

# Operating Manual

## LF1-LF4 i2380-87

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ELEKTROGERÄTEBAU GMBH



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## 1.0 General Guidelines for Safety

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	<b>WARNING</b> (Nonobservance or misapplication of the contents of the „Warning“ section could lead to serious accident, including death or injury)
<b>Turn off the power supply.</b> Working without disconnecting the power supply may cause an electrical shock. Before engaging upon any working procedures make sure to disconnect the power supply.	 Electrical Shock
<b>No remodelling !</b> Never remodel an analyser. Otherwise, a serious accident may result. IOTRONIC will not be responsible for any accident or damage of any kind which is caused by the user remodelling the analyser.	 No Remodelling
<b>Operating site must be free of water and humidity</b> The analytical instrument is not designed to be water-proof or dust-proof. The use of the analyser in places where water splashes or humidity is high may result in an electrical shock or short-circuit.	 Prohibited

	<b>CAUTION !</b> (Nonobservance or misapplication of the contents of the „Caution“ section could lead to serious physical injury to the user or serious damage to the product.)
<b>Specified power only</b> Do not operate the analyser on voltage which is not specified on the label on the right side of the transmitter housing. Failure to do so can result in damage or fire. Only the specified power level is to be applied.	 Caution
<b>Do not damage or change power cable !</b> Do not scratch, damage, process, or pull the power cable forcibly. Nonobservance could cause a fire or an electrical shock.	 Caution

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### Notes on operation

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- Dropping the device or subjecting it to strong impacts may result in faulty performance. Handle the analyser with care.
- Select an installation site convenient for future maintenance and inspection, and fix the device carefully so that it is free of vibrations.

## 2.0 Principle of measuring

The main difference between the common conductive way and the inductive technique is the electrodeless measuring. No conductive electrodes are touch with the liquid. Inside the probe there is a fully capsulated ring-core-transformer wich induces an ac current in the surrounding liquid. The value of the current is proportional to the conductivity of the liquid. With a second ring-core, wich acts as an current transformer the induced current is measured and after electronic processing in the measuring instrument displayed as conductivity.

The inductive technique garantees a lasting stable and perfect reading even in strong contaminated, oily or agressive liquids. Problems of conventional elektrodes with the influence of reading caused by wear, corruption and polarisation are eliminated as a matter of principle.

The expenditure of calibration, cleaning and maintenance is limited to a minimum or even not necessary in most applications.

The unit of conductivity is S/cm. Derivations are mS/cm and  $\mu$ S/cm.

## 3.0 Calibration

The instrument is calibrated by factory.

To compensate tolerances of the cell, it is possible to adjust the measured value for +/- 10%.

For a simple calibration, one need a buffersalution (potassiumchlorid 0,01 mol/l; =1913  $\mu$ S/cm)

Set the temperature compensation to 2,1%/°C.

Then dip the sensor into the the buffer solution and wait until the reading does not change.

