

CPC-GR-70



- radar level meters with guided wave (TDR)
- for continuous level measurement of liquids, mashies, bulk-solid materials and powders
- immediate view of the measured values on OLED or LCD display units
- universal use, direct mounting into containers, silos, vessels, reservoirs
- variants with rod or rope electrode
- measuring range up to 40 m
- current output (4...20 mA) with HART protocol or output RS-485 Modbus
- stainless steel design suitable for the food and pharmaceutical industries



The **CPC-GR-70** radar level meters are compact measuring devices consisting of two main parts – a level meter (housing) and a display module (display). The electronics transmits very short electrical pulses (0.5 ns), which are linked to a one-wire transmission line (measuring electrode). Measuring electrode can be created of rod or rope. The pulse propagates along the electrode in the form of electromagnetic wave toward the level surface, where it is partly reflected and the reflected component is returned to the receiving module of the electronics.

The electronics measures the time of flight of electromagnetic wave and the instant distance to the surface level is calculated. Then based on the height of the level, the level meter current output 4...20 mA is set with the HART communications or an industrial RS-485 line with Modbus RTU communications and the measured value is shown on the display.

Radar level meters with guided wave are suited to continuous level measurement of various liquid, mush and bulk-solid materials. Level meters are resistant against changes in the atmosphere (pressure, temperature, dust, steam) and to changes in medium parameters (change in dielectric constant, conductivity).

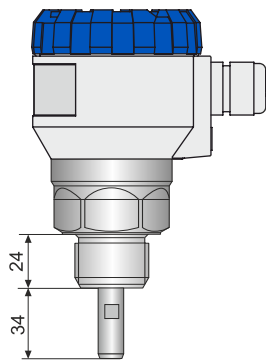
VARIANTS OF LEVEL METERS

CPC-GR-70_-00	Without electrode
CPC-GR-70_-10	Uncoated stainless steel rod electrode; 0,5 ... 8 m
CPC-GR-70_-11	Fully coated stainless steel rod electrode (PFA); 0,5 ... 2 m
CPC-GR-70_-12	Fully coated stainless steel rod electrode (FEP); 0,5 ... 2 m
CPC-GR-70_-13	Semi-coated stainless steel rod electrode (FEP); 0,5 ... 8 m
CPC-GR-70_-20	Uncoated stainless steel rod electrode with reference tube; 0,5 ... 3 m
CPC-GR-70_-24	Uncoated stainless steel rod electrode with reference tube (coaxial), for measurement of the interface between two different liquid media; 0,5 ... 3 m
CPC-GR-70_-30	Uncoated stainless steel rope electrode and weight; 1 ... 40 m
CPC-GR-70_-32	Fully coated stainless steel rope electrode (FEP) and coated weight (FEP); 1 ... 15 m
CPC-GR-70_-33	Uncoated stainless steel rope electrode with anchorage; 1 ... 40 m
CPC-GR-70_-34	Coated stainless steel rope electrode (Polyamide) and uncoated weight; 1 ... 40 m
CPC-GR-70_-35	Coated stainless steel rope electrode (Polyamide) with uncoated anchorage; 1 ... 40 m
CPC-GR-70_-36	Non-insulated rope electrode without weights; 1 ... 40 m
CPC-GR-70_-37	Insulated rope electrode without weights (polyamide rope insulation); 1 ... 40 m

