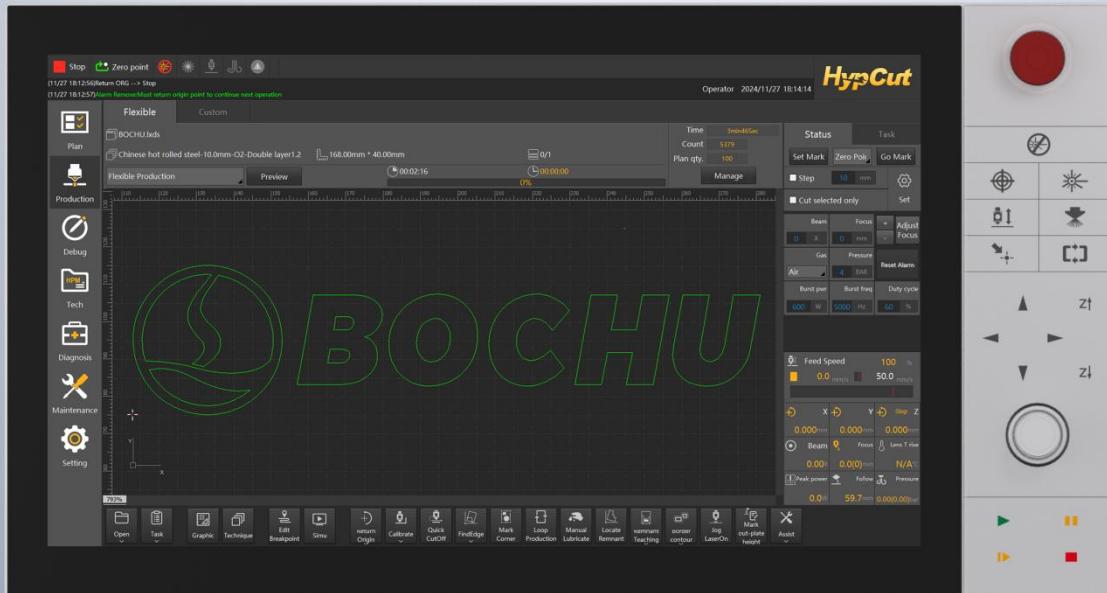




To bring you intelligent manufacturing



# HypCut Laser Cutting Control Software

## User Manual

System: FSCUT 8000

Software Version: 1.0.2430.7

Document Version: V1.5.0



[www.bochu.com](http://www.bochu.com)

# Foreword

Thank you for using BOCHU HypCut Laser Cutting Control Software!

BOCHU HypCut Laser Cutting Control System (hereinafter referred to as HypCut) is designed for metal plate processing. HypCut mainly contains the modules such as production management and statistics, laser cutting technique processing, laser cutting control, intelligent production assistance, rapid debugging, diagnosis and maintenance, local help and remote assistance, etc. With modular functions, HypCut can assist users in completing production tasks quickly. Only when used with HypTronic master station and a valid license can HypCut realize machining control.

This manual only serves as the operating guide for the HypCut main program. For additional information like hardware installation, and software debugging, please refer to other manuals or contact technical support.

This manual is based on HypCut 2024A-1.0.2430.7. Due to the continuous update of system functions, the actual situation may differ in some aspects from the statements in this manual. We've tried our best to ensure that the content is applicable, but we reserve the right of final interpretation. The contents of this manual are subject to change without notice.

For any questions or suggestions during use, please contact us through the information provided.

## Convention Symbol Explanation

**Notice:** Provides supplementary explanations or clarifications for the product

**Caution:** Indicates that non-compliance with the instructions may result in minor injuries or equipment damage.

**Warning:** Indicates that non-compliance with the instructions may result in severe injuries or death.

**Danger:** Indicates that non-compliance with the instructions will result in severe injuries or death.

## Declaration

The operation of the machine tool and the laser cutting effect may directly relate to the material being cut, the laser used, the gas used, the gas pressure, and the various parameters you set. Please set various parameters carefully according to your cutting process requirements!

Improper parameter settings and operations may lead to poor cutting effect, damage to the laser head, or other machine tool components, and even personal injury. HypCut Laser Cutting Control System has tried its best to provide various protection measures. Laser equipment manufacturers and end users should try to follow operating procedures to avoid the occurrence of injury accidents.

BOCHU shall not be liable for any direct or indirect losses arising from the following circumstances: damages caused by improper use of this manual or the product, failures to comply with safety operating procedures or force majeure events such as natural disasters.

Additionally, operational equipment carries inherent risks. Users are obligated to implement robust fault-handling mechanisms and safety protections. BOCHU assumes no responsibility for any incidental or consequential losses resulting from such risks.

## Revision History

Version No.	Date	Description
V1.4.0	2023/06/14	Updated function instructions based on HypCut 1.0.2220.5
V1.5.0	2025/08/22	Updated function instructions based on HypCut 1.0.2430.7.

## Features

- Decoupled architecture for machining control functions and graphic editing tools, ensuring system stability while retaining essential graphic optimization for easy use.
- The **Plan** module supports integration with 2D nesting software CypNest, enabling remote task push over the network. It also manages local job data and automatically generates statistical reports for evaluating machine productivity.
- The **Production** module, as the core module, supports flexible and batch production modes. It is enhanced by automated functions such as **Capacitive Find Edge**, meeting high-mix and high-volume production needs.
- The **Debug** module supports multiple file formats such as \*.dxf, \*.lxd, and \*.nc, and is compatible with international standard G-code generated by systems like ACTcut and Lantek. This allows you to quickly import external graphic samples and perform technique adjustments.
- The **Technique** module enables streamlined management of all materials and technique data, assisting you in building a comprehensive and structured technique library.
- The **Diagnosis** module adopts a grid-based interface that integrates key system components for centralized monitoring and data analysis. It supports rapid error identification and exception tracking, and provides usage insights for individual components.
- The **Maintenance** module tracks operational status of all machine components and provides preventive maintenance recommendations based on preset thresholds. This helps extend the system's mean time between failures (MTBF), prolong equipment lifespan, and maintain consistent performance over long-term operation.
- Supports graphic editing and optimization of drawings to reduce production preparation time.
- Supports **Visual Remnant** and **Monitor**, allowing parts to be intuitively dragged onto remnant plates for rapid reprocessing—what you see is what you cut.
- Supports automated auxiliary modules like **Auto Nozzle**, **Clean Nozzle**, drawing switching,

floating head calibration, laser beam centering, and equipment maintenance.

- Automatically optimizes external files (e.g., \*.dxf) upon opening or importing, including **Delete Duplicate, Join Segments, Delete Invisible, Identify Inner/Outer Contour, and Sort**.
- Supports **Flash Pierce, Segment Pierce, Stepping Pierce, Pre-pierce, and Grouped pre-piercing**. You can set separate duty cycle, pulse frequency, laser power, cut gas, gas pressure, laseroff delay time, and following distance for piercing and cutting processes.
- Enables real-time editing of power and pulse frequency curves, along with settings for smooth start and smooth end.
- Supports breakpoint memory and tracing, allowing forward and backward tracking from breakpoints.
- Allows positioning to any point during pause or stop states and resuming processing from any desired position.
- Features robust extensibility, supporting over 30 PLC procedure configurations and more than 50 programmable processes (requires expert-level access for editing).
- Provides programmable I/O ports and programmable alarms or warning inputs. HypCut allows customization of the alarm release method for user-defined input alarms. On the **Config tool → Alarm** page, both **Single Input Alarm Warning** and **4-bit code alarm** support selectable alarm release methods. You can configure the alarms to be released either manually or automatically according to operational needs.

# Contents

<b>Chapter 1 Overview</b> .....	1
<b>Chapter 2 Quick Start</b> .....	2
2.1 HypCut Launch .....	2
2.2 User Interface .....	4
2.3 Workflow Overview .....	3
2.3.1 Select Production Mode .....	3
2.3.2 Import Tasks/Drawings .....	4
2.3.3 Graphic Correction .....	5
2.3.4 Machining Technique Settings .....	6
2.3.5 Zero Point Confirmation .....	7
2.3.6 More Settings .....	8
2.3.7 Start Cutting .....	13
<b>Chapter 3 Plan</b> .....	16
3.1 Feature Overview .....	17
3.2 Drawing Import .....	18
<b>Chapter 4 Production</b> .....	19
4.1 Production Interface .....	19
4.1.1 Current Drawing .....	20
4.1.2 Add .....	29
4.1.3 Custom Production .....	30
4.2 Graphic Operations .....	31
4.2.1 Graphic Selection .....	32

4.2.2 Size and Transformation .....	33
4.2.3 Graphic Drawing and Auto Attach .....	35
4.2.4 Graphic Techniques and Tools .....	36
4.3 Machining Technique .....	42
4.3.1 Cutting Parameterer .....	43
4.3.2 Piercing Technique .....	47
4.3.3 Power Curve .....	48
4.3.4 Leadline Technique .....	49
4.3.5 Corner Technique .....	50
4.3.6 Defilm Parameters .....	51
4.3.7 Focus Temperature Drift Offset .....	51
4.3.8 Smart Techniques (For BLT Cutting Head) .....	52
4.4 Find Edge .....	54
4.4.1 Capacitive Find Edge .....	55
4.4.2 Single Side 2-Point Find Edge .....	58
4.4.3 Circle Centering .....	60
4.4.4 Photoelectric Find Edge .....	61
4.4.5 Optical Find Edge .....	63
4.5 Quick CutOff .....	63
4.6 Monitor .....	65
4.7 Cut Off Guide .....	67
4.8 Gas Calibration (For BLT Cutting Heads) .....	68
4.9 Jog Laser Shot .....	69
4.10 Manual Lubricate .....	70

4.11 Clean Nozzle .....	71
4.12 Replace Nozzle .....	73
4.13 Border Contour .....	79
4.14 Cycle Production .....	80
4.15 Mark Corner .....	80
4.16 Unloading Position .....	81
4.17 Maintenance Area .....	82
4.18 Record Out-Plate Height .....	82
4.19 Multi-Task Production .....	83
4.20 Remnant Position .....	85
4.21 External Powder Marking .....	86
4.22 Custom Menu Layout .....	89
4.23 Countersink Technique .....	90
<b>Chapter 5 Debug .....</b>	<b>91</b>
5.1 Machining and Dry Run .....	92
5.2 Simulate .....	93
5.3 Path Error .....	93
5.4 Laser Head Data (For BLT Cutting Heads) .....	94
5.5 Laser Long Shot .....	96
5.6 Auto Focus Test .....	97
5.7 Tape Shot .....	98
5.8 Cycle Test .....	99
5.9 System Latency Offset .....	100
<b>Chapter 6 Technique .....</b>	<b>102</b>

<b>Chapter 7 Diagnosis .....</b>	<b>104</b>
7.1 Machine .....	105
7.2 IO .....	109
7.3 Height Controller .....	110
7.4 Laser Head .....	111
7.5 Laser .....	111
7.6 Gas .....	112
7.7 Vision .....	113
7.8 Peripherals .....	113
7.9 Alarm Log .....	114
<b>Chapter 8 Maintenance .....</b>	<b>115</b>
<b>Chapter 9 Settings .....</b>	<b>116</b>
9.1 Global Parameters .....	117
9.1.1 Motion Control Parameters .....	117
9.1.2 Gas Delay and Gas Blow Parameters .....	118
9.1.3 Follow Control Parameters .....	120
9.1.4 Other Production Parameters .....	121
9.2 Height Controller .....	124
9.3 PLC .....	126
9.4 About Machine .....	127
<b>Chapter 10 Coordinate Systems .....</b>	<b>128</b>
10.1 Machine Coordinate System .....	128
10.2 Program Coordinate System .....	129
10.3 Find Zero Point After Unexpected Events .....	129

# Chapter 1 Overview

HypCut is a laser cutting control software specifically developed and deeply customized to meet the demanding requirements of high-power laser cutting applications in the industry. It provides professional technique models tailored for high-power cutting scenarios, enabling intelligent and efficient production. The software supports order-based production planning and scheduling, assisting in overall production management. Its modular design ensures a streamlined user experience, helping operators complete production tasks quickly and efficiently.

HypCut is pre-installed by default on the supplied HypTronic/HyPanel EtherCAT CNC Host and is ready for use upon startup. HypTronic/HyPanel features a one-click system recovery function, allowing you to easily restore factory settings in the event of system abnormalities. To obtain the software installation package for future upgrades or recovery, please contact your supplier or technical support.

# Chapter 2 Quick Start

## 2.1 HypCut Launch

Before starting HypCut, ensure that all electrical components are properly connected and successfully powered on. Double-click the HypCut shortcut to launch. Upon startup, module initialization and self-check procedures will be executed.



Figure 2-1 HypCut loading

Once the self-check is completed successfully, HypCut will automatically prompt you to perform ***Return Origin***. A reliable machine coordinate is extremely essential for the automated features and cutting accuracy. Therefore, it is strongly recommended to perform ***Return Origin*** after HypCut startup to ensure correct machine coordinate. If ***Return Origin*** is not implemented, the software will trigger an alarm to ensure the safety of equipment operation, and only low-speed jogging is allowed. All other movements are prohibited until ***Return Origin*** is performed to clear the alarm.

When the ***Return Zero*** button on the control panel is flashing, clicking it will initiate the ***Return Origin*** process; when the ***Return Zero*** is greyed out, clicking it will execute a ***Return Zero*** process.

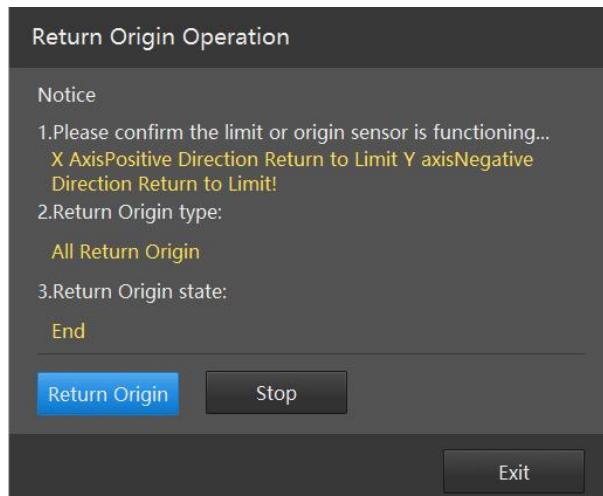


Figure 2-2 Return origin interface

---

**⚠ Caution:** If other active alarms exist at startup, manually clear them first before performing ***Return Origin***.

---

## 2.2 User Interface

The center area of the HypCut interface, with a black background, is the graphics display area. The white shaded outer frame indicates the machine tool's working boundary. The grid lines and rulers along the top and left of the drawing area dynamically adjust according to zoom level, providing a reference for machining.

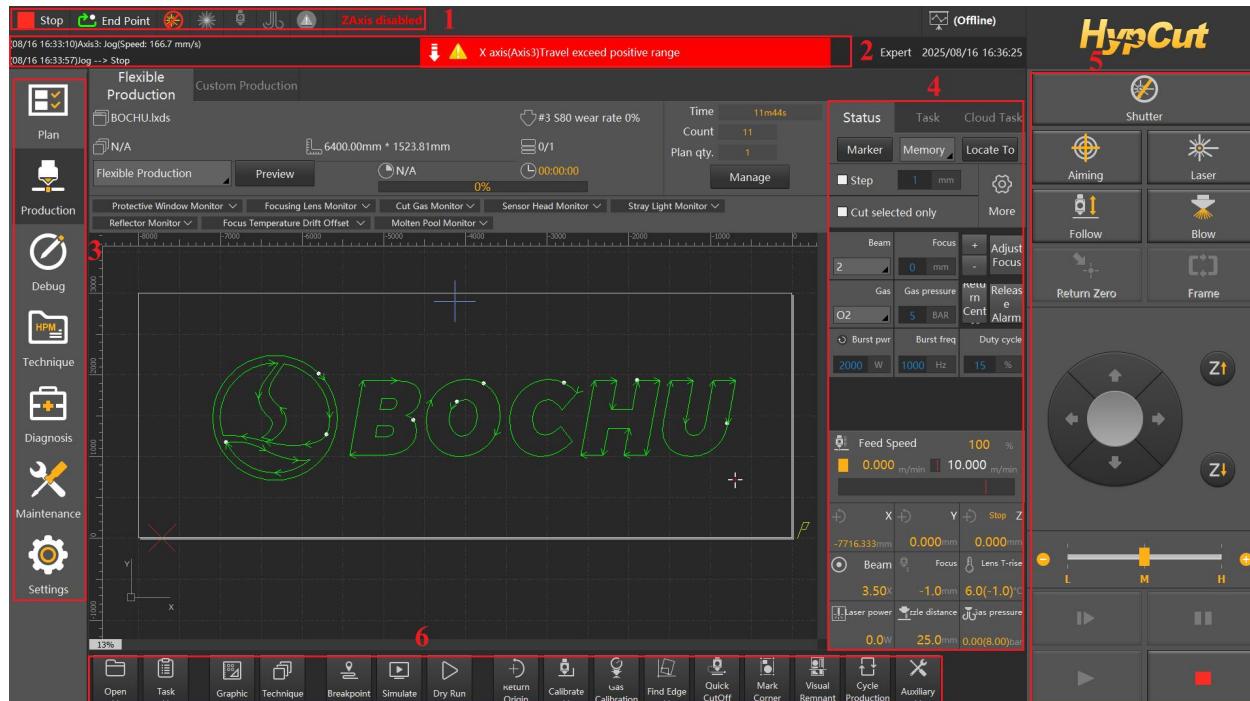


Figure 2-3 HypCut main interface

1. System Status Bar	4. Control Panel
2. Information/Alarm Bar	5. Production Information Panel
3. Main Menu	6. Bottom Function Bar

Table 2-1 HypCut Main Interface Layout Overview

No.	Name	Description
1	System Status Bar	<ul style="list-style-type: none"> <li>Displays the current status of the machine tool and any active automation functions via icons. Icons are categorized into persistent and active types.</li> <li>Persistent icons (from left to right) include operating status, return position after cutting, shutter, burst, follow, blow, and alarm. Active icons appear only when the corresponding automation function is</li> </ul>

No.	Name	Description
		enabled.
2	Information/Alarm Bar	<p>Shares the same display area for system messages and alarms.</p> <ul style="list-style-type: none"> <li>When no alarm is active, the bar displays cutting-related information on a black background. Double-clicking opens the system operation log.</li> <li>When an alarm or warning occurs, the bar switches to a red or yellow background, displaying the corresponding alarm message. Double-clicking will open the detailed alarm information window.</li> </ul>
3	Main Menu	Provides access to the main nine functional modules of the system. The currently selected module is shown with a black background and recessed appearance.
4	Control Panel	<p>Contains high-frequency operation buttons for laser cutting.</p> <ul style="list-style-type: none"> <li>If a dedicated HyPanel HMI display is connected, the on-screen console will automatically be hidden and replaced by physical HyPanel control buttons.</li> <li>For details on operation buttons, refer to <a href="#">HyPanel2 Control Buttons Description</a>.</li> </ul>
5	Production Information Bar	<ul style="list-style-type: none"> <li>Displays key information and controls including <b>Step</b> enabling/disabling, task selection, quick settings, and technique-related operations and display.</li> <li>For more details, see <a href="#">Production Information Panel</a>.</li> </ul>
6	Bottom Function Bar	<ul style="list-style-type: none"> <li>Provides access to essential functions based on the currently active module.</li> <li>For details on features under the <b>Production</b> module, refer to <a href="#">Bottom Function Overview</a>.</li> </ul>

## 2.3 Workflow Overview



Figure 2-4 Workflow overview

### 2.3.1 Select Production Mode

After entering the **Production** module, select the production mode in the upper-left corner of the CAD preview area. Two modes are provided: **Flexible Production** and **Batch Production**.

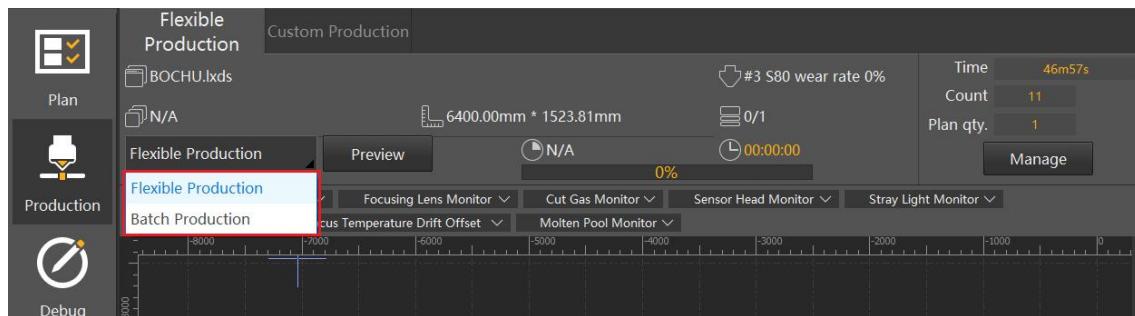


Figure 2-5 Select production mode

- **Batch production:** Uses a workpiece coordinate system with a fixed **Zero** position, suitable for high-volume, standard-plate cutting in continuous production scenarios. The fixed **Zero** position in batch production can be determined using either **Specify Zero** or **Capacitive Find Edge**.
- **Flexible production:** Uses a floating coordinate system with a flexible **Zero** position, ideal for low-volume or irregular-plate cutting in flexible production scenarios. The **Zero** position in this mode can be confirmed by the current position of the cutting head or **Capacitive Find Edge**.

### 2.3.2 Import Tasks/Drawings

After selecting the production mode, click *Open* to select the target drawings from the *Plan* or *Disk* tab.

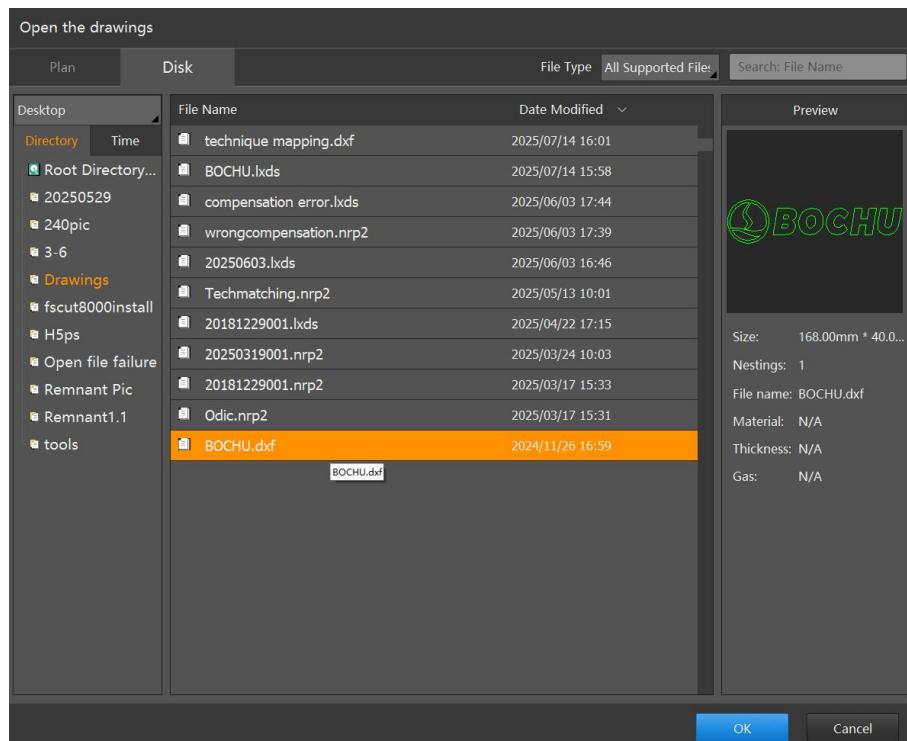


Figure 2-6 Import the drawings

 **Notice:**

1. Batch production supports only the BOCHU-specific formats: \*.nrp, \*.nrp2, \*.lxds, and \*.lxds; flexible production additionally supports \*.dxf and \*.nc files.
2. The *Plan* tab stores all drawings previously imported into HypCut, sorted by time. The *Disk* tab allows for importing new drawings from external storage.

### 2.3.3 Graphic Correction

After opening a drawing, if you need to adjust the graphic techniques (i.e., zero reference, lead, compensation, and microjoint), size, and quantities, click **Graphic** in the bottom function bar to enter the graphic editing module. For detailed operation, refer to [Graphic Operations](#).

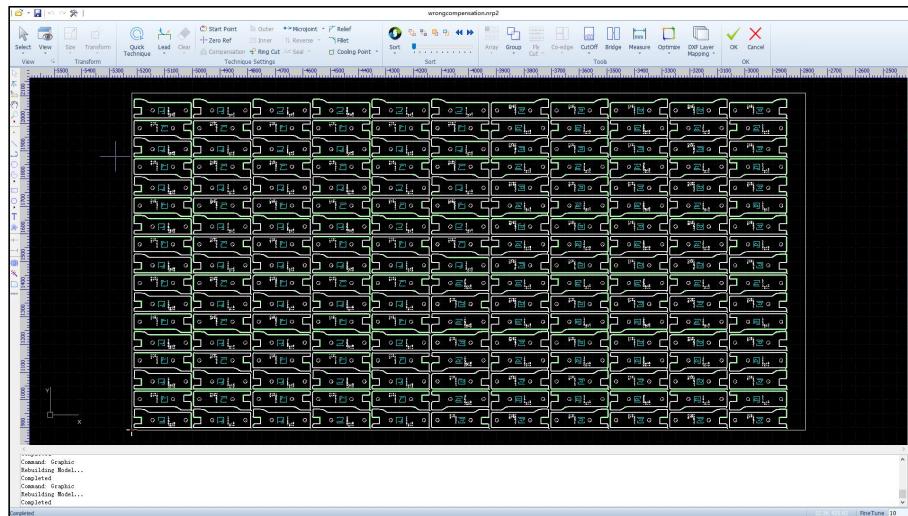


Figure 2-7 Graphic interface

HypCut provides tools for creating standard parts. Click **Standard Parts** on the left drawing toolbar to create commonly used parts. The software supports adding SmartDraw templates via the following two paths:

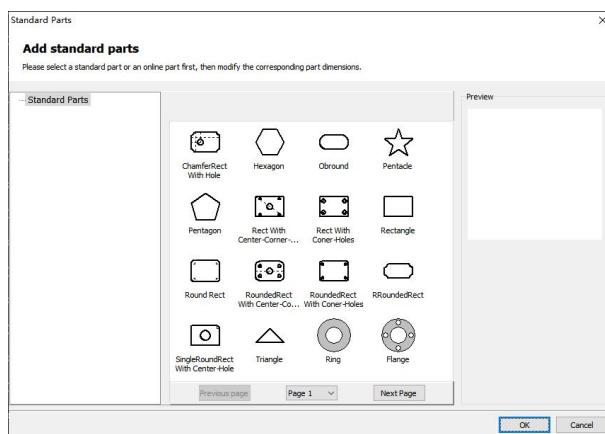


Figure 2-8 Add standard parts

- Software path: C:\Program Files(x86)\Friendess\Hypcut\ScriptShapes.
- User path: C:\Users\Public\Documents\Hypcut\SmartShapes (create a folder named SmartShapes if it does not exist).

 **Notice:** JS templates are only supported under the software path.

### 2.3.4 Machining Technique Settings

When a new drawing is imported on the *Plan* page, if no machining technique is assigned, the software automatically displays the *Select Technique* window for technique matching. To manually match or replace the technique, navigate to *Production* → *Technique*.

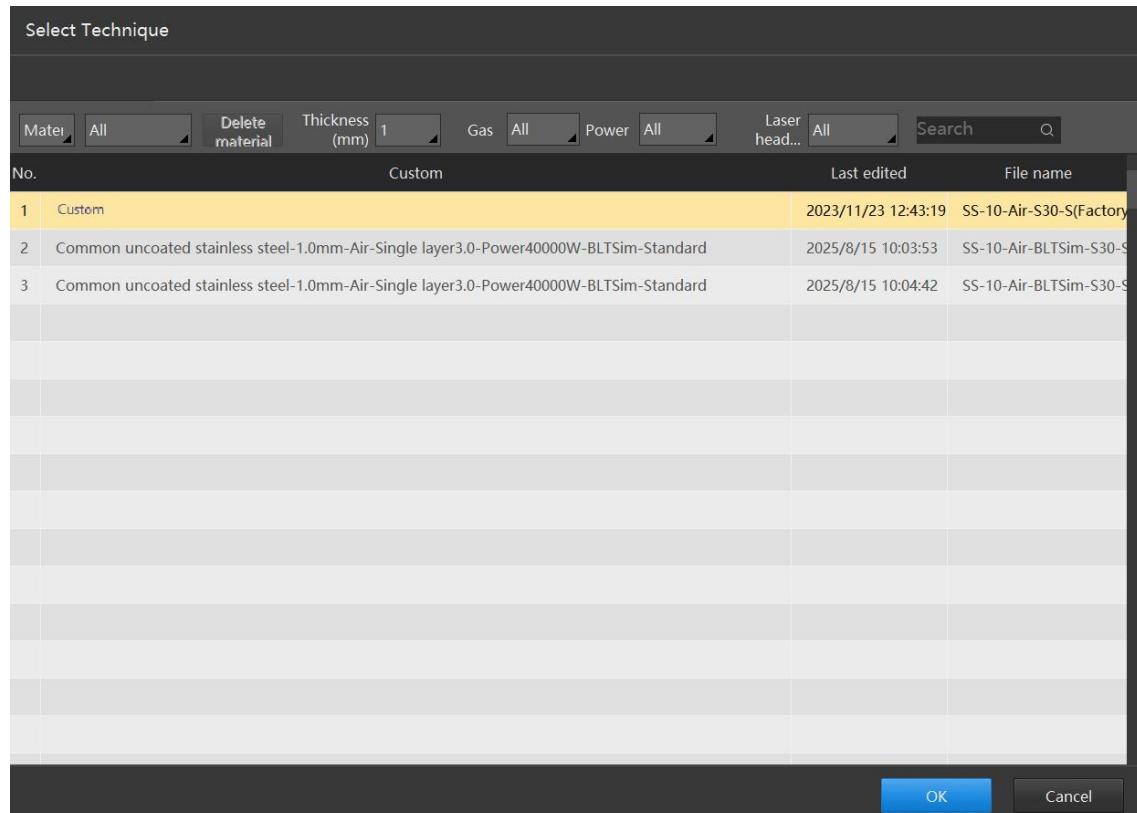


Figure 2-9 Technique interface

After selecting the correct technique entry, click *OK* to associate it with the drawing. Thereafter, you can click *Technique* at any time to view or modify the machining technique parameters. For details, see [Machining Technique](#).

To replace the current technique file, click *Read* to reopen the *Select Technique* window and select a new technique.

---

**⚠️ Notice:**

1. When opening previous drawings from the Plan module, the software associates the last-used technique file by default.
2. To modify data in the technique library, switch to the Technique module and click the Modify icon next to the file name. After making changes, click *OK* to save.

---

---

3. For batch production, drawings with breakpoint information (incomplete machining) will automatically cache a copy of the technique data to ensure that machining can be resumed at any time.

---

### 2.3.5 Zero Point Confirmation

In the **Flexible Production** mode, a dedicated floating coordinate system is used. When machining starts, the software automatically sets the cutting head position as the zero point—no manual setting is required.

---

 **Caution:** In the **Flexible Production** mode, it is recommended to verify the zero point by performing **Frame** or **Capacitive Find Edge** to avoid incorrect zero points, which may cause the cutting head to move outside the plate and compromise cutting safety.

---

In the **Batch Production** mode, a workpiece coordinate system is used. Before starting machining, you must specify a reference zero point for the part. Click **Specify Zero** in the bottom function bar to open the function window.

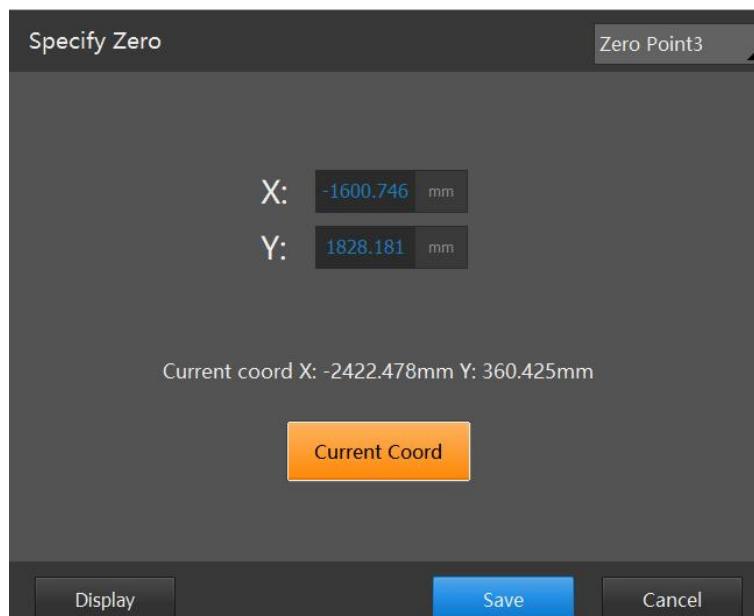


Figure 2-10 Batch production - specify zero

To specify the zero point, you can enter coordinates or move the cutting head to a desired position and read the **Current Coordinate** as the reference point for the workpiece coordinate system. Use **Display** to check saved zero points or add/delete zero points. Use the drop-down menu in the top-right corner to switch between previously saved zero points. When the **Specify Zero** dialog is open, performing **Frame** will start from the cutting head's current position. When

the dialog is closed, performing **Frame** will start from the previously saved fixed zero point.

---

**⚠️ Notice:** The software's default **Zero Reference** direction is aligned with the **Origin direction**.

---

### 2.3.6 More Settings

In the standard machining workflow, HypCut provides additional machining configurations and general settings under **Production** → **More**, helping improve production efficiency and automation.

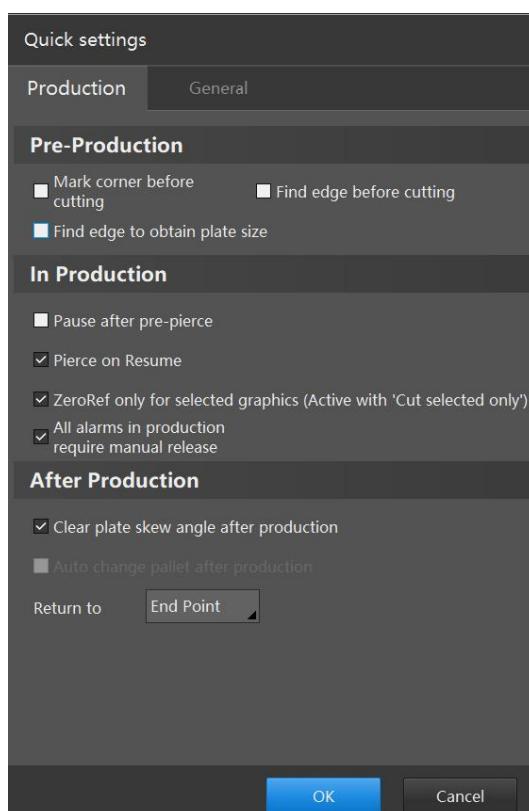


Figure 2-11 Quick settings - production

The quick settings in the **Production** tab are described in the table below.

Table 2-2 Quick Settings for Production

Category	Function	Description
Pre-Producti on	Mark corner before cutting	Marks the workpiece corners before each machining operation. The cutting head traces the outline of the part and makes "L"-shaped marks at all four corners to confirm the part's position on the plate.

Category	Function	Description
	Find edge before cutting	<ul style="list-style-type: none"> <li>Determines whether to perform automatic edge-finding before machining starts. Before cutting, the system performs capacitive edge-finding.</li> <li>This operation detects the plate corners along its edge, calculates the deflection angle, and automatically corrects the angle of the target graphics. It is intended to ensure that the target graphic aligns with the plate.</li> </ul>
In Production	Pause after pre-pierce	Stops machining automatically after pre-piercing is completed.
	Pierce on Resume:	When enabled, piercing will restart when machining resumes.
	ZeroRef only for selected graphics	Applies only when <b>Cut selected only</b> is checked.
	All alarms in production require manual release	<ul style="list-style-type: none"> <li>When enabled under <b>Config Tool</b> → <b>Alarm</b>, this option appears in <b>Production</b> → <b>More</b>.</li> <li>If activated, all alarms during machining must be cleared manually. The WKB Wireless Remoter supports alarm reset.</li> <li>If disabled, this feature is temporarily turned off and will be re-enabled automatically after restarting the software.</li> </ul>
After Production	Clear plate skew angle after production	Automatically clears the last edge-finding result after finishing machining, preventing the last data from affecting the next machining.
	Auto change pallet after production	<ul style="list-style-type: none"> <li>For machines equipped with the pallet changer, this option allows automatic table exchange after a job completes. During exchange, the rear machine tool supports the grating detection alarm.</li> <li>Exchange stops if the grating signal is active. The signal only takes effect during the table exchange. For the non-exchangeable pallet process, production is not affected even if this signal is active.</li> </ul>
	Auto switch to next	When a nesting result reaches its planned machining count, the

Category	Function	Description
	nesting after preset cuttings finished	software automatically switches to the next result.
	Prompt message after preset cuttings finished	<ul style="list-style-type: none"> <li>For single parts or other non-nested results, the message "Task completed" appears when processing is finished.</li> <li>For nested results, the message prompts after the last result is completed. If additional machining continues, the message appears after each completion.</li> <li>If <b><i>Auto change pallet after production</i></b> is enabled, the prompt appears only after the table exchange is completed.</li> </ul>
	Return to	Sets the cutting head to return to the specified position after machining.

Switch to the ***General*** tab, and you can enable more production-related options.

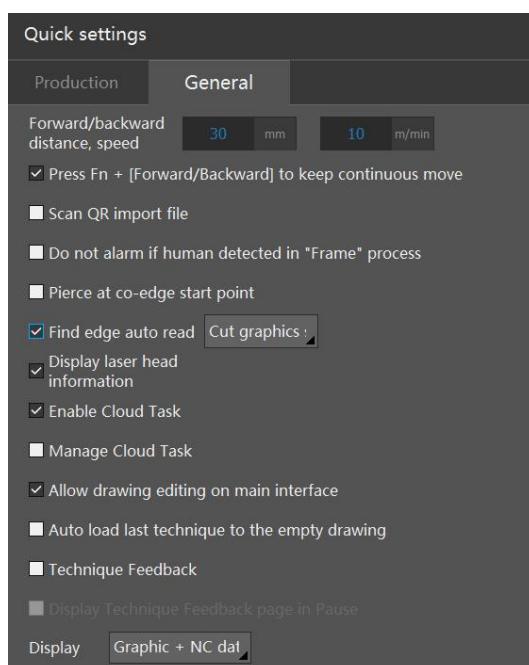


Figure 2-12 Quick settings - general

The quick settings in the ***General*** tab are described in the table below.

Table 2-3 Quick Settings for General Use

Function	Description
Forward/backward distance, speed	<ul style="list-style-type: none"> <li>Sets the distance and speed for moving forward or backward along a single section of the toolpaths after machining is paused.</li> </ul>

Function	Description
	<ul style="list-style-type: none"> <li>Supports continuous movement by holding <b><i>Fn + Forward/Backward</i></b>. For scenarios using travel speed between parts, the maximum speed for both single-step and continuous forward/backward moves will be limited to the configured value.</li> </ul>
Scan QR import file	Imports the drawings to be machined by scanning the CypNest nesting report using a QR code scanner.
Do not alarm if human detected in "Frame" process	<ul style="list-style-type: none"> <li>For safety monitoring, the software triggers an alarm or warning when a person is detected in the machine's monitoring area.</li> <li>When this option is enabled, no alarm will be triggered during <b><i>Frame</i></b>, even if a person is detected.</li> </ul>
Pierce at co-edge start point	Performs pierces at all co-edge start points. <b><i>Co-edge pierce detection</i></b> takes priority if it is enabled at the same time. Piercing is performed only where they are needed.
Find edge auto read	Allows automatic reading of <b><i>Cut graphics size</i></b> , <b><i>All graphics size</i></b> , or <b><i>Plate size</i></b> after edge finding.
Display laser head information	Displays real-time information in the center of the <b><i>Production</i></b> interface, such as <b><i>Protective Window Monitor</i></b> , <b><i>Stray Light Monitor</i></b> , and <b><i>Focusing Lens Monitor</i></b> .
Enable Cloud Task	<ul style="list-style-type: none"> <li>When enabled, all tasks pushed to HypCut will appear in the task panel on the right side of <b><i>Flexible Production</i></b>, grouped by source. These cloud tasks will no longer be pushed to the <b><i>Plan</i></b> module.</li> <li>When disabled, all tasks except those from cloud nesting will continue to be pushed to the <b><i>Plan</i></b> module.</li> <li>Cloud tasks also allow access to the <b><i>Part Library</i></b>, which lists all parts linked to CloudNest users bound to the machine. The library supports searching for part names and dragging them to the main interface for processing. The <b><i>Part Library</i></b> data comes from CloudNest's part list rather than the parts in the pushed drawings. Part library management is only supported in CloudNest.</li> </ul>
Manage Cloud Task	Requires <b><i>Enable Cloud Task</i></b> to be checked. When enabled, machining tasks

Function	Description
	from different sources can be pushed to the <i>Cloud Tasklist</i> .
Allow drawing editing on main interface	When enabled, drawings displayed in the main interface can be selected for deletion, dragging, copying, or pasting.
Auto load last technique to the empty drawing	When enabled, if a new drawing without a machining technique is imported, the software automatically applies the last used technique.
Display	<p>Defines the content shown on the main software interface, including graphics, NC, and monitoring data.</p> <ul style="list-style-type: none"> <li>● Graphic + NC data: Displays CADView interface and NC information.</li> <li>● Monitor + CNC data: Replaces CADView with the monitoring camera view and displays NC data.</li> <li>● Graphic + Monitor + CNC data: Displays CADView, with the monitoring view in the bottom-right corner, along with CNC data.</li> </ul>

---

 **Notice:** The last two options are only available when a vision monitoring camera is enabled.

---

### 2.3.7 Start Cutting

Before starting the actual cutting, check whether there are any active equipment alarms in the software. Then verify the drawing, technique parameters, zero point, and auxiliary functions. Use *Frame* to ensure the processing graphics are within the plate edge.

