OPERATING INSTRUCTIONS

Conductivity Transmitter N-LF2000 230V AC with time delay function

These operating instructions apply to the following device:

Article	Measuring range	Order number
N-LF2000, Conductivity measuring device with time delay function in wall mounting housing, 230V AC	0 - 20 µS/cm 0 - 200 µS/cm 0 - 2000µS/cm	880571

Gebrüder Heyl Vertriebsgesellschaft für innovative Wasseraufbereitung mbH
Max-Planck-Str. 16, 31135 Hildesheim, Germany
Phone: +49 (0) 5121 7609 0 / Fax: +49 (0) 5121 7609 44
E-mail: vertrieb@heylneomeris.de, Website: www.neomeris.de

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Phone: +49 (0) 5121 7609 0 / Fax: +49 (0) 5121 7609 44
E-mail: vertrieb@heylneomeris.de, Website: www.neomeris.de

Table of contents

1. Description

- Device for the measurement of the electrical conductivity of aqueous solutions using a two-electrode conductivity cell. Designed for wall mounting installation.
- Applications: Demineralisation, reverse osmosis, desalination, cooling water recirc., phase separation.
- Operation at 230 V AC or 24 V DC
- Switching contact K1 mains potential (hysteresis 5 % fixed) - time-delay function
- Switch contact K2 potential-free (hysteresis 5 % fixed) - time-delay function
- Alphanumeric display with 2 x 16 digits
- Temperature measurement and display between 0.0 °C and 90.0 °C if using a Pt100
- Temperature compensation with 2.2 % / K at 90 °C; can be switched off / disabled
- Temperature sensor is monitored for sensor brake and error message in display
- Switchable operating mode of the relay control
- Analogue output for the measured conductivity value: 0 – 10 V and 4 – 20 mA

2. Technical Data

Measuring ranges: 0 – 20 / 200 / 2000 µS/cm, depending on measuring cell and amplification

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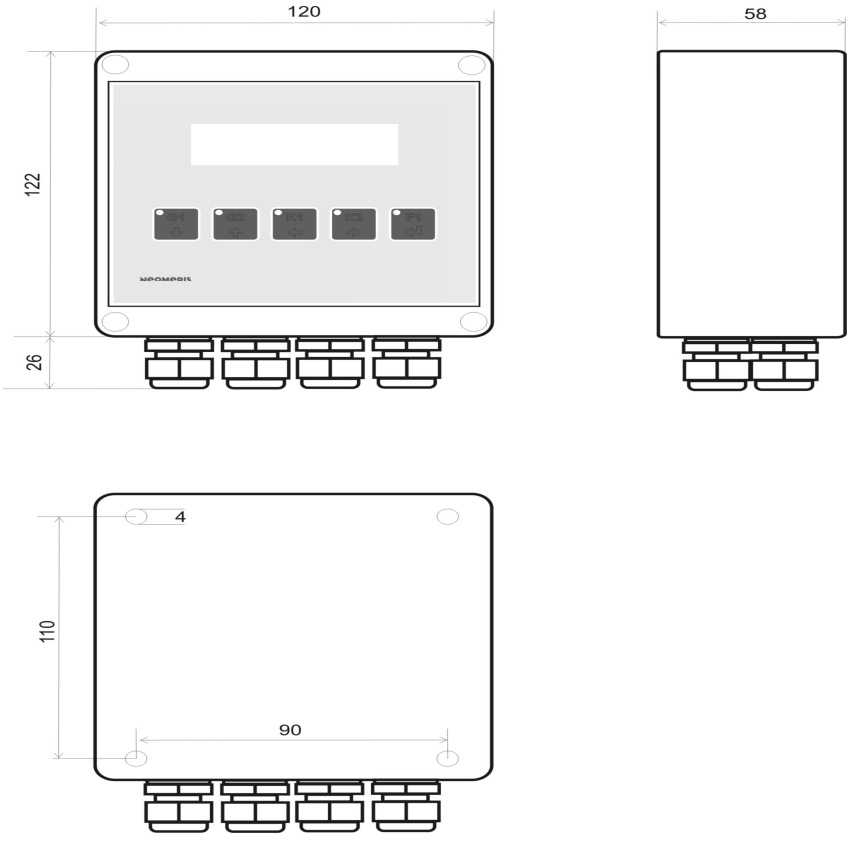
Temperature compensation:	Linear 2.2 % / K, can be disabled; reference temperature 25 °C
Indication of limit values:	Optical via 2 LEDs, 2 limit values can be set between 0 and 100 % of the measuring range
Limit value outputs:	1 potential-free relay contact, max. 6 A / 250 V AC
	1 relay contact 230V AC (Terminal 21)
Time delay function:	0 - 20 min in steps of 10 sec
Analog outputs:	0-10 V, Ra > 1 kOhm and 4-20 mA, Ra < 500 Ohm; corresponding to 0 – 20 / 200 / 2000 µS/cm
Power supply:	22 - 26 V DC, protected against voltage reversal, potential-separated, 1000 V isolation voltage; or 230 V 50/60 Hz
Power consumption:	Approx. 3 W / 3 VA
Protection class:	IP 65
Housing:	Wall mounting housing (Polycarbonate) 120 x 122 x 57 mm
Connections:	4 x M16 cable glands at bottom side of housing



