

Operating Instructions
for
Electrode Relays for
Conductive Level Switches

Model: NE
(without WHG-certification)



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2. Note

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

The instruction manuals on our website www.kobold.com are always for currently manufactured version of our products. Due to technical changes, the instruction manuals available online may not always correspond to the product version you have purchased. If you need an instruction manual that corresponds to the purchased product version, you can request it from us free of charge by email (info.de@kobold.com) in PDF format, specifying the relevant invoice number and serial number. If you wish, the operating instructions can also be sent to you by post in paper form against an applicable postage fee.

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

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. 20 $\mu\text{S/cm}$.

Electrode relay

The model NE-104 or NE-304 electrode relay controls the conductive electrodes and switches throughput, when the conductivity changes.

Model 104: 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.

Model 304: For two switching points, two interval mode operations or for one switching point and one operation in interval mode.

The electrode relay is connected to the electrodes via cable.

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

KOBOLD electrode relays of type NE- are used with conductive level switches NES, NEH and LNK for level monitoring and control of conductive liquids.

An electrode relay NE-104 is required for single point signalling.

It additionally includes one bistable interval relay with lock and is therefore suitable for pump control (Min./Max. control).

With relay NE-304 and a level conductive switch with two signal and one ground electrodes, two level limits could be detected. The relay outputs can both be operated as a Min./Max. control or separately as a limit switch (alarm) and a 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 $20 \mu\text{S}/\text{cm}$.

7. Electrical Connection



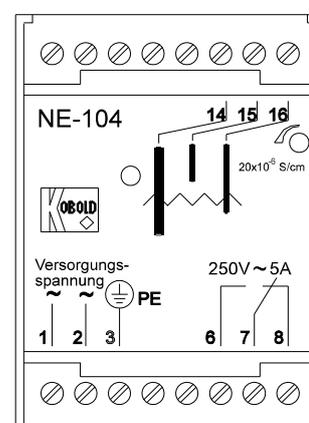
Attention! Make sure that the voltage values of your system correspond with the voltage values of the measuring unit. Make sure that the supply wires are de-energised.



Maximum cable length: 300 m, minimum cross-section $0,5 \text{ mm}^2$. A screened, low capacity cable is to be used at a cable length of approx. 15 m and near EMC-critical installation environment. The cable needs to be connected to an adequate shield ground.

7.1. Electrode relay NE-104

The NE-104 electrode relay is the standard relay for all conductive limit electrodes. It is supplied as a break relay, i.e., the relay picks up (contact 6-7 closes) when auxiliary power is applied. If the electrodes are wetted or the power fails, the relay disengages (contact 7-8 closes). The signal lamp (red LED) is energised when the relay picks up.



Electrode connection

Usage as Min/Max switch (2 electrodes)

- Connect the earth or reference electrode to terminal 14.
- Connect the switching electrode to terminal 15.

Level	Relay	LED
Below the switching electrode	relay picks up, contact 6-7 closed	on
Reaches or above the switching electrode	relay drops out, contact 7-8 closed	out

Use for interval control (3 electrodes)

- Connect the earth or reference electrode to terminal 14.
- Connect the MAX-switching electrode to terminal 15 and the MIN-switching electrode to terminal 16.
- Contact 6-7 is closed when the tank is empty. When the liquid reaches the MAX electrode, the relay changes over and contact 7-8 closes. The relay remains changed over until the level falls below the MIN electrode. The interval then repeats itself.
- The changeover contact may be used for evacuating or filling—as shown in the circuit examples.

Terminating the mains voltage

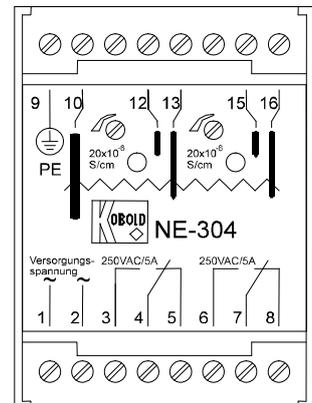
- The mains voltage is terminated at terminals 1 and 2, and the protective earth conductor at terminal 3 (PE).



Note: Terminal 14 (earth) is internally linked to terminal 3 (PE).