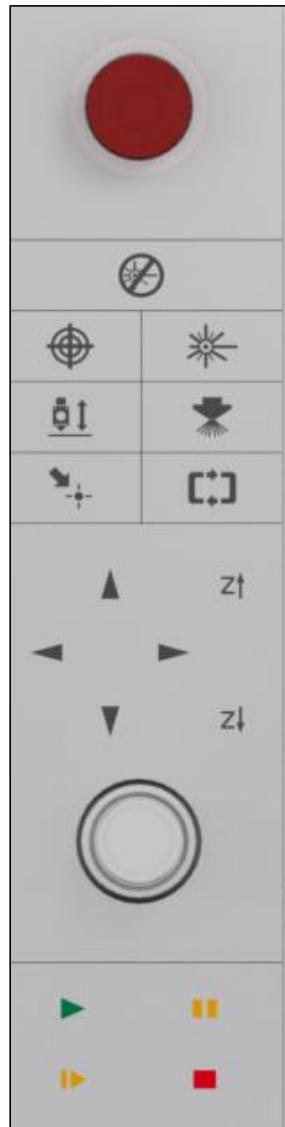


Figure 2-13 HyPanel2 control buttons

The functions of the HyPanel2 operation panel are described below:

**Table 2-4 HyPanel2 Control Buttons Description**

Button	Name	Description
	Emergency Stop	Press to immediately halt all machine movement in case of danger.
	Shutter	Controls the laser shutter's on/off state. Open the laser shutter before starting a job.
	Aiming	Controls the <i>Aiming</i> 's on/off state, used for cutting head positioning. Mutually exclusive with <i>Shutter</i> .
	Laser	When idle, press for laser burst. During operation, it shows laser status.
	Follow	Positions the cutting head to the plate surface (ensure material is present under the cutting head).
	Gas	Press to activate gas blow when idle. During operation, it reflects gas status.
	Return Zero Point	Press to allow the cutting head to return to the set zero point position.
	Frame	Verifies machining position accuracy before cutting. Press the <i>Frame</i> button, and the system automatically drives the cutting head along the bounding rectangle of the target graphics, with <i>Aiming</i> enabled for visual confirmation.
	Jog Control	Manually moves the cutting head along X/Y/Z axis. Jog speed adjustable on the <i>System Settings</i> → <i>Motion Control</i> page.
	Speed Knob	Adjusts cutting/simulation speed, with a range of 0% ~ 120%.
	Start	Initiates the cutting process. The machine starts operating according to the programmed path.
	Pause	Temporarily stops cutting. During the pause, manual control of the cutting head's movement, laser on-off switching, and gas flow remain available. Additionally, the <i>Forward</i> and <i>Backward</i> operations allow the cutting head to move along the toolpaths in either direction.

Button	Name	Description
	Resume	Continues the paused jobs. If no graphic shapes/techniques are changed, clicking <b>Breakpoint</b> can move the cutting head to the last paused position. Then, click <b>Resume</b> to restart cutting.
	Stop	Terminates the machining process. The cutting head returns to the preset position.

# Chapter 3 Plan

HypCut provides a dedicated **Plan** module for integration with BOCHU 2D nesting software CypNest. This module supports managing production tasks and drawings, checking production progress, generating production reports, backing up historical production data, among other functions.

The **Plan** main interface displays the status of newly imported tasks and unfinished tasks.

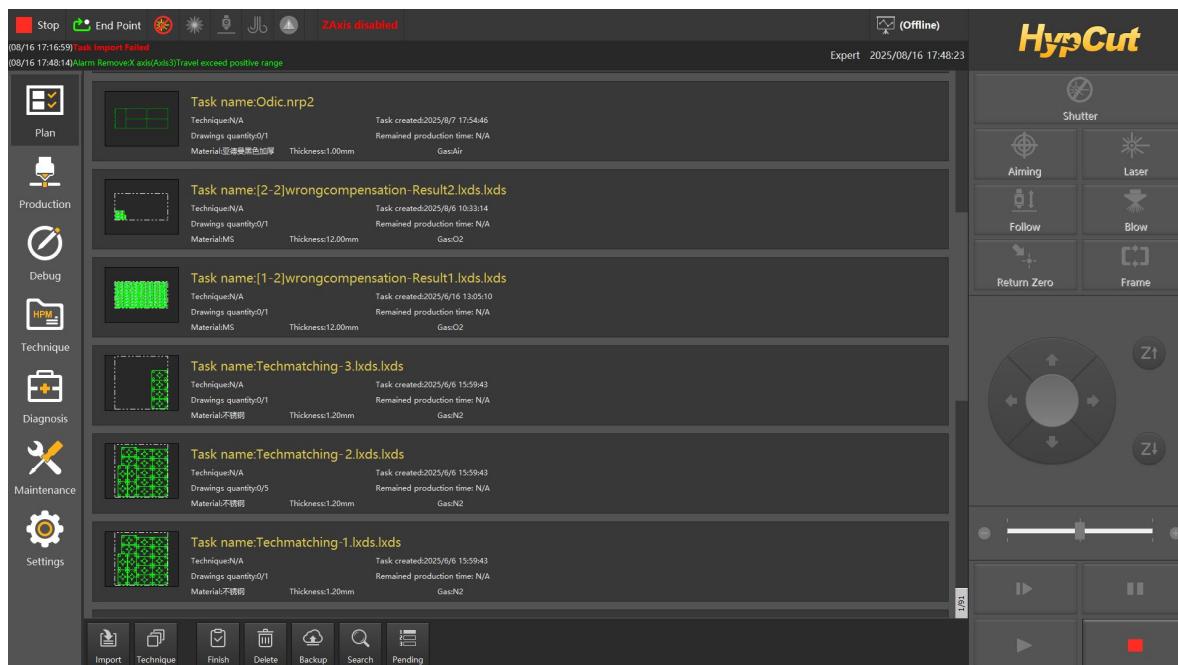


Figure 3-1 Plan interface

### 3.1 Feature Overview

HypCut automatically stores completed tasks in the production database for future reproduction or production statistics. Additionally, every drawing imported from an external disk is automatically saved in the **Plan** database, categorized by the time of creation by default.

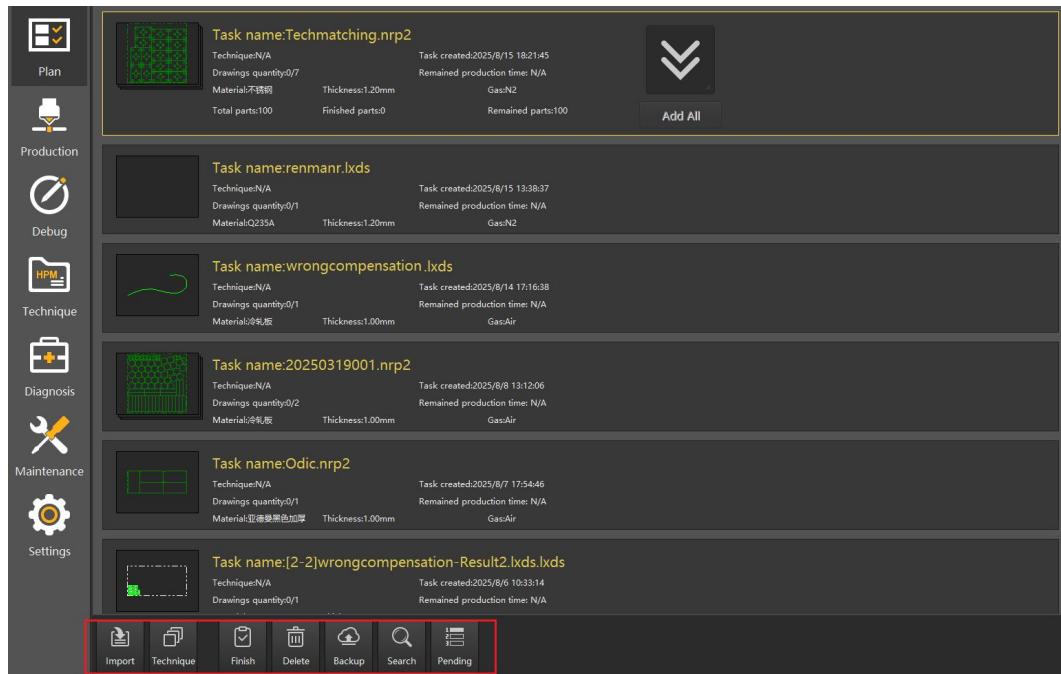


Figure 3-2 Plan interface

The operations in the **Plan** module are described in the table below.

Table 3-1 Functions in the Plan Module

Function	Description
Import	Imports CypNest production tasks from external storage devices or network sources into the <b>Pending</b> list in <b>Plan</b> .
Technique	Defines machining technique parameters for the selected task or drawing.
Delete	Removes the specified task from the <b>Pending</b> list.
Backup	Used to backup HypCut historical data to an external storage device (e.g., USB drive) or remote network location.
Search	Used to search historical processing records by specifying a date range.
Pending	Used to preview information of prepared drawings within the <b>Plan</b> page. The number in the top-right corner indicates the number of drawings in

	the <i>Pending</i> list.
Finish	Marks the task as <i>Finish</i> regardless of whether all nested results of the current task have been processed. Tasks currently being processed in <i>Batch Production</i> cannot be marked as <i>Finish</i> .

**⚠️Notice:** Changes to *Technique* in the *Plan* module will be applied to the parameter settings in the technique library.

## 3.2 Drawing Import

The cutting files generated in CypNest can be imported into HypCut via network transfer or external storage media (such as a USB drive). The imported tasks and historical data can be viewed under the *Plan* module.

Select a task and click *Add* to add all drawings within the task to the production queue on the right. Click *Finish* at the bottom of the interface to force the task status to *Finish*, regardless of whether all drawings in the task have been processed.

To view detailed information for the drawings within a task, click the icon above *Add* to expand the task, as shown below:

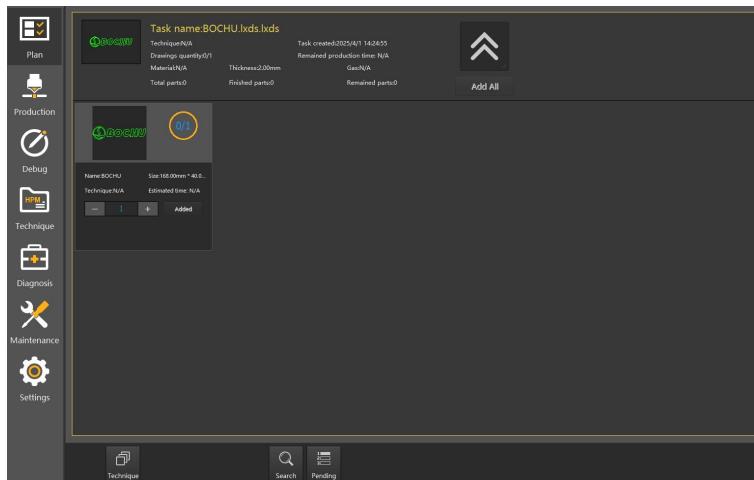


Figure 3-3 The detailed information of the task

After expanding the task, you can check the production status, machining progress, and parameter configuration of each drawing. You can also add selected drawings to the production queue on the right or perform *Technique* adjustments on specific drawings. Click the icon above *Add* to quickly return to the *Pending* list.

# Chapter 4 Production

This chapter introduces the **Production** module, the core machining function in HypCut. This module supports single-drawing quick production, semi-automatic high-efficiency production, and fully automatic continuous production.

## 4.1 Production Interface

The **Production** interface varies according to the selected mode: **Flexible Production** or **Batch Production**.

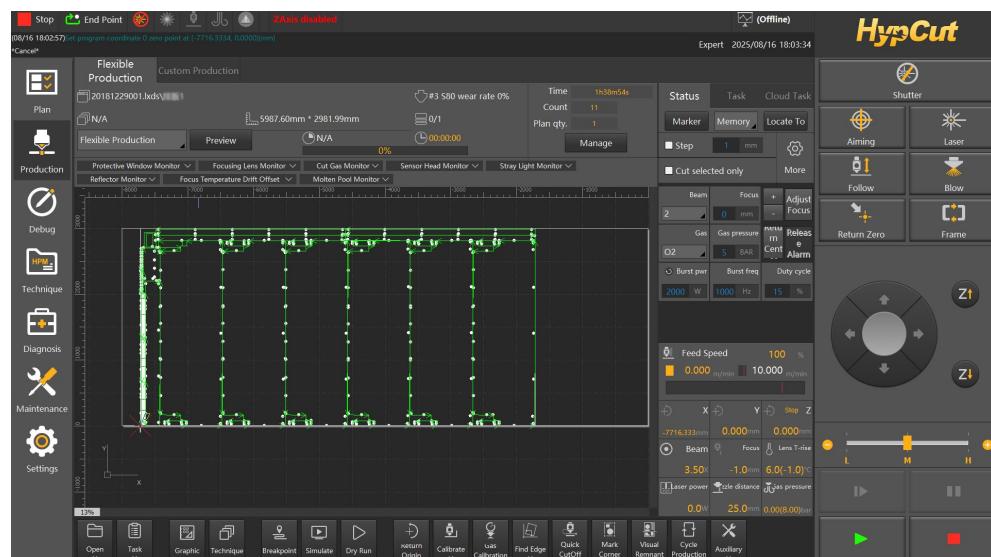


Figure 4-1 Production interface (flexible production)

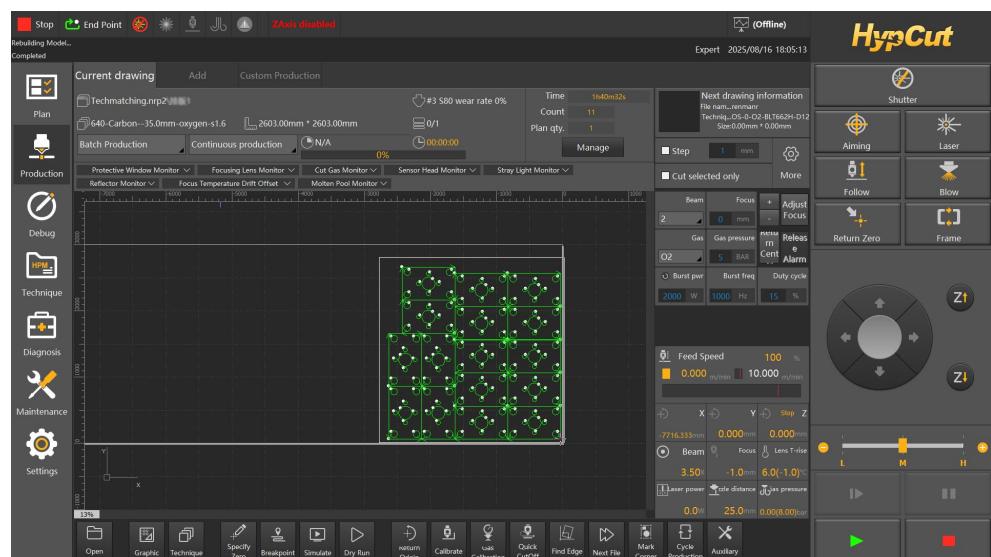


Figure 4-2 Production interface (batch production)

## 4.1.1 Current Drawing

### 4.1.1.1 Drawing Information Bar

In the **Batch Production** mode, the drawing information bar at the top of the **Current drawing** tab displays details such as the drawing name, technique, quantity, and machining time.

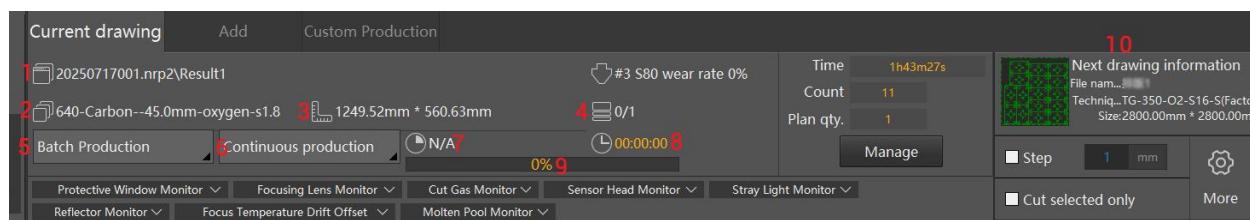


Figure 4-3 Drawing information bar (in batch production mode)

1. Drawing Name	7. Estimated Machining Time
2. Technique Name	8. Actual Machining Time
3. Plate Size	9. Machining Progress Bar
4. Drawing Quantity	10. Production Counter Management
5. Product Mode Switch	11. Next Drawing Information
6. Production Type Switch	

The production type switch is only available in the **Batch Production** mode.

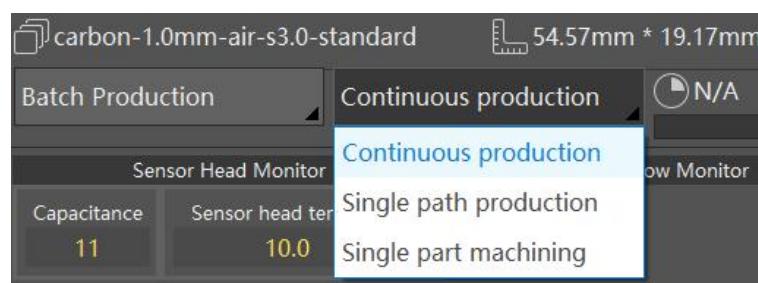


Figure 4-4 Production type switch

- **Continuous production (default):** Machining continues until the entire drawing is completed before stopping automatically.
- **Single path production:** Only one toolpath or contour is machined before the cutting

pauses. Press **Resume** to cut the next toolpath. The process repeats until all paths are completed.

- Single part machining: Only one part is machined before the cutting pauses. Press **Resume** to cut the next part. The process repeats until all parts are completed.

Click **Manage** to open the **Manage Production Counter** page.

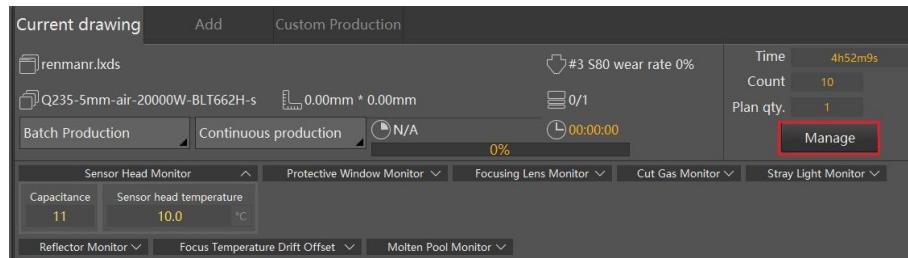


Figure 4-5 Production counter access

On this page, you can enter the **Planned times** and **Finished times** and choose whether to continue processing afterward. **Auto Pause** is available and the machine will automatically pause when the set time is reached.

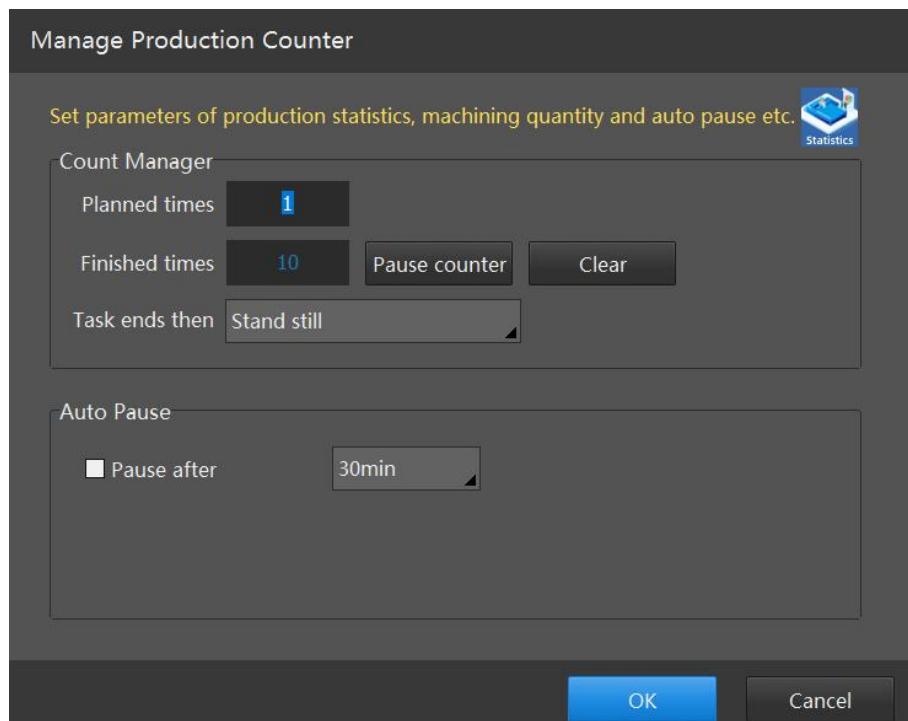


Figure 4-6 Manage production counter

#### 4.1.1.2 Production Information Panel

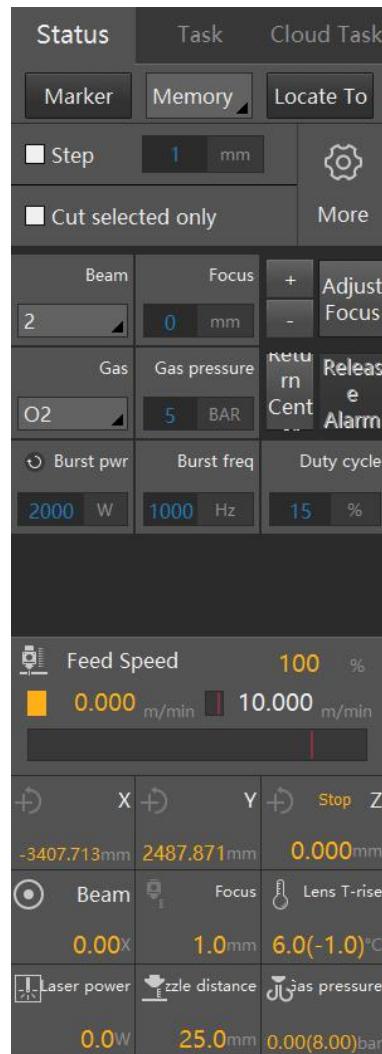


Figure 4-7 Production information panel (in flexible production mode)

The production information panel includes **Task**, **Cloud Task**, and **Status** tabs.

- **Task:** Displays detailed information about the current drawing for easy daily processing. When opening a \*.nrp/\*.nrp2 file or a nesting file from CypNest in the **Flexible Production** mode, clicking **Task** will display all parts used in the drawing, including their size and quantity.
- **Cloud Task:** Displays the nesting results pushed from CypNest or CloudNest.
- **Status:** Contains common production settings (such as **Step** and **Marker**), a laser burst section, and a real-time production data section.

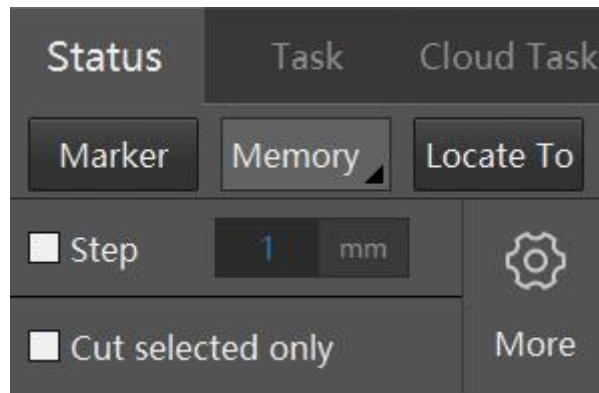


Figure 4-8 Status - common production settings

- **Marker:** Allows defining specific positions within the machine's working area for quick positioning of the cutting head. Click **Marker**, select a marker point, and then click **Current Coordinate** to save the current position as the marker point. Alternatively, select a marker point and input X and Y values. After defining the marker point, click **Locate To**, and the cutting head will move to the specified location.

---

 **Notice:**

1. When returning to the marker position, the Z-axis lifts to the maximum height first.
2. Up to 32 marker points can be recorded.
3. Each marker point can be assigned a custom name, but system-defined names cannot be modified.

---

- **Step:** Moves the servo axis by a fixed distance.
- **Cut selected only:** When only specific parts of a drawing require machining, enable this option and press Start. At this point, the system will skip the unselected graphics during cutting.
- **More:** Quick settings for production and general use. For details, refer to [More Settings](#).

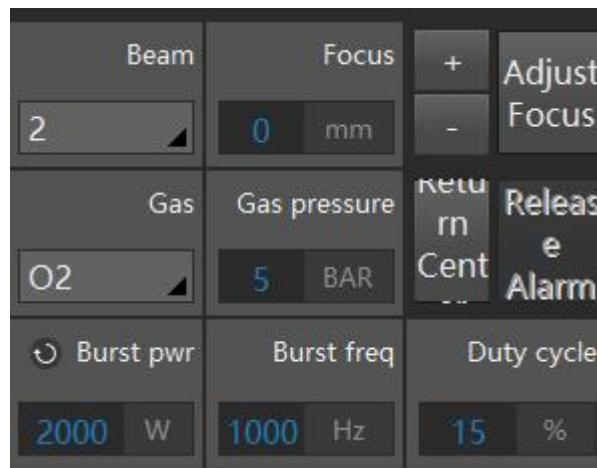


Figure 4-9 Status - laser burst operations

- Beam/Focus: Enter the beam size and focal position. Click **Adjust Focus**, and the cutting head will automatically perform the focusing. Each click of + or - changes the focal position by 0.1 mm. The updated value can be observed in the parameter display area at the bottom of the Status tab.
- Gas/Gas pressure: Select the corresponding assist gas and set the pressure. Click **Blow** to turn on the gas supply; the button turns green when active and returns to gray after release.
- Burst pwr/Burst freq/Duty cycle: Input the values for pulse laser power, frequency, and duty cycle. Click **Laser** to trigger the laser; the button turns green when active and returns to gray after release.
- Beam Collimation Diagram: For BLT cutting head, click the white button next to **Pulse power** to display the diagram. Click again to close the diagram and return to CADView. For non-BLT cutting heads, import the optical path diagram via **Config Tool → Cutting Head**. Once imported, clicking the white button next to **Burst power** will display the diagram; click again to close.

---

**⚠️ Notice:** For non-BLT cutting heads, the white button will not be displayed if the diagram is not imported.

---

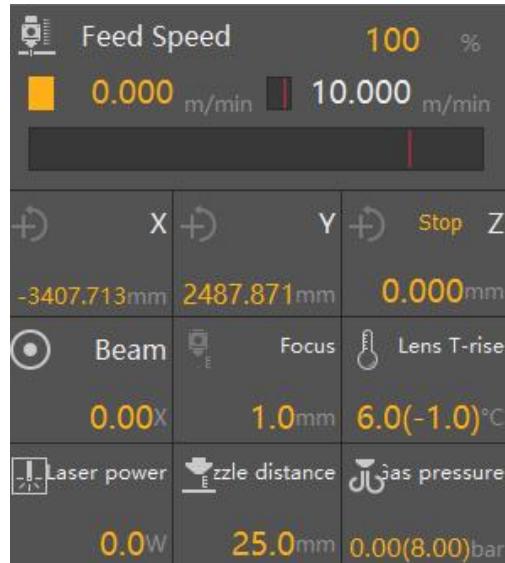


Figure 4-10 Status - production data

- Feed Speed: Displays speed rate, target speed, and real-time speed.
  - ◆ The speed can be adjusted during processing to facilitate machining technique tuning.
  - ◆ The adjustable feed rate range is 0% – 120%, with a default of 100%.
  - ◆ With the control panel: Rotate the knob counterclockwise to decrease or clockwise to increase the feed rate.
  - ◆ Without the control panel: Drag the slider in the software interface to adjust the feed rate.
- Coordinates: Displays X, Y, and Z-axis coordinates and the Z-axis movement status.
- Beam/Size: Displays current beam size and focal position. Updates in real time when the focal position changes during processing.
- Lens T-rise: For some BLT cutting heads, the software displays the lens temperature rise, helping to determine if the protective window is overheating or abnormal.
- Laser power: Displays the actual laser output power. Formula: Displayed Value = Laser Power × Peak Power Percentage × Duty Cycle (ensure the correct laser power is configured in ***Config Tool!***)
- Nozzle distance: Displays the real-time distance between the nozzle and the plate surface. If the plate is not detected, a fixed value is displayed.

#### 4.1.1.3 Bottom Function Overview

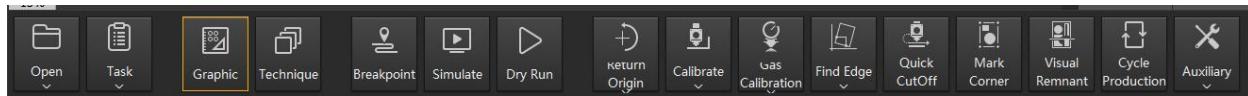


Figure 4-11 Bottom function bar (in flexible production)

- Open: Opens a drawing from the **Plan** module or **Disk** for quick single-drawing processing. The graphics in the selected drawing will be loaded to the CAD area, clearing existing graphics. If the newly opened drawing lacks a machining technique or the technique does not match the **Technique** database in HypCut, the software will automatically open the **Select Technique** window to assist in technique settings.
- Task: Available in the **Flexible Production** mode. If the current task is not finished, an urgent order is required. In such case, you can click **Task** → **Save Production File**. All information related to the current task, including the program zero point, edge-finding skew, breakpoints, and the drawing, can be saved locally. Click **Load Production File** after the urgent order is complete. You can resume the previous task based on the breakpoint.
- Graphic: Enters the drawing editing mode. If drawings exported from the BOCHU 2D nesting software CypNest contain minor defects affecting cutting quality, you can make basic modifications to the selected graphics, such as adding lead, compensation, or adjusting start points. For more details, refer to [Graphic Operations](#).
- Technique: Defines machining technique parameters for the selected task or drawing. Expert and lower-level permissions can only view and apply the factory-default technique; to make edits, you must save a separate copy. Modifying the technique parameters while the machine is in the paused state may result in loss of breakpoint data. Proceed with caution. During the machining, it is not allowed to modify parameter values or piercing stages. For more details, refer to [Machining Technique](#).
- Specify Zero: In the **Production** module, the workpiece coordinate system is used for machining, with each drawing processed according to the preset zero point. To change the zero point in the **Batch Production** mode, use **Specify Zero** to select or enter a coordinate value as the machining zero point for the drawing. Click **Display** to enter the **Zero Point Editor** page. Up to eight custom workpiece coordinate zero points can be stored, enabling quick switching between different production batches. When the **Specify Zero** dialog

appears, performing **Frame** will start from the cutting head's current position. When the dialog is closed, performing **Frame** will start from the previously saved fixed zero point.

- Breakpoint: Automatically recalls the last stop position after manual pauses or unexpected interruptions. The function is accessible when no graphic/technique parameter changes and no new round of machining initiation.
- Simulate: Simulates machining along the drawing's toolpath, allowing you to verify the machining sequence. No physical machine tool movement is required in the **Simulate** process. The simulation speed can be adjusted using the speed knob.
- Dry Run: The machine moves along the complete cutting path with the laser and gas off, and **Follow** disabled—only the X and Y axes move. This function is suitable for a comprehensive pre-cut check and simulation of the entire machining process without actually cutting the material. It is only available for Expert-level or higher permissions.
- Return Origin: Allows all axes to return to the mechanical origin and reset the machine coordinate system. Additionally, individual axes can be specified.
- Calibrate: Performs manual or quick capacitive calibration at any position.
- Next File: Available in the **Batch Production** mode. Quickly switches to the next pending drawing for machining when in stop status.
- Auxiliary: HypCut provides a series of auxiliary tools (such as **Quick Cutoff**, **Find Edge**, and **Border Contour**) that streamline operations, improve cutting efficiency, and enhance process safety. You can refer to the corresponding sections in this chapter.

During a machining pause, the start position for resuming machining can be fine-tuned by moving **Forward** or **Backward** along the toolpath. Process parameters can also be accessed directly during a machining pause. Additionally, you can read and apply another technique item from the **Select Technique** window or modify some machining parameters within the selected item.

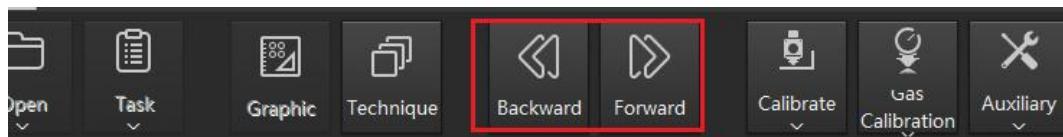


Figure 4-12 Backward and forward

- Backward: Available during pause. Moves backward along the toolpath by a defined distance.
- Forward: Available during pause. Moves forward along the toolpath by a defined distance.

#### 4.1.2 Add

The **Batch Production** mode allows you to import drawings or configure the technique parameters while the machine is still running the current production. This greatly reduces downtime for handling drawings and improves equipment utilization. When combined with the automatic drawing switch, the software opens the next drawing when the current one is completed, further enhancing production efficiency.

After sorting, the drawings are processed sequentially according to the queue order. If the **Current drawing** has not yet finished but needs to be switched to the next one, it will automatically move into the preparation list and be pinned to the top for quick switching. When the Current drawing finishes and reaches its preset processing count, it will be removed from the list and added to the processing history.

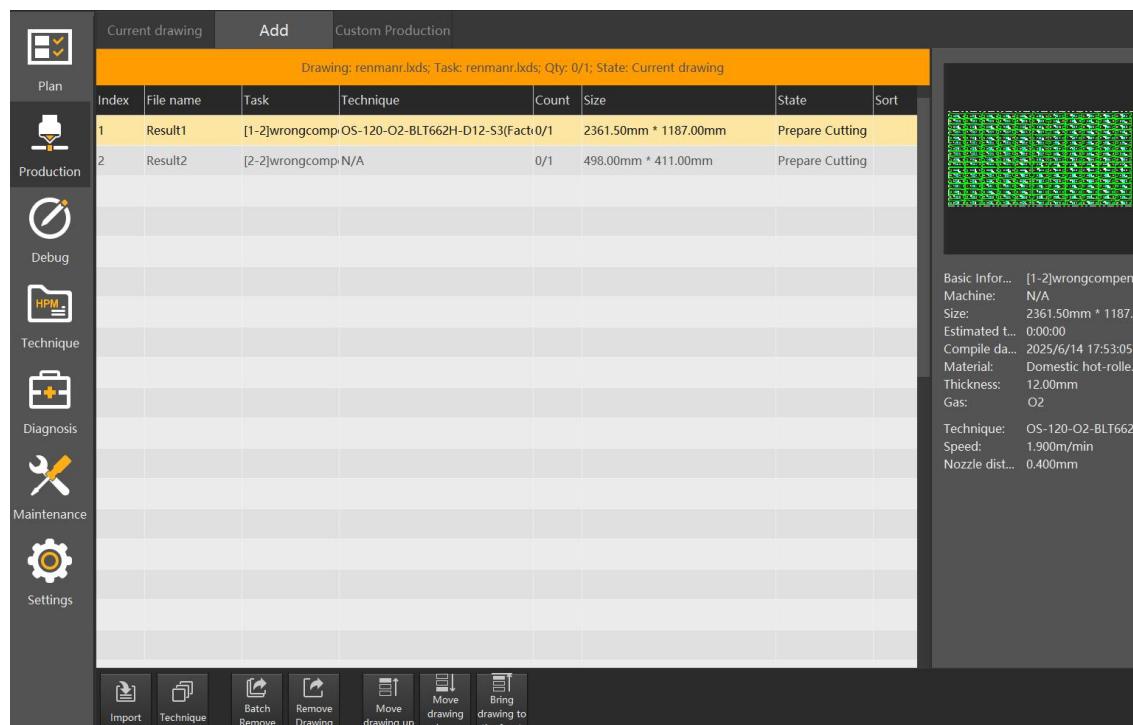


Figure 4-13 Add interface

- Import: Import a drawing (or all drawings from a task package) from **Plan** or **Disk** into the preparation list. Only \*.nrp2 and \*.l LDS file formats are supported.
- Technique: Configures the machining parameters for the selected task or drawing, same as **Technique** on the **Current Drawing** page.
- Batch Remove/Remove Drawing: (Batch) Removes the selected drawing from the

preparation list without deleting it.

- Move drawing up: Moves the selected drawing up in the queue.
- Move drawing down: Moves the selected drawing down in the queue.
- Bring drawing to the front: Moves the selected drawing to the front of the queue.

#### 4.1.3 Custom Production

Provides a manual control interface for switching custom output signals on/off and for starting/stopping specified PLC programs.

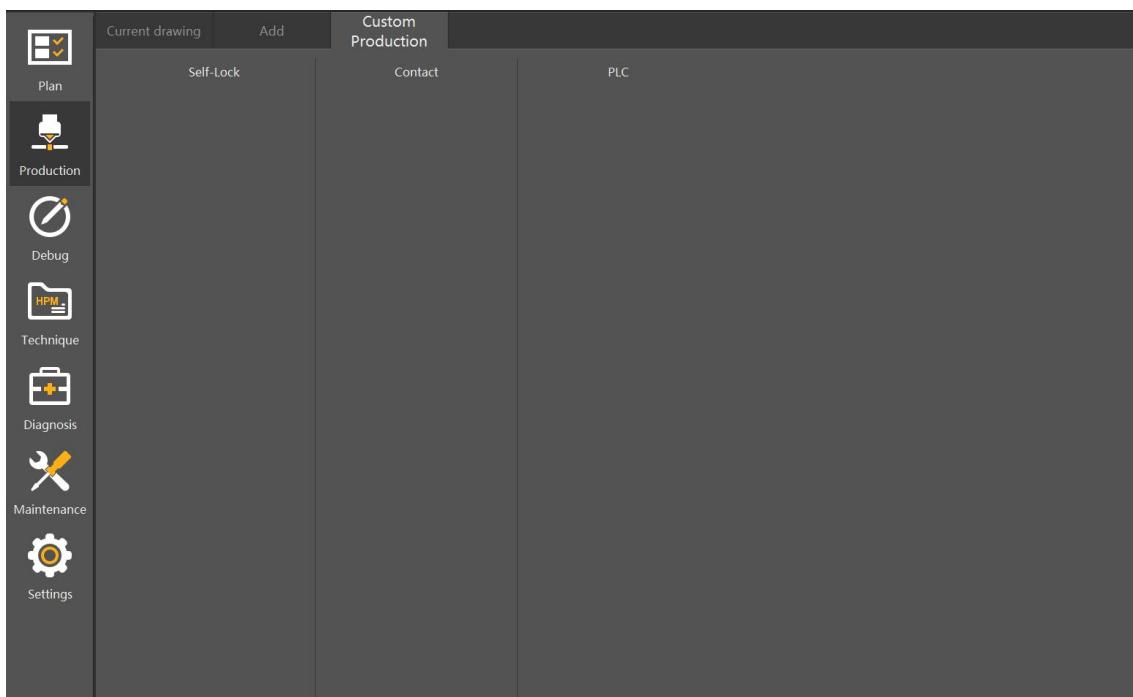


Figure 4-14 Custom production

## 4.2 Graphic Operations

HypCut is primarily a cutting control software and only includes basic graphic functions. For optimal performance, it is recommended to use it together with the CypNest nesting software.

The **Graphic** feature allows you to configure automatic optimization and drawing parameters to meet specific design requirements. When importing a drawing, you can enable **Auto check graphic self-intersect and overlap** to detect whether the imported graphics contain any self-intersections or overlapping elements.

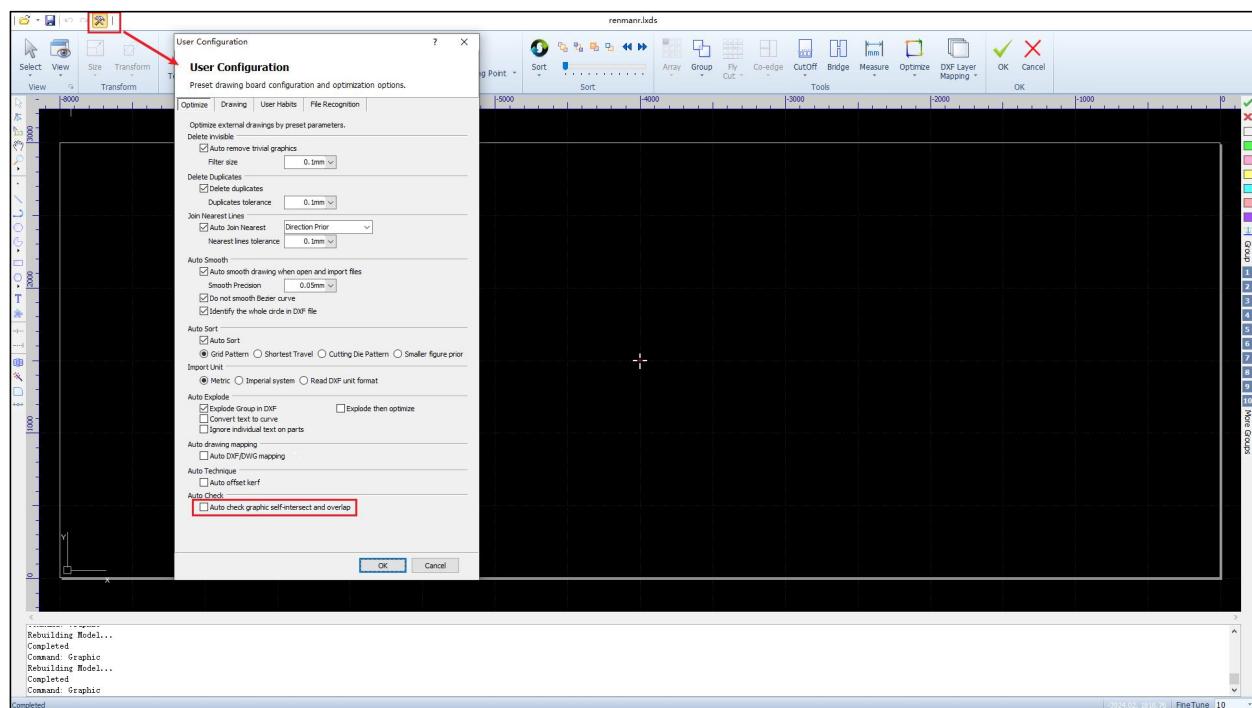


Figure 4-15 Graphic - user configuration

#### 4.2.1 Graphic Selection

HypCut supports two methods for selecting graphics: click selection and box selection.

- Click Selection: Click on a graphic to select it.
- Box Selection: Drag the mouse to form a semi-transparent checkbox on the screen to select the graphic. Box selection is divided into two types:
  - Left to right drag: Displays a blue solid-line semi-transparent rectangle. Only graphics that are completely enclosed within the rectangle will be selected.

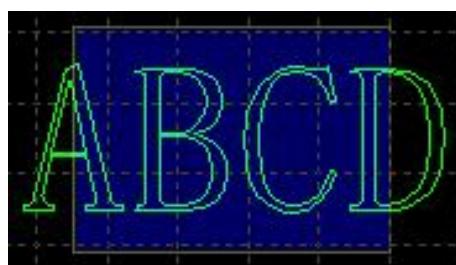


Figure 4-16 Dragging from left to right selects B and C only.

- Right to Left Drag: Displays a cyan dashed-line semi-transparent rectangle. Any graphic that is partially or fully within the rectangle will be selected.



Figure 4-17 Dragging from right to left selects A, B, C, and D

Regardless of whether using click selection or box selection, holding the **Shift** key while selecting allows you to add or remove graphics from the current selection without clearing the previous selection.

#### 4.2.2 Size and Transformation

The **Transform** section in the toolbar provides various geometric operations. Before applying a transformation, select the target graphic. Common operations such as **Translate**, **Rotate**, **Align**, and **Flip** can be applied with a single click from the **Transform** menu.

