

Educational conveyor line

LABOTRIX CONVEY R8

PRODUCT PASSPORT

Kyiv

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1. General Information about the Product

- 1.1. **Product name** — Educational Conveyor Line.
- 1.2. **Trademark** — Labotrix.
- 1.3. **Model** — Convey R8; full trade designation — LABOTRIX CONVEY R8.
- 1.4. **Manufacturer** — Labotrix Group Limited, China.
- 1.5. **Intended use:** Educational Conveyor Line Labotrix Convey R8 — a desktop belt transporter with object-detection means, designed to model automated manufacturing processes together with an educational robotic arm. The product reproduces a typical section of an automated line: objects move along the belt, sensors detect their appearance and determine their color, and the robotic arm performs gripping, sorting, or repositioning. The line is used in computer science, technology, and robotics lessons, and in club and project work — to study the basics of automation, industrial control logic, and work with discrete sensors.
- 1.6. **Design features:** the belt is driven by a stepper motor, which is connected directly to the robotic arm's stepper motor interface — the product has no separate power supply or control unit, and the speed and direction of movement are set programmatically. Two sensors are mounted on a shared bracket at the end of the frame: a photoelectric sensor that detects the appearance of an object, and a color sensor that determines the object's color; both are connected to the robotic arm's universal ports. The belt tension is adjusted using the tensioning unit's screws at the driven end of the frame. The kit also includes a demonstration positioning plate that fixes the relative position of the conveyor and the robotic arm's base and makes it possible to reproduce the same line geometry in subsequent lessons.
- 1.7. **Digital learning support:** together with the product, the buyer receives access to an online teaching-support course hosted on a learning management system (LMS) and designed for 70 academic hours of lessons. The course is built to match the current curricula of general secondary education institutions of Ukraine. The materials are grouped into research modules in the disciplines of physics, biology, chemistry, and STEM, and each topic includes a lesson plan, a list of required equipment, an experiment scenario, a step-by-step laboratory work instruction explaining the expected result, a video demonstration of the techniques, interactive exercises, and assignments for independent study, suitable for both individual and group work. All modules are designed for this exact equipment and tested on it, so the course works along a direct chain "equipment → methodology → learning outcomes". The course has a built-in language-model-based assistant with knowledge-base retrieval (Retrieval-Augmented Generation): based on the lesson topic, it selects suitable tasks, methodically lays out the sequence for conducting the research, analyzes students' typical mistakes and gives personal advice on how to fix them, adjusts the difficulty level to the preparation of a specific class, and helps prepare a research report and organize conclusions. The assistant's knowledge base is localized and aligned with the Ukrainian national curriculum. The license for the course and the accompanying software is valid for 12 months from the date access is granted; the assistant's content, interface, and responses are provided exclusively in Ukrainian.

2. Technical Specifications

- Brand — Labotrix
- Model — Convey R8
- SKU — LTX-CONVEY-R8
- Product type — desktop belt conveyor, an extension for an educational robotic arm
- Maximum payload (gram) — 500
- Effective transport length (millimeter) — 600
- Maximum belt speed (millimeter per second) — 120
- Maximum acceleration (millimeter per second squared) — 1100
- Belt speed change method — smooth, set by the program; direction reversal is enabled by changing the sign of the set speed value
- Belt drive type — a stepper motor, controlled through the stepper motor port on the robotic arm's controller
- Conveyor power source — supplied from the robotic arm's controller through the stepper motor port; the product has no power supply unit of its own
- Number of rollers (piece) — 2 (drive and driven)
- Belt tension adjustment — using the tensioning unit's screws at the driven end of the frame, with the hex key from the kit
- Frame material — aluminum
- Number of sensors in the kit (piece) — 2 (photoelectric and color sensor)
- Object detection means — a photoelectric infrared sensor (discrete signal: object detected or not detected) and a color-detection sensor (recognizes red, green, blue)
- Sensor connection interfaces — the robotic arm's universal ports
- Synchronization method with one or more robotic arms — by the photoelectric sensor's signal: the belt stops, the required robotic arm performs the grip at the recorded point, after which the belt resumes moving; smooth speed change makes it possible to match the line's pace with the operation of each of them
- Conveyor control — from the robotic arm's single software environment with a Ukrainian-language interface; supports graphical block-based programming and text scripts in Python
- Positioning the line relative to the robotic arm — using the demonstration positioning plate from the kit
- Compatibility — educational robotic arms with at least 4 degrees of freedom, with expansion ports for sensors and a stepper motor interface
- 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 and operating manual
- Installation method — on a laboratory stand or a demonstration table next to the robotic arm
- Ready-to-use condition — the belt module is assembled at the factory; before first startup, the sensor bracket must be fastened and the belt tension adjusted

- Care of the surfaces — wiping with a dry or slightly damp cloth is permitted
- 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
- Service life (year) — 5
- Warranty period (month) — 12

