

Measure with pleasure

Dinel[®]
industrial electronics



PRODUCT OVERVIEW

electronic level and flow measurement systems

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HISTORY

The firm 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 fulfill 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.



Important events and dates:

- 1995** – Company was established.
- 2000** – Our Quality Management System was certified according to ISO 9001 standard.
- 2001** – As a first Czech firm we placed on the market a compact ultrasonic level meter with 4 ... 20 mA output.
- 2002** – The requirements of directive 94/9/EC for non-explosive equipment were implemented and ATEX certificate was achieved.
- 2003** – New variants of ultrasonic level meters ULM and new types of supply and switching units PSU, DSU, LCU, TDU.
- 2005** – Removal to new building, installing new technology, introduced new isolating repeater IRU.
- 2007** – New stabilized power supplies SPSU with load bargraph, new version of capacitive level meter CLM–36N–40 for measurement of aggressive liquids.
- 2008** – Worldwide unique flexible level sensor FLD-48 “Meduse”, new type of ULM with measuring range up to 20 m, conductive level probes CNP and wall mounted supply and evaluation units were launched.
- 2009** – New capacitive level switch CLS–53 for bulky-solid and loose materials, new line of ultrasonic level meters ULM–53.
- 2010** – Ultrasonic level meters ULM–70 with matrix OLED display, advanced signal processing and current output with HART®. Membership in HART Communication Foundation.
- 2011** – New capacitive level switch CLS–23 for sensing of various types of liquids, stainless steel submersible hydrostatic level meter HLM–25S, multifunctional display unit MGU–800, switching units CDSU–522 for DIN rail mounting.
- 2012** – Submersible level sensor CLS–23S for level detection in wells or boreholes, capacitive level meter CLM–40 for level measurement of diesel fuel in trucks, building machines etc.
- 2013** – Radar level meter GRLM–70 “Miranda”, new line of ultrasonic level meters ULM–53L with Modbus protocol ULM–53L, electromagnetic flow meter EFM–115.
- 2014** – Flow control unit unit FCU-400, float system FS-4, new software applications Basic SCADA systems, touch sensor for LED lighting switching CTS-41

Thanks the flexible production and organization of logistics we are well able to modify a concrete piece to meet your requirements while keeping good delivery terms and prices. We will help you with choice of the best measuring method and equipment. All of our products meet requirements of European directives and norms. We keep 3 years warranty on all range of our products.



RADAR LEVEL METER GRLM-70 "MIRANDA"

HART[®]
COMMUNICATION PROTOCOL



Suited to continuous level measurement of various liquids, mush and bulk-solid materials.

- Radar level meter with guided wave (TDR)
- Universal use, direct mounting into containers, silos, vessels, reservoirs, etc.
- Stainless steel rod or rope electrode
- Measuring range up to 40 m
- Linear measurement also in non-conductive and in variously shaped tanks
- Immediate view measured values on the display
- Simple installation and settings
- Current output (4 ... 20 mA), HART[®] protocol

Technical specification

Supply voltage	18 ... 36 V DC
Output type	4 ... 20 mA (2-wire), HART [®]
Basic error ¹⁾	- for range 2,0 - 40 m +/- 2 mm
Resolution	1 mm
Ambient temperature range	-30°C ... +70°C
Process temperature range	-40°C ... +200°C
Process connection	Thread G1"
Process pressure	- for GRLM-70N-10(20,30,33) 0 ... 100 bar
(for temperature +85°C)	- for GRLM-70N-11(12) 0 ... 15 bar
	- for GRLM-70N-32 0 ... 5 bar
Protection class	IP67

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

Device classification

GRLM-70N	Performance for non-explosive area
GRLM-70NT / XiT	High temperature performance for non-Ex / Ex areas
GRLM-70Xi(XiT)	II 1/2 G Ex ia IIB T6 Ga/Gb ; II 1 D Ex ia IIIC T80°C Da



GRLM-70-10

Uncoated stainless steel rod electrode, for level measurement liquids and bulk solid materials (water, water solutions, emulsion, oils, diesel, flour, sand, granulates, etc.).

Maximum electrode length 8 m.

GRLM-70-11

Fully coated stainless steel rod electrode (PFA Teflon®), for level measurement of aggressive liquids and very pure liquids.

Maximum electrode length 2 m.

GRLM-70-12

Fully coated stainless steel rod electrode (FEP Teflon®), for level measurement of aggressive liquids and drinks.

Maximum electrode length 2 m.

GRLM-70-20

Uncoated stainless steel rod electrode with reference tube, for accurate level measurement of liquids in cramped spaces.

Maximum electrode length 3 m.

GRLM-70-30

Uncoated stainless steel rope electrode and weight, for level measurement of liquids and bulk solid materials (water, grains, sand, flour, cement, etc.) in higher silos, vessels, reservoirs.

Maximum electrode length 40 m.

GRLM-70-32

Fully coated stainless steel rope electrode and coated weight, for level measurement of aggressive liquids and very pure liquids.

Maximum electrode length 12m.

GRLM-70-33

Uncoated stainless steel rope electrode with anchorage, for level measurement of bulk solid materials (grains, flour, cement, etc.) in higher silos, vessels.

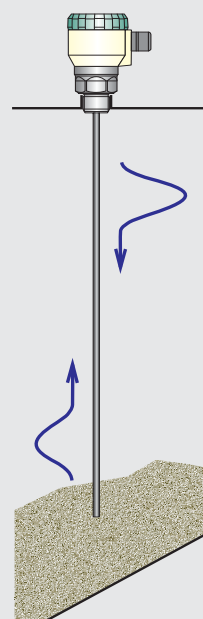
Maximum electrode length 40 m.



