

NEW

PiLoTREK w-200

NON-CONTACT, 80 GHz (W-BAND) RADAR
FOR LIQUIDS



5 YEARS WARRANTY

NIVELCO

LEVEL TRANSMITTERS



FEATURES

- 2-wire 80 GHz (W-band) radar
- Measuring range up to 30 m (98.5 ft) for liquids
- Accuracy of ±2 mm (0.787")
- Easy to install due to small antenna diameter
- 1", 1½" encapsulated horn antenna
- Integrated design with IP68 protection
- User-friendly threshold management
- Ex variant (pending)

- Measurement through a plastic tank roof
- For material prone to vapor formation
- For measuring liquids with a gas cushion
- It can also be used in a vacuum
- Open-channel flow measurement

APPLICATIONS

- For measuring the level of liquids, emulsions, and other media up to 30 m (98.5 ft)
- Storage tanks, chemical tanks, open pits, sumps, wells

AREAS OF APPLICATION

- Water and wastewater industry
- Energy industry / Plant utilities
- Food & Beverage
- Pharmaceutical industry
- Chemical industry
- Marine applications

The **PiloTREK W-200** family of new 80 GHz non-contact radar level transmitters uses industrial measurement technology's most advanced, state-of-the-art measurement method. It implements uncompromising, state-of-the-art level measurement technology for liquids, emulsions, and other media widely used in, for example, the food & beverage, energy, pharmaceutical, chemical, and marine applications, providing measurement results with mm accuracy.

It is also excellent for measuring substances prone to vapor formation and liquids with gas cushions. In addition to the level, volume, and weight measurement functions, this product family also inherits the open-channel flow measurement functions and the threshold functions to eliminate flexible and interfering echoes introduced in connection with ultrasonic devices. Since no medium is required for millimeter waves to propagate, it can also be used in a vacuum.

The device can also be operated with HART® compliant **NIVELCO EView2**, **MultiCONT** universal process controller, and **PACTware** software.

OPERATING PRINCIPLE

The reflection of the millimeter-waves is highly dependent on the dielectric constant of the medium. Therefore, the measured medium's dielectric constant (ϵ_r) must be over 1.9 for millimeter-wave level measurement. The measurement principle of a level transmitter with a millimeter-waves signal is based on measuring the reflection's time of flight.

The speed of propagation of millimeter-waves signals in the air, gases, and vacuum is almost constant regardless of temperature and medium pressure, so the measured distance does not depend on the physical parameters of the intermediate medium.

The **PiloTREK W-200** level transmitter is a continuous-wave frequency modulated radar (FMCW) operating at 80 GHz (W-band). The most obvious advantages of 80 GHz radars over lower frequency (5...12 & 25 GHz) radars are smaller antenna size, better focus, and smaller beam angle. A portion of the millimeter-wave continuous wave energy radiated by the level transmitter antenna is reflected from the measured surface, depending on the material to be measured. The distance of the reflecting surface is calculated with high accuracy by the electronics from the frequency shift of the reflected signal and converted into a distance, level, or volume signal by the electronics.

Informative ϵ_r values			
Butane	1.4	Grain	3...5
Cement	1.5...10	Cooking oil	3.9
LPG	1.6...1.9	Limestone	6.1...9.1
Kerosene	1.8...2.1	Acetone	21
Crude oil	2.1	Ethanol	24
Diesel	2.1	Methanol	33.1
Gasoline	2.3	Glycol	37
Asphalt	2.6	Nitrobenzene	40
Clinker	2.7	Water	80
Resin	2.4...3.6	Sulphuric acid (T = 20 °C)	84

TECHNICAL DATA

PiloTREK WP□-2□□-□		
Measured values	Distance; calculated values: level, volume, mass, flow	
Signal frequency	77...81 GHz (W-band)	
Measuring range*	0...30 m (0...98.5 feet)	
Minimum beam angle*	7°	
Lowest ϵ_r of medium*	1.9	
Resolution	1 mm (.039")	
Supply voltage	12...36 V DC	
Output	Analog	4...20 mA (3.9...20.5 mA); $R_{Tmax} = (U_s - 12 V) / 0.02 A$
	Digital	HART® interface, loop resistance $\geq 250 \Omega$
	Relay (optional)	SPDT 30 V / 1 A DC; 48 V / 0.5 A AC
	Service interface	SAT-504-3 compatible; galvanically isolated; 3.3 V LVDS; max. 100 mA
Measuring frequency	$\sim 1 s$	
Antenna diameter*	1" (25.4 mm), 1½" (38.1 mm)	
Antenna material*	PP, PVDF	
Process temperature	-40...+80 °C (-40...+176 °F)	
Ambient temperature		
Process pressure	-1...3 bar (-14.5...43.5 psi)	
Process connection	1", 1½" BSP / NPT	
Ingress protection	IP68	
Electrical connection	4 x 0.5 mm ² shielded $\varnothing 6$ mm cable x 5 m (up to 30 m); For relay option: 7 x 0.5 mm ² shielded cable [4x AWG22 shielded $\varnothing 0.24$ " cable x 16.4 ft (up to 98.5 ft); For relay option: 7x AWG22 shielded cable]	
Electrical protection	Overvoltage Class 1; (Class III [SELV])	
Housing material*	Plastic (PP / PVDF)	

*depending on order code

TYPE-DEPENDENT DATA

	WP□-212-□ WP□-213-□	WP□-214-□ WP□-215-□	WP□-224-□ WP□-225-□
Dead zone ⁽¹⁾	0 m		
Maximum measuring range ⁽²⁾	10 m (33 feet)		20 m (66 feet)
Accuracy ⁽³⁾	± 5 mm (.197")		± 2 mm (.078")
Beam angle (-3 dB)	12°		7°
Antenna insertion length ⁽⁴⁾	56 mm (2.2")		70 mm (2.75")
Lower process connection	1" BSP / NPT		1½" BSP / NPT
Upper process connection	1" BSP		

⁽¹⁾ Measured from the tip of the antenna.

