

# "Smart" Radar Explosion Proof 2 Wire Measurement Sensors"



www.bestobell.com  
1-800-668-3979

## FEATURES

2 Wire Operation  
Self Adjusting Tracking Radar  
Output 4-20 mA / 20- 4 mA  
For communications with calibration,  
diagnostics & data logging software  
Communication with "HART 7"

## APPLICATIONS

Water / Wastewater  
Chemicals with vapors

## MECHANICAL

Conduit Entry : 1/2" NPT  
Enclosure : Aluminum /S.S.- 94V0  
Ingress Protection : TYPE 4/4X ,  
NEMA 6 (IP68)

## ENVIRONMENTAL

Approvals :FM & CSA for Can. & US Explosion Proof  
Class I, Div.1, Groups B, C, D:  
Dust-Ignition Proof Enclosure for  
Class II/III Div. 1,Groups E, F, G  
Approvals : FCC Part 15 - Low  
Power Communication Device  
Temperature : - 40 to 140°F (- 40 to 60°C)  
Installation Category : Class II  
Catalogue # - On the Web return to Home Page & refer to  
Catalogue Number Structure for ordering information. In  
Product Documentation refer to page 5.

## TECHNICAL SPECIFICATIONS

Radar Range Code	RANGE In Liquids	RESOLUTION	MOUNTING
017	* - 17 ft. * - 5 m	0.08" 2.0 mm	2.0", 1 1/2" NPT **
033	* - 33 ft. - 10 m	0.15" 3.9 mm	2.0", 1 1/2" NPT **
050	* - 50 ft. * - 15 m	0.22" 5.7 mm	2.0", 1 1/2" NPT **
100	* - 100 ft. * - 30 m	0.44" 11 mm	2.0", 1 1/2" NPT **
140	* - 140 ft. * - 42 m	0.62" 15.7 mm	2.0", 1 1/2" NPT **
240	* - 240 ft. * - 73 m	1.06" 26 mm	2.0", 1 1/2" NPT **

Note - \* Minimum Range starts at the lower tip of the antenna for high dielectric material (water). For low dielectric materials allow longer Minimum Range.

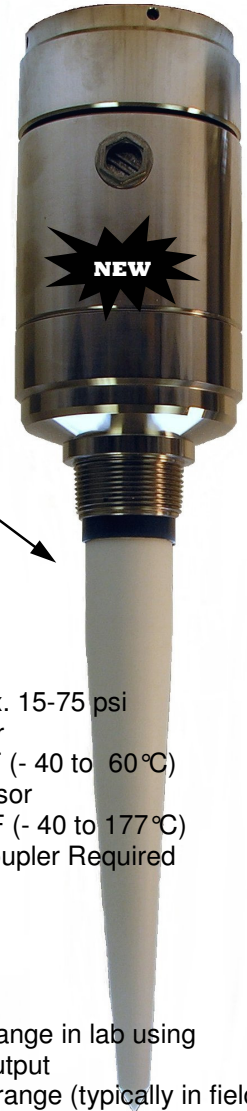
Note -\*\*Only 2" and 3"NPT Mtg. Connection Available on High Temperature Radar.

## OPTIONAL

Antenna Extension : 6" or 8" Lengths  
- Use only with Teflon Antenna !  
- Refer to catalogue number Page for ordering info.  
High Temperature Unit :  
- 2" / 1 1/2" NPT Process Connection  
- Teflon De-coupler threads on with 2" NPT Process Connection.



Antenna Extension



## PROCESS

Material Dielectric : Er >2  
Pressure : 5 bar Max. 15-75 psi  
Temperature : - Std. Sensor  
PP Rod : - 40 to 140°F (- 40 to 60°C)  
High Temp. Optional Sensor  
PTFE Rod : - 40 to 350°F (- 40 to 177°C)  
Teflon Temperature De-coupler Required

## OPERATIONAL

Operation : Pulse Radar  
Accuracy : +/- 0.1% of max. range in lab using  
4-20mA current output  
+/-0.25% of max. range (typically in field)  
Frequency : 6.3 GHz  
Loss of Echo Hold : 1 min., 22mA or 2mA output  
Transmitter Power : 50 uW average  
Calibration : via optional communications port.  
(required)  
Diagnostics: (Echo Profile) via communications port  
Antenna : Dielectric rod PP or Optional PTFE

