HRUSB-MaxSonar®-EZ™ Series

USB Rangefinder, High Resolution Precision

MB1403, MB1413, MB1423, MB1433, MB1443[4]

1 mm Resolution

*The HRUSB-MaxSonar-EZ sensor line is a cost-effective solution for applications where precision range-finding, space saving, and low-cost are needed. This sensor component module allows users of other more costly precision rangefinders to lower the cost of their systems without sacrificing performance. Additionally, this sensor line allows cost-sensitive designers to choose this precision sensor as a performance upgrade over other lower performance sensors. The HRUSB-MaxSonar-EZ sensor line provides high accuracy and high resolution ultrasonic proximity detection and ranging in air, in a package less than one cubic inch. This sensor line features 1-mm resolution, target-size compensation for improved accuracy, superior rejection of outside noise sources, internal speed-of-sound temperature compensation. This ultrasonic sensor detects objects from 1-mm to 5-meters, senses range to objects from 30-cm to 5-meters, with large objects closer than 30-cm are typically reported as 30-cm[1]. [1]**See Close Range Operation***

Features

- USB interface for simple computer connection and easy use via a COM port
- USB Micro-B connector is industry standard
- Resolution of 1-mm
- Stable and reliable range readings and excellent noise rejection
- Accuracy is factory-matched at 1-meter to 0.1% providing a typical large target accuracy of 1% or better for most voltages and uses[1]
- Continually measures and outputs range information
- Continuously variable gain for control and side lobe suppression
- Designed for protected indoor environments
- Sensor operates at 42KHz
- Low cost ultrasonic range finder
- Less than 1 cubic inch in size with easy mounting
- Distance sensor from 30-cm to 5-meters
- Proximity sensor from 1-mm to 5-meters
- Operating temperature range from -40°C to +65°C, provided proper frost prevention is employed
- Long range object detection
- Small and easy to mount
- Target size compensation provides greater consistency and accuracy when switching targets
- Sensor automatically handles acoustic noise[2,3]
- Simultaneous multi-sensor operation
- Sensor ignores most other acoustic noise sources[2,3]
- Calibrated sensor eliminates most sensor to sensor variation

Benefits

- USB interface for easy integration
- Easily deploy network-based IT solutions with integrated ultrasonic sensors
- Quality beam characteristics
- Excellent for multiple sensor systems
- Output allows users to get reliable range information at any time
- Fast measurement cycle
- Range-finding at a fraction of the cost of other precision rangefinders
- Reading-to-reading stability of 1-mm at 1-meter is typical
- Calibrated acoustic detection zones allow users to choose the part number with the detection zone matching a specific application
- Compensation provided for target size variation and operating voltage range
- Mounting holes provided
- Internal temperature compensation is standard

Applications and Uses

- Sensor grids
- Kiosks & booths
- Security systems
- People detection
- Autonomous navigation
- Multi-sensor arrays
- Bin level measurement
- Robots ranging sensor
- Automated factory systems
- Limited tank level measurements
- Box dimensioning
- Auto sizing
- Height monitors
- Human interfaces
- Presence sensor
- Occupancy sensor
- Security systems
- Sensor networks
- Cloud based network sensor

Notes:
[1]See Close Range Operation
[2]Users are encouraged to evaluate the sensor performance in their application.
[3]By design.
[4] Please reference page 13 for part number key

Close Range Operation

Applications requiring 100% reading-to-reading reliability should not use MaxSonar sensors at a distance closer than 30cm. Although most users find MaxSonar sensors to work reliably from 0 to 30cm 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.

HRUSB-MaxSonar-EZ General Description of Operation

The HRUSB-MaxSonar-EZ sensors are a high performance, ultrasonic range finder. The sensor utilizes a USB Micro-B connector for sensor interfacing. The sensor is small in size with holes on the PCB for easy mounting. The HRUSB-MaxSonar-EZ sends serial data to the users operating system which can then be read from the registered COM port (or equivalent) using a terminal program or read directly from the operating system (OS) by using the appropriate software functions.

The HRUSB-MaxSonar-EZ is powered by the USB connection and begins operating after the USB handshaking has occurred. The range information is sent continuously to the users operating system (OS) and is available to be read at any time.

Connection is handled automatically by device drives that are available for most OS's (Windows XP and later, Linux Kernel 2.6 and later, Mac OS X and later.) The steps taken to perform the configuration varies slightly by the target OS however the general operation and the data sent by the sensor remains the same. Configuration of the HRUSB-MaxSonar-EZ can be seen in the Serial Terminal Configuration section.

Accessing the USB Serial Output — Quick Setup

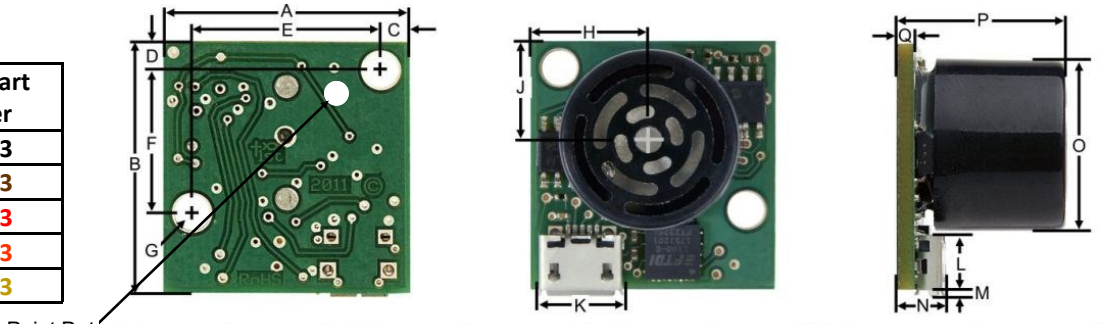
A terminal program is the easiest method of reading the sensor output. Software downloads and step by step instructions are available at http://www.maxbotix.com/terminal.htm

HRUSB-MaxSonar-EZ General Power-Up Instruction

Each time the HRUSB-MaxSonar-EZ takes a range reading, it calibrates itself. The sensor then uses this data to range objects. If the temperature or humidity changes during sensor operation; the sensor will continue to function normally over the rated temperature range while applying compensation for speed of sound changes caused by temperature.

