

MicroTREK

H-700

2-wire Guided Wave Radar Level Transmitters

User's Manual

5th Edition



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MicroTREK H-700 – User's Manual (this document)	
MicroTREK H-700 – Programming Guide	

BASIC CONCEPTS AND ELEMENTS

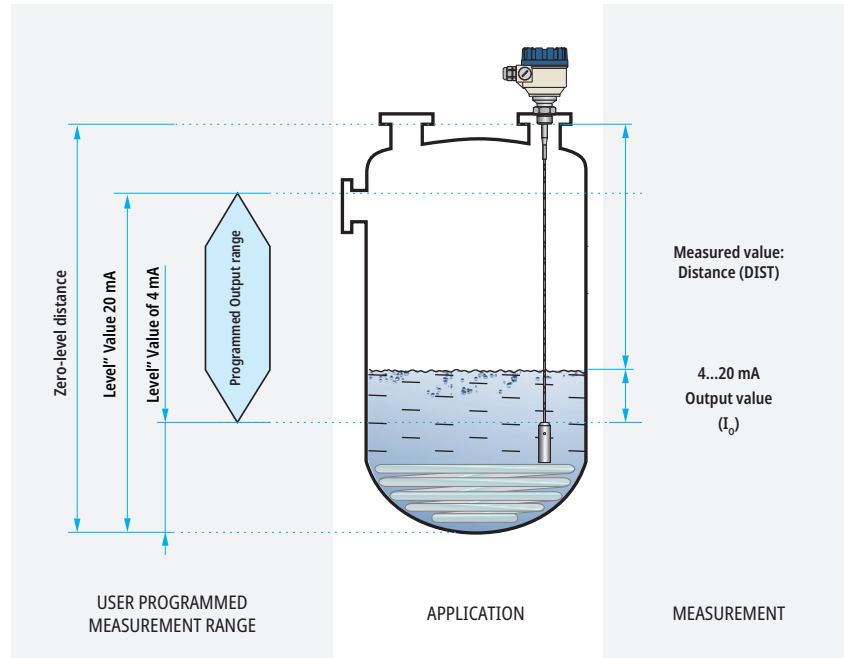


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Thank you for purchasing a NIVELCO product.

1. INTRODUCTION

Application

The MicroTREK 2-wire guided-microwave level transmitter measures the distance to the surface of liquids, solids, and granules, from which the device calculates and transmits the level, volume, or mass values as required.

The device can be used in storage and reaction tanks, bypass chambers, rigid pipelines of suitable diameter, and level reference vessels. The device can also be used with HART® compliant EView2, PACTware and MultiCONT universal process controller.

Operating Principle

The MicroTREK 2-wire guided-microwave level transmitter measurement method is based on TDR (Time Domain Reflectometry) analysis of the electromagnetic pulse traveling along the probe. The device sends a 0.8 nanosecond-wide, low-power pulse along an electrically conductive rod, cable, or coaxial waveguide at a known propagation speed close to the speed of light. If the electromagnetic pulse propagating along the conductor reaches a medium boundary with a different (ϵ_r) dielectric constant (the surface of the measured medium or the phase boundary of two liquids), some of the energy is reflected from there. The larger and sharper the (ϵ_r) dielectric constant change at the boundary of the media, the stronger the reflection (e.g., approximately 80% of the signal amplitude is reflected from a flat air-water boundary).

The pulse is detected and processed by the device as a voltage signal. Since the propagation speed is known, the distance of the reflecting surface can be determined by measuring the travel time of the pulse. The travel time is the time between the start of the pulse and the arrival of the reflected pulse, and the distance traveled is twice the distance to and from the target. The device converts the measured time into an electric signal proportional to the distance (an output current of 4...20 mA), provides a HART® output signal, and displays the result on the screen. Other derived quantities (volume, weight, etc.) can also be obtained from the distance data using the device software. The advantage of the described measurement technology compared to other level measurement methods is that dust, foam, vapor, boiling, and surface turbulence typically cause only limited interference, significantly less than with conventional non-contact radar measurement.

2. ORDER CODES (NOT ALL COMBINATIONS ARE AVAILABLE)

2.1 MicroTREK H-700 – With Cable Probe

MicroTREK **H** – – ⁽¹⁾

Type	Code	Probe / Process connection		Code	Housing		Code	Probe length ⁽⁶⁾		Code	Probe length ⁽⁶⁾		Code	Output		Code
Transmitter ⁽²⁾	T	Mono cable, Ø4 mm, 1.4401	1" BSP	K	Aluminum (powder-coated)	7	0 m	0	0 m	0	4...20 mA	+ HART®	4	+ HART® / Ex ta/tb IIIC (ATEX, IECEx)	5	
High-temperature transmitter ⁽³⁾	H		1" NPT	L												10 m
Transmitter + display ⁽²⁾	B		1½" BSP	V	20 m	2	2 m	2								
			1½" NPT	W					30 m	3						3 m
High-temperature transmitter + display ⁽³⁾	P		1½" TriClamp	1	4 m	4										
			2" TriClamp	2			5 m	5								
With interface function		Mono cable, Ø8 mm, 1.4401	1½" BSP	N	6 m	6										
Transmitter ⁽²⁾	C		1½" NPT	J			7 m	7								
High-temperature transmitter ⁽³⁾	E	Twin cable, 2× Ø4 mm, 1.4401	1½" BSP	T	8 m	8										
Transmitter + display ⁽²⁾	D		1½" NPT	U			9 m	9								
			Mono cable, Ø4 mm, FEP-coated ⁽⁴⁾	1" BSP					F							
				1" NPT					G							
Transmitter + display ⁽²⁾	D	TriClamp 1½"		X												
		Sanitary DN40	Y													
		High-temperature transmitter + display ⁽³⁾	F	Mono cable, Ø4 mm, + PFA/ FEP fully coated / DN50, PN25, 1.4571/1.4404 + PFA/FEP lining		M										

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

⁽²⁾ Flange temperature max. +90 °C (+194 °F).

⁽³⁾ Flange temperature max. +200 °C (+392 °F) ("M" type only up to +150 °C [+302 °F]).

⁽⁴⁾ Only the cable probe is coated.

⁽⁵⁾ Ex version not available.

⁽⁶⁾ Up to 30 m (100 ft) probe length.

2.2 MicroTREK H-700 – With Ø8 mm (Ø0.3") Rod Probe

MicroTREK **H** ⁽¹⁾

Type	Code	Probe / Process connection		Code	Housing	Code	Probe length ⁽⁶⁾		Code	Probe length ⁽⁶⁾		Code	Output		Code												
Transmitter ⁽²⁾	T	Mono rod, Ø8 mm, 1.4571/1.4404	1" BSP	R	Aluminum (powder-coated)	7	0 m	0	0 m	0	4...20 mA + HART®	4	4...20 mA														
High-temperature transmitter ⁽³⁾	H		1" NPT	P												Plastic, fiberglass-rein- forced ⁽⁵⁾	8	1 m	1	0.1 m	1	+ HART® / Ex ta/ tb IIIC (ATEX, IECEx)	5				
Transmitter + display ⁽²⁾	B		1½" TriClamp	3																				Stainless steel	9	2 m	2
High-temperature transmitter + display ⁽³⁾	P	Twin rod, 1.4571/1.4404	1½" NPT	E	0.3 m	3	0.3 m	3	+ HART® / Ex ia IIC/IIB (ATEX, IECEx)	8																	
With interface function			Mono rod PFA-coated	1½" TriClamp PFA-coated							O	0.4 m				4	0.4 m	4	+ HART® / Ex ta IIIC (ATEX, IECEx)	9							
Transmitter ⁽²⁾	C	Mono rod + PP-coated / DN50, PN25, 1.4571/1.4404 + PP lining ⁽⁴⁾		DN50, PN25, 1.4571/1.4404 flange, PFA-coated	Q	0.5 m	5	0.5 m	5	+ HART® + Relay	H																
High-temperature transmitter ⁽³⁾	E		I													0.6 m	6	0.6 m	6								
Transmitter + display ⁽²⁾	D																			0.7 m	7	0.7 m	7				
High-temperature transmitter + display ⁽³⁾	F																							0.8 m	8	0.8 m	8

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

⁽²⁾ Flange temperature max. +90 °C (+194 °F).

⁽³⁾ Flange temperature max. +200 °C (+392 °F)

(up to +150 °C [+302 °F] with plastic-coated probes).

⁽⁴⁾ High-temperature version not available.

⁽⁵⁾ Ex version not available.

⁽⁶⁾ Up to 3 m (10 ft) probe length.