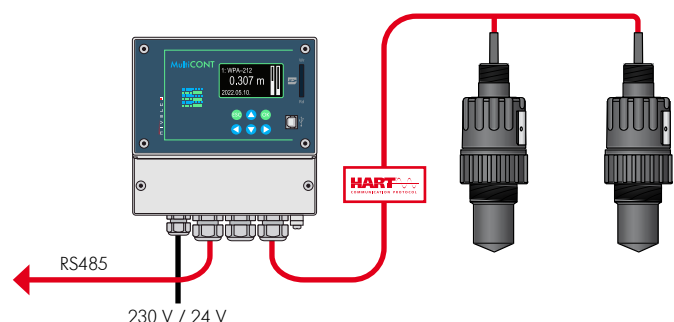
⁽³⁾ In the case of an ideal reflecting surface.

⁽²⁾ May be limited in the case of low dielectric constant or non-perpendicular or non-planar media.

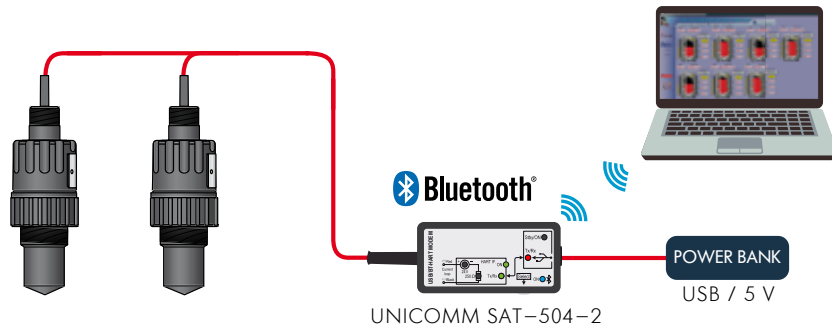
⁽⁴⁾ Measured from the sealing plane of the process connection.

HART® MULTIDROP LOOP

MultiCONT multichannel process controllers process and display measurement data supplied by NIVELCO's HART® equipped transmitters in a Multidrop loop. Connected transmitters can be programmed through MultiCONT, and it can also perform data logging tasks. Processed data may be sent to a computer via RS485 and displayed in NIVISON.

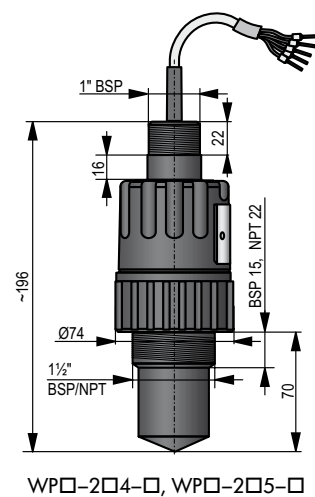
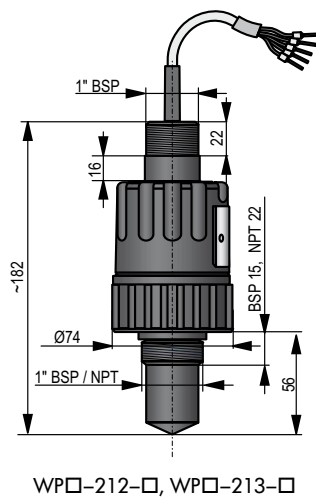


Bluetooth® CONNECTIVITY



Instruments with HART® connectivity can be linked to a PC via Bluetooth® using a UNICOMM HART®-USB/Bluetooth® modem (SAT-504). The USB power bank connected to the UNICOMM modem can power the entire setup.

DIMENSIONS



ORDER CODES (NOT ALL COMBINATIONS AVAILABLE)

Advanced 80 GHz radar level transmitters

PiloTREK WP □ - 2 □ □ - □

Integrated type	Antenna / Housing material	Code	80 GHz	Measurement distance	Code	Process connection - lower / upper	Code	Output / Ex	Code
	PP / PP	A		10 m	1	1" BSP / 1" BSP ⁽²⁾	2	4...20 mA + HART®	4
	PVDF / PVDF ⁽¹⁾	B		20 m	2	1" NPT / 1" BSP ⁽²⁾	3		8
				30 m ⁽¹⁾	3	1 1/2" BSP / 1" BSP ⁽³⁾	4		+ Relay
						1 1/2" NPT / 1" BSP ⁽³⁾	5		
						2" BSP / 1" BSP ^(1,4)	6		
						2" NPT / 1" BSP ^(1,4)	7		
						Ø75 mm / 1" BSP ^(1,5)	8		

⁽¹⁾ Under development
⁽²⁾ 10 m (33 ft) measuring range
⁽³⁾ 10 m or 20 m (33 ft or 66 ft) measuring range
⁽⁴⁾ 20 m (66 ft) measuring range
⁽⁵⁾ 30 m (98.5 ft) measuring range

