

Self Adjusting "Smart" Radar For Liquids and Solids



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 6 (IP68)

ENVIRONMENTAL

Temperature : - 40 to 140°F (- 40 to 60°C)
Approvals : 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

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) ,c/w bottom flange &
thermal gasket up to 300°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.

TECHNICAL SPECIFICATIONS

Radar Range	RANGE	RESOLUTION	MOUNTING
017	* - 17 ft. * - 5 m	+/- 3 mm	3",2",1 1/2" NPT **
033	* - 33 ft. * - 10 m	+/- 3 mm	3",2",1 1/2" NPT **
050	* - 50 ft. * - 15 m	+/- 3 mm	3",2",1 1/2" NPT **
100	* - 100 ft. * - 30 m	+/- 3 mm	3",2",1 1/2" NPT **
140	* - 140 ft. * - 42 m	+/- 3 mm	3",2",1 1/2" NPT **
240	* - 240 ft. * - 73 m	+/- 3 mm	3",2",1 1/2" NPT **
340	* - 340 ft. * -103.6m	+/- 3 mm	3",2",1 1/2" NPT **

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 : Standard 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

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

Note - **Only 2"and 3" NPT Mounting available for High
Temperature Radar.

ELECTRICAL SPECIFICATIONS

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

Catalogue Numbering Structure

- Standard "Smart" Radar Sensors



CATALOGUE NUMBER STRUCTURE

1) 2) 3) 4) 5) 6) 7) 8) 9)
ABMXXX - XXXR5CX - XYYYY - IP68 - XEX - NA - XXXX

- 1) Supply Voltage
2) Radar Range
3) Radar Frequency
4) Communications
5) Body Material
6) Antenna Material
Ingress Protection IP68 or leave blank for IP65
7) Radar Optional Extensions
8) Radar Explosion Proof (next page)
9) Swivel Aiming Mount / Flange Mounting

ABM Code **Eg. ABM400-050RLC2-ALAPP**
1) Supply Voltage: AC 115V - 400
AC 230V - 430
DC 12-30V - 300
Loop Powered DC 16-30V - 200
ABM 115volt radar 50 foot range with 232 communications and Aluminum body standard polypropylene antenna

2) Range:

Radar Range	ABM Code
* - 17 Ft	
* - 5 m	017
* - 33 Ft	
* - 10 m	033
* - 50 Ft.	
* - 15 m	050
* - 100 Ft.	
* - 30 m	100
* - 140 Ft.	
* - 42 m	140
* - 240 Ft.	
* - 73 m	240

Note - * 5.8 & 6.3 GHz - Minimum Distance Starts at the Lower Tip of Antenna.
* 26 GHz - Minimum Distance Starts at 36" from the bottom of the mounting thread base.

3) Radar Frequency : **ABM Code**
6.3 GHz - R6
5.8 GHz - R5
26 GHz - R2
Mini radar 26 GHz - M2

4) Communications : **ABM Code**
RS485 - 4
RS232 - 2
HART 7 - H

5) Body Material : **ABM Code**
Radar Std. Aluminum - AL
Radar Anodized Al. - AN
Radar Optional 316 S.S.- SS

6) Antenna Material Radar : **ABM Code**
Standard - Antenna Polypropylene - APP
Optional - Antenna Teflon - ATE
- High Temp. Teflon - HTE (c/w De-coupler) Includes Teflon antenna and 1 1/2" - 2" NPT Teflon De-coupler.
Sanitary Mtg.- 2" Tri clamp - S20 PTFE Teflon Material (26GHz Only)
Horn - 2" Dia. Horn - HR2
Flood Monitor Horn - 4" Dia. Horn - HR4 (used for 6 GHz & 26 GHz flood monitoring)
Horn - 5" Dia. Horn - HR5 (used for 26 GHz as extension for HR2)
Horn - 6" Dia. Horn - HR6 (used for 6 GHz radar)
Horn - 6" Dia. High Temp. - HT6 (used for 6 GHz radar ,see note below)
Horn - 2" Dia. ,5"Dia. High Temp. - HT2,HT5 (used for 26 GHz ,see note below)
Note - High temperature radar units with horns use 2" to 3" NPT Teflon De-coupler.
Mounting Adaptors - TD2 1.5" to 2" Teflon De-coupler
- TD3 2" to 3" Teflon De-coupler

ABM Code
7) Radar Optional: Antenna Built in Extension 1.5" - ATL
Antenna Extension Teflon 6" - AE6
Antenna Extension Teflon 8" - AE8
Radar Interface Detector - RID
— use with Teflon antennas only

8) Explosion Proof : Radar Explosion Proof Class 1 Div. 1 ABM300 - XXXYYCX- XYYYY - AEX - EXP per next page.

