Developed in Russian Academy of Science

SibER-64 v.1.1

MULTI-ELECTRODE ELECTRICAL RESISTIVITY AND INDUCED POLARIZATION IMAGING INSTRUMENT.

General

Electrodes:	64 + 2 remote (Tx and Rx)
External supply:	12 V
Display:	10", 1024 x 600 pixels with capacitive touchscreen
Internal memory:	4 ... 64 Gb
GUI language:	Russian, English
External interfaces:	USB 2.0, Fast Ethernet
Software updates through Internet:	YES
GPS receiver:	YES
Close lid protection:	IP 64
Open lid protection:	IP 54
Operating temperature:	-20 ... +40 0C
Moisture detector:	YES
Additional external switch unit:	NO
Additional external transmitter:	NO
Dimensions:	500 x 457 x 305 mm
Weight:	21 kg

Receiver (Rx)

Channels:	16 + 2 for Tx monitoring (output voltage and current)
Speed of data collection:	up to 1000 measurements per minute
Input impedance:	10 MOhm
Input voltage range:	+-0.1 mV ... +-9 V; +-9 V ... +-250 V
50 Hz rejection:	90 dB
Accuracy:	better than 1 %
ADC bits:	24
Overvoltage protection:	1 kV

Internal transmitter (Tx)

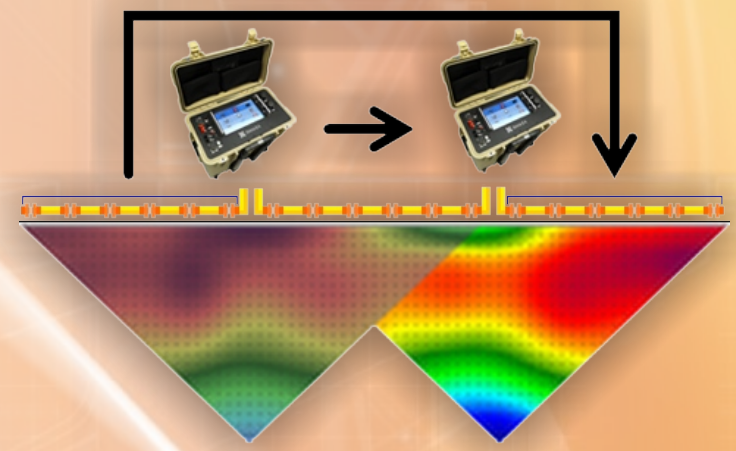
Output load:	10 Ohm ... 100 kOhm
Max. output power:	200 W
Max. output current:	2 A
Max. output voltage:	500 V
Short circuit protection:	YES
Temperature detector:	YES

Operation modes

Electric resistivity tomography:	YES
Vertical electrical sounding:	Optional
Electrical profiling:	NO
Resistivity:	YES
Induced Polarization (IP):	YES
Tx pulse length:	80 ms ... 2 s
Tx pause length:	20 ms

Arrays

Wenner (alpha, beta, gamma), Reciprocal Wenner (alpha, beta, gamma), Schlumberger, Reciprocal Schlumberger,
Inline Dipole-Dipole, Reciprocal Inline Dipole-Dipole, Forward Pole-Dipole, Backward Pole-Dipole, Pole-Pole, Reciprocal Pole-Pole,
Gradient (Multi-Gradient), Reciprocal Gradient (Multi-Gradient)



Standard multi-electrode cable set supplied with SibER-64 (5m spacing) allows profile length up to 315m. Profiles could be continued indefinitely by moving the first cable segment of the first layout to the last place in the next layout. Optionally, cable sets with smaller or larger electrode spacing are offered (1, 2, 10, 15, and 20m).

Shorter sets come as two segments of 32 electrode take-outs each, or as four segments of 16 electrodes each. Longer sets (>5 m spacing) come with 4-8 segments per set.Equipment is ideally suited to 3D electrical tomography of complex objects with the simultaneous multiple parallel and perpendicular arrays covering the study area. With a help of ERTLab software any arbitrary arrangement of electrodes on the surface or cross- boreholes are created and tomography studies are carried out with SibER-64.

