



CAPACITIVE LEVEL SENSORS CLS-23

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USED SYMBOLS

To ensure maximum safety of control processes, we have defined the following safety instructions and information. Each instruction is labeled with the appropriate pictogram.



Alert, warning, danger

This symbol informs you about particularly important instructions for installation and operation of equipment or dangerous situations that may occur during the installation and operation. Not observing these instructions may cause disturbance, damage or destruction of equipment or may cause injury.



Information

This symbol indicates particularly important characteristics of the device.



Note

This symbol indicates helpful additional information.

1. SAFETY



All operations described in this instruction manual have to be carried out by trained personnel or by an accredited person only. Installation, commissioning, operation and maintenance of the capacitive level sensors has to be carried out in accordance with this instruction manual; the provisions of regulations in force regarding the installation of electrical equipment have to be adhered to.

Improper use, installation or set-up of the sensor can lead to crashes in the application, (overfilling of the tank or damage of system components).

The manufacturer is not responsible for improper use, loss of work caused by either direct or indirect damage, and for expenses incurred at the time of installation or during the period of use of the level sensors.

2. PACKING, TRANSPORTATION AND STORAGE

Equipment CLS-23 is packed in a polythene bag and the whole consignment is placed in a cardboard box. The cardboard box is suitably filled to prevent mechanical damage during transport. Let the device packed up till the use to prevent possible damage.

Transport to the customer is realized by forwarding company. Upon receipt, please check whether the shipment is complete and corresponds to the extent of the order, or whether during the transport did not occurred the damage of the packaging or the equipment. The device apparently damaged during transport do not use and contact the manufacturer to resolve the situation.

If the device is transported further, then only wrapped in the original packaging and protected against shocks and weather. Store the device in its original packaging in a dry place, sheltered from the weather, with humidity up to 85% without the effects of chemically active substances. Storage temperature range is from -10 °C to +50 °C.



Sensor variants CLS-23_20 a 21 with the electrodes longer than 100 mm are fitted with protective caps at the ends of the electrodes to prevent damage of the electrodes, box rupture or injury of handling persons. Before commissioning, remove the caps.

3. BRIEF

Capacitive level sensors (switches) CLS–23 are designed for limit level detection of electrically conductive and non-conductive fluids in vessels, reservoirs, sumps, pipes, tanks, etc. The sensitivity of the sensor can be easily set by placing magnetic pen on sensitive spot.

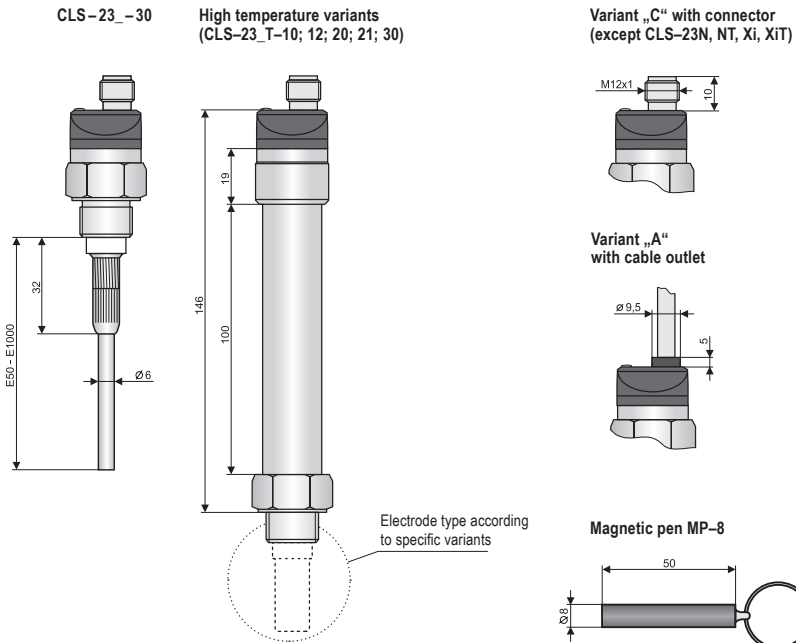
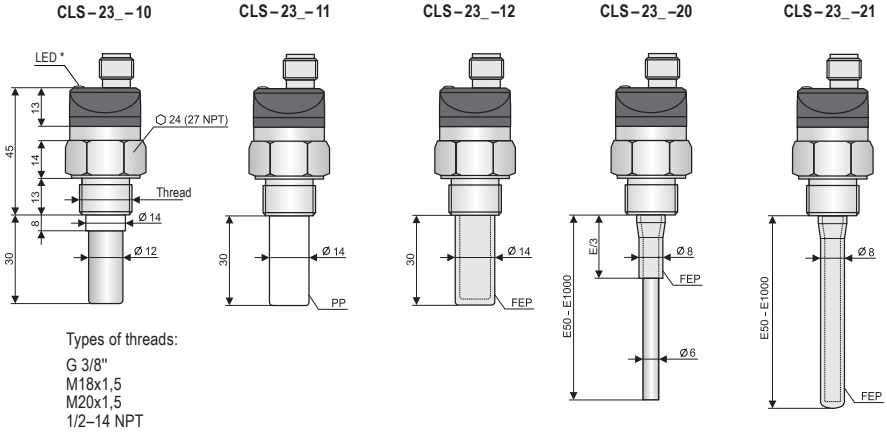
The process coupling at the housing can be with metric thread (M18x1.5 ; M20x1.5), pipe thread (G3/8" ; G1/2") or sealing thread (NPT 1/2–14). Output performances – transistor output with open collector (PNP), two wire electronic switch (S) and NAMUR output.