## ELECTRICAL SPECIFICATIONS

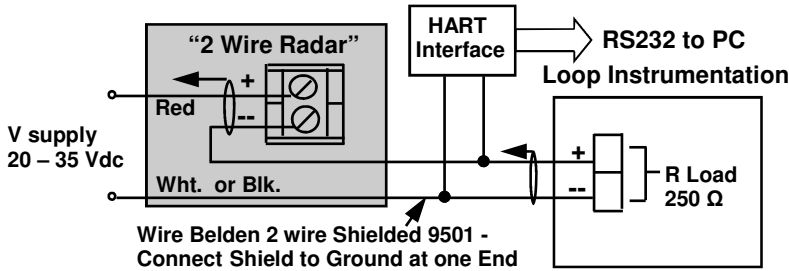
Power DC 16 to 30 VDC ,  
ABM200 R load max. = (Vs - 14 ) / 25 mA

Output 4-20 mA Output 6.1 uA resolution  
Optional Communication with "HART 7"

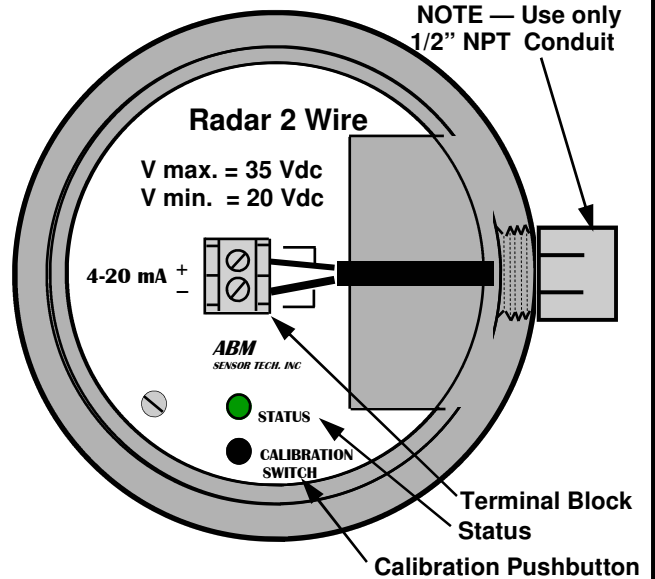
# 2 Wire Radar Sensors User Instruction Manual



**Fig. # 1 - "2 Wire Sensor" Wiring Connection**



**Top View of Sensor (Access Cover Removed)**



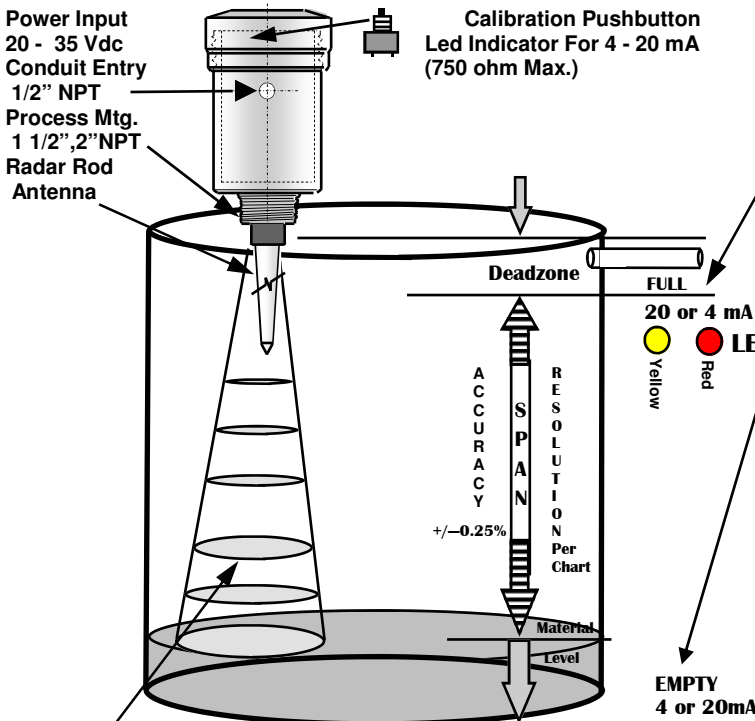
**FCC INFORMATION TO RADAR USERS**

**NOTE:** This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

**WARNING-** Changes or Modifications not expressly approved by ABM Sensor Technology Inc. could void the user's authority to operate the equipment.

**Typical Installation**

1) Radar unit must be installed into metal fitting with the antenna pointing downward.



Operation - electromagnetic 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 . The time of flight is divided by 2 and converted to an output signal directly proportional to the material level .

