

OWNER GUIDE

Fiber Laser

MARKING & ENGRAVING

From unboxing to your first confident mark.



Split-style Haotian fiber laser. Appearance and fitted equipment vary by order.

SET UP

Connect with confidence

FOCUS

Match lens and profile

CREATE

Test, save and repeat

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Read the safety section before connecting or operating the machine.

START HERE

Find your next step

Use the contents below or the PDF bookmarks to jump directly to a task.

Before you start	Safety and workspace	03
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Which machine does this cover?

This guide covers Haotian split fiber marking machines, with an EZCAD2 workflow and optional LightBurn guidance. Source power, MOPA controls, lenses, rotary type and Z-axis hardware depend on your order. Photos show representative equipment.

YOUR SUPPLIED CONFIGURATION COMES FIRST

Keep the factory software, calibration files, source test sheet and order specification. This is not a UV or CO2 operating manual. EZCAD3 and automatic Z motion require the matching configured hardware.

01 SAFETY

Protect people first

An open fiber marking machine must be treated as a Class 4 laser system. Follow its safety labels and your workplace laser safety procedures.

DANGER: INVISIBLE LASER RADIATION

Direct and reflected radiation can injure eyes and skin. Never look into the scan head, lens or beam path. The red positioning light does not show the invisible processing beam.

Use a controlled laser area

Have a competent laser safety person assess the workspace, reflections and access. Use suitable beam containment, barriers and interlocks. Keep untrained people outside the controlled area. An optional cabinet is not automatically a certified Class 1 enclosure. [2, 3]

Choose protection for your actual source

Select laser protective eyewear for the wavelength and exposure identified by the risk assessment. Check the markings and condition of the eyewear; tint alone proves nothing. Fiber sources commonly operate near 1064 nm, but the source label is authoritative. Protect everyone within the hazard area. [1, 3]

Control reflections and access

Keep hands out of the processing area. Remove jewelry and reflective loose items near the beam. Secure the part and use suitable beam stops. Keep the beam away from eye level and from doors or windows. Never bypass an interlock. [2, 3]

A PREVIEW IS NOT A SAFETY TEST

Successful red-light framing does not prove that laser radiation is contained. Complete the safety checks before any processing test.

Reference: [1] Original machine manual; [2] LIA and OSHA; [3] OSHA Technical Manual. See the source list at the end of this manual.

01 SAFETY

Prepare the workspace

Arrange the area so you can operate, stop and maintain the machine without reaching across the work zone.

- ☐ Use a stable, level bench with space for the cabinet, tower, computer and workpiece.
- ☐ Keep cooling vents clear. Protect the machine from moisture, dust and impacts.
- ☐ Check the machine voltage label and protective earth before connection.
- ☐ Set up suitable local fume extraction for the material and coating. Assess the material safety data before processing.
- ☐ Keep combustible clutter and flammable liquids away. Do not run unknown materials.
- ☐ Keep the emergency stop accessible. Know the site fire and evacuation procedure.

If something goes wrong

1**Stop the process**

Use the emergency stop for unexpected emission, movement or an immediate hazard. Do not reach into the work zone.

2**Make the area safe**

If safe, switch off and isolate power. For fire or suspected exposure, follow the site emergency procedure and obtain appropriate assistance.

3**Do not restart until checked**

Identify the cause and contact Haotian support before resuming if equipment is damaged or operation is abnormal.

STAY WITH THE MACHINE

Never leave a running laser unattended. Stop a job if extraction fails or unexpected smoke, heat, noise or behavior appears. [4]

Reference: [1] Original machine manual; [2] LIA and OSHA; [4] LightBurn safety guidance. See the source list at the end of this manual.

02 MACHINE OVERVIEW

Know the main parts

Identify these parts on your machine before you connect any cables.



Representative split machine: separate control cabinet, Z tower, scan head and worktable.

Part	What it does
Control cabinet	Houses the laser source, controller and power electronics. Keep it closed.
Z tower and scan head	Changes working height. Galvo mirrors direct the beam through the F-theta lens.
Lens and worktable	The lens defines the calibrated field; the table supports parts and fixtures.
Fiber cable and protective sleeve	Carries laser energy to the head. Leave it relaxed and supported.

PROTECT THE FIBER CABLE

Do not pull, kink, twist, crush or sharply bend the cable or protective neck. Do not lift the machine by the cable, scan head or connectors. Follow the supplied minimum bend radius if specified.

02 ACCESSORIES

Check your delivery

Compare the shipment with your packing list. Accessory type and quantity depend on the order.



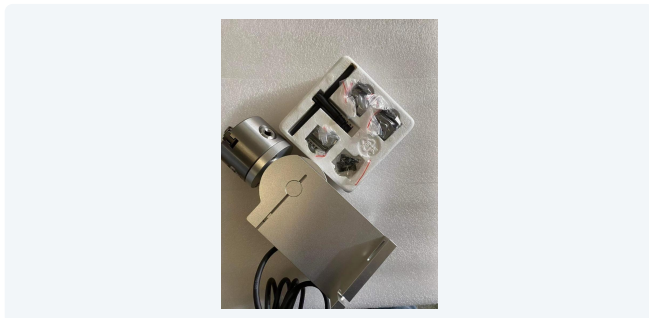
USB cable

Connects the controller to the computer.



Power cable

Use a suitable grounded outlet and the voltage on the machine label.



Rotary attachment

Holds and rotates round parts. Chuck size and fixtures vary.



Foot pedal

Triggers repeat jobs when configured. Keep clear until the part is secured.

Before discarding the packing

Check all compartments for small tools, fasteners, the focus ruler, USB drive and extra lens. Photograph shipping damage and retain the packaging. Contact support if anything listed is missing.

CONNECT ACCESSORIES WITH POWER OFF

Switch off and disconnect mains power before connecting or disconnecting the rotary, foot pedal or external motor cables.

02 ACCESSORIES

Tools, optics and files

Keep these items together so setup and future lens changes are straightforward.



