

**NEW** **PiLoTREK** WE-200

COMPACT 80 GHZ (W-BAND) RADAR  
FOR LIQUIDS & SOLIDS



5 YEARS WARRANTY

**TIVELCO**

LEVEL TRANSMITTERS

**FEATURES**

- 2-wire 80 GHz (W-band) radar
- Accuracy of  $\pm 2$  mm ( $\pm 0.078$ " )
- Small antenna diameter for easy installation
- Plug-in graphic display module
- Horn and plastic encapsulated antennas
- Compact design with IP66/IP67 (NEMA 4X/6) protection
- User-friendly threshold management
- Configuration via Bluetooth® with MobileEView app
- PACTware™ compatible
- NIFLANGE weldable stainless steel flange options
- High-temperature version
- 5 years warranty
- Ex version

**APPLICATIONS**

- For level measurement of liquids, emulsions and other media
- For free flowing solids
- Storage tanks, chemical tanks, open pits, sumps, wells
- Measurement through a plastic tank roof
- For materials that tend to vaporize

- For measuring liquids with a gas blanket
- It can also be used in a vacuum
- Open-channel flow measurement

**CERTIFICATES**

- ATEX (*Ex ia GD*)
- IECEx (*Ex ia GD*) (*in prep.*)
- INMETRO (*Ex ia GD*), ANATEL
- FM CII Div1 (*XP*) (*in prep.*)

**AREAS OF APPLICATION**

- Water and Wastewater Industry
- Energy / Utilities
- Food & Beverage
- Chemical & Pharmaceutical
- Agriculture
- Construction Materials
- Heavy Industry
- Packaging Industry



WES-214-4

The new **PiloTREK WE-200** non-contact radar level transmitters use the most advanced industrial measurement technology, the 80 GHz FMCW radar. The most fundamental advantage of 80 GHz radar compared to lower frequencies (5...12 GHz and 25 GHz) is the smaller antenna size, better focusability, and narrow beam angle. It uses the latest technology to measure liquids, masses, emulsions and other chemicals widely used in the water, food, energy, pharmaceutical and chemical industries, providing measurement results with millimeter accuracy. It is also excellent for measuring substances that tend to vaporize and liquids with a gas blanket or for free flowing solids.

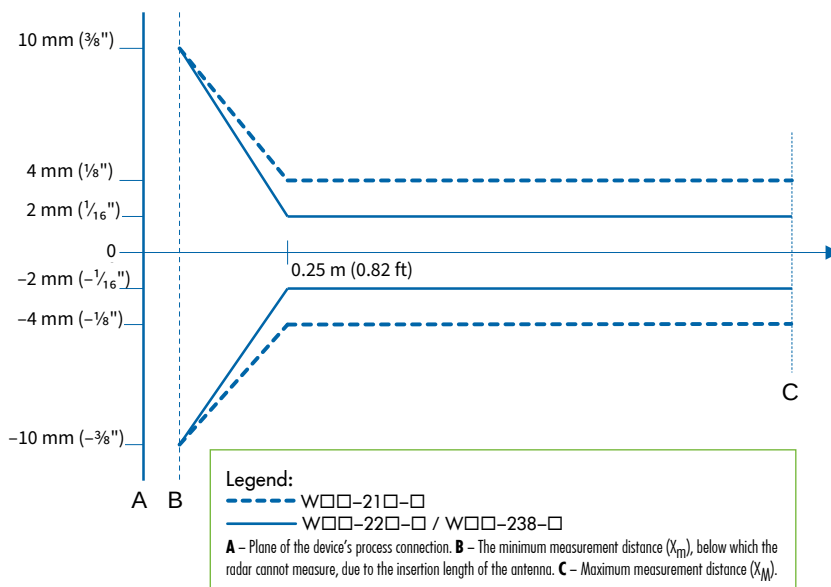
In addition to the level, volume, and weight measurement functions, this product family also inherits the open channel flow measurement functions and the threshold functions to eliminate false and interfering echoes. Since no medium is required for millimeter waves to propagate, it can also be used in a vacuum.

