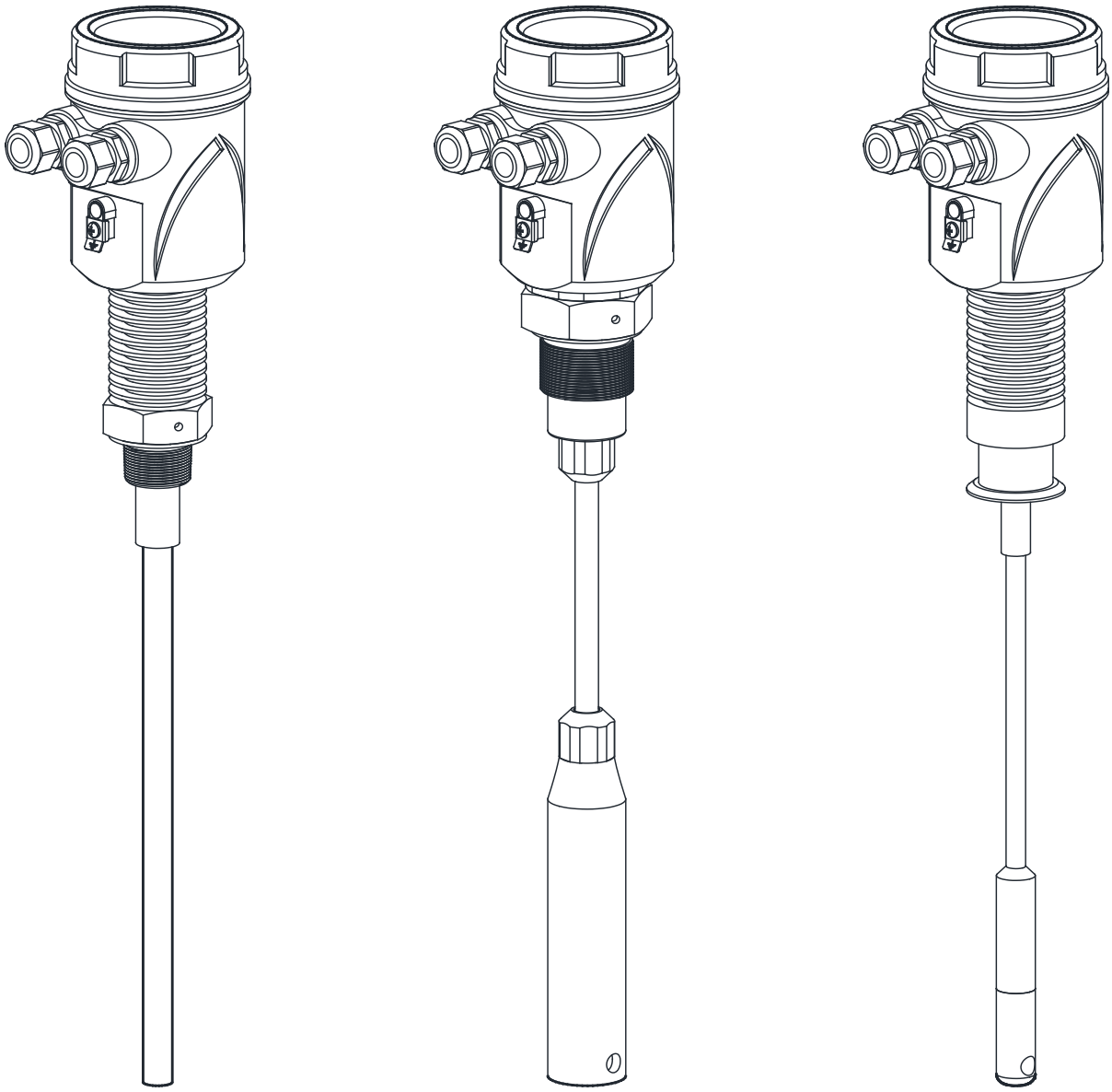
CLT4, 7, 8

capacitive level transmitter



technical documentation EN revision of 14/12/2023

sgm lektra

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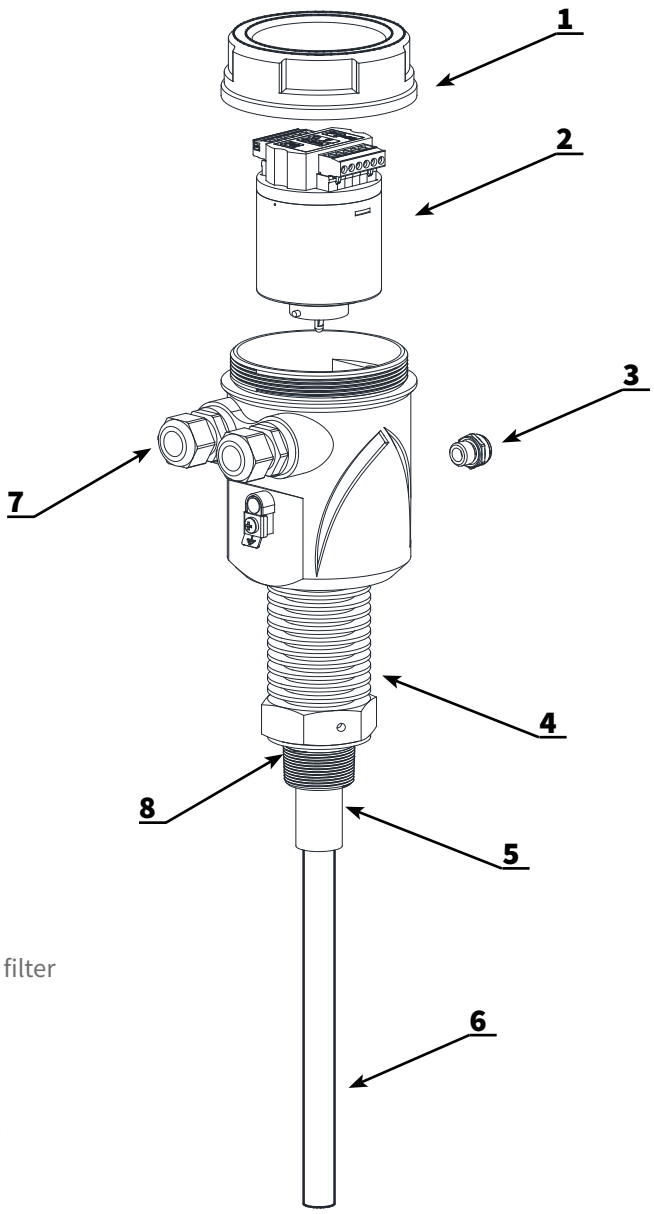
1-WARRANTY

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.

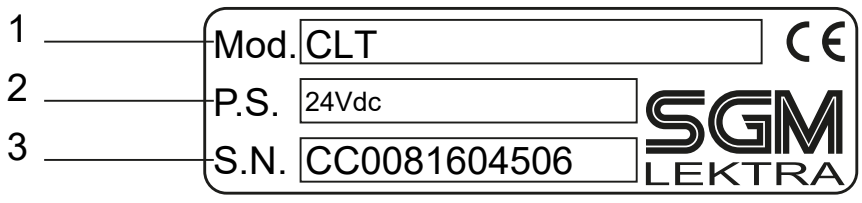
2-PRODUCT



1. Cover
2. TC22÷30
3. Anti-condensation filter
4. Heat sink
5. Covering
6. Rod
7. Skintop M20
8. Process cinnection

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.



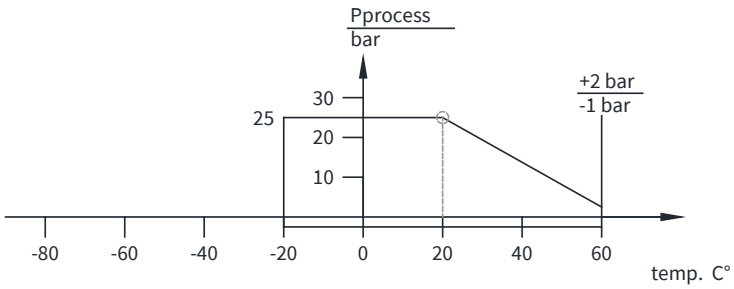
1. Product code
2. Voltage supply
3. Serial number

3-TECHNICAL SPECIFICATIONS

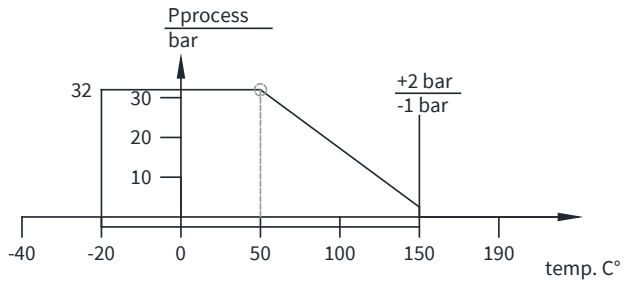
Housing material
PC/AL
Rope/rod material
Carbon steel, SS316
Insulation/covering material
PVC, PTFE
Mechanical installation and materials

Probe	Process Connection	Materiali
CLT4	G ½", G 1", 1" NPT	Carbon steel, SS316
CLT4	G 1"½	Carbon steel, SS316, PVC, PTFE
CLT4	CLAMP 1", 1" ½, 2"	SS316
CLT7	G 1"½	Carbon steel, SS316
CLT8	G 1", G 1"½	Carbon steel, SS316
CLT8	1" NPT	SS316
CLT8	G 1"½	PTFE
CLT8	CLAMP 1", 1" ½, 2"	SS316

Operating pressure as a function of temperature



PVC Insulated



PTFE Insulated

Protection rating
IP67/IP68 in process

Pressure
-1 ÷ +6bar

Temperatura di lavoro
-20÷+60°C (-40÷150°C PTFE with heat sink for CLS4 vers.)

