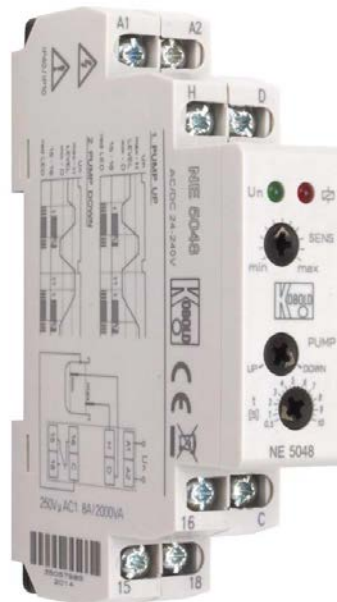# Operating Instructions

for

Electrode Relays for

Conductive Limit Switches

Model: NE-5048

(without WHG-certification)

Manufactured and sold by: KOBOLD Instruments Inc.
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NE-5048

1. Contents

2. Note

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 NE-unit should be used only when the machines fulfil the EC-machine guidelines.

3. Instrument Inspection

The instruments are inspected before shipping and sent out in perfect condition. Should damage to the instrument be visible, we recommend close inspection of the delivery package. In cases of damage, please immediately inform the forwarder as he is liable for any damage in transit.

Scope of delivery
- Conductive Electrode Relay   model: NE-5048
- Operating instructions

4. Regulation Use

The Conductive Limit Switch has been designed for use in level monitoring applications and for pump control for low to highly conductive liquids. The switch has no moving parts—thus, it is particularly suited for monitoring critical media with low solid contents, low density, or high viscosity.
It comprises conductive electrodes and an electrode relay.
The medium conductivity must be min. 10 μS/cm.

Electrode relay

The model NE-5048 electrode relay controls the conductive electrodes and switches throughput, when the conductivity changes.

Type 5048: For one switching point with one electrode and one earth electrode. The relay can be operated in interval mode with two electrodes and one earth electrode.

Electrodes

Two types of conductive probes are available: solid rod or flexible pendant electrodes; they are vertically mounted in the tank to be monitored. The electrode length corresponds to the switching point.

5. Operating Principle

The KOBOLD electrode relays type NE-5048 are used in conjunction with the conductive limit switches NES, NEH and LNK (option without electronic module) for level monitoring and level control of conductive liquids with a conductivity of more than 10 µS/cm.
Probes are immersed in the tank to detect the level. These probes (and the tank wall, if conductive) serve as contacts of a circuit. The probes can be single-rod or multi-rod probes (see also NES and NEH).
The NE-5048 relay provides a limit value signal for connecting one control and one earth electrode.
It also includes a bistable interval relay with latching and is thus suitable for interval switching - e.g. for pump control (min./max. control).

6. Mechanical Connection

The electrodes can be screwed into the tank cover via a pipe thread and sealed, for example. The electrode length corresponds to the desired switching points, and rod electrode lengths may be shortened. The electrode tip must be free of insulating materials. The electrodes must be installed so that the electrode rods or the pendant electrodes are not short-circuited with the side of the tank, or with each other. Please ensure that the rods cannot buckle, or that the pendant electrodes cannot become knotted.

The reference or earth electrode must be at least as long as the longest switching electrode. If the side of the tank is adequately conductive and is not coated with insulating material, it can be used as an earth electrode. The clearance between the switching electrode and the side of the tank should be as small as possible, so that the conductivity of the measuring distance does not fall below 10 μS/cm.

7. Electrical Connection

Attention! Make sure that the voltage values of your system correspond with the voltage values of the measuring unit. Make sure that the supply wires are de-energised.

Attention! The unit has a basic isolation between power terminals A1, A2 and measurement terminals D, H, C, which is dimensioned according to overvoltage category II. In this sense, the input measuring circuit is electrically isolated from the power supply terminals.

Maximum cable length: 300 m, minimum cross-section 0,5 mm². A screened, low capacity cable is to be used at a cable length of approx. 15 m and near EMC-critical installation environement. The cable needs to be connected to an adequate shield ground.

7.1. Electrode relay NE-5048

The NE-5048 electrode relay is the standard relay for all conductive limit electrodes. The relay is supplied in closed-circuit current version.

The function can be adapted to your application according to the following explanations.

The red LED signal lamp lights up when the relay is energised.

The green LED lights up when the supply voltage is applied.

NE-5048

The relay is intended for monitoring the level in conductive liquids, with the following functions to choose from: pump up or pump down (PUMP UP or PUMP DOWN).