7.2. Electrode relay NE-304

The NE-304 electrode relay is a double relay with two separated electrode circuits and one reference electrode. It is supplied as a break relay, i.e., the relay picks up (contact 3-4 and 6-7 closes) when auxiliary power is applied. If the electrodes are wetted or the power fails, the relay disengages (contact 4-5 and 7-8 closes). The signal lamps (red LED's) are energised when the relay picks up.



Electrode connection

Usage as MIN/MAX switch (3 electrodes)

- Connect the earth or reference electrode to terminal 10.
- Connect MIN.-switching electrode to terminal 12 and the MAX.-switching electrode to terminal 15.

	Level	Relay	LED
Min.-Electrode	Reaches or above the switching electrode	relay drops out, contact 4-5 closed	out
	Below the switching electrode	relay picks up, contact 3-4 closed	on
Max.-Electrode	Reaches or above the switching electrode	relay drops out, contact 7-8 closed	out
	Below the switching electrode	relay picks up, contact 6-7 closed	on

Use for two interval controls (5 electrodes)

- Connect the earth or reference electrode to terminal 10.
- Pump 1: Connect the MAX-switching electrode to terminal 12 and the MIN-switching electrode to terminal 13. Contact 3-4 is closed when the tank is empty (LED 1-on). When the liquid reaches the MAX electrode, the relay changes over and contact 4-5 closes (LED 1-out). The relay remains changed over until the level falls below the MIN electrode. The interval then repeats itself.
- Pump 2: Connect the MAX-switching electrode to terminal 15 and the MIN-switching electrode to terminal 16. Contact 6-7 is closed when the tank is empty (LED 2-on). When the liquid reaches the MAX electrode, the relay changes over and contact 7-8 closes (LED 2-out). The relay remains changed over until the level falls below the MIN electrode. The interval then repeats itself.
- The changeover contact may be used for evacuating or filling—as shown in the circuit examples.

Use for one interval controls and one switch point (4 electrodes)

- Connect the earth or reference electrode to terminal 10.
- Pump 1: Connect the MAX-switching electrode to terminal 12 and the MIN-switching electrode to terminal 13.
- Connect the switch point switching electrode to terminal 15.

