

PiLoTREK

WP-200

2-wire 80 GHz Non-Contact Radar
Level Transmitters

User's Manual
5th Edition



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Certificates		Reference Document Number
	ATEX, Certificate No.: BKI24ATEX0001 X	wpa200hu23p03-b
	IECEx, Certificate No.: IECEx BKI 26.0003X	wpa200en26h06-b
	ANATEL, Certificate No.: 04179-24-16612	wps200br24p01-b
	INMETRO, Certificate No.: DNV 24.0166 X.	wps200br24p01-b

Document Name	QR code
PiloTREK WP-200 – User's Manual (this document)	
PiloTREK – Programming Guide	

BASIC CONCEPTS AND ELEMENTS

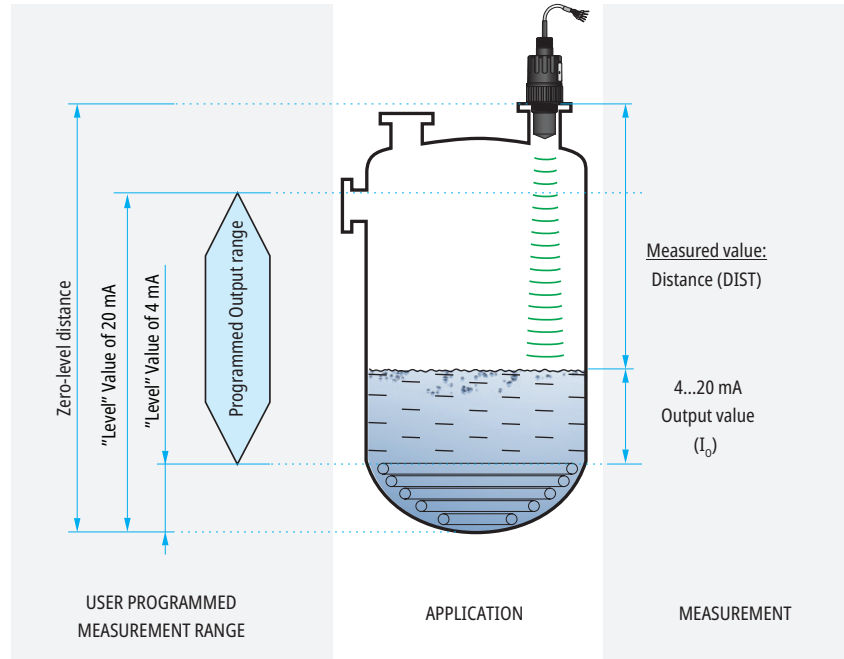


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NIVELO
Pressure sensor
Supply: 12...24 V
Output: 4...20 mA, HART
Amb. temp.: -20...60 °C
Max. press.: 10...100 bar
Max. temp.: 120...150 °C
CE
8000 0000

Thank you for purchasing a NIVELCO product.

1. INTRODUCTION

Application

The PilotREK WP–200 integrated non-contact radar level transmitters use the most advanced industrial measurement technology, the 80 GHz FMCW radar. Compared to lower frequencies (5...12 GHz and 25 GHz), 80 GHz radar has the main advantages of a smaller antenna size, better focusing capability, and a narrow beam angle.

It uses the latest technology to measure liquids, bulk materials, emulsions, and other chemicals widely used in, for example, the water industry, food industry, energy industry, pharmaceutical industry, and chemical industries, providing measurement results with millimeter accuracy.

It can also measure materials prone to vapor formation and liquids with a gas blanket. Since the propagation of millimeter waves does not require a medium, 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.

Operating Principle

The PilotREK WP–200 level transmitter is a frequency modulated continuous wave (FMCW) radar operating at 80 GHz (W-band).

Depending on the measured medium, part of the energy of the frequency-modulated wave emitted by the antenna of the level transmitter is reflected from the measured surface.

The electronics module calculates the distance of the reflecting surface from the frequency shift proportional to the flight time of the reflected signal with high accuracy and converts it into a signal proportional to distance, level, or volume. The propagation speed of the millimeter-wave signal in air, gases, and vacuum is virtually the same regardless of temperature and pressure, so these factors do not significantly affect the accuracy of the measurement.

The signal strength of the reflected millimeter waves depends largely on the measured medium's dielectric constant (DC = relative dielectric constant ϵ_r [specific gravity]). Therefore, the maximum measuring distance achieved may decrease accordingly. For media with a low dielectric constant, it is recommended to use an antenna with a larger diameter and therefore higher gain.