**Wiring Information**

- Ground shield at one end only.
- All terminal block wiring must be rated for 250V.
- Terminal is for use only with equipment which has no live parts which are accessible .
- Terminal is for use with equipment which maintains basic insulation from hazardous voltage under normal and single fault conditions .
- Connection used at the remote end of external circuit .

**Recommended Wiring**

- 2 Wire shielded 24 AWG , 300 V

**Calibration — 4 -20 or 20 - 4 mA Output**

**FULL — Calibrate 20 mA or 4mA (Set Near Target)**

1. Calibration mode LED color is blinking Green. (for Radar Low Dielectric Materials has to be off)
2. Push button and hold until LED turns Yellow (20 mA) or push button and hold until LED turns Red (4 mA)
3. Release button at Yellow or Red and observe LED flashes to acknowledge the calibration.

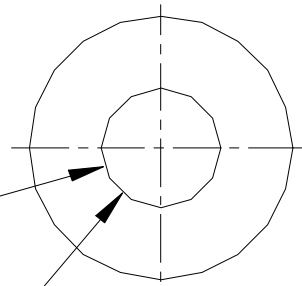
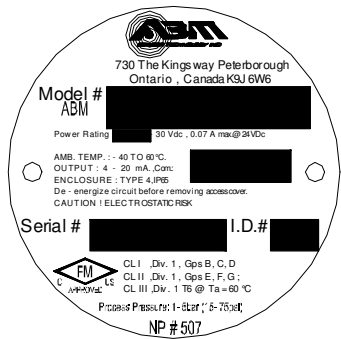
**EMPTY— Calibrate 4 mA or 20 mA (Set Far Target)**

1. Calibration mode LED color is blinking Green (for Radar Low Dielectric Materials has to be off)
2. Push button and hold until LED turns Red (4 mA) or push button and hold until LED turns Yellow (20 mA)
3. Release button at Yellow or Red and observe LED flashes to acknowledge the calibration.

**For Radar to turn the Low Dielectric Materials operation mode ON and OFF (this mode is recommended for materials with dielectric constant lower than 4 and also to eliminate multiple reflections in tank.)**

- 1) To turn the Low Dielectric Materials ON. Push button and hold until LED goes OFF after the sequence of Yellow , Red and turns Off. The Low Dielectric Material operation is On when the LED'S Green light gives two short blinks.
- 2) To turn the Low Dielectric Materials OFF. Push button and hold until LED goes OFF after the sequence of Yellow , Red and Turns OFF. The Low Dielectric Material operation is OFF when LED is blinking Green.
- 3) Or use "Hart 7 " communication software (Fig. #1).

# 2 Wire Explosion Proof Radar Level Measurement Sensors Outline Dimensional Dtl.



Nameplate Recess

Cover Tool Access Hole

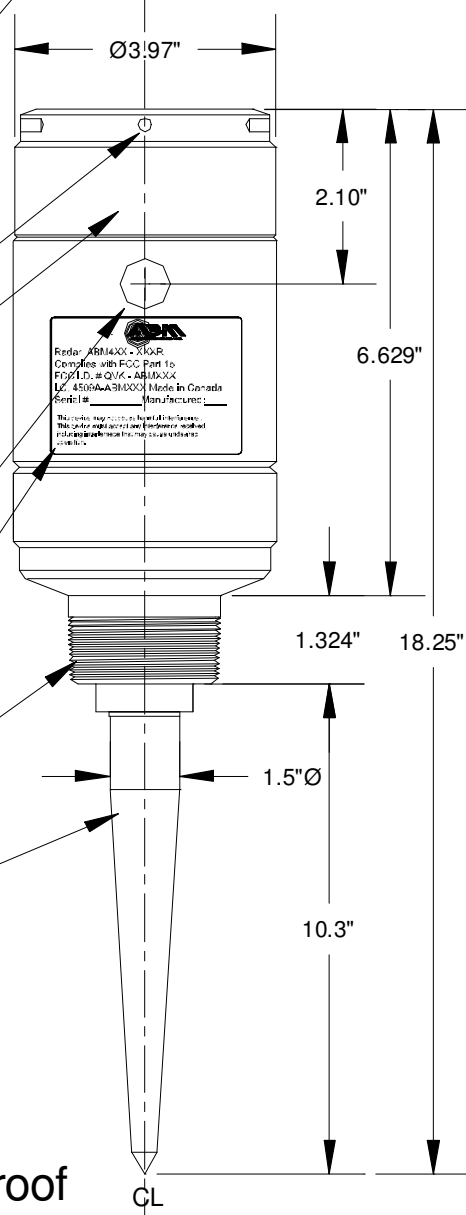
Thread on Wiring access Cover (Aluminum or S.S.)

