

MINILOG

**English
Version**



**2-Kanal
Messdaten-
erfassung**

**mit Auto-Range
und Echtzeituhr**

Cathodic protection measuring technology requires miniature battery operated data logging units.

MiniLog represents realization of measuring engineers' requirements to record large amounts of data over long periods in the field.

Due to sampling rate and number of recording channels the data accumulated may reach such proportions paper-supported chart recorders could only handle with great efforts.

MiniLog represents state-of-the-art measuring technology of cathodic protection.

System Description

MiniLog is a battery operated miniature sampling data logging unit for electrical potentials recording.

Short Term Recording and Long Term Recording

Bearing in mind that various sampling rates and large data capacities are available, **MiniLog** can be optimal used for short term recordings (e.g. stray current recordings), as well as for long term recordings over several months.

Battery Provision and Miniature Design

Due to the fact that **MiniLog** has tiny structure and dry cell battery is used for the power supply, **MiniLog** allows installation and operation even in test points.

Real Time Clock and Alarm Mode

In the **MiniLog** integrated real time clock provides all sampling values recorded with a date and time stamp. The utilisation of alarm mode provides pre-programmable sample recordings start at any time required. For example stray current measuring during night-time.

AC and DC Measurements

The **MiniLog AC / DC** has the capability of simultaneously DC and AC voltage recording. All DC inputs are effectively protected against falsifying 16 Hz and 50 Hz AC voltages by an active low-pass filter.

Auto-Range-Mode

An intelligent auto-range-mode has been integrated. This mode enables to measure within a wide reading range selecting the needed range (300 mV, 3 V and 30 V) automatically. This insures comfortable recordings without nuisance metering range restrictions

WinLog Evaluation Program

To facilitate the evaluation of the huge information logged in, a special software program has been developed. The **WinLog** evaluation program permits a graphical representation of the logged samples on the PC-screen and further to the printer. **WinLog** makes it easy to put recordings, which have been taken in different sites in comparison. Further more, enormous statistic's functions and mean value's calculations offer a wide range of possible manipulation.



Miniature Design and Dual Channel Recording

The remarkable diminutive volume when put in comparison to all known chart recorders, permits the utilisation in test points.

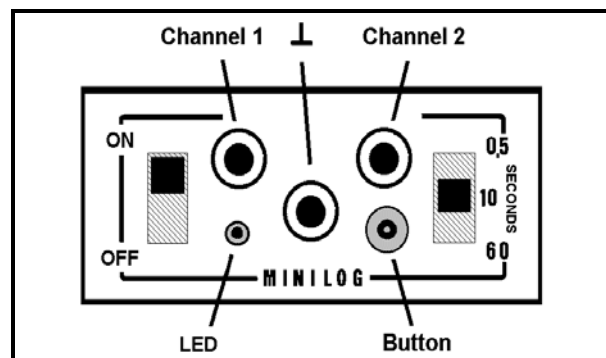
By means of utilising the latest known storage technology and the low current consuming microprocessor (supplied by standard 9 V block battery) used in this tiny device, a continuous recording capabilities for a time up to 6 month is possible. Internal Lithium cell secures all logged data during battery change, or depletion for a time longer than 2 years.

MiniLog is easy to operate. When the integrated Auto-Range-Function is used nuisance metering range alteration by the operator can be completely overlooked.

MiniLog will self-acting choose the proper metering range (300mV, 3V or 30 V) even when value change occurs during the running recording.

When Auto-Range is used **MiniLog** will provide ideal resolution of the sampling values during potential or current deviation.

In order to maintain the miniature design feature of the **MiniLog**, the installation of keyboard and display has been renounced. Only an On/Off-switch, sampling range switch and the recording start switch are to be operated by the technician.



