ULTRASONIC LEVEL METERS ULM-54

Dinel°

- For contactless continuous measurement of water level in outdoor applications – rivers, canals, reservoirs, as well as measuring of liquid and pasty substances, paste materials and bulk solids in open and closed reservoirs or vessels.
- Remote installation and parametrization option via the HART[®] communication protocol increases the effectiveness of the production process control.
- Combination of current output (4... 20 mA) with the HART[®] protocol.
- Variable installation thanks to the possibility of connection through the lower or upper threads.
- Intelligent numerical signal processing with the elimination of false echoes.
- Complete settings can be made using the PCU-100-_-H with the HART[®] communication.
- Optional connection using a standard cable gland, or a cable gland for protective hoses.
- High protection class IP68.
- With the help of a directional funnel, the reception of a reflected echo can be increased to measure problematic media (foaming levels, bulk solids, etc.).





The ULM® ultrasonic level meters are compact measurement devices including an electro acoustics converter, central processor unit and display module. Using the electro acoustics converter, the level meters transmit the sequence of ultrasonic pulses that spread towards the surface level. The converter recuperates reflected acoustic waves that are subsequently processed in the electronic module. The intelligent evaluation block filters out interfering signals, compares the cleaned received signal with the false reflection map (e.g. from mixers, ladders, reinforcement etc.) and selects a suitable reflection (echo). Based on the period during which the individual pulses spread towards the surface level and back and based on the measured temperature in the tank, the instant distance to the surface level is calculated. According to the level height, the level meter output is set: current 4 -20 mA with HART® protocol.

The level meters are suited to level measurement of various liquid materials, sewerage waters, mash and paste materials, suspensions in closed or open vessels, sumps, reservoirs and open channels. In case the level of bulk solids is measured, the measurement range is reduced. We recommend to consult the use with the manufacturer.

VARIANTS OF SENSORS

• ULM-5402	measuring range from 0.15 m to 2 m, all-plastic performance, PVDF emitter, process connection via G 1" screwing (upper or lower threads).
• ULM-5406	measuring range from 0.25 m to 6 m, all-plastic performance, PVDF emitter, process connection via lower G $1\frac{1}{2}$ " or upper G 1" screwing.
• ULM-5410	measuring range from 0.4 m to 10 m, all-plastic performance, PVDF emitter, process connection via lower G 2¼" or upper G 1" screwing. Plastic flange connection can also be selected from the accessories menu.

ULM-54_-02



ULM-54_-06



ULM-54_-10



Variant "B" with short cable terminal PG11



Variant "H" with outlet for protective conductor



TECHNICAL SPECIFICATIONS – LEVEL METER				
Measuring range ¹⁾	ULM-5402 ULM-5406 ULM-5410	0,15 2 m 0,25 6 m 0,4 10 m		
Adjustable measuring range (SPAN)		min. 200 mm		
Supply voltage	ULM-54	18 36 V DC		
Output	ULM-54I	$4\ldots 20\text{mA}$ (Limit values $3{,}9\ldots 20{,}5\text{mA}{)}{,}\text{HART}^{\otimes}$		
Current consumption	ULM-54I	4 20 mA / max. 22 mA		
Resolution	ULM–54_–02;10 ULM–54_–06	< 1mm < 2mm		
Accuracy (within the total range)		0,15 %		
Temperature error		max. 0,04%/K		
Operating frequency	ULM-5402 ULM-5406 ULM-5410	120 kHz 75 kHz 50 kHz		
Beamwidth (-3 dB)	ULM-5402;10 ULM-5406	10° 14°		
Ambient temperature range	ULM-5402 ULM-5406 ULM-5410	-30 +70 °C -30 +70 °C -30 +60 °C		
Short-time temperature stress resistance		+90 °C / 1 hod.		
Max. operation overpressure (on transmission surface)		0,1 MPa		
Sensitivity		3 levels (low – medium – high)		
Damping		0 99 s		
Measuring period		1 4s		
Rise time		cca. 30 s		
Failure indication (echo loss, level in dead zone, internal failure)		Adjustable in modes: 3.75 mA ; 22 mA ; Last measured value		
Protection class		IP68		
Mechanical connection	ULM-5402 ULM-5406 ULM-5410	screwing with thread G 1" (upper or lower threads) screwing with thread G $1\frac{1}{2}$ " and upper thread G 1" screwing with thread G $2\frac{1}{4}$ " and upper thread G 1"		
Recommended cable	ULM-54I	PVC 2 x 0,75 mm ²		
Maximal resistance of current output load	U = 24 V DC U = 22 V DC U = 20 V DC U = 19 V DC	$R_{max} = 270 \Omega^{2}$ $R_{max} = 180 \Omega$ $R_{max} = 90 \Omega$ $R_{max} = 45 \Omega$		
Weight	ULM-5402 ULM-5406 ULM-5410	0,2 kg 0,25 kg 0,65 kg		

