

**MB7060**  
**MB7070**



# **XL- MaxSonar<sup>®</sup> - WR1<sup>™</sup> (MB7060)** **XL- MaxSonar<sup>®</sup> - WRA1<sup>™</sup> (MB7070)** **Weather Resistant (IP67) Sonar Range Finder with High Power Output, Noise Rejection, Auto Calibration & Long-Range Narrow Detection Zone**

*This sensor provides very short to long-range detection and ranging, in a compact, robust PVC housing, designed to meet IP67 water intrusion, and matches standard electrical 3/4" PCV pipe fittings. This sensor has a new high power output along with real-time auto calibration for changing conditions (temperature, voltage or acoustic or electrical noise) that ensure you receive the most reliable (in air) ranging data for every reading taken. The low power 3.0V to 5.5V operation detects objects from 0-cm to 765-cm (25.1 feet) and provides sonar range information from 20-cm out to 765-cm with 1-cm resolution. Objects from 0-cm to 20-cm range as 20-cm. The interface output formats included are pulse width output (MB7060), real-time analog voltage envelope (MB7070), analog voltage output, and serial digital output.*

<b>Features</b>	<b>Benefits</b>	<b>Applications and Uses</b>
<ul style="list-style-type: none"> <li>• High acoustic power output</li> <li>• Real-time auto calibration and noise rejection for every ranging cycle</li> <li>• Precise narrow beam</li> <li>• Continuously variable gain</li> <li>• Object detection includes zero range objects</li> <li>• 3.0V to 5.5V supply with very low average current draw</li> <li>• Readings can occur up to every 100mS, (10-Hz rate)</li> <li>• Free run operation can continually measure and output range information</li> <li>• Triggered operation provides the range reading as desired</li> <li>• All interfaces are active simultaneously</li> <li>• Serial, 0 to Vcc, 9600Baud, 81N</li> <li>• Analog, (Vcc/1024) / cm</li> <li>• Pulse Width (MB7060)</li> <li>• Real-time analog envelope (MB7070)</li> <li>• Sensor operates at 42KHz</li> </ul>	<ul style="list-style-type: none"> <li>• Acoustic and electrical noise resistance</li> <li>• Reliable and stable range data</li> <li>• Sensor dead zone virtually gone</li> <li>• Low cost IP67 sensor</li> <li>• Quality narrow beam characteristics</li> <li>• Very low power ranger, excellent for multiple sensor or battery based systems</li> <li>• Ranging can be triggered externally or internally</li> <li>• Sensor reports the range reading directly, frees up user processor</li> <li>• Fast measurement cycle</li> <li>• User can choose any of the sensor outputs</li> <li>• No power up calibration required, perfect for when objects may be directly in front of the sensor during power up</li> <li>• Easy mounting or mating with standard electrical fittings</li> </ul>	<ul style="list-style-type: none"> <li>• Tank level measurement</li> <li>• Bin level measurement</li> <li>• Proximity zone detection</li> <li>• People detection</li> <li>• Robot ranging sensor</li> <li>• Autonomous navigation</li> <li>• Environments with acoustic and electrical noise</li> <li>• Multi-sensor arrays</li> <li>• Distance measuring</li> <li>• Long range object detection</li> <li>• Users who prefer to process the analog voltage envelope (MB7070)</li> <li>• Industrial sensor</li> <li>• -40°C to +65°C operation (+85°C limited operation)</li> <li>• Physical drop-in upgrade for LV-MaxSonar-WR1 product, part numbers: MB7001</li> </ul>



**MB7060**  
**MB7070**

**MB7060 & MB7070 Real-time Noise Rejection**

While the XL-MaxSonar® is designed to operate in the presence of noise, best operation is obtained when noise strength is low and desired signal strength is high. Hence, the user is encouraged to mount the sensor in such a way that minimizes outside acoustic noise pickup. In addition, keep the DC power to the sensor free of noise. This will let the sensor deal with noise issues outside of the users direct control (in general, the sensor will still function well even if these things are ignored). Users are encouraged to test the sensor in their application to verify usability.