SibER Instruments

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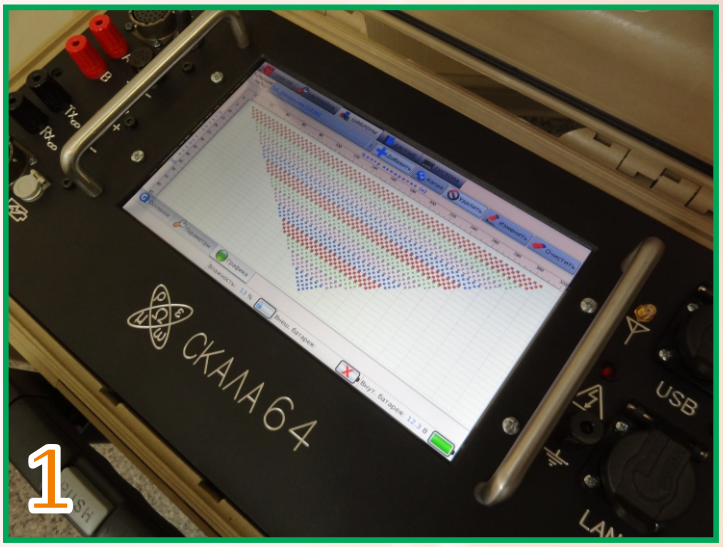
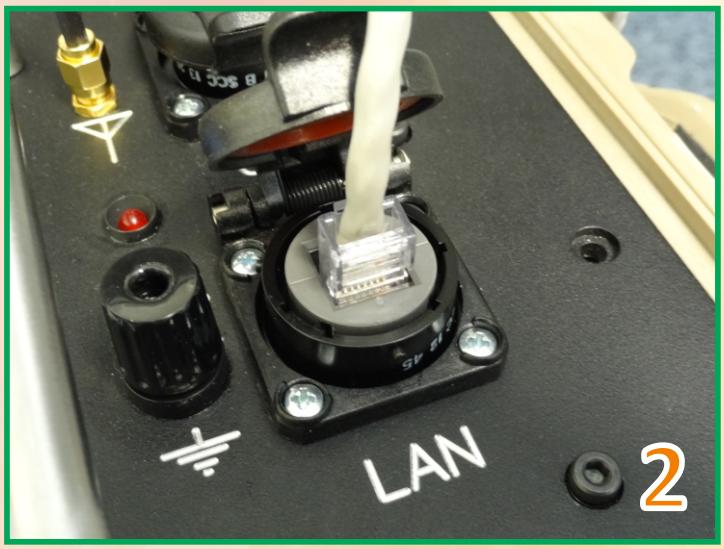
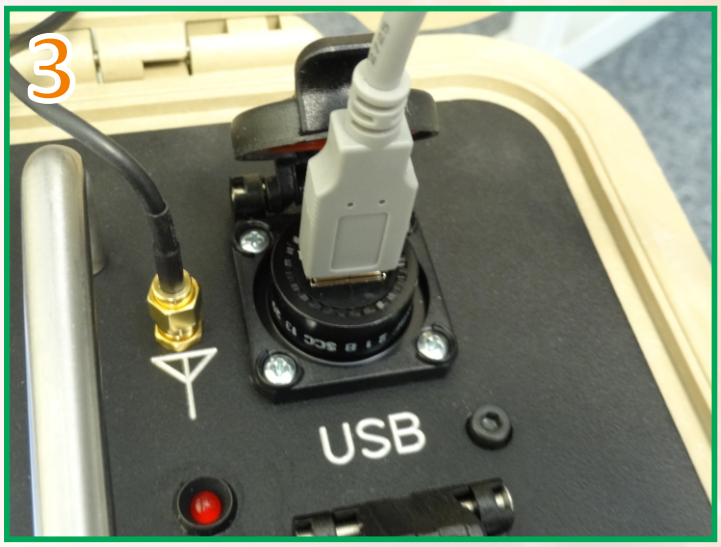


• Autonomic field operations (without PC) by 10” color touch-screen display [1]