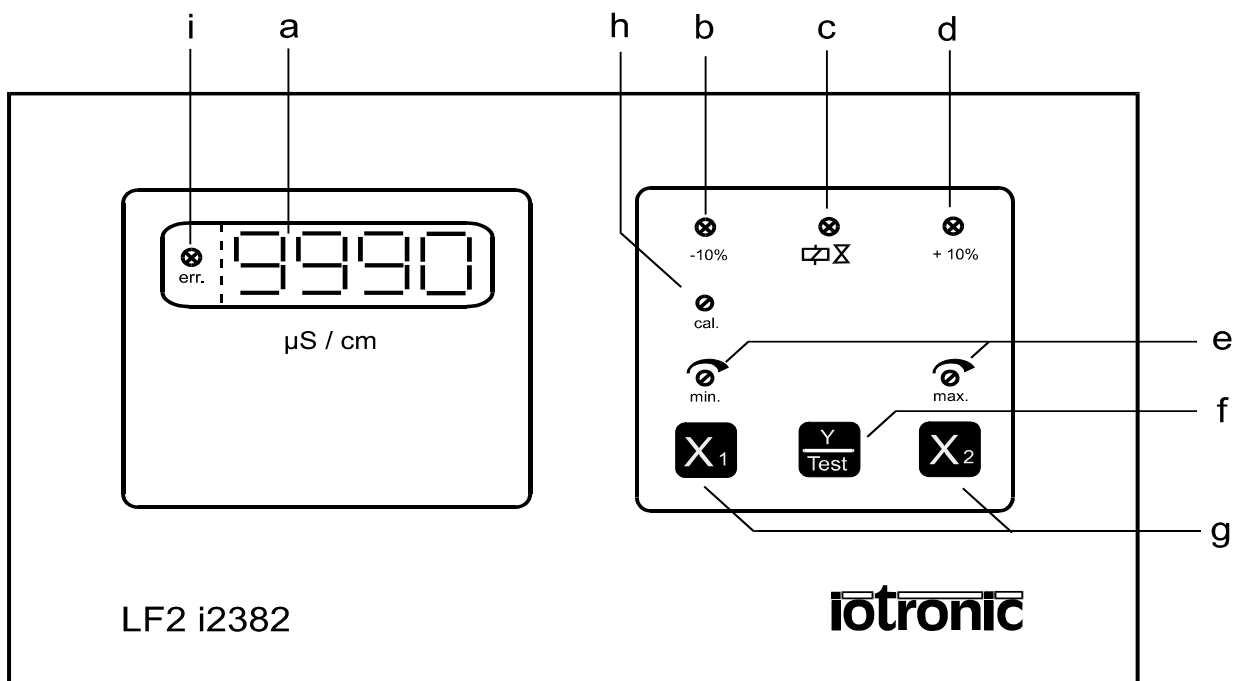
Now set the reading with the slope adjustment element to a value of 1410  $\mu$ S/cm.

#### 4.0 Description of the instrument

LF1 i2380: Device with maximum-function of relais  
 LF2 i2382: Device with maximum-function of relais  
 LF3 i2384: Device with maximum-function of relais  
 LF4 i2386: Device with maximum-function of relais

LF1 i2381: Device with minimum-function of relais  
 LF2 i2383: Device with minimum-function of relais  
 LF3 i2385: Device with minimum-function of relais  
 LF4 i2387: Device with minimum-function of relais

Front view (Example):



- |   |                                     |
|---|-------------------------------------|
| a : LED-display                         | f: manual override to operate valve |
| b: indicator light "alarm -10%"         | g: keys to display limit values     |
| c: indicator light "valve open"         | h: potentiometer to adjust slope    |
| d: indicator light "alarm +10%"         | i: overflow (only LF2)              |
| e: potentiometer to adjust limit values |                                     |

The limit values may be adjusted by turning the screw of the appropriate potentiometer. The current limit values may be displayed by pressing the appropriate key (X1 or X2).

The instrument has two potential-free relay contacts. Relay K2 may be used to control dosing devices (e.g. a valve). Relay K1 is an alarm relay that will be activated either if the measured value is 10% above or 10% below the preset limit values.

## **5.0 Switching Functions of the Relays**

### **Relay K2**

**XX x2380:**  
**XX x2382:**  
**XX x2384:**  
**XX x2386:**

The relay contact K2 will be activated if the measured value goes beyond the preset limit value X2. It remains activated until measured value falls below preset value X1

**XX x2381:**  
**XX x2383:**  
**XX x2385:**  
**XX x2387:**  
**XX x2389:**

The relay contact K2 will be activated if the measured value has fallen below the preset limit value X1. It remains activated until the preset limit value X2 is exceeded.

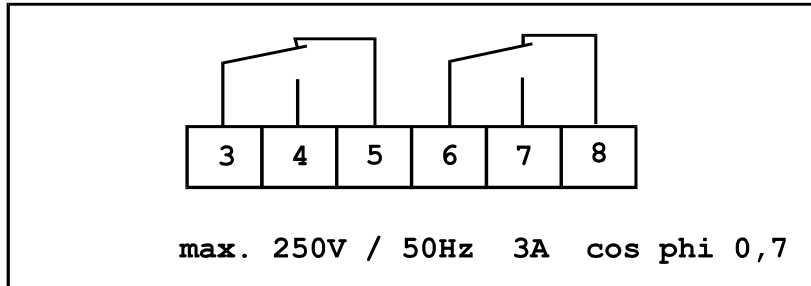
### **Relay K1**

The relay contact K1 will be activated either if the measured value has fallen below limit value X1 by more than 10% or the limit value X2 is exceeded by more than 10%. It may be used to control alarm devices like horn or light.