2. ORDER CODE (Not all combinations are available.)

PiloTREK W P — 2 — ⁽¹⁾

Antenna / Housing Material	Code
PP / PP	A
PVDF / PVDF	B
PTFE / PVDF	T
PTFE/PVDF (lens-antenna version)	C

Measurement Range	Code
10 m (33 ft)	1
20 m (66 ft)	2
30 m (98.5 ft) ⁽²⁾	3

Process Connection – Lower / Upper	Code
1" BSP / 1" BSP ⁽³⁾	2
1" NPT / 1" BSP ⁽³⁾	3
1½" BSP / 1" BSP ⁽⁴⁾	4
1½" NPT / 1" BSP ⁽⁴⁾	5
2" BSP / 1" BSP ⁽²⁾⁽⁵⁾	6
2" NPT / 1" BSP ⁽²⁾⁽⁵⁾	7
Ø75 mm (2½") / 1" BSP ⁽²⁾⁽⁶⁾	8

Output / Ex	Code
+ HART®	4
+ HART® / Ex ia GD	8
+ HART® + SPDT Relay	H
+ HART® + Bluetooth®	B
+ HART® + Bluetooth® / Ex ia GD	E
+ HART® + Bluetooth® + SPDT Relay	R
+ HART® + Bluetooth® with 10 m (33 ft) cable	T

⁽¹⁾ For explosion-proof devices, the article number is followed by "Ex" on the data plate.

⁽²⁾ Under development.

⁽³⁾ Only for 10 m (33 ft) measuring range.

⁽⁴⁾ Only for 10 m (33 ft) or 20 m (66 ft) measuring range.

⁽⁵⁾ Only for 20 m (66 ft) measuring range.

⁽⁶⁾ Only for 30 m (98.5 ft) measuring range.

Available Accessories	Order Code
Flanges	SFA-3□□-0
HART®–USB/Bluetooth® modem	SAT-504-□
HART®–USB/RS485 modem	SAK-305-2
HART®–USB/RS485 modem / Ex ia G	SAK-305-6
Mounting brackets	SAC-1□1-0
Smart Field Display and Data Logger	P□F-□1□-□
Loop Display	P□F-□11-□
Aiming device, 500 mm, aluminum, Pg9, drilled as DN50 PN16	SAA-102-0

Seals ⁽⁷⁾
EPDM
FPM
FFKM

⁽⁷⁾ Process seals are ordered separately and must be specified in the text part of the order. Other seals are also available.

3. TECHNICAL DATA

3.1 General Technical Data

		PVDF housing WPB-, WPT-, WPC-2□□-□	PP housing WPA-2□□-□
Measured and derived values		Distance; derived values: level, volume, mass, flow	
Signal frequency		77...81 GHz (W-band)	
Measuring range		0...30 m (0...98.5 ft)	
Lowest εr of medium		1.6 (under ideal conditions)	
Resolution		0.1 mm (.004")	
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 6.0 (optional), HART® interface (loop resistance ≥ 250 Ω)	
	Service interface	SAT-504-3 compatible; galvanically isolated; 3.3 V LVDS; max. 100 mA	
	Relay (optional)	SPDT 30 V / 1 A DC; 42 V / 0.5 A AC	
Measuring frequency		~ 1/s	
Antenna material ⁽¹⁾		Encapsulated antenna (PP / PVDF / PTFE)	
Process / ambient temperature		-40...+80 °C (-40...+176 °F)	-30...+80 °C (-34.4...+176 °F)
Process pressure		-1...3 bar (-14.5...43.5 psi)	
Seal	FPM (Viton®)		EPDM
	Optional: EPDM, FFKM Perfluoroelastomer (Kalrez® 6375)		
Process connection		1", 1½" BSP / NPT	
Ingress protection		IP66 / IP68	
Electrical connection		4× 0.5 mm² (22 AWG) shielded Ø6 mm (Ø0.24") cable × 5 m (16.4 ft), up to 30 m (98.5 ft); For the relay option: 7× 0.5 mm² (22 AWG) shielded cable	
Electrical protection ⁽²⁾		Class I overvoltage protection; (Class III [SELV])	
Weight		~ 600 g (1.3 lb)	

⁽¹⁾ Depending on order code.

⁽²⁾ Operate only with galvanically isolated power supply.

3.2 Type-specific Data

	Encapsulated horn antenna (WPA, WPB, WPT)			Lens-antenna (WPC)		
	WP□-212-□ / WP□-213-□	WP□-214-□ / WP□-215-□	WP□-224-□ / WP□-225-□	WPC-212-□ / WPC-213-□	WPC-214-□ / WPC-215-□	WPC-224-□ / WPC-225-□
Antenna material	PP, PVDF, PTFE			PTFE		
Dead zone ⁽¹⁾	0 m (0 ft)					
Maximum measuring range ⁽²⁾	10 m (33 ft)		20 m (66 ft)	10 m (33 ft)		20 m (66 ft)
Accuracy ⁽³⁾	Up to 6 m (19.7 ft): ±2 mm (±0.08") Over 6 m (19.7 ft): ±4 mm (±0.16")	±2 mm (±0.08")		Up to 6 m (19.7 ft): ±2 mm (±0.08") Over 6 m (19.7 ft): ±4 mm (±0.16")	±2 mm (±0.08")	
Beam angle (−3 dB)	12°	7°		12°	7°	
Antenna insertion length ⁽⁴⁾	56 mm (2.2")	70 mm (2.75")		28 mm (1.1")	46 mm (1.8")	
Lower process connection	1" BSP / NPT	1½" BSP / NPT		1" BSP / NPT	1½" BSP / NPT	
Upper process connection	1" BSP					

