

## Contents

|                                                                                     |           |
|-------------------------------------------------------------------------------------|-----------|
| <b>1. Introduction to Welding Robot Workstation .....</b>                           | <b>3</b>  |
| 1.1 Welding robot workstation (Hardware part) .....                                 | 3         |
| 1.2 Welding robot workstation (Software part) .....                                 | 4         |
| <b>2. Introduction and Software Upgrade of Intelligent Welding Software.. .....</b> | <b>5</b>  |
| 2.1 Intelligent welding software interface.....                                     | 5         |
| 2.2 Welding workstation upgrade and backup.....                                     | 5         |
| 2.2.1 Intelligent software upgrade and update methods .....                         | 5         |
| 2.2.2 Upgrading method for welding controller of welding workstation.....           | 6         |
| 2.2.3 Backup of welding workstation .....                                           | 6         |
| <b>3. Calibration of welding robot workstation .....</b>                            | <b>7</b>  |
| 3.1 Robot zero position (Zero point) calibration .....                              | 7         |
| 3.2 Robot TCP (20 points) calibration .....                                         | 8         |
| 3.3 Camera calibration (Hand eye calibration).....                                  | 10        |
| 3.4 Calibration of gun cleaning station.....                                        | 12        |
| 3.5 Rough positioning workstation calibration.....                                  | 13        |
| <b>4. The use of intelligent welding software.....</b>                              | <b>16</b> |
| 4.1 Intelligent welding software operation interface..                              | 16        |
| 4.2 Intelligent welding software usage --- User login                               | 16        |
| 4.3 Intelligent welding software usage --- Initialize connection.....               | 17        |
| 4.4 Intelligent welding software usage --- Download welding drawings.....           | 17        |

|                                                                                                    |           |
|----------------------------------------------------------------------------------------------------|-----------|
| 4.5 Intelligent welding software usage --- Scanning workpieces (Coarse positioning scanning) ..... | 18        |
| 4.6 Intelligent welding software usage --- Calculation (Workpiece registration).....               | 18        |
| 4.7 Weld seam extraction.....                                                                      | 20        |
| 4.7.1 Weld seam extraction --- Automatic extraction (Overall extraction).....                      | 20        |
| 4.7.2 Weld seam extraction --- Automatic extraction (Local extraction) .....                       | 21        |
| 4.7.3 Weld seam extraction --- Manual extraction (Conventional weld seam).....                     | 22        |
| 4.7.4 Weld seam extraction --- Manual extraction (Special weld seam) .....                         | 23        |
| 4.7.5 The use of node libraries.....                                                               | 24        |
| 4.7.6 Weld seam editing.....                                                                       | 24        |
| 4.8 Create weld seam units and send programs.....                                                  | 25        |
| <b>5. Introduction to Common Functions of Intelligent Welding Software .....</b>                   | <b>27</b> |
| 5.1 Intelligent Configuration --- Basic Settings.....                                              | 27        |
| 5.1.1 Intelligent Configuration --- Parameter Setting for Flat Welding and Vertical Welding.....   | 29        |
| 5.2 Welding technology.....                                                                        | 30        |
| 5.3 Introduction to Model Replacement and Software Parameter Comparison Tool.....                  | 31        |
| 5.4 Introduction to Cloud Data Functions.....                                                      | 33        |
| 5.4.1 Cloud data download drawings.....                                                            | 33        |
| 5.4.2 Cloud data intelligent reporting.....                                                        | 33        |

# 1. Introduction to Welding Robot Workstation

## 1.1 Welding robot workstation (Hardware part)



**Welding robot workstation:** It mainly includes two parts: robots and welding equipment.

**Robots:** It mainly consists of the robot body and control cabinet (hardware and software).

**Welding equipment:** Including control system, wire feeder (arc welding), protective gas, welding gun (pliers) and other components.

## 1.2 Welding robot workstation (Software part)



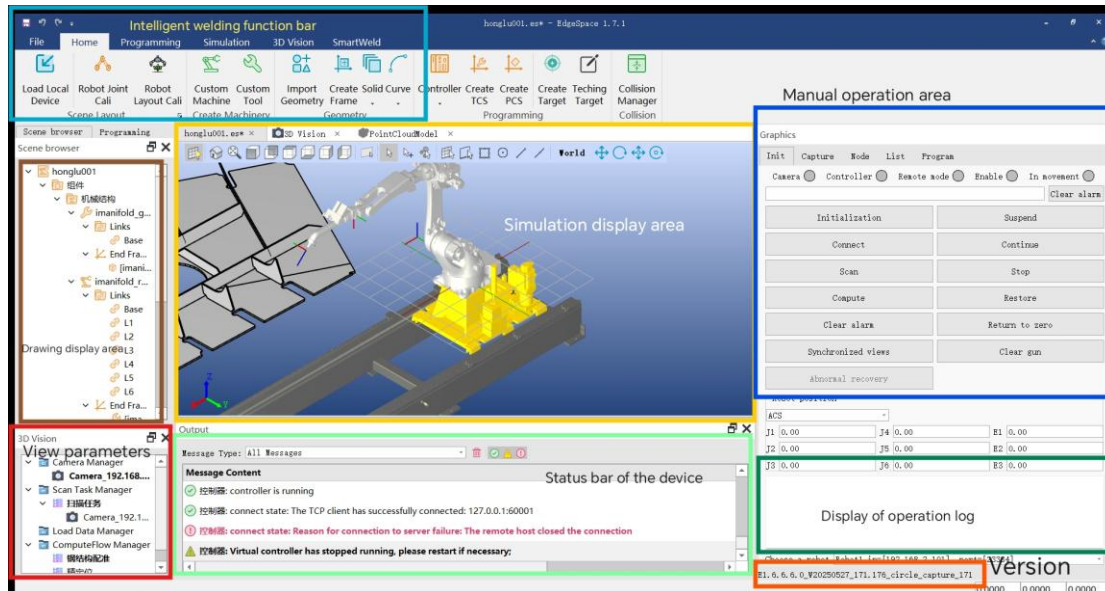
**Intelligent welding software:** The operation terminal of the workstation sends task instructions, processes image data, extracts weld seams, and sends welding programs.

**Visual camera software:** Provide image data.

**Auxiliary tools:** Intelligent welding software upgrade tool (remote upgrade tool), visual camera upgrade tool, and other auxiliary software tools. The 'upgrade tool' is mainly used to upgrade and update software versions. Regularly updating versions can ensure stable software operation. At the same time, new versions will release some new functions, making software use more convenient and improving production efficiency.

## 2. Introduction and Software Upgrade of Intelligent Welding Software

### 2.1 Intelligent welding software interface

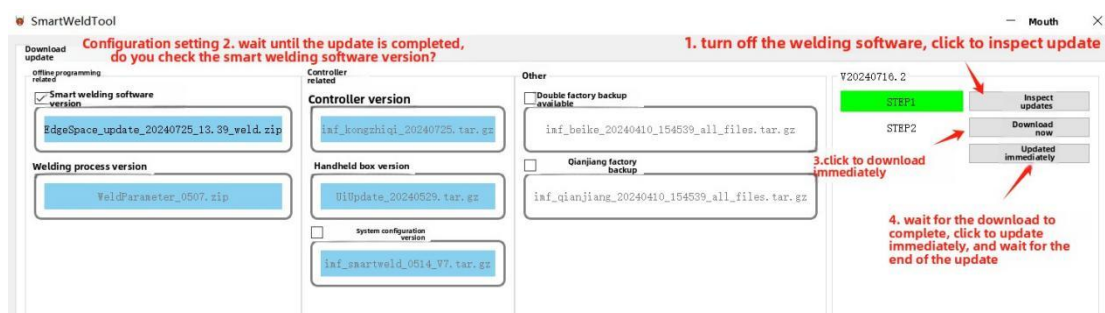


### 2.2 Welding workstation upgrade and backup

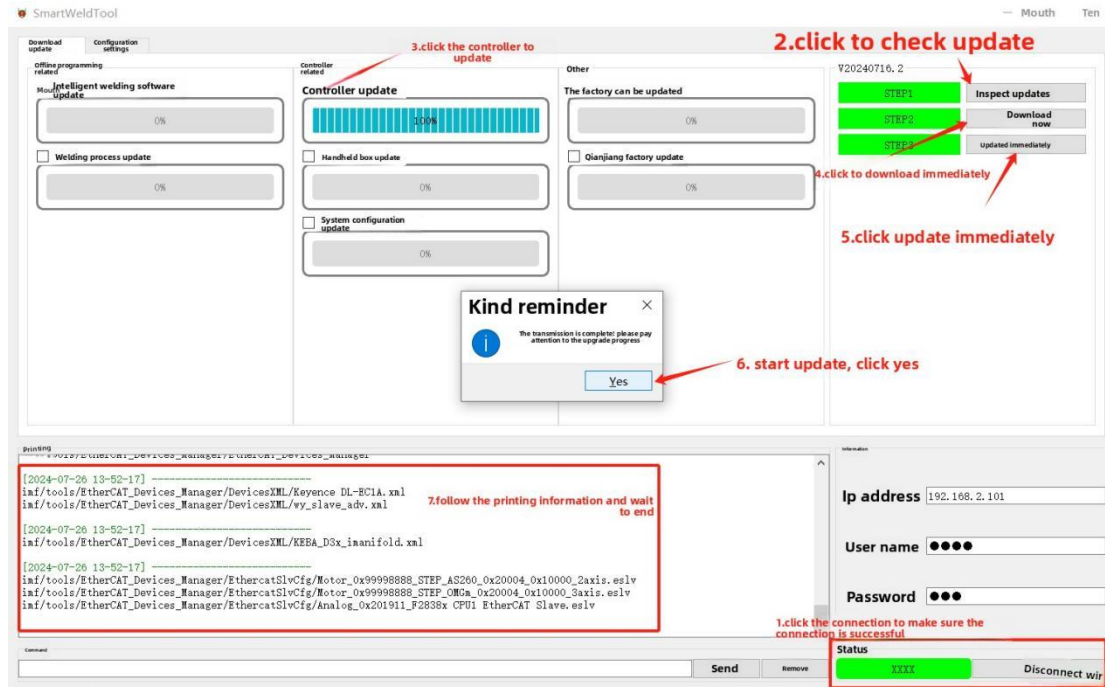
**Upgrade :** Regularly updating versions can ensure stable software operation, and new versions will release some new features, providing more options for production and improving production efficiency.

**Backup:** It can prevent the loss of device data in special circumstances and can be used to analyze the operation status of the device.