For every ranging cycle, individual filtering for that specific cycle is applied. In general, noise from regularly occurring periodic noise sources such as motors, fans, vibration, etc., will not falsely be detected as an object. This holds true even if the periodic noise increases or decreases (such as might occur in engine throttling or an increase/decrease of wind movement over the sensor). Even so, it is possible for sharp non-periodic noise sources to cause false target detection. In addition, \*(because of dynamic range and signal to noise physics,) as the noise level increases, at first only small targets might be missed, but if noise increases to very high levels, it is likely that even large targets will be missed.

\*In high noise environments, if needed, use 5V power to keep acoustic signal power high. In addition, a high acoustic noise environment may use some of the dynamic range of the sensor, this may decrease sensitivity. For applications with large targets, consider a part with ultra clutter rejection like the MB7052 or MB7092 or advanced filtering such as the MB7062 or MB7072.

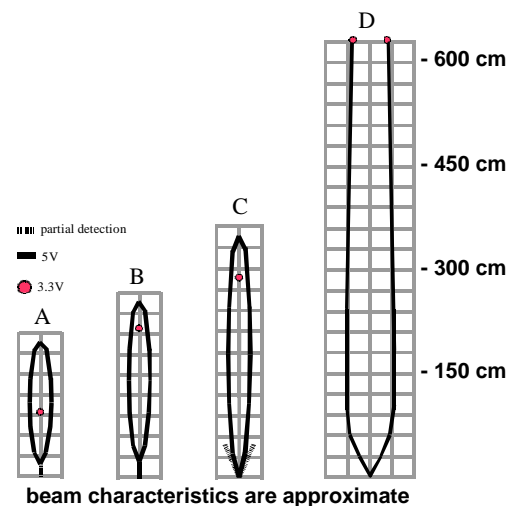
**MB7060 & MB7070 Beam Characteristics**

People detection requires high sensitivity, yet minimal side-lobes requires low sensitivity. The MB7060 and MB7070 balances the detection of people with minimal side-lobes. Sample results for measured beam patterns are shown below on a 30-centimeter grid. The detection pattern is shown for;

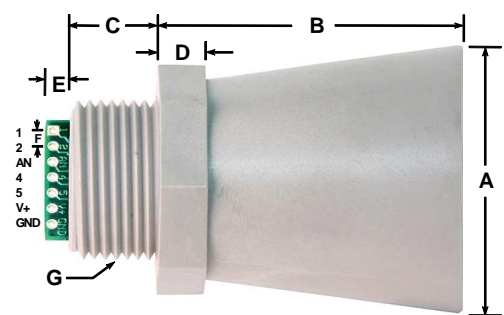
- (A) 0.25-inch diameter dowel,
- (B) 1-inch diameter dowel,
- (C) 3.25-inch diameter dowel,
- (D) 11-inch wide board moved left to right with the board parallel to the front sensor face and the sensor stationary.

This shows the sensor's range capability.

Note: The displayed beam width of (D) is a function of the specular nature of sonar and the shape of the board (i.e. flat mirror like) and should never be confused with actual sensor beam width.

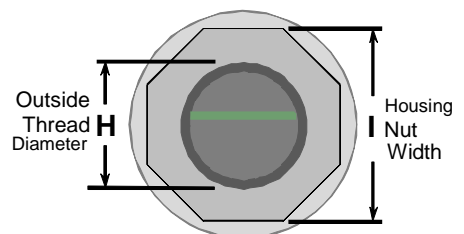


**MB7060 & MB7070 Mechanical Dimensions**



A	1.72" dia.	43.8 mm dia.
B	2.00"	50.7 mm
C	0.58"	14.4 mm
D	0.31"	7.9 mm
E	0.23"	5.8 mm
F	0.1"	2.54 mm
G	3/4" National Pipe Thread Straight	
H	1.032" dia.	26.2 mm dia.
I	1.37"	34.8 mm
weight, 1.76 oz., 50 grams		

values are nominal



**MaxBotix® Inc.**

MaxBotix, MaxSonar, WR1 & WRA1 are trademarks of MaxBotix Inc.  
XL-WR1™ XL-WRA1™ • Patents 7,679,996 • Copyright 2005 - 2012