2.3 MicroTREK H-700 – With Ø14 mm (Ø0.55") Rod or Coaxial Probe

MicroTREK **H** ⁽¹⁾

Type	Code
Transmitter ⁽²⁾	T
High-temperature transmitter ⁽³⁾	H
Transmitter + display ⁽²⁾	B
High-temperature transmitter + display ⁽³⁾	P
With interface function	
Transmitter ⁽²⁾	C
High-temperature transmitter ⁽³⁾	E
Transmitter + display ⁽²⁾	D
High-temperature transmitter + display ⁽³⁾	F

Probe / Process connection		Code
Mono rod ⁽⁴⁾ , Ø14 mm, 1.4571/1.4404	1½" BSP	S
	1½" NPT	Z
	2" TriClamp	4
Coaxial ⁽⁴⁾ , 1.4571/1.4404	1" BSP	A
	1" NPT	B
	1½" BSP	C
	1½" NPT	H
	1½" TriClamp	5
	2" TriClamp	6

Housing	Code
Aluminum (powder-coated)	7
Plastic, fiber-glass-reinforced ⁽⁵⁾	8
Stainless steel	9

Probe length ⁽⁶⁾	Code
0 m	0
1 m	1
2 m	2
3 m	3
4 m	4
5 m	5
6 m	6

Probe length ⁽⁶⁾	Code
0 m	0
0.1 m	1
0.2 m	2
0.3 m	3
0.4 m	4
0.5 m	5
0.6 m	6
0.7 m	7
0.8 m	8
0.9 m	9

Output	Code
+ HART®	4
+ HART® / Ex ta/ tb IIIC (ATEX, IECEx)	5
+ HART® / Ex ia IIIC (ATEX, IECEx)	6
+ HART® / Ex ia IIC/IIB (ATEX, IECEx)	8
+ HART® / Ex ta IIIC (ATEX, IECEx)	9
+ HART® + Relay	H

Accessories available	Order code
Graphic plug-in display module	SAP-300-0
HART®-USB/Bluetooth® modem	SAT-504-□
HART®-USB/RS485 modem	SAK-305-2
HART®-USB/RS485 modem / Ex ia G	SAK-305-6
Process connections ⁽⁷⁾	
DIN and ANSI flanges	MFT-□□□-□
DN40 Pipe coupling (DIN 11851)	
Special seals ⁽⁷⁾	
EPDM	
FFKM	

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

⁽²⁾ Flange temperature max. +90 °C (+194 °F).

⁽³⁾ Flange temperature max. +200 °C (+392 °F).

⁽⁴⁾ Can be ordered with segmented probe which must be specified in the text of the order.
The length of the probe section is 1 m.

⁽⁵⁾ Ex version not available.

⁽⁶⁾ Up to 6 m (20 ft) probe length.

⁽⁷⁾ The above process connections and special seals are ordered separately and must be specified in the text part of the order.

3. TECHNICAL DATA

3.1 General

		With plastic housing H□□-8□□-4	With aluminum housing H□□-7□□-4, 5, 6, 8	With stainless steel housing H□□-9□□-4, 5, 6, 8
Input data	Measured values	Distance between the reference point and the plane of the reflection (surface of the material); derived values: level, volume or weight		
	Measuring range	Depends on the probe and the measured medium (for technical data refer to – Probe Properties table)		
Probe types and technical data		Coaxial, dual cable, cable, dual rod, and rod probes (for technical data refer to – Probe Properties table)		
Housing		Plastic	Painted aluminum	Stainless Steel 1.4571/1.4404 (316Ti/316L equivalent)
Process temperature		-30...+200 °C (-22...+392 °F) (for technical data refer to – Process Temperature table)		
Process pressure		-1...40 bar (-14...580 psig) (for technical data refer to – Process Pressure diagram)		
Ambient temperature		-30...+65 °C (-22...+149 °F), with display: -20...+65 °C (-4...+149 °F)		
Seal		FPM (Viton®), optional FFKM Perfluoroelastomer (Kalrez 6375), EPDM		
Ingress protection		IP67 (NEMA 6 equivalent)		
Supply voltage		12 ⁽¹⁾ ...36 V DC, nominal 24 V DC, Ex version: 12 ⁽¹⁾ ...30 V DC, transient overvoltage protection ⁽²⁾		
Output data	Output signal	Analog: 4...20 mA; (3.9...20.5 mA) passive output; error signal 3.8 or 22 mA		
		BUS: serial, HART® interface, termination resistor maximum 750 Ω		
		Display (optional): SAP-300 graphic display unit		
		Relay (optional): SPDT 30 V / 1 A DC; 48 V / 0.5 A AC		
	Accuracy ⁽³⁾	Liquids: ±5 mm (±0.2"). If probe length is ≥ 10 m (L ≥ 33 ft); ±0.05% of probe length Solids: ±20 mm (±0.8"). If probe length is ≥ 10 m (L ≥ 33 ft); ±0.2% of probe length		
Electrical connection		2× M20×1.5 cable glands, cable outer diameter: Ø6...Ø12 mm (Ø0.23...Ø0.47") (metal for Ex version, otherwise plastic) + 2× internally threaded ½" NPT connection for protective pipes, wire cross-section: 0.5...1.5 mm ² (AWG20...AWG15) (shielded cable recommended)		
Electrical protection		Class III		
Weight (housing)		1.3 kg (2.9 lb)	2.2 kg (4.9 lb)	3.9 kg (8.6 lb)

⁽¹⁾ Reliable operation in industrial environments can be guaranteed for terminal voltages > 13 V.

⁽²⁾ The device has been tested and complies with MSZ EN IEC 61326-1:2021 Table 2. I/O signal/control with (e) remark, Surge test.

⁽³⁾ With ideal reflective surfaces and constant temperatures.

3.2 Probe Properties

Type	HOK-□□□-□ HOL-□□□-□ HOV-□□□-□ HOW-□□□-□	HOR-□□□-□ HOP-□□□-□	HOS-□□□-□ HOZ-□□□-□	HON-□□□-□ HOJ-□□□-□	HOT-□□□-□ HOV-□□□-□	HOD-□□□-□ HOE-□□□-□	HOA-□□□-□ HOB-□□□-□ HOC-□□□-□ HOH-□□□-□
Version	4 mm cable (0.15")	Rod		8 mm cable (0.3")	4 mm dual cable (0.1575")	Dual rod	Coaxial
Maximum measuring range	30 m (100 ft)	3 m (10 ft)	6 m (20 ft)	30 m (100 ft)		3 m (10 ft)	6 m (20 ft)
Minimum measuring range $\epsilon_r = 80 / 2.4$	0.25 m / 0.35 m (0.82 ft / 1.15 ft)				0.15 m / 0.3 m (0.5 ft / 1 ft)		0 m (0 ft)
Sensing area around probe	Ø600 mm (Ø2 ft)				200 mm (Ø 0.65 ft)		Ø0 mm (0 ft)
Minimum ϵ_r of medium	2.1				1.8		1.4
Process connection	1" BSP	1" BSP	1½" BSP				1" BSP
	1" NPT						1" NPT
	1½" BSP	1" NPT	1½" NPT				1½" BSP
	1½" NPT						1½" NPT
Material of probe	1.4401 (316 equivalent)	Stainless Steel 1.4571/1.4404 (316Ti/316L equivalent)		1.4401 (316 equivalent)		Stainless Steel 1.4571/1.4404 (316Ti/316L equivalent)	
Nominal diameter of probe	4 mm (0.15")	8 mm (0.3")	14 mm (0.55")	8 mm (0.3")	4 mm (0.15")	8 mm (0.3")	28 mm (1.1")
Weight	0.12 kg/m (0.08 lb/ft)	0.4 kg/m (0.25 lb/ft)	1.2 kg/m (0.8 lb/ft)	0.4 kg/m (0.25 lb/ft)	0.24 kg/m (0.16 lb/ft)	0.8 kg/m (0.5 lb/ft)	1.3 kg/m (0.85 lb/ft)
Separator material	-				PFA, welded onto cable	PTFE-GF25 if length is >1.5 m (5 ft)	PTFE,if length is >1.5 m (5 ft)
Tensioning weight dimensions	Ø25 x 100 mm (Ø1 x 4")	-		Ø40 x 260 mm (Ø1.5 x 10")	Ø40 x 80 mm (Ø1.5 x 3")	-	
Material of tensioning weight	Stainless Steel 1.4571/1.4404 (316Ti/316L equivalent)	-		Stainless Steel 1.4571/1.4404 (316Ti/316L equivalent)		-	