#### 2.2.1 Intelligent software upgrade and update methods



### 2.2.2 Upgrading method for welding controller of welding workstation



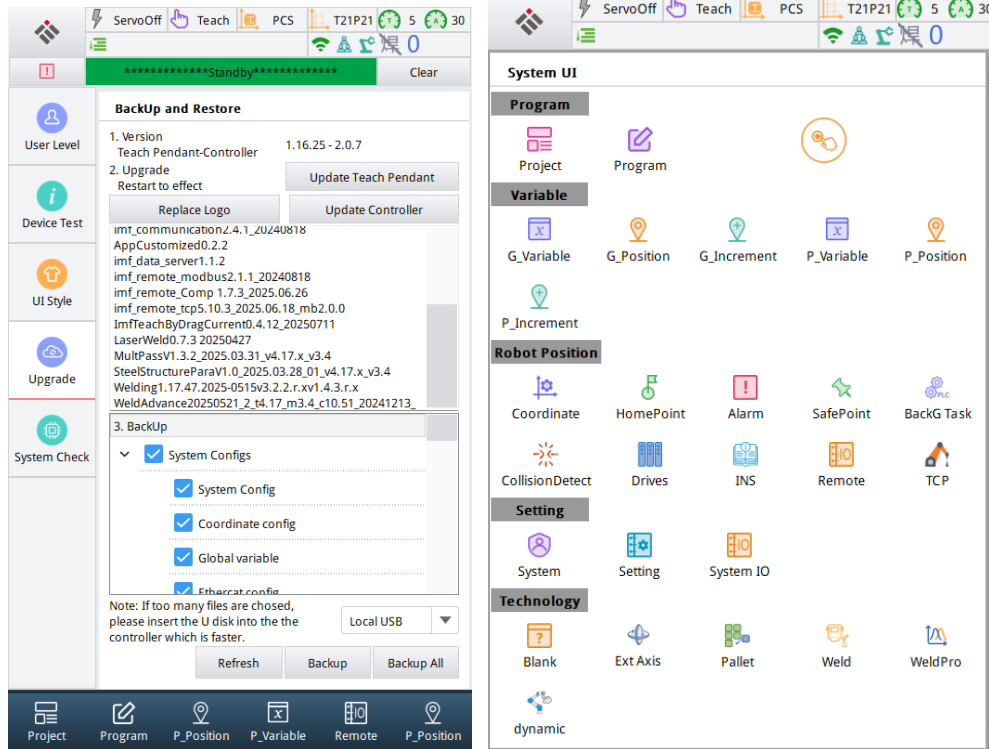
### 2.2.3 Backup of welding workstation

**Backup:** It can prevent the loss of device data in special circumstances and can be used to analyze the operation status of the device.

(It is recommended to use a 16GB USB drive for data backup)

**Backup steps:** System parameters → Upgrade backup → Backup everything (refer to the interface below)

# Welding Robot Workstation User Manual



## 3. Calibration of welding robot workstation

### 3.1 Robot zero position (Zero point) calibration

#### Note:

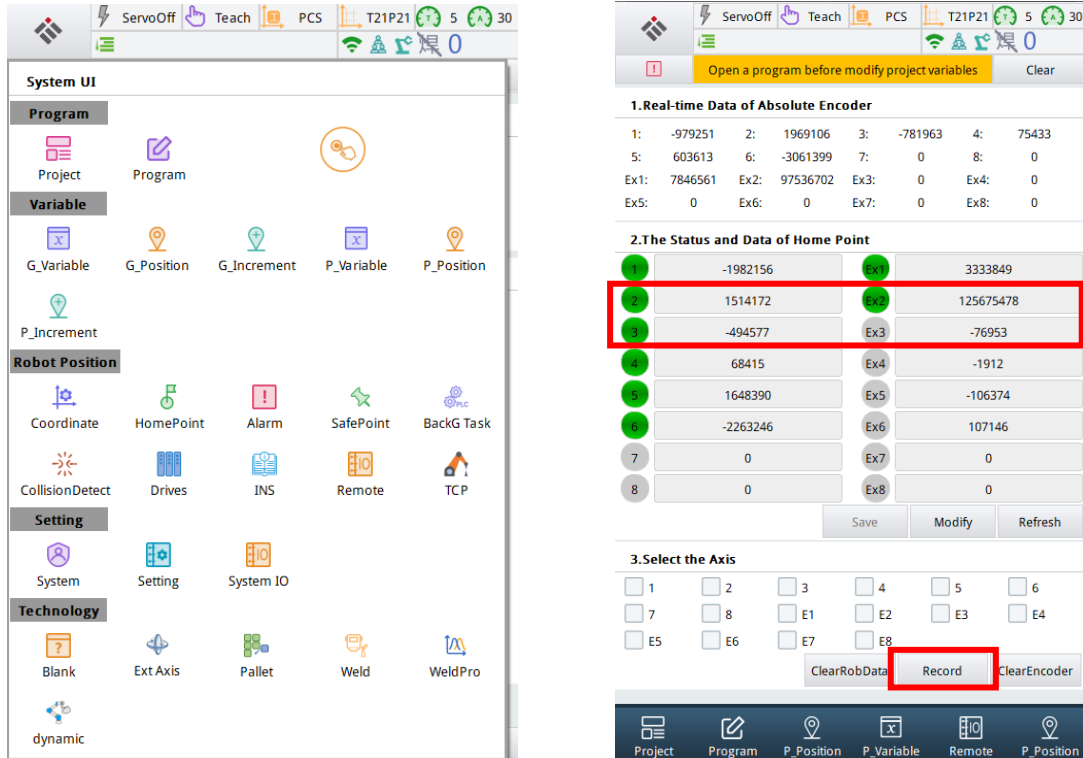
After the installation of the new equipment, it is necessary to check the zero position of the robot and calibrate the zero position of the robot. The zero position of the robot is the basis for all calibration.

When calibrating the robot TCP (20 o'clock), the calibration always fails, and the accuracy is still poor after multiple calibrations. This requires checking the zero position and recalibrating the zero point. (Refer to the figure on the right for the zero points of each axis)



## Robot zero calibration steps:

1. Select zero calibration on the main interface of the handheld box;
2. Select axis, normally check axes 1-6 and E1
3. After aligning the zero mark, record the zero point;



## 3.2 Robot TCP (20 points) calibration

**Note:** When calibrating, adjust the **automatic speed to between 20-30 (up gear+V)** to adjust the speed.

After completing the calibration, be sure to wrap around the point and not just look at the displayed values. Wrap around in all three directions, J4, J5, and J6. After confirming that there are no errors (within 1mm of the point error), proceed with camera calibration.

### Robot TCP (20 point) calibration steps:

Preparation work: Prepare calibration needles and calibration plates;

Step 1: Select the calibration option on the main interface of the handheld box and enter the calibration interface;

Step 2: After aligning the calibration needle tip with the calibration plate tip, record point 1. The recorded point will turn green.

Step 3: After recording, lift the gun up about 5mm and click on the

recording reference point.

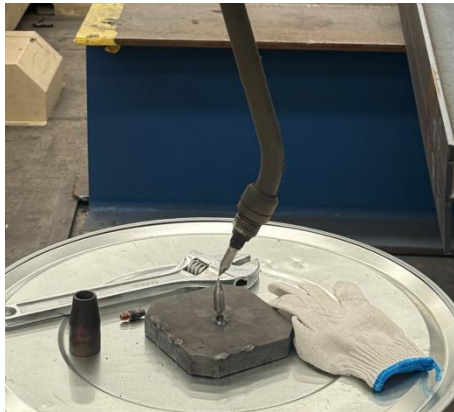
Step 4: Click on the motion to reach the reference point. The activation status of this point will turn gray and green, and then continue to press forward to reach the next reference point;

Step 5: After reaching the reference point, move the robot to align the calibration needle tip with the tip of the calibration plate again, record the second point, then lift the welding gun and repeat steps 4 and 5 to record 20 points.

Step 6: Calculate, check the calculated error value, and then select manual compensation.

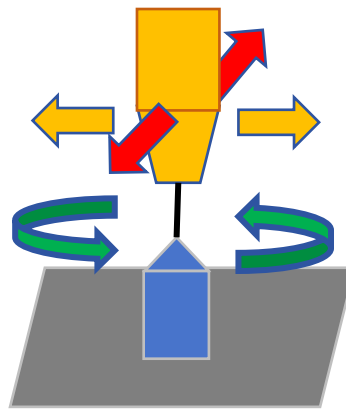
Step 7: After calibration is completed, perform point verification.

**Calibration tool preparation:**



Prepare calibration needle and calibration board

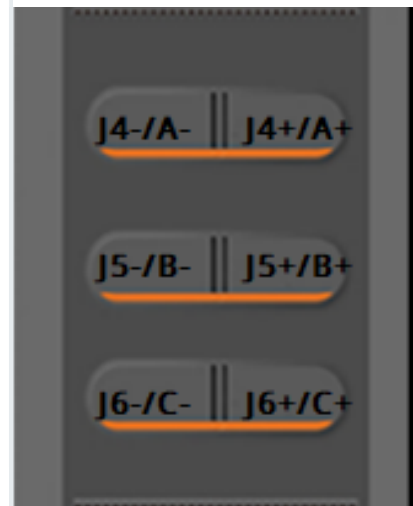
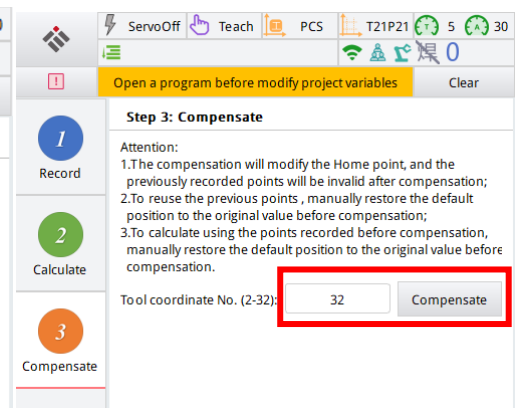
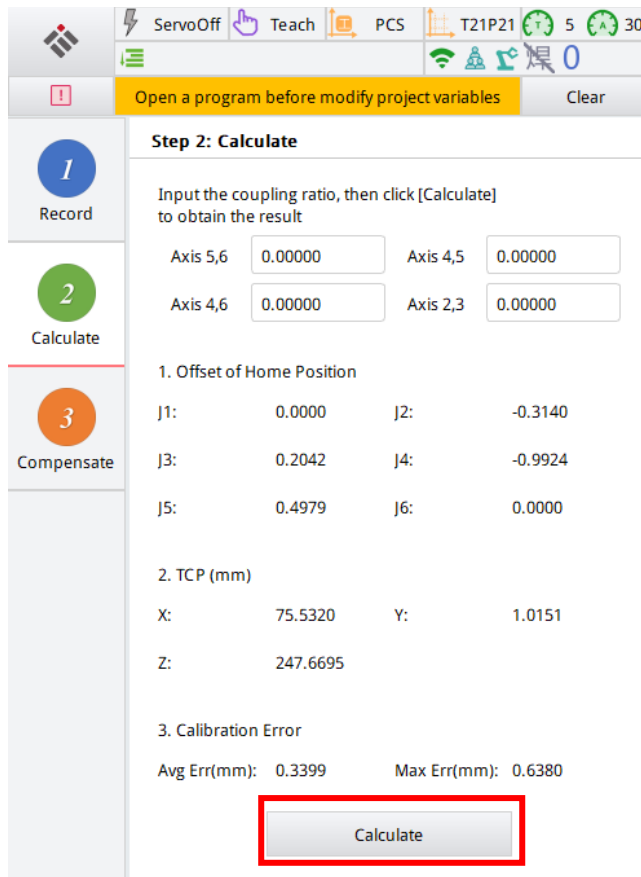
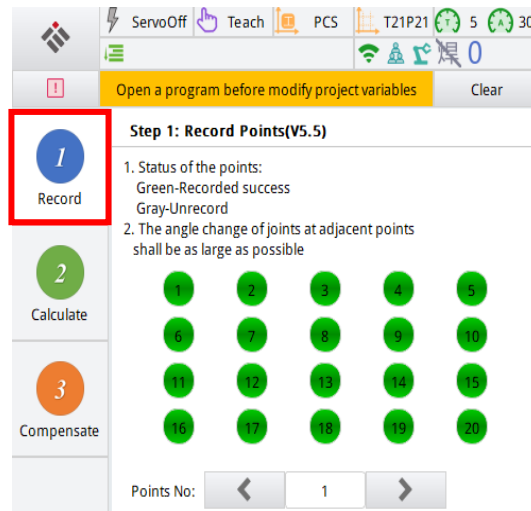
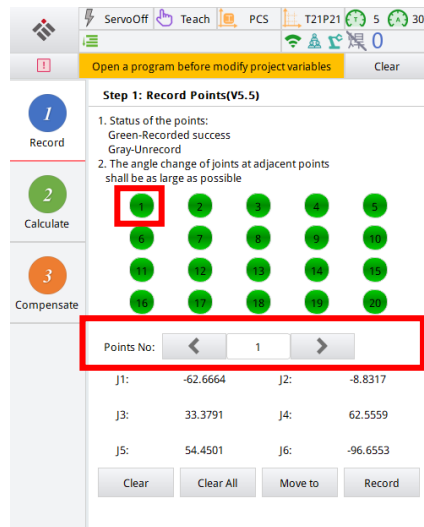
**Circle point verification:**



