

# XL-MaxSonar® - WR/WRC™ Series

High Performance, IP67 Weather Resistant, Ultrasonic Range Finder

MB7052, MB7060, MB7062, MB7066, MB7067, MB7068,  
MB7070, MB7072, MB7076, MB7077, MB7078, MB7092



The XL-MaxSonar-WR and XL-MaxSonar-WRC sensor series provide users with robust range information in air. These sensors also feature high-power acoustic output along with real-time auto calibration for changing conditions (supply voltage sag, acoustic noise, or electrical noise), operation with supply voltage from 3V to 5.5V, object detection from 0-cm to 765-cm (select models) or 1068-cm (select models), and sonar range information from 20-cm out to 765-cm (select models) or 1068-cm (select models) with 1-cm resolution. Objects from 0-cm to 20-cm range as 20-cm or closer. The sensor is housed in a robust PVC housing, designed to meet the IP67 water intrusion standard, and matches standard electrical/water 3/4" PCV pipe fittings. The user interface formats included are pulse-width (select models), real-time analog-voltage envelope (select models), analog voltage output, and serial output.

## Features

- Real-time auto calibration and noise rejection
- High acoustic power output
- Precise narrow beam
- Object detection includes zero range objects
- 3V to 5.5V supply with very low average current draw
- Free run operation can continually measure and output range information
- 10Hz refresh rate (MB7060, MB7062, MB7066, MB7070, MB7072, MB7076, MB7092)
- 6.6Hz refresh rate (MB7052)
- Triggered operation provides the range reading as desired
- All interfaces are active simultaneously
- RS232 Serial, 0 to Vcc, 9600 Baud, 81N
- Analog, (Vcc/1024) / cm for standard models

- Analog, (Vcc/1024) / 2cm for 10-meter models (MB7066, MB7076)
- Sensor operates at 42KHz

## Benefits

- Acoustic and electrical noise resistance
- Reliable and stable range data
- Robust, low cost IP67 standard sensor
- Narrow beam characteristics
- Very low power excellent for battery based systems
- Ranging can be triggered externally or internally
- Sensor reports the range reading directly, frees up user processor
- Easy hole mounting or mating with standard electrical fittings
- Filtering allows very reliable operation in most environments

## Applications and Uses

- Tank level measurement
- Bin level measurement
- Proximity zone detection
- Environments with acoustic and electrical noise
- Distance measuring
- Long range object detection
- Industrial sensor
- -40°C to +65°C (limited operation to +85°C)

## Close Range Operation

Applications requiring 100% reading-to-reading reliability should not use MaxSonar sensors at a distance closer than 20cm. Although most users find MaxSonar sensors to work reliably from 0 to 20cm for detecting objects in many applications, MaxBotix® Inc. does not guarantee operational reliability for objects closer than the minimum reported distance. Because of ultrasonic physics, these sensors are unable to achieve 100% reliability at close distances.

## Warning: Personal Safety Applications

We do not recommend or endorse this product be used as a component in any personal safety applications. This product is not designed, intended or authorized for such use. These sensors and controls do not include the self-checking redundant circuitry needed for such use. Such unauthorized use may create a failure of the MaxBotix® Inc. product which may result in personal injury or death. MaxBotix® Inc. will not be held liable for unauthorized use of this component.

## XL-MaxSonar-WR/WRC Pin Out

**Pin 1-** Leave open (or high) for serial output on the Pin 5 output. When Pin 1 is held low the Pin 5 output sends a pulse (instead of serial data), suitable for low noise chaining.

**Pin 2-** This pin outputs a pulse-width representation of range. To calculate the distance, use a scale factor of 58uS per cm. (MB7052, MB7060, MB7062, MB7066, MB7067, MB7068)

This pin outputs the analog voltage envelope of the acoustic waveform. For the MB7070 series and MB7092 sensors, this is a real-time always-active output (MB7070, MB7072, MB7076, MB7077, MB7078, MB7092)

**Pin 3- AN-** This pin outputs analog voltage with a scaling factor of  $(V_{cc}/1024)$  per cm. A supply of 5V yields  $\sim 4.9\text{mV/cm}$ , and 3.3V yields  $\sim 3.2\text{mV/cm}$ . Hardware limits the maximum reported range on this output to  $\sim 700$  cm at 5V and  $\sim 600$  cm at 3.3V. The output is buffered and corresponds to the most recent range data.

For the 10-meter sensors (MB7066, MB7076) Pin 3 outputs an analog voltage with a scaling of  $(V_{cc}/1024)$  per 2cm. A supply of 5V yields  $\sim 4.9\text{mV}/2\text{cm}$ , and 3.3V yields  $\sim 3.2\text{mV}/2\text{cm}$ . This Analog Voltage output steps in 2cm increments.

**Pin 4- RX-** This pin is internally pulled high. If Pin-4 is left unconnected or held high, the sensor will continually measure the range. If Pin-4 is held low the sensor will stop ranging. Bring high 20uS or more to command a range reading.

**Pin 5- TX-** When Pin 1 is open or held high, the Pin 5 output delivers asynchronous serial data in an RS232 format, except the voltages are 0-Vcc. The output is an ASCII capital "R", followed by ASCII character digits representing the range in centimeters up to a maximum of 765 (select models) or 1068 (select models), followed by a carriage return (ASCII 13). The baud rate is 9600, 8 bits, no parity, with one stop bit. Although the voltages of 0V to Vcc are outside the RS232 standard, most RS232 devices have sufficient margin to read the 0V to Vcc serial data. If standard voltage level RS232 is desired, invert, and connect an RS232 converter such as a MAX232. When Pin 1 is held low, the Pin 5 output sends a single pulse, suitable for low noise chaining (no serial data).

**V+** Operates on 3V - 5.5V. The average (and peak) current draw for 3.3V operation is 2.1mA (50mA peak) and 5V operation is 3.4mA (100mA peak) respectively. Peak current is used during sonar pulse transmit.

**GND-** Return for the DC power supply. GND (& V+) must be ripple and noise free for best operation.

## Auto Calibration

Each time before the XL-MaxSonar-WR takes a range reading it auto calibrates. The sensor then uses this data to range objects. If the temperature, humidity, or applied voltage changes during sensor operation, the sensor will continue to function normally. (The sensors do not apply compensation for the speed of sound change verses temperature to any range readings.) If the application requires temperature compensation please look at the HRXL-MaxSonar-WR sensor line.

## Supply Voltage Compensation

During power up, the XL-MaxSonar-WR sensor line will calibrate itself for the supply voltage. Additionally, the sensor will compensate if the supplied voltage gradually changes.

If the average voltage applied to the sensor changes faster than 0.5V per second, it is best to remove and reapply power to the sensor.

For best operation, the sensor requires noise free power. If the sensor is used with noise on the supplied power or ground, the accuracy of the readings may be affected. Typically, adding a 100uF capacitor at the sensor between the V+ and GND pins will correct most power related electrical noise issues.

## About Ultrasonic Sensors

Our ultrasonic sensors are desired for use in air, non-contact object detection and ranging sensors that detect objects within a defined area. These sensors are not affected by the color or other visual characteristics of the detected object. Ultrasonic sensors use high frequency sound to detect and localize objects in a variety of environments. Ultrasonic sensors measure the time of flight for sound that has been transmitted to and reflected back from nearby objects. Based upon the time of flight, the sensor then outputs a range reading.

## Base Sensor (MB7060 and MB7070)

The MB7060 and MB7070 are the base models of the XL-MaxSonar-WR sensor line. These sensors are recommended for general purpose usage. All other sensors in this series are based off these sensor models. The additional features are mentioned in their respective sections below.

## XL-MaxSonar-WR1 (MB7062 and MB7072)

The XL-MaxSonar-WR1 sensors feature a 3 reading stability filter that ranges to the first detectable target. Filtering is available on Pin3 (AN) and Pin 5 (TX). Filtering is not applied to the output on Pin 2 (PW). This filter requires that 3 consecutive range readings are within 1cm of each other to be considered a valid range reading. If the range readings are outside 1cm, the sensor discards the range reading set and reports the last valid range reading. This sensor does not view maximum range as a valid range, and will not report 765 when no target is detected. If this sensor does not detect a target for 1 hour, the sensor will go into fail-safe and report 000.

## XL-MaxSonar-WRL (MB7066 and MB7076)

The XL-MaxSonar-WRL will report a maximum distance of 10 meters for large targets.

## XL-MaxSonar-WRM (MB7052 and MB7092)

The MB7052 and MB7092 sensors prioritize large targets over both small targets and noise. These sensors report the target that gives the largest acoustic reflection. This stands in contrast to other units such as the MB7060 which are designed to report the distance to the first detectable target. If the largest target is removed from the field of view, the MB7052 and MB7092 will switch to the target that gives the next largest detectable return.

When targets are of similar amplitude reflections, preference is given to the closer target. The sensor expects to see a target by 7.56 meters. If no target is found, the sensor will increase in sensitivity until a target is found, or until no targets can be found.

In addition to the most-likely filtering, the MB7052 and MB7092 come equipped with a three-reading filter and reading hold which requires three consecutive range readings within 1cm of the most recent reading to be considered a valid range reading. If readings are found to be outside 1cm, or no target can be found by the sensor, then the sensor will report the last valid range reading. Upon power-up the sensor will default to reporting 7.65 meters unit a valid range reading is found.