Max. input power
1,5W

Cable glands
M20x1,5

Electronic insert material
Nylon; Metallic nylon

Mechanical assembly of electronic insert
Bayonet for IP67 housing

Electronic insert mechanical protection
IP50

Electrical connection
TC22÷29 - 2 removable 6-pin terminal blocks
TC30 - 1 removable 6-pin terminal block

Operating temperature
-30 ÷ +80°C

Supply voltage
TC22/TC26 24Vdc
TC23/TC27 24 Vac 50Hz
TC24/TC28 115 Vac 50Hz
TC25/TC29 230 Vac 50Hz
TC30 10÷30Vdc

Measurement range
20pF ÷ 10.000pF

Consumption
Max 2.5W (1.5W Vdc)

Analog output
4÷20 mA (max 500ohm)

TC26÷29 relay output
1 x SPDT 2A, 230Vac (resistive)

TC22÷29 serial output
RS485

Thermal drift compensation
internal sample capacity

Linearity
±0.5%

Calibration
via two buttons

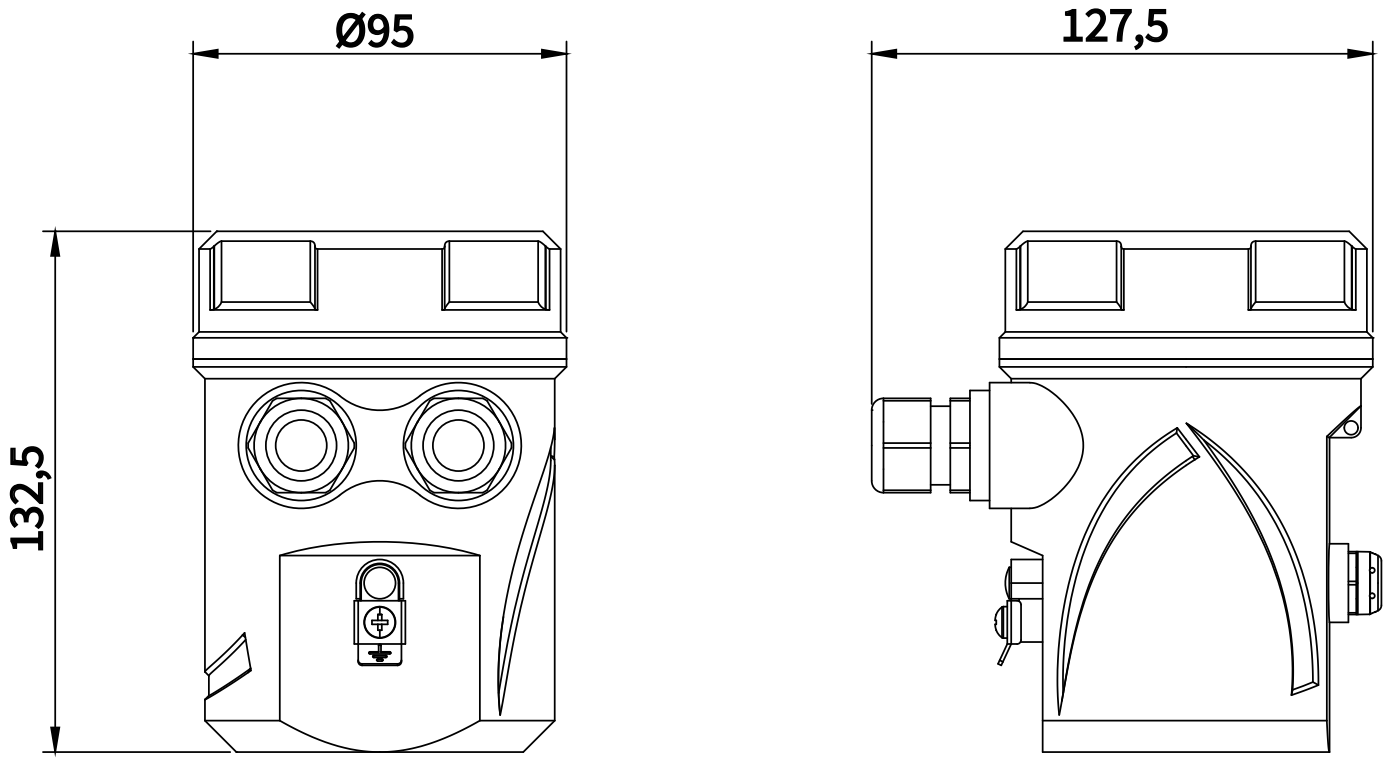
Indicator lights
Flashing GREEN LED: run mode
GREEN LED steady on: calibration mode
YELLOW LED: relay status (TC26÷29 only)

