

# SmartWave Pulse Radar Transmitters



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## Instruction Manual

**BINMASTER**

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## General Specifications

<b>Conduit Entry:</b>	1/2" NPT
<b>Enclosure:</b>	Aluminum or Stainless Steel –94VO
<b>Enclosure Rating:</b>	NEMA 4X (IP65)
<b>Ambient Operating Temperature:</b>	-40 to +140° F (-40 to 60° C)
<b>Process Operating Temperature: (PP Rod)</b>	-40 to 190° F (-40 to 90° C)
<b>Pressure:</b>	1-10 bar / 15-150 psi
<b>Approvals:</b>	FCC Part 15—Low Power Communication Device
<b>Antenna:</b>	Dielectric Rod Polypropylene Standard Dielectric Rod PTFE (Teflon)
<b>Accuracy:</b>	+/- 0.25% of maximum target range (in air)
<b>Frequency:</b>	6.3 GHz
<b>Loss of Echo:</b>	Hold 30 seconds, 22 mA
<b>Transmitter Power:</b>	50 uW average
<b>Calibration:</b>	Push-button or programmable via optional RS-485 communication port with utility software
<b>Diagnostics:</b>	Via communication port (echo profile, echo stability, operation errors)
<b>Power AC:</b>	AC units 115 VAC 60Hz or 230 VAC 50Hz, 1.7 VA
<b>Power DC:</b>	DC units 12 to 30 VDC, 0.07 A max @ 24 VDC
<b>Output:</b>	4-20 mA, RS-485, or Modbus RTU
<b>4 to 20 mA Max. Loop Resistance</b>	110 VAC @ 750 Ohms (isolated) 12 VDC @ 250 Ohms 24 VDC @ 750 Ohms

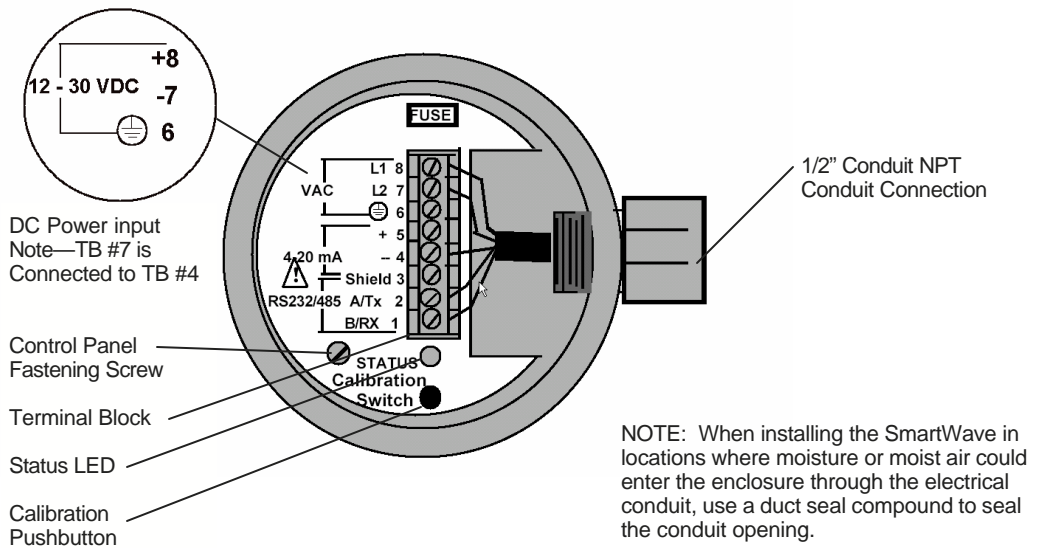
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## Operation

