

**Operating Instructions  
for  
Capacitive Level Monitor  
for Liquids**

**Model: NCW**





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## 2. Note

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Please read these operating instructions before unpacking and putting the unit into operation. Follow the instructions precisely as described herein.

The devices are only to be used, maintained and serviced by persons familiar with these operating instructions and in accordance with local regulations applying to Health & Safety and prevention of accidents.

When used in machines, the measuring unit should be used only when the machines fulfil the EWG-machine guidelines.

## 3. Instrument Inspection

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Instruments are inspected before shipping and sent out in perfect condition.

Should damage to a device be visible, we recommend a thorough inspection of the delivery packaging. In case of damage, please inform your parcel service / forwarding agent immediately, since they are responsible for damages during transit.

### **Scope of delivery:**

The standard delivery includes:

- Capacitive Level Monitor                      model: NCW
- Operating Instructions

## 4. Regulation Use

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The capacitive Level Monitor is indicated to punctual level detection in tanks containing liquids.

There are 4 basic models:

NCW-N

Rigid probe in PTFE, for general applications in metallic tanks.

NCW-T

Rigid probe in PTFE with stainless steel tube (ground tube). For products with a low dielectrical constant and non metallic tanks.

NCW-H

Rigid probe in PTFE with special thread made of stainless steel for high temperatures (125 °C).

NCW-S

Double rigid probe in PVDF for NON METALLIC tanks containing aggressive liquids that attack stainless steel.

## **5. Operating Principle**

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The measuring system is based on the capacitive measuring method. The measuring probe and the tank wall or the second electrode respectively form the plates of a capacitor, the medium in the tank is the dielectric fluid. The capacity depends on the medium. It is low when the measuring probe is not covered (empty tank) and it increases when the medium touches the measuring probe. This change is detected by the plug-in evaluation module and is being given out as limit value signal.

## **6. Mechanical Connection**

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### **Before installation:**

- Remove all packing materials and transport retainers and ensure that no such materials remain in the device.
- Make sure that the permitted max. operational pressure and temperature limits are not exceeded (see Technical Information)
- Protect the measuring sensor from external damage.
- The units may not be installed at a location within an inductive field.
- If possible, check directly after mechanical installation whether the connection thread to the pipe is fully sealed.

### **Installation:**

The NCW is installed using a 1" BSP, (2" BSP thread in NCW-S version)  
Check if probe's length is correct to detect the level. At the end of the probe there is a stopper to guaranty the electrode watertight.  
This part (10 mm approx.) is not sensible to the liquid.

In addition please pay attention to:

- The probe has not to be in the filling section of the tank.
- The distance between the probe and the tank's wall, in vertical mounting, must to be enough to avoid liquid accumulation.
- For side mounting, it is convenient to incline the equipment downward to avoid liquid rests on the probe.
- Check periodically that there are no product accumulations at the probe.
- If the NCW is installed outside, it is convenient to use a protective sun cover.

## 7. Electrical Connection

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### 7.1 General



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**Caution! Make sure that the voltage values of your system correspond with the voltage values of the measuring unit.**

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Please make sure, that the metallic tank is properly grounded.

The three cables of the power-supply line (L, N and earth) must be connected to the terminal of the electronic module as labelled. If the ground of the tank does not comply with the electrical ground of the cable, the electronic module should not be connected to the ground core of the power-supply cable.

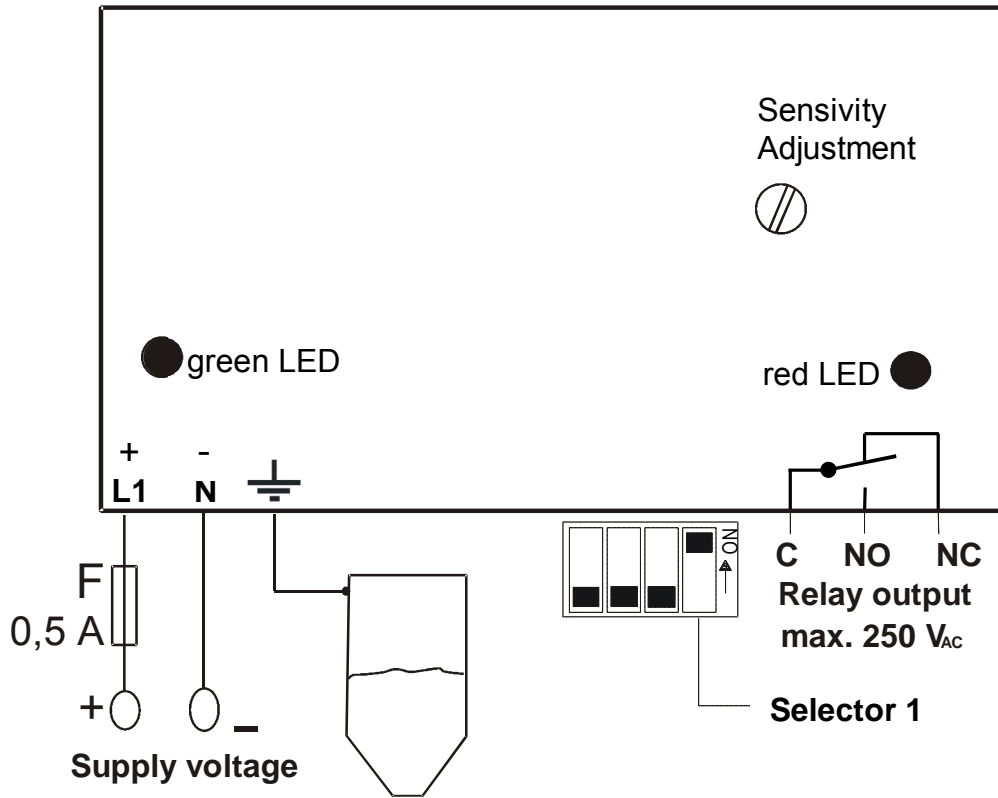
In any case for installations on metal tanks a grounding of the instrument is essential (screw at the process connection or internal connection with electronic module).

