

- For level detection of electrically conductive and non-conductive fluids
- Compact miniature performance
- Easy setting by means of magnetic pen
- Direct mounting to vessels, tanks, sumps, tubes
- High temperature performance available
- 2-wire connection directly to relay circuit or PLC input
- LED state indication *



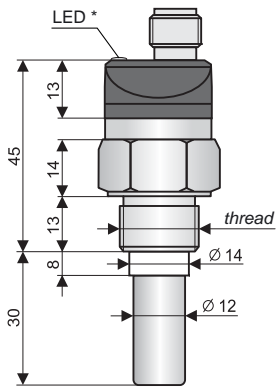
Capacitive level sensors (switches) CLS-23 are designed for limit level detection of electrically conductive and non-conductive fluids in vessels, reservoirs, sumps, pipes, tanks, etc. The sensitivity of the sensor can be easily set by placing magnetic pen on sensitive spot. The connection is done by means of two wires directly into a circuit with relay or to binary input of control system.

FEATURES OF VARIANTS

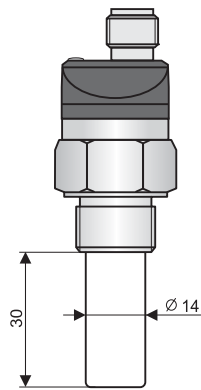
- **CLS-23N-10** **Uncoated short bar electrode**, for sensing of electrically non-conductive liquids (mineral and plant oils, resins, etc.). Mounting in horizontal position. Electrode length 30 mm.
- **CLS-23N-11** **Insulated (coated) short bar electrode**, for non-aggressive electrically conductive liquid sensing (water, water solutions). The insulation is made from polypropylene (PP). Electrode length 30 mm.
- **CLS-23N-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. Electrode length 30 mm.
- **CLS-23N-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-23N-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-23N-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.

DIMENSIONS DRAWINGS

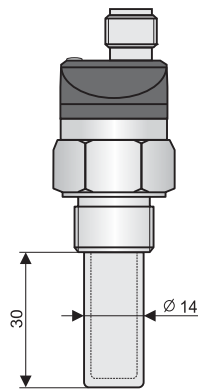
CLS-23N-10



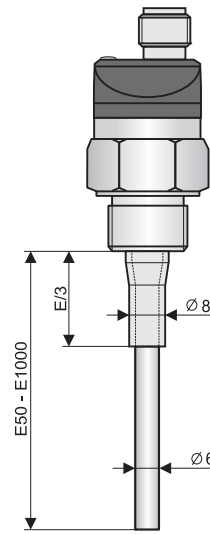
CLS-23N-11



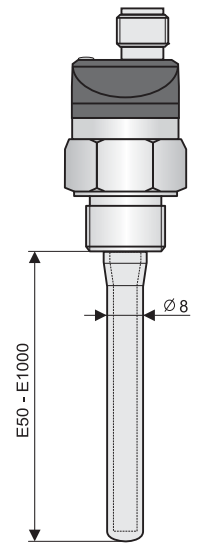
CLS-23N-12



CLS-23N-20

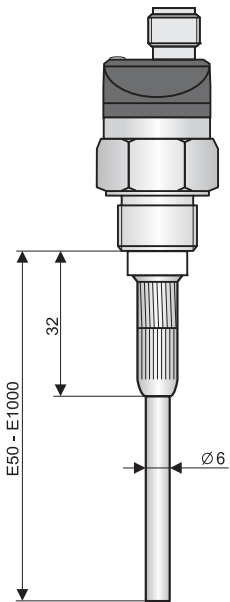


CLS-23N-21

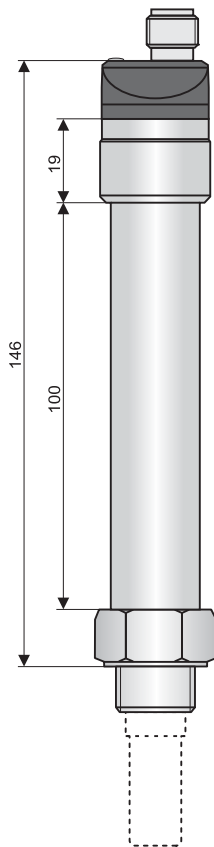


Types of threads: G 3/8"
M18x1.5
M20x1.5
1/2-14 NPT

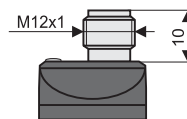
CLS-23N-30



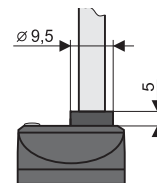
High temperatures variant (CLS-23NT-10; 12; 20; 21; 30)



