

# TLR - RADAR LEVEL TRANSMITTER



The label Trafag Industrial Components extends the Trafag brand name to instruments manufactured by qualified partner companies. The label Trafag Industrial components offer high-quality portfolio radar level transmitters. The ideal sensor for non-contact level measurement in a wide range of applications.

The principle of operation of this instrument is based on a high frequency band, enabling a very accurate detection of the level of media with a small emitting angle.

## Applications

- Water/wastewater field
- Hydraulics
- Chemical
- Food and beverage
- Vast range of liquids
- Vast range of solids

## Features

- Accurate reading measurement.
- Small emitting angle.
- High frequency band technology.
- Power One mode to discriminate echoes
- Easy to mount with direct or remote installation.
- Bluetooth programming and settings using a dedicated App.

XX/2025

Data sheet XXXXX

Standard specifications	
Power supply	Two-wires DC (22V-30V); Four-wires (12...30VDC)
Output type	4...20 mA, Modbus RS485, Hart protocol, Bluetooth
Technology	77...81 GHz
Protection class	IP 67
Process pressure	-1...3 bar (optional -1...+16bar with flange)
Relative humidity	45...75%
Accuracy	+2mm
Beam Angle	+3° (Aluminum model with display) +3.5° (GFPP and SS model)
Process temperature	-20°C ... +80°C (GFPP model) -20°C ... +60°C (SS model) -20°C ... +70°C (Aluminum model with display) -40°C ... +85°C (Aluminum model with display, rotatable flange with air purge) -40°C...+200°C (Aluminum model with display, cooling tower and PTFE lens)
Process connection	Thread G 1 1/2" (GFPP model), thread G 1 1/2" / 2" (SS model), thread G 2" (Aluminum model with display) and customized flanges for all models
Measuring range	Up to 30m (Aluminum model with display), up to 50m (GFPP and SS model)
Measuring cycle time	< 300 ms

## Ordering code

		TLR	X	X	-	XX	-	XXXX	-	x	-	XX	XXX
Version <sup>1</sup>	GFPP (polypropylene glass-fibre reinforced)		P										
	Stainless Steel SS304		S										
	Aluminium with display		D										
Media	Liquids			L									
	Solids			S									
Range	10 m					01							
	20 m					02							
	30 m					03							
	50 m					05							
Process Connections	Thread G 1 1/2"							G1.5					
	Thread G 2 "							G2.0					
	Customised Flange AISI 304							FX.4					
	Customised flange for high temperatures <sup>2</sup> DN50 PN16 AISI 304							FH.4					
	Customised flange for high temperatures <sup>2</sup> DN50 PN16 AISI 316L							FH.6					
	Rotable flange with air lens cleaning system <sup>3</sup> DN100 AISI316L							FP.6					
Output	4...20mA, Modbus, Bluetooth 2+2 wires									B			
	4...20mA, Modbus, Hart protocol 2+2 wires									H			
	4...20mA, Bluetooth (4 wires)									A			
	Modbus, Bluetooth (4 wires)									M			
Protection class	IP 67											67	
Electrical connection	M20x1.5(F)												E01
	½" NPT												E02
	Cable 1m												C01
	Cable 2m												C02
	Cable 5m												C05
	Cable 10m												C10
	Cable 30m												C30
	Cable 50m												C50

<sup>1</sup> See table "Variants"<sup>2</sup> See "High temperatures flange" table version<sup>3</sup> See "Rotable flange with air purge system" table version




## Order example

Ex: TLR-P-L-01-G1.5-B-67-C01


- GFPP (polypropylene)
- Liquids
- 10m
- Thread BSP 1.5"
- 4...20mA, Modbus, Bluetooth
- IP67
- Cable 1m

## Variants

Tab. 1


Version	Picture	Media	Process connections	Range (m)	Output	Electrical connections
P		Liquid	G1 ½", FX.X	10,20,30,50	A, B, M	Cable (C01, C02, C05, C10, C50)
S		Liquid	G1 ½", G2", FX.X	10,20,30,50	A, B, M	Cable (C01, C02, C05, C10, C50)
D		Liquid Solid	G2", FX.X, FH.4, FH.6, FP.6	10,20,30	H	E01, E02