There are next performances available: **N** – Normal for non-explosive areas, **E** – Extended temperature range for non-explosives areas, **Xi** – Explosion proof (intrinsically safe for explosive areas), **NT** – High temperature variant for non-explosives areas and **XIT** – High temperature variant for explosive areas.

4. FEATURES OF VARIANTS

- 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 PP (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". The insulation is made from FEP (Tetrafluoroethylene-Perfluoro-Propylene). 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. The insulation is made from FEP. Vertical mounting; horizontal mounting (from the side) is possible for shorter electrodes (up to 200 mm) Electrode length from 50 mm 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. The insulation is made from FEP. Vertical mounting; horizontal mounting (from the side) is possible for shorter electrodes (up to 200 mm). Electrode length from 50 mm to 1 m.
- CLS–23_–30** **Uncoated removable rod electrode**, for level detection of conductive and non-conductive liquids. Vertical mounting; horizontal mounting (from the side) is possible for shorter electrodes (up to 200 mm). Electrode length from 50 mm to 1 m.

5. DIMENSIONS DRAWINGS



* Variant „E“ without LED state indicator

6. MOUNTING RECOMMENDATION

CLS-23 level sensors can be fixed in a vertical, horizontal or bevelled position into the shell of the vessel, the storage tank for the fixation console in the pit, by screwing into the welding flange, using a fixing nut or NPT process connection.

Basic application recommendations are mentioned below.



During assembly into the metal tank or the storage tank, it is not necessary to separately ground the base of the level sensor. In the case of installation in concrete tanks or silos, it is recommended to install a level sensor on the auxiliary metal construction (console, cap, etc.) and to then connect it using a permanently dipped metal item or with steel reinforcement in the concrete (armouring).

In the case of the reading of an aggressive medium, we recommend that the producer be consulted.



If the sensors are fitted with protective caps at the ends of the electrodes, remove the caps before commissioning.

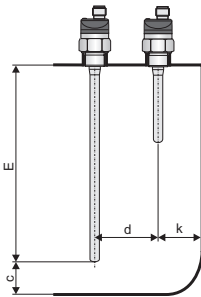


Fig. 1: Vertical mounting

For top mounting (vertical position) it is necessary to keep the distances from walls and from other sensors.

All vertically mounted sensors

$$c \geq 10 + \frac{E}{50} \quad d \geq 40 + \frac{E}{40} \quad k \geq 20 + \frac{E}{20}$$

E – Electrode length in mm

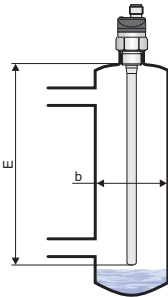


Fig. 2: Bypass measuring tube

Mounting in a **bypass measuring tube**. We recommend to keep the tube diameter.

$$b \geq 40 + \frac{E}{20}$$

E – Electrode length in mm

Applies to: CLS-23_-20, 21, 30

When installing the sensor into the **pipe** it is necessary to choose properly internal diameter of the tube to ensure the inner walls distances from the electrode to **min. 5 mm**. In some cases (sticky liquids, liquids with low dielectric constant) is suitable to mount the sensor in the **knee tube**.

