NIVOCAP

CAPACITIVE LEVEL TRANSMITTERS

FOR LIQUIDS, PASTES, POWDERS, AND BULK SOLIDS

5 YEARS WARRANTY

NIVELCO

LEVEL TRANSMITTERS

The NIVOCAP 2-wire capacitive level transmitter provides an ideal solution for distance, level, and volume measurement of conductive and non-conductive liquids, pastes, powders, and bulk solids with a relative dielectric constant (ε_r) greater than 1.5. The device's probe and the reference probe *(either the tank's metal wall or a separate probe)* operate as the opposing plates of a capacitor. The air between these plates is replaced by a medium with a higher dielectric constant, which changes the capacitance proportionally to the level of the material. The electronic circuitry incorporated into the device measures the capacitance difference and converts it to an output signal.

FEATURES

- Up to 20 m (65.6 ft) measuring range
- Vertical mounting
- Rod or cable probe versions
- Process temperature: –30…+200 °C (–22…+392 °F)
- Up to 40 bar (580 psi) process pressure
- 32-point linearization table
- Indirect assignment of 0% and 100%
- IP67 (NEMA 6 equivalent)
- 4…20 mA + HART® output
- PACT*ware*™ compatible
- Ex version
- 5-year warranty

APPLICATIONS

- Distance, level, and volume measurement of liquids, pastes, powders, and bulk solids with a relative dielectric constant (ε_r) greater than 1.5
- For high pressures and high-temperature mediums
- Chemical Industry
- Food and Beverage Industry
- Power Plants
- Oil & Gas Industry
- Water/Wastewater Industry

CERTIFICATES

- ATEX (Ex ia G)

SAP–202
plug-in display

CHR–200

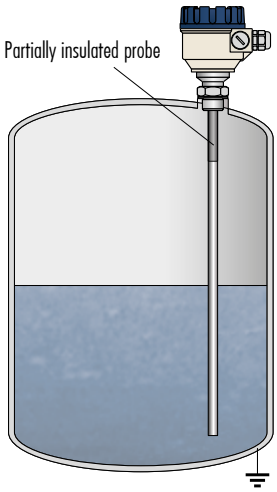
CAF–110

CFR–100

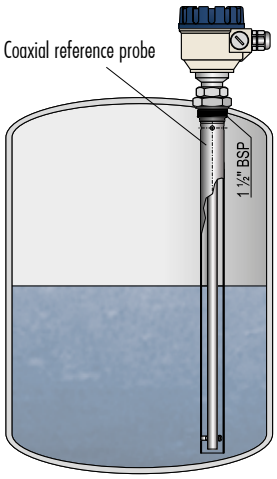
CBC–203–6 Ex

CTK–200

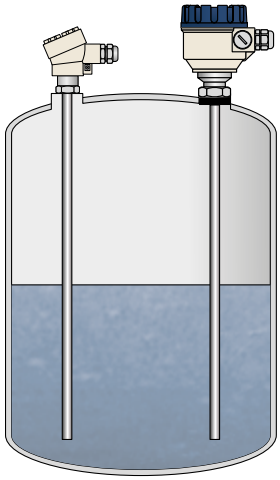
CONFIGURATIONS



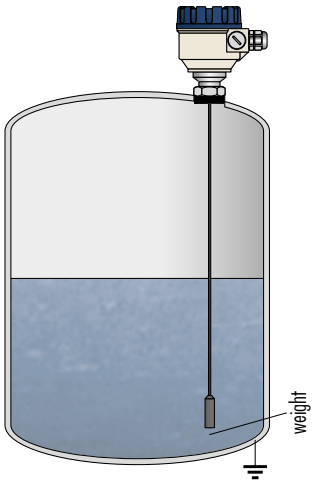
Rod probe
The metal tank contains a non-conductive medium. The rod probe is partially insulated at the process connection.



