

## CPC-C-70



- capacitive level meters
- for continuous level measurement of liquids or bulk-solid materials
- current (4...20 mA) output with HART communication
- measured data in real time on the display (OLED or LCD)
- variants with rope, rod or co-axial electrodes
- variants with fully coated electrodes for aggressive or electrically conductive media
- a wide range of applications, direct installation in storage tanks, vessels, silos, sumps etc.
- as compared with non-contact level meters, measurement is working in full range (no dead zone at the beginning and end of the electrode)
- contrary to radar level meters, media with extremely low dielectric constants ( $\epsilon_r$ ) are measured
- copying the configuration between level meters using the display module



Capacitive level meters **CPC-C-70** are compact measuring devices consisting of the level meter body and a measuring electrode. The level meter body contains measurement electronics and a display module. The electronics measure the electrical capacity of the electrode system, which depends on the level height. The level meter's electrical output corresponds to the capacity (level height) and the measured data are shown on the meter's display.

The level meter can be adjusted by means of a display and adjustment module positioned at the top of sensor under the transparent lid. The level meter has a 4...20 mA current output with HART communication. The level meter is fed by means of a cable connected to the terminal block located under the display and adjustment module.

Level meters are available in several sensing electrode modifications (rod and rope-type electrodes). Electrodes may be coated with insulation, which is important for their functioning in the case of adherent, electrically conductive and aggressive media. Rod electrodes are also available in a version provided with a reference tube or a pair of parallel electrodes for measuring liquids in non-conductive tanks.

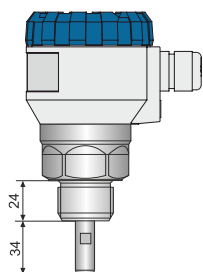
### VARIANTS OF LEVEL METERS

- **CPC-C-70\_00**     **Without electrode** (types 10 or 30 only) and attaches it to the electrode holder using M8 threaded connection.
- **CPC-C-70\_10**     **Uncoated stainless steel rod electrode** for level measurement of electrically non-conductive liquids (oils, diesel fuel) and bulk solids (flour, sand, cement, granulated plastic materials, etc.). Length 0.2 ... 8 m
- **CPC-C-70\_11**     **Coated stainless steel rod electrode (PFA)** with enhanced resistance to penetration (diffusion) of vapours and gases. For level measurement of water and other electrically conductive liquids in food processing, pharmaceutical, and chemical industries. It can be used temporarily for high-temperature applications (e.g. sanitization with hot steam) or for volatile aggressive liquids, etc. Length 0.2 ... 3 m
- **CPC-C-70\_12**     **Coated stainless steel rod electrode (FEP)**, suitable for level measurement of water and other electrically conductive liquids. Also suitable for impure liquids in metallic tanks, concrete sumps, etc. Length 0.2 ... 3 m
- **CPC-C-70\_13**     **Semi-coated stainless steel rod electrode (FEP)** for level measurement of electrically non-conductive liquids in environments where partial condensation of vapours on the electrode may occur. Length 0.5 ... 8 m
- **CPC-C-70\_20**     **Uncoated stainless steel rod electrode with reference tube** for level measurement of unpolluted and electrically non-conductive liquids (oil, diesel fuel, petrol). Length 0.2 ... 3 m.
- **CPC-C-70\_22**     **Coated stainless steel rod electrode (FEP) with reference tube** for level measurement of clean electrically conductive liquids (e.g. in plastic and glass tanks) and for higher measuring accuracy. Length 0.2 ... 3 m.
- **CPC-C-70\_30**     **Uncoated stainless steel rope electrode and weight** for level measurement of bulk solids (sand, flour, cement, etc.). The rope can also be shortened. Length 1 ... 20 m.
- **CPC-C-70\_31**     **Uncoated stainless steel rope electrode and coated dynamic anchor** for measurement of bulk solids in taller silos. Length 1 ... 20 m.
- **CPC-C-70\_32**     **Fully coated stainless steel rope electrode and weight (FEP rope insulation, FEP weight insulation)** designed for level measurement of electrically conductive and non-conductive liquids. Length 1 ... 15 m.
- **CPC-C-70\_61**     **Two coated stainless steel rod electrodes (PFA electrode insulation, PTFE head)** for level measurement of aggressive liquids. Length 0.2 ... 2 m.