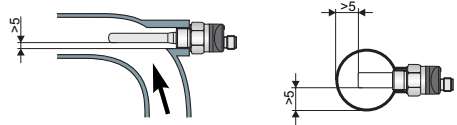
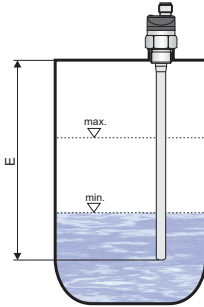


Fig. 3: Mounting in the pipe

Applies to: CLS-23_-10, 11, 12, 20, 21



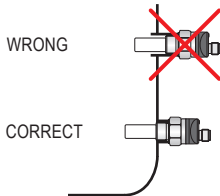
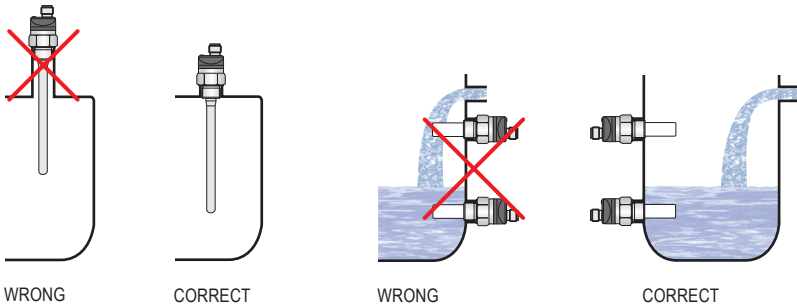
When installing the sensor in vertical position it can be used for **2-state (LO-HI) level control** between the min. and max. level. The position of the minimum and maximum level can be changed by setting the sensor. Fluid changes require new settings of the sensor

E – Electrode length in mm

Applies to: CLS-23_-20, 30 (only for electrically non-conductive liquids)

Applies to: CLS-23_-21 (for electrically conductive liquids)

Fig. 4: Two state regulation by hysteresis setting



Sensor installation **close to inlet hole**, in a narrow neck or using improper welding flange may result in **malfunction** of the sensor.

Suitable welding flanges can be found in the Dinel assortment, types ON, NN – see Accessories.

Applies to: All variants

Fig. 5: Long fitting tubes in side wall mounting

For electrodes with a length **over 300 mm** for the detection in non-conductive containers (sensors in vertical position) must be used the auxiliary electrode (e.g. conductivity probe). The **auxiliary electrode** is connected to the sensor housing. Recommended length of the auxiliary electrode and the distance from the sensor are shown in the picture.

Suitable types of auxiliary electrode probes are e.g. Dinel CNP–18F–30 with M18 thread.

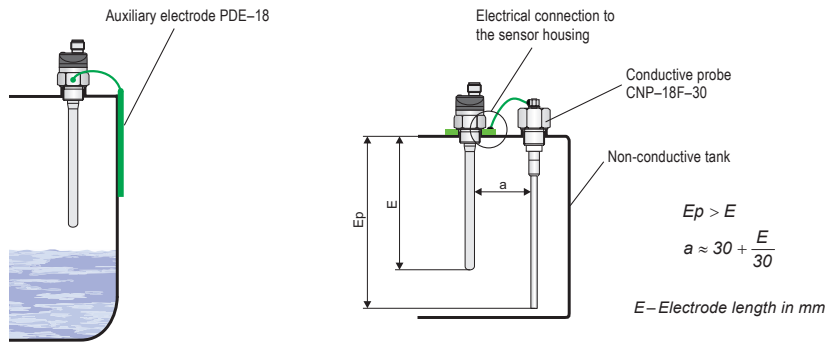


Fig. 6: Auxiliary electrode in non-conductive tanks

Applies to: CLS–23 _20, 21, 30 (for electrode length up to 300 mm)

7. ELECTRICAL CONNECTION

For “A” variant with the fixed cable, the individual colour cores of the connecting cable are connected to the respective terminals of the related equipment (supply unit).

For “C” variant with the connector, the cable can be supplied with the sensor (length 2 or 5 m), fitted with the pressed connector socket or dismantable connector socket without the cable (see accessories). In this case the cable is connected to the inside pins of the socket according to Fig. 10.

The sensor with related equipment is interconnected by a suitable three-core (P variation) or two-core (S and R variations) cable. The length of the cable for the Xi and XiT variations must be selected with respect to the maximum permitted parameters (usually inductance and capacity) of the outside intrinsically safe circuit of supply units (NSSU, NDSU, NLCU). If using a dismantable connector socket, the outside diameter of the cable is a maximum of 6 mm



Sensors CLS–23 are equipped with protection against over-voltages and current overload. The capacity loads and low resistance (bulb) are evaluated by sensors with output type „P“ and „S“ as short circuit. Sensors with output type „R“ are designed for interconnect to intrinsically safe supply units.

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

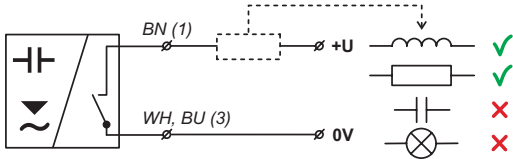


Fig. 7: "S" type sensors connection (2-wire electronic switch)

CLS-23_ _ _ _S_ _

Positive pole (+ U) of power supply is connected through a load (relay) to brown (blue) wire or pin connector No. 1, negative pole is connected to white wire or pin connector No. 3.

