

## CATALOGO

### sensori di livello





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# ABOUT US

The company Dinel, s. r. o. was founded in 1995, after transformation from the small private firm, which produced capacitive sensors since 1991.

Nowadays Dinel, s. r. o. is one of the most influential producers of level and flow measurement systems in the Czech Republic with big annual increases of sales and strong innovative potential.

Our level meters, limit level sensors and flowmeters fulfil various requirements in wide range of branches, e.g. water and waste water processing, agricultural technology and food industry, plastic materials technology, chemical industry, petroleum and gas filling stations, in heating and cooling technology, building materials processing technology, packaging technology, in transport vehicles, etc. Besides that our power supplies, display and control units are very frequently used in various control and measuring systems.



27

YEARS  
ON MARKET

22

YEARS  
OF ISO 9001  
CERTIFICATION

35

EMPLOYEES

20

YEARS  
OF ATEX  
CERTIFICATION

60

EXPORT  
COUNTRIES

45

DISTRIBUTORS  
WORLDWIDE

## DEVELOPMENT

Our engineers in the development department prepare new products and improve update the existing ones with new functions or they adjust them to specific customer requirements.

## PRODUCTION

Thanks to our own production, we are able to offer not only standard devices, but also prepare the products according to the individual wishes of our customers.

## SALES

All the products can be bought directly from us or it is possible to make use of our distributors in our country and abroad. We offer the possibility to lend standard products for the purpose of testing their functions.

## TECHNICAL SUPPORT

The team of technicians carry out advisory services, help solve the problems remotely or provide the service staff with professional training.

## SERVICING AND REPAIRS

At the request of our customers, we provide service for all of our products at the place of installation. We guarantee permanent reparability of all our products any time after warranty period which we provide for 3 years.

# CERTIFICATES

Certificate  
CQS (ISO)



Certificate  
IQNet



Quality  
Assurance  
Notification



CERTIFICATE  
for contact  
with drinking  
water



Institut pro testování  
a certifikaci a.s.



CERTIFICATE  
for contact  
with  
foodstuffs



Institut pro testování  
a certifikaci a.s.



HART  
Communication  
Foundation



Certificate  
SIL CLS-23



Certificate  
SIL  
RFLS-35/28



# LEGEND



Interesting fact / unique product



Additional information to product



The conformity mark



The explosion-proof equipment mark



HART Communication protocol, HART communication protocol interface



Modbus, an open protocol for the mutual communication between various devices



CAN, the bus employed for the internal communication network and units in cars



SIL, Safety Integrity Level standard



Continuous level meters



Limit level sensors



Flow meters



Evaluation and power supply units



Display units



Accessories and other products



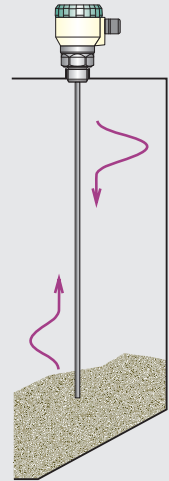


# CONTINUOUS LEVEL METERS

## PRINCIPLE OF CONTINUOUS LEVEL MEASUREMENT

### Guided wave radar level measurement

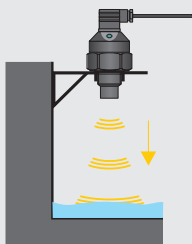
The function principle of the impulse radar (microwave) level meter is TDR (Time Domain Reflectometry). The electronics transmits very short electrical pulses (0.5 ns), which are linked to a one-wire transmission line (measuring electrode). Measuring electrode can be created of rod or rope. The pulse 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 appropriately sets the value of the output signal. The method is resistant to changes in the atmosphere (pressure, temperature, dust, steam) and changes in medium parameters (change in dielectric constant, conductivity).



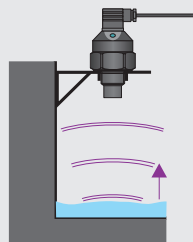
### GRLM-70

### Ultrasonic level measurement

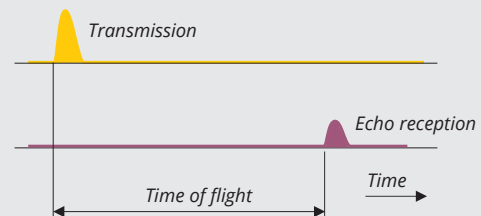
The ultrasonic level meter ULM transmits the series of ultrasonic pulses, that propagate towards the level surface. Reflected acoustic waves are received by the level meter and processed by internal processor. Then the temperature compensation is provided and the voltage signal is changed due to output current or voltage. The method is resistant to changes in the medium parameters (changes in dielectric constant, conductivity). In the case of harsh conditions in the atmosphere above the level (foaming, heavy turbulence and rapid air flow, strong evaporation) the method can be used only after an advance testing. In the case of vacuum the method is not applicable.



*Transmission of acoustic waves towards the level surface*



*Reception of acoustic waves reflected from the level*



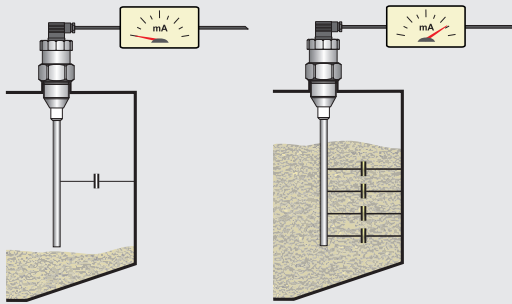
**Time of flight ~ Level height  
Output signal ~ Time of flight**

### ULM-53, ULM-54, ULM-70



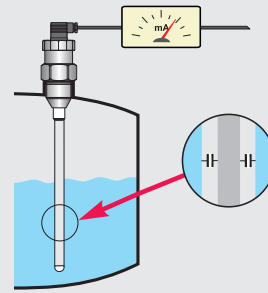
## Capacitive level measurement

The increase of the level causes bigger immersion of the measuring electrode and thereby increases its capacity. According to the measured capacity is set the output of the level meter.



### Measurement of electrically non-conductive materials:

The capacitor is made by electrode of the sensor and the wall. The dielectric is done by air or the material.



### Measurement of electrically conductive materials:

The capacitor is made by electrode of the sensor and the material (the wall). Dielectric is done by the insulation of the electrode.

The method is resistant to any changes in the atmosphere above the surface (vacuum, pressure, vapours, dust). It is also partially resistant to the formation of foam on the surface. Method is not applicable in case of change of dielectric constant of the medium. If only conductivity of the medium changes (eg. drinking water x steam condensate) and when the sensor is used with insulated electrode, it has no effect on the output signal.

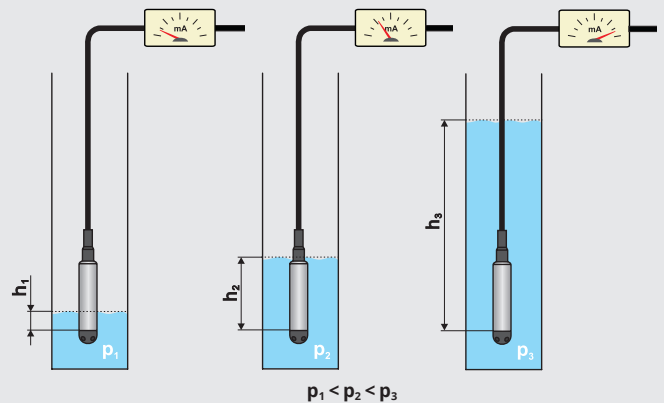
## CLM-36, CLM-40, CLM-70, DLM-35

## Hydrostatic level measurement

The principle of level measurement is taken from direct dependence of hydrostatic pressure ( $p$ ) on height of water column ( $h$ ), where the constants of proportionality are the density ( $\rho$ ) and the gravitation acceleration ( $g$ ).

$$p = h \cdot \rho \cdot g$$

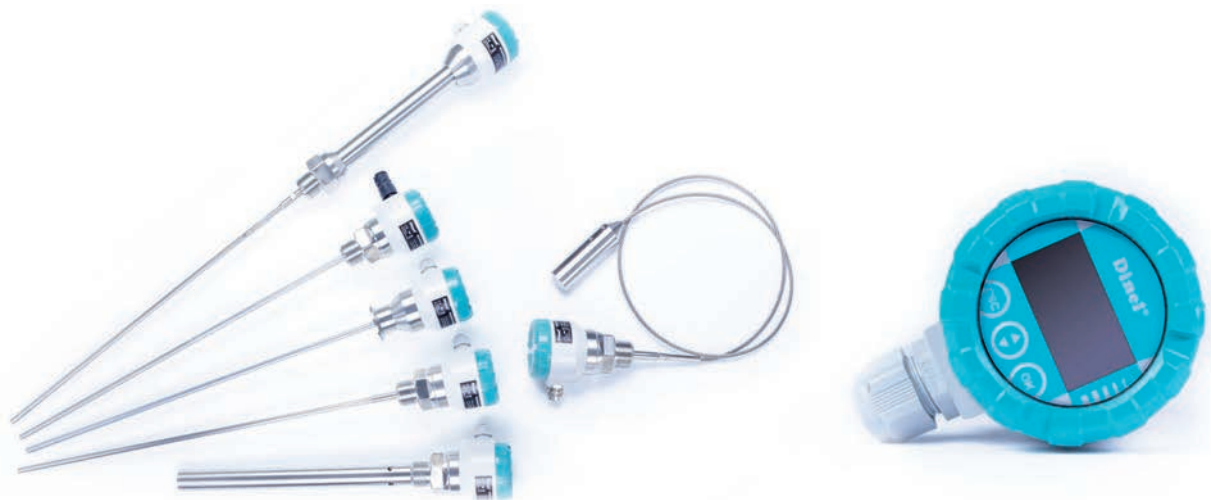
The method is resistant to the formation of foam on the level surface. The method is directly dependent on the density (specific gravity) of the liquid. When the liquid density is changing it is necessary to make an additional correction of the output.



## HLM-16/25N, HLM-25C, HLM-25S, HLM-35

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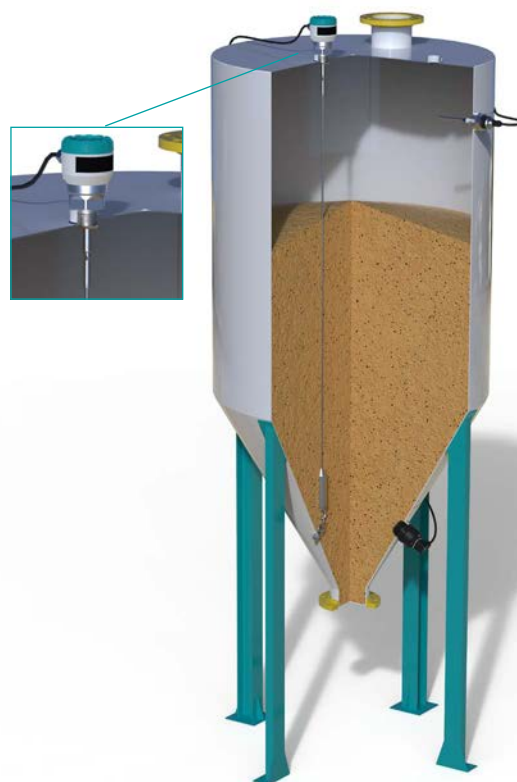


## Radar level meter GRLM-70 "Miranda"

Suited to continuous level measurement of various liquids, mashes, bulk solids and powders



- Radar level meter with guided wave (TDR)
- Universal use, direct mounting into containers, silos, vessels, reservoirs, etc.
- Stainless steel rod or rope electrode
- Xi, XiT versions for usage in explosive areas, or Xt, XtT versions for usage in flammable dusts areas
- Linear measurement also in non-conductive and in variously shaped tanks
- Immediate view of the measured values on OLED or LCD display units
- Simple installation and settings by removable display module DM-70
- Arbitrary selection between metric and imperial units
- Current output (4 ... 20 mA) with HART® protocol or output RS-485 Modbus RTU
- Optional connection using a cable gland, or a cable gland for protective hose





stainless steel design suitable for the food and pharmaceutical industries



Variants		
code	type of electrode	length of electrode
GRLM-70_-00	<b>without electrode</b>	-
GRLM-70_-10	<b>uncoated stainless steel rod electrode</b> for liquids and bulk solid materials (water solutions, emulsion, oils, diesel, flour, sand, granulates, etc.)	0,5 ... 8 m
GRLM-70_-11	<b>coated rod electrode (PFA)</b> for aggressive and very pure liquids	0,5 ... 2 m
GRLM-70_-12	<b>coated stainless steel rod electrode (FEP)</b> , for aggressive liquids and drinks	0,5 ... 2 m
GRLM-70_-13	<b>semi-coated stainless steel rod electrode (FEP)</b> for liquids in area, where it could condense steam on the electrode	0,5 ... 8 m
GRLM-70_-20	<b>uncoated stainless steel rod electrode with reference tube</b> for accurate level measurement of liquids in cramped spaces	0,5 ... 3 m
GRLM-70_-30	<b>uncoated stainless steel rope electrode and weight</b> for liquids and bulk solid materials (water, grains, sand, flour, cement, etc.) in higher silos, vessels, reservoirs	1 ... 40 m
<b>NEW</b> GRLM-70_-32	<b>coated stainless steel rope electrode and coated weight (FEP)</b> , for aggressive and very pure liquids	1 ... 15 m
GRLM-70_-33	<b>uncoated stainless steel rope electrode with anchorage</b> for bulk solid materials (grains, flour, cement, etc.) It is recommended to anchor in storage tanks and silos for bulk solid materials up to a depth of 10 meters	1 ... 40 m
GRLM-70_-34	<b>coated stainless steel rope electrode and weight (the rope has polyamide coating, the weight is uncoated)</b> for liquids and adhesive bulk solids (flour, cement, etc.)	1 ... 40 m
GRLM-70_-35	<b>coated stainless steel rope electrode (Polyamide) with uncoated anchorage</b> , for adhesive bulk solids (flour, cement, etc.). Recommended in tanks deeper than 10 m	1 ... 40 m
<b>NEW</b> GRLM-70_-36	<b>uncoated rope electrode without weight with rope clamps and eye ring</b> , for unsticky bulk solids (grains, sand, etc.) Recommended in tanks deeper than 10 m	1 ... 40 m
<b>NEW</b> GRLM-70_-37	<b>coated rope electrode without weight (polyamide), with cable clamps and eye ring</b> , for sticky bulk solids (flour, cement, etc.). Recommended in tanks deeper than 10 m	1 ... 40 m

