0.02mPa) | 50 | 2000 | -30 to 85 | 0.2 to 6 | 9 | 40 Continuous signal |
| MA40S4R | Open struct. | Receiver | 40 | - | -63 typ. (0dB=10V/Pa) | - | 80 | 2550 | -40 to 85 | 0.2 to 4 | 9 | - |
| MA40S4S | Open struct. | Transmitter | 40 | - | - | 120 typ. (0dB=0.02mPa) | 80 | 2550 | -40 to 85 | 0.2 to 4 | 9 | 20 Continuous signal |
| MA40S5 | Open struct. | Dual Use | 40 | 20 typ. | - | - | 60 typ. | 2550 | -30 to 85 | 0.5 to 2 | 9 | 20 Pulse width 0.4ms Interval 100ms |

Distance:30cm, Overall sensitivity:0dB=10Vp-p, Sensitivity:0dB=1Vrms/μbar, Sound pressure level:0dB=2x10⁻⁴μbar, 1μbar=0.1Pa

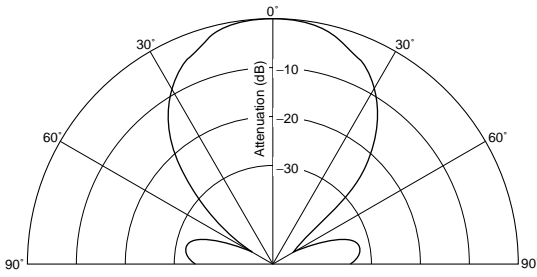
The sensor can be used in the operating temperature range.

Please refer to the individual specification for the temperature drift of Sensitivity/Sound pressure level or environmental characteristics in that temperature range.

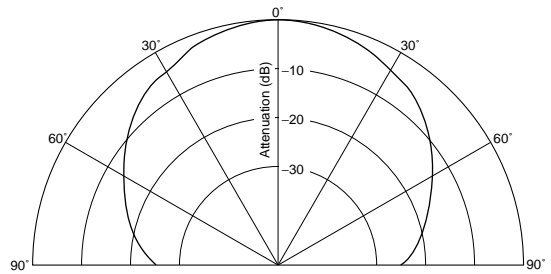
Directivity, detectable range and resolution are typical values. They can be changed by application circuit and fixing method of the sensor.

■ Directivity in Sensitivity

MA40B8R

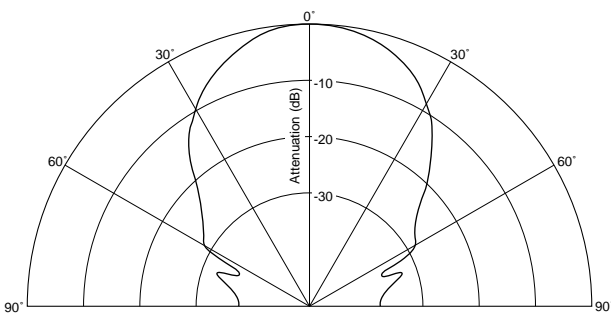


MA40S4R



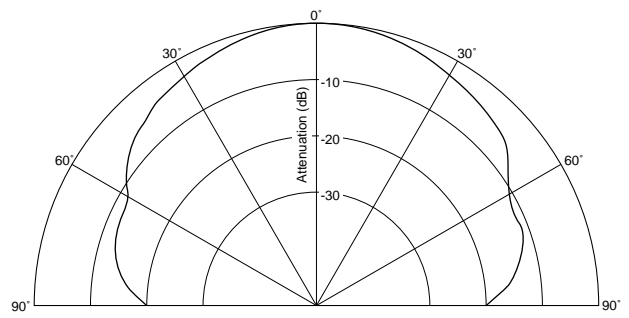
■ Directivity in S. P. L.