1/2" npt Conduit Entry

FCC Nameplate

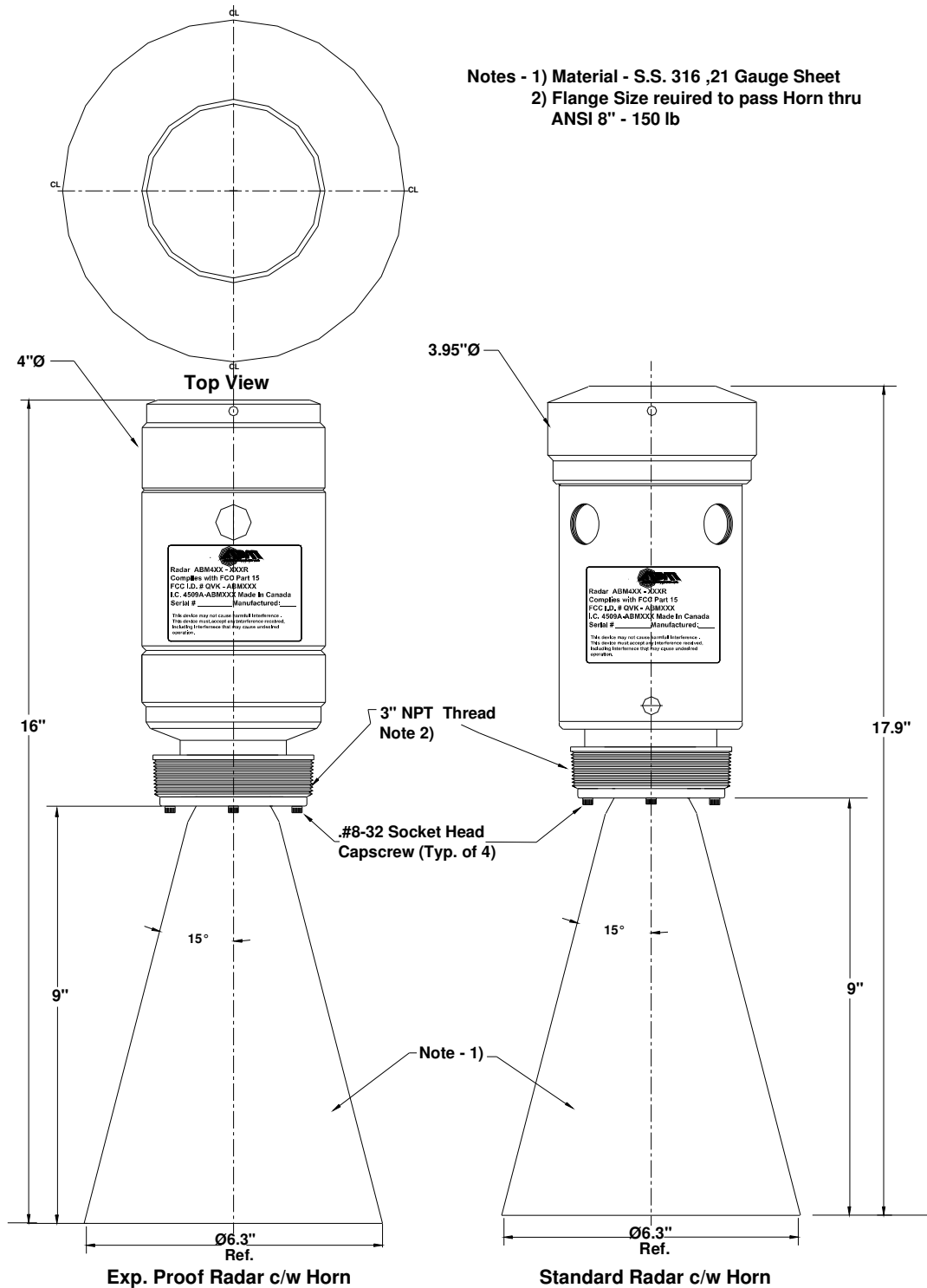
Mounting Thread 2"/ 1 1/2" NPT

Antenna Teflon



2 Wire Radar Explosion Proof Outline Dimensions

# Radar Standard and Exp. Proof Sensors c/w Horn Dimensional Dtl.



## 2, 3 & 4 Wire Radar Level Sensor with Horn Outline Detail

