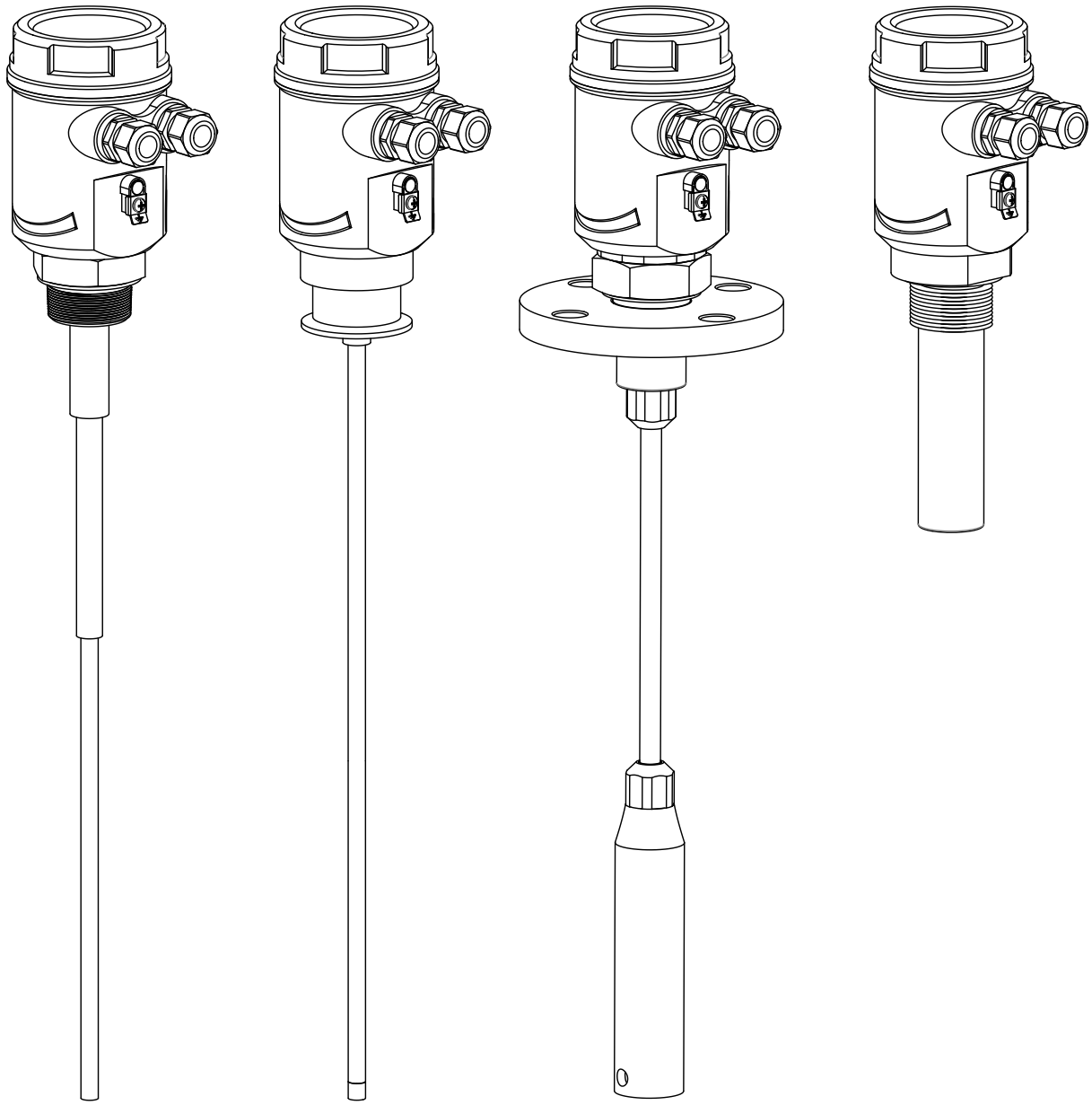
CLS2, 4, 7, 9

Capacitive rod / insulated and cable level switches for liquids and bulk solids



technical documentation EN revision of 11/12/2023

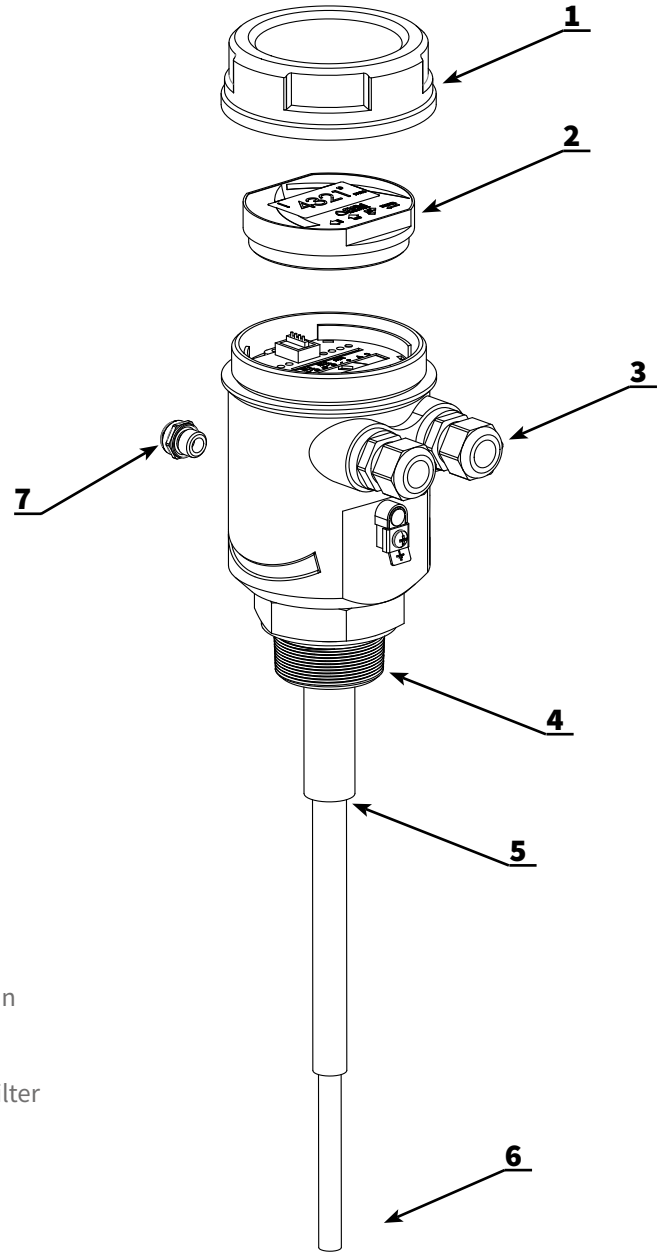
sgm lektra

CONTENTS

1-WARRANTY

SGM-LEKTRA SRL undertakes to remedy any fault, defect or absence, occurring within 12 months from the delivery date, provided that it is attributable to it and has been notified within the prescribed time limit.
SGM LEKTRA SRL may choose whether to repair or replace the faulty products.
The Products replaced under warranty will have an additional 12-month warranty.
The Products repaired under warranty will have a warranty until the original time limit.
The parts of the Products repaired out of warranty will have a 3-month warranty.
The Products are only guaranteed to meet particular specifications, technical characteristics or conditions of use if this is expressly agreed in the Purchase Agreement or in the documents referred to therein.
The warranty of SGM-LEKTRA SRL absorbs and replaces the warranties and responsibilities, both contractual and non-contractual, originating from the supply such as, for example, compensation for damages, reimbursement of expenses, etc., both towards the Customer and towards third parties.
The warranty is void in the event of tampering with or improper use of the Products.