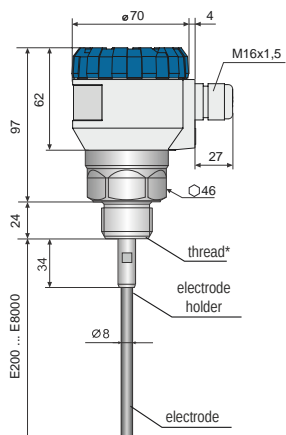


DIMENSION DRAWINGS

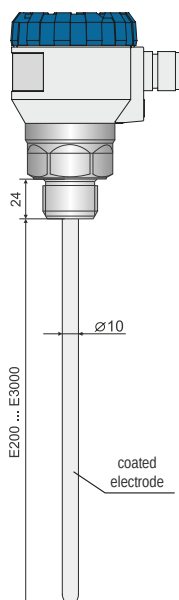
CPC-C-70\_00



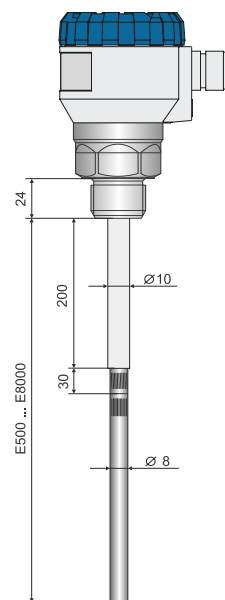
CPC-C-70\_10



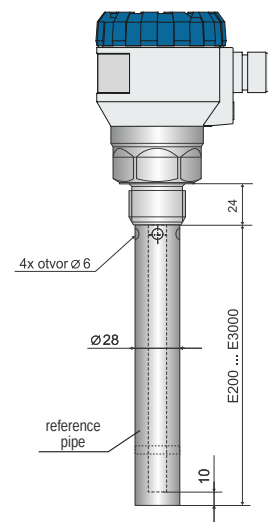
CPC-C-70\_11, 12



CPC-C-70\_13

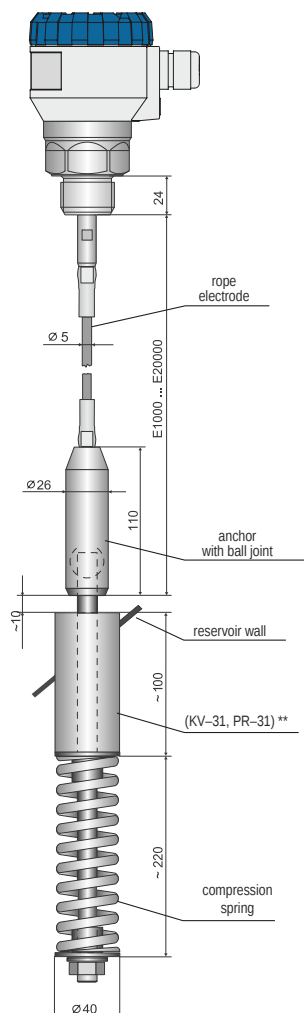


CPC-C-70\_20, 22

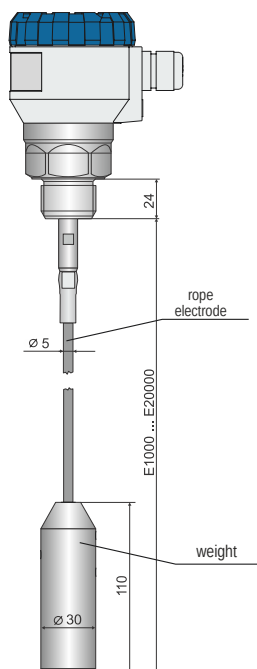


\* Types of thread: G1"  
(except type CPC-C-70\_61),  
1 NPT (except type CPC-C-70\_61)