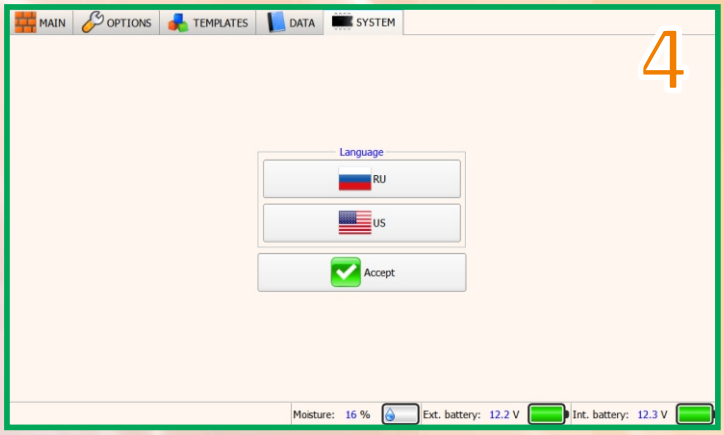
• Embedded software is easily updated through Internet by connecting SibER-64 to LAN with access to WWW. [2]

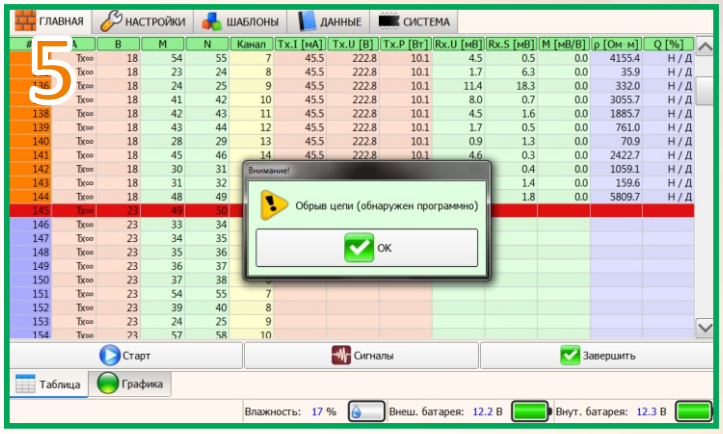




• Collected data are downloaded to PC via standard USB-cable. Internal memory of SibER-64 is automatically recognized by PC as a memory drive. Internal memory capacity is customer-defined (up to 64 Gb, enough to store 100 000 000 data points). [3]

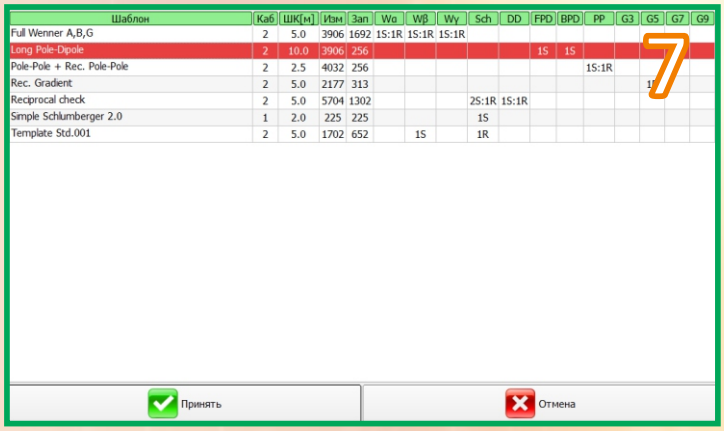
• User interface supports multiple languages, which are switched by a push of a button. Currently, only English and Russian are available, additional languages are coming soon through Internet updates. [4]



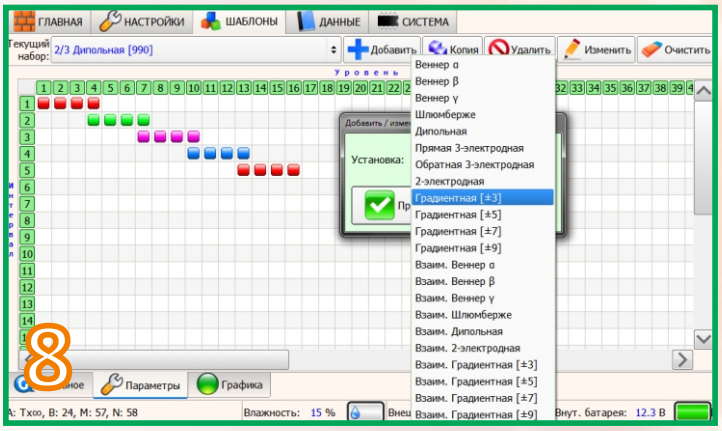


• During operation, the equipment automatically reports about errors if they occur. Device diagnoses short circuit, open circuit, low voltage of power supply (permanent or transitory), generator overheating, the moisture condensation inside the case, the lack of response from any part of the circuit. [5]