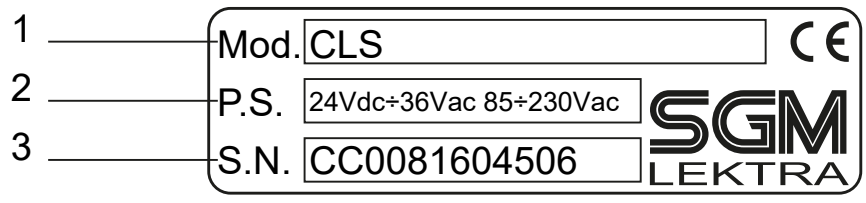
2-PRODUCT



1. Cover
2. VL601 (opt.)
3. Skintop M20
4. Process connection
5. Covering
6. Rod
7. Anti-condensate filter

2.1 - IDENTIFICATION

Every instrument has an adhesive identification plate on which the main information about the meter is outlined.
The following image describes the information and data on the plate.



1. Product code
2. Voltage supply
3. Serial number

3-TECHNICAL SPECIFICATIONS

Housing material

PC/AL

Rope/rod material

Carbon steel, SS316

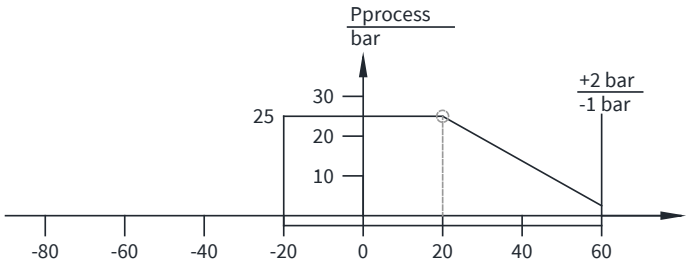
Insulation/covering material

PVC, PTFE, PE and PP

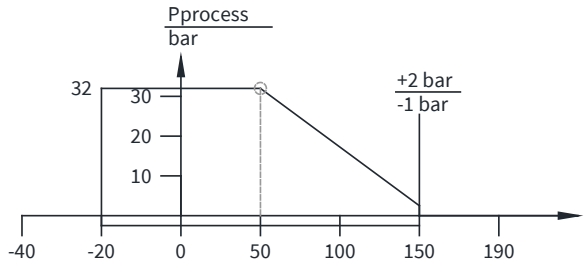
Mechanical installation and materials

Probe	Process connection	Materials
CLS2	G 1", G 1"½	Carbon steel, SS316
CLS4	G ½", G 1", 1" NPT	Carbon steel, SS316
CLS4	G ¾"	SS316
CLS4	G 1"½	Carbon steel, SS316, PVC, PTFE
CLS4	CLAMP 1", 1" ½, 2"	SS316
CLS4	COUPLING NUT DN25, DN40, DN50	SS304L (DIN 11851)
CLS4	FLANGE DN40	PN6 (PVC, PTFE UNI 1092-1), PN16 (Carbon steel, SS304, SS316)
CLS4	FLANGE DN50, DN80, DN100	PN6 (PVC, UNI 1092-1), PN16 (SS316, DIN 2527 form B)
CLS4	FLANGE ANSI RF2", RF3", RF4"	SS316 (150psi)
CLS7	G 1"½	Carbon steel
CLS7	FLANGE DN40	PN16 (Carbon steel, SS304, SS316)
CLS7	FLANGE DN50, DN80, DN100	SS316 (DIN 2527 form B)
CLS7	FLANGE ANSI RF2", RF3", RF4"	SS316 (150psi)
CLS9	G 1", G 1"½	PVC, PP
CLS9	FLANGE DN40	PN6 (PVC, PP)

Operating pressure as a function of temperature



PVC Insulated



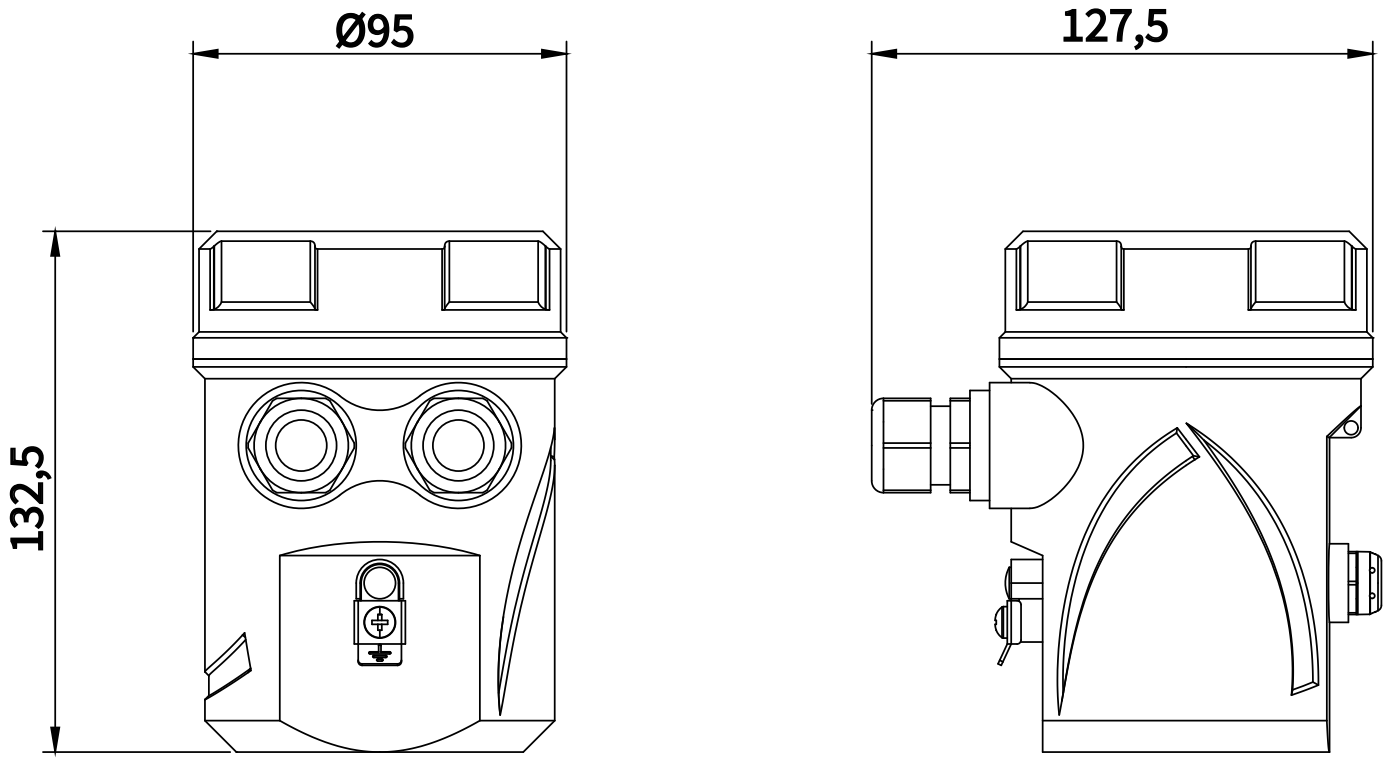
PTFE Insulated

Protection rating
IP67/IP68 in process
Pressure
-1 ÷ +6bar
Operating temperature
-20÷+60°C (-40÷150°C vers. PTFE with heat sink for CLS4)
Power supply
24Vdc/Vac ÷ 36Vac 50Hz; 85 ÷ 230Vac
Max. input power
1,5W
Cable glands
M20x1,5
Electrical connection
Plug-in terminal blocks
Relay output
3A 230Vac
Trigger mode
min. or max. level
Trigger delay
0÷30s (programmable)
Programming
Via extractable VL601 module
Void calibration
for self-acquisition through extractable VL601-SGM module
Thermal stability
1 typical minute
Display
LCD display on extractable VL601-SGM module
Greed LED: power on
Red LED: relay status (on with relay energized)
Certification
ATEX II 1/2D Ex ia/tb IIIC T150°C (opt.)