When verifying around points, all three directions must be verified

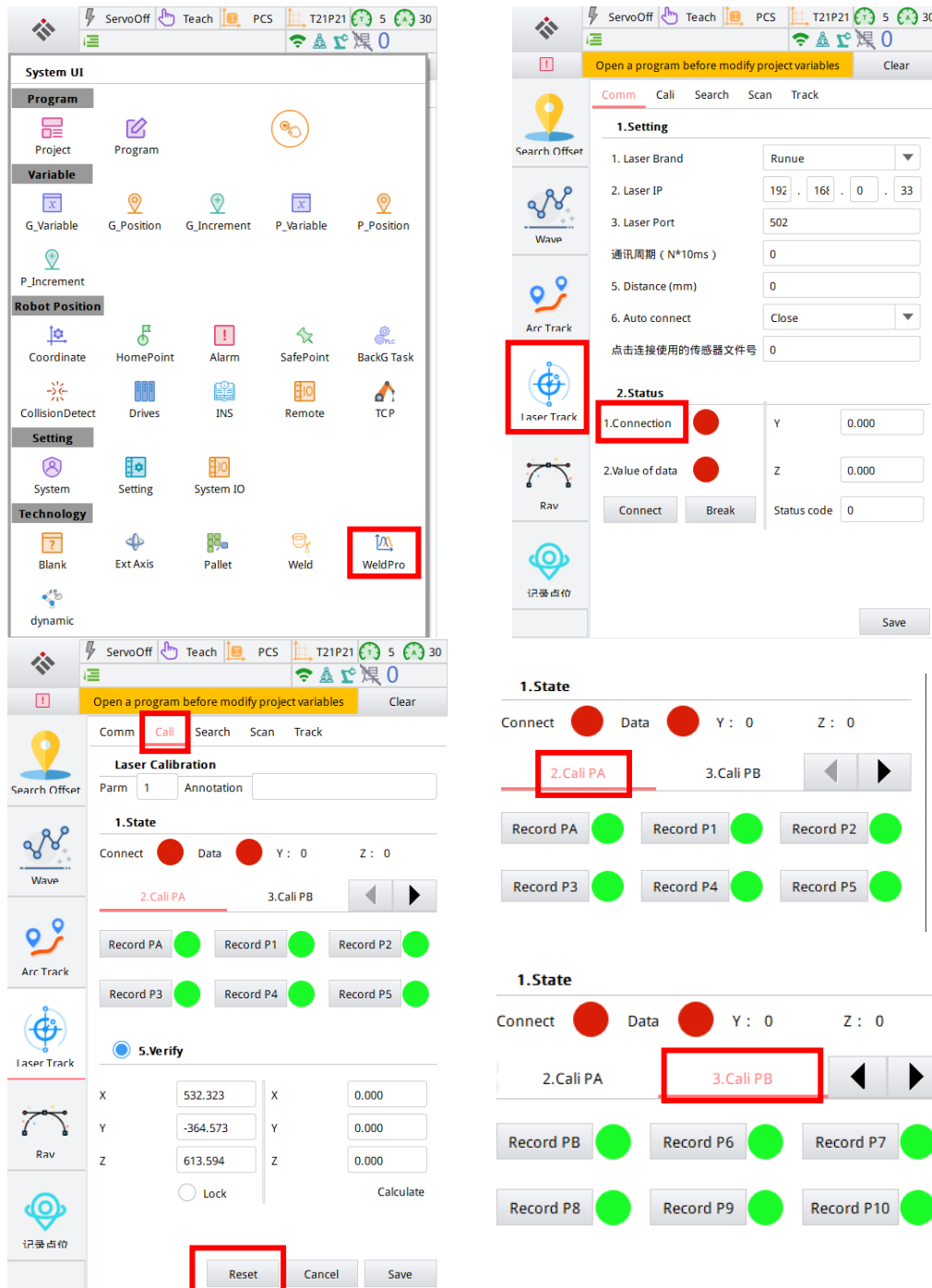
**Robot TCP (20 points) calibration steps (Images):**

## Welding Robot Workstation User Manual



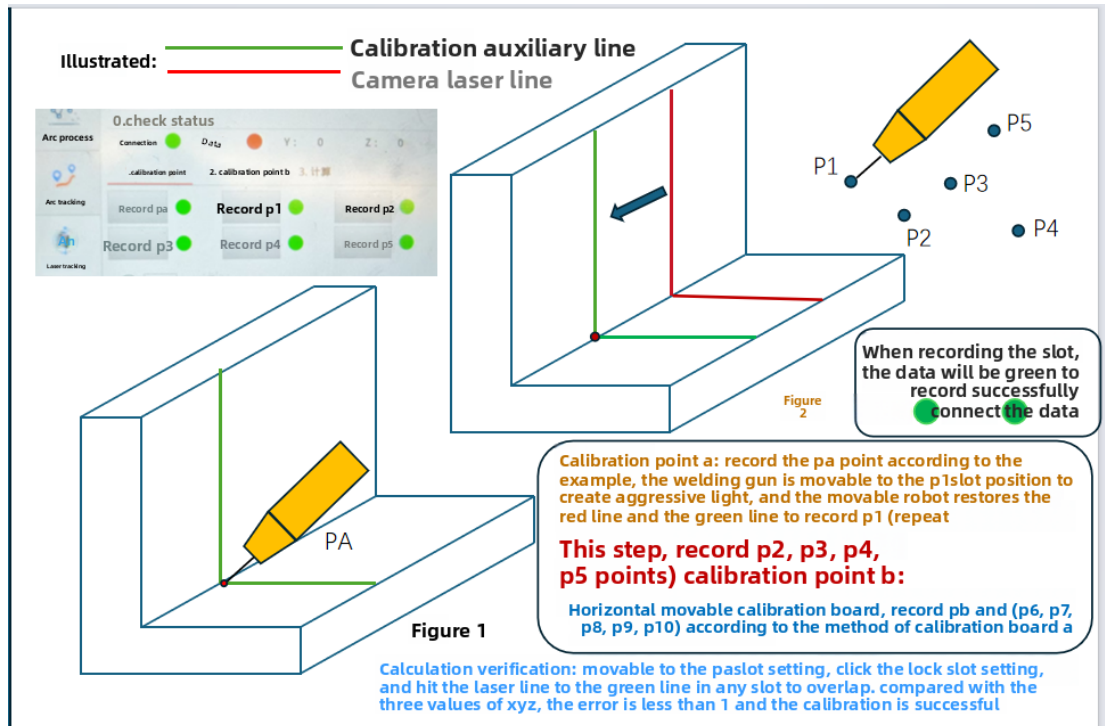
### 3.3 Camera calibration (Hand eye calibration)

**Camera calibration process:** Advanced welding → Laser tracking → Connection → Calibration → Reset → Calibration → Calculation verification.



Refer to the above figure for the calibration interface. How to record PA points, P1-P5 points, PB points, and P6-P10 points? Please refer to the next page.

When recording points, the camera shutter needs to be manually opened.



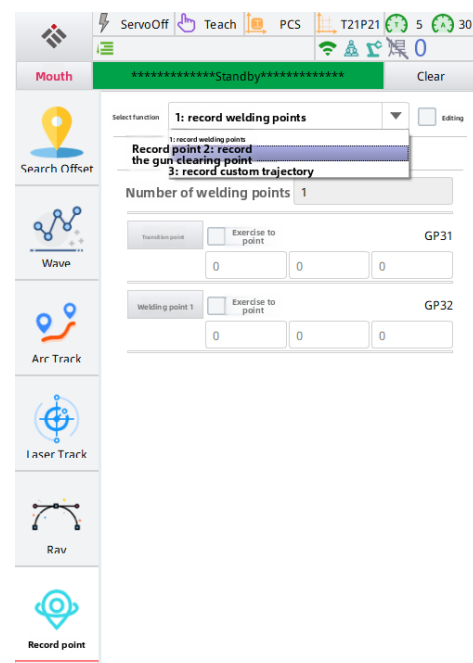
## 3.4 Calibration of gun cleaning station

### Calibration steps for gun cleaning station:

Main interface → Advanced welding → Record points → Select functions → Record gun cleaning points, enter the gun cleaning station calibration interface.

**Note :** After the robot TCP (20:00) calibration and camera hand eye calibration are completed, the gun cleaning station needs to be recalibrated.