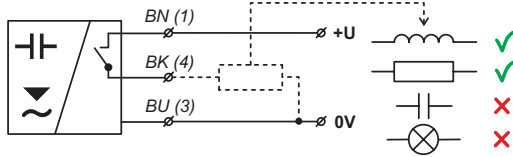


Fig. 8: "P" (PNP) type sensors connection

Typ CLS-23_ _ _ _P_ _

Positive pole (+ U) of power supply is connected to brown wire or pin connector No. 1, negative pole is connected to blue wire or pin connector No. 3. Load (relay) is connected to black wire or pin connector No. 4.

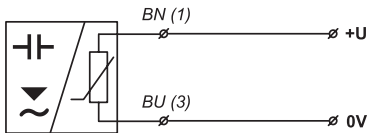


Fig. 9: "R" (NAMUR) type sensors connection

Typ CLS-23_ _ _ _R_ _

Brown wire or pin connector No. 1 is connected to positive pole (+U) of Intrinsically safe supply unit. Blue wire or pin.connector No. 3 is connected to negative pole of Intrinsically safe supply unit.

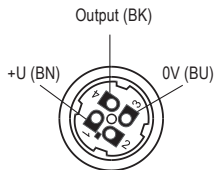


Fig. 10: Inside of the connector socket

Legend:

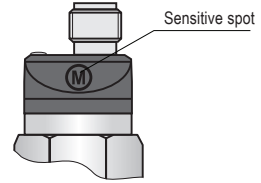
- (1...3) – Terminals number for variants with connector
- BN – Brown
- WH – White
- BK – Black
- BU – Blue



Electrical connection must be done in de-energized state! For switching supply sources, it is necessary to check that the input is galvanically separated from the network side and that they are fitted with a filter suppressing the conforming interference (terminals + and – oscillate together towards the ground potential), or the interference is removed in another manner.

8. SENSOR SETTINGS

The setting is done by placing magnetic pen MP-8 to sensitive spot (M) located on the front of the sensor. Short time attaching (up to 2 sec.) of the magnetic pen to the sensitive spot (M) makes the sensor open. Long time attaching (at least 4 sec.) of the pen when the level is changed, defines closed state of the sensor. In this way is set the sensitivity for the measured medium and switching modes SO (normally open) or SC (normally closed).



Sensors of type **CLS-23E** are produced **without signaling indicator LED**. For control of correct settings it is necessary to interconnect the sensor to related evaluation unit or load.

In the case of the vertical mounting for detection of **non-conductive** liquids by sensors **CLS-23_-20; -30** and for detection of **conductive** and **non-conductive** liquids by sensors **CLS-23_-21** it necessary to set limits ON and OFF when electrode of the sensor is immersed to medium.

mode O

(normally open)

When the level is low (the container is empty), attach the magnetic pen MP-8 to the sensitive spot (M) for short time (max. 2 sec.). When the level is high (the container is full), attach the magnetic pen MP-8 to the sensitive spot (M) for long time (min. 4 sec.).

mode C

(normally close)

When the level is low (the container is empty), attach the magnetic pen MP-8 to the sensitive spot (M) for long time (min. 4 sec.). When the level is high (the container is full), attach the magnetic pen MP-8 to the sensitive spot (M) for short time (max. 2 sec.).

FACTORY DEFAULT SETTINGS:

Types **CLS-23_-10; -20; -30** are set to detect mineral oil, **CLS-23_-11; -12; -21** to detect water. The mode O is set (sensor closes when immersed).

9. STATUS SIGNALIZATION (only with LED state indicator variant)

Indicator	Function
Orange LED	<p>Continuous light – Sensor is closed (switched ON)</p> <p>Dark – Sensor is open (switched OFF)</p> <p>Rapid flashing (period 0.2 s) – Unrecognized upper and lower limits or setting mistake</p> <p>Slow flashing (period 0.8 s) – Short circuit at sensor output</p>



Sensor for each flash of the LED switches its output on for approx. 3 ms. This period is sufficiently short to avoid unwanted switching of relay contacts. For binary inputs, we recommend to set the filter so as not to respond to pulses shorter than 3 ms.

Units Dinel NSSU, NDSU a NLCU with transistor switch („T“) detects and transmits these pulses to the output.