In case the level of bulk-solid materials is measured, the measurement range is reduced.
Including 250R resistor in case of HART[®] connection.

Used materials				
sensor part	variants	standard material		
Housing with thread	All types	plastic PP		
Electroacoustic converter	All types	plastic PVDF		
Cable gland	All types	plastic PA		

AREA CLASSIFICATION (according to EN 60079-10 and EN 60079-14)		
ULM-54N	Performance for non-explosive areas	

INSTALLATION

When placing the level meter in the tank, install it into the welding flange of the tank top cap or use the fixing nut or the flange.

If installed in an open channel (sumps, reservoirs, etc.), install the level meter as closest as you can to the maximum level expected. The front of the level meter must be vertically to the measured level.

Foam on the level absorbs the acoustic wave reflection which might cause malfunction of the level meter. If possible select the location where the foaming is as low as possible.

Protect the level meter against direct sunlight.

In the case of uncertainty we recommend to consult the application with the producer.

MOUNTING RECOMMENDATION



Recommended installation of the level meter ULM-54 in the tank using the lower thread



Recommended installation of the level meter



ULM-54-02; 06	a<3b b>100mm
ULM-54-10	a<1,5b b>100mm

a - neck height b - neck width m - dead zone

Installation of ULM-54 level meter through the inlet neck (in this way it is possible to fill the tank almost to its maximum height)



ELECTRICAL CONNECTION

Electrical connection must be done in de-energized state!

The supply source should be preferably designed as a stabilized source of safe voltage 18 V to 36 V DC, which is part of the downstream processing or display system.

In case of strong ambient electromagnetic disturbance, parallel run of the input cable with the power line or its length exceeding 30 m, we recommend using a shielded cable.

Connection via PG 11 gland or gland for protective hoses

(i)

The ULM level meter with a B or H type cable gland are connected to processing (display) units by means of a fixed PVC cable 5 m long. PG 11 (B) or plastic bushings with a thread for protective hoses (H) can be used as a cable gland. Connection diagrams are shown in Figures on the right.



Connection diagram of the ULM level meter (variant –I)



SETTINGS

Settings are made using the HART[®] communication protocol. Settings using PCU-100 -_- H unit or UHC-01 converter. For more information, refer to the operating instructions.

RANGE OF APPLICATIONS

For continuous non-contact level measurement of liquids (water solutions, sewerage water, etc.), mash and paste materials (sediments, sticks, resins etc.) in closed or open vessels, sumps, reservoirs and open channels. In case the level of bulk-solid materials is measured, the measurement range is reduced. We recommend to consult the use with the manufacturer.

ORDER CODE



CORRECT SPECIFICATION EXAMPLES

ULM-54N-02-G-I-B-K2 ULM-54N-10-G-I-H-K2

Accessories

Standard - incl. in the price of the level sensor

2x seal (for ULM-54 -02, 06,10)

Optional - for extra charge

- plastic fastening nuts PUM-G 1", PUM-G 11/2", PUM-G 21/4"
- shorn adapter ST-G 1, ST-G 11/2, ST-G 21/4
- stainless steel or standard steel welding flanges NN-G1, ON-G1, NN-G11/2, ON-G11/2
- protective hose (for version with "H" type terminal)
- converter / transducer from USB to HART® UHC-01

Level meter ULM-54 is equipped with protection against electric shock on the electrode, reverse polarity, output current overload, short circuit and against current overload on output. Protection against dangerous contact is provided by low safety voltage according (CE) Electromagnetic compatibility is provided.

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