

# Self Adjusting "Smart" Radar Standard Measurement Sensors



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## FEATURES

Self Adjusting Tracking Radar  
Programmable (recommended) and  
Simple push-button calibration  
Output 4-20 mA / 20-4mA  
(Isolated on 4 Wire Model's only)  
Optional RS232 OR RS485  
For communications with calibration,  
diagnostics & data logging software  
PL Compatible (Modbus RTU)  
Three or four Wire Operation

## APPLICATIONS

Food and Beverages  
Water / Wastewater  
Chemicals with vapors

## MECHANICAL

Conduit Entry : 1/2" NPT x 2  
Enclosure : Aluminum or S.S. - 94V0  
Ingress Protection : NEMA 4 (IP65) Type 4 / 4X

## ENVIRONMENTAL

Temperature : - 40 to 140°F (- 40 to 60°C)  
Approvals : FCC Part 15 - Low Power  
Communication Device

Installation Category : Class II

## PROCESS

Temperature PP Rod : - 40 to 176°F (- 40 to 80°C)  
De-coupler & PTFE Rod - 40 to 350°F (- 40 to 177°C)  
Material Dielectric : Er >2  
Max. Pressure : 5 bar (without De-coupler)

**Catalogue # - On the Web return to Home Page  
& Refer to Catalogue Number Structure for Ordering  
information. In Product Documentation refer to Page 4.**

## OPTIONAL

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



Antenna Extension



## 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)  
Response Time : Std. Unit 2 - 3 echo's per sec.  
: Std. with less damping 6 echo's / sec.  
: Fast Protocol Unit 10 - 30 echo's / sec.  
Frequency : 5.8 GHz or 6.3 GHz.  
Loss of Echo : Hold 1 min., 22mA or 2 mA. output  
Transmit Power : 50 uW average  
Calibration : Via communications port (required)  
Diagnostics : (Echo Profile) via communications port  
Antenna : Dielectric rod PP, & Optional PTFE  
Horn 316 S.S. for very low dielectric  
constant materials and short blanking

## TECHNICAL SPECIFICATIONS

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

Note - \* Minimum Distance starts at the lower tip of the antenna .  
Note - \*\* Only 2" NPT Mounting available for High Temperature

## ELECTRICAL SPECIFICATIONS

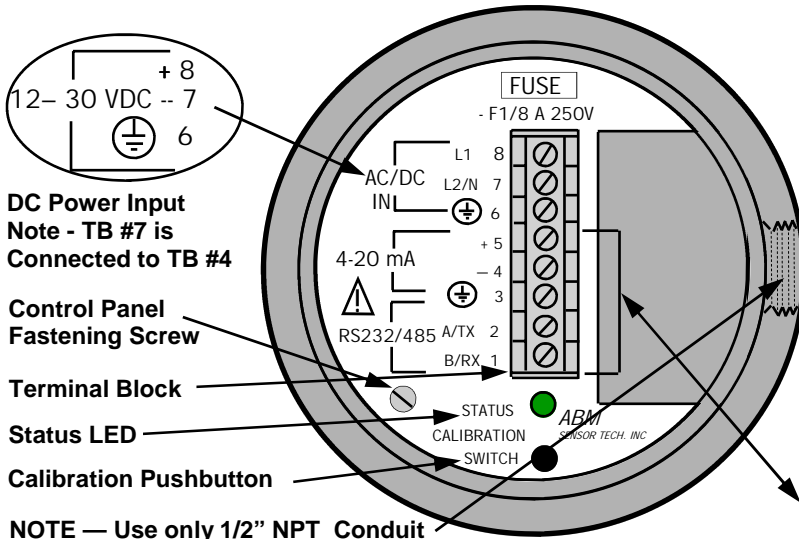
|                  |   |
|------------------|---|
| <b>Power</b>     | 115 VAC 60 Hz or 230 VAC 50 Hz                                  |
| <b>ABM400 AC</b> | (+/-20%) , 1.7 VA   |
| <b>ABM300 DC</b> | 12 to 30 VDC , 0.07 A max @ 24 Vdc<br>R load = (Vs - 6) / 24 mA |
| <b>Output</b>    | 4-20 mA Output 6.1 uA resolution                                |
|                  | 750 Ohms (Isolated on 4 Wire only)                              |
|                  | Optional RS232 or RS485 communications port.                    |

# 3 & 4 Wire Ultrasonic and Radar Sensors User Instruction Manual



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## Inter-Connection Diagram Top View of Sensor (Access Cover Removed)



**DC Power Input**  
 Note - TB #7 is Connected to TB #4

**Control Panel Fastening Screw**

**Terminal Block**

**Status LED**

**Calibration Pushbutton**

**NOTE — Use only 1/2" NPT Conduit**

### Typical Installation

- 1) Direct mounting ultrasonic sensor - Simply thread sensor directly into metal or plastic nozzle.
- 2) Radar unit must be installed into metal fitting with the antenna pointing downward.
- 3) Do not mount in the center of a domed tank.