	Level state	Mode	Type of sensor	Output state	LED indicator *
Minimum level sensing		O	CLS-23_--_--_--P_-- CLS-23_--_--_--S_--	CLOSED	 (Shine)
			CLS-23Xi_--_--R_-- CLS-23XiT_--_--R_--	HIGHER CURRENT	
		O	CLS-23_--_--_--P_-- CLS-23_--_--_--S_--	OPEN	 (Dark)
			CLS-23Xi_--_--R_-- CLS-23XiT_--_--R_--	LOWER CURRENT	
Maximum level sensing		C	CLS-23_--_--_--P_-- CLS-23_--_--_--S_--	CLOSED	 (sviti)
			CLS-23Xi_--_--R_-- CLS-23XiT_--_--R_--	HIGHER CURRENT	
		C	CLS-23_--_--_--P_-- CLS-23_--_--_--S_--	OPEN	 (nesviti)
			CLS-23Xi_--_--R_-- CLS-23XiT_--_--R_--	LOWER CURRENT	

* Variant „E“ without LED state indicator



For security reasons, we recommend to set the mode O (normally open, sensor closes when immersed) for minimum level detection. Any failure of the sensor or wiring is equally apparent as the emergency level state. Analogously – for the maximum level detection is recommended to set the mode C (normally closed, sensor opens when immersed).

10. ACCESSORIES

Standard

(included in the level sensors price)

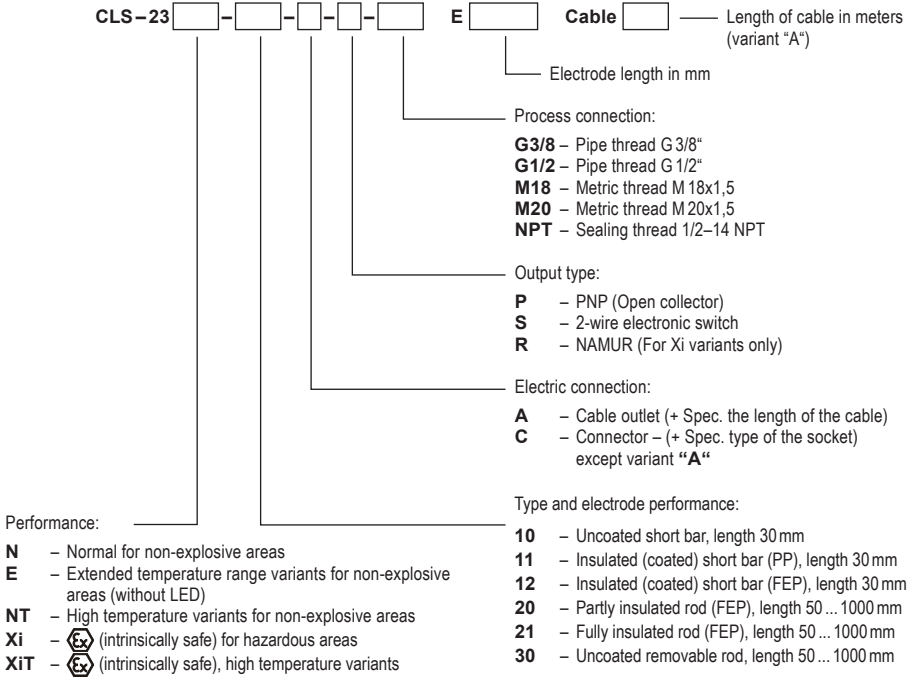
- 1pc of Magnetic pen MP-8
- 1pc of Seal (non-asbestos)

Optional

(for extra charge)

- Extra cables (over the standard length 2 m)
- Non-rewirable connector plug M12 (“N” and “NT” variants)
- Rewirable connector plug M12 (“N” and “NT” variants)
- Steel or Stainless steel welding flange
- Stainless steal fixing nut UM-18x1,5
- Other seals (PTFE, Al, etc.)

11. ORDER CODE



12. CORRECT SPECIFICATION EXAMPLES

CLS-23N-10-A-S-G3/8 cable 5 m

(N) For non-explosive areas; (10) Uncoated short bar electrode 30 mm, (A) Cable outlet with 5 m fixed cable; (S) 2-wire electronic switch; (G3/8) Process connection with pipe thread G3/8"

CLS-23E-30-A-S-G1/2 E450 cable 10 m

(E) Extended temperature range performance for non-explosive areas; (30) Uncoated removable rod electrode; (A) Cable outlet with 10 m fixed cable; (S) 2-wire electronic switch; (G1/2) Process connection with pipe thread G1/2"; (E450) Electrode length 450 mm.

CLS-23NT-20-C-S-M18 E320

(NT) High temperature variants for non-explosive areas; (20) Partly insulated rod electrode (FEP); (C) Electrically connection with connector; (S) 2-wire electronic switch; (M18) Process connection with metric thread M18x1.5; (E320) Electrode length 320 mm.

CLS-23Xi-11-C-R-NPT

(Xi) Intrinsically safe for hazardous areas; (11) Insulated (coated) short bar (PP) electrode 30 mm (C) Electrically connection with connector; (R) NAMUR output type; (NPT) Process connection with sealing thread 1/2 – 14 NPT.