The last reading hold is designed for users operating in environments with intermittent high noise who desire to poll the MB7052 or MB7092 at intermittent times. This allows the sensor to report the previously valid reading until the sensor's environment improves. If no valid range reading is found for ~1.5 hours, the sensor will send a fail-safe output "000" on all interfaces.

Package Types Currently Available
Full Horn — 3/4" NPT straight; back mounted thread (best performance)
Compact — 3/4" NPT straight; back mounted thread
Ultra-Compact — PCB with 4 mounting holes
1"NPS — External thread over full sensor body (1"NPS)
1" BSPP — External thread over full sensor body (1"BSPP)
30mm1.5 — External thread over full sensor body (30mm1.5)
<b>All package types have exposed PCB on user end for easy connection. Users desiring a fully enclosed assembly may purchase the "Shielded Cable Option" along with their sensor.</b>



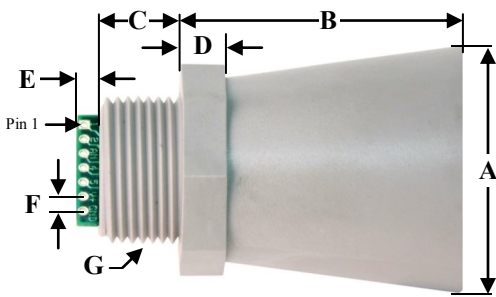
## Performance Changes when Selecting a Non-Full Horn Package

When selecting a XL-MaxSonar-WR without the full horn the sensor will experience the following performance changes:

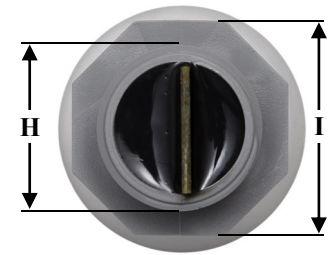
- The sensor will have a wider beam shape for the first meter.
- The sensor may have a dead zone from 0-6cm.
- The sensor may be less accurate by an additional +/- 0.5%.
- The sensor may have worse performance to small or soft targets.
- The sensor may experience decreased noise immunity when ranging to small, soft, angled, or distant targets.
- The maximum effective detection range is to 645cm, the sensor will still report 765 as a “no detection” output if a target is not found

## Mechanical Dimensions

### Full Horn

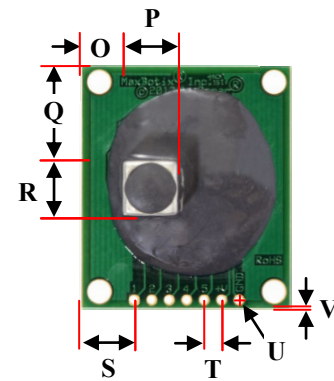
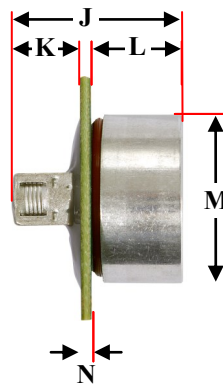
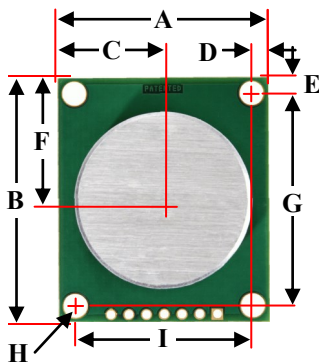


<b>A</b>	1.72" dia.	43.8 mm dia.
<b>B</b>	2.00"	50.7 mm
<b>C</b>	0.58"	14.4 mm
<b>D</b>	0.31"	7.9 mm
<b>E</b>	0.23"	5.8 mm
<b>F</b>	0.10"	2.54 mm
<b>G</b>	3/4"-14 NPS	
<b>H</b>	1.032" dia.	26.2 mm dia.
<b>I</b>	1.37"	34.8 mm
	Weight	50 grams



Values Are Nominal

### Ultra-Compact



All values are nominal		
<b>A</b>	30.48 mm	1.20"
<b>B</b>	35.56 mm	1.40"
<b>C</b>	12.24 mm	0.60"
<b>D</b>	2.54 mm	0.10"
<b>E</b>	2.54 mm	0.10"

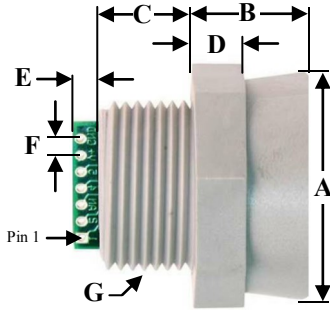
<b>F</b>	17.78 mm	0.70"
<b>G</b>	30.48 mm	1.20"
<b>H</b>	3.18 mm	0.13"
<b>I</b>	25.4 mm	1.00"
<b>J</b>	25.27 mm	1.00"
<b>K</b>	10.4 mm	0.41"

<b>L</b>	13.4 mm	0.53"
<b>M</b>	25.0 mm	0.98"
<b>N</b>	1.57 mm	0.62"
<b>O</b>	6.2 mm	0.24"
<b>P</b>	8.0 mm	0.31"
<b>Q</b>	13.9 mm	0.55"

<b>R</b>	7.80 mm	0.31"
<b>S</b>	7.62 mm	0.30"
<b>T</b>	2.54 mm	0.10"
<b>U</b>	1.07 mm	0.04"
<b>V</b>	1.27 mm	0.05"
<b>Weight 15.1 gram.</b>		

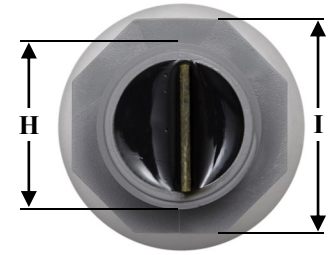
## Mechanical Dimensions Continued

### Compact Housing

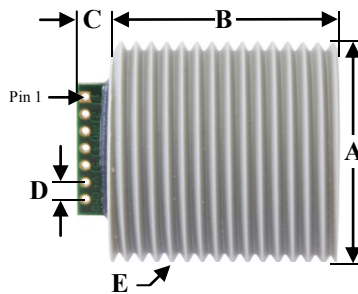


A	1.37" dia.	34.7 mm dia.
B	0.70"	17.9 mm
C	0.57"	14.4 mm
D	0.31"	7.9 mm
E	0.23"	5.8 mm
F	0.10"	2.54 mm
G	3/4"-14 NPS	
H	1.032" dia.	26.2 mm dia.
I	1.37"	34.8 mm
Weight		32 grams

Values Are Nominal

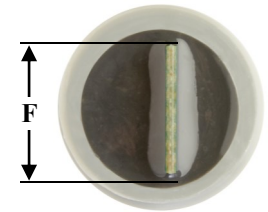


### 1" NPS Pipe Threading

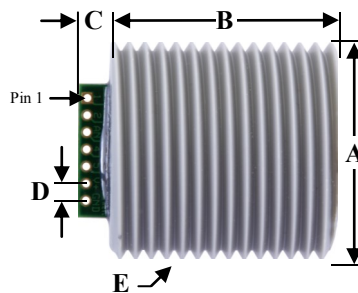


A	1.29" dia.	38.2 mm dia.
B	1.30"	33.1 mm
C	0.20"	5.2 mm
D	0.10"	2.54 mm
E	1" — NPS	
F	0.78"	19.8 mm
Weight		35 grams

Values Are Nominal

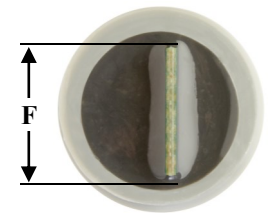


### 1" BSPP Pipe Threading

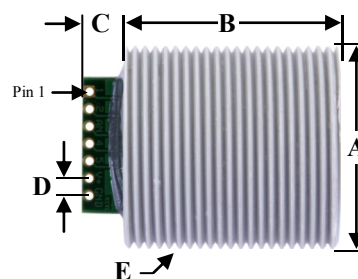


A	1.29" dia.	38.2 mm dia.
B	1.30"	33.1 mm
C	0.20"	5.2 mm
D	0.10"	2.54 mm
E	1" — BSPP	
F	0.78"	19.8 mm
Weight		34 grams

Values Are Nominal

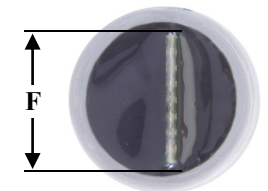


### 30mm1.5 Pipe Threading



A	1.17" dia.	29.7 mm dia.
B	1.30"	33.1 mm
C	0.20"	5.2 mm
D	0.10"	2.54 mm
E	30mm 1.5	
F	0.78"	19.8 mm
Weight		31 grams