HRUSB-MaxSonar-EZ Mechanical Dimensions

Paint Dot	Sensor Part Number
Black	MB1403
Brown	MB1413
Red	MB1423
Orange	MB1433
Yellow	MB1443



A	0.863"	21.92 mm	E	0.670"	17.00 mm	J	0.350"	8.89 mm	N	0.167"	4.24 mm
B	0.888"	22.56 mm	F	0.510"	12.6 mm	K	0.317"	8.05 mm	O	0.645"	16.38 mm
C	0.100"	2.54 mm	G	0.124" dia.	3.1 mm dia.	L	0.197"	5.00 mm	P	0.610"	15.49 mm
D	0.100"	2.54 mm	H	0.425"	10.79 mm	M	0.024"	0.62 mm	Q	0.065"	1.65 mm

Weight 4.9 grams

Operation Temperature and environments

The recommended operating temperature is 0C to 65C. The recommended dry storage temperature is –40C to +65C. Storage or operation in wet or moist environments may result in sensor damage.

About Ultrasonic Sensors

Our ultrasonic sensors are in air, non-contact object detection and ranging sensors that detect objects within an 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.

Serial Output Format

The sensor output is provided over the COM port (or equivalent) in an ASCII character format. If a target is detected at 480 millimeters the output appears as follows: “R0480 <carriage return>”. The output is an ASCII capital “R”, followed by four ASCII character digits representing the range in millimeters up to a maximum of 5000 millimeters. This is followed by an ASCII space and a carriage return.

Sensor Operation

When operating in free run mode, the HRUSB-MaxSonar-EZ sensors are designed to be used in a variety of indoor environments. Most range readings are accurately reported. If the range readings are affected, the effect is typically less than 5 mm. This allows users to employ real-time ultrasonic distance sensing without the need for complicated user software.
Many acoustic noise sources will have little to no effect on the reported range of the HRUSB-MaxSonar-EZ sensors. However, users are encouraged to test sensor operation in the operating environment.

Sensor Operation from 30-cm to 50-cm

Because of acoustic phase effects in the near field, objects between 30-cm and 50-cm may experience acoustic phase cancellation of the returning waveform resulting in inaccuracies of up to 5-mm. These effects become less prevalent as the target distance increases and has not been observed past 50-cm. For this reason, industrial users that require the highest sensor accuracy are encouraged to mount the HRUSB-MaxSonar-EZ from objects that are farther than 50-cm.

Target Size Compensation

Most low cost ultrasonic rangefinders will report the range to smaller size targets as farther than the actual distance. In addition, they may also report the range to larger size targets as closer than the actual distance.
The HRUSB-MaxSonar-EZ sensor line compensates for target size differences. This means that, provided an object is large enough to be detected, the sensor will report the same distance, typically within 2%, regardless of target size. Smaller targets can have additional detection noise that may limit this feature. In addition, targets with small or rounded surfaces may have an apparent distance that is slightly farther, where the distance reported may be a composite of the sensed object(s).

Internal Temperature Compensation

The speed of sound in air increases about 0.6 meters per second, per degree centigrade. Because of this, each HRUSB-MaxSonar-EZ is equipped with an internal temperature sensor which allows the sensor to apply a compensation for speed of sound changes.
The self heating (15mW at 5V, or 8mW at 3.3V) will change the temperature of the sensor by about 1 degree Celsius. The amount of self heating is dependent upon user mounting.
Most importantly, the actual air temperature of the path between the sensor and the target may not match the temperature measured at the sensor electronics. Sensors mounted in vertical applications, or applications where the environmental temperature gradient is severe, may experience a large temperature measurement error which will effect the sensor accuracy. For example, buildings with a height of 2-meters can have floor to ceiling temperature variations of 5°C or more. Because of these temperature effects, users desiring the highest accuracy output are encouraged to use a properly mounted sensor or to manually account for this measurement error.

Sensor Minimum Distance

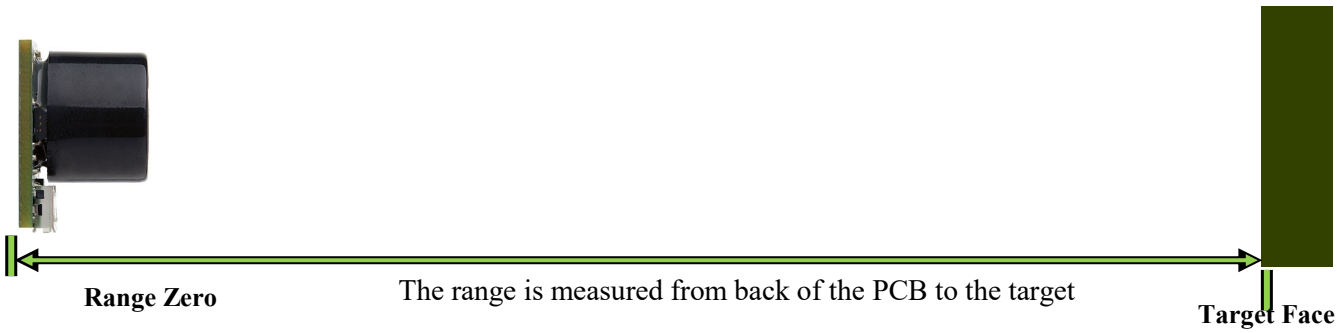
The sensor minimum reported distance is 30-cm (11.8 inches). However, the HRUSB-MaxSonar-EZ will range and report targets to within 1-mm of the front sensor face. Large targets closer than 30-cm will typically range as 300-mm.

Range “0” Location

The HRUSB-MaxSonar-EZ reports the range to distant targets starting from the back of the sensor PCB as shown in the diagram below.
Target detection has been characterized in the sensor beam patterns.

Multi-Sensor Operation

The HRUSB-MaxSonar-EZ is designed to function alongside other ultrasonic sensors operating in the same space, at the same time, on the same frequency. Our industry leading firmware allows users to connect multiple sensors across a single space without worrying about sensor interference (cross-talk). Angle and position of multiple sensors will determine how many sensors can be operated in a single environment without interfering with one another.



Serial Terminal Configuration

Windows Configuration

The HRUSB-MaxSonar-EZ inside Windows Operating systems is a plug and play device. When the HRUSB-MaxSonar-EZ ultrasonic rangefinder is connected to a computer running Windows XP or newer, Windows will automatically install and configure the device drivers. This configuration may take several minutes, but the device configuration will only occur once.