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Phone: +49 (0) 5121 7609 0 / Fax: +49 (0) 5121 7609 44
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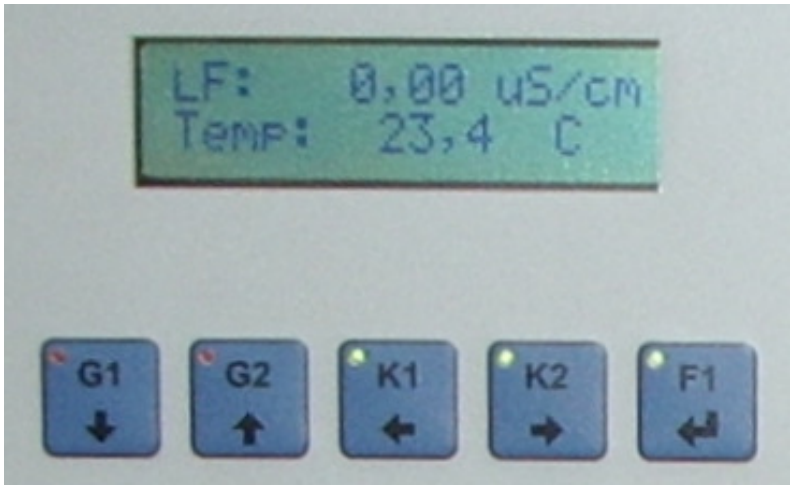
3. Display, Operation And Front Panel Settings



Display:	
Display top line:	Conductivity in µS/cm
Display bottom line:	
Without temperature compensation:	Limit value 1 and 2
With connected Pt100 sensor and enabled temperature compensation:	Sensor temperature or
Actuation G1 or G2:	Display of limit values 1 and 2 for 5 sec.
In case of fracture, disconnection or short-circuit of Pt100 sensor and enabled temperature compensation:	! T-Sensor !
Exceedance of the permitted measuring range:	! LF > MB !

LEDs:

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F1 green	Operating indicator, flashing in programming mode
K1 green	Relais 1 triggered
K2 green	Relais 2 triggered
G1 red	Conductivity limit value 1 exceeded / flashing with active time delay
G2 red	Conductivity limit value 2 exceeded / flashing with active time delay

Relay Settings:	
The mode of operation of the relay outputs can be switched on the circuit board by DIP-switch S4 (see chapter "**SETTINGS AND CONNECTION TERMINALS CIRCUIT BOARD**"):	
DIP switch position ***on***:	Relays drop at limit value exceedance
DIP switch position ***off***:	Relays are triggered at limit value exceedance
K1	Manual control of relay 1 (The buttons for the relay control invert the respective switching state for the actuation time.)
K2	Manual control of relay 2 (The buttons for the relay control invert the respective switching state for the actuation time.)

Limit Value Settings:	
Press F1 and G1 button **for 3 seconds simultaneously** The programming mode is then active and the LED at F1 flashes	**Button F1** the limit value G1 or G2 can be set **Button G1 (-10µS/cm) and G2 (+10µS/cm)** adjust the limit value G1 or G2 **Button K1 (-10sec) und K2 (+10sec)** adjust the delay time G1 or G2
Approx. 5 seconds after the last activation both limit values will be saved and the adjustment mode will be locked. Both limit values can be adjusted to any value of the measuring range.	

Calibration:
• Measuring range of the instrument are pre-calibrated • A correction is normally not necessary • Zero point is auto adjusted