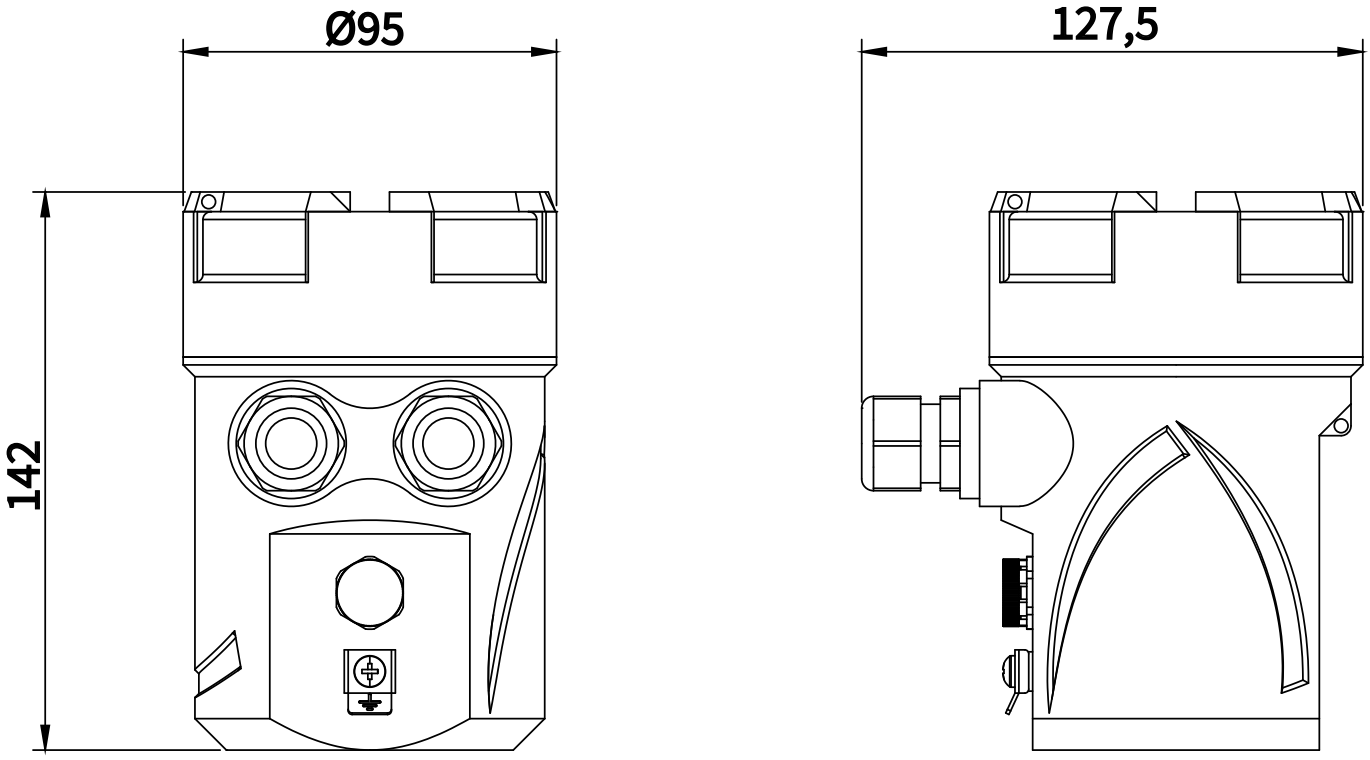
4-DIMENSIONS

4.1 - MECHANICAL DIMENSIONS

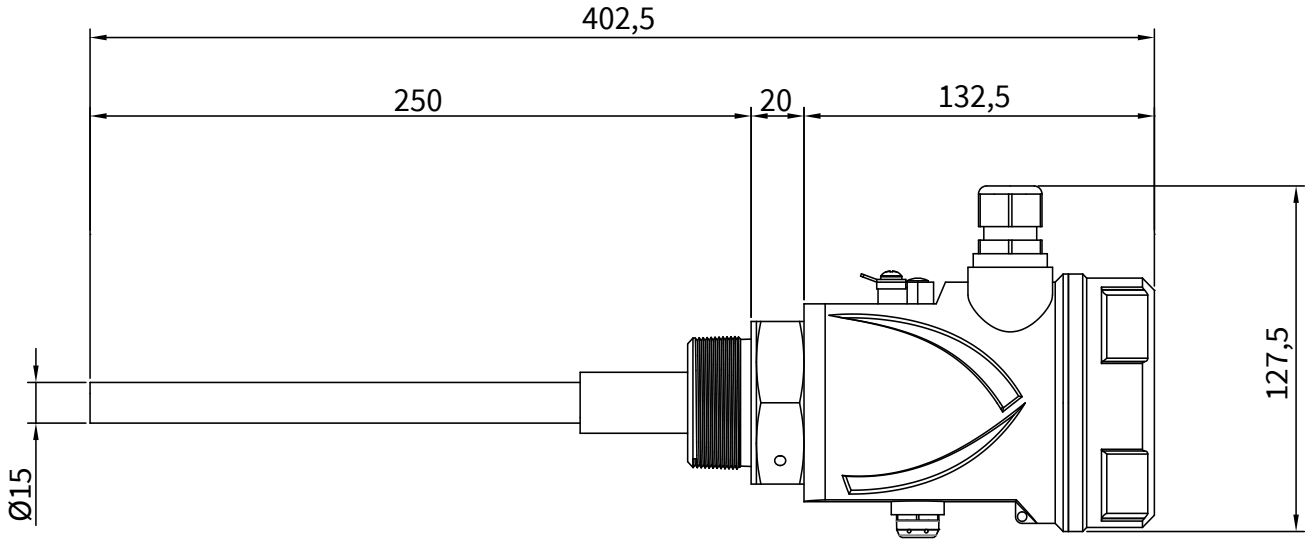
4.1.1 - POLYCARBONATE HOUSING



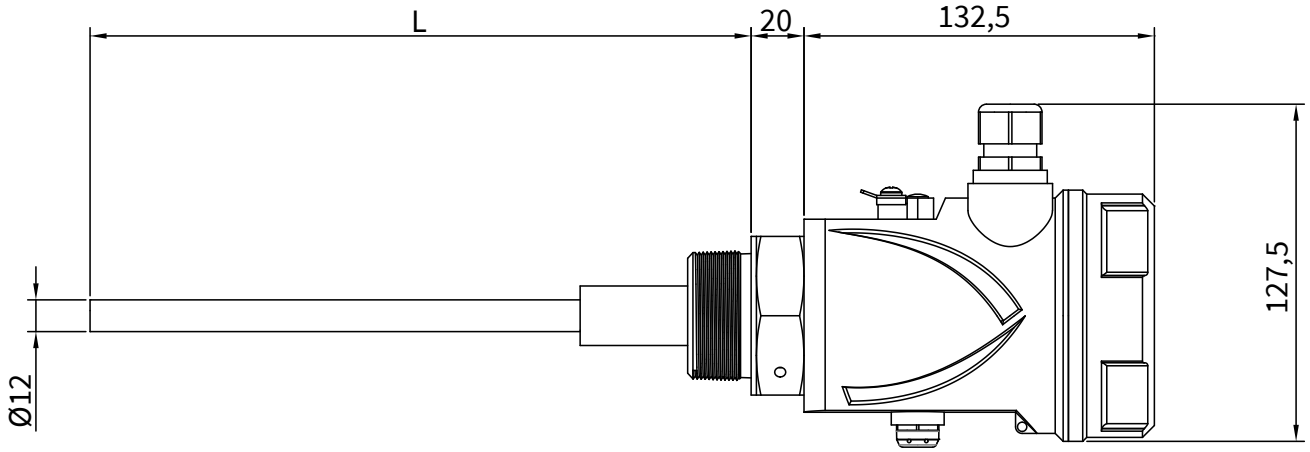
4.1.2 - ALUMINIUM HOUSING



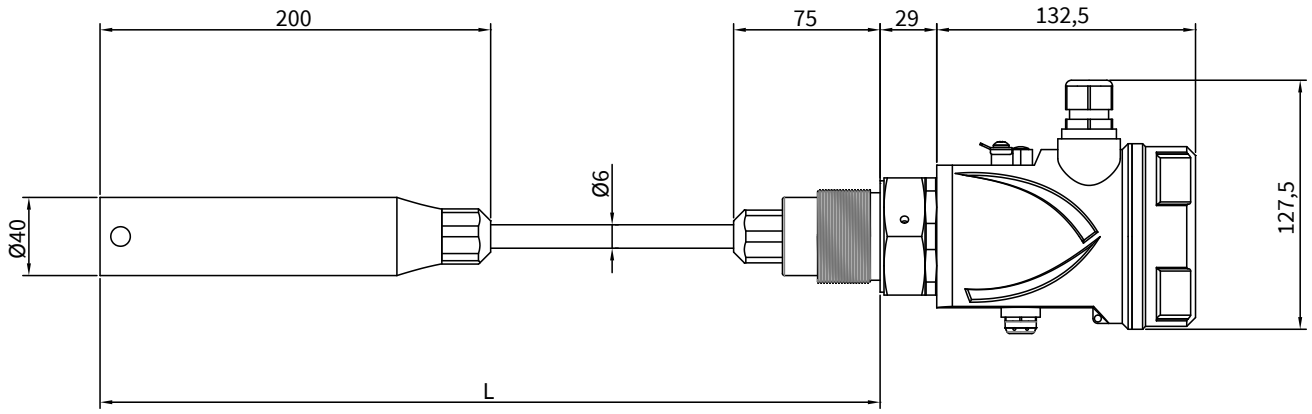
4.1.3 - CLS2



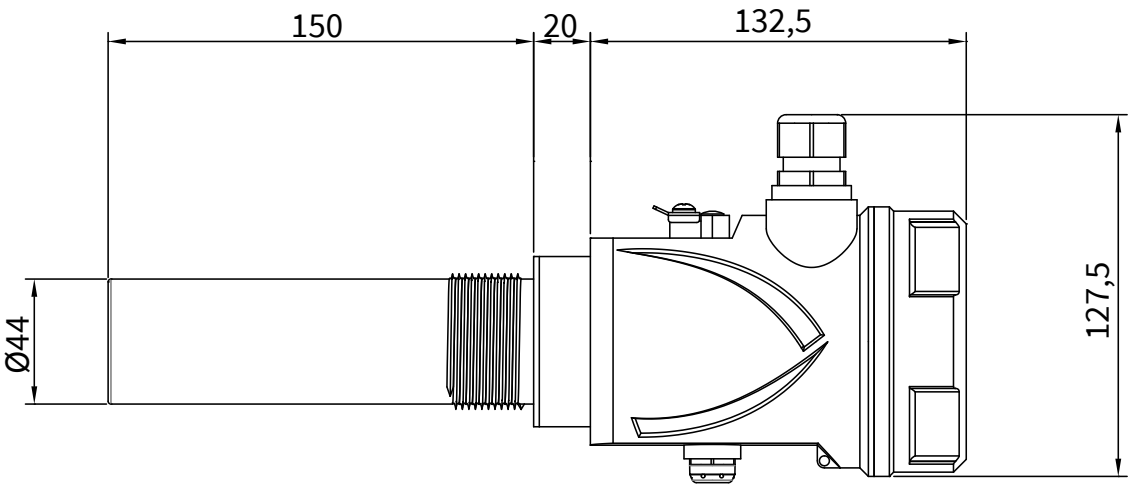
4.1.4 - CLS4



4.1.5 - CLS7



4.1.6 - CLS9



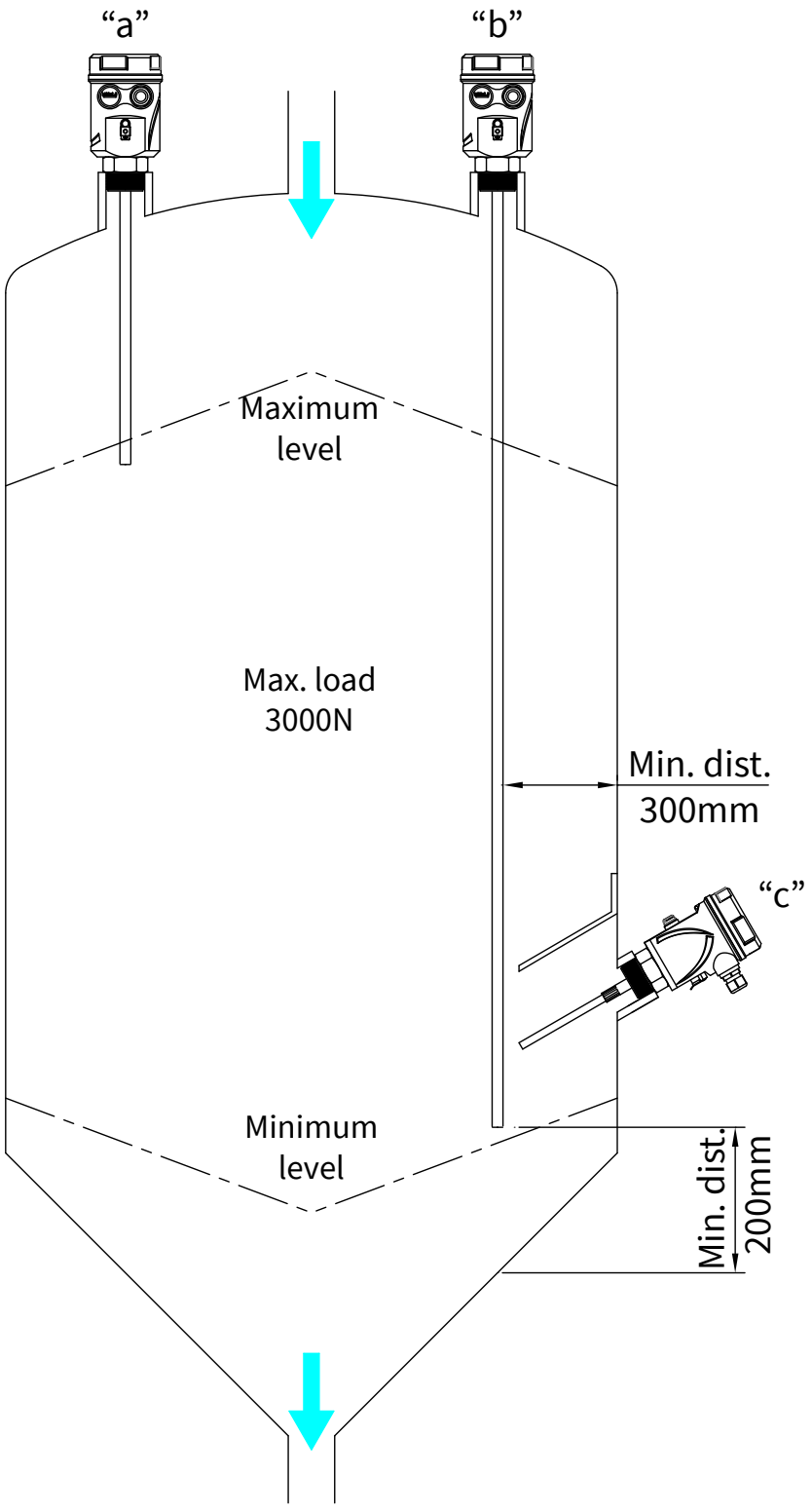
5-INSTALLATION

5.1 - PRECAUTIONS FOR INSTALLATION

5.1.1 - CORRECT INSTALLATION

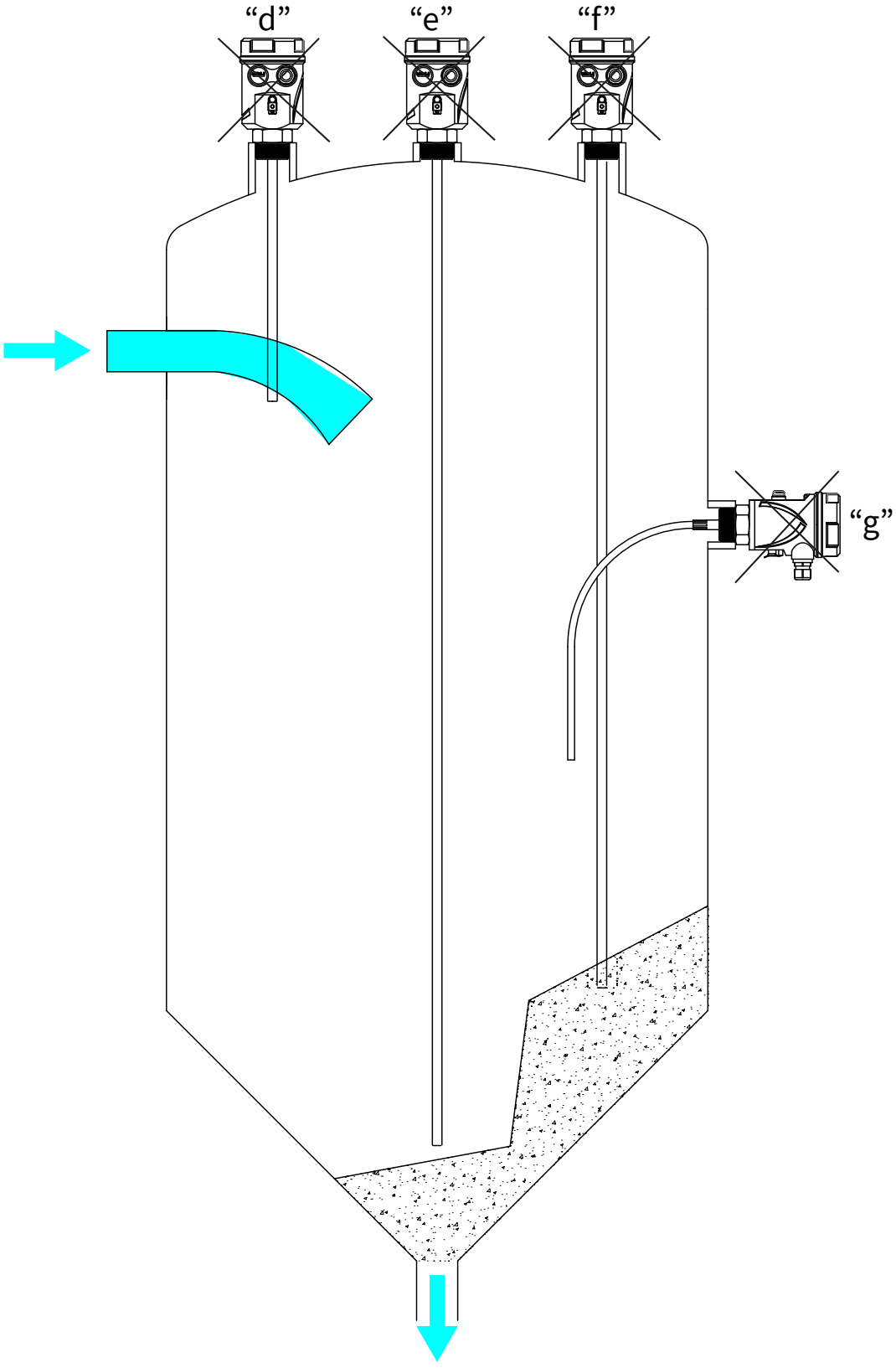
Correct installation of CLS sensors to control a Max. level (a) and Min. level (b). To avoid triggering problems, follow the instructions below:

- Install away from loading zones and keep a minimum distance of 300mm from the walls of the tank.
- When placing the order, select the option for the cable extension length, allowing the sensitive element to be positioned at least 200 mm from the bottom of the tank.
- Pay particular attention to the maximum load for minimum level CLS sensors (b).
  The mechanical load during discharge must not exceed a value of:
  3000N for process temperatures below 40°C
  2800N for process temperatures with a max. value of 70°C (80° non-continuous)
- Position the CLS2 sidewise at 30° angle (minimum), preferably with a sun protector plate (c)



5.1.2 - Incorrect installation

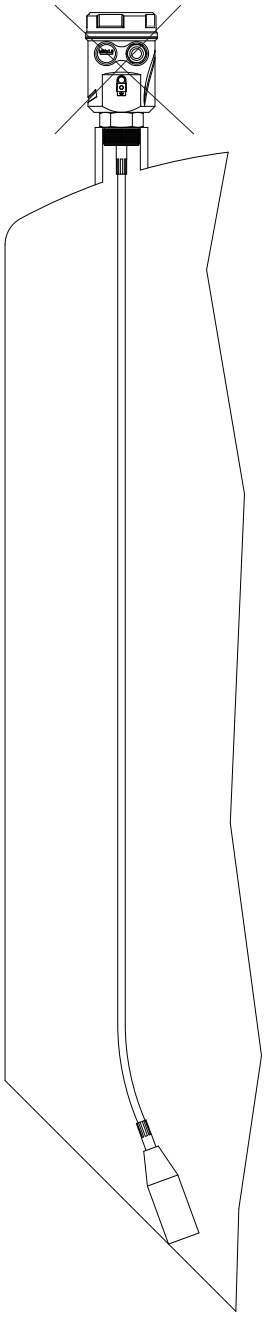
- Incorrect installation of CLS sensors.
- do not install near loading zones (d); false alarm signals may be generated and the CLS sensors may be damaged by the pouring in of the material.
- do not install at the centre of the tank loading point (e); the CLS sensors and/or ceiling of the tank may be damaged and eventually break the cable of the CLS sensors, due to the elevated mechanical stress created in this point.
- do not install in points where accumulations of product may form (f); the CLS sensors might remain blocked in the 'product present' position: false max. level alarm or, vice versa, failed min. level alarm signal.
- the CLS2 probes with rope extension cannot be installed sidewise (g).



