

# LTR51

Self Adjusting "Smart"  
Radar Level Sensors for Liquids

## Product Features

- Self adjusting tracking radar ideal for liquids
- Programmable (recommended) and Simple push-button calibration
- Output 4-20 mA / 20-4 mA (Isolated on 4 wire model's only)
- Optional RS232, RS485 for communications with calibration, diagnostics & data logging software
- Optional HART on 2-wire models
- PLC compatible (Modbus RTU)
- 2-wire DC loop powered, 3-wire DC, or 4-wire isolated AC operation

## Description

The LTR51 Series radar level sensors are designed for applications requiring non-contact level measurement, in which ultrasonic level measurement is not acceptable.

The LTR51 Series radar technology can be adjusted for variables such as materials to be measured, vessel configuration, and system interface. These sensors are ideal when vapor, dust, or a foaming surface prevents ultrasonic-wave measurements.

The LTR51 Series radar sensors can detect the level under a layer of light dust or airy foam, but if the dust particle size increases, or if the foam or dust gets thick, they will no longer detect the liquid level. Instead, the level of the dust or foam will be measured. Internal piping, deposits on the antenna, multiple reflections, or reflections from the wall can interfere with the proper operation of the radar sensor. Other sources of interference are rat-holing and bridging of solids, as well as angled process material surfaces that can reflect the radar beam away from the receiver.

LTR51 radar sensors use improved microwave-pulse technology to track any target material from the tip of the antenna to the bottom of the tank. Their power, pulse widths, and sensitivity depend on the distance of the target from the antenna and the dielectric constant of the reflecting material.

LTR51 radar sensors feature "echo marker" signal processing, making them among the most technologically advanced pulse radar systems on the market.

## Applications

- Food and beverages
- Water / Wastewater
- Chemicals with vapors
- Animal fat under high temperature
- Oils, fuels



Range Code	Range in Liquids	Resolution	Mounting
05	* - 17 ft. * - 5 m	0.08" 2.0mm	1-1/2", 2", 3" NPT **
10	* - 33 ft. * - 10 m	0.15" 3.9mm	1-1/2", 2", 3" NPT **
15	* - 50 ft. * - 15 m	0.22" 5.7 mm	1-1/2", 2", 3" NPT **
30	* - 100 ft. * - 30 m	0.44" 11 mm	1-1/2", 2", 3" NPT **
43	* - 140 ft. * - 43 m	0.64" 16 mm	1-1/2", 2", 3" NPT **
73	* - 240 ft. * - 73 m	1.06" 26 mm	1-1/2", 2", 3" NPT **