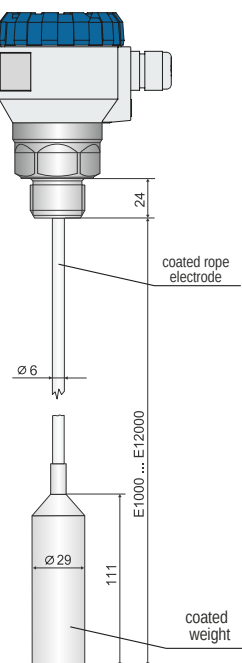
CPC-C-70\_31



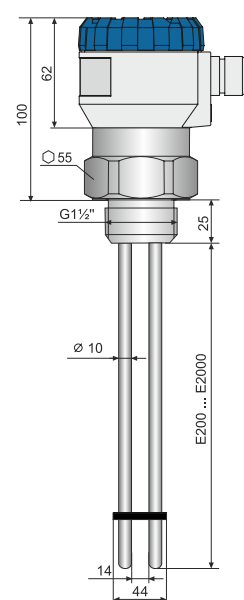
CPC-C-70\_30



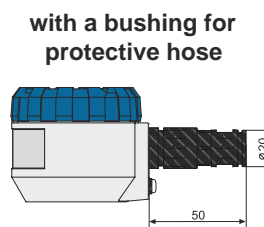
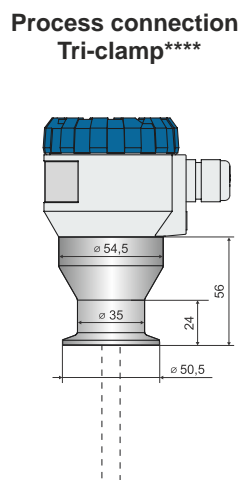
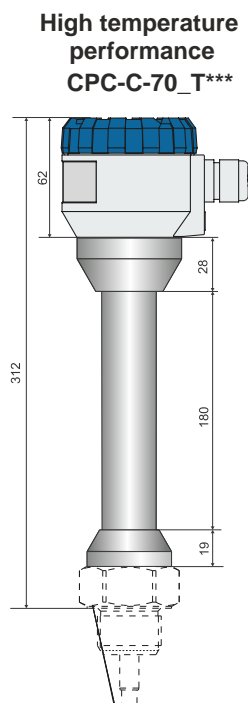
CPC-C-70\_32



CPC-C-70\_61



\*\* anchor roll KV-31 or dust proof bushing PR-31  
(see accessories)



\*\*\* Except type CPC-C-70\_-61

\*\*\*\* Only for type CPC-C-70\_-11 (12, 13, 32)

### Technical specification - level meter

Supply voltage	18 ... 36 V DC
Output	4 ... 20 mA (two-wire), HART®
Current output resolution	10 µA
Capacity range	0 to 3,000 pF
Resolution	0.01 pF for capacities from 0 to 300 pF 0.1 pF for capacities from 300 to 3,000 pF
Temperature error (for a temperature range from -30 to 70°C)	<1 pF up to 100 pF <1% of the measured value from 100 to 3,000 pF
Measuring frequency	100 to 800 kHz
Non-linearity (electronics)	max. 1%
Damping (time constant)	Adjustable 0 ... 99 sec
Maximum slew rate	<1 sec (0 ... 100%) ; for damping 0 sec
Current output error	max. 80 µA
Display/settings	display module
Protection class	IP67
Maximal resistance of current output load R <sub>max</sub> for voltage - 24V DC / 22V DC / 20V DC	270 / 180 / 90 <sup>2)</sup>
Maximum length of measuring electrodes	see dimensional drawing
Ambient temperature range	-30°C to +70°C
Recommended cable	PVC 2x 0.75 mm <sup>2</sup> shielded
Cable gland tightening torque	3 Nm
Weight – without electrode	approx. 0.5 kg (1 kg NT variant)