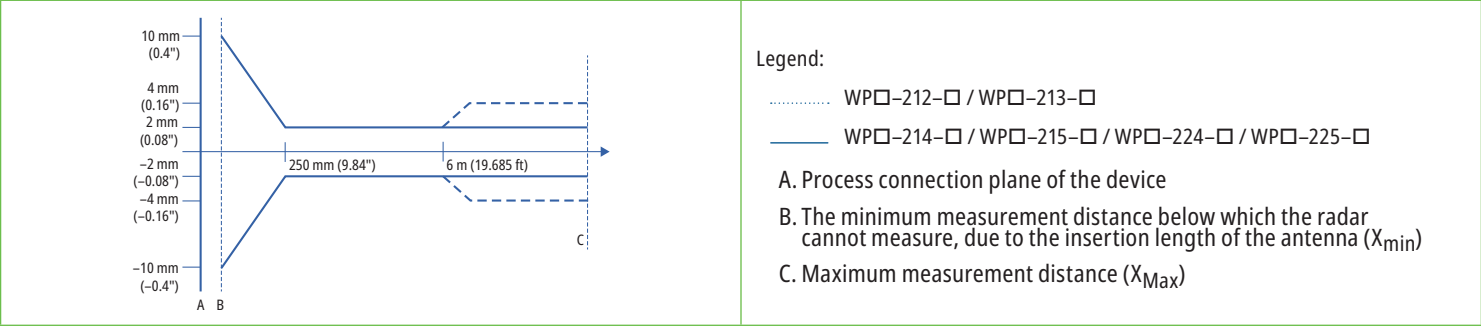
⁽¹⁾ Measured from the tip of the antenna, for <80 DC (ϵ_r).

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

⁽³⁾ In the case of an ideal reflecting surface, according to IEC 62828-1.

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

3.3 Linearity Error



3.4 Dimensions

PP / PVDF housing (WPA, WPB)		PTFE housing (WPT)	
WP□-212-□ / WP□-213-□	WP□-2□4-□ / WP□-2_5-□	WPT-212-□ / WPT-213-□	WPT-2□4-□ / WPT-2□5-□
PTFE housing lens-antenna version (WPC)		Aiming device	
WPC-212-□ / WPC-213-□	WPC-2□4-□ / WPC-2□5-□	SAA-102-0	

3.5 Explosion Protection, Designation, Limit Values

3.5.1 ATEX Intrinsically Safe Protection (Ex ia) – ATEX Certificate No.: BK124ATEX0001 X

Application group	WP□–2□□–8 Ex / WP–2□□–E Ex	
	IIC	IIIC
Ex marking (ATEX)	 II 1 G Ex ia IIC T5 Ga	 II 1 D Ex ia IIIC T95°C Da
Ex power supply, intrinsically safety data ⁽¹⁾	$U_i = 30 \text{ V}$, $I_i = 100 \text{ mA}$, $P_i = 0.75 \text{ W}$	$U_i = 30 \text{ V}$, $I_i = 140 \text{ mA}$, $P_i = 1 \text{ W}$
	$C_i \leq 12 \text{ nF} + 0.12 \text{ nF/m cable}$, $L_i \leq 238 \text{ } \mu\text{H} + 0.65 \text{ } \mu\text{H/m cable}$ with standard 5 m (16.4 ft) cable: $C_i \leq 12.5 \text{ nF}$, $L_i \leq 242 \text{ } \mu\text{H}$	
Supply voltage	12...30 V DC	
Temperature limit data	See tables in section 3.5.2	

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

3.5.2 Temperature Limit Data for ATEX (Ex ia) Approved Models

Temperature data	WP□–2□□–8 Ex / WP–2□□–E Ex	
	Hazardous gas atmospheres	Explosive dust atmospheres
	Ex ia IIC	Ex ia IIIC
Temperature class	T5	T95°C
Maximum ambient temperature	+80 °C (+176 °F)	+80 °C (+176 °F)
Maximum surface temperature at the process connection ⁽²⁾	+80 °C (+176 °F)	+80 °C (+176 °F)

⁽²⁾ Conducted or radiated heat transferred by medium, ambient or process connection.