To prevent polarisation or undesirable oxidation of the sensors, the measuring circuit is supplied with alternating current.
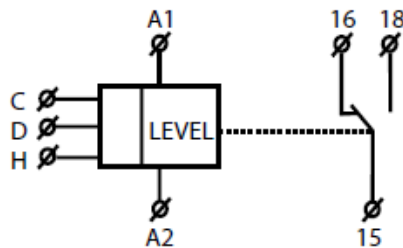
There are 3 probes for the measurement: H - upper probe, D - lower probe and C - common probe.

If a container made of conductive material is used for the measurement, the container wall can also be used as sensor C. If you want to monitor only 1 level, the inputs dog D must be connected and connected to 1 sensor. In this case the input resistance is reduced by half (2.5...50 KΩ instead of 5-100 KΩ). Sensor C can also be connected to a protective earth conductor of the supply system (PE). To avoid unwanted switching (due to sensor contamination caused by sediments, humidity...), the sensitivity of the device can be set in the range of 5 to 100 KΩ depending on the conductivity of the monitored liquid (resistance of the liquid).

To avoid unwanted switching of the output contacts due to an unstable surface of the liquid or wave movements in the tank,
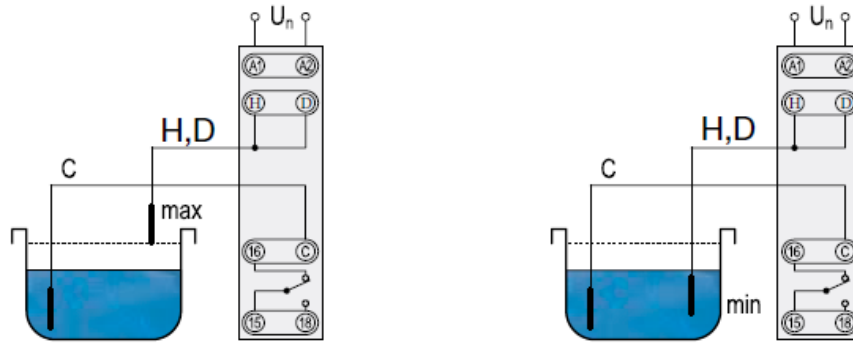you can set a delay in the output of 0.5-10 s.

Power supply connection

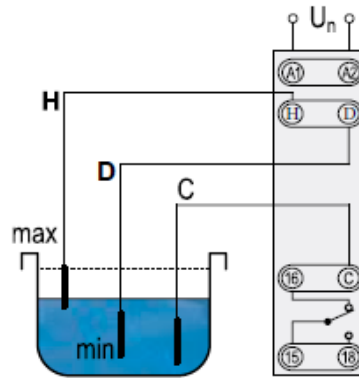The mains voltage is connected to terminals A1 and A2