### 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.

### Wiring Information

- Ground shield at one end only.
- All terminal block wiring must be rated for 250V.
- Power input wiring must be protected by a 15A double pole circuit breaker.
- 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

For AC Sensor —

Power 3 Wire unshielded 22 AWG, 300 V  
 Current Output 1 Pair shielded 24 AWG, 300 V  
 Communication 1 Pair shielded 24 AWG, 300 V

For DC Sensor—

Power & Current output 3 Wire shielded 24 AWG, 300 V  
 Communication 1 Pair shielded 24 AWG, 300 V

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

For Radar programmable through communication is recommended.

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

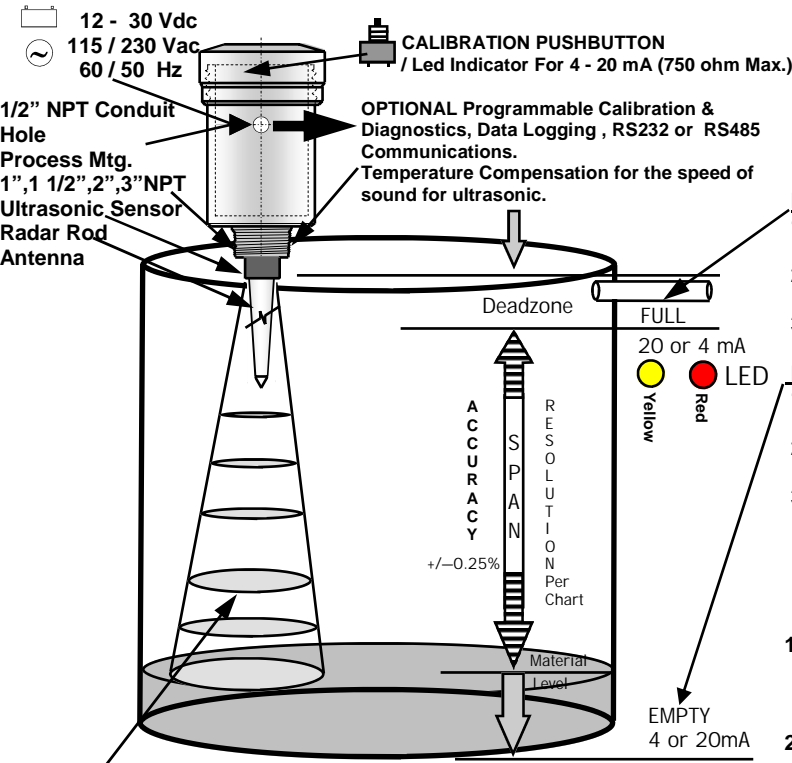
1. Calibration mode LED color is Green.  
(for Radar Low Dielectric Materials has to be off)
2. Push button and hold until LED turns Yellow (20 mA) or push button and hold until LED turns Red (4 mA)
3. Release button, observe LED flashes to acknowledge the calibration.

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

1. Calibration mode LED color is 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, 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 blinks constantly.
- 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 continuously Green.
- 3) Use communication software.



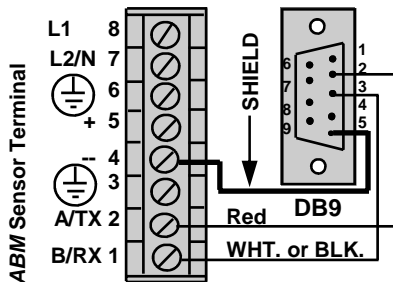
**Operation -** An ultrasonic/electromagnetic pulse is transmitted from the ABM sensor. The pulse travels to the surface being monitored and is reflected off this surface back to the sensor. The time of flight is divided by 2, corrected with temp. and converted to an output signal directly proportional to the material level.

# 3&4 Wire Ultrasonic and Radar Sensors Communication Interconnection Dtl.



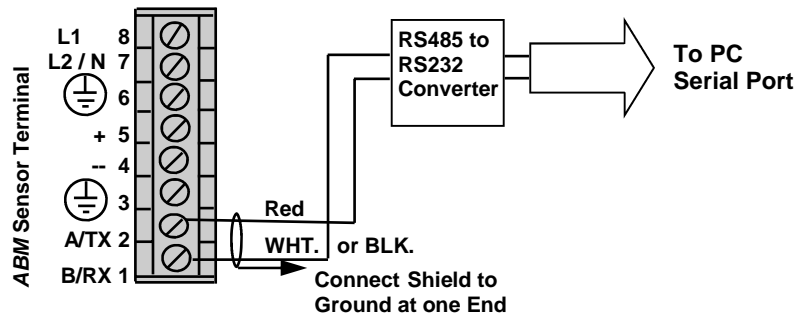
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**Fig. # 1 RS232 Connection**