3.5.3 IECEx Intrinsically Safe Protection (Ex ia) – IECEx Certificate No.: IECEx BKI 26.0003X

Application group	WP-2□□-8 Ex / WP□-2□□-E Ex	
	IIC	IIIC
Ex marking (IECEx)	Ex ia IIC T5 Ga	Ex ia IIIC T95°C Da
Ex power supply, intrinsically safety data ⁽¹⁾	$U_i = 30 \text{ V}, I_i = 100 \text{ mA}, P_i = 0.75 \text{ W}$	$U_i = 30 \text{ V}, I_i = 140 \text{ mA}, P_i = 1 \text{ W}$
	$C_i \leq 13 \text{ nF} + 0.14 \text{ nF/m cable}, L_i \leq 265 \text{ }\mu\text{H} + 0.72 \text{ }\mu\text{H/m cable}$ with standard 5 m (16.4 ft) cable: $C_i \leq 14 \text{ nF}, L_i \leq 270 \text{ }\mu\text{H}$	
Supply voltage	12...30 V DC	
Temperature limit data	See tables in section 3.5.4	

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

3.5.4 Temperature Limit Data for IECEx (Ex ia) Approved Models

Temperature data	WP□-2□□-8 Ex / WP□-2□□-E Ex	
	Hazardous gas atmospheres	Explosive dust atmospheres
	Ex ia IIC	Ex ia IIIC
Temperature class	T5	T95°C
Maximum ambient temperature	+80 °C (+176 °F)	+80 °C (+176 °F)
Maximum surface temperature at the process connection ⁽²⁾	+80 °C (+176 °F)	+80 °C (+176 °F)

⁽²⁾ Conducted or radiated heat transferred by medium, ambient or process connection.

3.5.5 INMETRO Intrinsically Safe Protection (Ex ia) – INMETRO Certificate NO.: DNV 24.0166 X

Application group	WP□–2□□–8 Ex / WP□–2□□–E Ex	
	IIC	IIIC
Ex marking (INMETRO)	Ex ia IIC T5 Ga	Ex ia IIIC T95°C Da
Ex power supply, intrinsically safety data ⁽¹⁾	$U_i = 30 \text{ V}, I_i = 100 \text{ mA}, P_i = 0.75 \text{ W}$	$U_i = 30 \text{ V}, I_i = 140 \text{ mA}, P_i = 1 \text{ W}$
	$C_i \leq 12 \text{ nF} + 0.12 \text{ nF/m cable}, L_i \leq 238 \text{ }\mu\text{H} + 0.65 \text{ }\mu\text{H/m cable}$ with standard 5 m (16.4 ft) cable: $C_i \leq 12.5 \text{ nF}, L_i \leq 242 \text{ }\mu\text{H}$	
Supply voltage	12...30 Vcc	
Temperature limit data	See tables in section 3.5.6	

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

3.5.6 Temperature Limit Data for INMETRO (Ex ia) Approved Models

Temperature data	WP□–2□□–8 Ex / WP□–2□□–E Ex	
	Hazardous gas atmospheres	Explosive dust atmospheres
	Ex ia IIC	Ex ia IIIC
Temperature class	T5	T95°C
Maximum ambient temperature	+80 °C (+176 °F)	+80 °C (+176 °F)
Maximum surface temperature at the process connection ⁽²⁾	+80 °C (+176 °F)	+80 °C (+176 °F)

⁽²⁾ Conducted or radiated heat transferred by medium, ambient or process connection.

3.6 Accessories

- Warranty card
- User's Manual
- EU Declaration of Conformity
- 2× flat nuts for the upper 1" BSP thread
- 1× O-ring

3.7 Conditions for Safe Operation

Compliance with technological process conditions

Make sure that all parts of the equipment that come into contact with the measured medium (sensor, seal, and fittings) meet the requirements of the process, such as the pressure and temperature generated during the process, as well as the chemical effects of the medium and the technologies used.

- ⚠ The cable extending from the device must be fixed and relieved of any tension.
 - ⚠ Use a junction box corresponding to the electrical classification of the environment to connect the wires.
 - ⚠ The device may only be powered from a Category 1 (SELV/PELV) power supply unit.
- If the device is installed in a place subject to overvoltage, the device must be equipped with overvoltage protection of at least overvoltage Class II.

Compliance with local rules and regulations

The **PiloTREK WP-200** is a Local Positioning Radar (LPR) and must be mounted in a fixed, antenna-down position. In addition, the following two restrictions on antenna placement and height from the ground must be observed:

- a separation distance of 4 km (2.48 miles) from radio astronomy sites operating in the frequency band 75...85 GHz, unless specifically authorized by the relevant national regulatory authority.
- At a distance between 4 and 40 km (2.48 and 24.8 miles) from any radio astronomy site, the height of the radar above ground level must not exceed 15 m (49.2 ft).

Compliance with Ex requirements

- Intrinsically safe devices may only be operated from a circuit that complies with the technical data of the device and is marked [Ex ia IIC] or [Ex ia IIB].
- The device may contain components capable of being electrostatically charged. The presence of electrostatic charges can cause sparks and ignition, so electrostatic charges must be prevented entirely in potentially explosive (Ex) atmospheres.
 - The device may only be installed in an environment free from direct air flows that may cause charge transfer or other electrostatic charging effects. Except in the case of application group III, if the conductivity of the particulate matter is greater than $>10^{-9}$ S (at $50 \pm 5\%$ relative humidity) or $>10^{-11}$ S (at $30 \pm 5\%$ relative humidity).
 - Increased caution is required during maintenance when explosive residues may be present in the process tank. Devices used in explosive (Ex) environments may only be handled using a water-moistened or antistatic wipe.