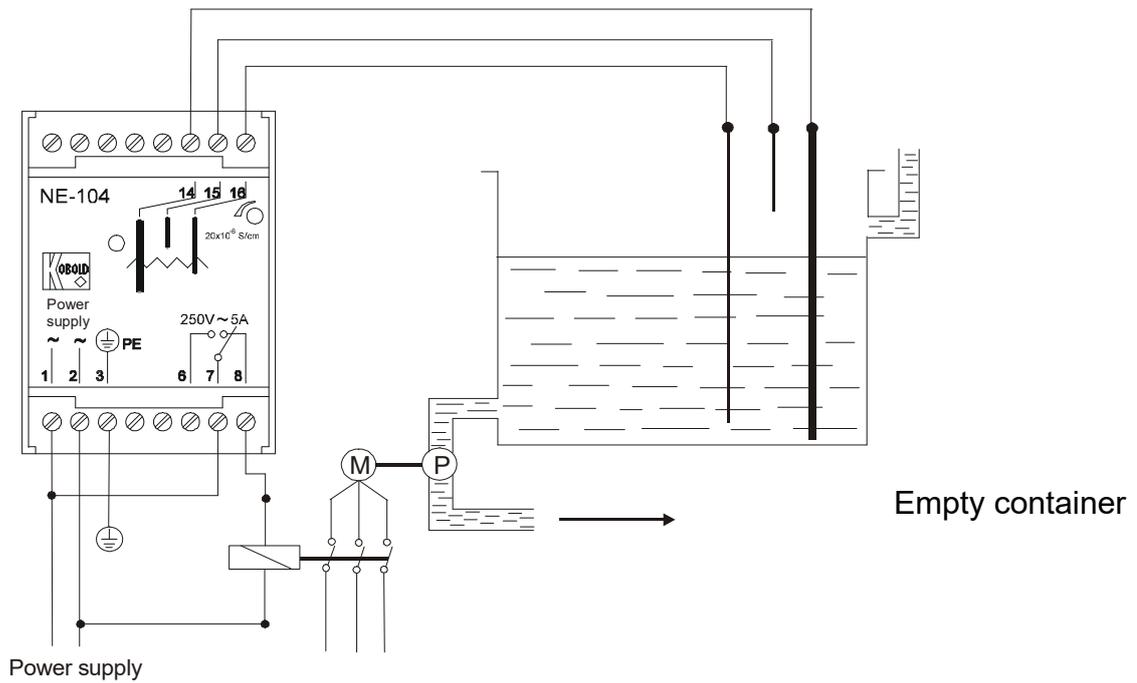
Terminating the mains voltage

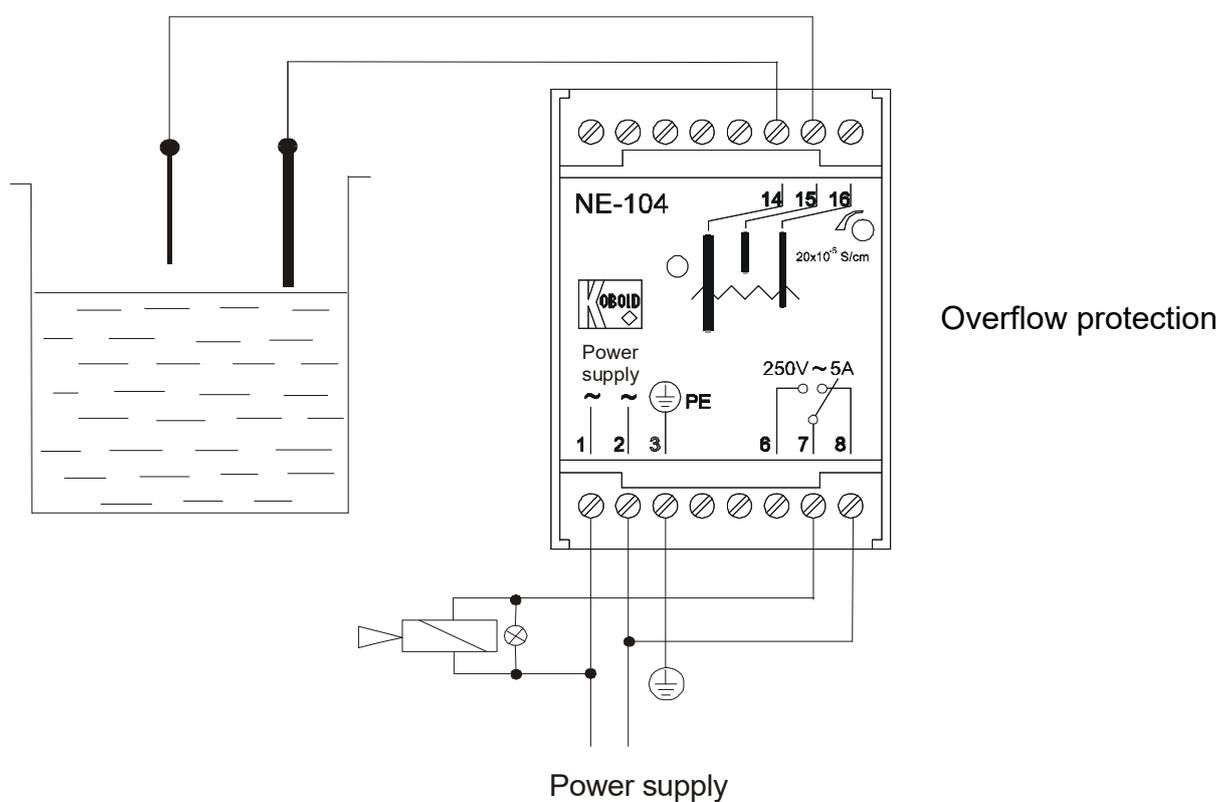
