

- For continuous level measurement of liquids or bulk solids
- Wide spectrum of use, direct mounting into tanks, vessels, sumps or silos and hoppers
- Setting using a magnetic pen without the need for complete emptying of the tank
- Possibility of linear measurement even in non-conductive or variously shaped vessels
- Optical indication of function and status of level meter by two LEDs
- Wide selection of electrical connection: connector or cable glands
- Housing, electrodes and reference tubes made from stainless steel
- Variants with coated electrode for aggressive or electrically conductive media



The capacitive level meters DLM® are intended for continuous level measurement of liquid and bulk solids in tanks, vessels sumps or silos, hoppers, etc. They are comprised of a housing with electronic module and measuring electrodes. The electronic part converts the size of the capacity to the current signal (4 ... 20 mA) or voltage signal (0 ... 10 V). Level meters are made in several modifications of measuring electrodes (rod and rope). The electrodes can be covered by an insulating coating in case level measurement of adhesive, aggressive or electrically conductive media. Rod electrodes are also available in a version with reference (coaxial) tube for measurement of liquids in tanks made of non-conductive material.

Level meters are produced in the following performances: **N** – for non-explosive areas, **NT** – high temperature for non-explosive areas. DLM are offered in variants with various types of process connection (metric and pipe thread, pressure thread NPT).

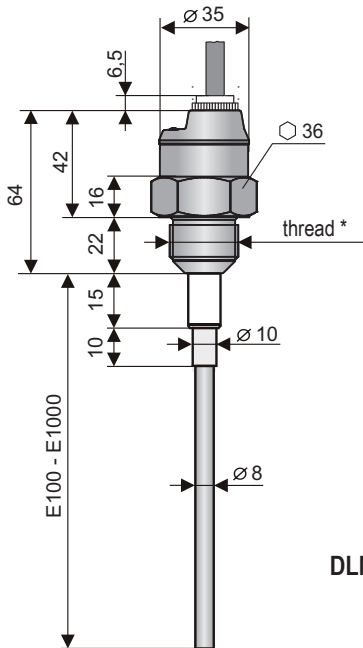
### VARIANTS OF SENSORS

- |                   |  |
|-------------------|--|
| <b>DLM-35_-20</b> | <b>Uncoated rod electrode</b> for level measurement of bulk-solid materials (cement, flour, sand, plastic granulate) and electrically non-conductive liquids (vegetable oil, diesel fuel, petrol),<br>Maximum electrode length 1 m.  |
| <b>DLM-35_-21</b> | <b>Coated rod electrode (FEP)</b> for level measurement of water and other electrically conductive liquids.<br>Can also be used for polluted liquids in metal tanks, concrete sumps, etc.<br>Maximum electrode length 1 m.   |
| <b>DLM-35_-22</b> | <b>Coated rod electrode (PFA)</b> with enhanced resistance to permeation (diffusion) of vapours and gases.<br>For level measurement of water and other electric conductive liquids in the food, pharmaceutical and chemical industries. Suitable for high-temperature applications (hot steam), volatile aggressive liquids, etc.<br>Maximum electrode length 1 m. |
| <b>DLM-35_-23</b> | like DLM-35_-20, but higher pressure resistance  |
| <b>DLM-35_-24</b> | like DLM-35_-21, but higher pressure resistance  |
| <b>DLM-35_-25</b> | like DLS-35_-22, but higher pressure resistance  |
| <b>DLM-35_-30</b> | <b>Uncoated rod electrode</b> for measuring the level of bulk-solid materials (cement, flour, sand, plastic granulate) and electrically non-conductive liquids (vegetable oil, diesel fuel, petrol),<br>Maximum electrode length 3 m.  |