Computers running Windows XP and older, have HyperTerminal included in the operating system. Computers running Windows Vista and newer require that a software is installed that is able to communicate with a communication port.
To configure the HRUSB-MaxSonar-EZ on computer systems running Windows, use the following directions.

1. Download a terminal program. A simple terminal program is available for download at www.maxbotix.com/terminal.htm
2. Unzip the terminal program to a folder of your choice, if using program that is provided.
3. Connect the HRUSB-MaxSonar-EZ ultrasonic rangefinder to a computer with a Micro-B USB Cable
4. Allow Windows time to automatically configure HRUSB-MaxSonar-EZ drivers
5. Run the terminal program of preference. If using the provided program, run the .exe file.
6. For users that operate with a different terminal program, set the configuration to the settings provided.

	Value
Baud	57600
Data bits	8
Parity	0 / None
Stop Bit	1
Flow Control	0/None

Warning:
Removing the sensor before Windows has configured the drivers may result in the drivers being corrupted. Please allow time for Windows to fully install and configure the drivers for the HRUSB-MaxSonar-EZ

Serial Terminal Configuration Con't

Windows Configuration Con't

If the provided software does not automatically find the first available HRUSB-MaxSonar-EZ ultrasonic rangefinder, use the following directions

1. Click the "Settings" option.
2. In the "Serial port settings" window, change the "Port" option to the COM port number assigned to the HRUSB-MaxSonar-EZ ultrasonic rangefinder.

For multiple sensor operation, use the following instruction set.
1. Open a terminal window
2. Click settings, if using the software provided for the HRUSB-MaxSonar-EZ ultrasonic rangefinder
3. Change the "Port" menu to match the newest "COM#"
4. Click ok.

	Value
Baud	57600
Data bits	8
Parity	0 / None
Stop Bit	1
Flow Control	0/None

Warning:
Removing the sensor before Windows has configured the drivers may result in the drivers being corrupted. Please allow time for Windows to fully install and configure the drivers for the HRUSB-MaxSonar-EZ

Linux Configuration

This was written using Ubuntu 12.10 and MoSerial terminal software.
1. Download and install a terminal program. http://www.maxbotix.com/terminal.htm has a recommended program
2. Configure the HRUSB-MaxSonar-EZ
3. Click "Port Setup"
    a. Set "Device" menu to "/dev/ttyUSB0"
    b. Set Baud, Data Bits, Parity, and Stop Bits to match provided settings.
    f. Turn off all "Handshake" options
4. Click OK
5. Click "Connect"
6. Click the tab that says "Received ASCII"

Apple OS Configuration

To configure the HRUSB-MaxSonar-EZ in Mac OS X operating systems please use the following instruction set.
1. Download a terminal program. http://www.maxbotix.com/terminal.htm has a recommended program
2. Open "Settings"
3. Click "Modem Preferences"
4. Select "usbserial0" for the HRUSB-MaxSonar-EZ ultrasonic sensor.
5. Set Data Rate, Data Bits, Parity, and Stop Bits to match provided settings
6. Remove check boxes from "Flow Control" options
7. Set "Service Name" to a name of preference
8. "Phone Number", "Pre-dial init", and "Password" options can be left blank .

For users that need drivers, drivers may be available for your system at http://www.ftdichip.com/FTDrivers.htm.

Serial Terminal Configuration Con't

USB Latency

Computer USB ports have latency and buffer sizes which can change the time between the range readings reported by the HRUSB-MaxSonar-EZ ultrasonic rangefinder. This time delay can be caused by the USB hardware on the computer's system board, the chipset managing USB communication ports, the age of the computer hardware, the number of devices using USB communication, and by the computers operating system.

When multiple USB connections are working in parallel, such as a mouse, keyboard, and flash-drive, the bandwidth is shared among the devices. When bandwidth is shared between devices, the buffer and latency is increased due to the extra demand of resources from the computer chipset.

Other Operating Systems

Windows Users

For advanced Windows users, this instruction set will allow the use of a low-latency mode of operation for the HRUSB-MaxSonar-EZ.

1. Open Windows' "Device Manager"
   This can often be accessed from the Windows' Control Panel
2. Expand the "Ports (COM & LPT)" menu
3. Select the COM port that is assigned to the HRUSB-MaxSonar-EZ.
4. Right click on the COM port and go down to "Properties" on the new menu
5. On the Communications Port Properties window select the "Port Settings" Tab
6. Click on the option that says "Advanced"
7. Set the "Receive (Bytes)" option to 512
8. Set the "Transmit (Bytes)" option to 512
9. Set the "Latency Timer (msec)" option to 2
10. The "Serial Enumerator" option should be checked.
    This setting makes Windows remember the COM port assigned to the Device
    When this is unchecked, Windows will assign it the first available Com Port

Linux Users

For advanced Linux users that wish to operate in low-latency with the HRUSB-MaxSonar-EZ please use the following directions. While operating in low-latency mode, the USB buffer delay will be reduced to 128mS at most.

1. Open xTerm window
2. Type the following command: **$ dmesg | grep FTDI**.
   a line that looks like "/dev/ttyUSB#" will be output
3. Enter the following command. **$ setserial /dev/ttyUSB# -g**.
   The # sign will be the USB port assigned to the HRUSB-MaxSonar-EZ sensor.
   Information will be output that looks like"/dev/ttyUSB#, UART: unk, PORT:0X0000, IRQ:0".
4. Enter the low latency command: **$ setserial /dev/ttyUSB# low_latency**.
   This command will set the HRUSB-MaxSonar-EZ into low-latency mode.

It is recommended that the configuration is confirmed. To do this enter the command **$ setserial /dev/ttyUSB# -g**.
The low-latency flag should be appended as follows:
"/dev/ttyUSB#, UART: unk, PORT: 0X0000, IRQ: 0, Flags: low_latency".

Selecting a HRUSB-MaxSonar-EZ

Different applications require different sensors. The HRUSB-MaxSonar-EZ product line offers varied sensitivity to allow you to select the best sensor to meet your needs.

The HRUSB-MaxSonar®-EZ™ Sensors At a Glance

People Detection Wide Beam High Sensitivity		Best Balance		Large Targets Narrow Beam Noise Tolerance
MB1403	MB1413	MB1423	MB1433	MB1443

The diagram above shows how each product balances sensitivity and noise tolerance. This does not affect the maximum range, pin outputs, or other operations of the sensor. To view how each sensor will function to different sized targets reference the HRUSB-MaxSonar-EZ-Beam Patterns.