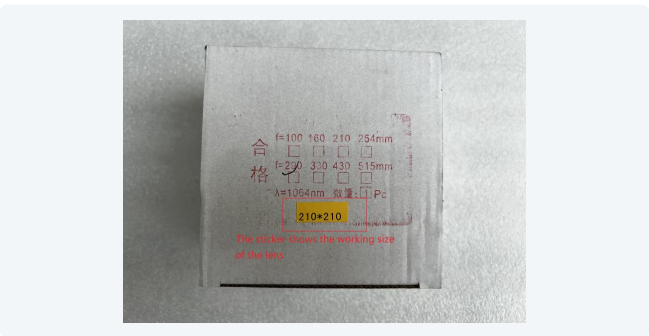
Positioning plates

Use with suitable fasteners to repeat part placement.



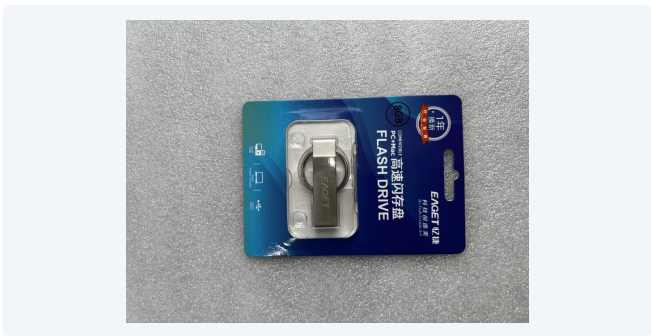
Tools and fasteners

Use the correct tool size. Avoid overtightening fixtures.



Extra F-theta lens

Check the lens label and matching calibration files.



USB drive

Contains supplied software, settings, drivers or documentation.

Also check	Why it matters
Focus ruler or gauge	Use the supplied reference point and distance for the fitted lens.
Test pieces	Make a trial mark before working on a valuable part.
Protective eyewear	Confirm wavelength protection and suitability before use.

03 SETUP

Connect the machine

Start with all switches off and the mains lead disconnected.



Z-axis connection

Connect the supplied external motor lead if fitted.



Rear connections

Match the labels on your cabinet; layouts vary.

- 1 Position the cabinet and tower**
Place both securely. Give the fiber sleeve a relaxed route with no sharp bends or strain.
- 2 Connect external accessories**
Align each connector before securing it. Connect the rotary and foot pedal only to their labeled ports. Never force or modify a plug.
- 3 Connect computer and mains**
Use the USB cable directly to the computer for initial setup. Verify voltage and grounding, then connect the power lead.

CHECK THE LABELS, NOT THE PHOTO

Port positions, voltage and switch functions can differ. If a connector or label is unclear, send a photo to support before applying power.

03 SETUP

Start and stop safely

Use the switch labels and sequence supplied for your individual machine.



Typical front panel. A laser enable control and an emergency stop may be separate from main power.

- 1 Prepare the job with emission disabled**
Check the safety area, extraction, lens, fixture and material. Keep the foot pedal clear. Release the emergency stop only after checking why it was engaged.
- 2 Power the machine and connect software**
Switch on the cabinet and controller as labeled. Open the correct software and confirm communication. Keep the source disabled while arranging the part where the controls allow this.
- 3 Enable only when ready**
Focus, check the job and frame it. Close the enclosure or secure the controlled area before enabling processing and starting a test.

Normal shutdown

Stop the job, disable laser output and close the software. Switch off the machine using its supplied sequence. Let extraction clear residual fumes. Isolate power before disconnecting accessories, changing the lens or moving the machine.

EMERGENCY STOP IS FOR HAZARDS

Do not use the emergency stop as a substitute for mains isolation during maintenance. After an emergency stop, investigate the cause before reset.

04 SOFTWARE

Protect the factory setup

Back up the complete supplied software package before installing or changing anything.

- 1 Make a read-only backup**
Copy the entire USB drive to a safe folder and a second location. Keep the original files unchanged.
- 2 Create a working copy**
Copy the supplied EZCAD folder to the computer. Run the working copy, not the only copy on the USB drive.
- 3 Keep the lens files together**
Store correction files, focus distances and lens labels together. Save an export or screenshots of the working device and rotary settings.
- 4 Record the exact configuration**
Keep the source model, rated power, controller type and software version. Support needs these details to supply matching settings.

Software	Use the correct package
EZCAD2	This guide illustrates the original EZCAD2 workflow. Use the machine-specific supplied build.
EZCAD3	Uses compatible control hardware and configured motion. A software install alone does not upgrade EZCAD2 hardware.
LightBurn	Optional third-party software. Confirm license, controller and version compatibility before use.

DO NOT USE ANOTHER MACHINE'S SETTINGS

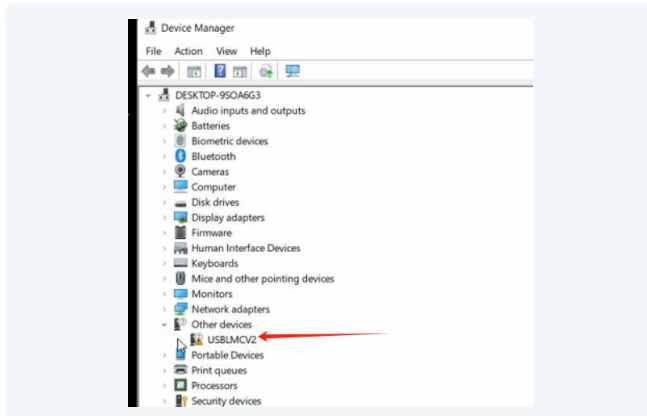
Laser type, control signals, timing and calibration must match your hardware. Ask Haotian for missing files instead of guessing. [5]

Reference: [1] Original manual; [5] LightBurn device setup. See the source list at the end of this manual.