9) Swivel Aiming Mount : 8" O.D. ,7.0" Bolt Circle 6 @ 1/4" Dia. Holes C/W 3" Sensor Mtg. Hole - AIM3
Flange Mount : 9" O.D. ,7.5" Bolt Circle 6 @ 3/4" Dia. Holes C/W 6" Sensor Mtg. Hole - FLA6
9" O.D. ,7.5" Bolt Circle 6 @ 3/4" Dia. Holes C/W 3" Sensor Mtg. Hole - FLA3
13.5" O.D.,11.75" Bolt Circle 8 @ 0.8" Dia. Holes — FLA8

10) For special custom orders please call directly Tel. (705) 740-2010

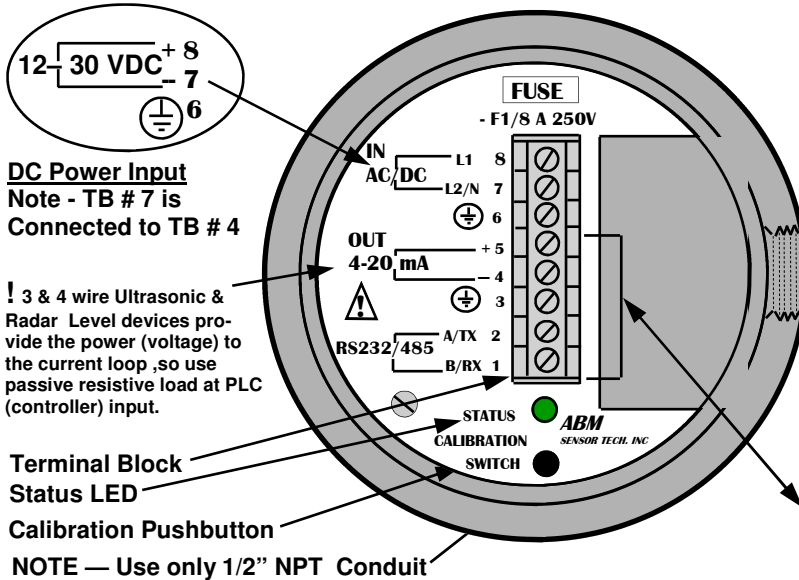
BESTOBELL
AQUATRONIX
SINCE / DEPUIS 1953
BEP-Bestobell
www.bestobell.com

3 & 4 Wire Ultrasonic and Radar Sensors User Instruction Manual



Inter-Connection Diagram

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.

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 —

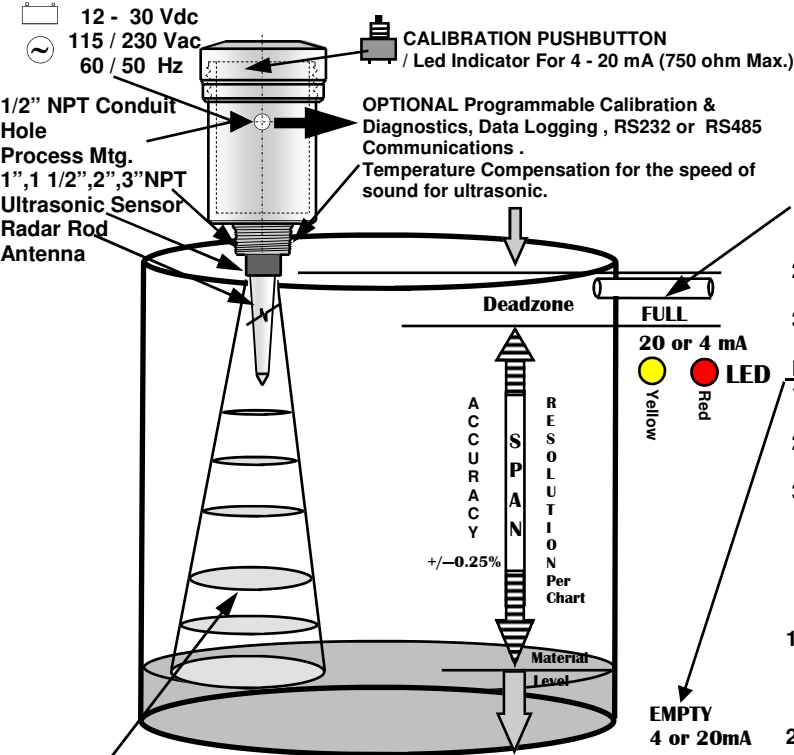
Power 3 Wire unshielded 22 AWG, 300 V
Current Output 1 Pair shielded 24 AWG, 300 V
Communication 1 Pair shielded 24 AWG, 300 V

For DC Sensor—

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

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.



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 and 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 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.)

