ABM100

ABM UL-RMB Wireless Remote Low Power Ultrasonic Level Sensor with Cellular Modem

Standard and Sanitary Mounting

BESTOBELL AQUATRONIX
SINCE / DEPUIS 1953
BEP-Bestobell
www.bestobell.com

Features
1. Plug and play. Mount the sensor and connect power. The sensor automatically connects to the Sensor Server.
2. Web access to measurement history, calibration and diagnostics
3. Self-adjusting technology eliminates unwanted echoes.
4. Self-cleaning feature reduces build up on the transducer face.
5. Range up to 60 feet (18.2 meters).
6. Temperature range -40 to 120°C.
7. Sanitary mounting available.
8. PVC, SS316L or TEFLON materials for transducers.
9. PVC, Aluminum or SS316L for electronics enclosures.
10. Antenna's available in custom side mount styles and magnetic mount.

Applications
1. Any liquids and solids.
2. Food and pharmaceutical.
3. High temperature applications.
4. Sanitary

Mechanical

Conduit Entry
1/2" NPT Hole (PVC Conduit only for PVC Housing)

Enclosure
Aluminum - 94V0
PVC or SS316L

Sensor Standard - PVC,

High Temperature
Optional - Teflon (standard mtg. only)

HTP. (5 Bar)
S.S. (1 1/2"or 2"sanitary only)

Ingress Protection
NEMA 6 (IP68)

Approvals
FM(USA) FM3810 (2005):
Electrical Electronic Test, Measuring and Process Control Equipment

ANSI/NEMA 250 (1991):
Enclosures for Electrical Equipment

FM(CAN.)
CSA C22.2 No. 1010.1 (2004)
Safety Requirements for Electrical Equipment for Measurement, Control and Laboratory Use. Part 1: General Requirements

CSA C22.2 No. 94 (2011)
Special Purpose Enclosures

Operational
Accuracy
+/-0.1% of Max. span (in Lab)
+/-0.25% of max. range (typically in field)

Response Time
Programmable through web interface.

Calibration
Push-button or web Interface.

Temperature Compensation
In transducer

Environmental

Temperature Ratings
Electronics Enclosure
-40 to 140°F (-40 to 60°C)
Continuous Operation

PVC & Standard Sanitary Nozzle:
- 40 to 140°F(-40 to 60°C)

Teflon Nozzle:
- 40 to 266°F(-40 to 130 °C)

S.S. HTP Sanitary:
-40 to 266°F(-40 to 130°C)

(1/2 hour steam cleaning. It is recommended that the sensor be removed for longer cleaning cycles. Not for continuous operation.)

Pressure Standard 2 bar

Optional 5 bar maximum using HTP Sanitary Sensor or special HP-PVC Sensor.

Installation Category Class II

Electrical Specifications
Power: 6 to 30 VDC, Continuous or Battery Supplied
(For battery life see battery life table on page 4)

Output Cellular Data to Sensor Server.

Technical Specifications

Range Code	Beam Angle	OperatingRange in Liquids	Resolution	Mounting
045	9°	1.0 - 60 ft. 0.30 - 18.2 m	0.007” 0.19 mm	3.0” NPT 3.0”Ø x 3.0” H
052	12°	0.9 - 50 ft. 0.27 - 15.2 m	0.007’ 0.19 mm	3.0”/ 2.0” NPT 2.0”Ø x 2.7” H
070	12°	0.8 - 30 ft. 0.24 - 9.1 m	0.007’ 0.19mm	3.0”/ 2.0” NPT 1.8”Ø x 2.25”H
080	12°	0.7 - 20 ft. 0.21 - 6.1 m	0.007’ 0.19mm	3.0”/ 2.0” NPT 1.8”Ø x 2.25”H
081	12°	0.6 - 16 ft. 0.18 - 4.9 m	0.007’ 0.19mm	3.0”/ 1.5” NPT 1.5”Ø x 2.1” H
148	12°	0.4 - 9 ft. 0.12 - 2.7 m	0.007’ 0.19mm	3.0”/ 1.0” NPT 1.1”Ø x 2.0” H