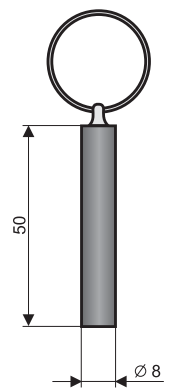
Variant "C" with connector



Variant "A" with cable outlets



Magnetic pen MP-8



* "N" and "NT" variants only

TECHNICAL SPECIFICATIONS

| | | |
|---|------------------------|---------------------------------------|
| Supply voltage | 6 ... 30VDC | |
| Supply current – OFF state | Max. 0.6 mA | |
| Switched current (Min. / Max.) | 3.3 / 40 mA | |
| Remanent voltage – ON state | Max. 6 V | |
| Output time delay | 0.1 s | |
| Protection class | IP68 (0.1 MPa) | |
| Cable ("B" performance with cable outlet) | CLS–23N, NT CLS–23E | PVC 2x 0.34 mm Silicone 2x 0.75 mm |
| Weight (with 2 m cable and 30 mm electrode) | CLS–23N, E CLS–23NT | Approx. 45 g Approx. 190 g |

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–23N, E–11 | Plastic PP |
| Electrode insulation | CLS–23_–12, 20, 21 | Plastic FEP |

TEMPERATURE AND PRESSURE RESISTANCE

| 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–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 |

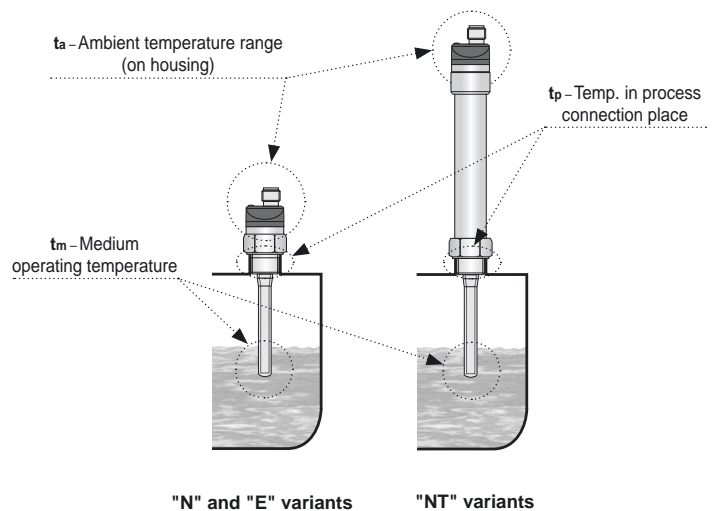
* Valid for top mounting (in vertical position)

PROCESS CONNECTION

| Type | Size | Marking |
|-------------------|---------|-------------|
| Metric thread | M18x1.5 | M18 |
| Metric thread | M20x1.5 | M20 |
| Pipe thread (BSP) | G 3/8" | G3/8 |
| Pipe thread (BSP) | G 1/2" | G1/2 |
| Sealing thread | 1/2–14 | NPT |

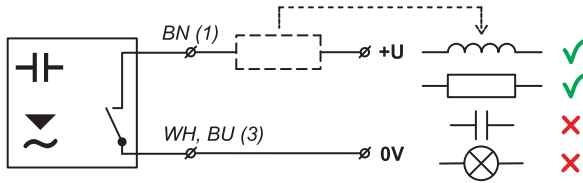
AREA CLASSIFICATION

| | |
|----------|---|
| CLS–23N | Normal for non-explosive areas |
| CLS–23E | Extended temperature range variants for non-explosive areas |
| CLS–23NT | High temperature variants for non-explosive areas |



ELECTRICAL CONNECTION

Positive pole (+ U) of power supply is connected through a load (relay) to brown wire, negative pole (0V) is connected to white wire. The sensor output is protected against short circuits. Capacity loads and loads with low sleep resistance (bulb) evaluate the sensor as a short circuit. In the case of connection to evaluation unit or to binary input of the PLC the load is not applied.

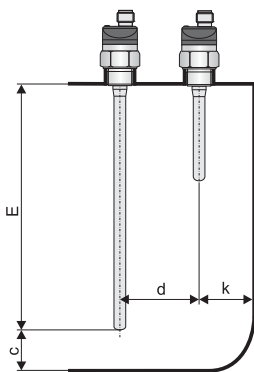


Note: In case of high ambient electromagnetic interference, parallel conductors with power lines, or lines at distances greater than 30 m, we recommend to use shielded cable.

