

Digital laboratory for the biology classroom

LABOTRIX SENSE BIO L1

PRODUCT PASSPORT

Kyiv

2026

1. Basic product information

- 1.1. Product name — Digital laboratory for the biology classroom.
- 1.2. Trademark — Labotrix.
- 1.3. Model — Sense Bio L1; full trade name — LABOTRIX SENSE BIO L1.
- 1.4. Manufacturer — Labotrix Group Limited, China.
- 1.5. Intended use: a comprehensive system for conducting laboratory research in biology classrooms of general education and higher education institutions. The laboratory allows students to independently conduct experiments to study the processes of plant and animal life, biochemical reactions and functions of the human body. The system is used in the study of plant physiology, histology, microbiology, human physiology and other sections of biology. The platform combines hardware, multimedia content and elements of generative artificial intelligence, which makes classes inclusive and exciting for students of different levels of training: working with it develops attention, logical and imaginative thinking, creative abilities and cooperation skills, and students perform tasks individually or in groups, developing educational independence and interaction.
- 1.6. Design features: The laboratory is equipped with a set of wireless sensors that transmit data to a computer. All sensors are safe and suitable for working with living organisms. The software provides real-time monitoring of processes, data recording and their further processing. The system is modular: you can expand the functionality by adding new sensors without replacing the main equipment. Each sensor is equipped with a 1.8-inch color LCD screen, which immediately shows the measurement result, and works completely autonomously - without a data logger or other additional analog-to-digital converter for data transmission to a computer or tablet.
- 1.7. Digital learning support: The product includes access to an online teaching support course hosted in a learning management system (LMS) and designed for 70 academic hours of classes. The course is designed to meet the current curricula of secondary education institutions in Ukraine. The materials are grouped into research modules in the disciplines of physics, biology, chemistry, STEM, and each topic contains a lesson plan, a list of necessary supplies, an experiment scenario, step-by-step instructions for laboratory work with an explanation of the expected result, a video demonstration of work methods, interactive exercises and tasks for independent study and for project activities, suitable for both individual and group work. All modules are designed for this equipment and tested on it, so the course works in a direct chain of "equipment → methodology → learning results." The course has a built-in assistant based on a language model with a search through the course knowledge base (Retrieval-Augmented Generation): based on the topic of the lesson, it selects relevant experiments, methodically describes the sequence of conducting the research, analyzes typical student errors and gives personal

advice on how to get rid of them, changes the level of complexity to prepare for a specific class, and helps to write a research report and organize the conclusions. The assistant's knowledge base is localized and aligned with the Ukrainian curriculum. The license for the course and accompanying software is valid for 12 months from the date of access transfer. The course content and assistant answers are provided in Ukrainian, and the learning platform interface is multilingual: Ukrainian localization is enabled by default, the English interface is available as an option.

- 1.8. Processing of the measured data on the platform: The sensors of the kit transmit the measurement results to the electronic platform automatically - the student does not copy the display from the screen or enter numbers by hand. The built-in artificial intelligence agent already works with this array: it builds graphs and tables from it, processes the results obtained, shows the patterns that appeared during the experiment, compares the measured with the reference values for this work and leads the student to independently formulate a hypothesis, conclusion and interpretation, keeping him within the given "corridor of knowledge" - it does not prompt a ready-made answer, but narrows the search to the right direction. Work with the platform is built in such a way that it is suitable for both individual performance and group work.