### Technical specification

Supply voltage	GRLM-70N(NT)	18 ... 36 V DC
	GRLM-70Xi(XiT)	18 ... 30 V DC
	GRLM-70Xt(XtT)	18 ... 33 V DC
Output type	GRLM-70_-_-_-I	4 ... 20 mA (2-wire), HART® protocol Modbus RTU
	GRLM-70_-_-_-M	
Basic measurement accuracy (for reference reflecting surface)		+/- 2 mm
Resolution		0,1 mm
Ambient temperature range		-30 ... +70 °C
Process temperature range		-40 ... +200 °C
Process connection		Thread G1"; NPT 1"; TriClamp Ø 50,5; Ø 64
Process pressure range (for temperature +85 °C)	GRLM-70_-10 (00, 20, 30, 33, 34, 35, 36, 37)	0 ... 100 bar
	GRLM-70_-11 (12, 13)	0 ... 20 bar
	GRLM-70_-32	0 ... 5 bar
Protection class		IP67

More detailed informations can be found in the datasheet of the product.



version 36 and 37

version 33 and 35



## Ultrasonic level meter ULM-70

**For continuous non-contact level measurement of various liquids, mashes, pasty materials and bulk solids in closed or open vessels, sumps, reservoirs etc.**



- Immediate view of the measured values on OLED or LCD display units
- Xi version for usage in explosive areas
- D-Logic system for advanced intelligent signal processing
- Easy adjustment without measured material
- Elimination of false reflections
- Arbitrary choice of metric or imperial displayed measuring units
- Level meter is also suitable for tanks with mixers
- Option normal or inverted mode (for distance measurement)
- Current output (4 ... 20 mA) with HART® protocol or output RS-485 Modbus RTU
- Choice of electric connection via cable glands, or a cable gland for protective hose
- While used with horn adapter can be measured difficult media (foamy levels, loose materials, etc.)
- Telescopic bracket for mounting of ultrasonic level meters in outdoor applications

### Variants

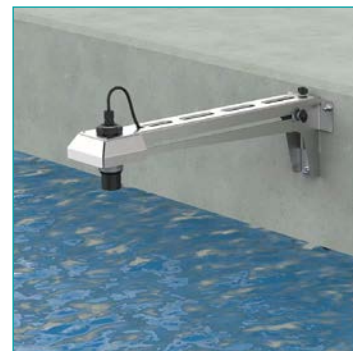
code	type	measuring range
ULM-70_-02	plastic transmitter, process connection with thread G 1"	0,15 ... 2 m
ULM-70_-06	plastic transmitter, process connection with thread G 1 1/2"	0,25 ... 6 m
ULM-70_-10	plastic transmitter, process connection with thread G 2 1/4"	0,4 ... 10 m
ULM-70_-20	plastic transmitter, process connection with aluminium alloy flange	0,5 ... 20 m

### Technical specification

Supply voltage	ULM-70N ULM-70Xi	18 ... 36 V DC 18 ... 30 V DC
Output type	var. "I" var. „M"	4 ... 20 mA (2-wire), HART® protocol Modbus RTU
Accuracy (within the total range)		0,15 %
Temperature error		max. 0,04 %/K
Sensitivity		3 steps (low – medium – high)
Ambient temperature range	ULM-70_-02, 06 ULM-70_-10, 20	-30 ... +70 °C -30 ... +60 °C
Max. operation overpressure (on transmission surface)		0,1 MPa
Recommended cable	ULM-70_-_-_-I ULM-70_-_-_-M	PVC 2 x 0,75 mm <sup>2</sup> PVC 2 x 2 x 0,25 mm <sup>2</sup>
Protection class		IP67

More detailed informations can be found in the datasheet of the product.





Telescopic bracket VKD



## Ultrasonic level meter ULM-54

**For continuous non-contact level measurement in outdoor applications - rivers, canals, sumps. For water, waste water and slurry, pastes and bulk materials**

**HART**  
COMMUNICATION PROTOCOL

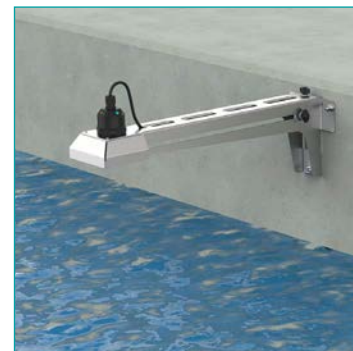


- Remote communication via HART® protocol
- Variable installation thanks to the possibility of connection via lower or upper thread
- Intelligent numerical signal processing with the elimination of false reflections
- Choice of connection using a standard cable gland or a gland for protective hoses
- High degree of protection IP68
- With the help of a horn adapter it is possible to increase the reception of the reflected echo and to measure problematic media (foaming levels, loose materials, etc.)
- Telescopic bracket for mounting of ultrasonic level meters in outdoor applications

Variants		
code	type	measuring range
ULM-54-02	all-plastic performance, PVDF emitter, process connection via G 1" screwing (upper or lower threads)	0,15 ... 2 m
ULM-54-06	all-plastic performance, PVDF emitter, process connection via lower G 1½" or upper G 1" screwing	0,25 ... 6 m
ULM-54-10	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	0,4 ... 10 m

Technical specification		
Supply voltage	ULM-54N- __	18 ... 36 V DC
Output type	ULM-54N- __-_-I	4 ... 20 mA, HART®
Accuracy (within the total range)		0,15 %
Temperature error		max. 0,04 %/K
Sensitivity		3 steps (low - medium - high)
Ambient temperature range	ULM-54N-02, 06 ULM-54N-10	-30 ... +70 °C -30 ... +60 °C
Max. operation overpressure (on transmission surface)		0,1 MPa
Recommended cable	ULM-54N- __-_-I	PVC 2 x 0,75 mm <sup>2</sup>
Protection class		IP68

More detailed informations can be found in the datasheet of the product.



Telescopic bracket VKD

## Ultrasonic level meter ULM-53

For continuous non-contact level measurement of various liquids, mashes and pasty materials in closed or open vessels, sumps, reservoirs etc.



- Variants of level meter with adjustment by two buttons, or by magnetic pen
- Optical state indication
- Xi version for usage in explosive areas
- Current output, voltage output or RS-485 Modbus output
- Wide choice of electric connection via connectors, cable glands, or a gland for protective hoses
- Reception of reflected ultrasonic signal from level can be improved using horn adapter
- Telescopic bracket for mounting of ultrasonic level meters in outdoor applications

### Variants

code	type of sensore	measuring range
ULM-53_-01	plastic transmitter and plastic body, mechanical connection with <b>thread G 3/4"</b>	0,1 ... 1 m
ULM-53_-02	plastic transmitter and plastic body, mechanical connection with <b>thread G 1"</b>	0,2 ... 2 m
ULM-53_-06	plastic transmitter and plastic body, mechanical connection with <b>thread G 1 1/2"</b>	0,2 ... 6 m
ULM-53_-10	plastic transmitter and plastic body, mechanical connection with <b>thread G 2 1/4"</b>	0,4 ... 10 m
ULM-53_-20	plastic transmitter and plastic body, <b>aluminium alloy flange</b>	0,5 ... 20 m

### Technical specification

Supply voltage	ULM-53N ULM-53Xi	12 ... 36 V DC 12 ... 30 V DC
Output type (var. "I")		4 ... 20 mA (2 -wire)
Output type (var. "U")		0 ... 10 V (3 -wire)
Output type RS-485 (var. „M")		Modbus RTU
Accuracy (within the total range)	ULM-53-01 ULM-53-02 (06) ULM-53-10 (20)	0,2 % 0,15 % 0,2 %
Temperature error		max. 0,04 %/K
Ambient temperature range	ULM-53-01, 02, 06 ULM-53-10, 20	-30 ... +70 °C -30 ... +60 °C
Max. operation overpressure (on transmission surface)		0,1 MPa
Recommended cable	ULM-53_-__-I ULM-53N-__-U ULM-53N-__-M	PVC 2 x 0.75 mm <sup>2</sup> PVC 3 x 0.50 mm <sup>2</sup> PVC 2x2 0,25 mm <sup>2</sup>
Protection class*	ULM-53_-__-__-T ULM-53_-__-__-G-M(L) ULM-53_-__-__-C-M(L) ULM-53_-__-__-B-M(L) ULM-53_-__-__-H-M(L)	IP67 IP67* IP68

T - set-up elements buttons  
M - set-up elements magnetic pen (MP8)  
L - no setting, no LED  
G - connection method ISO connector

\* If a special connector is used, IP68 protection can be achieved.  
More detailed informations can be found in the datasheet of the product.



stainless steel design suitable for the food and pharmaceutical industries



## Capacitive level meter CLM-70

**For continuous level measurement of liquids, bulk solids and powders in all branch of industry**



- A wide range of applications, direct installation in storage silos, sumps, etc.
- Variants with rope, bar or co-axial electrodes
- Variants with fully coated electrodes for aggressive or electrically conductive media
- Current output 4 ... 20 mA with HART® protocol
- No dead zones
- Easy manual setting by removable display module DM-70
- Immediate view of the measured values on OLED or LCD display units
- Specific performance and electrode length are custom-made
- Copying the configuration between level meters using the display module

Variants		
code	type of electrode	length of electrode
CLM-70_-00	<b>without electrode</b>	-
CLM-70_-10	<b>uncoated stainless steel rod electrode</b> for electrically non-conductive liquids (diesel fuel) and bulk solids (flour, cement etc.)	0,2 ... 8 m
CLM-70_-11	<b>fully coated rod electrode (PFA)</b> for water and electrically conductive liquids in food processing, pharmaceutical, and chemical industries	0,2 ... 3 m
CLM-70_-12	<b>fully coated stainless steel rod electrode (FEP)</b> suitable for impure liquids in metallic tanks, concrete sumps, etc.	0,2 ... 3 m
CLM-70_-13	<b>semi-coated stainless steel rod electrode (FEP)</b> for liquids where partial condensation of vapours on the electrode may occur	0,5 ... 8 m
CLM-70_-20	<b>uncoated stainless steel rod electrode with reference tube</b> for electrically non-conductive liquids (oil, diesel fuel, etc.)	0,2 ... 3 m
CLM-70_-22	<b>coated stainless steel rod electrode (FEP) with reference tube</b> for clean electrically conductive liquids	0,2 ... 3 m
CLM-70_-30	<b>uncoated stainless steel rope electrode</b> and weight for bulk solids	1 ... 20 m.
CLM-70_-31	<b>uncoated rope electrode and uncoated weight with addition dynamic anchorage</b> for bulk-solid materials in higher silos	1 ... 20 m
<b>NEW</b> CLM-70_-32	<b>fully coated stainless steel rope electrode and weight (FEP)</b> for electrically conductive and non-conductive liquids	1 ... 15 m
CLM-70_-61	<b>two coated stainless steel rod electrodes</b> (PFA electrode insulation, PTFE head) for aggressive liquids	0,2 ... 2 m

Technical specifications	
Supply voltage	18 ... 36 V DC
Output type("I" variant)	4 ... 20 mA (2-wire), HART®
Current output resolution	10 uA
Measuring range from	0 ... 3000 pF
Resolution	0.01 pF (for capacities 0 ... 300 pF) 0.1 pF (for capacities 300 ... 3000 pF)
Temperature error (for temperature range -30 ... 70 °C)	<1 pF up to 100 pF < 1 % of the measured value
Non-linearity (electronics)	max. 1 %
Damping	0 ... 99 s
Maximum slew rate	<1 sec (0 ... 100 %) ; for damping 0 sec
Current output error	max. 80 uA
Recommended cable	PVC 2 x 0,75 mm <sup>2</sup> , shielded
Ambient temperature range	-30 ... +70 °C
Process temperature range	-40 ... +200 °C
Max. process pressure range (for temp. +85 °C)	0 ... 100 bar
Protection class	IP67

More detailed informations can be found in the datasheet of the product.





magnetic pen for setting

## Capacitive level meter DLM-35

**For continuous level measurement of liquids, bulk solids and powders in tanks, hoppers etc.**



- Direct mounting into containers, vessels, basins, reservoirs, etc.
- Possibility of linear measurements even in non-conductive and differently shaped containers
- Xi version for usage in explosive areas
- Simple sensitivity setting by means of magnetic pen
- Special variant DLM-35NT-25 with resistance to hot steam
- LED state and function indication
- Wide choice of electric connection via connectors, cable glands, or a gland for protective hoses
- Material of housing and electrodes from stainless steel

### Variants

code	type of electrode	maximum electrode length
DLM-35_-20	<b>uncoated rod electrode</b> for bulk-solids (cement, flour, sand, plastic granulate) and electrically non-conductive liquids (oil, diesel fuel, petrol)	0,1 ... 2 m
DLM-35_-21	<b>coated rod electrode (FEP)</b> for water and other electrically conductive liquids etc.	0,1 ... 2 m
DLM-35_-22	<b>coated rod electrode (PFA)</b> , resistance to permeation (diffusion) of vapours. For water and other electric conductive liquids in the food, pharmaceutical and chemical industries	0,1 ... 2 m
<b>NEW</b> DLM-35_-25	<b>new design</b> , like DLM-35_-22 but higher pressure resistance at high temperature (hot steam)	0,1 ... 2 m
DLM-35_-30	<b>uncoated demountable rod electrode</b> for bulk-solids and electrically non-conductive liquids	0,1 ... 3 m
DLM-35_-31	<b>coated rod electrode (FEP)</b> for water and electrically conductive liquids. Can also be used for polluted liquids	0,1 ... 3 m
DLM-35_-40	<b>uncoated rod electrode with reference tube (coaxial electrode)</b> for unpolluted electrically non-conductive liquids	0,1 ... 1 m
DLM-35_-41	<b>coated rod electrode (FEP) with reference tube (coaxial electrode)</b> for unpolluted electrically conductive liquids in plastic and glass tanks	0,1 ... 1 m.
DLM-35_-50	<b>uncoated rope electrode with weight</b> for bulk-solids (e.g. grains, sand, gravel, cement, etc.)	0,5 ... 6 m
<b>NEW</b> DLM-35_-52	<b>fully coated rope electrode (FEP)</b> for electrically conductive and non-conductive liquids	1 ... 15 m

### Technical specification

Supply voltage	current output (var. „I“)	9 ... 34 V DC
	voltage output (var. „U“)	12 ... 34 V DC
Output type (var. „I“)		4 ... 20 mA (2 - wire)
Output type (var. „U“)		0 ... 10 V (3 - wire)
Non-linearity (electronics)		max. 1 %
Ambient temperature range		-40 ... +85 °C
Process temperature range		-40 ... +200 °C
Max. medium temperature range		-40 ... +300 °C
Process connection		Thread M27 x 2 ; M30 x 1,5 ; G1, G 3/4"; NPT 3/4; TriClamp ø34, ø50,5
Process pressure range (for temp. +85 °C)	DLM-35_-20, 30 DLM-35_-21, 22, 25, 31, 40, 41 DLM-35_-50	0 ... 25 bar 0 ... 20 bar 0 ... 1 bar
Protection class	DLM-35_-_-C-_- DLM-35_-_-A(B,D,V,H)-_-	IP67 IP68

More detailed informations can be found in the datasheet of the product.



