

Level Measurement Expert

TNRP Pulse Radar Level Transmitter



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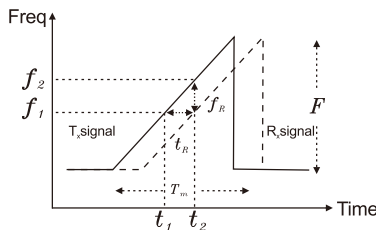
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PRODUCT INTRODUCTION

Pulse Radar level transmitter is a non contact measuring device, which is suitable for high temp., high pressure, and corrosive applications. It is easy to install and free of maintenance, especially for the high accuracy requirement environment.

PRINCIPLE

Pulse radar level transmitter adopts a high frequency signal, which is emitted via an antenna and swipes frequency increment by 0.5GHz during the measurement, reflected by the target surface and received at a time delay. The frequency difference, which is calculated from the transmitting frequency and the received frequency, which is directly proportional to the measured distance (or material surface). The frequency difference then is processed by Fast Fourier Transformation (FFT) to identify the signal in Intermedium Frequency (IF). This Pulse radar is innate with signal / noise enhancement and filtering of echo-back via Phase-Lock Loop (PLL) circuit that is the best solution for complex environment and high accuracy measurement.

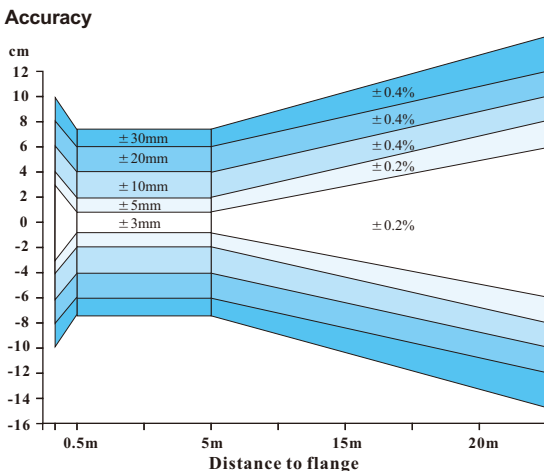


Design formula

$$Slop = \frac{F}{T_m} = \frac{f_R}{t_R} = \frac{f_R}{\frac{2R}{c}} \quad t_R = \frac{2R}{c}$$

$$R = \frac{F_R \times c \times T_m}{2F}$$

LINEARITY DIAGRAM



FEATURES

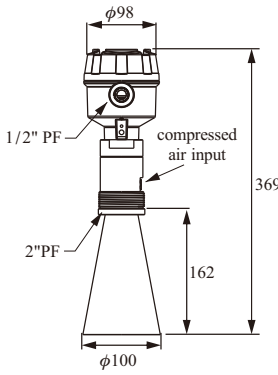
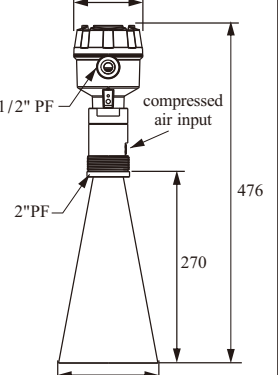
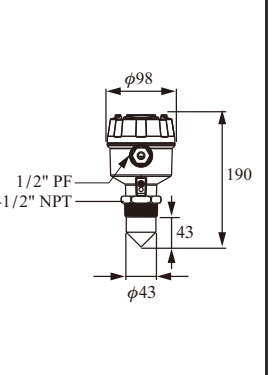
- Non contact measuring
- Corrosive and toxic liquid, hydrocarbons, slurries
- Not affected by specific gravity, pressure, temperature, viscosity, foam, and dust
- 5 digits LCM display
- Indicate signal wave inside the silo.
- Selection of Different Measurement unit(m, cm, mm, inch, Ft, %, mA)
- Measuring distance and actual level.
- Language selection of traditional Chinese, simplified Chinese, English.
- 4-20mA / 4 wires / 2 wires
- Modbus RS-485 to enhance isolation and easy for remote control.
- CE standards for isolation(EFT 2000V, B class or better)
- Suitable for mid-range signal
- 4mA, 20mA output
- Isolated circuit design.
- 26GHz TNRP could measure all kinds of material.