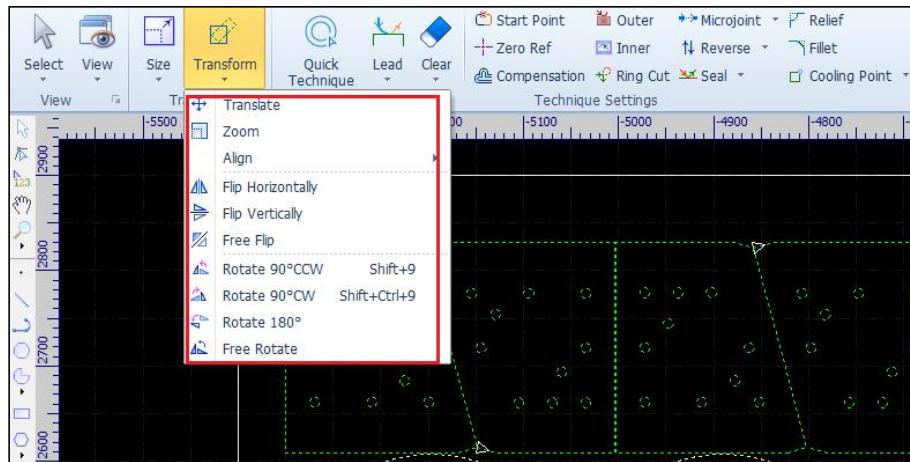


Figure 4-18 Transform

HypCut offers seven options for quick size adjustment. After selecting the target graphic, choose a preset size from the **Size** drop-down menu. For example, clicking **100 mm** will scale the graphic proportionally so that its width becomes 100 mm; clicking **2 X** will scale the graphic proportionally by a factor of 2.

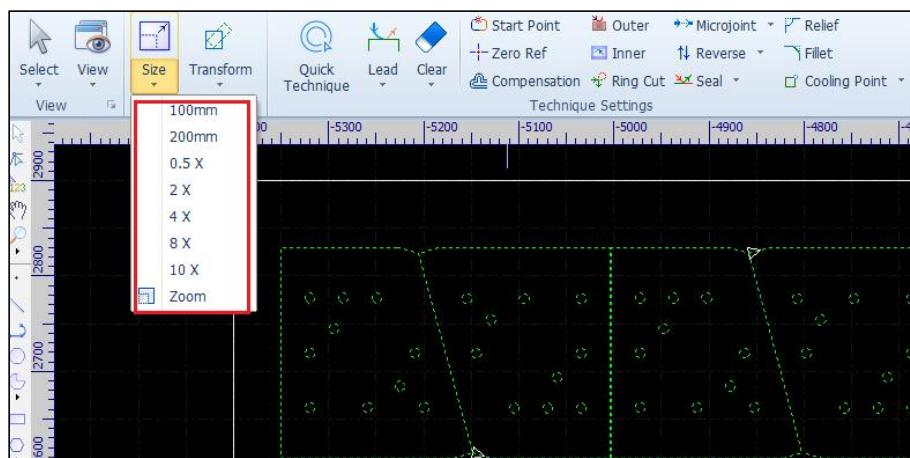


Figure 4-19 Size

To input an exact size, click the **Size** button, enter the desired values in the **Modify Size** screen, and click **OK** to apply the changes.

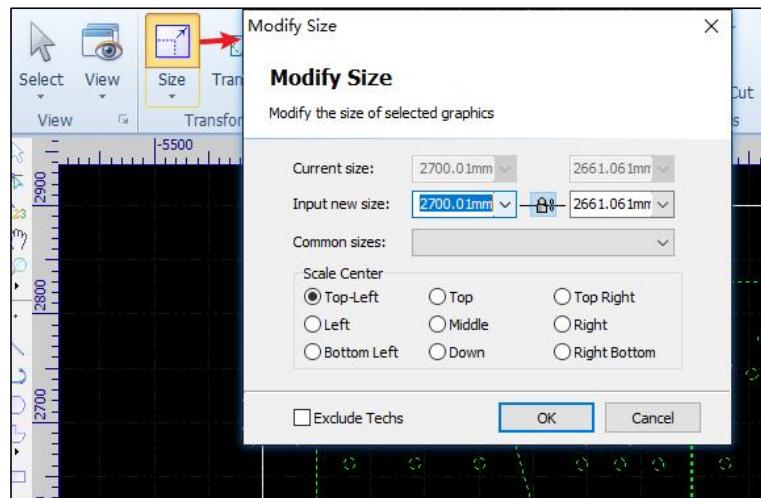


Figure 4-20 Modify size

When the lock icon between length and width is locked, it maintains the original aspect ratio. To input length and width separately, first unlock by clicking the lock icon, then enter the desired values.

The **Scale Center** allows specifying the positional relationship between the scaled graphic and the original graphic. For example, **Top Left** means the new graphic will align with the original at the top left

corner, with scaling based on this reference point. If **Exclude Techs** is checked, dimension modification will only apply to the base graphic dimensions, without considering the size of any added graphic techniques (lead, compensation, or others).



**Notice:** Dimensions of added graphic techniques (e.g., lead, compensation) will remain unchanged and will not be resized with the graphic.

### 4.2.3 Graphic Drawing and Auto Attach

The toolbar on the left side of the interface provides graphic drawing functions, including three main types: graphic elements, text, and standard shapes.



Figure 4-21 Drawing tools

During the drawing process, you can enable ***Auto Attach*** as needed, including attaching to the grid, key points on the graphic, and graphic boundaries.

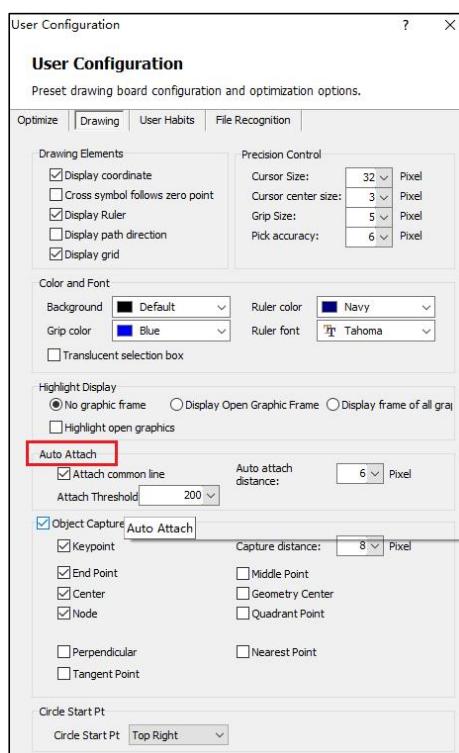


Figure 4-22 Enable auto attach

#### 4.2.4 Graphic Techniques and Tools

This section introduces several graphic techniques features such as *Cooling Point*, *Fly Cut*, and *Ring Cut*. Additionally, you can use the *Quick Technique* feature for easy settings.



Figure 4-23 Graphic technique settings

##### 4.2.4.1 Cooling Point

To add a cooling point, click *Cooling Point*, then click the desired position on the graphic. During machining, when the cutting head reaches a cooling point, the laser shuts off, and cooling gas is triggered. The dwell time is controlled via *Cooling point delay* on the *Settings* → *Global* page. After the delay, the laser activates to resume normal cutting operation.

Similar to manual microjoint, multiple cooling points can be added by consecutive clicking. Cooling points can still be added after other techniques, such as *Microjoint* and *Compensation*, have already been applied. Cooling points are displayed as solid white dots on the drawing board.

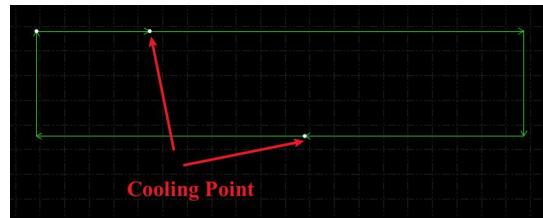


Figure 4-24 Cooling point

In addition to manual insertion, cooling points can also be added automatically. The procedure is as follows:

**Step 1** Select the graphic and click *Auto Cooling Point* from the *Cooling Point* drop-down menu.

**Step 2** On the function page, enable options to add cooling points to at leads and sharp corners.

**Step 3** When *Cooling point at lead* is enabled, the cooling point becomes part of the lead

path. It will move or be deleted automatically if the lead is modified.

#### 4.2.4.2 Ring Cut

After selecting the target graphic, click **Ring Cut** from the **Technique Settings** column to improve cutting quality at sharp corners.

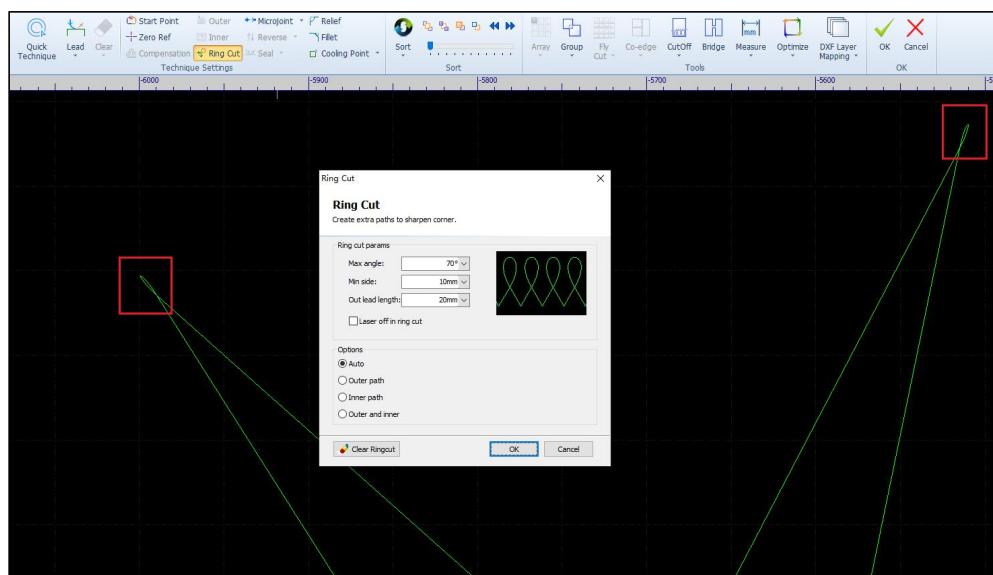


Figure 4-25 Ring cut

#### 4.2.4.3 Relief

Click **Relief**, enter the value of **Specify hole radius**, then move the mouse to the corner. When a square and a blue arc appear, left-click to add a relief. This creates a small hole at sharp corners, which facilitates downstream bending processes.

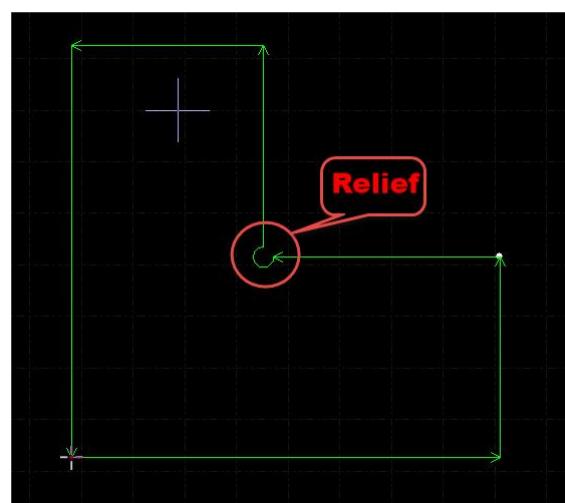


Figure 4-26 Relief

#### 4.2.4.4 Fly Cut

For regular arrangements of geometric shapes like rectangles, full circles, and polygons, the scan cutting algorithm merges line segments in the same direction into continuous machining paths, enabling ***Fly Cut*** during machining. It is recommended to sort the target graphics before applying ***Fly Cut*** to optimize scanning paths and reduce travel time.

According to the geometric features, select the corresponding mode from the ***Fly Cut*** drop-down menu: ***Linear Fly Cut***, ***Circle Fly Cut***, ***Obround Fly Cut***, and ***One-Path Fly Cut***. Partial parameters are described below:

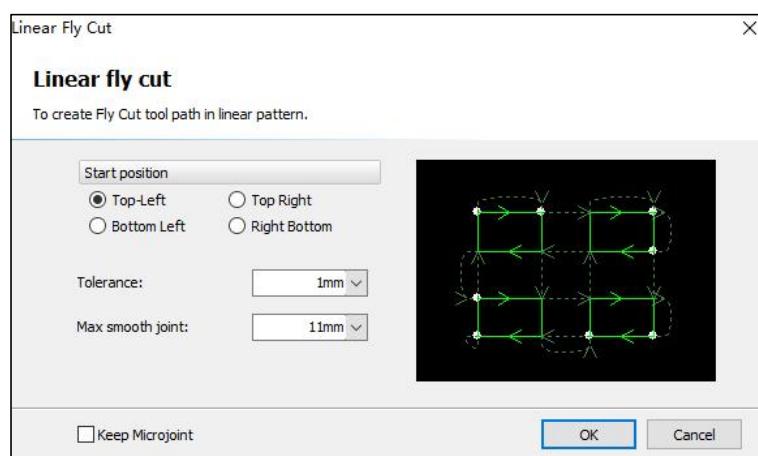


Figure 4-27 Linear fly cut

***Linear Fly Cut*** is mainly used for performing fly cutting on regularly arrayed graphics.

- Start position: Sets the starting point for the scanning cut.
- Tolerance: When connecting the colinear segments into a fly cutting path, any segment within the defined tolerance from the line will be included.
- Max smooth joint: When transitioning between two fly cutting rows, if the transition distance is smaller than this threshold, a smooth connection will be applied.

**Circle Fly Cut** is suitable for regularly arranged circular shapes.

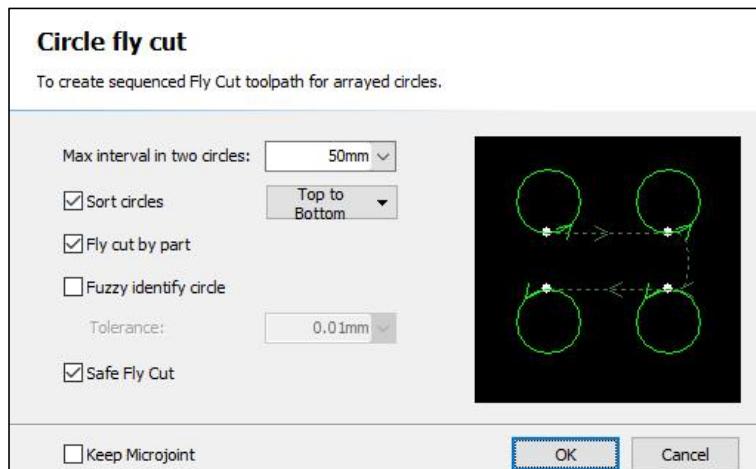


Figure 4-28 Circle fly cut

- Max interval two circles: Maximum spacing allowed between two adjacent circles. If the actual distance exceeds the set interval, **Fly Cut** will not be applied.

#### 4.2.4.5 Array and Fill Up

**Array** is used for quickly duplicating the selected graphics. Three array types are provided in HypCut.

Click **Array** or select **Rectangular Array** from the **Array** drop-down menu to enter the **Array Parameter** interface.

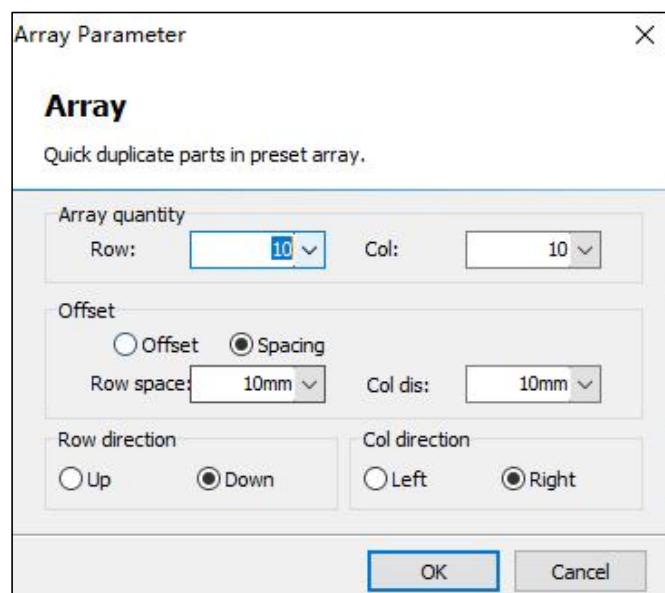


Figure 4-29 Array parameters

Set the array quantity, offset, and direction to complete the fast copy.

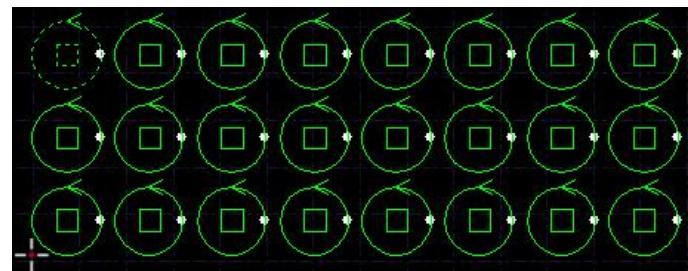


Figure 4-30 Array example

*Fill Up* is primarily used for full-plate cutting of a single graphic. Under the *Array* drop-down menu, select *Fill Up*. The software will quickly generate a filled nesting result based on parameters such as *Plate Size*, *Parts gap*, and *plate margin*. The nesting result is shown in the figure below:

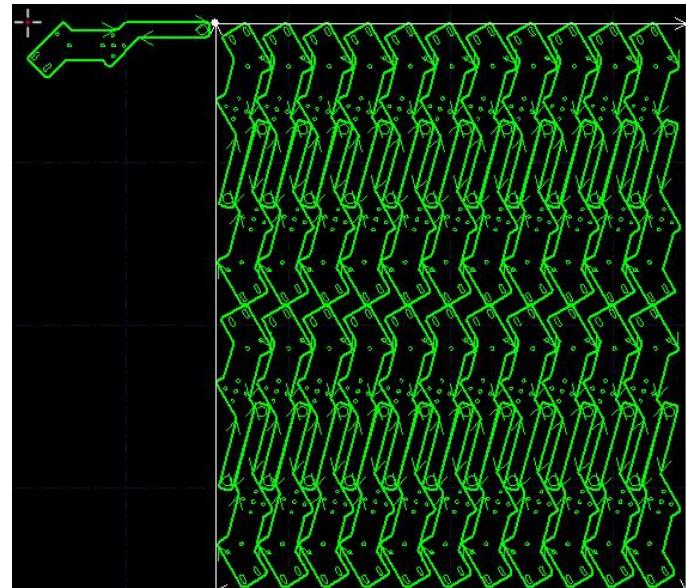
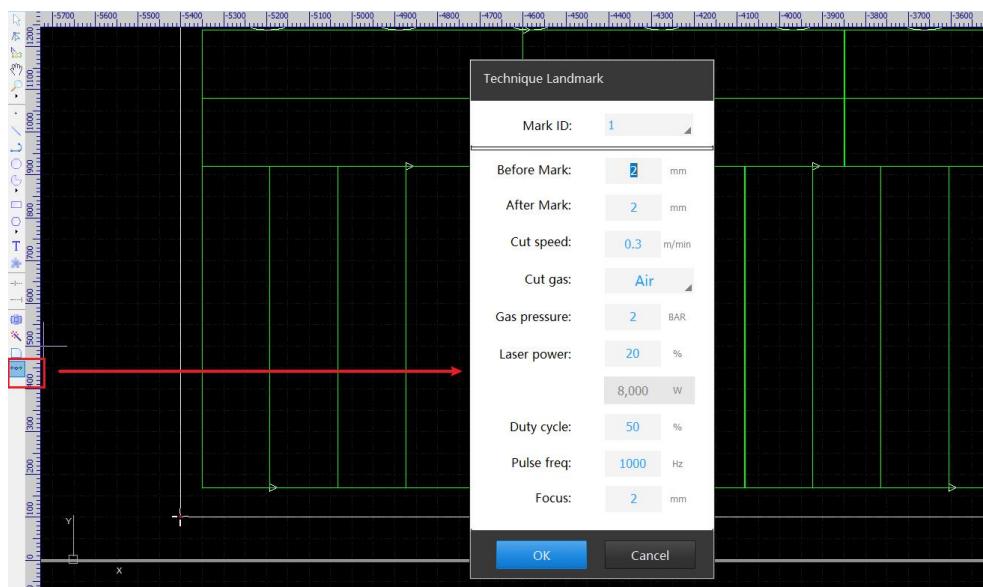


Figure 4-31 Fill up example

#### 4.2.4.6 Technique Landmark

When machining welded assemblies, the welding joints often have greater thickness or differ in material from the main plate. As a result, the machining technique for the main plate cannot be directly applied. In such cases, **Technique Landmark** can be used to assign custom cutting parameters specifically for these areas. To add a landmark, click **Technique Landmark** in the left toolbar (see the figure below), select a **Mark ID**, and configure the corresponding parameters. The landmark can be manually placed on the graphic.



If you need to modify the technique parameters of landmark during production, go to **Production** → **Auxiliary** → **Technique Landmark**.

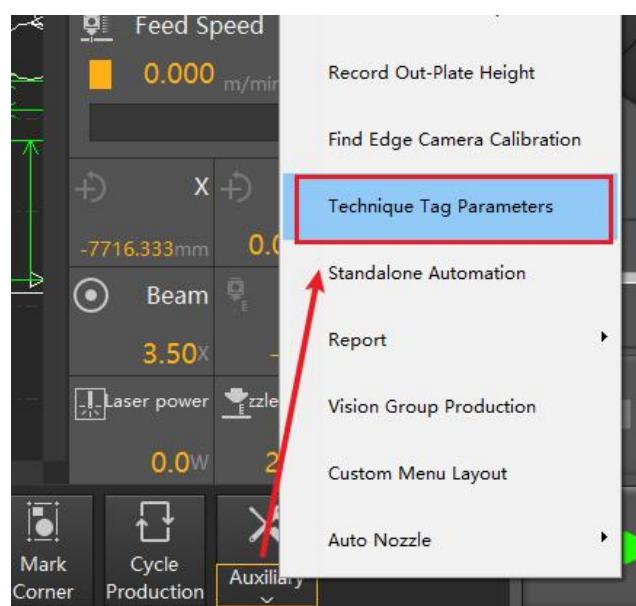


Figure 4-32 Technique landmark

## 4.3 Machining Technique

Used to configure the machining technique parameters for a selected machining task or drawing. Expert and lower-level permissions can only view and apply the factory-default technique; to make edits, you must save a separate copy.

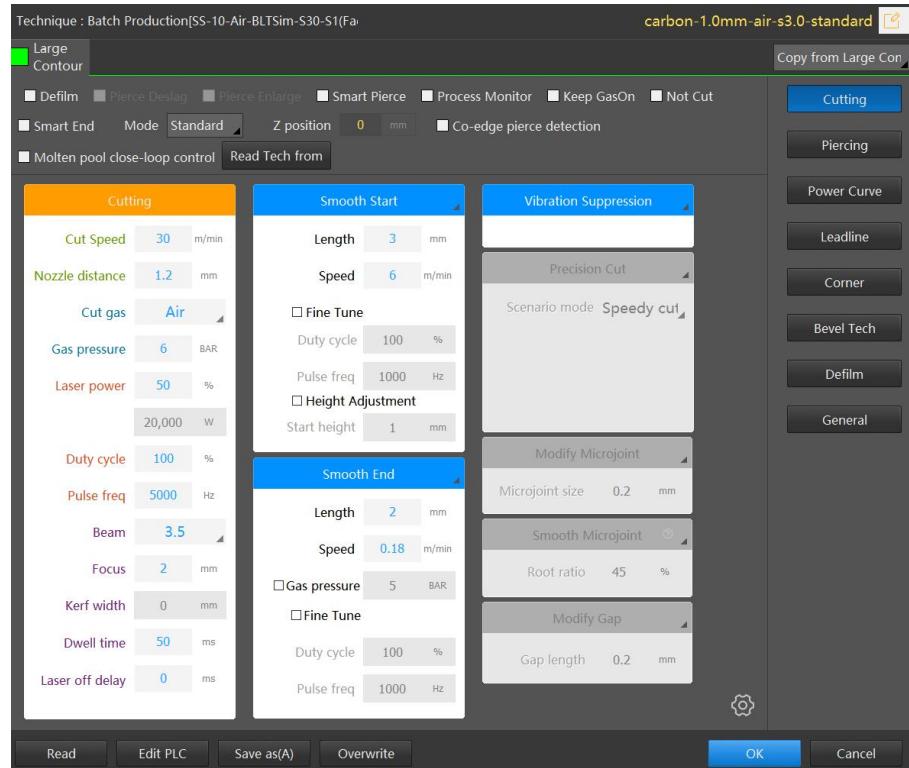


Figure 4-33 Technique interface

**⚠ Caution:**

1. The technique parameters are directly related to the plate materials, laser, gas pressure, etc., and must be set according to the actual production requirements.
2. All parameters shown (including those in figures) serve as a demonstration only—never as operational references.
3. Inappropriate or incorrect parameters may result in poor cutting results or even equipment damage (such as machine tools), so please set the parameters carefully.
4. Modifying the technique parameters while the machine is in the paused state may result in loss of breakpoint data. Proceed with caution. During the machining, it is not allowed to modify parameter values or piercing stages.

### 4.3.1 Cutting Parameterer

HypCut offers 7 layers, each allowing independent parameter settings for cut speed, laser power, cut gas, nozzle distance, etc. The cutting parameters are described in the table below:

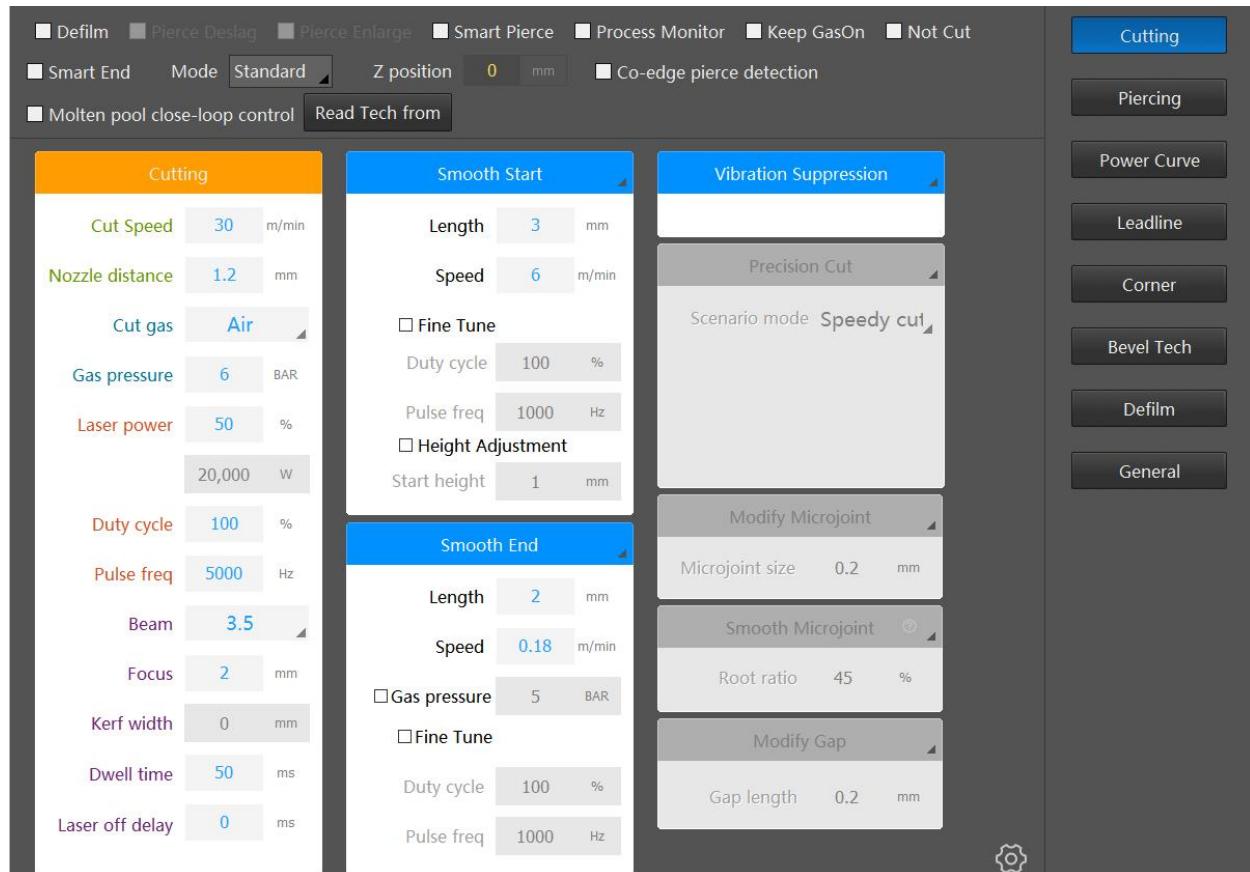


Figure 4-34 Cutting parameters

The cutting parameters are described in the table below:

Table 4-1 Cut Parameter Description

Category	Name	Description
Mode	Standard	Performs standard cutting according to the set parameters.
	Fixed height cut	The cutting head is fixed at a certain height for cutting (Z-axis locked at preset coordinate).
	Out-plate follow	Commonly used for cutting off plates. When this mode is selected, the cutting can start outside the plate. During machining, the cutting head stays at the preset height outside the plate, then activates the following mode upon detecting the incoming plate.
Cutting	Cut Speed	Sets the target speed during cutting. Actual speed may be lower due to

Category	Name	Description
Parameters		acceleration/deceleration at path starts/ends and corners.
	Nozzle distance	Distance between the cutting head and the plate surface during cutting.
	Cut gas	Sets auxiliary gas to be used for cutting: air, oxygen, nitrogen.
	Gas pressure	Sets the gas pressure of the auxiliary gas during cutting, requiring a proportional valve/multi-gas valve.
	Laser power	Sets the fiber laser's peak power, which determines the maximum cutting power that can be achieved when cutting. For example, with a 3000 W laser, if the peak power is set to 80%, the max cutting power is: $3000 \text{ W} \times 80\% = 2400 \text{ W}$ .
	Duty cycle	Sets PWM modulation duty cycle for controlling laser energy density.
	Pulse freq	Sets PWM carrier frequency (pulses/second). Higher values yield more continuous output.
	Beam	Cutting head default parameter. For cutting heads that support beam size switching, toggle between beam sizes here.
	Focus	The distance between the focus and plate surface.
	Kerf width	The kerf width is determined based on the test cut result when <b>Molten pool close-loop control</b> is disabled.
	Dwell time	Sets the extended piercing duration for complete plate penetration.
	Laser off delay	Sets the extended machining time to ensure complete cutting.
Smooth Start/End	Smooth Start	<ul style="list-style-type: none"> <li>Applies separate cutting parameters at the beginning of the cutting path over a specified length.</li> <li>You can adjust <b>Speed</b>, <b>Duty cycle</b>, <b>Pulse freq</b>, and <b>Start height</b> to achieve a stable and smooth cutting start. The minimum cutting speed is 0.1 mm/s. <b>Duty cycle</b> and <b>Pulse freq</b> become available only when <b>Fine Tune</b> is enabled.</li> </ul>
	Smooth End	<ul style="list-style-type: none"> <li>Applies separate speed, duty cycle, and pulse frequency near the end of the cutting path over a specified length.</li> <li>The minimum cutting speed is 0.1 mm/s. <b>Duty cycle</b> and <b>Pulse freq</b> become available only when <b>Fine Tune</b> is enabled. Additionally,</li> </ul>

Category	Name	Description
		<i>Smart End</i> is available at the top of the interface.
Precision Cut	Precision Cut	<p>When enabled, the machine dynamically adjusts motion based on curves and corners using the specified parameters. Typically, this only affects transitions like sharp corners or arc-line connections. Higher precision enhances cutting quality but may reduce speed. Choose a mode according to your needs.</p> <ul style="list-style-type: none"> <li>Speedy cut: Prioritizes efficiency; machine impact is secondary; precision is lowest. Suitable for mesh cutting.</li> <li>Fine cut: Prioritizes precision; machine impact is secondary; efficiency is lowest. Suitable for high-strength bolt holes.</li> <li>Precision fly cut: Optimized for fly-cutting circles that require high precision; only effective on fly-cut circles.</li> <li>Custom: Allows adjusting all parameters to meet specific needs.</li> </ul>
Graphic Technique Cutting	Modify Microjoint	<ul style="list-style-type: none"> <li>Requires Adjust Microjoint and Gap in tech table to be enabled on the <i>Settings</i> → <i>Global</i> page. Allows real-time modification of microjoint sizes without altering the drawing.</li> <li>This is useful when the microjoint in the original drawing is too large or too small. In such cases, you can pause the production and modify the microjoint size. Checking the <i>Smooth Microjoint</i> feature will process the microjoints at a lower power.</li> </ul>
	Modify Gap	Enables real-time adjustment of gap length during processing. The configured gap length overrides that in the original drawing. During pauses, you can modify the gap as needed
	Vibration Suppression	When enabled, suppresses shaking caused by slag splash during processing. Additional settings are available via the gear icon in the lower right corner.
Advanced Settings	Scan Cut	Helps address the overcutting issues at the endpoint of fly-cut circular arcs, helping improve cutting quality.
	Compensation	Allows flexible adjustment of inner and outer compensation widths during processing based on actual cutting results. Before using this function, compensation must be added to the graphics, and <i>Adjust kerf</i>

Category	Name	Description
		<p><i>offset in tech table</i> must be enabled on the <b>Settings → Global</b> page</p> <ul style="list-style-type: none"> <li>Thin Sheet Vibration Suppression: Adjusts the response speed of <b>Follow</b> when cutting thin sheets. A longer time results in stronger suppression, but slower response.</li> <li>Thick Plate Vibration Suppression: Adjusts the lifting speed of <b>Follow</b> for thick plates. A higher suppression level yields better vibration control but reduces the allowable angle of plate warping.</li> </ul>
Process Monitor Sensitivity		When <b>Process Monitor</b> is enabled, you can drag the slide to control monitor the sensitivity.
Keep GasOn		The assist gas remains on throughout the entire cutting process, without shutoff.
Not Cut		Disables cutting for all graphics on the current layer.
Z position		Records the coordinate of the Z-axis in the <b>Disable follow</b> mode, which needs to be enabled via <b>Settings → Global → Production</b> settings.

### 4.3.2 Piercing Technique

Select the appropriate piercing method as needed: **Segment Pierce**, **Flash Pierce**, and **Incremental Pierce**.

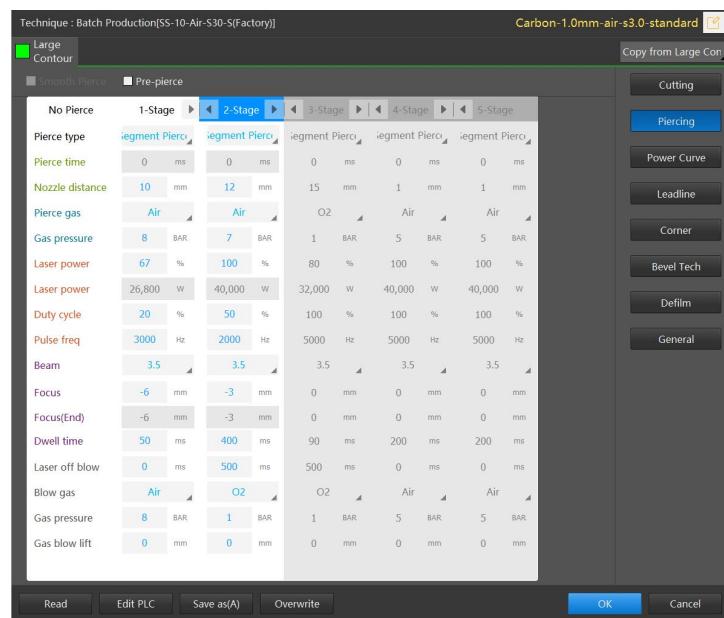


Figure 4-35 Piercing

The piercing parameters are described as follows:

Table 4-2 Piercing Method Description

Name	Description
Smooth Pierce	The cutting head performs a frog leap to the target position. During the movement, it pre-adjusts the focal position to the smooth piercing focus. The laser emits continuously, gradually transitioning both the cutting head and the focus. Once the cutting head descends to the cutting height and the focus reaches the cutting focus, the cutting process begins.
Incremental Pierce	After dwelling at the current piercing height for a specified time, the cutting head moves to the next piercing stage at a constant speed (Speed = Height Difference/Pierce time), with the laser continuously on during the transition.
Flash Pierce	Optimized for thick plates. Achieves rapid penetration through dynamic frequency/focus/power modulation.
Segment Pierce	Executes piercing at different heights using specific parameters for power, frequency, duty cycle, etc., for a defined period.

### 4.3.3 Power Curve

Defines the relationship between duty cycle or frequency and cutting speed. It dynamically adjusts the applied duty cycle or frequency based on the current speed, helping to reduce issues such as corner overburn or dross formation. This only applies during cutting, not piercing.

You can enable the power and frequency curves. During processing, the software dynamically adjusts laser power (via PWM duty cycle) and frequency based on the defined curves, helping to improve cutting quality – especially at corners. Frequency curve requires power curve to be enabled as well.

Clicking **Modify Curve** allows independent editing of power and frequency curves. The horizontal axis represents cutting speed, while the vertical axis represents cutting power or frequency. Double-click a point on the curve to add a power/frequency value at a specific speed. Choose from smoothing types: *Linear*, *Segmented*, or *Smooth*. The edited curves can also be copied for reuse.

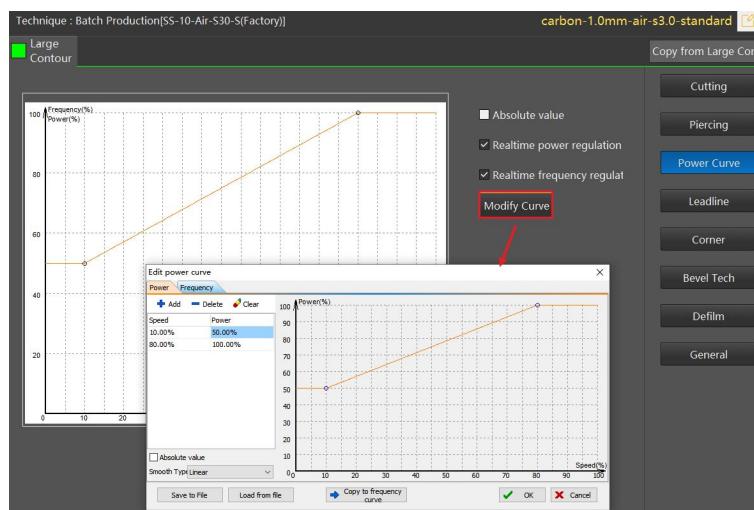


Figure 4-36 Power curve

#### 4.3.4 Leadline Technique

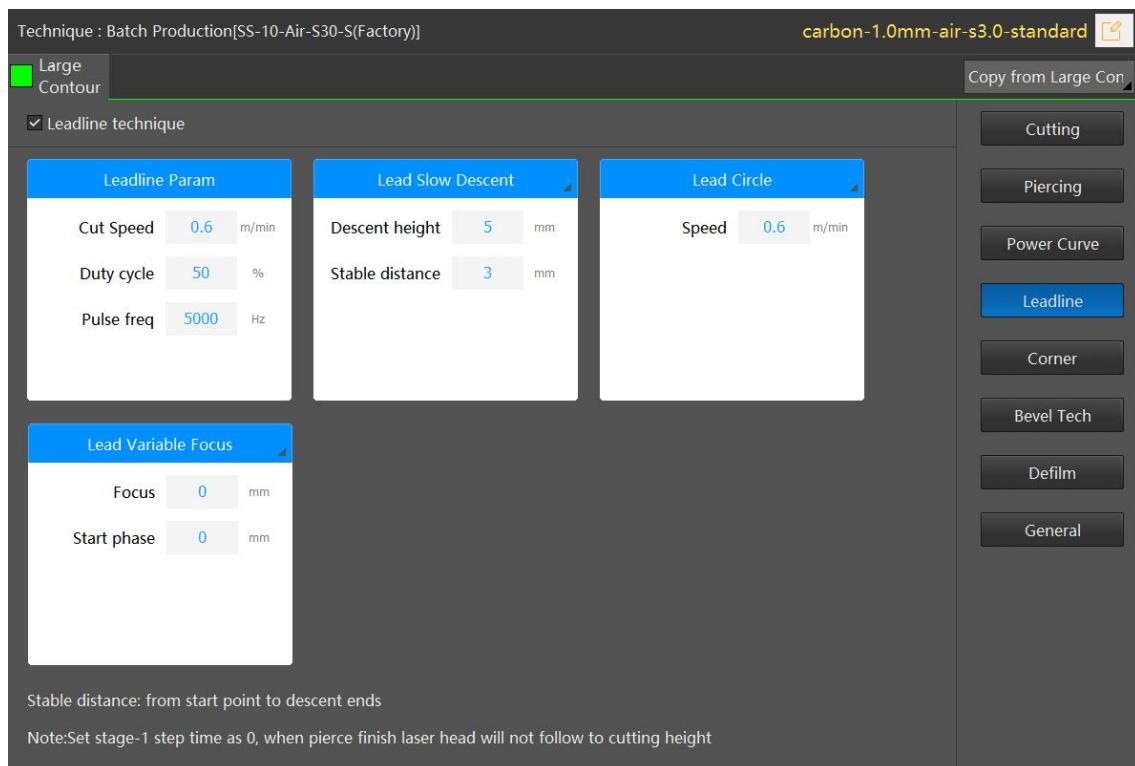


Figure 4-37 Leadline technique

The leadline parameters are described in the table below.

Table 4-3 Leadline Technique Description

Name	Description
Leadline Param	Specifies the <b>Cut Speed</b> , <b>Duty cycle</b> , and <b>Pulse freq</b> to be applied during the leadline path.
Lead Slow Descent	Activates laser at the preset <b>Descent height</b> . The cutting head synchronizes lead cutting and vertical descent to the cut height. <b>Stable distance</b> defines the distance from the cut height position to the start of the actual contour.
Lead Circle	When checked, a separate <b>Speed</b> is required for cutting the circle.
Lead Variable Focus	Performs automatic focus adjustments during the leadline cutting process.

#### 4.3.5 Corner Technique

When cutting corners with angles sharper than the set value, separate technique parameters are applied before and after the corner. This approach significantly enhances the cutting quality at the corners.

