Data Sheet

Wireless Remote Radar Level Sensor R-RMB

Battery Powered | Cellular Modem

Overview

The low-power R-RMB non-contact radar level sensor is the ideal solution for remote level measurement with high reliability and no maintenance requirements. The wireless sensor has a built-in cellular modem and internal battery pack for remote applications.

Operation

An electromagnetic pulse is transmitted from the sensor. The pulse travels to the surface being monitored and is reflected off the surface back to the sensor. The time-of-flight is divided by 2 and converted to an output signal directly proportional to the material level.

The sensor has feedback with the environment and automatically adjusts the transmit power, length of pulse and receiver sensitivity to match the current conditions. The same amplitude of echo is received regardless of distance. With self-adjusting technology, false echoes are pushed under the noise level and eliminated.

Benefits

- Low-power sensor with built-in cellular modem and internal battery pack for remote level monitoring
- Remote active control for continuous sensor improvements by experienced ABM engineers - solve any problems
- Maintenance-free due to build-up resistant Teflon antenna and non-contact operation
- Accurate and reliable measurements with self-adjusting technology – one echo only. False echoes from ladders, partitions, cross-beams, pipes, or material build-up are eliminated
- Plug-and-play installation with web interface calibration

Features

- Measuring range up to 340 ft (103.6 m)
- Non-contact measurements
- Battery / solar power operation
- Automatic connection to sensor servers
- Sensor Access website for measurement history, calibration and diagnostics
- 24/7 remote active control & support from ABM
- Side mount or magnetic mount antenna options
- Ingress protection class IP68 (NEMA 6)

Applications

Liquid and solid level measurement for:

- Water Tower Monitoring
- Wastewater Sewer / Manhole Monitoring
- Environmental Flood Monitoring

Technical Specifications

Range Code	Maximum Range	Resolution
017	* - 17 ft (5.2 m)	0.08” (2.0 mm)
033	* - 33 ft (10.1 m)	0.15” (3.9 mm)
050	* - 50 ft (15.2 m)	0.22” (5.7 mm)
100	* - 100 ft (30.5 m)	0.44” (11 mm)
140	* - 140 ft (42.7 m)	0.62” (15.7 mm)
240	* - 240 ft (73.2 m)	1.06” (26 mm)
340	* - 340 ft (103.6 m)	1.5” (38.1 mm)

* Minimum range starts at the lower tip of the antenna for high dielectric material (water). For low dielectric materials allow longer minimum range.

Operational	
Accuracy	+/- 0.10 % of maximum range (in lab using 4-20 mA current output) +/- 0.25 % of maximum range (typical in field)
Frequency	5.8 GHz, 6.3 GHz or 6.3 / 26 GHz (dual frequency)
Measurement Intervals	2 minutes to 24 hours (configurable)
Data Transmission Frequency	2 minutes to 24 hours (configurable – see page 4)
Response Time	2 - 3 echoes / second standard (6 echoes / second standard with less damping) 10 - 30 echoes / second fast protocol (if required)
Transmit Radar Power	50 uW average
Calibration	Programmable via Sensor Access website
Diagnostics	Echo Profile via Sensor Access website