04 SOFTWARE

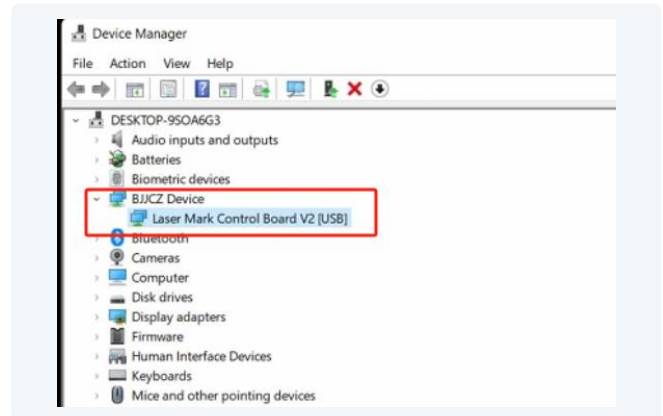
Install the EZCAD2 driver

The screenshots below are from the supplied legacy Windows package. Your Windows interface may look different.



Find the controller

An unconfigured controller may appear as USB LMC V2.



Verify installation

The original package shows the controller under BJJCZ Device.

1 Match Windows and driver architecture

Check System information for the system type. Use the matching driver from the Haotian package.

2 Connect and install

Power the controller with laser emission disabled. Open Device Manager, select the controller and choose Update driver, then browse to the supplied driver folder.

3 Confirm a clean device status

Complete the installer and reopen Device Manager. Resolve warning icons before opening the correct EZCAD2 working folder.

IF INSTALLATION IS BLOCKED

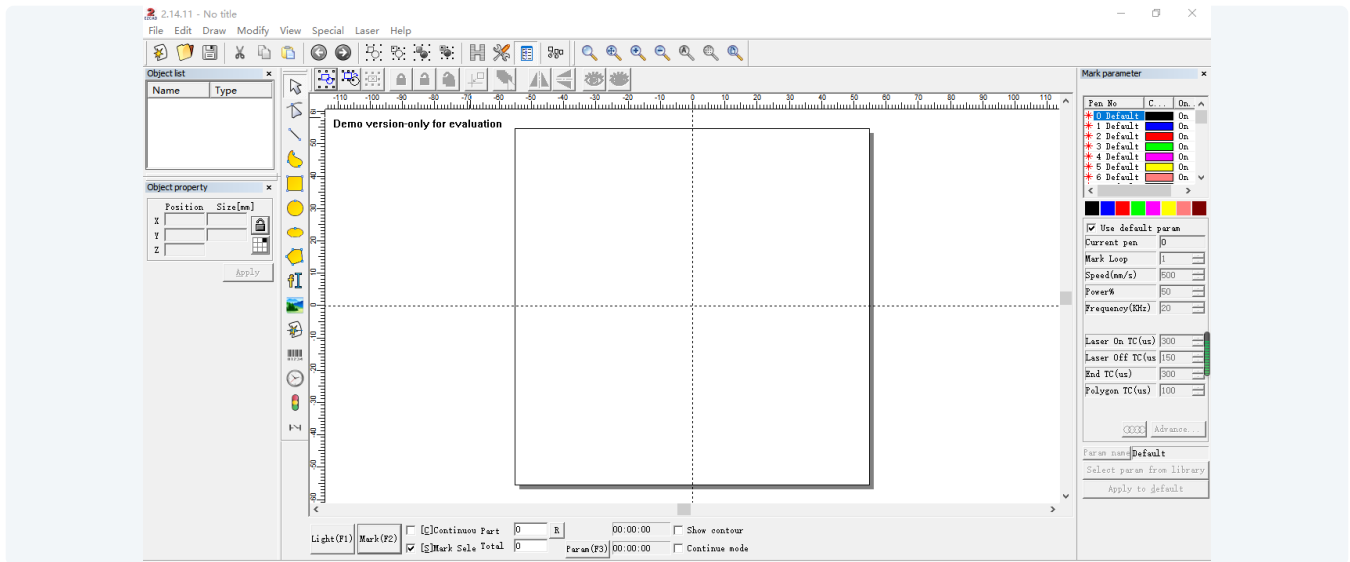
Use the matching signed package where available. Contact support for the correct driver. Do not disable Windows security or replace unrelated USB drivers to force installation.

If LightBurn was used on this computer, check which driver is active. EZCAD and LightBurn can require different Windows drivers. Close other laser programs before testing communication. [6]

04 EZCAD2

Get familiar with the screen

Open the supplied EZCAD2 application with the machine connected and laser output disabled.



Representative EZCAD2 workspace. Menu names and layout vary with the supplied build.

Area	What to check
Drawing field	Place artwork within the calibrated lens field. Confirm dimensions in millimeters.
Object and text controls	Select an object to edit text, position, size and other properties.
Pen parameters	Select the correct pen and approved processing settings.
Light and Mark controls	Light previews position. Mark starts processing. They are different actions.

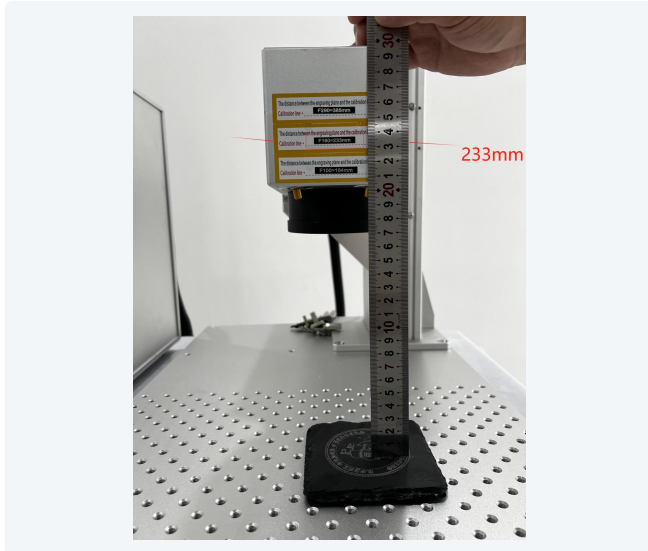
KEEP FACTORY PARAMETERS INTACT

Do not change source type, ports, correction files or timing just to clear an error. Save a backup and ask support if the profile does not match the machine.