3.8 Maintenance, Repair, and Storage Conditions

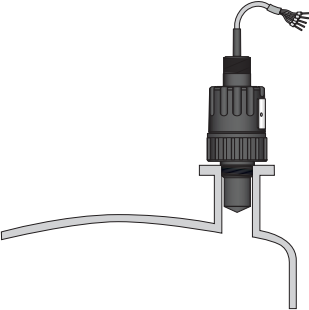
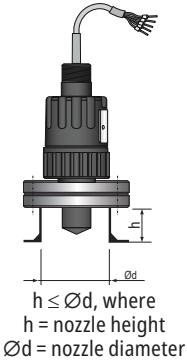
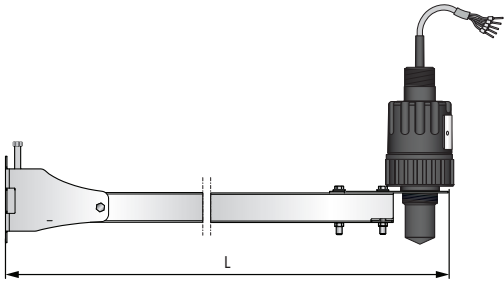
The PiloTREK WP-200 device does not require regular maintenance. However, there may be cases where the sensor head needs to be cleaned of material deposits. Clean the device carefully, without scratching or pressing the radiating surface. All repairs, whether covered by warranty or not, must be carried out by NIVELCO. The warranty terms are detailed in the warranty card. For repairs, the user must clean and disinfect the device, neutralize any chemical residues, and complete the [Returned Equipment Handling Form](#), which is available for download on our website. On the form, the user must declare the defect, provide the reason for return, and confirm that the device is clean and free of hazardous substances. If the device is not used, store it within the ambient temperature specified in the technical data, with a maximum humidity of 98%.

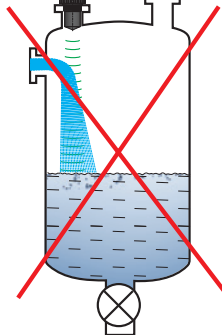
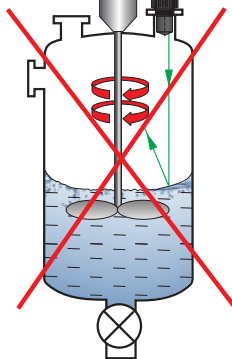
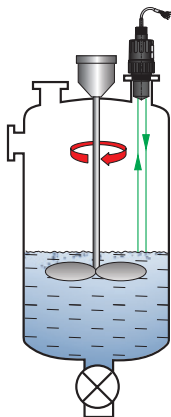
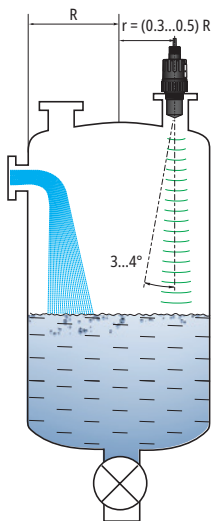
3.9 Firmware Update

The device firmware is continuously improved based on user feedback and application needs. If you want to update the firmware, use the built-in update communication port to upgrade to the latest version. To update, you need the NiFlash Light program; contact your local NIVELCO partner. In addition, the SAT-506-0 eLink communication adapter is required to upgrade the firmware.

4. INSTALLATION AND COMMISSIONING

4.1 Mounting

Pipe thread	Flange	Mounting bracket (SAC-1□1-0)
	 $h \leq \varnothing d$, where h = nozzle height $\varnothing d$ = nozzle diameter If the above condition cannot be met, consult NIVELCO.	 $L = 188...991 \text{ mm (7.4...39.02 in)}$



POSITION

The optimal location for PiloTREK (for a cylindrical tank) is at radius $r = (0.3...0.5) R$. The radiation cone angle should always be considered.

The liquid surface must be perpendicular to the axis of the device.

Under no circumstances place the device near the inlet opening. Improper placement may lead to malfunctions.

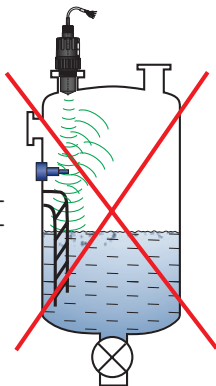
In the case of enclosed antenna designs, moisture on the front surface of the antenna should be minimized.

OBSTACLES

It is essential to avoid objects (pipes, ladders, structural elements, thermometers, etc.) entering the radiation cone.

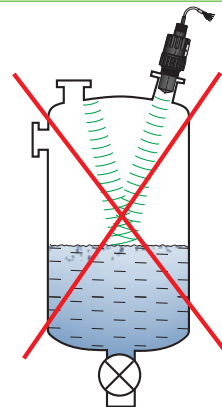


CAUTION! Up to four interfering echoes can be suppressed by configuring the threshold settings in PiloTREK WP-200.