3.3 Coated Probe Properties

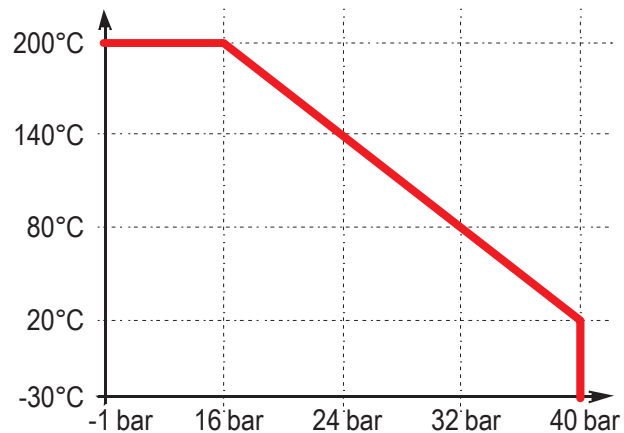
Type	H□F-□□□-□ H□G-□□□-□	H□X-□□□-□	H□Y-□□□-□	H□M-□□□-□	H□Q- □□□-□	H□O-□□□-□	H□I-□□□-□
Version	Ø4 mm (0.15") FEP-coated cable			Ø4 mm (0.15") fully FEP / PFA-coated cable	Fully PFA-coated rod		Fully PP-coated rod
Maximum measuring range	30 m (100 ft)				3 m (10 ft)		
Minimal measuring range εr= 80 / 2.4	0.25 m / 0.35 m (0.82 ft / 1.15 ft)						
Free space requirement	Ø600 mm (Ø2 ft)						
Minimal εr of medium	2.1						
Process connection	1" BSP / 1" NPT	1½" TriClamp	DN40 Pipe coupling (DIN 11851)	DN50		1½" TriClamp	DN50
Material of probe	1.4401 (316 equivalent) / FEP			1.4401 (316 equivalent) / FEP / PFA	Stainless Steel 1.4571/1.4404 (316Ti/316L equivalent) / PFA		Stainless Steel 1.4571/1.4404 (316Ti/316L equivalent) / PP
Nominal diameter of probe	6 mm (0.23")				12 mm (0.5")		16 mm (0.62")
Mass	0.16 kg/m (0.1 lb/ft)				0.5 kg/m (0.33 lb/ft)		0.6 kg/m (0.4 lb/ft)
Probe coating	–			PFA			PP
Tensioning weight dimensions	Ø25 x 100 mm (Ø1 x 4")				–		
Material of tensioning weight	Stainless Steel 1.4571/1.4404 (316Ti/316L equivalent)				–		
Maximum process temperature	+200 °C (392 °F)			+150 °C (+302 °F)			+60 °C (+140 °F)

PROCESS TEMPERATURE

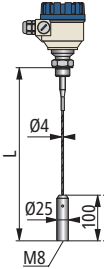
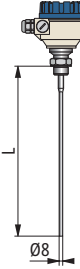
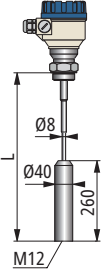
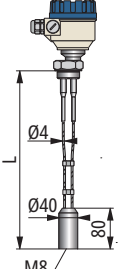
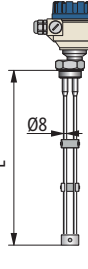
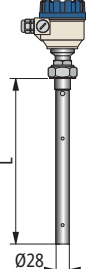
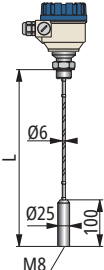
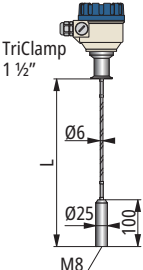
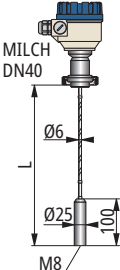
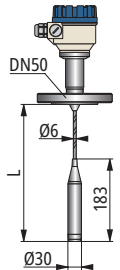
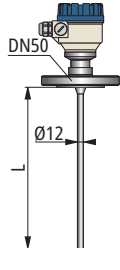
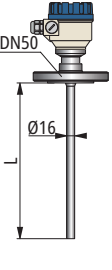
Type	Flange temperature
Standard transmitter	-30...+90 °C (-22...+194 °F)
High-temperature HH□ or HP□ transmitter	-30...+200 °C (-22...+392 °F) ⁽¹⁾

⁽¹⁾Limited for coated probes, see "Coated probe properties" table.

PROCESS PRESSURE DIAGRAM



3.4 Dimensions

HTK-□□□-□ HTL-□□□-□ HTV-□□□-□ HTW-□□□-□	HTR-□□□-□ HTP-□□□-□	HTS-□□□-□ HTZ-□□□-□	HTN-□□□-□ HTJ-□□□-□	HTT-□□□-□ HTU-□□□-□	HTD-□□□-□ HTE-□□□-□	HTA-□□□-□ HTB-□□□-□ HTC-□□□-□ HTH-□□□-□
						
HTF-□□□-□ HTG-□□□-□	HTX-□□□-□	HTY-□□-□	HTM-□□-□	HTQ-□□-□	HTI-□□-□	
						

3.5 Explosion Protection, Designation, Limit Values

3.5.1 ATEX Intrinsically Safe Protection (Ex ia) – ATEX Certificate No.: BK122ATEX0003 X/1

	Metal housing with SAP-300 display	Metal housing without SAP-300 display	Metal housing
Standard version	HB□-□□□-8 Ex	HT□-□□□-8 Ex	HB/T□-□□□-6 Ex
Ex marking (ATEX)	⊕ II 1G Ex ia IIB T6...T4 Ga	⊕ II 1G Ex ia IIC T6...T4 Ga	⊕ II 1D Ex ia IIIC T85°C...T110°C Da
High-temperature version	HP□-□□□-8 Ex	HH□-□□□-8 Ex	HH□-□□□-6 Ex
Ex marking (ATEX)	⊕ II 1G Ex ia IIB T6...T3 Ga	⊕ II 1G Ex ia IIC T6...T3 Ga	⊕ II 1D Ex ia IIIC T85°C...T180°C Da
Ex power supply, intrinsically safety data	Ui = 30 V, Ii = 140 mA, Pi = 1 W Ci ≤ 25 nF, Li ≤ 300 µH	Ui = 30 V, Ii = 100 mA, Pi = 0.75 W Ci ≤ 25 nF, Li ≤ 300 µH	Ui = 30 V, Ii = 140 mA, Pi = 1 W Ci ≤ 25 nF, Li ≤ 300 µH
Supply voltage	12...30 V DC		
Electrical connection	Cable entry	M20×1.5 cable gland	
	Cable outer diameter	Ø6...Ø12 mm (Ø0.23...Ø0.47")	
	Wire cross-section	0.5...1.5 mm² (AWG20...AWG15)	
Temperature limit data	See tables in section 3.5.2		

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

a. For Standard Temperature Transmitters

Temperature data	Hazardous gas atmospheres HT/B□-7□□-8 Ex HT/B□-9□□-8 Ex			Explosive dust atmospheres HT/B□□-7□□-6 Ex HT/B□□-9□□-6 Ex		
	Ex ia IIC, Ex ia IIB			Ex ia IIIC		
Maximum process temperature	+80 °C (+176 °F)	+90 °C (+194 °F)	+100 °C (+212 °F)	+80 °C (+176 °F)	+90 °C (+194 °F)	+100 °C (+212 °F)
Maximum surface temperature at the process connection	+70 °C (+158 °F)	+90 °C (+194 °F)	+100 °C (+212 °F)	+75 °C (+167 °F)	+90 °C (+194 °F)	+100 °C (+212 °F)
Highest ambient temperature	+65 °C (149 °F)					
Temperature class	T6	T5	T4	T85°C	T100°C	T110°C

b. For High-Temperature Transmitters

Temperature data	Hazardous gas atmospheres HH/P□-7□□-8 Ex HH/P□-9□□-8 Ex				Explosive dust atmospheres HH/P□□-7□□-6 Ex HH/P□□-9□□-6 Ex			
	Ex ia IIC, Ex ia IIB				Ex ia IIIC			
Maximum process temperature	+80 °C (+176 °F)	+90 °C (+194 °F)	+100 °C (+212 °F)	+180 °C (356 °F)	+80 °C (+176 °F)	+90 °C (+194 °F)	+100 °C (+212 °F)	+180 °C (356 °F)
Maximum surface temperature at the process connection	+70 °C (+158 °F)	+90 °C (+194 °F)	+100 °C (+212 °F)	+175 °C (347 °F)	+75 °C (+167 °F)	+90 °C (+194 °F)	+100 °C (+212 °F)	+175 °C (347 °F)
Maximum ambient temperature	+65 °C (149 °F)							
Temperature class	T6	T5	T4	T3	T85°C	T100°C	T110°C	T180°C

3.5.3 ATEX Combustible Dust Protection (Ex t) – ATEX Certificate No.: BK122ATEX0003 X/1

	Metal housing		High-temperature version with metal housing HH/P□-7□□-5 Ex HH/P□-9□□-5 Ex
	HT/B□-7□□-9 Ex HT/B□-9□□-9 Ex	HT/B□-7□□-5 Ex HT/B□-9□□-5 Ex	
Ex marking (ATEX)	Ⓔ II 1 D Ex ta IIIC T105°C Da	Ⓔ II 1/2 D Ex ta/tb IIIC T85°C...T110°C Da/Db	Ⓔ II 1/2 D Ex ta/tb IIIC T85°C...T180°C Da/Db
Waiting time for opening the cover	0 min	30 min	30 min
Ex power supply ⁽¹⁾	Ui = 30 V DC Ii = 1 A		
Supply voltage	12...30 V DC		
Temperature limit data	See tables in section 3.5.4		
Cable entry	M20×1.5 cable glands with "Ex ta" protection		
Cable outer diameter	Ø6...Ø12 mm (Ø0.23...Ø0.47")		
Electrical connection	Wire cross-section: 0.5...1.5 mm² (AWG20...AWG15)		

⁽¹⁾ Maximum supply voltage and current to the product while maintaining Ex protection.