### High temperature flange

	Max temperature	200° C (at process connection)
	Media	Liquid, solid
	Antenna material	PTFE
	Flange material	AISI 304, AISI 316L
	Flange size	DN50
	Process pressure	-1...16 bar

\*Available for aluminum with display (D coded) only

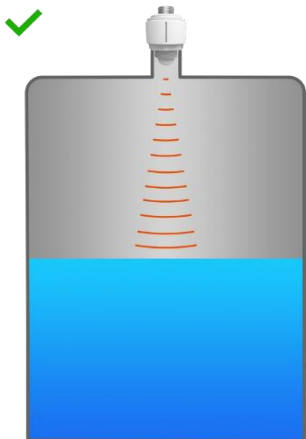
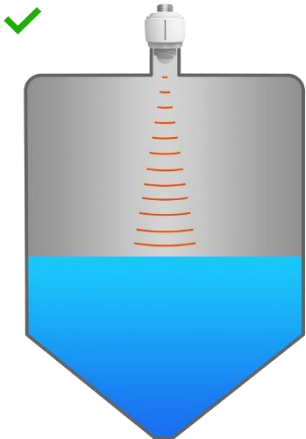
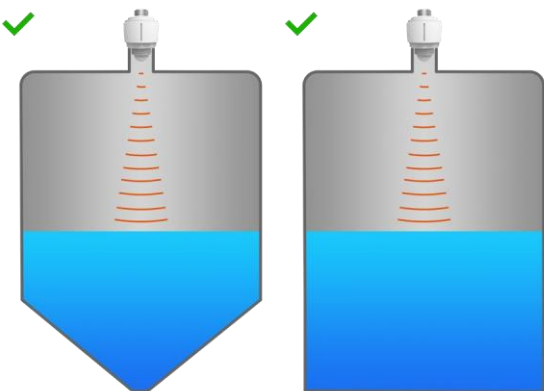
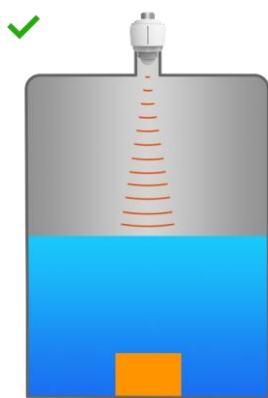
### Rotable flange with air lens cleaning system

	Max temperature	85° C (at process connection)
	Media	Solid with dust
	Antenna material	PTFE
	Flange material	AISI 316L
	Flange size	DN100
	Process pressure	-1...16 bar

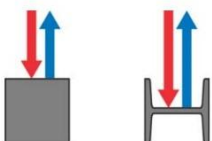
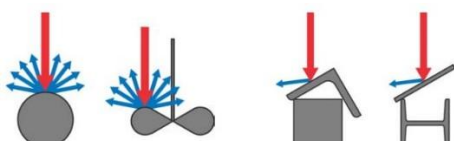
\*Available for aluminum with display (D coded) only

## Installation instructions

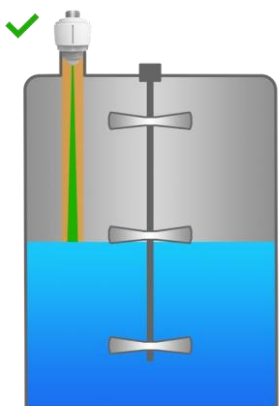
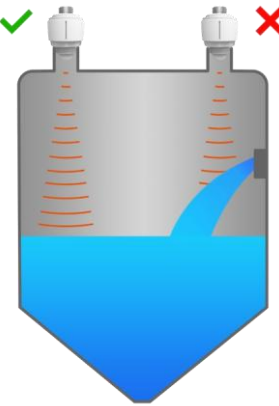
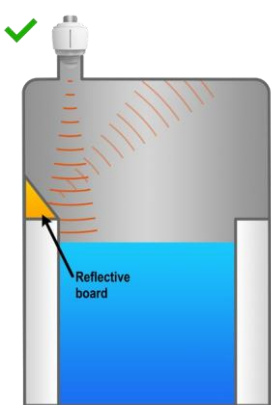
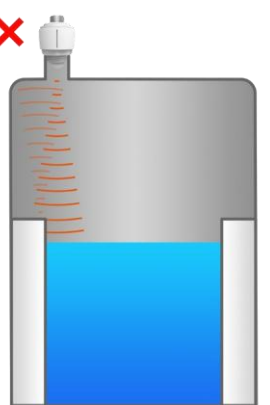
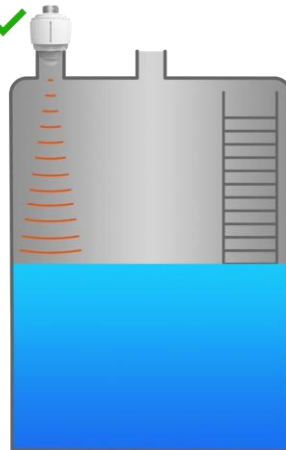