TC30 display
3 digit LCD

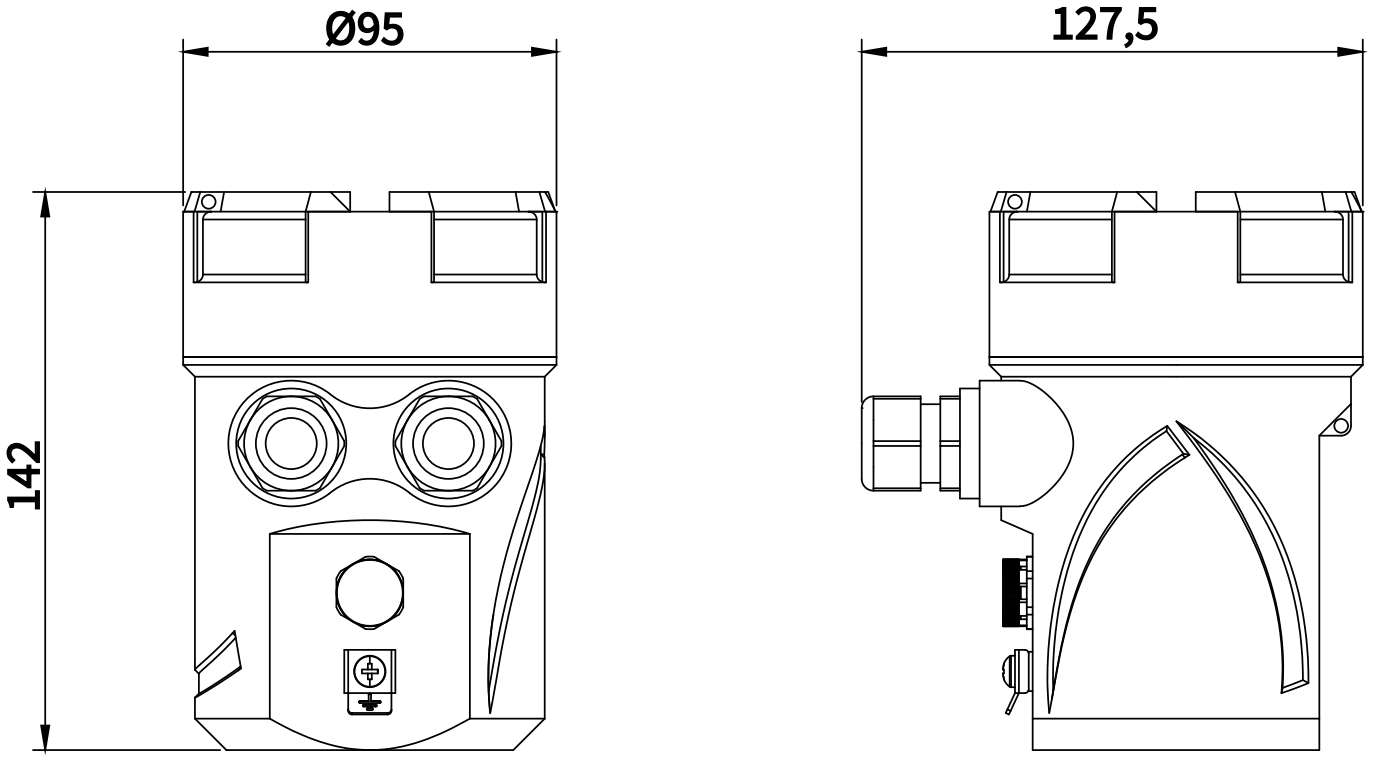
4-DIMENSIONS

4.1 - MECHANICAL DIMENSIONS

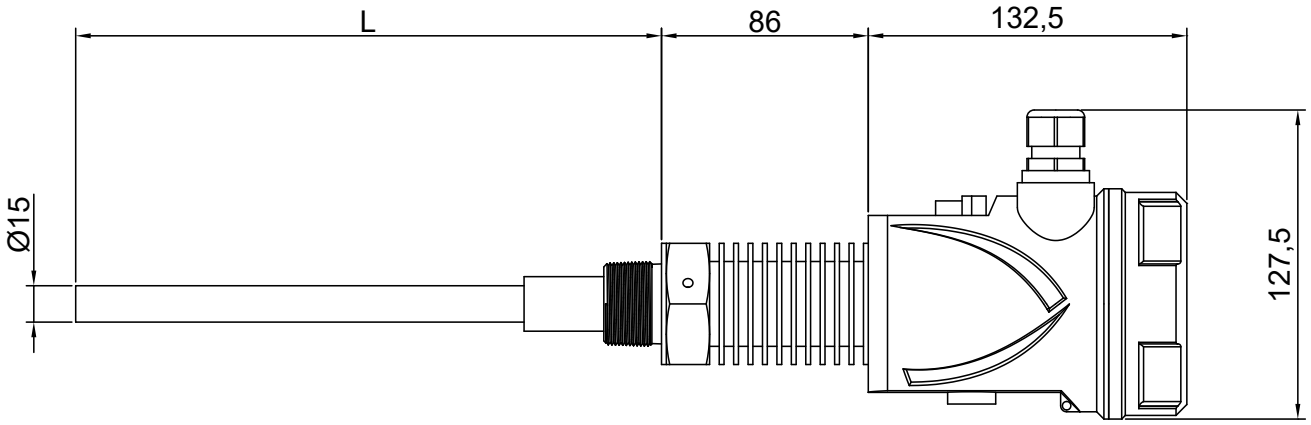
4.1.1 - POLYCARBONATE HEAD



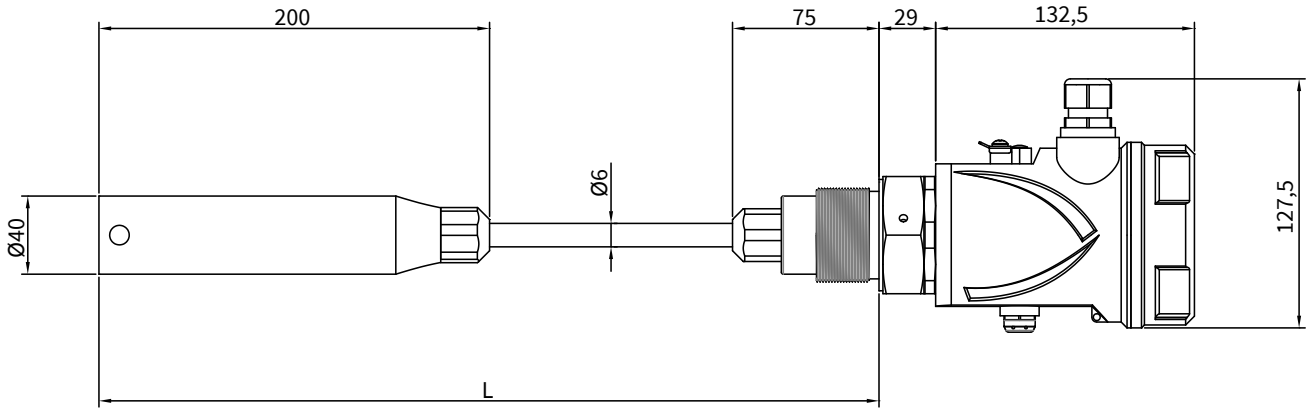
4.1.2 - ALUMINUM HEAD



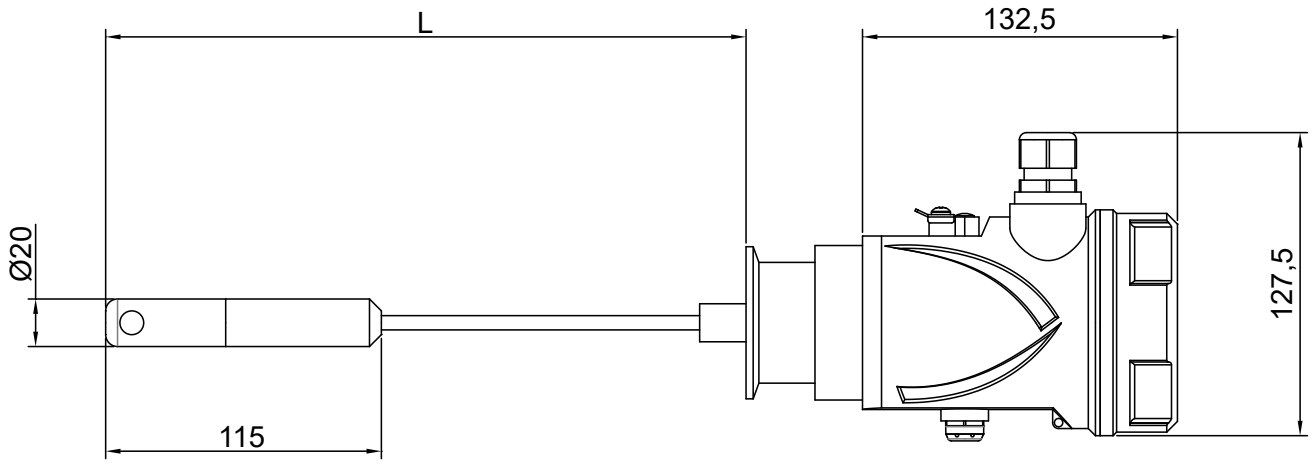
4.1.3 - CLT4



4.1.4 - CLT7



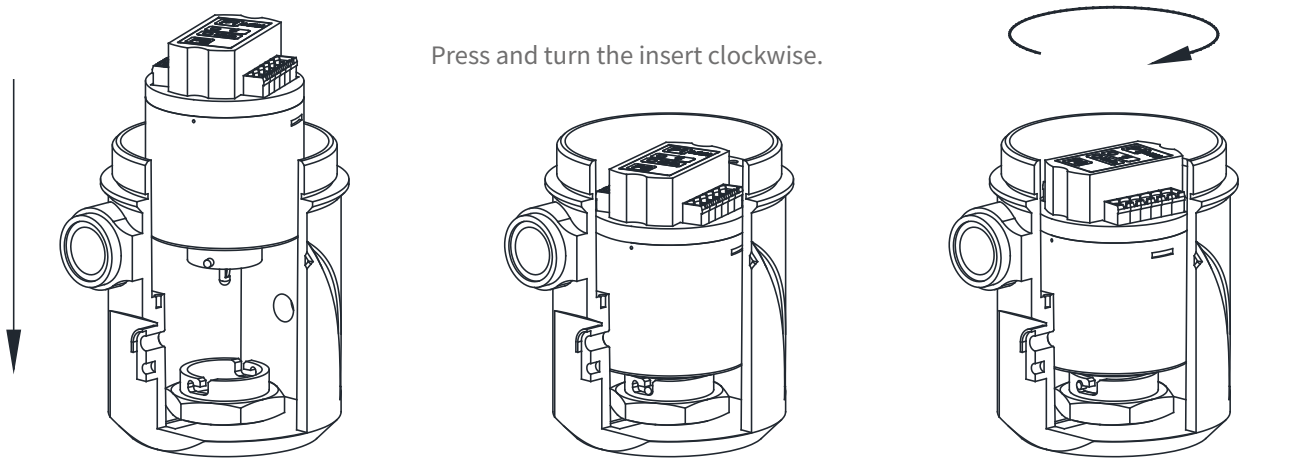
4.1.5 - CLT8



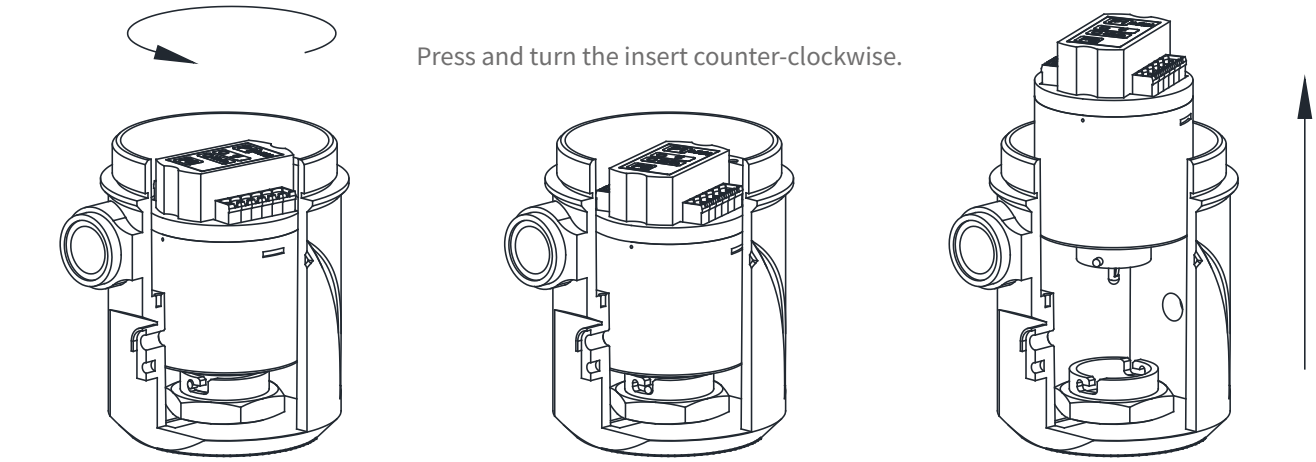
5-INSTALLATION

5.1 TC22÷30 INSTALLATION

The TC22÷30 is normally housed inside a IP67 connection head.
The bayonet coupling system means that to remove the TC22÷30 electronic insert from the connection head, simply pull out the electrical connectors, press and turn the insert counter-clockwise.
Turn clockwise in order to secure to the connection head.
No screws or conventional coupling system is required.
Important! Screw the cover and cable glands tightly to prevent water ingress and ensure IP67 protection.



Press and turn the insert clockwise.

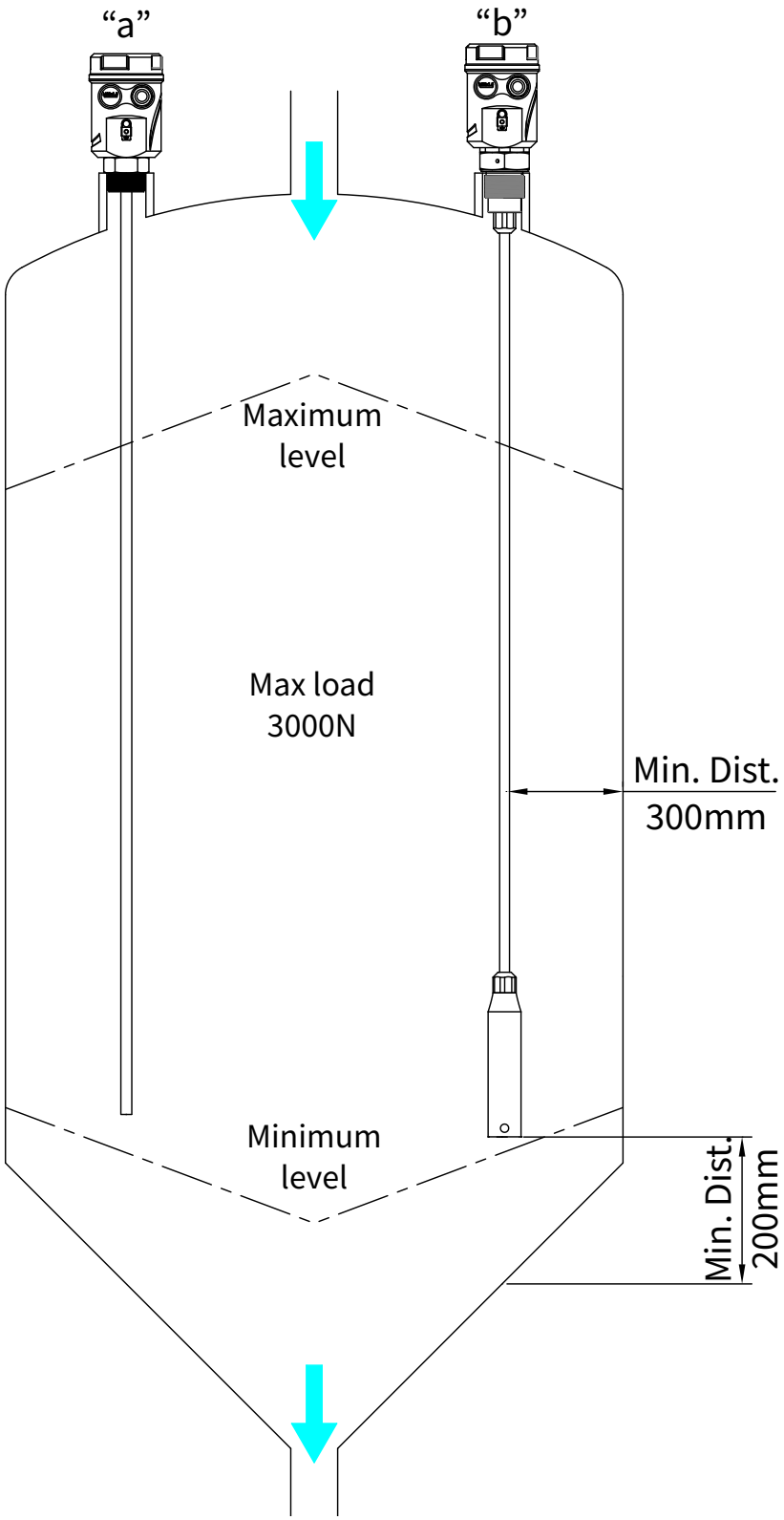


Press and turn the insert counter-clockwise.