3.5.4 Temperature Limit Data for ATEX (Ex t) Approved Models

a. For Standard Temperature Transmitters

Temperature data	Explosive dust atmospheres			
	HT/B□□-7□□-9 Ex HT/B□□-9□□-9 Ex	HT/B□□-7□□-5 Ex HT/B□□-9□□-5 Ex		
	Ex ta IIIC	Ex ta/tb IIIC		
Maximum process temperature	+65 °C (149 °F)	+80 °C (+176 °F)	+90 °C (+194 °F)	+100 °C (+212 °F)
Maximum surface temperature at the process connection	+65 °C (149 °F)	+75 °C (+167 °F)	+90 °C (+194 °F)	+100 °C (+212 °F)
Maximum ambient temperature	+65 °C (149 °F)			
Temperature class	T105°C	T85°C	T100°C	T110°C

b. For High-Temperature Transmitters

Temperature data	Explosive dust atmospheres HH/P□□-7□□-5 Ex HH/P□□-9□□-5 Ex			
	Ex ta/tb IIIC			
Maximum process temperature	+80 °C (+176 °F)	+90 °C (+194 °F)	+100 °C (+212 °F)	+180 °C (356 °F)
Maximum surface temperature at the process connection	+75 °C (+167 °F)	+90 °C (+194 °F)	+100 °C (+212 °F)	+175 °C (347 °F)
Maximum ambient temperature	+65 °C (149 °F)			
Temperature class	T85°C	T100°C	T110°C	T180°C

3.5.5 IECEx Intrinsically Safe Protection (Ex ia) – IECEx Certificate No.: IECEx BKI 22.0003X Issue 1

	Metal housing with SAP-300 display	Metal housing without SAP-300 display	Metal housing
Standard version	HB□-□□□-8 Ex	HT□-□□□-8 Ex	HB/T□-□□□-6 Ex
Ex marking (IECEX)	Ex ia IIB T6...T4 Ga	Ex ia IIC T6...T4 Ga	Ex ia IIIC T85°C...T110°C Da
High-temperature version	HP□-□□□-8 Ex	HH□-□□□-8 Ex	HH□-□□□-6 Ex
Ex marking (IECEX)	Ex ia IIB T6...T3 Ga	Ex ia IIC T6...T3 Ga	Ex ia IIIC T85°C...T180°C Da
Ex power supply, intrinsically safety data	Ui = 30 V, Ii = 140 mA, Pi = 1 W Ci ≤ 25 nF, Li ≤ 300 µH	Ui = 30 V, Ii = 100 mA, Pi = 0.75 W Ci ≤ 25 nF, Li ≤ 300 µH	Ui = 30 V, Ii = 140 mA, Pi = 1 W Ci ≤ 25 nF, Li ≤ 300 µH
Supply voltage		12...30 V DC	
Electrical connection	Cable entry	M20×1.5 cable gland	
	Cable outer diameter	Ø6...Ø12 mm (Ø0.23...Ø0.47")	
	Wire cross-section	0.5...1.5 mm² (AWG20...AWG15)	
Temperature limit data		See tables in section 3.5.6	

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

a. For Standard Temperature Transmitters

Temperature data	Hazardous gas atmospheres HT/B□-7□□-8 Ex HT/B□-9□□-8 Ex			Explosive dust atmospheres HT/B□□-7□□-6 Ex HT/B□□-9□□-6 Ex		
	Ex ia IIC, Ex ia IIB			Ex ia IIIC		
Maximum process temperature	+80 °C (+176 °F)	+90 °C (+194 °F)	+100 °C (+212 °F)	+80 °C (+176 °F)	+90 °C (+194 °F)	+100 °C (+212 °F)
Maximum surface temperature at the process connection	+70 °C (+158 °F)	+90 °C (+194 °F)	+100 °C (+212 °F)	+75 °C (+167 °F)	+90 °C (+194 °F)	+100 °C (+212 °F)
Maximum ambient temperature	+65 °C (149 °F)					
Temperature class	T6	T5	T4	T85°C	T100°C	T110°C

b. For High-Temperature Transmitters

Temperature data	Hazardous gas atmospheres HH/P□-7□□-8 Ex HH/P□-9□□-8 Ex				Explosive dust atmospheres HH/P□□-7□□-6 Ex HH/P□□-9□□-6 Ex			
	Ex ia IIC, Ex ia IIB				Ex ia IIIC			
Maximum process temperature	+80 °C (+176 °F)	+90 °C (+194 °F)	+100 °C (+212 °F)	+180 °C (356 °F)	+80 °C (+176 °F)	+90 °C (+194 °F)	+100 °C (+212 °F)	+180 °C (356 °F)
Maximum surface temperature at the process connection	+70 °C (+158 °F)	+90 °C (+194 °F)	+100 °C (+212 °F)	+175 °C (347 °F)	+75 °C (+167 °F)	+90 °C (+194 °F)	+100 °C (+212 °F)	+175 °C (347 °F)
Maximum ambient temperature	+65 °C (149 °F)							
Temperature class	T6	T5	T4	T3	T85°C	T100°C	T110°C	T180°C

3.5.7 IECEx Combustible Dust Protection (Ex t) – IECEx Certificate No.: IECEx BKI 22.0003X Issue 1

	Metal housing		High-temperature version with metal housing HH/P□-7□□-5 Ex HH/P□-9□□-5 Ex
	HT/B□-7□□-9 Ex HT/B□-9□□-9 Ex	HT/B□-7□□-5 Ex HT/B□-9□□-5 Ex	
Ex marking (IECEx)	Ex ta IIIC T105°C Da	Ex ta/tb IIIC T85°C...T110°C Da/Db	Ex ta/tb IIIC T85°C...T180°C Da/Db
Waiting time for opening the cover	0 min	30 min	30 min
Ex power supply ⁽¹⁾	Ui = 30 V DC Ii = 1 A		
Supply voltage	12...30 V DC		
Temperature limit data	See tables in section 3.5.8.		
Cable entry	M20×1.5 cable glands with "Ex ta" protection		
Cable outer diameter	Ø6...Ø12 mm (Ø0.23...Ø0.47")		
Electrical connection	Wire cross-section: 0.5...1.5 mm ² (AWG20...AWG15)		

⁽¹⁾ Maximum supply voltage and current to the product while maintaining Ex protection.

3.5.8 Temperature Limit Data for IECEx (Ex t) Approved Models

a. For standard temperature transmitters

Temperature data	Explosive dust atmospheres			
	HT/B□□-7□□-9 Ex HT/B□□-9□□-9 Ex	HT/B□□-7□□-5 Ex HT/B□□-9□□-5 Ex		
	Ex ta IIIC	Ex ta/tb IIIC		
Maximum process temperature	+65 °C (149 °F)	+80 °C (+176 °F)	+90 °C (+194 °F)	+100 °C (+212 °F)
Maximum surface temperature at the process connection	+65 °C (149 °F)	+75 °C (+167 °F)	+90 °C (+194 °F)	+100 °C (+212 °F)
Maximum ambient temperature	+65 °C (149 °F)			
Temperature class	T105°C	T85°C	T100°C	T110°C

b. For high-temperature transmitters

Temperature data	Explosive dust atmospheres HH/P□□-7□□-5 Ex HH/P□□-9□□-5 Ex			
	Ex ta/tb IIIC			
Maximum process temperature	+80 °C (+176 °F)	+90 °C (+194 °F)	+100 °C (+212 °F)	+180 °C (356 °F)
Maximum surface temperature at the process connection	+75 °C (+167 °F)	+90 °C (+194 °F)	+100 °C (+212 °F)	+175 °C (347 °F)
Maximum ambient temperature	+65 °C (149 °F)			
Temperature class	T85°C	T100°C	T110°C	T180°C

3.6 Accessories

- Warranty card
- User's manual
- EU declaration of conformity
- 2× M20×1.5 cable gland
- SAP-300 display unit (ordered separately)
- Flat seal (if required)

3.7 Conditions for Safe Operation

- Devices with an SAP-300 display may NOT be operated in an "Ex ia IIC" environment.
- 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].
- Devices with a plastic-coated sensor may only be installed in an "Ex ia IIB" environment free of direct airflow causing charge transfer.
- 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.
 - To avoid static charge build-up on versions with a plastic-coated sensor, the following safety regulations must be observed:
 - The specific resistance of the medium to be measured shall be $\leq 10^4 \Omega m$.
 - The speed of the filling and emptying process must be chosen according to the medium.
 - Avoid all mechanical contact with the plastic-coated probe.
 - Extreme care must be taken during maintenance when there may be explosive residue in the process tank. The device may only be touched in an explosive (Ex) environment with a wet antistatic cloth.