13. SAFETY, PROTECTIONS, COMPATIBILITY AND EXPLOSION PROOF

The level sensor is equipped with a protection against electric shock on electrode, polarity, overvoltage and short-term current overload on the output.

Electromagnetic compatibility is provided by conformity with standards EN 55011/B, EN 61326-1, EN 61000-4-2 (8 kV), -4-3 (10 V/m), -4-4 (2 kV), -4-5 (1 kV) a -4-6 (10 V).

Explosion proof CLS–23Xi and XiT is examined FTZÚ - AO210 Ostrava - Radvanice, certificate No. FTZÚ 12 ATEX 0106X.

Supplied electrical equipment matches the requirements of valid European directives for safety and electromagnetic compatibility. The declaration of Conformity for the above mentioned product was issued.

Special conditions for safe use

If the apparatus is used as device of Group II and with using of an approved power supply device, which output parameters comply with required input parameters, it is necessary to have an galvanic separation or in case of apparatus without galvanic separation (Zener barriers) it is necessary to provide equipotential equalizing between sensor and barrier earthing point.

Design CLS–23Xi-11 (12, 20, 21) can be used in zone 0. Other design DLS–23Xi can be used in zone 0 only electrode part and head with electronics can be used only in zone 1.

Ambient temperature: $T_{amb} = -20^{\circ}\text{C} \dots +75^{\circ}\text{C}$

Temperature of measured medium according to design variant:

Xi typ 10, 12:	(- 25°C to + 105°C)
Xi typ 11:	(- 10°C to + 105°C)
Xi typ 20, 21, 30, XiT:	(- 30°C to + 150°C)

14. USE, MANIPULATION AND MAINTENANCE

The level meter does not require any personnel for its operation.



It is forbidden to make any changes or interventions to the CLS–23 sensor without the consent of the producer. Any repairs must only be carried out by the producer or authorized service organisations.

Assembly, installation, commissioning, service and maintenance of the CLS–23 level sensor must be carried out in accordance with this manual and the provisions of valid standards for the installation of electrical equipment must be complied with.

15. GENERAL CONDITIONS AND WARRANTY

Dinel, s.r.o. guarantees for the period of three (3) years that the product has the characteristic as in technical specification is mentioned. The guarantee can be invoked only when the product is completed by original invoice and guarantee list. This guarantee does not cover the damages resulting from misuse, improper installation or incorrect maintenance.

This guarantee ceases when user or the other person makes any changes on the product or the product is mechanically or chemically damaged, or the serial number is not readable.

In the case of rightful complaint we replace the product or its defective part.

16. MARKING OF LABELS

Level sensor label data **CLS-23Xi(T)-10, 30**



Symbol of producer: Dinel logo®

Internet address: www.dinel.cz

Level sensor type and electrode length: CLS-23Xi(XiT)-__-R-__ Exxxx

Serial number: Ser. No.: xxxxx – (from the left: production year, serial production No.)

Label of non-explosive device: Performance II 1/2G Ex ia IIC T6 Ga/Gb

Limit operating parameters: $U_i = 12\text{ V}$, $l_i = 15\text{ mA}$; $P_i = 45\text{ mW}$; $C_i = 15\text{ nF}$; $L_j = 10\text{ }\mu\text{H}$

Ambient temperature range: $t_a = -20 \dots +75\text{ }^\circ\text{C}$

Number of certificate of intrinsic safety: FTZÚ 12 ATEX 0106X

Compliance mark:

Protection class: IP68, Electro-waste take-back system mark:

Level sensor label data **CLS-23Xi(T)-11, 12, 20, 21**



Symbol of producer: Dinel logo®

Internet address: www.dinel.cz

Level sensor type and electrode length: CLS-23Xi(XiT)-__-R-__ Exxxx

Serial number: Ser. No.: xxxxx – (from the left: production year, serial production No.)

Label of non-explosive device: Performance II 1G Ex ia IIB T6 Ga or II 1/2G Ex ia IIB T6 Ga/Gb

Limit operating parameters: $U_i = 12\text{ V}$, $l_i = 15\text{ mA}$; $P_i = 45\text{ mW}$; $C_i = 15\text{ nF}$; $L_j = 10\text{ }\mu\text{H}$

Ambient temperature range: $t_a = -20 \dots +75\text{ }^\circ\text{C}$

Number of certificate of intrinsic safety: FTZÚ 12 ATEX 0106X

Compliance mark:

Protection class: IP68, Electro-waste take-back system mark:



Real label size 81 x 9 mm.