( To prevent collisions during the cleaning process that may cause loss of



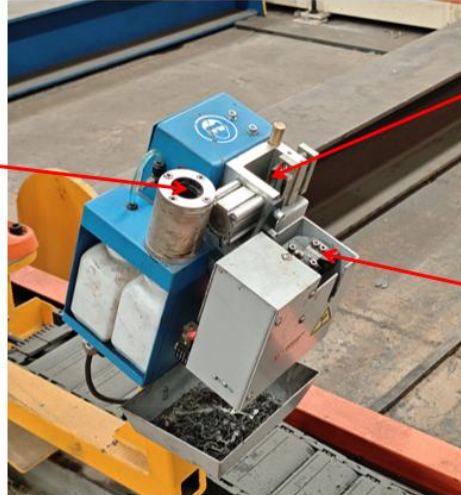
equipment accuracy. )

## Introduction to each point of gun cleaning Station:

### Fuel injection point

(the lift point on the fuel injection is set to the upper part of the fuel injection point. when performing the fuel injection, you will first move to the fuel injection point and then move to the fuel injection point. the slot setting must be reasonable and you cannot set the slot at will )

**Initial point and security point:** it can be placed on the same point as the robot zero slot device.



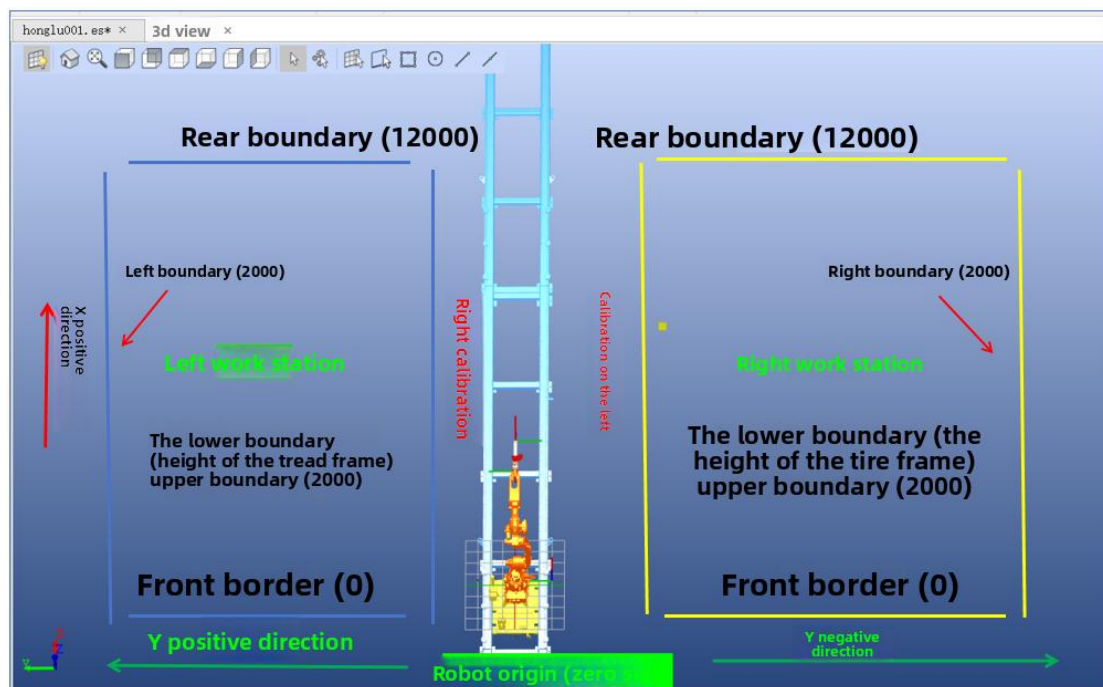
### Clearing gun point

(the lift point on the gun is set up to the upper part of the gun clearing point. when performing the gun clearing, it will move to the gun to lift the point. the slot setting must be reasonable when moving to the fuel injection point. you cannot set the slot at will )

### Shearing point

(the lift point on the shearing thread is set to the upper part of the scissor point. when performing the silk shear, you will first move to the shear line and lift the point, and then move to the shearing point. the slot setting must be reasonable and you cannot set the slot at will )

## 3.5 Rough positioning workstation calibration



Coarse positioning station calibration is used to set the cutting area, eliminate redundant and chaotic point clouds, and improve the accuracy of point cloud registration. Coarse positioning station calibration mainly calibrates the lower and left and right boundaries of the station.

**Namely: Left workstation:** calibrate the lower and right boundaries, **right workstation:** calibrate the lower and left boundaries.

### Rough positioning workstation calibration interface:

The left screenshot shows the 'Scan Settings' window. It includes fields for 'ScanMode' (SteelStructureScan), 'Workstation selection' (Left workstation), 'Scan height' (-100mm), 'Scan start stop position' (1000mm to 2000mm), and 'Expand' (checked). There are also fields for 'Number of extensions in the Y direction' (2), 'Y-direction extension length' (500), 'Theoretical photography point XYZ' (-400, -300, 1900), and 'Theoretical photography point ABC' (20, -20, -75). A red box highlights the 'CropBoxSetting' button. Below it are 'WorkstationRestrictions' and 'Speed compensation setting' buttons. At the bottom are 'Move to this height', 'Workstation unlocking', 'Save', and 'Start Scan' buttons.

The right screenshot shows the 'Preparation' window. It has a 'Station selection' dropdown set to 'Left workstation'. Below it are several calibration fields: 'Calibration of the left boundary' (0.00, 200.00, 0.00), 'Calibration of the right boundary' (0.00, 0.00, 0.00), 'Calibration of front boundary' (0.00, 0.00, 0.00), 'Calibration of rear boundary' (12,000.00, 0.00, 0.00), 'Calibration of lower boundary' (0.00, 0.00, -300.00), and 'Calibration of upper boundary' (0.00, 0.00, 2,000.00). At the bottom are 'Save' and 'Back' buttons.

### Rough positioning calibration instructions:

Left workstation: **The right and** lower boundaries need to be calibrated, and the left boundary of the left workstation is set to 2500 by default.

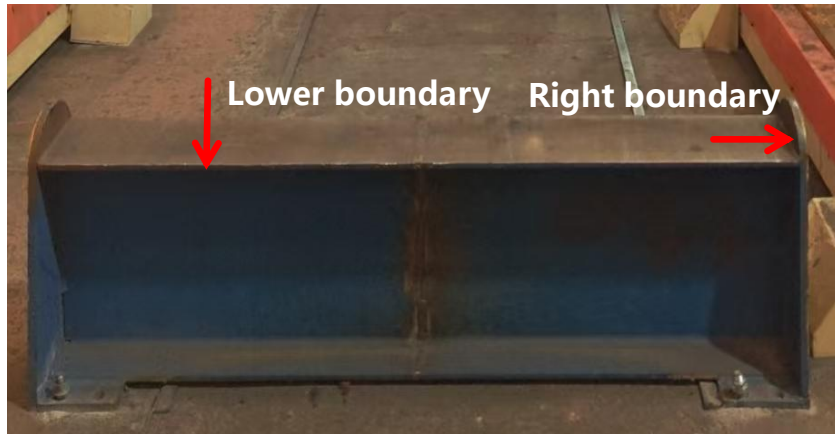
Right workstation: **The left and** lower boundaries need to be calibrated, and the left boundary of the left workstation is set to -2500 by default.

The default values can be used for the front boundary, rear boundary, and upper boundary.

### Taking the left workstation as an example:

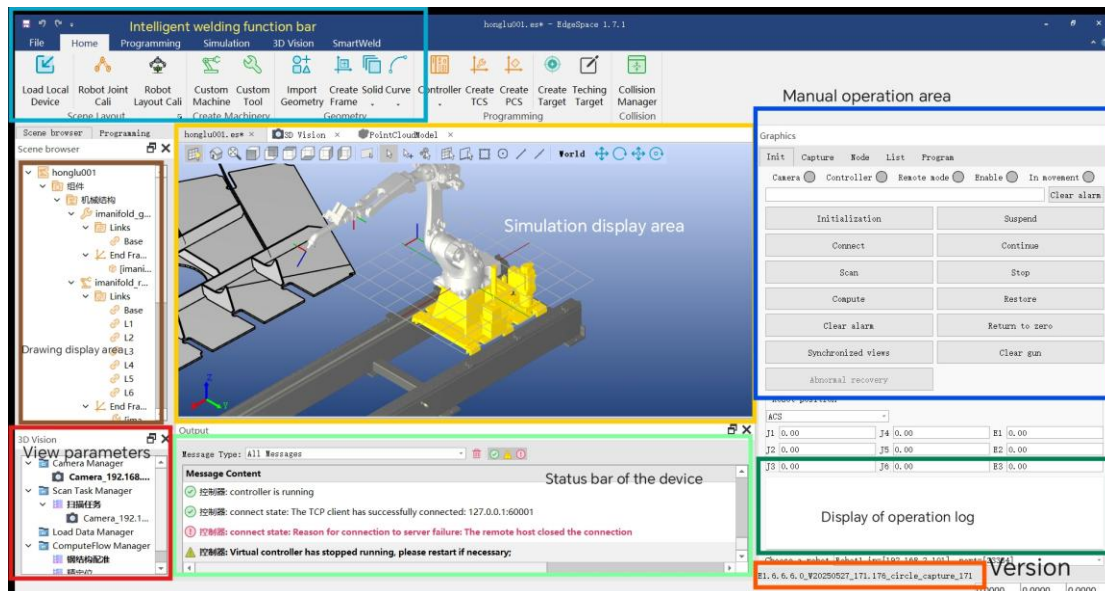
The left workstation needs to calibrate **the right boundary**. Move the robot and align the welding wire to the point on the right boundary of the tire frame for calibration.

The calibration of the lower boundary is the same. With a mobile robot, align the welding wire with the surface of the tire frame, and then perform point calibration.



## 4. The use of intelligent welding software

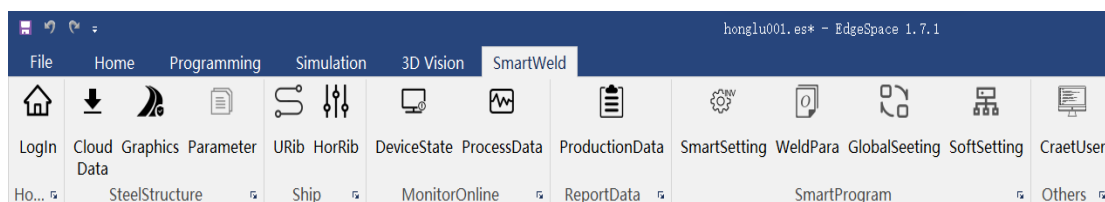
### 4.1 Intelligent welding software operation interface



Software operation steps: Log in to the software → Initialize connection → Upload imported drawings → Scan → Calculate → Weld seam extraction → Set welding unit (select welding process, edit weld seam) → Send program → Weld.