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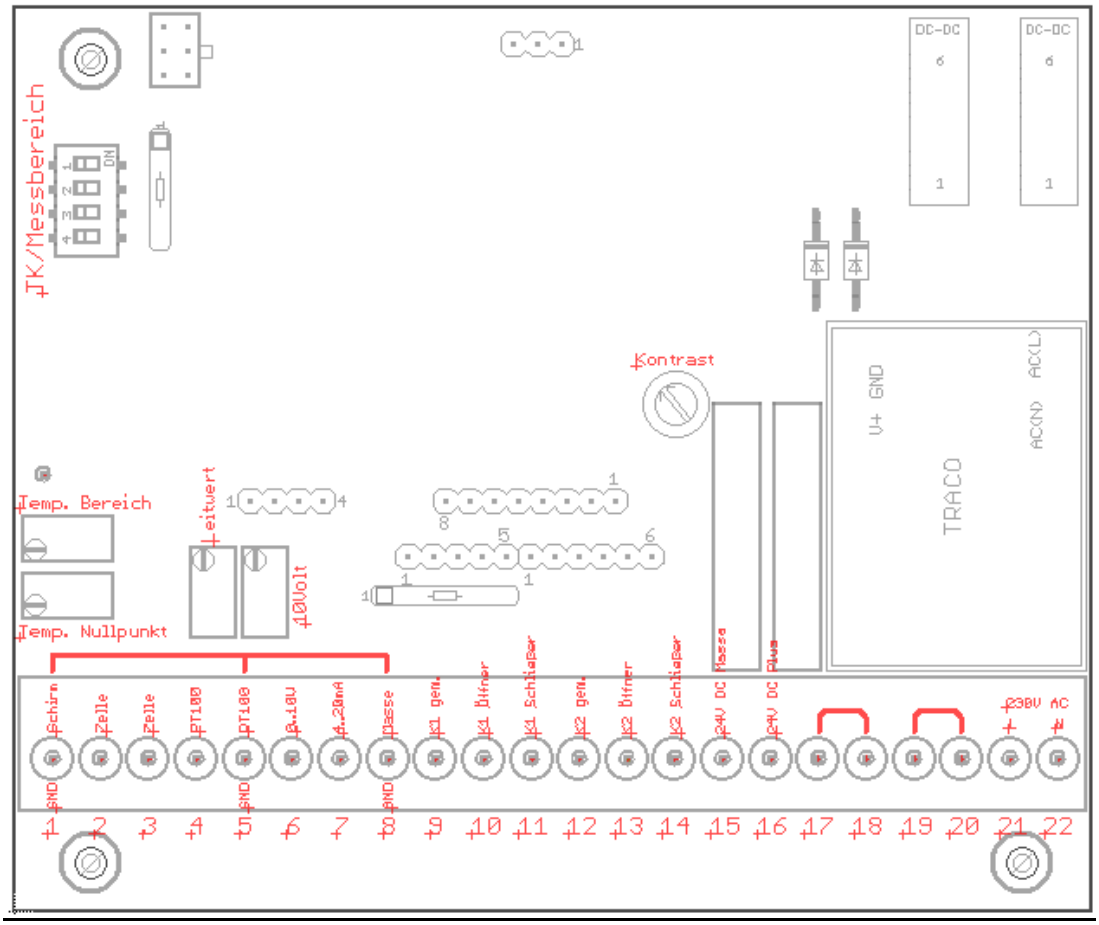
4. Settings And Connection Terminals Circuit Board



Terminal connections:

1	Shield	Sensor cable shield
2	MG1	Conductivity measuring cell
3	MG1	Conductivity measuring cell
4	MG2	Pt100
5	MG2	Pt100
6	0-10 V	Output 0 – 10 V
7	4-20 mA	Output 4 – 20 mA
8	Ground	Ground for outputs 0 – 10 V and 4 – 20 mA
9		230V AC, bridged to terminal 21
10	K1	Relay 1, open contact (Switch contact off Terminal 22)
11	K1	Relay 1, close contact (Switch contact off Terminal 22)

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12	K2 inp	Relay 2, input, root
13	K2 op	Relay 2, open contact
14	K2 cl	Relay 2, close contact
15	24 V -	Input 24 V DC, ground
16	24 V +	Input 24 V DC, +Pol
17	BR1	internally bridged to terminal 18, potential-free
18	BR1	internally bridged to terminal 17, potential-free
19	BR2	internally bridged to terminal 20, potential-free
20	BR2	internally bridged to terminal 19, potential-free
21	230 V AC	Input 230 V AC
22	230 V AC	Input 230 V AC

Potentiometer settings (all are pre-adjusted):

Range conductivity measurement
Setting for temperature measuring at 0 °C (Pt 100 = 100.0 Ohm)
Setting for range, e.g. at 60 °C (Pt100 = 123.2 Ohm)

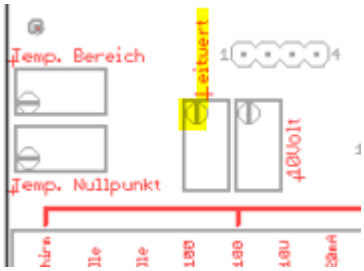
DIP switch settings:	S1	S2	S3	S4	required sensor
Measuring range 0 – 20	off	off	x	x	K = 0,1
Measuring range 0 – 200	on	off	x	x	K = 0,1
Measuring range 0 – 2000	on	on	x	on	K = 1,0

For DIP switch position S3:
With temp. compensation: on
Without temp. compensation: off

**** For DIP switch position S4**
Relay triggered at conductivity < limit value: on
Relay triggered at conductivity > limit value: off

Calibration:

The conductivity measuring instrument is delivered calibrated from the factory! If required, however, you can carry out an on-site calibration with a suitable reference solution and a slotted screwdriver, observing the one-step calibration rules. It is essential that you also observe the appropriate DIP switch setting.



