Choose the Proper Ultrasonic Sensor for your Application

This guide will help you select the correct MaxSonar® sensor for your use. We believe that the MaxSonar® sensors are among the easiest to use ultrasonic rangefinders available.

### Start Here

- **Indoor Use (or protected environments)**
  - Power-up calibration
  - Very low cost
  - Very small size
  - LV-MaxSonar-EZ

- **Easy to use ultrasonic rangefinder**
  - Real-time auto calibration
  - Low cost
  - Very small size
  - XL-MaxSonar-EZ & XL-MaxSonar-AE
  - Other XL Sensors available

- **Outdoor Use (or rugged environments) IP67 Rated**
  - Real-time auto or power-up calibration
  - Low cost
  - Very small size
  - XL-MaxSonar-WR
  - XL-MaxSonar-WRA
  - LV-MaxSonar-WR
  - Other WR Sensors available
  - XL-MaxSonar-WRC
  - XL-MaxSonar-WRCA
  - LV-MaxSonar-WRC
  - Other WRC Sensors available

Continued on page 2
### Ultrasonic Sensor Selection Guide

#### Product Line

<table>
<thead>
<tr>
<th>LV-MaxSonar-EZ</th>
<th>XL-MaxSonar-EZ</th>
<th>LV-MaxSonar-WR</th>
<th>LV-MaxSonar-WRC</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td></td>
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</tr>
<tr>
<td>Easy to use interface with Trigger or Free-run Operation and Stable Range Data</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Range produced by Analog Voltage Output and Serial Output</td>
<td>Yes</td>
<td>Yes-(XL-EZ)</td>
<td>Yes-(XL-WR, LV-WR)</td>
</tr>
<tr>
<td>Pulse Width Output</td>
<td>Yes</td>
<td>No-(XL-AE)</td>
<td>No-(XL-WRA)</td>
</tr>
<tr>
<td>Real-time Analog Envelope Output of the Acoustic Waveform</td>
<td>No</td>
<td>No-(XL-EZ)</td>
<td>No-(XL-WR, LV-WR)</td>
</tr>
<tr>
<td>IP67 Rated for Outdoor Use</td>
<td>No</td>
<td>(can be mounted in a way that protects the sensor from exposure to the elements.)</td>
<td>No</td>
</tr>
<tr>
<td>Automatic Calibration to Compensate for Changes in Temperature, Voltage, Humidity and Noise.</td>
<td>On power up only</td>
<td>Yes</td>
<td>No-(LV-WR On power up only)</td>
</tr>
<tr>
<td>Has noise canceling</td>
<td>Some</td>
<td>Yes</td>
<td>Some-(LV-WR)</td>
</tr>
<tr>
<td>Resolution</td>
<td>1 inch</td>
<td>1 cm</td>
<td>1 cm-(XL-WR, XL-WRA)</td>
</tr>
<tr>
<td>Maximum Rate Readings are taken</td>
<td>20Hz</td>
<td>10Hz</td>
<td>10Hz-(XL-WR, XL-WRA)</td>
</tr>
<tr>
<td>3.3V Operation, Average Current Draw</td>
<td>1.6mA</td>
<td>2.1mA</td>
<td>2.1mA</td>
</tr>
<tr>
<td>5V Operation, Average Current Draw</td>
<td>1.9mA</td>
<td>3.4mA</td>
<td>3.4mA</td>
</tr>
<tr>
<td>Acoustic Frequency</td>
<td>42kHz</td>
<td>42kHz</td>
<td>42kHz</td>
</tr>
<tr>
<td>Minimum Object Detection Distance</td>
<td>0 inches</td>
<td>0 cm (1)</td>
<td>0 cm/inches</td>
</tr>
<tr>
<td>Minimum Reported Distance</td>
<td>6 inches</td>
<td>20 cm</td>
<td>20 cm-(XL-WR, XL-WRA)</td>
</tr>
<tr>
<td>Maximum Range</td>
<td>254 inches (6.45 meters)</td>
<td>765 cm (3)</td>
<td>765 cm (3)-(XL-WR, XL-WRA)</td>
</tr>
<tr>
<td>Semi-custom solution available to meet almost any need</td>
<td>Yes (4)</td>
<td>Yes (4)</td>
<td>Yes (4)</td>
</tr>
</tbody>
</table>

#### Notes:

1. Objects from 0-mm to 1-mm may not be detected.
2. Objects closer than the minimum-distance-reported*, typically range as this value*.
3. Sensors with a 1068cm maximum range are available.
4. Contact MaxBotix Inc., to have your sensor solution evaluated.
5. Sensors may intermittently detect large objects out 765cm. The maximum reported range is 765cm.