The device can also be operated with HART®-compliant NIVELCO **EView2**, **MultiCONT** universal process controller, and **PACTware™** software, or programmed via Bluetooth® communication with the new **MobileEView** app.



WEP-214-4

**LINEARITY ERROR**



WET-215-B

## OPERATING PRINCIPLE

The reflection of millimeter waves is highly dependent on the dielectric constant of the medium. Therefore, the dielectric constant ( $\epsilon_r$ ) of the medium to be measured must be greater than 1.9 for millimeter-wave level measurement.

Informative $\epsilon_r$ values							
Butane ( $C_4H_{10}$ )	1.4	Ethers	4.4	Gasoline	2.3	Methyl alcohol ( $CH_3OH$ )	33.1
LP gas	1.6...1.9	Acetic acid ( $CH_3COOH$ )	6.2	Bitumen	2.6	Glycol ( $C_2H_6O_2$ )	37
Kerosene		Limestone	6.1...9.1	Carbon disulfide ( $CS_2$ )		Nitrobenzene ( $C_6H_5NO_2$ )	40
Crude Oil	2.1	Ammonia ( $NH_3$ )	17...26	Clinker	2.7	Glycerin ( $C_3H_8O_3$ )	41.1
Diesel Oil		Acetone ( $C_3H_6O$ )	21	Resin	2.4...3.6	Water ( $H_2O$ )	80
Benzol ( $C_6H_6$ )	2.2	Ethyl alcohol ( $C_2H_5OH$ )	24	Cereal Grain	3...5	Sulfuric acid ( $H_2SO_4$ ) ( $T = 20\text{ }^\circ\text{C}$ [ $+68\text{ }^\circ\text{F}$ ])	84

The measurement principle of a level transmitter with a millimeter wave signal is based on measuring the reflection's time of flight. The propagation speed of millimeter wave signals in air, gases and vacuum is almost constant regardless of the temperature and pressure of the medium, so the measured distance is independent of the physical parameters of the intermediate medium. The **PiloTREK WE-200** level transmitter is a frequency modulated continuous wave (FMCW) radar 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.

## TECHNICAL DATA

		PiloTREK W□□-200
Measured values		Distance; calculated values: level, volume, mass, flow
Signal frequency		77...81 GHz (W-band)
Measuring range <sup>(1)</sup>		0...30 m (0...98.5 ft)
Lowest $\epsilon_r$ of medium		1.9
Resolution		0.1 mm (0.04")
Supply voltage		12...36 V DC
Output	Analog	4...20 mA (3.9...20.5 mA); $R_{Lmax} = (U_S - 12\text{ V}) / 0.02\text{ A}$
	Digital	Bluetooth® LE 5.1 (optional), HART® interface (loop resistance $\geq 250\ \Omega$ )
	Service interface	Compatible with SAT-506-0
	Display	SAP-300 – graphic display unit
	Relay (optional)	SPDT 30 V / 1 A DC; 42 V / 0.5 A AC
Measuring frequency		~1/s
Antenna material <sup>(1)</sup>		1.4571 (316Ti) stainless steel, or plastic antenna enclosure (PP / PVDF / PTFE)
Standard version	Process temperature	-30...+85 °C (-22...+185 °F)
	Ambient temperature	-40...+70 °C (-40...+158 °F), with display -20...+70 °C (-4...+158 °F)
High-temperature version	Process temperature	-30...+180 °C <sup>(2)</sup> (-22...+356 °F)
	Ambient temperature	-40...+60 °C (-40...+140 °F), with display -20...+60 °C (-4...+140 °F)
Process pressure		PP, PVDF, PTFE antenna: -1...3 bar (-0.1...0.3 MPa; -14.5...43.5 psi); Stainless steel antenna: -1...40 bar (-0.1...4.0 MPa; -14.5...580 psi)
Process connection		1", 1½" BSP / NPT, TriClamp, prepared for welded flange (NIFLANGE)
Ingress protection		IP66 / IP67 (NEMA 4X / 6)
Electrical connection		2× M20×1.5 cable glands + 2× internally threaded ½" NPT connection, cable outer diameter: $\varnothing 6...12\text{ mm}$ (shielded cable is recommended), wire cross section: 0.5...1.5 mm <sup>2</sup> (20...15AWG)
Electrical protection		Overvoltage Class I; (Class III [SELV])
Housing material <sup>(1)</sup>		Fiberglass-reinforced plastic (PBT)      Painted aluminum      Stainless steel 1.4571 (316Ti)
Weight		1...1.6 kg (2.2...3.5 lb)      2...2.6 kg (4.4...5.7 lb)      3.3...3.9 kg (7.9...8.6 lb)

<sup>(1)</sup>According to order code.