TEST STANDARDS

- High voltage : IEC60947-2
- Isolated resistance : IEC60092-504
- Power supply change : IEC60092-504
- Power supply failure : IEC60092-504
- Electrical burst testing : IEC61000-4-4
- Voltage DIPS : IEC61000-4-11
- Humidity : IEC60068-2-30
- High/Low temperature test : IEC60068-2-38
- IP protection rating : IEC60529

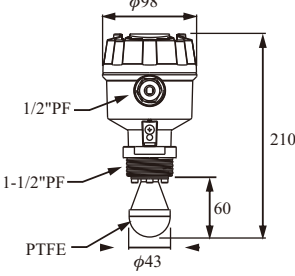
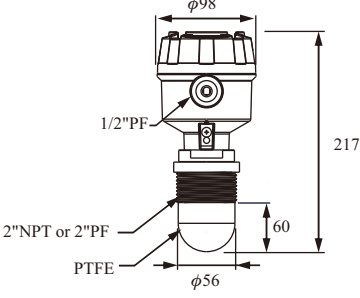
SPECIFICATION (26GHz 4-wire)

Dimensions (Unit:mm)		
Model	TNRP-204	TNRP-214
Medium	General liquid and solid	General liquid /suitable for acid and alkaline in liquid
Min. Dielectric constant (solid)	1.5	
Min. Dielectric constant (liquid)	1.4	
Measuring range	Liquid 30m Solid 20m	Liquid 30m
Accuracy	± 3 mm	
Repeatability	± 1 mm	
Digital communication	RS485 (Isolated)	
Ambient temperature	-40~90 °C(LCM<75°C)	
Operating temperature	-40~200 °C	
Operating pressure	0~40 bar	
Frequency	K Band	
Analog output	4~20mA / 4 Wire	
Protection rating	IP67	
Power supply	9.5~30Vdc	
Local display	5 digits LCM display	
Housing material	Aluminum	
Antenna type	Horn (43D)	Lens (56D)
Half-power beam width	$\pm 9^\circ$	
Antenna material	SUS316+PTFE	PTFE
Blind distance	500mm	

Dimensions (Unit:mm)				
	Model	TNRP-224	TNRP-234	TNRP-244
	Medium	General liquid and solid		
	Suitable For	Long distance measurement	Super distance measurement	Corrosion type acid and alkaline liquid
Min. Dielectric constant (solid)	1.5			
Min. Dielectric constant (liquid)	1.4			
Measuring range	Liquid 40m Solid 30m	Liquid 70m Solid 50m	Liquid 20m Solid 15m	
Accuracy	± 3 mm	± 3mm @distance<40m ± 0.01%F.S. @distance>40m	± 3 mm	
Repeatability	± 1 mm			
Digital communication	RS485 (Isolated)			
Ambient temperature	-40~90 °C(LCM<75°C)			
Operating temperature	-40~200 °C			
Operating pressure	0~40 bar			
Frequency	K Band			
Analog output	4~20mA / 4 Wire			
Protection rating	IP67			
Power supply	9.5~30 Vdc			
Local display	5 digits LCM display			
Housing material	Aluminum			
Antenna type	High gain horn (100)	High gain horn (140)	Lens(43DS)	
Half-power beam width	± 5°	± 3°	± 10°	
Antenna material	SUS 316		PTFE	
Blind distance	500 mm			

P.S. For TNRP-224 and TNRP-234, customer can connect the compressed air with 1/8"PT thread connector to avoid dust adhered.

SPECIFICATION (26GHz 2-wire)

