**(Translation of the original operating instructions!)**

---

## Table of contents:



---

## 1. General

**CAUTION!**

**Before commissioning the unit read these operating instructions carefully to avoid personal injuries or damage to the relay. Use the operating instructions together with sera data sheet 10331.**

**CAUTION!**

**All electrical connections and "internal" settings of appliances have to be carried out in an idle state.**

Presupposition for a perfect, safe operation of the electrode relay ER-104 is a proper transport, storage, assembly, professional installation and commissioning, intended operation and maintenance. Only persons with the expert knowledge and qualification required are allowed to carry out this (these) activity (ies). Please note the relevant safety instructions for the erection and the operation of electrical units.

## 2. Possible applications

The ER-104 has possible applications in all domains in which conductive, liquid media must be recorded, controlled and regulated. The recording is carried out by conductivity, i.e. the media are checked for electric conductivity. The liquid media are not electrolyzed in this process, as the test current used is AC. With the ER-104, limit levers (overflow/dry running) can be indicated or minimum/maximum controls be carried out. Moreover, the
ER-104 can be fitted with suitable electrodes for monitoring of diaphragm rupture in single- and double-diaphragm pumps (diaphragm rupture relay). The conductivity of the medium to be monitored is a pre-requisite for the correct function. When it is used as a contact protective relay, large loads can be switched through a low contact load of the transmitter (see data sheet 10331).

### 2.1 Use as an electrode relay

With the ER-104, liquid levers in dosing tanks can be monitored and/or controlled. One possible use is for monitoring the limit value (1 electrode and ground) or for controlling the maximum/minimum
(2 electrodes and ground). In this case the ER-104 reacts when the maximum electrode is passed, and retains this position until the level in the tank falls below the minimum electrode. The ground electrode must be placed below or at the same height as the minimum electrode.

### 2.2 Use as a diaphragm rupture relay

In double diaphragm pumps an electrode unit is screwed in between the two diaphragms. The buffer liquid (glycerine) in the diaphragm area shows little conductivity, so that the ER-104 doesn`t react. I case of a diaphragm rupture, the buffer liquid mixes with the conductive conveying medium, so that contact is made between the electrodes. The electronics react, and trigger an output relay whose switching contact can be used to indicate the diaphragm rupture.
In a single diaphragm pump the electrode unit is in the base ring in front of the diaphragm. When there is a rupture in the diaphragm, part of the conveying medium gets through the diaphragm into the electrode zone, so that contact is made and the relay reacts.

## 3. Function

An integrated amplifier records a test current that flows between the two max. input contacts and ground and switches a power relay at the output when an adjustable trigger threshold is passed.

## 4. Safety

### 4.1 Approved applications

The pre-requisites for perfect and safe operation of the device are: proper transport, storage, and assembly, expert installation and commissioning, approved application, service and maintenance. Only people with the necessary knowledge and qualifications should perform these tanks. The ER-104 is to be used solely for the purpose stated in the order confirmations.

### 4.2 Safety and warning instructions

Please observe the relevant safety instructions for the setting-up and operation of electrical equipment.

**CAUTION!**

**All electrical connections and „internal" device adjustments are only ti be undertaken with the voltage turned off!**

**CAUTION!**

**The maximum environmental temperature at the installation position of the ER-104 must not be exceeded!**

## CAUTION!

**The operating voltage of the ER-104 must correspond to the operating voltage of the installation!**

## CAUTION!

**These operating instructions must be available at the area of work at all times!**

## 5. Putting into operation

The device is ready for operation as soon as the electrical cables have been connected. While observing the safety instructions, a simple functional check can be made by short-circuiting the electrode circuit causing the relay to react. The response sensitivity of the relay can be adjusted between 2 and 300 kΩ. For diaphragm rupture monitoring, the switching point is adjusted in the factory to an average value (approx. 100 kΩ).

### 5.1 Operating or static current operation

In principle the ER-104 can be used in operating or static current operation. During static current operation the internal relay is triggered by unwetted electrodes and during operating current operation by wetted electrodes. In this way, the ER-104 can be switched to generate a warning signal in case of a mains failure.
The selector switch for the setting of the direction of action is inside the appliance, in the upper part of the printed circuit.

(operating current operation: switch = up;
static current operation: switch = down).

The state of delivery is “closed circuit system”.

### 5.2 Electrical connection of the ER-104

The electrical connection of ER 104 depend on the intended purpose – note the safety instructions!

**Use for limit value level recording:**
For limit value recording, connect the electrodes to inputs E2 and E0 (ground). When a conductive tank is used, the ground electrode is not necessary and the side of the tank can be used instead.

**Use in minimum/maximum operation:**
Connect the common ground electrode to terminal E0, the minimum level electrode to E1 and the maximum level electrode to E2.

If several ER-104 electrode relays are used, the E0 terminals must be connected with the ground electrode.

**Connection of the supply voltage:**
Connect the supply voltage with terminals A1 and A2.

**Connection of the output contacts:**
At the output there are 2 floating contacts available. The switch position shown in figure corresponds to the neutral position of the contacts without voltage supply to the relays.


1. Change-over contact

| | |
|---|---|
| Common contact | 11 |
| b-contact | 12 |
| a-contact | 14 |

2. Change-over contact

| | |
|---|---|
| Common contact | 21 |
| b-contact | 22 |
| a-contact | 24 |

### 5.3 Indicators and operating elements

**LED „red“**
lit: output relay picked up
unlit: output relay in neutral position

**Sensitivity range**
range 1: = 2...30 kΩ with internal coding plug.
range 2: = 2...300 kΩ without coding plug

**Sensitivity**
Adjust the trimming potentiometer through the opening provided in the housing cover with a screwdriver.

### 5.4 Adjustment

After connection of the electrodes and the voltage supply, the ER-104 can be adjusted for the media to be recorded, if at least 2 electrodes are immersed in the conductive liquid. First of all set the response sensitivity to the lowest value (Potentiometer „sensitivity“ on left limit stop).
Then turn the potentiometer to the right until the relay picks up (and/or is released in static current operation). When this position is reached, turn the potentiometer approx. 10°-15° further to the right in order to obtain a safe switching behaviour even if the conductivity is variable.
If the electrode relay does not respond even with right limit stop of the potentiometer, it has to be replaced by another version with greater sensitivity.

## 6. Maintenance

The electrode relay ER-104 does not require a special maintenance, only the general check / function control of the electrical units is necessary..