• The equipment allows viewing the output and input signals, helping to fine-tune parameters and configurations of the measuring sequence directly in the field. [6]

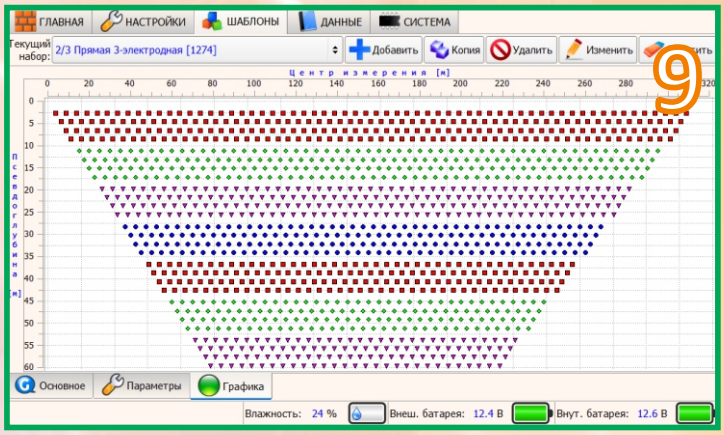


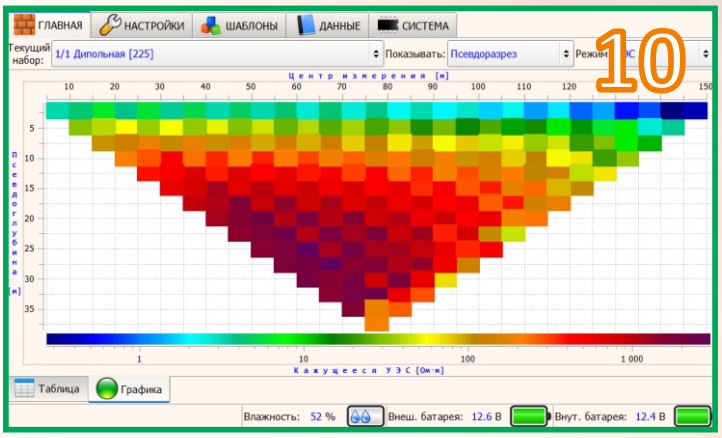
• Measuring sequence can contain up to 8 arrays of different configuration. User can choose the composite pattern and run one cycle of all the measurements, and then process the data as if the measurements were made with several different patterns. [7]



• Configuration and content of the measurement patterns are presented as graphical charts. Configuration could be easily edited, and the corresponding changes are immediately visible in the diagram in the next tab. [8, 9]

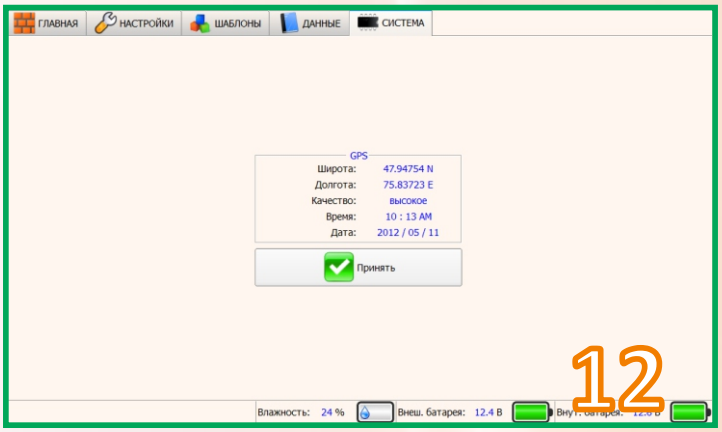
• Measurement patterns can be created/edited using the device itself and tested in the field using imaging signals. [7, 8, 9]