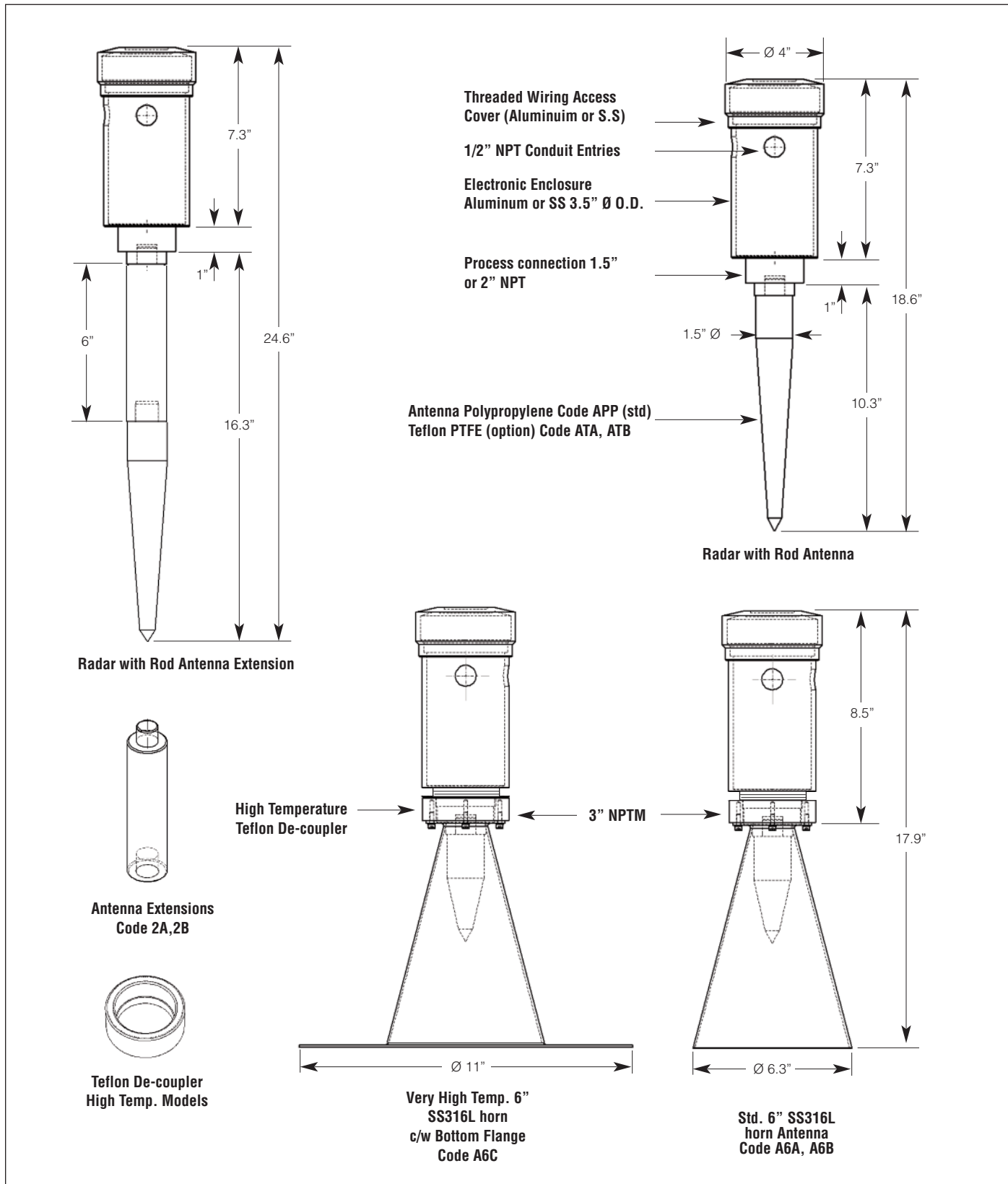
Note - \*Minimum range starts at the lower tip of the antenna or horn bottom for high dielectric materials (water). For low dielectric material allow longer minimum range.

\*\*Only 2" and 3" NPT mounting available for high temperature radar.

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## Dimensions & Mounting Options