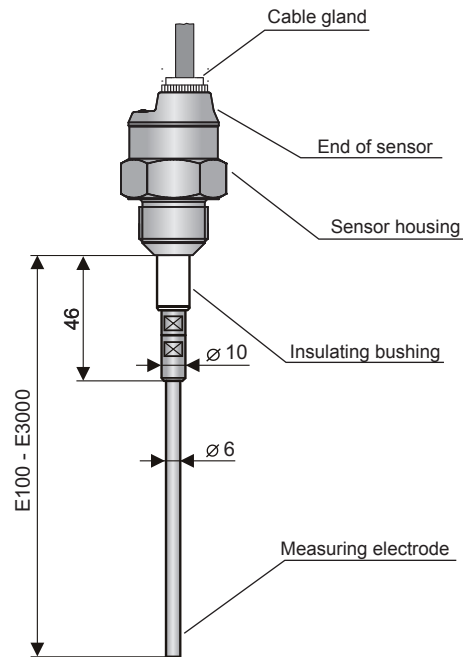
- DLM-35\_-31**    **Coated rod electrode (FEP)** for level measurement of water and other electrically conductive liquids. Can also be used for polluted liquids in metal tanks, concrete sumps, etc. Maximum electrode length 3 m.
- DLM-35\_-40**    **Uncoated stainless steel rod electrode with reference tube (coaxial electrode)** for accurate level measurement of unpolluted electrically non-conductive liquids (oils, diesel fuel, petrol). The measurement is not dependent on the tank shape and on the presence of objects in close proximity to the reference tube. Maximum electrode length 1 m.
- DLM-35\_-41**    **Coated stainless steel rod electrode with reference tube (coaxial electrode)** for accurate level measurement of unpolluted electrically conductive liquids in plastic and glass tanks. The measurement is not dependent on the tank shape and on the presence of objects in close proximity to the reference tube. Maximum electrode length 1 m.
- DLM-35\_-43**    like DLM-35\_-40, but higher pressure resistance
- DLM-35\_-44**    like DLM-35\_-41, but higher pressure resistance
- DLM-35\_-50**    **Uncoated stainless steel rope electrode with weight** suitable for level measurement of bulk-solids (grains, sand, flour, cement, etc.). Maximum electrode length 6 m.