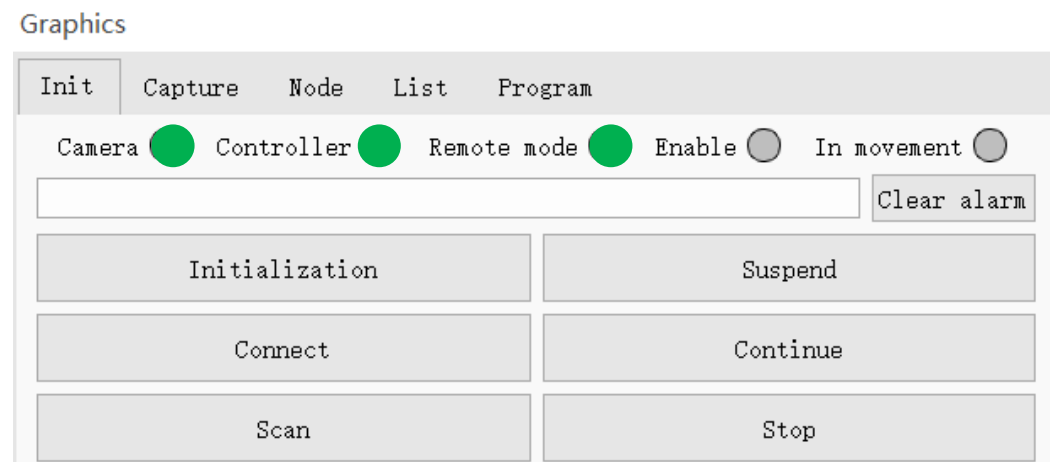
### 4.2 Intelligent welding software usage --- User login

User login: In the navigation bar above the software, select Smart Welding -> User Login. After successful login, you can use all the functions of the Smart Welding software.



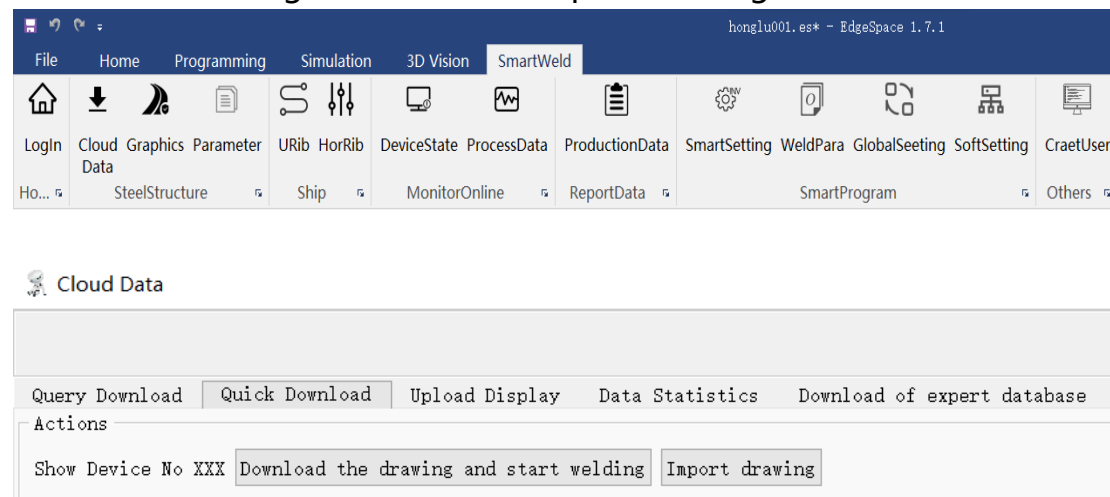
## 4.3 Intelligent welding software usage --- Initialize connection

Initialization device: Connect the welding workstation, and the status indicator light turns green to indicate successful connection; After successful connection, the welding workstation can be controlled using software.



## 4.4 Intelligent welding software usage --- Download welding drawings

Welding drawing download: Intelligent welding → Cloud data → Download drawings and weld → Import drawings.



## 4.5 Intelligent welding software usage --- Scanning workpieces (Coarse positioning scanning)

### Scan interface:

|                                            |                             |                            |            |
|--------------------------------------------|-----------------------------|----------------------------|------------|
| ScanMode                                   | SteelStructureScan          |                            |            |
| Workstation selection                      | Left workstation            |                            |            |
| Scan height                                | -100mm                      |                            |            |
| Scan start stop position                   | 1000mm                      | 2000mm                     |            |
| <input checked="" type="checkbox"/> Expand |                             |                            |            |
| Number of extensions in the Y direction    | 2                           |                            |            |
| Y-direction extension length               | 500                         |                            |            |
| Theoretical photography point XYZ          | 400                         | -300                       | 1900       |
| Theoretical photography point ABC          | 20                          | -20                        | -75        |
| CropBoxSetting                             | LiftWorkstationRestrictions | Speed compensation setting |            |
| Move to this height                        | Workstation unlocking       | Save                       | Start Scan |

**Workstation selection:** Based on the actual position of the workpiece, select the left and right workstations. To switch workstations, click on the workstation unlock button below to unlock them.

**Scanning height:** Adjust the appropriate scanning height according to the height of the workpiece to prevent gun collision during scanning. Can move to a safe height and verify if the set height is reasonable.

**Scanning start-stop position:** Set the scanning length according to the length of the workpiece.

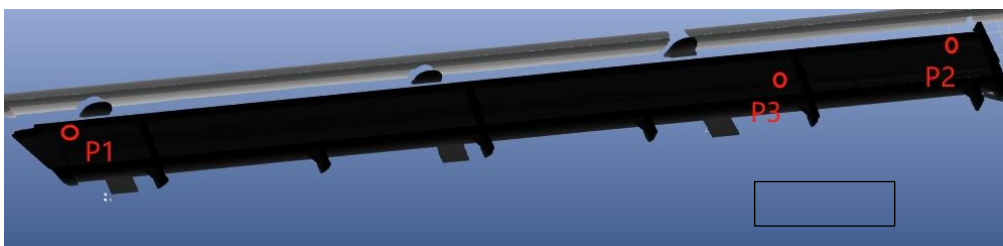
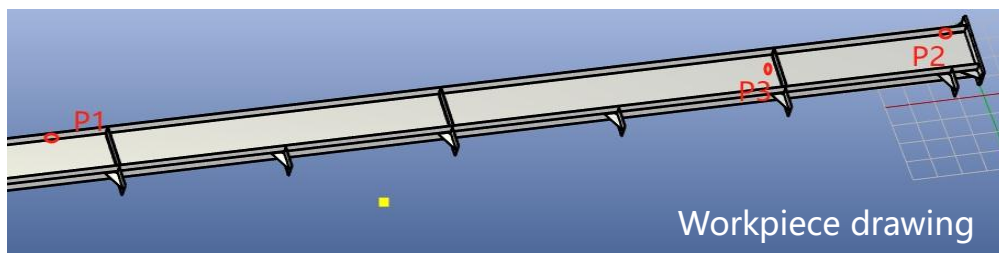
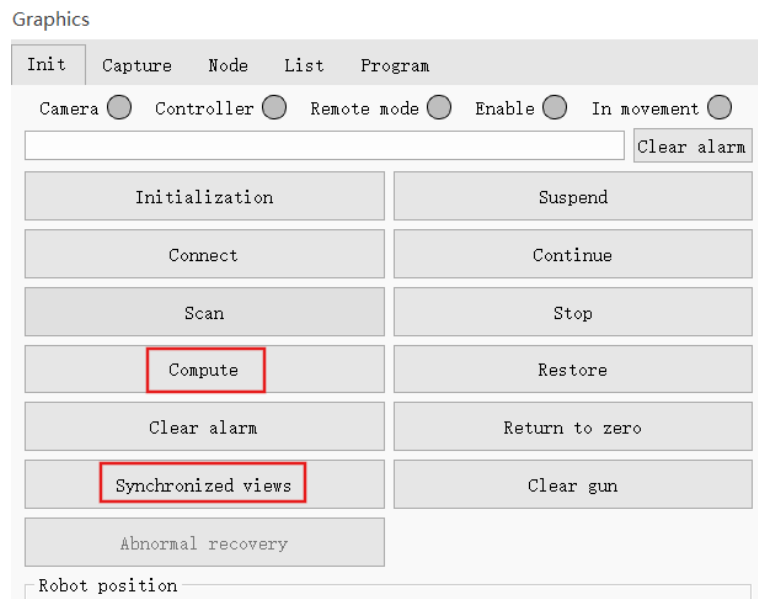
**Expand:** Adjust the scanning position (for special circumstances only, it is best to use the default value).

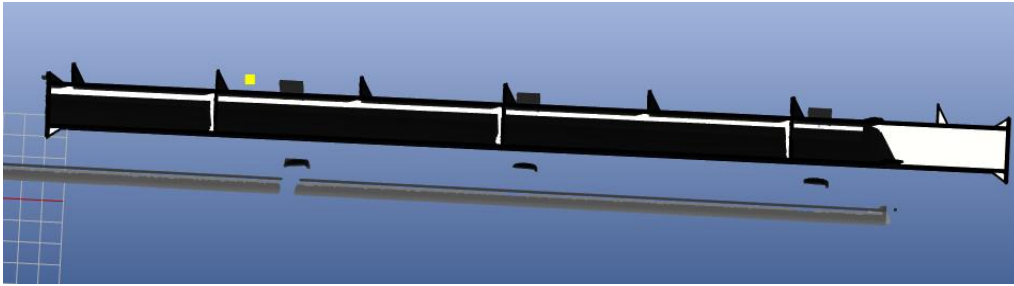
## 4.6 Intelligent welding software usage --- Calculation (Workpiece registration)

**Calculation:** Calculation is to match the workpiece drawing with the

## Welding Robot Workstation User Manual

scanned point cloud to obtain the approximate position of the workpiece.





## 4.7 Weld seam extraction

**Weld seam extraction:** Use the weld seam extraction function to extract the weld seam on the workpiece; There are multiple extraction methods for welds. There are mainly: automatic weld seam extraction, manual weld seam extraction, special weld seam extraction, node library extraction of weld seams, and custom editing of weld seam extraction.