2. Technical specifications

- Brand — Labotrix
- Model — Sense Bio L1
- The article is LTX-SENSE-BIO-L1
- System type — digital laboratory for conducting biological experiments
- Number of types of sensors in the basic set — 12 (13 units, 2 of which are heart rate sensors)
- Sensor types in the kit — carbon dioxide sensor, oxygen sensor, dissolved oxygen sensor, colorimeter sensor, temperature sensor, surface temperature sensor, gas pressure sensor, sound sensor, ultraviolet radiation sensor, heart rate sensor (2 pcs.), respiration sensor, ECG sensor
- Sensor display — color LCD, diagonal 1.8 inches, the readings are displayed on the screen immediately in real time
- Autonomy of the sensors — measurement and data transmission without a datalogger or any other additional analog-to-digital converter
- Carbon dioxide sensor — resolution 1 ppm within 0–50 000 ppm
- Oxygen sensor — resolution 0.1 % within 0–100 %
- Dissolved oxygen sensor — resolution 0.1 mg/l within 0–20 mg/l
- Colorimeter sensor — resolution 0.01 % within 0–100 %
- Temperature sensor - resolution 0.01 °C in the range from –50 °C to +200 °C
- Surface temperature sensor - 0.1 °C resolution from –25 °C to +125 °C
- Gas pressure sensor — resolution 0.1 kPa within 0–700 kPa
- Sound sensor — resolution 0.1 dB within 20 Hz–20 000 Hz and 20 dB–120 dB

- Ultraviolet sensor - intensity 0–11 UV index with resolution 1 UV index, detection wavelength 200–370 nm
- Heart rate sensor (2 pcs. in the set) - measurement limits from 30 to 200 beats per minute, counting step 1 beat per minute
- Respiration sensor - resolution 0.01 l/s in the range from –10 l/s to +10 l/s
- ECG sensor — resolution 0.1 mV, sampling rate 50–200 Hz within 0–5 V
- Data transfer type - wireless (Bluetooth), as well as wired connection (including USB) to a PC, mobile device or cloud service, with support for simultaneous reading of data from multiple sensors
- Data transmission range (meter) - up to 10
- Client program for data processing - version for Windows and macOS, interface in Ukrainian (English - as an option), supports graphical visualization of data in the form of tables and graphs with export to spreadsheet editors
- Sampling rate (measurements per second) — 10–200 (depending on sensor type)
- Pressure measurement accuracy (hectopascal) — ± 1
- Temperature measurement accuracy (degrees Celsius) — ± 0.5
- Digital learning support — online course in a learning management system (LMS)
- Course volume (academic hour) — 70
- Course subjects — physics, biology, chemistry, STEM
- Composition of the materials — research modules, experiment scenarios, step-by-step laboratory work instructions, video demonstrations, interactive exercises and tasks
- Compatibility of the materials with the equipment — full, along the chain "equipment → methodology → learning outcomes"
- Language-model-based assistant — built into the course, with retrieval over a localized knowledge base (Retrieval-Augmented Generation)
- Validity period of the license for the course and the software (month) — 12
- Language of the course and of the answers of the assistant — Ukrainian; interface of the platform — multilingual, the Ukrainian localization by default, an English-language interface available as an option
- Transfer of the results to the platform — automatic, without manual entry of numbers
- Processing of the measured data by the artificial intelligence agent — plotting of graphs and tables, analysis of the results, identification of the patterns of the experiment
- Comparison with reference values — provided for every laboratory work of the course
- Support in formulating the conclusions — within the defined "knowledge corridor", without a ready answer
- Software technical support (month) — 12
- Computer requirements — 2 GB RAM, 500 MB free disk space

- Power source of the sensors — built-in rechargeable battery (without replaceable batteries)
- Frequency of recharging the batteries of the sensors — not less than once a quarter
- Operating conditions — premises of an educational institution, air temperature from +5 to +40 °C, relative humidity from 40 to 60 % without condensate
- Language of marking and operating documentation — Ukrainian
- Product marking — trademark, model and a space for the inventory number
- Packaging — individual box of corrugated cardboard with the contents secured
- Documentation supplied — product passport with warranty card, operating manual and teaching guide for the teacher and for the student
- Surface care - sensor housings can be wiped with a dry or slightly damp cloth
- Organization of work - suitable for teacher demonstration in front of the class and for research work of increased complexity
- User requirements — calibration and preparation of sensors is carried out by the teacher, students work under supervision
- Service life (year) — 5
- Warranty period (month) — 12