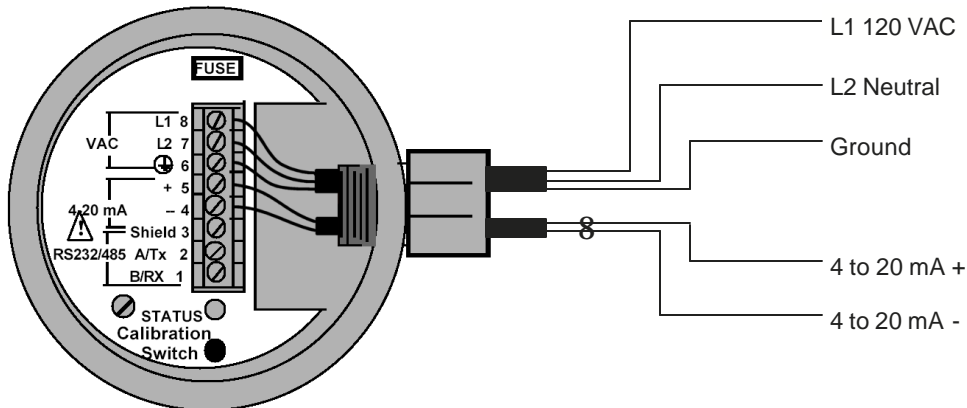
The SmartWave is a very accurate, noiseless and self-adjusting pulse radar transmitter for distance up to 100 feet. The SmartWave adjusts microwave transmit pulse amplitude and its width to a target distance and target reflection properties. The receiver changes its sensitivity with the amplitude of received echoes. In addition, the unit analyzes the shapes of the received pulses and eliminates the ones coming from tank walls, standpipes, and other obstructions. These features allow the SmartWave to track any wanted target from the tip of the rod antenna to the bottom of the tank, regardless of the tank shape or environmental conditions. Any build up on the rod antenna does not deteriorate the performance of the Radar Transmitter. The SmartWave Transmitter does not have any mismatch between resonator and transceiver. This eliminates the problems when a target is close to the antenna and give optimal performance of the radar. The SmartWave Transmitter also features a Low Dielectric Constant Mode. In this mode SmartWave will ignore echoes from tank bottoms with material present and it will increase it's transmit energy and sensitivity of the receiver until it will detect echoes from surfaces of the low dielectric materials. SmartWave in this mode will work with dielectrics around 2 and higher.

## FCC Information to SmartWave Pulse Radar Users

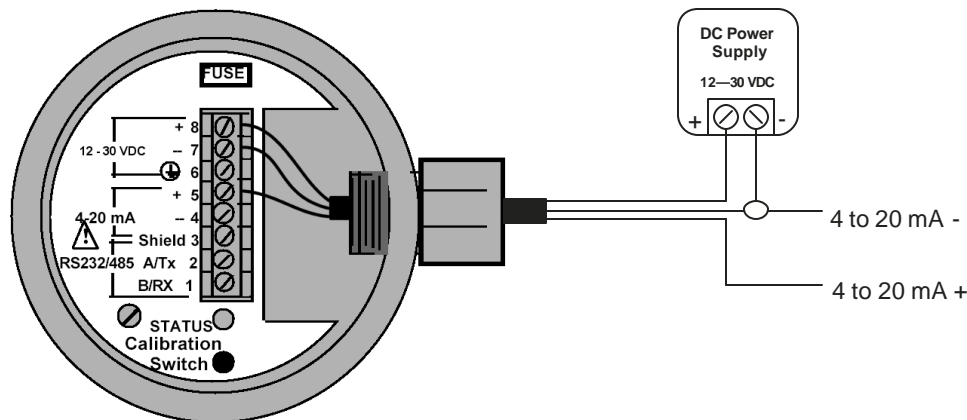
**Note:** This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC rule. These limits are designed to provide reasonable protection against harmful interference when the equipment is operating in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed in accordance with the instructions, may cause harmful interference to radio communications.