## Capacitive level meter CLM-36

**For continuous level measurement of liquids, bulk solids and powders in tanks, hoppers, silos etc.**



- Direct mounting into containers, silos, vessels, basins, reservoirs, etc
- Possibility of linear measurements even in non-conductive and differently shaped containers
- Xi version for usage in explosive areas and high temperature versions
- Easy and quick connecting by connector
- Removable inner electronic module
- Material of housing and electrodes from stainless steel

Variants		
code	type of electrode	length of electrode
CLM-36_-10	<b>uncoated rod electrode</b> for non-conductive liquids and powder or bulk-solid materials	0,2 ... 5 m
CLM-36_-11	<b>fully (PFA) coated rod electrode</b> for water and other electrically conductive liquids. Also suitable for polluted liquids in metallic storage tanks, concrete sumps, etc.	0,2 ... 3 m
CLM-36_-12	<b>fully (FEP) coated rod electrode</b> for water and other electrically conductive liquids. Also suitable for polluted liquids in metallic storage tanks, concrete sumps, etc.	0,2 ... 3 m
CLM-36_-20	<b>uncoated rod electrode with reference tube</b> for clean non-conductive liquids (oils, diesel, petrol)	0,2 ... 3 m
CLM-36_-22	<b>coated rod electrode and reference tube</b> for clean conductive liquids in plastic and glass vessels	0,2 ... 3 m
CLM-36_-30	<b>uncoated rope electrode and uncoated weight</b> for bulk-solid materials (grains, sand, etc.)	1 ... 20 m
CLM-36_-31	<b>uncoated rope electrode and uncoated weight with addition dynamic anchorage</b> for bulk-solid materials in higher silos	1 ... 20 m
<b>NEW</b> CLM-36_-32	<b>fully coated rope electrode (FEP)</b> for electrically conductive and non-conductive liquids	1 ... 15 m

Technical specification		
Supply voltage	current output (var. „I“)	9 ... 36 V DC
	voltage output (var. „U“)	16 ... 36 V DC
Output type	current output (var. „I“)	4 ... 20 mA (2-wire)
	voltage output (var. „U“)	0 ... 10 V (3-wire)
Non-linearity (electronics)		max. 1 %
Ambient temperature range		-40 ... +85 °C
Process temperature range		-40 ... +200 °C
Max. medium temperature range		-40 ... +300 °C
Process connection		Thread M36 × 2 ; G 1" ; TriClamp Ø50,5
Process pressure range (for temp. +85 °C)	CLM-36_-10, 20, 30	0 ... 50 bar
	CLM-36_-11, 12, 22	0 ... 20 bar
	CLM-36_-32	0 ... 5 bar
Protection class		IP65/IP67

More detailed informations can be found in the datasheet of the product.



## Capacitive level meter CLM-40

For continuous level measurement of diesel fuel, oils and other petroleum products in trucks, building machines, locomotive engines etc.

CAN CE

- Direct mounting in tanks by means of a flange with five holes or by means of a G1 "pipe thread
- Arbitrarily long rod electrode with reference tube (range of lengths 0,1 ... 1 m, electrode can be of any length)
- Current output, voltage output or output for CAN bus
- Certificate of the Ministry of Transport and Communications of the Czech Republic (ATEST 8 SD)
- Very easy installation, no setup required
- Stainless steel housing, electrode and reference tube
- Setting with magnetic pen or CAN bus

### Variants

code	type of electrode	maximum electrode length
CLM-40N-40	uncoated rod electrode and reference tube with setting by magnetic pen, possibility of shortening the measuring electrode	0,1 ... 1 m

### Technical specification

Supply voltage	current output (var. „I“)	9 ... 30 V DC
	CAN bus ( var. „CAN“)	9 ... 30 V DC
	voltage output (var. „U“)	12 ... 30 V DC
Output type	CLM - 40N-40-_-I	4 ... 20 mA (lim. values 3.9 ... 20.5 mA)
	CLM - 40N-40-_-U	0 ... 10 V (lim. values 0 ... 10.2 V)
	CLM - 40N-40-_-CAN	CAN SAE j1939 line (according to FMS standard)
Non-linearity (electronics)		max. 1 %
Ambient temperature range		-40 ... +85 °C (CAN only to 80 °C)
Process connection		Flange; Thread G 1"
Protection class		IP68

More detailed informations can be found in the datasheet of the product.



## Submersible hydrostatic level meter HLM-16/25

For level measurement of water in non-pressure reservoirs, drill holes, water wells, sumps, swimming pools etc.



- Stainless steel submersible probe
- Version with stainless steel sensor (for rain, drinking, or river water) or version with ceramic sensor (for lightly soiled, or sludge water)
- Arbitrary measurement ranges up to 100 m
- Precise customer choice of the measurement range up to 100 m
- Probe diameter 25 mm or 16 mm
- Over voltage protection inside probe



The HLM level meter received the TEST CERTIFICATE from ITC and so it complies with hygienic requirements for direct and permanent contact with drinking water.

Variants		
code	type	measuring range
HLM-16N	<b>stainless steel sensor, predefined measurement ranges. Probe diameter 16 mm.</b> Suitable for clean, lightly soiled, or sludge water	1 ... 100 m
HLM-25C	<b>ceramic sensor, arbitrary measurement ranges. Probe diameter 25 mm.</b> Suitable for clean, lightly soiled, or sludge water, certificate for contact with drinking water	1 ... 100 m
HLM-25S	<b>stainless steel sensor, arbitrary measurement ranges. Probe diameter 25 mm.</b> Suitable for rain, drinking, or river water	1 ... 100 m

Technical specification		
Supply voltage	HLM-25S (var. „I“)	12 ... 36 V DC
	HLM-25S (var. „U“)	16 ... 36 V DC
	HLM-25C	12 ... 34 V DC
	HLM-16N	10 ... 30 V DC
Output type		4 ... 20 mA (2-wire)
Output type (HLM-25S,HLM-25C)		0 ... 10 V (3-wire)
Maximum measurement range		100 m
Accuracy (from full measured range)		0,5 %
Ambient temperature range		-20 ... +70 °C
Protection class		IP68

More detailed informations can be found in the datasheet of the product.



## Hydrostatic level meter HLM-35

**For continuous level measurement of liquids in non-pressure tanks, vessels and pipes**



- Installation into the thread in the tank wall
- Intended for various liquids (water, oil, coolants, water solutions, etc.)
- Arbitrary measurement ranges of water column heights up to 100 m (H<sub>2</sub>O)
- Atmospheric pressure compensation using a cable capillary or a valve
- Current (4 ... 20 mA) or voltage (0 ... 10 V) output
- LED indication
- Variants of level meter with adjustment by magnetic pen or without adjustment elements



Possibility to use as pressure gauge up to 1 MPa (10 bar).



### Variants

code	type	measuring range
HLM-35N-CV	measuring transducer with a <b>ceramic membrane</b> . Pressure compensation via a valve with water-proof membrane	1 ... 100 m
HLM-35N-CK	measuring transducer with a <b>ceramic membrane</b> . Pressure compensation via capillary	1 ... 100 m
HLM-35N-SV	sensor with <b>stainless steel</b> transducer diaphragm. Pressure equalizing with valve	1 ... 100 m
HLM-35N-SK	sensor with <b>stainless steel</b> transducer diaphragm. Pressure equalizing with capillary tube	1 ... 100 m

### Technical specification

Supply voltage	12 ... 34 V DC	
Output type	current	4 ... 20 mA (2-wire)
	voltage	0 ... 10 V (3-wire)
Maximum measurement range	100 m	
Accuracy (from full measured range)	0,5 %	
Ambient temperature range	-20 ... +70 °C	
Process connection	thread M27x2; G 3/4"	
Protection class	HLM-35_ _ _ _ _ C- _ _ _ _	IP67
	HLM-35_ _ _ _ _ (A,B,V,H)- _ _ _ _	IP68

More detailed informations can be found in the datasheet of the product.



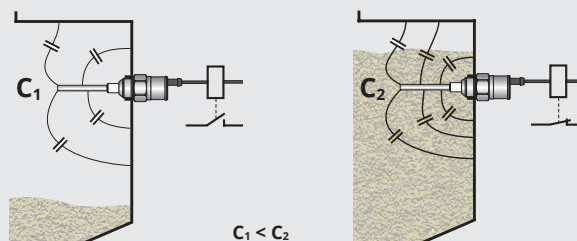


# LIMIT LEVEL SENSORS

## PRINCIPLE OF LIMIT LEVEL SENSING

### CAPACITIVE LIMIT LEVEL SENSING

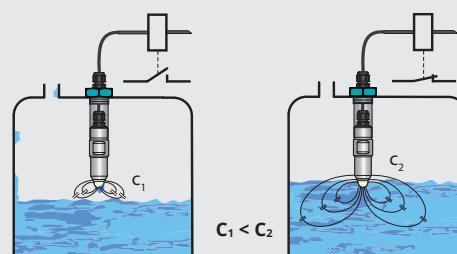
The principle is based on increasing of the level sensor electrode capacity due to its immersion to the medium. The sensor electronics evaluates the change in capacitance and performs switching of the output, which can be connected to a relay or to an input of a control system.



**CLS-23, CLS-23S, CPS-24, CTS-41, DLS-27, DLS-35, FS-4**

### HIGH-FREQUENCY LEVEL SENSING

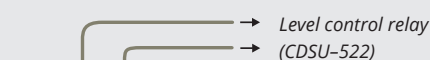
Sensors operating at high-frequencies are intended to suppress electrically conductive materials adhering to the measuring electrode of the sensor.



**FLD-32, GPLS-25, RFLS-28, RFLS-35, RFLS-53**

### CONDUCTIVE LEVEL SENSING

It evaluates the change of electrical resistance of the measured medium.



#### Level sensing in plastic tanks (electrically non conductive):

The change of electrical resistance is evaluated between the two conductive probes.



#### Level sensing in metal tanks (electrically conductive):

The change of electrical resistance is evaluated between the conductive probe and the vessel wall.

**CNP-18**

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## Ultrasonic level sensor ULS-53

**For limit non-contact level sensing of various liquids, mashes and pastes in closed or open tanks, vessels, sumps, reservoirs etc.**



- Variants of adjustment by two buttons or by magnetic pen
- Optical state indication
- Xi version for usage in explosive areas
- Wide choice of electric connection via connectors, cable glands, or a gland for protective hoses
- Additional horn adapter improve measurement of problematic media (foamy levels, loose materials, etc.)
- PNP output and current switch output

Variants		
code	type of sensore	measuring range
ULS-53-01	plastic transmitter and plastic body, mechanical connection with <b>thread G ¾"</b>	0,1 ... 1 m
ULS-53-02	plastic transmitter and plastic body, mechanical connection with <b>thread G 1"</b>	0,2 ... 2 m
ULS-53-06	plastic transmitter and plastic body, mechanical connection with <b>thread G 1 ½"</b>	0,2 ... 6 m
ULS-53-10	plastic transmitter and plastic body, mechanical connection with <b>thread G 2 ¼"</b>	0,4 ... 10 m
ULS-53-20	plastic transmitter and plastic body, <b>aluminium alloy flange</b>	0,5 ... 20 m

Technical specification		
Supply voltage	ULS-53N	12 ... 36 V DC
	ULS-53Xi	12 ... 30 V DC
Supply current	ULS-53N_ _ _ -P	max. 12 mA
	ULS-53N(Xi)_ _ _ -S	OFF state 4 mA / ON state 20 mA
Output type	ULS-53N_ _ _ -P	PNP, max. 300 mA
	ULS-53N(Xi)_ _ _ -S	current switch 4 mA/20 mA
Temperature error		max. 0,04 %/K
Ambient temperature range	ULS-53N_-01, 02, 06	-30 ... +60 °C
	ULS-53N_-10, 20	-30 ... +70 °C
Protection class*	ULS-53_ _ _ _ _ -T	IP67
	ULS-53_ _ _ _ _ -G-M(L)	
	ULS-53_ _ _ _ _ -C-M(L)	IP67*
	ULS-53_ _ _ _ _ -B-M(L)	IP68
	ULS-53_ _ _ _ _ -H-M(L)	

T - set-up elements buttons  
M - set-up elements magnetic pen (MP-8)  
L - no setting, no LED  
G - connection method ISO connector  
C - connection method M12x1 connector  
B - connection method short cable gland  
H - connection method cable gland for protective hose

\* If a special connector is used, IP68 protection can be achieved.  
More detailed informations can be found in the datasheet of the product.





magnetic pen for setting



# High-frequency level sensor RFLS-35

High-frequency limit level sensor with elimination of deposits or foam on the electrode



- Designed for reliable limit sensing of the level height of wide-ranging liquids, mash and pasty materials
- Resistant to adhesion of viscous and sticky media (ketchup, yoghurt, spreads, syrups, creams, pastes, cleaning agents, alkalis, etc.)
- Unique „Medium window“ material type differentiation function
- Replacement of a vibrating level sensor
- Direct mounting into tanks, vessels, sumps, pipes or funnels and containers
- Xi version for usage in explosive areas and extended version for higher pipes or thick tank walls
- Settings using the magnetic pen
- Universal design for all types of fluids (electrically conductive and non-conductive)
- High stability at high sensitivity (possible to use for substances with  $\epsilon_r \geq 1.5$ )
- The version with PD output now also has a diagnostic function



The first high-frequency level sensor with ultra low power consumption allowing the performance with NAMUR output on the market.