17. SPECIFICATIONS




TECHNICAL SPECIFICATIONS		
Supply voltage		6 ... 30 V DC
Supply current	– Output type P – Output type S	max. 0,6 / 7 mA (OFF / ON state) max. 0,6 mA (OFF state)
Switched current (Min. / Max.)	– Output type P – Output type S	max. 100 mA 3,3 mA / 40 mA (min. / max.)
Remanent voltage - ON state	– Output type P – Output type S	1,8 V 6,0 V
Output time delay		0,1 s
Protection class		IP68 (0,1 MPa)
Cable (for cable outlet performance)	CLS–23N, NT, Xi, XiT CLS–23E	PVC 2x 0,34 mm ² (3x 0,34 mm ² – výstup type P) Silicone 2x 0,5 mm ²
Weight (with 2 m cable and 30 mm electrode)	CLS–23N, E, Xi CLS–23NT, XiT	Approx. 45 g Approx. 190 g

ELECTRICAL PARAMETERS – variants Xi, XiT	
Supply voltage	8 ... 9 V DC
Current supply (state OFF / ON) – NAMUR	≤ 1 mA / ≥ 2,2 mA
Max. internal values	U _i = 12 V DC; I _i = 15 mA; P _i = 45 mW; C _i = 15 nF; L _i = 10 μH
Coupling capacity / Electric strength	44 nF / 250 V AC
Cable LC parameters	Typical C < 150 pF/m Typical L < 0,8 μH/m

PROCESS CONNECTION		
Type	Size	Marking
Metric thread	M18 x 1,5	M18
Metric thread	M20 x 1,5	M20
Pipe thread (BSP)	G 3/8"	G3/8
Pipe thread (BSP)	G 1/2"	G1/2
Sealing thread	1/2–14	NPT

OUTPUT TYPE	
Output	Variants
S („S“)	N, E, NT
PNP („P“)	N, E, NT
NAMUR („R“)	Xi, XiT

MATERIAL PERFORMANCE		
Sensor part	Variants	Material
Housing	All variants	Plastic PP
Process coupling	All variants	Stainless steel W.Nr. 1.4305 (AISI 303)
Electrode	All variants	Stainless steel W.Nr. 1.4305 (AISI 303)
Electrode insulation	CLS–23_–11	Plastic PP
Electrode insulation	CLS–23_–12, 20, 21	Plastic FEP

WORKING AREAS (EN 60079-10-1)	
CLS-23N	Performance for non-explosive areas
CLS-23E	Extended temperature performance for non-explosive areas
CLS-23NT	High temperature performance for non-explosive areas
CLS-23Xi(XiT)-10 CLS-23Xi(XiT)-30	Performance for explosive areas (XiT-high temperature),  II 1/2 G Ex ia IIC T6 Ga/Gb with intrinsically safe supply units, electrode part zone 0, housing zone 1
CLS-23Xi-11, 12, 20, 21	Performance for explosive areas,  II 1 G Ex ia IIB T6 Ga with intrinsically safe supply units, whole sensor zone 0
CLS-23XiT-11, 12, 20, 21	High temperature performance for explosive areas,  II 1/2 G Ex ia IIB T6 Ga/Gb with intrinsically safe supply units, electrode part zone 0, housing zone 1.