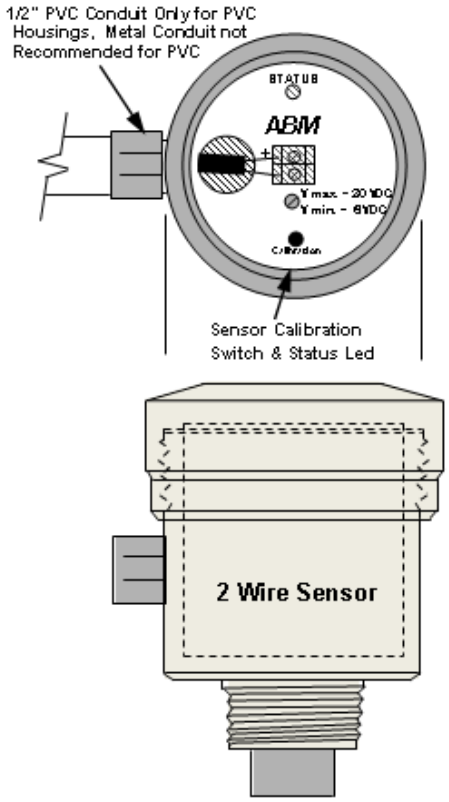
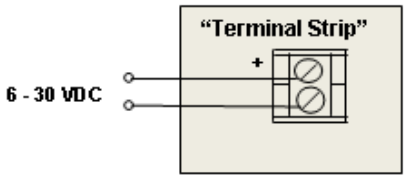
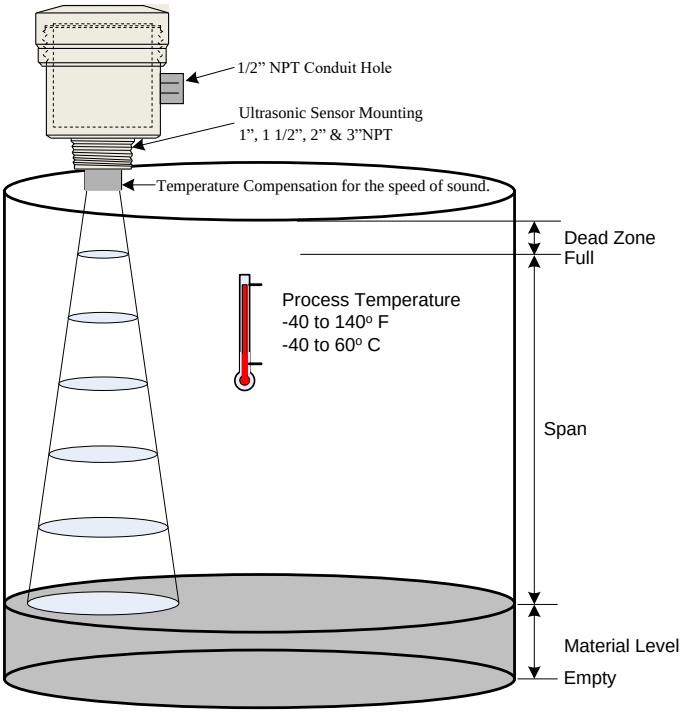


Fig. # 1 - "Remote Sensor" Wiring Connection



Typical Installation

Direct Mounting Ultrasonic Sensor - Simply thread sensor directly into metal or plastic nozzle.



Operation - An ultrasonic pulse is transmitted from the ABM sensor. The pulse travels to the surface being monitored and is reflected off this surface back to the sensor. If data logging is enabled the measurement is stored. If data logging is off or the maximum number of measurements has been logged then the sensor connects to the server and post the measurements.

Calibration with Push-button

The calibration button has 3 functions "update server now", set the "full" or set "empty" level. The number of seconds the button is pressed determines which function will be executed. See Table 2 for button timing.

- Pressing the button until the LED turns green causes the sensor to wake from sleep, take a measurement, connect to the server, post the measurement and download any calibration changes.
- The calibration button can be used to set the "full" or "empty" level to the current target distance. Pressing and holding the calibration button will cause the LED to change color as per Table 2.

