



451\_5XY\_04\_E\_man Rev. 1 del 21.03.11

## Continuous level transmitter for H temperature, series 451

### INSTRUCTION MANUAL - English

Thank you for purchasing 451 series level transmitter.

Before using the device, please read carefully this manual, and keep it in a safe place, for future use.

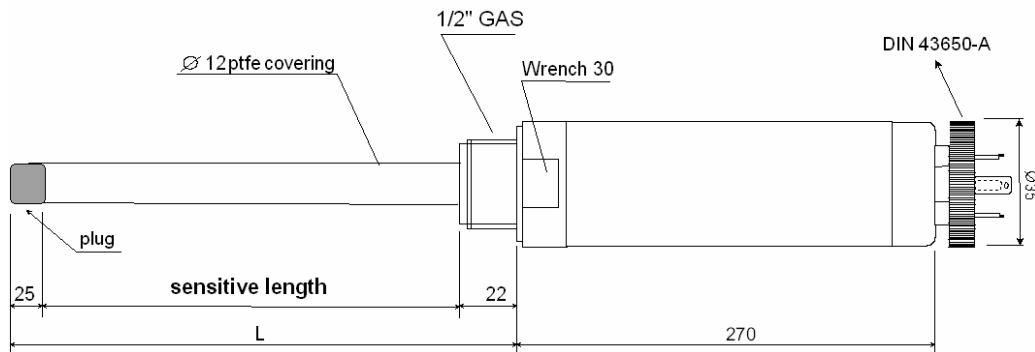
#### 1 - Description

**451** series are capacitive continuous level transmitters for solid and liquid materials. The material to be controlled can be good electric conductor, or insulating, like water, oil, diesel fuel, powders in general. They cannot be used with inflammable liquids, but they can be used with diesel fuel at  $T < 55^{\circ}\text{C}$ .

Rugged and compact, the **451** series give an output current signal, proportional to the product level, with 3 wire connection.

#### 2 - Technical characteristics

• dimensions are in mm:



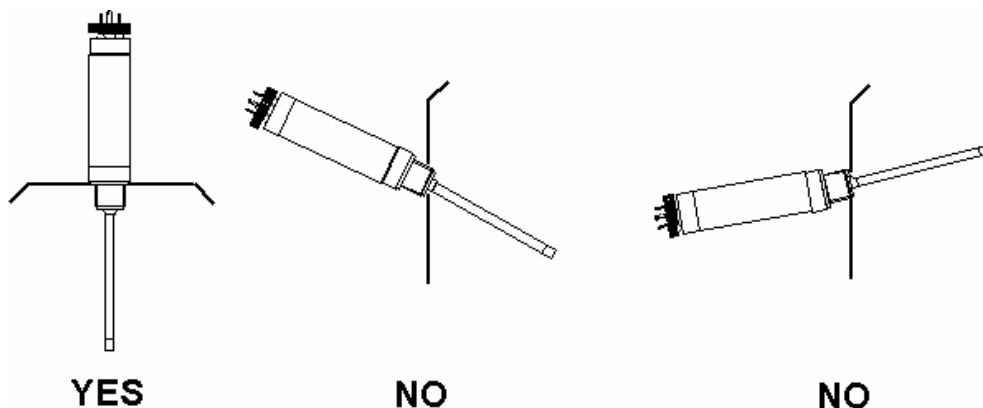
Drawing #1

- Power supply: 24V d.c.  $\pm 10\%$
- Output Voltage (only for test): min 1V  $\div$  max 12 V [instantaneous, not calibrated]
- Output Signal: 4 $\div$ 20 [mA] [calibrated, with 3" delayed] R max: 250 omh
- absorption: 0.9 VA
- thread: 1/2" gas
- electric wiring: DIN 43650-A
- weight: 1500 g [ per L = 1000 mm]
- temperature: 210  $^{\circ}\text{C}$  on the electrode
- plug: 25mm not-sensitive end, at the bottom
- protected against power supply reversal
- covering 3mm thick PTFE food compliant
- stainless steel body
- pressure  $\leq 18$  bar
- precision: 0,5% f.s. after calibration, at 25 $^{\circ}\text{C}$
- working: once the transmitter has been installed, it generates a normalized 4 $\div$ 20 mA d.c. signal proportional to the material level in the tank, with 4mA probe covered for 1.5% of the length and 20mA with probe covered for 99% of the length.

#### 3 - Installation and use

##### 3.1 - Mechanical assembly

• The transmitter must be installed according to the following drawing:



Drawing #3



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Consider the thermal stretch of the PTFE coating that, at 210°C, is  $20 \div 30$ mm.