System Operation



Intelligent Recording of DC and AC Voltages

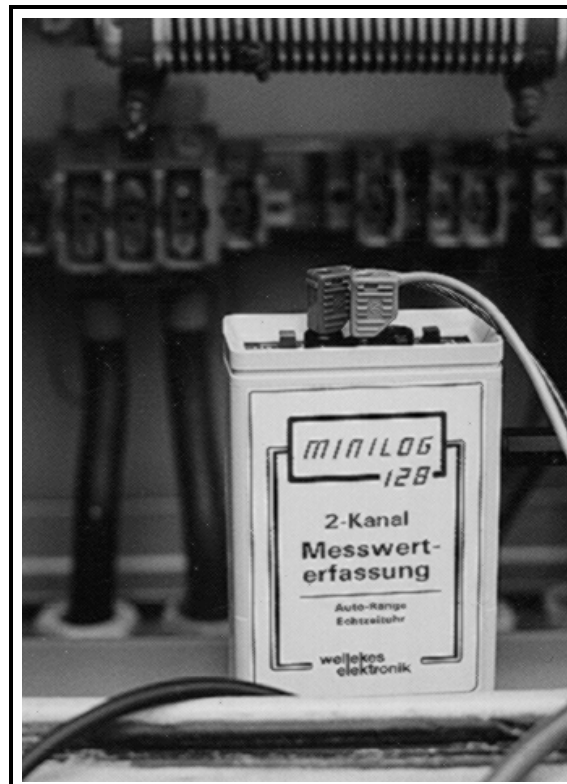
Using the fast sampling rate of 100 ms, **MiniLog** will be capable of showing the graphical display of the depolarisation curve during off-potential measuring. Representation is as well possible outdoors with sites having extremely AC voltage interference. The high AC voltage attenuation in the DC channels within the 16 Hz and 50 Hz ranges have been encountered using active low-pass filter and computerised integration procedure. Reliable recording without any further noticeable interference is achievable.

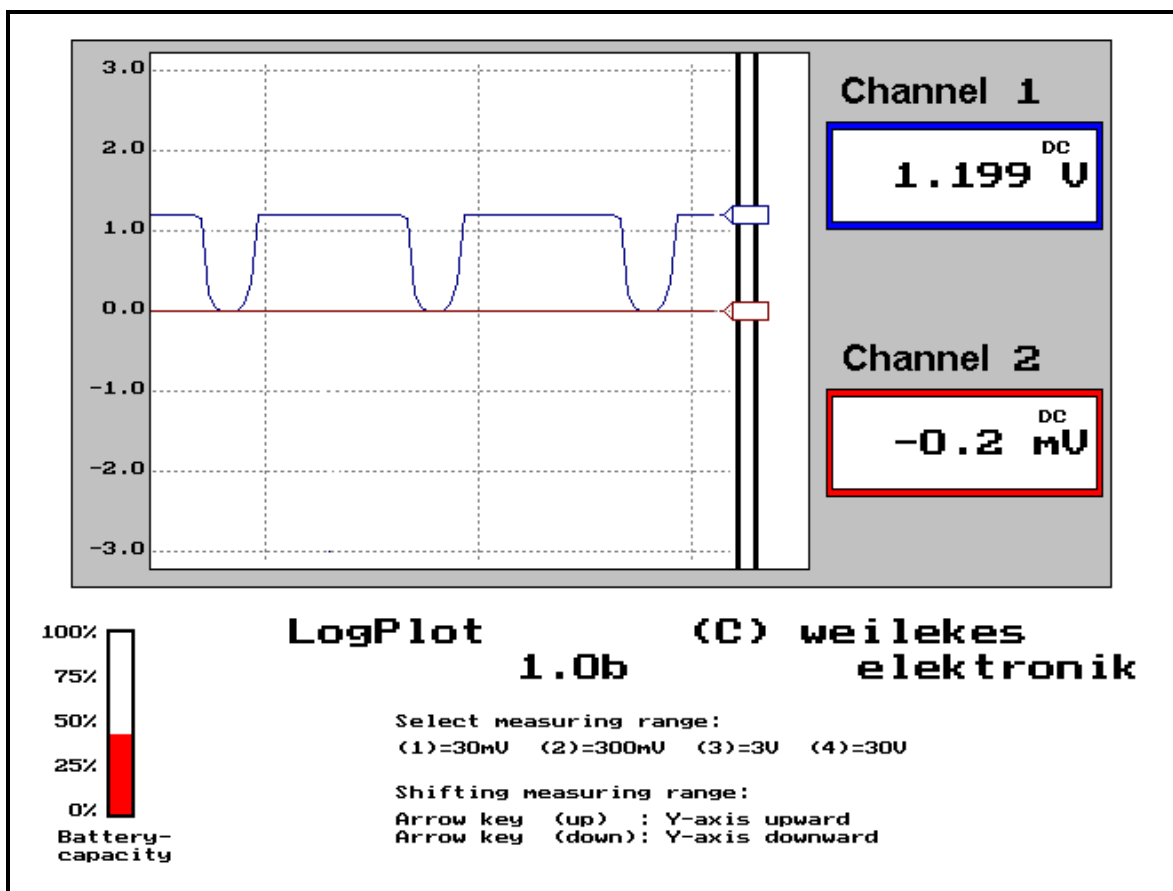
Integrated Real Time Clock and Alarm Mode