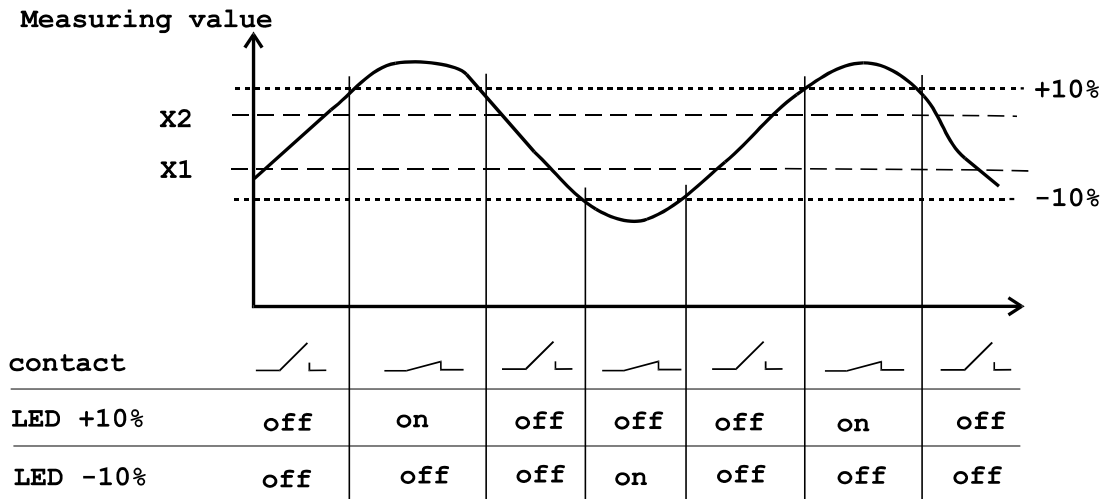
**Contact position shown not activated**



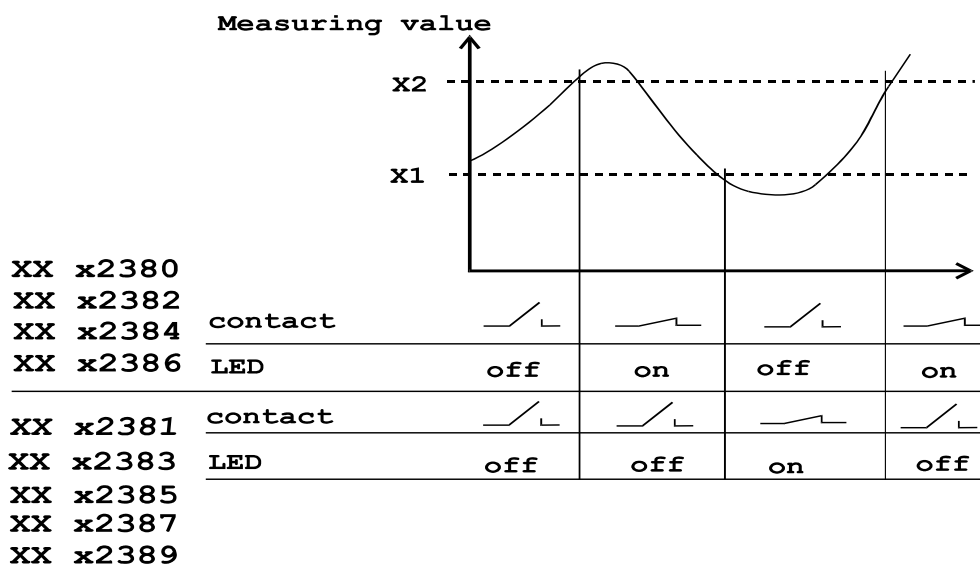
Please observe technical specifications.



### 5.1 Function-diagram for contact K1



### 5.2 Function-diagram for contact K2





## **Manual Override of Relay K2**

Pressing the key "Y/Test" may activate the relay contact K2. The contact is activated as long as the key is pressed.

## **6.0 Setting of Limit Values**

Adjust the limit values by using a screwdriver. The values may be adjusted by pressing the key X1 or X2 and turning the potentiometer located above each key until the desired value is displayed.

Note: Limit value X2 has to be programmed higher than limit value X1.

## **7.0 Remote control**

To terminals 24/25 a remote contact may be connected. It controls the action of the relays. Only when the remote contact is closed, the relays may be active.