<p>Dimensions (Unit:mm)</p>		
<p>Model</p>	<p>TNRP-202</p>	<p>TNRP-212</p>
<p>Medium</p>	<p>General liquid and solid</p>	<p>General liquid /suitable for acid and alkaline in liquid</p>
<p>Min. Dielectric constant (solid)</p>	<p>1.5</p>	
<p>Min. Dielectric constant (liquid)</p>	<p>1.4</p>	
<p>Measuring range</p>	<p>Liquid 20m Solid 10m</p>	<p>Liquid 20m</p>
<p>Accuracy</p>	<p>± 5mm</p>	
<p>Repeatability</p>	<p>± 3mm</p>	
<p>Digital communication</p>	<p>HART</p>	
<p>Ambient temperature</p>	<p>-40~90°C(LCM<75°C)</p>	
<p>Operating temperature</p>	<p>-40~200°C</p>	
<p>Operating pressure</p>	<p>0~40 bar</p>	
<p>Frequency</p>	<p>K Band</p>	
<p>Analog output</p>	<p>4~20mA</p>	
<p>Protection rating</p>	<p>IP67</p>	
<p>Power supply</p>	<p>24Vdc ± 10%</p>	
<p>Local display</p>	<p>5 digits LCM display</p>	
<p>Housing material</p>	<p>Aluminum</p>	
<p>Antenna type</p>	<p>Horn (43D)</p>	<p>Lens (56D)</p>
<p>Half-power beam width</p>	<p>±9°</p>	
<p>Antenna material</p>	<p>SUS 316 + PTFE</p>	<p>PTFE</p>
<p>Blind distance</p>	<p>500 mm</p>	

Dimensions (Unit:mm)			
	Model	TNRP-222	TNRP-232
Medium	General liquid and solid		
Suitable For	Long distance measurement	Super distance measurement	Corrosion type acid and alkaline liquid
Min. Dielectric constant (solid)	1.5		
Min. Dielectric constant (liquid)	1.4		
Measuring range	Liquid 30m Solid 20m	Liquid 35m Solid 30m	Liquid 15m
Accuracy	± 5 mm	± 3mm @distance<40m ± 0.01%F.S. @distance>40m	± 5 mm
Repeatability	± 3mm		
Digital communication	HART		
Ambient temperature	-40~90°C(LCM<75°C)		
Operating temperature	-40~200°C		
Operating pressure	0~40 bar		
Frequency	K Band		
Analog output	4~20mA		
Protection rating	IP67		
Power supply	24Vdc ± 10%		
Local display	5 digits LCM display		
Housing material	Aluminum		
Antenna type	High gain horn (100D)	High gain horn (140D)	Lens (43DS)
Half-power beam width	±5°	±3°	±10°
Antenna material	SUS 316		PTFE
Blind distance	500 mm		

P.s. For TNRP-222 and TNRP-232, customer can connect the compressed air with 1/8"PT thread connector to avoid dust adhered.

MODEL NUMBER / ORDER CODE COMPARISON TABLE

Model Number	Order Code
TNRP-204	TNRP20000-A1MB
TNRP-214	TNRP20000-A521
TNRP-224	TNRP20000-A2
TNRP-234	TNRP20000-A3MA
TNRP-244	TNRP20000-A421
TNRP-202	TNRP20000-A1
TNRP-212	TNRP20000-A5
TNRP-222	TNRP20000-A2
TNRP-232	TNRP20000-A3
TNRP-242	TNRP20000-A4

ORDER INFORMATION

TNRP 2 0 0 0 0 - ⁰⁹ ¹⁰ ¹¹ ¹² ¹³ ¹⁴ ¹⁵ ¹⁶ ¹⁷ ¹⁸ ¹⁹ ²⁰ ²¹ ²² ²³

⑩ ⑩ Antenna type

- A1: Horn(43D)
- A2: Horn(100D/162L)
- A3: Horn(140D/270L)
- A4: Lens(43DS)
- A5: Lens(56D)
- B1: Horn(100D/126L)
- B2: Horn(140D/202L)

⑪ ⑫ Antenna material

- MA: SUS 304
- MB: SUS 316
- MC: SUS 316L
- 21: PTFE coating

Connection

⑬ ⑭	⑮ ⑯	⑰ ⑱
Flange	B1: 1-1/2"	03: PF male
AK: JIS-FF	B2: 2"	07: NPT male
AN: ANSI-RF	B4: 2-1/2"	40: 5 kg/cm ²
AS: DIN-FF	B5: 3"	42: 10 kg/cm ²
	B7: 4"	48: 150 Lbs
Thread	B8: 5"	49: 300 Lbs
AA: JIS AC:	B9: 6"	57: PN10
ANSI	E3: DN65	58: PN16
	E4: DN80	59: PN25
		60: PN16

