

GENERAL DESCRIPTION

NIVOCAP 2-wire capacitive level transmitters provide an ideal solution for level measurement of conductive or non-conductive liquids. The probe of the instrument and the reference probe (which can be either the metal wall of the tank or installed separately) operate as opposing plates of a capacitor. Between the plates of this capacitor the air is replaced by a medium with greater dielectric constant than the air during filling the tank, therefore the capacitance is changing directly proportional to the level. The incorporated electronic circuitry measures the capacitance difference and converts it to an output signal proportional to level.

MAIN FEATURES

- Max. 65.5 feet measurement range
- Vertical mounting
- Rod or cable probe versions
- -22 to +392 °F medium temperature
- Max. 580 psig medium pressure
- 32 point linearization table
- Indirect assignment of 0% and 100%
- 4-20 mA + HART output
- Ex version
- IP67 protection

APPLICATIONS

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

CERTIFICATIONS

- ATEX approved (Ex ia)



CHR-200

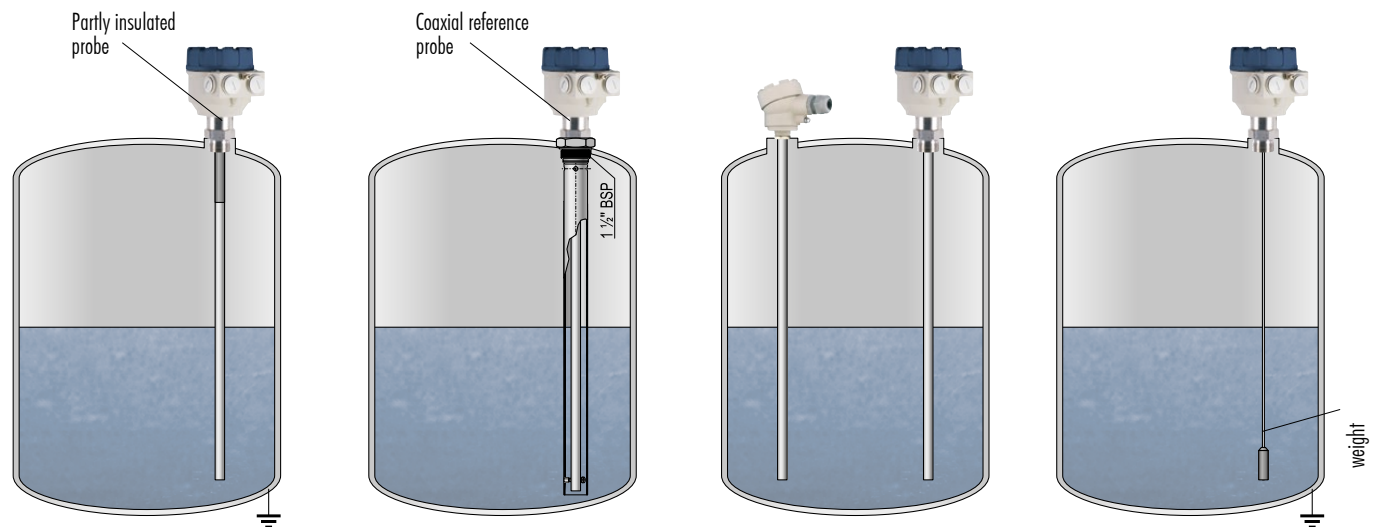
CAF-110

CFR-100

CTR-300

CTK-200

MEASUREMENT ARRANGEMENTS



Rod probe
Metal tank and non-conductive medium.
The rod probe is insulated partly 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 temp. rod probe	Cable probe
Measurement range (Ln)		7.85 - 120 inch (0.2 – 3 m)		3.3 - 65.5 ft (1 – 20 m)
Capacitance range		0 pF...5 nF		
Min. capacitance change		Max. (I _{out}) SPAN: 10 pF or 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 codes		
Material of wetted parts	Threaded part	316Ti (1.4571) stainless steel		
	Probe	Fully or partially PFA coated 304 (1.4301) stainless steel		Fully FEP coated steel cable
Housing material		Plastic (PBT), paint coated aluminium or stainless steel		
Medium temperature		-22 °F to +266 °F	-22 °F to +392 °F	-22 °F to +266 °F
Ambient temperature		-13 °F to +158 °F		
Medium pressure		max. 580 psig		max. 232 psig
Power supply / consumption		12 – 36 V DC / max. 800 mW, overvoltage protection against transients		
Output data	Output signals	Analogue: 4–20 mA (3.9...20.5 mA) $R_{max} = U_i - 11.4 V / 0.02A$ Error indication: 3.8 mA or 22 mA		
		Digital communication: 4–20 mA + HART		
		Display module: SAP-202, 6 digit LCD, dimensions, bargraph		
		Current loop test: 10 mV / 1 mA via resistor in series		
	Damping time	0, 3, 6 ... 300 sec selectable		
	Linearity error	±0.3% FS		
	Temperature error	±0.02% /°C FS		
Electrical connection		internal thread for 2x 1/2" NPT cable protective pipe + 2x M20 x1.5 cable glands cable outer diameter: Ø 0.3... Ø 0.5 inch, wire cross section: max. AWG15		
Electrical protection		Class III.		
Ingress protection		IP67		
Mass		≈ 5.5 lb with 20 inch probe	≈ 36.6 lb with 20 inch probe	≈ 4.4 lb with 10 feet probe