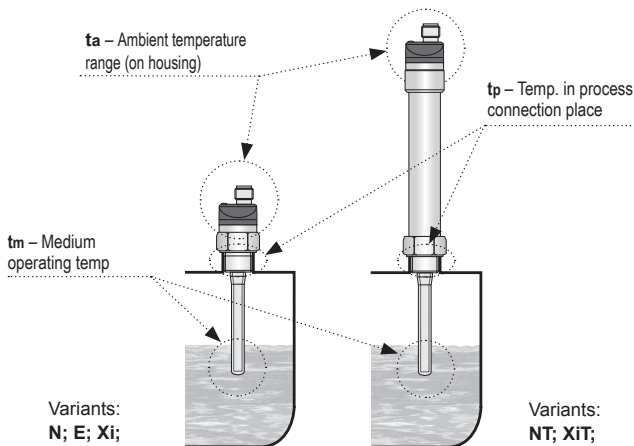
TEMPERATURE AND PRESSURE RESISTANCE – variants N, E, NT								
Variant (Performance)	Temperature tp	Temperature tm	Temperature ta	Max. operating pressure for temperature tp				
				to 30°C	to 85°C	to 105°C	to 130°C	to 150°C
CLS-23N-10	-25°C ... +105°C	-25°C ... +105°C	-20°C ... +80°C	8 MPa	6 MPa	5 MPa	–	–
CLS-23E-10	-25°C ... +120°C	-25°C ... +120°C	-25°C ... +105°C	8 MPa	6 MPa	5 MPa	–	–
CLS-23NT-10	-30°C ... +150°C	-30°C ... +150°C	-20°C ... +80°C	8 MPa	6 MPa	5 MPa	4 MPa	3 MPa
CLS-23N-11	-10°C ... +105°C	-10°C ... +105°C	-10°C ... +80°C	7 MPa	5 MPa	4 MPa	–	–
CLS-23E-11	-10°C ... +105°C	-10°C ... +105°C	-10°C ... +105°C	7 MPa	5 MPa	4 MPa	–	–
CLS-23N-12	-25°C ... +105°C	-25°C ... +105°C	-20°C ... +80°C	8 MPa	6 MPa	5 MPa	–	–
CLS-23E-12	-25°C ... +120°C	-25°C ... +120°C	-25°C ... +105°C	8 MPa	6 MPa	5 MPa	–	–
CLS-23NT-12	-30°C ... +150°C	-30°C ... +150°C	-20°C ... +80°C	8 MPa	6 MPa	5 MPa	4 MPa	3 MPa
CLS-23N-20	-25°C ... +105°C	-30°C ... +150°C*	-20°C ... +80°C	3 MPa	2,5 MPa	2 MPa	–	–
CLS-23E-20	-25°C ... +120°C	-30°C ... +150°C*	-25°C ... +105°C	3 MPa	2,5 MPa	2 MPa	–	–
CLS-23NT-20	-30°C ... +150°C	-30°C ... +150°C	-20°C ... +80°C	3 MPa	2,5 MPa	2 MPa	1,5 MPa	1 MPa
CLS-23N-21	-25°C ... +105°C	-30°C ... +150°C*	-20°C ... +80°C	3 MPa	2,5 MPa	2 MPa	–	–
CLS-23E-21	-25°C ... +120°C	-30°C ... +150°C*	-25°C ... +105°C	3 MPa	2,5 MPa	2 MPa	–	–
CLS-23NT-21	-30°C ... +150°C	-30°C ... +150°C	-20°C ... +80°C	3 MPa	2,5 MPa	2 MPa	1,5 MPa	1 MPa
CLS-23N-30	-25°C ... +105°C	-30°C ... +150°C*	-20°C ... +80°C	8 MPa	6 MPa	5 MPa	–	–
CLS-23E-30	-25°C ... +120°C	-30°C ... +150°C*	-25°C ... +105°C	8 MPa	6 MPa	5 MPa	–	–
CLS-23NT-30	-30°C ... +150°C	-30°C ... +150°C	-20°C ... +80°C	8 MPa	6 MPa	5 MPa	4 MPa	3 MPa

* Valid for top mounting (in vertical position)

TEMPERATURE AND PRESSURE RESISTANCE – variants Xi, XiT

Variant (Performance)	Temperature t_p	Temperature t_m	Temperature t_a	Max. operating pressure for temperature t_p				
				to 30°C	to 85°C	to 105°C	to 130°C	to 150°C
CLS-23Xi-10	-25°C ... +105°C	-25°C ... +105°C	-20°C ... +75°C	8 MPa	6 MPa	5 MPa	–	–
CLS-23XiT-10	-30°C ... +150°C	-30°C ... +150°C	-20°C ... +75°C	8 MPa	6 MPa	5 MPa	4 MPa	3 MPa
CLS-23Xi-11	-10°C ... +105°C	-10°C ... +105°C	-10°C ... +75°C	7 MPa	5 MPa	4 MPa	–	–
CLS-23Xi-12	-25°C ... +105°C	-25°C ... +105°C	-20°C ... +75°C	8 MPa	6 MPa	5 MPa	–	–
CLS-23XiT-12	-30°C ... +150°C	-30°C ... +150°C	-20°C ... +75°C	8 MPa	6 MPa <td 5 MPa	4 MPa	3 MPa	
CLS-23Xi-20	-25°C ... +105°C	-30°C ... +150°C*	-20°C ... +75°C	3 MPa	2,5 MPa	2 MPa	–	–
CLS-23XiT-20	-30°C ... +150°C	-30°C ... +150°C	-20°C ... +75°C	3 MPa	2,5 MPa	2 MPa	1,5 MPa	1 MPa
CLS-23Xi-21	-25°C ... +105°C	-30°C ... +150°C*	-20°C ... +75°C	3 MPa	2,5 MPa	2 MPa	–	–
CLS-23XiT-21	-30°C ... +150°C	-30°C ... +150°C	-20°C ... +75°C	3 MPa	2,5 MPa	2 MPa	1,5 MPa	1 MPa
CLS-23Xi-30	-25°C ... +105°C	-30°C ... +150°C*	-20°C ... +75°C	8 MPa	6 MPa	5 MPa	–	–
CLS-23XiT-30	-30°C ... +150°C	-30°C ... +150°C	-20°C ... +75°C	8 MPa	6 MPa	5 MPa	4 MPa	3 MPa

* Valid for top mounting (in vertical position)



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