05 FOCUS AND LENSES

Set the focus correctly

A small height error can make a good machine produce a weak or blurred mark.



Measure from the supplied datum

The illustrated 233 mm is an example, not a universal setting.



Check the reference line

Follow the distance and datum specified for your fitted lens; pictured distances are examples.

1 Identify the fitted lens

Select its matching software profile and obtain its supplied working distance.

2 Set the material height

With output disabled, place the gauge on the surface to be marked. Adjust Z to the supplied reference line or datum. Keep fingers clear of moving parts.

3 Remove the gauge and verify

Remove tools from the work zone. Make a small test under the normal safety controls. Stop between small height adjustments if fine tuning is needed.

FOCAL LENGTH IS NOT THE FOCUS-RULER DISTANCE

The F-number on a lens and a distance measured from a line on the head are different references. Do not substitute one for the other. [7]

05 FOCUS AND LENSES

Change a lens with confidence

A lens change also changes focus and calibration. Treat it as a setup change.

- 1 Stop, isolate and protect the optics**
 Switch off, disconnect mains power and work in a clean area. Follow the supplied lens-change method; avoid touching optical surfaces.
- 2 Fit the correct lens**
 Use a compatible lens, seat it gently and store the removed lens with its protective caps.
- 3 Load its matching profile**
 Set the specified field size and lens correction. Keep separate, clearly named profiles for each lens.
- 4 Refocus and check the result**
 Use that lens's supplied working distance. Frame a small square, make a test mark and measure the actual size before production.

Record for every lens	Use this information
Lens identity	Label, wavelength and serial or part number if present.
Calibrated field	Use the supplied working area, not an assumed F-number conversion.
Working distance	Record the value and the exact physical reference used.
Profile and correction file	Keep both with the factory backup.

LARGER FIELD DOES NOT MEAN THE SAME RESULT

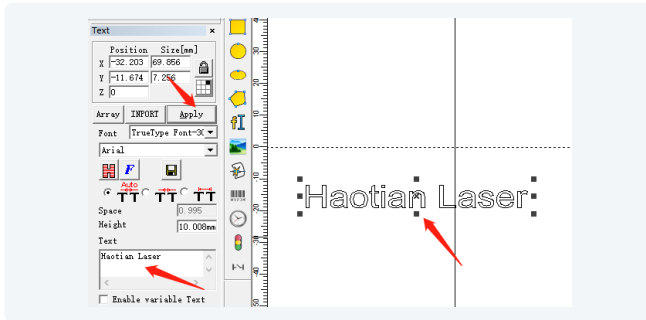
A larger field generally changes spot size and process performance. Re-test the material and verify dimensions after changing lenses.

Reference: [1] Original manual; [8] LightBurn lens-change guidance. See the source list at the end of this manual.

06 FIRST JOB

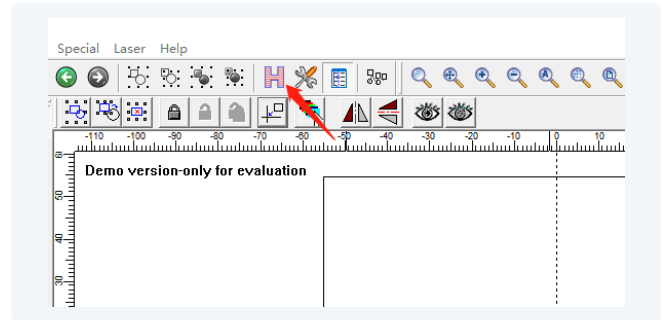
Make your first mark

Start with a small design on a suitable scrap piece of the same material.



Create and center text

Edit the text, apply changes and confirm its size.



Add a hatch if needed

A filled mark needs hatch settings as well as an outline.

1 Create a simple object

Enter short text or draw a small square. Confirm units and position in the field.

2 Apply a supplied material preset

Use a verified starting recipe for your source and material. Confirm the selected pen and hatch settings.

3 Focus and preview

Secure the test piece, focus it, then use Light (F1 in the illustrated EZCAD2 build) to check placement. Press Esc to stop the preview before starting Mark (F2).

4 Run one supervised test

Secure the safety area and enable processing. Run the job, stop, inspect and adjust only one variable at a time.

SAVE THE SUCCESSFUL JOB

Record material, lens, focus, settings and result. Use the same fixture and orientation for repeat work.

06 PROCESS SETTINGS

Understand the controls

Use the source-specific test sheet and proven presets. These controls interact, so there is no universal recipe.

Control	What changes
Speed	Scan speed in millimeters per second. Lower speed often adds more energy per unit length, but can increase heating.
Power	Commanded output percentage. The useful operating range depends on the source and process.
Frequency	Pulse repetition rate, normally in kHz. Changing it can change pulse energy and marking behavior.
Pulse width	Available on supported MOPA sources. Use only the range allowed for the specific source.
Hatch or line interval	Distance between fill lines. Smaller spacing can increase coverage and processing time.
Passes and scan angle	Repeat count and scan direction affect texture, heat accumulation and material removal.

A reliable test method

Keep the lens, focus, artwork size and material fixed. Make a small test matrix within the approved source limits. Compare edge quality, contrast, depth and time. Record the best result before changing a second variable.

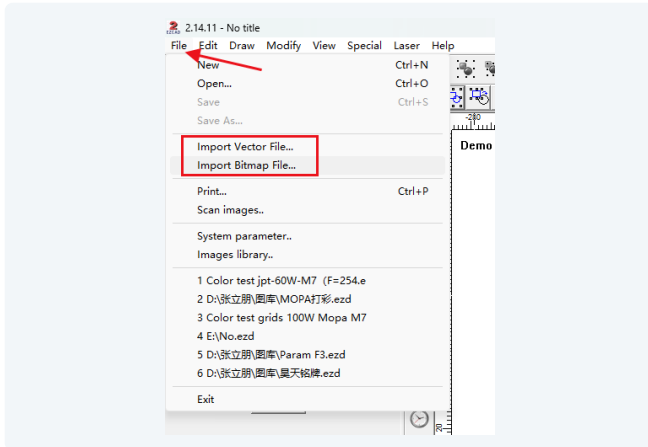
DO NOT COPY SCREENSHOT NUMBERS

The values in the original software screenshots are examples. Do not treat them as presets for every source, metal or coating.