5.2 - PRECAUTIONS FOR INSTALLATION

5.2.1 - CORRECT INSTALLATION

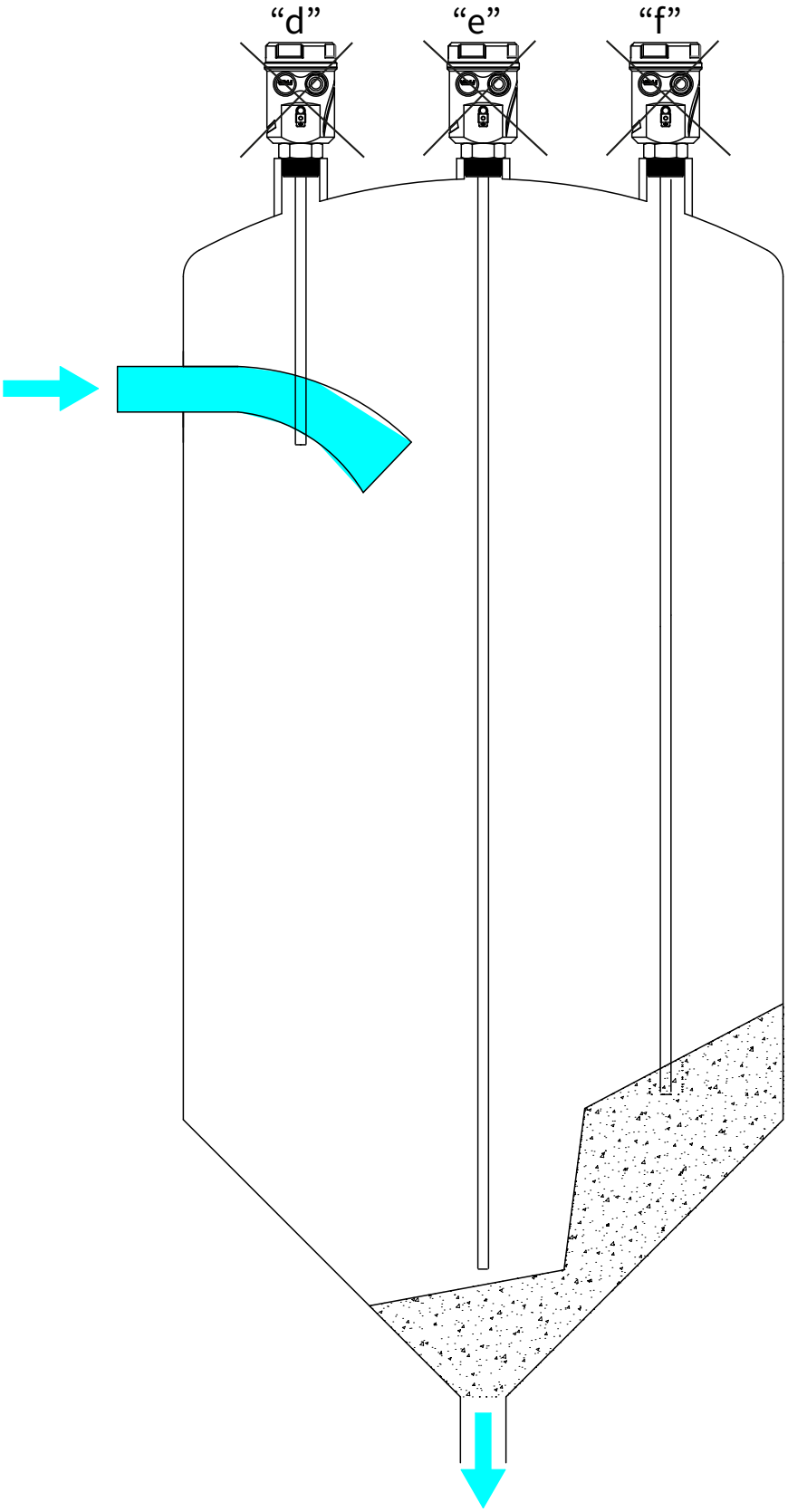
Correct installation of CLT sensors to level measurement. To avoid triggering problems, follow the instructions below:
- Install away from loading zones and keep a minimum distance of 300mm from the walls of the tank.
- When ordering, select the length of the rope that allows the sensitive element to be positioned at least 200mm from the bottom of the silo.



5.2.2 - Incorrect installation

Incorrect installation of CLS sensors:

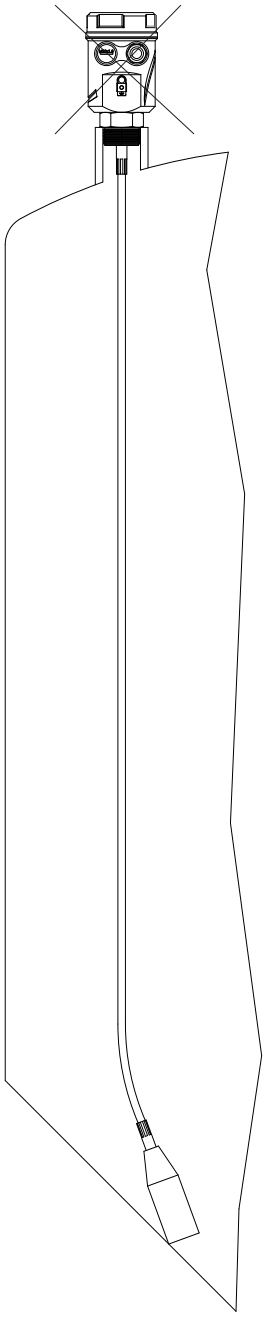
- do not install near loading zones (d); false level signals may be generated and the CLT sensors may be damaged by the pouring in of the material.
- do not install at the centre of the tank loading point (e); the CLT sensors and/or ceiling of the tank may be damaged and eventually break the rode of the CLT sensors, due to the elevated mechanical stress created in this point.
- do not install in places where product accumulation can occur (f); CLTs can get stuck in the false level measurement condition.



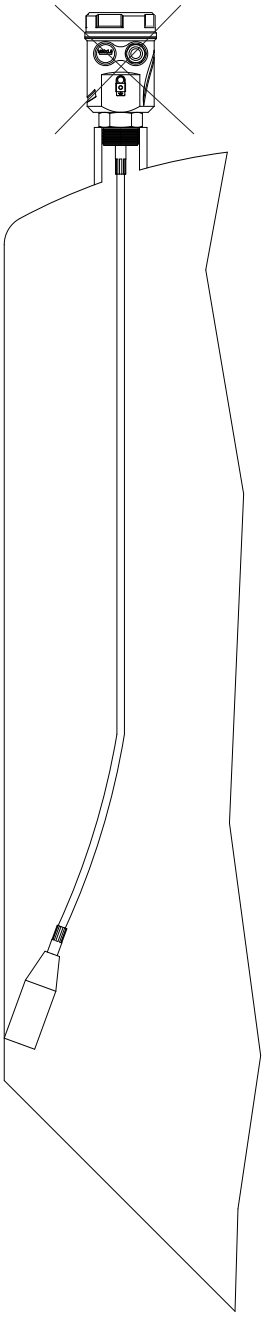
5.2.3 - Rope

Bent rope (h-i)
The rope must be straightened (l) to prevent the sensitive element from touching the silo wall, because, in this case, a false level measurement would be transmitted.

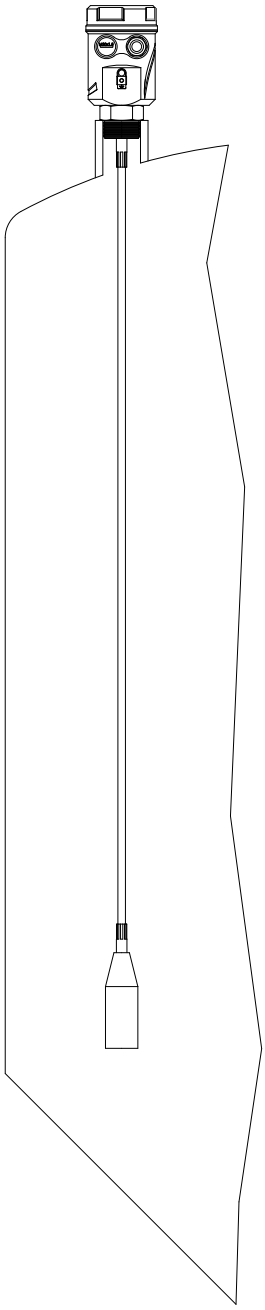
“h”



“i”



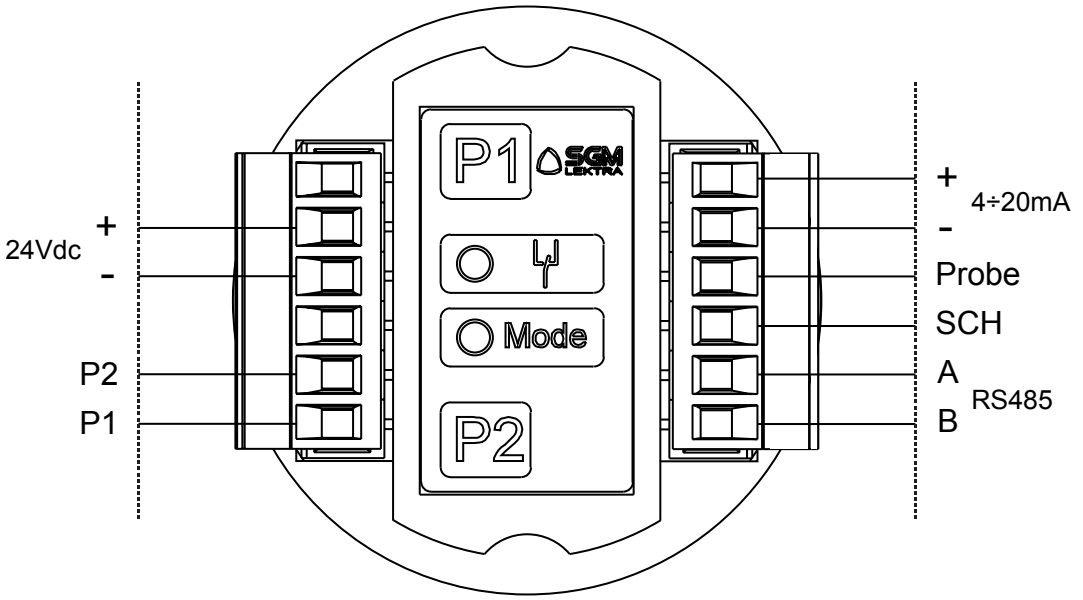
“l”



