

Demonstration set for studying optics

LABOTRIX OPTICA 01

PRODUCT PASSPORT

Kyiv

2026

Contents

1. General Information about the Product.....	2
2. Technical Specifications.....	2
3. Package Contents.....	4
4. Safety Precautions.....	5
5. Preparation for Use.....	6
6. Operating Procedure.....	6
7. Care, Maintenance and Troubleshooting.....	7
8. Storage and Transportation Conditions.....	8
9. Warranty Obligations.....	8
10. Product Disposal.....	9
Contacts.....	10
WARRANTY CARD.....	11
Service Records.....	13

1. General Information about the Product

- 1.1. **Product name** — Demonstration kit for studying optics.
- 1.2. **Trademark** — Labotrix.
- 1.3. **Model** — Optica O1; full trade designation — LABOTRIX OPTICA O1.
- 1.4. **Manufacturer** — Labotrix Group Limited, China.
- 1.5. **Intended use:** a kit of demonstration equipment for physics teachers in general secondary education institutions and specialized science-oriented classes. The kit is designed for conducting demonstration experiments and trials covering optical phenomena of ray and wave nature. It allows students to become familiar with the nature of light radiation, observe optical phenomena in nature, and verify the basic laws of optics in practice.
- 1.6. **Design features:** the kit is built around a magnetic optical bench with a scale, which ensures precise alignment and mounting of optical elements. The package contents include optical elements made of acrylic and optical glass, prisms, lenses, mirrors, diffraction gratings, and auxiliary equipment. All components are of industrial-grade manufacture and are intended for repeated experiments in an educational environment. The kit includes a printed instructional guide for conducting demonstration experiments.
- 1.7. **Digital learning support:** together with the product, the right of access to an online teaching support course is transferred; the course is hosted in a learning management system (LMS) and is designed for 70 academic hours of lessons. The course is compiled to match the current curricula of general secondary education institutions of Ukraine. The materials are grouped into research modules in the subjects of physics, biology, chemistry, STEM, and every topic contains a lesson plan, a list of the required equipment, an experiment scenario, a step-by-step laboratory work instruction with an explanation of the expected result, a video demonstration of working techniques, interactive exercises and tasks for independent study, suitable both for individual and for group work. All modules are compiled for this very equipment and have been tested on it, therefore the course works along the direct chain "equipment → methodology → learning outcomes". A language-model-based assistant with retrieval over the course knowledge base (Retrieval-Augmented Generation) is built into the course: for the topic of the lesson it selects appropriate experiments, sets out the sequence of conducting the study in methodological terms, examines typical student errors and gives personal advice on how to get rid of them, changes the level of difficulty to match the preparation of a particular class and helps to draw up a report on the study and to organize the conclusions. The knowledge base of the assistant is localized and aligned with the Ukrainian curriculum. The license for the course and the accompanying software is valid for 12 months from the date on which access is transferred; the content, the interface and the answers of the assistant are provided exclusively in Ukrainian.

2. Technical Specifications

- Brand — Labotrix

- Model — Optica O1
- SKU — LTX-OPTICA-O1
- Product type — kit of demonstration equipment for studying optics
- Number of optical element items in the kit (piece) — 36
- Total number of optical elements including duplicates (piece) — 39; all of them fit into the foam insert of the storage box
- Length of the optical bench with scale (centimeter) — depends on configuration
- Material of the main optical elements — optical glass and acrylic
- Objectives: lenses of equal focal length, focal lengths (millimeter) — 75, 100, 150
- Mirrors: convex and concave, focal lengths (millimeter) — 50, 80
- Prisms — triangular and rectangular isosceles, made of optical glass
- Diffraction gratings with a period (millimeter) — 0.01 and 0.06
- Slits: single-slit and double-slit, with width (millimeter) — 0.05, 0.10, and 0.8
- Half-cylinders: material — optical glass and acrylic, diameter (millimeter) — 25
- Dimensions of sample blocks for refraction experiments (millimeter) — 70 × 40 × 20
- Light source — included in the kit
- Screens and observation devices — included in the kit
- Power supply — from the electrical mains or battery, depending on the type of light source
- 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, of the interface and of the answers of the assistant — Ukrainian
- Operating conditions — premises of an educational institution, air temperature from +5 to +40 °C, relative humidity from 40 to 60 % without condensate
- Service life (year) — 5
- Warranty period (month) — 12
- 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 in a foam insert
- Ready-to-use condition — supplied in assembled form, requires no additional setup