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 against changes in the atmosphere (pressure, temperature, dust, steam) and to changes in medium parameters (change in dielectric constant, conductivity).



ULTRASONIC LEVEL METERS ULM-70



For continuous non-contact level measurement of various liquid and bulk-solid materials in closed or open vessels, sumps, reservoirs etc.

- Outstanding contrast matrix OLED display
- Quick view measured values on the display
- D-Logic system for advanced intelligent signal processing
- Mapping of false reflections
- Arbitrary choice of metric or imperial displayed measuring units (eg. mm, m, l, m³, gal, inch)
- Easy adjustment without measured material
- Xi version for usage in explosive areas
- Current output (4 ... 20 mA), HART®
- While used with horn adapter can be measured difficult media (foamy levels, loose materials, etc.)

Technical specification

Supply voltage	18 ... 36 V DC
Output type	4 ... 20 mA (2-wire), HART®
Accuracy (from full measured range)	0.15%
Temperature error	max. 0.04% /K
Sensitivity	3 steps (low – medium – high)
Ambient temperature range	-30°C ... +70°C
Protection class	IP67

Device classification

ULM-70N	Performance for non-explosive areas
ULM-70Xi-02, 06	Ex II 1/2G Ex ia IIB T5
ULM-70Xi-10	Ex II 1/2G Ex ia IIA T5
ULM-70Xi-20	Ex II 2G Ex ia IIA T5

ULM-70-02

Measuring range from 0.15 m to 2 m, plastic transmitter, mechanical connection with thread G 1".

ULM-70-06

Measuring range from 0.25 m to 6 m, plastic transmitter, mechanical connection with thread G 1 1/2".

ULM-70-10

Measuring range from 0.4 m to 10 m, plastic transmitter, mechanical connection with polyethylene flange or aluminium alloy flange.

ULM-70-20

Measuring range from 0.5 m to 20 m, plastic transmitter, mechanical connection with aluminium alloy flange..



ULTRASONIC LEVEL METERS ULM-53



For continuous non-contact level measurement of various liquid and bulk-solid materials in closed or open vessels, sumps, reservoirs etc.

- Configuration and adjustment by two buttons
- Options of inverse function
- Xi version for usage in explosive areas
- Easy and quick connecting by connector
- Optical state indication
- While used with horn adapter can be measured also some difficult media (foamy levels, loose materials, etc.)



Technical specification

Supply voltage	18 ... 36 V DC
Output type (var. "I")	4 ... 20 mA (2-wire)
Output type (var. "U")	0 ... 10 V (3-wire)
Accuracy (from full measured range)	0.2%
Temperature error	max. 0.04% /K
Ambient temperature range	-30°C ... +70°C
Protection class	IP67

Device classification

ULM-53N	Performance for non-explosive areas
ULM-53Xi-02, 06	Ex II 1/2G Ex ia IIB T5
ULM-53Xi-10	Ex II 1/2G Ex ia IIA T5
ULM-53Xi-20	Ex II 2G Ex ia IIA T5

ULM-53-02

Measuring range from 0.2 m to 2 m, plastic transmitter and plastic body, mechanical connection with thread G 1".

ULM-53-06

Measuring range from 0.25 m to 6 m, plastic transmitter and plastic body, mechanical connection with thread G 1 1/2".

ULM-53-10

Measuring range from 0.4 m to 10 m, plastic transmitter and plastic body, polyethylene flange or aluminium alloy flange.

ULM-53-20

Measuring range from 0.5 m to 20 m, plastic transmitter and plastic body, alluminium alloy flange.

ULTRASONIC LEVEL METERS ULM-53L



Low cost version with fixed measurement ranges for continuous non-contact level measurement of various liquid and bulk-solid materials in closed or open vessels, sumps, reservoirs etc.

- Simple installation without any settings
- Maximum measuring range up to 20 m
- Cable outlet with fixed 5 m long cable
- Current or voltage output
- Mechanical connection with thread or flange

Technical specification

Supply voltage	18 ... 36 V DC
Current output (var. -I)	4 ... 20 mA (limit values 3.9 ... 20.5 mA)
Voltage output (var. -U)	0 ... 10 V (limit values 0 ... 10.2 V)
RS-485 output (var. -M)	Modbus RTU protocol
Resolution	< 1 mm
Accuracy (within the total range)	max. 0.3 %
Ambient temperature range	-30°C ... +70°C
Protection class	IP68



ULM-53L-02

Measuring range from 0.2 m to 2 m, plastic transmitter and plastic body, mechanical connection with thread G 1".

ULM-53L-06

Measuring range from 0.25 m to 6 m, plastic transmitter and plastic body, mechanical connection with thread G 1 1/2".

ULM-53L-10

Measuring range from 0.4 m to 10 m, plastic transmitter and plastic body, polyethylene flange.