## DIMENSIONAL DRAWINGS

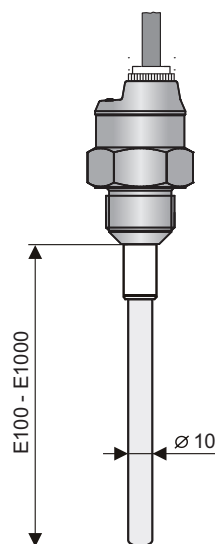
**DLM-35\_-20, 23**



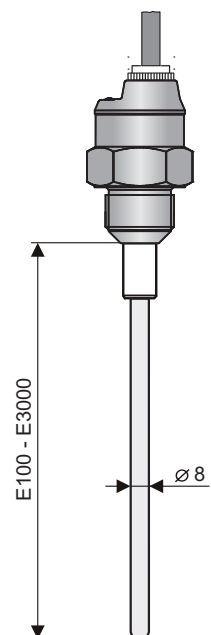
**DLM-35\_-30**



**DLM-35\_-21, 22, 24, 25**

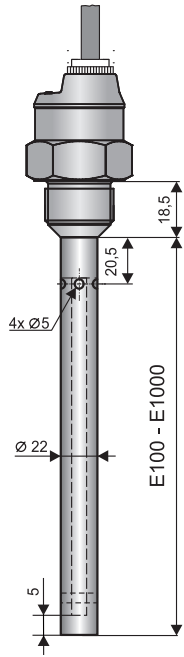


**DLM-35\_-31**

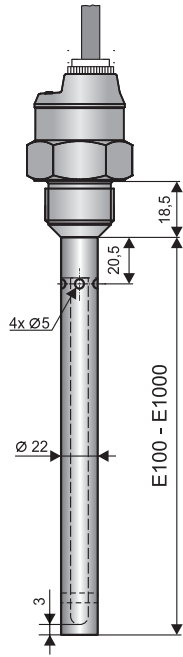


\* Type of threads: G 3/4"  
M27x2  
M30x1.5  
NPT 3/4

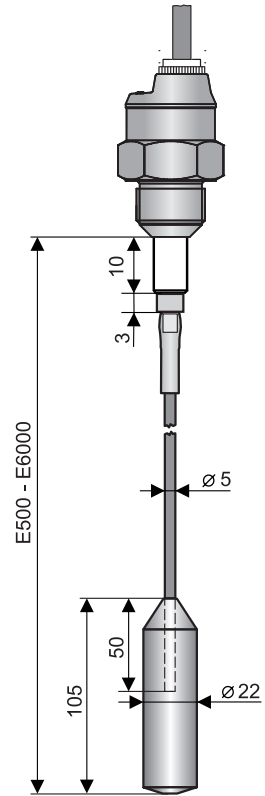
DLM-35\_-40, 43



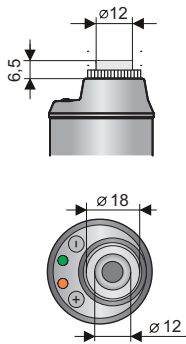
DLM-35\_-41, 44



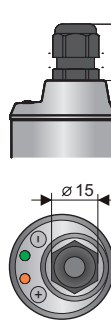
DLM-35\_-50



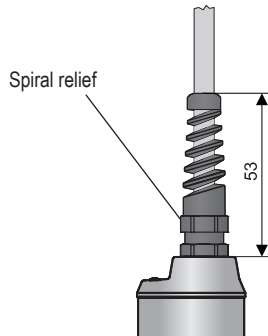
Design "A" with short stainless steel gland



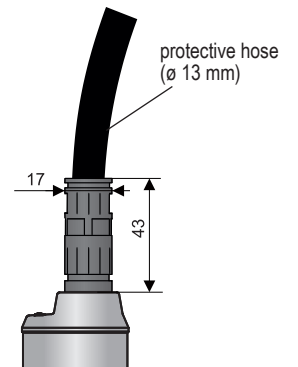
Design "B" with plastic threaded cable gland



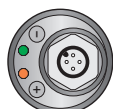
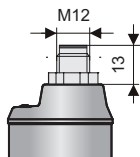
Design "V" with plastic cable gland with spiral relief – in case of increased mechanical wear on the cable.



Design "H" with cable gland for protected hoses – for using in an outdoor environment or in an area with increased moisture.



Design "C" with connector M12



## BASIC TECHNICAL DATA

Supply voltage	DLM-35_--_--I DLM-35_--_--U	9 ... 34 V DC 12 ... 34 V DC
Current output		4 ... 20 mA (2-wire)
Voltage output		0 ... 10 V (3-wire)
Power consumption	DLM-35_--_--I DLM-35_--_--U	3,75 ... 20.5 mA 5 mA (voltage output open circuit)
Non-linearity		max. 1 %
Temperature error		max. 0.05% / K
Voltage error for current and voltage output		max. 0,3 $\mu$ A/V and 0,1 mV/V
Leakage resistance electrode - housing / dielectric strength		1 M $\Omega$ / 200 V DC
Coupling capacity (housing - power) / dielectric strength		50 nF / 500 V AC
Coupling capacity (electrode - power) / dielectric strength		47 nF / 500 V AC
Ambient temperature range:		- 40 ... + 85 °C
Protection	type DLM-35_--_--C_-- type DLM-35_--_--A(B,V,H)_--	IP67 IP68
Maximum load resistance for current output (at U = 24 V)		R <sub>max</sub> = 700 $\Omega$
Weight (excluding electrode and cable)	performance N performance NT	approx. 0.3 kg approx. 0.6 kg
Cable (version with cable glands)		PVC 2 x 0.75 mm <sup>2</sup> or 3 x 0.5 mm <sup>2</sup> (according to design)