MA40B8S



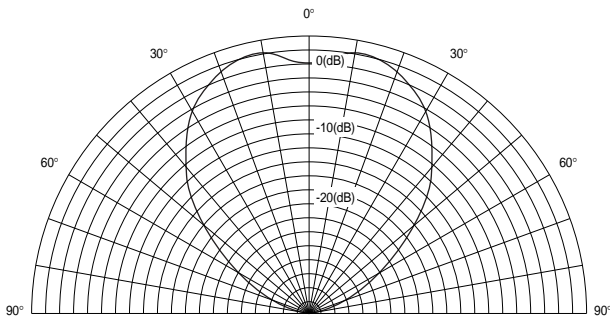
■ Directivity in S. P. L.

MA40S4S



■ Directivity in Overall Sensitivity

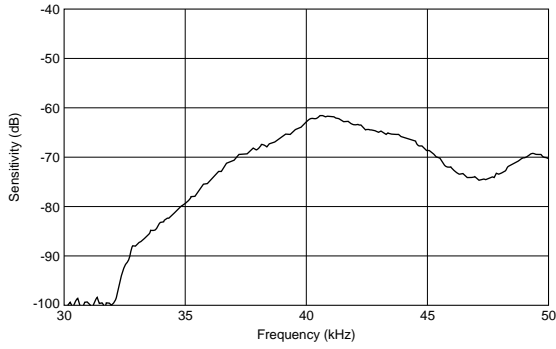
MA40S5
Beam Pattern



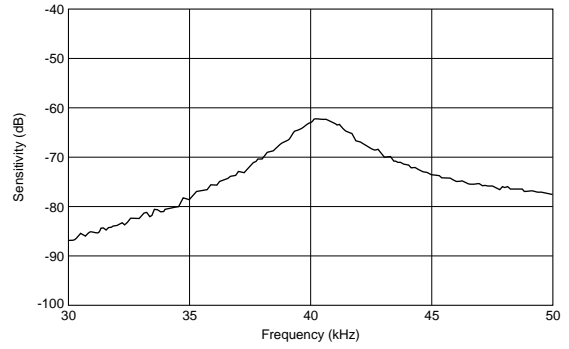
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■ S. P. L. -Freq. Characteristics

MA40B8R

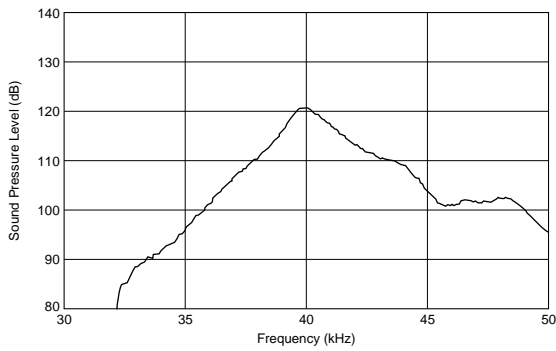


MA40S4R

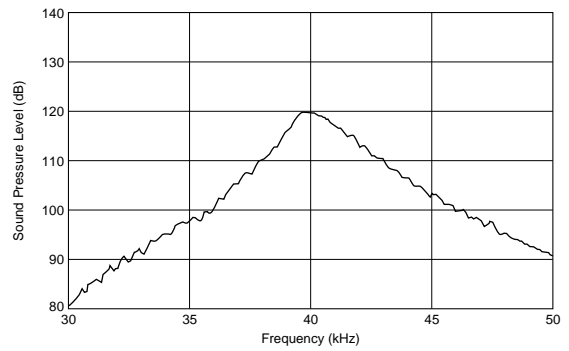


■ Sensitivity-Freq. Characteristics

MA40B8S



MA40S4S



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Water Proof Type Symmetric Directivity

■ Features

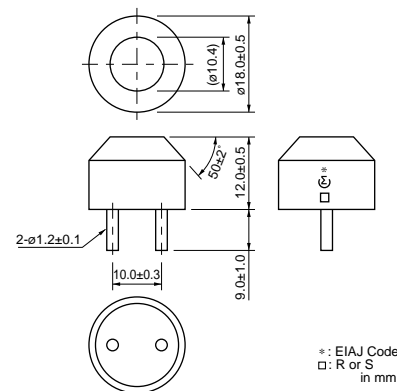
1. Compact and light weight.
2. High sensitivity and sound pressure.
3. Less power consumption.
4. High reliability.

