

Digital CNC milling machine

LABOTRIX MILL X1

PRODUCT PASSPORT

Kyiv

2026

1. Basic product information

- 1.1. Product name — Digital milling machine with numerical program control.
- 1.2. Trademark — Labotrix.
- 1.3. Model — Mill X1; full trade name — LABOTRIX MILL X1.
- 1.4. Manufacturer — Labotrix Group Limited, China.
- 1.5. Intended use: The machine is designed for technology training workshops and STEM laboratories of educational institutions. It processes wood, plastic and metal: cuts out contours of a given shape, removes a layer of material to obtain relief surfaces and applies engraving - all according to a program that is prepared in advance on a computer. The equipment is used in technology and STEM classes, as well as in group work on the basics of digital production.
- 1.6. Design features: The movement is performed by three controlled axes of the machine: the table with the workpiece moves in the longitudinal and transverse directions, and the spindle assembly is lowered and raised vertically. Stepper motors operating through screw pairs with trapezoidal threads on chrome-plated guide shafts are responsible for movement in each direction. The control board reads the control program in G-code format and, based on it, sets the trajectory of movement and the speed of rotation of the spindle. The cutting tool is fixed directly in the spindle, and the workpiece to be processed is clamped in a vice on the work table. Safe operation is ensured by limit switches on each of the three axes, a sensor that determines the zero position along the Z axis, and an emergency stop button. If necessary, a 40 mm wide laser module is installed on the machine instead of a milling spindle. The drives and spindle are powered by a separate 48 V DC power supply.

2. Technical specifications

- Brand — Labotrix
- Model — Mill X1
- The article number is LTX-MILL-X1
- Product type — desktop milling machine with numerical control
- Number of controlled axes (pieces) — 3
- Working area: longitudinal × transverse movement (millimeter) - 300 × 180
- Vertical travel of the spindle assembly, Z axis (millimeter) — 78
- Axis drive — stepper motors of size 42 × 48 mm, screw pairs with trapezoidal thread on chrome-plated guide shafts
- Spindle diameter (millimeter) — 52
- Spindle motor power (watts) — 500
- Spindle speed (revolutions per minute) — 12000
- Maximum travel speed (millimeters per minute) — 5000

- Maximum feed rate during machining (millimeters per minute) — 2000
- Maximum acceleration (millimeters per second squared) — 200
- Processing accuracy (millimeter) — ± 0.1
- Safety and control elements - emergency stop button, limit switches on the X, Y and Z axes, as well as a zero level sensor on the Z axis
- Power supply — 48 V DC from the mains power supply
- Power consumption (watt) — 500
- Control — personal computer based on Windows 7, 8, 10, Linux or macOS; the program for the machine is executed in G-code format
- Installing a laser module instead of a spindle is structurally provided, module width (millimeter) is 40
- Materials for processing - wood, plastic, metal
- Overall dimensions (millimeters) — 485 × 415 × 374
- Weight (kilograms) — 11
- 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
- Completeness of documentation - passport with warranty card, operating instructions and methodological materials
- Packaging for delivery - individual packaging with content fixation and corner stiffeners
- Installation method - on a laboratory table or workbench with a flat, stable surface
- User requirements - the work is organized by a teacher or a master of industrial training, students work under direct supervision
- Service life (year) — 5
- Warranty period (month) — 12

3. Equipment

- Milling machine, equipped with numerical control and three controlled axes, with limit switches and a zero position sensor on the Z axis — 1 pc.
- 48 V power supply unit — 1 pc.
- Universal type vice, designed for fixing the workpiece on the workbench of the machine, - 1 pc.
- Set of metal cutters (end, ball, conical) — 1 set
- Special set of tools for machine operation and final processing of products — 1 set
- Set of safety glasses for working with the machine tool - 1 set
- Consumables for making products based on students' educational projects per academic year - wood, plastic, and aluminum
- Computer software that allows you to prepare control programs and control the machine from a personal computer - 1 set

- Methodological materials for use in the educational process — 1 set
- Product Passport and Warranty Card — 1 pcs
- Individual transport packaging — 1 pcs

The machine is supplied assembled, ready to be connected via the included mains power supply. The laser module is not included in the standard package and can be purchased separately if required.

4. Safety measures

4.1. General requirements

- Read this passport before first use; work with the machine is only permitted after completion of a safety briefing.
- The machine is operated by trained personnel who have the skills to work with the machine control software.
- Students work with the machine tool only under the direct supervision of a teacher or industrial training master.
- Before each turn on, inspect the machine: check for mechanical damage, play in moving parts, and the integrity of the power supply cable.

4.2. Electrical safety

- Connect the machine's power supply to a 220 V outlet through a grounded mains filter; the machine itself is supplied with a safe voltage of 48 V DC from the power supply.
- It is forbidden to operate the machine with a damaged cable or power supply unit housing.
- Do not open the housing of the power supply unit and the machine controller yourself.
- Before cleaning the machine from chips and dust, unplug the power supply from the outlet.