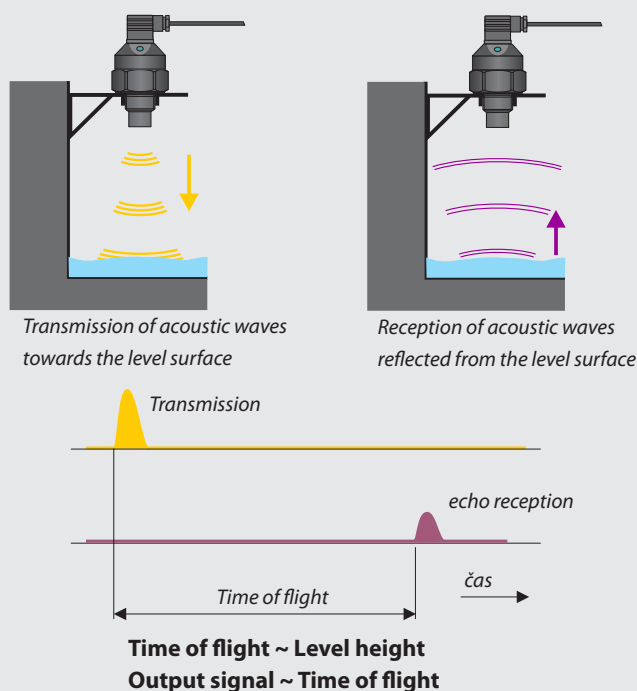
ULM-53L-20

Measuring range from 0.5 m to 20 m, plastic transmitter and plastic body, aluminium alloy flange.

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.



SUBMERSIBLE HYDROSTATIC LEVEL METERS HLM



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

- Stainless steel submersible probe
- Precise customer choice of the measurement range up to 200 m
- The health certificate for contact with potable water available (only HLM-25S)
- Probe diameter 25 mm or 16 mm
- Over voltage protection inside probe

Technical specification

Supply voltage	12 ... 36 V DC
Output type	4 ... 20 mA (2-wire)
Output type (HLM-25S, 25N)	0 ... 10 V (3-wire)
Measurement range	max. 200 m
Accuracy (from full measured range)	0.5%
Ambient temperature range	-20°C ... +70°C



HLM-25S

Measuring range from 1 to 100 m H₂O, arbitrary measurement ranges (customer configurable in 10 cm step). Probe diameter 25 mm. Current (4 ... 20 mA) or voltage (0 ... 10 V) output, certificate for contact with potable water.

HLM-25N

Measuring range from 1 m to 200 m H₂O, predefined measurement ranges. Probe diameter 25 mm. Current (4 ... 20 mA) or voltage (0 ... 10 V) output. Suitable for level measurement of slightly aggressive liquids.

HLM-16N

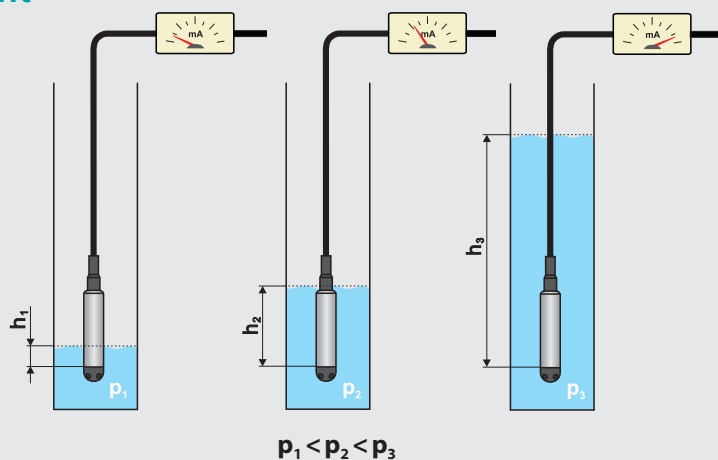
Measuring range from 1 m to 100 m H₂O, predefined measurement ranges. Probe diameter 16 mm. Current (4 ... 20 mA) output. Suitable for level measurement of slightly aggressive liquids.

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 (ρ) 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.



CAPACITIVE LEVEL METERS CLM-36



For continuous level measurement of liquid and bulk-solid materials.

- Direct mounting into containers, silos, vessels, basins, reservoirs, etc.
- Selectable measuring ranges
- Easy and quick connecting by connector
- Continuous adjustment of initial capacity
- Xi version for usage in explosive areas
- Material of housing and rod electrodes from stainless steel

Technical specification

Supply voltage	9 ... 36 V DC
Output type (var. "I")	4 ... 20 mA (2-wire)
Output type (var. "U")	0 ... 10 V (3-wire)
Accuracy (from full measured range)	1%
Ambient temperature range	-40 ... +85°C
Temperature range on electrode	-40 ... +200°C
Process connection	thread M36×2 ; G 1" ; TriClamp
Protection class	IP65 / IP67

Device classification

CLM-36N	Performance for non-explosive area
CLM-36NT / XiT	High temperature performance for non-Ex / Ex areas
CLM-36Xi	Ex II 1 G Ex ia IIB T5 Ga ; Ex II 1D Ex ia IIIC T83°C Da
CLM-36XiT	Ex II 1/2 Ex ia IIB T5 Ga/Gb ; Ex II 1/2D Ex ia IIIC T83°C Da/Db



CLM-36-10

With uncoated rod electrode for level measurement of non-conductive liquids (oils, diesel, benzine) and bulk-solid materials (flour, sand, cement, plastic granulates, etc.). Maximum electrode length up to 5 m.

CLM-36-11

Isolated rod electrode (PFA Teflon®), for level measurement of water and other electrically conductive liquids in the food, pharmaceutical and chemical industries. Isolation of electrode with higher resistance to penetration (diffusion) of gases or vapors. Suitable for high temperature applications (hot steam), volatile corrosive liquids, etc. Maximum electrode length up to 3 m.

CLM-36-12

Isolated rod electrode (FEP Teflon®), for level measurement of water and other electrically conductive liquids. Can also be used for waste liquids in metal tanks, concrete reservoirs, etc. Maximum electrode length up to 3 m.