■ Applications

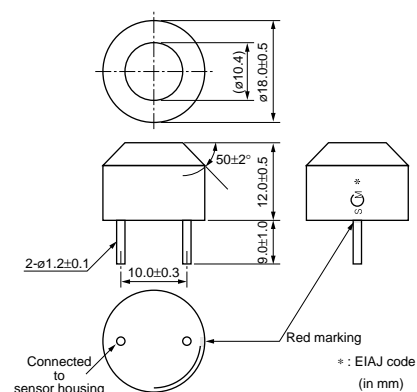
Back sonar of automobiles, Parking meters, Water level meters.



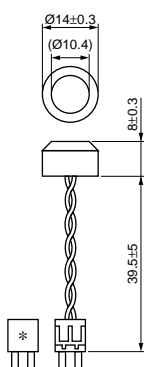
MA40E7R/S



MA40E7S-1



MA40E8-2

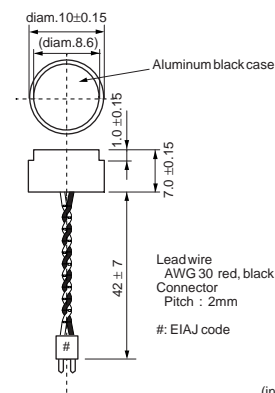


Lead wire : AWG30, Red, Black
Connector Pitch : 2mm
* : EIAJ code

(in mm)



MA40MC10-1B



(in mm)

| Part Number | Construction | Using Method | Nominal Freq. (kHz) | Overall Sensitivity | Sensitivity (dB) | S.P.L. (dB) | Directivity (°) | Cap. (pF) | Operating Temp. Range (°C) | Detectable Range (m) | Resolution (mm) | Max. Input Voltage (Vp-p) |
|-------------|--------------|--------------|---------------------|---------------------|----------------------------------------------|---------------------------|-----------------|-----------|----------------------------|----------------------|-----------------|--------------------------------------------|
| MA40E7R | Water proof | Receiver | 40 | - | -74 min. (0dB=10V/Pa) | - | 100 | 2200 | -30 to 85 | 0.2 to 3 | 9 | - |
| MA40E7S | Water proof | Transmitter | 40 | - | - | 106 min. (0dB=0.02mPa) | 100 | 2200 | -30 to 85 | 0.2 to 3 | 9 | 100 Pulse width 0.4ms Interval 100ms |
| MA40E7S-1 | Water proof | Dual Use | 40 | - | -72 min. (0dB=10V/Pa) : reference only | 106 min. (0dB=0.02mPa) | 75 | 2200 | -30 to 85 | 0.2 to 3 | 9 | 100 Pulse width 0.4ms Interval 100ms |
| MA40E8-2 | Water proof | Dual Use | 40 | - | -85 min. (0dB=10V/Pa) | 106 min. (0dB=0.02mPa) | 75 | 2800 | -30 to 85 | 0.2 to 1.5 | 9 | 160 Pulse width 0.8ms Interval 60ms |
| MA40MC10-1B | Water proof | Dual Use | 40 | - | -86 min. (0dB=10V/Pa) | 104 min. (0dB=0.02mPa) | 100 typ. | 2400 | -30 to 85 | 0.2 to 1.5 | 9 | 160 Pulse width 0.8ms Interval 60ms |

Distance:30cm, Overall sensitivity:0dB=10Vp-p, Sensitivity:0dB=1Vrms/μbar, Sound pressure level:0dB=2x10⁻⁴μbar, 1μbar=0.1Pa

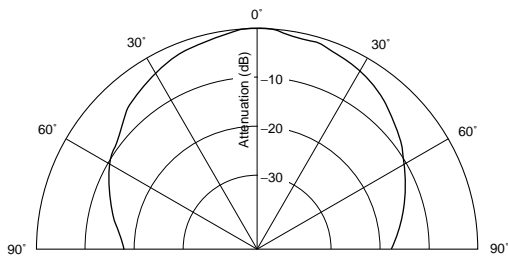
The sensor can be used in the operating temperature range.