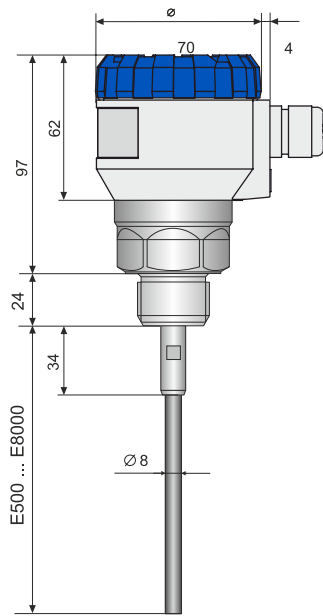


DIMENSION DRAWINGS

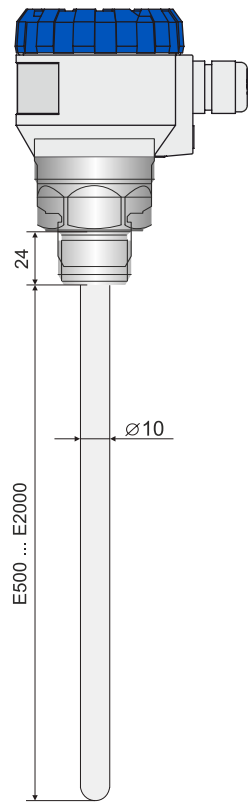
CPC-GR-70_-00



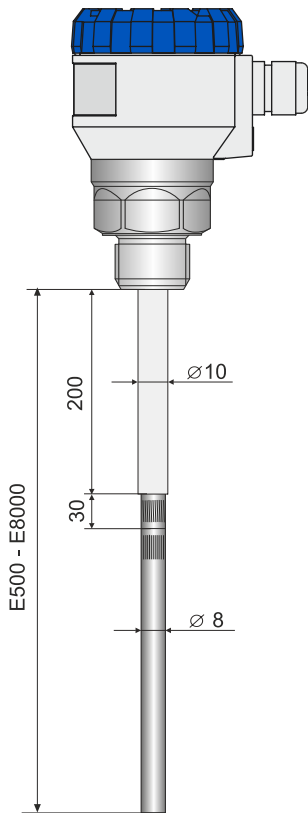
CPC-GR-70_-10



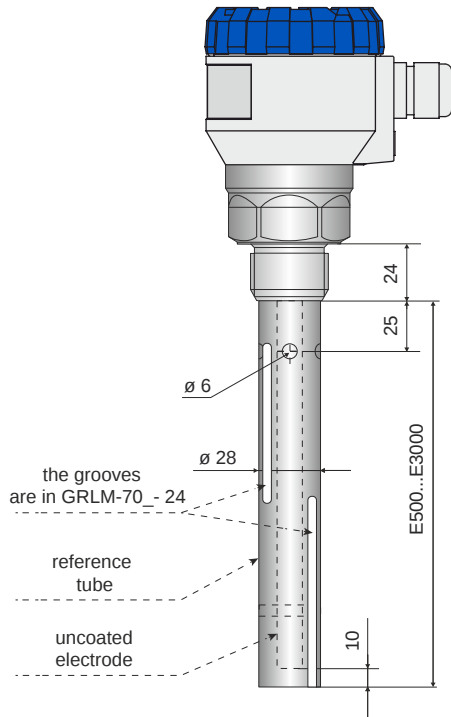
CPC-GR-70_-11 (12)



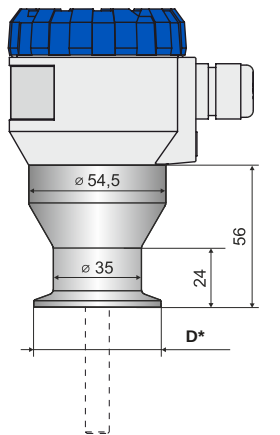
CPC-GR-70_-13



CPC-GR-70_-20 (24)