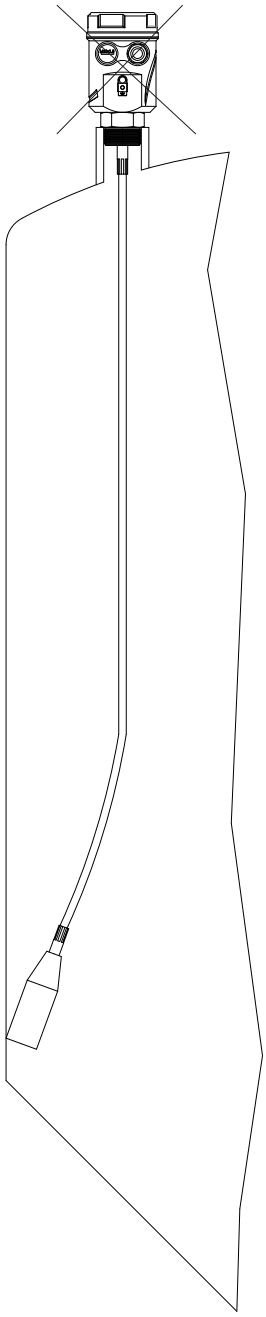
5.1.3 - Cable

Bent cable (h-i)
The cable must be straightened (l) to prevent the sensitive element from touching the wall of the tank and sending a false ‘product present’ signal: false max. level alarm or, vice versa, failed min. level alarm signal.

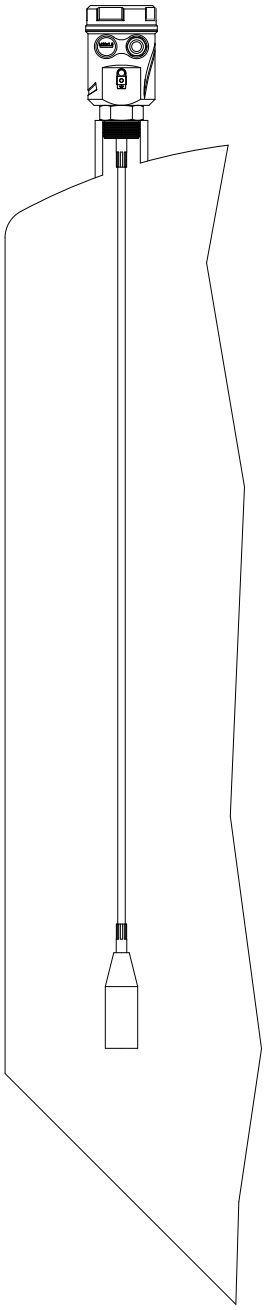
“h”



“i”



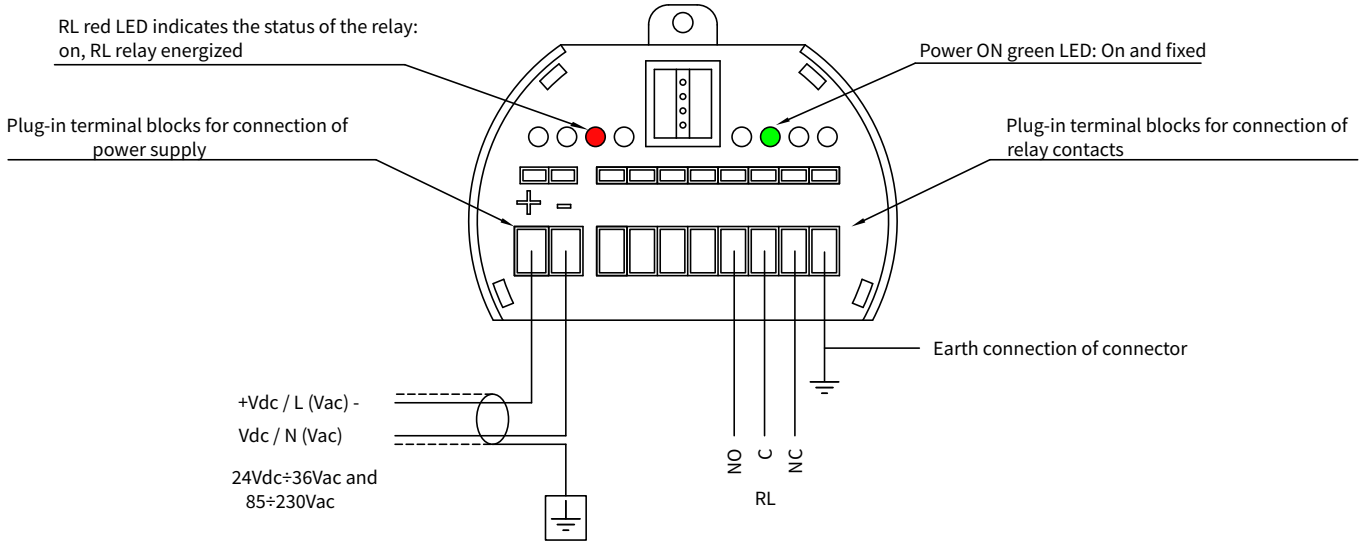
“l”



6-ELECTRICAL CONNECTION

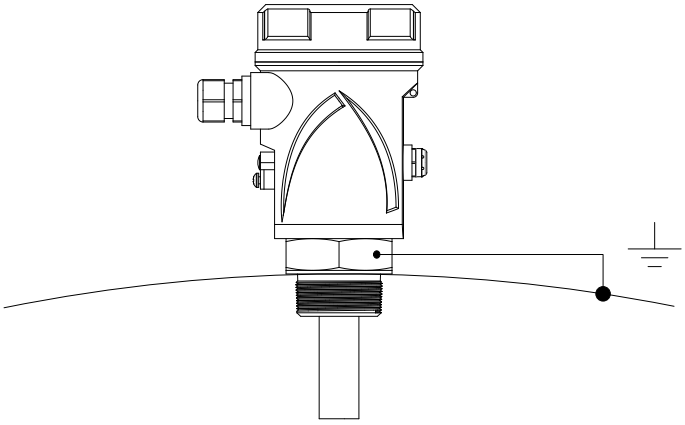
6.1 - CONNECTIONS

1) Before energizing this product, make sure all connections have been correctly made and that the mains voltage corresponds to that on the rating plate.
2) Tighten the cable glands and cover to ensure a protection rating of IP67.
3) To prevent the infiltration of water or humidity, which may damage the level sensor, do not remove the caps of unused cable glands.



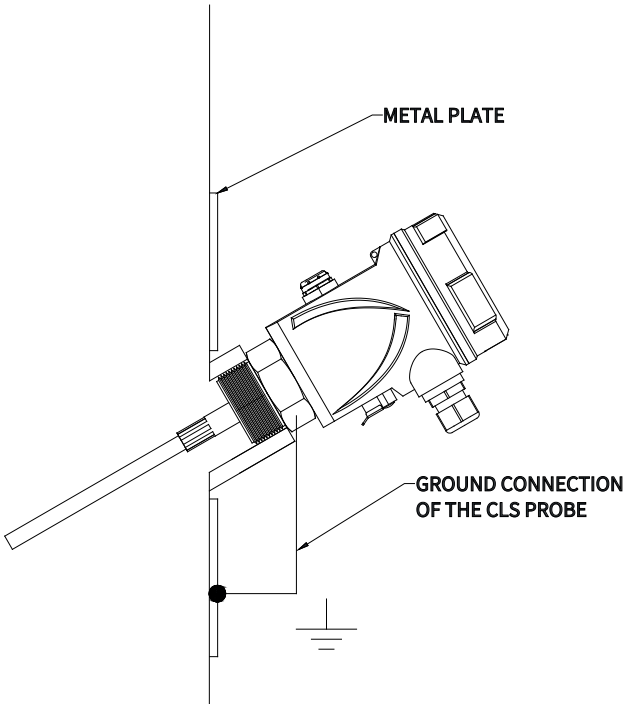
6.2 - GROUNDING

The ground connection is essential for the correct functioning of the capacitive probes.
Only CLS9 liquid probes do not need this connection.