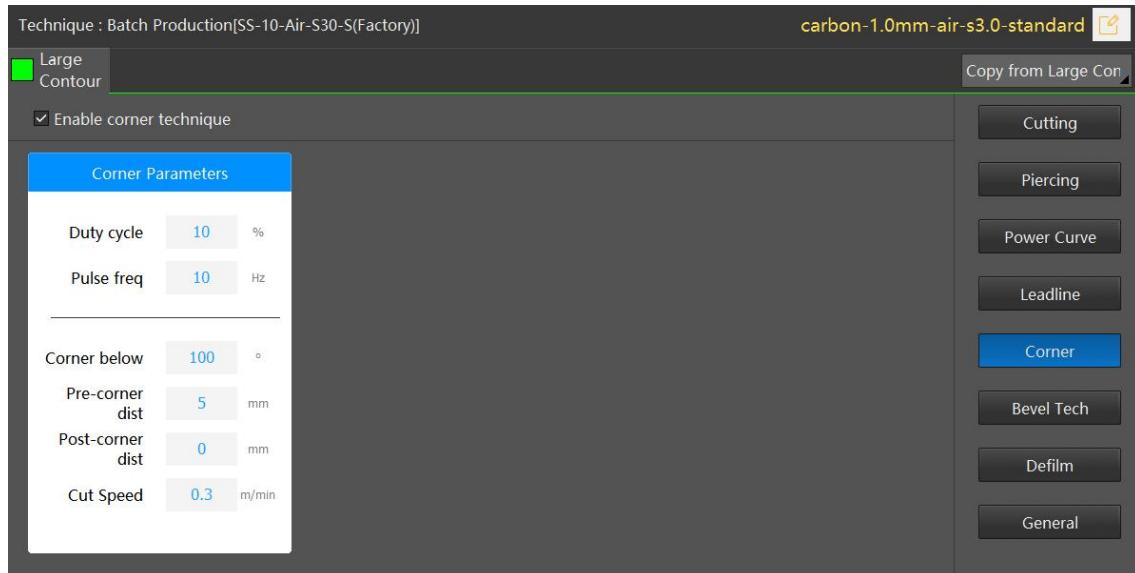


Figure 4-38 Enable corner technique

### 4.3.6 Defilm Parameters

Performs a low-power pass along the cutting paths using Defilm-specific parameters, followed by normal cutting with standard layer parameters. This feature is used to remove rust and protective film from the plate surface.

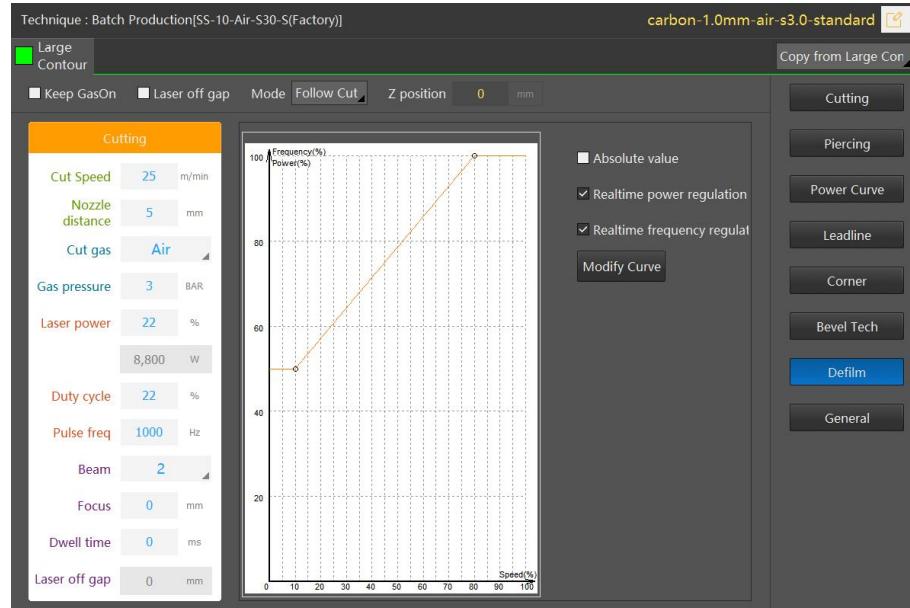


Figure 4-39 Defilm

### 4.3.7 Focus Temperature Drift Offset

The focus temperature drift offset compensates for thermal shifts of the focal point, and can be tuned by adjusting *Offset factor*.

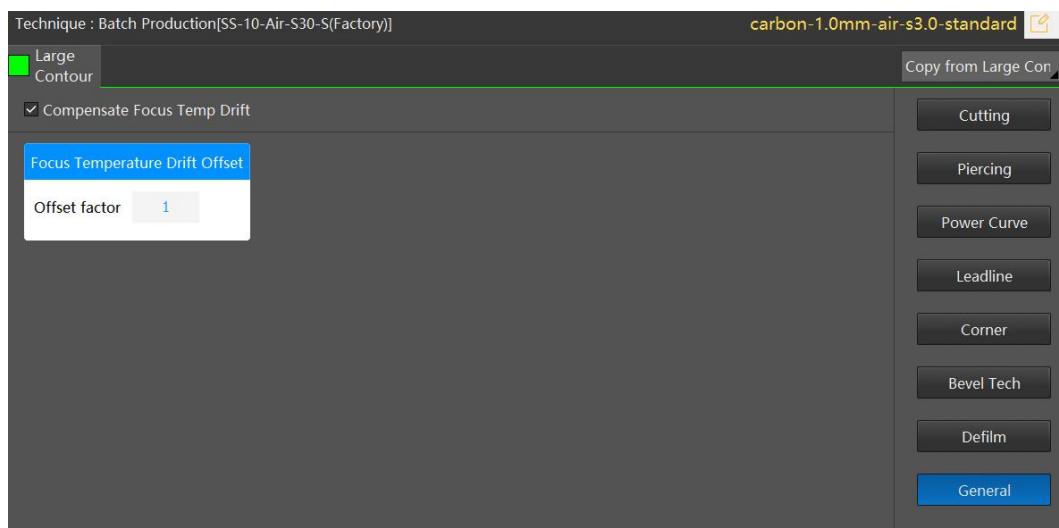


Figure 4-40 Focus temperature drift offset

### 4.3.8 Smart Techniques (For BLT Cutting Head)

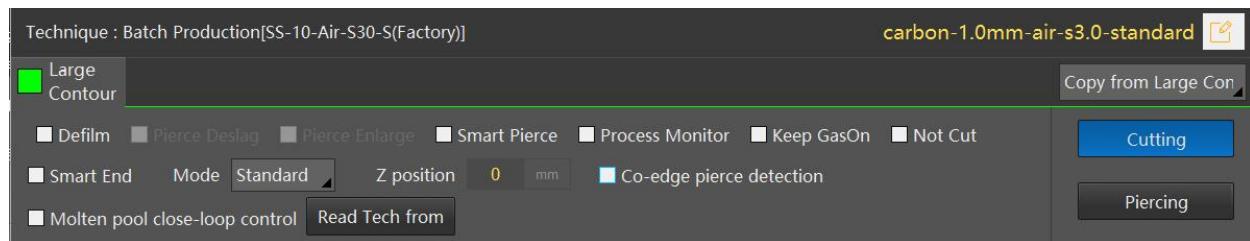


Figure 4-41 Smart techniques

The smart techniques are described in the table below.

Table 4-4 Smart Technique Description

Name	Description
Process Monitor	<ul style="list-style-type: none"> <li>While cutting, the software monitors whether the plate has been fully penetrated. If incomplete penetration is detected, the laser will shut off, retract, and re-cut the toolpath.</li> <li>By default, <i>Recut incomplete cutting</i> is enabled on the <i>Settings</i> → <i>Global</i> → <i>Production</i> page. If this option is disabled, and plasma is detected during process monitoring, the software will trigger an alarm and pause the operation without re-cutting.</li> <li>To enable <i>Process Monitor</i> and <i>Smart Pierce</i> options on the <i>Technique</i> page, you must check <i>Enable Smart Monitor</i> under <i>Config Tool</i>.</li> </ul>
Smart Pierce	During piercing, the software detects whether the plate has been penetrated. If penetration is successful before the set piercing delay, the cutting head will immediately transition to cutting. If not, the cutting head will proceed with cutting until the dwell time is reached.
Smart End	When enabled, this function improves the finish at the end of closed cutting paths by preventing burr or dross formation. If <i>Smooth End</i> is enabled, it will be automatically applied to the end of all cutting paths.
Co-edge pierce detection	Requires BLT-H series cutting head. When enabled, the software will automatically detect whether or not to perform piercing at the start of the co-edges, requiring dedicated piercing parameters (not <i>Smooth Pierce</i> ). Additionally, the drawing needs overcut/laser on distance settings (recommended in CypNest).
Molten Pool Monitor	<ul style="list-style-type: none"> <li>Requires BLT-M or BLT-MA series cutting head. The <i>Molten Pool Monitor</i></li> </ul>

Name	Description
	<p>window will appear after checking <b>Enable Molten Pool Monitor</b> on the <b>Config Tool</b> → <b>Cutting Head</b> page. This feature provides multiple intelligent detection and control functions: focus compensation, active speed Control, auto laser centering, nozzle detection, and technique parameter recommendation.</p> <ul style="list-style-type: none"> <li>Once <b>Molten pool closed-loop control</b> and <b>Speed closed-loop control</b> are activated, manual parameter adjustments are generally unnecessary. To enable <b>Auto Center</b>, navigate to <b>Diagnosis</b> → <b>Laser Head</b> → <b>Advanced Config</b>. Check <b>Real-time Auto Alignment</b>, and select the application scenario as required.</li> </ul>
Cutting head cooling	<ul style="list-style-type: none"> <li>This feature utilizes cooling gas to extend the nozzle's lifespan and protect the cutting head. When enabled, the gas continues to blow for a preset time after the laser shuts off to cool down the head.</li> <li>To activate this feature, navigate to <b>Config Tool</b> → <b>Advanced</b> → <b>Advanced</b>, check <b>Enable Cutting Head Air Cooling</b>, and configure <b>Cooling Gas Output</b>.</li> <li>On the <b>Technique</b> page, click the gear icon to open the <b>Advanced Cutting</b> window, enable <b>Laser Head Cooling</b>, and configure <b>TurnOff Delay</b>. <ul style="list-style-type: none"> <li>If the next gas-on event occurs within 10 seconds after gas shut-off and a gas type switch is required, the <b>Gas switch delay</b> will apply.</li> <li>If the gas remains off for more than 10 seconds, regardless of whether the gas type changes, the <b>Gas On Delay</b> will apply.</li> </ul> </li> </ul>

## 4.4 Find Edge

HypCut supports multiple edge-finding methods. From the **Find Edge** drop-down menu, you can select the suitable method to determine the plate's skew angle and position. The edge finding results will be displayed in the upper right of the drawing area as shown below. Edge finding determines the skew angle of the plate placement, allowing the system to automatically correct the processing direction during cutting.

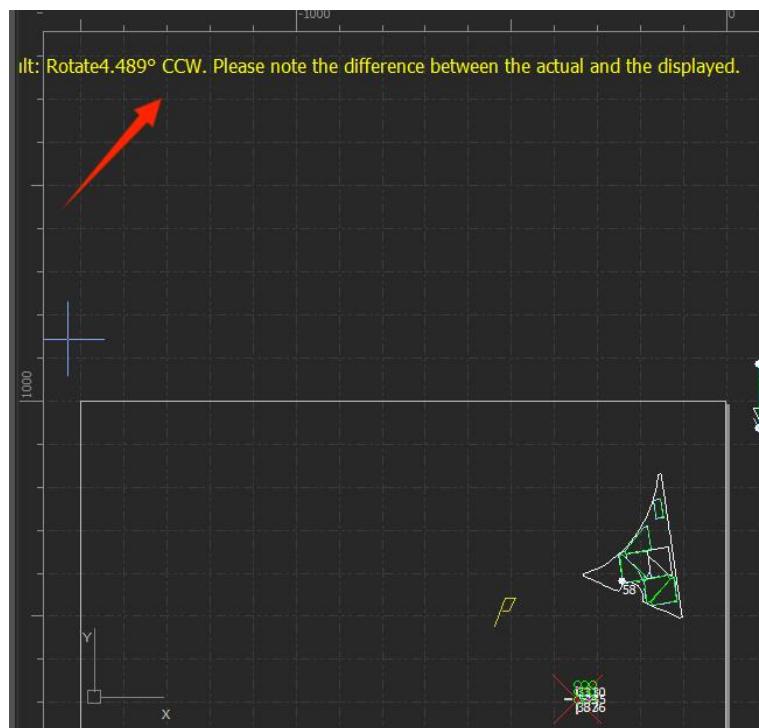


Figure 4-42 Edge-finding result



**Caution:** Ensure the plate size matches the actual plate for edge finding. It is recommended to set the value slightly smaller than the actual plate size to reduce the risk of nozzle collision.

#### 4.4.1 Capacitive Find Edge

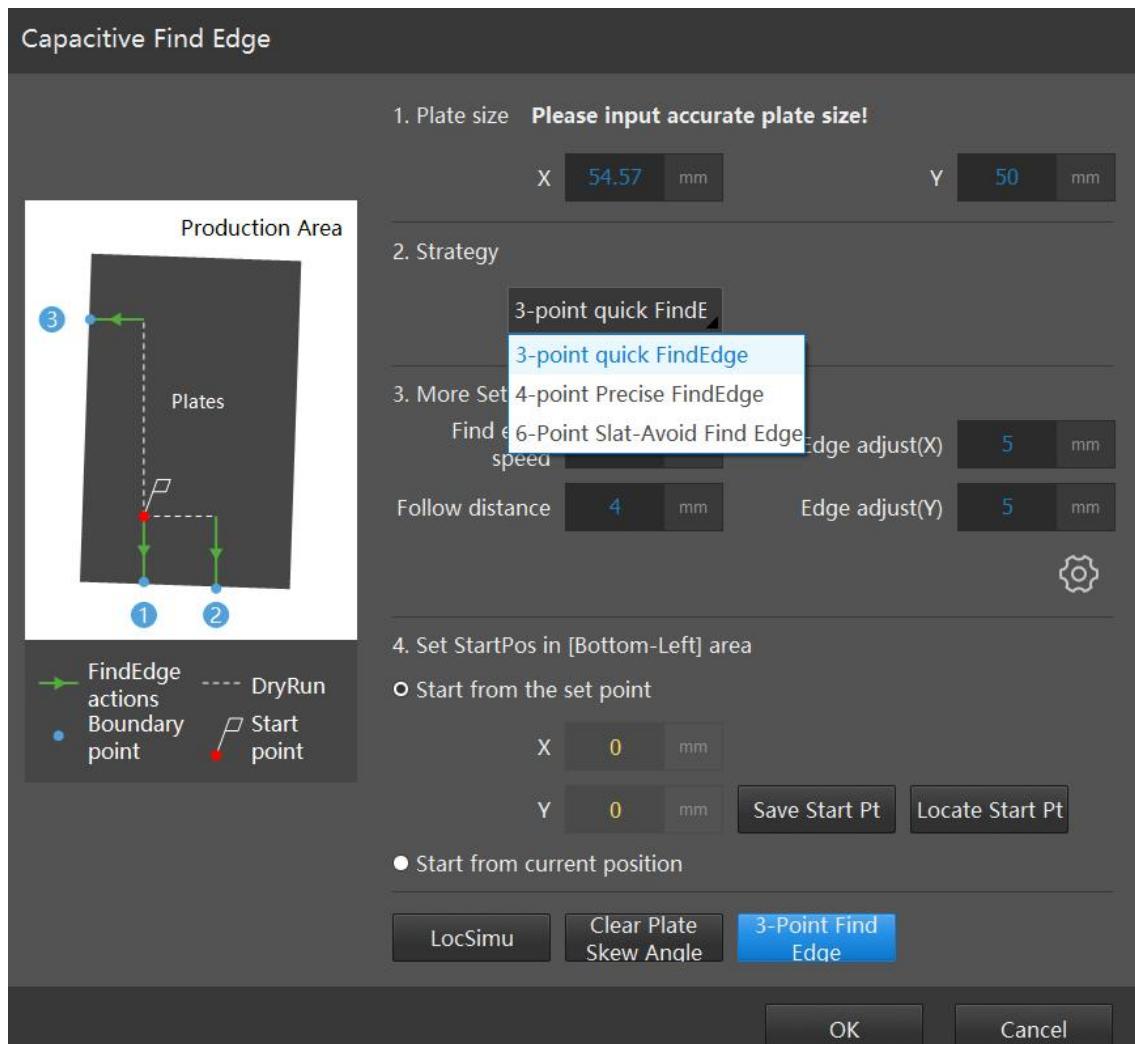


Figure 4-43 Capacitive find edge

- Plate size: X indicates the plate length along the machine's X-axis; Y indicates the plate length along the machine's Y-axis.

**⚠️ Notice:**

- The sheet size defaults to the maximum dimensions of the drawing. When the actual plate size differs from the drawing size, you can adjust the values.
- In the **Batch Production** mode, if a fixed plate size is preferred without automatic reading of the draw dimensions, uncheck **Find edge auto read cut/all graphic size** via **More → General**.

- Edge-finding strategies:
  - 3-point quick FindEdge: Commonly used strategy for quick edge-finding.
  - 4-point Precise FindEdge: Enhances the accuracy of **3-point Quick FindEdge** by ensuring that the two points selected along the long edge are as far apart as possible.
  - Six-point Slat-Avoid FindEdge: Recommended for thin sheets. The system performs six single-point edge-finding actions automatically to effectively avoid interference caused by slats on thin sheets.

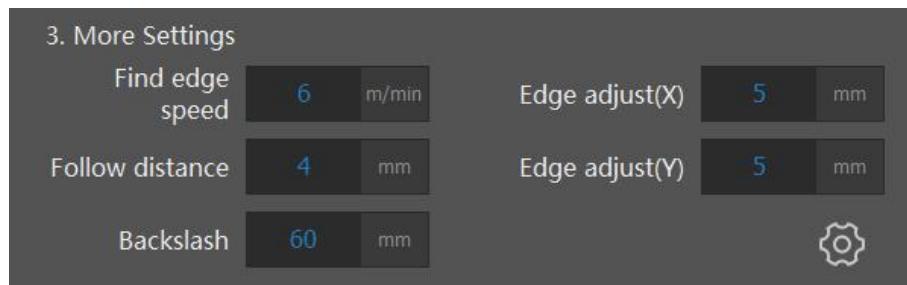


Figure 4-44 More settings

- More settings
  - Find-edge speed: Sets the speed during edge finding.
  - Follow distance: Sets the distance between the nozzle and the plate during edge finding.
  - Edge adjust (X/Y): The edge finding usually extends outside the plate boundary. Therefore, this parameter helps leave a margin to adjust the cutting head position inward toward the plate, avoiding vibration during plate edge cutting. A positive value offsets inward toward the plate, while a negative value offsets it outward. This value can be adjusted downward appropriately if the margin is set during nesting.
  - Backslash: Set according to the actual backlash of the machine's rack when **Six-point Slat-Avoid FindEdge** is used.

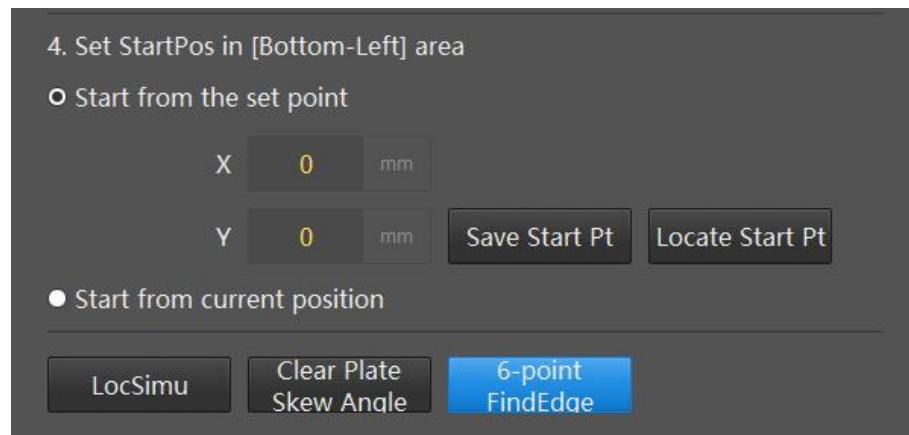


Figure 4-45 Set edge-finding start point

- Start from the set point: Each edge-finding operation starts from a fixed point. Use the control panel button on the right to jog the cutting head to a suitable start position, then save it as the edge-finding start point. Always position the cutting head inside the plate when setting the start point.
- Start from current position: Each edge-finding operation starts from the current position of the cutting head. Ensure the cutting head is positioned inside the plate.
- Clear Plate Skew Angle: Clear the edge-finding result when it is no longer needed.

If ***Find edge before cutting*** is enabled in ***More → Pre-Production*** settings, the software performs capacitive edge finding during dry run or before cutting based on the preset ***Zero Reference*** of the graphic. In this case, enable ***Start from the set point*** and select an appropriate start point.

---

 **Notice:**

1. Before ***Find Edge***, please perform ***Return Origin*** to correct the machine coordinate system. Ensure that there is a plate under the cutting head for proper following.
2. For steel plates, the maximum allowable tilt should exceed 10°.

---

#### 4.4.2 Single Side 2-Point Find Edge

Suitable for irregular plates with one straight edge. Compared with *3-point Quick FindEdge*, this method can only detect the skew angle of the plate, but cannot determine the machining zero point. Therefore, when the 2-point edge finding is completed, you must jog the cutting head to a suitable position for machining.

The 2-point edge-finding direction must be selected according to the position of the plate's straight edge. For example, if there is a straight edge on the right side of the plate and it is used to detect the plate's skew angle, select *Right*.

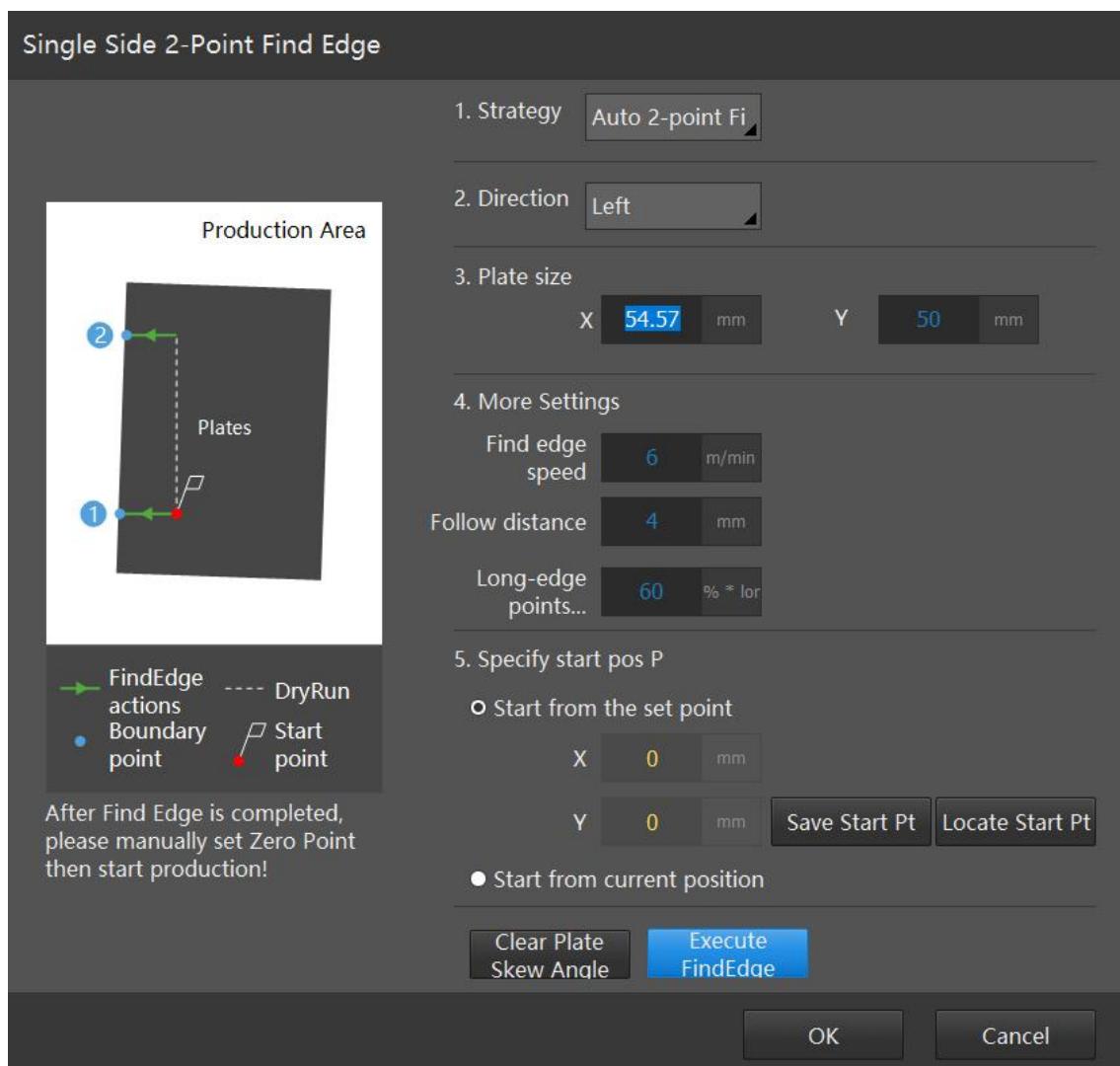


Figure 4-46 2-Point find edge

When **Manual 2-point FindEdge** is used, jog the cutting head to the plate edge and record the coordinates of two different positions along the same edge. The software will automatically calculate the plate's skew angle. The greater the distance between the two points, the higher the accuracy.

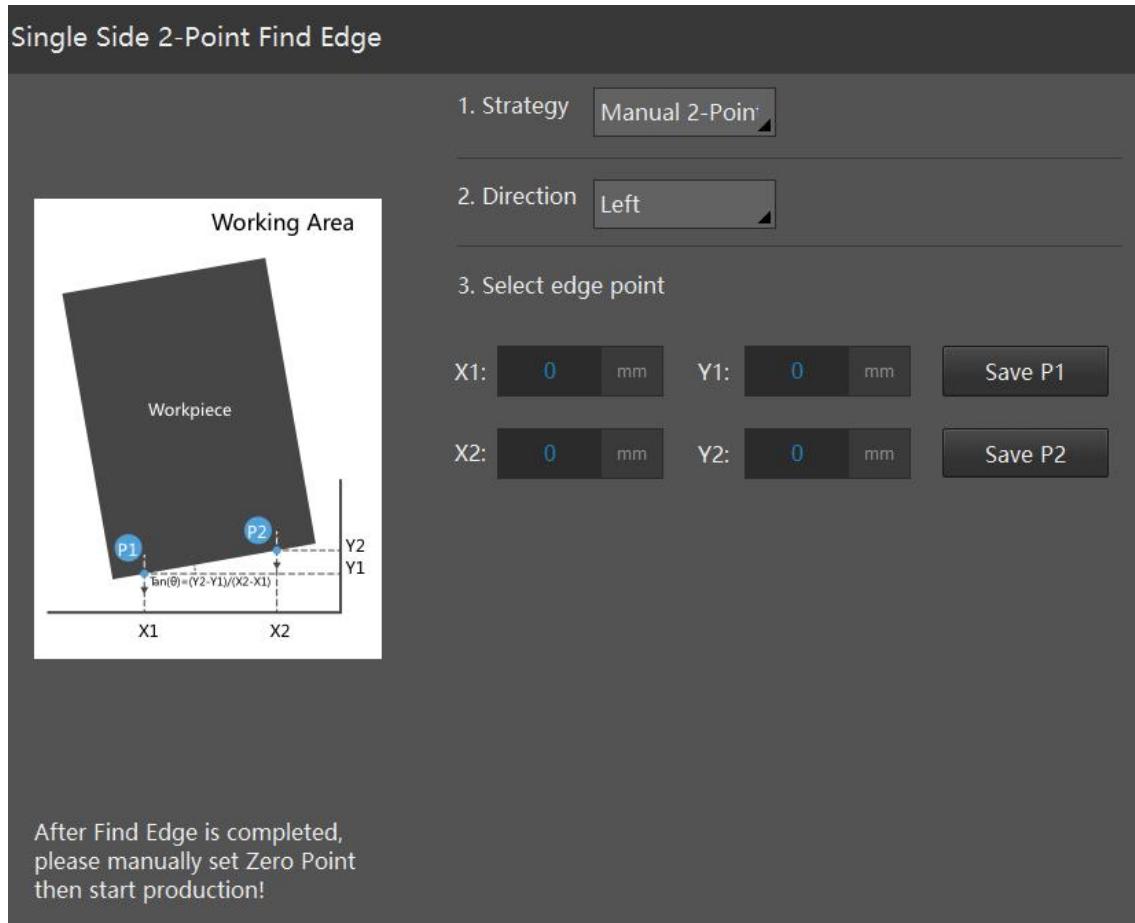


Figure 4-47 Manual 2-point edge finding

#### 4.4.3 Circle Centering

Only applicable to circular plates. After centering is completed, the machining zero point will be set at the geometric center of the circular plates. Therefore, when using this method for edge finding, you must set the *Zero Reference* to *Center*.

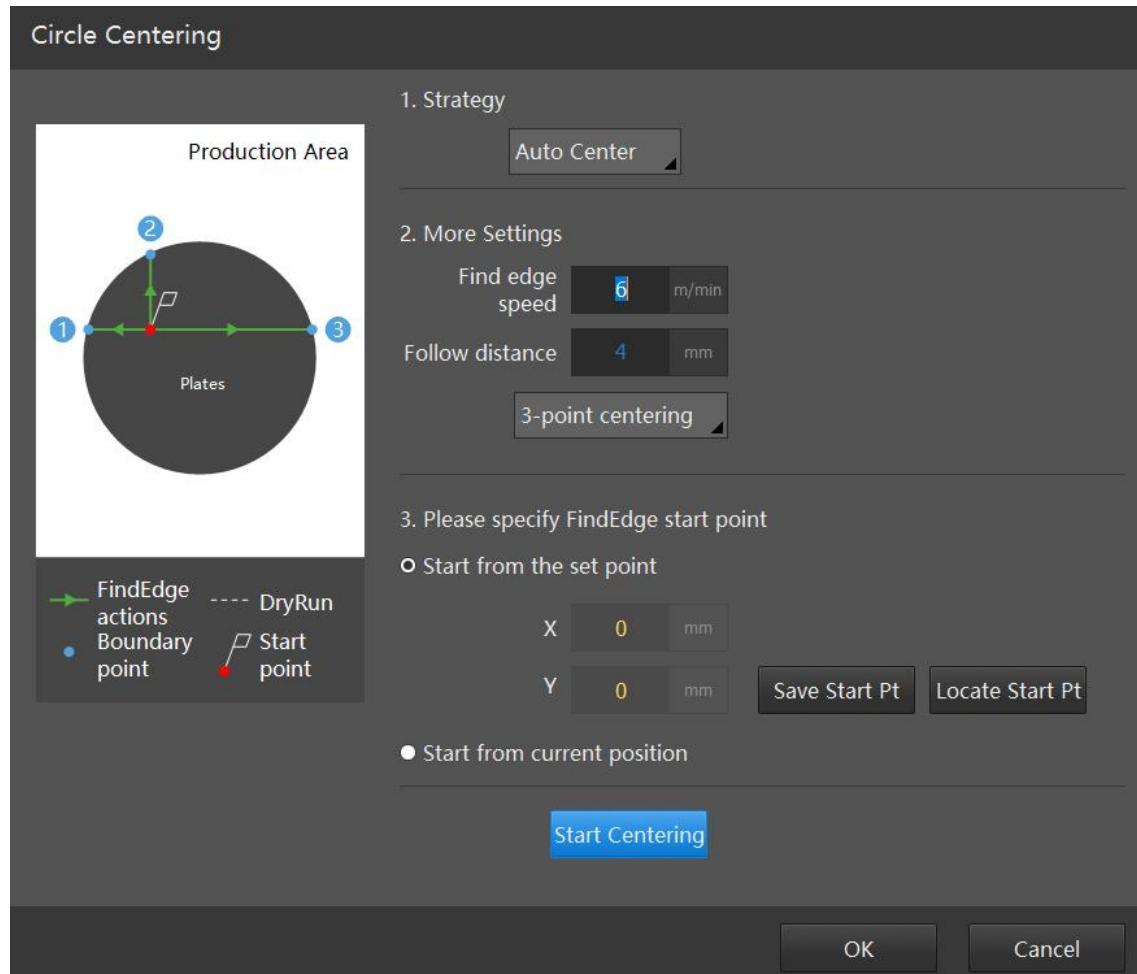


Figure 4-48 Circle centering

When *Manual 3-Pt FindEdge* is used, move the cutting head and record the coordinates of three points. After recording, click *Start Centering*, and the cutting head will move to the center position.



**Notice:** Before performing circular centering, ensure a circular plate is present beneath the cutting head.

#### 4.4.4 Photoelectric Find Edge

Navigate to **Config Tool** → **Advanced** → **Find Edge Config**, and configure the input and output of the photoelectric switch. Once configured, **Photoelectric Find Edge** can be selected from the **Find Edge** drop-down menu.

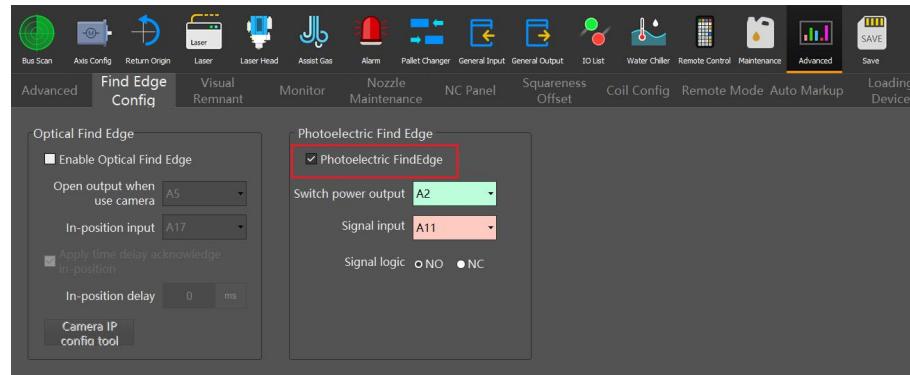


Figure 4-49 Photoelectric edge finding configuration

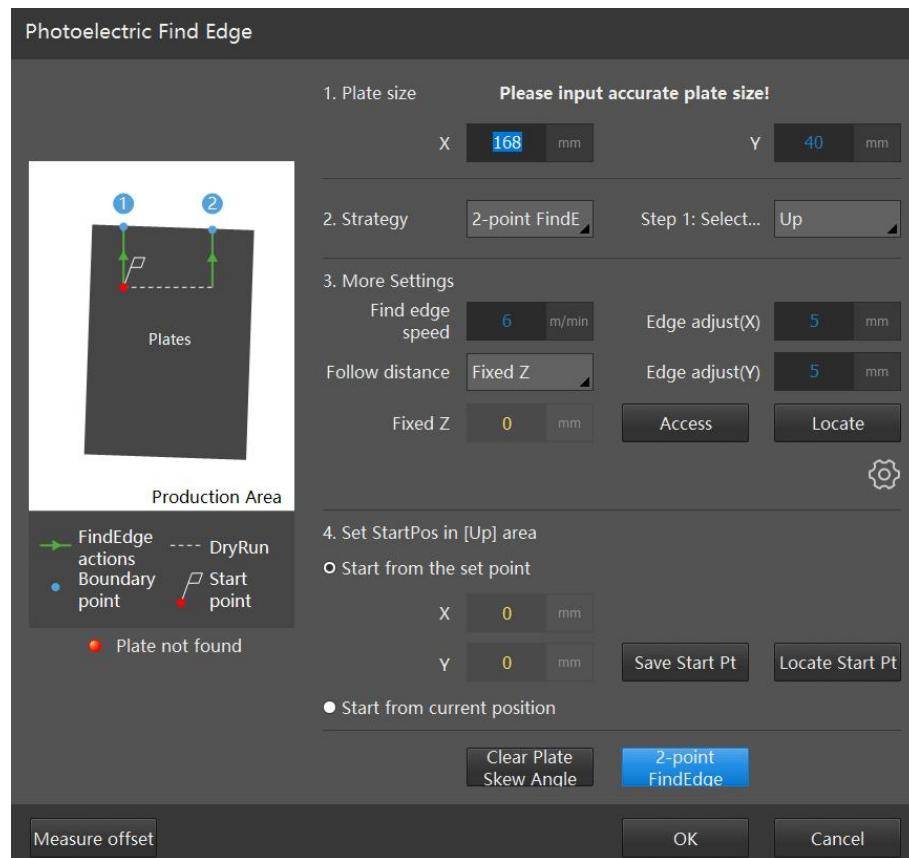


Figure 4-50 Photoelectric find edge interface

Click **Measure offset** on the function page to measure the offset between the photoelectric switch and the center of the cutting head nozzle. The procedure is as follows:

**Step 1** Move the cutting head inside the plate, click **Burst**, then click **Mark** to record the laser burst position.

**Step 2** Move the red light of the photoelectric switch to the marked position, and click **Calculate error** to measure the offset value.

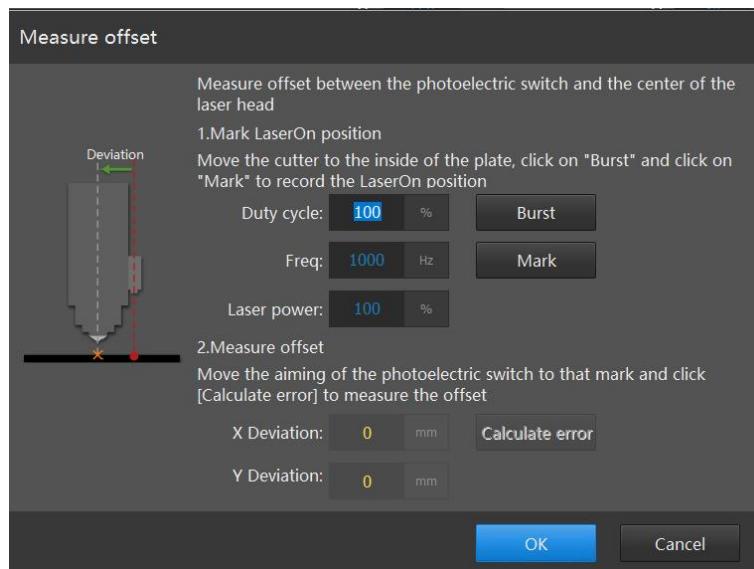


Figure 4-51 Measure offset

**Step 3** After the error measurement, proceed with the standard edge-finding settings. For **Follow distance**, you can choose either **Fixed Z** or **Current Height**.

If an abnormal loss of skew angle occurs before the plate is fully processed, the skew angle can be set manually without performing a new edge-finding operation. When manually set, both **Direction** and **Angle** parameters must be configured.

The historical edge-finding angle can be found in the log. A positive angle indicates counterclockwise rotation; a negative angle indicates clockwise rotation.

---

**⚠️ Notice:** The edge-finding angle cannot be set to 0°. If no edge-finding angle is required, click **Clear Plate Skew Angle**. This will restore the edge-finding angle after it has been automatically cleared. Restoring will overwrite the current angle, so please use with caution based on actual needs.

---

#### 4.4.5 Optical Find Edge

The function uses an optical camera system to automatically detect the plate edge, improving positioning accuracy. For detailed steps, please refer to [HypCut Optical Find Edge Function Manual](#).

#### 4.5 Quick CutOff

Defaults to apply the current drawing's technique parameters to cut off the plate quickly. This function can be assigned via the WKB Wireless Remoter, with the parameter settings identical to those in the software's *Quick CutOff* interface.

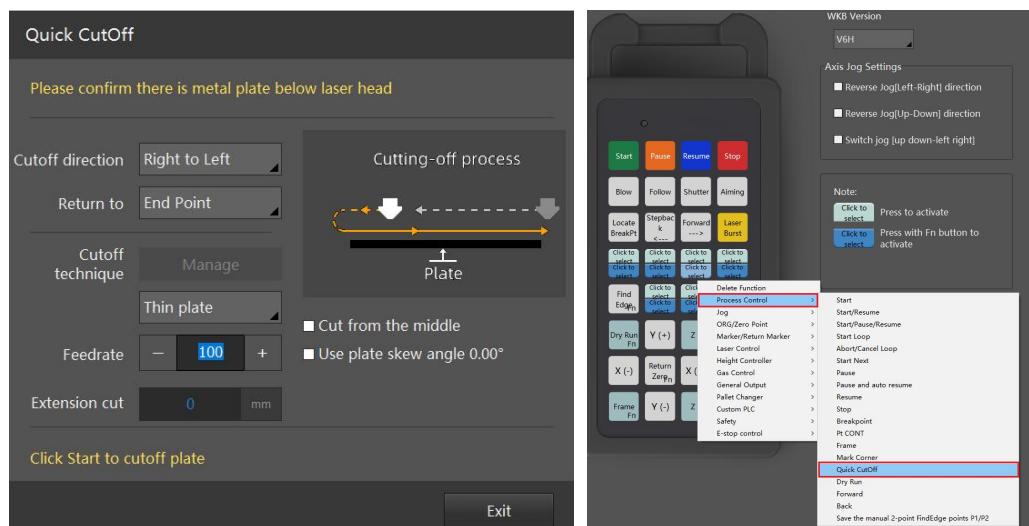


Figure 4-52 Quick cutoff

- Cutting technique: Defines the technique used for executing a quick cutoff.
  - In the **Batch Production** mode, the cutting technique defaults to the large contour's machining parameters defined in batch production. Still, you can select any entry in the technique library for quick cutoff.
  - In the **Flexible Production** mode and **Debug** module, the default is the large contour's machining technique.
- Thick/Thin plate
  - In the **Batch Production** mode, the thick or thin plate is determined by the thickness in the selected technique parameters. Thin plate: thickness  $\leq$  4 mm; thick plate: thickness  $\geq$  4 mm.

- In the **Flexible Production** mode, the thin or thick plate type must be selected manually.

---

**⚠️ Notice:** Since thin plate edges are prone to warping, the **Quick Cutoff** function applies special handling for thin plates. The first 10 mm is cut with a fixed height, where the fixed height equals the cutting height.

---

- Feedrate: Adjusts the machining speed during quick cutoff in real time. Adjustment range: 0% to 120%.
- Extension cut: Ensures complete separation by extending the cut beyond the plate edge, especially when the plate's cut surface is not perpendicular. Ensure there is no plate under the cutting head.

## 4.6 Monitor

After completing the Monitor configuration via **Config Tool** → **Advanced** → **Monitor**, enter the **Production** module. The monitoring interface will automatically appear, and you can right-click the monitoring area to open the **Parameter Setting** window. In the settings window, click **Pedestrian Detection**, configure the correct **Account**, **Password**, and **IP**, then click **Ensure** to display the monitoring video.

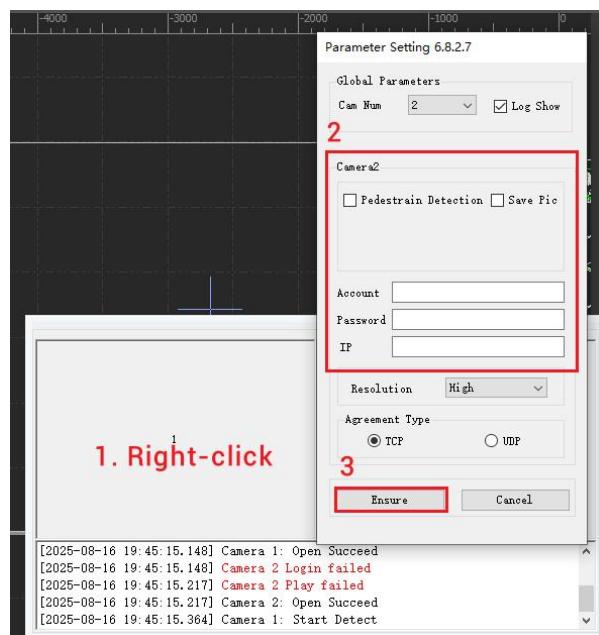


Figure 4-53 Monitoring parameter settings

When a person is detected in the monitoring area, the software will issue an alarm.