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MaxBotix® Inc.
The names MaxBotix®, MaxSonar®, EZ0, EZ1, EZ2, E4, AE0, AE1, AE2, AE3, AE4, WR1, and WRC1 are trademarks of MaxBotix Inc.
### LV-MaxSonar-EZ
**Some Features:**
- Easy to use interface
- 1 inch resolution
- Various calibrated beam widths
- Size is less than 1 cubic inch

**Possible Applications:**
- Educational and hobby robots
- Distance measuring
- UAV
- Some industrial uses
- Autonomous navigation

**Comments:**
- Power up calibration compensates for various mounting arrangements and environments.
- * For best operation, must be clear of objects for 14 inches during power up calibration.
- **NOTE:** Requires user to cycle the power to recalibrate sensor if the voltage, temperature or humidity change during operation.

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### XL-MaxSonar-EZ
**Some Features:**
- Easy to use interface
- 1 cm resolution
- Various calibrated beam widths
- Size is less than 1 cubic inch
- Real-time auto calibration
- Real-time noise rejection
- High acoustic power

**FOR THE ANALOG ENVELOPE (AE):**
- Real-time analog envelope

**Possible Applications:**
- Robots
- Distance measuring
- Industrial uses
- UAV
- Autonomous navigation
- Bin levels
- Changing environment conditions

**FOR THE ANALOG ENVELOPE (AE):**
- Troubleshooting and sensor integration
- User signal processing
- Recommended for sensor integration process into systems

**Comments:**
- Automatically compensates for noisy and changing environmental conditions (temperature, voltage or humidity).
- Auto calibration will compensate for and detect up close objects.

**FOR THE ANALOG ENVELOPE (AE):**
- Allows easy identification of troubleshooting issues using the real-time analog envelope.

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### LV-MaxSonar-WR
**Some Features:**
- Easy to use interface
- IP67 rated
- 1 cm (or 1 inch LV-WR) resolution
- Calibrated beam width
- Small size
- High acoustic power

**FOR THE WR (ANALOG ENVELOPE):**
- Real-time analog envelope

**Possible Applications:**
- Robots
- Distance measuring
- Industrial uses
- UAV
- Autonomous navigation
- Bin levels
- Changing environment conditions
- Tank levels
- Proximity zone detection

**FOR THE WR (ANALOG ENVELOPE):**
- Troubleshooting and sensor integration
- User signal processing
- Recommended for sensor integration process into systems

**Comments:**
- Auto calibration will compensate for and detect up close objects.
- 10 meter part detect larger targets to the long 10 meter range

**FOR THE WR (ANALOG ENVELOPE):**
- Allows easy identification of troubleshooting issues using the real-time analog

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### LV-MaxSonar-WRC
**Some Features:**
- Easy to use interface
- Smallest compact IP67 rated size available
- 1 cm (or 1 inch LV-WRC) resolution
- Calibrated beam width
- Real-time auto calibration
- Real-time noise rejection
- High acoustic power

**FOR THE WRC (ANALOG ENVELOPE):**
- Real-time analog envelope

**Possible Applications:**
- Robots
- Distance measuring
- Industrial uses
- UAV
- Autonomous navigation
- Bin levels
- Changing environment conditions
- Tank levels
- Proximity zone detection

**FOR THE WRC (ANALOG ENVELOPE):**
- Troubleshooting and sensor integration
- User signal processing
- Recommended for sensor integration process into systems

**Comments:**
- Automatically compensates for noisy and changing environmental conditions (temperature, voltage or humidity).
- Auto calibration will compensate for and detect up close objects.