The real time clock provides all sampling values during recording with a date and time stamp. This will ease and facilitate the association between recordings that are several hours, days or even months apart.

For sampling recordings that are to be taken in definite times (e.g. during night time or at weekends) **MiniLog** offers an alarm mode.

The alarm mode enables the **MiniLog** to start sampling at a defined time and date.





To control the sampling values during recording, it is possible to connect the **MiniLog** through the existing port to a PC or notebook by means of serial interface cable.

In order to be able to observe the sampling values on the PC/notebook monitor, **MiniLog** transmits each sampling value recorded through his serial interface port. Program **LogPlot** allows the real time presentation of the sampling values in a PC or a notebook during running **MiniLog** recordings.

With a resolution of 3½ digits, **LogPlot** display a virtual activity of a recorder. The amplitude of the actual sampling value from both **MiniLog** - channels is exposed in a sub-window parallel to the graphical sample display. Similar to a 2-channel chart recorder the samples will be represented as a solid line.

Additionally for the battery condition control a percentage scale display is used. Also the actual date and time of the recording **MiniLog** are to be observed on the display. Similar to a chart recorder, manipulation of the scale in different steps to facilitate reading and evaluation of important potential portion is possible.

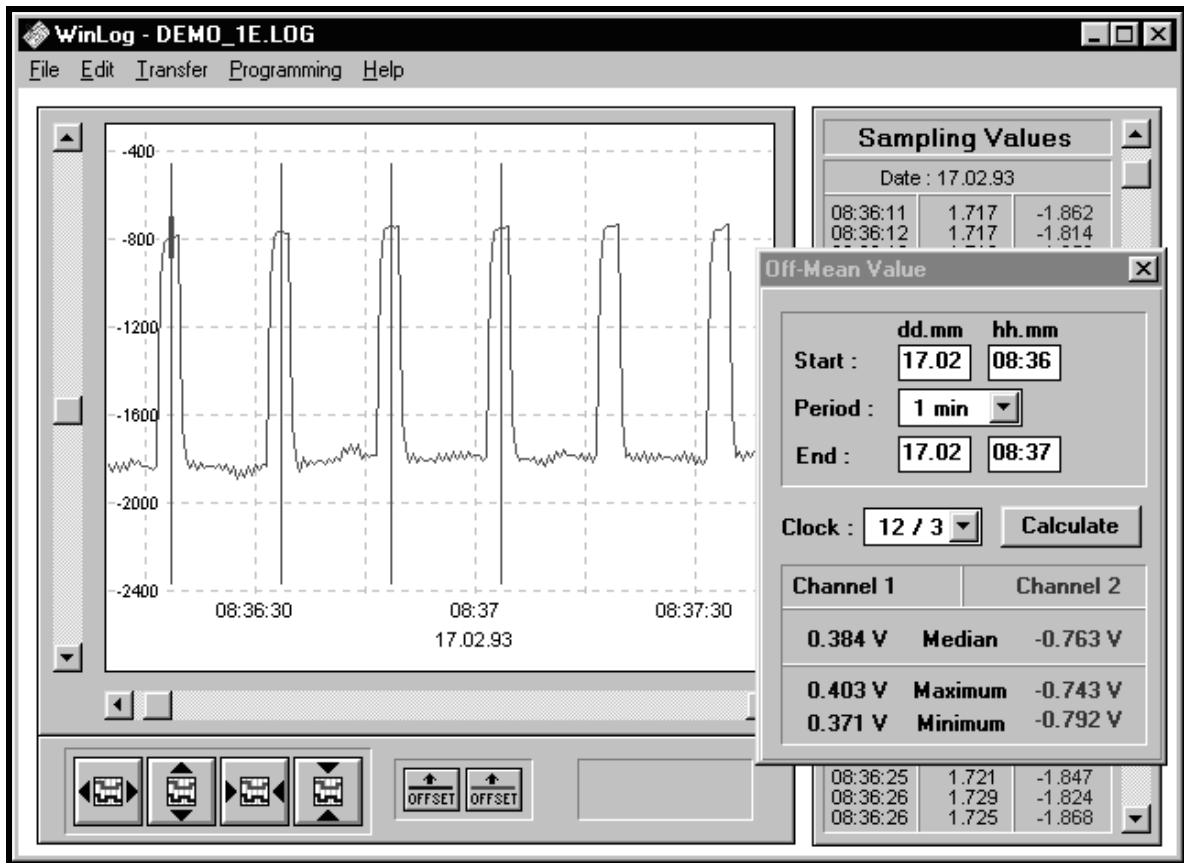
WinLog
Evaluation Software

Data Processing

WinLog is required to transfer the logged data from **MiniLog** to the PC or notebook; for the comfortable data evaluation.

WinLog is conformable with the highest software standards, consequently **WinLog** is runnable under Windows 3.1x, Windows 95 and Windows NT.

WinLog submits simultaneously the graphical and the digital presentation of the sampling values. Thus **WinLog** offers optimum degree of fast and accurate recordings' evaluation.



Without nuisance hidden, hard to keep in mind menu functions, the Windows display has all functions visual on the menu bar. The menus can be dropped down and the belonging commands are visible to select either with shortcuts, keyboard or with the mouse. Zooming and offset could be directly selected on the display.



Definite Identification for each *MiniLog*

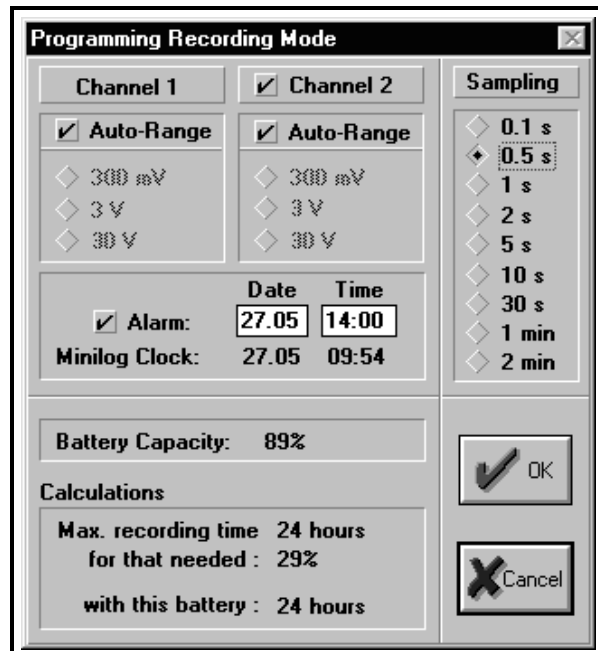
Each *MiniLog* can get its own identification. The identification code gives the PC information about working sites and jobs. Therefore when sampling data readings are performed, this attached information is immediately available. Likewise it is always possible to call the most important characteristics (e.g. start time, used sampling rate) of the last recording and the actual battery condition.