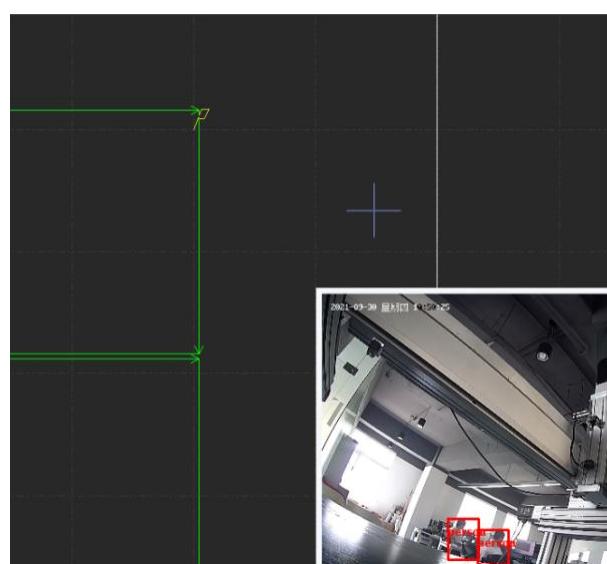


Figure 4-54 Monitoring alarm

In the *Config Tool* → *Alarm* screen, you can set the *Max travel speed in safety mode*. To quickly activate *Safety Mode*, you can customize a button to *Safety Mode* in the *Config Tool* → *Remote Control* screen.

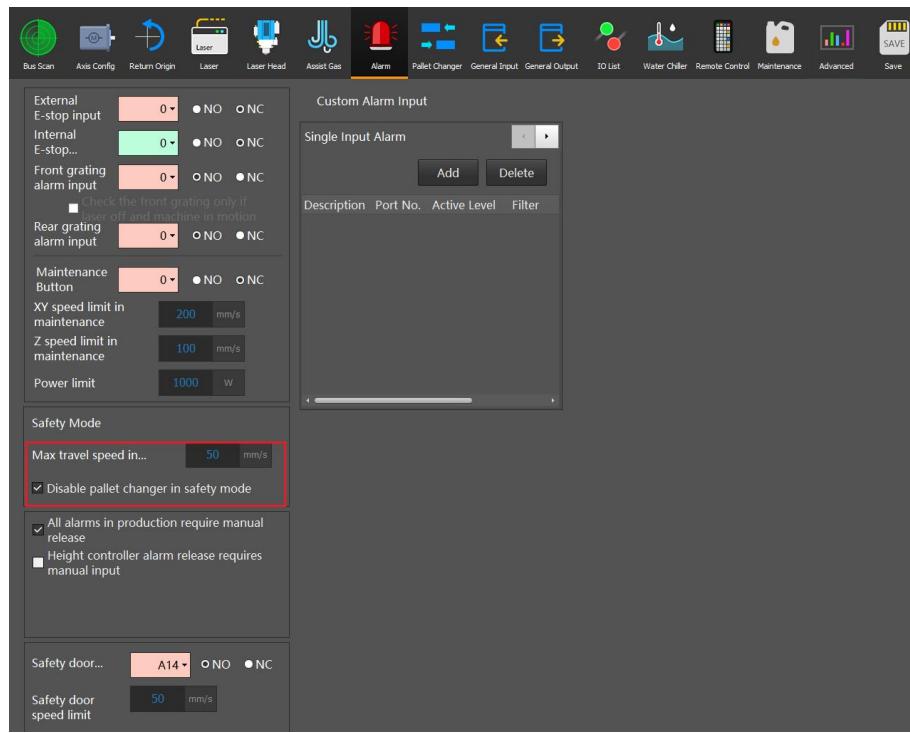


Figure 4-55 Config tool - alarm - safety mode

- When camera-based pedestrian detection is enabled: If the camera detects personnel entering the machining area, the system will issue a warning indicating "Personnel detected, safe mode activated". When the personnel leaves the machining area, the software will exit *Safety Mode*. In *Safety Mode*, the maximum travel speed for the next toolpath is limited to the value specified in *Max travel speed in safety mode*.
- When controlled via the WKB Wireless Remoter: Press the *Safety Mode (Self-Lock)* button will activate *Safety Mode*, and the software will display a warning indicating "Safe mode activated". Press the button again to exit the mode. In the *Safety Mode*, the maximum travel speed for the next toolpath is limited to the value specified in *Max travel speed in safety mode*.
- When both Wireless Remoter's safety mode is on and the camera detects personnel: The software will issue a warning indicating "Personnel detected, safe mode activated". The software will only exit the safety mode when the camera detects no personnel and the Wireless Remoter's safety mode is disabled.

## 4.7 Cut Off Guide

When the machine is stopped, navigate to *Auxiliary* → *Cut Off Guide* under the *Flexible Production* mode. By selecting points directly on the plate, a cutoff line can be generated, which will then be cut. *Cutoff Tech* always uses the large contour's technique under the *Flexible Production* mode. *Start Cutoff* can only be executed when the software is free of alarms.

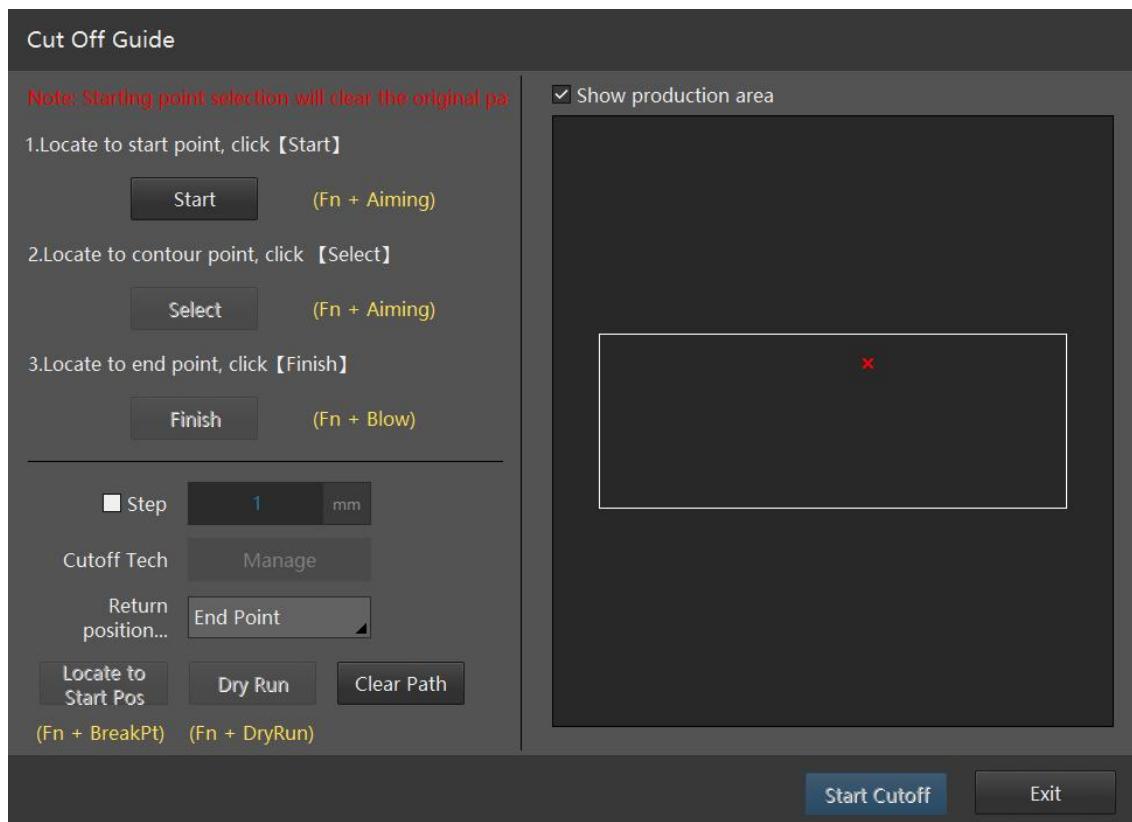


Figure 4-56 Cut off guide

## 4.8 Gas Calibration (For BLT Cutting Heads)

Calibrates the DA proportional valve's voltage-to-pressure curve for precise gas control.

Once calibration is successful, the results are automatically saved. Afterwards, you can click **Read Calibration** to acquire the calibration data, no need to recalibrate when changing nozzles.

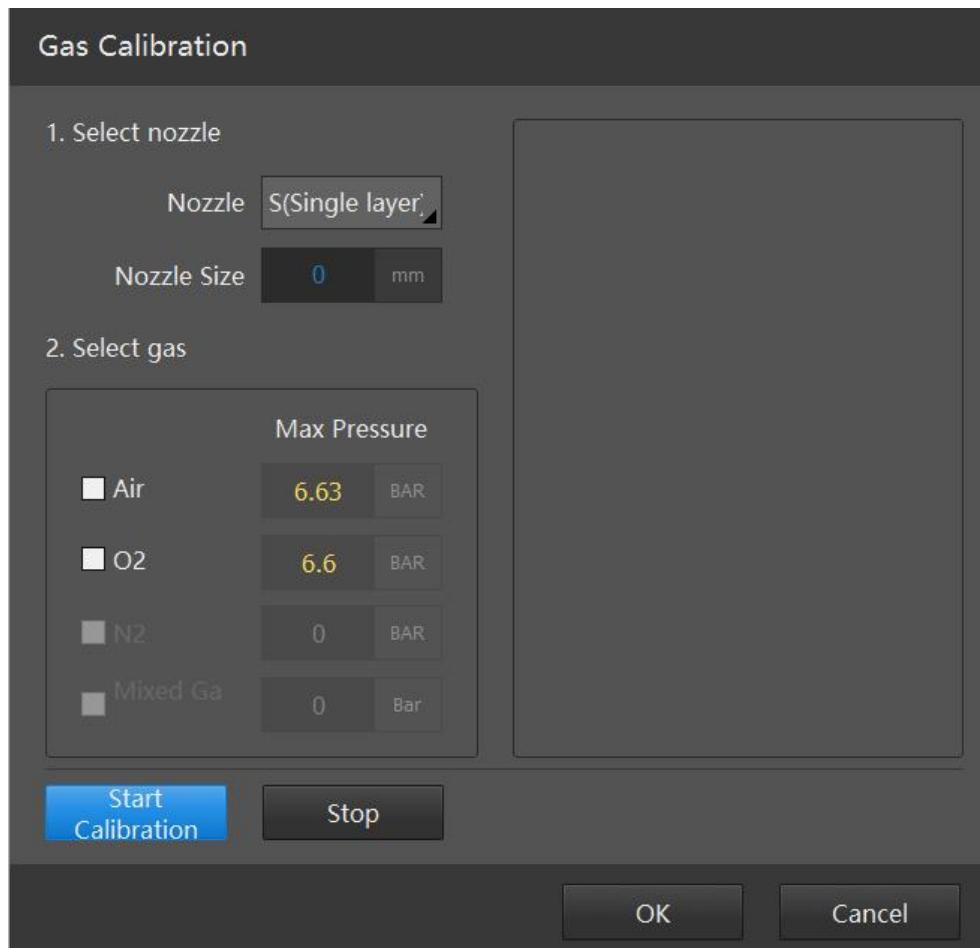


Figure 4-57 Gas calibration

The calibration procedure is as follows:

**Step 1** Ensure that the gas configuration is correct and that the gas to be calibrated is equipped with a DA proportional valve.

**Step 2** Select the current nozzle type and size.

**Step 3** Select the gas type to be corrected.

**Step 4** Click **Start Calibration**. Once the calibration process is completed, the result will be displayed on the right.

## 4.9 Jog Laser Shot

When *Jog Laser Shot* is enabled, the cutting head will follow to a position above the plate surface during jogging, emitting laser and gas for cutting. No piercing operation will be performed during *Jog Laser Shot*.

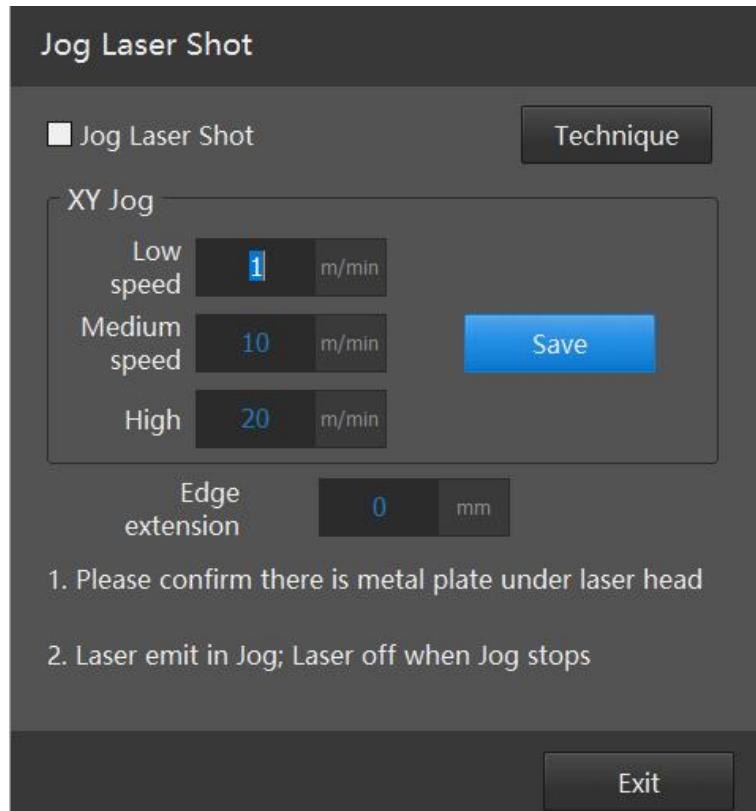


Figure 4-58 Jog laser shot

---

**⚠️Notice:** Ensure that there is a plate beneath the cutting head for proper following when using *Jog Laser Shot*.

---

## 4.10 Manual Lubricate

In both *Flexible Production* and *Batch Production* modes, when the machining system is free of alarms and in pause or stop status, **Manual Lubricate** is available in the **Auxiliary** drop-down menu. This feature is used for lubricating a specified range of the machine.

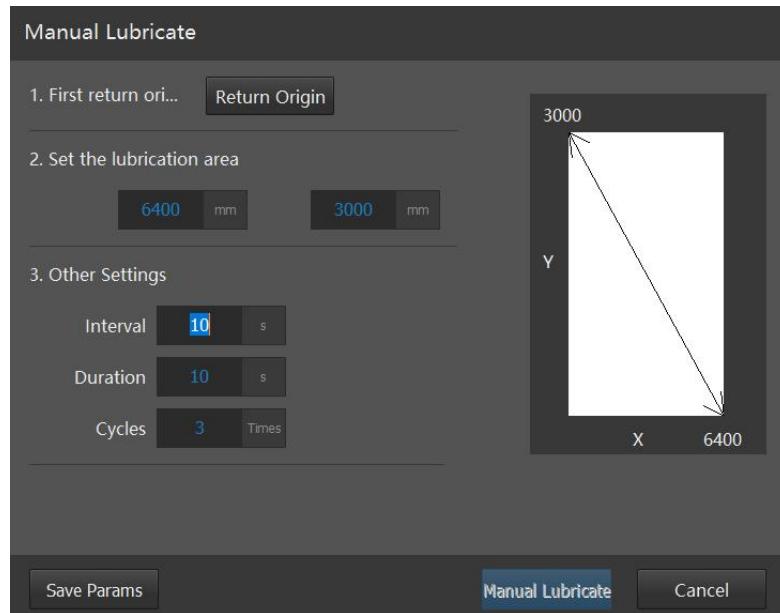


Figure 4-59 Manual lubrication

- **Return Origin:** Moves at travel speed to the machine coordinate (0, 0).
- **Lubrication area (X/Y):** The working area for lubrication relative to the machine stroke. The default is 80% of the stroke range.
- **Interval:** Sets the time interval between the end of each lubrication cycle and the next.
- **Duration:** Sets the time from the start to the end of each lubrication cycle.
- **Cycles:** Sets the number of back-and-forth passes within the lubrication area. One back-and-forth pass counts as one cycle.

---

 **Notice:**

1. Performing **Manual Lubricate** will reset the accumulated lubrication time and distance counters for **Automatic Lubricate**.
2. For steel plates, the maximum allowable tilt should NOT exceed 10°.
3. Upon entering the interface, the laser, shutter, and gas supply will be turned off. Exiting

the interface is not allowed during movement.

## 4.11 Clean Nozzle

Check *Enable auto clean nozzle* via *Config Tool* → *Advanced* → *Nozzle Maintenance*.

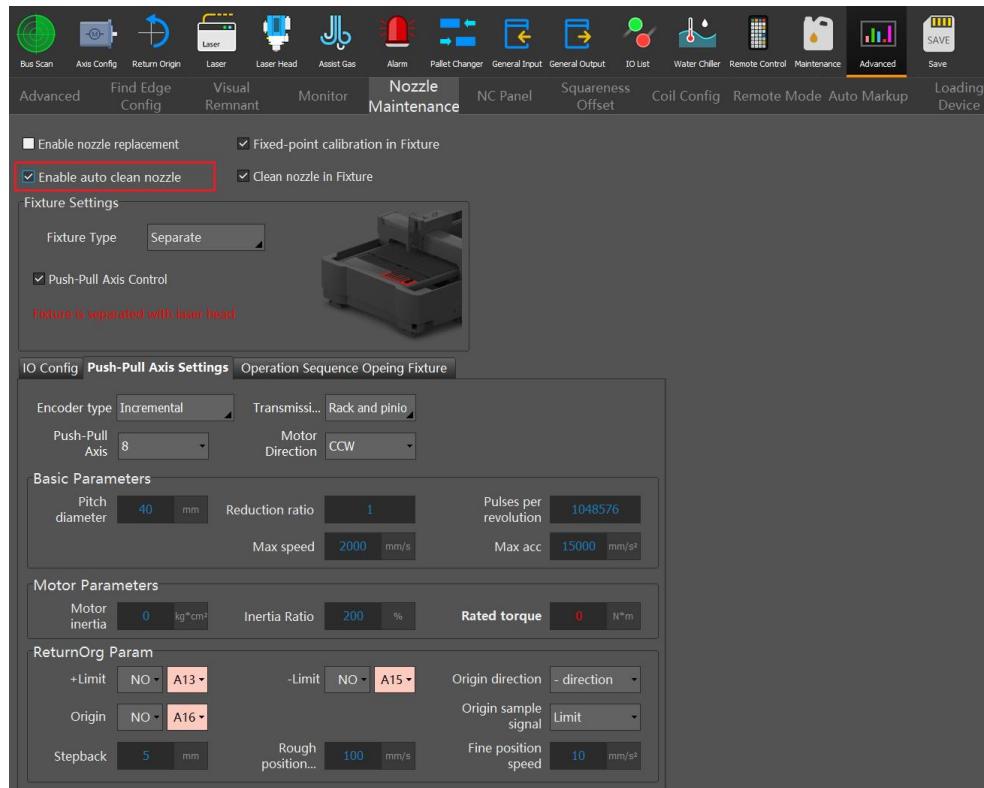


Figure 4-60 Enable auto clean nozzle

Select the fixture type according to the actual configuration. If the nozzle fixture is located outside the machine's working area, select **Separate** and configure the corresponding I/O for the fixture. If you are using the BNR240 Automatic Nozzle Changer, select **BOCHU nozzle replacement fixture** directly.

After saving the configuration, navigate to **Production** → **Auxiliary** → **Auto Nozzle**, click **Clean Nozzle**. This function uses a brush, in combination with nozzle movement and blowing, to remove metal slag from inside the nozzle.

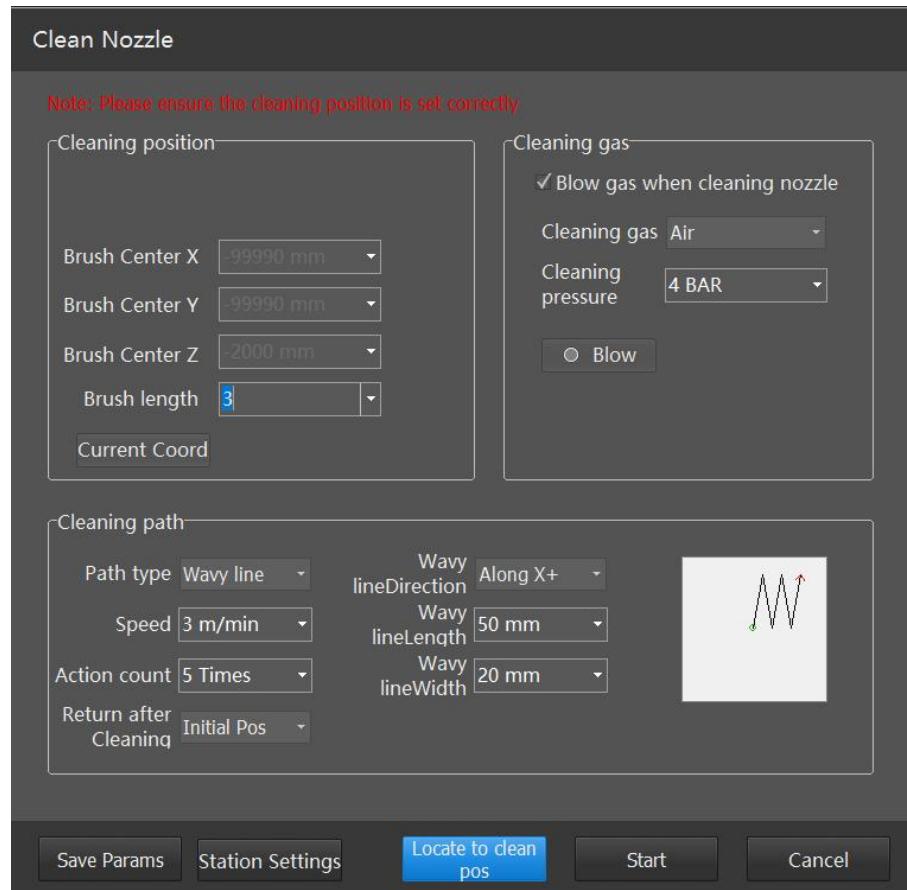


Figure 4-61 Clean nozzle

The brush center is defined as the **Cleaning position**. Cleaning can only be performed when the cutting head is positioned at the **Cleaning position**, otherwise, the software will issue a prompt indicating not positioned at the specified location. During cleaning, the nozzle will move from **Brush Center Z** + 20 mm down to **Brush Center Z** - (**Brush length** ÷ 2). Therefore, you should configure these parameters carefully.

In the **Clean Nozzle** interface, both the control panel and the WKB Wireless Remoter respond only to the blow, stop, and jog buttons. While the interface is opened or during cleaning, the cutting head can be jogged into the **Maintenance Area**. Clicking **Save Params**, **Locate to clean pos**, or **Start** will save all parameters set in the **Clean Nozzle** interface.

In the three path-type diagrams, green indicates the cleaning position (start point); red indicates the end point. When setting the path type and direction, ensure the maintenance motion does not exceed the machine's travel range.

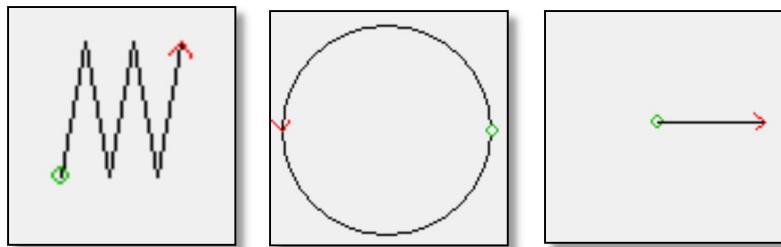


Figure 4-62 Cleaning path types

## 4.12 Replace Nozzle

On the *Config Tool* → *Advanced* → *Nozzle Maintenance* page, check *Enable nozzle replacement* to activate the related nozzle functions in the software.

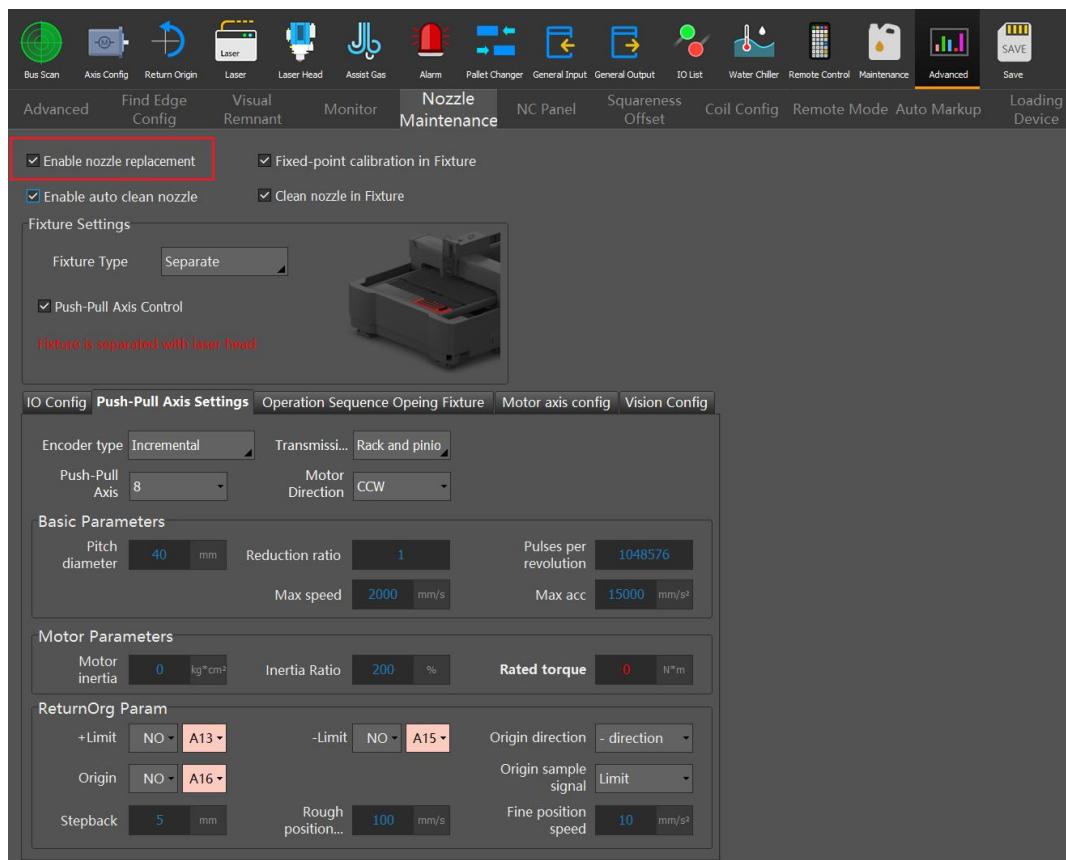


Figure 4-63 Enable nozzle replacement

- **Push-Pull Axis Control:** If the fixture is equipped with a push-in/pull-out mechanism, enable this option to control the push/pull of the nozzle drawer.

- Fixed-point calibration in Fixture: When enabled, the same fixture is shared for both nozzle replacement and calibration.
- Clean nozzle in Fixture: When enabled, the same fixture is shared for both nozzle replacement and cleaning.



Figure 4-64 Replace/Clean nozzle

The **IO Config** parameters are described as follows.

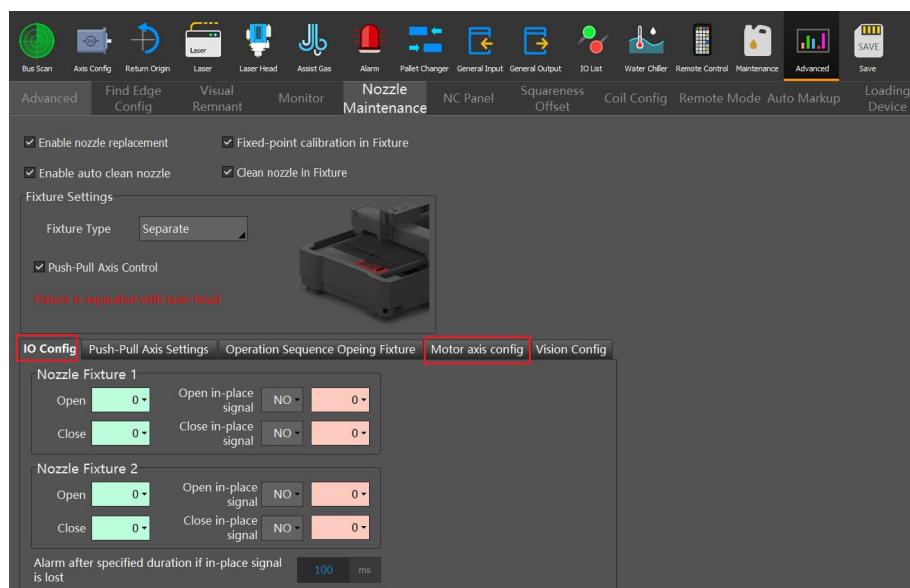


Figure 4-65 IO configuration

- Open/Close: Configures the I/O ports to control the opening or closing of the fixture.
- Open/Close in-place signal: When the signal is active, the software considers the fixture fully opened or closed.
- Motor axis config: Configures parameters for the motor controlling nozzle rotation. If **Push-Pull Axis Control** is enabled, **Push-Pull Axis Settings** should also be configured.

Click **Auto Nozzle** via **Production** → **Auxiliary** → **Auto Nozzle**. Select a trigger mode and set

a threshold for nozzle cleaning.

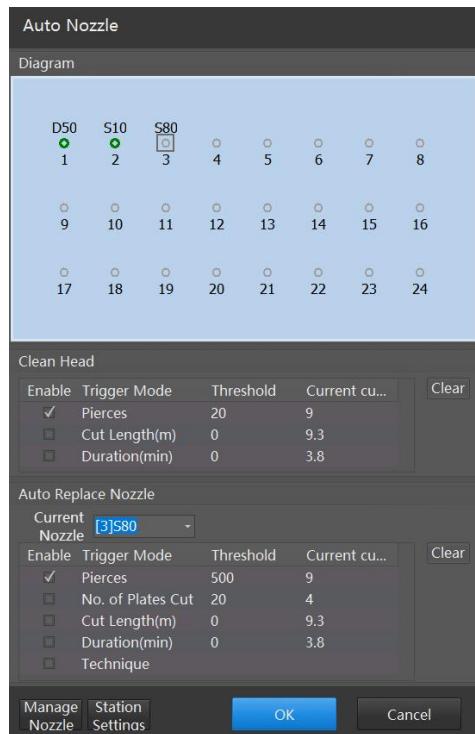


Figure 4-66 Auto nozzle

- **Technique:** When replacing a nozzle, the software will first select the nozzle specified by the current technique. If the nozzle is modified in the technique and the nozzle library contains the specified nozzle, the software will automatically pause at the start of the next job and proceed to replace it.
- **Trigger Mode:** Supports piercing count, cut plate count, cut length, duration, and technique as trigger conditions. When the counter reaches the set threshold, nozzle replacement/cleaning starts.
- **Threshold:** Defines the fatigue threshold of the nozzle. When the fatigue value exceeds this limit, the software considers the nozzle worn and activates the automatic cleaning/replacement.

Click **Nozzle Manage**. You can perform nozzle management, including adding or deleting a nozzle. Click **Add Nozzle** to add a new one. Enter the station ID, nozzle type, and diameter. Nozzle names are generated automatically based on type and diameter (type + diameter  $\times$  10) and cannot be modified.

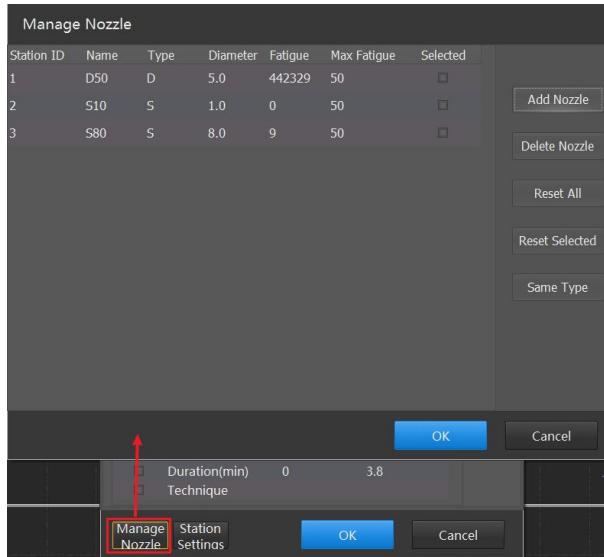


Figure 4-67 Nozzle management

In the **Auto Nozzle** screen, click **Station Settings** to configure the number of nozzle stations and related motion parameters for the motor axes. The **Station Settings** panel contains the following tabs: **Control**, **Locate**, and **Settings**, which are described below.

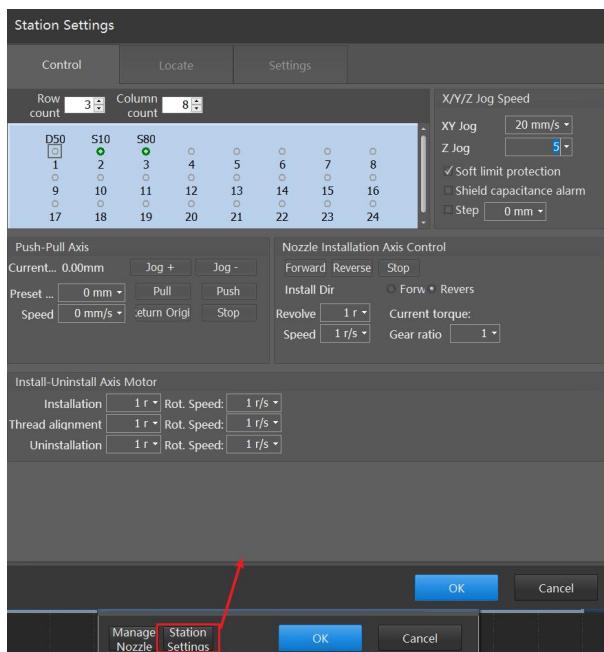


Figure 4-68 Station setting - control

The main parameters of the **Station Setting** → **Control** page are described below:

- Push-Pull Axis: Allows manual control of pushing, pulling, and origin returning of the nozzle drawer. You can set the distance and speed for each movement.
- Nozzle Installation Axis Control: Used for testing the number of revolutions and speed required for nozzle installation and uninstallation. Here, **Revolve** refers to the rotation of the nozzle station, not the motor. With a **Gear ratio** of n, each motor revolution results in n station revolutions. The **Revolve** and **Speed** set here are for testing purposes only; in production, the parameters are sourced from the **Install-Uninstall Axis Motor**. **Gear ratio** and **Install Dir** are parameters used in both testing and production.
- Install-Uninstall Axis Motor: Configures the number of rotations and speed for installation, uninstallation, and thread alignment. Thread alignment refers to the process where, during installation, due to wear at the nozzle station, the threads of the ceramic body and the nozzle may not be perfectly aligned vertically—there can be a deviation of about 1°. In such cases, the nozzle cannot be directly screwed into the cutting head. After initial contact, the motor reverses for a short distance to align the threads, allowing smooth installation.

The parameters in the **Locate** tab are described below.

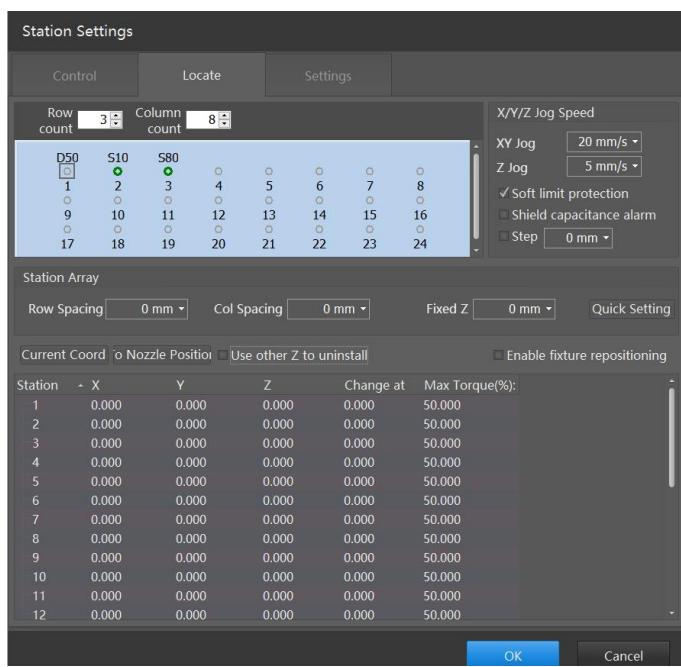


Figure 4-69 Station settings - locate

- Max Torque: The rotation stops once the set torque is reached (unit: %).
- Use other Z to uninstall: Prevents position deviation during nozzle installation by using two different Z-axis coordinates for installation and uninstallation.

- Quick Setting: Sets the coordinates for a nozzle station array starting from the current position as Station 1, with both X and Y growing in the positive direction.

The parameters in the **Settings** tab are described below.

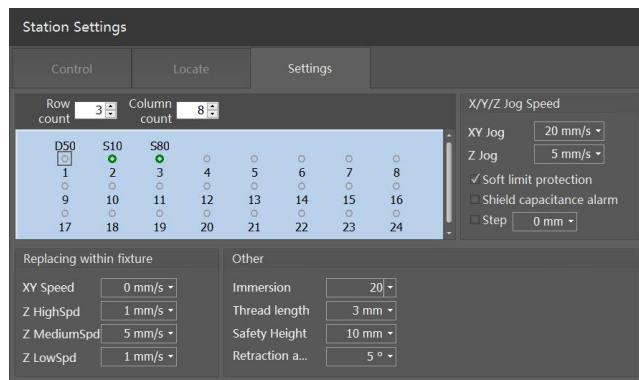


Figure 4-70 Station settings - settings

- XY Speed: Sets the movement speed of the X/Y axes after entering the fixture.
- Z HighSpd: Sets the high speed used before reaching the set **Safety Height**.
- Z MediumSpd: Used after reaching the **Safety Height** and before reaching the **Thread length**.
- Z LowSpd: Used after reaching the **Thread length**.
- Thread length: The vertical distance (up or down) when rotating the nozzle to engage/disengage the threads.
- Retraction angle after installation: A small reverse rotation applied after installation to prevent the fixture from being driven by friction when the cutting head moves upward.

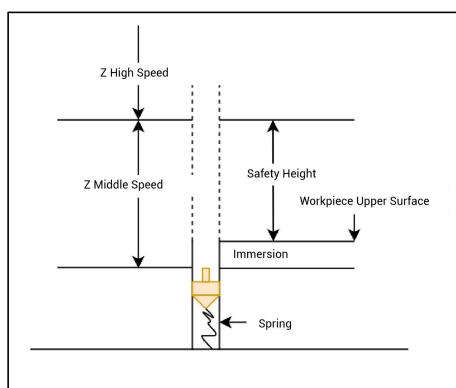


Figure 4-71 Replacing within the fixture (speed and height) diagram

## 4.13 Border Contour

Generates one or more border contours around the maximum outer contour of the part. Two functions are provided: *Create Border Contour* and *Clear Border Contour*.

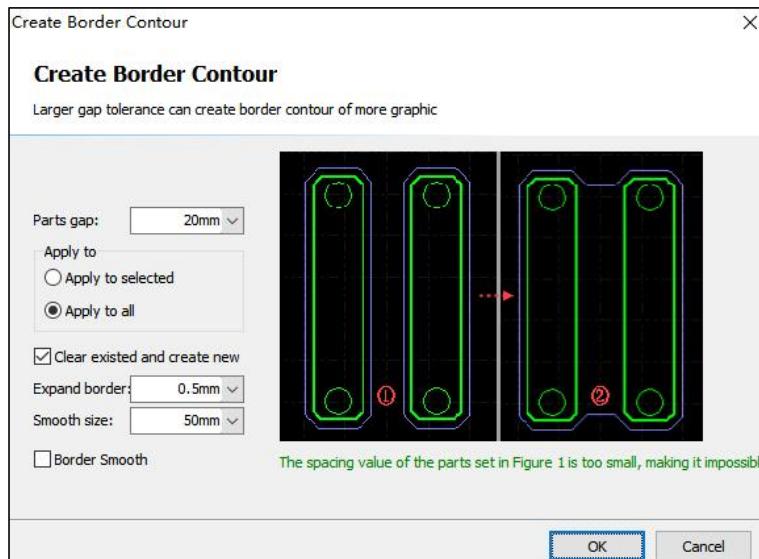


Figure 4-72 Create border contour

- **Create Border Contour:** Creates an outer border contour based on the part geometry. The larger the *Parts gap* between parts, the larger the area included in the border contour.
- **Clear Border Contour:** Removes any existing border contour from the current drawing.

## 4.14 Cycle Production

Used for continuous processing in combination with the pallet changer. If **Auto change pallet after production** is enabled, the pallets will be automatically exchanged after each processing cycle. This function requires a high-low table, a hydraulic lift table, or a dual pallet changer configured with a hardware enable signal.

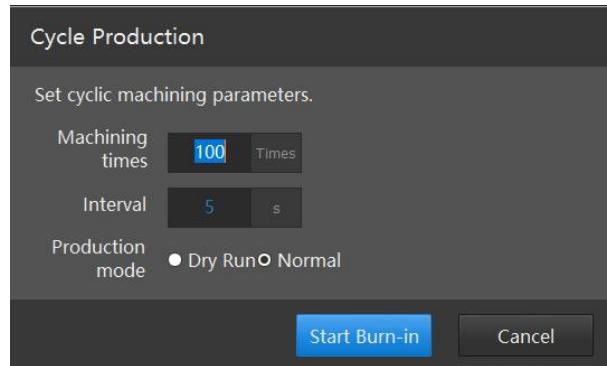


Figure 4-73 Cycle production

## 4.15 Mark Corner

The **Mark Corner** function works similarly to **Frame** and is used to determine whether the machining graphics are within the plate. This function can only be used when stopped. Especially when processing large plates, this function eliminates the need to visually check the **Aiming** to confirm the graphic's position on the plate. You only need to observe whether the laser is emitted on the plate during marking.

Go to **Production** → **Auxiliary** → **Mark Corner**. After setting the marking parameters on the function page, click **Start Test**. The system will emit laser at the four corners of the graphic's bounding rectangle, creating four "L"-shaped corner marks.

