SIP Rabbit

● for precision agriculture measurements

The **SIP Rabbit** system is optimized for quasi continuous resistivity measurements with moving electrodes. This type of measurement is needed for example in precision agriculture. The standard instrument supports a true parallel measurement with one transmitter (current) and 5 receiver (voltage) dipoles. The complex apparent resistivity (amplitude and phase) will be measured at up to 4 frequencies at the same time. For moving measurements, these frequencies typically lie in the range of 100 - 1000 Hz. The time series recording is interrupt free. Therefore, a dense resistivity profile is guaranteed.

Complex resistivities can be measured in the range of 1 mHz and 1 kHz. Complex resistivities provide information on water content and porosity of the soil.

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FIELD OPERATION ▶

Rolling or looped electrodes are used for field operation. It is also possible to use "caterpillar chains". Demands placed on the electrodes are strongly dependent on the conditions of the area. This is why they are not included components of the measuring instrument. They are supplied by the operator.

Fig. 1: **SIP Rabbit** *during field operation.*
Yellow casing: Rabbit instrument.
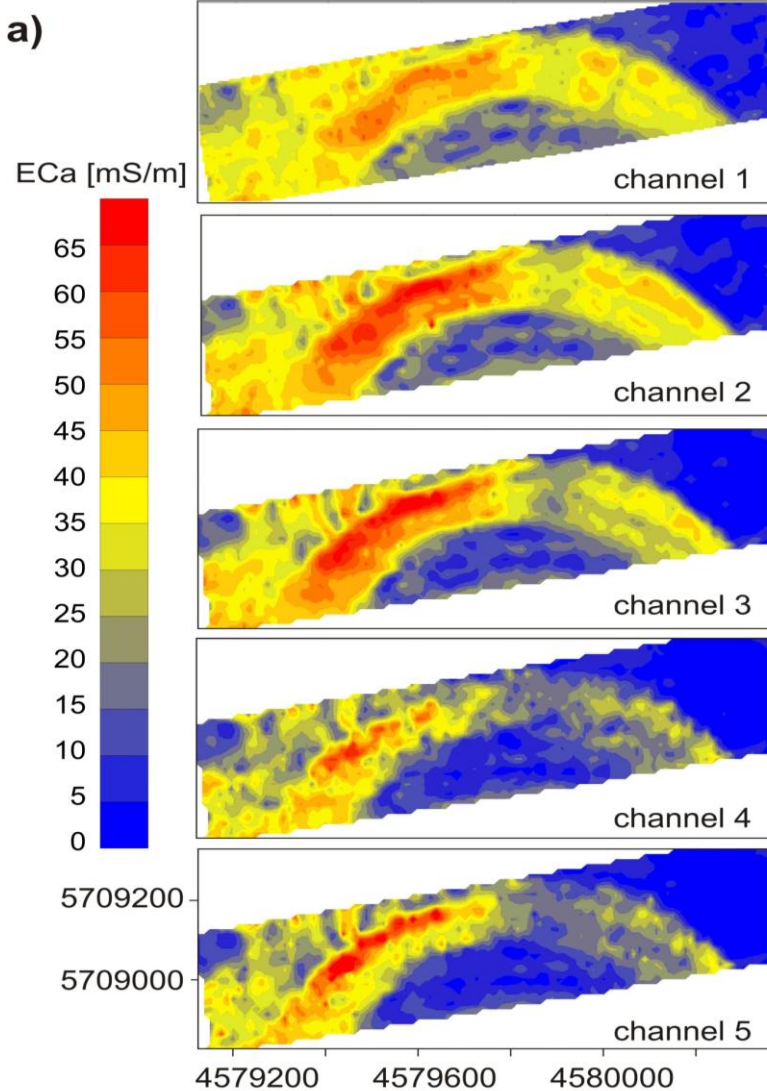
◀ FIELD DATA

Fig. 2: Spatial variability of the electric conductivity.
*Here: Paleochannel. Area: 400 m x 1200 m.*
Channel 1: Lowest depth,
Channel 5: largest depth.
In: Lück E. & Rühlmann J. (2010): Geophilus Electricus - a new soil mapping system. International Conference on Agricultural Engineering, Clermont-Ferrand, REF319.

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OPERATING SOFTWARE ▶

During the measurement the main menu of the PC (Laptop) displays (real time) the recorded time series of current and voltages. This makes a first data quality check very easy. In addition the calculated resistivities for all configurations and frequencies are shown along the profile.