<sup>(2)</sup>High-temperature version with metal housing and stainless steel antenna only.

## TYPE-DEPENDENT DATA

	W□□-212-□ W□□-213-□	W□□-214-□ W□□-215-□	W□□-224-□ W□□-225-□
Dead zone <sup>(2)</sup>	0 m (0 ft)		
Maximum measuring range <sup>(3)</sup>	10 m (33 ft)		20 m (66 ft)
Accuracy <sup>(4)</sup>	±4 mm (±0.157")		±2 mm (±0.078")
Beam angle (-3 dB)	12°		7°
Antenna insertion length <sup>(5)</sup>	80 mm (3.15")		92 mm (3.62")
Process connection	1" BSP / NPT		1½" BSP / NPT

<sup>(2)</sup> Measured from the tip of the antenna.

<sup>(4)</sup> In the case of an ideal reflecting surface.

<sup>(3)</sup> May be limited in the case of low dielectric constant or non-perpendicular or non-planar media.

<sup>(5)</sup> Measured from the sealing plane of the process connection.

## Ex INFORMATION

Application group	IIC	IIIC
Standard version	WE□-2□□-8 Ex, WG□-2□□-8 Ex	
Ex marking (ATEX)	⊕ II 1G Ex ia IIC T6 Ga	⊕ II 1D Ex ia IIIC T85°C Da
Ex marking (INMETRO)	Ex ia IIC T6 Ga	Ex ia IIIC T85°C Da
High-temperature version	WH□-2□□-8 Ex, WJ□-2□□-8 Ex <sup>(6)</sup>	
Ex marking (ATEX)	⊕ II 1G Ex ia IIC T6...T3 Ga	⊕ II 1D Ex ia IIIC T85°C...T180°C Da
Ex marking (INMETRO)	Ex ia IIC T6...T3 Ga	Ex ia IIIC T85°C...T180°C Da
Ex power supply, intrinsically safety data <sup>(7)</sup>	U <sub>i</sub> = 30 V, I <sub>i</sub> = 100 mA, P <sub>i</sub> = 0.75 W C <sub>i</sub> ≤ 12 nF, L <sub>i</sub> ≤ 250 μH	U <sub>i</sub> = 30 V, I <sub>i</sub> = 140 mA, P <sub>i</sub> = 1 W C <sub>i</sub> ≤ 12 nF, L <sub>i</sub> ≤ 250 μH
Supply voltage	12...30 V DC	
Electrical connection	Cable entry	2× M20×1.5 cable glands + 2× internally threaded ½" NPT connection
	Cable outer diameter	Ø6...12 mm
	Wire cross-section	0.5...1.5 mm <sup>2</sup> (AWG20...15)

<sup>(6)</sup> Under development

<sup>(7)</sup> In IIB applications, Ex power supply data for IIIC can be used.

## TEMPERATURE DATA FOR Ex CERTIFIED MODELS

Temperature data	Standard version WE□-2□□-8 Ex, WG□-2□□-8 Ex	High-temperature version WH□-2□□-8 Ex, WJ□-2□□-8 Ex		
	Ex ia IIC, Ex ia IIIC	Ex ia IIC, Ex ia IIIC		
Temperature class	T6 T85°C	T5 T100°C	T4 T135°C	T3 T180°C
Highest process temperature	+80 °C (+176 °F)	+100 °C (+158 °F)	+135 °C (+275 °F)	+180 °C (+356 °F)
Highest surface temperature at the process connection	+70 °C (+158 °F)		+135 °C (+275 °F)	
Highest ambient temperature	+70 °C (+158 °F)		+60 °C (+140 °F)	

