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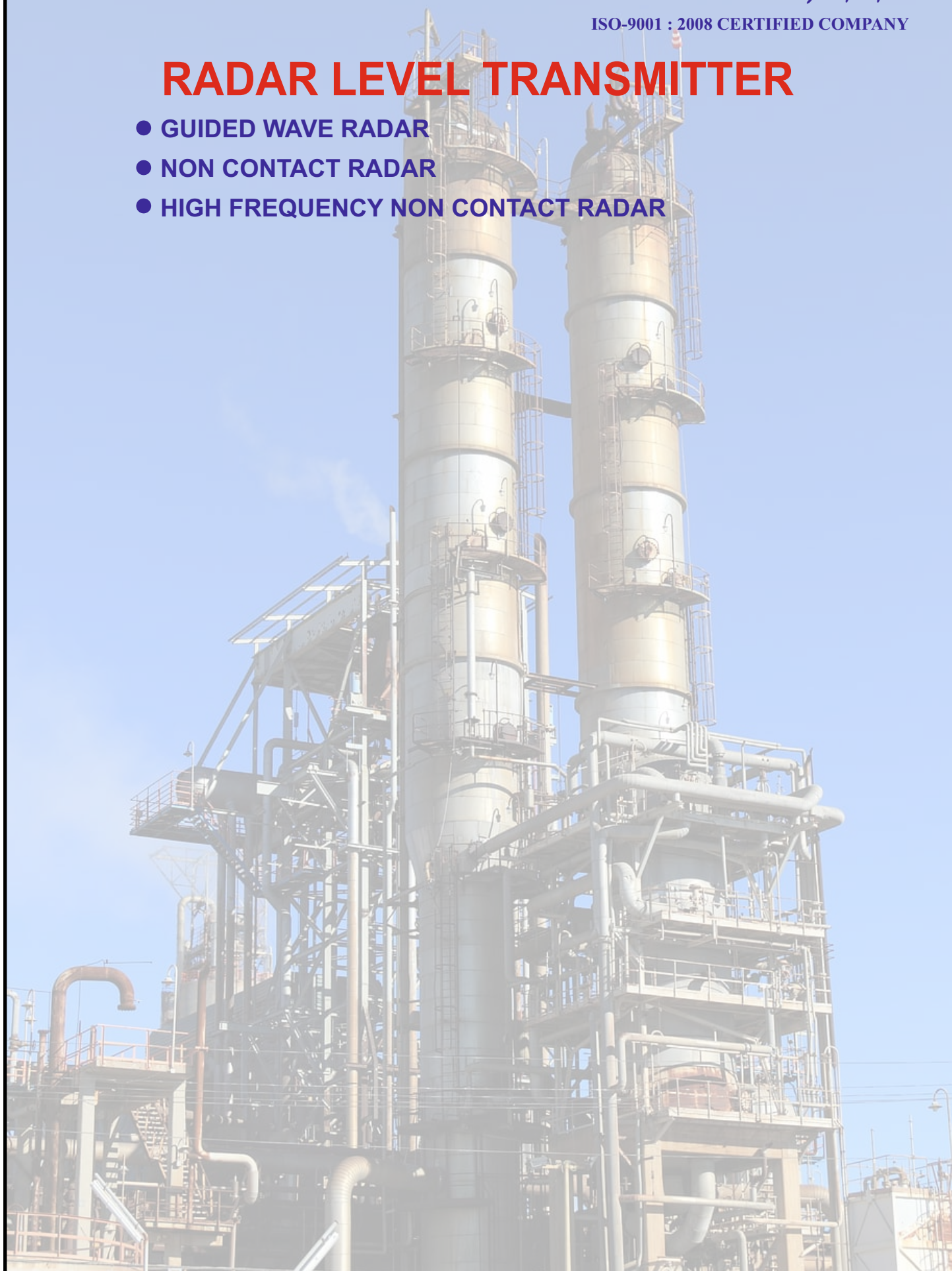


*... the level & gas people*

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# **RADAR LEVEL TRANSMITTER**

- GUIDED WAVE RADAR
- NON CONTACT RADAR
- HIGH FREQUENCY NON CONTACT RADAR



# BRIEF INTRODUCTION OF HIGH FREQUENCY NON CONTACT RADAR LEVEL TRANSMITTER (26GHZ)

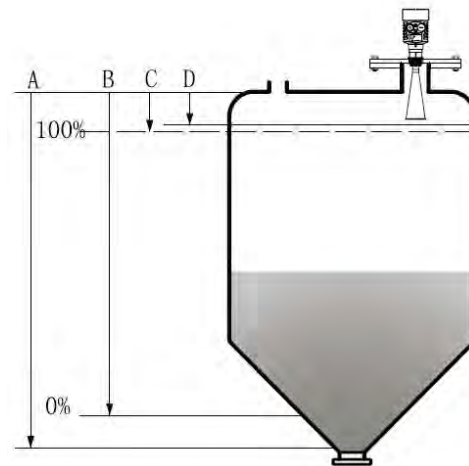
## Product description

501E-53 series transmitters are 26GHz high-frequency radar level transmitters with analog signals 4-20mA, the Max. Measuring distance is up to 70m. The antenna has been further optimized, and the latest update microprocessor can make higher speed signals analysis, which enables the level transmitters can be used in very complicated measuring applications such as reaction kettles or solid bunkers.