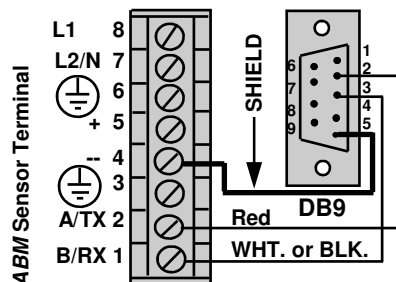
- 1) To turn the Low Dielectric Materials ON. Push button and hold until LED goes OFF after the sequence of Yellow, Red and turns Off. The Low Dielectric Material operation is On when the LED'S Green light blinks constantly.
- 2) To turn the Low Dielectric Materials OFF. Push button and hold until LED 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.

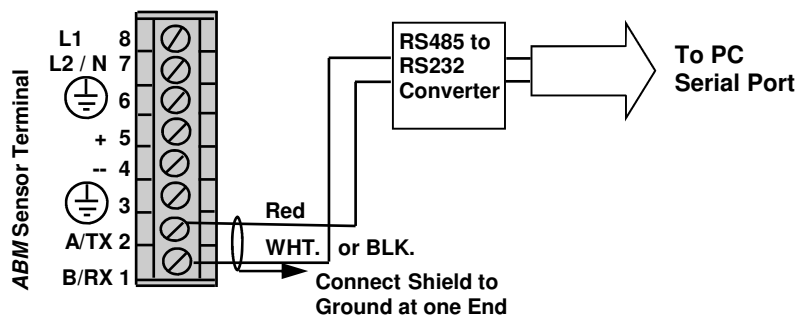


Fig. # 1 RS232 Connection



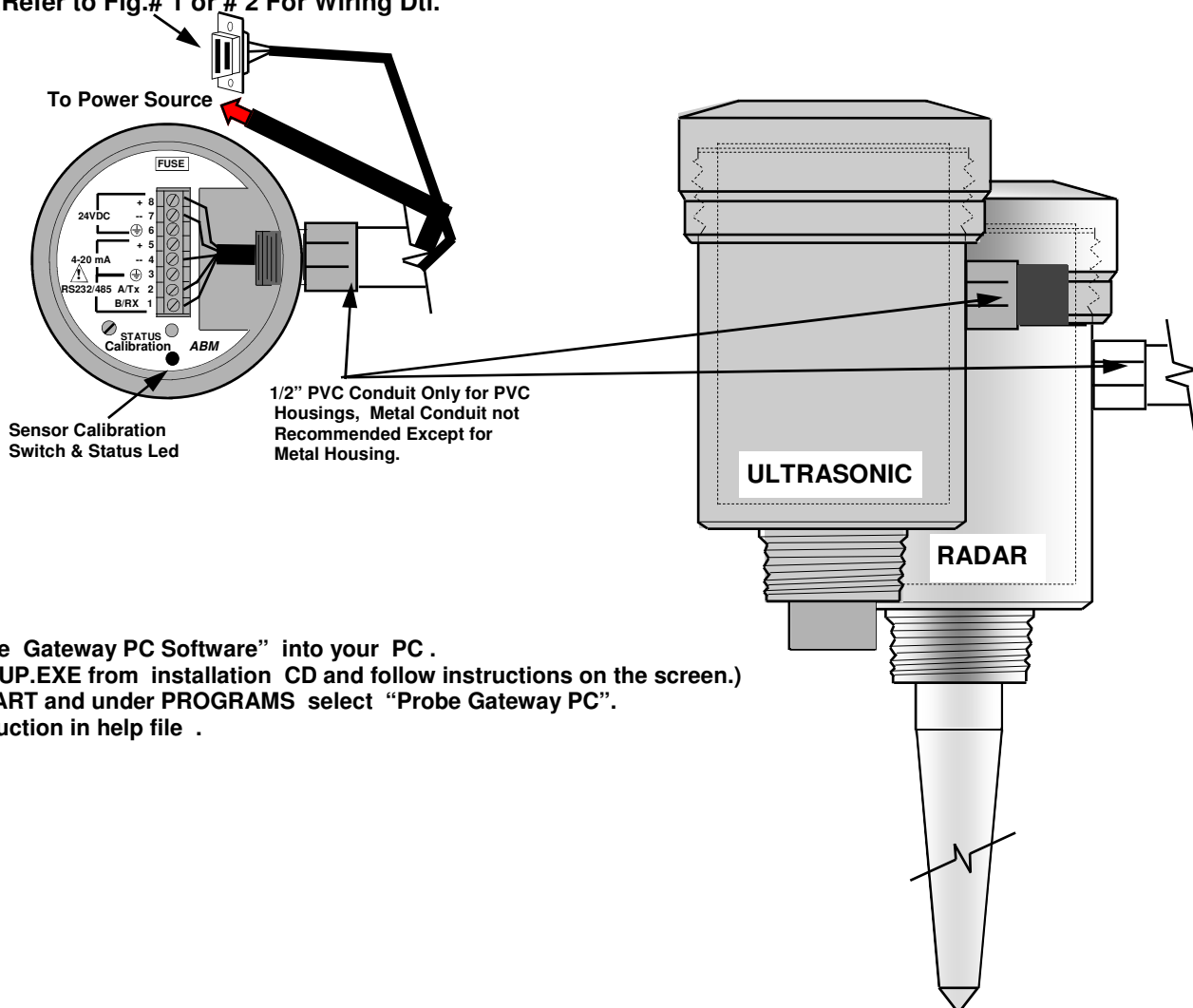
Note – Connect the shield to ABM Sensor Terminal #4.

