

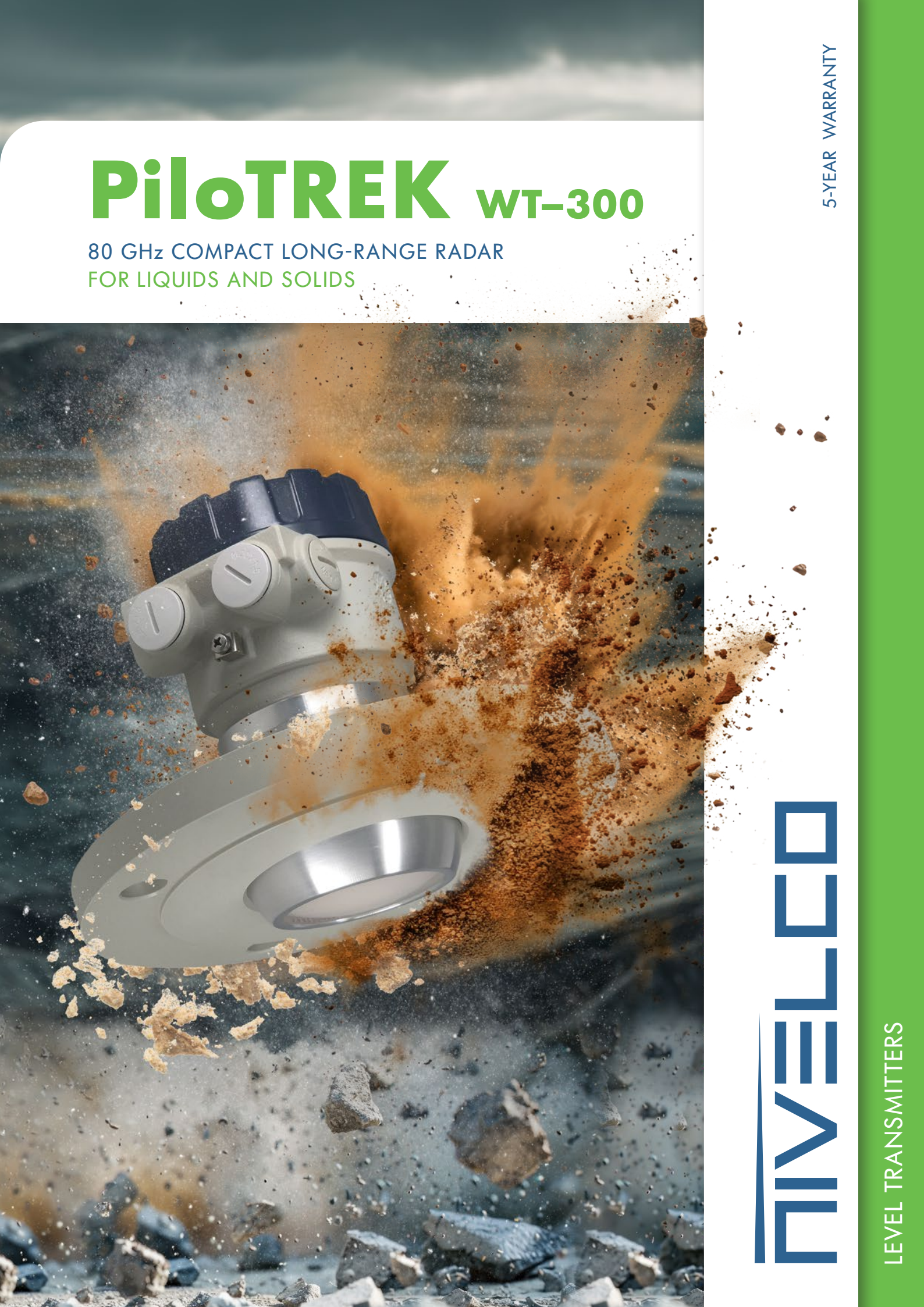
PiLoTREK WT-300

80 GHz COMPACT LONG-RANGE RADAR
FOR LIQUIDS AND SOLIDS

5-YEAR WARRANTY

LEVELCO

LEVEL TRANSMITTERS



The new **PiloTREK WT-300** non-contact radar level sensors utilize 80 GHz FMCW radar technology, the most advanced technology available for industrial level measurement. Designed for liquids, slurries, emulsions, and bulk solids, they are ideally suited for applications in the food processing, agricultural, construction materials, chemical, and mining industries.