Please refer to the individual specification for the temperature drift of Sensitivity/Sound pressure level or environmental characteristics in that temperature range.

Directivity, detectable range and resolution are typical values. They can be changed by application circuit and fixing method of the sensor.

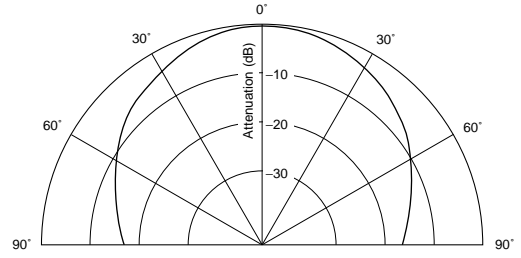
■ Directivity in Sensitivity

MA40E7R



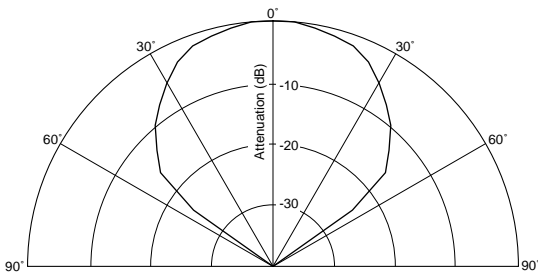
■ Directivity in S. P. L.