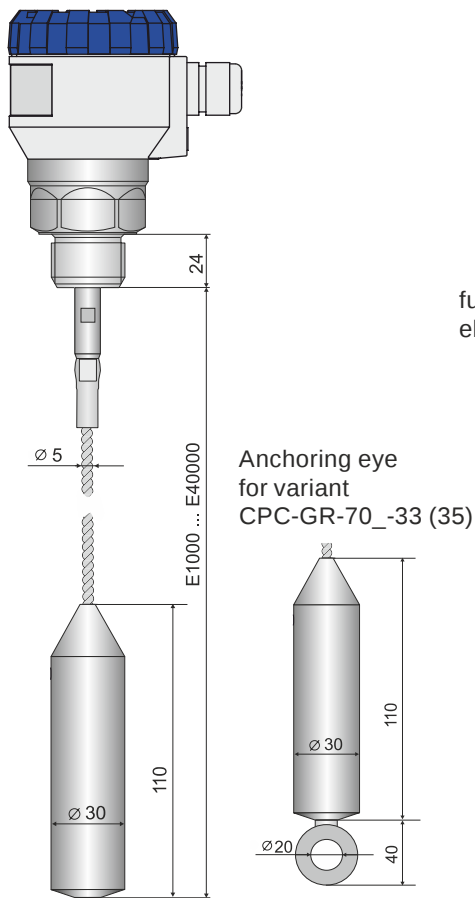


Tri- Clamp



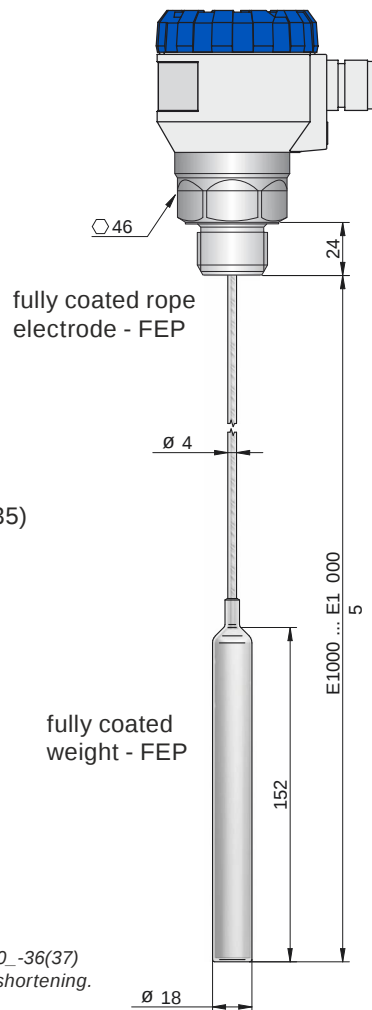
* D: Tri-Clamp CI50 (Ø 50,5 mm)
Tri-Clamp CI64 (Ø 64 mm)

CPC-GR-70_-30 (33,34,35)

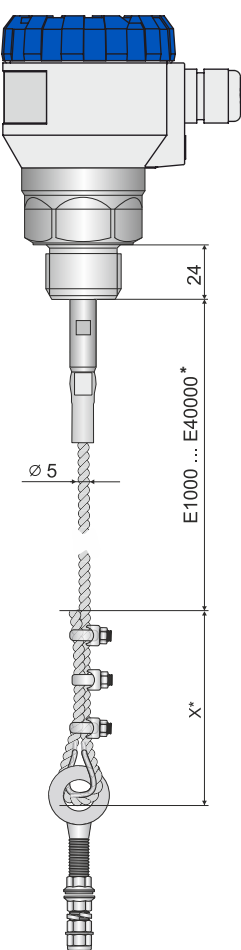


* Please refer to the instructions for the CPC-R-70_-36(37) version for details on rope length, attachment or shortening.