CLM-36-20

With uncoated rod electrode and reference tube for level measurement of clean non-conductive liquids (oils, petrol, diesel). By means of reference tube the output signal does not depend on the dimension and shape of the vessel. Maximum electrode length up to 3 m.

CLM-36-22

With coated rod electrode and reference tube for level measurement of clean conductive liquids. Main use is for measurement in plastic and glass vessels and for fine measuring. Maximum electrode length up to 3 m.

CLM-36-30

With uncoated stainless steel rope electrode and uncoated weight for level measurement of bulk-solid materials (grains, sand, flour, cement, etc.). Maximum electrode length up to 20 m.

CLM-36-31

With uncoated stainless steel rope electrode and uncoated weight with addition dynamic anchorage. For level measurement of bulk-solid materials (grains, sand, flour, cement, etc.) in higher silos. Maximum electrode length up to 20 m.

CLM-36-32

With fully coated rope electrode for level measurement of electrically conductive and non-conductive liquids. Maximum electrode length up to 20 m.

CLM-36-40

With two coated electrodes for level measurement of aggressive liquids. Process connection G 1 1/2". Maximum electrode length up to 2 m.



CAPACITIVE LEVEL METER CLM-40

CE

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

- Direct mounting into tank through the flange
- Arbitrary electrode length (max. 1 m)
- Material of housing and rod electrode from stainless steel
- Simple installation without any settings

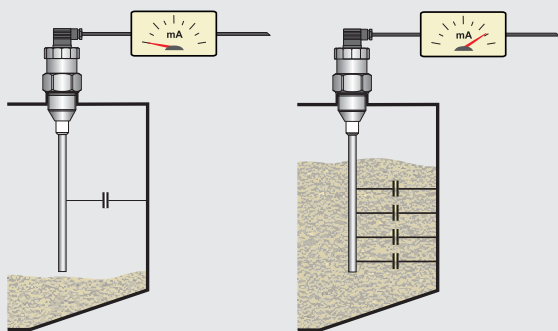
Technical specification

Supply voltage	9 ... 36 V DC
Output type (var. "I")	4 ... 20 mA (2-wire)
Output type (var. "U")	0 ... 10 V (3-wire)
Accuracy (from full measured range)	1%
Ambient temperature range	-40 ... +85°C
Protection class	IP68



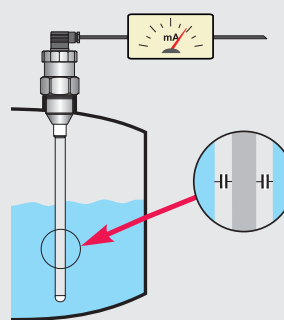
Capacitive level measurement

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.

CAPACITIVE LEVEL SENSORS DLS-27



For limit level sensing of liquid and bulk-solid materials.

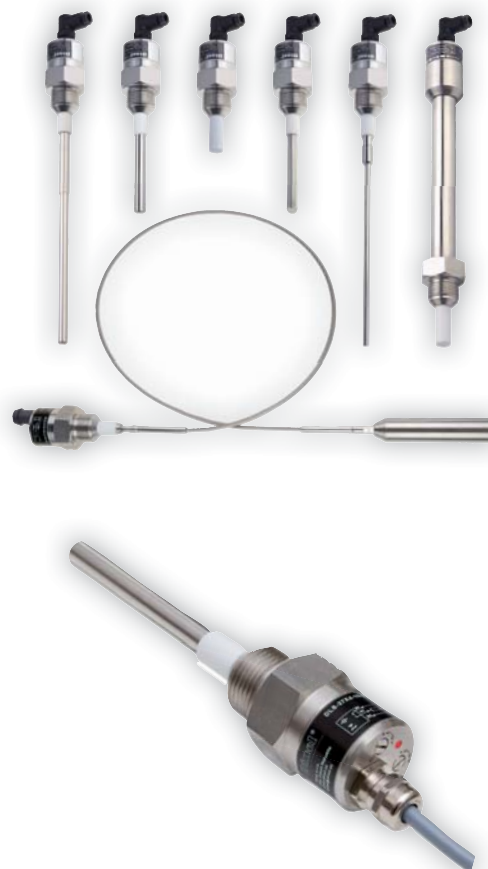
- Direct mounting into various containers, silos, vessels, tanks, filling inlets, reservoirs, etc.
- Xi versions for usage in explosive areas
- Sensitivity and hysteresis fluently adjustable
- LED state indication
- Material of housing and electrode from stainless steel

Technical specification

Supply voltage	7 ... 36 V DC
Output type	NPN ; PNP ; NAMUR
Ambient temperature range	-20 ... +80°C
Temperature range on electrode	-30 ... +200°C
Process connection	thread M27x2 ; M30x1,5 ; G 3/4" ; TriClamp
Protection class	IP67

Device classification

DLS-27N	Performance for non-explosive areas
DLS-27NT / XiT	High temperature performance for non-Ex / Ex areas
DLS-27Xd	Ex II 1D Ex tD A20 T 77°C IP6X
DLS-27Xi	Ex II 1G Ex ia IIB T6 Ga; Ex II 1D Ex ia IIIC T76°C Da
DLS-27XiT	Ex II 1/2G Ex ia IIB T6 Ga/Gb; Ex II 1/2D Ex ia IIIC T76°C Da/Db
DLS-27XiM, XiMT	Ex I M2 Ex ia I Mb



DLS-27-10

Uncoated short bar electrode for sensing non-adhesive bulk-solid (powder) materials (sand, sugar) and electrically non-conductive liquids (oils, diesel, petrol). Horizontal mounting. Electrode length 50 mm or 100 mm.