**FOR THE WRC (ANALOG ENVELOPE):**
- Allows easy identification of troubleshooting issues using the real-time analog

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### XL-MaxSonar-WRCA
**Some Features:**
- Easy to use interface
- Real-time auto calibration
- Real-time noise rejection
- High acoustic power

**FOR THE WRCA (ANALOG ENVELOPE):**
- Real-time analog envelope

**Possible Applications:**
- Robots
- Distance measuring
- Industrial uses
- UAV
- Autonomous navigation
- Bin levels
- Changing environment conditions

**FOR THE WRCA (ANALOG ENVELOPE):**
- Troubleshooting and sensor integration
- User signal processing
- Recommended for sensor integration process into systems

**Comments:**
- Automatically compensates for noisy and changing environmental conditions (temperature, voltage or humidity).
- Auto calibration will compensate for and detect up close objects.

**FOR THE WRCA (ANALOG ENVELOPE):**
- Allows easy identification of troubleshooting issues using the real-time analog
LV-MaxSonar-EZ Mechanical Dimensions

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<table>
<thead>
<tr>
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<tbody>
<tr>
<td>A</td>
<td>0.785&quot;</td>
<td>19.9 mm</td>
</tr>
<tr>
<td>B</td>
<td>0.870&quot;</td>
<td>22.1 mm</td>
</tr>
<tr>
<td>C</td>
<td>0.100&quot;</td>
<td>2.54 mm</td>
</tr>
<tr>
<td>D</td>
<td>0.100&quot;</td>
<td>2.54 mm</td>
</tr>
<tr>
<td>E</td>
<td>0.670&quot;</td>
<td>17.0 mm</td>
</tr>
<tr>
<td>F</td>
<td>0.510&quot;</td>
<td>12.6 mm</td>
</tr>
<tr>
<td>G</td>
<td>0.124&quot; dia.</td>
<td>3.1 mm dia</td>
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</tbody>
</table>

values are nominal

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<tr>
<td>H</td>
<td>0.100&quot;</td>
<td>2.54 mm</td>
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weights, 4.3 grams

XL-MaxSonar-EZ & AE Mechanical Dimensions

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weights, 5.9 grams

MaxSonar-WR & WRA Mechanical Dimensions

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<tbody>
<tr>
<td>A</td>
<td>1.72&quot; dia.</td>
<td>43.8 mm dia</td>
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<tr>
<td>B</td>
<td>2.00&quot;</td>
<td>50.7 mm</td>
</tr>
<tr>
<td>C</td>
<td>0.58&quot;</td>
<td>14.4 mm</td>
</tr>
<tr>
<td>D</td>
<td>0.31&quot;</td>
<td>7.9 mm</td>
</tr>
<tr>
<td>E</td>
<td>0.23&quot;</td>
<td>5.8 mm</td>
</tr>
<tr>
<td>F</td>
<td>0.1&quot;</td>
<td>2.54 mm</td>
</tr>
<tr>
<td>G</td>
<td>3/4&quot;-14 National Pipe Thread Straight</td>
<td></td>
</tr>
</tbody>
</table>

values are nominal

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<tr>
<td>H</td>
<td>1.032&quot; dia.</td>
<td>26.2 mm dia</td>
</tr>
<tr>
<td>I</td>
<td>1.37&quot;</td>
<td>34.8 mm</td>
</tr>
</tbody>
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weight, 1.76 oz., 50 grams

MaxSonar-WRC & WRCA Mechanical Dimensions

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<td>A</td>
<td>1.37&quot; dia.</td>
<td>34.7 mm dia</td>
</tr>
<tr>
<td>B</td>
<td>0.70&quot;</td>
<td>17.9 mm</td>
</tr>
<tr>
<td>C</td>
<td>0.57&quot;</td>
<td>14.4 mm</td>
</tr>
<tr>
<td>D</td>
<td>0.31&quot;</td>
<td>7.9 mm</td>
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</table>

weight, 1.23 oz., 32 grams