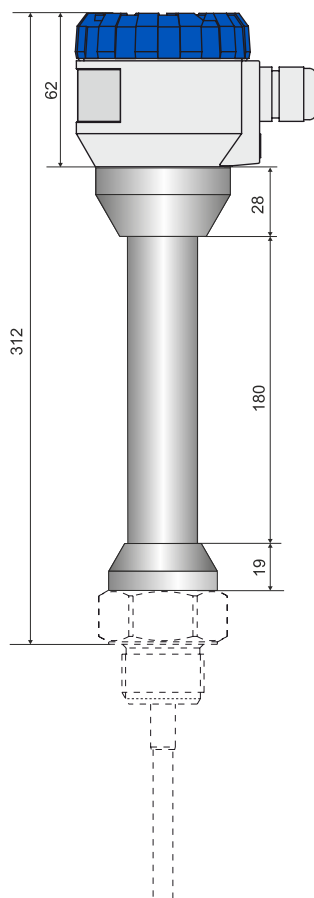
CPC-GR-70_-32



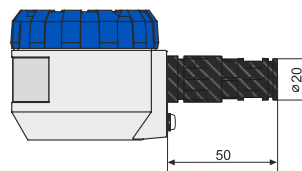
CPC-GR-70_-36 (37)



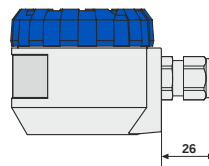
High temperature performance CPC-GR-70_T



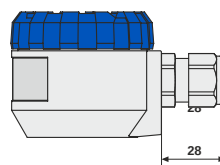
performance of cable gland



variant "H1"
with protective conductor



variant "B1, (D1, S1)"
with cable gland M16



variant "B2 (B3, D2, D3)"
with cable gland M20

Technical specification - level meter		
Supply voltage	CPC-GR-70N(T)-__	18 ... 36 V DC
Output type	CPC-GR-70__-_-I CPC-GR-70__-_-M	4 ... 20 mA with HART RS-485 / Modbus RTU
Current consumption	CPC-GR-70__-_-I CPC-GR-70__-_-M	4 ... 20 mA / max. 22 mA type 10 mA / max. 30 mA
Basic measurement accuracy (for reference reflecting surface)		± 2 mm
Error of current output ²⁾		max. 80 µA
Resolution		0,1 mm
Maximal length of measuring electrode	CPC-GR-70__10 (13)	8 m
	CPC-GR-70__11 (12)	2 m
	CPC-GR-70__20 (24)	3 m
	CPC-GR-70__30 (33, 34, 35)	40 m
	CPC-GR-70__32	15 m
Adjustable measuring range (SPAN)		min. 200 mm
Measurement sensitivity (8 degrees)		low (1) - medium (3) - high (5) - user (1 - 8)
Failure indication (echo loss) adjustable in modes		3,75 mA, 4 mA, 20 mA, 22 mA, LAST ⁴⁾
Damping		1 ... 99 s
Rise time		approx. 60 s
Leakage resistance electrode - housing		10 kΩ
Coupling capacity (housing - power) / dielectric strength		5 nF/500 V AC
Maximal resistance of current output load R _{max} for voltage - 24V DC / 22V DC / 20V DC		270 Ω / 180 Ω / 90 Ω ⁵⁾
Maximum tensile strength of the rope electrode		1400 kg ⁶⁾
Ambient temperature range ⁷⁾		-30 ... +70°C
Process temperature range ⁷⁾		-40 ... +200°C
Media temperature range ⁷⁾		-40 ... +300°C
Process pressure (for temperature +85°C)	CPC-GR-70N-10 (00, 20, 24, 30, 33, 34, 35, 36, 37)	0 ... 100 bar
	CPC-GR-70N-11 (12, 13)	0 ... 20 bar
	CPC-GR-70N-32	0 ... 5 bar
Protection class		IP67

1) Metal circular plate 0,5 m², type with reference tube CPC-GR-70__20 water.

2) This error only applies to the current output version. Data outputs (HART, MODBUS) are not affected by this error.

3) Dead zone = blind zone = blocking distance at the beginning and end of the electrode.

4) During an echo failure, the display shows the last measured value and the current is held at the last valid value.

5) Including 250R resistor when connected with HART.

6) All ropes except the rope of CPC-GR-70__32 type.

7) See instruction manual.