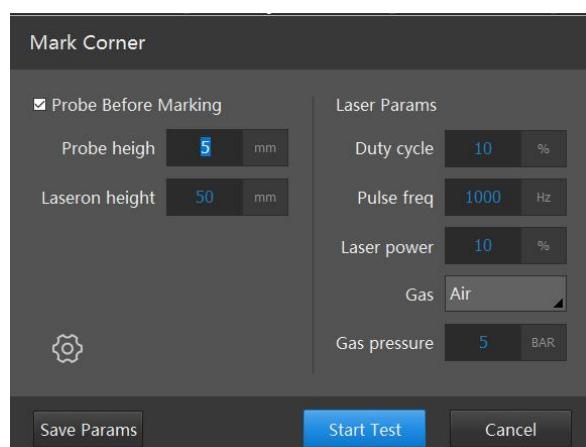


Figure 4-74 Mark corner

## 4.16 Unloading Position

Used in combination with the pallet changer. Before pallet exchange, the cutting head will first move to the configured unloading coordinates.

Before using this function, you need to check *Enable unloading position* via *Config Tool* → *Advanced* → *Advanced*. After saving the changes, return the user interface and navigate to *Production* → *Auxiliary* → *Unloading Position*.

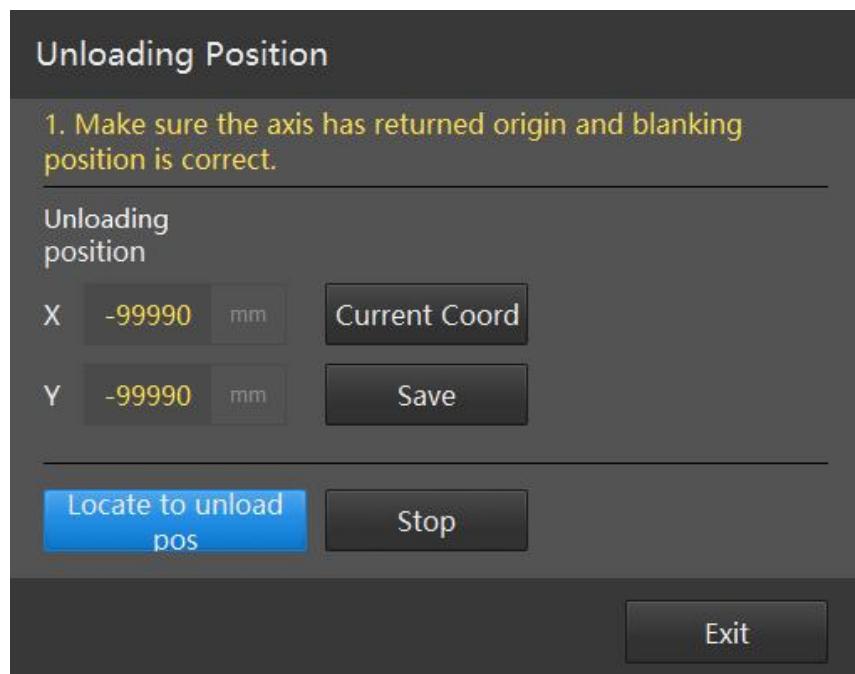


Figure 4-75 Unloading position

## 4.17 Maintenance Area

The maintenance area is usually set at the front of the machine for easy access to the cutting head. It is used for operations such as laser centering and nozzle replacement. This function must first be enabled in *Config Tool* → *Advanced* → *Advanced*.

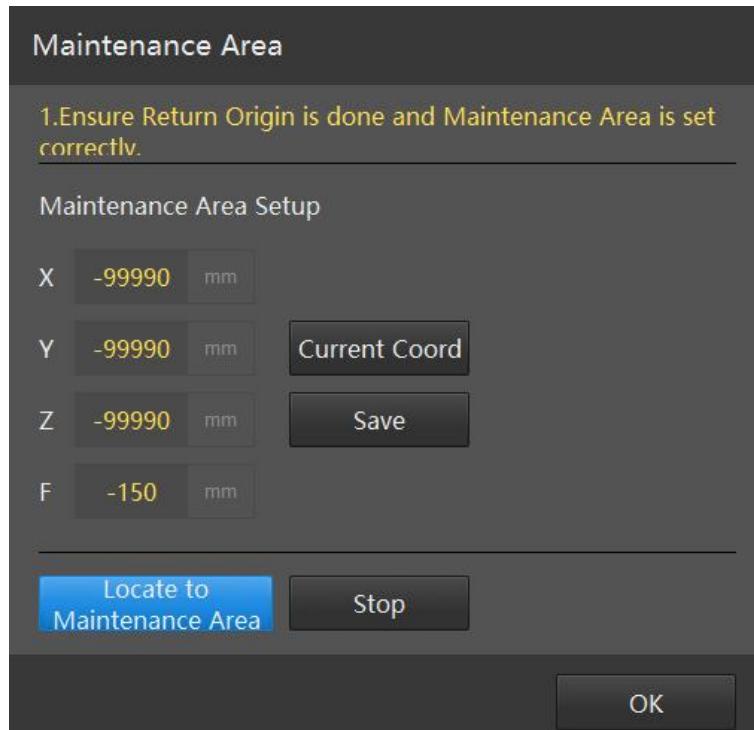


Figure 4-76 Maintenance area

## 4.18 Record Out-Plate Height

The *Record Out-Plate Height* function is used to record a Z-axis coordinate. When *Out-plate follow* is selected for the *Mode* on the *Technique* page, the recorded Z value will be used as the Z-axis lower limit during following.

---

 **Caution:** The stored *Record Out-Plate Height* can be affected by the *Cutoff Line* function. Once *Cutoff Line* has been executed, the recorded out-plate height will be overwritten with the height recorded during *Cutoff Line*.

---

## 4.19 Multi-Task Production

In *Production* → *Auxiliary*, select *Multi-Task Production* to configure the *Station Mode*, *Production mode*, and *Switch File*.

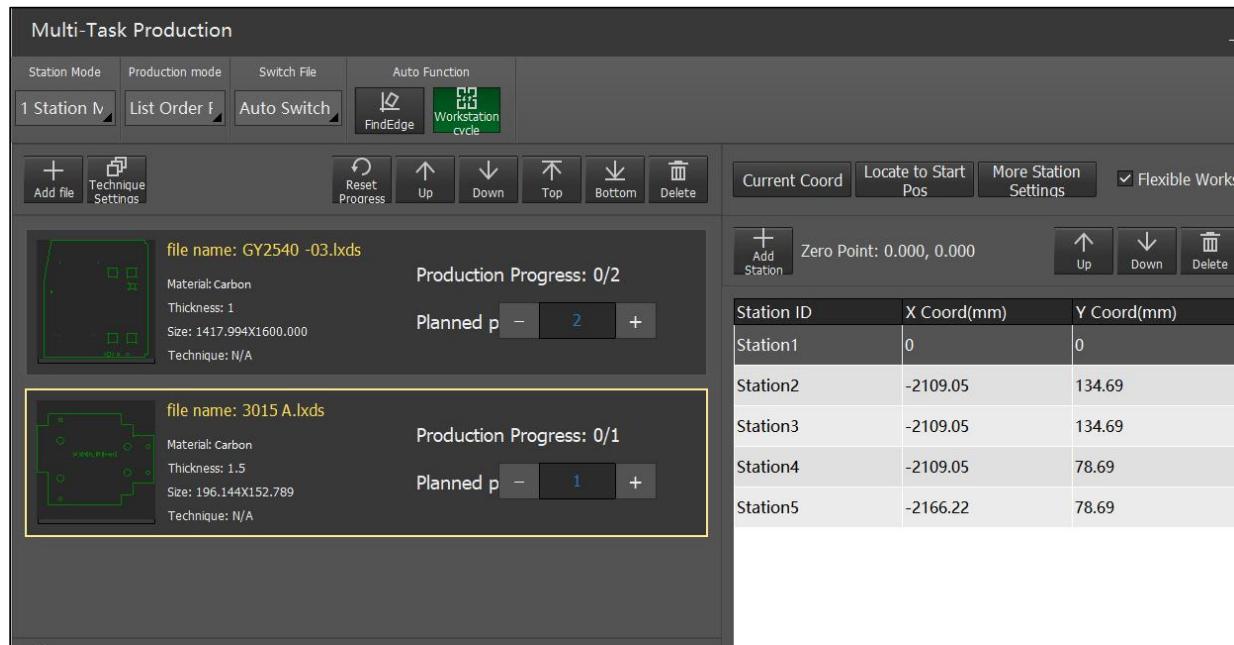


Figure 4-77 Multi-task production

- **1 Station - 1 Plate:** Single station machining.
- **1 Station Multi-Plate:** Multi-station machining.
- **Single Time Production:** Stops machining after completing one run.
- **Single File Production:** Stops machining after reaching the planned quantity.
- **List Order Production:** After reaching the planned quantity for the current file, switch to the next file in the list until all files are processed.
- **Manual Switch:** Manually select the next file to process.
- **Auto Switch:** Automatically switch to the next file once the current file reaches its planned quantity.
- **Auto pallet changer:** Automatically exchanges the pallet after processing is completed (For **1 Station - 1 Plate** only).
- **FindEdge:** Performs edge-finding before cutting.

- Add file: Adds files to the processing list.
- Technique Settings: Defines technique parameters to the selected file.
- Flexible Workstation: Defines stations by specifying the station zero point.

This function also supports unified ***Zero Reference*** settings for all processing file by clicking the gear icon from the bottom-left corner of the ***Multi-Task Production*** interface. When ***1 Station Multi-Plate*** is enabled, jog the cutting head to set the zero point for each station, or enter the zero point directly. Batch modification of station zero points and the offset from the edge-finding start point to the zero point is also supported via ***More Station Settings***.

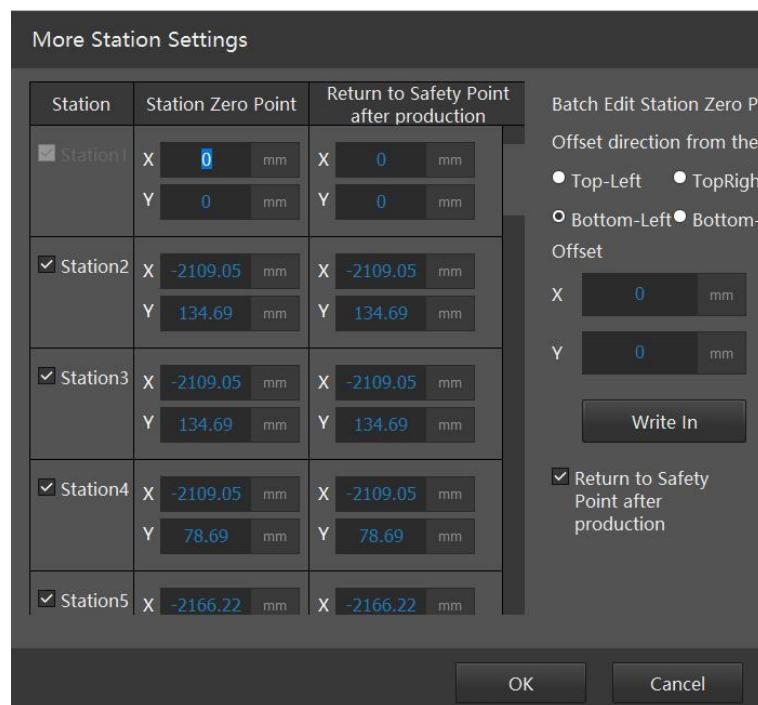


Figure 4-78 Station settings

## 4.20 Remnant Position

After importing a remnant file from CypNest, navigate to **Production** → **Auxiliary** → **Remnant Position**.

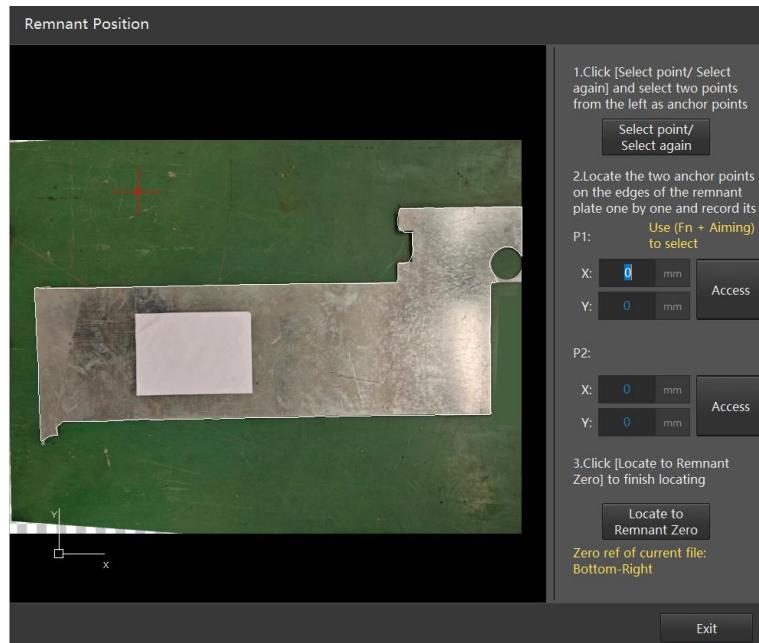


Figure 4-79 Remnant position

The steps for remnant positioning are as follows:

**Step 1** Select two points on the remnant image as anchor points.

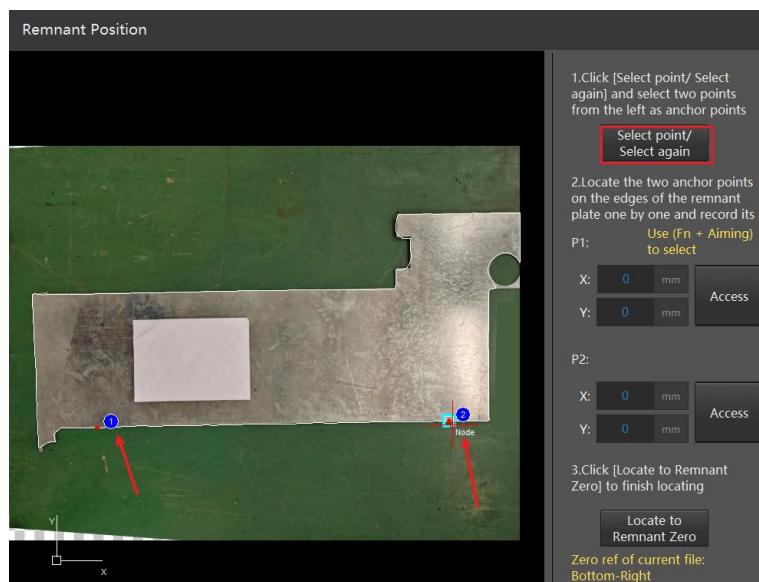


Figure 4-80 Point selection

**Step 2** Sequentially jog the cutting head to the two selected points on the remnant and record their machine coordinates.

**Step 3** Click *Locate to Remnant Zero*, and the cutting head will move to the zero point of the remnant.

## 4.21 External Powder Marking

Enable *External marking device* via *Config Tool* → *Advanced* → *Advanced*.

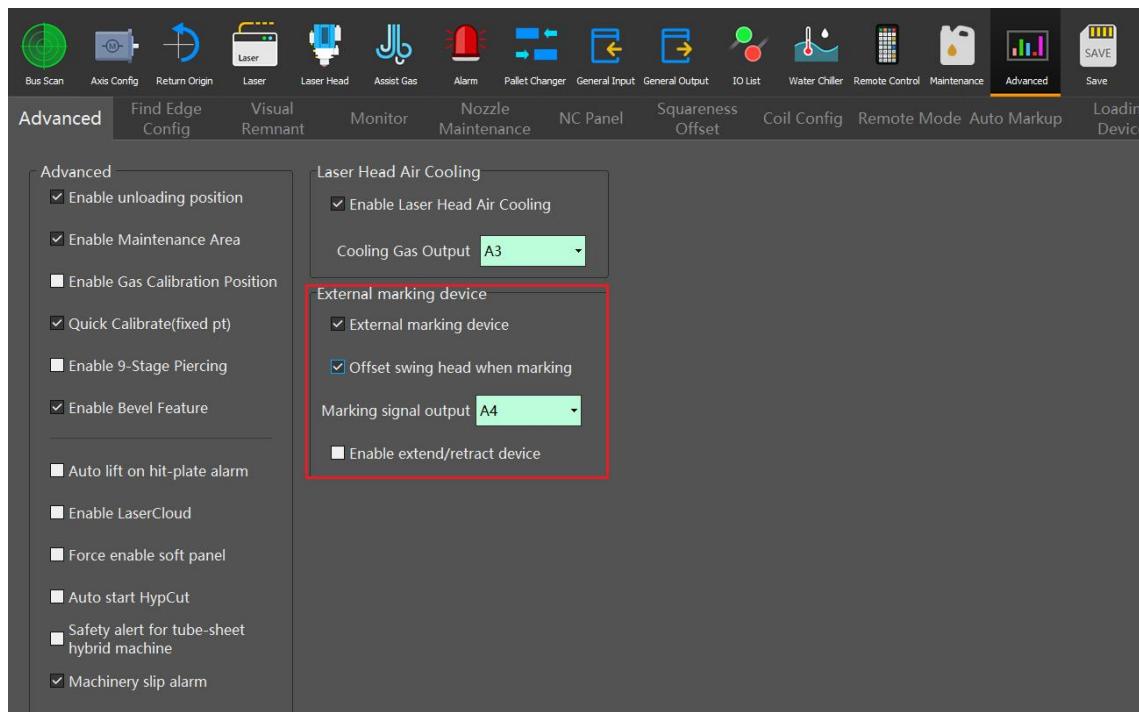


Figure 4-81 External marking device

Before use, the external marking device must be calibrated to obtain the positional offset between the powder head and the cutting head. The procedure is as follows:

**Step 1** Jog the Z-axis to a suitable height for powder bursting and ensure the sprayed mark is clear.

**Step 2** After powdering is complete, raise the cutting head. For single-swing devices, the head will also return to the centered position.

**Step 3** Jog the cutting head to the powdered mark position, follow the plate with powered path, and click **Record Coordinate**. This records the offset between the powder head and the cutting head.

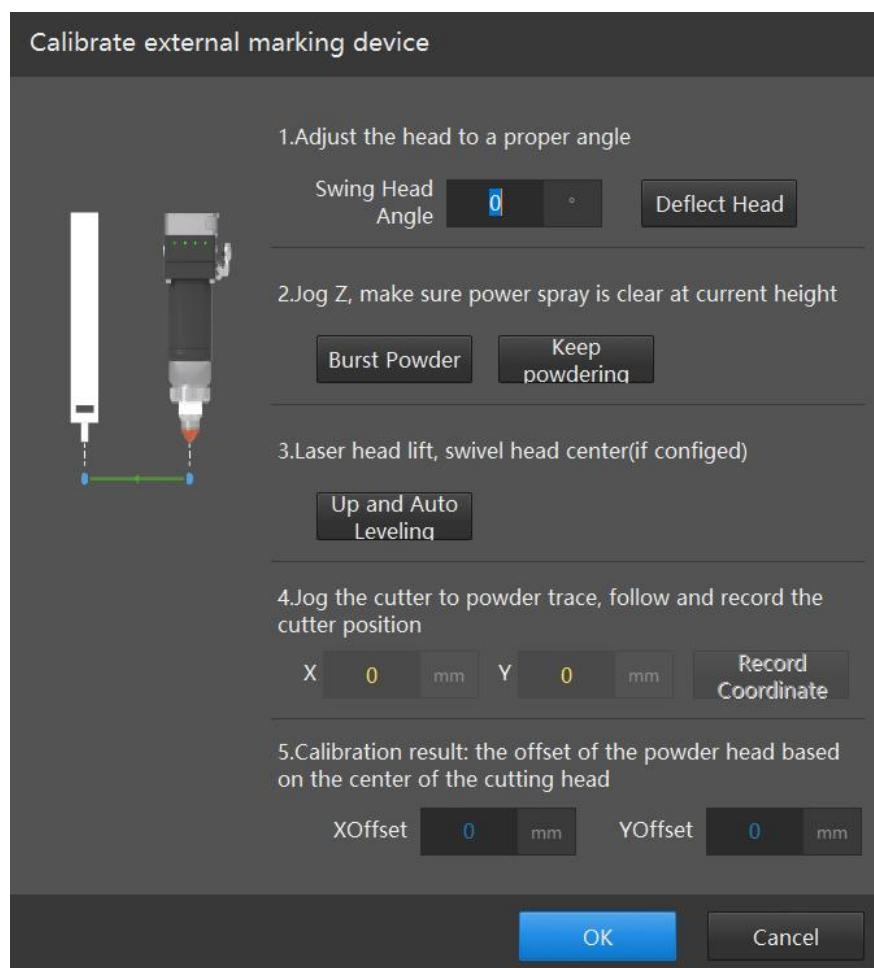


Figure 4-82 External marking device calibration

When using powder marking, select **Use external marking device** in the **Mark** technique layer. Once enabled, there is no need to set cutting parameters for the **Mark** layer. During calibration, coordinate recording must be performed with **Follow** enabled to determine the optimal powder bursting height for the gun head. This ensures adaptability for different plate thicknesses and varying distances between the spray head and plate surface.

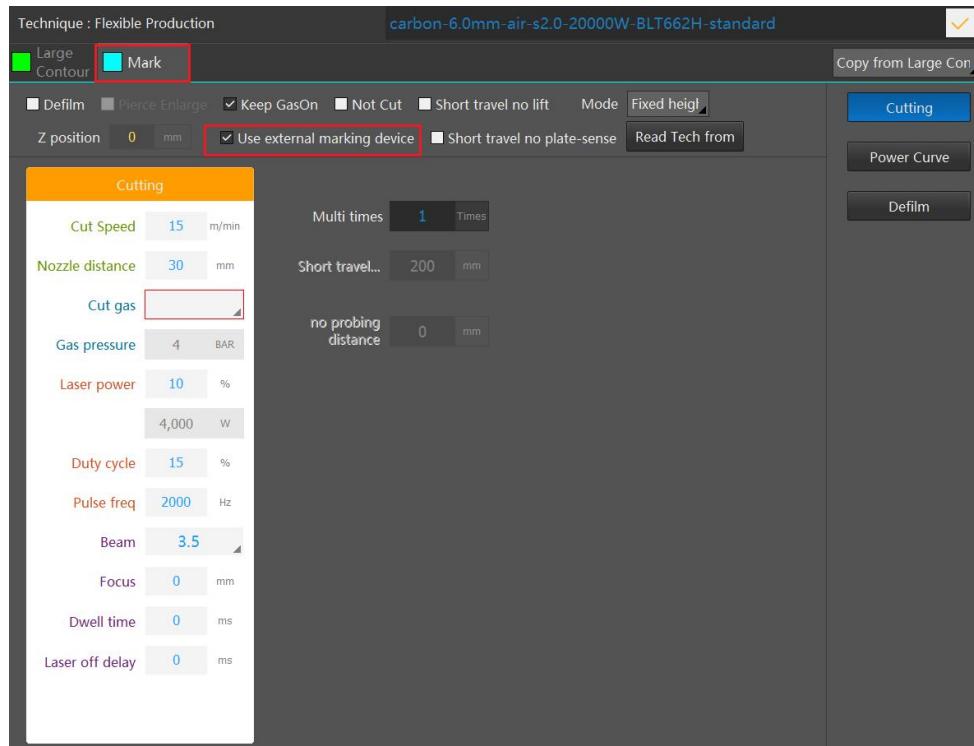


Figure 4-83 Use external marking device

- **Short travel no plate-sense:** When the start point of the next powder marking path is within the configured distance from the end point of the current path, the cutting head will not perform plate sensing at the next start point. For single-swing devices, the head will also not return to the centered position after finishing the current marking.
- **Dwell time:** When external marking device is enabled, the delay before starting powdering to allow the device to prepare, ensuring a clear start section.
- **Laser off delay:** When external marking device is enabled, set the delay before stopping marking to shut off powdering early, preventing excess marks at the end of the path.

## 4.22 Custom Menu Layout

By dragging the mouse or clicking *Up/Down*, you can customize the display order of functions on the main interface as needed.

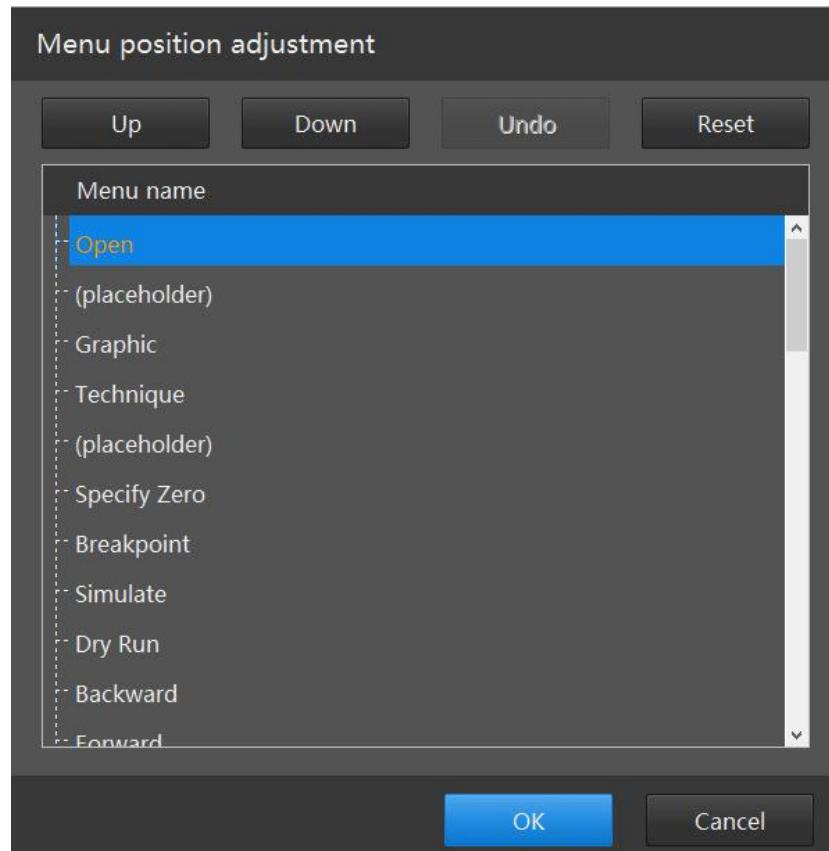


Figure 4-84 Custom menu layout

## 4.23 Countersink Technique

The countersink feature in HypCut allows for the efficient creation of countersink holes in multiple sizes. It automatically optimizes toolpaths and parameters, removing the need for secondary drilling and improving both speed and precision. For more details, refer to [HypCut Countersink Function Manual](#).

# Chapter 5 Debug

The **Debug** module supports multiple graphic operations and flexible positioned machining, enabling equipment manufacturers to quickly conduct technique tests and verify machine tool performance. You can also perform machining in this module, but only in the floating coordinate system. It includes essential drawing tools and graphic optimization options (same as [Graphic Operations](#)).

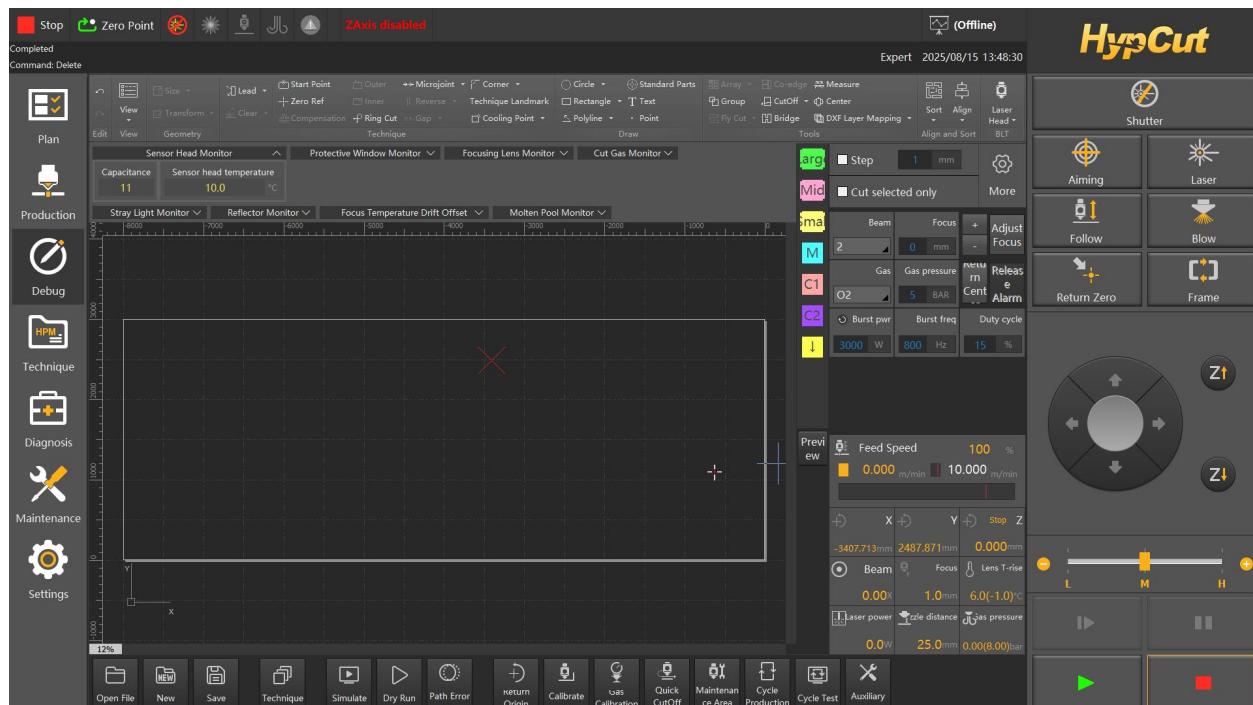


Figure 5-1 Debug interface

## 5.1 Machining and Dry Run

Click the **Start** button on the control panel to begin machining. During the machining for debugging, the monitoring data including coordinates, speed, machining time, and following will be displayed as follows.

When the monitoring data is displayed, the functions at top of the interface will be unavailable to prevent graphic changes during machining. To modify parameters, pause the machining first, then click **Technique** at the bottom of the interface.

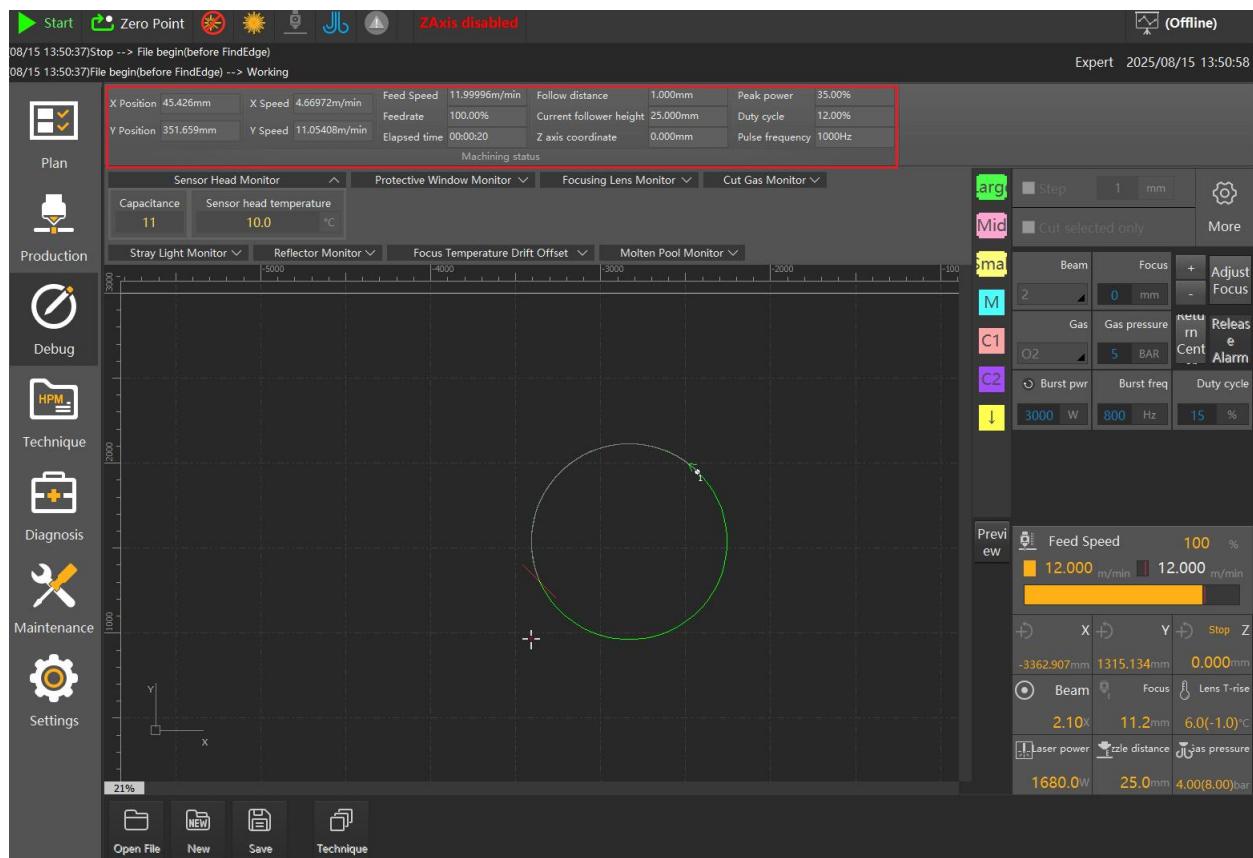


Figure 5-2 Monitoring data

## 5.2 Simulate

After graphic sorting is complete, you can use **Simulate** to fully simulate the processing of the entire file without the machine movement. The simulation not only shows the cutting order between different graphics but also the machining process within the graphic.

Click **Simulate**, and the simulation information bar appears at the top of the **Debug** interface. You can adjust the simulation speed as needed.

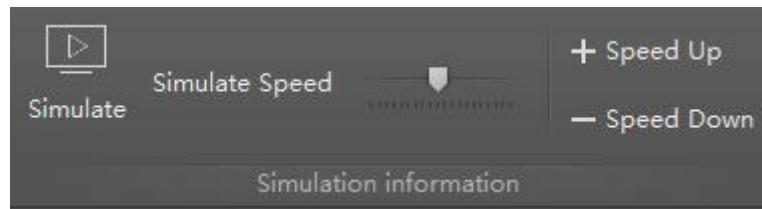


Figure 5-3 Simulation information bar

## 5.3 Path Error

Click **Path Error**, the cutting head will perform a dry run along the graphics to be machined. When finished, check the paths on the drawing board. The blue line indicates the actual path traced by the servo motors, which can be used to adjust the technique parameters required for the actual cutting. The following functions are included in the **Path Error** drop-down menu:

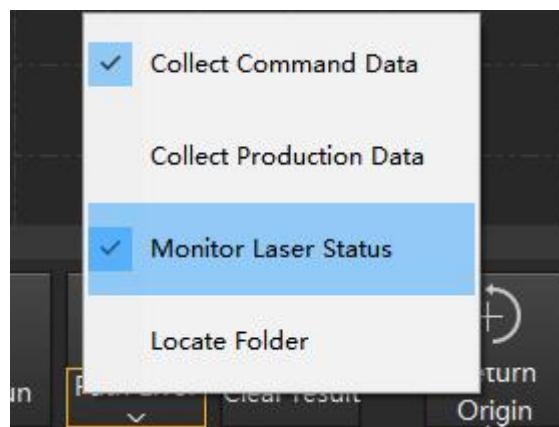


Figure 5-4 Path error drop-down menu

- **Collect Command Data:** Requires **Collect Production Data** to be simultaneously activated. When enabled, command feedback information for the processing path will be saved during the path error process.
- **Monitor Laser Status:** Detects whether the laser's on/off state is functioning correctly.

- Locate Folder: Opens the folder where the saved information is stored.

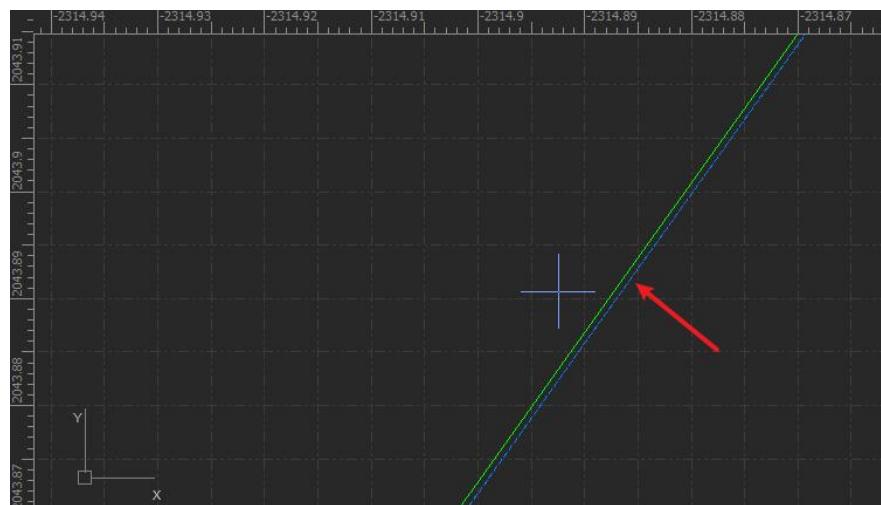


Figure 5-5 Path error example

**⚠️ Notice:** If the options mentioned above are not checked, the software will save the feedback information after performing **Path Error**. To delete the measurement results, click **Clear result**.

## 5.4 Laser Head Data (For BLT Cutting Heads)

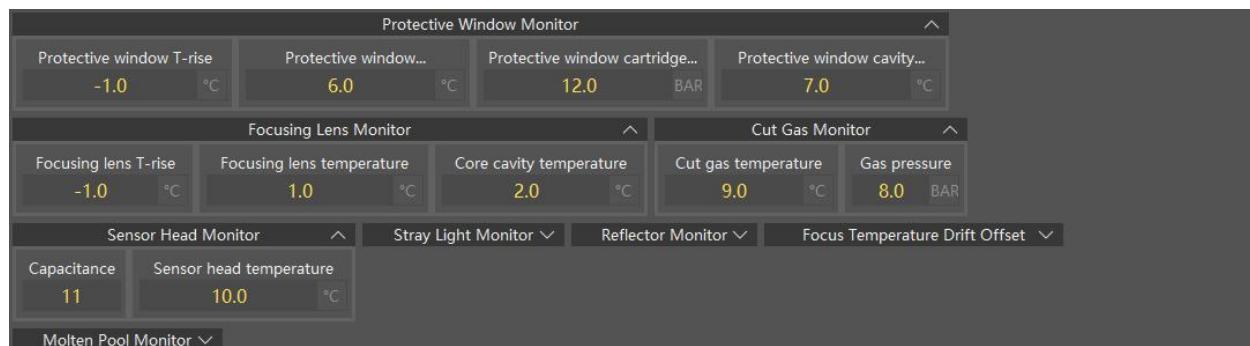


Figure 5-6 Laser head data

- Protective Window Monitor: Displays protective window T-rise, protective window temperature, protective window cartridge pressure, and protective window cavity temperature.
- Cut Gas Monitor: Displays cut gas temperature and gas pressure.
- Sensor Head Monitor: Displays capacitance and sensor head temperature.
- Focusing Lens Monitor: Displays focusing lens T-rise, focusing lens temperature, and core cavity temperature.

The **Production** module also supports real-time monitoring of cutting head information. This can be enabled via **More** → **General** → **Display laser head information**.

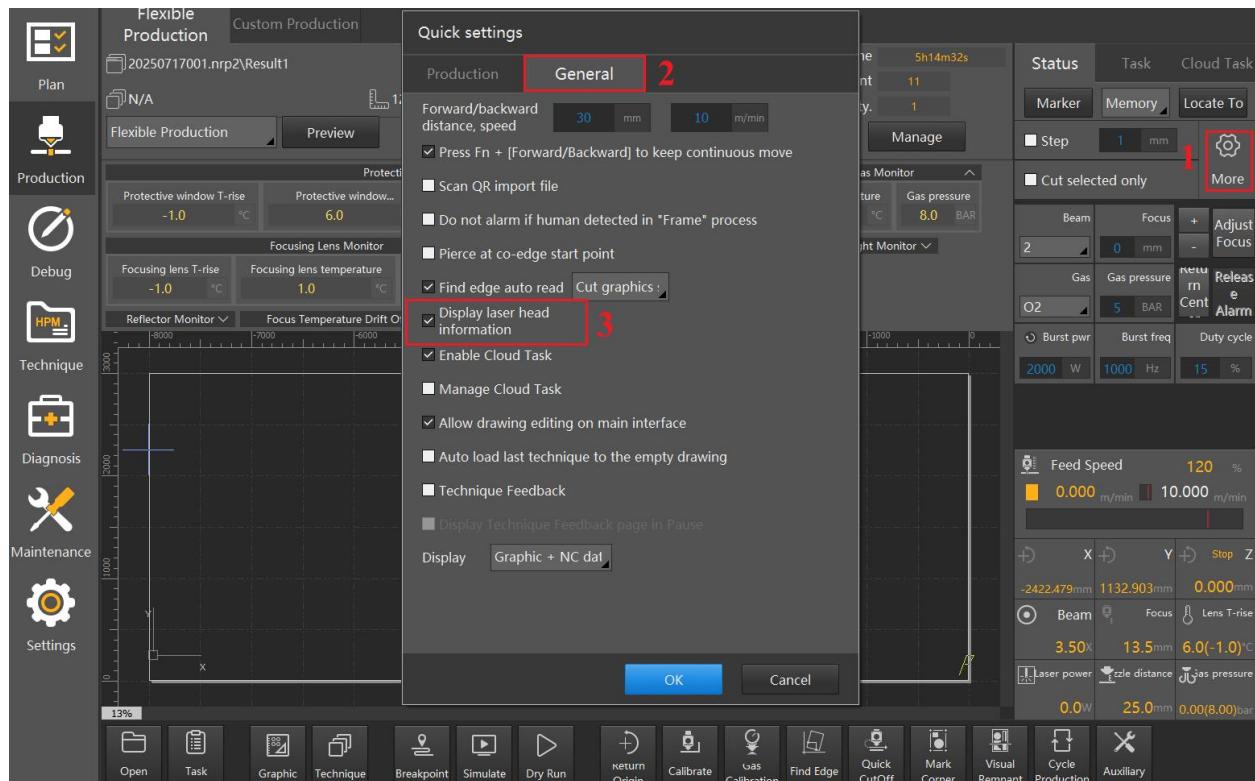


Figure 5-7 Laser head data displayed in the production module

## 5.5 Laser Long Shot

Used to test how different *Laser power*, *Duty cycle*, and *Pulse frequency* affect focal drift. In the *Debug* module, select *Laser Long Shot* from the *Laser Head* drop-down menu to open the feature page.