Individual Recording Mode Settings

Parallel to the standard settings (via operational switch at the front plate) *MiniLog* may be pre-programmed by PC for additional settings.

Independently programmable are features like Auto-Range on/off for both channels individually, pre-selection of measuring ranges, doubling recording capacity by switching off second channel, alarm controlled recording start-up.

Depending on *MiniLog* version up to 9 different sampling rates are available for varying measuring tasks.



Data Evaluation

The windows graphic display of sampling values offers versatile options of data evaluation. For example it is possible to stretch or compress the time axis up to a maximum factor of 64. The zooming will give a proportional overall view when fast potential changes within seconds or slow potential changes within hours' range are to be evaluated.

Changeable Time Axis

In order to evaluate even smaller potential changes correctly, **WinLog** offers the possibility of voltage magnification. The scale of the voltage axis can be spread out in 8 different steps and additionally shifted around an independently selectable voltage ranging. For example to display a voltage range from -800 mV to -900 mV perfectly on the screen. This function is at wish changeable and offers the possibility of sampling value procession that is not available by paper-based recorders.

Voltage Magnifier

After having an optimised look at the recorded values, **WinLog** allows printing of the whole section or selected parts with printer or plotter. A legend can be added and edited as necessary. The time and voltage axis scales can be selected and edited as desired. It is even possible for **WinLog** to calculate the current values by means of switching a definite calculating factor when voltage is measured.

**Graphical Illustration
with Printer or Plotter**

Individual Legend Adoption

Individual Text Adoption

In order to be able to compare between different recordings, the recording sessions to be compared can simultaneously be loaded on the PC and be processed. Shunt voltages may be converted into equivalent current values. To evaluate the median for off-potential measuring, **WinLog** will form the mean value based on multiple sampling periods.

Comparative Function

Offset and Factor Calculation

**Off-Potentials
Mean Value**

Most Important Features

Features of MiniLog

- 8 Bit microprocessor operated sampling values' recorder
- 12 Bit A/D-converter with integrated active low-pass filter for each DC-input as protection against AC interference
- 2-channel recording with Auto-Range mode
- 128 KBytes or 512 KBytes RAM size with battery backup
- Integrated real time clock for presenting date and time
- 3 Standard-sampling values
(selectable via 3-position selector switch: 0,5 s, 10 s, 60 s)
- 9 Pre-programmable sampling rates
- **Pre-programmable functions:**
 - Sampling rates (0,1 s, 0,5 s, 1 s, 2 s, 5 s, 10 s, 30 s, 60 s, 120 s)
0,1s only for MiniLog DC Version
 - Auto-Range is for each channel individually disactivatable
 - Double recording capacity with disactivation of second channel
 - Alarm mode with date and time for precise sampling start-up, e.g. during night hours or weekends
- User freely programmable identification text or code for each **MiniLog** unit (e.g. to define each individual measuring job).
- Self-acting battery condition test after each start using light diodes as status indicator.
- The display of exact percentage **MiniLog**-battery condition in a PC/Notebook screen.
- Self-acting power saving control. The microprocessor will switch the **MiniLog** off when within consecutive 5 minutes the system has not been in use (the function is blocked during data recording).
- Self-acting data recording reliability test. Auto-termination will take place when the system detects weak battery condition.
- No data loss by weak battery condition and during battery replacement.

Features of WinLog

- Runnable under Windows 3.1x, Windows 95 and Windows NT
- Large scale multicoloured display of sampling value
- Digital and analogue display of sampling values
- Comprehensive zoom facilities via keys
- Rapid viewing of entire recording via scrollbars
- Enormous statistics' function for sampling value evaluation (forming mean-, maximum-, minimum value and standard deviation)
- Compressing and spreading recorded sessions (= post-recording sampling rate change)
- Evaluation by other software is possible. ACSII-code is used to export the sampling values
- Comfortable and easy method of printing service. Preview gives the user the possibility to modify the legend and axis as desired
- Current calculation by means of volt measuring (i.e. shunt voltage measuring) with user's choice for the Y-axis scale
- Comments can be added at any point desired within the graph so as to explain or simply to mark an essential point
- Easy way forming the off-potentials mean value.