If the above regulations are observed, considering the closed technological system, there is no possibility of static charge accumulation, so there is no risk of ignition.

- Devices protected against dust ignition may only be operated in a circuit with the parameters specified in the technical data.
- In the "Ex ta/tb IIIC" protection, the device cover may only be removed after a minimum waiting time of 30 minutes after de-energizing the device.
- Dust accumulation must be prevented on the housing of devices with "Ex ta/tb IIIC" protection.
- The aluminum content of the aluminum alloy housing exceeds the limit value, so the device must be protected against impact and friction in potentially explosive (Ex) environments.
- 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.
- The device must be grounded to the EP system at the grounding screw point of the device.

3.8 Maintenance and Repair

The 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. Refer to the warranty card for warranty information. The device returned for repair must be cleaned by the user, all chemical deposits must be removed, and the device must be disinfected before sending it back. In addition, the return package must include a properly completed Returned Equipment Handling Form, in which the sender declares that the device is free of all contamination and substances hazardous to health.

3.9 Firmware Update

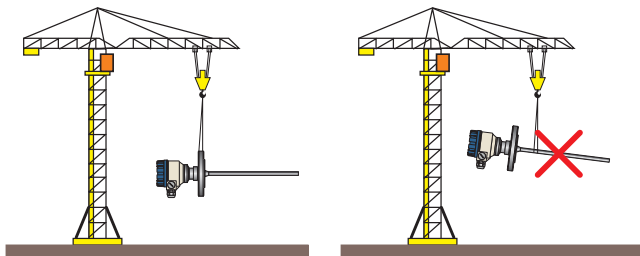
The device's firmware is continuously maintained, considering user feedback and needs. If you want to update the firmware, use the built-in update communication port to upgrade to the latest version. To update, you need the NiFlash Light program; contact your local NIVELCO partner. In addition, the SAT-506-0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

4. INSTALLING

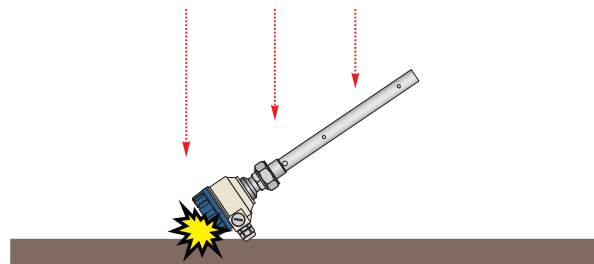
4.1 Handling and Storage



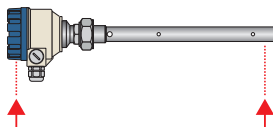
Lift the instrument using both hands, or if necessary, use a hoist. Do not lift the instrument by the probe, as the probe is a mechanically sensitive part.



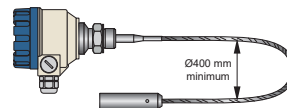
Protect the instrument from mechanical impacts and falling. The electronics are a sensitive and fragile unit.



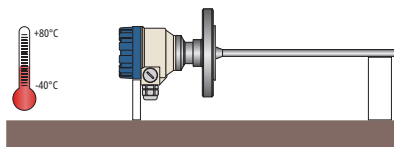
Do not bend coaxial and rod probes.
The device must be supported in the marked places.



The cable probe must not be looped, broken, or frayed.
The minimum bending diameter is 0.4 m (16").
Any of these can cause a measurement error.



Storage temperature:



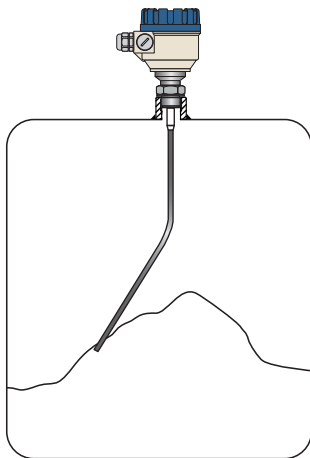
4.2 Mounting on Containers

4.2.1 General Mounting Instructions

The size and position of the fittings on the top of the tank (and the distance from the wall), the internal anti-reflection fittings, the rough joints, the welds, and the shape and design of the top and bottom of the tank are very important for the correct operation of the device. Any object that distorts the probe's electromagnetic field degrades the measurement accuracy. The coaxial probe is an exception because it has no external electromagnetic field.

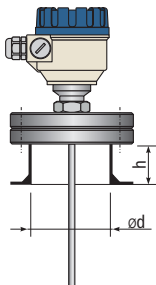
Threaded process connection

The simplest mounting method is to screw the device into a 1" BSP, 1" NPT, 1½" BSP or 1½" NPT threaded hole.



Nozzle height

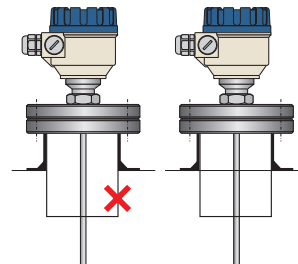
 Do not fit a nozzle longer than its diameter, especially for single probes and powder applications.



$h \leq \varnothing d$, where
 h = nozzle height
 $\varnothing d$ = nozzle diameter

Consult NIVELCO if the above condition cannot be met.

Nozzles penetrating into tank

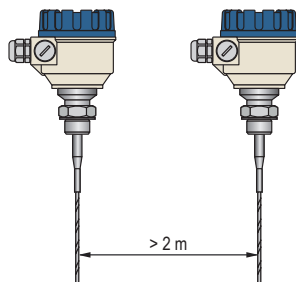


 **The nozzle must not extend into the tank, as the protruding part interferes with the measurement.**

Mounting two devices

If two devices have to be mounted on one tank, they must be spaced at least 2 m (6.5 ft) apart to eliminate interference and measurement inaccuracies resulting from the interaction of the two electromagnetic fields.

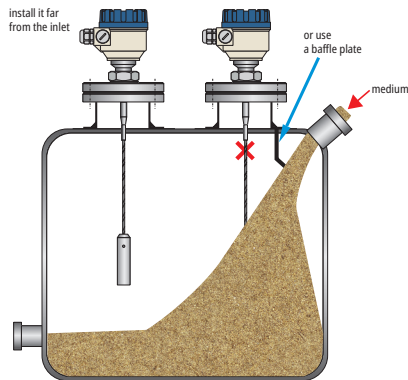
Devices equipped with coaxial probes are not subject to the above warning because there is no electromagnetic field outside the probe's outer sheath.



Effects of material influx

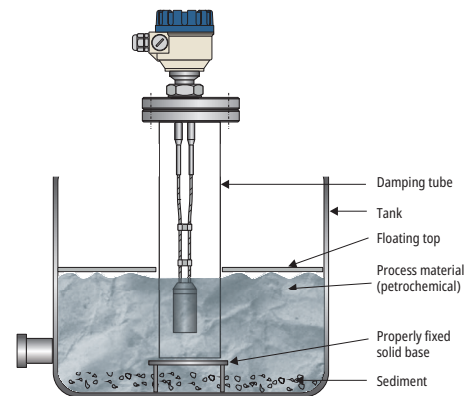
! Do not place the nozzle near the material inlet pipe connector.

Material flowing onto the sensor probe causes incorrect level indication. If there is not enough space, it is recommended to install a baffle plate.



Using a protective tube

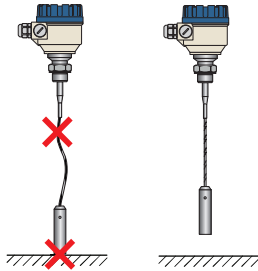
Floating-roof tanks are commonly used for petrochemical storage. In such cases, the use of a damping tube is recommended.