## MATERIAL DESIGN

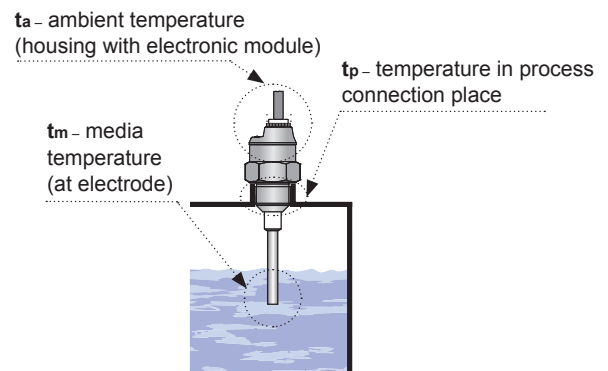
part of sensor	type	standard material	optional (on request)
Housing	all types	stainless steel W.Nr. 1.4301 (AISI 304)	stainless steel W.Nr. 1.4571 (AISI 316 Ti)
Rod electrode	all types except DLM-35_--50	stainless steel W.Nr. 1.4301 (AISI 304)	stainless steel W.Nr. 1.4571 (AISI 316 Ti)
Rope electrode	DLM-35_--50	stainless steel W.Nr. 1.4404 (AISI 316 L)	-
Reference tube	DLM-35_--40, 41	stainless steel W.Nr. 1.4301 (AISI 304)	stainless steel W.Nr. 1.4571 (AISI 316 Ti)
Insulating bushing	DLM-35_--20,21,22,30,31,40,41 DLM-35_--23,24,25,43,44,50	PTFE PPS + GF40	-
Electrode coating	DLM-35_--21, 24, 31, 41 DLM-35_--22, 25	FEP PFA	-
Cable gland	DLM-35_--_--A DLM-35_--_--B DLM-35_--_--V DLM-35_--_--H	stainless steel W.Nr. 1.4301 (AISI 304) plast PA / NBR plast PA / NBR plast PA / NBR	-
Connector M12	DLM-35_--_--C	nickel-plated brass	-
Weight	DLM-35_--50	stainless steel W.Nr. 1.4301 (AISI 304)	-

## TEMPERATURE AND PRESSURE RESISTIVITY

design variant	temperature t <sub>p</sub>	temperature t <sub>m</sub>	temperature t <sub>a</sub>	max. operating pressure for temperature t <sub>p</sub>				
				to 30°C	to 85°C	to 120°C	to 150°C	to 200°C
DLM-35N-20,21,22, 30,31,40,41,50	-40°C ... +85°C	-40°C ... +200°C	-40°C ... +85°C	5 MPa	2,5 MPa	-	-	-
DLM-35N-23,24,25, 43,44	-25°C ... +85°C	-40°C ... +200°C	-25°C ... +85°C	7,5 MPa	5 MPa	-	-	-
DLM-35NT-20,21,22, 30,31,40,41,50	-40°C ... +200°C	-40°C ... +200°C	-40°C ... +85°C	5 MPa	2,5 MPa	1,5 MPa	1 MPa	0,5 MPa
DLM-35NT-23,24,25, 43,44	-25°C ... +200°C	-40°C ... +200°C	-25°C ... +85°C	7,5 MPa	5 MPa	4,5 MPa	4 MPa	3,5 MPa

## PROCESS CONNECTION

type	size	marking
Pipe thread	G 3/4"	G
Metric thread	M27x2	M27
Metric thread	M30x1.5	M30
Pressure thread	NPT 3/4	NPT