Technical Specifications

MiniLog DC

(Channels 1 and 2 are for DC-Voltage)

Technical Specifications:

Measuring Range Channel 1 and 2 (DC)			
	± 300 mV	± 3 V	± 30 V
Resolution	0,2 mV	2 mV	20 mV
Input Resistance	2 M Ω	2 M Ω	1 M Ω
Attenuation at 16 Hz / 50 Hz	45 / 60 dB	45 / 60 dB	35 / 45 dB
Accuracy (% of value indicated) (Basic Deviation)	0,5 % $\pm 0,6$ mV	0,5 % ± 4 mV	0,5 % ± 40 mV

Operating Temperature -15°C to 60°C
Relative Humidity 10 to 80% non condensing

Recording Capacity:

Version 128 (Capacity: approx. 85.000 Sampling Values)

Sampling Rate	0,5 s	10 s	60 s
Single Channel	12 h	10 days	60 days
Dual Channel	6 h	5 days	30 days

Version 512 (Capacity: approx. 340.000 Sampling Values)

Sampling Rate	0,5 s	10 s	60 s
Single Channel	48 h	40 days	238 days
Dual Channel	24 h	20 days	119 days

Dimensions : approx. 11,2 x 7 x 3,3 cm
Weight : approx. 220 g (incl. battery)
Battery : E-Block 6LR61 Type Alkaline

MiniLog AC / DC

(Channel 1 for AC / Channel 2 for DC)

Technical Specifications:

Measuring Range Channel 1 (AC rms.)			
	250 mV	2,5 V	25 V
Resolution	0,2 mV	2 mV	20 mV
Input Resistance	2 MΩ	2 MΩ	1 MΩ
Accuracy (% of value indication) (Basic Deviation)	1,5 % ± 1 mV	1,5 % ± 4 mV	1,5 % ± 40 mV

Measuring Range Channel 2 (DC)			
	± 300 mV	± 3 V	± 30 V
Resolution	0,2 mV	2 mV	20 mV
Input Resistance Input resistance	2 MΩ	2 MΩ	1 MΩ
Attenuation at 16 Hz / 50 Hz	45 / 60 dB	45 / 60 dB	35 / 45 dB
Accuracy (% of value indication) (Basic Deviation)	0,5 % ± 0.6 mV	0,5 % ± 4 mV	0,5 % ± 40 mV

Operating Temperature -15°C to 60°C
Relative Humidity 10 to 80% non condensing

Recording Capacity:

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Single Channel	48 h	40 days	238 days
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Dimensions : approx. 11,2 x 7 x 3,3 cm
Weight : approx. 220 g (incl. battery)
Battery : E-Block 6LR61 Type Alkaline

MiniLog AC

(Channel 1 and 2 for AC-Voltage)

Technical Specifications:

Measuring Range Channel 1 and 2 (AC rms.)			
	250 mV	2,5 V	25 V
Resolution	0,2 mV	2 mV	20 mV
Input Resistance	2 MΩ	2 MΩ	1 MΩ
Accuracy (% of value indicated) (Basic Deviation)	1,5 % ± 1 mV	1,5 % ± 4 mV	1,5 % ± 40 mV

Operating Temperature -15°C to 60°C

Relative Humidity 10 to 80% none condensing

Recording Capacity:

Version 128 (Capacity: approx. 85.000 sampling values)