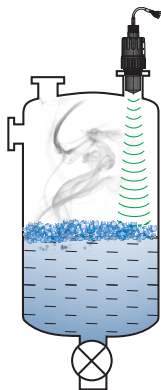
ALIGNMENT

The plane of the process connection must be parallel to the measured surface within $\pm 2...3^\circ$.



GAS / VAPOR

In a closed (especially outdoors, exposed to direct sunlight) tank, vapors/gases above the liquid may reduce the millimeter-wave signal transmission.

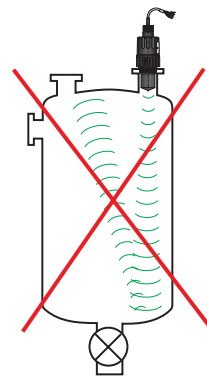


EMPTY TANK

Especially in the case of tanks with convex or conical bottoms or tanks with equipment (e.g., heating element, mixing paddle) at the bottom, the device may indicate an incorrect level when the tank is completely drained.

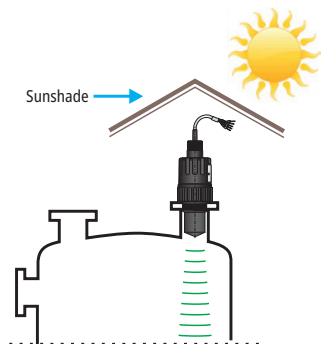
It is because the tank bottom or objects at the bottom of the tank scatter or reflect the millimeter waves emitted to a certain extent, or the lower signal level of the scattered radiation interferes with itself in the tank.

At least 100 mm (3.9") of liquid must cover these interfering devices or the convex or conical tank bottoms for a reliable measurement.



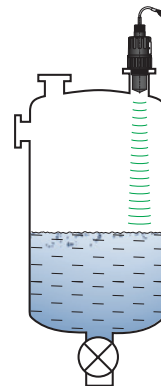
TEMPERATURE

It is recommended to shield the transmitter from direct sunlight.



FOAM

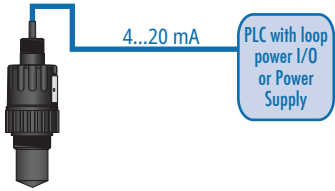
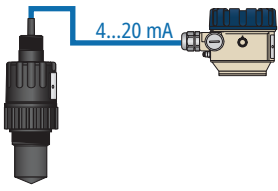
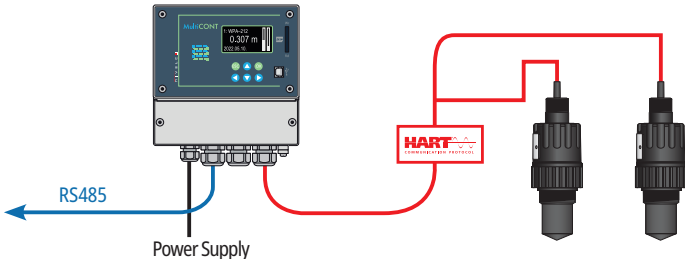
Foam on the measured surface may prevent millimeter-wave level measurement. Therefore, if possible, the sensor should be installed in a location where foam formation is minimal.



4.2 Open-Channel Flow Measurement Applications

- The device can measure flow in open channels using flumes/weirs or by means of an output conversion table (OCT). [See the PiloTREK User's and Programming Manual on the NIVELCO website for more information.](#)
- The level transmitter should be installed as close as possible to the maximum measured level.
- The level transmitter must be placed in the longitudinal axis of the flume, at a location determined by the flume characteristics. This point is marked on the Parshall flumes sold by NIVELCO and 3rd party flumes.
- Foam may form on the surface of the flowing liquid, which can affect the measurement result. To ensure proper echo formation, a clear and unobstructed liquid surface must be provided in front of the sensor.
- The level transmitter must be secured in its mounting location to prevent it from moving.
- The accuracy of volume flow measurement depends on the size and shape of the flume-weir and the surface of the flowing liquid (rippling, foaming). Open-channel flow measurement accuracy is always lower than level measurement accuracy.
- The level transmitter should be protected from direct sunlight. Use a NIVELCO **NISHADE** cover to protect the device.

4.3 Wiring

Standalone transmitter	Connected to MonoCONT	Connected to MultiCONT (HART® Multidrop)
		
See Chapter 4.3.1.	See MonoCONT User's and programming manual.	See MultiCONT User's and programming manual.