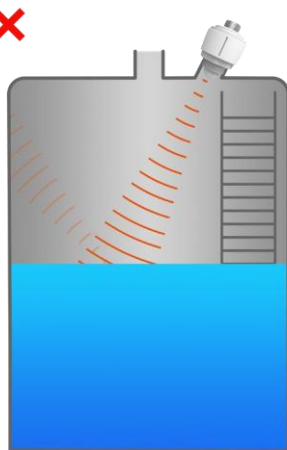
TLR can be mounted in the centre or close to the edge (side) of the tank, but some guidelines must be considered to avoid the happening of wrong readings, false echoes and reflections:

CENTER MOUNTING	
<p>Flat ceiling</p> 	<p>Flat ceiling with conical tank bottom</p> 
<p>Flat ceiling without internal operating mechanics</p> 	<p>Flat ceiling without internal parts provoking false readings *</p> 

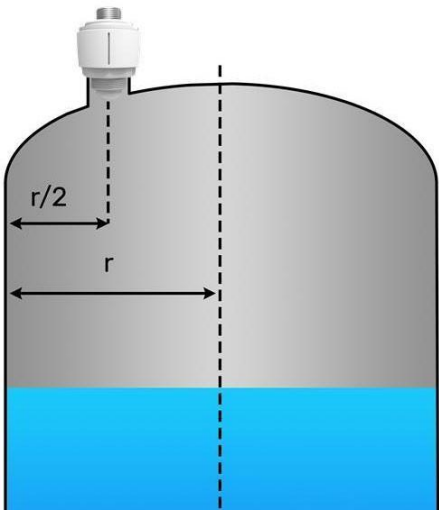
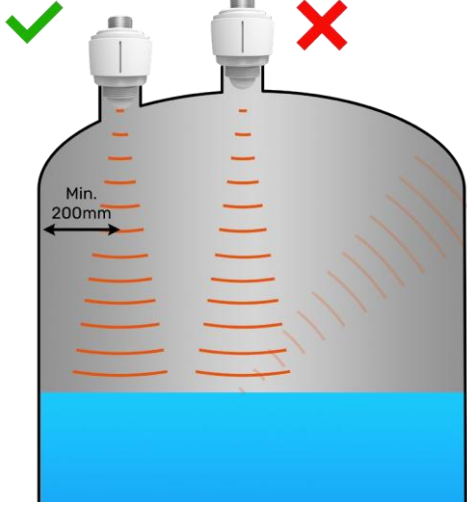
\* There're structural or mechanic parts of any kind not provoking false reading signals:

Allowed	Not allowed
	

**SIDE MOUNTING (close to the edge) - Flat, cylindrical, conical tank ceiling, bottoms or others**

Mixers or internal operating parts	Pipes	
		
Disconnected parts require reflective boards		
		
Foreign bodies		
		

To calculate the minimum distance to the edge of the tank:

STANDARD (r/2)	OPTIONAL (200mm)
	
The standard "safety distance" is equal to r/2 of the tank but possible encumbrances must always be considered	The minimum 200mm from the edge of the tank could be considered in the lack of encumbrances