MA40E7S

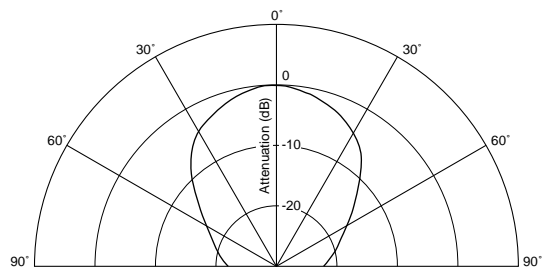


■ Directivity in Overall Sensitivity

MA40E7S-1

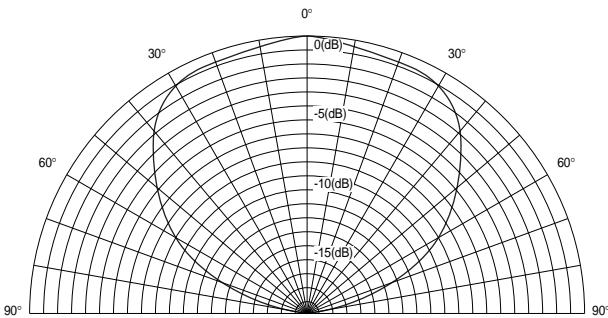


MA40E8-2



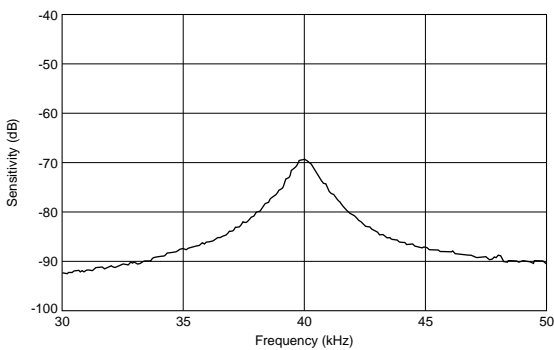
MA40MC10-1B

Beam Pattern



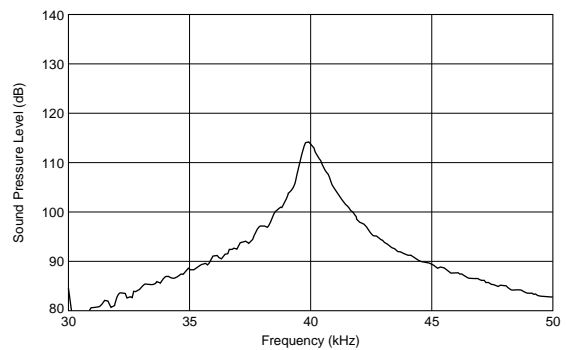
■ S. P. L. -Freq. Characteristics

MA40E7R



■ Sensitivity-Freq. Characteristics

MA40E7S



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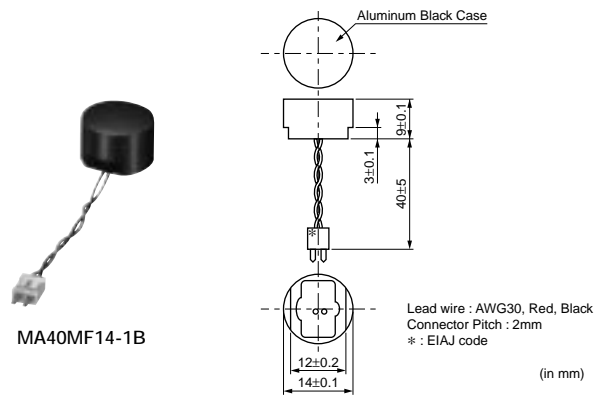
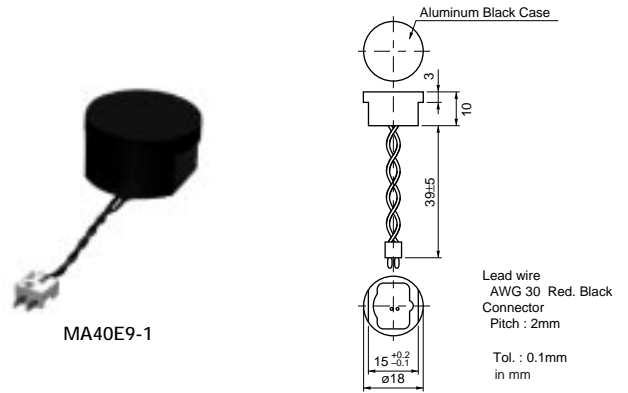
Water Proof Type Asymmetric Directivity

■ Features

1. Compact and light weight.
2. High sensitivity and sound pressure.
3. Less power consumption.
4. High reliability.
5. Compressed directivity by itself

■ Applications

Vack sonar of automobiles, Parking meters, Water level meter.



| Part Number | Construction | Using Method | Nominal Freq. (kHz) | Overall Sensitivity | Sensitivity (dB) | S.P.L. (dB) | Directivity (°) | Cap. (pF) | Operating Temp. Range (°C) | Detectable Range (m) | Resolution (mm) | Max. Input Voltage (Vp-p) |
|-------------|--------------|--------------|---------------------|---------------------|--------------------------|---------------------------|-----------------|-----------|----------------------------|----------------------|-----------------|-------------------------------------------|
| MA40E9-1 | Water proof | Dual Use | 40 | - | -85 min. (0dB=10V/Pa) | 103 min. (0dB=0.02mPa) | 100 x50° | 4000 | -30 to 85 | 0.2 to 1.5 | 9 | 160 Pulse width 0.8ms Interval 60ms |
| MA40MF14-1B | Water proof | Dual Use | 40 | - | -87 min. (0dB=10V/Pa) | 103 min. (0dB=0.02mPa) | 110 x50° | 4400 | -30 to 85 | 0.2 to 1.5 | 9 | 160 Pulse width 0.8ms Interval 60ms |

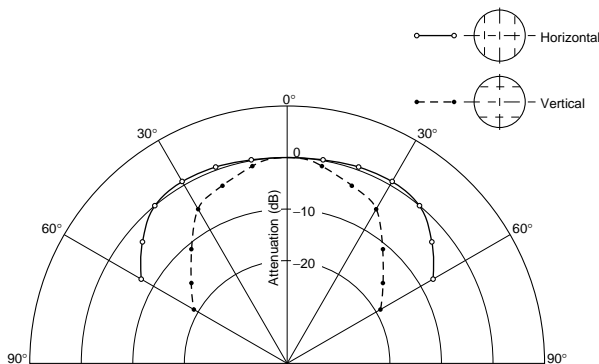
The sensor can be used in the operating temperature range.