Straightness and contact of measuring probes with other fittings and distance from the bottom of the tank.

After installation, the cable probes and the associated tension weight must be straight, tensioned, and away from other fittings (e.g., mixer). They must not come into contact with the tank wall, bottom, or other objects.

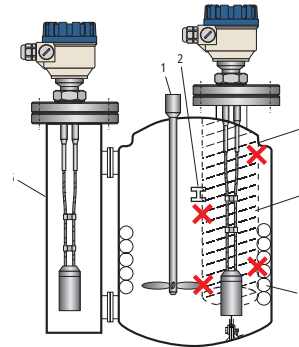
The installation space requirements of the different measuring probes must be taken into account according to the data of the measuring probes (see Technical Data).



Using a stirrer

There is no radiation cone along the probe.

When measuring liquids, the use of a reference chamber or damping tube is recommended, since it provides mechanical and electromagnetic protection for accurate measurement.



1. Stirrer
2. Mounting bracket
3. Fracture-like change of the tank
4. Tank heating
5. Reference measurement chamber
6. The cylindrical magnetic field of the probe in the direction of the impulse travel (free space required!)

❌ Do not mount the probe near these objects.



Protect the device from direct sunlight
Attaching the probe to the bottom of the tank.

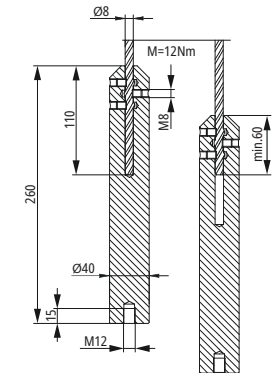
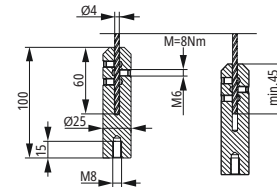
Flexible cable probes can be anchored to the bottom of the tank with a fastener or loop.

Installing and shortening the cable probes

If necessary, the probe can be shortened, but only for liquid applications.

Steps:

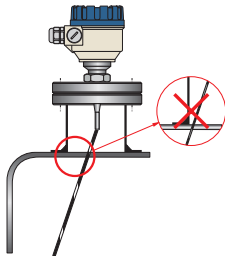
1. Loosen the grub screws (hexagon) with an Allen key. (ISO 2936).
2. Pull the cable out of the tension weight and cut to the desired size.
3. Insert the cable back into the weight as shown and tighten the screws.
4. Modify the configuration parameters to the new length, the reference point being the upper edge of the weight.



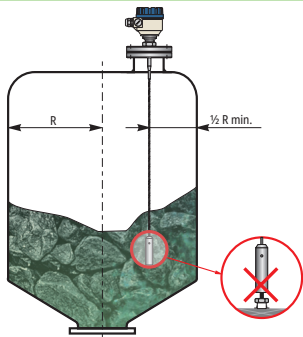
4.2.2 Installing the Device for Measuring Solids

False readings

Do not let the probe touch the side of the nozzle.



Coning and strong tensile force on the probe



Strong tensile force. The cable rope must not be anchored when measuring solids.

The device is mounted at a distance of half the radius of the tank from the top of the tank with a minimum lift nozzle height.

It prevents excessive mechanical stress when emptying the tank.

The tensile force of the probe cable rope depends on the tank's height and shape, the particle size of the material, the density, and the discharge speed.

The following table gives the tensile load values for the different materials (approximate data in tons).

Probe type	Material	Probe length		
		6 m (20 ft)	12 m (40 ft)	24 m (80 ft)
Single cable, Ø8 mm (Ø0.31"), max. load: 3.0 T	Cement	0.6 T	1.2 T	2.4 T
	Ash	0.3 T	0.6 T	1.2 T

The measured process material can accumulate on the probe and nozzle, which attenuates the energy of the measuring pulse.

Avoid creating cavities that increase deposition.

Observe the load capacity of the tank top, which must ensure the maximum tensile force of the probe

4.3 Shortening the H-700 probes

Almost any type of MicroTREK probes can be shortened at the site if necessary.

4.3.1 Shortening of Rigid Coaxial Probes

Due to the welded construction, we do not recommend shortening coaxial probes at the site. Instead, we suggest returning the complete device with the coaxial probe to the factory if shortening the length of the probe is necessary.

4.3.2 Shortening of Flexible Cable Probes

Steps for shortening flexible cable probes assembled with tensile weights

1. Using a hexagon Allen key, loosen all three grub screws on the tension weight. (Screw size is M6 for the 4 mm (0.1575") diameter probe, and M8 for the 8 mm (0.315") diameter cable probe, according to ISO 2936.)
2. Pull the cable out of the tension weight. Bind the wire strands of the rope probe together by wrapping 5-6 layers of electrical insulation tape around both sides of the cut.
3. Cut the rope probe to the desired length.
4. Insert the cable back into the tension weight as shown.
5. Tighten firmly the hexagon screws in the following order:
First tighten the upper hexagon screw.
Next tighten the lowest hexagon screw.
Finally, tighten the middle hexagon screw firmly.
6. Tighten each hexagon screw repeatedly and firmly.
7. Modify the configuration parameters corresponding to the new immersion length.

4.3.3 Shortening of Rigid Rod Probes

Rigid rod probes are much easier to shorten with a hacksaw or cutting disc.

4.3.4 Parameters to be Modified After the Probe is Shortened

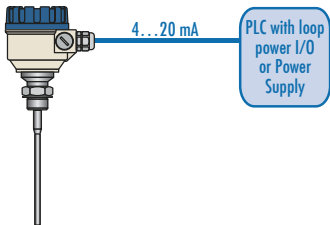
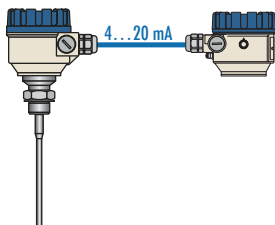
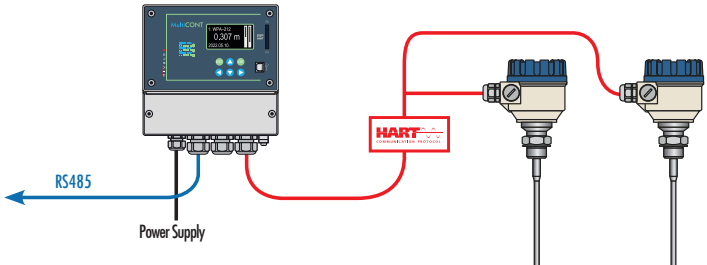
After the probe is shortened, 3 setting parameters must be modified. Parameters can be modified in the following ways:

- using the device's own display (SAP-300) and buttons,
- using the EView2 configuration PC software,
- using the MultiCONT universal HART® controller,
- using MultiCONT, the single-channel HART® smart field display and data logger.

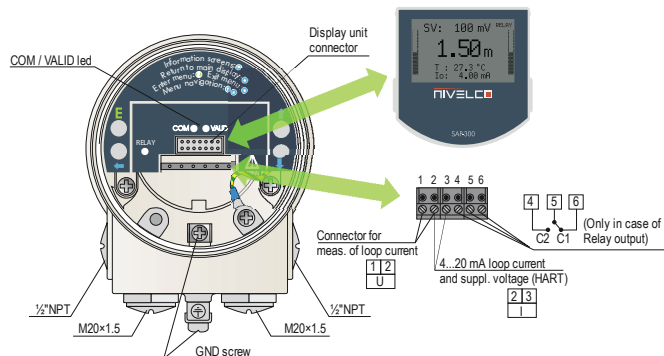
The procedure for modifying the parameters after shortening the device's probe length is summarized in the table below:

Parameters to be modified	Local menu	EView2	MonoCONT	MultiCONT	MODBUS
Probe Length (P03) value to be set: Factory-set value minus the length that was cut off.	Measurement Optimization → Range Blocking → Sensing Distance	Measurement configuration → Sensing Distance	Transmitter → Transmitter setup → P03 Sensing distance	Devices → Remote Program → Parameters → P03 Sens- ing distance	806 → float
Zero-level distance (P04) value to be set: Factory-set value minus the length that was cut off.	Measurement Config. → Zero-Level Distance	Measurement config. → Zero-Level Dist.	Transmitter → Transmitter setup → P04 Zero-level distance	Devices → Remote Program → Parameters → P04 Zero-level distance	808 → float
PV Value of 20 mA (P11) to be set: Facto- ry-set (level) value minus the length that was cut off.	Output setup → Analog Output → PV Value of 20 mA	Outputs → Current output → Assignment of 20 mA - PV	Transmitter → Transmitter setup → P11 PV Assign 20 mA	Devices → Remote Program → Parameters → P11 PV assign 20 mA	822 → float

4.4 Wiring

Standalone transmitter	Connected to MonoCONT	Connected to MultiCONT (HART® Multidrop)
		
See Chapter 4.4.1	See MonoCONT User's and programming manual	See MultiCONT User's and programming manual

4.4.1 Wiring of Standalone Transmitter



If the transmitter is pre-equipped with a display unit, gently unplug it by pulling it upwards using two fingers from the sides.