3. Package Contents

- Conveyor belt module with stepper motor — 1 pcs
- Color sensor with mounting bracket — 1 pcs
- Photoelectric sensor (infrared switch) with mounting bracket — 1 pcs
- Tool kit for assembling and adjusting belt tension (M4 and M5 hex keys) — 1 set.
- Wooden cubes of three colors — red, green, and blue (learning objects for sorting) — 40 pcs
- Demonstration positioning plate — 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

The educational robotic arm, the air pump with end effector, and the power supply unit are not included in the kit and are supplied separately; the cables for connecting the stepper motor and the sensors to the robotic arm are supplied together with those components. The product is supplied assembled and does not require assembly, except for mounting the sensor bracket and adjusting the belt tension before first startup.

4. Safety Precautions

4.1. General requirements

- Before using the line for the first time, read this passport, as well as the passport of the robotic arm the line is used with, and keep the documents together with the products.
- Only a teacher or another staff member who has completed occupational safety training is allowed to work with the line; students work with the equipment only under adult supervision.

- Before each lesson, inspect the frame, the belt, the cables, and the sensor mounts for damage; a conveyor with a damaged or delaminated belt must not be used.
- Do not leave the equipment switched on unattended.
- A product that has exhausted its service life is to be disposed of in accordance with the applicable legislation, protecting the environment.

4.2. Risk of Entanglement by the Moving Belt

- The main hazard of the conveyor — entanglement of fingers, hair, clothing, or drawstrings in the gap between the belt and the drive or driven roller. Do not bring your hands close to the rollers while the belt is moving.
- Do not touch the belt while it is moving, and do not try to stop or hold it with your hand.
- Before starting work, tie back long hair, remove scarves, ties, bracelets, and chains, button up or roll up loose sleeves; do not lean over the running conveyor.
- Do not place foreign objects on the belt — tools, cables, sheets of paper, clothing.
- Perform any adjustments — belt tension, sensor position, frame mounting — only after the belt has come to a complete stop and the robotic arm's power has been switched off.
- If an object gets stuck on the belt, first stop the motor via the program and switch off the robotic arm, and only then address the cause; do not free the stuck object while it is running.

4.3. Electrical Safety and Working with the Robotic Arm

- The conveyor and the sensors are powered from the robotic arm through the corresponding connectors; do not connect the stepper motor or the sensors to any other power sources.
- Perform all cable connections and disconnections only with the robotic arm switched off: connecting "hot" damages the ports.
- Do not mix up the connectors: the stepper motor cable connects to the stepper motor interface, and the sensor cables — to the universal ports; an incorrect connection will damage the sensor or the port.
- The conveyor operates in the same work area as the robotic arm — do not keep your hands within its reach while the program is running, and make sure the belt and the work area are free of foreign objects before starting.
- The mass of objects on the belt must not exceed either the conveyor's maximum payload or the robotic arm's load capacity.
- Do not allow liquid to get on the stepper motor, the sensors, or the connectors.

4.4. It is strictly prohibited

- Carry or move the conveyor while the belt is running.
- Disassemble, repair, or independently modify the conveyor, the stepper motor, or the sensors.
- Leave children unattended with the equipment switched on.
- Place objects on the belt that exceed the maximum payload, as well as sharp and fragile objects not required by the learning task.
- Lubricate the belt and the rollers.
- Operate the product with damaged cables, connectors, or belt.

5. Preparation for Use

- 5.1. Unpack the product, check the completeness of the kit against Section 3 of this passport, and inspect the frame, the belt, the rollers, the sensors, and the cables for mechanical damage. We recommend keeping the packaging for future transportation.
- 5.2. Place the conveyor on a level, stable table; make sure all the supports rest firmly on the surface and the frame does not wobble. Turn the driven roller by hand and make sure the belt moves freely, without binding, and does not run off the rollers.
- 5.3. Position the robotic arm so that the required end of the belt is within its reach, and route the cables so that they do not cross the belt or enter the range of motion of its links.
- 5.4. Fasten the shared bracket with the photoelectric sensor and the color sensor at the end of the belt using the screws and the hex key from the kit; adjust the height and reach of the sensors so that an object on the belt interrupts the photoelectric sensor's beam and enters the color sensor's field of view without touching them.
- 5.5. Using the stepper motor cable, connect the conveyor to the robotic arm's stepper motor interface, and using the sensor cables — connect the sensors to the corresponding universal ports; check the orientation of each connector before connecting.
- 5.6. Switch on the robotic arm and perform a return to the home point, then check the belt tension according to Section 7 of this passport and its tracking along the center of the rollers at low speed.

6. Operating Procedure

6.1. Preparation for the lesson

- Inspect the line: check the integrity of the belt, the cables, and the sensor mounts, the stability of the conveyor and the robotic arm on the table, as well as the belt tension and its tracking on the rollers.
- Make sure there are no foreign objects on the belt or in the robotic arm's work area, and brief the students on safety precautions, emphasizing the risk of entanglement by the moving belt.