For applications on non-metallic respectively plastic tanks it is mandatory to note that the ground of the power-supply line must be connected to the electronic module. For such applications the two probe instruments NCW-T or NCW-S are used.

After successful installation the following indicating lights are available:

- Green LED to display, that the NCW is connected to a power-supply
- Red LED to display, that the output relay is activated

With the DIP switch 1 the position of the relay for a covered probe can be inversed. The other DIP switches (2, 3 and 4) are used for the adjustment of the sensitivity of the probe.



## 8. Operation

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After making sure that the connection is correct, you adjust the SENSIBILITY to adapt the NCW to the tank.

- Make sure that the liquid does not reach the probe.

- The power GREEN LED must light up.

1. Switch the SELECTOR 1 into "ON" position.

2. Turn the sensibility adjustment to the right until the RED LED lights.

3. Turn the adjustment to the left VERY SLOWLY until the RED LED turns off.

Turn once more to the left to avoid a critical adjustment.

The equipment will be adjusted. When the liquid reaches the probe, the relay will connect and the RED LED lights up.

If you want the relay to act inverted, switch the SELECTOR 1 into "OFF" position.

### 8.1 Vertical mounting

In applications where NCW is mounted vertical, the acting point can be adjusted along the probe.

Using the sensibility adjustment we can adjust this point. If the liquid to be detected has a high dielectric constant, it could be possible that you cannot change this point using only the sensibility adjustment.

In these cases, you can decrease the probe's sensibility sitting in ON position the selectors 4, 3 or 2 in this order.

### 8.2 Module change

MODCAP modules are delivered with the selectors 2, 3 and 4 adjusted to every probe. If the module needs to be substituted because of damage, you must operate in this way with openly probe:

1. With SELECTORS 1, 2, 3 and 4 in "ON" position, turn the adjustment multi turn trimmer to the right totally (20 turns). The RED LED must light up.

If the RED LED does not light up, switch the selector 2 into OFF position. If in this case, the RED LED does not light up as well, repeat this operation with selector 3 and then with selector 4 until the LED lights up.



## 9. Technical Information

Measuring principle:	capacitive
Measuring length:	265...4000 mm (shorter versions on request)
Medium temperature:	max. 90 °C (model: NCW-H up to max. 125 °C)
Ambient temperature:	-10... +60 °C
Max. pressure:	PN 10
Media DC-value:	$\epsilon_r = \text{min. } 1.5$
Materials:	Housing: polycarbonate Connection: stainless steel 1.4305 (models NCW-N, NCW-H, NCW-T) PVDF (model NCW-S) probe: stainless steel with PTFE coating for model NCW-N and NCW-H PVDF coating for model NCW-S stainless steel tube 1.4305 with inside probe (stainless steel with PTFE coating) for model NCW-T
Mechanical connection:	G 1 male thread for models NCW-N, NCW-H, NCW-T G 2 male thread for model NCW-S adapter for models NCW-N, NCW-H, NCW-T: thread of G 1 ¼, G 1 ½ circular flange (not for NCW-S) Ø 110 mm, 200 mm welded sleeve (not for NCW-S) Ø external 40 mm
Power supply:	18...36 V <sub>DC</sub> , 24 V <sub>AC</sub> , 110 V <sub>AC</sub> , 230 V <sub>AC</sub> , 50/60 Hz
Power input:	max. 1 VA
Electrical connection:	1 (2) cable gland M20x1,5
Contacts:	relay output
Relay output:	max. 250 V <sub>AC</sub> , 1 A
Protection:	IP 65