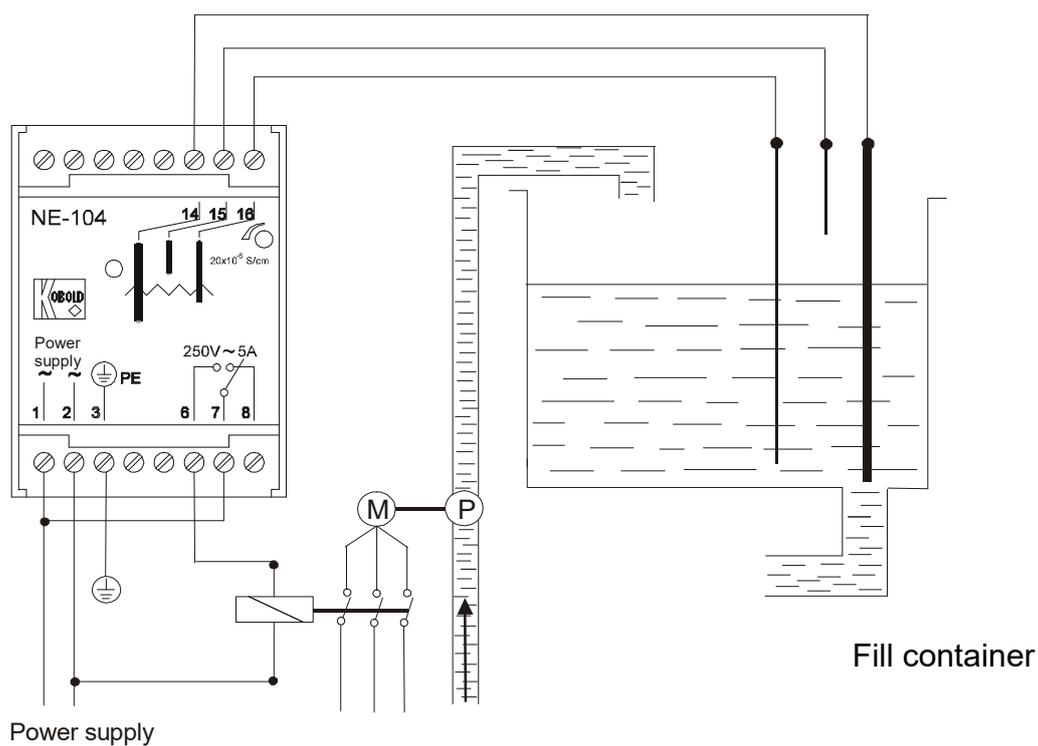
- The mains voltage is terminated at terminals 1 and 2, and the protective earth conductor at terminal 9 (PE).

