

FOR LIQUIDS

# NIVOCAP

CAPACITIVE LEVEL TRANSMITTERS



5 YEARS WARRANTY @ NIVELCO – WHERE ELSE?

**NIVELCO**

LEVEL TRANSMITTERS



NIVOCAP 2-wire capacitive level transmitters are an ideal solution for level measurement of conductive and non-conductive liquids. The device's probe and the reference probe (which can be either the metal wall of the tank or a separate probe) operate as opposing plates of a capacitor. Between the plates of this capacitor, the air is replaced by a medium with a higher dielectric constant, changing the capacitance proportionally to the material's level. The incorporated electronic circuitry measures the capacitance difference and converts it to an output signal.

**FEATURES**

- Maximum 20 m measuring range
- Vertical mounting
- Rod or cable probe versions
- -30...+200 °C process temperature
- Up to 40 bar process pressure
- 32-point linearization table
- Indirect assignment of 0% and 100%
- IP67
- 4...20 mA + HART® output
- PACTware™ compatible
- Ex version
- 5 years warranty

**APPLICATIONS**

- Level and volume measurement
- Level measurement of conductive and non-conductive materials
- Level measurement of liquids
- For high pressures and high-temperature mediums

**CERTIFICATES**

- ATEX (Ex ia G)



SAP-202 display



CHR-200



CAF-110



CFR-100

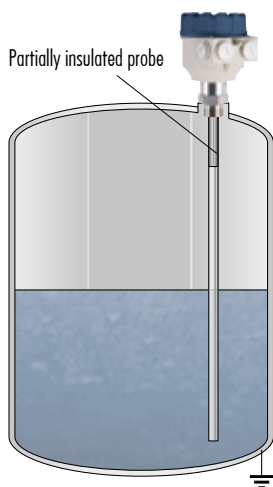


CBC-203-6 Ex



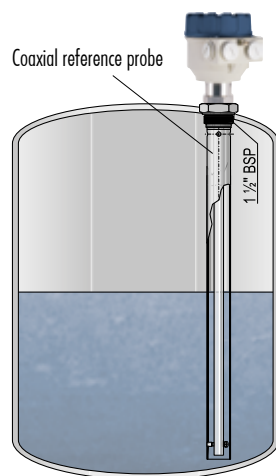
CTK-200

**ARRANGEMENTS**



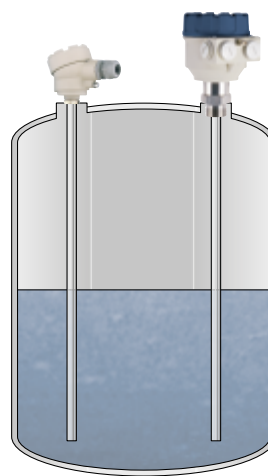
**Rod probe**

Metal tank and non-conductive medium. The rod probe is partially insulated at the process connection.