The PiloTREK WT-300 provides millimeter-level accuracy over long measuring ranges and ensures reliable measurement of very low dielectric liquids and solids, even under dusty or foaming process conditions.

In addition to level, volume, and mass measurement, the product family features advanced threshold management functions to suppress false echoes. Fast and easy commissioning, testing, and maintenance are available via Bluetooth® using the NIVELCO **MobileEView** App for iOS and Android devices

The sensors are fully compatible with NIVELCO's **MultiCONT** (Hub) 15-channel controller, **MonoCONT** single-channel smart field display, and **PACTware™** software.

FEATURES

- 2-wire 80 GHz (W-band) long-range radar
- Measurement range up to 60 m
- Accuracy ± 2 mm
- Extremely narrow 3° beam angle
- Minimum material dielectric constant (ϵ_r) of 1.4
- Suitable for vacuum applications
- High-temperature version available
- Screw-on, welded, and tilting flanges
- Air-purge option
- Local display plug-in unit
- User-friendly threshold management
- Configuration via Bluetooth® and the NIVELCO MobileEView App
- PACTware™ compatible
- IP66/IP67 protection
- 5-year warranty

APPLICATIONS

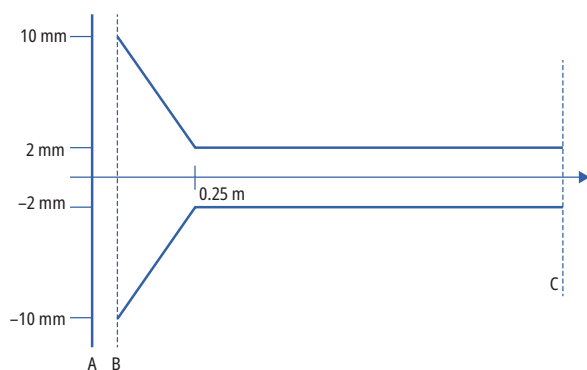
- Water and Wastewater
- Agriculture
- Construction Materials
- Chemical & Pharmaceutical
- Food Industry
- Mining
- Power Generation
- Packaging Industry
- Plastics & Recycling

CERTIFICATES

- ATEX (Ex ia GD), ATEX (ta D)
- IECEx (Ex ia GD)
- FM Class I, Division 1 (pending)



LINEARITY ERROR



Legend:

- A** – Process connection plane of the device.
- B** – The minimum measurement distance below which the radar cannot measure, due to the insertion length of the antenna (X_{min}).
- C** – Maximum measurement distance (X_{Max}).