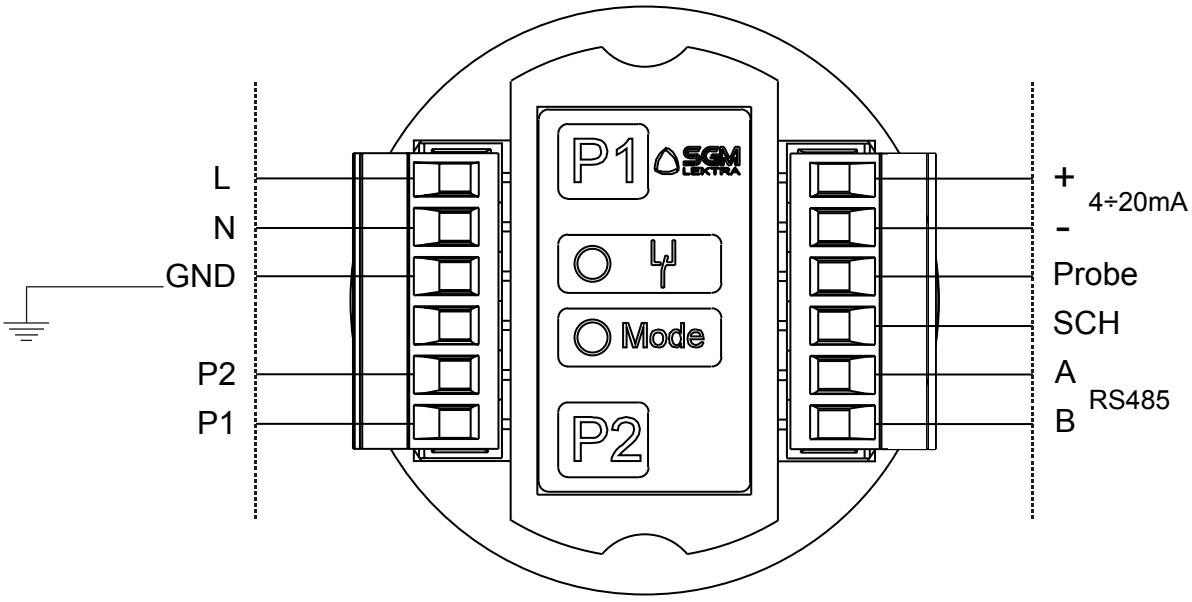
6-ELECTRICAL CONNECTION

6.1 - CONNECTIONS

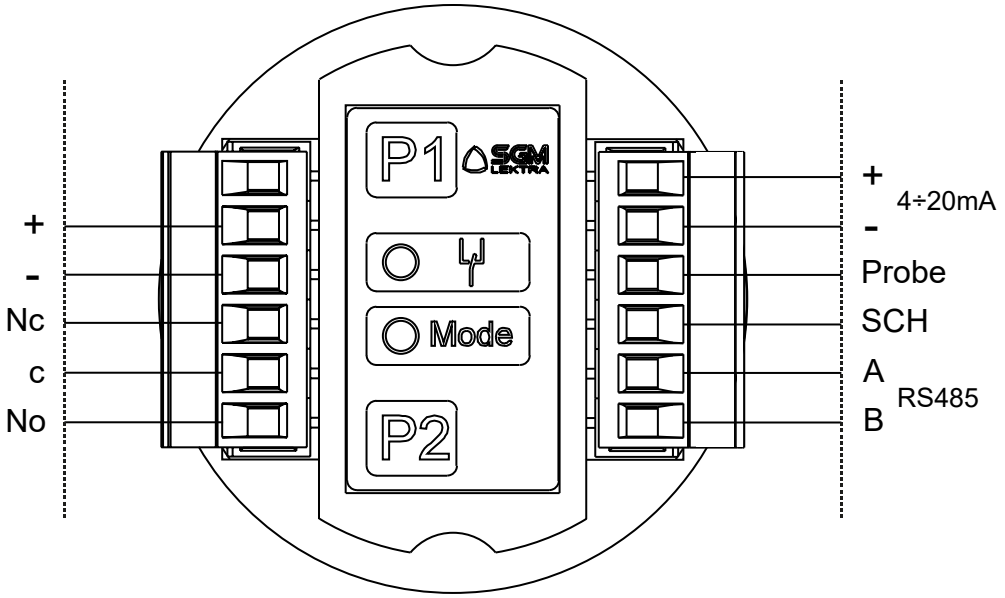
The TC22÷30 capacitive transmitter, depending on the model, can be powered in direct or alternating voltage as depicted in the following images.
The current consumption is less than 1.5W in the case of DC power supply (TC22÷26) and max 2.5W in the case of AC power supply (TC23, TC24, TC25, TC27, TC28, TC29).
The TC22÷30 capacitive transmitters are housed inside the connection head of the capacitive sensors; unscrew the cover of the latter to access the insert connections.
The electrical connections must be made with multi-wire cable of the appropriate diameter to guarantee the mechanical seal of the cable gland.
No special cables are required for the compact version, and there are no practical connection limitations.
For the TC22÷26 model, take into account that the negative of the power supply is in common with the negative of the current output.
For models TC23, TC24, TC25, TC27, TC28, TC29 the current output is galvanically separated from the power supply.