SPECIAL DATA FOR Ex CERTIFIED MODELS

Type		C□□-2□□-□ Ex / C□□-3□□-□ Ex
Protection type		Intrinsically safe
Ex marking		See: www.nivelco.com
Intrinsically safe data		
Temperature classification	T6...T4 temp. class	Tambient: -13 °F to +158 °F; Tmedium max. +176 °F to 248 °F
	T3 temperature class	Tambient: -13 °F to 113 °F; Tmedium max. 374 °F

PROBE SELECTION

Consequences of the capacitive operation principle: Relative dielectric constant of the medium should be taken into consideration. Measurement will be accurate only in case of suitable probe and reference probe selection.

	Medium			Reference probe		
	Conduc-tive	Non-conductive		Rod	Tube	Tank wall
		$\epsilon_r > 2$	$2 > \epsilon_r > 1.5$			
Insulated probe, reference probe	■	■	–	■	■	■
Partly insulated probe, reference probe	–	■	■	■	■	–
Conductive tank				■	■	■
Non-conductive tank				■	■	–

NIVOCAP C-200/C-300 with rod probe

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

Version / Max. temperature

C <input type="checkbox"/> <input type="checkbox"/> - <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> - <input type="checkbox"/> <input type="checkbox"/>	
T	Transmitter / 130°C
B	Transmitter with local LCD indicator / 130°C
H	Transmitter / 200°C
P	Transmitter with local LCD indicator / 200°C

Process connection size / Insulation

C <input type="checkbox"/> <input type="checkbox"/> - <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> - <input type="checkbox"/> <input type="checkbox"/>	
M	3/4" BSP / Fully PFA insulated stainless steel
Z	3/4" NPT / Fully PFA insulated stainless steel
R	1" BSP / Fully PFA insulated stainless steel
P	1" BSP / Partially PFA insulated stainless steel
A	1" NPT / Fully PFA insulated stainless steel
C	1" NPT / Partially PFA insulated stainless steel
S	1 1/2" BSP / Fully PFA insulated stainless steel
T	1 1/2" BSP / Partially PFA insulated stainless steel
B	1 1/2" NPT / Fully PFA insulated stainless steel
D	1 1/2" NPT / Partially PFA insulated stainless steel

Housing

C <input type="checkbox"/> <input type="checkbox"/> - <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> - <input type="checkbox"/> <input type="checkbox"/>	
2	Aluminium (paint coated)
3	Plastic, PBT, glass fibre reinforced
4 *	Stainless steel

* Ex version under approval

Probe length

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

Output / Approval

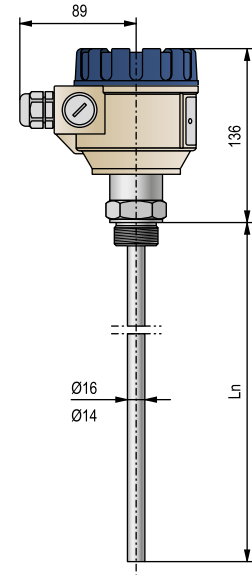
C <input type="checkbox"/> <input type="checkbox"/> - <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> - <input type="checkbox"/> <input type="checkbox"/>	
2	4-20 mA
4	4-20 mA + HART
6	4-20 mA / Ex
8	4-20 mA+ HART / Ex

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

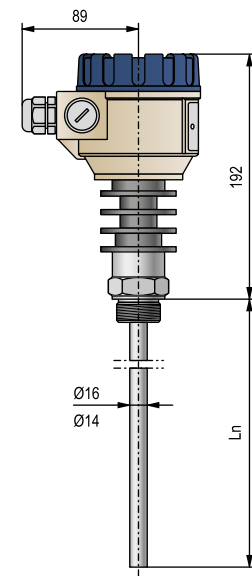
X07	1 1/2" Triclamp (ISO 2852)
X07	2" Triclamp (ISO 2852)
X12	DN40 Pipe coupling (DIN 11851)
X12	DN50 Pipe coupling (DIN 11851)

Accessories to order (see relevant page for details)

CBR-205-2M-900-01	Adapter 1" BSP / 3/4" NPT (1.4571)
CBR-205-2M-900-02	Adapter 1" BSP / 2" BSP (1.4571)
S A P - 2 0 2 - 0	Plug-in display module
S A T - 3 0 4 - 0	HART-USB modem
S A K - 3 0 5 - 2	HART-USB/RS485 modem
S A K - 3 0 5 - 6	HART-USB/RS485 modem / Ex ia



CTR-200 / 300



CHR-200 / 300

NIVOCAP C coaxial reference probe

For use with NIVOCAP rod probe type capacitance level transmitters
 Internal process connection for NIVOCAP: 1" BSP, process connection: 1 1/2" BSP/NPT