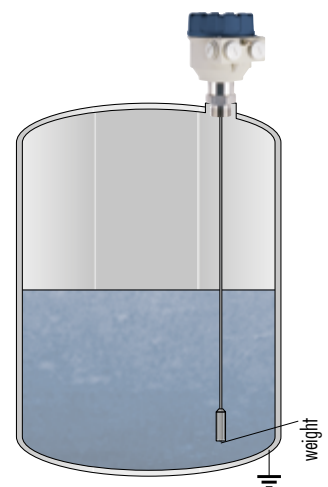
**Rod probe**

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		1...20 m
Capacitance range		0 pF...5 nF		
Min. transmittable capacity range		Max. (I <sub>out</sub> ) SPAN: 10 pF or 10% FS		
Saturation capacitance of the insulated probe		~600 pF/m		~200 pF/m
Relative dielectric constant		ε <sub>r</sub> min. 1.5		
Process connection		As per order code		
Material of wetted parts	Threaded part	1.4571 Stainless steel		
	Probe	Fully or partially PFA-coated 1.4301 stainless steel	Fully or partially FEP-coated steel cable	
Housing material		Plastic (PBT), painted aluminum or stainless steel		
Process temperature		-30...+130 °C	-30...+200 °C	-30...+130 °C
Ambient temperature		-25...+70 °C		
Process pressure		Maximum 40 bar (4 MPa)		Maximum 16 bar (1.6 MPa)
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 <sub>max</sub> = (U <sub>s</sub> -11.4 V)/0.02 A Error indication: 3.8 mA or 22 mA		
		Digital communication: HART®		
		Display module: SAP-202, 6-digit LCD, dimensions, bargraph		
	Damping time	0, 3, 6...300 s (selectable)		
	Linearity error	±0.3% FS		
Temperature error	±0.02% / °C FS			
Electrical connection		2× M20×1.5 cable glands + 2× internally threaded ½" NPT connection, cable outer diameter: Ø6...12 mm (shielded cable is recommended), wire cross section: 0.5...1.5 mm <sup>2</sup>		
Electrical protection		Class III		
Ingress protection		Probe: IP68. Housing: IP67		
Weight		~2.5 kg with 0.5 m probe	~3 kg with 0.5 m probe	~2 kg with 3 m probe

Ex INFORMATION

C□□-2□□-□ Ex / C□□-3□□-□ Ex		
Protection		Intrinsic safety
Ex marking		⊕ II 1 G Ex ia IIB T6...T3 Ga
Intrinsic safety data		C <sub>i</sub> ≤ 15 nF, L <sub>i</sub> ≤ 200 μH, U <sub>i</sub> ≤ 30 V, I <sub>i</sub> ≤ 140 mA, P <sub>i</sub> ≤ 1.0 W
Temperature classification	T6...T4 temperature class	T <sub>ambient</sub> : -25...+70 °C; T <sub>medium</sub> : maximum +80...+120 °C
	T3 temperature class	T <sub>ambient</sub> : -25...+45 °C; T <sub>medium</sub> : maximum +190 °C

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				Reference probe		
	Conductive	Non-conductive			Rod	Tube	Tank wall
		ε <sub>r</sub> > 2	2 > ε <sub>r</sub> > 1.5				
Insulated probe, reference probe	■	■	-	Conductive tank	■	■	■
Partially insulated probe, reference probe	-	■	■	Non-conductive tank	■	■	-

**NIVOCAP C-200 with rod probe**

**5 years**

2-wire compact capacitive level transmitter for conductive and non-conductive liquids with partially or fully plastic-coated stainless steel rod probe

**Version / Max. temperature**

C   -    -

<b>T</b>	Transmitter / +130 °C
<b>B</b>	Transmitter with plug-in display / +130 °C
<b>H</b>	Transmitter / +200 °C
<b>P</b>	Transmitter with plug-in display / +200 °C

**Process connection size / Insulation**

C   -    -

<b>M</b>	¾" BSP / Fully PFA-insulated stainless steel
<b>Z</b>	¾" NPT / Fully PFA-insulated stainless steel
<b>R</b>	1" BSP / Fully PFA-insulated stainless steel
<b>P</b>	1" BSP / Partially PFA-insulated stainless steel
<b>A</b>	1" NPT / Fully PFA-insulated stainless steel
<b>C</b>	1" NPT / Partially PFA-insulated stainless steel
<b>S</b>	1½" BSP / Fully PFA-insulated stainless steel
<b>T</b>	1½" BSP / Partially PFA-insulated stainless steel
<b>B</b>	1½" NPT / Fully PFA-insulated stainless steel
<b>D</b>	1½" NPT / Partially PFA-insulated stainless steel
<b>1</b>	* 1" TriClamp / Fully PFA-insulated steel
<b>2</b>	* 1½" TriClamp / Fully PFA-insulated steel
<b>3</b>	* 2" TriClamp / Fully PFA-insulated steel