Rod probe
With coaxial tube reference probe



Rod probe
With reference rod probe



Cable probe with weight
Metal tank

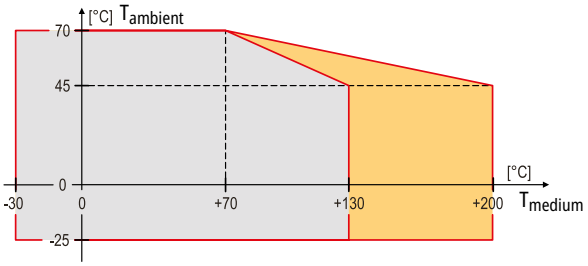
TECHNICAL DATA

Version		Rod probe	High-temperature rod probe	Cable probe
Measuring range (Ln)		0.2…3 m (7.8"… 9.8 ft)		1…20 m (3.3…66 ft)
Capacitance range		0 pF…5 nF		
Min. transmittable capacity range		Max. (I_{out}) SPAN: 10 pF / 10% FS		
Saturation capacitance of the insulated probe		~600 pF/m		~200 pF/m
Relative dielectric constant		ε_r min. 1.5		
Process connection		As per order code		
Material of wetted parts	Threaded part	1.4571 (316Ti) stainless steel		
	Probe	Fully or partially PFA-coated 1.4301 stainless steel		Fully / partially FEP-coated steel cable
Housing material		Plastic (PBT), painted aluminum / stainless steel		
Process temperature		–30…+130 °C (–22…+266 °F)	–30…+200 °C (–22…+392 °F)	–30…+130 °C (–22…+266 °F)
Ambient temperature		–25…+70 °C (–13…+158 °F)		
Process pressure		Maximum 40 bar (580 psi)		Maximum 16 bar (232 psi)
Supply voltage / consumption		12…36 V DC / maximum 800 mW, transient overvoltage protection		
Output properties	Output signals	Analog: 4…20 mA (3.9…20.5 mA) R_{max} = (U_S–11.4 V)/0.02 A. Error indication: 3.8 mA / 22 mA		
		Digital communication: HART®		
		Display module: SAP–202, 6-digit LCD, dimensions, bar graph		
		Current loop test: 10 mV / 1 mA via a resistor in series		
	Damping time	0, 3, 6…300 s (selectable)		
	Linearity error	±0.3% FS		
	Temperature error	±0.02% / °C FS (±0.0111% / °F FS)		
Electrical connection		2× M20×1.5 cable glands + 2× internally threaded ½" NPT connection, cable outer diameter: Ø6…12 mm (Ø0.24…0.47") (shielded cable is recommended), wire cross section: 0.5…1.5 mm² (22…15AWG)		
Electrical protection		Class III		
Ingress protection		Probe: IP68. Housing: IP67		
Weight		~2.3 kg (~5 lb) with 0.5 m (1.6 ft) probe	~3 kg (~6.6 lb) with 0.5 m (1.6 ft) probe	~2 kg (~4.4 lb) with 3 m (9.8 ft) probe

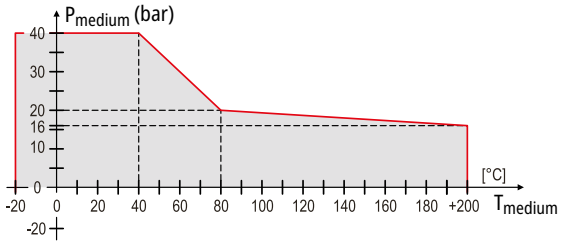
Ex INFORMATION

C□□–2□□–□ Ex / C□□–3□□–□ Ex		
Protection		Intrinsic safety
Ex marking		⟨Ex⟩ II 1 G Ex ia IIB T6…T3 Ga
Intrinsic safety data		$C_i \leq 15$ nF, $L_i \leq 200$ µH, Ui ≤ 30 V, $I_i \leq 140$ mA, $P_i \leq 1.0$ W
Temperature classification	T6…T4 temperature class	$T_{ambient}$: –25…+70 °C; T_{medium}: maximum +80…+120 °C
	T3 temperature class	$T_{ambient}$: –25…+45 °C; T_{medium}: maximum +190 °C

TEMPERATURE DATA



PRESSURE DATA



SELECTING THE APPROPRIATE PROBE

The device uses the capacitive operating principle; therefore, if the dielectric constant of the measured material changes or it is too low, or the wrong probes are selected for the job, measurement accuracy will suffer.