- Surface care — optical elements may be wiped with a special microfiber cloth
- User requirements — the light source is switched on and off only by the teacher; students observe under supervision

3. Package Contents

- Magnetic optical bench with scale — 1 pcs
- Holder frame for optical elements — 4 pcs
- Light source with power module — 1 pcs
- Inclined movable support for the optical disk and prisms — 1 pcs
- Plate with image (vector) — 1 pcs
- Screen with scale for observing diffraction — 1 pcs
- Experimental screen — 1 pcs
- Trihedral mirror (convex, concave, flat) — 1 pcs
- Collimating mirror — 1 pcs
- Plate with one slit (0.8 mm) — 1 pcs
- Plate with five slits (0.8 mm) — 1 pcs
- Acrylic half-cylinder ($d = 25$ mm) — 1 pcs
- Half-cylinder made of optical glass ($d = 25$ mm) — 1 pcs
- Acrylic block ($70 \times 40 \times 20$ mm) — 1 pcs
- Block of optical glass ($70 \times 40 \times 20$ mm) — 1 pcs
- Concave mirror ($F = 50$ mm) — 1 pcs
- Concave mirror ($F = 80$ mm) — 1 pcs
- Concave lens ($F = 100$ mm) — 1 pcs
- Concave lens ($F = 150$ mm) — 1 pcs
- Convex lens ($F = 75$ mm) — 1 pcs
- Convex lens ($F = 100$ mm) — 1 pcs
- Convex lens ($F = 150$ mm) — 1 pcs
- Concave lens ($F = 75$ mm) — 1 pcs
- Triangular prism made of optical glass — 1 pcs
- Rectangular isosceles prism made of optical glass — 1 pcs
- Optical slit (0.05 mm) — 1 pcs
- Optical slit (0.10 mm) — 1 pcs
- Double optical slit ($d = 0.05$ mm) — 1 pcs
- Double optical slit ($d = 0.10$ mm) — 1 pcs
- Diffraction grating ($d = 0.01$ mm) — 1 pcs
- Diffraction grating ($d = 0.06$ mm) — 1 pcs
- Set of color filters — 1 pcs
- Optical disk — 1 pcs
- Limb with a degree scale — 1 pcs
- Convex mirror ($F = 50$ mm) — 1 pcs
- Convex mirror ($F = 80$ mm) — 1 pcs
- Foam insert for placing components — 1 pcs
- Storage box — 1 pcs
- Methodological guide for conducting demonstration experiments — 1 pcs
- Right of access to the online course with a language-model-based assistant (license) — 1 pcs
- Product Passport and Warranty Card — 1 pcs
- Individual transport packaging — 1 pcs

Purposely designed as a demonstration kit intended for placement on the magnetic bench. Diagrams and images are provided separately. The kit does not require assembly; all components are ready for use.

4. Safety Precautions

4.1. General requirements

- Before first use, read this passport carefully and follow its recommendations. Keep the passport together with the kit and the proof of purchase.
- At the educational institution, the equipment is used by a physics teacher or another specialist who has undergone special training and occupational safety instruction. Students may work with the kit only under the constant supervision and guidance of an adult.
- Before first use, inspect all components for mechanical damage, cracks, chips, or defects on the optical surfaces. Components with damage must not be used.
- Make sure the magnetic bench is placed on a level, stable surface and cannot slip during the demonstration of experiments.