1. Insert the cable through the cable gland or conduit into the housing.
2. Unplug/remove black screw terminal (1-6) for easier wire connection.

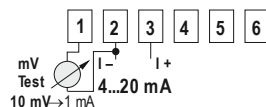
3. Check the polarity before inserting the wires into the terminal ports 2 and 3:

Minus (-) to Terminal 2
Plus (+) to Terminal 3

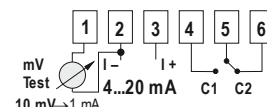
DO NOT perform an insulation test with a test voltage of 500 V AC due to the internal electronic overvoltage protection.

4. Tighten the cable gland or conduit, as well as the device cover, to prevent humid air, water, and dust from penetrating the enclosure.

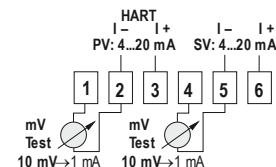
Model with 2-wire Loop power



Model with 2-wire Loop power and NO/NC Relay output

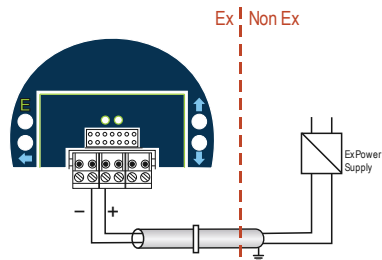


Model with 2-wire Loop power and dual-current-generator output



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.



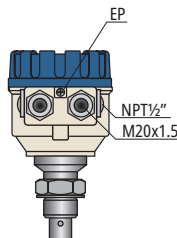
⚠ In non-hazardous areas, the device must be powered through a galvanically isolated power supply.
 For devices used in hazardous areas, the requirements in section "[3.7. Conditions for Safe Operation](#)" must be observed when selecting the power supply.

Do not perform an insulation test with a test voltage of 500 V AC due to the internal electronic overvoltage protection.

Connecting (grounding) to an equipotential network (EPH)

Threaded ground connection (EP) on the side of the housing, maximum wire cross-section: 4 mm² (AWG12). The housing of the device must be earthed to the ground with a resistance of $R < 1 \Omega$.

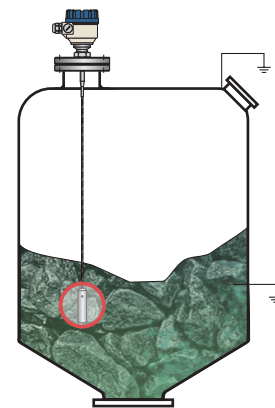
The shield of the signal cable must be grounded at the instrument panel. Do not run the signal cable near high-current cables, as shielding does not protect against switching harmonics.



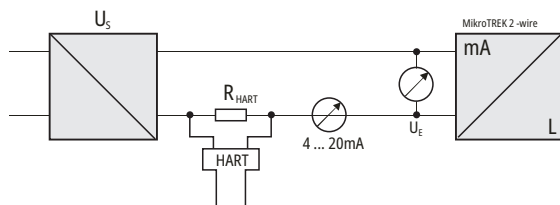
Electrostatic discharge (E.S.D.)

⚠ The device is protected against 4 kV E.S.D.
 Warning: The electrostatic discharge protection of the measuring system cannot be ensured by the internal ESD protection alone. In all cases, it is the user's responsibility to ensure that the tank, measured material, and probe are grounded.

⚠ Risk of injury!
 The probe may accumulate an electrostatic charge during regular operation, so discharge it to the ground by touching it (tank side) when installing.
 Ground the inlet and the measured medium.



Design of the measuring network



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

Line A: minimum voltage on the device's input terminals

Line B: minimum supply voltage (voltage drop on the device and the 250 Ω loop resistance)

An example for calculating the supply voltage:

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

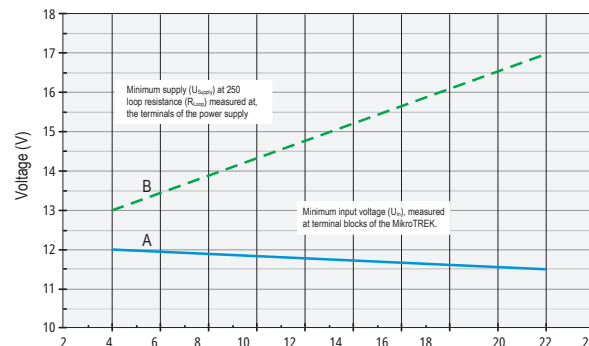
$$U_{\text{Supply min.}} = U_{In \min.} + (I_{\min} * R_{Loop}) = 12 \text{ V} + (4 \text{ mA} * 0.25 \text{ k}\Omega) = 13 \text{ V}$$

The minimum supply voltage at $I_{\max} = 22$ mA current:

$$U_{\text{Supply min.}} = U_{In \min.} + (I_{\max} * R_{Loop}) = 11.5 \text{ V} + (22 \text{ mA} * 0.25 \text{ k}\Omega) = 17 \text{ V}$$

Therefore, if the loop resistance is 250 Ω , 17 V is just enough for the entire 4...20 mA measuring 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](#)".



4.5 Device Setup and Service Options

- UNIDISP SAP-300 Plug-in graphic display unit and 4-key menu-driven programming (if equipped)
- [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

4.6 BUS (HART®) Communication

The output of the device can be used as:

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

EView2 software and MonoCONT and MultiCONT remote display/controllers support both modes. According to the Rosemount standard, HART® communication can be used between the MicroTREK 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 other than 0.

4.7 Commissioning and Setup

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 programming chapters.

Caution! The instrument starts with a current consumption of 3.5 mA (parameter P12:c Analog current loop output mode) after power-on and, after successful initialization, maintains the set error current of 3.8 mA (see MicroTREK User's and programming manual.) at the output until the first successful measurement.

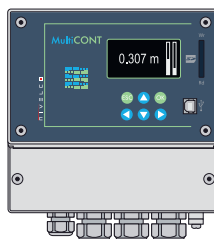
5. USER INTERFACE OPTIONS / PROGRAMMING

Transmitters with Local display via display and 4 push buttons



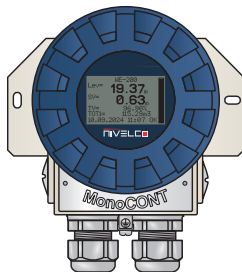
1. Insert display and power up transmitter.
2. Press **E** button to enter menu
3. See 5.1 Local display / menu handling for more information

via MultiCONT field controller



1. See MultiCONT Manual for wiring and handling
2. See MicroTREK User's and programming manual for configuration

via MonoCONT field display



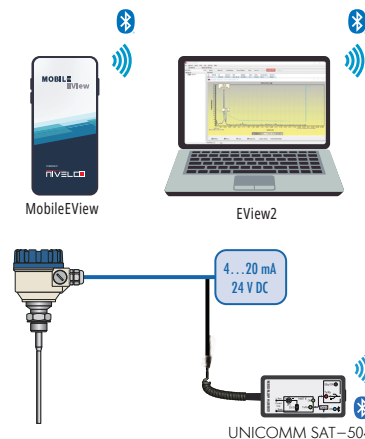
1. See MonoCONT Manual for wiring and handling
2. See MicroTREK User's and programming manual for configuration

Transmitters with MODBUS interface via MODBUS master

1. See MODBUS Manual for supported protocol
2. See MicroTREK User's and programming manual for configuration

Transmitters with HART

using HART Modem (SAT-504-□) and EView2 (PC) or EView Mobile



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 the modem has a Bluetooth option
3. Download [EView2 software](#) for Windows devices
4. Power up transmitter and connect from software

5.1 Local Display / Menu Handling

5.1.1 SAP-300 Display Unit (Optional)

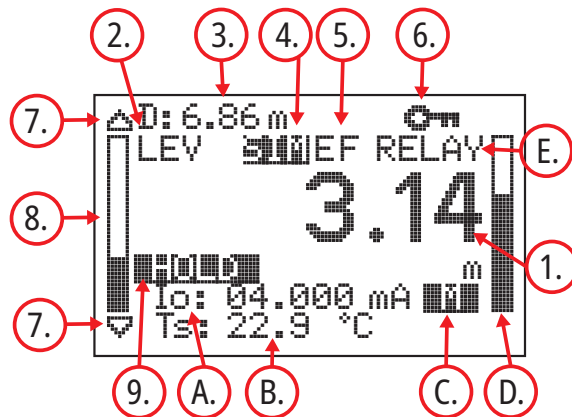
MicroTREK H-700 type compact guided wave radar transmitters can be equipped with an SAP-300 display unit. The display shows the actual measurement value and status information by default. The display can also be used to program most of MicroTREK's parameters with the four buttons.