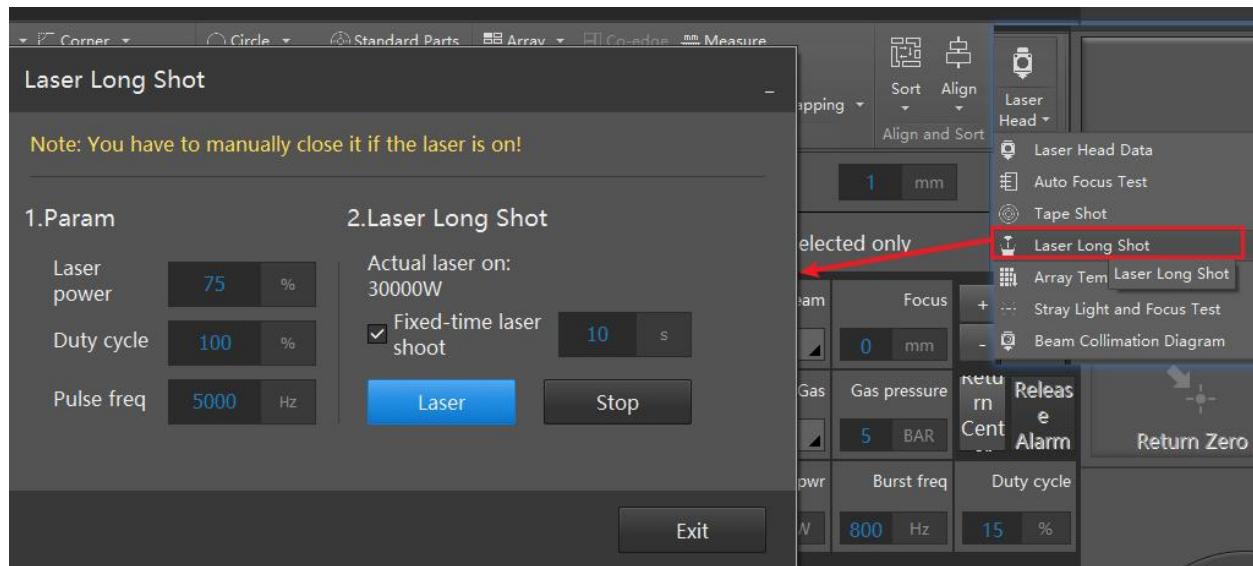


Figure 5-8 Laser long shot

**⚠️ Notice:** This feature is only available under expert or developer-level permissions.

## 5.6 Auto Focus Test

Used to measure the actual focus position corresponding to the zero focus of the cutting head.

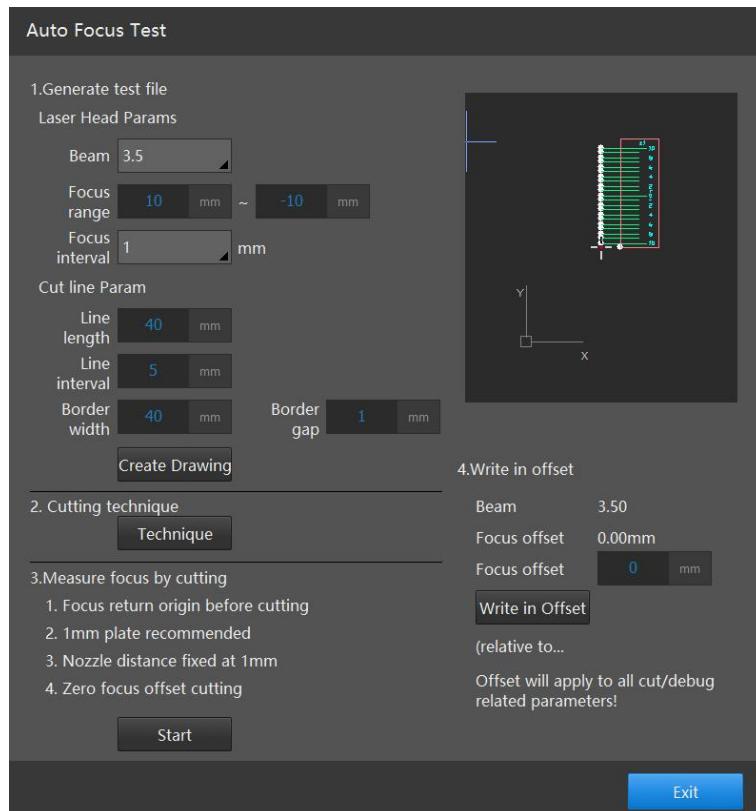


Figure 5-9 Auto focus test

In the *Laser Head* drop-down menu, click *Auto Focus Test*. The procedure is as follows:

**Step 1** Select the beam diameter to be tested. Then set the *Laser Head Paras* and *Cut line Param*. Click *Create Drawing* to generate the drawing on the right.

**Step 2** Confirm the drawing, then click *Technique* to modify technique parameters such as gas type and cut speed.

**Step 3** Click *Start* to perform the cutting operation.

Based on the test cut, analyze the cutting results of different focal points, and identify the thinnest cut. Enter the value for *Focus offset* and click *Write in Offset* to confirm it. For example, if the kerf at focus 3 is the thinnest, enter 3 at *Focus offset*.

## 5.7 Tape Shot

Used to test for lens/window contamination in the optical path. In the *Laser Head* drop-down menu, click **Tape Shot**. The procedure is as follows:

**Step 1** Place the tape beneath the nozzle.

**Step 2** Set the parameters, including *Laser power*, *Duty cycle*, *Pulse freq*, and *Shot Duration*.

**Step 3** Click *Laser* to perform a tape shot.

**Step 4** After the test, check the spot on the tape for any contamination. If contamination is present, additional tests will be required to determine contamination source.

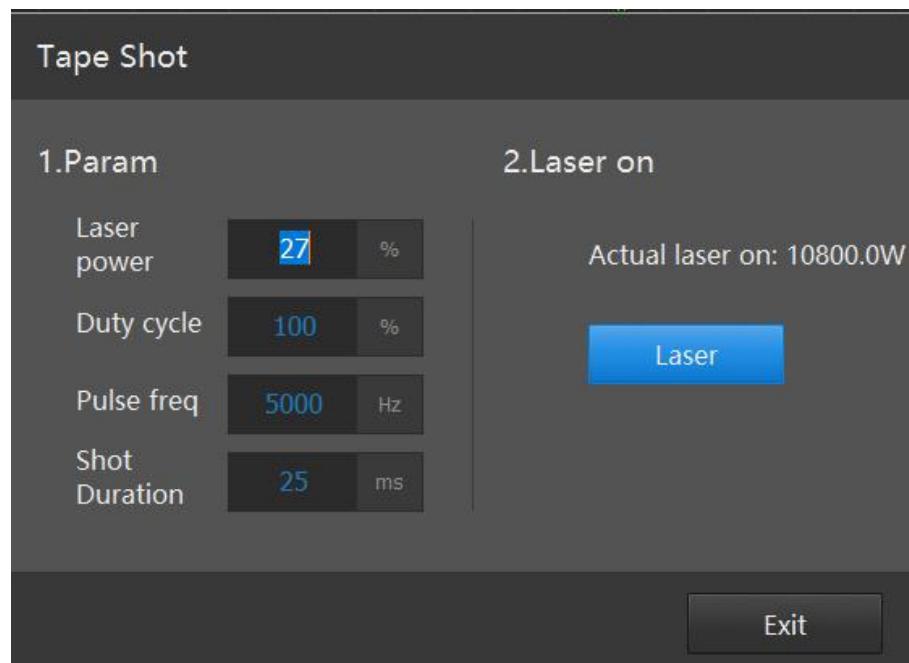


Figure 5-10 Tape shot

## 5.8 Cycle Test

In the *Debug* module, open the *Auxiliary* drop-down menu and select *Cycle Test*. This feature supports *Time-Phase Test*, *Z Dry Run Test*, and *XY Dry Run Test*.

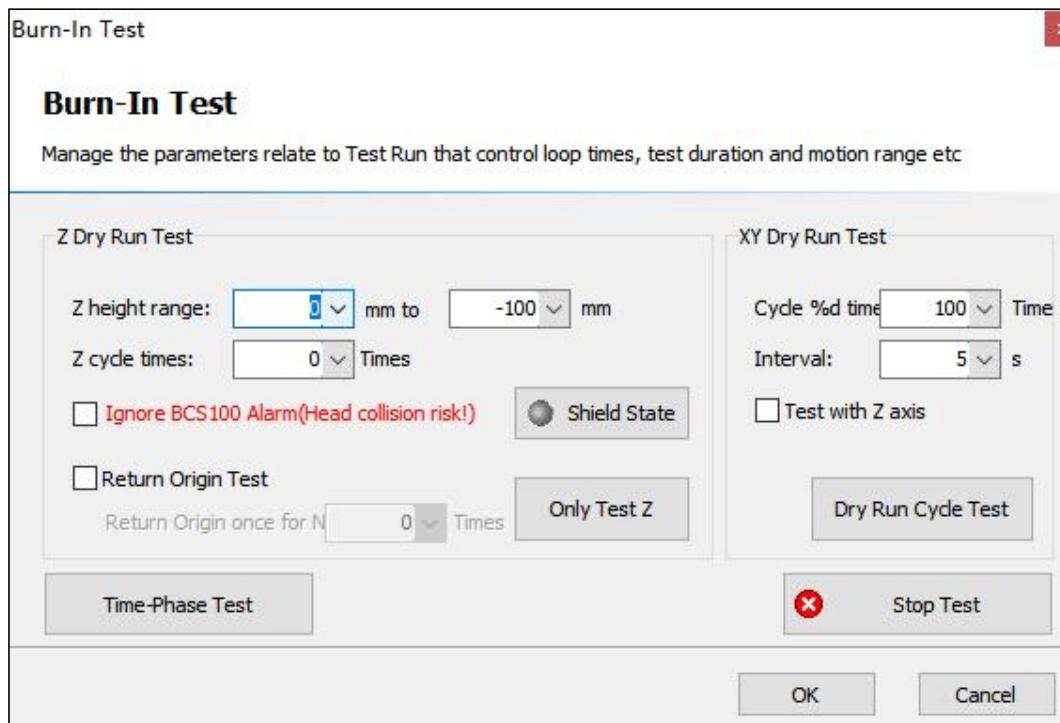


Figure 5-11 Cycle test

## 5.9 System Latency Offset

In the *Debug* module, open the *Auxiliary* drop-down menu and select *System latency offset*. Before use, a *System Latency* needs to be completed.

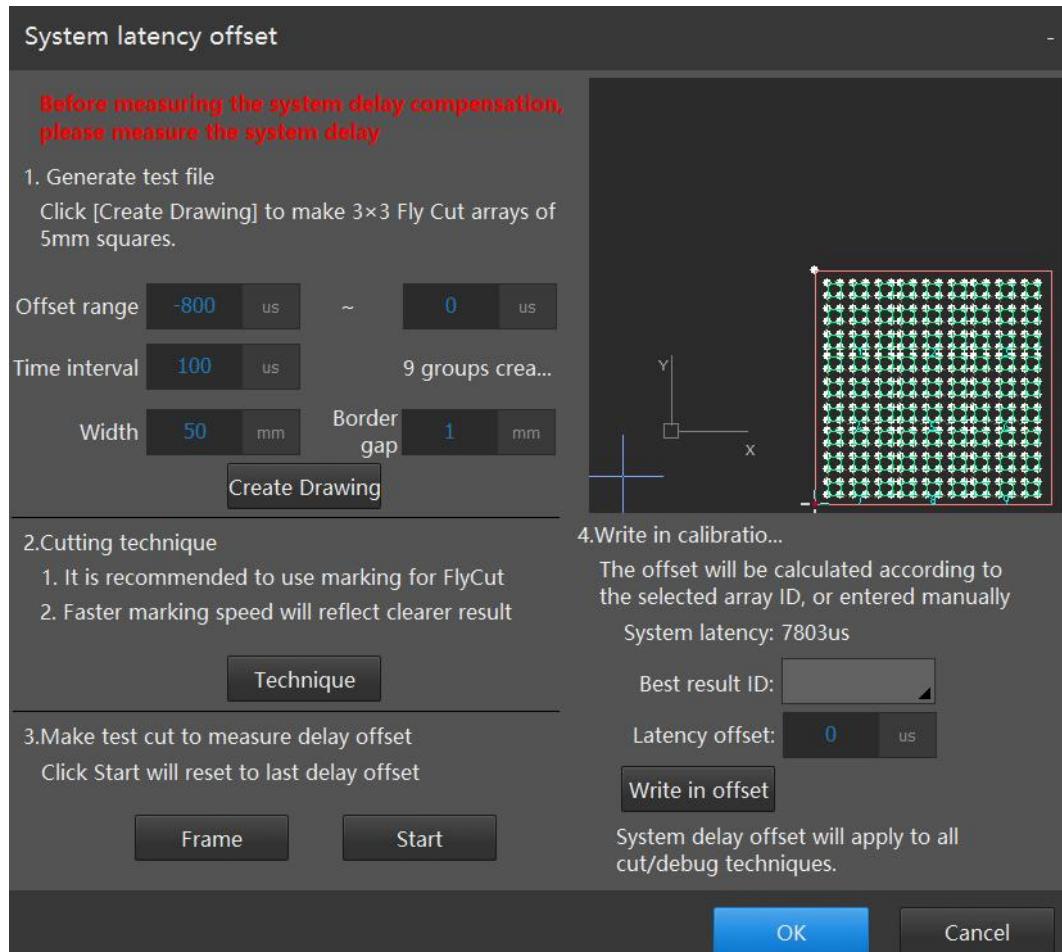


Figure 5-12 System latency offset

The steps are described below:

**Step 1** Generate the test drawing based on the set parameters.

1. Set the required *Offset range* and *Time interval*. The software will automatically generate a square array, with each group corresponding to a specific compensation value.
2. You can also set the *Width* and *Border gap* for each group.

**Step 2** Define the cutting technique. After generating the drawing, adjust the marking, array, and frame cutting parameters as needed.

**Step 3** Click *Start* to perform the cut and collect the test result.

**Step 4** Write in calibration data. Identify the array with the best cutting result. The software will automatically calculate the compensation value based on its ID, and then click ***Write in offset*** to confirm it.



**Notice:** If you wish to use the technique parameter from this page, click ***Start***. If you exit this page, the drawing will be machined, applying the cutting parameters on the ***Production → Technique page***.

# Chapter 6 Technique

HypCut provides a **Technique** database management module, allowing you to centrally manage all created and saved machining parameters.

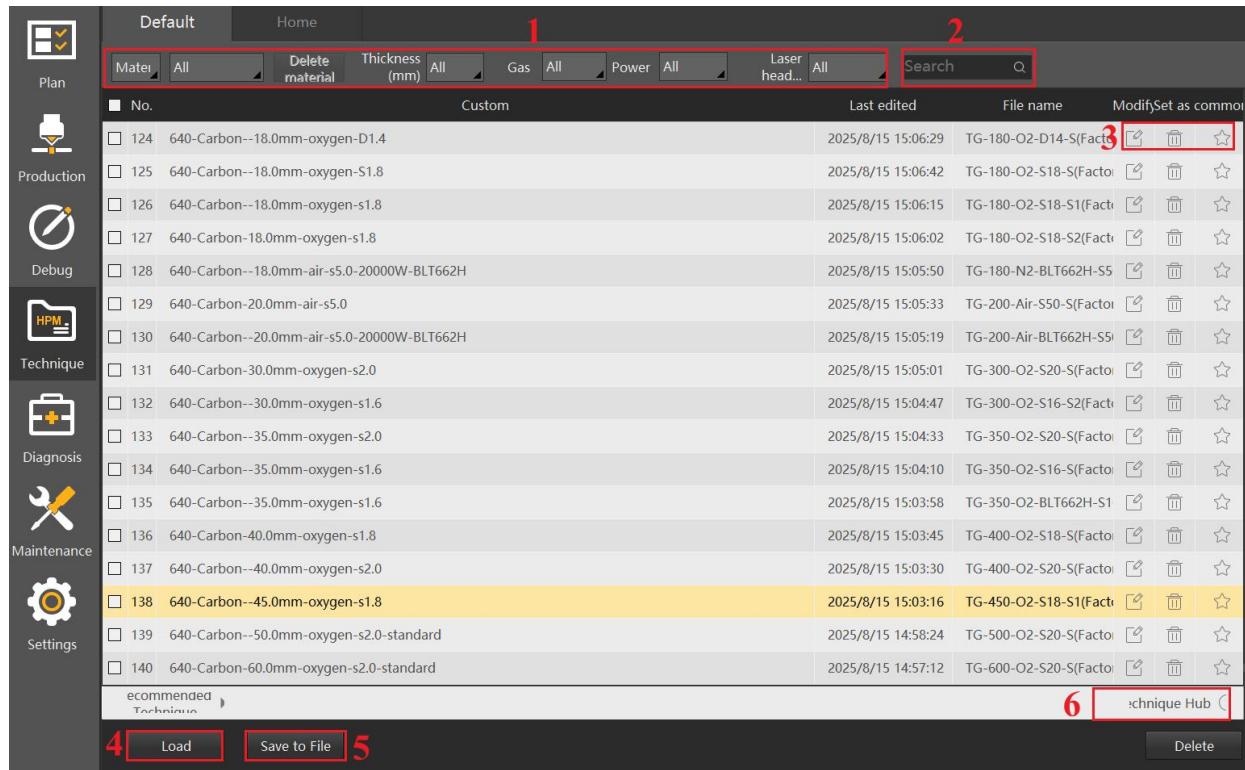


Figure 6-1 Technique library

The main operations are described below:

Table 6-1 Main Operations in the Technique Module

No.	Name	Description
1	Filter	Quickly filter the applicable technique based on <b>Material</b> , <b>Thickness</b> , <b>Gas</b> , <b>Power</b> , and <b>Laser head Model</b> .
2	Search	Enter keywords to filter technique results.
3	Operation Bar	<ul style="list-style-type: none"> <li>● Modify: Adjusts machining parameters as needed; the custom name can be modified. After modification, the last edited time will be refreshed.</li> <li>● Delete: Deletes the technique entry in the corresponding row.</li> <li>● Set as common: Marks the frequently used techniques; these will appear directly under the <b>Home</b> tab.</li> </ul>
4	Load	Imports the technique files from the local.

No.	Name	Description
5	Save to File	Saves the technique files (*.hpm) to the local.
6	Technique Hub	Must be enabled via <b>Settings</b> → <b>Global</b> → <b>Production</b> settings. When the machining system is connected to the network, <b>Recommended Technique</b> is available.

# Chapter 7 Diagnosis

The **Diagnosis** module provides data analysis and management for 9 commonly used laser processing equipment, each with dedicated diagnostic tools. This allows you to clearly and efficiently identify, test, and resolve issues with a specific abnormal unit.

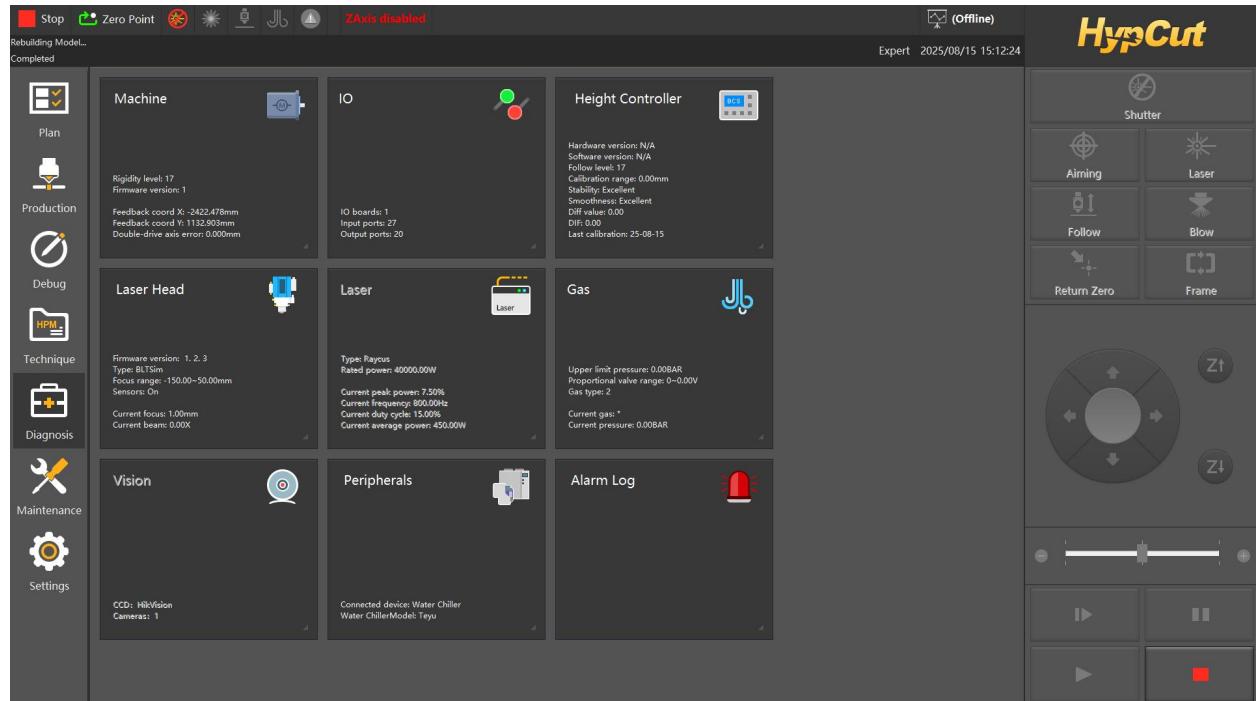


Figure 7-1 Diagnosis interface

## 7.1 Machine

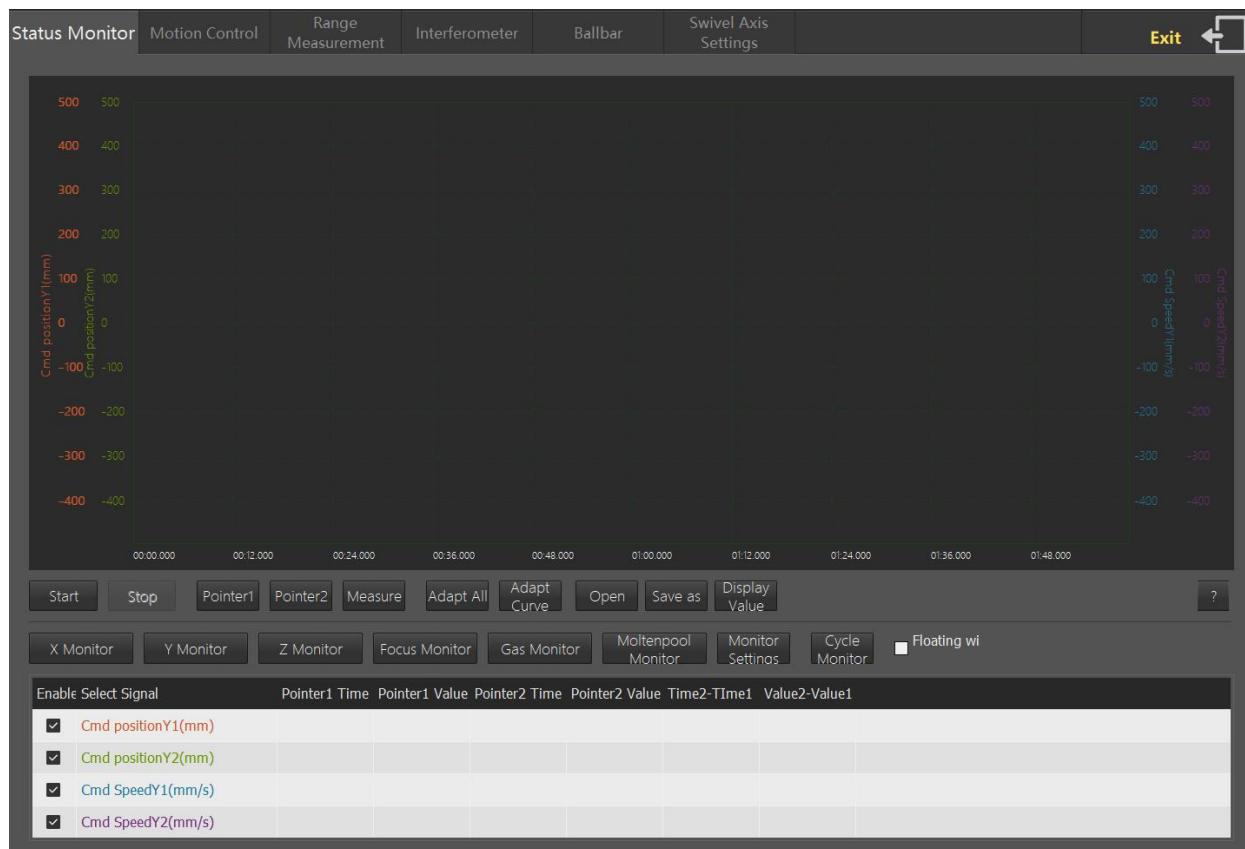


Figure 7-2 Debug - machine

- Status Monitor: Collects system monitoring data and generates curves. You can configure the data item to be monitored in **Monitor Settings**. Six monitoring types are included, covering motion axis, height controller, IO, BLT laser head, extended monitor information, and extended external monitor information.
- Motion Control: Checks axis motion status, origin signals, and limit signals. Additionally, five functions are available on this page, including **Inertia Measurement**, **System Latency**, **Circle Error Measurement**, **Drive Optimization**, and **Write Servo Params**.
- Range Measurement: Measures the physical positions of X/Y-axis positive/negative hard limits relative to the machine origin, then calculates the optimal soft limit range. The procedure is as follows:

**Step 1** Verify that the machine can detect each axis's origin position and limit switches.

**Step 2** Click **Return Origin**.

**Step 3** Then click **Range Measurement**, and the machine will automatically move to probe

the positive/negative limits.

#### Step 4 Save the range measurements.

- Interferometer: A measurement method based on wave interference. Two light beams (often split from one) overlap to produce an interference pattern. Because visible light has a very short wavelength, even tiny differences in optical path length can be detected (as they create visible changes in the pattern). For a machine with large travel ranges, the segmented interferometer compensation is available. The procedure is as follows:

#### Step 1 Check **Segmented interferometer program** and enter the value for **Second segment** position. Click **Generate Program** to create two programs.

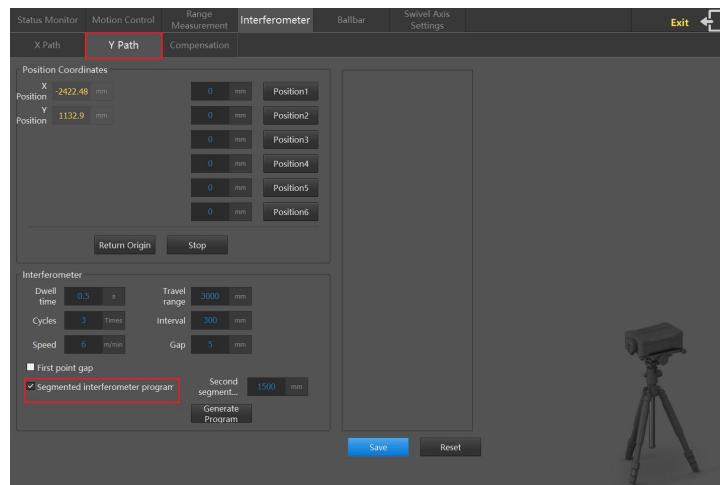


Figure 7-3 Segmented interferometer program

#### Step 2 After executing the first segment, click **Locate to Start Pos**, then execute the second segment.

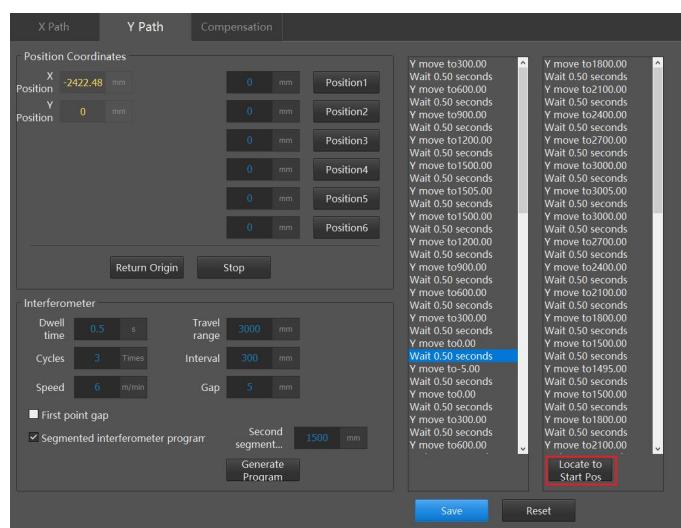


Figure 7-4 Locate to start

**Step 3** Switch to the *Compensation* tab and select *Disable pitch compensation*. Then, select *Interferometer data stitching*, import the two program results, and enter the value for *Second segment position* to complete the stitching process.

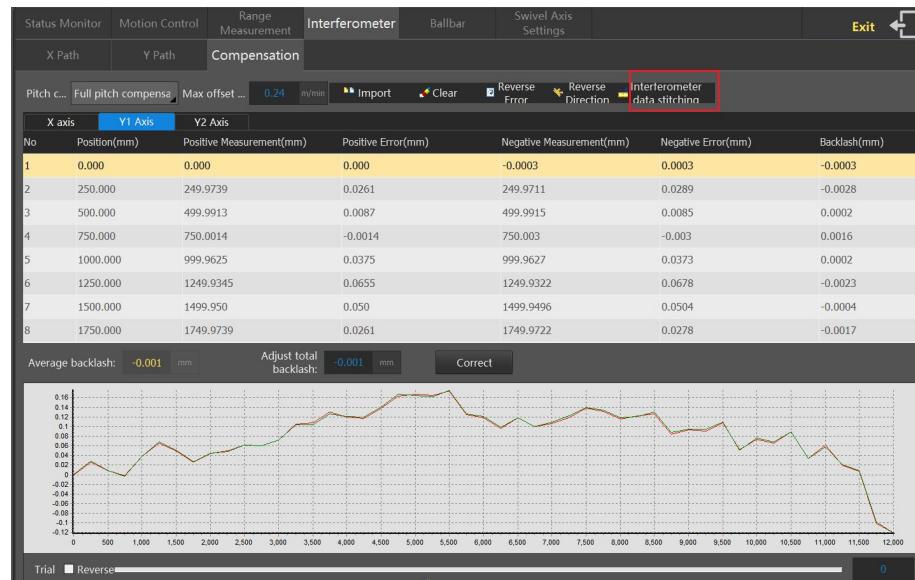


Figure 7-5 Interferometer data stitching

- **Ballbar:** The ballbar device connects between the cutting head and the machine table. As the cutting head executes a circular interpolation path, the system measures the actual X/Y-axis motion trajectory, compares it against a geometrically standard circle, and finally evaluates the error type and magnitude generated by the machine tool.

- **Swivel Axis Settings:** Requires *Enable Bevel Feature* to be checked via *Config Tool* → *Advanced* → *Advanced*. On the *Diagnosis* → *Swivel Axis Settings* page, perform *Swing Calibration* and save the results. Switch to the *Swivel Axis Settings* tab, and configure the swivel-axis motion parameters for basic swing control. Additionally, bevel quick cutoff and bevel cutoff line are supported.
  - **Bevel quick cutoff:** Swings the cutting head to the target angle, then follows the plate surface to start edge-finding.
  - **Bevel cutoff line:** Swings the cutting head to the target angle, then performs plate-sensing.



Figure 7-6 Swivel axis settings

The software supports setting the bevel angle in the PLC, within the angle range defined in the *Config Tool*. Parallel actions are not supported. Bevel cutting angles can be set during *Custom Production*.

## 7.2 IO

The **IO** page displays real-time input/output status during cutting, helping diagnose potential I/O-related issues. Click the **IN/OUT** button to observe the status of input and output.

Limit signals indicate whether the cutting head triggers a limit switch; PWM signals reflect the laser ON/OFF status. Additionally, 20 output ports and 27 input ports are provided.

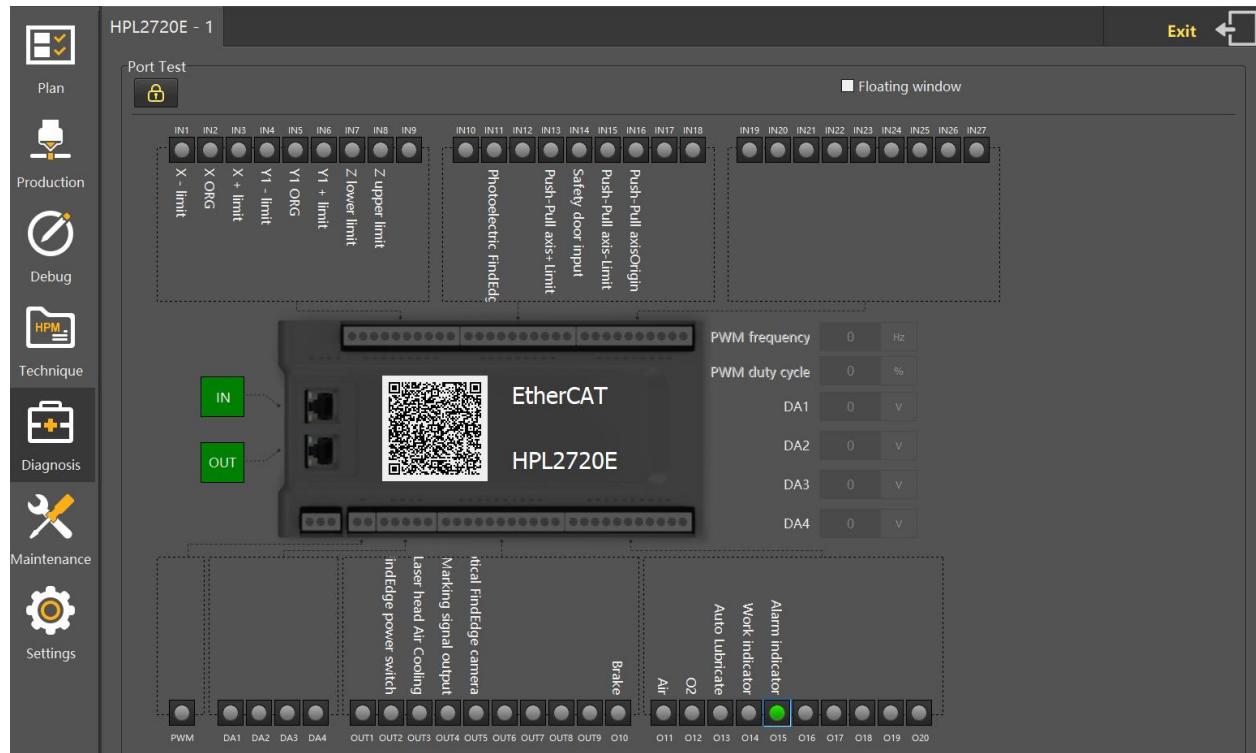


Figure 7-7 Debug - IO

## 7.3 Height Controller

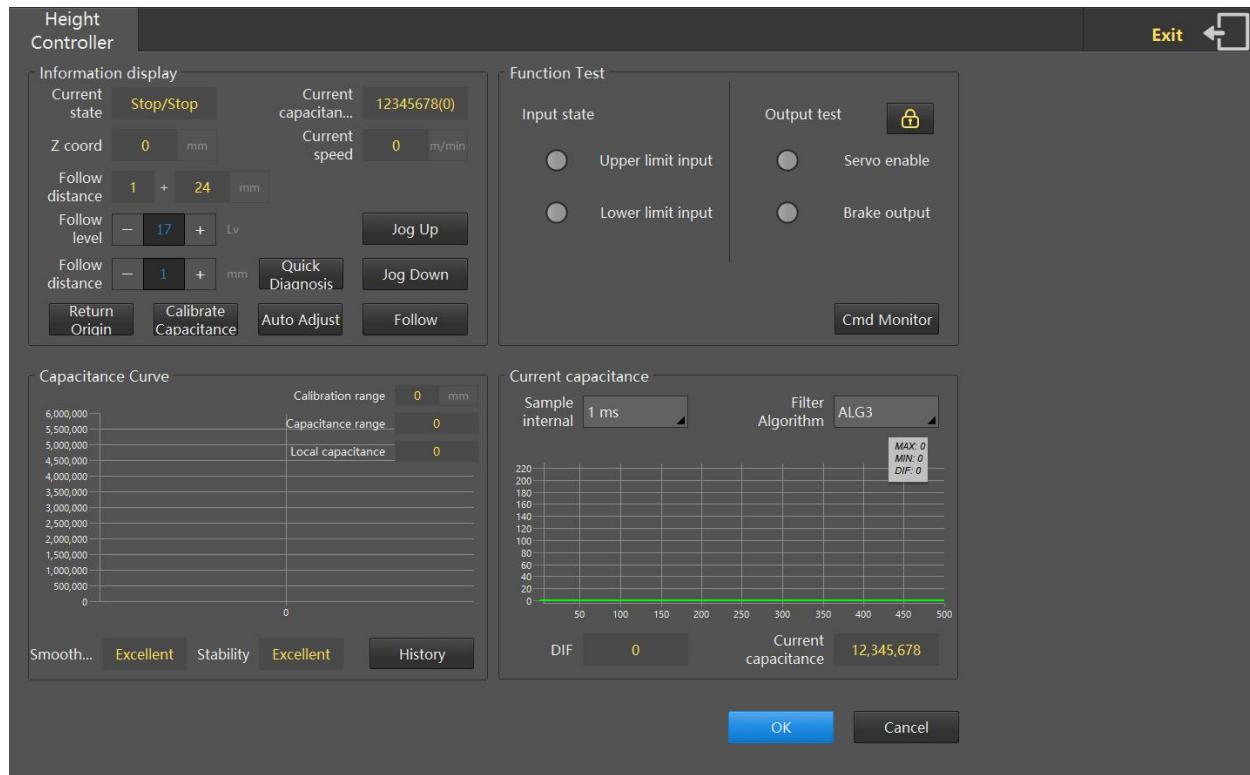


Figure 7-8 Debug - height controller

- **Information display:** Shows the current Z-axis motion status. Supports Z-axis origin returning, capacitance calibration, follow level and distance setting, among others. Clicking **Auto Adjust** fine-tunes the following position and automatically optimizes internal parameters.
- **Capacitance Curve:** Records the **Capacitance range** and **Local capacitance** after calibration, allowing viewing of previous calibration records.
- **Function Test:** Divided into **Input status** and **Output test**. **Upper/lower limit inputs** can be used to check whether the limit switches are effective. The **Output test** (after unlocking) allows turning the Z-axis brake signal output on/off and enabling/disabling the Z-axis driver.
- **Current capacitance:** Displays the height controller's current information, such as DIF (variation in current capacitance value).

## 7.4 Laser Head

For BLT series cutting heads, enter the **Laser Head** sub-module to access real-time sensor monitoring, focus motor test, advanced options, and auto laser centering.

For non-BLT cutting heads, only **Adjust Focus** is available, which is used to configure the DA output corresponding to the actual focus.

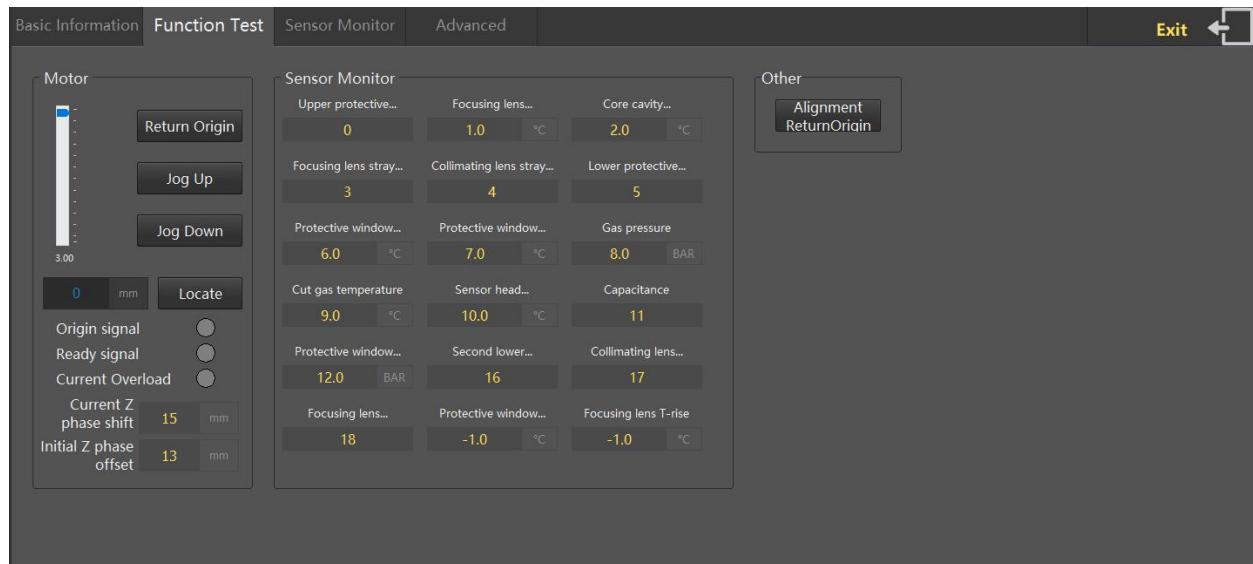


Figure 7-9 Debug - laser head (adapted for BLT)

## 7.5 Laser

This module displays the current status of the laser, such as shutter enable state and readiness to emit laser. It also shows related warnings and alarm messages, along with the total operating time statistics for the laser.

## 7.6 Gas

The **Gas** sub-module supports **Gas Calibration**, **Gas Way Diagnosis**, and **Pressure Test**.

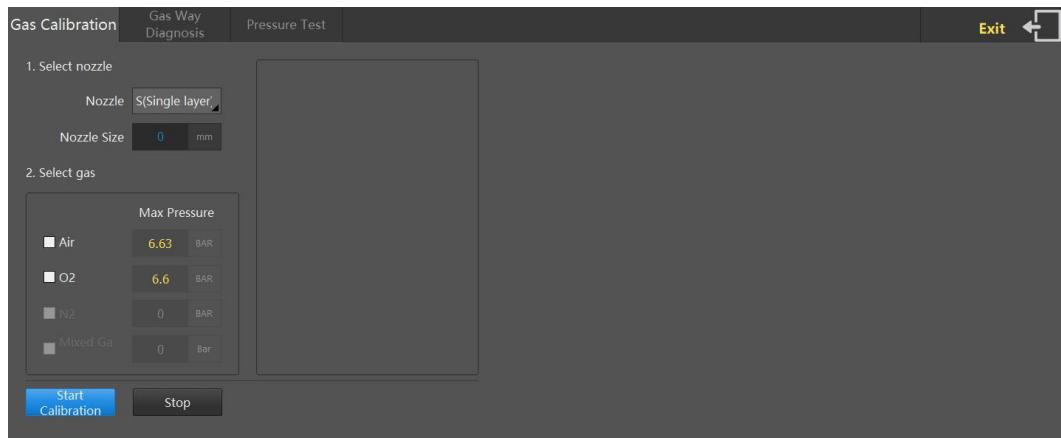


Figure 7-10 Debug - gas

On the **Gas Way Diagnosis** page, the quality of the gas way can be assessed by observing indicators such as **Stable gas pressure**, **Stable time**, and **Rise duration**.