Selecting a HRUSB-MaxSonar-EZ Detection Zone

Different applications require different sensors. The HRUSB-MaxSonar-EZ product line offers varied detection zones (detection distances) to allow you to select the best sensor to meet your needs. Each sensor is matched to provide the approximate detection zone shown in this datasheet. This allows end users to select the part number that matches their given sensing application. Each part number has a consistent field of detection so additional units of the same part number will have similar detection zones. The beam plots are provided to help identify an estimated detection zone for an application based on the acoustic properties of a target versus the plotted beam patterns.

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.

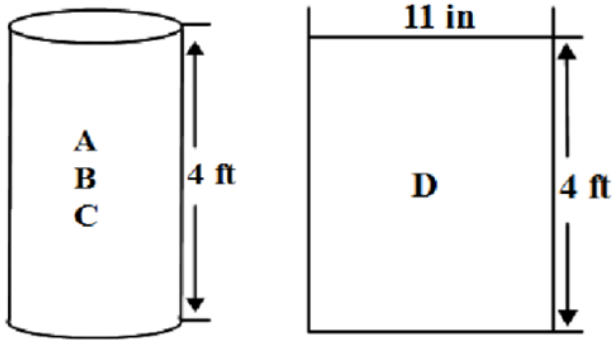
Each detection zone is a 2D representation of the detection area of the sensor. The detection zone is actually shaped like a 3D cone (having the same detection pattern both vertically and horizontally). Detection patterns for dowels are used to show the detection zone of each sensor. Dowels are long cylindered targets of a given diameter. The dowels provide consistent target detection characteristics for a given size target which allows easy comparison of one MaxSonar sensor to another MaxSonar sensor.

For each part number, the four patterns (A, B, C, and D) represent the detection zone for a given target size. Each beam pattern shown is determined by the sensor's part number and target size.

The actual beam angle changes over the full range. Use the detection zone for a specific target at any given distance to calculate the beam angle for that target at the specific distance. Generally, smaller targets are detected over a narrower beam angle and a shorter distance. Larger targets are detected over a wider beam angle and a longer range.

Beam Pattern Target Shapes

A 6.1-mm (0.25-inch) diameter dowel 4ft length
B 2.54-cm (1-inch) diameter dowel 4ft length
C 8.89-cm (3.5-inch) diameter dowel 4ft length
D 11-inch wide board 4ft in length moved left to right with the board parallel to the front sensor face. This shows the sensor's range capability.



MB1403 HRUSB-MaxSonar®-EZ0™ Beam Pattern and Uses

The HRUSB-MaxSonar-EZ0 is the highest sensitivity and widest beam sensor of the HRUSB-MaxSonar-EZ sensor series. The wide beam makes this sensor ideal for a variety of applications including people detection, autonomous navigation, and wide beam applications.

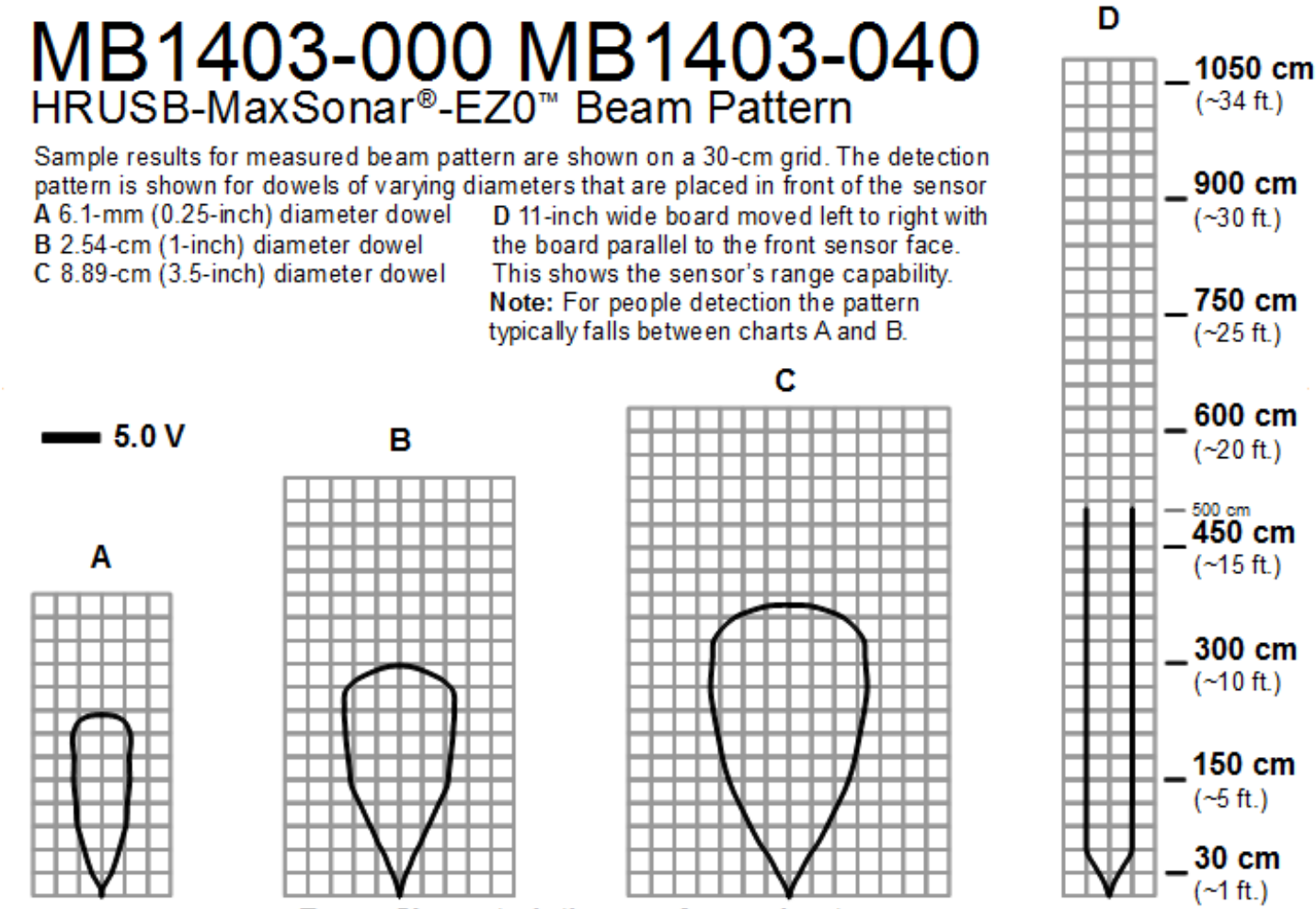
MB1403-000 MB1403-040

HRUSB-MaxSonar®-EZ0™ 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.