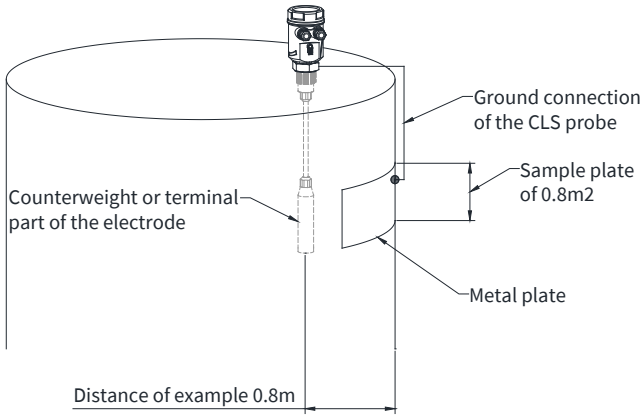


6.2.1 - Tanks or silos in non-conductive material

When the CLS probe is to be installed laterally on a tank of non-conductive material, it will be necessary to apply a metal plate outside the tank to create the grounding reference.
The minimum required surface of the plate is 25dm2 (e.g. square plate 0.5m x 0.5m).
In case of tanks with thick walls it is advisable to increase the surface of the plate up to 64dm2 (e.g. square plate 0.8mx0.8m)

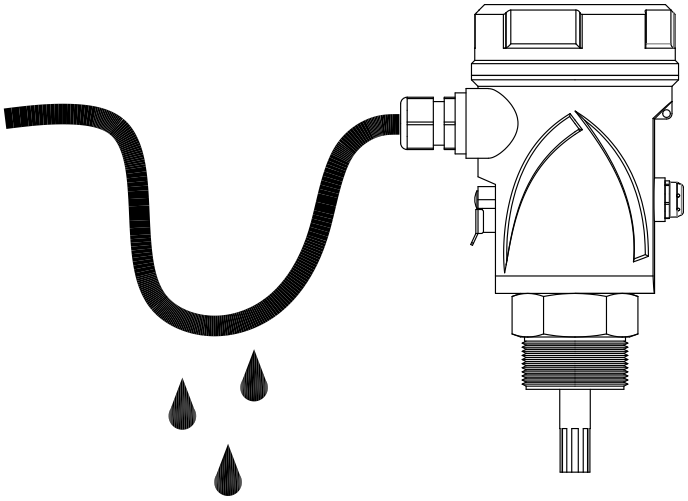


When the CLS probe is to be installed on the top in a tank of non-conductive material, it will be necessary to apply a metal plate outside the tank to create the mass reference. The plate must be positioned at the height of the terminal part of the electrode or at the height of the counterweight, in the case of CLS7 probes.
The surface of the plate must be directly proportional to the distance between the electrode / counterweight and the tank wall; example: with a distance of 0.8m between the electrode / counterweight and the tank wall, the minimum surface of the plate must be 0.8m2.



6.3 - INFILTRATIONS OF HUMIDITY

To avoid infiltrations of humidity inside the cover, we recommend:
- Using a cable with an external diameter of 6÷12mm for the electrical connections and fully tightening the M20 cable gland.
- Fully tighten the cover.
- Position the cable in such a way as to form a downward curve in the output of the M20 cable gland; in this way condensation and/or rainwater will tend to drip from the bottom of the curve.



7-LOCAL OPERATOR INTERFACE (LOI) - VL601

The CLS capacitive level checks are programmed and calibrated using the VL601 display module.

7.1 - VL601 FEATURES

The VL601 programming module can be activated and deactivated on-board the CLS without affecting the unit's operation.

The VL601 module is equipped with an LCD dot-matrix display and allows simple and fast start-up using the 4 programming keys.

The symbol 

on the display indicates that the relay is energized, normal condition.

The symbol 

on the display indicates that the relay is de-energized, alarm condition.

1. From "RUN" mode: press  to select the parameter to be programmed.
2. Press  to confirm the selection.
3. To select the parameter option press  .
4. Press  to confirm and save the selection, press  to exit without saving.

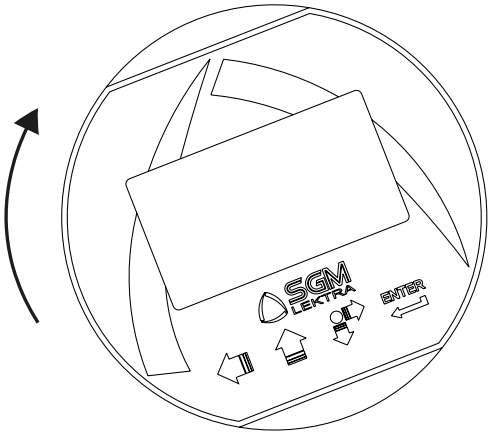
LEFT-HAND ARROW key:
- **Exit without saving**
- **When pressed with the ENTER key performs a void calibration**

UP ARROW key:
- **Parameter option selection**

SCROLL key:
- **Scroll parameters**

ENTER key:
- **Confirm parameter selection**
- **Save parameter setting**

By unscrewing the cover, it is possible to lock the VL601 module (by turning it clockwise until it clicks) or unlock it (by turning it anti-clockwise) as shown in the figure.



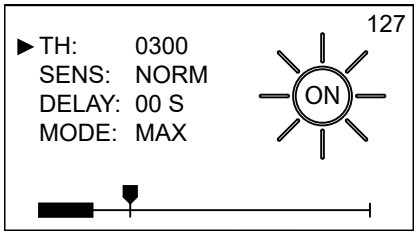
LOCK

UNLOCK

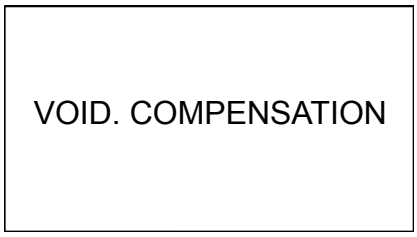
8-SENSOR CALIBRATION

CAUTION: In order to correctly calibrate the sensor, ensure the real level is in the ‘sensor unoccupied’ condition.

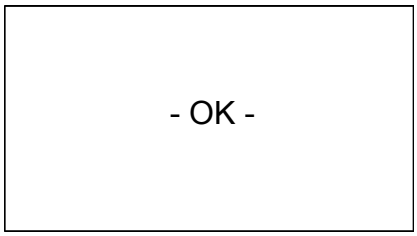
From “RUN” mode, press ENTER and the LEFT-HAND ARROW at the same time.



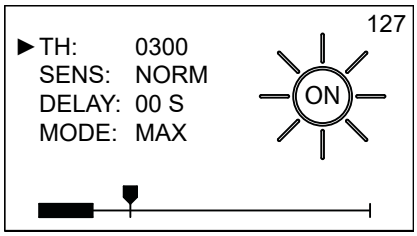
During the calibration of the sensor, the VL601 module display will show the wording “VOID. COMPENSATION”.



Once the sensor calibration data has been correctly acquired, the VL601 module display will show the wording “- OK -”

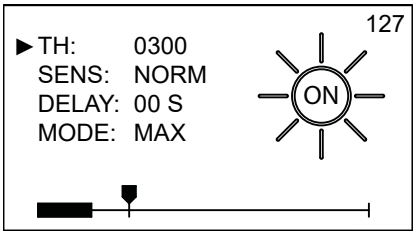


When sensor calibration is complete, the system will automatically return to “RUN” mode.