Technical specification - display module		
Type of display	matrix OLED, LCD ¹⁾	
Resolution	128 x 64 pixels	
Height of digits / Number of display digits of measured values	9 mm / 5 digits	
Colour of display	OLED LCD	yellow black with white background light
Type of buttons	low lift membrane	
Ambient temperature range	OLED LCD	-30 ... +70 °C -20 ... +70 °C
Weight	46 g	

1) OLED- suitable for indoor and low-light applications.

LCD – suitable for outdoor applications particularly with direct sunlight.



Used materials		
unsubmerged parts of the sensor	Variants	Standard material
Lid	all types except CPC-GR-70NS (70NTS) CPC-GR-70NS (70NTS)	aluminium alloy with powder coating stainless steel W. Nr. 1.4301 (AISI 304)
Glass	all types	polycarbonate
Body	all types except CPC-GR-70NS (70NTS) CPC-GR-70NS (70NTS)	aluminium alloy with powder coating stainless steel W. Nr. 1.4301 (AISI 304)
Display module	all types	plastic material POM
Cable gland	CPC-GR-70N(NT) CPC-GR-70NS (NTS)	plastic - polyamide metallic – stainless steel W. No. 1.4301 (AISI 304)

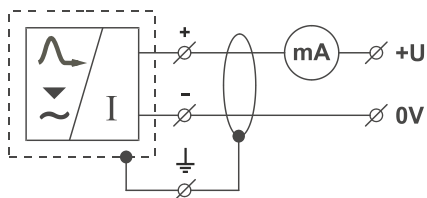
immersed parts of the sensor	Variants	Standard material
Housing	threaded head Tri-clamp	stainless steel W. Nr. 1.4404 (AISI 316 L) nickel-based alloy (W. Nr. 2.4856 / ALLOY 825) stainless steel W. Nr. 1.4404 (AISI 316 L)
Electrode	CPC-GR-70_-10 (11, 12, 13, 20, 24) CPC-GR-70_-30 (32, 33, 34, 35, 36, 37)	stainless steel W. Nr. 1.4404 (AISI 316 L) stainless steel W. Nr. 1.4401 (AISI 316)
Electrode coating	CPC-GR-70_-11 CPC-GR-70_-12 (13) CPC-GR-70_-32 CPC-GR-70_-34 (35, 37)	PFA FEP FEP PA
Reference tube	CPC-GR-70_-20 (24)	stainless steel W. Nr. 1.4301 (AISI 304)
Weight	CPC-GR-70_-30	stainless steel W. Nr. 1.4301 (AISI 304)
Weight coating	CPC-GR-70_-32	FEP
Anchorage	CPC-GR-70_-33	stainless steel W. Nr. 1.4401 (AISI 316)
Eye rings and clamps	CPC-GR-70_-36 (37)	stainless steel W. Nr. 1.4401 (AISI 316)

Process connection		
type	size	marking
Pipe thread	G 1"	G1 (G1Y)
Pressure thread	NPT 1"	NPT
Jointless connection - Tri-Clamp	ø 50,5 mm ø 64 mm	CI50 CI64