#### STANDARD SAFETY DISTANCE FORMULA

To calculate the standard safety distance (d) according to the height of the tank (h), it's appropriate to use the following formula:

$$d = h \cdot \tan(\alpha)$$

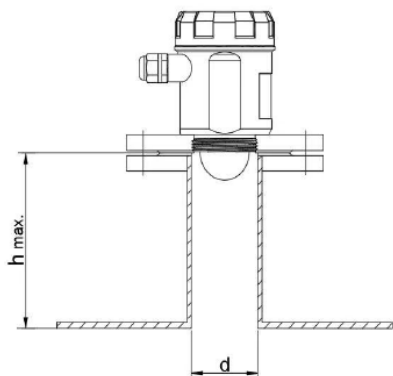
h= height of the tank in mm

$$\alpha = \text{rad}(1.75^\circ) = 0.0305$$

h [mm]	d [mm]
1000	200
2000	200
3000	200
4000	122
5000	153
7500	229
10000	306
20000	611
30000	917
40000	1222
50000	1528

## STUB MOUNTING

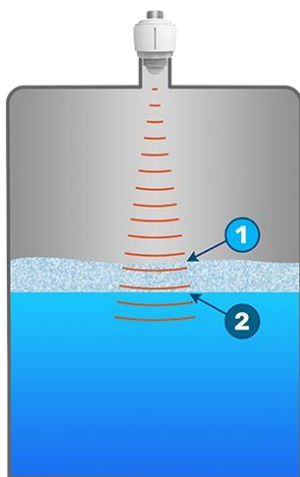
In the case of stub mounting, the stub should be as short as possible and the end should be rounded to minimize disturbing reflections but there're some guidelines to be considered:

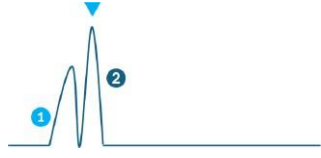



d	h MAX
40 mm	60 mm
50 mm	80 mm
80 mm	130 mm
100 mm	230 mm
150 mm	380 mm

## Operating principles

When “Power One” function is (1) the TLR radar, in its basic configuration, uses the echo with higher decibels as the reference measurement. When “Power One” function is (0), the reference echo is always the first.



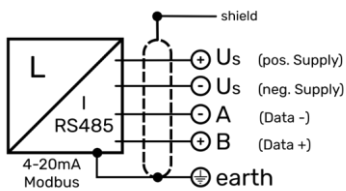
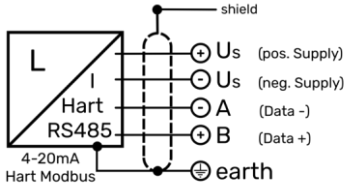
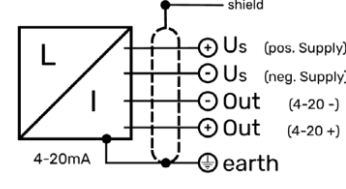
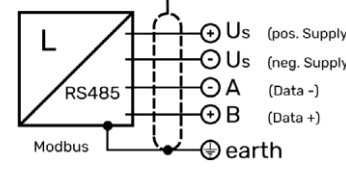
2nd Echo - Standard	
1st Echo - Power One (0)	

To have the correct measurement, there're two dead reading zones to be considered according to the measuring range:

Range	Standard dead reading zone	Configurable
10 m	200 mm	100 mm
20,30,50 m	200 mm	