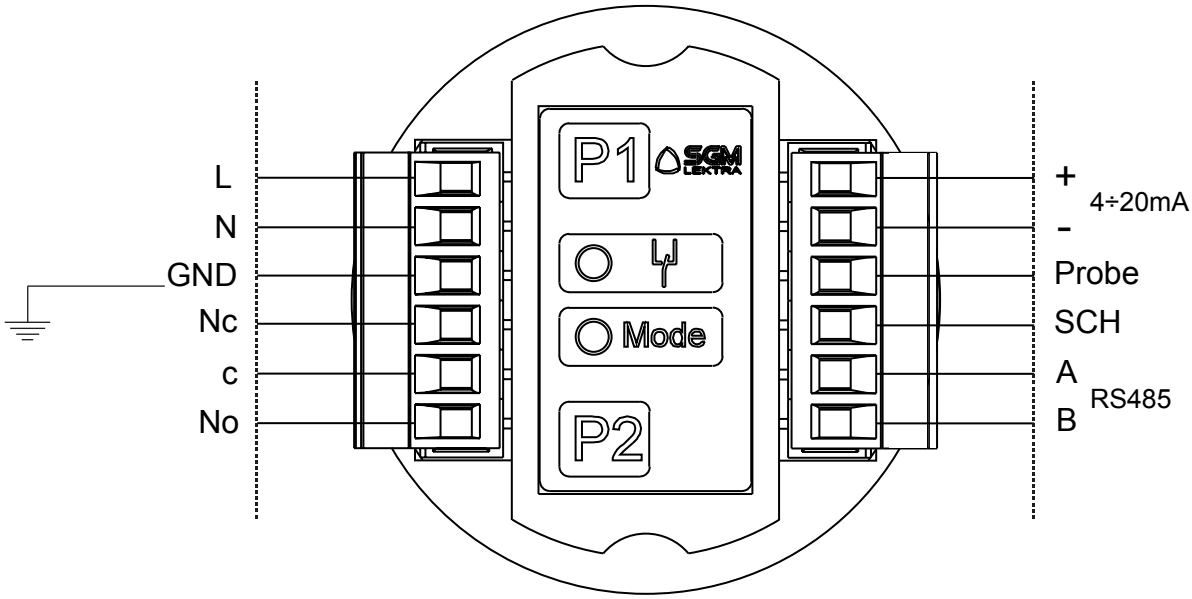
TC22 24Vdc



TC23 24Vac **TC24** 115Vac **TC25** 230Vac

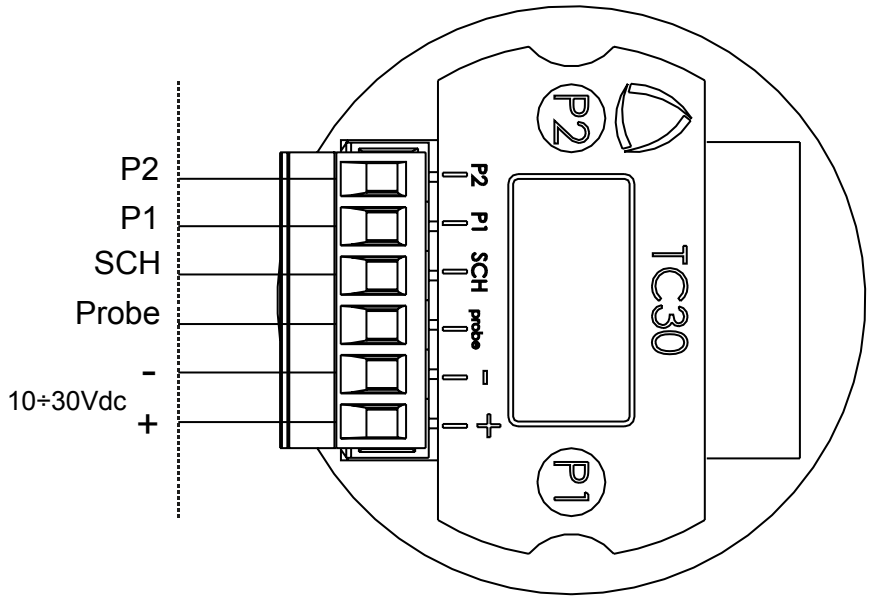


TC26 24Vdc



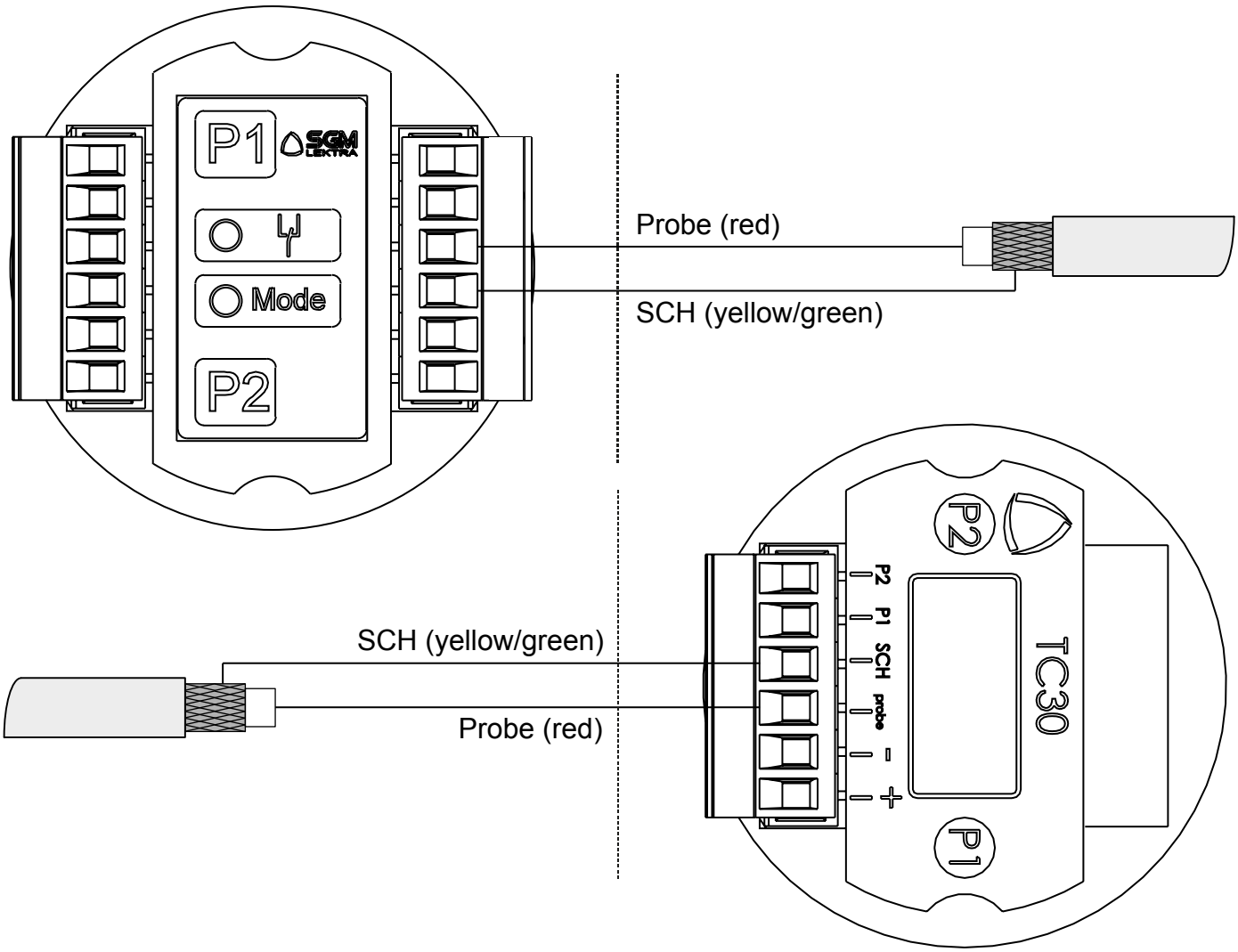
TC27 24Vac **TC28** 115Vac **TC29** 230Vac

The TC30 capacitive transmitter can be powered with a continuous voltage from 10 to 30Vdc max.
The level measurement is converted into a 4-20mA signal on the same power wires.
The TC30 capacitive transmitters are housed inside the connection head of the capacitive sensors, unscrew the cover of the latter to the connections of the electronic insert.
The electrical connections must be made with cable of the appropriate diameter to guarantee the mechanical seal of the cable gland. No special electrical connection cable is required for the compact version, and there are no practical connection limitations.



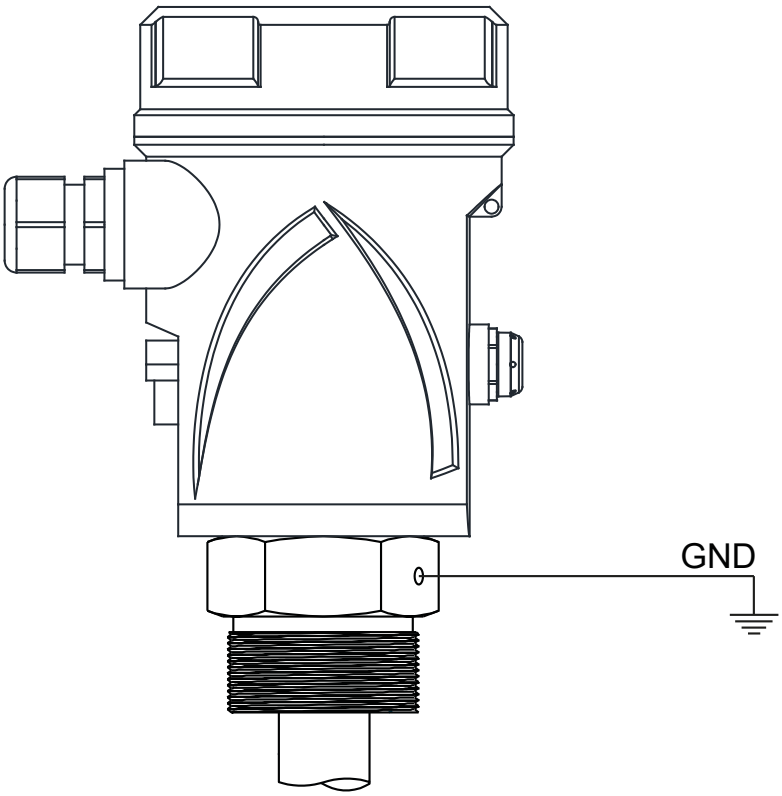
6.2 - ELECTRICAL CONNECTIONS OF THE TCXX SEPARATED FROM THE ELECTRODE

The image below shows the connection of the coaxial cable for the probes with the electronics separated from the electrode.



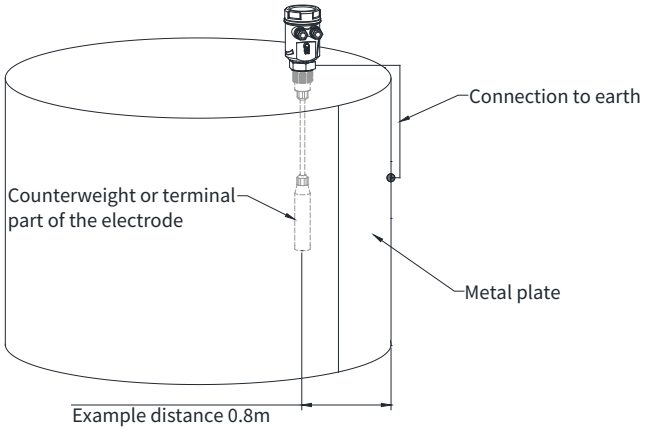
6.3 - EARTH CONNECTIONS ON PROBE

Connect the measuring probe to the tank earthing (equipotential connection).
A special electrical terminal is located on the side of the enclosure or on the mechanical connection to the process.
With this connection you also obtain the ground connection and the dispersion of electrostatic charges.



6.3.1 - Tank or silos made of non-conductive material

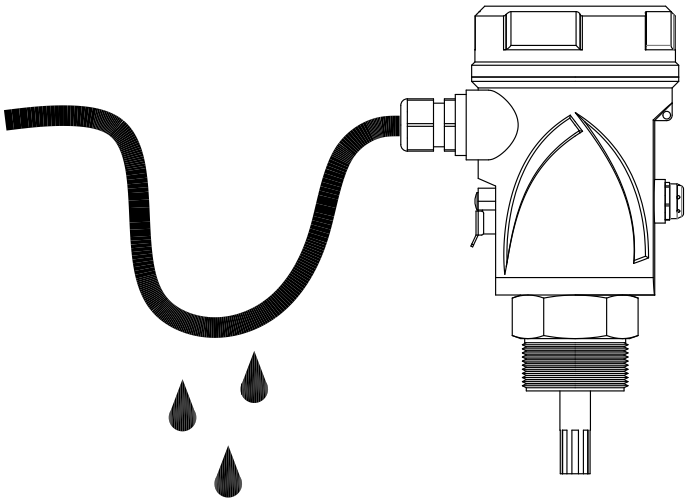
When the CLT probe must be installed on the top of a tank made of non-conductive material, it will be necessary to apply a metal plate to the outside of the tank to create the mass reference, positioning it over the entire height of the tank.
The surface of the plate must be directly proportional to 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 area of the plate must be 0.8m².



6.4 - 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-CALIBRATIONS

7.1 - CALIBRATIONS

The TC22÷30 can be calibrated by using buttons P1 and P2 under two different procedures:

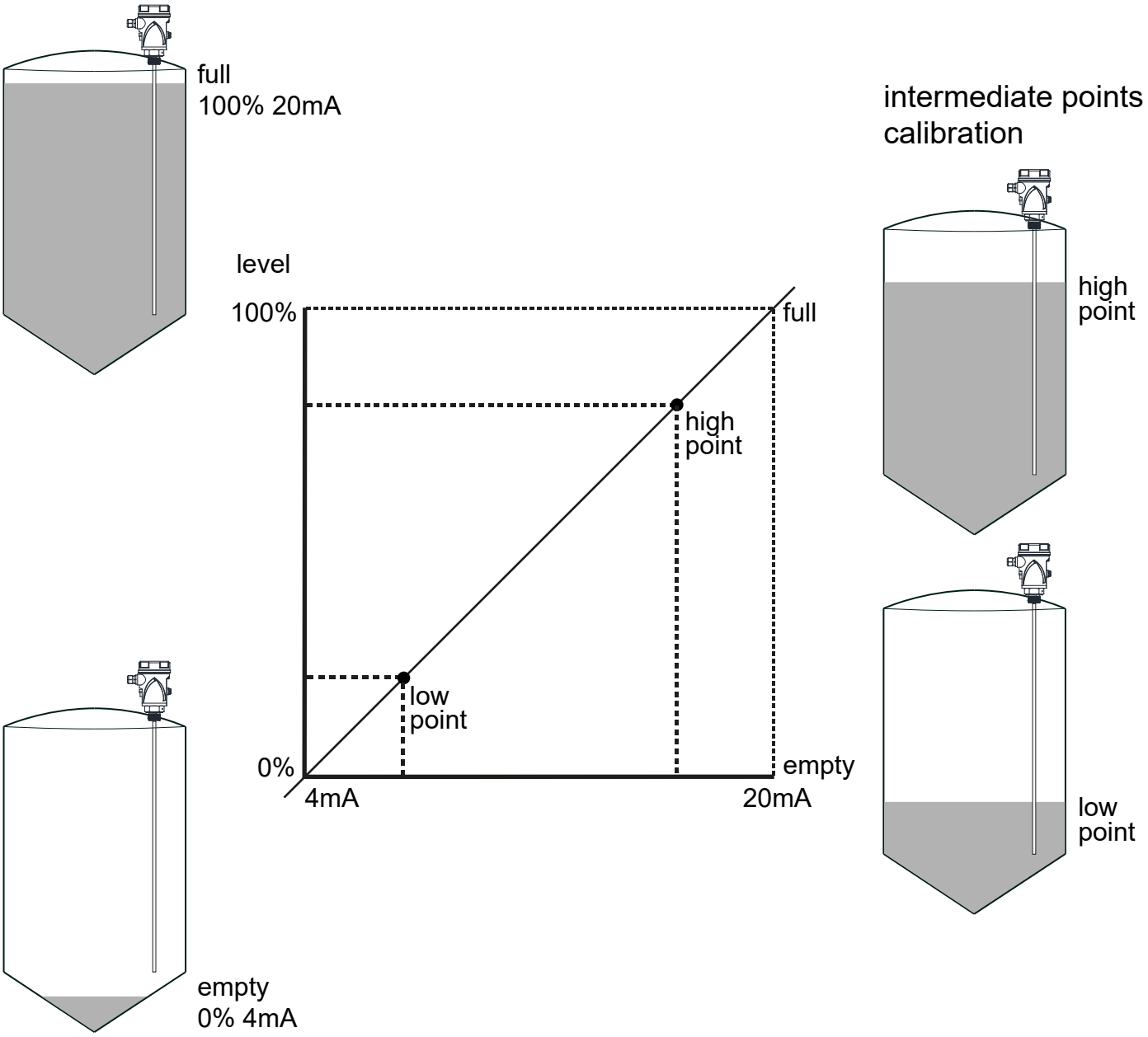
a) Full/empty calibration.

b) High point / low point calibration.