3. Equipment

- Wireless carbon dioxide sensor — 1 pc.
- Wireless oxygen sensor — 1 pc.
- Wireless dissolved oxygen sensor — 1 pc.
- Wireless colorimeter sensor — 1 pc.
- Wireless temperature sensor — 1 pcs
- Wireless surface temperature sensor — 1 pc.
- Wireless gas pressure sensor — 1 pcs
- Wireless sound sensor — 1 pcs
- Wireless ultraviolet radiation sensor — 1 pc.
- Wireless heart rate sensor — 2 pcs.
- Wireless breathing sensor — 1 pc.
- Wireless ECG sensor — 1 pc.
- Box (case) with foam insert liners for the sensors — 1 pcs
- Right of access to the online course with a language-model-based assistant (license) — 1 pcs
- USB cable for connection with a computer — 1 pcs
- Software on optical disc or with download link — 1 pc.
- ECG electrodes (disposable) — 3 pcs.
- Product Passport and Warranty Card — 1 pcs
- Individual transport packaging — 1 pcs
- Methodological manual for the teacher and the student with a description of 14 laboratory and project works - 1 set.

The sensors have built-in batteries; before first use, fully charge them using the included USB cable. The system requires software installation before first use.

4. Safety measures

4.1. General requirements

- Heart rate, respiration and ECG sensors are not medical devices: they are intended for educational demonstrations and research purposes only. Only perform measurements with these sensors with the student's voluntary consent and in the presence of a teacher.
- Read this passport and the experiment guide before first use.
- The laboratory is designed to be conducted under the guidance of a teacher or instructor who has received appropriate training. Students work under the constant supervision of an adult.
- Do not allow liquids to get on the electronic parts of the sensors. If the electrodes are wet, wipe them with a soft cloth before turning them on.
- Sensors should not be left in water or other liquids for extended periods of time.
- Do not dismantle the sensors and software yourself - this may lead to data loss and equipment damage.

4.2. Electrical safety

- The sensors are powered by built-in low-voltage rechargeable batteries, which is safe for the user.
- Charge the batteries of the sensors only with the standard USB cable from the set, following the operating manual.
- Do not short-circuit the contacts of the charging port with metal objects.
- Do not heat the sensors or throw them into a fire.

4.3. Working with biological material

- When working with living organisms, plants, and animals, follow the rules of humane treatment and ethical standards.
- When using chemical solutions (hydrogen peroxide, sodium hydroxide), follow the instructions and use protective gloves and goggles.
- The oxygen sensor should not be immersed in concentrated acids or alkalis - this may damage the electrode.
- ECG electrodes are disposable: dispose of the used electrode immediately after the session and do not reuse it on another student.

4.4. It is strictly forbidden

- Do not drop the sensors, subject them to mechanical shocks, or squeeze them with great force.
- Leave the sensors in direct sunlight for long periods of time.
- Modify the software without the manufacturer's permission.

- Use the laboratory in conditions with temperature changes of more than 15 °C per hour.
- Carry the system while it is turned on on materials that are prone to static electricity.

5. Preparation for work

- 5.1. Unpack the kit and check for the presence of all components according to section 3. We recommend that you save the packaging for further transportation.
- 5.2. Install the software on your computer according to the instructions located on the optical disc or available via the link.
- 5.3. Before first use, fully charge the built-in batteries of each sensor using the USB cable provided.
- 5.4. Check the quality of the ECG electrodes - they should not have any visible damage or cracks.
- 5.5. Turn on the sensors in sequence and make sure they appear in the software's list of active devices.
- 5.6. Read the experiment manual to familiarize yourself with the recommended laboratory work and the order in which it should be performed.

6. Procedure

6.1. Starting the system

- Launch the software on your computer and select the "Devices" menu.
- Make sure that all sensors required for the experiment are displayed in the list of active devices.
- Add each required sensor to the experiment scenario and define the recording parameters (measurement frequency, duration, storage format).