Please refer to the individual specification for the temperature drift of Sensitivity/Sound pressure level or environmental characteristics in that temperature range.

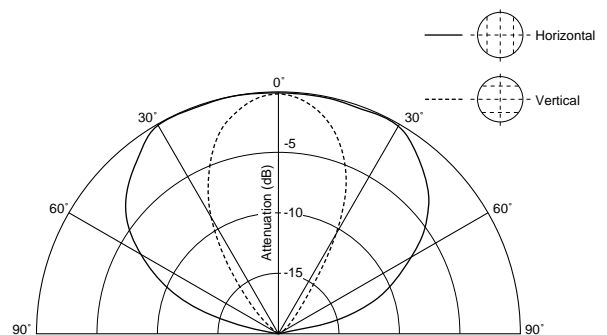
Directivity, detectable range and resolution are typical values. They can be changed by application circuit and fixing method of the sensor.

■ Directivity in Overall Sensitivity

MA40E9-1



MA40MF14-1B



High-frequency Type

■ Features

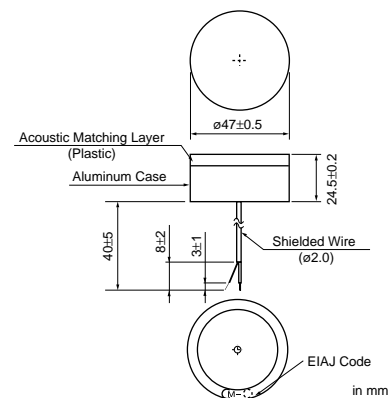
Using longitudinal vibration and matching with the air by acoustic matching layer, this type realized high sensitivity. Because of short wavelength, this type has sharp directivity and can be used high precise measurement.

■ Applications

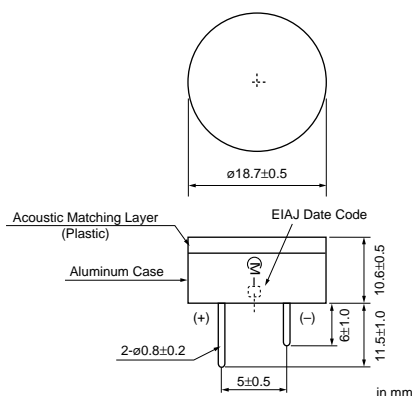
Approach switch for FA, Distance meter, Water or liquid level meters.



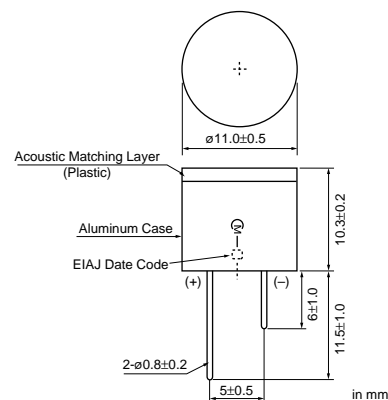
MA80A1



MA200A1



MA400A1



| Part Number | Construction | Using Method | Nominal Freq. (kHz) | Overall Sensitivity (dB) | Sensitivity | S.P.L. | Directivity (°) | Cap. | Operating Temp. Range (°C) | Detectable Range (m) | Resolution (mm) | Max. Input Voltage (Vp-p) |
|-------------|---------------------|--------------|---------------------|------------------------------------|-------------|--------|-----------------|------|----------------------------|----------------------|-----------------|-------------------------------------------|
| MA80A1 | High frequency type | Dual Use | 75 +/-5 | -47 min. 0dB=18Vpp (at 50cm) | - | - | 7 | - | -10 to 60 | 0.5 to 5 | 4 | 120 Pulse width 0.6ms Interval 50ms |
| MA200A1 | High frequency type | Dual Use | 200 +/-10 | -54 min. 0dB=18Vpp (at 20cm) | - | - | 7 | - | -30 to 60 | 0.2 to 1 | 2 | 120 Pulse width 250µs Interval 20ms |
| MA400A1 | High frequency type | Dual Use | 400 +/-20 | -74 min. 0dB=18Vpp (at 10cm) | - | - | 7 | - | -30 to 60 | 0.06 to 0.3 | 1 | 120 Pulse width 125µs Interval 10ms |