MB1403 Features and Benefits

- Factory calibrated wide beam width
- High acoustic sensitivity
- Detects small targets to longer distances
- Widest beam width for the HRUSB-MaxSonar-EZ sensors

MB1403 Applications and Uses

- People detection
- Small target detection
- High sensitivity applications
- Obstacle avoidance

MB1413 HRUSB-MaxSonar®-EZ1™ Beam Pattern and Uses

The HRUSB-MaxSonar-EZ1 is an indoor ultrasonic sensor and is a quality, low-cost starting place for a customer not sure of which HRUSB-MaxSonar-EZ sensor to use. It balances the detection of people and other objects with a narrow beam width.

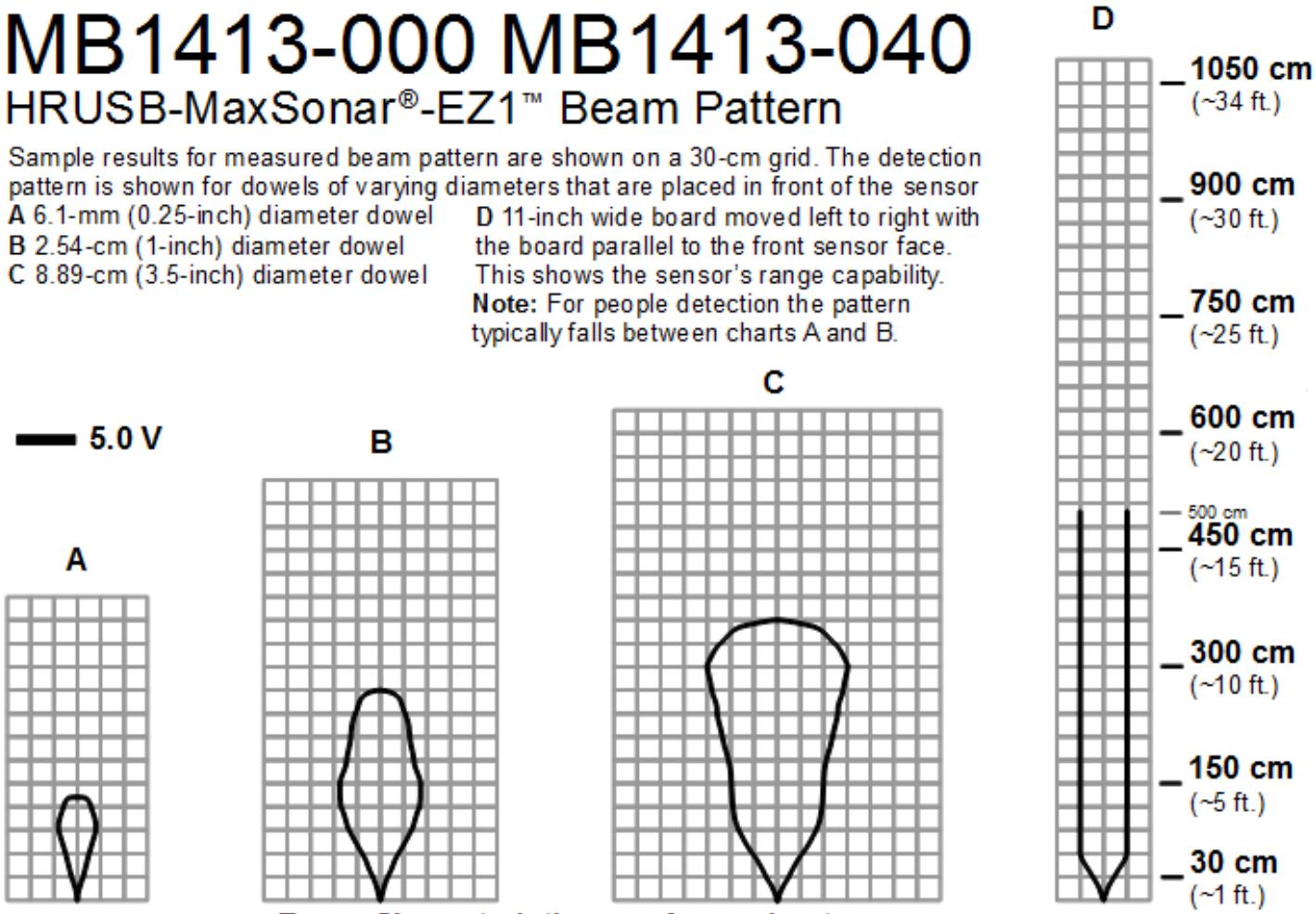
MB1413-000 MB1413-040

HRUSB-MaxSonar®-EZ1™ 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.

MB1413 Features and Benefits

- Good balance between people detection and beam pattern width
- Well balanced acoustic sensitivity
- Ignores some small targets
- Detects most targets to long distances
- Wider, balanced beam width
- Sensitive long narrow beam

MB1413 Applications and Uses

- Our most recommended HRUSB-MaxSonar-EZ sensor
- People Detection
- Well balanced detection
- Autonomous Navigation

MB1423 HRUSB-MaxSonar®-EZ2™ Beam Pattern and Uses

The HRUSB-MaxSonar-EZ2 is a good compromise between sensitivity and side object rejection. The HRUSB-MaxSonar-EZ2 is an excellent choice for applications that requires slightly less side object detection and sensitivity than the MB1013 HRLV-MaxSonar-EZ1.