High-frequency level sensor RFLS-35N-2-CI received the TEST CERTIFICATE from ITC and it complies with hygienic requirements for products designed for contact with foodstuffs and meals.

## Technical specification

Supply voltage	7 ... 34 V DC
Output type	PNP; NAMUR
Switching current	max. 300 mA
Ambient temperature range	-40 ... +80 °C
Process temperature range	-40 ... +105 °C
Maximum overpressure	100 bar
Process connection	thread G 1/2" ; G 3/4" ; M27 x 2; TriClamp (ø34, ø50,5)
Protection class	RFLS-35_ _ _ -C_ _ _ IP67 RFLS-35_ _ _ IP68 A(B,D,H,V)_ _ _

More detailed informations can be found in the datasheet of the product.

Variants		
code	type of sensore	o-ring
RFLS-35-1B	<b>insulated electrode (PEEK)</b> , for various fluids, mashed and paste-like materials, also for fuel, oil or methanol	NBR
RFLS-35-11B	<b>insulated electrode (PEEK) extended version</b> , for various liquid, mashed and paste-like materials, also for fuel, oil or methanol	NBR
RFLS-35-1E	<b>insulated electrode (PEEK)</b> , for sensing various liquid, mashed and paste-like materials, also for acids, bases or alcohol, ammonia, acetone, chlorine	EPDM
RFLS-35-11E	<b>insulated electrode (PEEK) extended version</b> , for various liquid, mashed and paste-like materials, also for acids, bases or alcohol, ammonia, acetone, chlorine	EPDM
RFLS-35-1V	<b>insulated electrode (PEEK)</b> , for various liquid, mashed and paste-like materials, also for fuel, oil, acids, bases or asphalt, tar, toluene	FPM
RFLS-35-11V	<b>insulated electrode (PEEK) extended version</b> , for various liquid, mashed and paste-like materials, also for fuel, oil, acids, bases or asphalt, tar, toluene	FPM
RFLS-35-2	<b>insulated electrode (PTFE) without O-ring</b> , for various liquid, mashed and paste-like materials, especially suitable for aggressive liquids	-
RFLS-35-21	<b>insulated electrode (PTFE) extended version without O-ring</b> , for various liquid, mashed and paste-like materials, especially suitable for aggressive liquids	-



with protective crown



tubular extender TN-28



magnetic pen for setting



NEW variant with front thread

## High-frequency level sensor RFLS-28

High-frequency limit level sensors with elimination of deposits and foam on the electrode. Variants RG and RN are for vertical mounting (with or without tubular extender TN-28). Variants FG and FN are for direct side mounting



- **NEW variants FG and FN with front thread**
- **RG, RN - Installation with the tubular extender in tanks, containers, sumps or funnels and containers**
- For reliable limit level sensing of various liquids, slurries and pastes
- Resistant to adhesion of viscous and adhering media (ketchups, yoghurts, spreads, syrups, creams, pastes, cleaning agents, etc.)
- Unique material type resolution function „Medium window“ (the sensor is sensitive only to the set medium and does not react to substances with lower and higher permittivity)
- Can replace vibration level sensors
- Adjustment with a magnetic pen or by means of a setting wire (PD variant)
- Universal design for all types of liquids (electrically conductive or non-conductive)
- High stability at high sensitivity (can be used for substances with  $\epsilon_r \geq 1.5$ )
- The version with PD output now also has a diagnostic function

### Variants

code	type of sensore	o-ring
RFLS-28_-1B	<b>insulated electrode (PEEK)</b> , for various fluids, mashed and paste-like materials, also for fuel, oil or methanol	NBR
RFLS-28_-10B	<b>insulated electrode (PEEK) extended version</b> , for various liquid, mashed and paste-like materials, also for fuel, oil or methanol	NBR
RFLS-28_-1E	<b>insulated electrode (PEEK)</b> , for sensing various liquid, mashed and paste-like materials, also for acids, bases or alcohol, ammonia, acetone, chlorine	EPDM
RFLS-28_-10E	<b>insulated electrode (PEEK) extended version</b> , for various liquid, mashed and paste-like materials, also for acids, bases or alcohol, ammonia, acetone, chlorine	EPDM
RFLS-28_-1V	<b>insulated electrode (PEEK)</b> , for various liquid, mashed and paste-like materials, also for fuel, oil, acids, bases or asphalt, tar, toluene	FPM
RFLS-28_-10V	<b>insulated electrode (PEEK) extended version</b> , for various liquid, mashed and paste-like materials, also for fuel, oil, acids, bases or asphalt, tar, toluene	FPM



### Technical specification

Supply voltage	7 ... 34 V DC
Output type	PNP
Max. switching current (PNP output)	max. 300 mA
Ambient temperature range	-40 ... +80 °C
Maximum overpressure	100 bar
Process connection	thread G 3/4", NPT 3/4"
Protection class	IP68

More detailed informations can be found in the datasheet of the product.



magnetic pen for setting

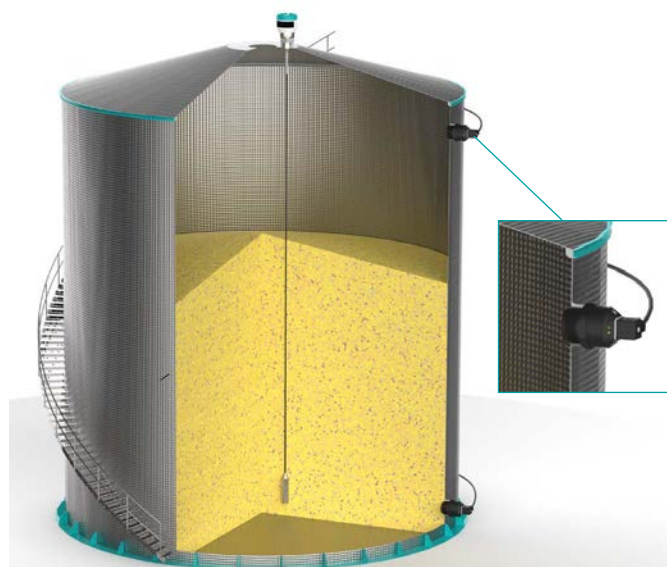


## High-frequency level sensor RFLS-53

For demanding applications to indicate bulk/solids powder, dust and hygroscopic materials and it can replace mechanical rotary level switches or standard capacitive level switches



- The RFLS-53 uses the principle of high-frequency capacitive measurement
- It responds to the mass of the material and ignores deposits and material residues on the measuring part
- The sensor is available in several versions with different types of outputs and electrical connections
- The RFLS-53 fully replaces the older CLS-53, its electrical connection is different for the 230 VAC version (3 wires)



### Variants

code	type of sensore
<b>NEW</b> RFLS-53N	<b>3-wire connection</b> with PNP, relay contact or solid state relay output for connected to Din rail supply and switching units or binary input of PLC

### Technical specification

Supply voltage	RFLS-53N_-P	7 ... 34 V DC
	RFLS-53N_-RE	95 ... 230 V AC
	RFLS-53N_-SSR	95 ... 230 V AC
Output type		PNP
		Relay contact
		SSR relay contact
Switching current	RFLS-53N_-P	max. 300 mA
	RFLS-53N_-RE	1 A
	RFLS-53N_-SSR	max. 130 mA
Ambient temperature range		-20 ... +60 °C
Process connection		thread G 1½"
Protection class		IP65

More detailed informations can be found in the datasheet of the product.



magnetic pen for setting

## Capacitive level sensor DLS-35

For limit level sensing of liquids, bulk solids and powders



### Variants

code	type of sensore	electrode length
DLS-35_-10	<b>uncoated short bar electrode</b> for non-adhesive bulk solids (sand, sugar) and non-conductive liquids (petroleum products, oils), horizontal mounting	50 mm or 100 mm
DLS-35_-13	like DLS-35_-10 with higher pressure resistance	50 mm or 100 mm
DLS-35_-20	<b>semi-coated rod electrode</b> for adhesive bulk solids and non-conductive liquids, horizontal or vertical mounting	0,1 ... 2 m
DLS-35_-21	<b>fully coated rod electrode (FEP)</b> for conductive liquids (water solutions, water), adhesive and aggressive materials, horizontal or vertical mounting	0,1 ... 2 m
DLS-35_-22	<b>fully coated rod electrode (PFA)</b> with enhanced resistance to permeation (diffusion) of vapours and gases. For water and conductive liquids in the food, pharmaceutical and chemical industries. In the short term can be used for high temperature applications or for aggressive liquids. Horizontal or vertical mounting	0,1 ... 2 m
<b>NEW</b> DLS-35_-25	<b>new design</b> , like DLS-35_-22 with higher pressure resistance at and high temperature (hot steam)	0,1 ... 2 m
DLS-35_-30	<b>uncoated demontable rod electrode</b> for bulk solids and conductive or non-conductive liquids. Vertical or horizontal slant mounting	0,1 ... 3 m
DLS-35_-31	<b>fully coated rod electrode (FEP)</b> , for aggressive conductive liquids (water, chemicals). Vertical mounting	0,1 ... 3 m
DLS-35_-40	<b>uncoated rod electrode with reference tube</b> (coaxial electrode), for non-conductive liquids (petroleum products, oil) in non-conductive tanks. Vertical mounting	max. 1 m
DLS-35_-41	<b>fully coated rod electrode (FEP) with reference tube</b> (coaxial electrode), for conductive liquids in non-conductive tanks. Vertical mounting	max. 1 m
DLS-35_-50	<b>uncoated rope electrode and weight</b> , for use in a deeper silos (bulk solids, gravel, cement) or sumps (liquids). Vertical mounting	1 ... 6 m
<b>NEW</b> DLS-35_-52	<b>fully coated rope electrode (FEP)</b> for electrically conductive and non-conductive liquids	1 ... 15 m

- Direct mounting into various containers, silos, vessels, tanks, filling inlets, reservoirs, etc.
- Increased resistance to electromagnetic interference
- Xi version for usage in explosive areas
- Simple sensitivity setting by means of magnetic pen
- Mode for quick setting of the sensor without the presence of medium
- LED state and function indication
- Wide choice of electric connection via connectors, cable glands, or a gland for protective hoses
- Material of housing and electrode from stainless steel
- High stability at high sensitivity (can be used for material with min.  $\epsilon_r = 1,3$ )
- Special variant DLS-35NT-25 with resistance to hot steam

### Technical specification

Supply voltage	7 ... 34 V DC
Output type	NPN; PNP; NAMUR
Switching current	max. 300 mA (NPN, PNP)
Ambient temperature range	-40 ... +85 °C
Process temperature range	-40 ... +200 °C
Max. medium temperature range	-40 ... +300 °C
Process connection	thread G1"; G 3/4"; M27 x 2; M30 x 1,5; NPT 3/4; TriClamp (ø34, ø50,5)
Process pressure range (for temp. +85 °C)	DLS-35_-13 0 ... 50 bar DLS-35_-10, 20, 30 0 ... 25 bar DLS-35_-25, 21, 22, 31, 40, 41 0 ... 20 bar DLS-35_-50 0 ... 1 bar
Protection class	DLS-35_-_-C-_- IP67 DLS-35_-_- IP68 A(B,D,V,H)-_-

More detailed informations can be found in the datasheet of the product.





## Capacitive level sensor DLS-27

For limit level sensing of liquids, bulk solids and powders



- Direct mounting into various containers, silos, vessels, tanks, filling inlets, reservoirs, etc.
- Sensitivity and hysteresis fluently adjustable
- LED state indication
- Fixed cable or connector connection
- Material of housing and electrode from stainless steel
- Xi version for usage in explosive areas, Xd for areas with the possibility of combustible dusts and XIM for mining areas with the presence of methane gas



### Variants

code	type of sensore	electrode length
DLS-27_-10	<b>uncoated short bar electrode</b> for non-adhesive bulk solids (sand, sugar) and non-conductive liquids (petroleum products, oils), horizontal mounting	50 mm or 100 mm
DLS-27_-11	<b>fully coated short bar electrode</b> , for conductive liquids (water). Horizontal mounting into tanks and tubes	30 mm
DLS-27_-20	<b>semi-coated rod electrode</b> for adhesive bulk solids (cement, flour) and non-conductive liquids (plant oils). Horizontal, slant or vertical mounting	0,1 m ... 1 m
DLS-27_-21	<b>fully coated rod electrode</b> (FEP) for conductive liquids (water solutions, water), adhesive and aggressive materials, horizontal or vertical mounting	0,1 m ... 1 m
DLS-27_-22	<b>fully coated rod electrode</b> (PFA) with enhanced resistance, for sensing aggressive conductive liquids and materials. Horizontal or vertical mounting	0,1 m ... 1 m
DLS-27_-30	<b>uncoated demontable rod electrode</b> for bulk solids and conductive or non-conductive liquids. Vertical or horizontal slant mounting	0,1 m ... 3 m
DLS-27_-31	<b>fully coated rod electrode</b> , for sensing aggressive conductive liquids (water, various chemicals). Vertical mounting	0,1 m ... 2 m
DLS-27_-40	<b>uncoated rope electrode and weight</b> , for general purpose use in deeper silos (bulk solids sensing - sand, gravel, cement) or sumps (sensing liquids). Vertical mounting	1 m ... 6 m

### Technical specification

Supply voltage	7 ... 36 V DC
Output type	NPN; PNP; NAMUR
Switching current	max. 300 mA (NPN, PNP)
Ambient temperature range	-20 ... +80 °C
Process temperature range	-40 ... +200 °C
Max. medium temperature range	-40 ... +300 °C
Process connection	thread M27 x 2; M30 x 1,5; G ¾"; TriClamp ø34
Process pressure range (for temp. +85 °C)	0 ... 20 bar
Protection class	IP67

More detailed informations can be found in the datasheet of the product.



magnetic pen for setting

## Capacitive level sensor CLS-23

Miniature capacitive level sensor for sensing various types of liquids



- Detection of various types electrical conductive or non-conductive liquids (water, water solution, cooling liquids, oil, ets.)
- Xi version for usage in explosive areas
- Simple sensitivity setting by means of magnetic pen
- Direct mounting into various containers, vessels, tanks, etc.
- LED state indication
- High-temperature performance
- SIL 1 according to the standard EN 61508