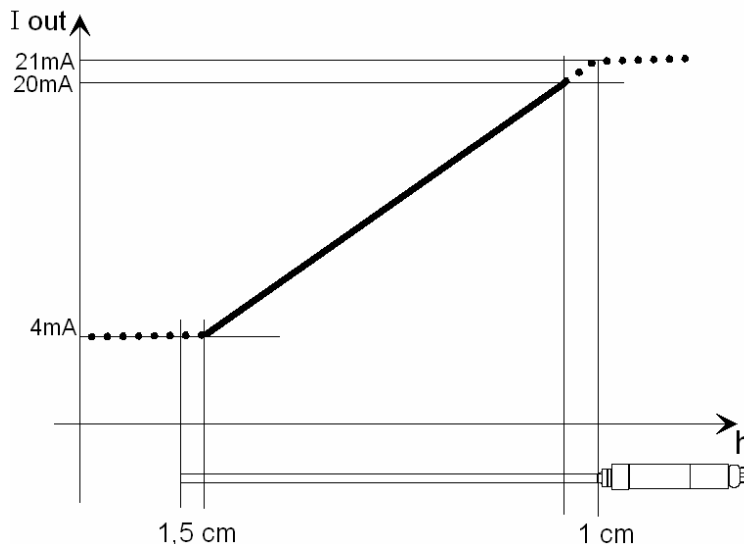
For the management of the output signal with a regulator or PLC consider current values (mA) read during normal use condition.

The transmitter must be mounted in the tank, in vertical position, so that the tank sides aren't in contact with the probe.

The minimum measurement level (4mA) is about 1,5% of the probe height.

The maximum measurement level (20mA) is about 99% of the probe height.

The following drawing is an example for 1m long probe.



### 3.2 - Electric wiring

- **Before powering the device, be sure that the power supply voltage is in the range 24 V d.c  $\pm 10\%$  .**
- Wire the transmitter to the power supply and to the current loop receiver, according the following drawing (3-wire connection):  
It is recommended the use of a shielded cable, especially for long distances.  
The maximum current loop load is 250 $\Omega$ .

#### In the case of metallic tank

Do not interpose flange or electric insulating gaskets (like PTFE) between the thread  $\frac{1}{2}$ " of the probe and the surface/body of the tank; the ground of the tank must be in contact with the thread  $\frac{1}{2}$ " of the probe. Anyway, connect electrically the terminal GND of the transmitter with the tank ground.

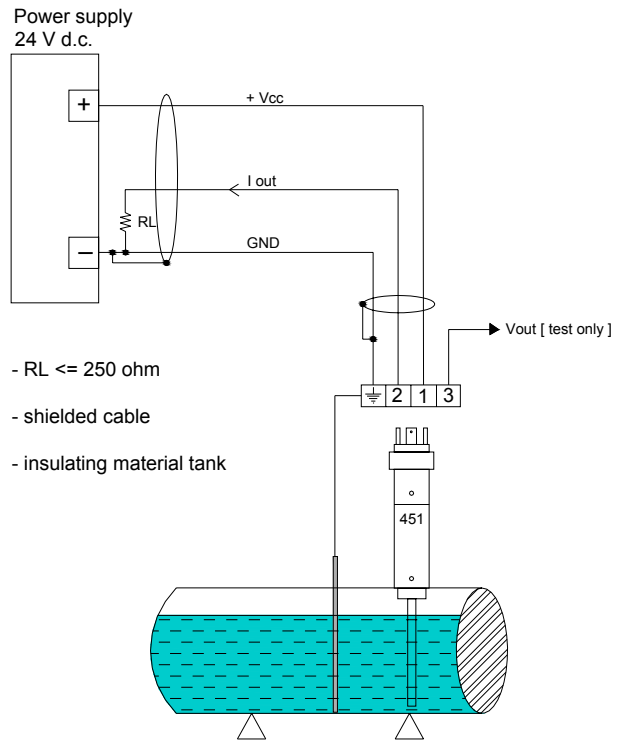
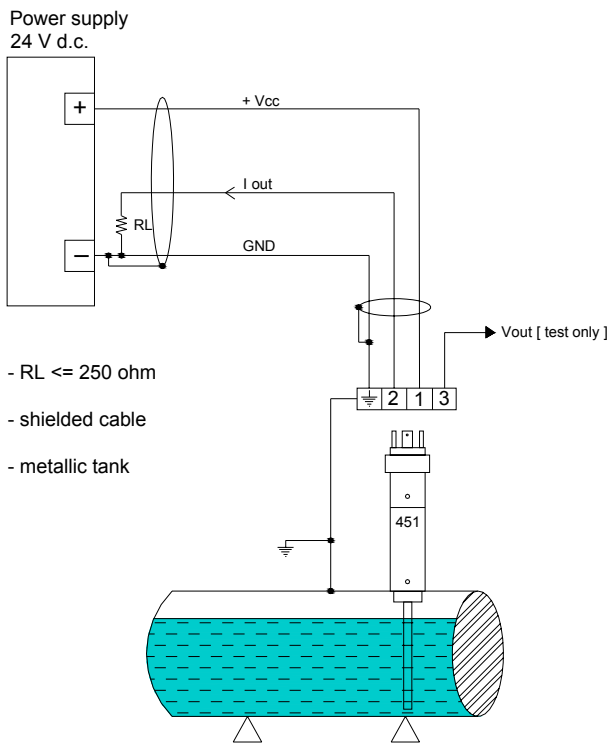
#### In the case of insulating material tank

You must insert inside the same tank a metallic electrode (good electric conductor) that has to be always in contact with the material to be measured, also to the least desired level; this electrode must have the same length of the probe and diameter 4mm, and must be electrically connected to the terminal GND of the transmitter.