### Technical specification - display module

Display type		matrix OLED, LCD <sup>1)</sup>
Resolution		128 × 64 pixels
Digit height / Number of displayed digits of the measured quantity		9 mm / 5 digits
Display colour	OLED	yellow
	LCD	black with white background light
Type of keys		membrane type with low travel distance
Ambient temperature range	OLED	-30 ... +70°C
	LCD	-20 ... +70°C
Weight		46 g

1) OLED - suitable for internal applications and applications at reduced lighting levels. LCD - suitable for outdoor applications, especially with direct sunlight.  
2) Including resistor 250R with connection with HART.



Used materials		
Sensor part	Variants	Standard material
Lid	All types	aluminium alloy with coating
Glass	All types	polycarbonate
Body	All types	aluminium alloy with coating
Housing with thread or with Tri-Clamp	All types, except 61 CPC-C-70_-61	St. Steel W. Nr. 1.4404 (AISI 316 L) mat. PTFE
Electrode	CPC-C-70_-10(11,12,13,20,22,61) CPC-C-70_-30(31,32)	St. Steel W. Nr. 1.4404 (AISI 316 L) St. Steel W. Nr. 1.4401 (AISI 316 )
Electrode coating	CPC-C-70_-11,61 CPC-C-70_-12,13,22,32	PFA FEP
Reference tube	CPC-C-70_-20,22	St. Steel W. Nr. 1.4301 (AISI 304)
Weight	CPC-C-70_-30,31	St. Steel W. Nr. 1.4301 (AISI 304)
Weight coating	CPC-C-70_-32	PTFE
Anchorage	CPC-C-70_-31	Steel / St. Steel W. Nr. 1.4401 (AISI 316)
Display module	All types	plastic material POM
Cable gland	CPC-C-70N(NT)	plastic - polyamide

Device classification (according to EN 60079-10-1 and EN 60079-10-2)		
Sensor performance	electrode type	Device classification
CPC-C-70N	all types	Basic performance for use in non-explosive areas.
CPC-C-70NT	all types	High-temperature performance for use in non-explosive areas (max. 200°C)

Process connection		
name	dimension	marking
Pipe thread	G 1" (G1½ for type CPC-C-70_-61)	G1 (G for type 61)
Tapered pipe thread	NPT 1"	NPT
Seamless connection – Tri-Clamp	ø50.5 mm or ø64 mm	Cl50 (for ø50.5 mm) or Cl64 (for ø64 mm)

Temperature and pressure resistivity					
variant	temperature tm	temperature tp	temperature ta	max. overpressure for temperature tp	
				up to 30°C	up to 85°C
CPC-C-70N-10	-40°C ... +300°C	-40°C ... +85°C	-30°C ... +70°C	15 MPa	10 MPa
CPC-C-70N-11(12,13)	-40°C ... +200°C	-40°C ... +85°C	-30°C ... +70°C	4 MPa	2,5 MPa
CPC-C-70N-20	-40°C ... +200°C	-40°C ... +85°C	-30°C ... +70°C	15 MPa	10 MPa
CPC-C-70N-22	-40°C ... +200°C	-40°C ... +85°C	-30°C ... +70°C	4 MPa	2 MPa
CPC-C-70N-30 (31 s KV)	-40°C ... +200°C	-40°C ... +85°C	-30°C ... +70°C	15 MPa	10 MPa
CPC-C-70N-31 s PR	-40°C ... +130°C	-40°C ... +85°C	-30°C ... +70°C	15 MPa	10 MPa
CPC-C-70N-32	-40°C ... +130°C	-40°C ... +85°C	-30°C ... +70°C	1 MPa	0.5 MPa
CPC-C-70N-61	-40°C ... +200°C	-40°C ... +85°C	-30°C ... +70°C	0.1 MPa	0.1 MPa