TECHNICAL DATA

		PiloTREK W□□-3□□-□		
Measured values		Distance; calculated values: level, volume, mass, open-channel flow		
Signal frequency		77...81 GHz (W-band)		
Measurement range ⁽¹⁾		0...60 m		
Dead zone ⁽²⁾		0 m		
Antenna insertion length ⁽³⁾		17 mm		
Beam angle (−3 dB)		3°		
Lowest ε _r of medium		1.4		
Accuracy		±2 mm		
Supply voltage		12...36 V DC		
Output	Analog	4...20 mA (3.9...20.5 mA); R _{Lmax} = (U _S − 12 V) / 0.02 A		
	Digital	HART® interface, HART® loop resistance ≥250 Ω		
	Display	Plug-in local display unit (SAP-300-0)		
	Relay (optional)	SPDT 30 V / 1 A DC; 42 V / 0.5 A AC		
Connectivity		Bluetooth® LE 6.0		
Measuring frequency		~1/s		
Antenna material		PTFE (For housing and flange materials see Material Variations table)		
Process temperature		−40...+80 °C; high-temperature version: −40...+200 °C ⁽⁴⁾		
Ambient temperature		−40...+70 °C, with display −20...+70 °C		
Seal		FPM (Viton®), Optional: EPDM, FFKM Perfluoroelastomer (Kalrez® 6375)		
Process pressure		−1...3 bar		
Maximum pressure of the pneumatic system		10 bar		
Process connection		3" BSP/NPT, DIN, ANSI, JIS flanges (Screw-on, Welded, Tilting)		
Ingress protection		IP66/IP67		
Electrical connection		2× M20×1.5 cable glands or 2× ½" NPT; cable OD: Ø6...12 mm; recommended shielded cable: 0.5...1.5 mm ²		
Electrical protection		Overvoltage Class 1; (Class III [SELV])		
Housing material ⁽¹⁾		Painted aluminum	Fiberglass-reinforced plastic (PBT)	1.4571/1.4404 stainless steel
Weight		1.5...2.5 kg	1...1.2 kg	2.5...3.5 kg

⁽¹⁾According to order code. ⁽²⁾ Measured from the tip of the antenna. ⁽³⁾ Measured from the seal plane of the process connection. ⁽⁴⁾High-temperature version only with metal housing and stainless steel flange.

OPERATING PRINCIPLE

The PiloTREK WT-300 utilizes 80 GHz (W-Band) FMCW radar technology. The high operating frequency enables excellent signal focusing, a narrow beam angle, and reliable measurement in demanding applications. Distance is calculated from the frequency difference between the transmitted and reflected signals and converted into level, volume, mass, or flow values. The achievable measuring range depends on the dielectric constant (ε_r) and surface characteristics of the medium.

Typical Dielectric Constant (ε _r) Values for Bulk Solids					
Cement	1.5...10	Ground stone, gravel, sand, silica sand	2.5...5.0	Rice, wheat	2.5...4.5
Coal, coal powder, metal ore	2.3...15	Malt (dry)	2.2...3.0	Seed-corn, granulated fodder mixture	2.0...3.0
Corn, cereals, grain, sunflower seed	2.0...5.0	Perlite	1.6	Sodium bicarbonate, Baking soda (NaHCO ₃)	5.7
Flour	2.4	PET granules	2.8...3.3	Sodium carbonate, Soda (Na ₂ CO ₃)	5.3...8.4
Fly ash	1.5...5.0	Powdered lime (CaO)	1.6...2.2	Sodium chloride (NaCl), Table salt, rock salt	3.3
Granulated plastic	1.1...2.8	Powdered milk	1.6...2.2	Soybean meal	2.0...3.5
Granule fertilizers (Nitrates, Phosphates)	1.6...6.4	Powdered sugar	1.8	Wood pellets, chips	1.2...2.5

Typical Dielectric Constant (ε _r) Values for Liquids					
Butane (liquid)	1.8	Light hydrocarbons	1.7...2.0	Process oils	2.1...2.8
Crude oil	2.0...2.5	Liquid CO ₂	1.6	Propane (liquid)	1.6...1.9
Diesel fuel	2.0...2.3	LPG, LNG	1.4...1.7	Styrene	2.4...2.6
Fuel oil	2.1...2.7	Lubricating oil	2.1...2.8	Toluene	2.3...2.4
Gasoline	1.9...2.2	Mineral oil	2.1...2.4	Vegetable oil	2.9...3.3
Jet fuel	1.9...2.1	Naphtha	1.8...2.1	White spirit	1.9...2.2
Kerosene	1.8...2.0	Pentane, Hexane, Heptane	1.8...1.9	Xylene	2.3...2.6