SAP-300 DISPLAY UNIT – TECHNICAL DATA		WARNING!
Display	64 × 128 dot matrix LCD	 Do not expose the SAP-300 to prolonged heat or sunlight as the display may be damaged.
Operating temperature:	–20...+65 °C (–4...+149 °F)	



Do not leave the SAP-300 in the MicroTREK, if it is not possible to protect the MicroTREK from sunlight or if the MicroTREK is to be used outside the operating temperature range of the SAP-300.

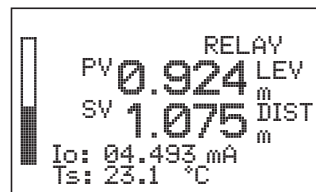
1	Measured Primary Value (PV), with unit indication below (5 digit)
2	Measured quantity (PV mode): LEV – Level, VOL – Volume...
3	Raw value for PV calculation: 'D:' – Distance, 'L:' – Level,
4	SIM – indicator: Simulation mode active. Warning! PV is simulated, not measured.
5	Empty/Full marker: 'E' – Tank Empty, 'F' – Tank Full
6	Menu locked by: '🔑' – Security code, 'REM' – Remote access active
7	Trend indicator: 'Δ' – slow increase,



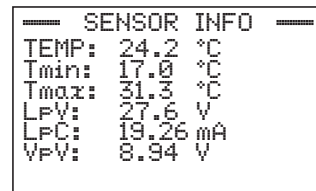
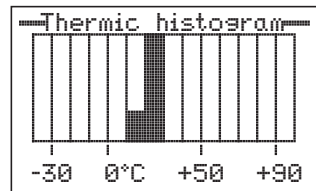
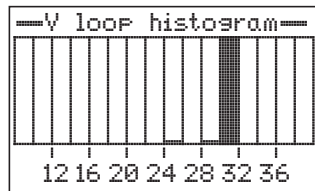
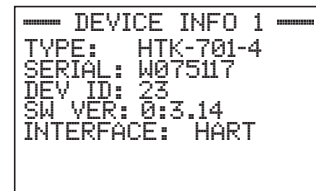
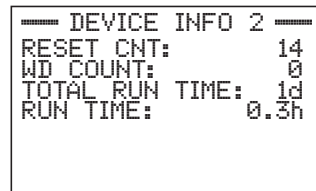
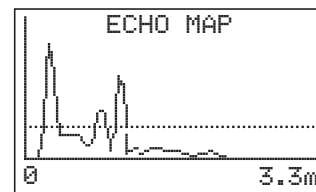
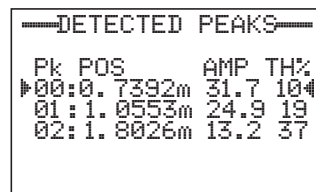
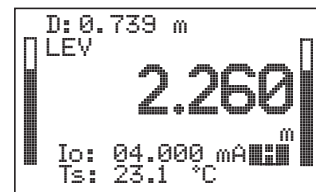
5.1.3 Info Screens

You can switch between info screens using the   and  buttons.

- **Value display:** single display mode
- **Echo map:** dotted line indicates threshold level
- **Peak list:** Peak no., Position, Amplitude [dB], Threshold relative to peak amplitude
- **Device info 1:** Type and version info
- **Device info 2:** Run time info (only for advanced diagnostic purposes)
- **Sensor info:** (TEMP) Electronics temperature, (LpV) Loop voltage, (LpC) Loop current, (VpV) Internal buffer voltage.
- **Histogram:** Thermal histogram, Loop voltage histogram



3 sec



5.1.4 Menu Handling

Navigating in the menu	Button	Value input	Checkbox setting
Entering the selected menu		Accepting the setting	Accepting the setting
Selecting a menu item	 	Modifying digit value	Selecting an item
Going back to the previous menu		Next digit	Switching checked/unchecked

Menu properties

Enter the main menu from any info screen by pressing the  button.

Menu TOP row: left – **MENU TITLE**, right –  or  indicates that menu can be scrolled in given direction.

Menu BOTTOM row: left – **<Menu ID>** (M-ID), right – **Parameter-ID** (P-ID), only if relevant

Changes take effect only after you exit the menu. Until then, the transmitter continues to operate with the previous settings.

After 30 seconds of inactivity (or if SAP-300 is unplugged) MicroTREK will automatically exit the menu, discarding all changes.

Local display access and remote programming (**REM**) through Bluetooth®, HART or MODBUS block each other. Whichever is first will have priority.

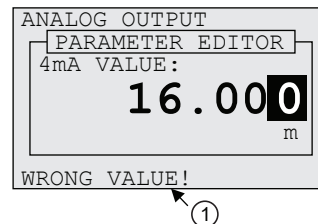
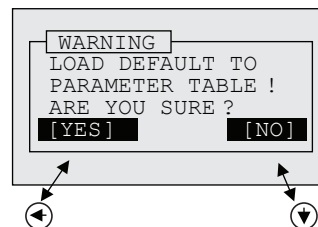
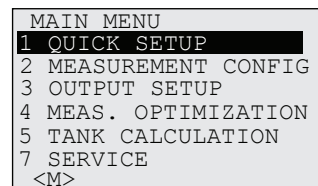
Dialog BOX:  or  buttons perform the function displayed on the screen, e.g., [Yes], [No].

Value input – special key combinations (press simultaneously)

 +  → Return to original value.

 +  → Set to default value.

 +  → Set to actually measured value. (Supported only for some parameters.)

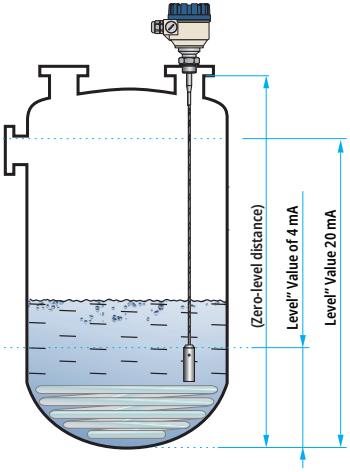


6. MicroTREK SETTINGS

6.1 Quick Setup

Local display menu	M-ID	EView2	MonoCONT	P-ID	MultiCONT	MODBUS
QUICKSET	Q	—	—	—	—	—

MicroTREK H-700 offers a built-in Quick Setup feature for simple LEVEL measurement applications. Quick Setup guides you sequentially through the following basic settings. Press  button for 3 seconds to exit Quick Setup any time. See the MicroTREK User's and Programming Manual on the NIVELCO website for more information.

#		Description	
0	ENGINEERING SYSTEM	Defines RF compliance and the unit system (Metric/Imperial) to be used. For USA select "US / Imperial". See chapter 2.2.1 Engineering System / Units for more information.	
1	ZERO-LEVEL DISTANCE	Defines the zero point for level measurement. Enter the distance between the sealing plane of the process connection and the designated zero level. See chapter 2.2.2 Measurement Configuration / Zero-level distance for more information.	
2	PV VALUE OF 4 mA	Defines the LEVEL value assigned to 4 mA current output, by default the zero-level. See chapter 2.3.1 Output setup / PV Value of 4 mA for more information.	
3	PV VALUE OF 20 mA	Defines the LEVEL value assigned to 20 mA current output, by default the maximum measurable level. The analog output automatically scales the set level range to the 4...20 mA current output range. See chapter 2.3.1 Output setup / PV Value of 20 mA for more information	
4	ERROR MODE	Defines the behavior of the current output in case of "No echo error", i.e. while no up-to-date LEVEL value is available. See chapter 2.3.1. Output setup / Error Mode for more information. Options: – HOLD Keeps last valid value on output (default). Recommended setting. – 3.8 mA Outputs "Low error current". – 22 mA Outputs "High error current". Use an "Error current" mode only when the control system can unambiguously distinguish it from the valid 4 mA and 20 mA endpoints.	
5	DAMPING TIME	The delay in seconds before the output reaches 98% of the new value. Larger values smooth the output (e.g., to suppress ripples); smaller values allow a faster reaction to sudden changes. Default is 20 s. See chapter 2.2.3 Measurement Configuration / Damping for more information.	



[MicroTREK – Programming Manual](#)

htk701en26h05 – September 2026

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