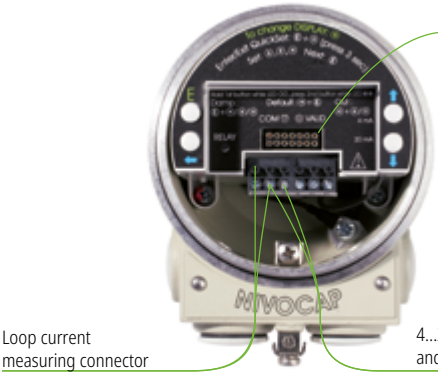
	Material		
	Conductive	Non-conductive	
		$\varepsilon_r > 2$	$2 > \varepsilon_r > 1.5$
Insulated probe, reference probe	■	■	–
Partially insulated probe, reference probe	–	■	■

	Reference probe		
	Rod	Tube	Tank wall
Conductive tank	■	■	■
Non-conductive tank	■	■	–

DISPLAY

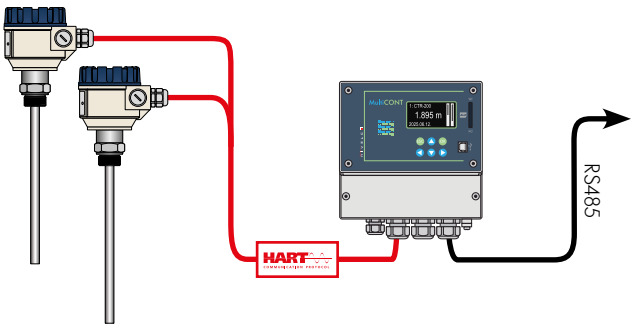
The basic functions can be configured using the programming buttons. The SAP–202 plug-in display allows for simplified programming that covers full parameter programming.

WIRING



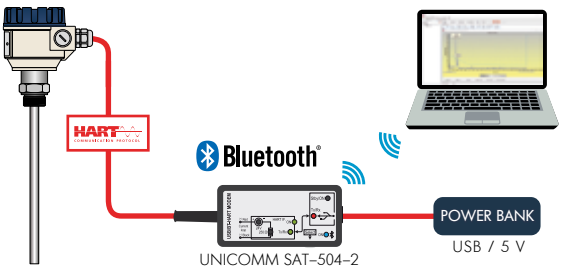
NIVOCAP TRANSMITTERS IN HART MULTIDROP LOOP

The **MultiCONT** processes and displays measurement data supplied by NIVELCO's HART-equipped transmitters connected to a multidrop loop. Up to 15 transmitters *(including mixed models)* can be connected, and remote programming can also be performed through the MultiCONT. Data can be re-transmitted via an RS485 communication line to a PC or PLC as needed.

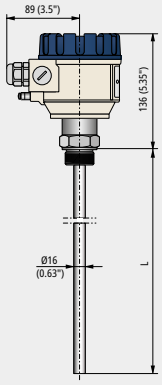
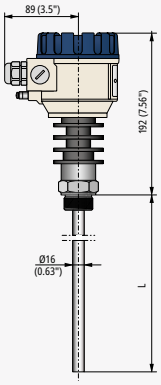
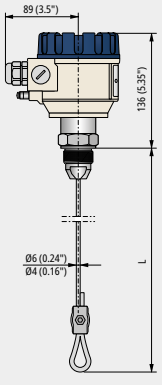
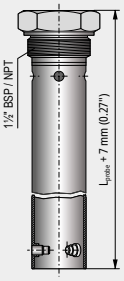
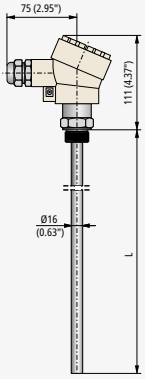
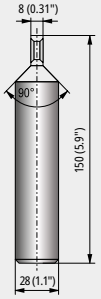


COMPUTER CONNECTION

HART® output devices and **UNICOMM** SAT–305 HART–USB modems can be wired to a PC, while UNICOMM SAT–504 HART–USB/Bluetooth® modems can connect transmitters via Bluetooth®. All data measured by the NIVOCAP can be displayed on the PC, and the devices can be reprogrammed as needed. Up to 15 standard transmitters can be connected to a HART® modem. Additionally, EView2 configuration software or **NIVISION** process visualization software can be used.