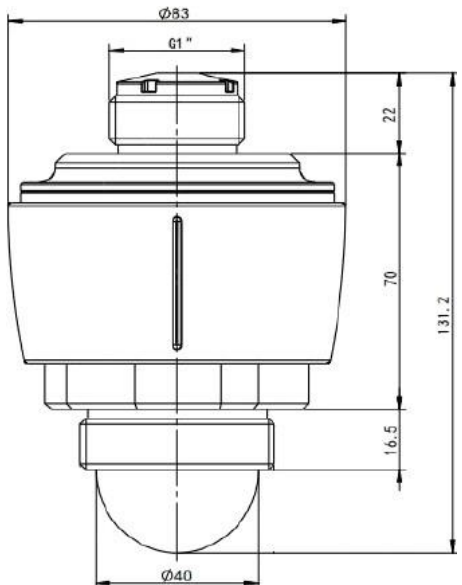
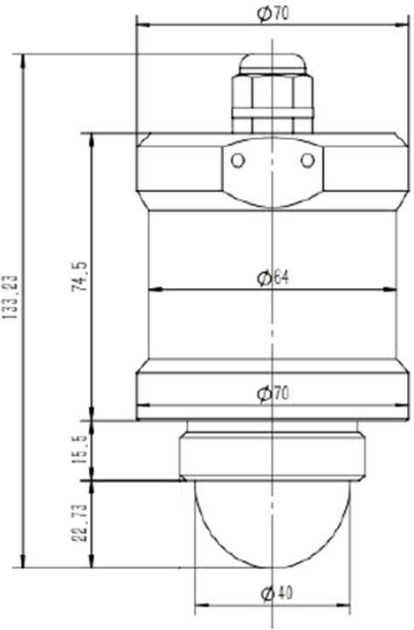
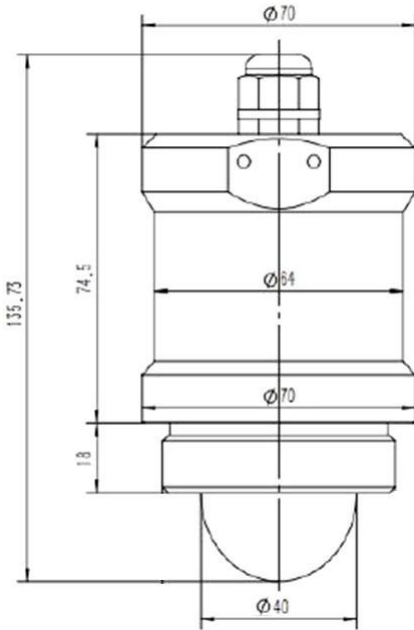
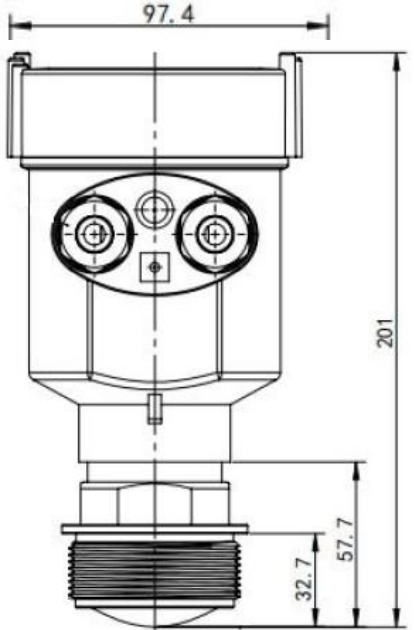
# Output

Tab.2 - Electrical connection schema

Schema	Wires	Output code
	<p>Red (+) / Positive power supply            Blue (-) / Negative power supply, OUTPUT 4...20 mA            Green(-) / RS-485 communication negative            Yellow (+) / RS-485 communication positive</p>	B
	<p>Red (+) / Positive power supply            Blue (-) / Negative power supply, OUTPUT 4...20 mA / HART            Green (-) / RS-485 communication negative            Yellow (+) / RS-485 communication positive</p>	H
	<p>Red (+) / Positive power supply            Blue (-) / Negative power supply            Green (-) / 4...20 mA communication negative            Yellow (+) / 4...20 mA communication positive</p>	A
	<p>Red (+) / Positive power supply            Blue (-) / Negative power supply            Green (-) / RS-485 communication negative            Yellow (+) / RS-485 communication positive</p>	M

## Dimensions - All dimensions are in mm

Tab.3 - Dimensions

<p>TLR-P-(...)-G1.5</p> 	<p>TLR-S-(...)-G1.5</p> 
<p>TLR-S-(...)-G2.0</p> 	<p>TLR-D-(...)-G2.0</p> 
<p>TLR-D-(...)-FH.4/6</p>	<p>TLR-D-(...)-FP.6</p>