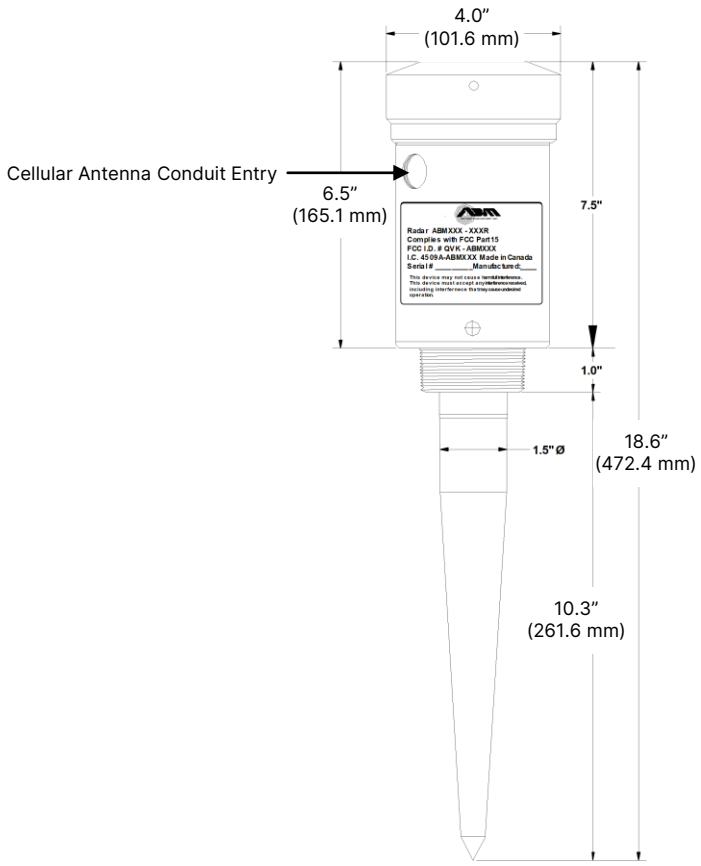
Environmental	
Ambient Temperature	-40 to 60°C (-40 to 140°F)
Process Pressure	≤ 5 Bar (72.5 psi)
Process Temperature	-40 to 80°C (-40 to 176°F)
Material Dielectric	Er >2
Installation Category	Class II

Electrical	
Power	12 to 30 VDC, 0.2 A max @ 24 VDC for short time duration
Output	Cellular data transmission to servers

Mechanical	
Conduit Entry	½” NPT Hole
Enclosure Material	Aluminum-94V0 standard. SS316L optional
Antenna	Teflon rod standard (smooth finish resists build-up) SS316L horn optional (very low dielectric constant materials and short blanking)
Ingress Protection	NEMA 6 (IP68)

Approvals	
FCC	FCC Part 15 - Low Power Communication Device
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

Dimensions and Mounting



Antenna	Mounting Thread NPT
Teflon Rod	1.5” (38.1 mm) / 2.0” (50.8 mm) / 3.0” (76.2 mm)
Horn	3.0” (76.2 mm)

Mounting Accessories

Description	Part #
6” Antenna Extension for Extendable 10” Teflon Rod [ATE]	AE6
8” Antenna Extension for Extendable 10” Teflon Rod [ATE]	AE8

Batteries and Lifespan

The remote low power radar level sensor is powered 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 servers
3. Strength of the cellular signal
4. 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.

Factor 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.

				Frequency of connection to ABM servers			
Part #	**Battery Location**	**Quantity**	**Battery Type**	**15 min.**	**30 min.**	**1 hour**	**2 hours**
AA	Internal battery pack	11	AA Energizer Ultimate Lithium	3 months	6 months	1 year	2 years
D8	External battery box	8	D Cell Duracell Coppertop MN1300	6 months	1 year	2 years	4 years
D18	External battery box	18	D Cell Duracell Coppertop MN1300	1 year	2 years	4 years	8 years

Lifespan values were determined with good cellular coverage and mild temperatures.

Note: Custom battery packs are available for applications requiring more frequent measurement updates while still achieving long battery life. Contact ABM for assistance.

Model Numbering

View the R-RMB model number table below or configure a product online at: www.abmsensor.com/product-configurator/.

ABM	XXX	XXX	XX	XX	XX	XXX	XX
Supply Voltage	-						
Battery Power (wireless)	100						
Maximum Range		-					
17 ft (5.2 m)		017					
33 ft (10.1 m)		033					
50 ft (15.2 m)		050					
100 ft (30.5 m)		100					
140 ft (42.7 m)		140					
240 ft (73.2 m)		240					
340 ft (103.6 m)		340					
Operating Frequency			-				
5.8 GHz			R5				
6.3 GHz			R6				
6.3 / 26 GHz			R6R2				
Communication				-			
Cellular Modem				CM			
Enclosure Material					-		
Aluminum					AL		
SS316L					SS		
Antenna						-	
10” Teflon Rod (extendable)						ATE	
12” Teflon Rod (non-extendable)						ATL	
6” Horn						HR6	
Battery Pack							-
Internal 12AA Holder							AA
External 8D Enclosure							8D
External 18D Enclosure							18D

Contact

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