## POLARIZATION

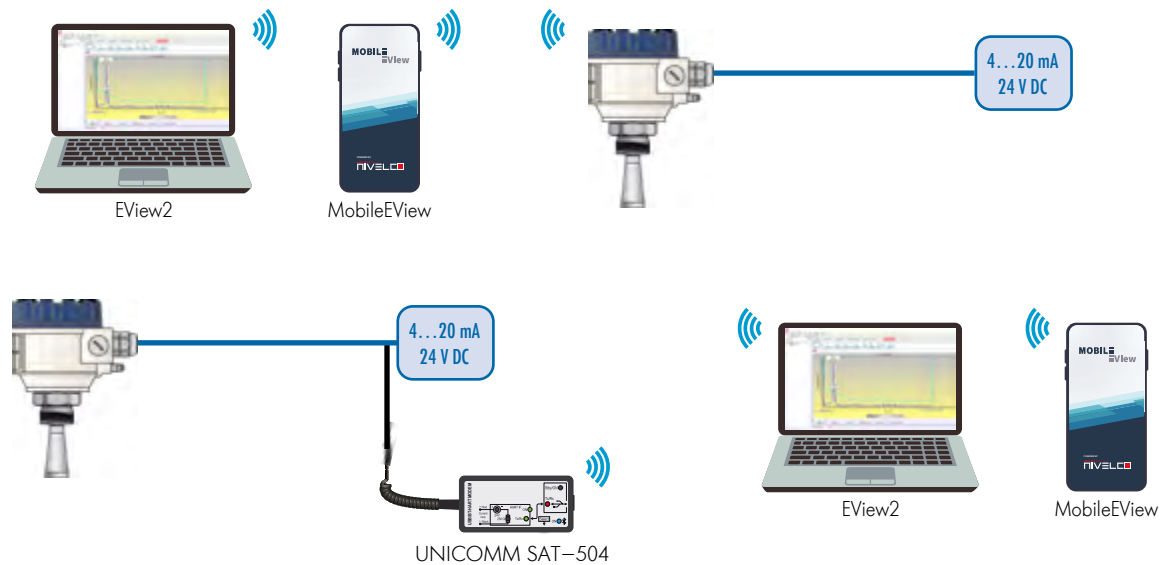
The PilotREK W-200 80 GHz radar is much less sensitive to installation conditions, both in terms of polarization and clutter sensitivity, due to its narrow and nearly circular beamwidth.

## BACKGROUND MAPPING

Thanks to its 80 GHz FMCW technology, it is much less sensitive to the presence of clutter than previous generation radars. It now has an easy-to-use, flexible threshold management (EView2) that allows echoes from clutter in the tank to be easily masked if necessary. The threshold curve is designed to mask unwanted echoes from the measurement. Echo peaks below the threshold are not included in the evaluation.

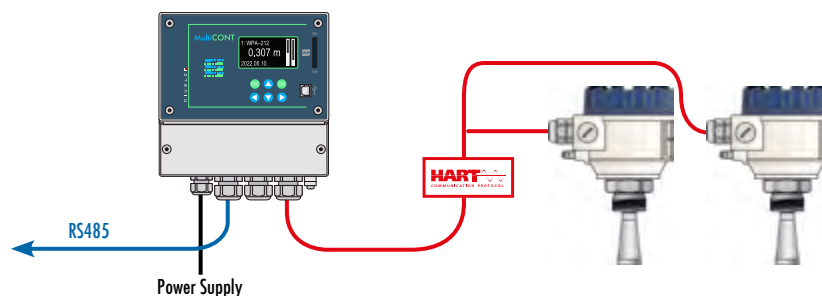
## Bluetooth® CONNECTIVITY

The Bluetooth® option on the **PiLoTREK W-200 Series** allows for convenient device setup and diagnostics via the NIVELCO **MobileEView** app for Android or iOS or the free **EView2** software download for laptops.