4.2. Safety when working with glass and optical elements

- Glass components have sharp edges and may break if dropped. Handle them carefully and do not subject them to mechanical impact.
- If an element breaks, do not touch the fragments. Inform the teacher and allow a specialist to remove the debris and dispose of it safely.
- The surfaces of lenses and mirrors are highly sensitive to contamination. Do not touch the working surfaces with your fingers to avoid leaving grease and dust marks.
- Do not insert sharp objects into the slits and do not attempt to widen or modify them.

4.3. Safety when working with the light source

- The light source may become hot during operation. Do not allow students to touch it during the experiment; it must be switched on and off only by the teacher.
- Do not point the light beam directly into eyes. Even scattered light from the diffraction grating or screen can harm vision.
- Before packing and storage, let the light source cool down.

4.4. It is strictly prohibited

- Using kit components for purposes other than intended, such as a pointer, a cutting ruler, or for throwing.
- Disassembling the light source, mirrors, and prisms; altering their design or independently unsticking or re-gluing optical elements.
- Immersing glass or acrylic components in water; washing them under a strong stream of water or exposing them to solvents.
- Leaving the kit in direct sunlight or near heat sources, as this may deform the acrylic and alter its optical properties.
- Using abrasive powders, pastes, or metal brushes to clean optical surfaces.

5. Preparation for Use

- 5.1. Unpack the kit and make sure all components are present according to Section 3 of the passport. It is recommended to keep the cardboard packaging and protective film for further storage and transportation.
- 5.2. Place the magnetic optical bench on a stable horizontal table to prevent accidental falling. Make sure the bench does not wobble and is precisely aligned.
- 5.3. Place the components in the holder frames and secure them on the magnetic bench in the required sequence according to the experiment diagram.
- 5.4. Wipe the optical surfaces of lenses, mirrors, and prisms with a soft lint-free cloth or a special optical wipe to remove dust and packaging residue.
- 5.5. Connect the light source to the electrical mains or insert the battery, depending on the type. Test the light operation before starting the experiment.
- 5.6. If the kit was stored at a low temperature, keep it at room temperature indoors for at least one hour before first use to prevent condensation from forming on the optical surfaces.

6. Operating Procedure

6.1. Preparation of the optical setup

- Place the light source at one end of the magnetic bench; install the collimating slit to obtain a parallel or divergent light beam.
- Place the required optical elements (lenses, mirrors, prisms, slits, gratings) in the required positions on the bench using the holder frames.
- Place the screen or observation device in the final position to record the light pattern.

6.2. Experiments with lenses

- To demonstrate focusing: direct a parallel beam of light at a convex lens and observe how the rays converge at the focal point on the screen.
- To demonstrate divergence: direct light at a concave lens and observe the divergence of the rays.
- Use lenses with different focal lengths to compare the power of optical elements.

6.3. Experiments with mirrors

- Direct the light beam at the flat mirror to demonstrate the law of reflection: the angle of incidence equals the angle of reflection.
- Study image formation using convex and concave mirrors.
- Observe the focusing and scattering of light depending on the type of mirror.

6.4. Experiments with diffraction and interference

- Place the diffraction grating in front of the light source and observe the distribution of maxima on the screen.

- Use slits and double slits to demonstrate diffraction and interference patterns.
- Compare the results for gratings with different periods (0.01 and 0.06 mm).

6.5. Finishing the work

- Turn off the light source and, if necessary, let it cool down.
- Slowly remove the optical elements from the bench and place them in the corresponding slots of the storage box.
- Wrap all components in protective film and close the storage box.

6.6. Work with the 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.

7. Care, Maintenance and Troubleshooting

7.1. Cleaning

- Wipe glass and acrylic surfaces with a soft lint-free cloth moistened with distilled water, then wipe dry.
- To remove fingerprint smudges, use a special optical wipe that is included in a commercial kit for cleaning optical instruments.
- For persistent contamination, a solution of neutral dishwashing detergent diluted in distilled water may be used. After cleaning, wipe the surfaces dry.
- It is strictly prohibited to use abrasive materials, acetone, alcohol, and solvents that may damage the surfaces.