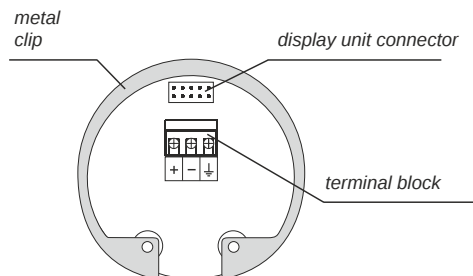


ELECTRICAL CONNECTION

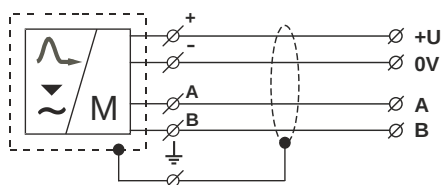
When using the M16 gland, the level meter is connected to the follow-up (evaluation) device using a suitable cable with the outer diameter of 6 - 8 mm by means of screw terminals located under the display module. The recommended cross section of cores for the current version $2 \times 0,5 \div 0,75 \text{ mm}^2$ and for the version with Modbus communication $2 \times 2 \times 0,25 \text{ mm}^2$ (twisted pair, shielded). In the case of the Modbus version and where it is assumed that the device will not be at the end of the chain, we recommend using the M20 gland, which is suitable for 2 cables with the $\varnothing$ of 5.5–7.5 mm. Plus pole (+U) is connected to the terminal (+), minus pole (0V) to the terminal (-) and the shielding (only for shielded cables) to the terminal ($\perp$). Communication wires A and B of the line RS-485 (for version „M“ - Modbus) are connected to the terminals A and B.



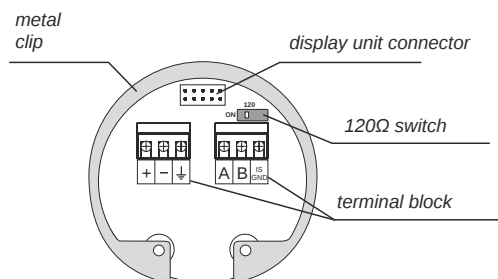
Wiring diagram of the level meter with current output CPC-GR-70_--_-I



Inside view of screw terminals of the level meter with current output CPC-GR-70_--_-I



Wiring diagram of the level meter with Modbus CPC-GR-70_--_-M



Inside view of screw terminals of the level meter with Modbus CPC-GR-70_--_-M

SETTINGS

Setting is done using the 3 buttons located on the DM-70 display module. All setting items are available in the level meter menu.

button

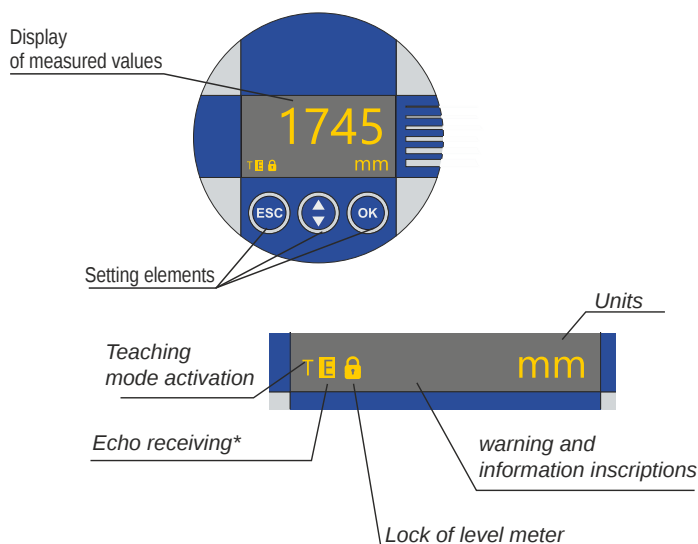
- Set-up mode access
- Confirmation of selected item in the menu
- Move the cursor in the line
- Saving of set-up data

button

- Move in the menu
- Change of values

button

- cancelling of carried out changes
- Shift one level up



* Slow flashing while the reflected signal (echo) is received from the measured level.

ORDER CODE

CPC-GR-70 - 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

B3 : plastic cable gland M20 for 2 cables, not possible for NS, NTS

D1 : metal dustproof cable gland M16, not possible for the NS, NTS

D2 : metal dustproof cable gland M20, not possible for the NS, NTS

D3 : metal dustproof cable gland M20 for 2 cables, not possible for NS, NTS

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

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

type of output:

I : current (4...20 mA) with HART communication

M : RS-485 (Modbus RTU)

material of the inner o-rings:

0 : without O-ring, not selectable for electrode type 10, 20, 24, 30, 33, 34, 35, 36, 37

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

E : material EPDM, not selectable for electrode types 11, 12, 13, 32

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

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

process connection:

G1 : thread G1", housing material stainless steel (W. Nr. 1.4404 / AISI 316L)

G1Y : thread G1", housing material nickel-based alloy (W. Nr. 2.4856 / ALLOY 825) (cannot be selected for performance type 00, 10, 13, 20, 24, 30, 33, 34, 35, 36, 37)

CI50 : Tri-Clamp Ø 50,5 mm (cannot be selected for performance type 00, 10, 20, 24, 30, 33, 34, 35, 36, 37)

CI64 : Tri-Clamp Ø 64 mm (cannot be selected for performance type 00, 10, 20, 24, 30, 33, 34, 35, 36, 37)

NPT : 1" NPT thread (cannot be selected for the 11, 12, 13, 20, and 32 electrode types and for the NT, NTS performance)

type of electrode:

00 : without electrode (not for CI50 process connection)

10 : uncoated stainless steel rod electrode, 0,5 ... 8 m (not for CI50 process connection)

11 : fully coated stainless steel rod electrode (PFA), length 0.5 ... 2 m (not for NPT process connection)

12 : fully coated stainless steel rod electrode (FEP), length 0.5 ... 2 m (not for NPT process connection)

13 : semi-coated stainless steel rod electrode (FEP), length 0.5 ... 8 m (not for NPT process connection)

20 : uncoated stainless steel rod electrode with reference tube, length 0.5 ... 3 m (not for CI50 process connections)

24 : uncoated stainless steel rod electrode with reference tube, length 0.5 ... 3 m (not for CI50 process connections)

30 : uncoated stainless steel rope electrode and weight, length 1 ... 40 m (not for CI50 process connection)

32 : fully coated rope electrode (FEP) and weight (FEP), length 1 ... 15 m (not for NPT process connection)

33 : uncoated stainless steel rope electrode with anchorage, electrode length 1 ... 40 m (not for CI50 process connection)

34 : coated rope electrode (Polyamide) and uncoated weight, electrode length 1 ... 40 m (not for CI50 process connection)

35 : coated rope electrode (Polyamide) and uncoated anchorage, electrode length 1 ... 40 m (not for CI50 process connection)

36 : uncoated rope electrode without weight, anchoring with rope clamps and eye ring, length 1 ... 40 m (not for CI50 process connection)

37 : coated rope electrode without weight (polyamide), anchoring with rope clamps and eye ring, length 1 ... 40 m (not for CI50 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)



ACCESSORIES

1x of seal (asbestos free), other seals (PTFE, Al, etc.) See table in the manual for pressure resistance.	included in the price		
3 pcs stainless steel cable clamp (for the variants 36, 37)	included in the price		
1 pc stainless steel eye ring (for the variants 36, 37)	included in the price		
universal converter from USB to HART	at extra cost		
converter (Modbus)	at extra cost	SRS-U4	
display unit	at extra cost	DM-70	
fixing nuts - stainless steel G1	at extra cost		
steel welding flange	at extra cost	NN-G1	
extension cable for display	at extra cost	PK-70-1	
tightening rope clamp (for the variants 36, 37)	at extra cost		
mounting kit for rope anchoring (for the variants 36, 37)	at extra cost		

SAFETY, PROTECTIONS AND COMPATIBILITY

The level meter is equipped with protection against fault voltage on the electrode, reverse polarity, short-term overvoltage and current overload on output.

Protection against dangerous contact is provided by low safety voltage according to EN 33 2000-4-41 (SELV). EMC is ensured by conformity with standards EN 55011 (B), EN 61326-1, EN 61000-4-2 (A, 30kV), EN 61000-4-3 (A, 10V), EN 61000-4-4 (A, 2kV), EN 61000-4-5 (A, 2kV), EN 61000-4-6 (A, 10V).

A declaration of conformity was issued for this device in the wording of Act No. 90/2016 Coll., as amended. The supplied electrical equipment meets the requirements of applicable government regulations on safety and electromagnetic compatibility.