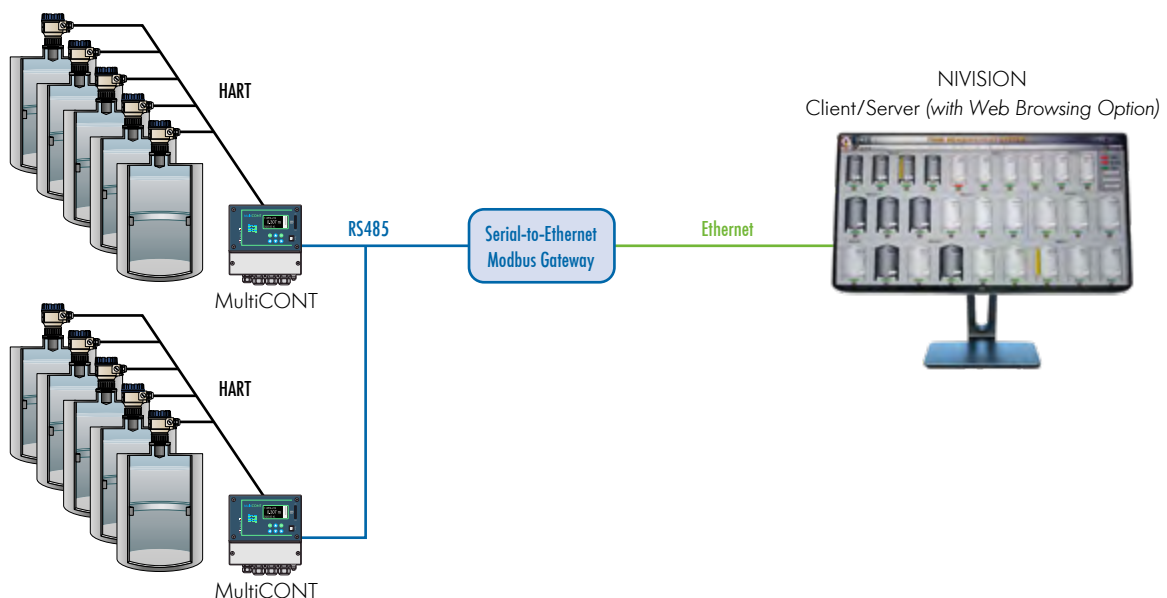


## PiLoTREK TRANSMITTERS IN HART® MULTIDROP LOOP

**MultiCONT** multi-channel remote controllers process, display, and transmit data from NIVELCO's HART®-equipped transmitters in a multidrop loop. Up to 15 of these connected transmitters can be programmed and maintained from MultiCONT, which supports data-logging tasks. MultiCONT provides programmable relay outputs, while 4...20 mA outputs are available through remote I/O modules.



MultiCONT can send measurement data via RS485 to PLCs, computers running third-party SCADA systems, or the NIVELCO **NIVISION** inventory monitoring system.



## WIRING



WEK-200-B

## PROGRAMMING, ECHO MAP

All parameters can be programmed via the optional SAP-300 plug-in display; measurement and output parameters can be set using a text-based menu system. Measured values are displayed as numbers and bar graphs on the dot-matrix screen. The echo map helps detect false reflections and optimizes measurement configuration.



Simple programming and setup menu

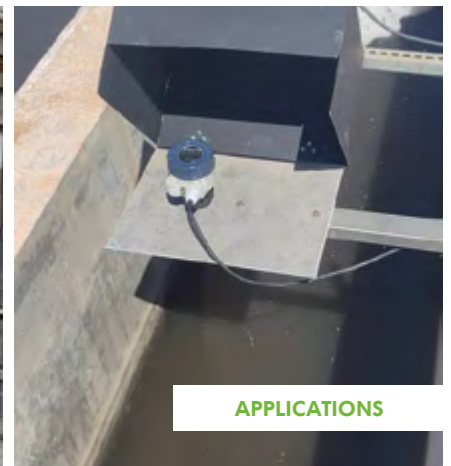


The displayed values are clearly visible

## MOUNTING

The device must be mounted far as possible from interfering objects inside the tank and from sources of interference, such as waves, vortices or strong vibrations. The antenna cover must be parallel to the measured surface within  $\pm 2...3^\circ$ .