DLS-27-11

Fully coated short bar electrode for sensing electrically conductive liquids (water). Assembly into a side wall of vessel or into a pipe. Electrode length 30 mm.

DLS-27-20

Semi-coated rod electrode for sensing light-bulk solid or powder materials (plastic granulates, flour, cement) and non-conductive liquids (plant oils). Horizontal, slant or vertical mounting. Maximum electrode length up to 1 m.

DLS-27-21

Fully coated rod electrode (FEP Teflon®), for sensing electrically conductive liquids (water solutions, water), adhesive and aggressive materials. Horizontal or vertical mounting. Maximum electrode length up to 1 m.

DLS-27-22

Isolated rod electrode for level measurement of water and other electrically conductive liquids in the food, pharmaceutical and chemical industries. Isolation of electrode from PFA material with higher resistance to penetration (diffusion) of gases or vapors. Suitable for high temperature applications (hot steam), volatile corrosive liquids, etc. Horizontal or vertical mounting. Maximum electrode length up to 1 m.

DLS-27-30

Dismountable rod uncoated electrode for sensing bulk-solid (powder) materials and conductive or non-conductive liquids. Mounting from the top (vertically) or slant from the side. Maximum electrode length up to 3 m.

DLS-27-31

Fully coated rod electrode for sensing aggressive electrically conductive liquids (water, solutions of chemicals). Vertical mounting. Maximum electrode length up to 2 m.

DLS-27-40

Uncoated stainless steel rope electrode and weight for general purpose in deeper silos (bulk-solid and powder materials sensing – sand, gravel, cement) or hoppers (liquids sensing). Vertical mounting. Maximum electrode length up to 6 m.



CAPACITIVE LEVEL SWITCH CLS-53

CE

Detection of bulk-solid, fragmental and extruded materials.

- Limit level sensing of various bulk-solid materials (pellets, wooden chips, granulates, cereals) in metal and plastic hoppers, containers and silos
- Simple sensitivity setting by means of magnetic pen
- 2 or 3-wire connections directly to the relay circuit or PLC logic unit
- Wide range of supply voltage
- LED state indication



Technical specification

Supply voltage – CLS-53N-SAC	20 ... 250 V AC/DC
Supply voltage – CLS-53N-P (N)	7 ... 36 V DC
Output type	SAC ; NPN ; PNP
Switching current – CLS-53N-SAC	max. 0.3 A
Switching current – CLS-53N-P (N)	max. 0.2 A
Ambient temperature range	-20 ... +60°C
Process connection	thread G 1 1/2"
Protection class	IP65

CLS-53N-SAC

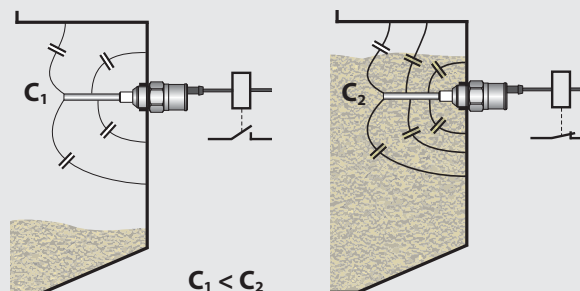
2-wire connection with electronic current switch directly connected to the relay circuit. Supply voltage up to 230 V AC/DC.

CLS-53N-P (N)

3-wire connection with NPN or PNP output for connected to Dinel supply and switching units or binary input of PLC.

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.



CAPACITIVE LEVEL SENSORS 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, etc.)
- Simple sensitivity setting by means of magnetic pen
- Direct mounting into various containers, vessels, tanks, etc.
- LED state indication
- High temperature performance

Technical specification

Supply voltage	6 ... 30 V DC
Output type	PNP ; S ; NAMUR
Switching current	max. 40 mA (PNP 100 mA)
Ambient temperature range	-20 ... +80°C
Temperature range on electrode	-30 ... +150°C
Process connection	thread M18x1,5 ; M20x1,5 ; G 3/4" ; NPT
Protection class	IP68

Device classification

CLS-23N	Performance for non-explosive areas
CLS-23E, CLS-23NT	High temperature performance for non-explosive areas
CLS-23Xi	II 1/2G Ex ia IIC T6 Ga/Gb; II 1G Ex ia IIB T6 Ga
CLS-23XiT	II 1/2G Ex ia IIB T6 Ga/Gb



CLS-23-10

Uncoated short bar electrode, for sensing of electrically non-conductive liquids (mineral and plant oils, resins, etc.). Mounting in horizontal position. Electrode length 30 mm.

CLS-23-11

Insulated (coated) short bar electrode, for non-aggressive electrically conductive liquid sensing (water, water solutions). The insulation is made from polypropylene. Electrode length 30 mm.

CLS-23-12

Insulated (coated) short bar electrode, for moderately aggressive electrically conductive liquid sensing (chemicals, water, moderately aggressive water solutions). Higher temperature resistance than variant "11". Electrode length 30 mm.

CLS-23-20

Partly insulated rod electrode, 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). Maximum electrode length up to 1 m.

CLS-23-21

Fully insulated rod electrode, for 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). Maximum electrode length up to 1 m.

CLS-23-30

Uncoated removable rod electrode, 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). Maximum electrode length up to 1 m.

SUBMERSIBLE LEVEL SENSOR CLS-23S

For level detection in wells, boreholes or tanks.