## AC Wire Diagram



## DC 3—Wire Diagram



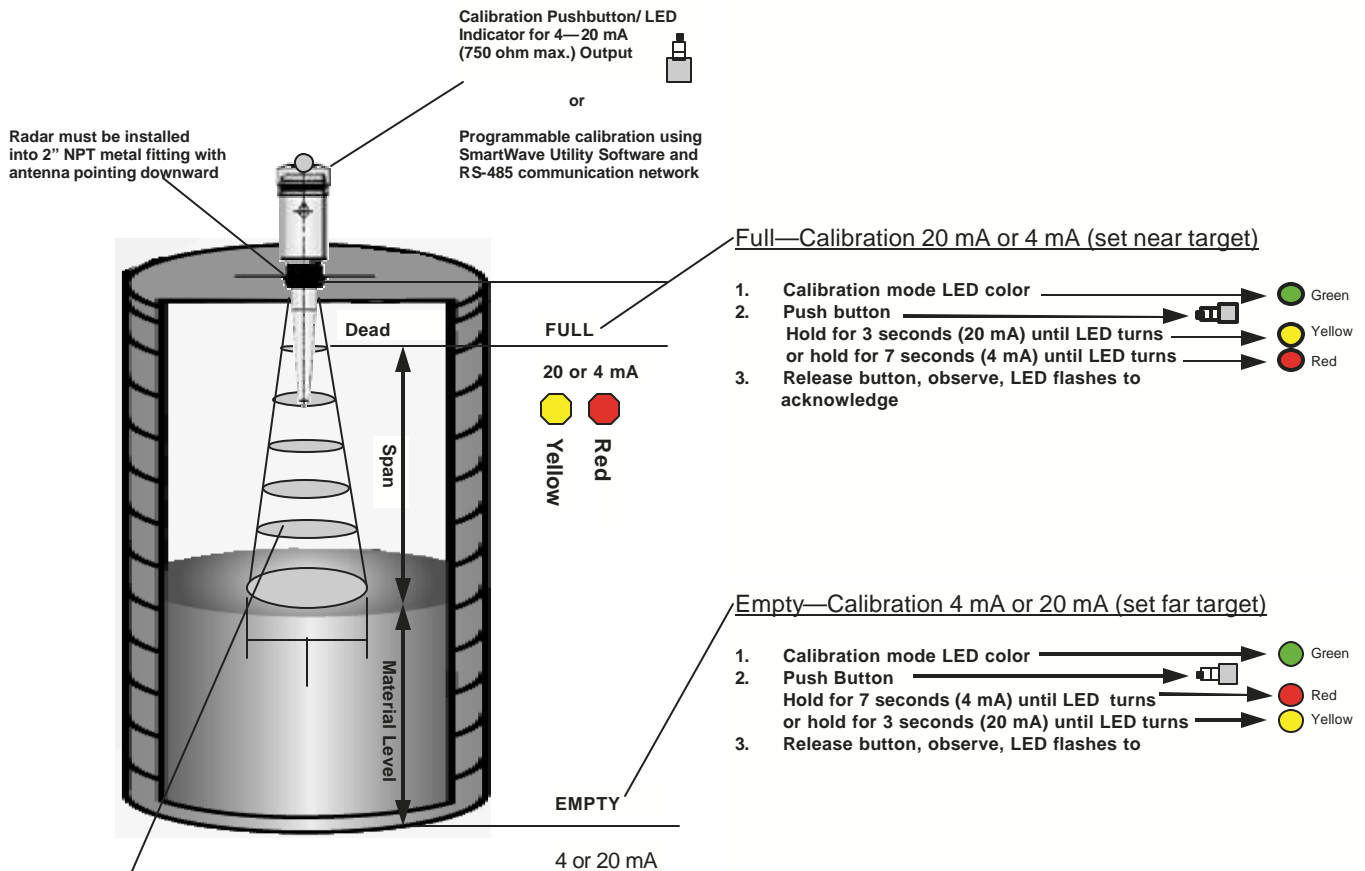
### Wire/Cable for AC Units

115/230 VAC.....	3 wire unshielded, 22AWG (7X30), 300V
4-20 mA.....	1 pair shielded, 24AWG (7X32), 300V
RS-485.....	1 pair shielded, 24AWG (7X32), 300V

### Wire/Cable Recommendation for 3—Wire DC Units

24 VDC + 4-20 mA.....	3 wire shielded, 24AWG (7X32), 300V
RS-485.....	1 pair shielded, 24AWG (7X32), 300V

# Calibration—4-20 or 20-4 mA Output and Low Dielectric Material Mode

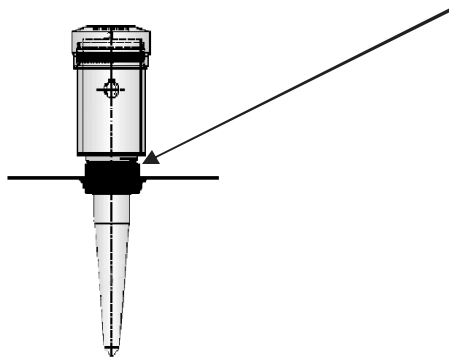


Operation—An electromagnetic pulse is transmitted from the SmartWave transmitter. The pulse travels to the surface being monitored and is reflected off this surface back to the antenna. The time of flight is divided by 2 and converted to an output signal directly proportional to the material level.

## Turning On/Off Low Dielectric Materials Operation Mode (for materials with dielectric constant lower than 4)

1. To turn the Low Dielectric Mode On. Push calibration button and hold until the LED goes OFF after the sequence of Yellow and red flashes from the LED. The Low Dielectric mode is ON when the LED's Green light blinks constantly.
2. To turn the Low Dielectric Mode OFF. Push calibration button and hold until LED goes OFF after the sequence of Yellow and Red Flashes from the LED. The Low Dielectric mode is OFF when the LED is continuously Green

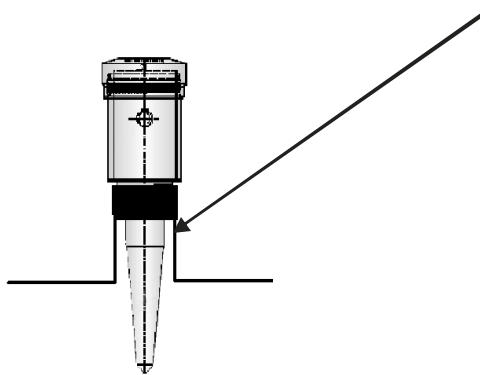
# Mounting



Standard Mounting:

Mounting the SmartWave Transmitter is critical to the proper operation of the unit. The unit can be directly mounted by simply threading the sensor directly into a 2" NPT metal mounting flange with the antenna pointing down. The SmartWave Transmitter must be installed in a metal flange. If an extended standpipe is used for mounting, please consult the factory for assistance.