### 4.7.1 Weld seam extraction --- Automatic extraction (Overall extraction)

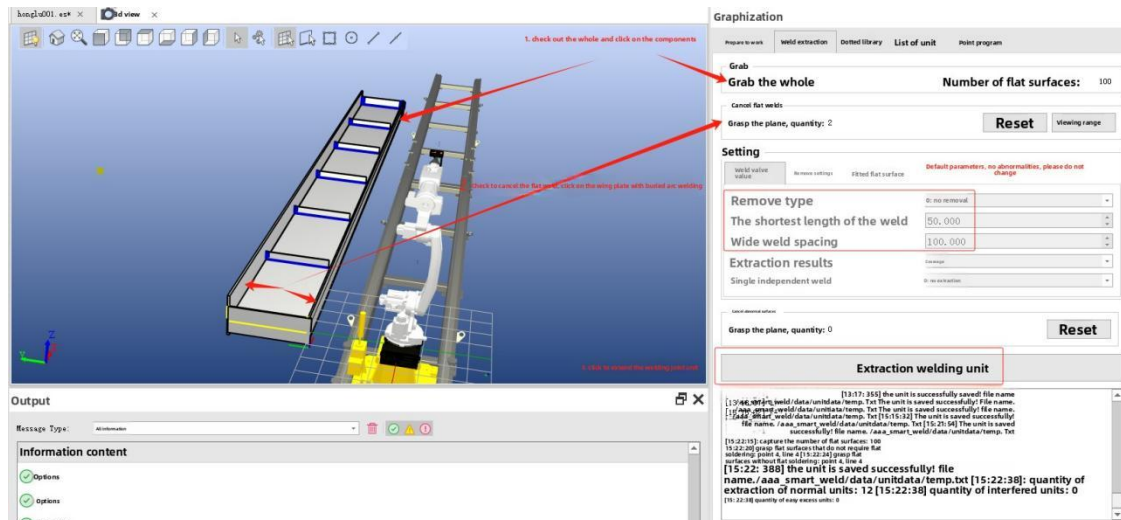
**Extraction steps:** Check the set parameters ->[Extract Whole] ->[Cancel Flat Weld Seam - Grasp Plane] ->Click [Extract Weld Seam Unit]

**Note:** Using this extraction method, if there are too many or too few extracted welds, you can modify the setting parameters, cancel the abnormal surface, and re extract the welds. This extraction method will extract all the welds in the plane and also extract the unwelded plates, which need to be manually deleted.

For workpieces with multiple auxiliary plates, it is recommended to use 4.7.2 weld seam extraction --- automatic extraction (local extraction).

### **Automatic extraction interface demonstration:**

## Welding Robot Workstation User Manual

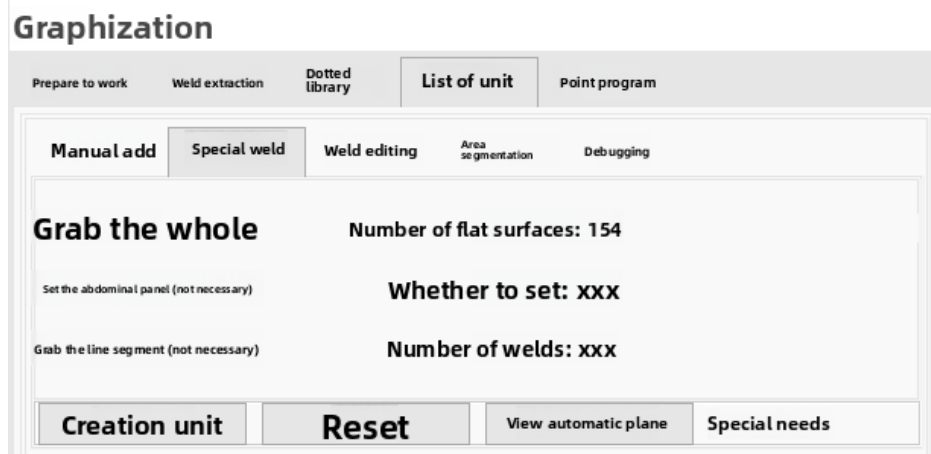


### 4.7.2 Weld seam extraction --- Automatic extraction (Local extraction)

**Extraction steps:** [Visualization] -> [Unit List] -> [Special Weld Seam] interface -> [Grasp Whole]: Obtain component information -> [Set Web Plate]: Obtain web plate information -> [Generate Unit]: Obtain weld seam information.

(This extraction method will automatically extract and filter the flat welding of the wing plate. If welding is required, you can grab it.)

#### Operation interface:

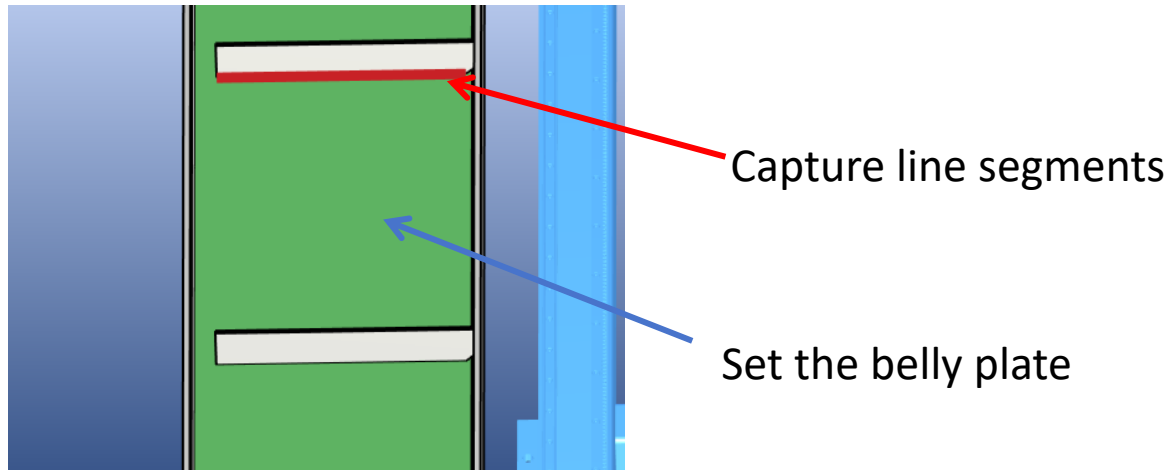


#### Extract for different situations:

Click on [Generate Unit] to [Capture Whole] .(same as weld seam extraction)

[Grasp the whole] → [Set the belly plate] Extract the relevant welds of

the belly plate. (Used to remove positions that do not require welding)  
 [Capture Whole] → [Capture Line Segment], click [Generate Unit].



### 4.7.3 Weld seam extraction --- Manual extraction (Conventional weld seam)

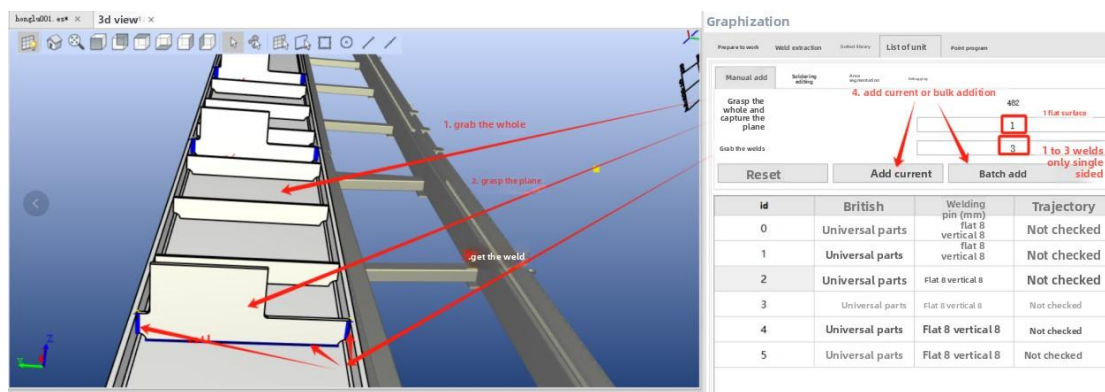
#### Operation steps:

[Grasp Whole] → [Grasp Plane] → [Grasp Weld Seam] → [Add Current] or [Batch Add].

#### Operating instructions:

Weld seam grasping: Only one plane and a maximum of three weld seams can be grasped at a time.

Batch addition: Only identical units will be generated. If the length and width of the reinforcing plate are not consistent, multiple batch additions are required.



#### 4.7.4 Weld seam extraction --- Manual extraction (Special weld seam)

##### Special weld seam extraction interface:

##### Special weld seam extraction --- custom grasping plane steps:

**Grasp plane:** grasp the plane where the custom weld seam is located.

[P1] refers to **point 1** of the weld seam to be grasped, and [P2] refers to **point 2** of the weld seam to be grasped. Two points correspond to one weld seam.

You can freely select any two points of a line on the component and can also use the [Grabbing Line Segment] as a weld seam. After selecting, click on [Generate Unit].

##### Extract for different situations:

The number of planes (including web plates) must be greater than or equal to 2.

Two planes (one plate and one web plate) are used to grasp only one flat weld (unobstructed, for dynamic positioning).

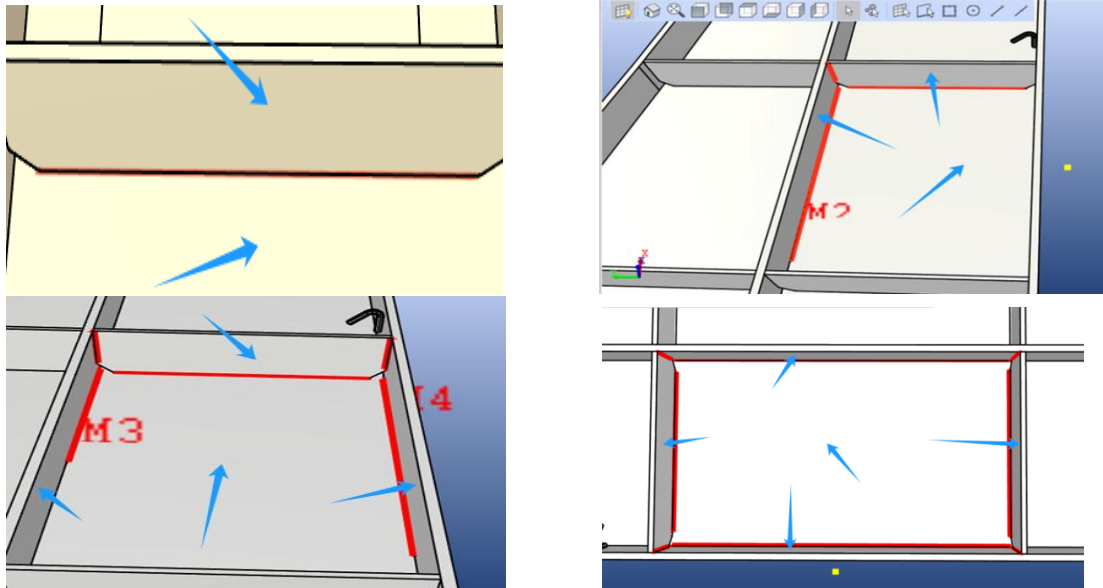
Three planes (2 plates+1 web plate) allow for arbitrary grasping of one vertical weld and two horizontal welds within the area.

Four planes (3 plates+1 web plate) allow for arbitrary grasping of two vertical welds and three horizontal welds within the area.