Temperature resistivity (high-temperature performance)			
variant	temperature tm	temperature tp	temperature ta
CPC-C-70NT-10	-40°C ... +300°C	-40°C ... +200°C	-30°C ... +70°C
CPC-C-70NT-11(12,13)	-40°C ... +200°C	-40°C ... +200°C	-30°C ... +70°C
CPC-C-70NT-20(22)	-40°C ... +200°C	-40°C ... +200°C	-30°C ... +70°C
CPC-C-70NT-30 (31 s KV)	-40°C ... +200°C	-40°C ... +130°C	-30°C ... +70°C
CPC-C-70NT-31 s PR	-40°C ... +130°C	-40°C ... +130°C	-30°C ... +70°C
CPC-C-70NT-32	-40°C ... +130°C	-40°C ... +130°C	-30°C ... +70°C
CPC-C-70NT-61	-	-	-

Note: For correct operation of the level meter, none of the specified temperature ranges (tp, tm or ta) must be exceeded.



Pressure resistivity (high-temperature performance)					
variant	maximum overpressure for temperature $t_p$				
	up to 30°C	up to 85°C	up to 130°C	up to 160°C	up to 200°C
CPC-C-70NT-10(20, 30)	15 MPa	10 MPa	3 MPa <sup>1)</sup>	2 MPa <sup>1)</sup>	1 MPa <sup>1)</sup>
CPC-C-70NT-11(12,13,22)	4 MPa	2.5 MPa	2 MPa	1.5 MPa	0.3 MPa
CPC-C-70NT-32	1 MPa	0.5 MPa	0.1 MPa	-	-
CPC-C-70NT-61(31)	-	-	-	-	-

1). The above-mentioned values do not apply to hot water, aqueous solutions and steam, in such cases the use must be consulted with the manufacturer.

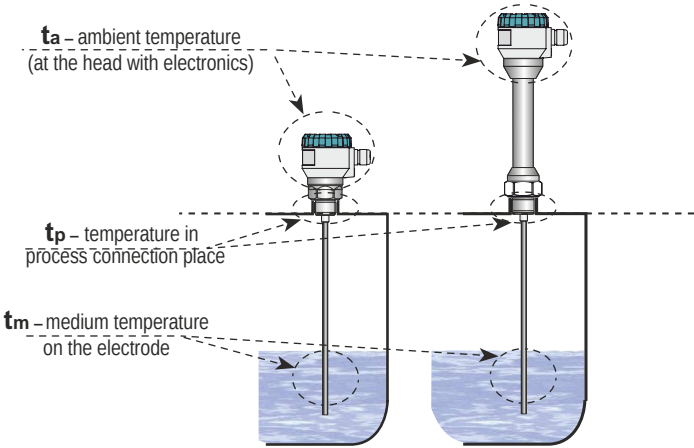
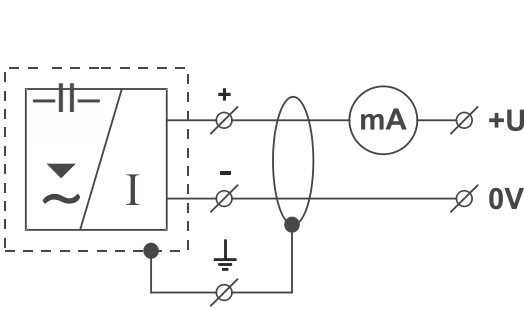


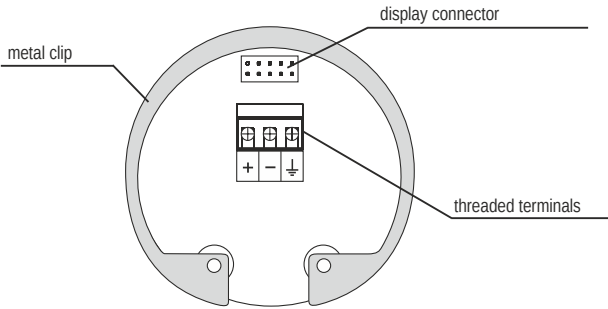
Illustration of temperature measurement areas

ELECTRICAL CONNECTION

The level meter is connected to the follow-up (evaluation) device using a suitable cable with an outer diameter of 6 - 8 mm by means of screw terminals located under the display module. The recommended wire cross-section is  $2 \times 0.5 - 0.75 \text{ mm}^2$  (shielded) for the current version. The positive pole (+U) is connected to the (+) terminal, the negative pole (0V) to the (-) terminal, and the shield (only for shielded cables) is connected to the ( $\perp$ ) terminal.