Connection type

C F - 1 - 0

A BSP
 D NPT

Probe length

C F - 1 - 0

0 2 0.2 m
 n n 0.3-3 m; each started 0.1 m

nn = 03-30 : 0.3-3 m

NIVOCAP C reference rod probe

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

Connection type

C - 1 - 0

F BSP
 E NPT

Connection size / Insulation

C - 1 - 0

R 1" / Fully PFA insulated stainless steel
 P 1" / Partially PFA insulated stainless steel

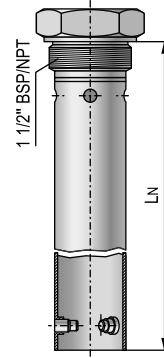
Probe length

C - 1 - 0

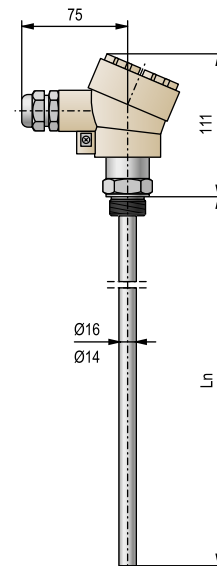
Fully PFA insulated
 0 2 0.2 m
 n n 0.3-3 m; each started 100 mm

Partially PFA insulated
 0 2 0.2 m
 n n 0.3-3 m; each started 100 mm

nn = 03-30 : 0.3-3 m



CAF-100



CFP-100

NIVOCAP C-200/C-300 with cable probe

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

Version / Max. temperature

C	□ □ - □ □ □ □ - □
T	Transmitter / 130°C
B	Transmitter with local LCD indicator / 130°C

Process connection / Cable type

C	□ □ - □ □ □ □ - □
K	1" BSP / Fully FEP insulated steel
V	1 1/2" BSP / Fully FEP insulated steel
E	1" NPT / Fully FEP insulated steel
F	1 1/2" NPT / Fully FEP insulated steel

Housing

C	□ □ - □ □ □ □ - □
2	Aluminium (paint coated)
3	Plastic, PBT, glass fibre reinforced
4	* Stainless steel

* Ex version under approval

Probe length

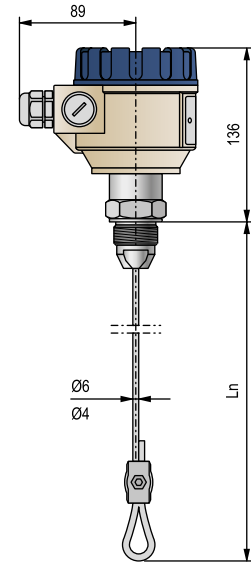
C	□ □ - □ □ □ □ - □
Fully FEP insulated	
0 1	1 m
n n	2-20 m; each started 1 m
Partially FEP insulated	
0 1	1 m
n n	2-20 m; each started 1 m
nn = 02-20 : 2-20 m	

Output / Approval

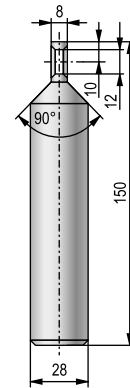
C	□ □ - □ □ □ □ - □
2	4-20 mA
4	4-20 mA + HART
6	4-20 mA / Ex ia
8	4-20 mA+ HART / Ex ia

Accessories to order (see relevant page for details)

CTK-103-0M-400-01	St.st. counterweight Ø 28x150 mm
CBR-205-2M-900-01	Adapter 1" BSP / 3/4" NPT (1.4571)
CBR-205-2M-900-02	Adapter 1" BSP / 2" BSP (1.4571)
S A P - 2 0 2 - 0	Plug-in display module
S A T - 3 0 4 - 0	HART-USB modem
S A K - 3 0 5 - 2	HART-USB/RS485 modem
S A K - 3 0 5 - 6	HART-USB/RS485 modem / Ex ia



CTK-200 / 300



CTK-103-0M-400-01

NIVOCAP CNR-100 X28

Capacitance level transmitter with coaxial rod probe,
3/4" process connection and paint coated aluminium housing with 2" height

Process connection size

C R - 1

N	3/4" NPT
T	3/4" BSP

Probe length

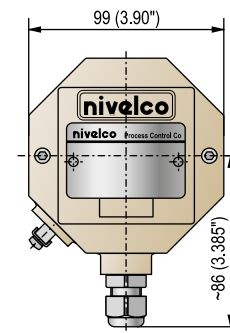
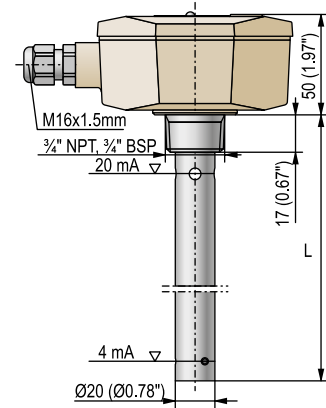
C R - 1

nn	7.9"-5 ft (0.3-1.5 m); each started 4" (100 mm)
nn = 03-15	: 7.9"-5 ft (0.3-1.5 m)

Power supply / Output

C R - 1

3	16-30 V DC / 0-10 V
4	12-30 V DC / 4-20 mA



CTR-1054-X28