Five planes (4 plates+1 web plate) can be used to grab four vertical welds

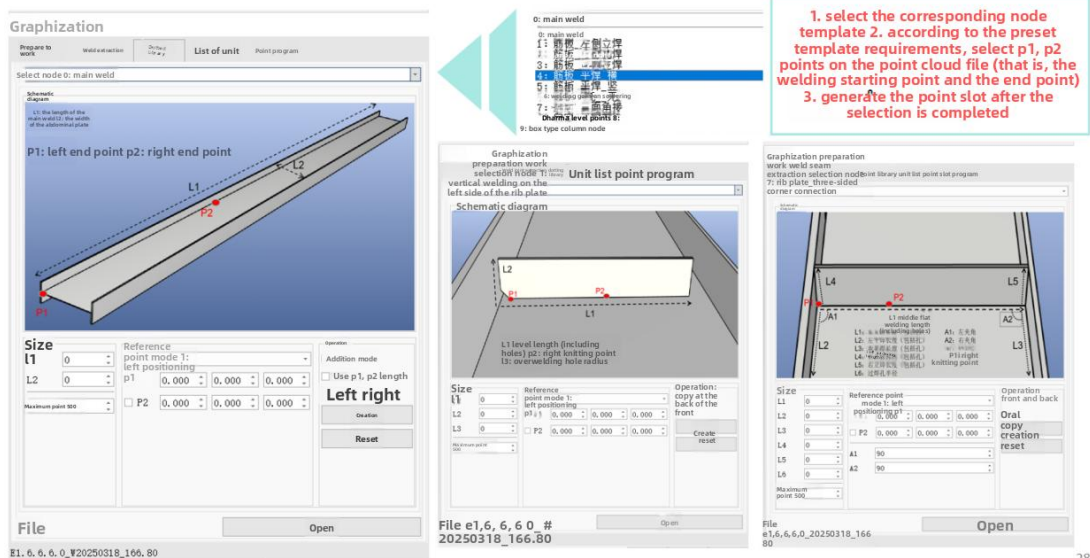
or four flat welds within any area.

**Extract reference diagrams for different situations:**



## 4.7.5 The use of node libraries

**Node library:** Suitable for small workpieces without workpiece drawings, using preset templates for extracting welds.

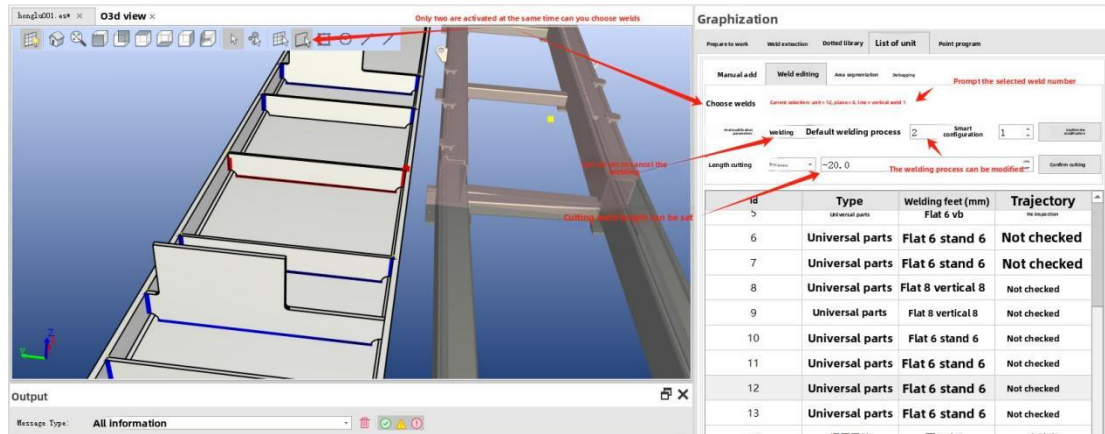


## 4.7.6 Weld seam editing

**Weld seam editing:** Weld seam editing is mainly used to process welds, including canceling welding, reversing direction, cutting length, and

adjusting weld seam length (fixed length/fixed ratio).

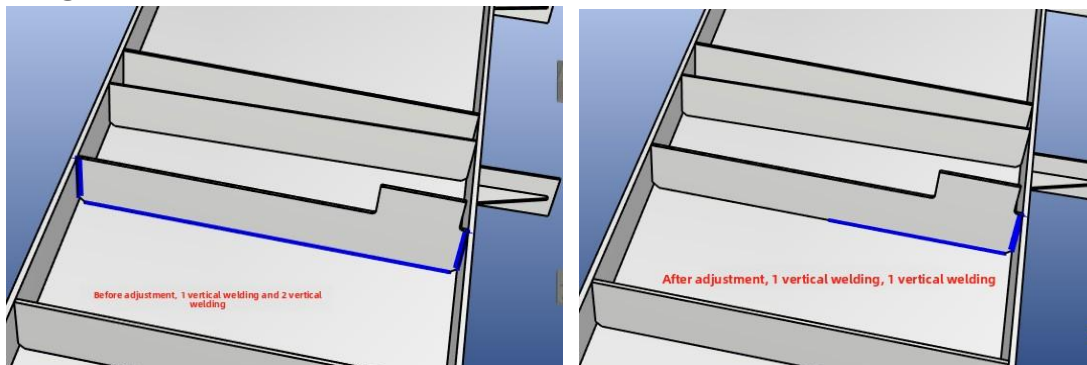
**Function usage introduction:** Both [Select Weld Seam] and [Select Surface] need to be activated simultaneously to select the weld seam; This function can set multiple attributes and edit operations for the selected weld seam.



### Adjust weld seam length: (fixed length/fixed ratio)

**Weld seam length adjustment:** Weld according to a fixed length and ratio, generally using a fixed ratio of 50%, so there is no need to measure the length. Once the welding length is adjusted, it cannot be restored and can only be re extracted.

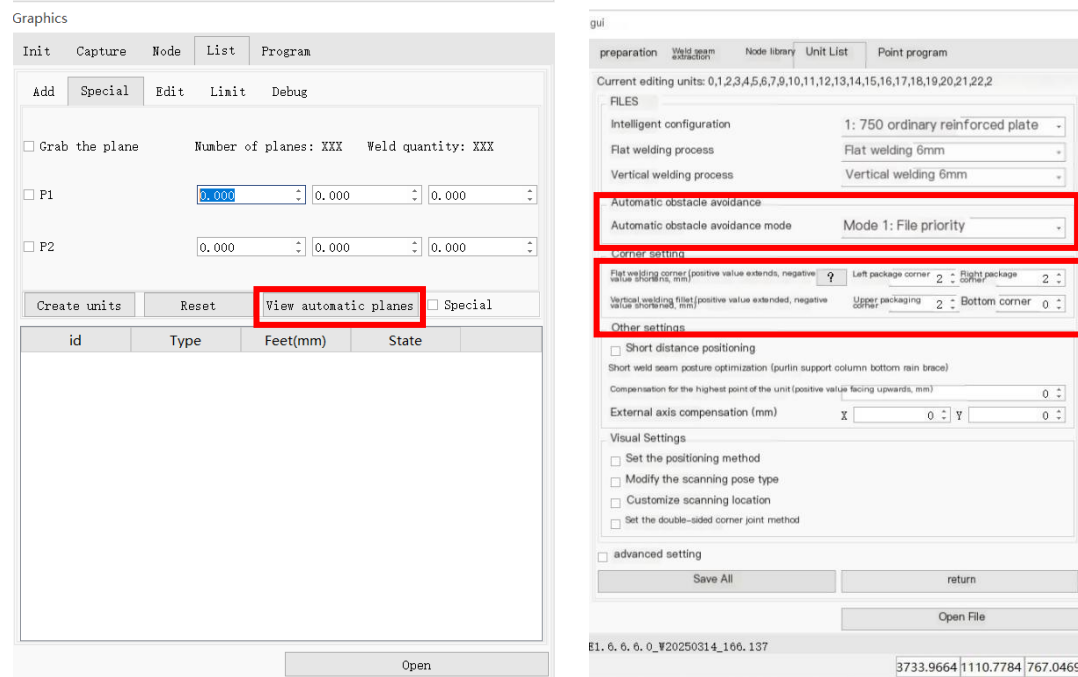
#### Diagram reference:



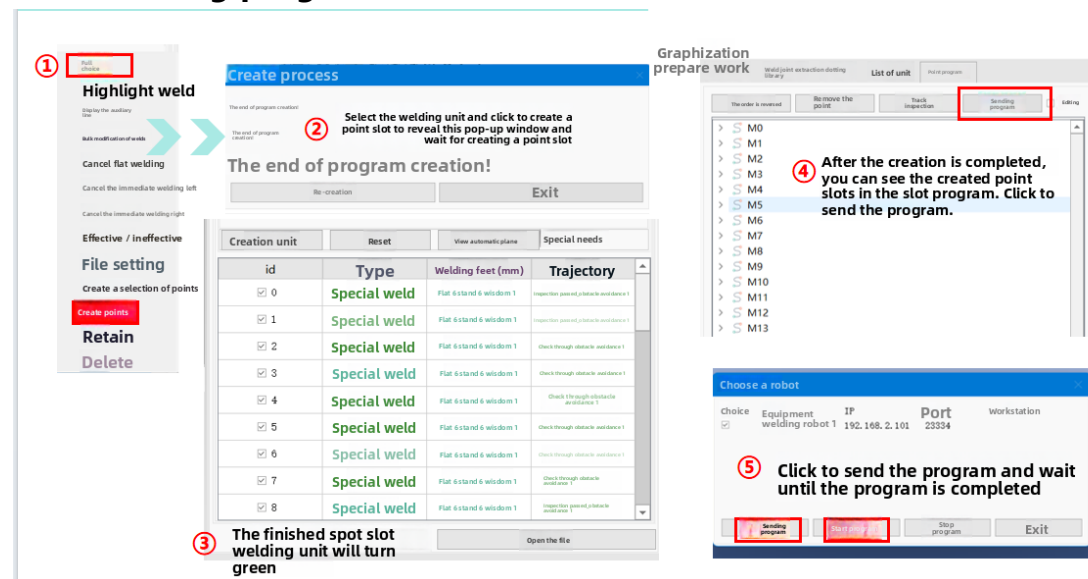
## 4.8 Create weld seam units and send programs

**Generate welding unit creation points:** After extracting the weld seam, generate welding units. We can set the welding units and select the welding process we need, (Left click to select welding unit, right-click to set welding unit) The operation interface is as follows:

# Welding Robot Workstation User Manual



## Send welding program:



## Welding positioning (precise positioning scanning):

After the program is issued and successfully started, the device will undergo a positioning process. After the positioning is completed, the device will start arc welding. Currently, there are two laser positioning methods:

Linear laser positioning: requires low equipment accuracy and slow positioning speed.

Point cloud scanning: requires high device accuracy and fast positioning

speed, and requires software calculation. It is recommended that the software be resident in the front-end.

Both laser positioning methods can be used together with welding wire positioning (the left image shows line laser positioning, and the right image shows point cloud scanning).



## 5. Introduction to Common Functions of Intelligent Welding Software

**Common functions of the software:** After understanding the basic usage process, the software also has some frequently used functions, (such as **intelligent configuration, welding process, software settings, cloud data, and manual coarse positioning function**).