- Stainless steel removable protection basket
- Two-wire connection directly to relay circuit or to control system input
- Maximum immersion depth 100 m
- Very easy installation without adjustment

Technical specification

Supply voltage	6 ... 30 V DC
Output type	S (2-wire current switch)
Supply current – OFF state	0.6 mA
Switching current	max. 40 mA
Ambient temperature range	-20 ... +80°C
Protection class	IP68



CE



THRU-WALL LEVEL SWITCHES GPLS-25

For liquids limit level sensing on non-conductive (glass or plastic) gauge-pipes, tubes and vessel.

- Miniature performance in plastic housing
- 2 or 3-wire connections directly to the relay circuit or PLC logic unit
- Simple sensitivity setting by means of magnetic pen
- Types with fixed cable or with a connector
- LED state indication

Technical specification

Supply voltage	8 ... 30 V DC
Output type	PNP ; S (2-wire current switch)
Switching current	max. 40 mA (PNP 100 mA)
Maximum vessel's wall (tube) thickness	8 mm
Ambient temperature range	-20 ... +80°C
Protection class	IP67



CE

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.

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.

FLEXIBLE LEVEL SENSOR FLD-48 „MEDUSE“



For limit level sensing of liquids in non-conductive plastic and glass vessels.

- Miniature performance in flexible housing, possibility of placing at curved surface
- The system of electrodes eliminating adhesion of dirtiness at inner side of the vessel
- Simple self-adhesive fixation, LED state indication
- Configuration and adjustment by means of third "programming" wire

Technical specification

Supply voltage	6 ... 30 V DC
Output type	S (2-wire current switch)
Switching current	max. 40 mA
Ambient temperature range	-10 ... +60°C
Maximum vessel's wall thickness	8 mm
Vessel's diameter for sensor's fixation	min. 200 mm
Protection class	IP67



CAPACITIVE PROXIMITY SWITCHES CPS-24



For the detection of leakage or spillage of liquid 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
- Xi version for usage in explosive areas
- LED state indication

Technical specification

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

Device classification

CPS-24N	Performance for non-explosive areas
CPS-24Xi	Ex II 1G Ex ia IIC T6



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 with a relay output and power supply voltage of 230 V and 24 V AC/DC
- Float guiding rods of any length (max. 2.5 m)

Technical specification	
Range of ambient operational temperatures ¹⁾	-20 ... +60°C
Range of the sensed medium densities	800 ... 950 kg/m ³
Minimum layer thickness of medium for detection - on water level	5 mm
- in empty reservoir	25 mm
Cable	PUR 3x0,14 mm ³ (brown: + pole, white: - pole, green: not used)
Float weight (board + 4 floats + CPS-24Xi sensor)	600 g
Working area	With spark resistant power supply unit NSSU-811-230V (24V)-R SP2, complete float system zone 1
Other parameters	see manual for CPS-24Xi sensor see manual for NSSU-811 sensor

1) The float should be protected against freezing (see Maintenance and operational conditions).



CONDUCTIVE PROBES CNP-18

CE



For direct level detection of liquids.

- Medium temperature up to 130°C
- Simple mounting, connection by cable or contact screw
- Material of housing and electrode from stainless steel
- Functionality of the probes are provided by unit CDSU-522

Technical specification

Temperature at housing	max. 130°C
Maximum pressure (for temperature 25°C)	4 MPa
Process connection	thread M18x1,5

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

Dismountable rod electrode (electrode length from 50 to 3000 mm), vertical mounting, fixed cable.

CNP-18F-30

Dismountable rod electrode (electrode length from 50 to 3000 mm), vertical mounting, screw connector.



LEVEL CONTROL RELAY CDSU

CE

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

- Dual channel, two single relay output
- Wall mounted case or DIN rail 35 mm mounted
- LED state indication
- Pump control (Low-high level control)
- Safety requirements according to EN 61010-1

CDSU-522

DIN rail mounting, continuous sensitivity adjustment.

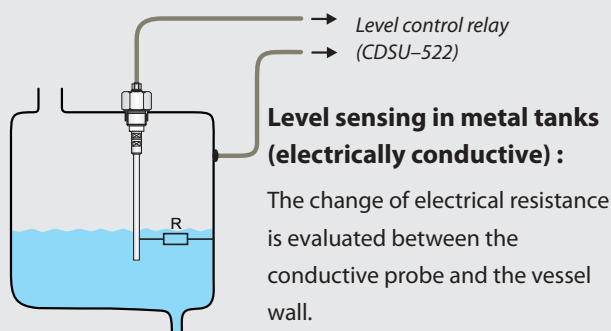
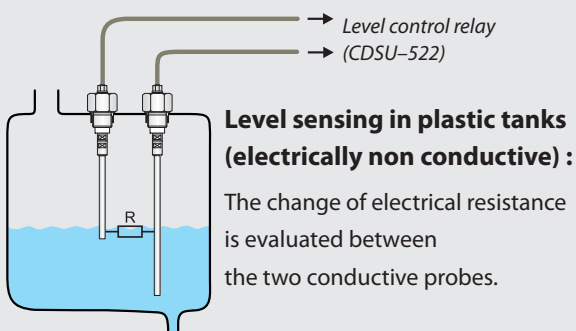
CDSU-522-W

Wall mounted case, continuous sensitivity adjustment and time delay set up.



Conductive level sensing

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



CAPACITIVE TOUCH SENSOR CTS-41



For modern method of LED lighting 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



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 (material: wood)
Sensitivity	to hand contact
Ambient temperature range	-10 ... +50°C
Weight	approx. 60g

CTS-41-0

Capacitive touch sensor with angled terminal block

CTS-41-1

Capacitive touch sensor with straight terminal block

ELECTROMAGNETIC FLOW METER EFM-115



For continuous flow measurement in agriculture, water treatment, chemical, food and pharmaceutical industry.