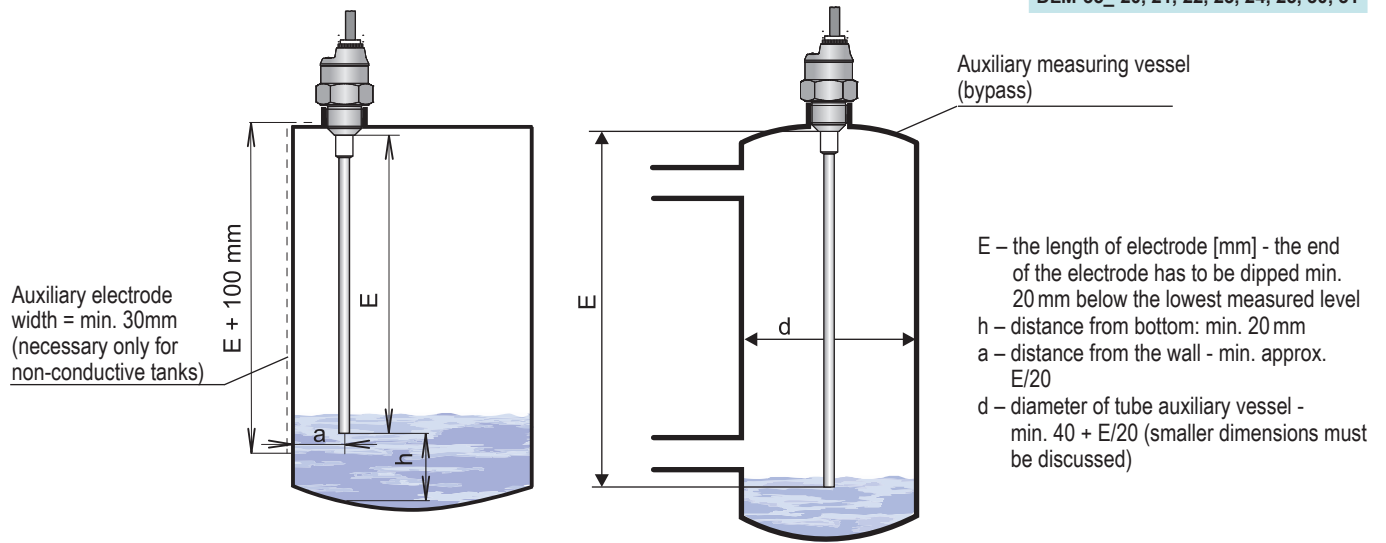


## MOUNTING AND RECOMMENDATIONS

Level meters are installed vertically in the upper lid of a tank, hopper or silo. In case of installing in concrete sumps or silos, it is recommended to install the level meter to an auxiliary metal structure and then connect it with a metal, constantly submerged object. Orientation distances for installation of the level meter (including possible auxiliary electrode) are indicated in the figures below.