Values Are Nominal



## About Package Types

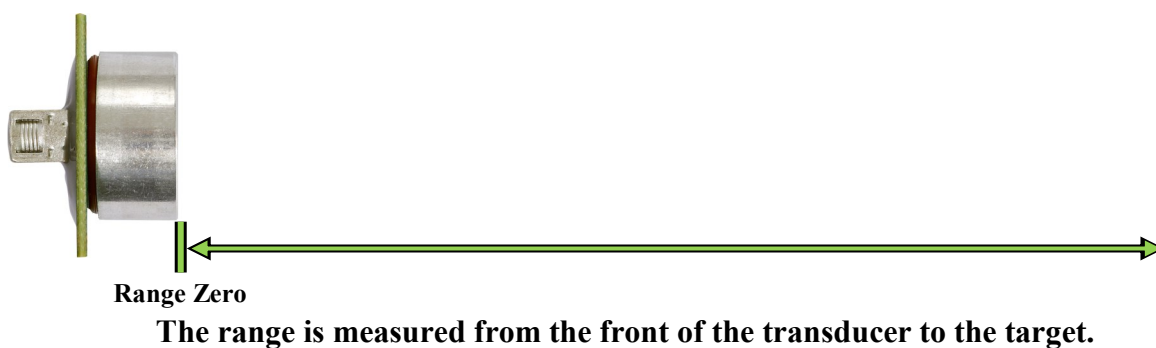
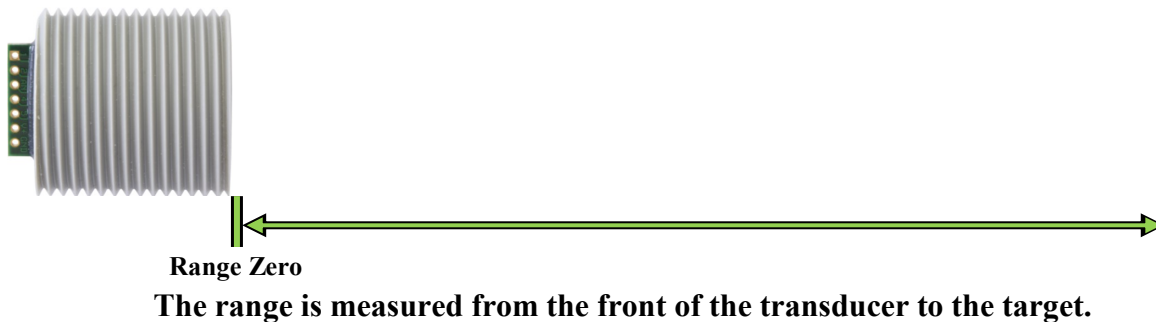
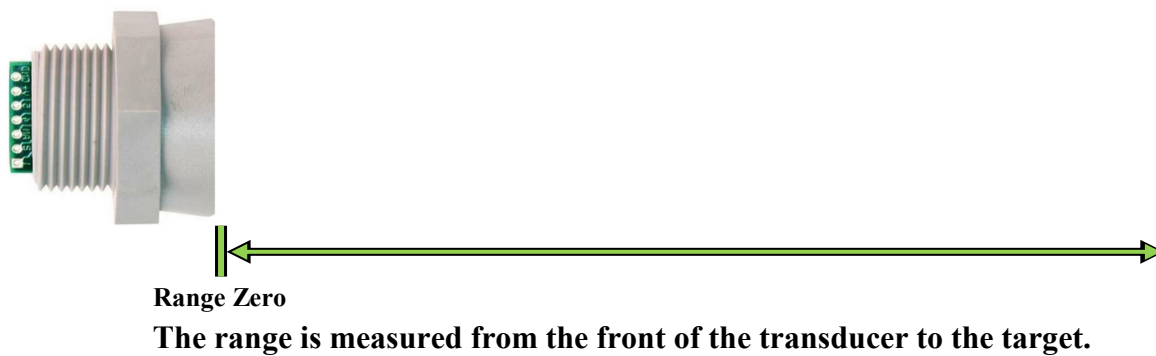
Part Number	AN Voltage	Serial Data (0 to Vcc level)	Pulse Width	Analog Envelope	Stability Filter	Most Likely Filter	Refresh Rate	Other Packages Available <sup>1</sup>	7 meter range	10 meter range
MB7052	Yes	RS232	Yes		Yes	Yes	6.6Hz	Yes	Yes	
MB7060	Yes	RS232	Yes				10Hz	Yes	Yes	
MB7062	Yes	RS232	Yes		Yes		10Hz	Yes	Yes	
MB7066	Yes	RS232	Yes				10Hz			Yes
MB7070	Yes	RS232		Yes			10Hz	Yes	Yes	
MB7072	Yes	RS232		Yes	Yes		10Hz	Yes	Yes	
MB7076	Yes	RS232		Yes			10Hz			Yes
MB7092	Yes	RS232		Yes	Yes	Yes	10Hz	Yes	Yes	

The XL-MaxSonar-WR sensor line is available in a variety of packages for applications with specific mounting requirements. The full horn package provides peak accuracy and sensitivity in this sensor line. It is recommended that testing is completed to ensure that the selected sensor will operate as desired in your application.

## Range “0” Location

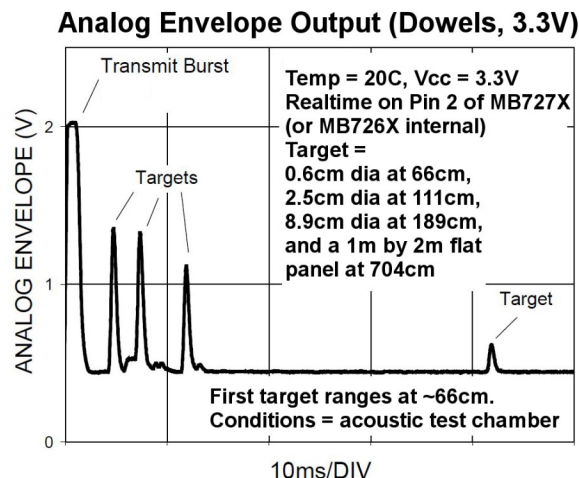
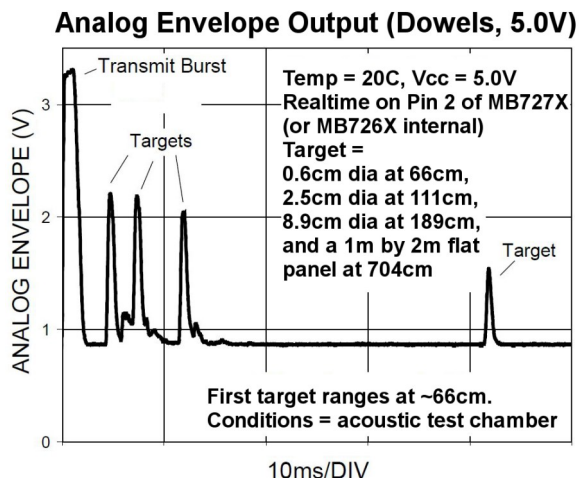
The XL-MaxSonar-WR sensors reports the range to distant targets starting from the front of the sensor as shown in the diagrams below.

The XL-MaxSonar-WR will report the range to the closest detectable object. Target detection has been characterized in the sensor beam patterns.



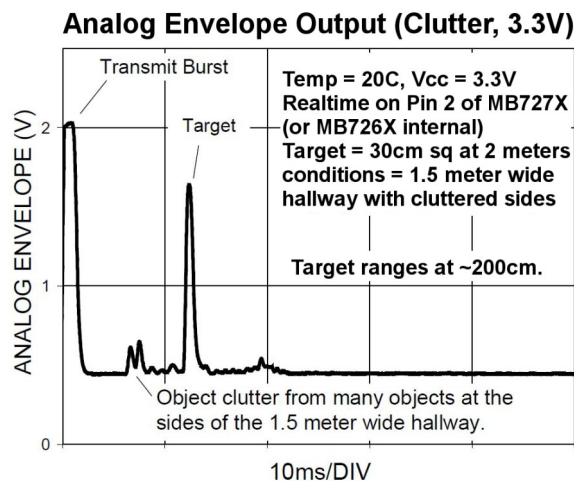
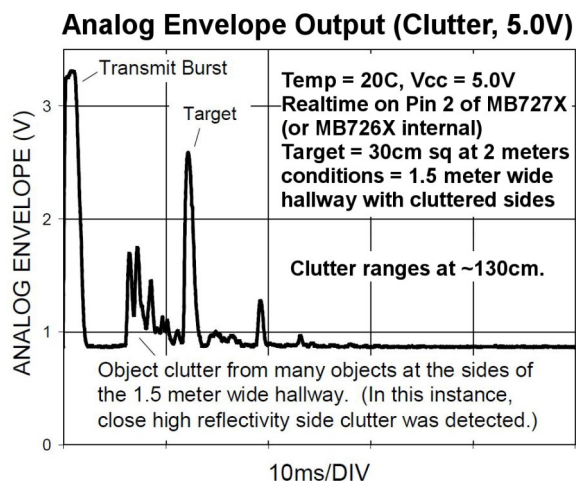
## Typical Performance to Target