- Positive and negative flow from DN 15 – 200 mm flanged type
- Bi-directional total flow measurement, flow direction indication
- Robust and resistant cover of sensor and transmitter
- Easy and fast-moving change from compact to remote version
- Manual set up of outputs, high-speed signal processing
- Measurement data archiving

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
Binary outputs	up to 4 relays (250 V AC/3A)
Communication output	RS 485 (galvanically separated) or RS 232 / Modbus RTU
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° C ... +50° C
Control unit dimension	180 x Ø 115 mm
Process connection	DIN flange
Protection class	IP67
Liner type	Hard rubber
Material of sensing electrode	Stainless steel AISI 316L

EFM-115-0

flow meter without communication

EFM-115-M

flow meter with communication RS 485 / Modbus RTU

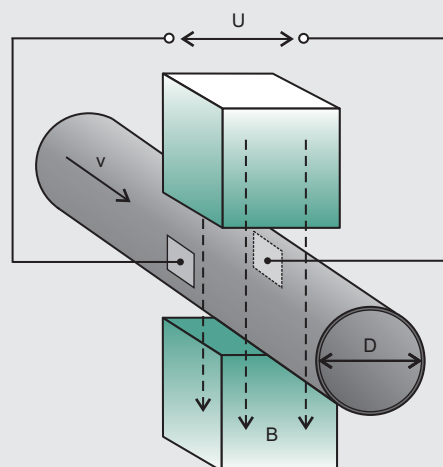


Electromagnetic flow measurement

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.



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-53L with RS485/Modbus RTU output (max. 4 sensors)

- Data archiving in the internal memory with possibility of copying on a USB flash disc
- Built-in web server
- Displaying on a large OLED matrix display
- A broad choice of flow rate physical units
- Power supply voltage 230V AC or 24V DC
- Possibility of any conversion curve

Technical specifications

Casing - material	ABS
Housing dimensions	160x166x106 mm
Protection class	IP65
Ambient temperature range	-30° C ... +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 / 100mA RS 485 / Modbus RTU - Slave, galvanically isolated 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 / I _{max} . 120 mA
Display type	Matrix OLED display 128x64 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	820g



FCU-400-0

unit without web server

FCU-400-W

unit with web server



POWER SUPPLY AND SWITCHING UNITS



Universal DC stabilized power supply and switching units.

- Resistant to short circuits and current overloading and overvoltages
- Pump control (Low-high level control)
- Wall mounted case or DIN rail 35 mm mounted
- LED status indication
- Safety requirements according to EN 61010-1



DSU-1222

Dual channel supply and switching unit, selectable types of connected sensors on front panel.

DIN rail mounting.

DSU-1222-W

Regulation and supply unit for low and high level control by means of two limit level sensors with two or three-wire connection.

Wall mounted case.

DSU-2422-P (N)

Dual channel supply and switching unit for supply and evaluation sensors with NPN or PNP output.

DIN rail mounting.

SDSU-1222-W

Regulation and supply unit for low and high level control by means of two limit level sensors connection (third wire programmable sensors FLD-48 "Meduse"). Contains programmable buttons for easy setting up of the sensor, pump control function.

Wall mounted case.

SSU-1211

Single channel supply and switching unit, types of connected sensors is selectable by jumper on terminal unit.

DIN rail mounting.

LCU-1221

Regulation and supply unit for low and high level control by means of two limit level sensors.

DIN rail mounting.

LCU-1232

Regulation and supply unit for low and high level control by means of two limit level sensors with ALARM relay output.

DIN rail mounting.

TDU-1211

Timing regulation and supply unit for level regulation by means of one limit level sensor and time set in margins 1 second to 100 minutes.

DIN rail mounting.



INTRINSICALLY SAFE SUPPLY UNITS



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

- Resistant to short circuits and current overloading and overvoltages
- LED status indication
- Relay or transistor output
- Pump control (Low-high level control)
- Mounting on DIN rail 35 mm, power supply 230 V AC or 24 V DC



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

Single channel unit with LFD system for supply and state-detecting of two NAMUR sensors. Function LFD for evaluation of cable faults. Relay contact output.

NDSU-822

Dual channel unit without additional functions for supply and state detecting of one NAMUR sensor. Transistor switch or relay contact output.

NLCU-821

Regulation and supply unit for low and high level control by means of two NAMUR limit level sensors. Relay contact output.

NLCU-822

Regulation and supply unit for low and high level control by means of two NAMUR limit level sensors. Function LFD for evaluation of cable faults. Protection against non-logical states of level sensors (which can occur in fail or wrong connection of sensors). Relay contact output.



ISOLATING REPEATER



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

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

IRU-420-I

Intrinsically safe isolating repeater for galvanic separation and conversion of input current signal 4 ... 20 mA from transducer in explosive area to output current signal 4 ... 20 mA.

IRU-420-H

The same as IRU-420-I, with possibility of bidirectional transmission of HART® communication signal.

IRU-420-U

The same as IRU-420-I, conversion of input signal 4 ... 20 mA to output signal 0 ... 10 V.



UNIVERSAL STABILIZED POWER SUPPLIES



Power supply units for industrial applications.

- Resistant to short circuits and current overloading
- High quality terminals
- Suited in polycarbonate enclosure
- Installation on DIN rail 35 mm

SPSU-1200-20

Universal stabilized power supply 12 V DC / 2.0 A, continuous load indication.

SPSU-2400-18

Universal stabilized power supply 24 V DC / 1.8 A, continuous load indication.