Legend: (1), (3) – Terminals number for variants with connector
 BN – Brown
 WH – White (Variants "N" and "NT")
 BU – Blue (Variant "E")

INSTALLATION AND RECOMMENDATIONS

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



$$c \geq 10 + \frac{E}{50}$$

$$d \geq 40 + \frac{E}{40}$$

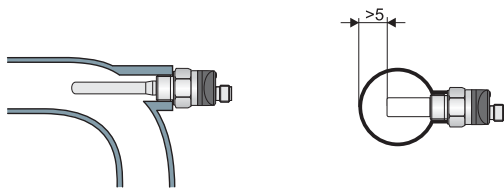
$$k \geq 20 + \frac{E}{20}$$

E – Electrode length in mm

Applies to:

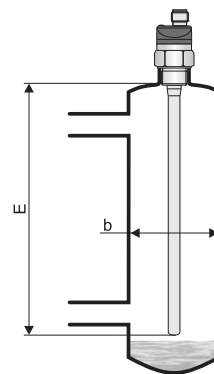
All variants

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**.



Applies to:

CLS-23_-10, 11, 12, 20, 21



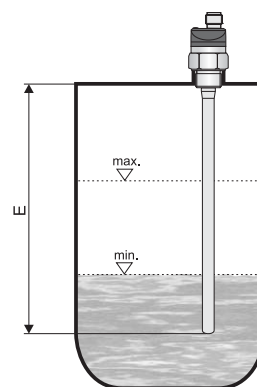
Installation into the auxiliary **stilling pipe**. We recommend to keep the tube diameter.

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

E – Electrode length in mm

Applies to:

CLS-23_-20, 21, 30



When installing the sensor 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

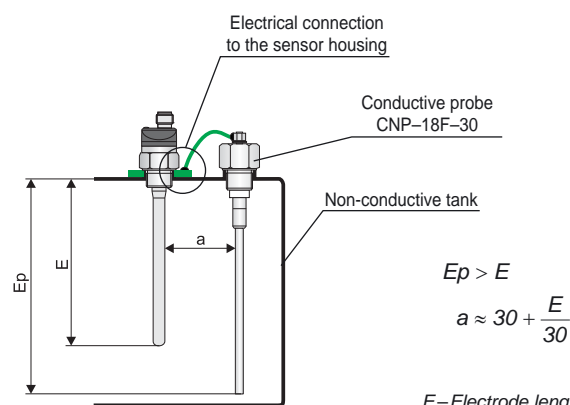
E – Electrode length in mm

Applies to:

CLS-23_-20, 30 (only for electrically non-conductive liquids)
 CLS-23_-21 (for electrically conductive liquids)

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.



$$E_p > E$$

$$a \approx 30 + \frac{E}{30}$$

E – Electrode length in mm

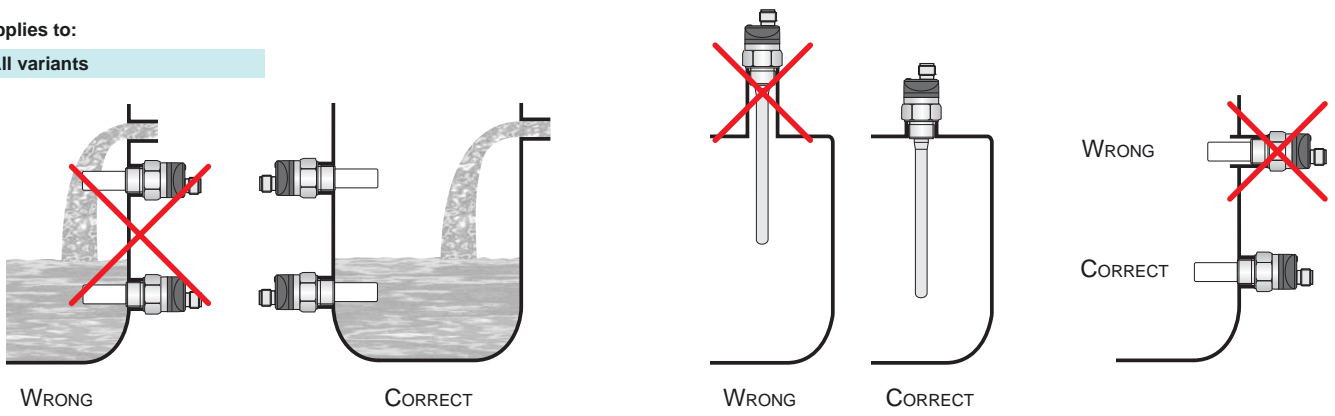
Applies to:

CLS-23_-20, 21, 30 (for electrode length up to 300 mm)

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.

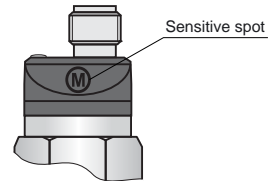
Applies to:

All variants



SENSOR SETTINGS

Setting is done by placing a magnetic pen MP-8 (included in a delivery) to a sensitive spot (M) located next to the connector. Brief attaching (max. 2 sec.) of the magnetic pen causes open state, long attaching (at least 4 sec.) defines closed state of the sensor. In this way, the sensitivity of the measured media and modes of SO (normally open) or SC (normally closed) is set. When you change the fluid it is necessary to make the new settings.