### Variants

code	type of sensore	electrode length
CLS-23-10	<b>uncoated short bar electrode</b> , for electrically non-conductive liquids (mineral and plant oils, resins, etc.). Mounting in horizontal position	30 mm
CLS-23-11	<b>insulated (coated PP) short bar electrode</b> , for non-aggressive electrically conductive liquid (water, water solutions)	30 mm
CLS-23-12	<b>insulated (coated FEP) short bar electrode</b> , for moderately aggressive electrically conductive liquid (chemicals, water, moderately aggressive water solutions). Higher temperature resistance than variant "11"	30 mm
CLS-23-20	<b>partly insulated rod electrode</b> , for level detection of conductive and non-conductive liquids, partially resistant to vapours (water) condensation in the sensing area. Vertical mounting; horizontal mounting (from the side) is possible for shorter electrodes (up to 200 mm)	50 mm ... 1 m
CLS-23-21	<b>fully insulated rod electrode</b> , universal use, for level detection of conductive liquids (water, water solutions). Resistant to vapours (water) condensation in the sensing area and partially resistant to medium spraying. Vertical mounting; horizontal mounting (from the side) is possible for shorter electrodes (up to 200 mm)	50 mm ... 1 m
CLS-23-30	<b>uncoated demountable rod electrode</b> , for level detection of conductive and non-conductive liquids. Vertical and horizontal mounting (from the side) is possible for shorter electrodes (up to 200 mm)	50 mm ... 1 m

### Technical specification

Supply voltage	6 ... 30 V DC						
Output type	PNP; S; NAMUR						
Switching current	max. 40 mA (PNP 100 mA)						
Ambient temperature range	-25 ... +80 °C						
Process temperature range	-30 ... +150 °C						
Max. medium temperature range	-30 ... +150 °C						
Process connection	thread M18 x 1,5; M20 x 1,5; NPT 1/2; G 1/2"; G 3/8"						
Process pressure range (for temp. +85 °C)	<table> <tr> <td>CLS-23-10, 12, 30</td> <td>0 ... 60 bar</td> </tr> <tr> <td>CLS-23-11</td> <td>0 ... 50 bar</td> </tr> <tr> <td>CLS-23-20, 21</td> <td>0 ... 25 bar</td> </tr> </table>	CLS-23-10, 12, 30	0 ... 60 bar	CLS-23-11	0 ... 50 bar	CLS-23-20, 21	0 ... 25 bar
CLS-23-10, 12, 30	0 ... 60 bar						
CLS-23-11	0 ... 50 bar						
CLS-23-20, 21	0 ... 25 bar						
Protection class	IP68						

More detailed informations can be found in the datasheet of the product.



## Submersible level sensor CLS-23S

Capacitive sensor for detection of water in bores, wells and sumps



- Stainless steel removable protective basket preventing mechanical damage of the electrode
- Two-wire connection directly to relay circuit or to control system input (PLC)
- Maximum immersion depth 100 m
- Very easy installation without adjustment

### Variants

code	type of sensore	electrode length
CLS-23S-11	<b>insulated (coated) short bar electrode with stainless steel protection basket.</b> Possible submersion down to 100 m	30 mm

### Technical specification

Supply voltage	6 ... 30 V DC
Output type	S (current switch)
Supply current – OFF state	0,6 mA
Switching current	max. 40 mA
Ambient temperature range	-20 ... +80 °C
Protection class	IP68

More detailed informations can be found in the datasheet of the product.





magnetic pen for setting



## Thru-wall level sensor FLD-32 “Flexi Watch”

**For limit sensing of liquid levels in non-conductive tanks (through a non-conductive wall of a vessel or pipeline)**



- Direct replacement for FLD-48 „Medusa“
- The sensor is equipped with a high-frequency technology, enabling reliable function even in case of adhering conductive media
- Miniature performance in a flexible housing, optional installation on slightly curving surfaces
- Attached using self-adhesive a layer or special fastening bands
- Configuration and setup using „programming“ cable or magnetic pen
- LED status indication



### Variants

code	type of sensore	cable length
FLD-32N	for indication of the presence of (conductive or non-conductive) liquids in glass or plastic vessels	2 or 5 m

### Technical specification

Supply voltage		6 ... 30 V DC
Output type		S (current switch)
Switching current		max. 40 mA
Ambient temperature range		-20 ... +70 °C
Maximum vessel wall thickness	el. conductive liquids	8 mm
	el. non-conductive liquids	3 mm
Diameter of the container for mounting the sensor		min. 300 mm
Protection class		IP67

More detailed informations can be found in the datasheet of the product.



planar electrode

prismatic electrode



magnetic pen for setting



## Thru-wall level sensor GPLS-25

For limit level indication of liquids in glass or plastic gauge-pipes, tubes or tanks



- High-frequency allows reliable operation for the adhesive and electrically conductive media
- Miniature configuration, LED state indication
- Simple sensitivity setting by means of magnetic pen
- Types with fixed cable or with a connector
- PNP or S (electronic switch) type terminal



Variants		
code	type of sensore	electrode
GPLS-25N-0	prismatic (refracted) electrode, shape-adapted to be attached to the gauging pipe or other tube. The fixing of the sensor onto a pipe is provided by plastic straps	prismatic
GPLS-25N-1	planar electrode, suitable for installation on flat surfaces (e.g. plastic or glass tanks). The sensor can be fixed with plastic straps or by double sided adhesive layer	planar

### Technical specification

Supply voltage	6 ... 30 V DC	
Output type	PNP ; S (current switch)	
Switching current	PNP output „S“ output (2-wire current switch)	max. 100 mA 3,3 mA / 40 mA (min./max.)
Maximum vessel's wall (tube) thickness	electrically conductive liquids electrically non-conductive liquids with $\epsilon_r < 10^*$	8 mm 3 mm
Ambient temperature range	-20 ... +80 °C	
Diameter of the gauge-pipes for mounting the sensor	15 ... 50 mm	
Protection class	IP67	

\*)  $\epsilon_r$ , see relative permittivity table

More detailed informations can be found in the datasheet of the product.



## Capacitive proximity switch CPS-24

For the detection of leakage or spillage of liquids in detention sumps, or on the floor



- Also suitable for detecting the position, movement or approach of objects
- Adjustable sensitivity
- Material of housing and nut from stainless steel
- Output type NPN, PNP, NAMUR
- Xi version for usage in explosive areas
- LED state indication

### Variants

code	type of sensore
CPS-24	for detection of proximity or motion of solid objects. It is suitable for indication of the liquid level through non-conductive walls of vessels or on non-conductive gauge-pipes. It is excellent for liquid leakage detection in collection pits or directly on floors

### Technical specification

Supply voltage	7 ... 36 V DC
Output type	NPN ; PNP ; NAMUR
Switching current	max. 200 mA (NPN, PNP),
Ambient temperature range	-20 ... +70°C
Sensing distance (Sensitivity)	0 ... 10 mm
Process connection	thread M24x1
Protection class	IP67

More detailed informations can be found in the datasheet of the product.





## Float system FS-4

**For detection of leakage of petroleum and petroleum products in both empty and water filled trap reservoirs**



- The unit is intended for an assembly with CPS- 24Xi-C-RO capacitive sensor and NSSU-811 SP2 assessment unit
- Relay output and power supply voltage of 230 V and 24 V AC/DC
- Float guiding rods of any length (max. 2.5 m)

### Variants

code	type of sensore	length of guiding rods
FS-4	for detection of leakage of petroleum and petroleum products in trap or protection reservoirs	0,5 ... 2,5 m

### Technical specification

Range of ambient operational temperatures <sup>1)</sup>	-20 ... +60°C
Range of the sensed medium densities	800 ... 950 kg/m <sup>3</sup>
Minimum layer thickness of medium for detection	on water level in empty reservoir 5 mm 25 mm
Cable	PUR 3x0,14 mm <sup>2</sup> (brown: + pole, white: - pole, green: not used)
Float weight (board + 4 floats + CPS-24Xi sensor)	cca 1,6 kg
Working area	With intrinsically safe power supply unit NSSU-811-230V (24V)-R SP2, complete float system zone 1

1) The float should be protected against freezing (see documentation of FS-4).

More detailed informations can be found in the datasheet of the product.



## Conductive probe CNP-18

For direct level detection of electrically conductive liquids (water)



- Electrical connection via cable or screw terminal
- Easy assembly, long service life
- Housing and electrode is from stainless steel
- The probes can be connected to Dinel CDSU series evaluation units
- Designed with short bar electrode or dismountable rod electrode

### Variants

code	type of sensore	electrode length
CNP-18N-10	short bar electrode for horizontal mounting, fixed cable	-
CNP-18F-10	short bar electrode for horizontal mounting, screw connector	-
CNP-18N-30	removable rod electrode, installation from above (shorter electrodes also from the side). Fixed cable connection	max. 3 m
CNP-18F-30	removable rod electrode, installation from above (shorter electrodes also from the side). Bolt clamp	max. 3 m

### Technical specification

Temperature at housing	max. 130 °C
Maximum pressure (for temperature 25°C)	4 MPa (40 bar)
Process connection	thread M18x1,5; G 3/8"; G 1/2"
Protection class	IP67

More detailed informations can be found in the datasheet of the product.



# FLOW METERS

## PRINCIPLE OF FLOW SENSING

### Measurement principle of the thermal flow sensor

The function of thermal flow sensors is based on the measuring of the thermal dissipation to the measured medium. The sensor is internally heated to a temperature above several °C higher than the temperature of the medium. The movement of the medium draws this heat from the stem surface into the surrounding space (medium). The amount of heat drawn off is proportionate to the flow rate of the medium. The sensor reacts to this by changing the thermal power delivered to the sensor stem. The amount of required power then serves as information for controlling the output. The sensitivity of the sensor is primarily affected by the thermal capacity of the medium. The flow output can be configured to a switching ON mode - output is switched ON when the flow rate increases, or an switching OFF mode - the output is switched ON when the flow rate decreases.

### TFS-35

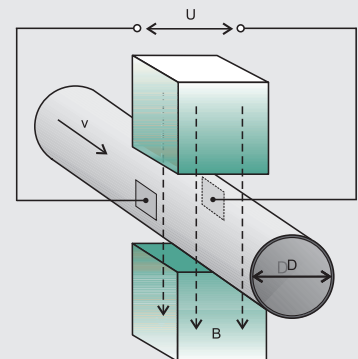
### Electromagnetic flow measurement

The principle of flow measurement is taken from the Lorentz law under which the magnetic force acts on the moving charge in a magnetic field. Voltage on measuring electrodes arises in the consequence of this principle. This voltage is directly dependent on the flow velocity, the size of the magnetic induction and the distance between the electrodes.

$$U = v \cdot B \cdot D$$

The method is resistant to changes in pressure, density and viscosity of the liquid. The method is not suitable for measuring of electrically non-conductive liquids.

### EFM-115



■ Thermal flow sensor TFS-35 .....	36
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magnetic pen for setting

## Thermal flow sensor TFS-35

**For limit and continuous flow rate sensing of liquids and for monitoring their temperature**



- These sensors are intended for installation in pipes, in which the actual flow and temperature are monitored
- Flow rate measurement is shown in a bar graph by five green LED diodes and in the same graduation it is possible to select the limit for output switching
- Can be selected either 1x current output 4...20 mA and 1x limit PNP output, or 2x limit PNP output
- Optical indication of output states (flow and temperature) by two LEDs
- Stainless steel housing

### Variants

code	type of sensore	stem length
TFS-35-10	short cylindrical bare stem	20 mm
TFS-35-11	extended cylindrical bare stem	50 mm

### Technical parameters

Supply voltage	12 ... 34 V DC	
Output	TFS-35_ _ _ -PFPT TFS-35_ _ _ -IFPT(F)	2x PNP 1x PNP, 1x 4...20 mA
Maximum switching current	max. 300 mA	
Maximum residual voltage in ON state	1,5 V	
Temperature output - switching points	15 °C; 30 °C; 45 °C; 60 °C; 75 °C	
Flow rate range	1 až 150 cm/s	
Ambient temperature range $t_a$	-20 ... +80 °C	
Pressure strength	100 bar	
Process connection	thread G 1/2"	
Protection class	TFS-35_ _ _ -C-L_	IP67
	TFS-35_ _ _ -A(B,V,H)-L_	IP68

More detailed informations can be found in the datasheet of the product.





# Electromagnetic flow meter EFM-115

**For continuous flow measurement of water and water based liquids in water treatment, chemical, food and other branch of industry**



- Flanged type DN 10 – 300 mm
- Easy change from compact to remote version
- Robust and resistant cover of sensor and transmitter
- Flow direction indication
- Universal power supply
- Archiving of measured data

## Variants

code	type of sensore	communication
EFM-115-0	flow meter without communication	-
EFM-115-M	flow meter with RS 485 / Modbus RTU	RS 485 / Modbus

## Technical specification

Supply voltage	85 ... 260 V AC (9 ... 36 V DC)
Analog output	Active galvanically separated, 0 (4) ... 20 mA
Frequency output	0 ... 1 kHz / 0 ... 100 % from flow rate range, galvanically separated
Binary outputs	up to 4 relays (230 V AC/3A)
Communication output	RS 485 (galvanically separated) / Modbus RTU (variant M)
Medium conductivity	≥ 5 µS/cm for demi water ≥ 20 µS/cm
Measurement accuracy	0,3 % of reading
Maximum Pressure	standard 1,6 MPa
Ambient temperature	-20 ... +50 °C
Liner temperature resistance	rubber -5 ... +90 °C PTFE -25 ... +130 °C
Measuring range	0,3 ... 12 m/s
Control unit dimension	180 x Ø 115 mm
Process connection	DIN flange
Protection class	IP67
Liner type	Hard rubber (standard) PTFE (optional)
Material of sensing electrode	Stainless steel 17.348 (AISI 316L)

More detailed informations can be found in the datasheet of the product.