**Housing**

C    -     -

<b>2</b>	Painted aluminum
<b>3</b>	Fiberglass-reinforced plastic (PBT)
<b>4</b>	* Stainless steel

\* Ex version under approval

**Probe length**

C    -     -

Fully PFA-insulated	
<b>0 2</b>	0.2 m
<b>n n</b>	0.3...3 m; sold by the 100 mm
Partially PFA insulated	
<b>0 2</b>	0.2 m
<b>n n</b>	0.3...3 m; sold by the 100 mm

nn = 03...30 : 0.3...3 m

**Output / Certificates**

C    -     -

<b>2</b>	4...20 mA
<b>4</b>	4...20 mA + HART®
<b>6</b>	4...20 mA / Ex ia G
<b>8</b>	4...20 mA+ HART® / Ex ia G

Available on request: special process connections (should be given in the text of the order)

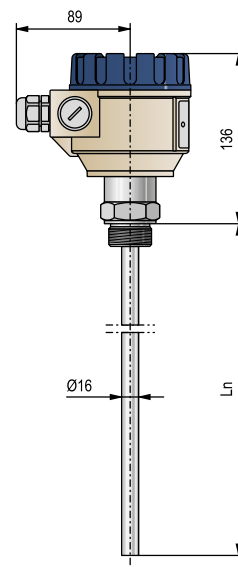
<b>X12</b>	DN40 Pipe coupling (DIN 11851)
<b>X12</b>	DN50 Pipe coupling (DIN 11851)

Accessories sold separately; see relevant page for details

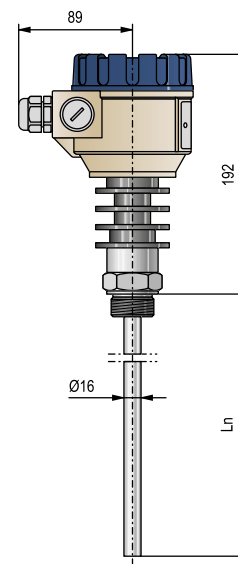
<b>S A P - 2 0 2 - 0</b>	Plug-in display module
<b>S A T - 5 0 4 - <input type="checkbox"/></b>	HART®-USB/Bluetooth® modem
<b>S A K - 3 0 5 - <input type="checkbox"/></b>	HART®-USB/RS485 modem

**Adapters**

<b>E A A - 1 8 6 - 0</b>	1" BSP / ¾" NPT (1.4571)
<b>E A A - 1 8 D - 0</b>	1" BSP / 2" BSP (1.4571)



CTR-200/300



CHR-200/300



**NIVOCAP C coaxial reference probe** **5 years**

For use with NIVOCAP rod probe capacitive level transmitters  
 Internal process connection for NIVOCAP: 1" BSP, process connection: 1½" BSP/NPT

**Connection type**

C <input type="checkbox"/> F - 1 <input type="checkbox"/> <input type="checkbox"/> - 0	
A	BSP
D	NPT

**Probe length**

C <input type="checkbox"/> F - 1 <input type="checkbox"/> <input type="checkbox"/> - 0	
0 2	0.2 m
n n	0.3...3 m; sold by the 0.1 m
nn = 03...30 : 0.3...3 m	

**NIVOCAP C reference rod probe** **5 years**

Reference rod probes for NIVOCAP rod probe type capacitance level transmitters  
 Process connection 1" BSP/NPT

**Connection type**

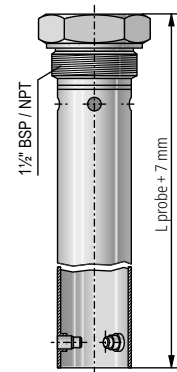
C <input type="checkbox"/> <input type="checkbox"/> - 1 <input type="checkbox"/> <input type="checkbox"/> - 0	
F	BSP thread
E	NPT thread