## Working principle

The radar level transmitter antenna emits narrower micro wave pulses which will be transmitted via the antenna. The micro wave will be reflected back after touching the surface of a medium, and then antenna system will receive it and transmit it into the electrical circuit, which will be automatically turned into the level signals.

- A. Setting measuring range
- B. Low level adjustment
- C. High level adjustment
- D. Dead zone



Measuring reference is the bottom surface of threads or the sealing surface of a flange.

Note: when using the radar level transmitter, must keep the highest level of medium out of the dead zone (see area D shown in the drawing).

## Features

- Non contact measuring, no abrasion, no contamination
- Easy installation due to small size of antenna
- Shorter wave length, which can get better reflection for the inclined solid surface.
- Smaller measuring dead zone, which can get better measuring results for small tanks.
- Smaller beam angle, which makes the energy be more concentrated, enhancing the wave

reflection ability which can keep signals more powerful to avoid obstacles

- Almost unaffected by corrosion and foams.
- Almost unaffected by changes of steam, changes of temperature and pressure in the air.
- Even in heavy dust environment, the transmitter can also receive the real level return wave.
- High SNR, which can make the instrument get better performance.
- Frequency 26GHz is the best option for measuring solid and low dielectric constant medium.

## Introduction of Transmitter

### ● Type: Wave

**Application:** all aggressive liquids

**Measuring range (Maximum):** 20m (depends on dielectric constant of different medium and the concrete working conditions)

**Enclosure:** Die Cast Aluminum

**Process connection:** thread, flange

**Medium temperature:** -40°C~+120°C

**Process pressure:** -1~3Kg/cm<sup>2</sup>

**Accuracy:** ±5mm

**Repeatability:** ±2mm

**Frequency range:** 26GHz

**Signal output:** 4-20mA/ HART (2-wire), RS485/ Modbus

**Enclosure Protection:** IP66



501E-53-1

### ● Type: Horn Antenna

**Application:** liquids with high temperature, high pressure and light corrosion.

**Measuring range (maximum):** 30m (depends on dielectric constant of different medium and the concrete working conditions)

**Enclosure:** Die Cast Aluminum

**Process connection:** thread, flange

**Medium temperature:** -40°C~+250°C

**Process pressure:** -1~40Kg/cm<sup>2</sup>

**Accuracy:** ±3mm

**Repeatability:** ±2mm

**Frequency range:** 26GHz

**Signal output:** 4-20mA/ HART (2-wire) , RS485/Modbus

**Enclosure Protection:** IP66



501E-53-2

● **Type:** Horn Antenna (High Range)

**Application:** solid material, process tank or heavy dust or ash, or easy crystallization and condensation place.

**Measuring range (Maximum):** 70m (depends on dielectric constant of different medium and the concrete working conditions)

**Enclosure:** Die Cast Aluminum

**Process connection:** thread, flange

**Medium temperature:** -40°C~+250°C

**Process pressure:** -1~3Kg/cm<sup>2</sup>

**Accuracy:** ±15mm

**Repeatability:** ±2mm

**Frequency range:** 26GHz

**Signal output:** 4-20mA/ HART (2-wire), RS485/ Modbus

**Enclosure Protection:** IP66



**501E-53-3**

● **Type:** Parabolic Antenna

**Application:** solid material, process tank or heavy dust or ash, or easy crystallization and condensation place.

**Measuring range (Maximum):** 70m (depends on dielectric constant of different medium and the concrete working conditions)

**Enclosure:** Die Cast Aluminum

**Process connection:** thread, flange

**Medium temperature:** -40°C~+250°C

**Process pressure:** -1~3Kg/cm<sup>2</sup>

**Accuracy:** ±15mm

**Repeatability:** ±2mm

**Frequency range:** 26GHz

**Signal output:** 4-20mA/ HART (2-wire), RS485/ Modbus

**Enclosure Protection:** IP66



**501E-53-4**

● **Type:** Horn Antenna

**Application:** solid particles and dust

**Measuring range (Maximum):** 30m (depends on dielectric constant of different medium and the concrete working conditions)