## Flow control unit FCU-400

**For measurement of immediate volume flow rate in open channels and drains. Intended for an assembly with ultrasonic level meter ULM-53 with RS485/Modbus RTU output (max. 4 sensors)**



- Data recording in the internal memory with possibility of copying on a USB flash disc
- Built-in web server, current output
- Displaying on a large OLED matrix display
- A broad choice of flow rate physical units
- Power supply voltage 230 V AC or 24 V DC
- Arbitrary conversion curve
- Designed according to TNV 25 9305

### Technical specifications

Casing - material	ABS
Housing dimensions	160 x 166 x 106 mm
Protection class	IP65
Ambient temperature range	-30 ... +60 °C
Power supply voltage	100 ... 240 V AC (9 ... 36 V DC)
Nominal power consumption	10 VA (8 VA)
Outputs	0, 2 or 4 SSR relays, max. 250 V AC/100 mA RS 485/Modbus RTU - Slave, galvanically isolated current output (optional) Ethernet/RJ45 (optional)
Inputs	RS 485/Modbus RTU - Master, galvanically isolated (max. 4 sensors) Binary input for user flow rate counter resetting USB
Internal power supply for sensors	Us = 24 V DC/Imax. 120 mA
Display type	Matrix OLED display 128 x 64 dots
Control	Membrane keyboard - 4 keys
Size of internal memory for data archiving	Continuous archiving of average 5-minute flow rates for at least 15 month
Totalizer function	2 counters of total flow quantity on each channel
Motor hours function	Measuring time of faultless operation and time of failure state
Web server function	Displaying of currently measured values and total flow quantity on all channels
Language	English
Weight	820 g

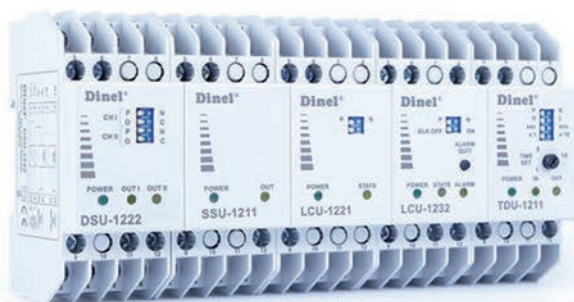
More detailed informations can be found in the datasheet of the product.



# EVALUATION & SWITCHING UNITS



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## Power supply and switching units

### Universal DC stabilized power supply and switching units



- Resistant to short circuits and current overloading and overvoltages
- Automatic level regulation function (based on type)
- Wall mounted case or DIN rail 35 mm mounted
- LED status optic indication
- Option to connect Dinel limit sensors with all types of outputs

#### Variants

code	description
SSU-1211 SSU-2411	single-channel universal power supply unit for powering sensors and converting their state to a power contact
DSU-1222 DSU-2422	two-channel universal power supply unit for powering sensors and converting their state to a power contact
LCU-1221	control unit designed for automatic level control between minimum and maximum level conditions by means of two limit level sensors. Pumping or draining function
LCU-1232	control unit designed for automatic level control between minimum and maximum state by means of two limit level sensors. Supplemented with an input for a third emergency sensor. Pumping or draining function
DSU-1222-W	control unit for automatic level control between minimum and maximum state using two limit level sensors. Wall-mounted design
SDSU-1222-W	control unit for automatic level control between minimum and maximum state using two limit level sensors programmable via a third wire (e.g. FLD-32 "Flexi Watch"). Wall-mounted design
TDU-1211	timing unit for level control using one limit sensor

#### NEW Variants

code	description
<b>NEW</b> DSU-1222-A	dual channel power supply and evaluation unit for flexiwatch sensors. Allows remote parameterization of sensor connections. Includes LC (level control) function
<b>NEW</b> SSU-1212-AD	single-channel unit designed for sensors with diagnostic function (RFLS-35, RFLS-28). The diagnostic function monitors the correct function and settings of the connected sensor. Extended with a remote parametrization function. Use for safety applications
<b>NEW</b> SSU-1212-D	single-channel unit designed for sensors with diagnostic function (RFLS-35, RFLS-28). The diagnostic function monitors the correct function and settings of the connected sensor. Use for safety applications
<b>NEW</b> TDU-1222	timing unit for level control using one limit sensor. Supplemented by the possibility of connecting an emergency sensor



# Level control relay CDSU

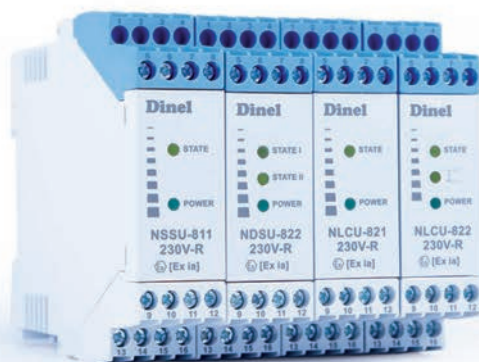
For status evaluation of conductive level probes (e. g. CNP-18)



- Dual channel, two single relay output
- Wall mounted case or DIN rail 35 mm mounted
- LED state indication
- Automatic level regulation function

Variants		
code	type of sensore	type of mounting
CDSU-522	DIN 35 mm rail mounting. Continuous sensitivity adjustment	DIN
CDSU-522-W	wall mounted case (possible to locate in an outdoor environment). Continuous sensitivity adjustment and time delay set up	wall





## Intrinsically safe supply units NxxU

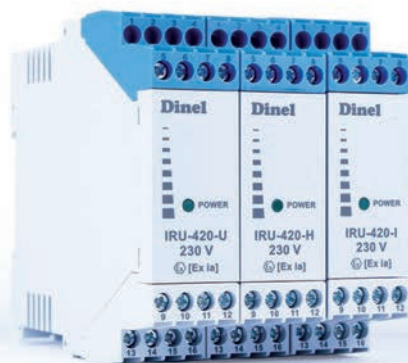
For energizing and state-detection of NAMUR sensors in explosive area



- Resistant to short circuits and current overloading and overvoltages
- LED status optic indication
- Relay or transistor output
- Automatic level regulation function (based on type)
- Option to located the connected sensor in hazardous environments zone 0
- Mounting on DIN rail 35 mm, power supply 230 V AC or 24 V DC

### Variants

code	description
NSSU-811	single channel unit without additional functions for supply and state detecting of one NAMUR sensor. Transistor switch or relay contact output
NSSU-812	like NSSU-811 supplemented with an LFD system (cable fault detection), relay contact output
NDSU-822	for powering and assessing the state of two limit sensors, without supplementary functions. Transistor switch or relay contact output
NLCU-821	two-state level regulation unit using two limit sensors, relay contact output
NLCU-822	like NLCU-821 with an LFD function (cable fault detection) and protection against illogical limit sensor states arising due to malfunction or incorrect connection, relay contact output



## Isolating repeaters IRU-420

**For galvanic separation of current signal from transducer in explosive area to evaluation in non-explosive area**



- Galvanic separation input and output signal
- Option bi-directional transmission of communication signal HART®
- LED status optic indication
- Integrated auxiliary voltage source
- Installation on DIN rail 35 mm, power supply 230 V AC or 24 V DC

### Variants

code	description
IRU-420-I	for powering and galvanic separation of current signal 4 ... 20 mA from an environment with an explosion hazard to a BNV environment
IRU-420-H	for powering and galvanic separation of current signal 4 ... 20 mA from an environment with an explosion hazard to a BNV environment. Possibility of bidirectional transmission of HART® communication signal
IRU-420-U	for powering and galvanic separation of current signal 4 ... 20 mA at 0 ... 10 V from an environment with an explosion hazard to a BNV environment



## Universal stabilized power supplies

**For reliable power supply for sensors in demanding industrial applications.  
Unlike switch-mode power supplies, they prevent mains interferences**



- Resistant to short circuits and current overloading
- Galvanic separation of output from mains power supply
- Robust design, quality terminal box
- Suited in polycarbonate enclosure
- Installation on DIN rail 35 mm

### Variants

code	description	supply voltage	max. current consumption
SPSU-1200-20	stabilized power supply with indicating device	12 V DC	2,0 A
SPSU-2400-18	stabilized power supply with indicating device	24 V DC	1,8 A
PSU-1200-S	stabilized power supply	12 V DC	160 mA
PSU-2400-S	stabilized power supply	24 V DC	80 mA



# DISPLAY UNITS



■ Programmable control unit PCU-100 .....	46
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■ SCADA system .....	50



## Programmable control unit PCU-100

For display, recording and evaluation of physical values  
Configuration of level meter using HART®



- Universal industrial data logger, optionally with six-digit display function (PCU-100-D)
- One input channel 4-20 mA current loop, optional with HART® support protocol for digital data transmission (PCU-100-\_-H)
- Connection to PC via micro USB port, easy to use application (downloadable at [www.dinel.cz](http://www.dinel.cz)) for setting up the unit and the connected sensor (HART® supported version only)
- Includes power supply for the sensor (transmitter)
- Configurable LCD display, including bargraph, data storage on internal continuously overwritten FLASH memory
- FLASH memory capacity 500,000 records
- Many conversion characteristics: linear, quadratic, square root, user-defined tables with linear approximation or conversion to volume according to specified tank parameters
- Battery-backed real-time circuit

### Variants

code	description
PCU-100-D	front panel with a graphic LCD display and a membrane keypad
PCU-100-L	front panel without an LCD display with status LEDs
PCU-100-_-I	PCU-100 with current input module
<b>NEW</b> PCU-100-_-H	PCU-100 with current input module with HART® communication
<b>NEW</b> PCU-100-_-_-I	PCU-100 with current output module
PCU-100-_-_-_-230V	PCU-100 with 230 V AC power supply

### Technical specifications of PCU-100-\_-\_-230V

Supply voltage	85 ... 253 V AC
Rated power consumption	6 VA
Output	1 × SSR relay, max. 250 V AC/100 mA
Input	active current loop (4 ... 20 mA) power supply 24 V +/- 10 %, serial impedance <110 Ω
Display type	graphical LCD 132 × 32 px
Internal memory size	min. 500 000 records
Archiving Period	user adjustable (1 sec ... 8 hours)
Languages	Czech, English
Dimensions	110 x 80 x 65 mm
Weight	320 g
Housing - material	ABS/PC
Protection class	IP65
Ambient temperature	-25 ... +50 °C

More detailed informations can be found in the datasheet of the product.





## PCU-100 with wireless communication in stand-alone version

Transfer of measured data to Cloud storage via GSM network

Optional battery-powered version, typically for environmental and monitoring applications

- Option of unit with GSM module for remote data management (PCU-100-\_-\_-G)
- Possibility of processing transferred data via GSM network in the Dinel Cloud application
- Adjustable shutdown mode for save battery power
- Optional set of the unit PCU-100-\_-\_-12V (battery-powered version) with external battery BSU-1201 for remote locations without power supply

### Variants

code	description
PCU-100-D	front panel with a graphic LCD display and a membrane keypad
PCU-100-L	front panel without an LCD display with status LEDs
<b>NEW</b> PCU-100-_-_-G	PCU-100 with communication <b>GSM</b> module
<b>NEW</b> PCU-100-_-_-12V	PCU-100 with <b>battery</b> power supply

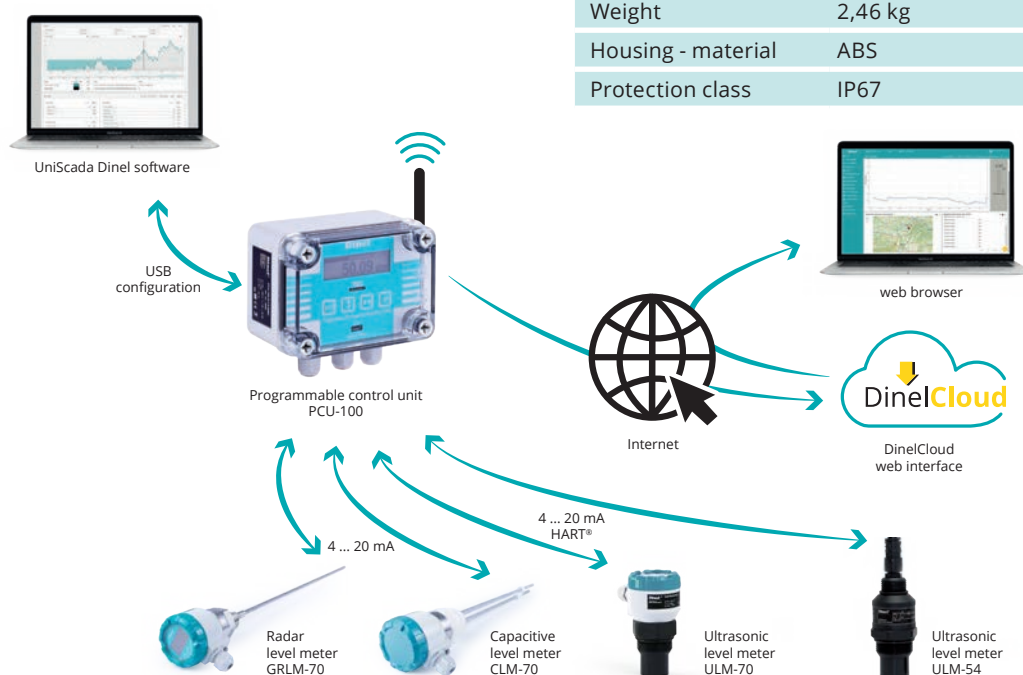
### Technical specifications of PCU-100-\_-\_-12V

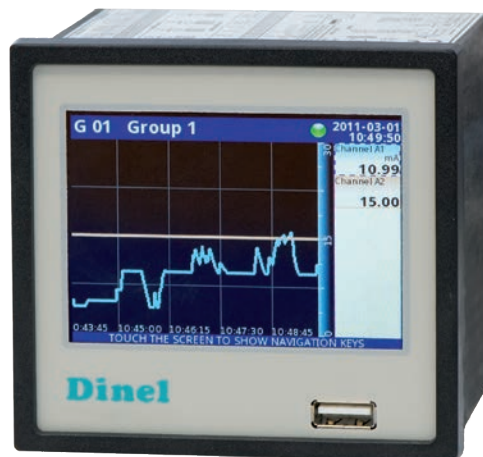
Supply voltage	9...26 V DC
Rated power consumption	max. 10,4 W

Other specifications are the same as for PCU-100-\_-\_-230V.

### Technical specifications of BSU-1201

Nominal Voltage	12 V DC
Capacity	7 Ah
Battery type	lead
Dimensions	200 x 120 x 90 mm
Weight	2,46 kg
Housing - material	ABS
Protection class	IP67





## Multifunction graphical unit MGU-800

For display, recording and evaluation of process instruments signals (level, flow, temperature, pressure, etc.)