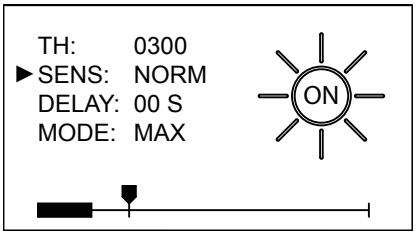
9-PARAMETER PROGRAMMING

9.1 - TH



Press ENTER to modify the programming.
Using the UP ARROW adjust the limit from 0 to 1000:
during programming a “transparent” cursor will be displayed
which indicates the new positioning of the level alarm limit.
Press ENTER to confirm.
NOTE: the TH value must always be greater than the value shown in void conditions.

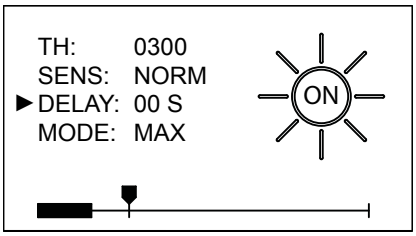
9.2 - SENS



Press ENTER to modify the programming.
Set the sensor sensitivity: NORMAL or HIGH.
The table shows a few examples of how the “SENS” parameter should be set in relation to the material.

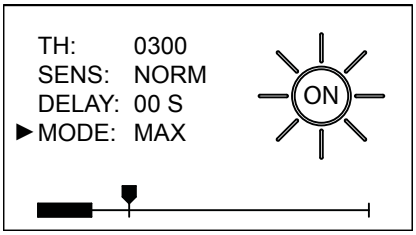
HIGH (high sens.)	NORM (normal sens.)
Sunflower seeds	Cornflour
Plast. chips in ABS	Wheat flour
Plast. chips in PA	Rice
Bran	Cement

9.2 - DELAY



Press ENTER to modify the programming.
Using the UP ARROW, adjust the delay time from 0 to 30 seconds for the switching of the sensor from the normal state to the alarm state
(for MAX alarm, relay de-energized in the absence of product; for MIN alarm, relay de-energized in the absence of product).
When the process ceases to be in alarm conditions, the sensor instantly switches without a delay, from the alarm state to the normal state
(for MAX alarm, relay energized in absence of product;
for MIN alarm, relay energized in presence of product).

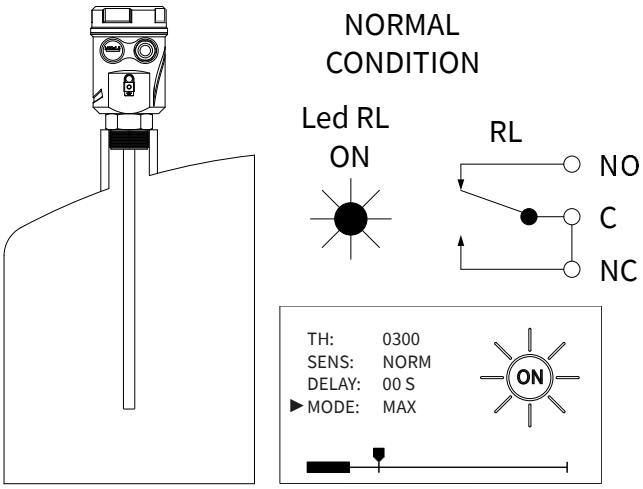
9.3 - MODE

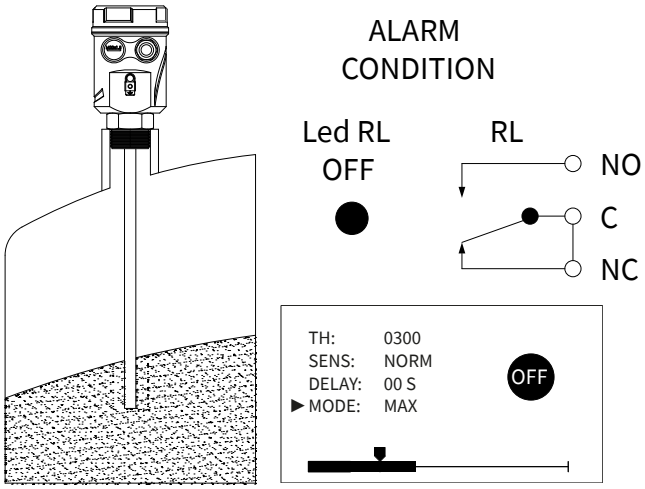


Press ENTER to modify the programming. Set the sensor alarm mode.

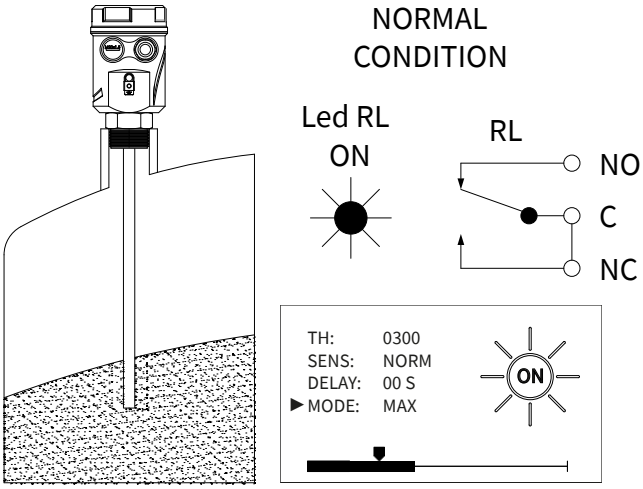
Use the UP ARROW to change the alarm mode, MAX or MIN, highlighted in negative.
Press ENTER to confirm.

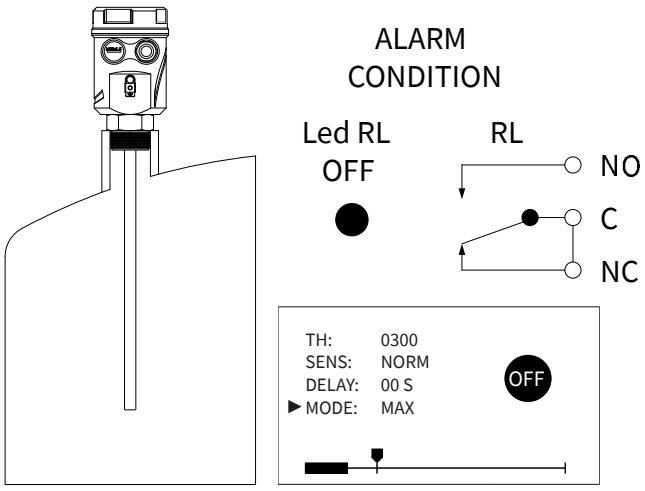
By setting the MODE parameter with the “MAX” option, the CLS sensors will work in maximum level alarm mode:
- normal condition; relay energized in absence of product.
- alarm condition; relay de-energized in presence of product.





By setting the MODE parameter with the “MIN” option, the CLS sensor will work in minimum level alarm mode:
- normal condition; relay energized in presence of product.
- alarm condition; relay de-energized in absence of product.





10-FACTORY TEST AND QUALITY CERTIFICATE

CE

In conformity to the company and check procedures I certify that the equipment:

(Electronic Unit)	(Capacitive probe)

is conform to the technical requirements on Technical Data and it is made in conformity to the procedure

Quality Control Manager: ..... Production and check date: .....

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web: sgm-lektra.com

sgm lektra