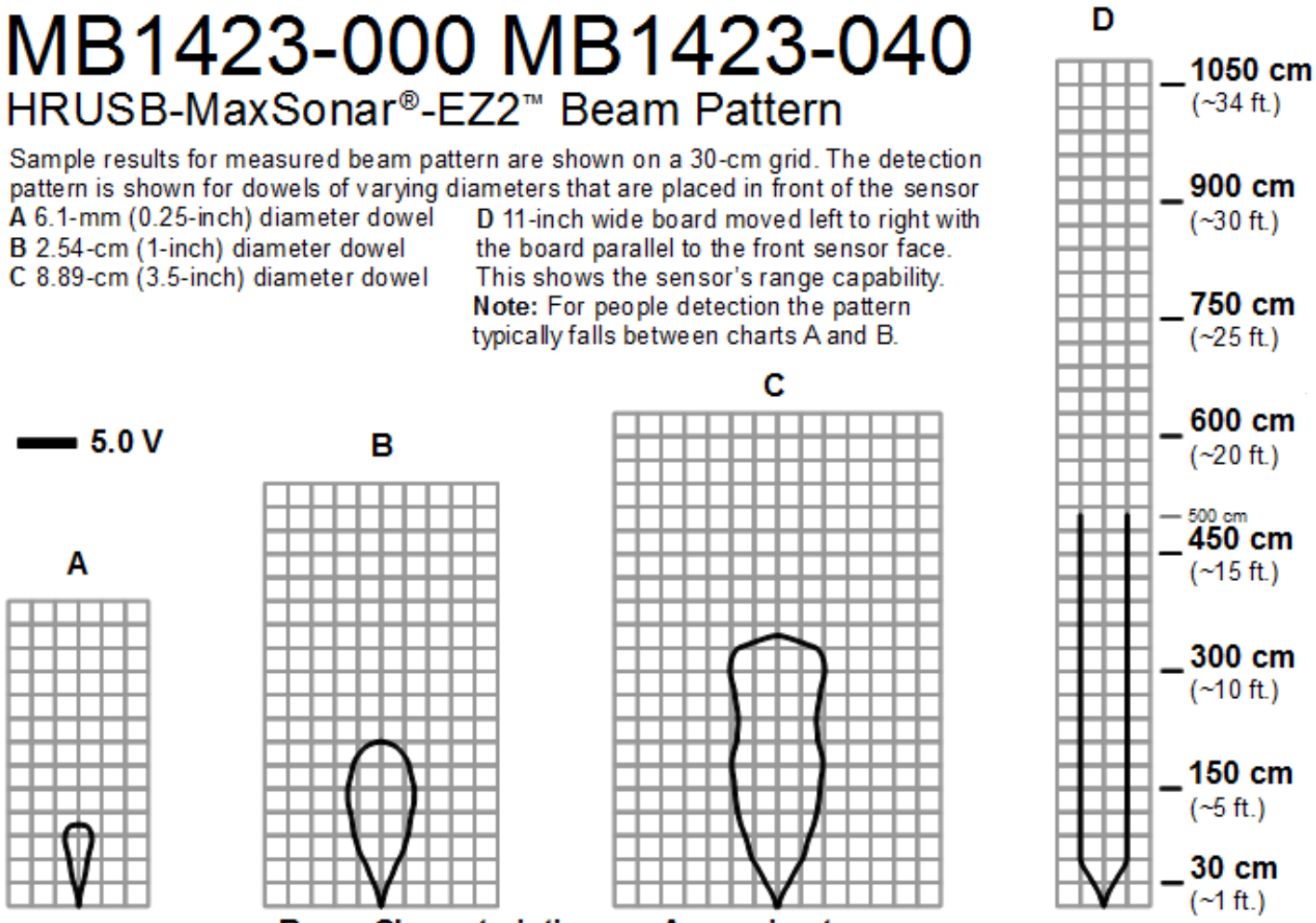
MB1423-000 MB1423-040

HRUSB-MaxSonar®-EZ2™ 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.

MB1423 Features and Benefits

- Good balance between high sensitivity and noise tolerance
- Well balanced acoustic sensitivity
- Ignores some small targets
- Detects most targets to long distances
- Balanced Beam Width
- Best compromise for beam width, sensitivity and sensor range

MB1423 Applications and Uses

- Well balanced detection
- Applications where the HRUSB-MaxSonar-EZ1 is too wide

MB1433 HRUSB-MaxSonar®-EZ3™ Beam Pattern and Uses

The HRUSB-MaxSonar-EZ3 is a narrow beam sensor with good side object rejection. The HRUSB-MaxSonar-EZ3 has slightly wider beam width than the MB1443 HRUSB-MaxSonar-EZ4 which makes it a good choice for when the HRUSB-MaxSonar-EZ4 does not have enough sensitivity for the application.