06 ARTWORK

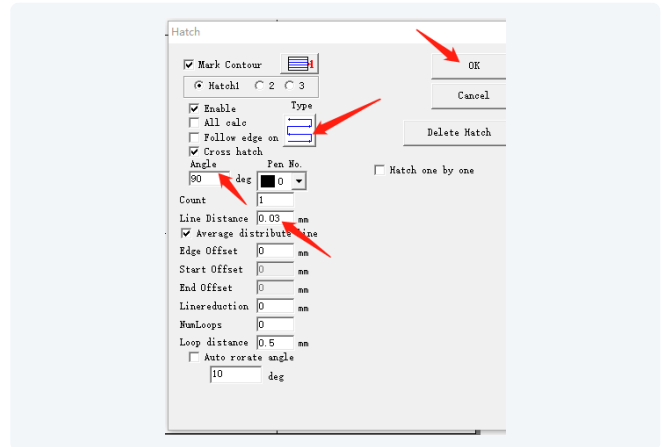
Prepare vectors and text

Clean artwork gives more predictable outlines, fills and job times.



Import using the correct command

Choose a vector or bitmap import according to the artwork.



Check the hatch settings

Closed shapes and the selected hatch define filled areas.

1

Check format compatibility

Use a format supported by your installed EZCAD build. DXF, PLT and some AI versions are common; support for other formats varies.

2

Confirm scale and shape

After import, check dimensions in millimeters. Inspect curves, holes and small details. Convert fonts to outlines when moving files between systems.

3

Remove duplicate and stray paths

Duplicates can be marked twice. Open contours may prevent the intended fill. Check the job before marking.

4

Assign the intended operation

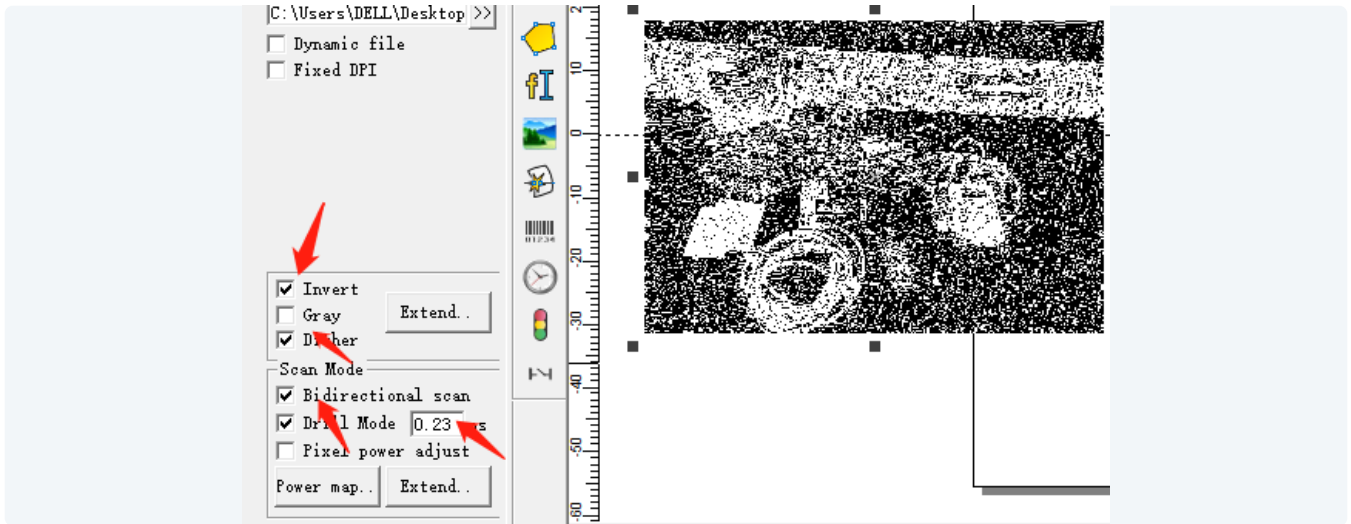
Use outlines for line work and hatch for filled work. Test small details on scrap before running the full design.

For LightBurn, use the import formats documented for your installed version. Recheck size, layer mode and output settings after importing.

06 ARTWORK

Prepare a bitmap

A photograph or shaded image needs a different workflow from a filled vector logo.



Original EZCAD2 bitmap controls. The best choices depend on the source, material and image.

- 1 **Prepare the image at final size**
Crop to the subject and set the desired dimensions before choosing resolution and process settings.
- 2 **Choose the tonal method**
Use grayscale or a suitable dithering method supported by the software. Invert only when the desired material response requires it.
- 3 **Match detail to the process**
Fine pixels cannot overcome a large spot, poor focus or unsuitable material. Avoid excessive sharpening and heavy noise.
- 4 **Run a small comparison**
Test contrast, image mode, line interval and scan direction on the actual material. Compare the result under consistent lighting.

PHOTOS AND DEPTH MAPS ARE DIFFERENT

Normal grayscale artwork represents shading. A relief depth map represents depth. Do not assume a regular photo is ready for deep relief engraving.

07 LIGHTBURN

Set up LightBurn

LightBurn is optional. Confirm that the license and installed version support your controller.