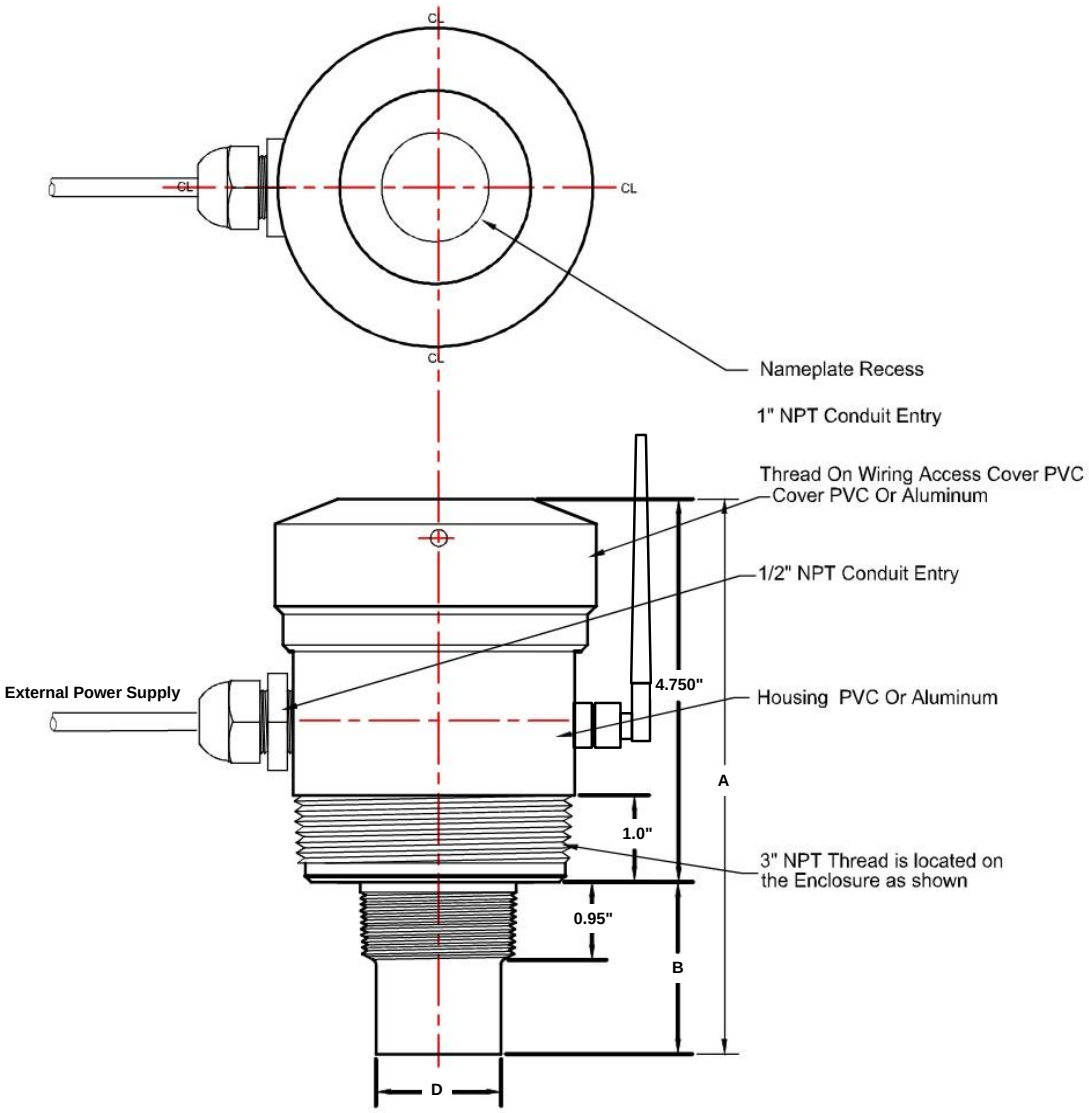
Example, pressing the button for greater than 7 seconds will cause the LED to turn green, then yellow. Releasing the button while the LED is yellow will set the "full" level to current material height.

Button Pressed (Seconds)	LED Colour	Description
< 2	Off	If the button is pressed less than 2 seconds it is ignored and no action is taken.
> 2	Green	Take a measurement and connect to the server now.
> 7	Yellow	Program the full tank distance equal to the current distance.
> 12	Red	Program the empty tank distance equal to the current distance.
> 17	Off	Button pressed greater than 17 seconds it is ignored and no action is taken

Table 2: LED colour and timing. Symbols < "less than", > "greater than"

LED Order

Sensor Dimensions with External Power Supply or Battery Pack.