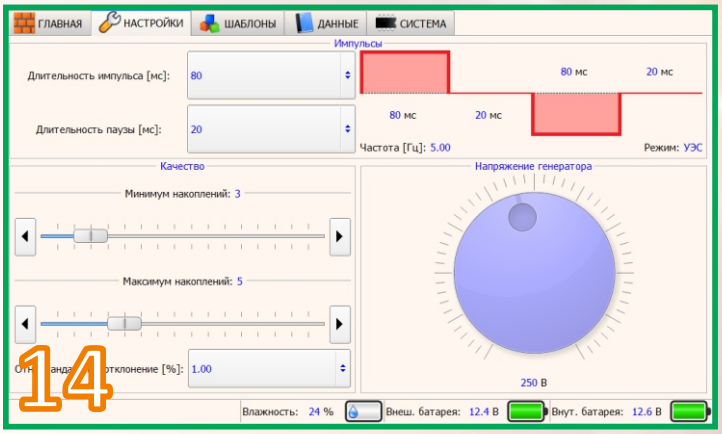


• During data collection apparent electrical resistivity (ER) and induced polarization (IP) data are interactively shown on display as color profile image, profile layers or sounding curves. [10, 11]

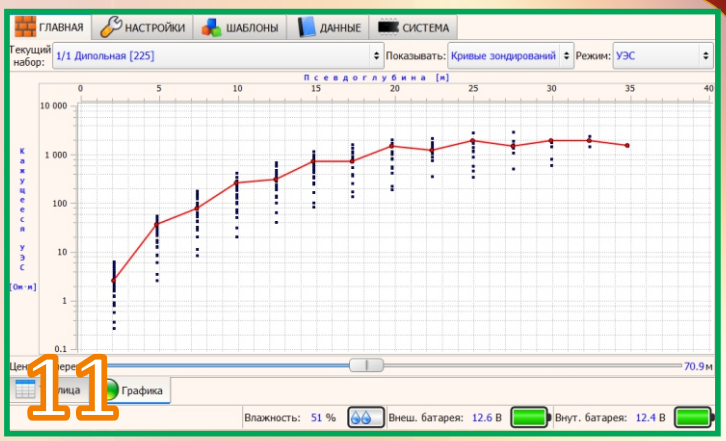
• If composite measuring sequence containing several arrays (i.e Wenner, Schlumberger, dipole-dipole, etc.) is used, the operator can switch between arrays during measurement. [11]



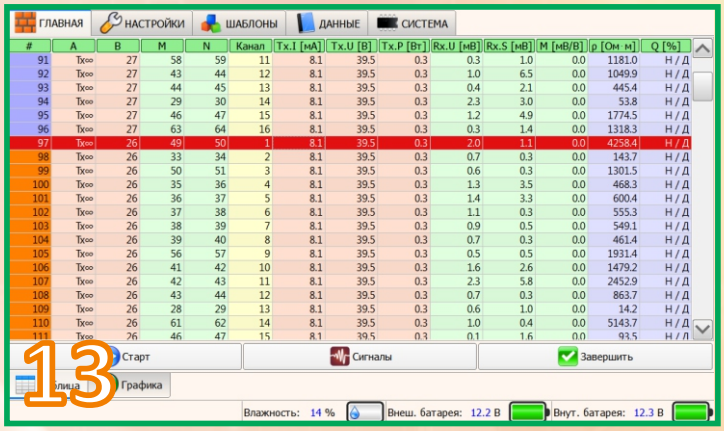
• The data are displayed in tabular form and graphs. Operator can pause and resume the work at any time. It is possible to select any point on the diagram (cross-sectional profile, profile curve, sounding curve) - and check the corresponding measurement in the table. [10, 13]



• Before measurement the grounding contact of each electrode is tested and the results are saved in the data file. The electrodes can be disconnected from the protocol if they are non-grounded or poorly grounded [15]



• GPS-receiver is embedded into equipment, so each data file contains information about the geographical location and the exact time of survey. [12]



• It is possible to control of the generator output voltage, duration of the feeding pulses and pauses between them, the minimum and maximum amount of measurements, which is determined by the desired relative standard deviation. [14]

• The equipment offers the IP mode with one time window, which is divided into fragments of 20 msec. This allows selecting from the recorded signal any time intervals that are multiples of the length of the fragment. [14] Measuring parameters can be adjusted during field measurements without pausing of the protocol. Each measurement is recorded in the table together with corresponding parameters. [11, 14]