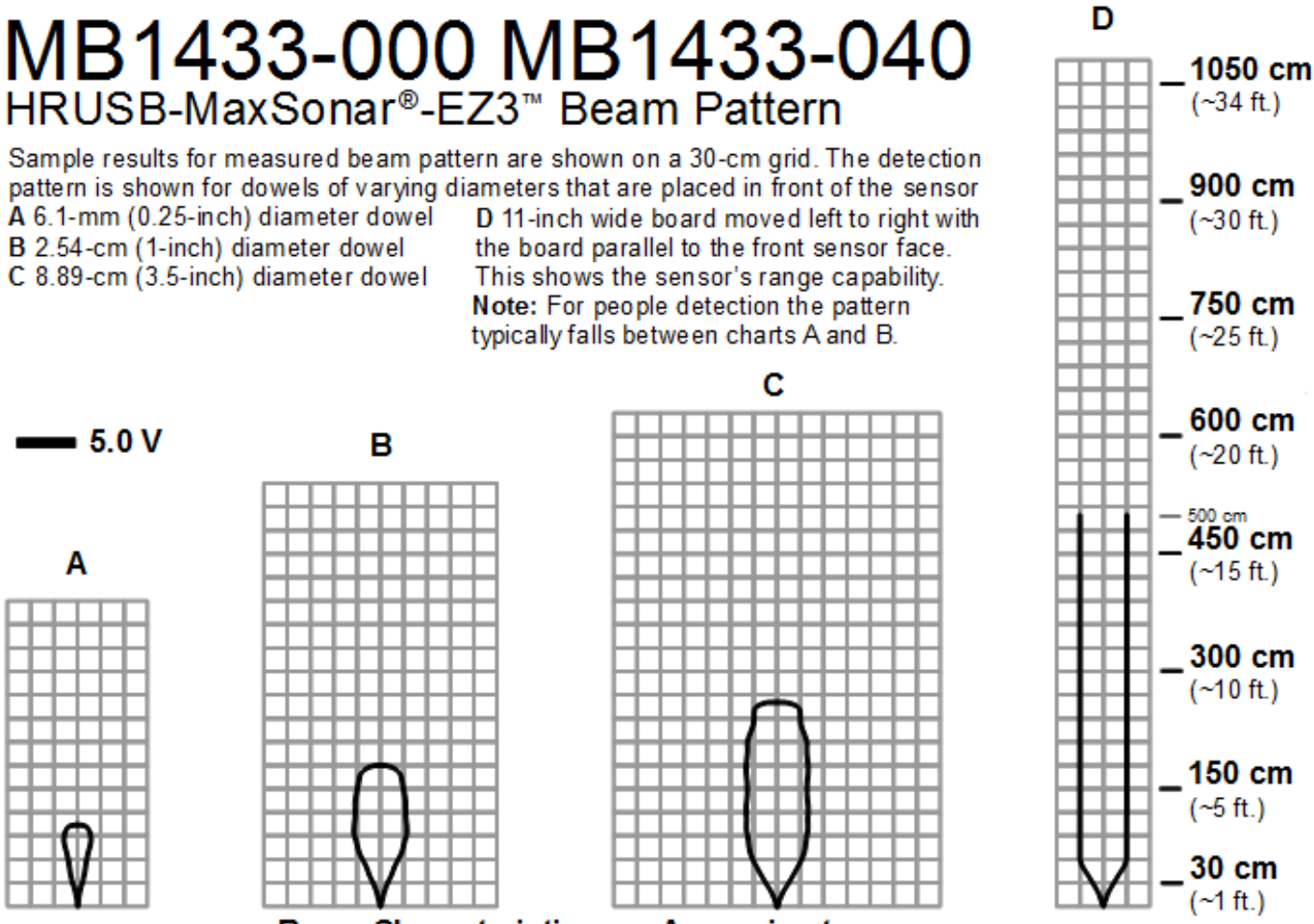
MB1433-000 MB1433-040

HRUSB-MaxSonar®-EZ3™ 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.

MB1433 Features and Benefits

- More sensitive then the HRUSB-MaxSonar-EZ4
- More noise tolerant acoustic sensitivity
- Ignores some small targets and medium targets
- Detects most targets to long distances
- Narrow beam width

MB1433 Applications and Uses

- Large target detection
- Short range medium target detection
- Applications requiring high noise tolerance

MB1443 HRUSB-MaxSonar®-EZ4™ Beam Pattern and Uses

The HRUSB-MaxSonar-EZ4 is the narrowest beam width sensor which is also the least sensitive to side objects offered in the HRUSB-MaxSonar-EZ sensor line. The HRUSB-MaxSonar-EZ4 is an excellent choice when only larger objects need to be detected.

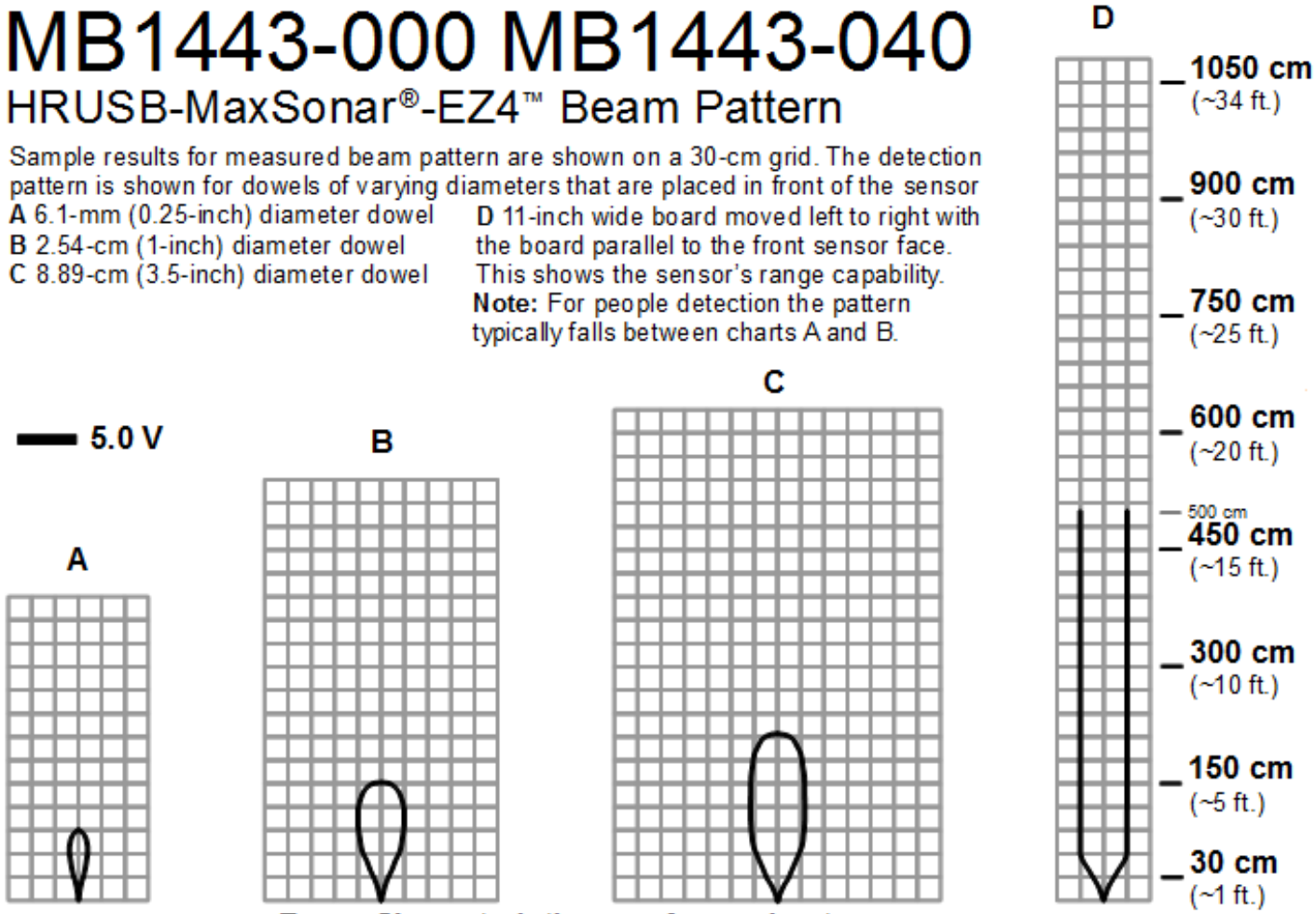
MB1443-000 MB1443-040

HRUSB-MaxSonar®-EZ4™ 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.