- 1 Back up before switching**
Keep the complete factory package and export your current settings. Close EZCAD and other laser-control programs.
- 2 Install the matching driver**
On Windows, use the galvo driver option in the LightBurn installer. Version 2.1 documentation covers supported EZCAD2 and EZCAD3 devices. macOS does not require this Windows driver. [6]
- 3 Add the correct galvo device**
Import the machine-specific files when prompted. EZCAD2 commonly uses markcfg7 in the plug folder. EZCAD3 commonly uses markcfg0 and may also require Motors.ini and a COR file. [5]
- 4 Verify before processing**
Confirm source settings, lens field, correction and orientation. Use a separate named device profile for each lens. Focus and test a small measured square. [5, 8]

Switching back to EZCAD

Close LightBurn first. If EZCAD no longer finds the controller, restore the supplied EZCAD Windows driver using the current vendor guidance. Recheck Device Manager and open the unchanged factory working folder. [6]

COMPATIBILITY IS CONFIGURATION-SPECIFIC

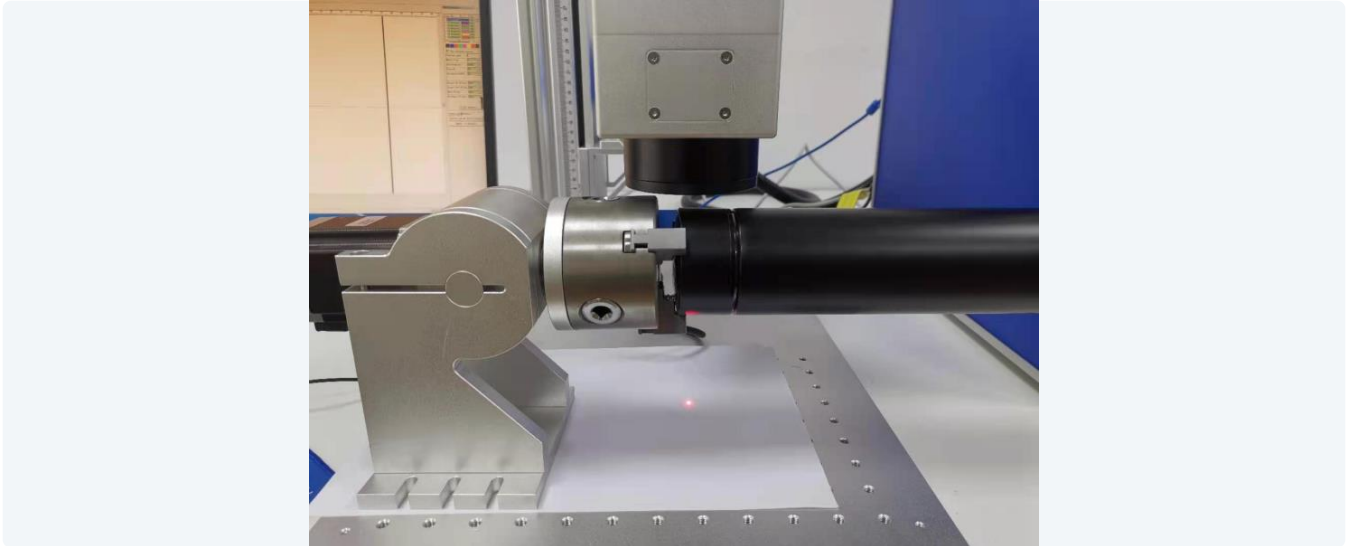
EZCAD3 support does not mean every scanner, 3D head or motion feature is supported. Confirm the exact hardware and required functions with Haotian before changing workflows.

Reference: [5] Device setup; [6] Drivers; [8] Lens changes. See the source list at the end of this manual.

08 ROTARY MARKING

Mount and align round parts

Connect or disconnect the rotary only while the machine is switched off and isolated.



Representative chuck rotary positioned under the scan head.

- 1 Secure the rotary and workpiece**
Fix the rotary to the table as appropriate. Grip the part firmly without distortion and support long items. Check that it can turn without collision.
- 2 Measure and level**
Measure the part diameter at the marking position with calipers. Align the cylinder axis parallel to the worktable and the intended software axis.
- 3 Focus on the marking surface**
For the standard rotary workflow, set focus at the top surface where the beam will mark. Keep the part centered beneath the field.
- 4 Preview the centerline**
Use the red-light preview to align a reference line along the top of the cylinder. Stop preview before test motion or marking.

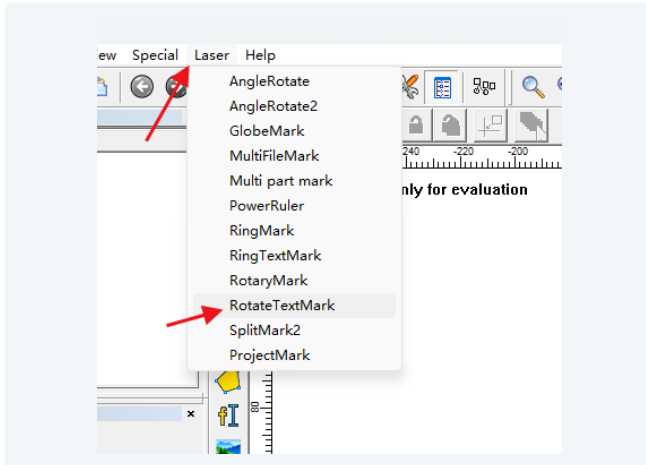
KEEP HANDS CLEAR

Chuck jaws, shafts and the part rotate. Keep clothing, hair, cables and hands clear during test motion and processing.

08 ROTARY MARKING

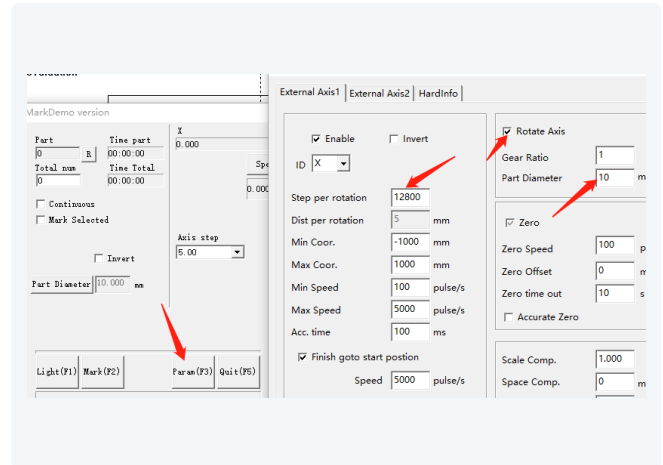
Rotary workflow in EZCAD2

Menu names vary. Use the rotary function supplied with your EZCAD2 configuration.