**Enclosure:** Die Cast Aluminum

**Process connection:** thread, flange

**Medium temperature:** -40°C~+250°C

**Process pressure:** -1~3Kg/cm<sup>2</sup>

**Accuracy:** ±15mm

**Repeatability:** ±2mm

**Frequency range:** 26GHz

**Signal output:** 4-20mA/ HART (2-wire), RS485/ Modbus

**Enclosure Protection:** IP66



**501E-53-5**

● **Type:** Horn

**Application:** sanitary liquid storage containers, heavy corrosive liquids

**Measuring range (Maxim um):** 20m (depends on dielectric constant of different medium and the concrete working conditions)

**Enclosure:** Die Cast Aluminum

**Process connection:** flange

**Medium temperature:** -40°C~+250°C

**Process pressure:** -1~3Kg/cm<sup>2</sup>

**Accuracy:** ±3mm

**Repeatability:** ±2mm

**Frequency range:** 26GHz

**Signal output:** 4-20mA/ HART (2-wire), RS485/ Modbus

**Enclosure Protection:** Ip66



**501E-53-6**

## General Specifications

- **Working frequency** : 26GHz
- **Application** : Aggressive Liquid with high Temp., Solid Material, Dust or Ash, Solid Particles
- **Power Supply** : 24V DC (Power Range 12V~45V)
- **Output Signal** : 4~20mA Output Superimposed with HART® Protocol/ Field bus
- **System** : 2 Wire
- **Load Resistance** : 600 ohm HART®/ 575 ohm FF
- **Fail safe/ Loop check** : Provided 3.8mA or 21.6mA
- **Relative Humidity** : 0~100%
- **Damping** : Adjustable between 0~32 sec
- **Response Time** : >0.2 sec.
- **Warm up Time** : 3 sec.
- **Sample** : echo sampling 55 times /s
- **Display** : 4.5 Digit LCD
- **Sensing Material** : PP / PVDF, SS316
- **Electrical Connection** : 1/2" , 3/4" NPT (F)
- **Enclosure** : Die cast Aluminum or Stainless Steel

## Model Selection Reference Table For High Frequency Non Contact Radar Level Transmitter (26GHz)

| Model     | Application  | Antenna diameter | Dielectric constant | Solid particles | Solid powder | Liquid | Accuracy | Beam angle |
|-----------|--------------|------------------|---------------------|-----------------|--------------|--------|----------|------------|
| 501E-53-1 | Liquid       | 45mm             | 2.5~3.0             | N.A             | N.A          | 5m     | 5mm      | 20°        |
|           | Liquid       | 72mm             | 2.5~3.0             | N.A             | N.A          | 10m    | 5mm      | 14°        |
| 501E-53-2 | Liquid       | 48mm             | 2.5~3.0             | N.A             | N.A          | 5m     | 3mm      | 18°        |
|           | Liquid       | 76mm             | 2.5~3.0             | N.A             | N.A          | 10m    | 3mm      | 12°        |
|           | Liquid       | 96mm             | 2.5~3.0             | N.A             | N.A          | 20m    | 3mm      | 8°         |
| 501E-53-3 | Solid        | 76mm             | 2.5~3.0             | 10m             | 10m          | N.A    | 15mm     | 12°        |
|           | Solid        | 96mm             | 2.5~3.0             | 20m             | 20m          | N.A    | 15mm     | 8°         |
|           | Solid        | 121mm            | 2.5~3.0             | 35m             | 30m          | N.A    | 15mm     | 6°         |
| 501E-53-4 | Solid        | 242mm            | 2.5~3.0             | 45m             | 40m          | N.A    | 15mm     | 4°         |
| 501E-53-5 | Solid/Liquid | 76mm             | 2.5~3.0             | 8m              | 8m           | 12m    | 5mm      | 12°        |
|           | Solid/Liquid | 96mm             | 2.5~3.0             | 13m             | 13m          | 22m    | 5mm      | 8°         |
|           | Solid/Liquid | 121mm            | 2.5~3.0             | 20m             | 20m          | 30m    | 5mm      | 6°         |
| 501E-53-6 | Liquid       | 48mm             | 2.5~3.0             | N.A             | N.A          | 5m     | 3mm      | 18°        |
|           | Liquid       | 76mm             | 2.5~3.0             | N.A             | N.A          | 10m    | 3mm      | 12°        |
|           | Liquid       | 96mm             | 2.5~3.0             | N.A             | N.A          | 20m    | 3mm      | 8°         |

## Ordering Information

### Model Selection

501E-53-1 / 2 / 3 / 4 / 5 / 6.....

### Electrical Classification

Weather proof.....

Explosion proof.....

Intrinsically Safe.....