When no remote control is used, terminals 24/25 must be linked. (Normal operation).

Function of special operation is inverse.



Be sure not to connect strange voltage to terminal 24/25. Nonobservance could result in an electrical shock.

## **8.0 Display**

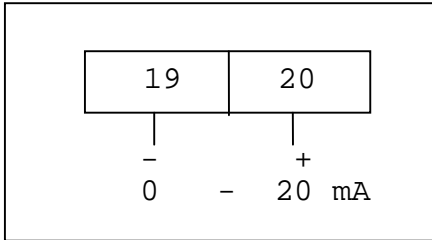
### **8.1 LED-Display**

The multi-digit LED displays the present actual value. The programmed values for X1 or X2 are displayed by pressing the appropriate keys. In the event that the measuring range is exceeded the digits disappear and the highest digit indicates the fault.

### **8.2 Indicator Lights of the Limit Values**

Indicator lights indicate when the pre-set limit value is exceeded or the measured value has fallen below the pre-set limit value.

### 9.0 Setting of the 20 mA Analog Output



The instrument delivers a current output, 0 or 4 to 20 mA, which may be used as input to remote recording devices, for data processing, controlling functions etc. The current output is independent of resistance load up to a value of 500 ohms.



Be shure not to connect strange voltage to the terminal 19/20. Non-observance could result in an electrical shock. The recorder output can be switched over from 0-20mA to 4-20mA by means of a jumper.



0 -20 mA



4 -20 mA

## 10.0 Installation of the measuring device

The instrument is build into a plastic-housing with dimensions 212 x 185 x 114 mm. The separate terminal box has on ist bottom- and rearplate 11 pre-pressed cable bushings. On the back of the housing, there are 3 holes for wall-fixing. The control hole is to hang up the device, the other ones to fix it.



### **WARNING**

**Only Qualified Personnel !**

**Only Specified Power Supply !**

See required power supply as noted on instrument.