MATERIAL VARIATIONS

	W□T-3□□-□		W□F-3□□-□		W□L-3□□-□	
Housing	Painted aluminum		Fiberglass-reinforced plastic (PBT)		316Ti/316L stainless steel	
Flange	PP	Stainless steel	PP	Stainless steel	PP	Stainless steel
Antenna housing	Aluminum	Stainless steel	PP	Stainless steel	Stainless steel	
Clamping ring	Aluminum			Stainless steel		

CERTIFICATION DATA – ATEX (Ex ia) CERTIFICATE NO.: BKI24ATEX0001 X

Application group		IIC	IIIC
Standard version		WT□- / WB□- / WC□ / WD□-3□□-8 Ex / E Ex	
Ex marking (ATEX)		Ⓔ II 1G Ex ia IIC T6 Ga	Ⓔ II 1D Ex ia IIIC T85°C Da
High-temperature version		WK□- / WL□- / WM□ / WN□-3□□-8 Ex / E Ex	
Ex marking (ATEX)		Ⓔ II 1G Ex ia IIC T6...T3 Ga	Ⓔ II 1D Ex ia IIIC T85°C...T200°C Da
Ex power supply, intrinsically safety data ⁽¹⁾		Ui = 30 V, li = 100 mA, Pi = 0.75 W, Ci ≤ 13 nF, Li ≤ 265 µH	Ui = 30 V, li = 140 mA, Pi = 1 W, Ci ≤ 13 nF, Li ≤ 265 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 mm²	

⁽¹⁾ In IIB applications, Ex power supply data for IIIC can be used.

TEMPERATURE DATA – ATEX (Ex ia) (Ex-CERTIFIED MODELS)

	Standard version	High-temperature version			
	WE□-2□□-8 Ex / WG□-2□□-8 Ex / WE□-2□□-E Ex / WG□-2□□-E Ex	WH□-2□□-8 Ex / WJ□-2□□-8 Ex / WH□-2□□-E Ex / WJ□-2□□-E Ex			
	Ex ia IIC, Ex ia IIIC	Ex ia IIC, Ex ia IIIC			
Temperature class	T6 T85°C	T6 T85°C	T5 T100°C	T4 T135°C	T3 T200°C
Max. process temperature	+80 °C)	+80 °C	+100 °C	+135 °C	+200 °C
Max. surface temperature (process connection)	+70 °C	+70 °C	+95 °C	+130 °C ⁽²⁾	+180 °C ⁽²⁾
Max. ambient temperature	+70 °C				

⁽²⁾ In high-temperature applications, compliance with the maximum ambient temperature requirements is typically achieved by insulating the technology.

CERTIFICATION DATA – ATEX (Ex ta) CERTIFICATE NO.: BKI24ATEX0001 X

	Standard version with metal housing		High-temperature version with metal housing
	WT□- / WB□-3□□-5 / C Ex, WC□- / WD□-3□□-5 / C Ex	WT□- / WB□-3□□-5 / C / F / J Ex, WC□- / WD□-3□□-5 / C / F / J Ex	WK□- / WL□-3□□-5 / C / F / J Ex, WM□- / WN□-3□□-5 / C / F / J Ex
Ex marking (ATEX)	Ex ta IIIC T105°C Da	Ex ta/tb IIIC T85°C...T110°C Da/Db	Ex ta/tb IIIC T85°C...T200°C Da/Db
Cover-opening delay	0 min.	30 min.	30 min.
Ex power supply data ⁽³⁾	Ui = 30 V DC li = 1 A		
Supply voltage		12...30 V DC	
Electrical wiring	Cable entry	“Ex ta” certified 2× M20×1.5 cable gland	
	Cable outer diameter	Ø6...12 mm	
	Wire cross-section	0.5...1.5 mm²	

⁽³⁾ In IIB applications, Ex power supply data for IIIC can be used.