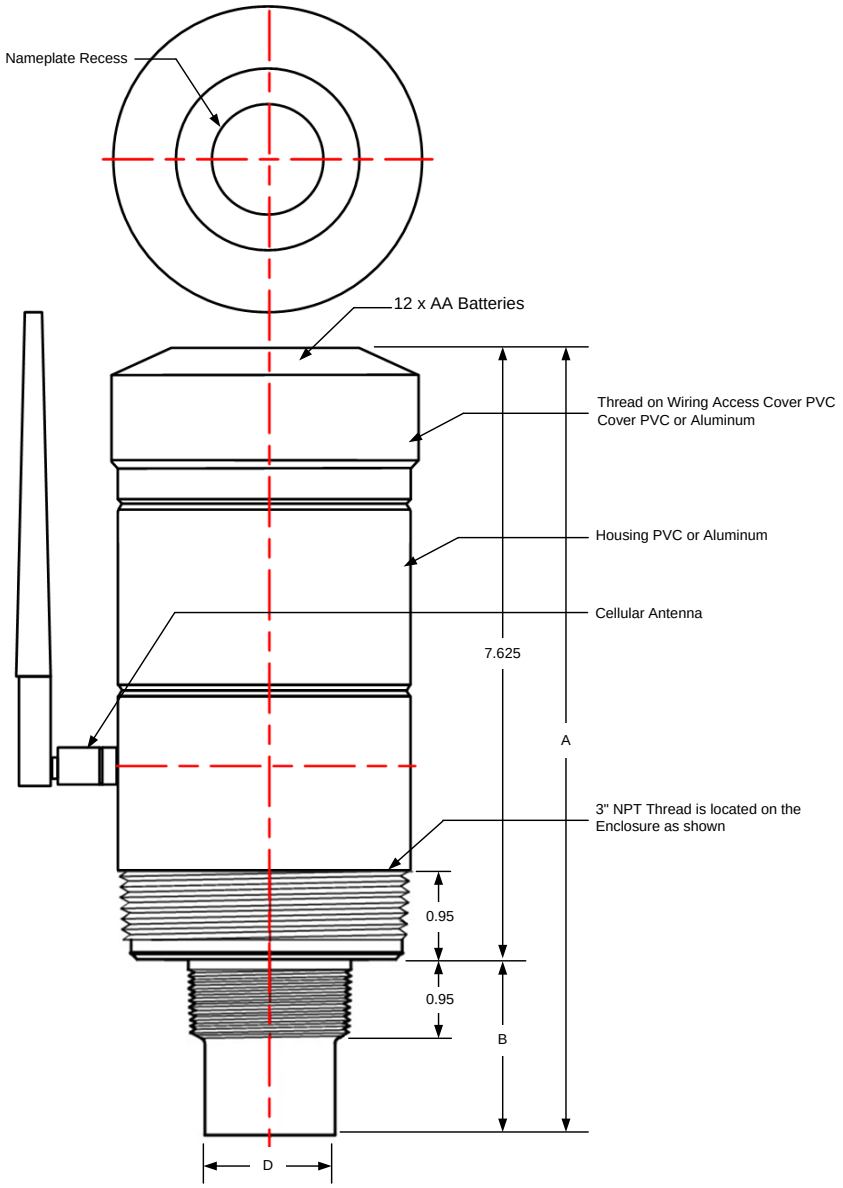


Model # (replace xx with battery suffix)	Operating Range	Operating Frequency	Mounting Thread NPT	Dimension 'A'	Dimension 'B'	Dimension 'D'
ABM100-045ULCM-ALPVC-xx	60' (18.2m)	45 KHz	3"	7.75" (197mm)	3.0" (76.2mm)	3.0" (76.2mm)
ABM100-052ULCM-ALPVC-xx	50' (15.2m)	52 KHz	3"/2"	7.8" (198mm)	3.05" (77.5mm)	2.2" (55.9mm)
ABM100-070ULCM-ALPVC-xx	30' (9.1m)	70 KHz	3"/2"	7.0" (178mm)	2.25" (57.2mm)	1.8" (45.7mm)
ABM100-080ULCM-ALPVC-xx	20' (6.1m)	80 KHz	3"/2"	7.0" (178mm)	2.25" (57.2mm)	1.8" (45.7mm)
ABM100-081ULCM-ALPVC-xx	16' (4.9m)	81 KHz	3"/1.5"	6.85" (174mm)	2.1" (53.3mm)	1.5" (38.1mm)
ABM100-148ULCM-ALPVC-xx	9' (2.7m)	148 KHz	1"	6.75" (172mm)	2.0" (50.8mm)	1.1" (27.9mm)

Battery Suffix	Battery Type	Internal/External
D18	D Cell Duracell Coppertop MN1300	External Battery Pack
RAY2	RAYOVAC, Model 803	External Battery Pack

*See page 6 for battery life.

Sensor Dimensions with Internal AA Battery Pack



Model #	Operating Range	Operating Frequency	Mounting Thread NPT	Dimension 'A'	Dimension 'B'	Dimension 'D'
ABM100-045ULCM-ALPVC-AA	60' (18.2m)	45 KHz	3"	10.625"(296.875mm)	3.0" (76.2mm)	3.0" (76.2mm)
ABM100-052ULCM-ALPVC-AA	50' (15.2m)	52 KHz	3"/2"	10.675"(271.175mm)	3.05" (77.5mm)	2.2" (55.9mm)
ABM100-070ULCM-ALPVC-AA	30' (9.1m)	70 KHz	3"/2"	9.875"(250.875mm)	2.25" (57.2mm)	1.8" (45.7mm)
ABM100-080ULCM-ALPVC-AA	20' (6.1m)	80 KHz	3"/2"	9.875"(250.875mm)	2.25" (57.2mm)	1.8" (45.7mm)
ABM100-081ULCM-ALPVC-AA	16' (4.9m)	81 KHz	3"/1.5"	9.725"(246.975mm)	2.1" (53.3mm)	1.5" (38.1mm)
ABM100-148ULCM-ALPVC-AA	9' (2.7m)	148 KHz	1"	9.625(244.475mm)	2.0" (50.8mm)	1.1" (27.9mm)

Battery Suffix	Battery Type	Internal/External
AA	AA Energizer Ultimate Lithium **	Internal Battery Pack

* See page 6 for battery life.
** Lithium batteries not included with sensor.

Batteries and Battery Life