- 3.5" TFT touch display (resolution 320 x 240 pixels)
- Arbitrary combination of I/O modules
- Records values to internal memory (1.5 GB)
- Various types of graphical displays, multi-language
- Extensive ways of data communication (RS232/485, USB, LAN)
- Evaluating and processing of the measured data on PC
- Installation on front panel
- Sensor power supply output 24V, load current of internal power supply max. 0,2 A

### Module variants

code	description
II16	16x Current inputs (4 ... 20 mA)
IUI4 (IUI8)	4 (8) Current inputs (4 ... 20 mA) + 4 (8) Voltage inputs (0 ... 10 V)
ID8	8 Optoisolated digital (binary) inputs
IFI2 (IFI4)	2 (4) Current inputs for flowmeters + 2 (4) Current inputs (4 ... 20 mA)
IPI2 (IPI4)	2 (4) Pulse inputs for flowmeters + 2 (4) Current inputs (4 ... 20 mA)
ICP4	4 Universal counter inputs
ITC4 (ITC8)	4 (8) Thermocouple sensors (TC/mV) inputs
IRT4	4 Resistance temperature detectors (RTD) inputs
OI2	2 Passive current outputs (4 ... 20 mA)
OR8	8 Relay outputs (1 A/250 V)

### Technical specifications

Supply voltage	24 V 230 V	19...50 V DC, 16...35 V AC 85 ... 260 V AC/DC (50...60 Hz)
Power supply output	24 V DC +/- 5 %/max. 200 mA	
Power consumption	15 VA (max. 20 VA)	
Built-in digital input	0...24 V DC, galvanic insulated low state: 0...1 V, high state: 8...25 V power consumption: 7,5 mA/24 V	
Display type	3,5" TFT color display, 320 x 240 px	
Basic communication interface	RS-485 Modbus RTU USB port (front)	
Optional communication interface	RS-485, RS-485/RS-232 Modbus RTU USB port (rear) Ethernet 10M RJ-45	
Languages	Czech, English, Russian, German and other	
Dimensions	96 x 96 x 100 mm	
Weight	340 g	
Housing - material	NORYL - GFN2S E1	
Protection class	IP40 (optional IP54)	
Ambient working temperature	0 ... +50 °C	

More detailed informations can be found in the datasheet of the product.



with remote control  
RCW-1



## Programmable display unit PDU

For measurement and display of physical values



- Suitable for connecting level meters or other process instruments with a current or voltage output
- 4-digit LED display
- Up to 4 relay outputs, option of an insulated analogue output
- Includes an auxiliary voltage power supply for current loop 4 ... 20 mA
- Front panel performance (IP40) or wall-mounted case (IP65)
- Communication interface RS-485 / Modbus RTU
- Power supply 230 V AC or 24 V DC

### Module variants

code	description
PDU-420-W	wall-mounted case unit with 2 relay outputs and 4-digit display, support infrared remote control RCW-1
PDU-420-P	front panel performance unit with 2 relay outputs and 4-digit display
PDU-421-P	front panel performance unit with 2 relay outputs and 4-digit display. Support analog output signal 4 ... 20 mA
PDU-440-P	front panel performance unit with 4 relay outputs and 4-digit display

### Technical specifications

Housing type		P (panel)	W (wall mounted)
Supply voltage	24 V	19 ... 50 V DC, 16 ... 35 V AC	24 V DC +/- 15 %
	230 V	85 ... 260 V AC/DC (50 ... 60 Hz)	230 V AC +/- 10 %
Power consumption	24 V	4,5 W (4,5 VA)	4,5 W
	230 V	4,5 VA	2,6 VA
Power supply output		24 V DC +/- 5 % / max. 100 mA	
Input	current	0/4 ... 20 mA	
	voltage	0/1 ... 5 V, 0/2...10 V	
Output	2 / 4 (relay 1A/250 V AC) optional 0 ... 24 mA		2 (relay 1A/250 V AC)
Display range		-999 ... 9999, decimal point	
Communication interface		RS-485 Modbus RTU	
Dimensions		96 x 48 x 100 mm	110 x 80 x 67 mm
Weight		210 g	330 g
Housing - material		NORYL-GFN2S E1	ABS
Protection class		IP40 (from front)	IP65
Ambient working temperature		0 ... +50 °C	

More detailed informations can be found in the datasheet of the product.

# Local process indicator LDU-401

For local display of measured physical value



- For local level indication directly on the level meter
- Programming through 2 keypads programmable unit, decimal point can be arbitrarily set
- Assembly between the level meter (CLM-36 or ULM-53) and the connector



## SCADA system

Software applications for setting of level meters that are connected to the communications loop and collection of measurement data



- Graphic visualization
- Data recording and export to Excel

### Basic SCADA level

Application for communication with level meters. (ULM-53, ULM-70, GRLM-70).

### Basic SCADA flow

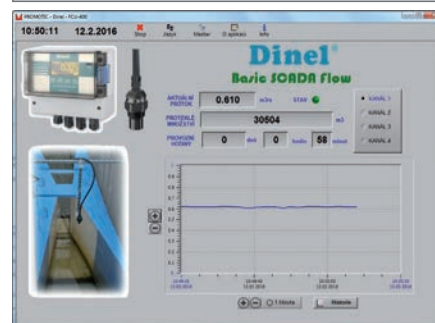
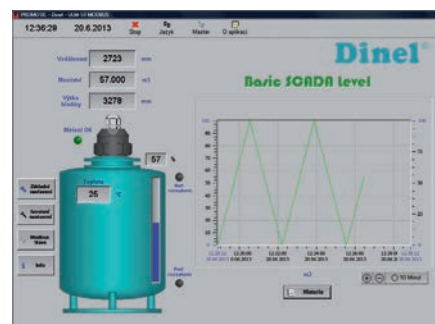
Application for communication with flow meters. (FCU-400).

### Basic SCADA fuel

Application for communication with level meters for diesel measurement (CLM-40-40).

### Uni SCADA

Applications for communication with end devices with HART® output.





# ACCESSORIES



■ Accessories .....	52
■ Other products .....	55



# Capacitive touch sensor CTS-41

**For modern method of LED lights switching or for similar power loads**

- The touch sensor allows switching through non-conductive materials (such as wood, glass, ceramics, plasterboard, etc.)
- The sensor has no movable parts so that its service life is unlimited
- Multiple methods of installation using self-adhesive tape, glue or screws
- Power supply voltage 10 ... 28 V DC
- Sensitivity automatic control



## Product variants

code	description
CTS-41T-0	TOGGLE touch sensor - press on / press off (button function). With angled terminal block
CTS-41T-1	TOGGLE touch sensor - press on / press off (button function). With direct terminal block
CTS-41S-0	SINGLE KEY touch sensor - on when zooming in / off when zooming out (sensor function). With angled terminal block
CTS-41S-1	SINGLE KEY touch sensor - on when zooming in / off when zooming out (sensor function). With direct terminal block

## Technical specifications

Power supply voltage	10 ... 28 V DC
Supply current (OFF state)	max. 10 mA
Switched current	max. 10 A (continuously)
Dimensions	41 x 43 x 10 mm
Covering wall maximum thickness	30 mm (wood)
Sensitivity	to hand contact
Ambient temperature range	-10 ... +50 °C
Weight	approx. 60 g

# Convertor UCC-01

**Converter for sensor connection to CAN output (CLM-40) and a PC with special software (Basic Scada fuel)**

- Power supply voltage: USB interface (4.4 ... 5.25 V DC)
- Operating temperature range: -40 ... +80 °C



## Convertor URC-485

**Converter for connection of the sensor with RS 485 / Modbus outputs (GRLM-70, ULM-70, ULM-53, EFM-115, FCU-400, MGU-800, PDU-4xx-P, PDU-420-W) and PC with special software (Basic Scada level)**



- Power supply: from USB interface (4,4 ... 5,25 V DC)
- Galvanic isolation (optoisolation) between an USB interface and RS-485 lines
- Ambient temperature range: 0 ... +50 °C



## Convertor UHC-01

**Universal USB to HART® converter. Setting, reading of measured data via PC from devices supporting HART® communication protocol**



- Use with external power supply for current loop or internal power supply (24 V / 45 mA) with short circuit protection
- Integrated and switchable HART® communication resistor (250 Ω)
- Supplied with setup and diagnostic software supporting HART® protocol revision 5 and 7
- Communication signalling via LEDs
- Very compact dimensions and low weight



## HUB HB-485

**For connection more level meters ULM with unit FCU**



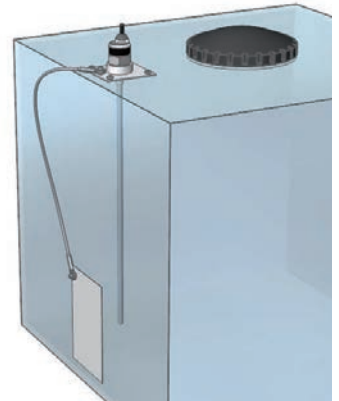
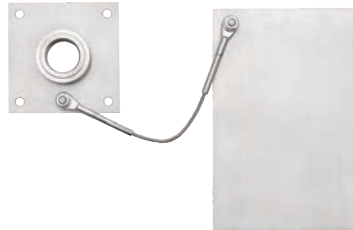
- Cable glands for protective hose
- Possibility of connection to 4 level meters of ULM series with output RS 485
- Plastic box with IP65



## Auxiliary plate electrode PDE

**For maximum reliability and linearity of capacitive sensors placed in non-conductive tanks**

- Designed for capacitive sensors installed in vertical position with electrode length exceeding 300 mm
- Stainless steel performance
- Process connection M18x1,5 or M27x2, G ¾



## Cable hanger KD-60

**For hydrostatic level meters HLM safety cable hanging**

CE

- Plastic performance



## Non-hermetic junction box NB

**For termination of hydrostatic level meter cable with compensation capillary and its electrical connection with the supply cable**

CE

- For connection of hydrostatic level meters HLM-25C, HLM-25S, HLM-16N, HLM-35C and HLM-35S equipped with a cable with compensation tube
- Equipped with a valve with semipermeable membrane to equalize atmospheric pressure (non-permeable to water, permeable to air)
- Option of overvoltage protection version
- Protection class IP65



### Product variants

code	description
NB-01	version without overvoltage protection
NB-11	version with overvoltage protection

# Horn adapters ST-G

**For performance improvements of ultrasonic level meters ULM and ULS**

- Increases the radiation directivity of acoustic waves
- Improves reception of weak ECHOS (foamy or unstable level surfaces, solid materials, ... )
- Reduces the risk of false reflections
- Process connection thread G $\frac{3}{4}$ ", G1", G1 $\frac{1}{2}$ " or G2 $\frac{1}{4}$ "



# Telescopic bracket VKD

**Intended for mounting of ultrasonic level meters in outdoor applications - rivers, canals, dams, or for installation in tanks with open ceilings - sumps and shafts**



- The telescopic bracket allows the level meter to be mounted in the range of 50-90 cm from the wall
- The connecting material is part of the telescopic bracket (except for the screws for fixing to the wall - it is recommended to use 3x M8 through anchor)



# Other products

**We offer a wide range of accessories**



- Steel and stainless steel welding flanges
- Plastic and stainless steel fixing nuts and flanges
- Metal-plate holder for proximity switches CPS-24
- Relays and mounting sockets, cable connectors
- Display module DM-70 for GRLM-70, CLM-70, and ULM-70
- Extension cable to the display module PK-70-1 for GRLM-70, CLM-70, and ULM-70
- Miniature connectors M12 for DLS-27, CPS-24, CLS-23, DLX-35, ULM-53, RFLS-35 sensors
- Miniature connectors M8 for GPLS-25 sensors
- Distance plastic crown for CPS-24, use inter-coat space of double coated tanks
- Atypical seal made of PTFE, aluminium, or other materials
- Magnetic pen MP-8