Choose a rotary marking tool

The supplied build may show RotateTextMark or RotaryMark.



Confirm the rotary parameters

Check axis, part diameter and the configured steps per revolution.

- 1 Load the matching rotary setup**
 Use the axis and steps per revolution supplied for the fitted motor and driver. The original example uses 12,800 steps; do not assume that applies to every rotary.
- 2 Enter the actual diameter**
 Measure at the engraving position. Re-enter the value when the part diameter changes.
- 3 Test motion without processing**
 Keep emission disabled where possible. Confirm one full revolution using the supplied test function. Resolve scale or direction errors before marking.
- 4 Choose split settings and test**
 For split marking, start from the supplied preset. Check a small sample for seams and distortion before a full wrap.

For ordinary flat marking afterward, return to the normal marking mode and verify the rotary is no longer being commanded.

08 ROTARY MARKING

Rotary workflow in LightBurn

Use Laser Tools > Rotary Setup. The labels below follow the LightBurn 2.1 galvo guide. [9]

Setting	What to verify
Rotary type	Choose Chuck for a jaw fixture or Roller for a driven-wheel fixture.
Steps per rotation	Use the manufacturer value. Test should make the rotary turn one full revolution and return.
Diameter	For a chuck, enter the measured workpiece diameter. For a roller, verify the driven roller diameter.
Axis and output center	Match the physical rotary orientation and align the output center with the part.
Split size	Smaller slices may reduce seams but increase job time. Confirm diameter and alignment first.

Before starting the complete design

Enable Rotary Mode, check its status and preview the job. Run a small test to confirm size, direction, focus and seam quality. For a wrap, the artwork span around the part must match the intended circumference. Disable Rotary Mode before returning to flat marking.

AVOID FIXING ONE ERROR WITH ANOTHER

Correct the motion scale and diameter before adjusting split size or overlap. A smaller split does not correct the wrong steps per revolution.

Reference: [9] LightBurn Rotary Mode for galvo lasers. See the source list at the end of this manual.

09 TROUBLESHOOTING

Power or connection problem

Start with external checks. Stop if you see damage, smell burning or hear unusual electrical noise.

Symptom	Safe checks
No power	Check the outlet, supply lead, rear mains switch and emergency-stop state. Verify the machine label matches the supply.
Machine powered, not detected	Use a direct USB connection. Try the supplied cable or a known-good replacement. Check Device Manager, software and driver match.
EZCAD works, LightBurn does not	Confirm LightBurn compatibility, active Windows driver and the selected device profile.
LightBurn works, EZCAD does not	Close LightBurn. Check whether the EZCAD driver needs restoring. Use the correct factory folder.
Motorized Z does not move	Power off and isolate. Check the external motor connector and any labeled manual or motor mode selector. Check for a physical obstruction.

If a fuse is suspected

Contact support for the correct fuse specification and replacement procedure for your machine. Disconnect mains before any authorized access to a fuse holder. Never bypass a fuse or increase its rating. Repeated failure needs a technician.

CABINET CHECKS BELONG TO SERVICE PERSONNEL

Do not open the cabinet to measure live voltages or reconnect internal wiring. Send the symptom and photos to support for a guided diagnosis.

09 TROUBLESHOOTING

Red frame, but weak or no mark

A visible red preview does not confirm that the processing laser is enabled.

- 1 Check the obvious first**
Remove the lens cap. Confirm source enable, emergency stop and any enclosure interlocks. Do not bypass a safety input.
- 2 Recheck lens and focus**
Use the installed lens's profile and working distance. Confirm the part is flat and located in the calibrated field.
- 3 Confirm job output**
Check that the intended object or pen is selected for output, the power is not zero and the process settings match the source.
- 4 Try a known-good small test**
Use a verified preset on a compatible test piece. Keep the same lens and focus. Do not use repeated maximum-power tests to diagnose the machine.
- 5 Collect evidence if it persists**
Save the job, photograph the lens label and include a screenshot of settings, the material, focus method and result.

DO NOT CHANGE THE LASER TYPE TO EXPERIMENT

Incorrect source-control settings can create unsafe behavior or damage equipment. Restore the verified factory profile or ask support.

Sudden loss of output

Stop if output drops suddenly or the fiber sleeve appears damaged. Leave the cabinet and source sealed. Support can determine whether a source test or authorized repair is required.

09 TROUBLESHOOTING

Improve marking quality

Check the physical setup before changing process parameters.



Extra lines or heavy corners

Check artwork duplication and validated timing settings.

Visible rotary seams

Verify alignment, motion scale, diameter and split settings.

Result	Check first
Blurred or inconsistent depth	Focus, part level, lens cleanliness and workholding.
Wrong size or distorted shape	Correct lens profile, correction file and design dimensions.
Red preview offset	Focus first, then the red-light offset. Keep lens calibration separate.
Rotary stretch or gaps	Actual diameter, steps per revolution, axis and part slippage.
Extra line or burnt edge	Duplicate paths, hatch, speed and approved laser timing.
Noise from head or only one line	Stop processing and contact support. Do not open the scanner or adjust mirrors.

Back up settings before approved changes. Make one small test after each change and keep the original job for comparison.

10 CARE AND MAINTENANCE

Keep the machine reliable

Stop the machine and isolate mains power before cleaning or connecting accessories.