**Connection size / Insulation**

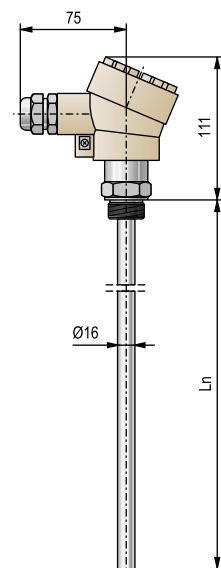
C <input type="checkbox"/> <input type="checkbox"/> - 1 <input type="checkbox"/> <input type="checkbox"/> - 0	
R	1" / Fully PFA-insulated stainless steel
p	1" / Partially-PFA insulated stainless steel

**Probe length**

C <input type="checkbox"/> <input type="checkbox"/> - 1 <input type="checkbox"/> <input type="checkbox"/> - 0	
Fully PFA-insulated	
0 2	0.2 m
n n	0.3...3 m; sold by the 100 mm
Partially PFA-insulated	
0 2	0.2 m
n n	0.3...3 m; sold by the 100 mm
nn = 03...30 : 0.3...3 m	



CAF-100



CFR-100

**NIVOCAP C-200 with cable probe**

**5 years**

2-wire compact capacitive level transmitter for conductive and non-conductive liquids with partially of fully plastic-coated stainless steel cable probe

**Version / Max. temperature**

C    -     -

<b>T</b>	Transmitter / +130 °C
<b>B</b>	Transmitter with plug-in display / +130 °C

**Process connection / Cable type**

C    -     -

<b>K</b>	1" BSP / Fully FEP-insulated steel
<b>V</b>	1½" BSP / Fully FEP-insulated steel
<b>E</b>	1" NPT / Fully FEP-insulated steel
<b>F</b>	1½" NPT / Fully FEP-insulated steel
<b>4</b>	* 1" TriClamp / Fully FEP-insulated steel
<b>5</b>	* 1½" TriClamp / Fully FEP-insulated steel
<b>6</b>	* 2" TriClamp / Fully FEP-insulated steel

**Housing**

C    -     -

<b>2</b>	Painted aluminum
<b>3</b>	Fiberglass-reinforced plastic (PBT)
<b>4</b>	* Stainless steel

\* Ex version under approval

**Probe length**

C     -      -

Fully FEP-insulated	
<b>0 1</b>	1 m
<b>n n</b>	2...20 m; sold by the meter
nn = 02...20 : 2...20 m	

**Output / Certificates**

C     -      -

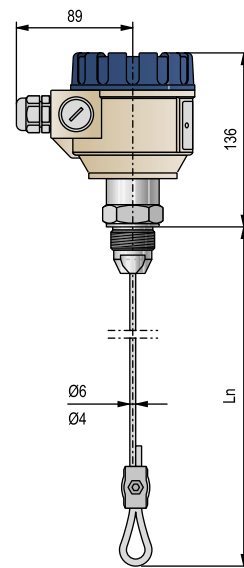
<b>2</b>	4...20 mA
<b>4</b>	4...20 mA + HART®
<b>6</b>	4...20 mA / Ex ia G
<b>8</b>	4...20 mA+ HART® / Ex ia G

**Accessories sold separately; see relevant page for details**

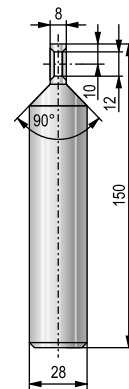
<b>CTK-103-0M-400-01</b>	stainless steel counterweight Ø28 x 150 mm
<b>S A P - 2 0 2 - 0</b>	Plug-in display module
<b>S A T - 5 0 4 -</b>	HART®-USB/Bluetooth® modem
<b>S A K - 3 0 5 -</b>	HART®-USB/RS485 modem

**Adapters**

<b>E A A - 1 8 6 - 0</b>	1" BSP / ¾" NPT (1.4571)
<b>E A A - 1 8 D - 0</b>	1" BSP / 2" BSP (1.4571)



CTK-200 / 300



CTK-103-0M-400-01