MB1443 Features and Benefits

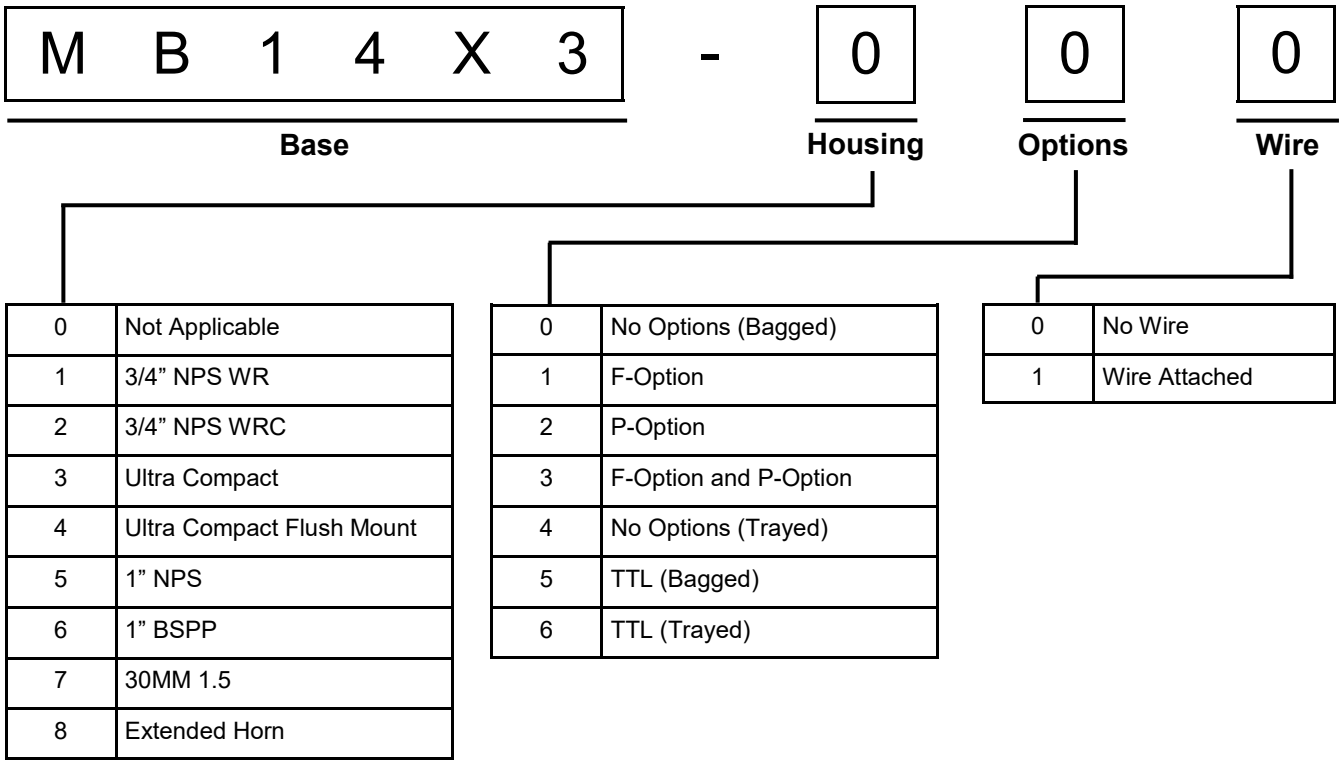
- Best noise tolerance of the HRUSB-MaxSonar-EZ sensors
- Most noise tolerant acoustic sensitivity
- Ignores some small targets and medium targets
- Detects most large targets to long distances
- Narrow beam width

MB1443 Applications and Uses

- Large target detection
- Applications requiring high noise tolerance

Part Numbers

All part numbers are a combination of a six-character base followed by a dash and a three-digit product code. Please review the following table for more information on the three-digit product code.



0	Not Applicable
1	3/4” NPS WR
2	3/4” NPS WRC
3	Ultra Compact
4	Ultra Compact Flush Mount
5	1” NPS
6	1” BSPP
7	30MM 1.5
8	Extended Horn

0	No Options (Bagged)
1	F-Option
2	P-Option
3	F-Option and P-Option
4	No Options (Trayed)
5	TTL (Bagged)
6	TTL (Trayed)

0	No Wire
1	Wire Attached

The following table displays all of the active and valid part numbers for this product.

Active Part Numbers for MB1403, MB1413, MB1423, MB1433 and MB1443				
MB1403-000	MB1413-000	MB1423-000	MB1433-000	MB1443-000
MB1403-040	MB1413-040	MB1423-040	MB1433-040	MB1443-040

After reviewing this datasheet, do you have any more questions?

We offer Technical Support on all of our products even if you purchased them through one of our many vendors worldwide.

You can **fill out a Technical Support form** for assistance on a sensor here --> **Technical Support**

Not sure which sensor you need for your application?

We offer Sensor Selection Assistance, click the link here to fill out a form for support --> **Sensor Selection Help**

Looking for tutorials to help you get started?

Frequently Asked Questions about Our Sensors

We receive many questions about our products and services. This resource offers answers to common inquiries we receive about our product lines and their application.

Fully Calibrated Beam Patterns

All of our sensors are factory calibrated to provide consistent beam patterns, detection zones, to fit into a wide variety of applications. In our product lines, each model number comes with a different beam pattern that reflects the sensitivity and the detection zone of how it sees a target. Additionally, we strive to maintain consistency between our finished products, and you will see little to no deviation between sensors of the same model. This allows you to have confidence in your final application when using multiple sensors.

Understanding Range Readings

The success of an application may hinge upon knowing the exact location of a target. However, a sensor may report one meter even if the target is not exactly one meter away from the sensor. Sensor specifications, such as resolution, precision, and accuracy, help you to understand sensor performance.

How to Use Multiple Ultrasonic Sensors

This guide covers three ways to run your sensors in a Multiple Sensor environment and issues you may face.

Contact us now with any questions at sales@maxbotix.com or call +1-218-454-0766.

Please call during our preferred business hours of 8:00 am – 4:30 pm EST on Monday through Thursday and 8:00 am – 2:00 pm EST on Friday, or you may leave us a voicemail anytime.

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