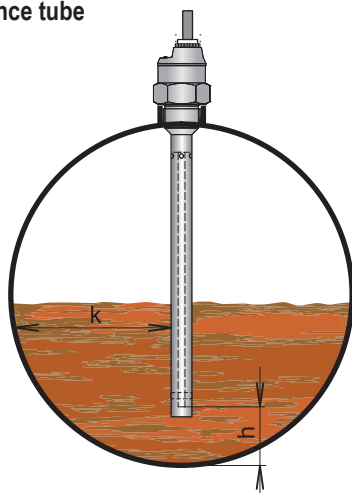
### Variants with rod electrode

DLM-35\_-20, 21, 22, 23, 24, 25, 30, 31



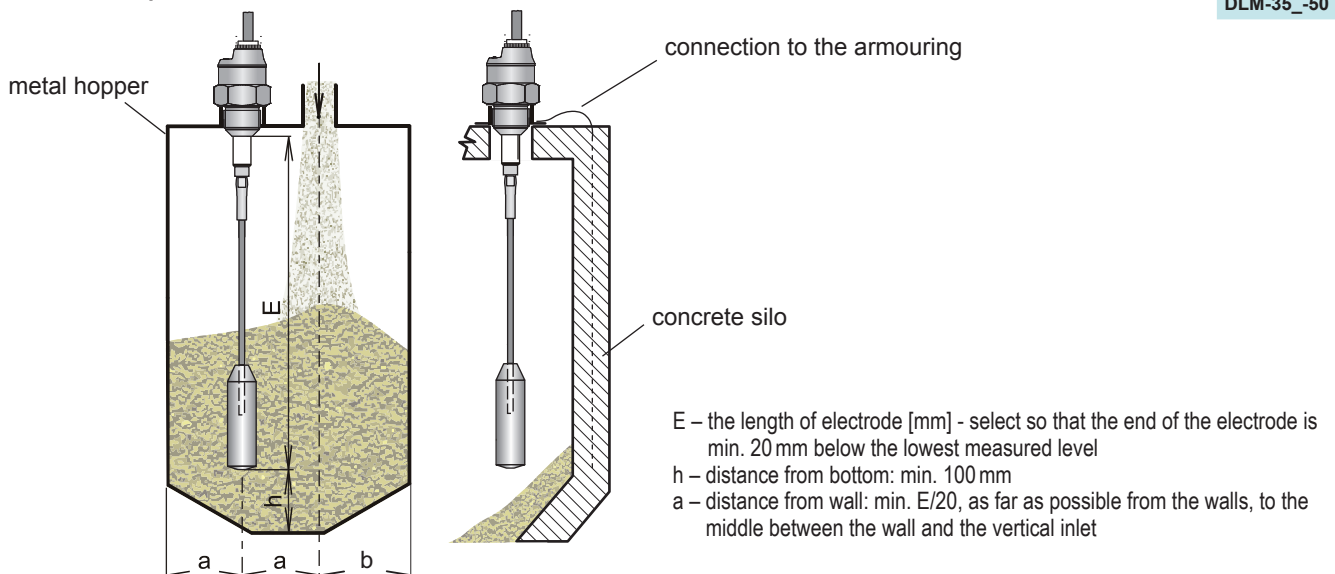
### Variants with reference tube

DLM-35\_-40, 41, 43, 44



### Variants with rope electrode

DLM-35\_-50



## ELECTRICAL CONNECTION



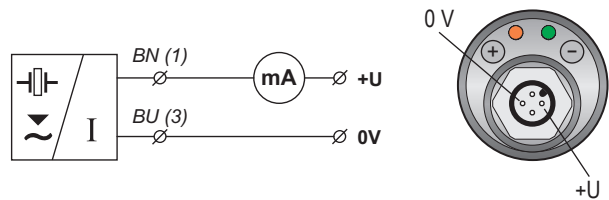
Electrical connection can only be made in de-energized status!

The positive pole of the supply voltage (+U) is connected to the brown wire *BN* or pin connector no. 1, the negative pole (0V) is connected to the blue wire *BU* or pin connector no. 3 and output voltage (Uout) to the black wire *BK* or pin connector no. 4. Wiring diagrams are provided in the figures on the right.

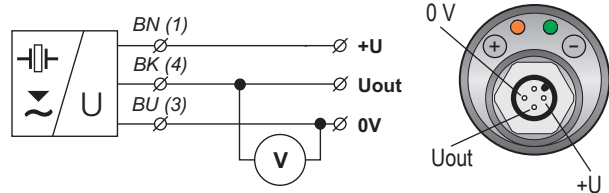
Note: In case of strong ambient electromagnetic interference, paralleling of conductors with power distribution, or for the distribution to distance over 30 m, we recommend using shielded cable.

Level meters DLM-35 with type of cable outlet A, B, V or H are connected to assessing units permanently connected by PVC cable, see page 3.

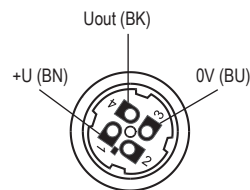
Level meters DLM-35 with connection method type C (see page 3) are connected to control units by means of a connector socket with compressed cable (length 2 or 5 m), or by means of a connector socket without cable (see accessories). In this case the cable is connected to the inside pins of the socket according to the figure on the right. The recommended diameter of this cable is 4 to 6 mm (the recommended cross-sectional area is 0.25 to 0,5 mm<sup>2</sup>).