4.3. Mechanical safety

- The cutters have sharp cutting edges; carry and store them only in a protected container.
- Keep your hands away from the work area while the spindle is rotating.
- Before starting, make sure that the workpiece is securely clamped in the vice and the cutter is in the spindle.
- When operating the machine, wear the safety glasses provided.
- Wait for the spindle to come to a complete stop before removing the workpiece or touching the work area.

4.4. It is strictly forbidden

- Start machining without the workpiece securely clamped in the vice.
- Change the control program or machine operating parameters without involving a qualified specialist.

- Leave the machine turned on unattended.
- Bring foreign objects or loose materials into the working area of the machine.
- Attempt to remove the workpiece or cutter from the work area while the axes are moving.

5. Preparation for work

- 5.1. Unpack the machine and check the completeness according to section 3 of this passport.
- 5.2. Place the machine on a flat, stable surface of a table or workbench that prevents vibration during operation.
- 5.3. Connect the power supply to a 220 V outlet through a grounded power filter and connect the machine to the computer using the supplied cable.
- 5.4. Place the desired cutter in the spindle collet and tighten it securely with a wrench. Check the fixation by hand: the cutter should not rotate or wobble.
- 5.5. Secure the workpiece in a universal vice on the workbench so that it has no protruding loose parts.
- 5.6. Turn on the machine and wait for initialization: all three axes perform a calibration movement to the limit switches, after which the spindle returns to the zero point along the Z axis.

6. Procedure

6.1. Preparation of the management program

Compile or open a ready-made machining control program in G-code format in the bundled control program preparation software and download it to the machine via a computer connection.

6.2. Processing mode settings

- Set the milling depth per pass depending on the material: for wood and plastic it can be greater, for metal it can be less, taking into account the hardness of the workpiece and the type of milling cutter.
- Make sure that the feed rate during processing does not exceed 2000 mm/min, and the idle speed does not exceed 5000 mm/min.
- Choose the spindle speed, up to 12,000 rpm, according to the material and cutter diameter.

6.3. Starting processing

Press the start button in the machine control program. Observe the process, paying attention to the uniformity of the milling and the clamping status of the workpiece. In case of any abnormality, press the emergency stop button immediately.

6.4. Control during operation

Listen to the sounds the machine makes: creaking, knocking or a change in the pitch of the spindle rotation may indicate a malfunction or blunting of the cutter. If necessary, stop the machining immediately with the emergency stop button.

6.5. Completion of work

- Wait for the control program to complete and for the movements to stop automatically.
- Allow the spindle to come to a complete stop before touching the work area.
- Remove the finished product from the vise and remove chips and dust from the work area with a soft brush.

7. Care, maintenance and possible malfunctions

7.1. Cleaning

- After each work, remove chips and dust from the work area, guide shafts and screws with a soft brush and a dry cloth.
- Do not wash the machine under running water or immerse it in liquid.
- Remove stubborn dirt with a cloth slightly dampened in a neutral detergent solution, then wipe dry.
- Do not use solvents, acetone, or abrasives to clean the housing and guides.

7.2. Periodic control

- Check the condition of the guide shafts and screws at least once a month, and remove dust and dirt if necessary.
- Check the power supply cable and the computer connection cable for damage.
- Repair and maintenance of the machine should only be performed by an authorized service center.

7.3. Possible malfunctions and ways to eliminate them

Symptom	Possible cause	User actions
The machine does not turn on.	The power supply is not plugged into the outlet; the power cable is damaged.	Check the socket and cable; contact a service center if necessary.
The spindle does not rotate.	The controller did not receive the command; the connection to the computer was broken.	Restart the control program; check the computer connection cable

Symptom	Possible cause	User actions
The cutter does not remove material	The workpiece is not clamped tightly; the cutter is dull or damaged; the milling depth is set incorrectly	Check workpiece clamping; replace cutter; adjust milling depth
The machine makes strange noises or vibrates	The mounting screws are loose; the guides are dirty; the cutter is dull.	Tighten fasteners; clean guides; replace cutter
The machine does not execute the program accurately	Guides dirty or worn; workpiece shifted during machining	Clean the machine; check the workpiece is securely fastened; contact service if necessary.
The controller does not connect to the computer	Damaged or disconnected cable; driver conflict on the computer	Check cable and connections; reinstall control drivers

8. Storage and transportation conditions

- Store the machine in a dry, heated room at a temperature of +5 to +40 °C and a relative humidity of no more than 80%.
- Protect the machine from direct sunlight, vibration and mechanical shock.
- Before long-term storage, cover the machine with protective packaging material.
- Transport the machine in its original or similar rigid packaging in a closed vehicle.
- Do not place heavy objects on the machine packaging.
- 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 CNC milling machine
Product model:	LABOTRIX MILL X1
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