TEMPERATURE DATA – ATEX (Ex ta) (Ex-CERTIFIED MODELS)

	Standard version				High-temperature version			
	WT□- / WB□-3□□-5 / C Ex, WC□- / WD□-3□□-5 / C Ex	WT□- / WB□-3□□-5 / C / F / J Ex, WC□- / WD□-3□□-5 / C / F / J Ex			WK□- / WL□-3□□-8 / E Ex, WM□- / WN□-3□□-8 / E Ex			
	Ex ta IIIC	Ex ta/tb IIIC			Ex ia IIC, Ex ia IIIC			
Temperature class	T105°C	T85°C	T100°C	T110°C	T85°C	T100°C	T135°C	T200°C
Maximum process temperature	+65 °C	+80 °C	+90 °C	+100 °C	+80 °C	+90 °C	+100 °C	+180 °C
Maximum surface temperature at the process connection ⁽⁴⁾	+65 °C	+75 °C	+90 °C	+100 °C	+75 °C	+90 °C	+100 °C	+175 °C
Maximum ambient temperature	+65 °C							

⁽⁴⁾ In high-temperature applications, compliance with the maximum ambient temperature requirements is typically achieved by insulating the technology.

CERTIFICATION DATA – IECEx (Ex ia GD) CERTIFICATE NO.: IECEx BKI 26.0003X

Application group		IIC	IIIC
Standard version		WT□- / WB□- / WC□- / WD□-3□□-8 Ex / E Ex	
Ex marking (IECEx)		Ex ia IIC T6 Ga	Ex ia IIIC T85°C Da
High-temperature version		WK□- / WL□- / WM□- / WN□-3□□-8 Ex / E Ex	
Ex marking (IECEx)		Ex ia IIC T6...T3 Ga	Ex ia IIIC T85°C...T200°C Da
Ex power supply, intrinsically safety data ⁽¹⁾		Ui = 30 V, li = 100 mA, Pi = 0.75 W, Ci ≤ 13 nF, Li ≤ 265 µH	Ui = 30 V, li = 140 mA, Pi = 1 W, Ci ≤ 13 nF, Li ≤ 265 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 ²	

⁽¹⁾ In IIB applications, Ex power supply data for IIIC can be used.

TEMPERATURE DATA – IECEx (Ex ia GD) (Ex-CERTIFIED MODELS)

	Standard version	High-temperature version				
	WE□-2□□-8 Ex / WG□-2□□-8 Ex / WE□-2□□-E Ex / WG□-2□□-E Ex	WH□-2□□-8 Ex / WJ□-2□□-8 Ex / WH□-2□□-E Ex / WJ□-2□□-E Ex				
	Ex ia IIC, Ex ia IIIC	Ex ia IIC, Ex ia IIIC				
Temperature class	T6 T85°C	T6 T85°C	T5 T100°C	T4 T135°C	T3 T200°C	
Max. process temperature	+80 °C	+80 °C	+100 °C	+135 °C	+200 °C	
Max. surface temperature (process connection)	+70 °C	+70 °C	95 °C ⁽²⁾	+130 °C ⁽²⁾	+180 °C ⁽²⁾	
Max. ambient temperature	+70 °C					

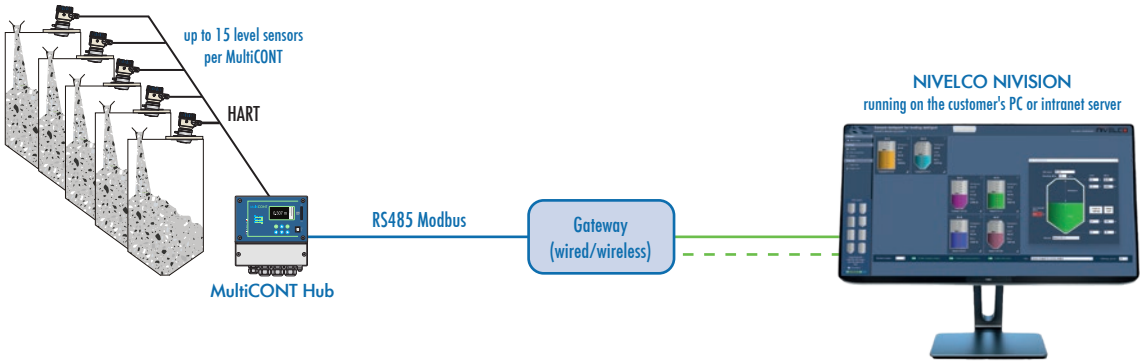
⁽²⁾ In such cases, compliance with the maximum ambient temperature requirements is typically achieved by insulating the technology.