7.2. Periodic inspection

- At least once a month with regular use, check the sharpness of images formed by the lenses and mirrors, as well as the brightness of the screens.
- Make sure the magnetic bench holds the components without shifting and that the holder frames operate without play.
- Repairs and servicing are performed only by an authorized service center; the user is not permitted to disassemble or modify the components independently.

7.3. Possible malfunctions and methods of their elimination

Symptom	Possible cause	User actions
Light pattern on the screen is unclear or blurred	Optical surfaces are contaminated; light source is positioned incorrectly; elements are shifted on the bench	Wipe the optical surfaces with a soft cloth; check the bench alignment; reposition the components according to the experiment diagram
Diffraction pattern is invisible or weak	Grating is installed incorrectly; illumination is insufficient; light source has failed	Reposition the diffraction grating for precise alignment with the beam; increase the light intensity; check the light source
Image from the lens or mirror is missing	Optical element has failed; screen is positioned outside the focal point	Move the screen to the focusing position; check the presence and condition of the optical element
Magnetic bench does not hold components securely	Magnets are contaminated with dust; metal contacts have oxidized	Wipe the magnetic surfaces with a dry soft cloth; remove contamination
The light source does not light up	Source is not plugged into the mains; battery is depleted; the bulb has burned out	Check the mains connection; replace the battery; replace the bulb with a new compatible one
Slit produces a blurred pattern instead of a sharp one	Slit is contaminated; light beam is not directed at the center of the slit	Wipe the edges of the slit; adjust the direction of the light beam

8. Storage and Transportation Conditions

- Store the kit in a dry room at a temperature not below +5 and not above +40 °C and relative humidity up to 80% at +25 °C, without condensation forming.
- Place the components in the storage box in a horizontal position. Do not leave the kit standing vertically for extended periods.
- Protect from direct sunlight, vibration, mechanical shocks, and exposure to aggressive substances.
- Transport in the original or similar rigid packaging by any type of enclosed transport. Keep horizontal during transportation.
- On the packaging, place the marks "Fragile" and "This Side Up"; do not allow it to be pressed down by cargo.
- The service life, subject to compliance with storage conditions, is unlimited.

9. Warranty Obligations

- 9.1. The warranty period of operation of the product is 12 months from the date of sale specified in the warranty card.

- 9.2. The manufacturer guarantees that the product conforms to the declared technical specifications provided that the transportation, storage and operating rules set out in this passport are observed.
- 9.3. During the warranty period, defects of the product that have arisen through the fault of the manufacturer are remedied free of charge. The method of remedy (repair, replacement of a component or replacement of the product) is determined by the service center.
- 9.4. Warranty service is provided on presentation of a correctly and completely filled-in warranty card and of a document confirming the fact and the date of purchase.
- 9.5. The warranty does not cover 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 cover the natural wear of the coating and of the appearance of the product, nor 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

LABOTRIX GROUP LIMITED

Room 910, Isteeasia 1 No. 18 Fu'an Blvd, Pinghu Subdistrict,
Longgang District, Shenzhen City,
Guangdong Province, China 518111
Phone: +86 13925261264
E-mail: salesmanager@labotrix.com
Website: <https://labotrix.com/>

Address in Ukrainian:

LABOTRIX GROUP LIMITED

Room 910, Istilazia 1, Fuan Boulevard No. 18,
Pinghu Subdistrict, Longgang District,
Shenzhen, Guangdong Province, China 518111
Telephone: +86 13925261264
E-mail: salesmanager@labotrix.com
Website: <https://labotrix.com/>

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

Name:	Demonstration set for studying optics
Product model:	LABOTRIX OPTICA O1
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 _____

Telephone of the buyer _____ Signature of the buyer _____

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 of the product is valid for 12 months from the date of sale specified in the warranty card. Within this period, components that have failed because of a manufacturing defect are repaired or replaced at no cost to the buyer.
2. Before applying, 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 subsection 7.3.
3. After the end of the 12-month warranty period, repairs are performed on a paid basis; the cost of the work and of the 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