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Attention!

- Only one power supply connection is permitted; either 230 V AC or 24 V DC
- The 24 V DC input is protected against polarity reversal
- AC voltage at the 24 V DC input or DC voltage at the 230 V AC input will destroy the instrument immediately and completely!
- The measuring cell connection cable must be a shielded type for usage in industrial environments at lengths above 1 meter
- The terminals ground and shield are internally connected to the common housing ground (Voltage isolation of 1000 V to the power transformer and to the 24 V DC connection, respectively). These terminals must never be bridged to another terminal or connected to an existing ground connection, otherwise the potential isolation of measuring cell and electronics will be overruled.

5. Further Operating Conditions

The operation of the measuring instrument above the permitted measuring range and constant short-circuit, respectively, can lead to instrument damage!

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6. Conductivity Measuring Cells Overview:

Conductivity measuring cells for standard applications:				
cell constant (±10%)	**for measuring range**	**measuring cell with PT100 and part number**		**for conductivity transmitter**
0,1	0 - 20 µS/cm	N-LF3401/PT100, 3/4"	880574	N-LF2000
		N-LF1201/PT100, 1/2"	880576	
0,1	0 - 200 µS/cm	N-LF3401/PT100, 3/4"	880574	N-LF2000
		N-LF1201/PT100, 1/2"	880576	
1,0	0 - 2000 µS/cm	N-LF3410/PT100, 3/4"	880575	N-LF2000
		N-LF1210/PT100, 1/2"	880577	

- Electrode pin material: 1.4571
- Housing material: POM
- Max. operating pressure: 6 bar
- Max. operating temperature: 60 °C
- Protection class connector: IP 65
- Connector contacts: 2 and ⏚ = electrodes 1 and 3 = temperature sensor
- Operation conditions: **Electrode pins must be completely immersed!**
- Temperature sensor Pt100

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Conductivity measuring cells for cooling tower applications:				
cell constant (±10%)	**for measuring range**	**measuring cell with PT100 and part number**		**for conductivity transmitter**
0,1	0 - 20 µS/cm 0 - 200 µS/cm	NEOMERIS SELECT conductivity sensor, PT100	890826	N-LF2000
1,0	0 - 2000 µS/cm	NEOMERIS SELECT conductivity sensor, PT100	890817	N-LF2000
Suitable accessories and article number:		• Cell constant: k=0,1 +/-10% or k=1 +/-10% • Wetted materials: CPVC, Graphite, Viton® • Max. temperature / pressure: 60 °C (140 deg F) / 6,5 bar (100 psig) • Temperature sensor: PT100 RTD		
T-Pie 1" with 3/4" NPT inner thread only for part number 890817(!)	890821			
T-Pipe 1,5" with 1" NPT inner thread only for part number 890817 + 890826(!)	890861			
Connection cable 3 m with tinned cable ends for part number 890826 + 890817	890827			

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Connection cable 6 m with tinned cable ends for part number 890826 + 890817	890828	

Conductivity measuring cells for high temperature applications:				
cell constant (±10%)	**for measuring range**	**measuring cell with PT100 and part number**		**for conductivity transmitter**
0,1	0 - 20 µS/cm 0 - 200 µS/cm	NEOMERIS SELECT HTLF ¾-inch NPT thread; PT100	890790	N-LF2000
		NEOMERIS SELECT HTLF EXT ¾-inch NPT thread; PT100	890794	N-LF2000
1.0	0 - 2000 µS/cm	NEOMERIS SELECT HTLF ¾-inch NPT thread; PT100	890792	N-LF2000
		NEOMERIS SELECT HTLF EXT ¾-inch NPT thread; PT100	890796	N-LF2000

- Cell constant: k=0,1 +/-10% or k=1 +/-10%
- Operating temperature: 0-200°C
- Max. pressure: 0-17 bar
- 3/4" NPT for mounting in ¾-inch t-pipe
- EXT version 3/4" NPT for mounting in 1-inch t-pipe

NEOMERIS SELECT HTLF

NEOMERIS SELECT HTLF EXT

Gebrüder Heyl Vertriebsgesellschaft für innovative Wasseraul
Max-Planck-Str. 16, 31135 Hildesheim, German
Phone: +49 (0) 5121 7609 0 / Fax: +49 (0) 5121 760
E-mail: vertrieb@heylneomeris.de, Website: www.neo

- Cable: 6“ PTFE-coated cable
- Temperature compensation: PT100 RTD
- Housing and pins made of stainless steel 316

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