Connection diagrams and interior view of connector of level meter DLM (variant - I)



Connection diagrams and interior view of connector of level meter DLM (variant - I)



Inside of the connector socket (variant "C")

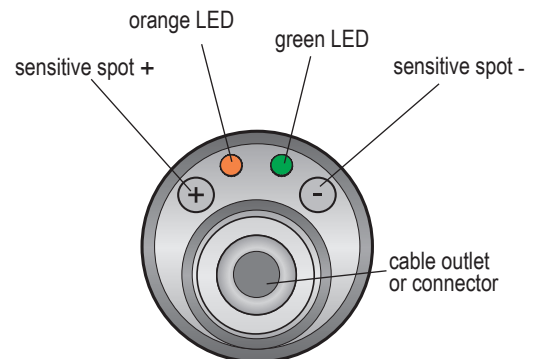
### Legend:

(1...) – terminal numbers  
connector sockets  
BN – brown  
BU – blue  
BK – black

## SETTINGS

Settings of the measuring range are done by touching a magnetic pen to the pair of sensitive spot "-" and "+". Sensitive spot "-" used for input to the setting mode for setting the limit 4 mA (0V) and decreasing the set current (voltage). Upon reaching the required current (voltage) waits for a permanently illuminated orange LED, and by applying the magnetic pen to the sensitive area "-", confirmation is performed of the set value. Sensitive area "+" is used for input to the setting mode for setting the limit setting 20 mA (10V) and increasing the set current (voltage). Upon reaching the required current (voltage) it waits for a permanently illuminated orange LED, and by applying the magnetic pen to the sensitive area "+" confirmation is performed of the set value. The setting process is indicated by the orange LED "STATE". The green LED indicator "RUN" indicates correct function of level measurement.

You can find more information in the instruction manual.