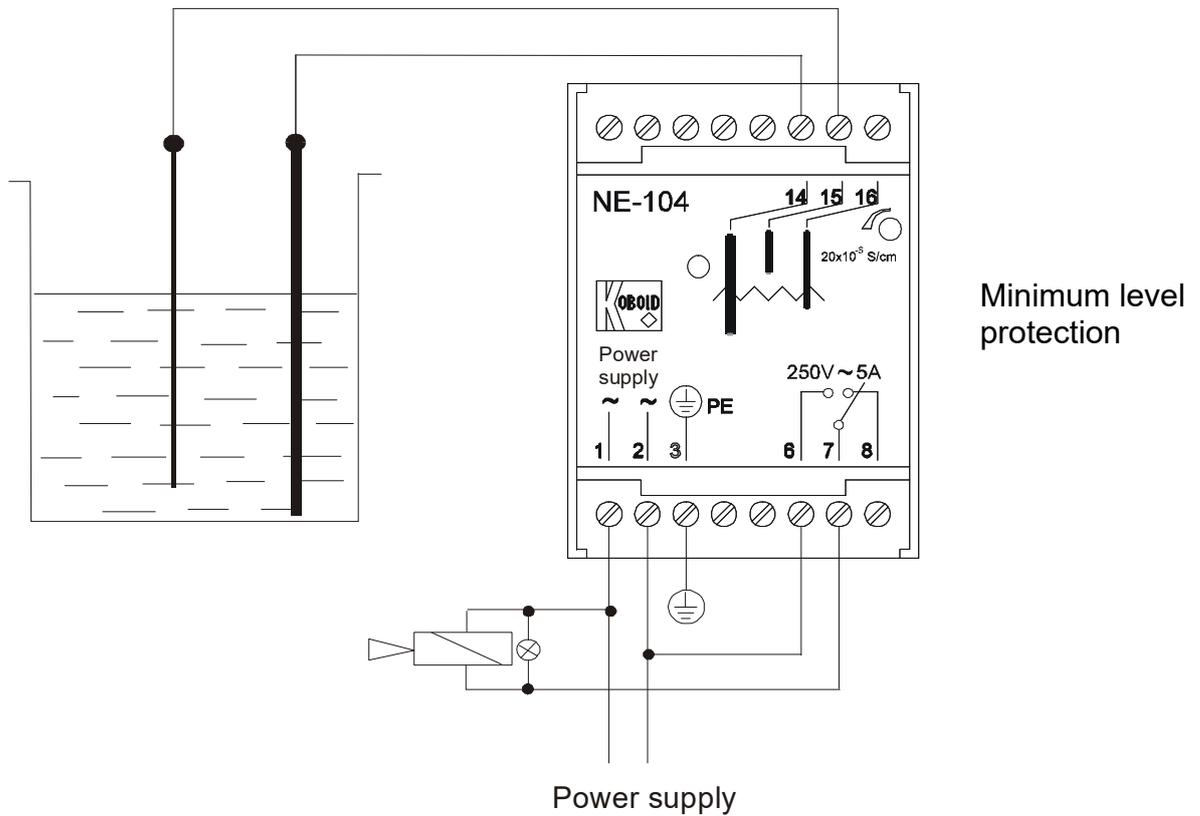


Note: Terminal 10 (earth) is internally linked to terminal 9 (PE).

Connection Diagrams – examples of use model NE-104







8. Commissioning

Turn the sensitivity potentiometer fully clockwise to the right, until the stop is reached. When the main voltage has been connected, and the electrodes have been connected according to their required function, the conductive limit switch is ready for operation. The tank may now be filled. The sensitivity is optimally adjusted with this basic setting. Should foaming cause the relay to operate too early, the sensitivity can be reduced by turning the sensitivity potentiometer to the left, until the foam does not cause the relay to operate.

9. Locating and Remedying Faults

The relay does not operate:

- Check that the main voltage is applied to terminals 1 and 2. If the voltage is present, the red LED should light up and the relay should pick up. If there is no reaction, the relay is faulty.
- If the LED is energised
Relay model NE-104: Disconnect the electrode from terminals 14, 15, and 16, and short-circuit terminals 14 and 15 with a wire jumper. The relay must drop out now. If there is no reaction, the relay is faulty.
Relay model NE-304: Disconnect the electrode from terminals 10, 12, 13, 15, and 16, and short-circuit terminals 10, 12 and 10, 15 with a wire jumper. The relay must drop out now. If there is no reaction, the relay is faulty.
- 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.

10. 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.