Connection diagram of level meter with current output CPC-C-70\_...-I



Internal view of threaded terminals of level meter with current output CPC-C-70\_...-I



## SETTINGS

Setting is done using the 3 buttons located on the display module. All setting items are available in the level meter menu.

### Button

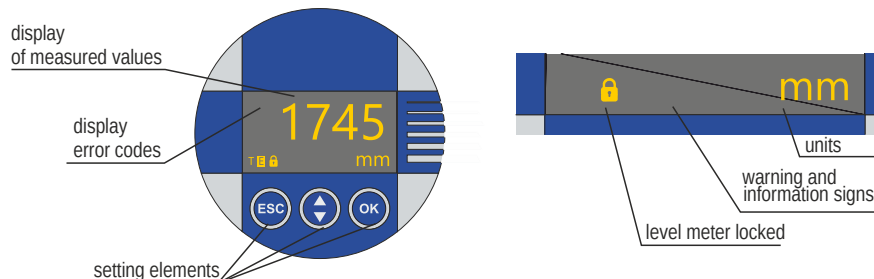
- access to the setting menu
- acknowledgement of the selected menu item
- cursor movement in line
- saving settings

### Button


- navigation in menu
- changing values

### Button

- cancelling changes
- moving up a level




*\* flashes intermittently when receiving a reflected signal (echo) from the measured level*

 The level meter, type CPC-C-70\_ \_ \_ \_ \_L, is supplied without the DM-70 display module. To set up the level meter it is necessary to connect a display module (or it can be configured via HART). When the set-up is complete, the display module can be disconnected and the level meter takes measurements without it.

## STATUS AND FAILURE INDICATION

### • Status indication (lower left corner of the display):

**symbol ** – **lights permanently** – the level meter is locked against unauthorized settings; a password is required for unlocking (see MENU – PASSWORD)

### • Warning signs:

**FIXED OUTPUT** – the output current is fixed to a constant value (see MENU – DIAGNOSTIC – CURRENT)

**LOW POWER** – low supply voltage (it must be within the specified range – see TECHNICAL SPECIFICATIONS)

**NO PASSWORD** – when changing the locked level meter settings

**NO DATA AVAILABLE** – display module doesn't communicate with the electronics of the level meter (e.g. incorrectly inserted display module into connector or measuring module is not functional).

### • Information signs:

**CAPACITY** – actual capacity displayed (see DIAGNOSTIC – CAPACITY)

**CURRENT** – actual current displayed (see DIAGNOSTIC – CURRENT)

### • Error codes:

(see in manual chapter 21. „Error Codes”)



ORDER CODE

CPC-C-70   -   -   - I -  -  - E

**electrode length in [mm]**

**set-up elements:**

**D** : version with OLED display

**C** : version with LCD display

**L** : without display, full lid

**electrical connection:**

**B1** : plastic cable gland M16, not possible for the NS, NTS performance

**B2** : plastic cable gland M20, not possible for the NS, NTS performance

**H1** : plastic cable gland for protective hose, not possible for the NS, NTS

**S1** : stainless steel cable gland M16, only for the NS, NTS

**material of the inner o-rings:**

**V** : material FPM, not selectable for electrode types 11, 12, 13, 32, 22, 61

**E** : material EFDM, not selectable for electrode types 11, 12, 13, 32, 22, 61

**B** : material NBR, not selectable for electrode types 11, 12, 13, 32, 22, 61

**F** : material FFPM, not selectable for electrode types 11, 12, 13, 32, 22, 61

**process connection:**

**G1** : pipe thread G1", housing material stainless steel (W. Nr. 1.4404 / AISI 316L), cannot be selected for performance type 61