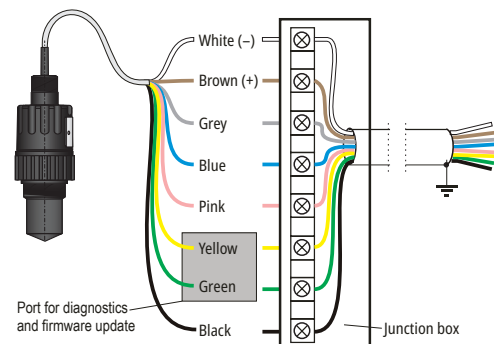
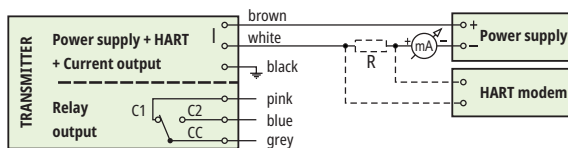
4.3.1 Wiring of Standalone Transmitters

- Check that the terminals of the already installed terminal box are not energized
- Connect the wires of the device as shown in the diagram. Pay attention to the polarity: (+) brown, (-) white. (For cabling, it is recommended to use $2 \times 0.5 \text{ mm}^2$ ($2 \times 20\text{AWG}$) twisted-pair shielded cable or $5 \times 0.5 \text{ mm}^2$ ($5 \times 20\text{AWG}$) for the optional relay).
- When connecting the shielding, make sure that there is no ground loop.
- After the device is powered on, the necessary programming can be carried out.

The device must be operated with a galvanically isolated power supply.

Color coding of terminals

pink – C1 relay output	white – I	Current loop, supply voltage, and HART terminal 1 (-)
gray – CC relay output	brown – I	Current loop, supply voltage, and HART terminal 2 (+)
blue – C2 relay output	black – GND	Technical ground and shielding point



Extending the cable

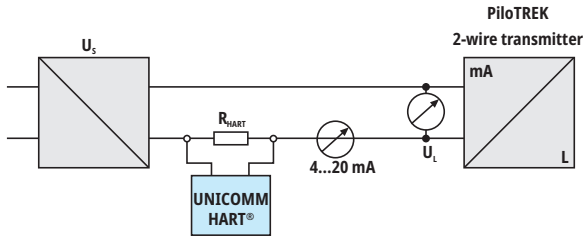
It is recommended to use a terminal box to extend the cable. The shielding must be connected to the shielding of the extension cable and grounded at the processing device.

The green and yellow wires are the connection points of the "Service interface" (see the next chapter). They are not required for using the device. They are covered with a shrink tube at the cable end by default.

 In non-hazardous areas, the device must be powered through a galvanically isolated power supply.

For devices used in hazardous areas, the requirements in section "[3.7 Conditions for safe operation](#)" must be observed when selecting the power supply.

Designing a measuring network



Power supply	
Nominal voltage	24 V DC
Maximum voltage (U_{in}):	36 V DC
Minimum voltage (U_{in}):	Depends on the load impedance. (See diagram)
Loop resistance, R_{Loop}	$R_{HART} + R_{cable} + R_{ammeter}$
Minimum R_{HART}	0 Ω
Maximum R_{HART}	750 Ω
R_{HART} resistance for HART® communication	250 Ω (recommended)

Line "A": minimum voltage at the input terminals of the device

Line "B": minimum supply voltage (voltage across the device and the 250 Ω loop resistor)

Example for calculating the supply voltage:

The required minimum supply voltage at $I_{min} = 4$ mA:

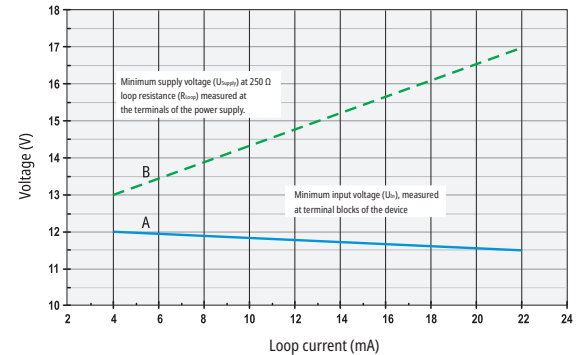
$$U_{Supply \min.} = U_{IN \min.} + (I_{min} * R_{Loop}) = 11.5 \text{ V} + (4 \text{ mA} * 0.25 \text{ k}\Omega) = 12.5 \text{ V}$$

the required minimum supply voltage at $I_{max} = 22$ mA:

$$U_{Supply \min.} = U_{IN \min.} + (I_{min} * R_{Loop}) = 11.5 \text{ V} + (22 \text{ mA} * 0.25 \text{ k}\Omega) = 18.5 \text{ V}$$

Therefore, in the case of a loop resistance of 250 Ω , the 17 V supply voltage is just sufficient for the whole 4...20 mA in the measurement range.

In hazardous areas, the data and requirements for designing the network may be different. When designing the measurement network, take into account the data and requirements in "[3.5. Explosion Protection](#), Designation, Limit Values" and "[3.7. Conditions for safe operation](#)".



4.4 Device Setup and Service Options

- MobileEView App for iOS or Android device (if PiloTREK is equipped with Bluetooth® connectivity).
 - Download the free MobileEView App to your iOS or Android device.
 - Bluetooth® operation mode (on/off/time-out, etc.) can be selected based on security policy.
- [MonoCONT](#) and [MultiCONT](#) remote display/controllers.
- Via HART®:
 - [EView2](#) free download SW for Windows devices using a HART® modem. Ex.: [UNICOMM SAT-504-□](#).
 - Via PACTware.
 - 3rd party HART® modem.