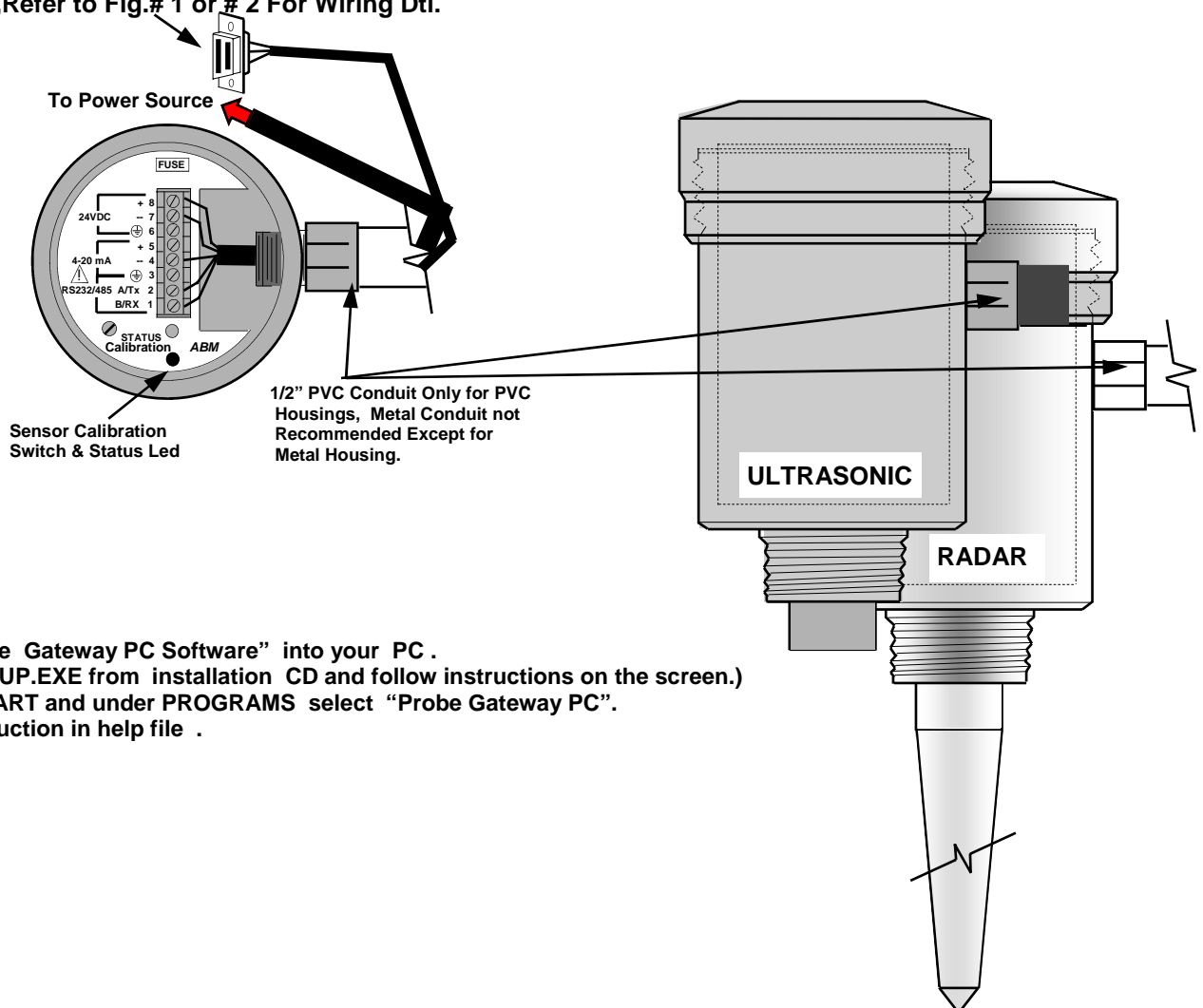
Note – Connect the shield to ABM Sensor Terminal #4.

**Fig. # 2 RS485 Connection**



Note – Connect the shield to ABM Sensor Terminal #3.

Connect to Serial Port of PC, use Extension Cable length as required, Refer to Fig.# 1 or # 2 For Wiring Dtl.



- 1) Load "Probe Gateway PC Software" into your PC .  
(Select SETUP.EXE from installation CD and follow instructions on the screen.)
- 2) Click on START and under PROGRAMS select "Probe Gateway PC".
- 3) Follow instruction in help file .