Remote ultrasonic sensor with AA battery pack option. The remote ultrasonic sensor also comes with an external battery pack option.

The remote low power ultrasonic level sensor can be powered continuously or by one of the battery packs listed in the table below.

When using a battery pack option the battery life is affected by many factors:
1. How often the sensor takes a measurement.
2. How often the sensor connects to the ABM Sensor Server.
3. The strength of the cellular signal.
4. The temperature where the sensor is installed.
5. Battery shelf life.

Factors 1 and 2 can be programmed by the user to minimize battery use (see table below).

Factors 3 and 4 are outside of the user's control but may be mitigated.

Factor 3, poor cellular signal will require the cellular module to transmit at high power levels reducing the expected life of the battery. In cases where the cellular signal is weak a directional antenna can be used.

Factors 4, cold temperatures reduce battery life.

Factor 5. Check the shelf life of the batteries before purchasing to ensure that batteries are not near the end of their shelf life.

			Connection to ABM Server Every			
Battery Type	**Quantity**	**Battery Location**	**15 Min**	**30 Min**	**1 Hour**	**2 Hours**
AA Energizer Ultimate Lithium	12	Built-in	3 Months	6 Months	1 Year	2 Years
D Cell Duracell Coppertop MN1300	8	External Box	6 Months	1 Year	2 Year	4 Years
D Cell Duracell Coppertop MN1300	18	External Box	1 Year	2 Years	4 Years	8 Years
RAYOVAC, Model 803	2	External Box	2 Years	4 Years	8 Years	10+ Years

**The values in the above table were determined with good cellular coverage and mild temperatures.*

Please note:
Custom battery packs are available for applications requiring more frequent measurement updates while still achieving long battery life.

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