To calibrate using the two buttons P1 and P2, set up the capacitive sensor and install it in its operating state.
Depending on the filling state reaching either 0% or 100%, use the procedure described later in section 7.2 or in the event that the end of the range cannot be reached, use the procedure described in section 7.3.

Important!

Calibration can be performed first on the empty point and then on the full point, as described in the procedure above, or in the opposite way, i.e. first on the full point and then on the empty point.

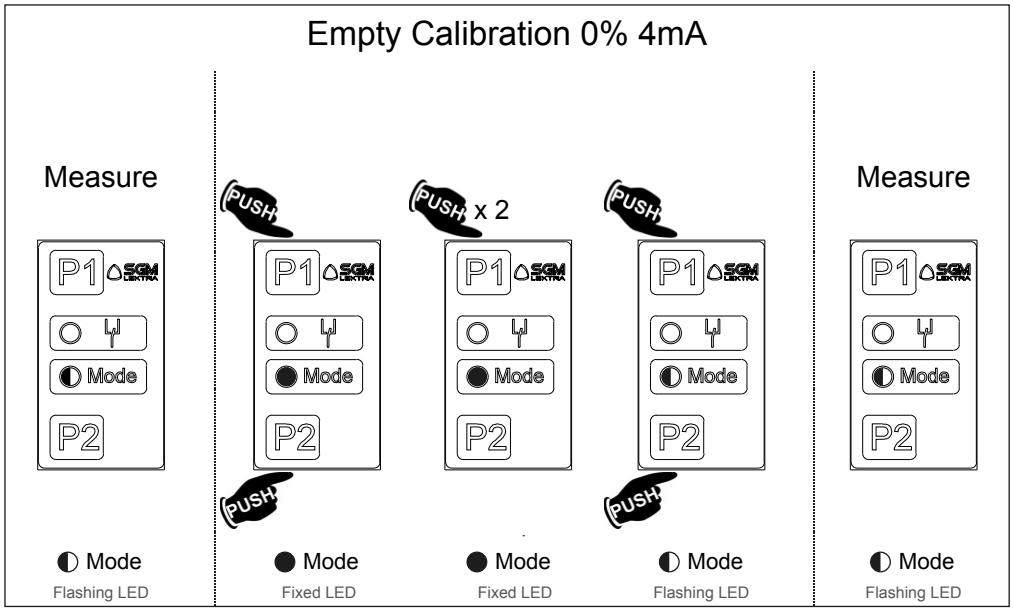


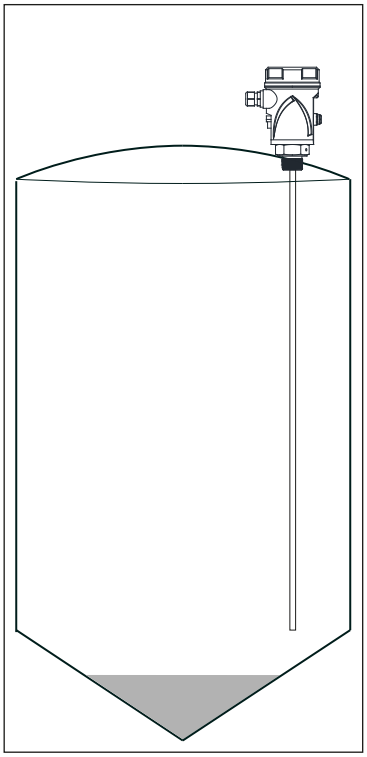
7.2 - FULL AND EMPTY CALIBRATION 4÷20mA

The TC22÷30 can be calibrated to 0% and 100% levels respectively, electronically storing the corresponding capacitances. During normal measuring operations, the “Mode LED” flashes for TC22÷29, for TC30 the digital dot on the display flashes.

7.2.1 - Calibration 0% (4mA)

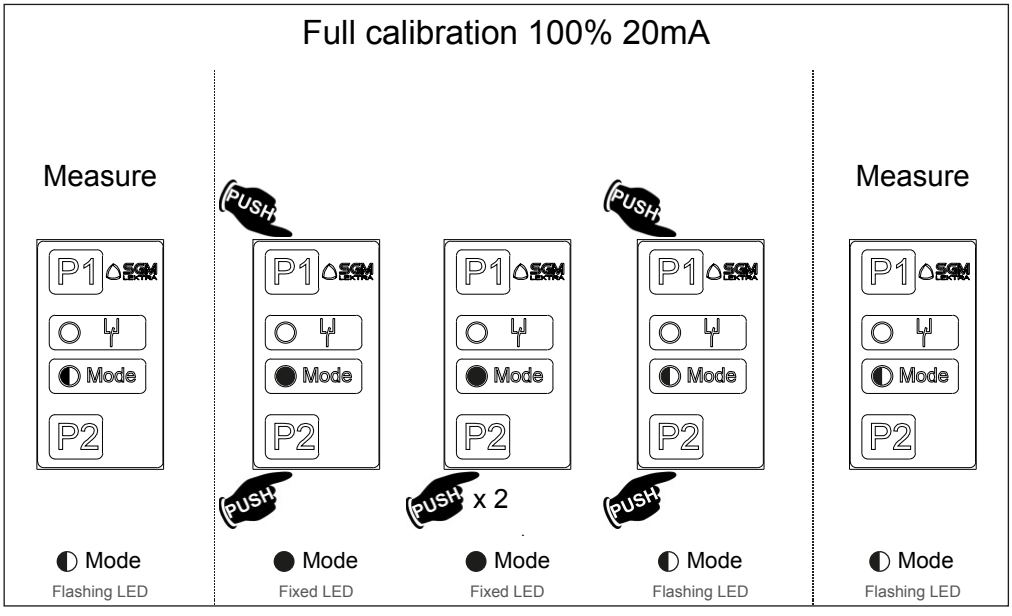
Set the actual level to 0%.
Press P1 and P2 simultaneously, release them and check that “Mode LED” is permanently lit. Press P1 twice.
The level measurement at 0% is then associated with 4mA.
Press P1 and P2 simultaneously to return to measurement status, checking that “Mode LED” flashes.

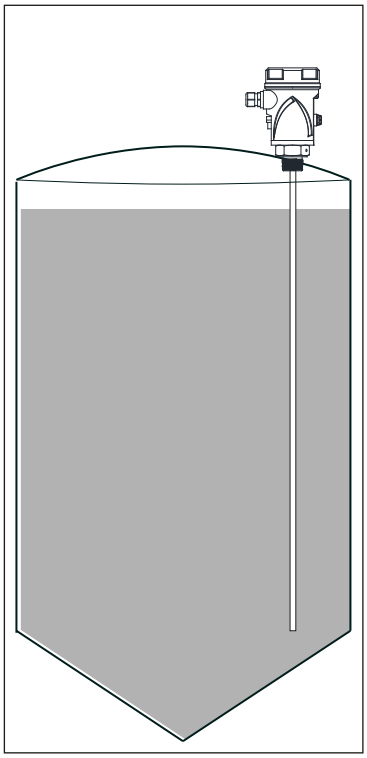




7.2.2 - Calibration 100% (20mA)

Set the actual level to 100%.
Press P1 and P2 simultaneously, release them and check that “Mode LED” is permanently lit.
Press P2 twice. The level measurement at 100% is then associated with 20mA.
Press P1 and P2 simultaneously to return to measurement status, checking that “Mode LED” flashes.

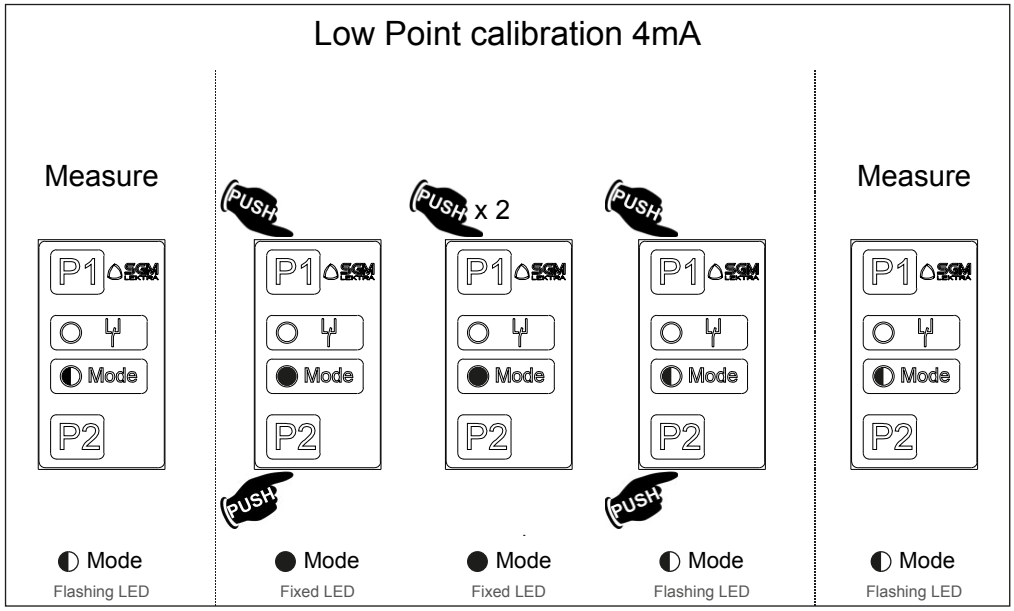


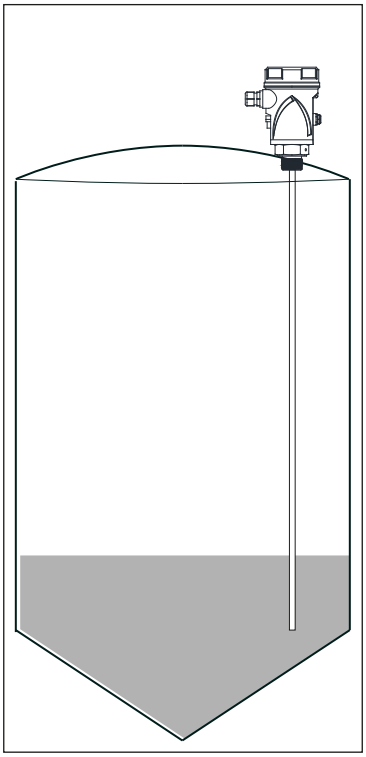


7.3 - HIGH AND LOW POINT CALIBRATION

7.3.1 - Low Point Calibration

If the fluid level can only be altered to a limited extent, calibration of the TC22÷30 is still possible.
Connect an indicator (multimeter) to the TC22÷30 4-20mA output.
Assume we need to calibrate the low point, (Lowpoint) and that the level present is at 26%
(corresponding to 8.16mA on the 4-20mA scale).
Press P1 and P2 simultaneously, release them and check that “Mode LED” is permanently lit, i.e. in calibration mode.
Press P1 twice for the low calibration point.
The measured level is momentarily associated with 0% and thus with the 4mA output current.
To reach the 26% point, increase the output current by pressing P2 several times until 8.16mA is reached,
(P1 decrease the value).
When the current value corresponding to the calibration point has been reached, press P1 and P2 simultaneously to save and exit calibration mode and return to measurement mode (Mode LED flashing).