Email: [info@maxbotix.com](mailto:info@maxbotix.com)

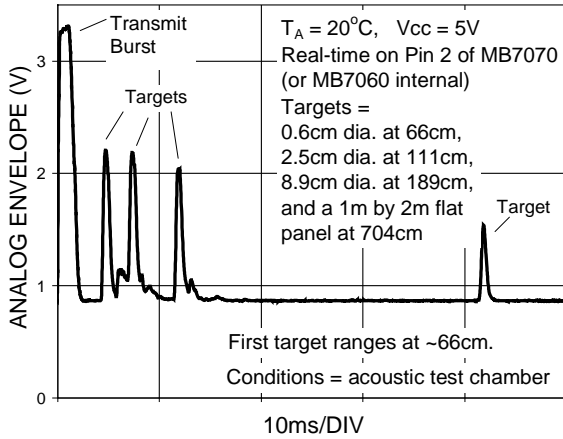
Web: [www.maxbotix.com](http://www.maxbotix.com)

Part Number: PD10024e

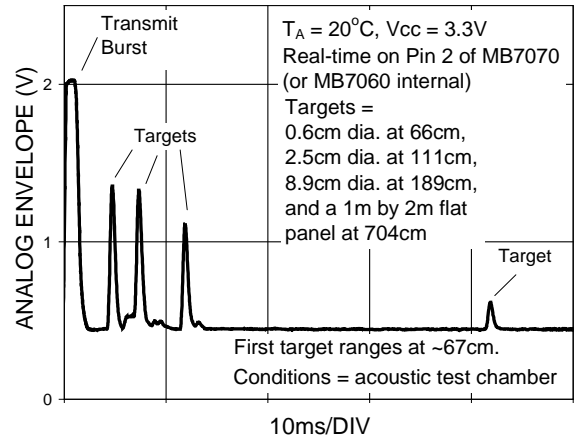
**MB7060**  
**MB7070**

**Typical Performance to Targets**

**Analog Envelope Output (Dowels, 5V)**

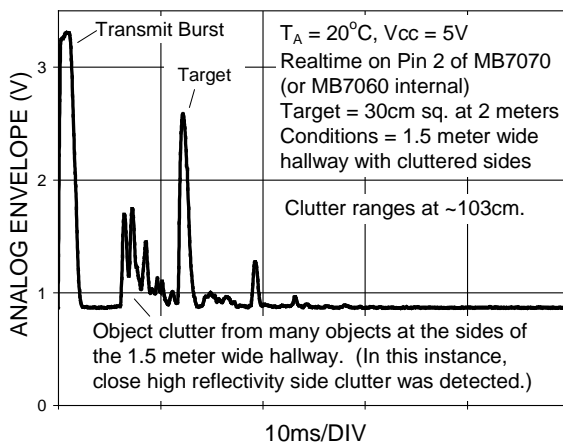


**Analog Envelope Output (Dowels, 3.3V)**

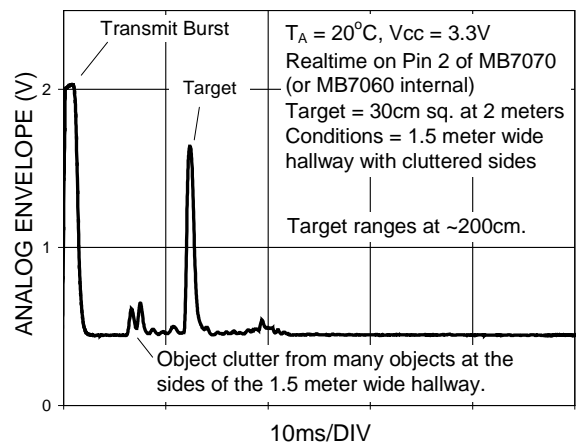


**Typical Performance in Clutter**

**Analog Envelope Output (Clutter, 5V)**



**Analog Envelope Output (Clutter, 3.3V)**



Product / specifications subject to change without notice. For more info visit [www.maxbotix.com](http://www.maxbotix.com)