Fig. # 2 RS485 Connection



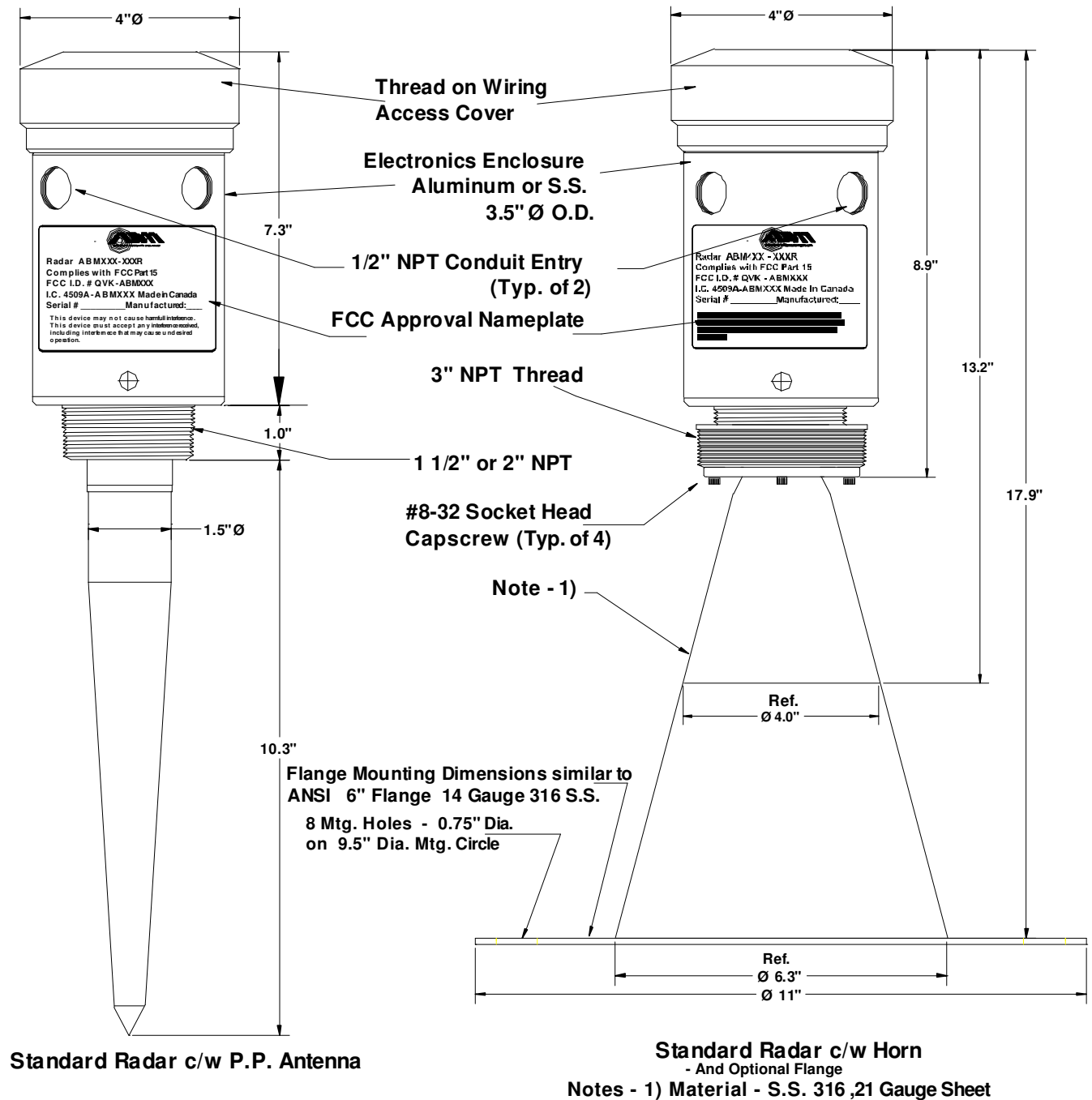
Note – Connect the shield to ABM Sensor Terminal #3.

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 .

3 & 4 Wire Standard Radar Measurement Sensors Outline Dimensional Dtl.



3 Wire Radar IP68 Level Sensor with Horn Outline Detail