When	Operator care
Before each session	Check cables, fiber sleeve, lens cover condition, fixtures and clear vents. Verify safety controls and extraction.
After each session	Remove loose debris from the worktable when safe. Keep dust away from the lens. Cover clean optics when not in use.
When the lens looks contaminated	Use only the lens supplier's approved cleaning materials and method. Do not rub a dry, dusty lens or use household cleaners.
At intervals suited to use	Inspect external connections, extraction filters and workholding. Follow component-specific maintenance instructions.
Before moving or storing	Power off and disconnect. Protect optics and fiber cable, secure moving parts and retain the original packing.

Leave sealed parts sealed

The laser source, fiber termination, galvo mirrors, power supplies and internal controller wiring are service items. Do not attempt fiber splicing, internal optical alignment or live electrical tests yourself.

STOP AND ASK FOR SERVICE

Damaged insulation, a kinked fiber sleeve, recurrent fuse failure, unusual noise or a sudden output drop requires support before further use.

10 ADVANCED WORK

Deep relief and 2.5D

Validate a small sample before committing to a long engraving.

Workflow	What it means
Repeated flat engraving	Multiple passes remove material from a flat design. As the surface deepens, focus and debris can affect the result.
LightBurn 3D Sliced	Uses a grayscale depth map to distribute passes by image tone. This mode can work without a live Z axis; depth still needs process testing. [10]
Configured EZCAD3 2.5D	Combines suitable control hardware, scanner and Z motion to coordinate layered engraving and focus changes. Verify the exact configuration. [11]
True 3D dynamic focus	Requires a suitable focusing scanner and controller. A motorized tower by itself is not a true 3D scan head.

Build the process in stages

Define material, target depth, fine detail and acceptable time. Test material removal and finishing separately. Keep the workpiece secure, control heat and debris, and measure the result between trials. Confirm the Z travel and collision clearances before any motion-controlled job.

SOFTWARE CANNOT ADD MISSING HARDWARE

Do not assume a motorized Z tower is wired for software motion. Ask Haotian to confirm the controller, scanner, axis drive and supplied workflow for your order.

Reference: [10] LightBurn 3D Sliced; [11] JCZ deep engraving architecture. See the source list at the end of this manual.

11 SUPPORT

Get help faster

Email a clear description and the information below so the team can diagnose the issue.

HAOTIAN LASERS SUPPORT**info@haotianlasers.com**www.haotianlasers.com

- ☐ Order or invoice number and machine serial number.
- ☐ Laser source model and rated power; controller and software version.
- ☐ Lens label, working area and the profile in use.
- ☐ Material, coating, focus reference and distance.
- ☐ Settings screenshot and the job file if possible.
- ☐ Clear photos of the result, machine labels and external connections.
- ☐ A short video of the symptom without removing covers or defeating safety controls.
- ☐ When it started, what changed and which safe checks you already completed.

KEEP YOUR MACHINE DOCUMENTATION

Warranty terms follow your quotation, invoice and sales agreement. Use this email for configuration files, missing items and service guidance.

11 DAILY REFERENCE

Ready-to-mark checklist

Use this page before a job and after changing material, lens or fixture.

- ☐ The operator is trained and the controlled laser area is secured.
- ☐ Required beam containment, eyewear and safety controls are in place.
- ☐ Extraction is running and the material is suitable for laser processing.
- ☐ The correct lens is fitted and its matching profile is selected.
- ☐ The lens cap is removed; optics appear clean and undamaged.
- ☐ The part is secure and the intended surface is in focus.
- ☐ No tools, rulers, hands or loose objects remain in the work zone.
- ☐ Artwork dimensions, output selection and settings are checked.
- ☐ Red preview placement is correct; preview has been stopped.
- ☐ A suitable scrap test has passed.
- ☐ The operator will remain present throughout the job.

After the job

Stop processing, disable output and let the workpiece cool. Save the successful job and settings. Check the part before repeating. Switch off using the normal shutdown sequence when finished.

IF UNCERTAIN, STOP

Keep output disabled and contact info@haotianlasers.com before continuing.

11 MACHINE RECORDS

Keep your settings together

Complete this page for the machine and retain it with the factory backup.

Machine record	Your information
Order and serial number	_____
Source model and rated power	_____
Controller and software version	_____
Machine input voltage	_____
Factory backup location	_____
Rotary type and axis	_____
Verified steps per revolution	_____

Lens record

Lens and field	Focus distance and datum	Profile or correction
_____	_____	_____
_____	_____	_____
_____	_____	_____

Successful material recipe

Material and coating: _____
 Lens and focus: _____
 Speed, power, frequency and pulse width: _____
 Hatch, angle and passes: _____
 Result and job filename: _____

12 REFERENCES

Sources and scope

Technical additions were checked against the primary references below on 17 October 2026.

[1] Supplied Haotian machine manual

2024 Haotian Fiber Marking Machine Manual. Original photos, machine connections and EZCAD2 workflow.

[2] LIA and OSHA: Laser Safety

Hazards and the role of training, containment and safety controls.

[3] OSHA Technical Manual, Section III, Chapter 6

Laser hazard evaluation and controlled areas.

[4] LightBurn: Safety and Warnings

Operator supervision and protective equipment.

[5] LightBurn: Add a Galvo Laser

Machine configuration imports and lens profiles.

[6] LightBurn: Installing Galvo Drivers

Windows drivers and switching software.

[7] LightBurn: Focusing Galvo Lasers

Focus references and working distance.

[8] LightBurn: Changing a Galvo Laser Lens

Profiles, focus, field size and calibration.

[9] LightBurn: Rotary Mode (Galvo)

Rotary scale, diameter, axis and split settings.

[10] LightBurn: 3D Sliced Engravings

Depth-map workflow and focus limitations.

[11] JCZ: Laser Control Systems

Hardware architecture for 2.5D deep engraving.

How to use these references

Click a source title to open it. Online software instructions can change. Factory files, equipment labels and configuration-specific instructions govern your individual machine. This guide does not certify an installation or replace a site risk assessment.

Photos are from the supplied manual and show representative equipment. Software screenshots illustrate controls, not universal process presets. UV and CO2 service procedures have been excluded from this fiber guide.