6.2. Conducting experiments

- Choose an experiment from the manual and prepare the necessary equipment and materials (flasks, plants, reagents, etc.).
- Place the sensors according to the experimental scheme (in the solution, on the skin, near the subject of study).
- Click the "Start" button in the software to begin recording data.
- Watch the charts in real time on your computer screen.

6.3. Data storage and analysis

- Press the "Stop" button to end data recording.
- Save the received data in CSV or XLS format for further processing.
- Use the software's analysis features to calculate averages, graphs, and draw conclusions.

6.4. Completion of work

- Close the software and turn off the sensors.
- If the system will not be used for several days, check the sensor battery level before your next workout.

6.5. Working with an online course

- Obtain an account at the educational institution and activate the right of access to the course; the validity period of the license is counted from the date on which access is transferred.
- Select the topic of the lesson in the course list: every topic is accompanied by a plan, a list of equipment, an experiment scenario, a step-by-step instruction, a video demonstration and interactive tasks.
- Formulate a query to the assistant on the topic of the lesson — it will suggest appropriate experiments, set out the sequence of actions, examine typical errors and advise how to correct them.
- Set the level of difficulty of the tasks to match the preparation of the class; on the basis of the results of the work the assistant will help to draw up the report and to organize the conclusions.
- Start recording the sensor readings: the data arrive at the platform automatically, there is no need to copy them out manually.
- Open the graph or the table of the measured values and ask the agent to process the result: it will show the patterns, compare the data with the reference values of the work and lead the student to formulating a hypothesis and a conclusion.

7. Care, maintenance and possible malfunctions

7.1. Cleaning

- Wipe the sensors with a soft, slightly damp cloth after each experiment, especially if they have been in contact with liquids.
- Do not wash or reuse used ECG electrodes - dispose of them immediately after use.
- Do not use abrasives, solvents, or alcohol to clean the plastic parts of the sensors.

7.2. Periodic control

- Check the condition of the sensors and the integrity of the connections at least once a month.
- Check the charge level of the built-in batteries and recharge the sensors in a timely manner.
- Repair and replacement of damaged sensors are performed only by an authorized service center.

7.3. Possible malfunctions and ways to eliminate them

Symptom	Possible cause	User actions
The sensor does not appear in the list of active devices	Battery is low or sensor is turned off; Bluetooth is turned off on computer	Charge the sensor battery, turn on the sensor; make sure Bluetooth is enabled in your computer settings
The graph shows unstable or sharp jumps in values	The sensor is too close to a source of electromagnetic interference (microwave oven, WiFi router)	Move the sensor away from the source of interference or increase the distance from the computer.
The software frequently closes	Driver version mismatch; not enough memory on the computer	Update Bluetooth drivers; close unnecessary programs and free up RAM
The temperature sensor shows values far from expected	The sensor is located near a heat source; calibration is off.	Move the sensor away from radiators, lamps and other heat sources; check the battery level
Cannot connect to Bluetooth sensor	Sensor is in sleep mode or battery is low; Bluetooth on computer is inactive	Restart the sensor, charge the battery; check that Bluetooth is active on the computer and visible to other devices

8. Storage and transportation conditions

- Store the system in a dry, indoor location at temperatures between +5 °C and +40 °C and relative humidity up to 80% without condensation.
- Store the sensors in a well-ventilated area, protected from direct sunlight.
- Before long-term storage (more than a month), check and, if necessary, recharge the sensor batteries.
- When transporting, pack the system in the original or similar rigid packaging, positioning the sensors so that they do not move.
- Protect the system from shock, vibration, moisture, and dust during transportation.
- The storage period before commissioning is unlimited provided that the stated requirements are observed.