Sensors "CLS-23E" are produced **without optical LED indication**. To check the proper settings it is necessary to connect the sensor to the evaluation device or the load (relay) and from it take the information about closing / opening the sensor.

For use of the sensors in vertical position and sensing the non-conductive liquids (CLS-23_-20, -30) or conductive or non-conductive liquids (CLS-23-21) it is needed to set the switching limits (ON/ OFF) by the electrode immersed in the medium.

FACTORY DEFAULT SETTINGS:

Types **CLS-23_-10; -20; -30** are set to detect mineral oil, **CLS-23_-11; -12; -21** to detect water.

| | Level state | Mode | Output state | LED Indicator |
|-----------------------|-------------|------|--------------|---------------|
| Minimum level sensing | | SO | CLOSED | (Shine) |
| | | SO | OPEN | (Dark) |
| Maximum level sensing | | SC | CLOSED | (Shine) |
| | | SC | OPEN | (Dark) |

For **security reasons**, we recommend to set the **mode SO** (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 SC** (normally closed, sensor opens when immersed).

STATUS SIGNALIZATION (only for "N" and "NT" variants)

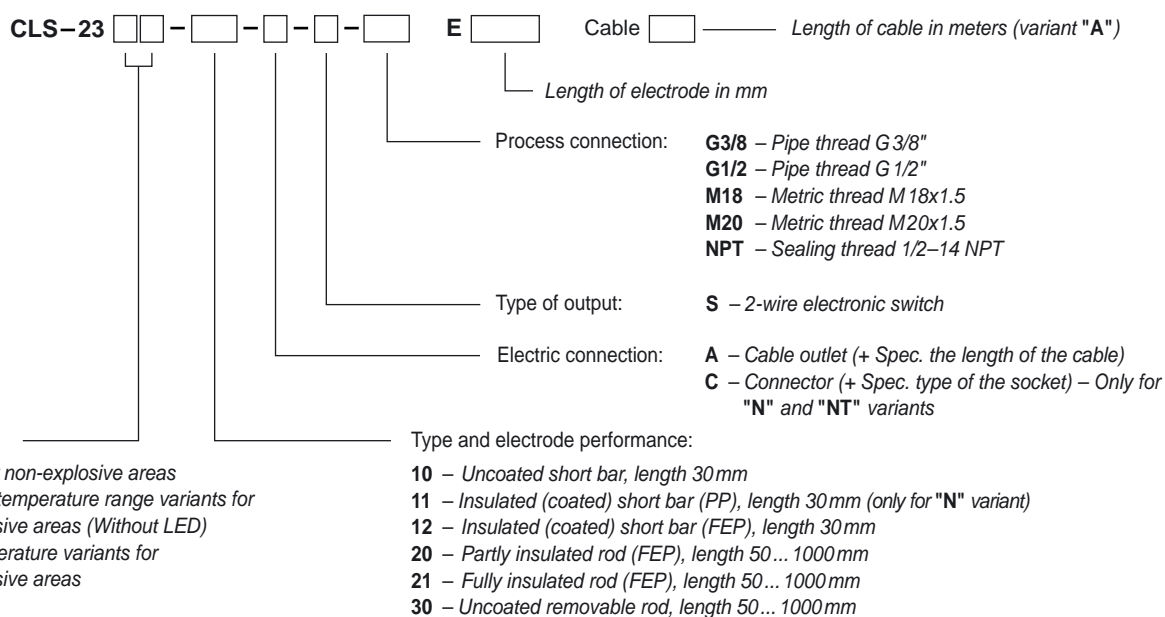
| Indicator | Function |
|------------|---|
| Orange LED | Continuous light – Sensor is closed (switched ON) Dark – Sensor is open (switched OFF) Rapid flashing (period 0.2 s)* – Unrecognized upper and lower limits or setting mistake Slow flashing (period 0.8 s) – Short circuit at sensor output |

* 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.

AREAS OF APPLICATION

Detection of various types of liquids - water, oils, coolants, water solutions, etc. Suitable for metal vessels, containers, tanks, sumps, pipes. Suitability for non-metallic containers (glass, plastic containers, etc.) please consult with the manufacturer.

ORDER CODE



CORRECT SPECIFICATION EXAMPLES

CLS-23N-10-A-S-G3/8 Cable 8m

CLS-23N-11-C-S-NPT

CLS-23E-30-A-S-M20 E450 Cable 10m

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

ACCESSORIES

Standard – included in the level sensors price

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

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
- Other seals (PTFE, Al, etc.)

SAFETY, PROTECTIONS AND COMPATIBILITY

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) and -4-6 (10 V).



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