Sampling Rates	0,5 s	10 s	60 s
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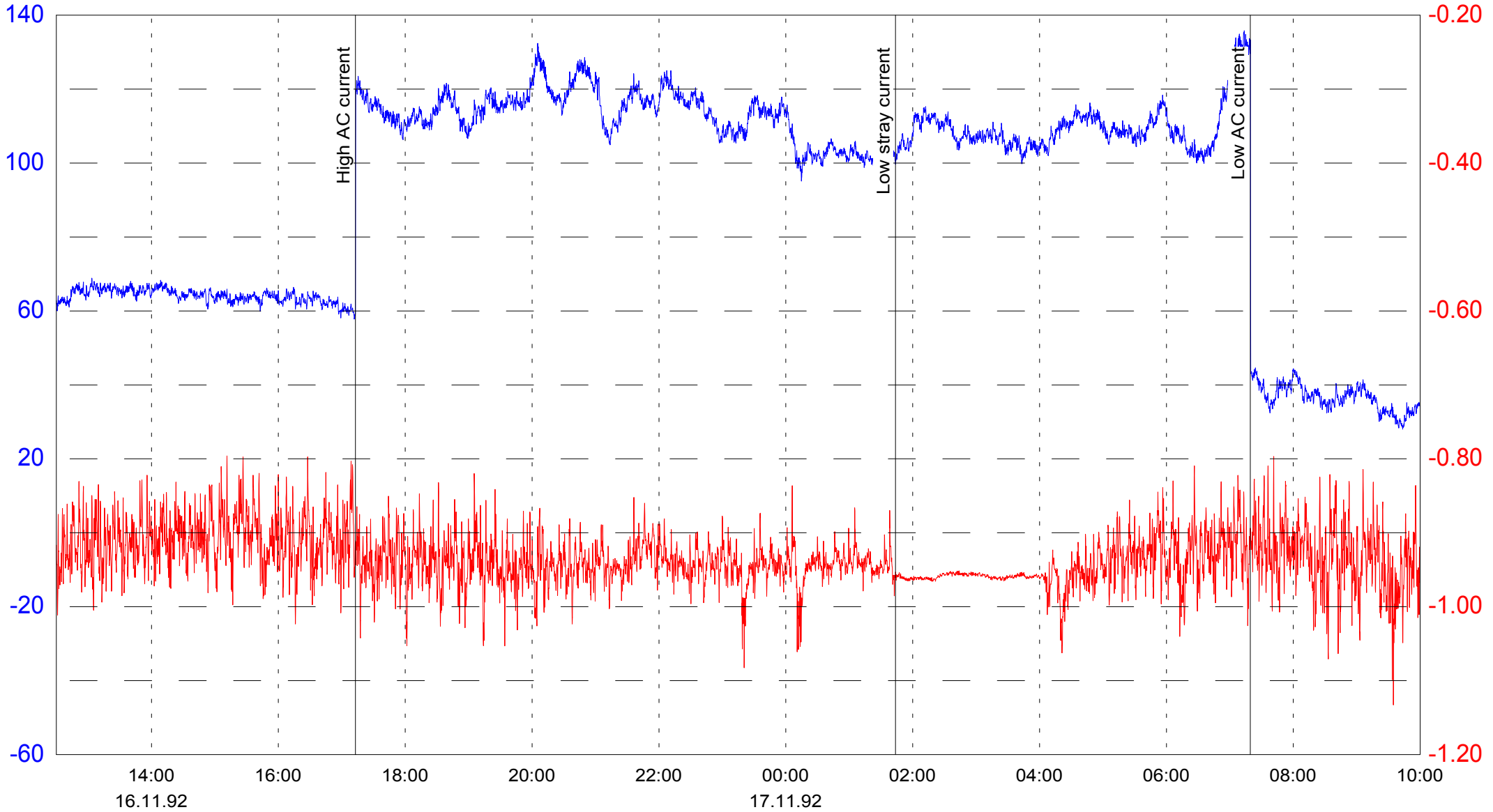
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Single Channel	48 h	40 days	238 days
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Weight : approx. 220 g (incl. battery)
Battery : E-Block 6LR61 Type Alkaline

[mA]

[V]



— : AC Current
 — : Pipe Potential

**Simultan Recording of
 AC Current and Pipe Potential
 with MINILOG AC/DC Sampling Rate: 10s**

	Channel 1	Channel 2
Maximum Value	0.136	-0.80
Minimum Value	0.028	-1.13
Median	0.092	-0.93
Standard Deviation	0.029	0.035