### All sensor models

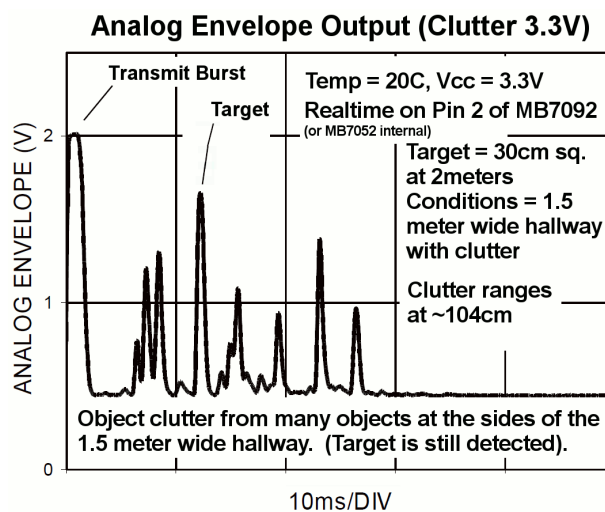
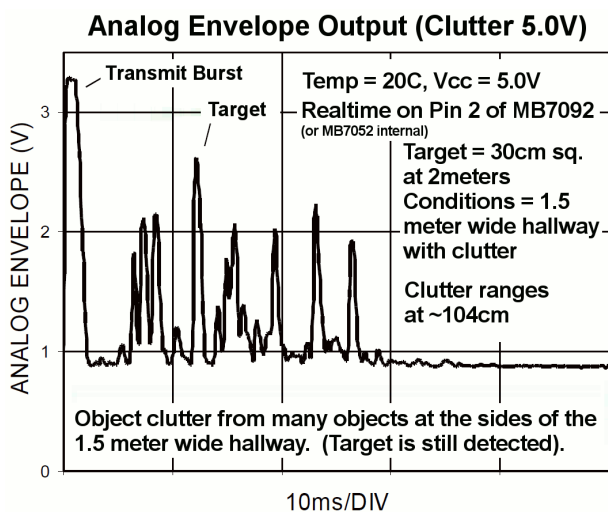


## Typical Performance in Clutter

### MB7060, MB7062, MB7076, MB7070, MB7072, MB7076



## Typical Performance in Clutter



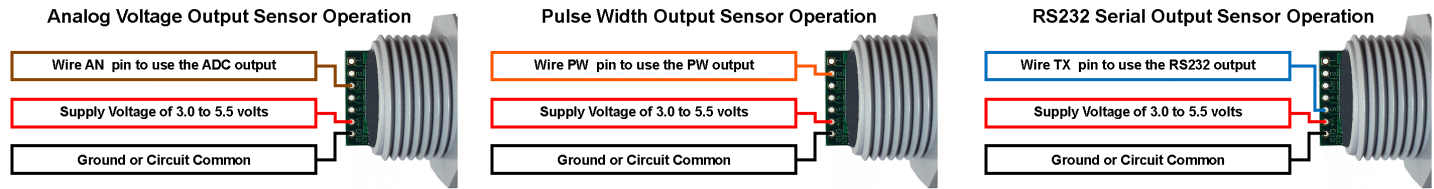
### MB7052, MB7092



## Device Comparison Chart

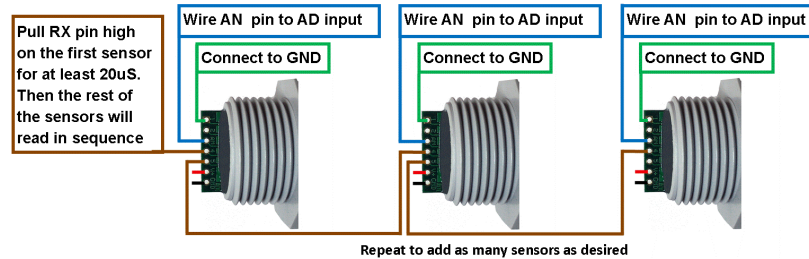
Notes:

<sup>1</sup> Alternative package types have a maximum effective detection range of 645cm, the sensor will still report 765 as a “no detection” output if a target is not found



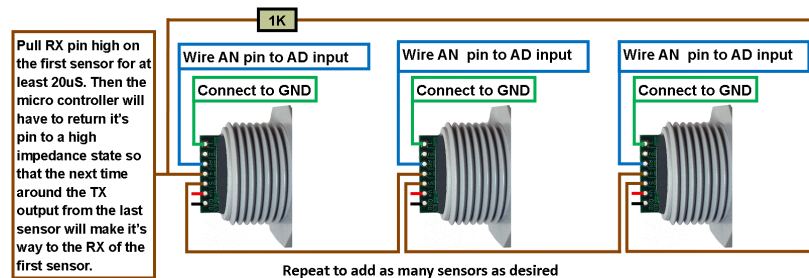
## Real-time Auto Calibration

The XL-MaxSonar-WR automatically calibrates prior to each range reading. The sensor then uses this data to range objects. If the temperature, humidity, or applied voltage changes during sensor operation, the sensor will continue to function normally. (The sensors do not apply compensation for the speed of sound change verses temperature to any range readings.) Detection has been characterized in the published sensor beam patterns.

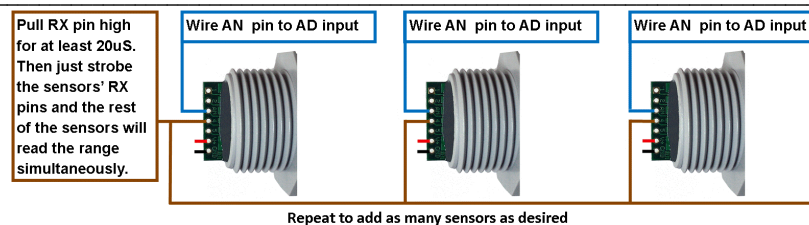


## Real-time Noise Rejection

While the XL-MaxSonar-WR is designed to operate in the presence of noise, best operation is obtained when noise



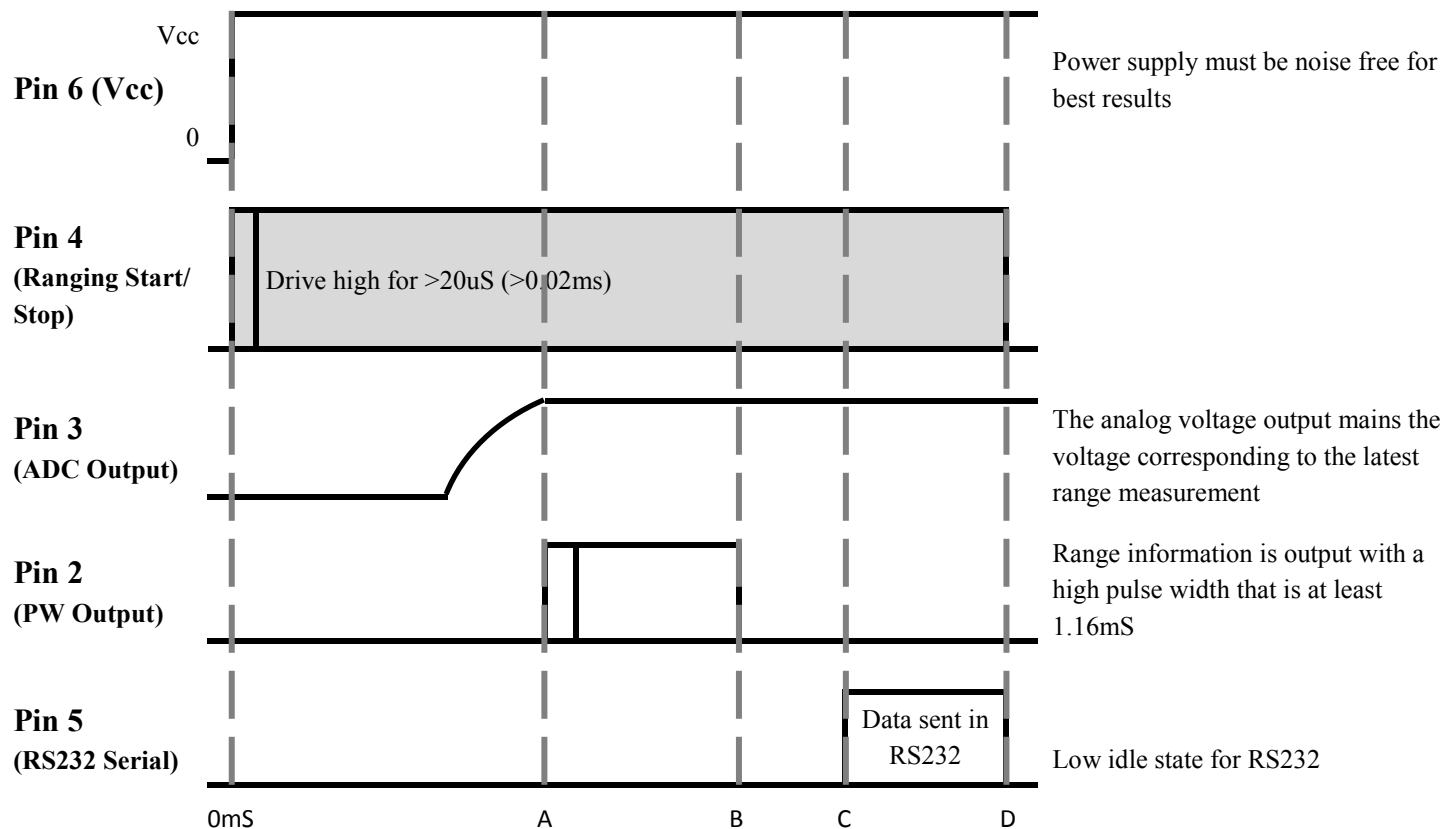
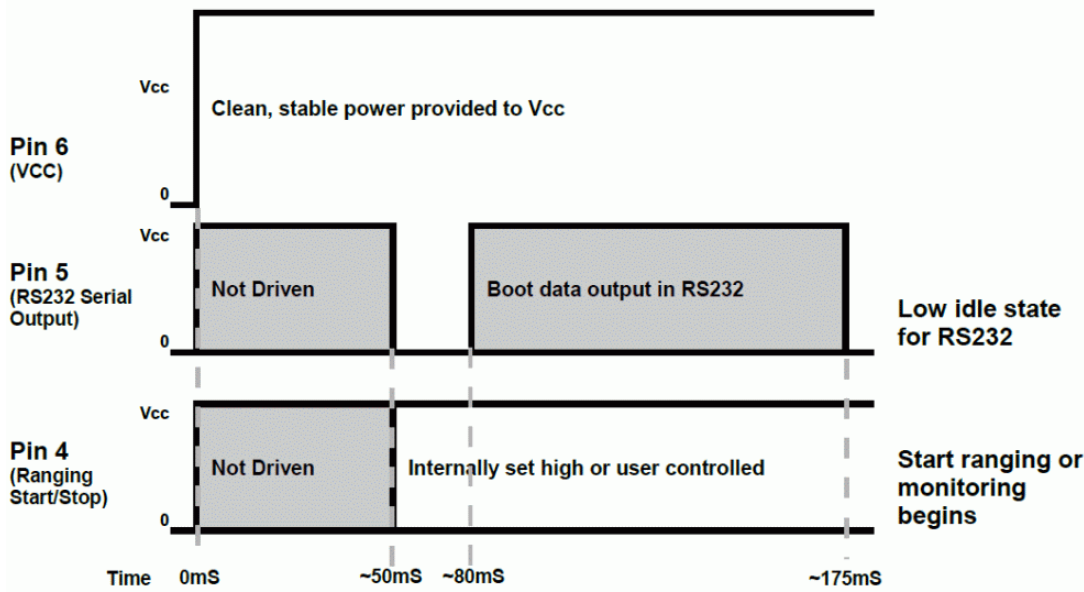
strength is low and desired signal strength is high. Hence, the user is encouraged to mount the sensor in such a way that minimizes outside acoustic noise pickup. In addition, keep the DC power to the sensor free of noise. This will let the sensor deal with noise issues outside of the users direct control (Even so, 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.