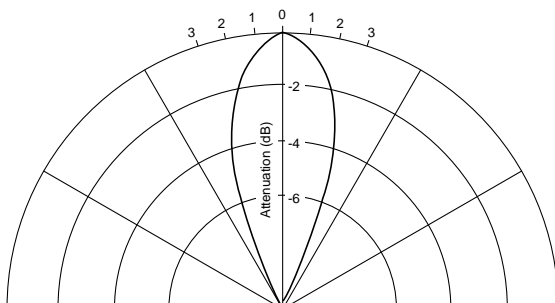
The sensor can be used in the operating temperature range.

Please refer to the individual specification for the temperature drift of Sensitivity/Sound pressure level or environmental characteristics in that temperature range.

Directivity, detectable range and resolution are typical values. They can be changed by application circuit and fixing method of the sensor.

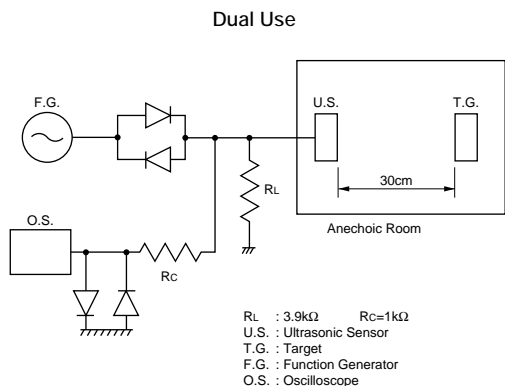
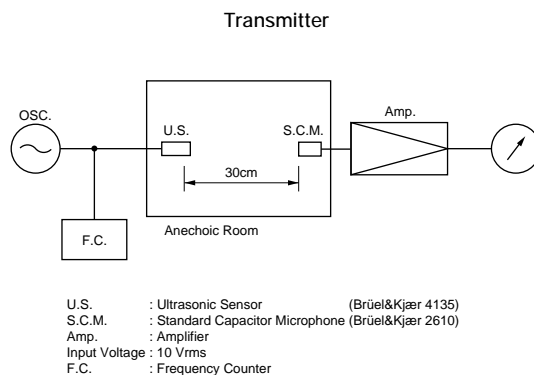
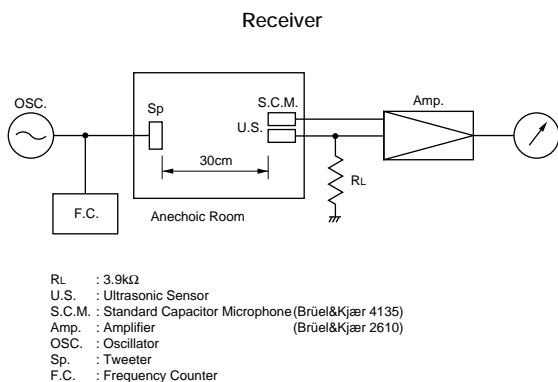
■ Directivity in Overall Sensitivity

MA_A1 Series



Data/Notice/Part Numbering

■ Test Circuit



■ Notice (Soldering and Mounting)

1. Pay attention to the mounting position as these sensors have directivity.
2. Please avoid applying DC-bias by connecting DC blocking capacitor or some other way because, otherwise, the component may be damaged.
3. Do not use in water.

● Part Numbering (The structure of the "Global Part Numbers" that have been adopted since June 2001 and the meaning of each code are described herein.) (If you have any questions about details, inquire at your usual Murata sales office or distributor.)

Ultrasonic Sensors

(Global Part Number) **MA** **40MF** **14** **-1N** **-M**

① ② ③ ④ ⑤

- ① Product ID
- ② Series
- ③ Characteristics
- ④ Individual Specification Code
- ⑤ Packaging

* Global Part Number shows only an example which might be different from actual part number.

* Any other definitions than "① Product ID" might have different digit numbers from actual Global Part Number.