PSU-1200-S

Stabilized power supply 12 V DC / 80 mA.

PSU-2400-S

Stabilized power supply 24 V DC / 40 mA.

PSU-2400

Stabilized power supply 24 V DC / 150 mA.

DSU-2420

Dual channel stabilized power supply 2x 24 V DC / 50 mA.



PROGRAMMABLE DISPLAY UNITS PDU



For measurement and display of physical values.

- 4-digit LED display
- Up to 4 relay outputs, acoustic ALARM signalization
- Communication interface RS-485 / Modbus RTU
- Power supply 230 V AC or 24 V DC, sensor power supply
- Front panel performance (IP40) or wall-mounted case (IP65)

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.

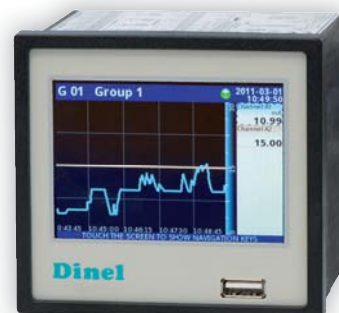


MULTIFUNCTION GRAPHICAL UNIT MGU-800



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

- 3.5" TFT display, multi-language menu
- Modular concept, variety of possible I/O module configurations
- Measured data recordable into internal memory
- Extensive ways of data communication
- Evaluating and processing of the measured data on PC
- Front panel performance
- Power supply 230 V or 24 V



MODULE I116

16 Current inputs (4 ... 20 mA)..

MODULE IUI4 (IUI8)

4 (8) Current inputs (4 ... 20 mA) + 4 (8) Voltage inputs (0 ... 10 V).

MODULE ID8

8 Optoisolated digital (binary) inputs.

MODULE IFI2 (IFI4)

2 (4) Current inputs for flowmeters + 2 (4) Current inputs (4 ... 20 mA).

MODULE IPI2 (IPI4)

2 (4) Pulse inputs for flowmeters + 2 (4) Current inputs (4 ... 20 mA).

MODULE ICP4

4 Universal counter inputs.

MODULE ITC4 (ITC8)

4 (8) Thermocouple sensors (TC/mV) inputs.

MODULE IRT4

4 Resistance temperature detectors (RTD) inputs.

MODULE OI2

2 Passive current outputs (4 ... 20 mA).

MODULE OR8

8 Relay outputs (1 A/250 V).

LOCAL PROCESS INDICATOR LDU-401



For local display of measured physical value.

- For local level indication directly on the level meter
- 4-digit LED display
- Programming through 2 keypads
- Assembly between the level meter (CLM or ULM) and the connector
- 4 ... 20 mA loop powered
- Protection class IP65



BASIC SCADA SYSTEMS

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

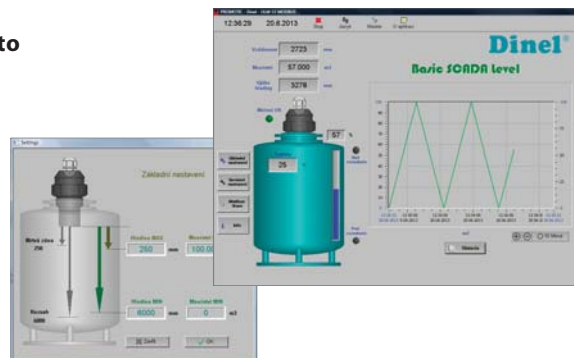
- graphic visualization
- archiving and export to Excel

Basic SCADA level

Application for communication with level meters

Basic SCADA flow

Application for communication with flow meters



CONVERTOR URC-485

For connection sensor with output RS 485 / Modbus (ULM-53L) and PC with special software (Basic Scada level)

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



HORN ADAPTERS ST-G

For performance improvements of ultrasonic level meters ULM.

- 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 G1" or G1.5"



NON-HERMETIC JUNCTION BOX NB-01

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

- Membrane for input of atmospheric pressure with protection against moisture
- Quality terminals (3 + GND), robust design
- DIN rail mounted (35 mm), Protection class IP65



OTHER PRODUCTS

- Set of auxiliary plate electrodes for capacitive sensors DLS-27 and CLS-23, helps level sensing in plastic (or other electrically non-conductive) tanks.
- Steel and stainless steel welding flanges
- Stainless steel fixing nuts
- Metal-plate holder for proximity switches CPS
- Relays and mounting sockets, cable connectors
- Miniature connectors M12 for DLS, CPS and CLS sensors
- Miniature connectors M8 for GPLS sensors
- Distance plastic crown for CPS, use inter-coat space of double coated tanks
- Atypical seals from PTFE, Al, or other material
- Auxiliary plate electrode PDE for capacitive sensors DLS-27 a CLS-23
- Cable hanger KD-60 for level meters HLM



MAP OF DINEL LEVEL SENSORS APPLICATIONS	CONTINUOUS LEVEL METERS									LIMIT LEVEL SENSORS								
	GRLM-70	CLM-36-10	CLM-36-12	CLM-36-20	CLM-36-22	CLM-36-30 CLM-36-31	CLM-36-40	ULM-53 ULM-70	HLM-16, 25 HLM-25S	DLS-27-10, 20 DLS-27-30, 40	DLS-27-21 DLS-27-31	CLS-23-10, 20 CLS-23-30	CLS-23-11, 12 CLS-23-21	CLS-53	CPS-24	GPLS-25 FLD-48	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	••	•	•	-	-	••	-	-	-	••	-	-	-	••	-	-	-	
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

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