For outdoor use, we recommend using an aluminum housing. In regions with extremely hot climates, we recommend protecting the instrument from direct sunlight to avoid exceeding the ambient temperature limits of the housing.

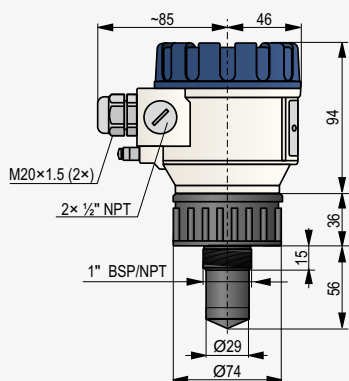


APPLICATIONS

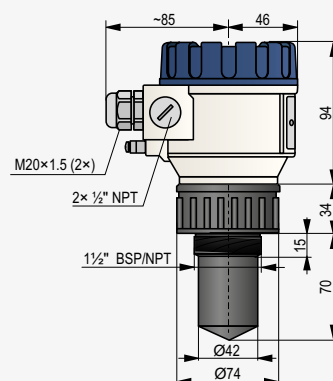
**DIMENSIONS**

**Encapsulated antenna, plastic housing (W□P, W□V, W□F)**

W□□-212-□ / W□□-213-□

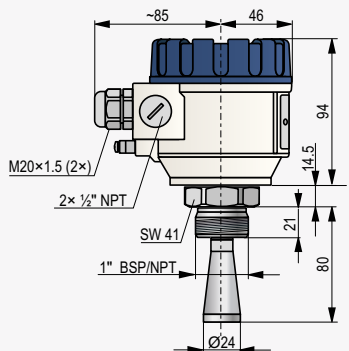


W□□-2□4-□ / W□□-2□5-□

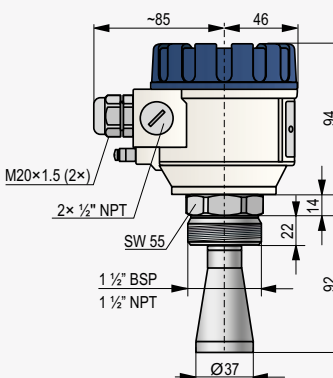


**Stainless steel antenna, plastic housing (W□M)**

W□M-212-□ / W□M-213-□

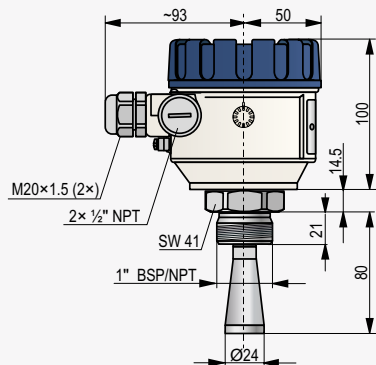


W□M-2□4-□ / W□M-2□5-□

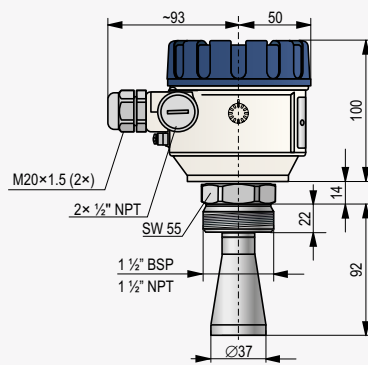


**Stainless steel antenna, aluminum housing (W□S)**

W□S-212-□ / W□S-213-□

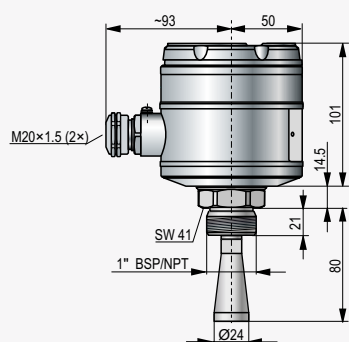


W□S-2□4-□ / W□S-2□5-□

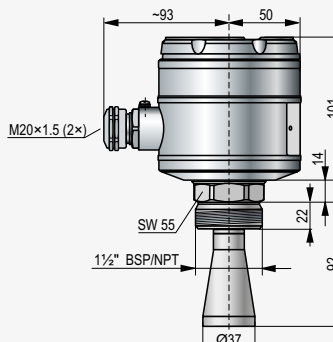


**Stainless steel antenna, stainless steel housing (W□K)**

W□K-212-□ / W□K-213-□



W□K-2□4-□ / W□K-2□5-□



## ORDER CODES

(NOT ALL COMBINATIONS AVAILABLE)