※(1) TNRP-202,204 thread connection 1-1/2" PF only
 (2) TNRP-212,214 thread connection 2" PF, NPT only
 (3) TNRP-222,224 thread connection 2" PF only
 (4) TNRP 234,232 thread connection 2"PF only
 (5) TNRP 234,232 thread connection 1-1/2"NPT only
 (6) Please do check Radar antenna can be direct fitted in flange connection and nozzle below is the suggestion
 (7) 2"Flang is applicable in open area

Type	Opening	Flange size
TNRP-21X	56mm	2-1/2"
TNRP-22X	100mm	4"
TNRP-23X	140mm	6"
TNRP-24X	44mm	2"



TNRP 2 0 0 0 0 - ⁰⁹ ¹⁰ ¹¹ ¹² ¹³ ¹⁴ ¹⁵ ¹⁶ ¹⁷ ¹⁸ ¹⁹ ²⁰ ²¹ ²² ²³

⑱ ⑳ Flange material

- MA: SUS 304
- MB: SUS 316
- MC: SUS 316L
- MD: SS41 zinc coating
- 18: PP
- 21: PTFE
- 00: None

㉑ Output

- A: Loop Power 24 Vdc with HART
- B: 4-Wire 24Vdc 4~20mA with RS-485
- C: Loop Power 24 Vdc, 4~20mA

㉒ Accuracy

- A: ± 3mm
- B: ± 5mm
- C: ± 10mm
- D: ± 20mm
- ※2 Wire only option A: ± 5mm or C: ± 10mm

㉓ Measuring distance

- A: 10m
- B: 20m
- C: 30m
- D: 40m
- E: 70m

TNRP Pulse Radar Level Transmitter

Customer Information

Prepared by: _____ Date: _____

Company: _____ Industry: _____

E-mail: _____ Phone Number: _____

Address: _____

Application Information

B.1 Measuring Material Information

Application Description:

Application Description:				
Installation Area:	<input type="checkbox"/> Storage tank	<input type="checkbox"/> Process tank	<input type="checkbox"/> Open-air application	
Material Status :	<input type="checkbox"/> Liquid	<input type="checkbox"/> Slurry/ Sludge/ Paste	<input type="checkbox"/> Solid/ Granulate/Grain	<input type="checkbox"/> Powder
Material Name :		Dielectric Constant	<input type="checkbox"/> 1.4~1.9	<input type="checkbox"/> 4.0~10.0
			<input type="checkbox"/> 2.0~2.5	<input type="checkbox"/> > 10
			<input type="checkbox"/> 2.6~4.0	<input type="checkbox"/> Unknow

B.2 Power Supply

DC : _____ AC : _____

B.3 Output Signal

Analog : 4~20 mA-4 Wire 4~20mA 2-Wire

Digital : RS-485 HART Other

B.4 Measuring range

Measuring range: _____ meters

B.5 Measuring Condition

Operating Temperature

Max: _____ °C Min: _____ °C

Ambient Temperature

Max: _____ °C Min: _____ °C

Operating Pressure

Max: _____ Bar Min: _____ Bar

B.6 Connection



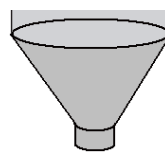
Connection: Threaded

Flange

Size and Standard: _____

Flange Material: _____

B.7 Tank Information

Tank Shape	<input type="checkbox"/> Vertical Cylinder	<input type="checkbox"/> Horizontal Cylinder	<input type="checkbox"/> Spherical	
	<input type="checkbox"/> Cubical/rectangular	<input type="checkbox"/> Other: _____		
Tank Material	<input type="checkbox"/> Cubical	<input type="checkbox"/> Plastic	<input type="checkbox"/> Cement	<input type="checkbox"/> Other _____
Tank Bottom	<input type="checkbox"/> Metal			
	<input type="checkbox"/> Plastic			
	<input type="checkbox"/> Cement			
	<input type="checkbox"/> Other	_____ _____		

Tank
 Tank Height (H): _____ m
 Tank Diameter (W): _____ m
 Cone Height (H1): _____ m
 (Ignore cone height with flat/disk bottom)