9. Warranty obligations

- 9.1. The warranty period of the product is 12 months from the date of sale specified in the warranty card.
- 9.2. The manufacturer guarantees that the product complies with the declared technical characteristics, provided that the rules for transportation, storage and operation set out in this passport are followed.
- 9.3. During the warranty period, product defects that have arisen due to the manufacturer's fault will be eliminated free of charge. The method of elimination (repair, component replacement or product replacement) is determined by the service center.
- 9.4. Warranty service is provided upon receipt of a correctly and completely filled out warranty card and a document confirming the fact and date of purchase.
- 9.5. The warranty does not apply to cases where the malfunction is caused by:
 - mechanical damage, in particular cracks, chips and deformation of the housing and of the components of the product;
 - violation of the operating, storage or transportation rules set out in this passport;
 - ingress of liquid or foreign objects into the product, and also the action of insects and animals;
 - independent disassembly, repair or modification of the product, in particular repair at unauthorized workshops;
 - use of the product other than for its intended purpose;
 - force majeure circumstances (fire, flood, earthquake, etc.).
- 9.6. The warranty does not apply to natural wear and tear of the coating and appearance of the product, as well as to consumables.

10. Product disposal

- The product must not be disposed of together with unsorted municipal waste. This is indicated by the marking in the form of a crossed-out container on the product or its packaging.
- After the end of the service life, hand the product over to a collection point for the corresponding waste or to an organization holding the appropriate permit.
- Hand over the packaging elements (cardboard, polymer materials) to the corresponding streams of recyclable materials.

Contacts

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Conditions of use and storage of the product

The product is intended for educational work in general secondary education institutions and is used only under the control and supervision of a teaching staff member; the recommended age of students — from 10 years, that is, students of grade 5 and of higher grades. Keep the product in a dry, clean and ventilated room at a temperature from +5 to +40 °C and relative air humidity up to 80 % without condensation, separately from heat sources and out of direct sunlight, moisture and dust. Use the product exclusively for its intended purpose and do not allow drops, impacts or other mechanical damage. If you notice damage, a crack or any malfunction, stop working with the product immediately and inform the teacher or the responsible person of the educational institution; repairing the product on your own is prohibited.

WARRANTY CARD

Product name:	Digital laboratory for the biology classroom
Product model:	LABOTRIX SENSE BIO L1
Serial number:	
Date of sale:	
Warranty period:	12 months from the date of sale
Trading organization:	
Signature of the seller:	

The goods have been received in working order, without visible damage, complete, and have been checked in my presence. I have no claims regarding the quality of the goods; I have read and agree to the operating and warranty service conditions.

Full name of the buyer

Buyer's phone number Buyer's signature

Dear Customer!

Thank you for choosing Labotrix products. After-sales service of this product is provided in accordance with the regulations of the company and the legislation of the country of sale. So that we can serve you quickly and without unnecessary formalities, check that this warranty card is filled in correctly at the moment of purchase and keep it together with the payment document throughout the entire warranty period. When applying for repair, hand the product over to the seller or to the service center together with the filled-in card.

Procedure for applying

1. The right to free warranty service for the product is valid for 12 months from the date of sale specified in the warranty card. Within this period, components that have failed due to a manufacturing defect are repaired or replaced without payment from the buyer.
2. Before contacting, make sure that the malfunction is not caused by the reasons listed in section 9 of this passport, and if possible, use the table of possible malfunctions in section 7.3.
3. After the 12-month warranty period, repairs are carried out for a fee; the cost of work and spare parts is determined depending on the nature of the malfunction.

Grounds for refusal of warranty service

The company reserves the right to refuse free service or to perform the work on a paid basis if at least one of the following circumstances is established:

- absence of the warranty card, its incomplete or corrected completion, and also the absence of a document confirming the purchase;
- non-conformity of the serial number of the product with the number specified in the card, or damage to the factory marking;
- traces of independent disassembly, repair or modification of the product;
- damage caused by violation of the operating rules, connection to an unsuitable power source or external mechanical impact;
- damage as a result of force majeure circumstances.

Service Records

Date of entry	Description of the malfunction	Work performed	Position, signature, full name of the responsible person