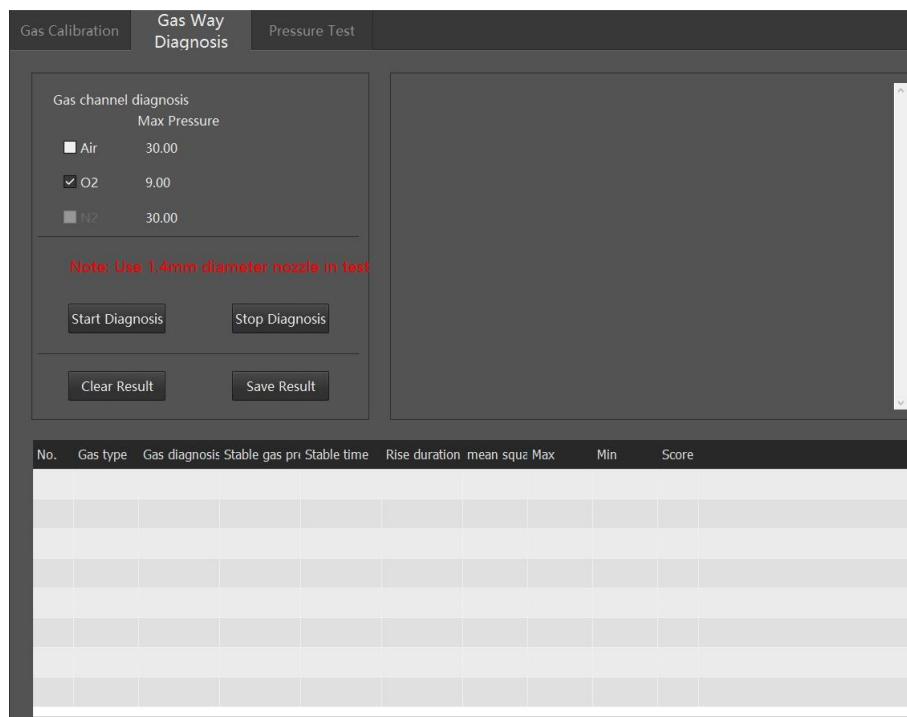


Figure 7-11 Gas way diagnosis

On the **Pressure Test** page, you can monitor both the target and current pressure values of the selected gas type. This helps determine the gas supply status, including whether the gas is insufficient.

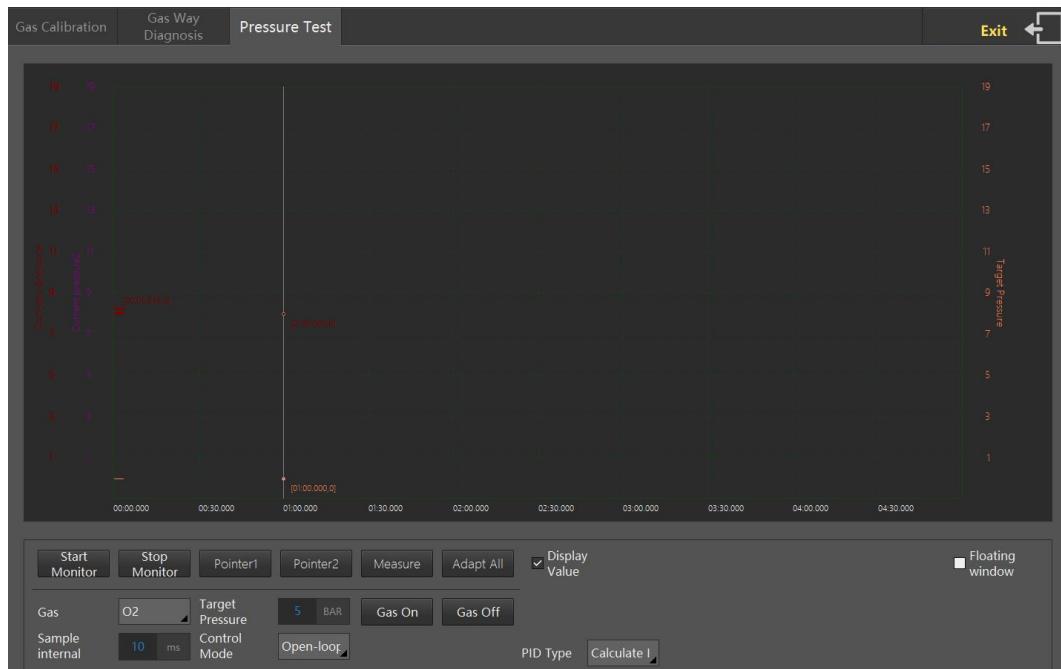


Figure 7-12 Pressure test

## 7.7 Vision

Displays the basic information of the software's camera setup. Supports camera calibration and can be used to monitor the machine's working area. If a person enters the monitored area, the software can display a warning or trigger an alarm.

## 7.8 Peripherals

Water chiller is an industrial cooling device designed for laser processing equipment. The chiller provides a stable and precise temperature-controlled cooling medium for these applications.

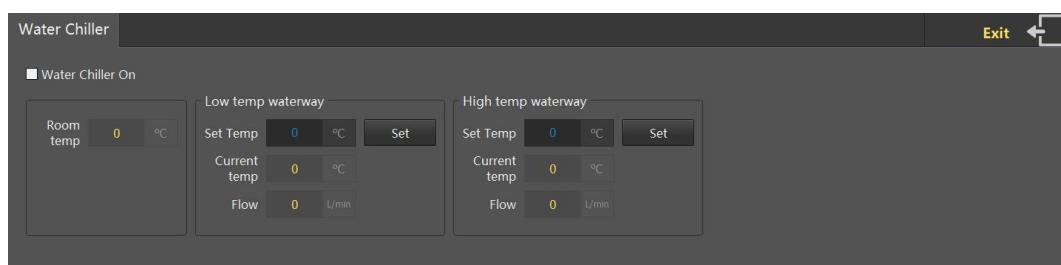


Figure 7-13 Water chiller

## 7.9 Alarm Log

During machine operation, HypCut continuously monitors all components. If an alarm is detected, it immediately displays alarms with a red title bar and initiates safety measures like motion stop. Most operations remain disabled until the alarm is resolved. Always inspect and clear the alarm before proceeding.



Figure 7-14 Alarm example

Double-clicking an alarm message will directly navigate to the *Diagnosis* → *Alarm Log* page, where the cause and solution for the alarm can be found.



Figure 7-15 Debug - alarm log

Beyond the alarm, if HypCut detects other operational anomalies, it will display them in the *Log* area (see Figure 7-14) with different colors based on their severity. These include categories such as warning, hint, and information (the mentioned messages will not cause the machine to stop). However, it is still recommended to promptly monitor all messages displayed by the software to take necessary actions as early as possible.

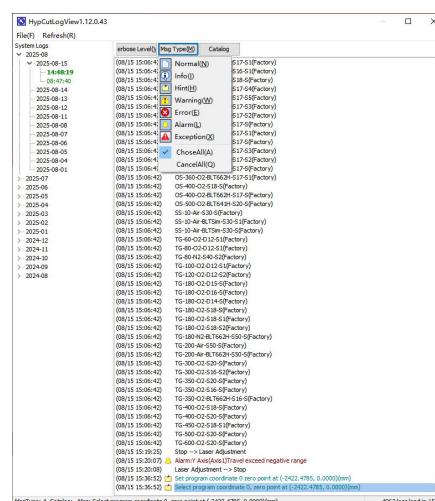


Figure 7-16 Log

# Chapter 8 Maintenance

During equipment operation, this module tracks the usage time or running distance for various machine components (such as the laser, rack and pinion, reducers, motors, gas valves, and others). The system issues reminders and maintenance recommendations based on preset thresholds to support proper maintenance practices.

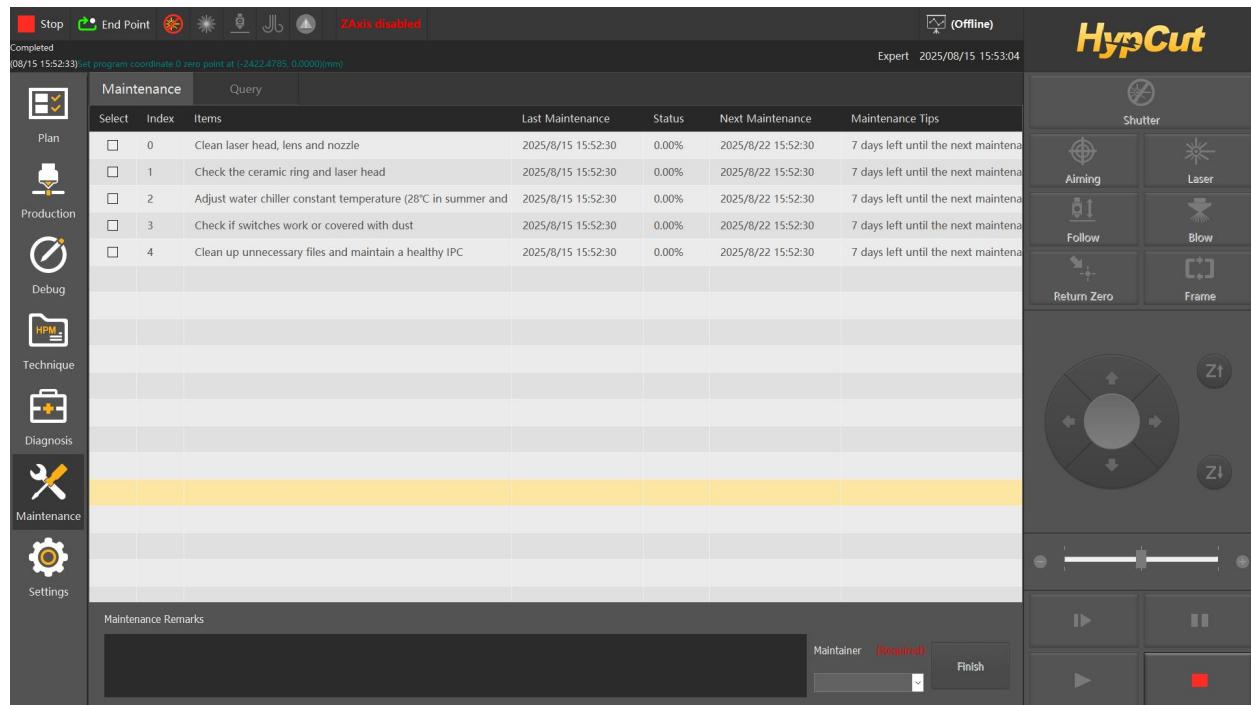


Figure 8-1 Maintenance

# Chapter 9 Settings

The **Settings** module allows you (with the appropriate permission) to access configuration rights for basic parameters, machine installation settings, and PLC programming at HypCut's underlying level. General users can use the **Settings** module to configure system operation preference parameters, perform encryption/decryption, and other related operations.

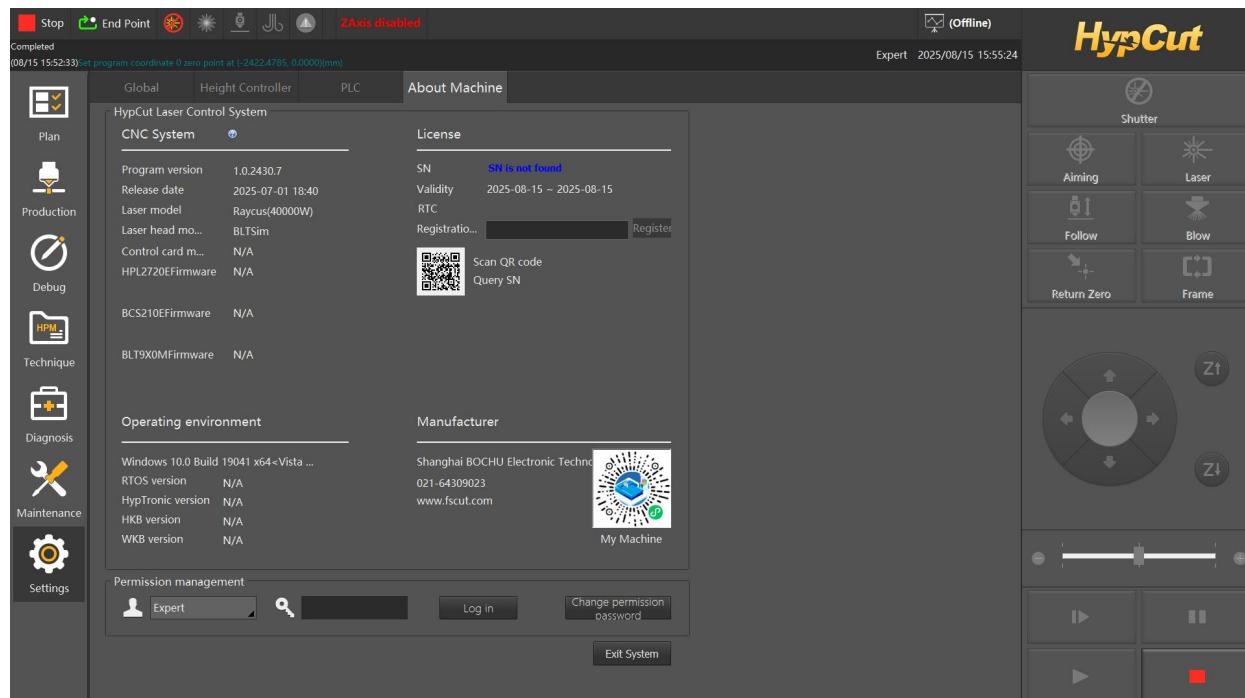


Figure 9-1 Setting interface

---

**⚠ Caution:** Incorrect configuration of underlying parameters can cause serious safety hazards or even result in personal injury or death. It is recommended that only expert-level personnel use these settings, and only after proper training.

---

## 9.1 Global Parameters

### 9.1.1 Motion Control Parameters

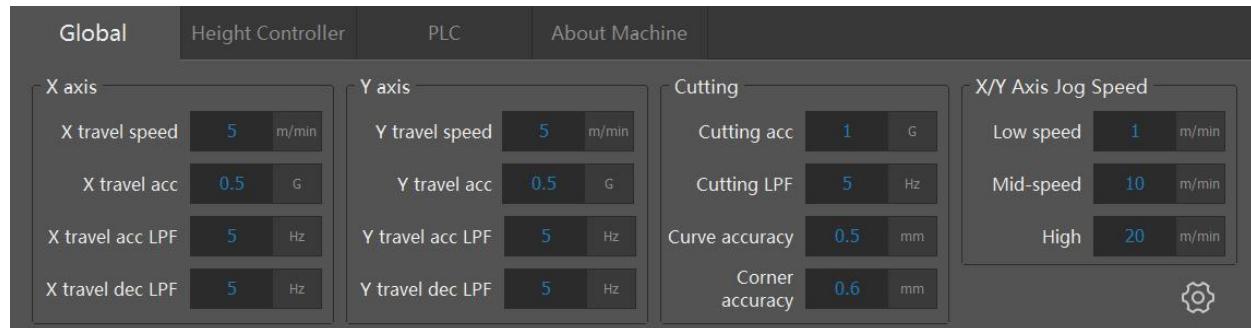


Figure 9-2 Motion control parameters

The motion control parameter description is shown as follows.

**Table 9-1 Motion Control Parameter Description**

Name	Description
X/Y travel speed	Sets the speed of single-axis travel motion (not the cutting speed).
X/Y travel acc	Sets single-axis maximum acceleration during travel (works with travel speed).
X/Y acc LPF	Sets single-axis acceleration change rate during travel (works with travel acceleration).
X/Y travel dec LPF	Sets single-axis deceleration change rate during travel.
Cutting acc	Sets the maximum acceleration during cutting.
Cutting LPF	Sets the jerk rate (derivative of acceleration) for single-axis cutting (works with cut acceleration).
Curve accuracy	Controls the curve machining precision. A lower value can lead to a higher precision.
Corner accuracy	Controls the corner machining precision. Affects corner sharpness and speed reduction (lower = sharper but slower).
X/Y Axis Jog Speed	Sets the X/Y jog speed for low, middle, and high mode.
Linear travel	This option can be enabled by clicking the small gear icon under <b>X/Y Axis Jog Speed</b> . When enabled, the cutting head travel motion is linear, bringing a smoother visual motion effect.

### 9.1.2 Gas Delay and Gas Blow Parameters

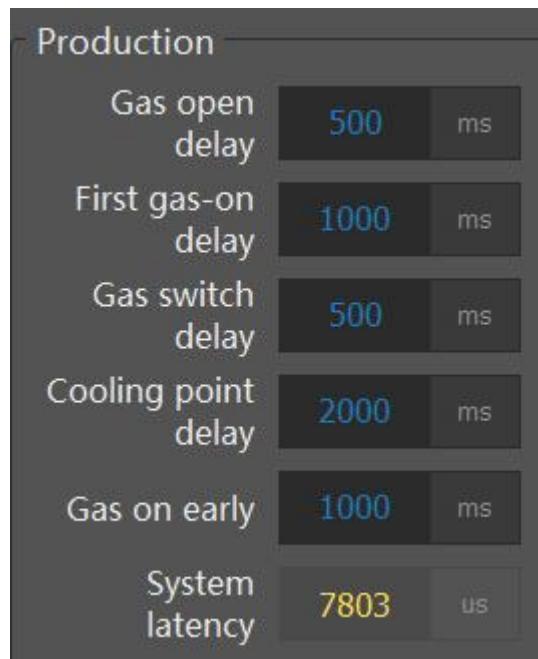


Figure 9-3 Default settings

The related settings of gas delay are described in the table below:

**Table 9-2 Gas Delay Descriptions**

Name	Description
Gas open delay	Gas activation delay before laser is activated.
First gas-on delay	Gas delay for the initial blow (ensures clean start).
Gas switch delay	Transition time to reach a stable pressure for the cutting head when switching gases.
Cooling point delay	Gas duration at cooling points (prevents corner overheating).
Gas on early	Sets pre-gas activation time during travel.
System latency	Servo response delay.

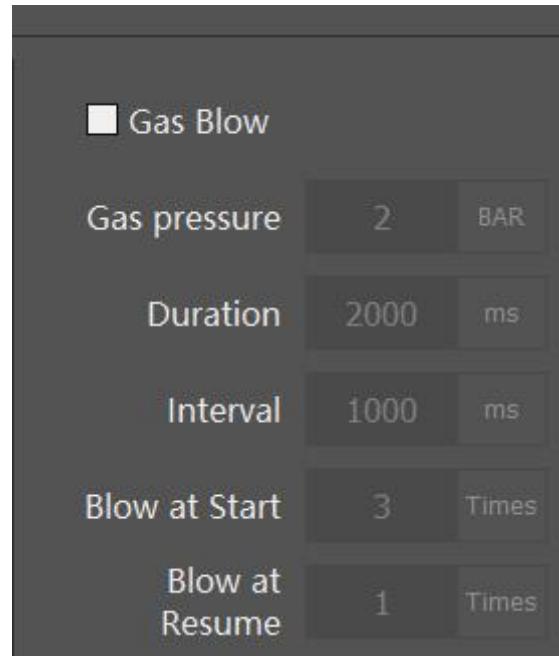


Figure 9-4 Gas blow parameters

Before starting cutting, the machining system will toggle the gas on and off. Enabling this function allows blowing away dust on the laser protective window, helping extend its service life. The gas blow parameters are described in the table below:

**Table 9-3 Gas Blow Parameter Description**

Name	Description
Gas pressure	Pressure when performing a gas blow.
Duration	Blow time for a single gas blow.
Interval	The gas-off time of the gas blow process.
Blow at Start	Number of gas blows before initial cut (clears residual debris).
Blow at Resume	Number of gas blows after pauses (re-establishes gas flow).

### 9.1.3 Follow Control Parameters

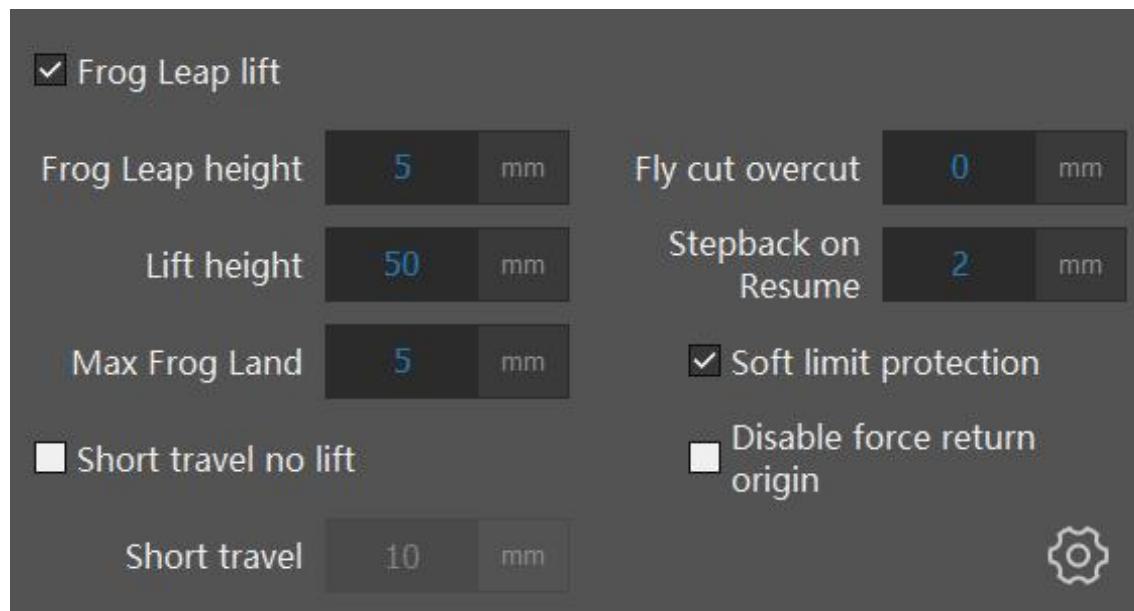


Figure 9-5 Follow control settings

The follow control parameter description is shown as follows.

**Table 9-4 Follow Control Parameters Description**

Name	Description
Frog leap lift	When checked, a frog leap lift will be used during travel. Before the Z-axis finishing lifting, the X and Y axes simultaneously start to travel along an arc to shorten the travel time.
Frog Leap height	Z-axis lifts to the specified height before initiating the leapfrog.
Lift height	The maximum lift height of the cutting head during frog leap.
Max Frog Land	The land distance during the downward phase of a leapfrog.
Short travel no lift	When enabled, the height controller does not lift during the travel shorter than the set value and travels to the start point of the next part, eliminating unnecessary Z-axis retractions.
Short travel	Defines the distance threshold for this feature. The cutting head will lift when the set travel distance is exceeded.
Fly cut overcut	Enables fly cut across overcut (for the graphics added overcut only), improving efficiency and saving time.
Stepback on Resume	Sets the distance for each forward or backward movement after resuming machining.

Name	Description
Soft limit protection	When enabled, the system issues warnings upon detecting potential travel range violations.
Disable force return origin	The software defaults to prompt you to perform <i>Return Origin</i> after startup. You can cancel it by checking this option. Proceed with caution.

#### 9.1.4 Other Production Parameters

Click the gear icon under *Disable force return origin* to access more production settings

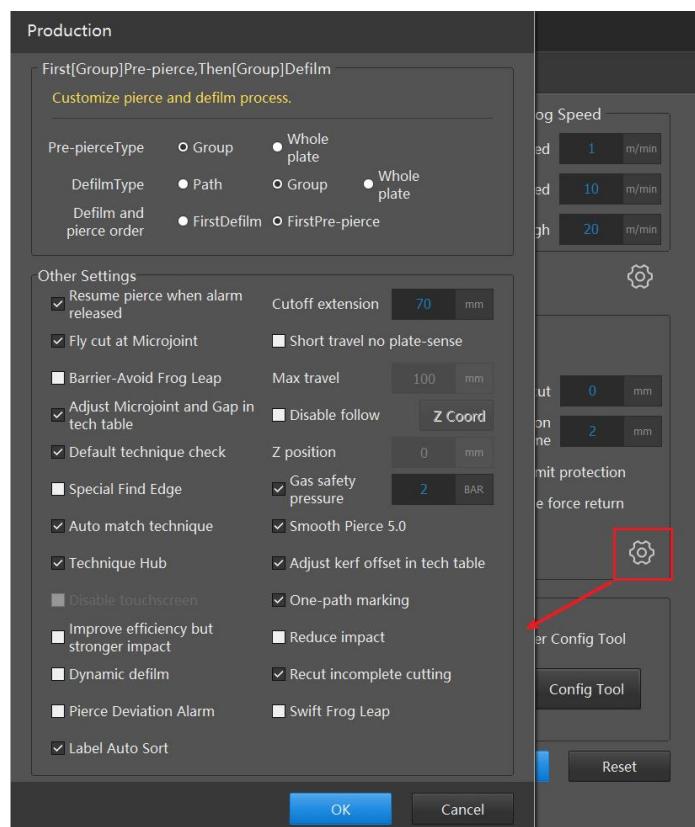


Figure 9-6 Other production settings

The other settings are described in the following table.

**Table 9-5 Other Production Setting Description**

Name	Description
Resume pierce when alarm released:	It is suitable for cutting some poor materials, which triggers the alarm after hit-plate and then pauses the cutting. Enabling this function can continue the piercing process after releasing the hit-plate alarm. This function allows for a smoother, more consistent production process and reduces unnecessary downtime.

Name	Description
Fly cut at Microjoint	Enables fly cut across microjoints (for the graphics added microjoints only), improving efficiency and saving time. This function is disabled if piercing is enabled.
Barrier-Avoid Frog Leap	Provides a smarter barrier-avoidance leapfrog algorithm (requires <i>Frog Leap lift</i> enabled).
Adjust Microjoint and Gap in tech table	Allows microjoint/gap size modification in the <i>Technique</i> interface.
Default technique check	Detects whether the cutting technique parameters are set.
Special Find Edge	When enabled, all the edge-finding methods become directly following plate surface and detect plate edge—more concise and faster.
Auto match technique	For the drawings exported from CypNest, HypCut allows automatically matching the technique entry in the technique library based on material, thickness, and gas. This can reduce setup technique operations and improve work efficiency.
Technique Hub	When checked, this function appears in the <i>Technique</i> module.
Disable touchscreen	When enabled, HyPanel will not respond to touch. Reactivation takes 3 - 5 seconds. HyPanel700 does not support this feature.
Improve efficiency but stronger impact	Efficiency first, accuracy second, and machine impact last. This function is suitable for an exhibition demo. When checked, the <i>Scenario mode</i> in the <i>Technique</i> interface will be disabled.
Dynamic Defilm	During pauses, changing the enable/disable status of <i>Defilm</i> on the <i>Technique</i> page takes effect in the next section of the toolpath.
Pierce Deviation Alarm:	<p>Supports piercing detection at pre-piercing positions.</p> <ul style="list-style-type: none"> <li>• Co-edge pierce detection (enabled) + Pierce Deviation Alarm (enabled): If the plate is detected, the software issues an alarm indicating "Plate misalignment is detected" and pauses. Alarm can be cleared manually to continue.</li> <li>• Co-edge pierce detection (enabled) + Pierce Deviation Alarm (disabled): If the plate is detected, the machine system re-pierces and continues.</li> <li>• Co-edge pierce detection (disabled) + Pierce Deviation Alarm (enabled):</li> </ul>

Name	Description
	<p>No detection, no alarm, and no re-piercing.</p> <ul style="list-style-type: none"> <li>• Co-edge pierce detection (disabled) + Pierce Deviation Alarm (disabled): No detection, no alarm, and no re-piercing.</li> </ul>
Label Auto Sort	Sorts labels generated by marking devices, such as inkjet printers or galvanometer scanners, to optimize the marking sequence and minimize travel distance
Short travel no plate-sense.	Disables plate detection for short travel.
Disable follow	When checked, the height follow is disabled. The Z-axis moves to a specified coordinate for machining, allowing non-metal cutting.
Gas safety pressure	Sets the Max.gas pressure in the machining process.
Smooth Pierce 5.0	Performs the corresponding movement within the set travel/pierce height/ follow tolerance, enhancing <b>Smooth Pierce</b> efficiency.
Adjust kerf offset in tech table	Enables kerf compensation adjustment in the <b>Technique</b> interface during production and debugging. You can apply compensation to inner or outer contours (or both). This function is only accessible for the graphics added compensation (excludes co-edge and fly-cut graphics). The compensation logic only supports <b>Shrink inner, expand outer</b> .
One-path marking	Enabled by default, optimizing marking efficiency.
Reduced impact	Suitable for low-rigidity machines (e.g., those experiencing major impact at 3 - 4 Hz).
Recut incomplete cutting	Allows process monitoring to trigger automatic recutting when incomplete cutting is detected within a set number of alarms over a given time.
Swift Frog Leap	Optimizes frog leap motion during travel.

---

 **Notice:** On the **Global** page, click **Backup** at the lower left to back up both parameters and the technique entries in the technique library locally.

---

## 9.2 Height Controller

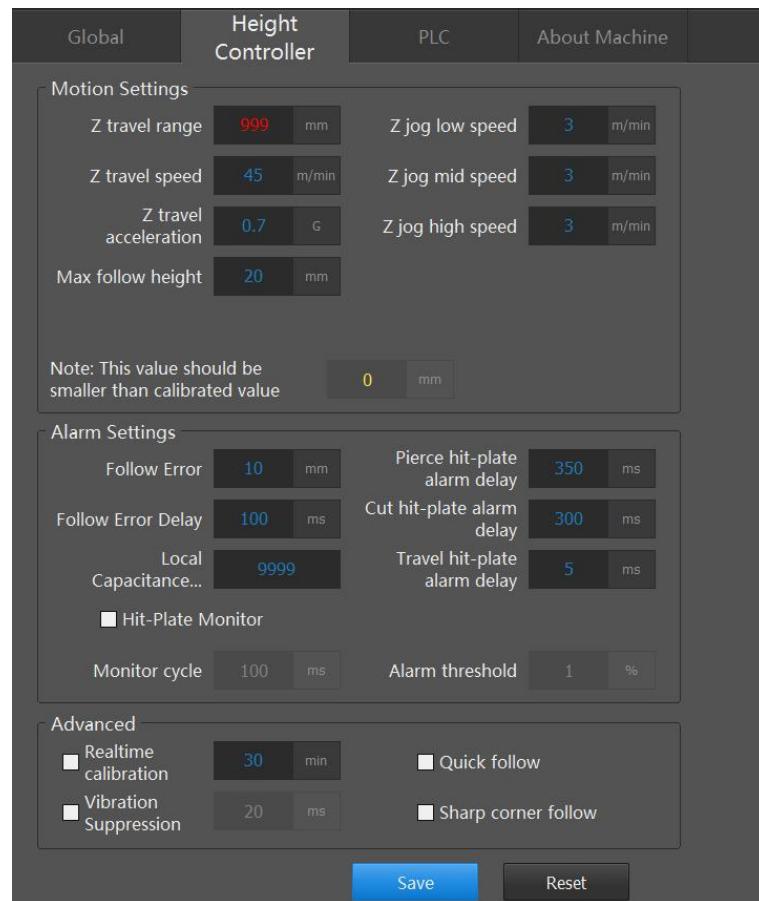


Figure 9-7 Height controller

Height controller parameters are shown in the following table.

Table 9-6 Height Controller Parameter Description

Category	Name	Description
Motion Settings	Z travel range	Sets the maximum travel range of the Z-axis.
	Z travel speed	Sets the maximum travel speed of the Z-axis.
	Z travel acceleration	Sets Z-axis maximum acceleration during travel (works with travel speed).
	Max follow height	The highest permissible following height for the height controller during operation. When activated above the set height, clicking <b>Follow</b> will move the cutting head to get close to the plate and then lift up to <b>Max Follow Height</b> .
	Z jog low/mid/high speed	Sets the jog speed of the Z-axis in the low, middle and high mode.

Category	Name	Description
Alarm Settings	Follow Error	Sets maximum follow error allowed by Height Controller. After the cutting head follows in place, once the follow error exceeds this set value as the cutting head moves out of the plate edge or the plate shakes violently, the software will trigger a follow error alarm.
	Follow Error Delay	Sets the filtering time for the follow deviation alarm. A larger value allows a longer duration for tracking errors to occur, while also enhancing the ability to filter out disturbances.
	Local Capacitance Drop	Detects abnormal capacitance reduction. The software will trigger a local capacitance drop alarm if the local capacitance diminished exceeds the set value.
	Piece/Cut/Travel hit-plate alarm delay	When the machining system is in the stop, travel, cut, or pierce status, if the hit-plate duration reaches the set value, the cutting head will automatically lift up for protection and trigger the alarms. When the value is set to 0, the hit-plate alarm will no longer be triggered in the in stop, travel, cut, or pierce status.
	Hit-Plate Monitor	Once enabled, the system will trigger the hit-plate monitor based on the cycle and threshold.
Advanced	Realtime calibration	When enabled, calibration is performed based on the set interval. It is capable of avoiding cutting quality problems caused by capacitance fluctuation due to temperature shifts.
	Quick follow	When enabled, improves <b>Frog Leap</b> efficiency and thus cutting.
	Vibration Suppression	When enabled, it is capable of suppressing the vibration caused by the cutting airflow on the plate with weak structural rigidity, reducing the cross-section wavy lines. Meantime, it helps suppress the vibration from airflow and surface slags.

Category	Name	Description
	Sharp corner follow	Suitable for cutting parts with sharp corners (e.g. triangles). When enabled, it is able to quickly follow in place at sharp corners, reducing vibration and dwell time.

## 9.3 PLC

The PLC page allows you to customize the PLC actions that occur during machining. For example, if ***Safety door alarm input*** is configured via ***Config Tool → Alarm***, an alarm will be issued when the safety door is opened.

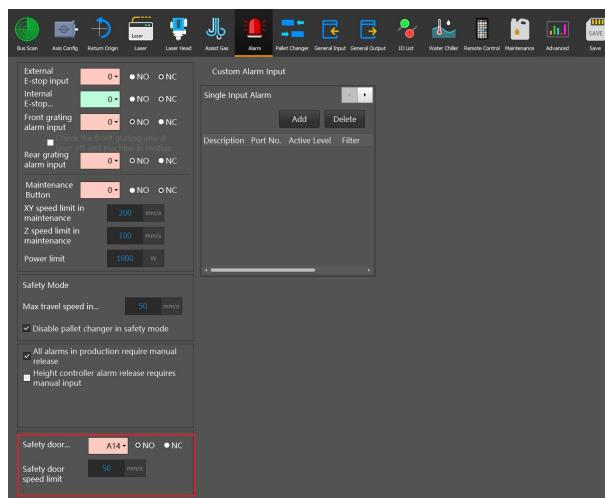


Figure 9-8 Safety door alarm input

If the safety door alarm is triggered in the servo-disable state (recommended with STO), the software will execute the corresponding PLC process.

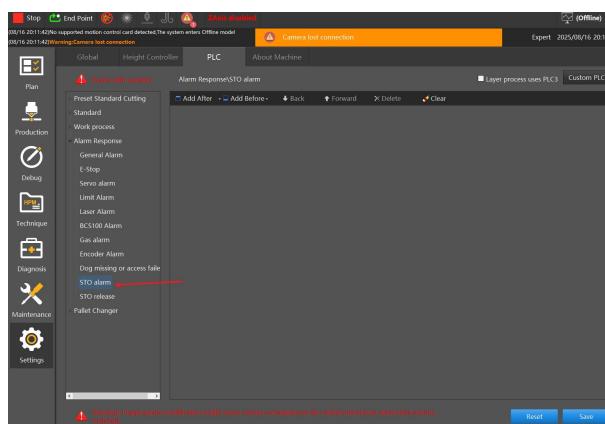


Figure 9-9 PLC - safety door alarm

**⚠️ Notice:** Improper PLC modifications may cause severe equipment damage or safety hazards. Consult technical support before making changes.

## 9.4 About Machine

Displays system/machine information including release date, control card model, laser model, cutting head model, height controller model, validity, among others.

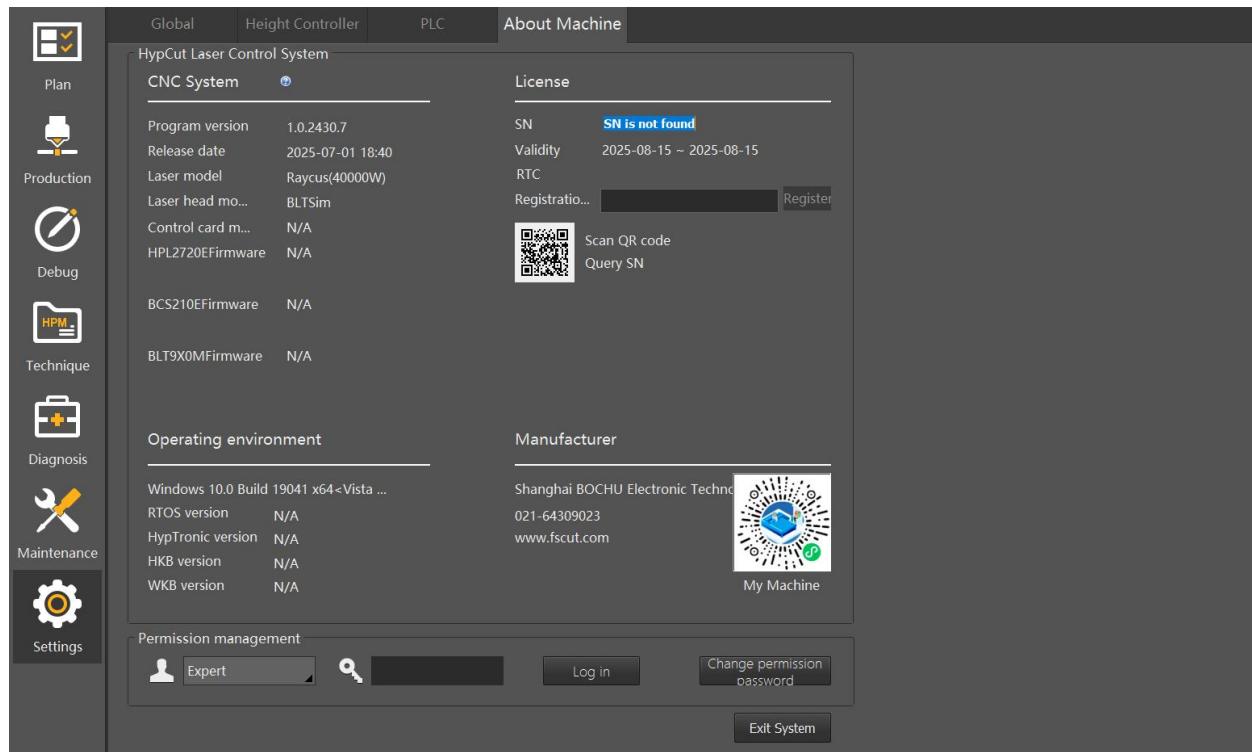


Figure 9-10 About machine interface

# Chapter 10 Coordinate Systems

The coordinate system used during the graphic design process is independent of the actual machine. It serves only as a reference for graphic designing. During processing, the coordinate system is associated with the machine's operational state. The relationship between the two coordinate systems is illustrated below.

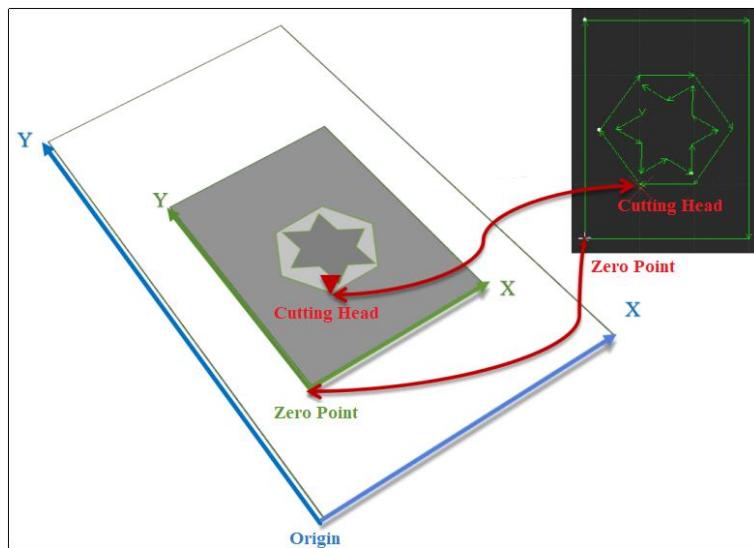


Figure 10-1 Coordinate system relationship

Click **Preview** on the Debug page to display the position of the graphic relative to the machine's working area.

## 10.1 Machine Coordinate System

The machine's structure and parameters uniquely define the machine coordinate system. Performing **Return Origin** consistently establishes the same coordinate system every time. During initial installation or abnormal deviations, reset the machine coordinate system via **Return Origin**.

Regardless of the equipment's mechanical structure (gantry or cantilever type), HypCut maintains a consistent definition for all coordinate systems. All movements are defined as the cutting head's movement relative to the workpiece. With the origin of the machine coordinate as a reference, moving the cutting head to the right defines the positive X-direction; moving the cutting head toward the rear defines the positive Y-direction. Thus, the lower-left corner of the

workpiece corresponds to the minimum coordinates, and the upper-right corner represents the maximum coordinates.

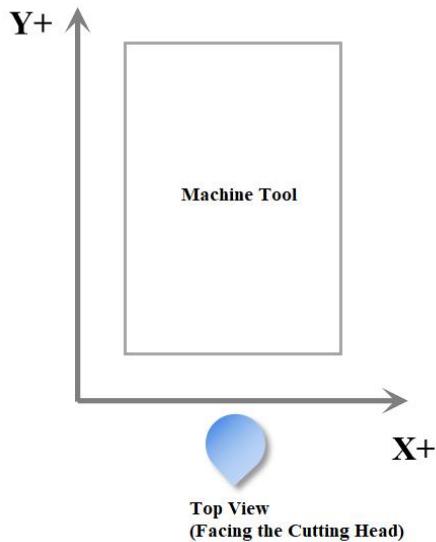


Figure 10-2 Top view of the machine tool

## 10.2 Program Coordinate System

Since the machine coordinate system is fixed, a program coordinate system is introduced to facilitate flexible and efficient operation. In HypCut, the program coordinate system shares the same axis orientations as the machine coordinate system. The only difference is the coordinate's zero point, referred to as the program zero point. The program coordinate system includes the float coordinate and the workpiece coordinate.

The **Debug** module uses a float coordinate system. The float system is suitable for flexible processing scenarios, using the cutting head's real-time position as the processing start point. When executing functions like **Frame**, **Dry Run**, and **Start** cutting, the cutting head's current position is automatically assigned as the zero point.

## 10.3 Find Zero Point After Unexpected Events

- If the machining process is stopped by peripheral errors (e.g., laser/gas failure) while the machine coordinate system is not affected, press/click **Return Zero** to directly locate the zero point position.
- If the machine coordinate deviates due to a sudden power loss, a servo alarm, or a similar

situation, it is recommended to first perform ***Return Origin*** to reset the machine coordinate. Afterwards, click ***Return Zero*** to return to the designated zero point.

Copyright Shanghai BOCHU Electronic Technology Co., Ltd.



Shanghai BOCHU Electronic Technology Co., Ltd.

No. 1000, South Lanxianghu Road, Minhang District, Shanghai City, China

Web: [www.bochu.com](http://www.bochu.com)

Tel: +86(21)64309023

Email: [Support@bochu.com](mailto:Support@bochu.com)