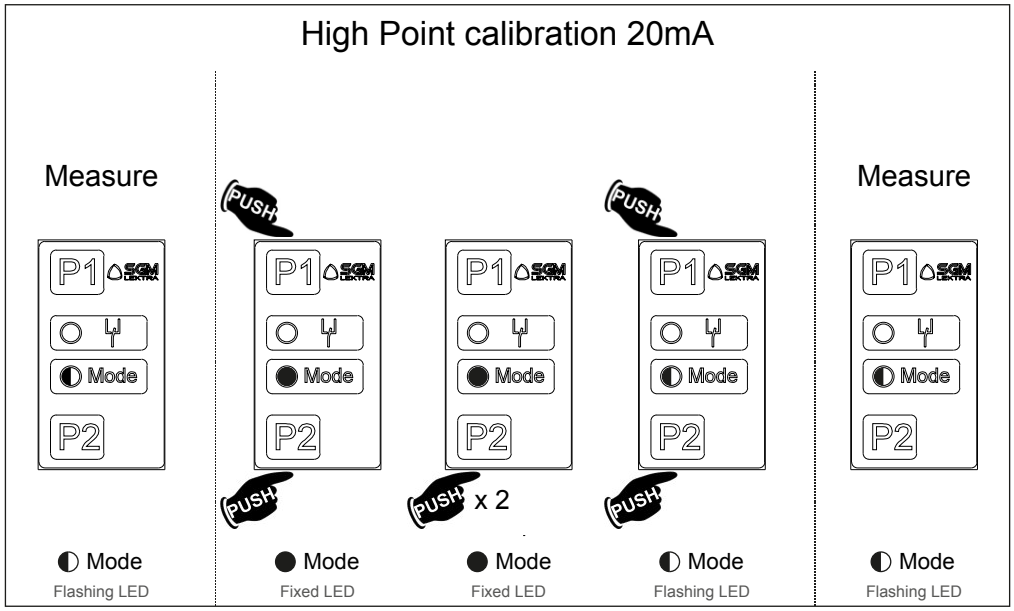


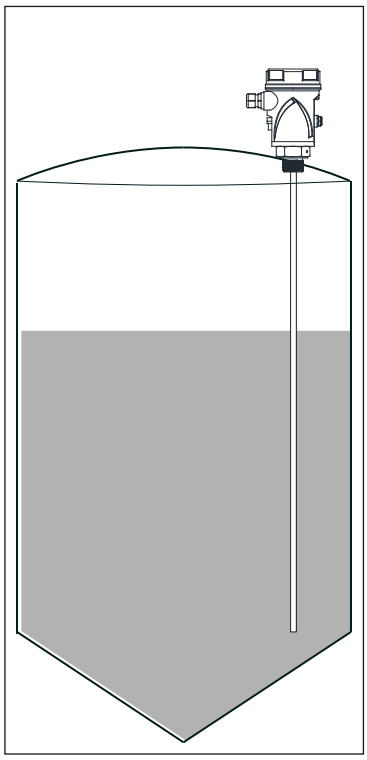


7.3.2 - High Point Calibration

To calibrate the high point, increase the level as much as possible, e.g. 58% (13.28mA), then press P1 and P2 simultaneously, “Mode LED” will be permanently lit.
Press P2 twice for High-point calibration.
The current output is momentarily set at 20mA (100%).
To reach 58%, press P1 several times until 13.28mA is reached, (P2 increases the value).
When the value is reached, press P1 and P2 simultaneously to store the high point and return to measurement mode (Mode LED flashing).

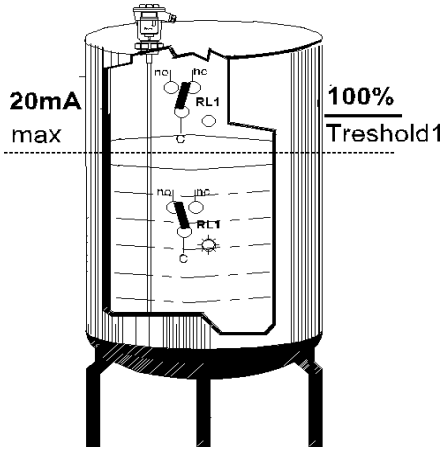
Important!
Calibration can be performed by storing the low-point fi rst and then the high-point or with the high-point fi rst and then the low-point.

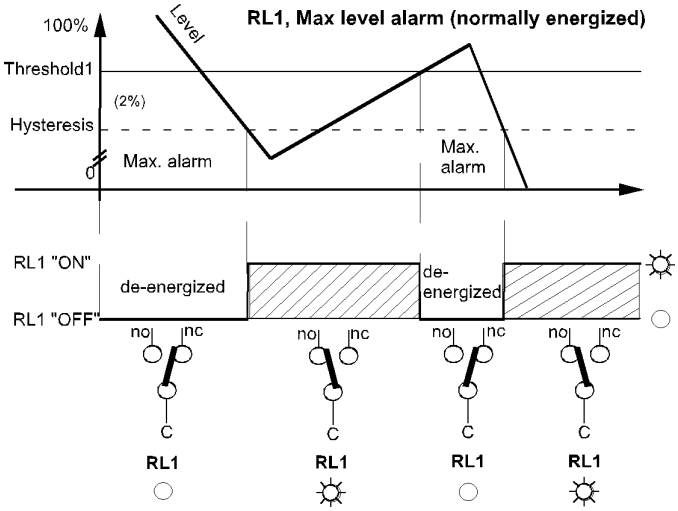




7.3.3 - Relay threshold calibration (TC26÷29 only)

The TC26-9 relay operates as a maximum level (threshold1).
This configuration is default factory-programmed and can be changed via the RS485 port and the “TC” communication s/w. For further information, refer to the related technical documentation”.
Per To calibrate maximum level threshold1, set the product level to the point at which you want the maximum level threshold to be triggered, then press P1 and P2 simultaneously, release them and check that the “Mode LED” is permanently lit, press P2 and then press P1. “Mode LED” will resume flashing to indicate measurement mode.
The maximum level threshold has been saved.
Status of contacts above and below the threshold.





8-SEPARATE VERSION WITH MOUNTING BASE

The **R** and **S** versions of **CLTX** capacitive probes have an aluminium base to mount the housing and connect the coaxial cable from the electrode.

To connect the coaxial cable, proceed as follows:

A - Unscrew the 4 screws at the bottom of the base

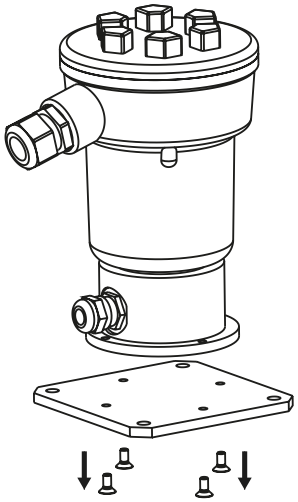
B - Rotate the housing to access the inside of the aluminium base

C - Connect the red wire to the centre connection point (electrode signal) and the yellow-green wire to the side connection point (cable shield)

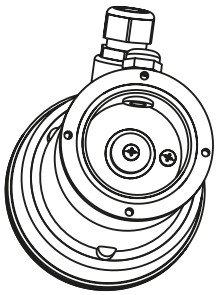
D - Tighten the 4 screws at the bottom of the base

E - Tighten the cable gland

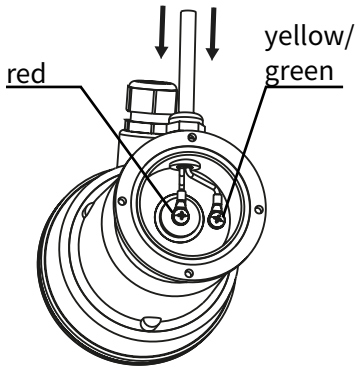
F - Secure the housing



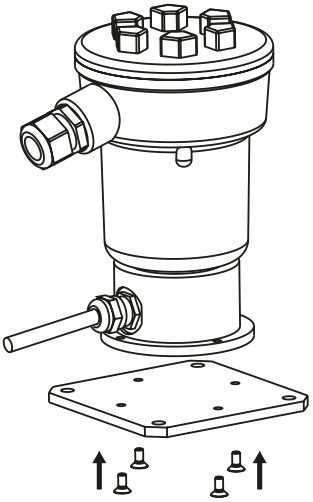
A



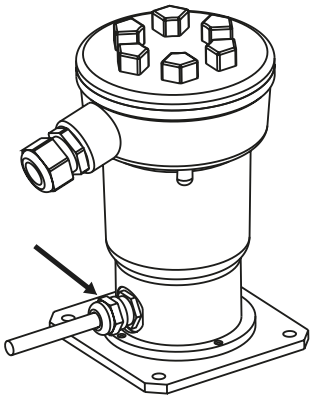
B



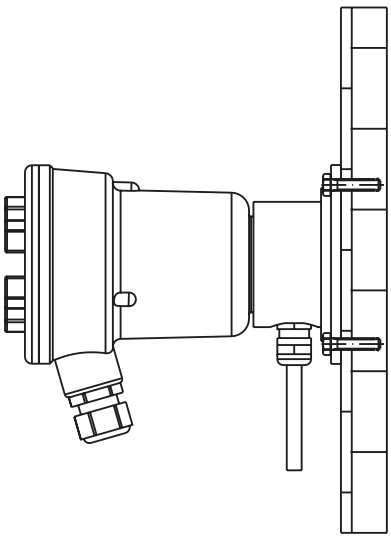
C



D



E



F

9-ACCEPTANCE TESTING/QUALITY CERTIFICATE

CE

In accordance with production and testing procedures, we hereby certify that the instrument:

(electronic insert)	(capacitive probe)

satisfies the technical characteristics mentioned in the TECHNICAL DATA paragraph and complies with the construction procedures

Quality control manager: ..... Date of manufacture and testing: .....

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