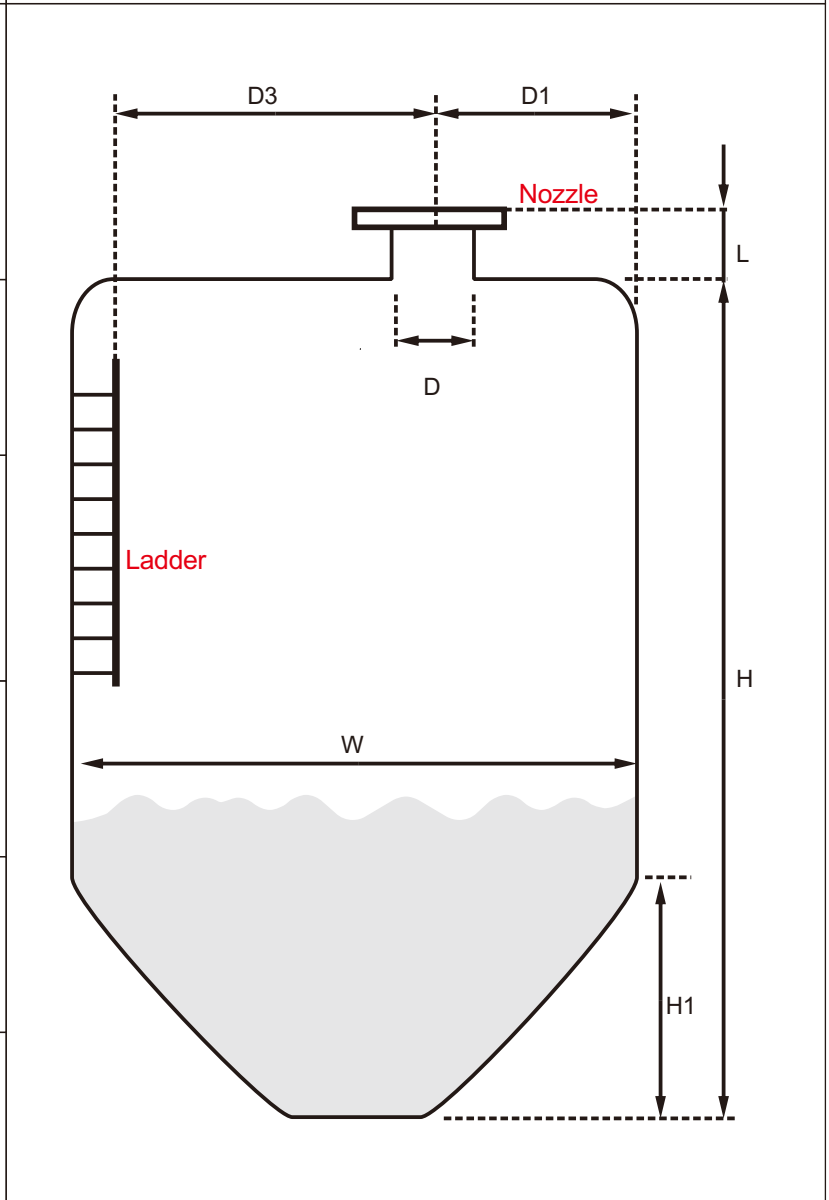
Radar
 Distance to tank wall(D1): _____ m

Nozzle
 Yes
 Nozzle Diameter (L): _____ m
 Nozzle Height (D): _____ m
 NO

Ladder
 Yes
 Distance to rada (D3): _____ m
 NO

Heater
 Yes
 NO

Other Internal Obstacles
 Yes
 NO





Power plant
port wave height edtection



Oil Factory
Process Oil Detection



Government agencies
flood prevention and control



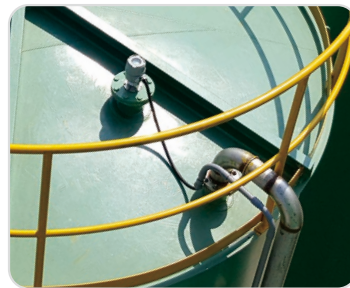
Pharmaceutical Factory
Boiler Liquid Detection



Feed industry
butter storage detection



Oil Factory
Soybean oil level detection



Plastic industry
chemical detection



Feeding plant
Corn storage tank detection

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