# Installation and commissioning instructions (Ex-ia) Electrode relay ER-142, ER-143

**Important safety instructions please read and note**

Suitable transport, storage, correct assembly, expert installation and initial start-up in accordance with the current standards are vital for a problem-free, safe operation of the electrode relays.

These activities may only be carried out by persons with the necessary expertise and qualifications. The relevant safety regulations for the assembly and operation of electrical equipment and the assembly requirements for equipment in ex-areas must be complied with. Note in particular the installation rules **EN 60079-14** for electrical installations in hazardous areas. In addition, the EC-Type Examination Certificate **TÜV 02 ATEX 1833** has to be considered.

Please contact the manufacturer should the information contained in these instructions prove to be in any way insufficient.

**The recommended operation voltage for ER-142 and ER-143 must be compatible with the system. All electrical connections must be carried out with the power off.**

## 1 Assembly

The electrode relays ER-142 and ER 143 are suitable for quick mounting on a standard rail in accordance with DIN EN 50 022. The max. ambient temperature of the electrode relays may not be exceeded at the assembly location. The electrode relay must not be installed in the "ex-atmosphere" and operation of the equipment within the "ex-atmosphere" is not permitted.

## 2 Electrical connection

### 2.1 Connecting the transducers (electrodes)

**Limit value monitors (overflow/dry-run)**

Connect the reference electrode (frame) to terminal E0 and the electrode for the monitoring the level to terminal E2.

**2-point control (min./max. operation)**

Connect the reference electrode (frame) to terminal E0, the electrode for the lower level to terminal E1 (min.) and the electrode for the upper level to terminal E2 (max.). Please ensure that the frame electrode is beneath the 'max.' and 'min.'.

**Multi-combinations**

Terminal E0 must be bridged with and the reference electrode (frame) connected to all relays.

### Note

When installing the sensor line in proximity to power lines can reduce the use of a shielded cable faults by coupling. The max. Cable length between probe and electrode relay depends on the required sensitivity of the equipment and must be maintained for the operation. These are particular account of the, on the nominal values of $C_0$ and $L_0$.

## 2.2 Connecting the supply voltage

Connect, in line with the imprint on the casing lid, to the terminals marked **A1, A2** . In accordance with EN 61010-1 an all-pole switch-off in the building installation should be provided for, which must be near the electrode relay - marked as a separating device for these and in within reach. Surge protection against power failure on the part of the transformers is provided for the devices by an upstream soldered fuse (fuse value depending on the nominal voltage of the network, see technical specifications).

## 2.3 Connecting the voltage-free output contacts

| ER-142 | |
|---|---|
| **Terminal** | **Assignment** |
| 11 | COM |
| 12 | NC |
| 14 | NO |

| ER-143 | |
|---|---|
| **Terminal** | **Assignment** |
| 11 | COM1 |
| 12 | NC1 |
| 14 | NO1 |
| 21 | COM2 |
| 22 | NC2 |
| 24 | NO2 |

The switch position, as represented on the type plate, corresponds to the voltage-free status of the relays. If it is set to "closed-circuit operation" the contact position as shown corresponds to that of netted electrodes.

The ER-142 has one, the ER-143 has two voltage-free changeover contacts are available as output.

# 3 Initial operation / Setting

The equipment must be open in order to carry out the function settings as described below. The equipment must be voltage-free as it is possible to come into contact with live wires inside the equipment.

Before the initial operation the required function is selected at the switches S1 and S2, which can be accessed by removing the casing lid (factory settings: S1 "high", S2 "operation"). Replace the lid carefully.

Once the function has been set and/or the measurement value recorders and the supply voltage have been connected, the electrode relays ER-142 / ER-143 can be adjusted to the media to be monitored:

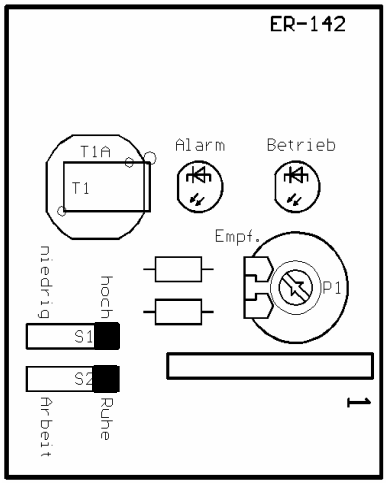
First of all, the operating sensitivity is set to the minimum value by inserting a screwdriver in the opening provided in the casing lid (potentiometer P1 "sens." to the left = factory setting). When dipping the electrodes "max." and "frame" in the conductive liquid turn the potentiometer to the right until such time as the output relay begins to take (or falls off to closed-circuit operation). Once this position has been reached, the potentiometer is turned a further 10°-15° in the same direction in order to provide a safe range in the case of unsteady conductivity. If the relay does not begin to operate even at a high level of sensitivity (switch setting S1 "high", potentiometer turned to the right), the equipment should be replaced by an electrode relay ER-142 / ER-143 with a higher level of sensitivity.