Bluetooth® CONNECTIVITY

The Bluetooth® option on the PiloTREK W-300 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.



INVENTORY VISUALIZATION AND MONITORING



DIMENSIONS

Aluminum Housing (W□T-3□□-□)	Plastic Housing (W□F-3□□-□)	Threaded Versions (WTT/WBT/WCT/WDT-33M/33N-□)

ORDER CODES (NOT ALL COMBINATIONS ARE AVAILABLE)

2-wire Compact Long-range Non-contact Radar Level Sensors for Liquids and Solids

PiloTREK W ■ ■ - 3 ■ ■ - ■ (1)

Version	Code	Antenna / Housing	Code	Measurement range	Code	Process connection	Code	Output / Certificates	Code	
Standard Transmitter	T	PTFE Fiberglass-reinforced plastic (PBT) Painted aluminum Stainless steel	F	30 m	3	3" BSP ⁽⁵⁾	M	4...20 mA + HART®	4	
	+ plug-in display		B			3" NPT ⁽⁵⁾	N		Ex ta D	5
	+ air purge		C		60 m	6	3" BSP ⁽⁶⁾		P	Ex ia GD
	+ plug-in display + air purge		D			3" NPT ⁽⁶⁾	R		+ Bluetooth®	B
High-Temperature Transmitter ⁽²⁾	K					DIN flanges RF ANSI flanges JIS flanges	Stainless steel (1.4571/1.4404)		+ Bluetooth® / Ex ta D	C
	+ plug-in display	L							+ Bluetooth® / Ex ia GD	E
	+ air purge	M							+ Relay	H
	+ plug-in display + air purge	N							+ Relay / Ex ta D	F
										+ Relay + Bluetooth®
							Polypropylene (PP)	+ Relay + Bluetooth® / Ex ta D	J	
							Prepared for flange	Custom flange with aluminum antenna enclosure ⁽³⁾ Custom flange with stainless steel antenna enclosure ⁽³⁾ Prepared for weldable flange ⁽⁴⁾	U V S	

(1) For explosion-proof versions, the suffix "Ex" is added to the article number on the data plate.

(2) High-temperature version (max. +200 °C) available only with metal housing and stainless steel flange. Currently under development.

(3) Flange type MFC-□□□-W from size DN100 / 4" / JIS100A to be ordered separately.

(4) Only for stainless steel housing, stainless steel antenna housing.

PROCESS SEAL MATERIAL

Standard process seal: FPM (Viton[®]). EPDM and FFKM (Kalrez[®] 6375) seals are available as options. Other seal materials available on request. Specify seal material when ordering.

ACCESSORIES

Graphic plug-in display module	UNIDISP SAP-300-0
HART [®] -USB/Bluetooth [®] modem for remote programming	UNICOMM SAT-504-□
eLink communication module	UNICOMM SAT-506-□
Multichannel process controller, display module	MultiCONT PRW-2□□-□
HART [®] -USB/RS485 modem for PC-based remote configuration, DIN rail mountable	UNICOMM SAK-305-□
24 V DC power supply, DIN rail mountable	NIPOWER PPK-431-□
Intrinsically safe isolator, DIN rail mountable	UNICONT PGK-301-□ Ex
EView2 configuration software for PC-based remote configuration	FREE download
MobileEView – free Bluetooth [®] mobile application	
Smart Field Display & Data Logger	MonoCONT P□F-□□□-□
Sunshield	UNIMOUNT SAB

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**PiloTREK WT-300
- CONFIGURATION &
REQUEST FOR QUOTE**

NIVELCO Process Control Co.

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NIVELCO.COM