6.2. Connection and switching on

- Check that the stepper motor cable and the sensor cables are connected according to the wiring diagram, and that the sensors are securely fastened to the frame.
- Switch on the robotic arm and wait until the indicator lights up green, then perform a return to the home point.
- In the robotic arm's software environment, establish a connection with the equipment.

6.3. Sensor Setup

- In the program, enable each sensor, specifying its version and the number of the port it is actually connected to.
- Check the sensor readings: pass an object by the photoelectric sensor and, in turn, place objects of different colors under the color sensor, comparing the readings obtained with the expected ones.

- If necessary, adjust the photoelectric sensor's sensitivity screw and the distance from the sensors to the belt surface.

6.4. Starting and Operating the Line

- In the program, set the stepper motor interface, and the direction and speed of belt movement — start at low speed, run the belt, and check that it does not drift sideways.
- Typical operating algorithm: enable the sensors, enable the motor, read the photoelectric sensor's signal in a loop, stop the motor after an object is detected, read the color, give the robotic arm the command to grip and move the object, and then enable the motor again.
- Every program must include a motor shutdown command both in normal completion and in the algorithm's emergency branches — otherwise the belt will keep moving until the robotic arm's power is switched off.
- While operating, do not keep your hands in the work area; place new objects only at the start of the belt, on the side opposite the sensors, and only when there is no moving robotic arm nearby.

6.5. Stopping and Finishing Work

- Stop the program execution and make sure that the conveyor motor is switched off and the belt has come to a complete stop.
- Remove the learning objects from the belt, switch off the robotic arm with the power button, and disconnect the power supply unit from the mains.

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 tasks, 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

- Before cleaning, switch off the robotic arm and disconnect the power supply unit from the mains.
- Wipe the belt, the frame, and the sensor housings with a dry or slightly damp soft cloth.
- Wipe the optical windows of the photoelectric sensor and the color sensor with a dry soft cloth or an optical cleaning wipe: dirty optics — the most common cause of false triggers.
- Do not use aggressive (corrosive) agents, solvents, or abrasives.

- Do not lubricate the belt or the rollers: lubricant causes the belt to slip and contaminates the objects.

7.2. Periodic inspection

- Check the belt tension and its tracking on the rollers; adjust with the tensioning unit's screws using the hex key from the kit if necessary.
- Check the tightness of the screws on the frame, the tensioning unit, the supports, and the sensor bracket, as well as the condition of the belt along its entire length — tears, delamination, or stretched sections are grounds for replacing the belt.
- The product does not require lubrication; repairs to the conveyor, the stepper motor, and the sensors must be performed only by an authorized service center.

7.3. Possible malfunctions and methods of their elimination

Symptom	Possible cause	User actions
The belt does not move, the motor does not respond	The stepper motor cable is not connected or the robotic arm is switched off, there is no motor-enable command in the program	Check the cable and connector, that the robotic arm is switched on, and that the motor interface in the program is correct
The belt slips, the object stops, but the roller keeps turning	Insufficient belt tension or overload	Adjust the belt tension, reduce the mass of the objects
The belt gradually shifts toward one edge of the frame	Uneven side tension or misalignment of the driven roller	Stop the belt, switch off the power, and tighten the adjustment screw on the opposite side in small increments
Cubes fall off the belt or shift during movement	Speed or acceleration too high, table vibration	Reduce the speed, check the conveyor's stability on the table, place objects in the center of the belt
The photoelectric sensor does not respond to the object	The sensor is not enabled in the program, a different port is specified, the optics are dirty, or the sensitivity is too low	Check the connections and the settings in the program, wipe the optical window, adjust the sensitivity screw
Color sensor does not recognize the object's color	Distance to the object too large or too small, lighting too bright or insufficient, dirty optics	Adjust the distance and the lighting of the work area, wipe the sensor's optical window
The belt does not stop after the program ends	There is no motor shutdown command in the program	Add a motor shutdown command to the end of the program and to the algorithm's emergency branches

8. Storage and Transportation Conditions

- Store the product in a dry room protected from dust, direct sunlight, and sudden temperature changes.
- Before long-term storage, disconnect all cables, remove the sensor bracket or protect it from impact, and release the belt tension.
- Carry the conveyor by holding it by the frame with both hands; do not lift the product by the belt, the motor, the sensors, or the cables.
- Store the learning objects and small accessories in a closed container to avoid losing them.
- Transport the product in its original or similar rigid packaging by any type of enclosed transport; do not place heavy objects on the packaging.
- The storage period before commissioning is unlimited provided that the stated requirements are observed.

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

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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

Name:	Educational conveyor line
Product model:	LABOTRIX CONVEY R8
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