7.2. Process Applications NE-5048

1 Level Monitoring
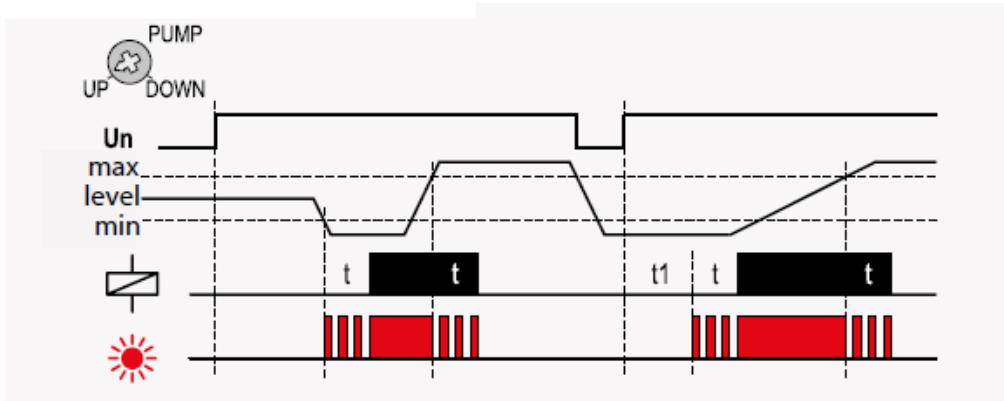

2 Level Monitoring

NE Switch
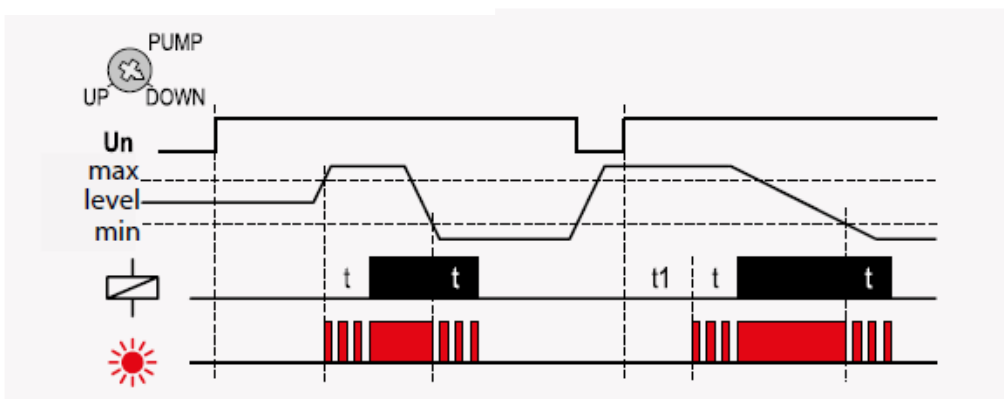**A1, A2: Power supply**
C: Reference electrode
H: MAX maximal level electrode
D: MIN minimal level electrode

Filling function

Emptying function
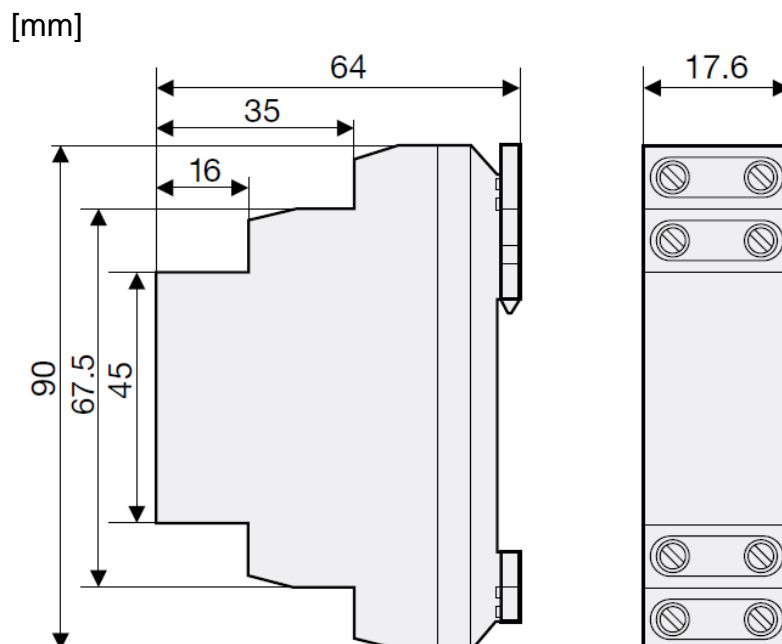
8. Locating and Remedying Faults

The relay does not operate:
- Check whether the mains voltage is applied to terminals A1 and A2 (green LED lights up).
- If the LED lights up
Disconnect electrodes from terminals C, H, D and short-circuit terminals C and H, D with a wire jumper. The relay must now react according to the function of the presetting. If there is no reaction, there is a fault in the relay.
- If the relay switches, remove the short-circuiting link and connect the electrodes according to the connecting instructions. Short-circuit the electrodes at the tips with a wire jumper. If the relay does not change over now, there is a cable interruption, or the electrode tips are insulated by deposits.
- If the relay with the wire jumper at the electrode tips changes over, remove the wire jumper, adjust the maximum sensitivity on the relay, and immerse the electrodes in the medium. If the relay still does not switch, the conductivity of the medium may be too low.

9. Maintenance

The conductive limit switch requires absolutely no maintenance. The electrode tips should be occasionally inspected for deposits or corrosion, and should be cleaned. Insulating deposits can cause a malfunction.

10. Dimensions

[mm]

11. Technical Information

NE-104, NE-304

Power supply:	24-240 V$_{AC/DC}$ (AC 50 – 60 Hz) - 15%, +10%;
Power input:	max. 2 VA/1.5W
Floating voltage:	max. 3.5 V$_{AC}$ 10 Hz
Short-circuit-current:	<0.1 mA AC
Sensitivity:	adjustable 5 – 100 kΩ
Response time:	400 ms
Switch-on delay:	1.5 s
Switch-off delay:	adjustable 0.5-10 s
Output:	1 potential-free change-over contact
Switching capacity:	max. 250 V$_{AC}$, 8 A, 2000 VA (AC) 240 W (DC)
Housing:	Macrolon®
Protection class housing:	IP 40
Protection class terminals:	IP 10
Ambient temperature:	-20 °C...+55 °C
Dimensions:	90 x 17.6 x 64 mm
Weight:	73 g
Mounting:	Quick mounting for standard rail DIN 60715
Visual indication of operating status:	LED red Monitoring state LED green Operating voltage

12. Order Codes

Example: NE-504 8

Typ	Description	Number of outputs	Power supply
NE-	Electrode relay	**504** = 1 limit signal or 1 Min./Max. controller	**8** = 24 - 240 V$_{AC/DC}$