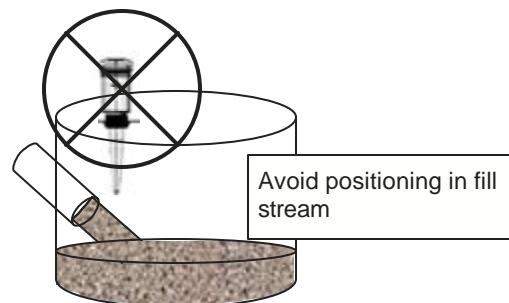
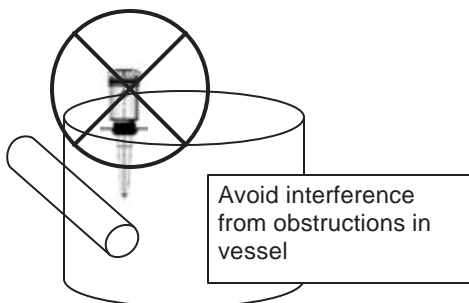
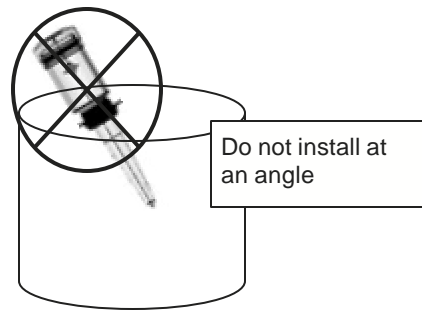
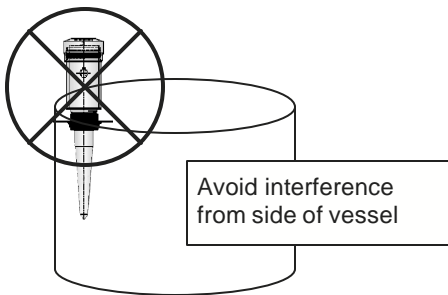
Threaded Mounting Flange (2" NPT)



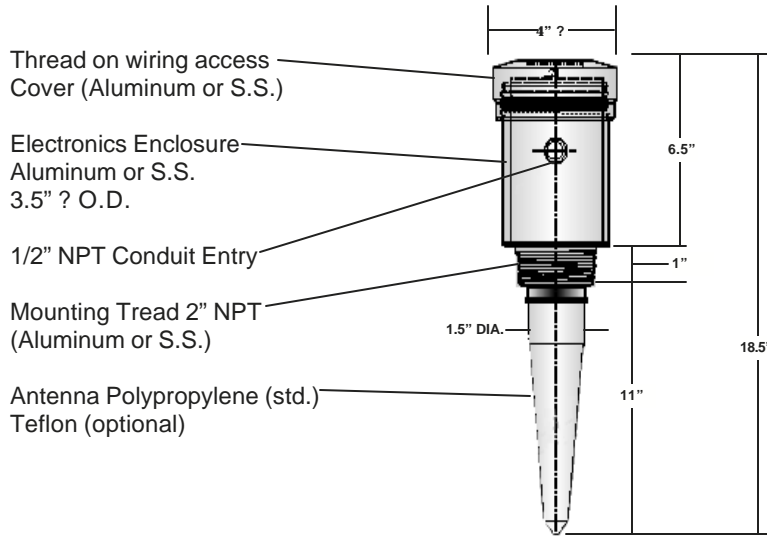
Metal Standpipe Mounting:

Pipe Diameter	Max. Length
2.5"	2"
3.0"	4"
3.5"	4"
4.0"	11" & Longer

# Positioning







MODEL	VOLTAGE	OPERATING FREQUENCY	RANGE	RESOLUTION	MOUNTING	PART NUMBER
SS400-050RC	120 VAC	6.3 GHz	* - 50 ft. * - 15 m	0.22" 5.7 mm	2.0" NPT	730-0420
SS400-100RC	120 VAC	6.3 GHz	* - 100 ft. * - 30 m	0.44" 11 mm	2.0" NPT	730-0422
SS300-050RC	12 to 30 VDC	6.3 GHz	* - 50 ft. * - 15 m	0.22" 5.7 mm	2.0" NPT	730-0424
SS300-100RC	12 to 30 VDC	6.3 GHz	* - 100 ft. * - 30 m	0.44" 11 mm	2.0" NPT	730-0426

Note - \* Minimum distance starts at the lower tip of the antenna

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