## Sensor Minimum Distance

The XL-MaxSonar-WR sensors have a minimum reported distance of 20-cm (7.87 inches). However, the

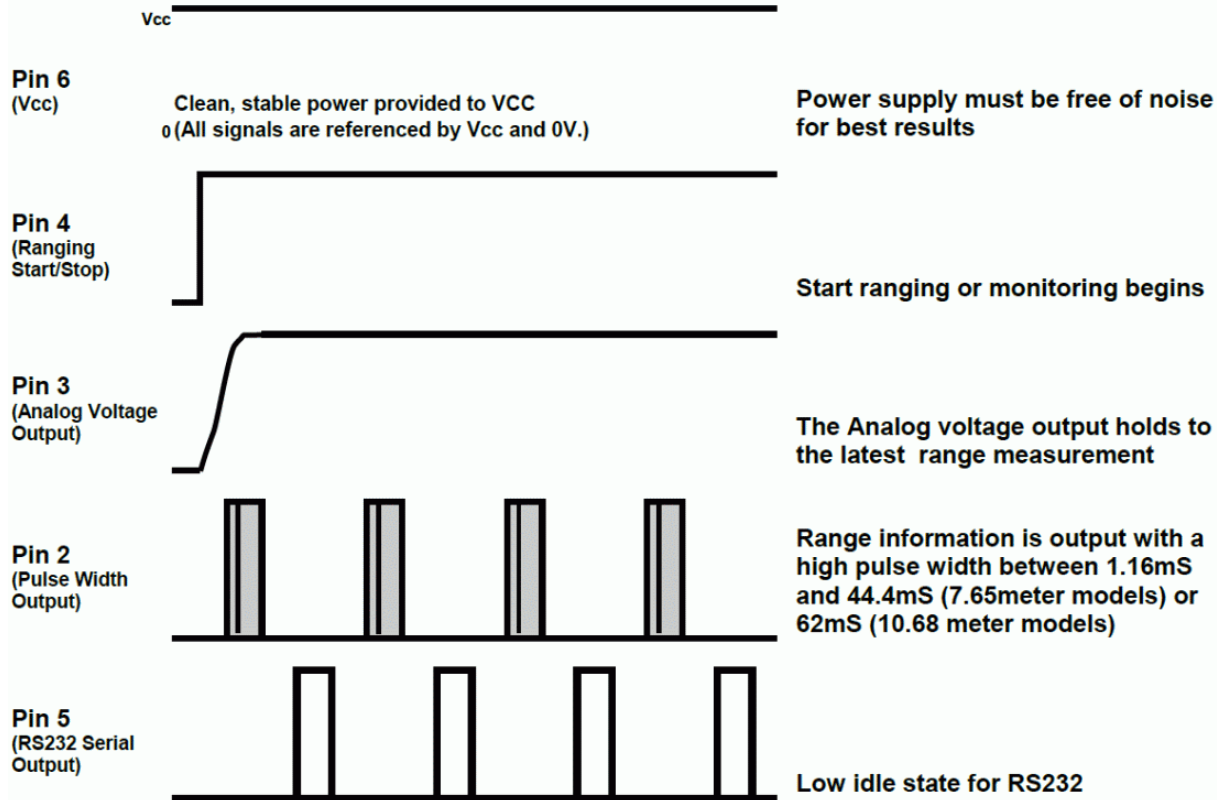
### Power Up Timing



Product	Maximum Refresh Rate	Pulse Width Reported	Max Pulse Width End	Serial Data Reported	End of Range Cycle
MB7052	6.6 Hz	~82.3mS	~126.7mS	~144.3mS	~149mS
MB7060, MB7062, MB7066	10 Hz	~32.3mS	~76.7mS	~94.3mS	~99mS
MB7070, MB7072, MB7076, MB7092	10Hz	NA	NA	~94.3mS	~99mS

XL-MaxSonar-WR will range and report targets to the front sensor face. Large targets closer than 20-cm will typically range as 20-cm. For the alternative housings, objects between 4-cm and 20-cm will typically range as 20-cm.

### Free-Run Operation



## XL-MaxSonar-WR Sensor Operating Modes

### Independent Sensor Operation

The XL-MaxSonar-WR sensors are designed to operate in a single sensor environment. Free-run is the default mode of operation for all of the MaxBotix Inc., sensors. The XL-MaxSonar-WR sensors have three separate outputs that update the range data simultaneously: Analog Voltage, Pulse Width<sup>1</sup>, and RS232 Serial. Below are diagrams on how to connect the sensor for each of the three outputs.

Note 1 - select models output an Analog Envelope for end user processing (MB707X sensors and MB7092)

### Using Multiple Sensors in a Single System

When using multiple ultrasonic sensors in a single system, there can be interference (cross-talk) from the other sensors. MaxBotix Inc., has engineered a solution to this problem for the XL-MaxSonar-WR sensors. The solution is referred to as chaining. We have 3 methods of chaining that work well to avoid the issue of cross-talk.

The first method is AN Output Commanded Loop. The first sensor will range, then trigger the next sensor to range and so on for all the sensors in the array. Once the last sensor has ranged, the array stops until the first sensor is triggered to range again. Below is a diagram on how to set this up.

The next method is AN Output Constantly Looping. The first sensor will range, then trigger the next sensor to range and so on for all the sensor in the array. Once the last sensor has ranged, it will trigger the first sensor in the array to range again and will continue this loop indefinitely. Below is a diagram on how to set this up.

The final method is AN Output Simultaneous Operation. This method does not work in all applications and is sensitive to how the other sensors in the array are physically positioned in comparison to each other. Testing is recommend to verify this method will work for your application. All the sensors RX pins are connected together and triggered at the same time causing all the sensor to take a range reading at the same time. Once the range reading is complete, the sensors stop ranging until triggered next time. Below is a diagram on how to set this up.

#### People Sensing:

For users that desire to detect people, the detection area to the 1-inch diameter dowel, in general, represents the area that the sensor will reliably detect people.

# MB7052-MB7092 XL-MaxSonar®-WRM1/WRMA1™ Beam Pattern and Uses

The XL-MaxSonar-WRM1/WRMA1 ignores smaller targets and only reports the range to the largest acoustic return. The filtering in the MB7052 and MB7092 also rejects moving target clutter such as rain or snow, electrical noise, and outside acoustic noise.