## 10. Order Codes

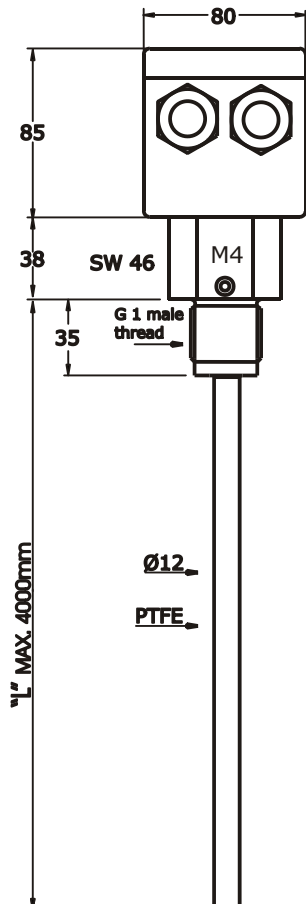
Order example: **NCW-N 1 2G6 0 0**

Model	Probe length	Mech. connection	ATEX	Supply voltage
<b>NCW-N...</b> (Standard)	<b>..1..</b> = up to 1 metre <b>..2..</b> = up to 2 metres <b>..3..</b> = up to 3 metres <b>..4..</b> = up to 4 metres	<b>..2G6..</b> = G 1, st. st.	<b>0</b> = without	<b>..0</b> = 230 V <sub>AC</sub> <b>..4</b> = 110 V <sub>AC</sub> <b>..2</b> = 24 V <sub>AC</sub> <b>..3</b> = 18..36 V <sub>DC</sub>
<b>NCW-H...</b> (High temperature)				
<b>NCW-T...</b> (with reference pipe)				
<b>NCW-S...</b> (2-probe sensor with PVDF connection)		<b>..9G9..</b> = G 2, PVDF		

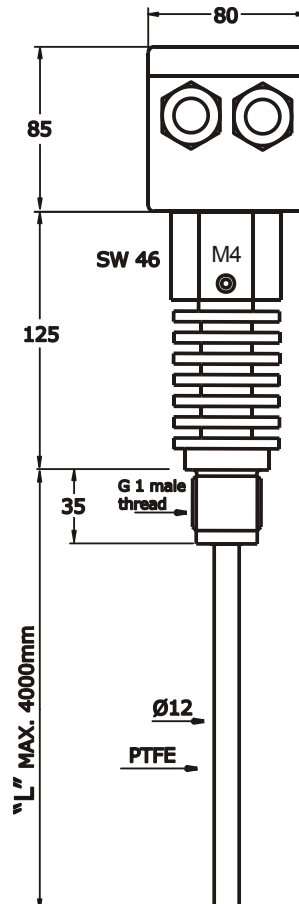
\*Please specify probe length „L“ in writing.

## 11. Dimensions

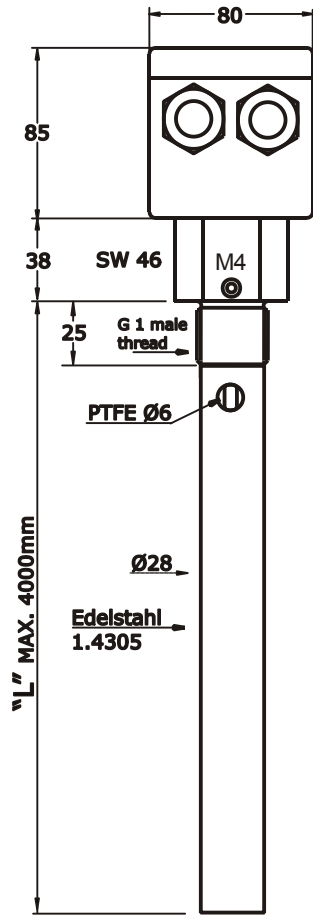
**NCW-N**



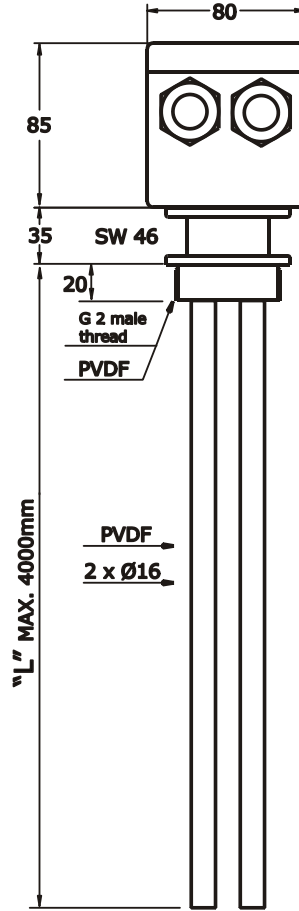
**NCW-S**



NCW-T



NCW-H



## 12. Declaration of Conformance

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We, KOBOLD Messring GmbH, Hofheim-Ts, Germany, declare under our sole responsibility that the product:

**Capacitive Level Monitor for Liquids**

**Model: NCW-...**

to which this declaration relates is in conformity with the standards noted below:

**EN 61000-6-1 2002**

**EN 61000-6-3 2002**

Also the following EEC guidelines are fulfilled:

**2004/108/EC  
93/68/EEC**

**EMC Directive**

Hofheim, 25. Feb. 2008



H. Peters  
General Manager



M. Wenzel  
Proxy Holder