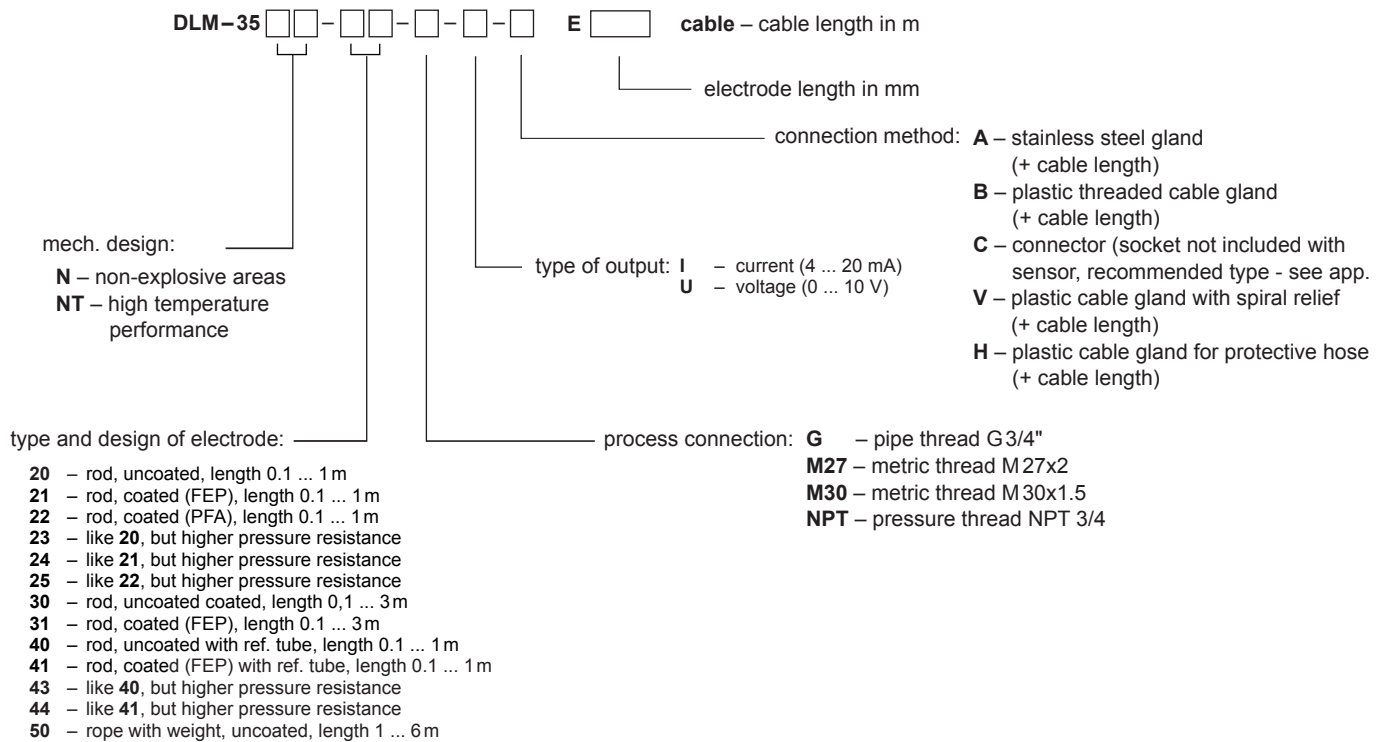


Top view of level meter

## FUNCTION AND STATUS INDICATION

LED indicator	colour	function
"RUN"	green	<p><b>Measuring function indication</b></p> <p><b>flashing</b> – (repeats according to the period of measuring approx. 0.5 s) – correct function of level measuring</p> <p><b>dark</b> – incorrect installation or malfunction. LED is also not illuminated in limit setting mode.</p> <p><b>alternating flashing green and orange LED</b> – incorrectly set limits</p>
"STATE"	orange	<p><b>Settings indication</b></p> <p><b>slow flashing</b> – indicates setting of the limit 4 mA (0V)</p> <p><b>rapid flashing</b> – indicates setting of the limit 20 mA (10V)</p> <p><b>permanent shine</b> – the level meter is ready to confirm the limit setting by means of magnetic pen</p> <p><b>3x short flashes</b> – setting confirmation</p> <p><b>simultaneous shine of green and orange LED</b> – during touching the mag. pen, when the limit setting is confirmed</p>

## ORDER CODE



## CORRECT SPECIFICATION EXAMPLES

DLM-35N-20-M27-I-B E200 cable 5 m

(N) design for use in normal areas; (20) uncoated rod electrode, (M27) process connection by thread M27; (I) output current; (B) plastic threaded cable gland; (E200) electrode length 200 mm

DLM-35N-21-G-U-C E580

(N) design for use in normal areas; (21) coated rod electrode (FEP); (G) process connection by thread G3/4"; (U) output voltage; (C) connector; (E580) electrode length 580 mm.

DLM-35N-40-M30-I-H E900

(N) design for use in normal areas; (40) uncoated rod electrode with reference tube; (M30) process connection by thread M30, (I) output current, (H) cable gland for protective hose; (E900) electrode length 900 mm.

## ACCESSORIES

### standard – included in the level meter price

- 1 pcs. magnetic spring MP-8
- 1 pcs. seal (asbestos free)

### optional – for a surcharge

(see catalogue sheet of accessories)

- cable (over the standard length 2m)
- connector socket (type ELWIKa or ELKA)
- normal steel welding flange or stainless steel welding flange
- protective hose (for type of cable outlet H)
- stainless steel fixing nut
- various types of seals (PTFE, Al, etc.)

## SAFETY, PROTECTIONS, COMPATIBILITY AND EXPLOSION PROOF

The level sensor is equipped with protection against electric shock on electrode, reverse polarity, output current overload, short circuit and short time overvoltages.

Protection against dangerous contact is provided by low safety voltage according to EN 33 2000-4-41. Electromagnetic compatibility is provided by conformity with standards EN 55022/B, EN 61326-1, EN 61000-4-2, -3, -4, -5 and 6.

version 12/2015