### Measuring Range

10 Mtr. ....

20 Mtr.....

30 Mtr.....

70 Mtr.....

### Output

4-20mA linear Output.....

Field bus Output.....

### Process Connection

| 501E-53-1<br>&<br>501E-53-2 | 501E-53-3               | 501E-53-4     | 501E-53-5               | WKRD53-6       |
|-----------------------------|-------------------------|---------------|-------------------------|----------------|
| A1 - 1½"NPT                 | B1 - 6" -U Joint Flange | C1 -1½"NPT    | D1 - 3" -U Joint Flange | E1 -3" Flange  |
| A2 - 2" Flange              | B1 - 8" -U Joint Flange | C2 -2" Flange | D2 - 4" -U Joint Flange | E2 -4" Flange  |
| A3 - 3" Flange              | B1 - 10"-U Joint Flange | C3 -3" Flange | D3 - 6"-U Joint Flange  | E3 -6" Flange  |
| A4 - 4" Flange              |                         | C4 -4" Flange | D4 - 8"-U Joint Flange  | E4 -8" Flange  |
| A5 - 6" Flange              |                         | C5 -6" Flange | D5 - 10"-U Joint Flange | E5 -10" Flange |
| A6 - 8" Flange              |                         |               |                         |                |
| Others.....J                |                         |               |                         |                |

### Horn Antenna Dia Meter

| 501E-53-1 | 501E-53-2    | 501E-53-3 | 501E-53-4            | 501E-53-5            | 501E-53-6 |
|-----------|--------------|-----------|----------------------|----------------------|-----------|
|           | D1- 46mm     | D4 -76mm  | D7 - Parabolic 196mm | D9 - Parabolic 76mm  | D12 -46mm |
|           | D2- 76mm     | D5 -96mm  | D8 - Parabolic 242mm | D10 - Parabolic 96mm | D13 -76mm |
|           | D3- 96mm     | D6 -121mm |                      | D11-Parabolic 121mm  | D14 -96mm |
|           | Others.....K |           |                      |                      |           |

### Length of Antenna Extension Pipe

| 501E-53-1 | 501E-53-2 | 501E-53-3 | 501E-53-4 | 501E-53-5 | 501E-53-6 |
|-----------|-----------|-----------|-----------|-----------|-----------|
| P- 100mm  | N/A       |           |           |           |           |
| Q- 200mm  |           |           |           |           |           |

Please Specify

W  
E  
I

Please Specify

H  
F

Please Specify

Please Specify

Please Specify

|                                                               | VIII | IX | X              | XI |
|---------------------------------------------------------------|------|----|----------------|----|
| <b>Head Flange Material</b>                                   |      |    |                |    |
| CS.....                                                       | 1    |    |                |    |
| PP.....                                                       | 2    |    |                |    |
| SS304.....                                                    | 3    |    |                |    |
| SS316.....                                                    | 4    |    |                |    |
| <b>Temperature</b>                                            |      |    |                |    |
| Common seal/ (-40~+120)°C.....                                |      | P  | Please Specify |    |
| Seal for high temperature/ (40~+250)°C with cooling fins..... |      | G  |                |    |
| <b>Pressure (kg/cm<sup>2</sup>).....</b>                      |      |    |                |    |
| <b>Display</b>                                                |      |    |                |    |
| With.....                                                     |      |    |                | V  |
| Without.....                                                  |      |    |                | X  |

- Data sheet for model selection

## Tank/container information

Tank type:

☐ Storage tank   ☐ Reaction tank   ☐ Separation tank   ☐ Marine tank

### Tank structure:

☐ Tank material: ☐ Tank pressure:

Tank size:

Height of tank:                      m

Diameter of tank: m

Shape of tank top:

☐ Arch      ☐ Flat top      ☐ Open      ☐ Conic

Shape of tank bottom:

☐ Tapered    ☐ Flat    ☐ Inclined    ☐ Arch

### Installation:

☐ Top mounted ☐ Side mounted ☐ Bypass pipe mounted ☐ Wave guide pipe mounted

Extension pipe at tank top (important information):

Pipe height: mm,

Pipe diameter:                      mm

## Measuring medium

Medium name: ☐ Liquid ☐ solid ☐ mix medium

Medium temperature:                      °C

Dielectric constant:

Adhesion: ☐ Yes ☐ No

Stirring: ☐ Yes ☐ No

## Process connection

Thread: ( ☐ G1½" ☐ 1½" NPT ☐ G2" A ☐ G1" A ☐ 1" NPT ) ☐ Flange (ANSI= )

Power supply:

☐ 24V DC 2-wire      ☐ 220V AC

Output: ☐ 4-20mA ☐ HART ☐ Fieldbus

Display: ☐ With display and programmer ☐ Without display and programmer

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