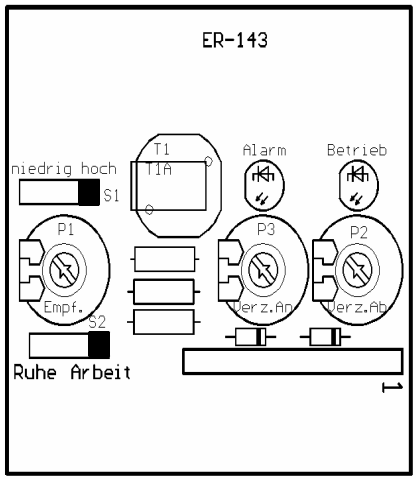
## 4 Display elements / control elements

| | | |
|---|---|---|
| LED GREEN "operation" | LIGHTING | Ready for operation |
| | DARK | Power failure / equipment failure |
| LED RED "alarm" | LIGHTING | Output relay on |
| | DARK | Output relay off |

The potentiometer P1 (fine tuning sensitivity) on both models and in addition the potentiometers P2 (delay relay drop) and P3 (delay relay power) on the ER-143 model can be adjusted by inserting a screwdriver in the openings provided in the casing lid. Switch S1 (switch-over sensitivity range):

"niedrig" = 2...30 kΩ
"hoch" = 3...300 kΩ




### Switch S2 (switch-over closed-circuit/open-circuit operation).

Both switches can be accessed by removing the casting lid. The optional button T1 can be accessed on both models without removing lid.

## 5 Operation monitoring

Please proceed as follows to check the operation of the electrode relays ER-142 / ER-143:

| | | | Open-circuit setting S2 | | closed-circuit setting S2 | |
|---|---|---|---|---|---|---|
| | | LED operation | LED alarm | Contact setting | LED alarm | Contact setting |
| 1 | Supply voltage connected to terminals **A1, A2**. | on | off | closed: 11-12 (21-22)<br>open: 11-14 (21-24) | on | closed: 11-14 (21-24)<br>open: 11-12 (21-22) |
| 2 | Bridge terminals **E1, E0** | on | off | closed: 11-12 (21-22)<br>open: 11-14 (21-24) | on | closed: 11-14 (21-24)<br>open: 11-12 (21-22) |
| 3 | Bridge terminals **E2**, **E0** if bridge **E1**, **E0** present | on | on | closed: 11-14 (21-24)<br>open: 11-12 (21-22) | off | closed: 11-12 (21-22)<br>open: 11-14 (21-24) |
| 4 | Remove bridge **E2**, **E0** | on | on | closed: 11-14 (21-24)<br>open: 11-12 (21-22) | off | closed: 11-12 (21-22)<br>open: 11-14 (21-24) |
| 5 | Remove bridge **E1**, **E0** | on | off | closed: 11-12 (21-22)<br>open: 11-14 (21-24) | an | closed: 11-14 (21-24)<br>open: 11-12 (21-22) |

## 6 Maintenance / cleaning

The electrode relays ER-142 and ER-143 require no further maintenance other than the general checking/function monitoring of electrical equipment.

## 7 Technical data

| | | |
|---|---|---|
| **Power supply** | | |
| | Nominal operating voltage | 230 V AC ±10% |
| | Optional | 24, 42, 48, 115, 127, 240 V AC ±10%, 24VDC ±10% |
| | Nominal frequency | 48...62 Hz |
| | Power consumption | ≤ 2 VA |
| **Output (voltage-free)** | | |
| | ER-142: | 1 change-over contact |
| | ER-143: | 2 change-over contact |
| | Switching voltage | Max 250/24 V AC/DC |
| | Switching current | Max 5/8 A AC/DC |
| | Switching power | Max 100/50 VA/W |
| **Input** | | |
| | perm. outer inductivity | see certification TÜV 02 ATEX 1833 |
| | perm. outer capacity | see certification TÜV 02 ATEX 1833 |
| | Operating circuit voltage $U_0$ | see certification TÜV 02 ATEX 1833 |
| | Short circuit current $I_0$ | see certification TÜV 02 ATEX 1833 |
| | Power $P_0$ | see certification TÜV 02 ATEX 1833 |
| **Sensitivity** | | |
| | Standard | (2...30 / 3...300) kΩ |
| | Optional | 0.2…3; 8…800 kΩ |
| **Delay time** | | |
| | Standard | ca. 0.5 s pull-in/release |
| | ER-142: optional: | ca. 0.8; 3.2; 7 s pull-in/release |
| | ER-143: adjustable | ca. 0.5 s..10 s pull-in/release |
| **Dimensions W x L x H** | | |
| | ER-142 | 45 x 75 x 110 mm |
| | ER-143 | 55 x 75 x 110 mm |
| Weight | | ca. 250/260 g |
| Storage temperature | | -30...80 °C |
| Operating temperature | | -25...60 °C |

| Standards | | |
|---|---|---|
| EN 60 529 | Protection class (Terminals) | IP 20 |
| EN 60 529 | Protection class (Casing) | IP 40 |
| EN 61 010-1 | Protection class (device) | II |
| EN 61 010-1 | Overvoltage category | II |
| EN 61 010-1 | Soiling degree | 2 |
| EN 60 079-0, EN 60 079-11 | Category Group | ia/ib IIC |
| EN 60 326 | EMC | |
| | | |

| Fuse values | |
|---|---|
| $U_{nom.}$ | $I_{nom.}$ |
| 240 V | 50 mA |
| 230 V | 50 mA |
| 127 V | 80 mA |
| 115 V | 80 mA |
| 48 V | 200 mA |
| 42 V | 200 mA |
| 24 V | 315 mA |
| 24 V DC | 100 mA |