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## Specifications

<b>MECHANICAL</b>		<b>Diagnostics :</b> <b>Antenna :</b>	(Echo Profile) via communications port - Polypropylene Rod - Teflon Rod - High Temp. Radar Teflon Rod c/w Teflon Antenna and 1.5"-2" NPT Teflon De-coupler - Std. 6" SS316L horn - High Temp. Std. 6" SS316L horn - Very High Temp. Std. 6" SS316L horn with bottom flange c/w 2"-3" NPT Teflon De-coupler
<b>Conduit Entry :</b>	1/2" NPT x 2		
<b>Enclosure :</b>	Aluminum or S.S.		
<b>Ingress Protection :</b>	NEMA 6 (IP67)		
<b>ENVIRONMENTAL</b>			
<b>Temperature :</b>	-40 to 140 °F (- 40 to 60 °C)		
<b>Approvals :</b>	FCC Part 15 - Low Power Communication Device		
<b>Installation Category :</b>	Class II		
<b>PROCESS</b>		<b>ELECTRICAL</b>	
<b>Temperature PP Rod :</b>	-40 to 140 °F (-40 to 60 °C)	<b>Power Supply :</b>	12 to 30 VDC , 0.07 A max @ 24 Vdc R load = (Vs - 6)/24 mA
<b>De-coupler &amp; PTFE Rod :</b>	-40 to 350 °F (-40 to 177 °C)		115 VAC or 230 VAC (± 20%), 1.7 VA R load = 750 ohms max.
<b>Material Dielectric :</b>	Er >2	<b>Output :</b>	4-20 mA output 6.1 uA resolution, 2-wire with 16-30VDC loop powered 3-wire with 12-30VDC power 4-wire isolated with AC power
<b>Max. Pressure :</b>	5 bar (without De-coupler)	<b>Communication port:</b>	RS232, RS485, or HART
<b>OPERATIONAL</b>		<b>Loop powered Display:</b>	<b>Display:</b> -4 1/2 digit LCD 1/2" high
<b>Operation :</b>	Pulse Radar	<b>Temperature:</b>	-40 to 140 °F (- 40 to 60 °C)
<b>Accuracy :</b>	± 0.1% of max. range in lab using 4-20 mA current output ± 0.25% of max. range (typically in field)	<b>Voltage Drop:</b>	0.95V @ 20mA
<b>Response Time :</b>	Standard Unit 2 - 3 echo's per sec. Std. with less damping 6 echo's per sec. Fast Protocol Unit 10 - 30 echo's per sec	<b>Accuracy:</b>	Reading +/- 0.5%
<b>Frequency :</b>	5.8 GHz or 6.3 GHz.	<b>Humidity:</b>	0-95% Non-condensing
<b>Loss of Echo :</b>	Hold 1 min., 22 mA or 2 mA. output 22 mA and above = LOE (Loss Of Echo)	<b>Range:</b>	3.5 mA to 22mA
<b>Transmit Power :</b>	50 uW average	<b>OPTIONS</b>	
<b>Calibration :</b>	Manual or via communications port (optional)	<b>Antenna Extension :</b>	- 6" or 8" Lengths. <b>Use only with Teflon Rod Antenna.</b>

## Custom Builder

MODEL      1      2      3      4      5      6      7      8

LTR51 -  -  -  -  -  -  -  -  -

BOX1 CODE	Supply Voltage
A1	115 VAC (±20%), 1.7 VA
A2	230 VAC (±20%), 1.7 VA
D1	12 to 30 VDC 0.07 A max. @ 24VDC
D2	16 to 30 VDC (Loop powered) 0.07 A max. @ 24VDC

BOX2 CODE	Output
A	4-20mA/20-4 mA

BOX3 CODE	Measurement Range
05	17 ft. (5m)
10	33 ft. (10m)
15	50 ft. (15m)
30	100 ft. (30m)
43	140 ft. (43m)
73	240 ft. (73m)

BOX4 CODE	Enclosure Type
AR2	Aluminum, 1/2" NPT x 2 conduit
SR2	Stainless, 1/2" NPT x 2 conduit

BOX5 CODE	Process Connection
P15	1-1/2" NPT male*
P20	2" NPT male
P30	3" NPT male**

\* Required if Teflon de-coupler is supplied.  
\*\* Required if horn antenna is supplied.

BOX6 CODE	Communication
0	None
A	RS232
B	RS485
H	HART (2-wire only)

BOX7 CODE	Antenna
APP	Polypropylene Rod (Standard)
ATA	Teflon Rod
ATB	High Temp., Teflon Rod*
A6A	Std. 6" SS316L horn
A6B	High Temp., Std. 6" SS316L horn
A6C	Very High Temp., Std. 6" SS316L horn with bottom flange**

\* C/w 1-1/2" to 2" NPT Teflon De-coupler.  
\*\* C/w 2" to 3" NPT Teflon De-coupler.

BOX8 CODE	Options
0	None
D1	Head Mounted LCD Display
2A	Antenna Extension, 6" long*
2B	Antenna Extension, 8" long*

\* Use with Teflon antennas only