

Mobrey CLT-ISOL-24

General information

The transmitter CLT is a solid state amplifier, which measures capacitance and gives a continuous 4-20 mA current output directly proportional to the capacitance. An oscillator in the measuring circuit changes its frequency with the capacitance. Increasing capacitance leads to a lower oscillator frequency. Normally the capacitance input is sourced from a suitable probe, designed to measure the level of a liquid in a tank.

Applications

The CLT is suitable for measuring level in all conductive liquids as well as non-conductive liquids with dielectric constant >2, provided the probe used is suitably designed and fitted to the tank. The transmitter in its robust IP65 aluminium box is designed to be mounted in the field close to the probe, which will fit almost any kind and size of tank. The system will accurately measure the level of the liquid with a measuring span from 50 millimeters to several meters if necessary.

Typical uses include pressurized and non-pressurized water tanks like boilers, expansion vessels, tanks for feedwater, condensate, freshwater, wastewater etc. Other uses are chemicals, oil and fats, paint, foodstuff and many more liquids.

Easy to use

The CLT has no potentiometers, it is μ P-based and uses 3 buttons, one SET and two UP/DOWN keys for setting the measuring range. It has a non-volatile E²PROM, which doesn't need battery back-up. Once it has been set up it won't forget its calibration and it won't change in years and years to come!

Power requirements

The CLT is a 3-wire 24 VDC-powered device with an isolated 4-20 mA output. The current consumption is 100 mA maximum.

Output

The output is isolated from the 24 VDC supply and also from the probe input. This ensures that the CLT will always produce perfect results at all times without any risk of permanent or intermittent signal deterioration because of earthing problems. However, the same 24 V supply can be used to power the transmitter and the 2-wire output. This is normally the case.

Reversed output 20-4 mA

Sometimes the application calls for a decrease in output current as the level rises (increasing capacitance). This is easily accomplished with the CLT, which allows the "zero" setting to be larger than the "span" setting thus inverting the output.

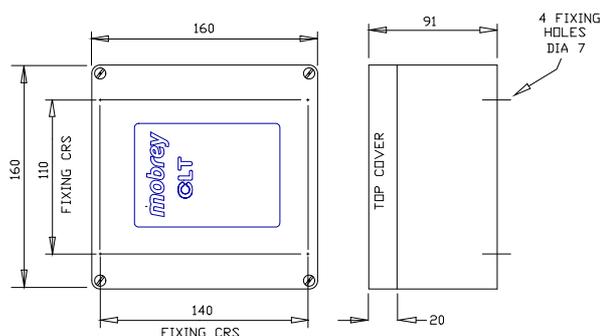
Sensor cable

The cable between the CLT and the capacitance probe is a triaxial cable, where the outer screen is used for connection to ground and the inner screen screens the centre electrode wire. Keep the cable length as short as possible, length over 5m is not recommended.

The CLT is designed to suppress the cable capacitance, which otherwise would be added to the measured capacitance.



Dimensions

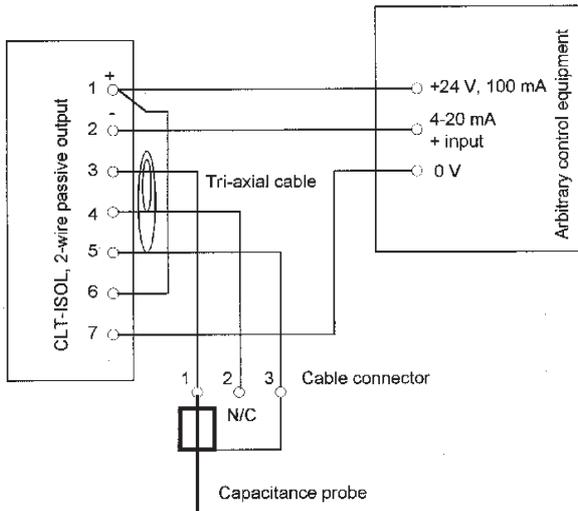
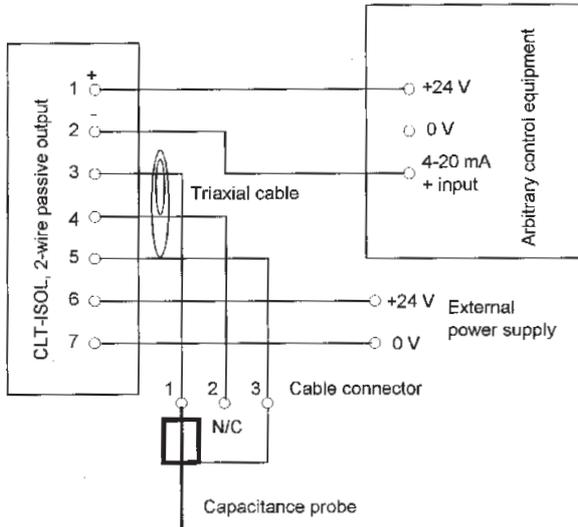


Wiring details

TERMINAL

1	2-wire output 4-20 mA +
2	2-wire output 4-20 mA -
3	Capitance input (probe)
4	Screen (inner)
5	Screen (outer), signal ground
6	+24 V supply (14-32 V), 100 mA
7	0 VDC

Typical wiring



Calibration

Follow the steps below:

1. Take off the lid to the CLT box.
2. Connect a mA-meter to the red (+) and black (-) test jacks on the circuitboard.
3. Adjust the level to somewhere below 30 % of maximum. Now decide what current this represents (see formula below).
4. Press the red SET-button for 1-2 s and then release it. The actual capacitance value sensed at this level is now stored in memory. The built-in LED will flash and the current reading will become unsteady.
5. Now press either the up (+) or down (-) button and release it. The LED goes out and the current will freeze on some current value (= the latest calibration).
6. Using the ± buttons adjust the output current until it corresponds to the set level as decided in paragraph 4 (the smallest step is 0.06 mA).
7. Press the SET button again. The new low level calibration point (capacitance versus current) is now stored in memory. The LED now signals double flashes, the current is again unstable and the CLT is ready to calibrate the span point.
8. Raise the level to 70 % or more of maximum level. Decide what the corresponding current value shall be (use the formula below).
9. Press either the + or - button for 1-2 s and release it. The LED goes out, the current stabilizes on the last current calibration value.
10. Adjust the current output using the ± buttons so that it corresponds to the set level as decided in paragraph 9 (smallest step 0.06 mA).
11. Press the SET button. The LED gives a long flash to indicate "All set". The new high level calibration point is now stored in memory.
12. This concludes the calibration procedure. The CLT now calculates the current output linearly in relation to the measured capacitance, which changes linearly with the level.

Note: If at any time, only one of the calibration points needs to be changed, this can be done by skipping over the other point by pressing the SET button.

* Formula:

$$\text{mA} = 4 + \frac{x \cdot 16}{100}; x = \% \text{ level}$$

E.g. $x = 30\% \rightarrow \text{Corr. current} = 4 + 0,3 \cdot 16 = 8,8 \text{ mA}$

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