# MAP OF APPLICATIONS

Map of Dinel level sensors applications	CONTINUOUS LEVEL METERS																	
	GRIM-70-10	GRIM-70-11, 12	GRIM-70-20	GRIM-70-30, 33	GRIM-70-32	CLM-36(70)-10 DLM-35-20	CLM-36(70)-11, 12 DLM-35-21, 22	CLM-36(70)-20 DLM-35-40	CLM-36(70)-22 DLM-35-41	CLM-36(70)-30, 31 DLM-35-50	CLM-36(70)-32 DLM-35-51	CLM-70-61	CLM-40	ULM-53	ULM-70 ULM-54	HLM-16N HLM-25S	HLM-25C	HLM-35
AGRICULTURE, FOOD PROCESSING, PACKING TECHNOLOGY																		
corn, cereals, seeds	••	••	–	••	••	••	–	–	–	••	–	–	–	–	•	–	–	–
malt and feeding mixtures – dry	••	••	–	••	••	•	•	–	–	••	•	–	–	–	•	–	–	–
malt and feeding mixtures – wet	•	••	–	•	••	–	•	–	–	–	•	–	–	–	•	–	–	–
chocolate, fruit jam	••	••	•	••	••	–	••	–	–	–	••	•	–	••	••	–	–	–
beverages – water, sirup, wine, milk	••	••	••	••	•	–	••	–	•	–	••	•	–	••	••	–	•	••
spirits	••	•	••	••	•	–	••	–	•	–	••	•	–	•	•	•	–	••
sugar, salt	••	•	–	••	•	–	••	–	–	••	••	•	–	•	••	–	–	–
powders, flour, coffee	•	••	–	•	••	•	–	–	–	••	–	–	–	–	–	–	–	–
plant oils	••	••	••	••	••	••	••	•	•	••	••	•	•	••	••	•	•	••
WATER PROCESSING TECHNOLOGY, ENVIRONMENTAL																		
water storage tanks	••	••	••	••	••	–	••	–	••	–	••	••	–	••	••	••	••	••
sewage sumps	••	••	••	••	••	–	••	–	–	–	••	–	–	••	••	–	••	••
open channels	–	–	–	–	–	–	•	–	•	–	•	–	–	••	••	–	–	–
wells, bores	–	–	–	–	–	–	•	–	–	–	•	–	–	•	•	••	••	–
reservoirs, rivers	•	•	•	•	•	–	•	–	–	–	•	–	–	••	••	•	••	•
CHEMICAL INDUSTRY																		
alkalic liquids, chemicals, reagents	•	•	•	•	•	–	•	–	•	–	•	•	–	•	•	–	–	•
bulk-solid materials – salt, fertilizers	••	••	–	••	••	•	–	–	–	•	–	–	–	•	•	–	–	–
liquid detergents	••	•	••	••	•	–	•	–	•	–	•	•	–	••	••	–	–	•
anorganic solvents, acids	•	••	–	•	••	–	•	–	–	–	•	••	–	•	•	–	–	•
resins	••	••	••	••	••	•	•	–	–	–	•	••	–	•	••	–	–	•
PHARMACY																		
non-conductive fluids, organic solvents	••	••	••	••	••	••	•	••	–	–	•	•	•	•	•	–	–	•
clean water, de-mi water	••	••	••	••	••	–	••	–	•	–	••	••	–	•	••	••	••	••
pasty mass	••	••	••	••	••	–	••	–	–	–	••	–	–	••	••	–	–	–
PETROCHEMICAL INDUSTRY																		
oil, diesel	••	••	••	••	••	••	•	••	•	•	•	–	••	•	••	–	–	••
petrol	••	••	••	••	••	••	•	••	•	•	•	–	••	–	–	–	–	•
TRANSPORT VEHICLES, ENGINES																		
diesel tanks	•	•	••	•	•	••	•	••	•	–	–	–	••	–	–	–	–	•
cooling fluid in engine	•	•	••	•	•	–	••	–	••	–	–	–	–	–	–	–	–	•
oils in engines, compressors	•	•	••	•	•	•	•	•	•	–	–	–	••	–	–	–	–	•
HEATING																		
water condensate tanks, coolers	•	••	•	•	••	–	••	–	•	–	••	–	–	•	•	–	–	•
boilers, steam developers	•	••	•	•	••	–	•	–	•	–	•	–	–	–	–	–	–	•
wooden pellets, chips	••	•	–	••	•	•	–	–	–	•	–	–	–	–	•	–	–	–
heating oil	••	••	••	••	••	••	•	••	•	•	•	–	••	••	••	•	•	••
BUILDING AND PROCESS INDUSTRY																		
cement, powder lime, chalk - dry	••	•	–	••	•	•	•	–	–	••	•	–	–	–	–	–	–	–
gravel	••	••	–	••	••	•	–	–	–	•	–	–	–	•	•	–	–	–
liquid asphalt, bitumen	••	•	–	•	•	•	•	–	–	•	–	–	–	–	–	–	–	–
sand	••	••	–	••	••	•	•	–	–	•	–	–	–	–	•	–	–	–
MACHINERY																		
hydraulic oil	••	••	••	••	••	••	•	••	•	–	•	•	••	••	••	•	•	••
lubricants	••	••	••	••	••	••	•	•	•	–	•	•	•	••	••	•	•	••
cooling emulsions	••	••	••	••	••	•	••	–	••	–	••	•	–	••	••	•	•	••
PLASTIC TECHNOLOGY																		
granulates	••	••	–	••	••	••	–	–	–	••	–	–	–	•	•	–	–	–
powders	••	••	–	••	••	••	–	–	–	••	–	–	–	–	•	–	–	–

## IMPORTANT NOTE:

This table is for orientation only. Specific type for particular application is advised to consult with the producer. Each application is influenced by many aspects.

LEGEND					
••	suitable	•	conditionally applicable	–	not suitable



LIMIT LEVEL SENSORS															
	DLS-27-10, 20, 30, 40 DLS-35-10, 20, 30, 50	DLS-27-11, 21, 22, 31 DLS-35-11, 21, 22, 31	DLS-35-40	DLS-35-41	CLS-23-10, 20, 30	CLS-23-11, 12, 21	ULS-53	RFLS-35(28)-1B, 11B	RFLS-35(28)-1E, 11E	RFLS-35(28)-1V, 11V	RFLS-35-2, 21	RFLS-53	CPS-24	GPLS-25 FLD-32	CNP-18
AGRICULTURE, FOOD PROCESSING, PACKING TECHNOLOGY															
corn, cereals, seeds	••	•	-	-	•	-	-	-	-	-	-	••	•	-	
malt and feeding mixtures – dry	••	•	-	-	•	•	-	-	-	-	-	••	-	-	
malt and feeding mixtures – wet	-	•	-	-	-	•	-	-	-	-	•	-	-	-	-
chocolate, fruit jam	•	••	-	-	•	••	••	••	••	••	••	-	-	-	-
beverages – water, sirup, wine, milk	-	••	-	•	-	••	••	••	••	••	••	-	-	•	••
spirits	•	••	-	••	•	••	•	••	••	-	••	-	-	-	-
sugar, salt	•	•	-	-	•	••	•	-	-	-	-	•	•	-	-
powders, flour, coffee	••	•	-	-	•	-	-	-	-	-	-	•	-	-	-
plant oils	•	-	•	•	••	-	••	••	-	••	••	-	•	•	-
WATER PROCESSING TECHNOLOGY, ENVIRONMENTAL															
water storage tanks	-	••	-	•	-	••	••	•	•	•	••	-	-	••	••
sewage sumps	-	••	-	-	-	••	••	•	•	•	••	-	-	-	•
open channels	-	-	-	-	-	-	••	-	-	-	-	-	-	-	-
wells, bores	-	-	-	-	-	••	•	-	-	-	-	-	-	-	-
dry run pump protection	-	••	-	-	-	••	-	•	•	•	•	-	-	-	•
reservoirs, rivers	-	-	-	-	-	-	••	-	-	-	-	-	-	-	-
water leakage detection	•	•	-	-	••	•	-	-	-	-	-	-	••	-	•
CHEMICAL INDUSTRY															
alkalic liquids, chemicals, reagents	•	••	-	-	•	••	•	•	••	••	••	-	-	•	-
bulk-solid materials – salt, fertilizers	••	-	-	-	•	-	•	-	-	-	-	••	•	-	-
liquid detergents	•	••	-	•	•	••	••	•	••	••	••	-	-	•	•
anorganic solvents, acids	•	•	-	-	•	•	•	-	-	•	•	-	-	••	-
resins	•	••	-	-	•	••	•	••	••	••	••	-	-	-	-
aggressive liquid leakage detection	•	-	-	-	•	•	-	-	-	-	-	-	•	-	-
PHARMACY															
non-conductive fluids, organic solvents	••	•	••	••	••	•	•	-	-	•	•	-	-	•	-
clean water, de-mi water	•	••	-	••	•	••	•	•	•	•	•	-	-	••	•
pasty mass	•	••	-	-	•	•	••	•	•	•	••	-	-	-	-
PETROCHEMICAL INDUSTRY															
oil, diesel	••	-	••	•	••	-	•	•	-	••	••	-	-	•	-
petrol	••	-	••	•	••	-	-	•	-	••	••	-	-	-	-
leakage detection	-	-	-	-	•	-	-	-	-	-	-	-	••	-	-
TRANSPORT VEHICLES, ENGINES															
diesel tanks	••	•	••	•	••	•	-	•	-	••	••	-	-	-	-
cooling fluid in engine	-	••		••	-	••	-	•	•	-	•	-	-	•	-
oils in engines, compressors	•	•	••	•	•	•	-	••	-	••	••	-	-	-	-
HEATING															
water condensate tanks, coolers	-	••	-	••	-	••	•	•	•	-	•	-	-	•	-
boilers, steam developers	-	•	-	•	-	•	-	-	•	-	•	-	-	-	-
wooden pellets, chips	•	-		-	•	-	-	-	-	-	-	••	-	-	-
heating oil	••	•	••	•	••	•	••	•	-	••	••	-	-	•	-
BUILDING AND PROCESS INDUSTRY															
cement, powder lime, chalk - dry	••	-	-	-	-	-	-	-	-	-	-	••	-	-	-
gravel	•	-	-	-	-	-	•	-	-	-	-	•	-	-	-
liquid asphalt, bitumen	••	•	-	-	•	•	-	-	-	••	••	-	-	-	-
sand	••	-	-	-	-	-	-	-	-	-	-	•	-	-	-
MACHINERY															
hydraulic oil	••	•	••	•	••	•	••	••	-	••	••	-	-	-	•
lubricants	••	•	••	•	••	•	••	••	-	••	••	-	-	-	-
cooling emulsions	•	••	-	••	•	••	••	•	-	••	••	-	-	•	•
PLASTIC TECHNOLOGY															
granulates	••	•	-	-	•	-	•	-	-	-	-	••	•	-	-
powders	••	•	-	-	•	-	-	-	-	-	-	•	•	-	-

FLOW METERS			
	TFS-35	EFM-115	FCU-400
AGRICULTURE, FOOD PROCESSING, PACKING TECHNOLOGY			
beverages – water, sirup, wine, milk	••	••	-
spirits	••	•	-
WATER PROCESSING TECHNOLOGY			
water storage tanks	••	•	-
sewage sumps	••	••	••
open channels	-	-	••
reservoirs, rivers	-	-	•
PHARMACY			
non-conductive fluids, organic solvents	••	-	-
clean water, de-mi water	••	••	-
PETROCHEMICAL INDUSTRY			
oil, diesel	•	-	-
petrol	-	-	-
TRANSPORT VEHICLES, ENGINES			
cooling fluid in engine	••	-	-
oils in engines, compressors	••	-	-
HEATING			
water condensate tanks, coolers	••	-	-
heating oil	•	-	-
MACHINERY			
hydraulic oil	••	-	-
lubricants	•	-	-
cooling emulsions	••	-	-

# APPLICATION TABLE

PROCESS MEDIUM FEATURES AND OTHER FACTORS	CONTINUOUS LEVEL MEASUREMENT						
	GRLM-70	ULM-53	ULM-70 ULM-54 with horn adapter	CLM-36 DLM-35	CLM-70	HLM-35	HLM-25 HLM-16
<b>SOLID</b>							
dust - fraction up to 0.1 mm	••	–	–	••	••	–	–
loose material - fraction up to 10 mm	••	–	•	•	•	–	–
piece material - fraction over 10 mm (up to 60 mm)	–	•	••	–	–	–	–
changing (DK <sup>1)</sup> , density)	••	•	••	–	–	–	–
settled dust (up to 5 mm layer)	••	–	•	••	••	–	–
extreme dustiness - dust permanently in the air (layer above 5 mm)	–	–	–	•	•	–	–
extremely lightweight material	–	–	•	•	•	–	–
highly abrasive material (sharp stones)	–	•	••	–	–	–	–
flammable money, explosives	••	–	–	••	••	–	–
mechanical obstacles in the stack	•	–	••	•	•	–	–
<b>LIQUIDS AND SLURRIES</b>							
liquid <sup>2)</sup>	••	••	••	••	••	••	••
paste-like substance <sup>3)</sup>	••	••	••	•	•	–	–
hygienic applications	••	•	•	••	••	•	–
hygienic applications with sanitation	••	–	–	••	••	–	–
changing DK <sup>1)</sup>	••	••	••	–	–	•	•
changing density	••	••	••	•	•	–	–
sticking + el. conductive (strong alkalis)	••	•	••	–	–	•	–
aggressive inorganic acids	•	•	•	•	•• <sup>4)</sup>	–	–
non-fuming diluted chemicals	••	••	••	•	•• <sup>4)</sup>	–	–
organic solvents	••	–	–	••	••	•	–
very small tanks	–	–	–	••	•	•	•
very volatile	••	–	–	••	••	•	–
foam continuous, dense	••	•	••	••	••	••	••
foam incoherent, moulded	•	–	–	•	•	••	••
combustibles	••	•	•	••	• <sup>5)</sup>	• <sup>5)</sup>	–
liquid gases	••	–	–	•	•	–	–
sludge	•	••	••	•	•	–	–
barriers in the tank	••	–	••	••	••	••	••
higher pressure (above 2 bar)	••	–	–	••	••	•	•
vacuum	••	–	–	••	••	–	–

LEGEND	
••	suitable
•	conditionally applicable
–	not suitable
1)	dielectric constant (relative permittivity)
2)	$\eta$ - dynamic viscosity < 1000 [10-3 Pa.s]
3)	$\eta$ - dynamic viscosity > 1000 [10-3 Pa.s]
4)	variant CLM-70-61
5)	certification is missing for now, otherwise yes
6)	only to max. levels or protect with a shield
7)	only rope electrode
8)	concentration to 5 %

PROCESS MEDIUM FEATURES AND OTHER FACTORS	LIMIT LEVEL SENSING						
	DLS-35 DLS-27 from side	DLS-35 DLS-27 from above	RFLS-53 from side	ULS-53 from above	GPLS-25 FLD-32 through wall	RFLS-35 RFLS-28-F <sub>+</sub> from side	RFLS-28-R <sub>+</sub> from above
<b>SOLID</b>							
dust - fraction up to 0.1 mm	••	••	•	–	–	–	–
loose material - fraction up to 10 mm	•• <sup>6)</sup>	••	••	•	•	–	–
piece material - fraction over 10 mm (up to 60 mm)	–	• <sup>7)</sup>	•	••	–	–	–
changing (DK <sup>6)</sup> , density)	•	•	•	••	–	–	–
settled dust (up to 5 mm layer)	••	••	••	–	–	–	–
extreme dustiness - dust permanently in the air (layer above 5 mm)	•	•	•	–	–	–	–
extremely lightweight material	•	•	–	–	–	–	–
highly abrasive material (sharp stones)	–	•	–	••	–	–	–
flammable money, explosives	••	••	–	–	–	–	–
<b>LIQUIDS AND SLURRIES</b>							
liquid <sup>7)</sup>	•	••	–	••	••	••	••
paste-like substance <sup>8)</sup>	–	••	–	••	•	••	••
hygienic applications	•	••	–	•	••	••	••
hygienic applications with sanitation	•	•	–	–	••	•	•
changing DK <sup>6)</sup>	•	•	–	••	–	•	•
changing density	•	•	–	••	••	••	••
sticking + el. conductive (strong alkalis)	–	•	–	•	••	••	••
aggressive inorganic acids	–	•	–	•	••	•	•
non-fuming diluted chemicals	•	••	–	••	••	••	••
organic solvents	••	••	–	–	••	••	••
very small tanks	••	•	–	–	••	••	••
very volatile	••	••	–	–	••	••	–
foam on the surface	•	•	–	•	••	••	••
combustibles	••	••	–	•	•	••	–
liquid gases	•	•	–	–	–	•	•



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