DIMENSIONS

Rod probe	High-temperature version with a rod probe	Cable probe
		
Coaxial tube reference probe	**Rod reference probe**	**Counterweight**
		

APPLICATION EXAMPLE

ORDER CODES *(NOT ALL COMBINATIONS AVAILABLE)*

CAPACITIVE LEVEL TRANSMITTERS

NIVOCAP C□□–□□□–□[(1)]

Version		Code
+130 °C (266 °F)	Transmitter	T
	Transmitter + plug-in display	B
+200 °C (392 °F)	Transmitter	H
	Transmitter + plug-in display	P

Housing	Code
Aluminum	2
Plastic (PBT)	3
Stainless steel[(2)]	4

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

[(2)] Ex version under approval.

Process connection / Probe / Insulation				Code
¾" BSP		fully PFA-insulated rod probe		M
¾" NPT				Z
1" BSP	Rod probe	fully insulated (PFA)		R
		partially insulated (PFA)		P
	Cable probe	fully insulated (FEP)		K
1" NPT	Rod probe	fully insulated (PFA)		A
		partially insulated (PFA)		C
	Cable probe	fully insulated (FEP)		E
1½" NPT	Rod probe	fully insulated (PFA)		B
		partially insulated (PFA)		D
	Cable probe	fully insulated (FEP)		F
1½" BSP	Rod probe	fully insulated (PFA)		S
		partially insulated (PFA)		T
	Cable probe	fully insulated (FEP)		V
TriClamp[(2)]	1"	Rod probe	fully insulated (PFA)	1
	1½"			2
	2"			3
	1"	Cable probe	fully insulated (FEP)	4
	1½"			5
	2"			6

Code	Probe length		Code
Rod			
0	0 m	0 m	0
1	1 m (3.28 ft)	0.1 m	1
2	2 m (6.56 ft)	0.2 m	2
3	3 m (9.84 ft)	0.3 m	3
		⋮	⋮
		0.9 m	9
Cable			
0	0 m	0 m	0
1	10 m (32.8 ft)	1 m	1
2	20 m (65.6 ft)	2 m	2
		3 m	3
		⋮	⋮
		9 m	9

Output / Certificates	Code
4…20 mA	2
4…20 mA + HART®	4
4…20 mA / Ex ia G	6
4…20 mA + HART® / Ex ia G	8

ACCESSORIES

REFERENCE PROBES FOR CAPACITIVE ROD PROBES

NIVOCAP C□□– 1□□

Version / Thread	Code
Coaxial tube / 1½" BSP	A
Coaxial tube / 1½" NPT	D
Reference rod / 1" BSP	F
Reference rod / 1" NPT	E

Probe type	Code
Coaxial[(4)]	F
Rod, fully insulated[(5)]	R
Rod, partially insulated[(5)]	P

[(4)] Only with 1 ½" process connection. [(5)] Only with 1" process connection.

Code	Probe length		Code
0	0 m	0 m	0
1	1 m	0.1 m	1
2	2 m	0.2 m	2
3	3 m	0.3 m	3
		⋮	⋮
		0.9 m	9

Plug-in graphical display module	UNIDISP SAP–202–0
HART®–USB/Bluetooth® modem for remote programming	UNICOMM SAT–504–□
HART®–USB/RS485 modem for remote programming with PC, DIN rail mountable	UNICOMM SAK–305–□
Stainless steel counterweight Ø28 × 150 mm (11 × 5.9")	CTK–103–0M–400–01
1" BSP / ¾" NPT (1.4571) adapter	NIFIT EAA–168–0
1" BSP / 2" BSP (1.4571) adapter	NIFIT EAA–16D–0
Multichannel process controller and display unit	MultiCONT PRW–2□□–□
24 V DC power supply, DIN rail mountable	NIPOWER PPK–431–□
Intrinsically safe isolator module, DIN rail mountable	UNICONT PGK–301–□ Ex

NIVOCAP – CONFIGURATION & REQUEST FOR QUOTE

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