4.5 BUS (HART®) Communication

The output of the device can be used as:

- Current loop and HART®.
- Multidrop, HART® protocol.

MonoCONT and MultiCONT remote display/controllers support both modes. By the Rosemount Standard, HART® communication can be used between the PiloTREK as a “slave” and the HART® master as a point-to-point connection.

Communication can be implemented in two modes.

If the device is set to current transmission (4...20 mA, “0” HART short address) only one device can be used in the HART® communication loop.

In a multidrop operation (4 mA), several devices (up to 15) can be connected in a HART® communication loop. The device's short address must be different from 0.

4.6 Commissioning and Setup

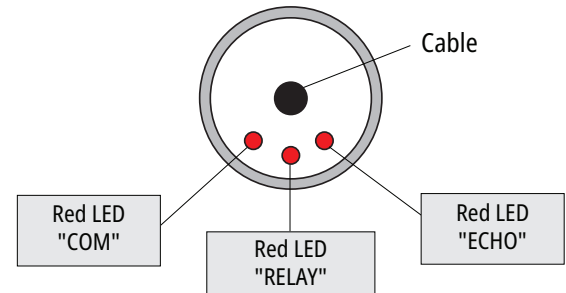
When the device is connected correctly, the radar starts up with a current consumption of 3.5 mA after switching on the power supply. After 3...5 s, the ECHO and the COM LED light up together. After another 5...10 s, the transmitted current corresponding to the operating mode appears on the current output. In this case, the device measures with factory settings. The factory default settings are suitable for checking functionality and for simple measurement tasks, but the device's full potential can only be utilized with correct programming tailored to the requirements of the process. Therefore, to get to know the operational characteristics thoroughly and solve complex measuring tasks, it is necessary to study the chapters about programming.

The factory default settings are suitable for checking functionality and simple measurement tasks but the device's full potential can only be used with the correct programming tailored to the requirements of the measured process. Therefore, to get to know the operational characteristics thoroughly and solve complex measuring tasks, it is necessary to read the chapters about programming.

LED states:

- **ECHO-LED**
 - ON, if the device receives a suitable echo.
 - BLINKS when the device is searching for an echo.
- **COM-LED**
 - FLASHES UP ONCE if there has been a HART message exchange,
 - ON, if the device is in remote programming mode.
 - BLINKS for 4 seconds after the device is switched on: service communication connection can be established during this time. If it continues to blink, it indicates a firmware error.
- **RELAY LED (optional)**
 - ON, when CC-C2 is energized.
 - OFF, when CC-C1 is energized

Top view of the transmitter neck:



All parameters of the device have a factory default value, which can be restored later if necessary.

The factory settings of the PiloTREK WP-200 level measuring device are as follows.

- Measurement mode: level (LEV).
- Zero level is assigned to the maximum measuring distance.
- The current loop output is directly proportional to the level.
- 4 mA and 0% are assigned to zero level.
- 20 mA and 100% are assigned to the maximum level (minimum measuring distance).
- The current loop output holds the last value in case of an error.
- Level-following time constant: 40 s.

4.6.1 Status Signals Indicated by Two LEDs

ECHO LED	COM LED	Number of blinks	Status	Source -bit- (See 6.1.)
Blinking alternately		continuous	Low loop voltage	Bit15, Bit14, Bit11 present at the same time
Flashing up at the same time, then pause, and repeat		2	OCT integrity error	Bit3 or Bit4 or Bit5
		3	Not in use	-
		4	Relay error	Bit13
		5	Not in use	-
		6	NV memory error (EEPROM)	Bit1
		continuous	• HRP detection failure • SIM detection failure	Bit12

5. USER INTERFACE OPTIONS / PROGRAMMING

Transmitters with Bluetooth® via MobileEView App or EView2 (PC)



1. Install MobileEView App on iOS or Android devices or download [EView2 software](#) for Windows devices.
2. Power up transmitter and connect from software.

Transmitters with HART® using HART Modem (SAT-504-□) and EView2 (PC) or MobileEView App



1. Connect HART modem to current loop using 250 Ω HART resistor.
2. Connect Laptop to HART® modem using USB cable or via Bluetooth® if modem has Bluetooth® option.
3. Download [EView2 software](#) for Windows devices.
4. Power up transmitter and connect from software.



[PilotREK
– Programming Guide](#)

via MultiCONT field controller



1. See MultiCONT Manual for wiring and handling.
2. See PilotREK Programming Manual for configuration.

via MonoCONT field display



1. See MonoCONT Manual for wiring and handling.
2. See PilotREK Programming Manual for configuration.

Transmitters with MODBUS interface via MODBUS master

1. See MODBUS Manual for supported protocol.
1. See the [PilotREK User's and Programming Manual](#) on the NIVELCO website for configuration.

wpa200en26h05 – May 2026

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