### Advanced 80 GHz Radar Level Transmitters

PiloTREK W ■ ■ - 2 ■ ■ - ■ (1)

Version	Code	Antenna / Housing	Code	Measurement range	Code	Process connection	Code	Output / Certificates	Code	
Transmitter	E	PP	Fiberglass-reinforced plastic (PBT)	10 m (33 ft)	1	1" BSP (4)	2	-	4	
Transmitter with plug-in display	G		Painted aluminum	20 m (66 ft)	2	1" NPT (4)	3	Ex ta D (2)	5	
Transmitter, high temp. version (2)	H		Stainless steel	30 m (98.5 ft) (2)	3	1 1/2" BSP (5)	4	Ex ia GD	8	
Transmitter with plug-in display, high temp. version (2)	J	1-4571	Fiberglass-reinforced plastic (PBT)			1 1/2" NPT (5)	5	+ Bluetooth®	B	
			Painted aluminum	M			Ø75 mm (2 1/2") (2, 6)	8	+ Bluetooth® / Ex ta D (2)	C
			Stainless steel	S			Prepared for welded flange (7)	S	+ Bluetooth® / Ex ia GD	E
PVDf		Fiberglass-reinforced plastic (PBT)	V			1 1/2" TriClamp (2)	C	+ Relay	H	
		Painted aluminum	B			2" TriClamp (2)	D	+ Relay / Ex ta D (2)	F	
		Stainless steel	W			3" TriClamp (2)	E	+ Relay + Bluetooth®	R	
PTFE		Fiberglass-reinforced plastic (PBT) (3)	F					+ Relay + Bluetooth® / Ex ta D (2)	J	
		Painted aluminum (3)	T							
		Stainless steel (3)	L							

(1) For explosion-proof devices, the article number is followed by "Ex" on the data plate. (2) Under development. (3) Up to 20 m (66 ft) measuring range. (4) Only for 10 m (33 ft) measuring range. (5) Only for 10 m (33 ft) or 20 m (66 ft) measuring range. (6) Prepared for flange, only 30 m (98.5 ft) and encapsulated types, flanges available from size DN80 should be ordered separately. (7) Only for 10 m (33 ft) or 20 m (66 ft) ranges, with 1/2" stainless steel antenna, flange type MF□-□□□-L to be ordered separately.



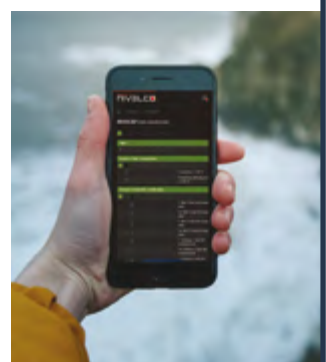
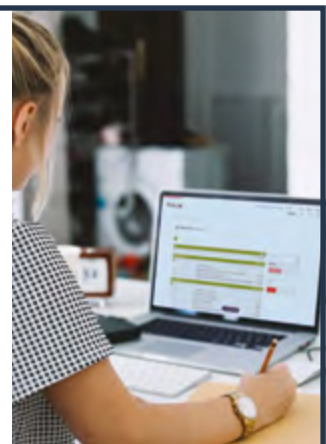
## [next.nivelco.com](http://next.nivelco.com)

### Simplify Your Selection, Maximize Your Results!

Simplify the product selection process with the NIVELCO Selector to find the perfect product for your application. Our online product catalog provides a comprehensive list of all our products and their features to help you make an informed decision. A responsive interface provides a seamless browsing experience on any device, giving you the flexibility to explore our range anywhere, anytime.



**PiloTREK WE-200  
- CONFIGURATION &  
REQUEST FOR QUOTE**



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