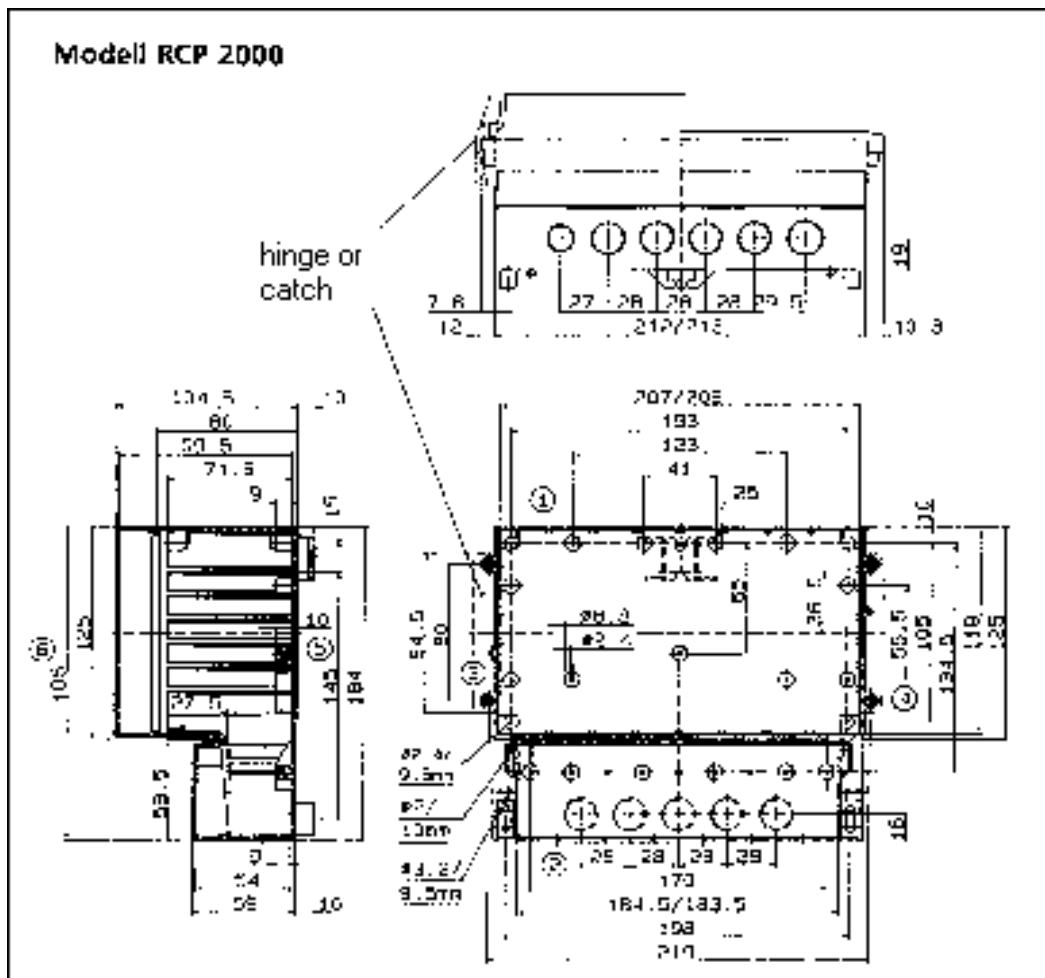
### **Observe local regulations!**



Install a power supply that can be disconnected (plug, switch).

Use suitable cable bushings for cable inlet. Take care for sufficient fixing of the connection cables. Do not install measuring- or control cables in parallel or close distance in the same cable guide with power supply.

10.1 Dimension sheet



**11.0 Technical data**

Range: 0-1999  $\mu$ S/cm (Resolution: 1  $\mu$ S/cm), **LF1**  
 0-9990  $\mu$ S/cm (Resolution: 10  $\mu$ S/cm), **LF2**  
 0-19,99 mS/cm (Resolution: 0,01 mS/cm), **LF3**  
 0-199,9 mS/cm (Resolution: 0,1 mS/cm), **LF4**

Reference temperature: 25°C

Recorder output: 0/4 - 20 mA - burden max. 500 Ohm

Display: multi-digit LED-display

Indications: 3 LED for limit value

Relay contact: 2 potential free SPDT  
 max. 250V 50Hz 3A, cos phi min 0,7

**General data**

Supply voltage: 230 V / 50 Hz (+10%/-15 %)  
 (other voltages on request)

Power consumption: approx. 4,5 VA

Dimensions: 212 x 185 x 114 mm (width x height x depth)

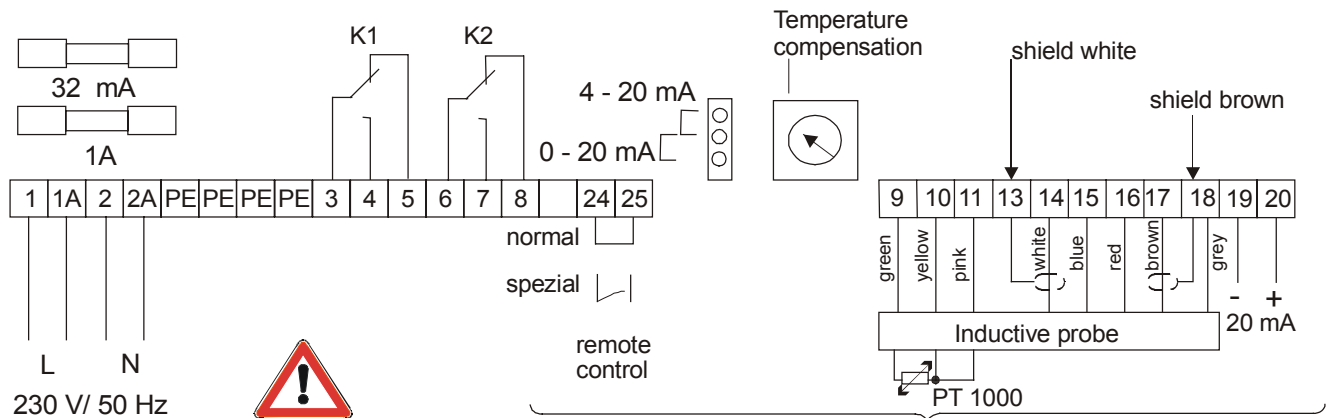
Protection: IP 65

Connection: Inline terminals 1,5 mm<sup>2</sup>

Ambient temperature: - 5°C bis 50°C

**Technical modifications reserved !**

**11.1 Connection diagram**



**Caution !**

**Do not connect strange voltage to these terminals !**