## MB7052-MB7092

### XL-MaxSonar®-WRM/WRM1™ Beam Pattern

Sample results for measured beam pattern are shown on a 30-cm grid. The detection pattern is shown for dowels of varying diameters that are placed in front of the sensor

**A** 6.1-mm (0.25-inch) diameter dowel

**B** 2.54-cm (1-inch) diameter dowel

**C** 8.89-cm (3.5-inch) diameter dowel

**D** 11-inch wide board moved left to right with the board parallel to the front sensor face.

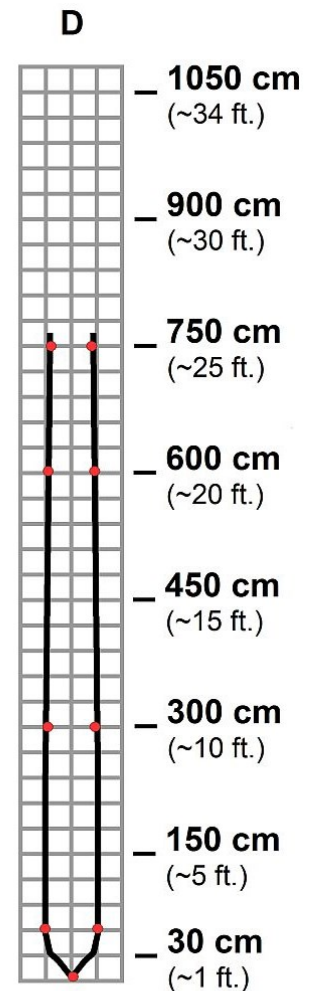
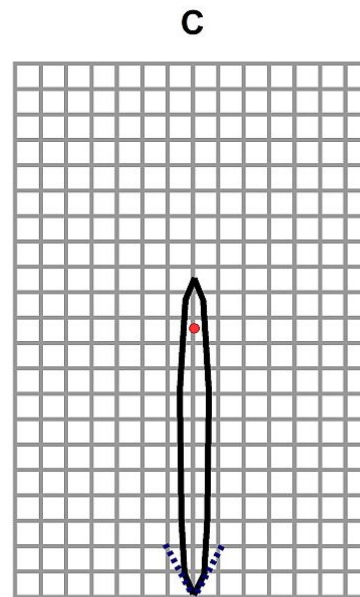
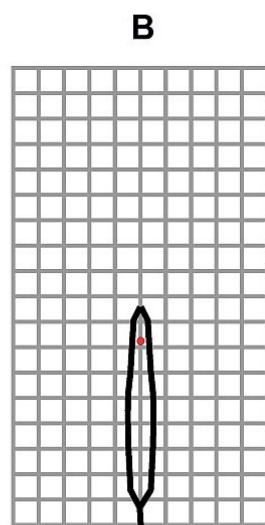
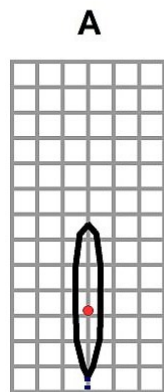
This shows the sensor's range capability.

**Note:** For people detection the pattern typically falls between charts A and B.

■ Partial Detection

— 5.0 V

● 3.3 V



**Beam Characteristics are Approximate**

Beam Pattern drawn to a 1:95 scale for easy comparison to our other products.

### MB7052-MB7092

#### Features and Benefits

- Clutter rejection provides range to the largest amplitude reflection within the field of view
- Real-time calibration, noise rejection and additional filtering provides stable range information
- Excellent for ranging to large objects in the presence of cluttered or noisy environments
- Excellent for applications that require consistently accurate outputs

- Impressive acoustic and electrical noise resistance
- 10Hz refresh rate for the MB7092
- 6.6Hz refresh rate on the MB7052

### MB7052-MB7092

#### Applications and Uses

- Autonomous Navigation
- Environments with acoustic and electrical noise
- Bin Level Measurement
- Tank Level Measurement

## MB7060-MB7070 XL-MaxSonar®-WR/WRA1™ Beam Pattern and Uses

The XL-MaxSonar-WR/WRA1 reports the range to the first detectable target. The MB7060 and MB7070 sensors are the most recommended XL-MaxSonar-WR sensor. This is a good starting place when unsure of which XL-MaxSonar-WR to use.

# MB7060-MB7070

## XL-MaxSonar®-WR/WRA1™ Beam Pattern

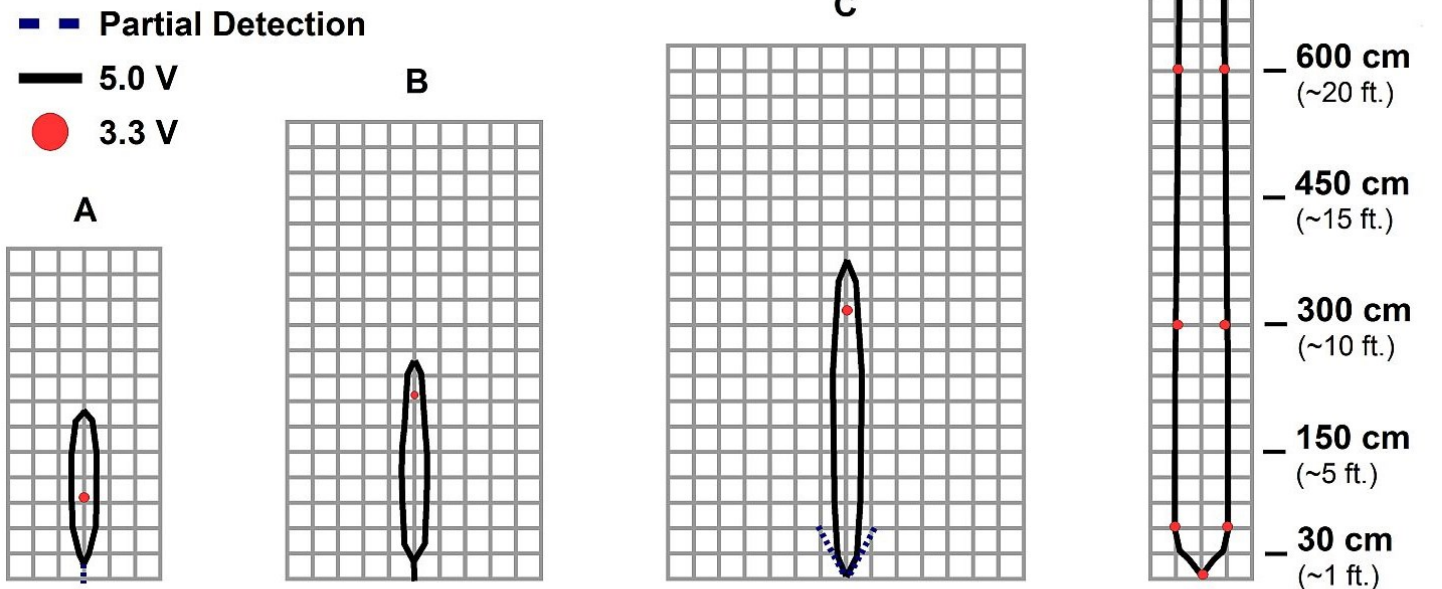
Sample results for measured beam pattern are shown on a 30-cm grid. The detection pattern is shown for dowels of varying diameters that are placed in front of the sensor

- A 6.1-mm (0.25-inch) diameter dowel
- B 2.54-cm (1-inch) diameter dowel
- C 8.89-cm (3.5-inch) diameter dowel

D 11-inch wide board moved left to right with the board parallel to the front sensor face.

This shows the sensor's range capability.

**Note:** For people detection the pattern typically falls between charts A and B.



**Beam Characteristics are Approximate**

Beam Pattern drawn to a 1:95 scale for easy comparison to our other products.

### MB7060-MB7070

#### Features and Benefits

- Real-time calibration, and noise rejection for every ranging cycle
- Readings can occur up to every 100mS (10Hz)
- Analog voltage ( $V_{cc}/1024$ ) / cm
- Precise narrow beam
- Continuously variable gain

### MB7060-MB7070

#### Applications and Uses

- Applications where a stability filter is not needed or desired
- Multi-Sensor Arrays
- Distance Measuring
- People Detection

# MB7062-MB7072 XL-MaxSonar®-WR/WRA™ Beam Pattern and Uses

The XL-MaxSonar-WR/WRA sensors have a 3 reading stability filter in the firmware. This sensor is well suited for applications requiring stable, accurate range readings. This sensor ranges to the first detectable target.

## MB7062-MB7072

### XL-MaxSonar®-WR™ Beam Pattern

Sample results for measured beam pattern are shown on a 30-cm grid. The detection pattern is shown for dowels of varying diameters that are placed in front of the sensor

**A** 6.1-mm (0.25-inch) diameter dowel

**B** 2.54-cm (1-inch) diameter dowel

**C** 8.89-cm (3.5-inch) diameter dowel

**D** 11-inch wide board moved left to right with the board parallel to the front sensor face.

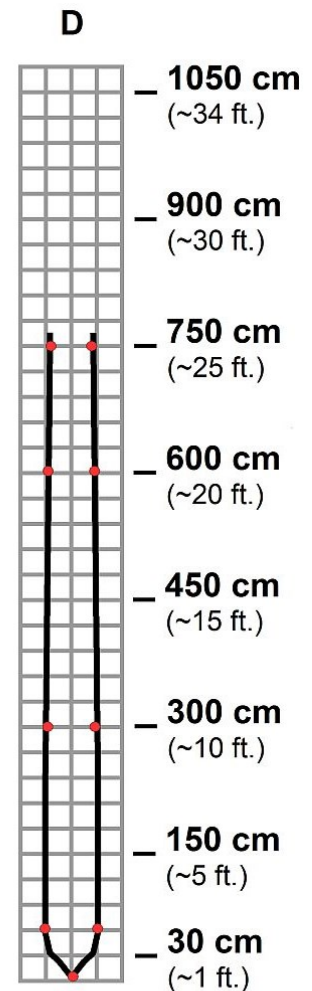
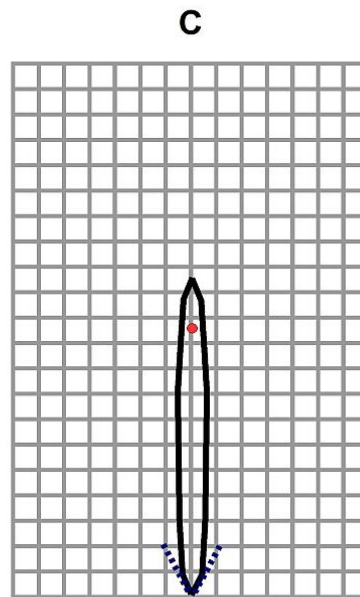
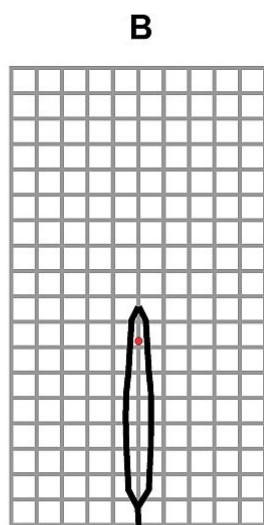
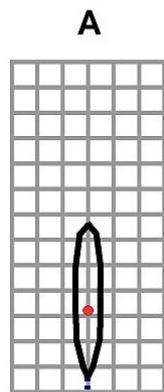
This shows the sensor's range capability.