11. Technical Information

NE-104, NE-304

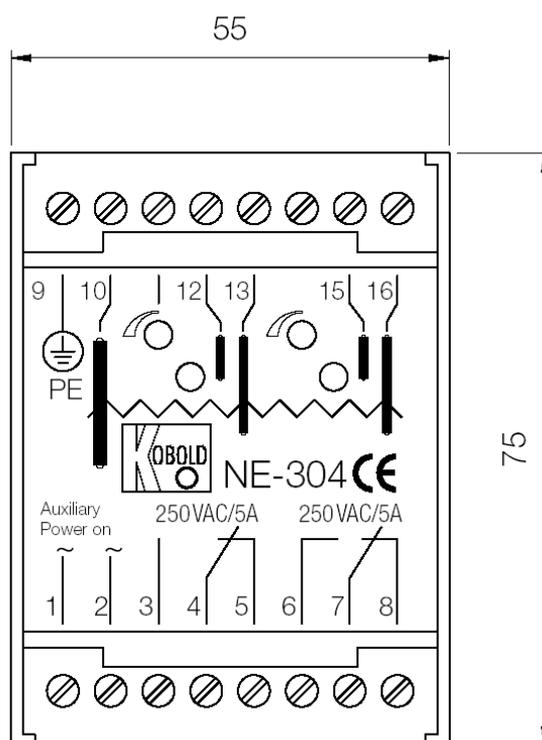
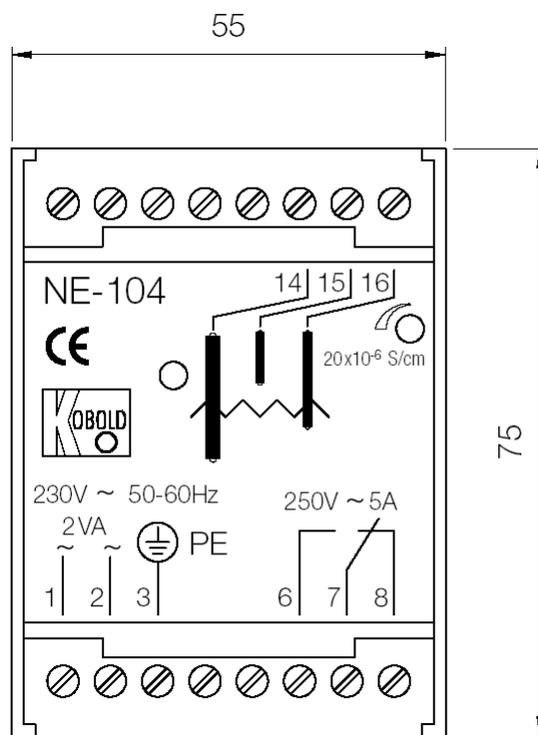
Power supply:	230, 110, 224 V _{AC} ± 15%; 50 - 60 Hz
Power input:	NE-104: approx. 2 VA NE-304: approx. 4 VA
Floating voltage:	approx. 10 VA
Short-circuit-current:	approx. 0.5 mA
Sensitivity:	adjustable 0 - 50 kOhm
Response time:	approx. 1 s
Output:	NE-104: 1 floating changeover contact NE-304: floating changeover contacts
Switching capacity:	max. 250 V _{AC} , 5 A, 600 VA
Housing:	Macrolone
Protection:	Housing: IP 40
Terminals:	IP 20
Ambient temperature:	-20 °C...+60 °C
Dimensions:	75 x 55 x 110 mm
Installation:	DIN rail mount or screw fixation
Signalling:	LED red: monitoring state

12. Order Codes

Order Details (Example: NE-104 0)

Model	Description	Number of outputs	Power supply
NE-	Electrode relay	104 = 1 limit signal or 1 min/max controller 304 = 2 limit signals or 2 min/max controller	0 = 230 V _{AC} 1 = 110 V _{AC} 2 = 24 V _{AC}

13. Dimensions



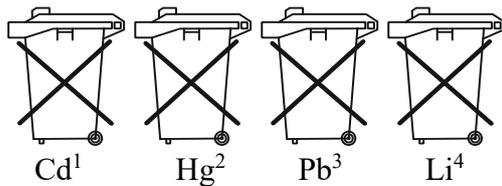
14. Disposal

Note!

- Avoid environmental damage caused by media-contaminated parts
- Dispose of the device and packaging in an environmentally friendly manner
- Comply with applicable national and international disposal regulations and environmental regulations.

Batteries

Batteries containing pollutants are marked with a sign consisting of a crossed-out garbage can and the chemical symbol (Cd, Hg, Li or Pb) of the heavy metal that is decisive for the classification as containing pollutants:



1. „Cd" stands for cadmium
2. „Hg" stands for mercury
3. „Pb" stands for lead
4. „Li" stands for lithium

Electrical and electronic equipment



15. EU Declaration of Conformance

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

Electrode Relays for Conductive Level Switches Model: NE-104, NE-304

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

EN 61326-1:2013

Electrical equipment for measurement, control and laboratory use - EMC requirements - Part 1: General requirements

EN 61010-1:2011

Safety requirements for electrical equipment for measurement, control and laboratory use - Part 1: General requirements

Also the following EEC guidelines are fulfilled:

2014/30/EU

EMC Directive

2014/35/EU

Low Voltage Directive

2011/65/EU

RoHS (category 9)

Hofheim, 27. Apr. 2016



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