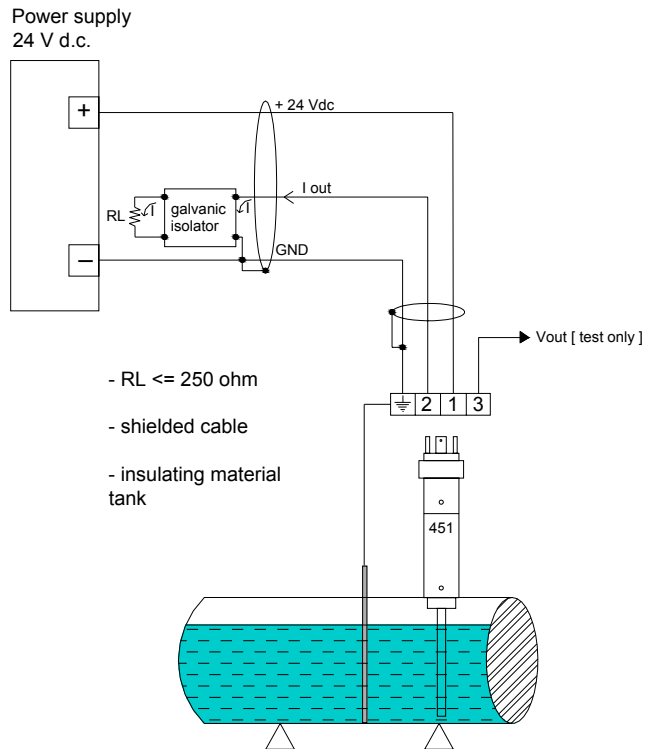
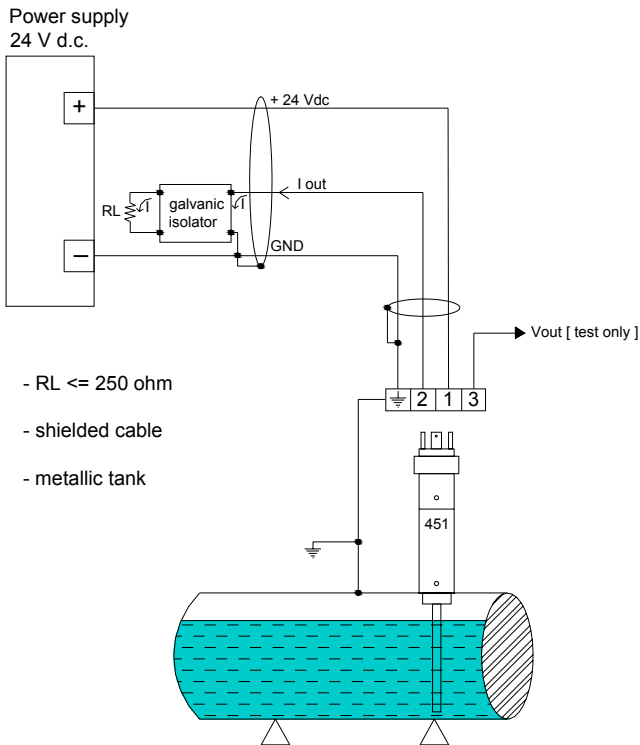


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### 3.3 - Wiring diagram for user not galvanically isolated



### 3.4 - Wiring diagram for user galvanically isolated





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#### 4 - Notes and troubleshooting

- Don't touch the sensitive part of the probe with hands or other objects.
- It is recommended the use of a shielded cable, especially for long distances; the link cable must have a section which depends on the length: for cables up to 100 m long, 0.5 mmq; up to 500 m long, 1 mmq; up to 1 km long, 1.5 mmq [the resistance of every cable must always be lower than 15  $\Omega$ ].
- The electric connection is 3 wire, with 4  $\div$  20 mA output signal.
- Provide for periodic cleaning (usually every six months) to prevent any deposits on the Teflon coating sensor part, because this situation can cause anomalous reading of the transmitter, not corresponding to the true level of material.
- In the case of breaking of a current loop wire, the output current will be 0 mA, allowing easy service.
- In case of breaking of the covering in PTFE, the current can reach the maximum value overcoming 20mA, allowing one elementary diagnostic of the transmitter. The electronic part doesn't broken, but the covering in PTFE must be replaced.
- The probe must not be immersed in liquids with turbulence: this situation can cause anomalous reading of the transmitter, not corresponding to the true level of material.
- In the case of conductive liquids, like water, the probe must do not be coated with the material in its not immersed height, for example water drop or spray: this situation can cause anomalous reading of the transmitter, not corresponding to the true level of material.
- In case of irregular working, check the power supply and ground wiring; if is ok, disconnect the output of the transmitter from the user load and temporarily connect through a 250  $\Omega$  – 1/4W resistor to ground: verify that the voltage reading in parallel to that resistor changes from 1V to 5V, according to the level of the material covering the probe. Using a good digital dc mA meter it is possible to measure directly the output current, 4 $\div$ 20 mA.