**G1Y** : thread G1", housing material nickel-based alloy (W. Nr. 2.4856 / ALLOY 825), cannot be selected for performance type 00, 10, 20, 22, 30, 31, 61

**G** : pipe thread G1½", only for performance type 61

**CI50** : Tri-Clamp Ø 50.5 mm, only for performance types 11, 12, 13, 32

**CI64** : Tri-Clamp Ø 64 mm, only for performance types 11, 12, 13, 32

**NPT** : NPT 1" thread, only for performance types 00, 10, 30, 31, cannot be used for NT performance type

**type of electrode:**

**00** : without electrode (G1Y, G1½, CI50, CI64 process connection cannot be selected)

**10** : uncoated stainless steel rod electrode, length 0.2 ... 8 m (G1Y, G1½, CI50, CI64 process connection cannot be selected)

**11** : fully coated stainless steel rod electrode (PFA insulation), length 0.2 ... 3 m (NPT, G1½ process connection cannot be selected)

**12** : fully coated stainless steel rod electrode (FEP insulation), length 0.2 ... 3 m (NPT, G1½ process connection cannot be selected)

**13** : semi-coated rod electrode (FEP insulation), length 0.5...8 m (NPT, G1½ process connection cannot be selected)

**20** : uncoated stainless steel rod electrode with reference tube, length 0.2 ... 3 m (only with G1 process connection)

**22** : coated stainless steel rod electrode with reference tube (FEP insulation), length 0.2 ... 3 m (only with G1 process connection)

**30** : uncoated rope electrode, length 1 ... 20 m (G1Y, G1½, CI50, CI64 process connection cannot be selected)

**31** : uncoated rope electrode with anchor, length 1 ... 20 m (G1Y, G1½, CI50, CI64 process connection cannot be selected)

**32** : electrode with insulated cable (FEP) and insulated weight (FEP), length 1 ... 15 m (NPT, G1½ process connection cannot be selected)

**61** : two fully coated stainless steel rod electrodes (PFA insulation), length 0.2 ... 2 m, not applicable for NT performance (only with G1½ process connection)

**performance:**

**N** : basic performance

**NS** : basic performance, stainless steel housing and lid (only for electrical connection S1)

**NT** : high temperature performance

**NTS** : high temperature performance, stainless steel housing and lid (only for electrical connection S1)

CORRECT SPECIFICATION EXAMPLES

CPC-C-70N-10-G1-I-B-D-E7000

(N) Normal performance; (10) uncoated stainless steel rod electrode; (G1) Process connection G1" thread; (I) Output type: current; (B) Connection method: short cable gland; (D) Setting elements: basic version with OLED display; (E7000) Electrode length 7000 mm.

CPC-C-70NT-12-G1-I-H-L-E1000

(NT) High temperature performance; (12) coated stainless steel rod electrode (FEP); (G1) Process connection G1" thread; (I) Output type: current; (H) Connection method: cable gland for protective hose; (L) Setting elements: without display, full cap; (E1000) Electrode length 1000 mm.

ACCESSORIES

standard (included in the level meter price)

- 1 x seal (asbestos-free), other seals by request (PTFE, Al., etc.) \*

\* except type 61

optional - for a surcharge

- steel welding flange G1, G1½
- stainless steel welding flange G1, G1½
- fixing nut G1, G1½ (stainless steel, plastic)
- anchor roll KV-31 (for CPC-C-70-31 only)
- dust proof bushing PR-31 (for CPC-C-70-31 only)
- extension cable for PK-70-1 display

SAFETY, PROTECTIONS, COMPATIBILITY AND EXPLOSION PROOF

This equipment has been issued with a Declaration of Conformity pursuant to Act No. 90/2016 Sb., as amended. The electrical equipment supplied complies with the requirements of applicable government regulations on safety and electromagnetic compatibility.