Fig. 3: Main screen of PC operating software.
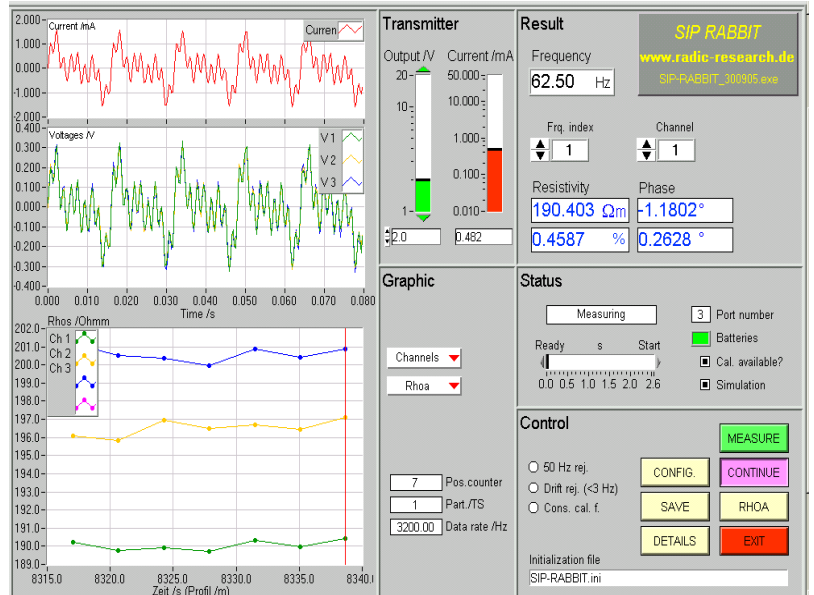
APPLICATION RANGE

- Humus
- Seashore
- Arable land
- Historical buildings
- Contaminated sites
- Archaeological sites
- Laboratory measurements
- Nuclear waste disposal sites
- Estimation of hydraulic permeability
- Groundwater exploration in arid areas
- Discrimination between clay and saline water
- Detection and characterization of electronic conductors
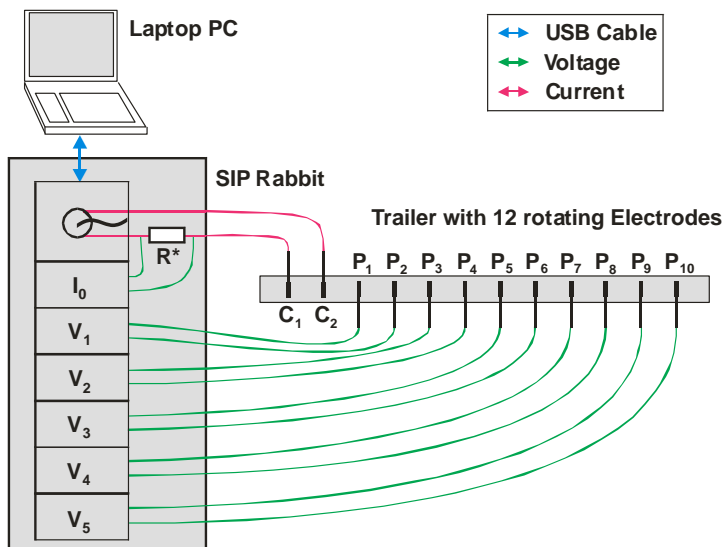
Fig. 4: SIP Rabbit schematic diagram.

SIP Rabbit

Technical specifications

General
- Frequency range: 0.001 - 1000 Hz
- Signal: 4 sinusoidal frequencies
- Channels: 5x voltage, 1x current
- PC interface: USB
- Standard output power of build-in transmitter: ±400 V, ±125 mA
- Two internal 12 V (7 Ah) batteries
- Battery capacity: >8 h
- If 50 W source is used, then an additional external battery is need
- Water resistance: splash-proof
- Weight: 15 kg
- Size: 50 x 18 x 50 cm^3

Channel
- A/D converter: 24 bit
- Initial sample rate: 19.2 kHz
- Data rate: 3.2 kHz / 2^n, n=0,1,2…15
- Input voltage range: ±2.5 V
- Input current range: ±250 mA
- Buffer length: up to 250 ksmpls
- Data format: 32 bit
- Digital power line filter
- Digital drift filter

PC Software
- Windows 7 - 10
- Control of the entire system
- Time series recording, storing, displaying, transfer function, confidence limits, exporting to commercial inversion programs

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