**Note:** For people detection the pattern typically falls between charts A and B.

■ Partial Detection

— 5.0 V

● 3.3 V



**Beam Characteristics are Approximate**

Beam Pattern drawn to a 1:95 scale for easy comparison to our other products.

### MB7062-MB7072

#### Features and Benefits

- 1 hour fail-safe built into sensor
- Real-time calibration, noise rejection and additional filtering provides stable range information
- Excellent for ranging to large objects in the presence of cluttered or noisy environments
- Excellent for applications that require consistently accurate outputs
- Advanced acoustic and electrical noise filtered output

- Reports filtered output on serial and analog-voltage outputs
- Reliable stable range data
- No power up calibration is required

### MB7062-MB7072

#### Applications and Uses

- Long range object detection
- Industrial sensor
- Drop in upgrade for MB7060 and MB7070

# MB7066-MB7076 XL-MaxSonar®-WRL/WRLA1™ Beam Pattern and Uses

The XL-MaxSonar-WRL/WRLA1 ranges objects from 0-cm to 1068-cm (35 feet) and provides range information from 20-cm to 1068-cm with a 1-cm resolution. This sensor is designed for applications where large object detection is needed to 10 meters.

## MB7066-MB7076

### XL-MaxSonar®-WRL/WRLA1 Beam Pattern

Sample results for measured beam pattern are shown on a 30-cm grid. The detection pattern is shown for dowels of varying diameters that are placed in front of the sensor

**A** 6.1-mm (0.25-inch) diameter dowel

**B** 2.54-cm (1-inch) diameter dowel

**C** 8.89-cm (3.5-inch) diameter dowel

**D** 11-inch wide board moved left to right with the board parallel to the front sensor face.

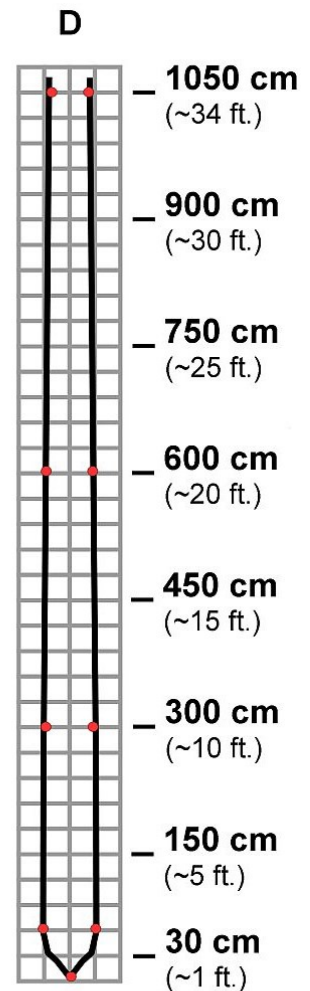
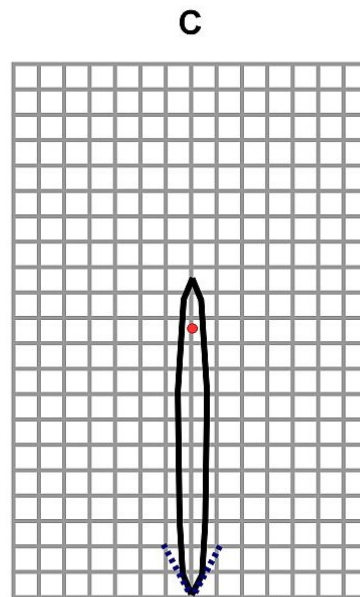
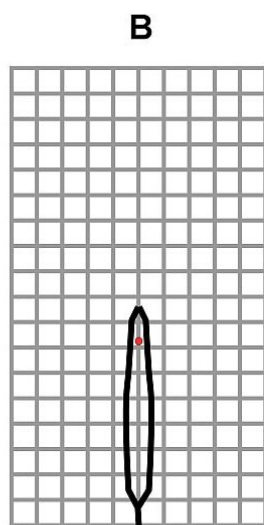
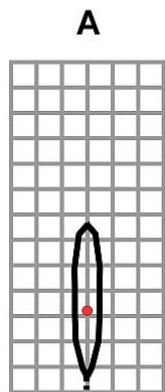
This shows the sensor's range capability.

**Note:** For people detection the pattern typically falls between charts A and B.

■ Partial Detection

— 5.0 V

● 3.3 V



**Beam Characteristics are Approximate**

Beam Pattern drawn to a 1:95 scale for easy comparison to our other products.

### MB7066-MB7076

#### Features and Benefits

- Extended 10 meter range detection and outputs
- High acoustic power output
- Readings can occur up to every 100ms, 10-Hz rate
- Triggered operation provides the range reading as desired
- Fast measurement cycle
- Quality narrow beam characteristics
- Low cost, long range IP67 sensor

### MB7066-MB7076

#### Applications and Uses

- Robot ranging sensor
- Autonomous navigation
- Distance measuring
- Long range object detection
- Industrial sensor



## MB706X-MB707X XL-MaxSonar-WRC Beam Pattern and Uses

The XL-MaxSonar-WR product line is available in alternative housings that include a WRC housing, 1" NPS pipe threading, 1" BSPP pipe threading, and 30mm 1.5 pipe threading

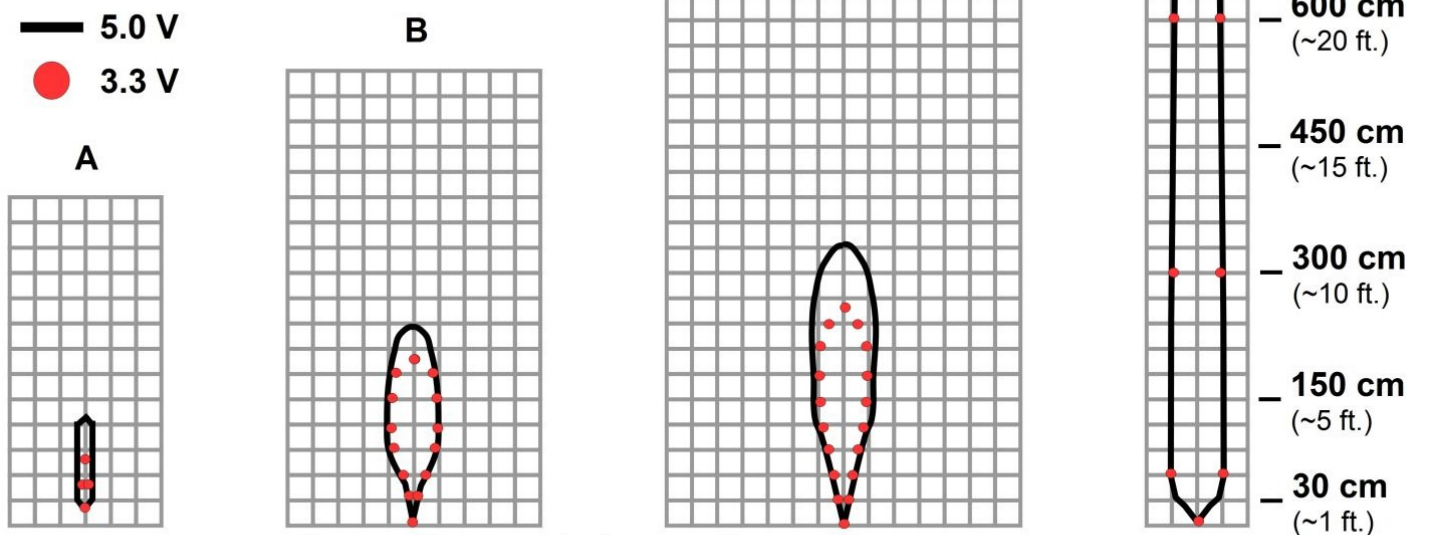
**MB7052-WRC, MB7052-1" NPS, MB7052-1" BSPP, MB7052-30mm1.5**  
**MB7062-WRC, MB7062-1" NPS, MB7062-1" BSPP, MB7062-30mm1.5**  
**MB7067-WRC, MB7067-1" NPS, MB7067-1" BSPP, MB7067-30mm1.5**  
**MB7072-WRC, MB7072-1" NPS, MB7072-1" BSPP, MB7072-30mm1.5**  
**MB7077-WRC, MB7077-1" NPS, MB7077-1" BSPP, MB7077-30mm1.5**  
**MB7092-WRC, MB7092-1" NPS, MB7092-1" BSPP, MB7092-30mm1.5**

Sample results for measured beam pattern are shown on a 30-cm grid. The detection pattern is shown for dowels of varying diameters that are placed in front of the sensor.

- A 6.1-mm (0.25-inch) diameter dowel
- B 2.54-cm (1-inch) diameter dowel
- C 8.89-cm (3.5-inch) diameter dowel

D 11-inch wide board moved left to right with the board parallel to the front sensor face. This shows the sensor's range capability.

**Note:** For people detection the pattern typically falls between charts A and B.



**Beam Characteristics are Approximate**

Beam Pattern drawn to a 1:95 scale for easy comparison to our other products.

### MB706X-MB707X Features and Benefits

- Can be flush mounted in an application
- Same resolution as the full horn equivalent
- Available in both metric and imperial housing sizes

### MB706X-MB707X Applications and Uses

- UAV blimps
- Bin level measurement
- Proximity zone detection
- Robot ranging sensor
- Tank level measurement
- Auto sizing

## MB706X-MB707X XL-MaxSonar-WR UltraCompact Beam Pattern and Uses

The XL-MaxSonar-WR product line is available in an UltraCompact alternative housing. The UltraCompact housing is designed for users that are creating a custom horn mount. The recommended horn can be downloaded from [http://www.maxbotix.com/Ultrasonic\\_Sensors/Outdoor\\_Sensors.htm](http://www.maxbotix.com/Ultrasonic_Sensors/Outdoor_Sensors.htm) under the “Documents” Tab.

- MB7052 – UltraCompact with a Full Horn**
- MB7062 – UltraCompact with a Full Horn**
- MB7067 – UltraCompact with a Full Horn**
- MB7072 – UltraCompact with a Full Horn**
- MB7077 – UltraCompact with a Full Horn**
- MB7092 – UltraCompact with a Full Horn**

Sample results for measured beam pattern are shown on a 30-cm grid. The detection pattern is shown for dowels of varying diameters that are placed in front of the sensor.

- A** 6.1-mm (0.25-inch) diameter dowel
- B** 2.54-cm (1-inch) diameter dowel
- C** 8.89-cm (3.5-inch) diameter dowel

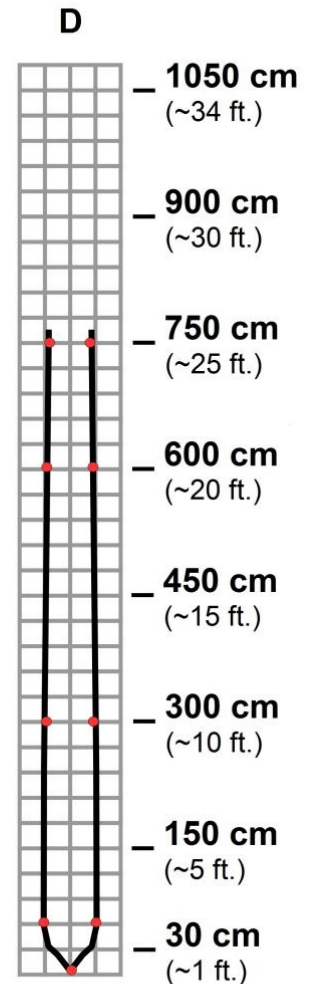
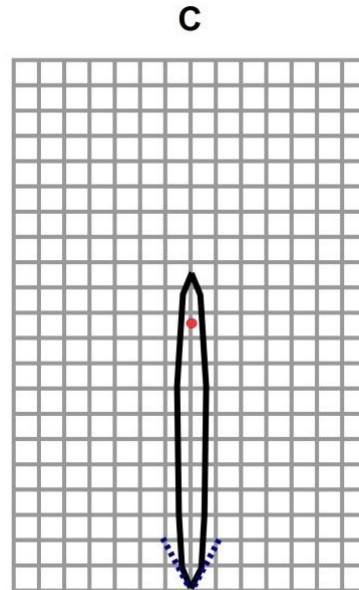
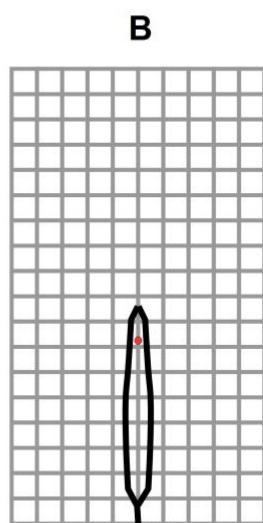
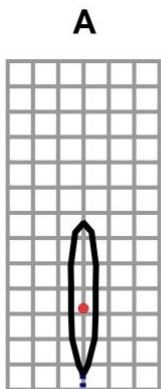
**D** 11-inch wide board moved left to right with the board parallel to the front sensor face. This shows the sensor’s range capability.

**Note:** For people detection the pattern typically falls between charts A and B.

■ ■ Partial Detection

— 5.0 V

● 3.3 V



**Beam Characteristics are Approximate**

Beam Pattern drawn to a 1:95 scale for easy comparison to our other products.

### MB706X-MB707X Features and Benefits

- Can be flush mounted in an application
- Same resolution as the full horn equivalent
- Gives the ability to create custom mounts

### MB706X-MB707X Applications and Uses

- UAV blimps
- Bin level measurement
- Proximity zone detection
- Robot ranging sensor
- Tank level measurement
- Auto sizing

# MB706X-MB707X XL-MaxSonar-WR UltraCompact Beam Pattern and Uses

The XL-MaxSonar-WR product line is available in an UltraCompact alternative housing. The UltraCompact housing is designed for users that want to create a custom mount.

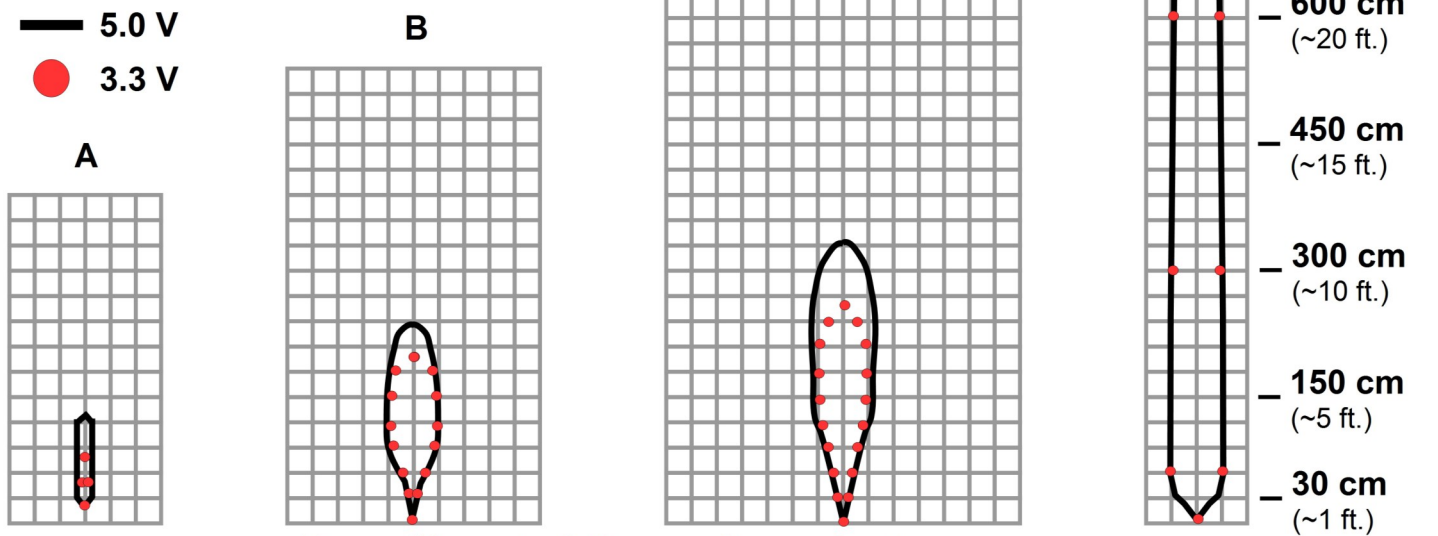
- MB7052 – UltraCompact Flush Mount**
- MB7062 – UltraCompact Flush Mount**
- MB7067 – UltraCompact Flush Mount**
- MB7072 – UltraCompact Flush Mount**
- MB7077 – UltraCompact Flush Mount**
- MB7092 – UltraCompact Flush Mount**

Sample results for measured beam pattern are shown on a 30-cm grid. The detection pattern is shown for dowels of varying diameters that are placed in front of the sensor.

- A** 6.1-mm (0.25-inch) diameter dowel
- B** 2.54-cm (1-inch) diameter dowel
- C** 8.89-cm (3.5-inch) diameter dowel

**D** 11-inch wide board moved left to right with the board parallel to the front sensor face. This shows the sensor's range capability.

**Note:** For people detection the pattern typically falls between charts A and B.



**Beam Characteristics are Approximate**

Beam Pattern drawn to a 1:95 scale for easy comparison to our other products.

## MB706X-MB707X Features and Benefits

- Can be flush mounted in an application
- Same resolution as the full horn equivalent
- Allows for custom mounts to be designed.

## MB706X-MB707X Applications and Uses

- UAV blimps
- Bin level measurement
- Proximity zone detection
- Robot ranging sensor
- Tank level measurement
- Auto sizing