### 5.1 Intelligent Configuration --- Basic Settings:

**Intelligent configuration interface:**

**Basic settings:**

There are two common functions we use, which are to modify the welding sequence and set the gun cleaning mode.

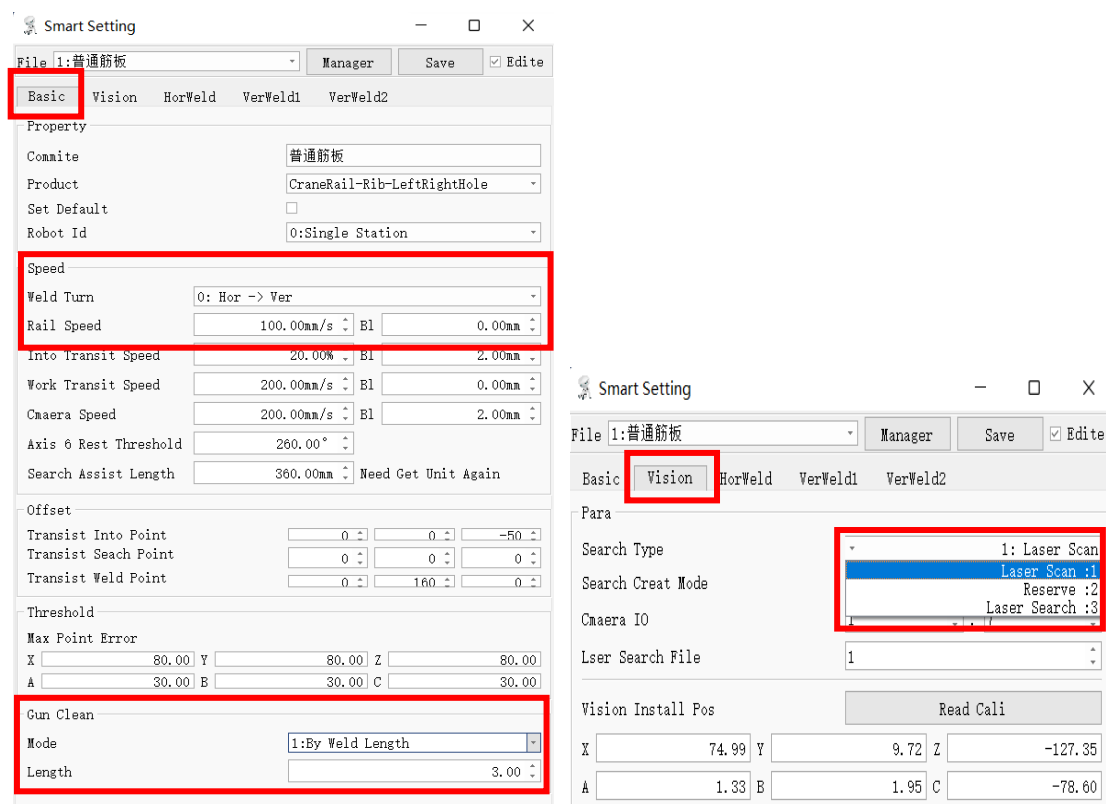
### **Welding sequence:**

It can be welded vertically first or horizontally first and then vertically.

### **Clear the gun:**

M block counting: After welding one M unit, clean the gun.

Welding distance: Clean the gun according to the preset distance, and clean the gun as many meters as welded.



### **Visual:**

Switch positioning method: Scan point cloud/line laser positioning.

### **Note:**

Select 'Edit' to unlock all options, and after completing the settings, click 'Save' above to save the parameter settings.

## 5.1.1 Intelligent Configuration --- Parameter Setting for Flat Welding and Vertical Welding

### Wire positioning:

On this interface, you can set whether to enable wire positioning. Checking the starting point positioning indicates that wire positioning has been enabled. If wire positioning is not required, uncheck it.

### Vertical welding corner setting:

According to the requirements, we can select the endpoint wrapping angle. After selecting it, the equipment will execute the wrapping angle program when welding to the endpoint. Based on the actual situation on site, the length of the wrapping angle changing posture and the welding angle during wrapping angle can be modified.

### Angle and compensation:

The angle during welding can be adjusted, and the positions of the starting and ending points of the welding can be fine tuned (it is recommended to use the default values).

### Operation interface:

The image displays two side-by-side screenshots of the 'Smart Setting' software interface, showing different welding configuration tabs.

**Left Screenshot (HorWeld Tab):**

- File:** 1:普通筋板
- Buttons:** Manager, Save, Edit
- Tabs:** Basic, Vision, HorWeld, VerWeld1, VerWeld2
- Common:**
  - Gun Height: 7.00mm
  - Gun Search: ☐ Gun Search Start, ☐ Gun Search End
- Degree And Offset:**
  - Weld Turn(left to right): ☒ Auto, ☐ From Search
  - Gun Tilt Degree: 40.00 °
  - Forward Degree: 10.00 °
  - Weld Fail Degree: 0.00 °
  - Offset Start: 0.00, 2.00, 0.00
  - Offset End: 0.00, 2.00, 0.00
  - Weld Rot Length: 100.00, 100.00
  - Keep Weld Degree: ☐ Dissable, Length Threshold: 2000.00
  - ☐ Set Weld Degree Start
  - ☐ Set Weld Degree End

**Right Screenshot (VerWeld1 Tab):**

- File:** 1:普通筋板
- Buttons:** Manager, Save, Edit
- Tabs:** Basic, Vision, HorWeld, VerWeld1, VerWeld2
- Common:**
  - Gun Height: 3.00mm
  - Gun Search: ☐ Gun Search Start, ☐ Gun Search End
  - Warp: ☒ End Wrap
- Wrap:**
  - Warp Length: 20.00mm
  - Wrap Gun Degree: 45.00 °
- Degree And Offset:**
  - WeldTurn(bottom to top): ☐ Auto, ☐ From Search
  - Gun Rotate Degree: 45.00 °
  - Bottom Weld Degree: 70.00 °
  - Top Weld Degree: 70.00 °
  - Bottom Weld Offset: X: 0.00, Y: 0.00, Z: 0.00
  - Top Weld Offset: X: 0.00, Y: 0.00, Z: 0.00
  - None Hold Offset: Height: 7.00, Degree: 0.00

### Note:

Check the 'Edit' option above to unlock all options. After completing the settings, click 'Save' above to save the parameter settings. (Except for the three sets of settings introduced, it is recommended not to change any

other parameters, just use the default values).

## 5.2 Welding technology

**File information:** Refers to the process parameters used in this file, which require a 6mm flat weld for welding corners.

**Welding parameter settings:** Set the current and voltage for arc initiation, welding, and arc termination, and set the welding swing parameters.

**Electric arc tracking:** It is recommended to choose dry elongation adaptive tracking mode, which requires high equipment accuracy. (For special needs, please contact us for assistance with debugging if you need to use the other items.).

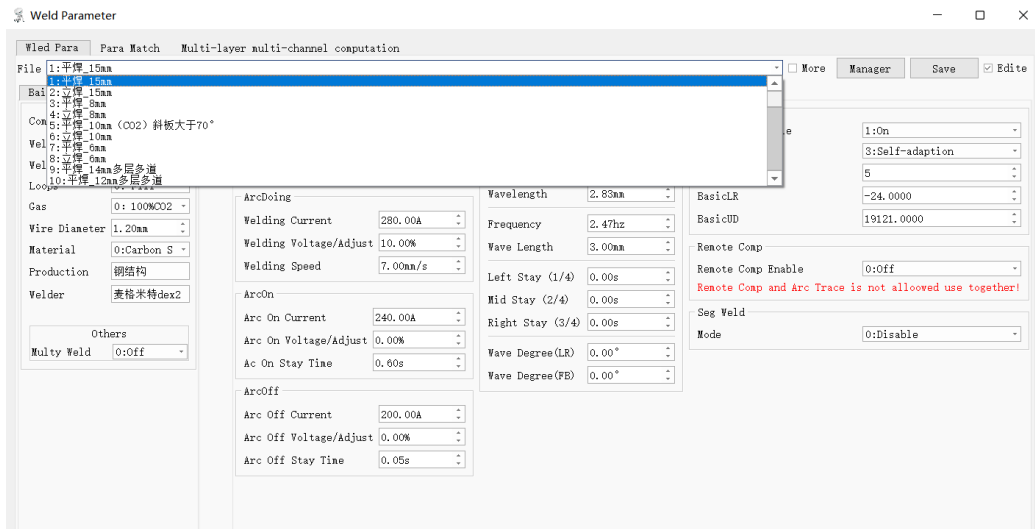
**Remote compensation:** default off, needs to be turned on when using remote control.

**Intermittent welding:** It can be opened according to the welding needs, and can be set according to the duty cycle or distance.

**Welding technology operation interface:**

The screenshot displays the 'Weld Parameter' software window. It features a top menu bar with 'Weld Para', 'Para Match', and 'Multi-layer multi-channel computation'. Below this is a file selection dropdown showing '1: 平焊\_6mm (CO2)\_悬臂'. The main interface is divided into several panels:

- Basic:** Contains fields for 'Connite' (set to 'a (CO2)\_悬臂'), 'Weld Feet' (5.00mm), 'Weld Postion' (0: Hor Weld), 'Loops' (0: Fill), 'Gas' (0: 100%CO2), 'Wire Diameter' (1.20mm), 'Material' (0: Carbon), 'Production' (行车梁), 'Welder' (麦格米特pluse), and 'Multy Weld' (0: Off).
- Single:** Includes 'Common' settings like 'File Id' (1) and 'Welder Work Mode' (0: DC, Unify). It also has 'ArcDoing' settings for 'Welding Current' (250.00A), 'Welding Voltage/Adjust' (2.00%), and 'Welding Speed' (8.00mm/s). 'ArcOn' settings include 'Arc On Current' (230.00A), 'Arc On Voltage/Adjust' (0.00%), and 'Ac On Stay Time' (0.00s). 'ArcOff' settings include 'Arc Off Current' (200.00A), 'Arc Off Voltage/Adjust' (4.00%), and 'Arc Off Stay Time' (0.00s).
- Wave Para:** Settings for 'Wave Enable' (1: On), 'Wave Type' (Sin), 'Wavelength' (3.00mm), 'Frequency' (2.67hz), 'Wave Length' (2.00mm), and 'Left Stay (1/4)' (0.00s).
- Arc Trace:** Includes 'Arc Trace Enable' (1: On), 'Trace Mode' (1: Setting Basic), 'File Id' (1), 'BasicLR' (0.0000), and 'BasicUD' (9405.0000).
- Remote Comp:** 'Remote Comp Enable' is set to 0: Off, with a warning 'Remote Comp and Arc Trace is not allo-'. 'Seg Weld' mode is set to 0: Disable.



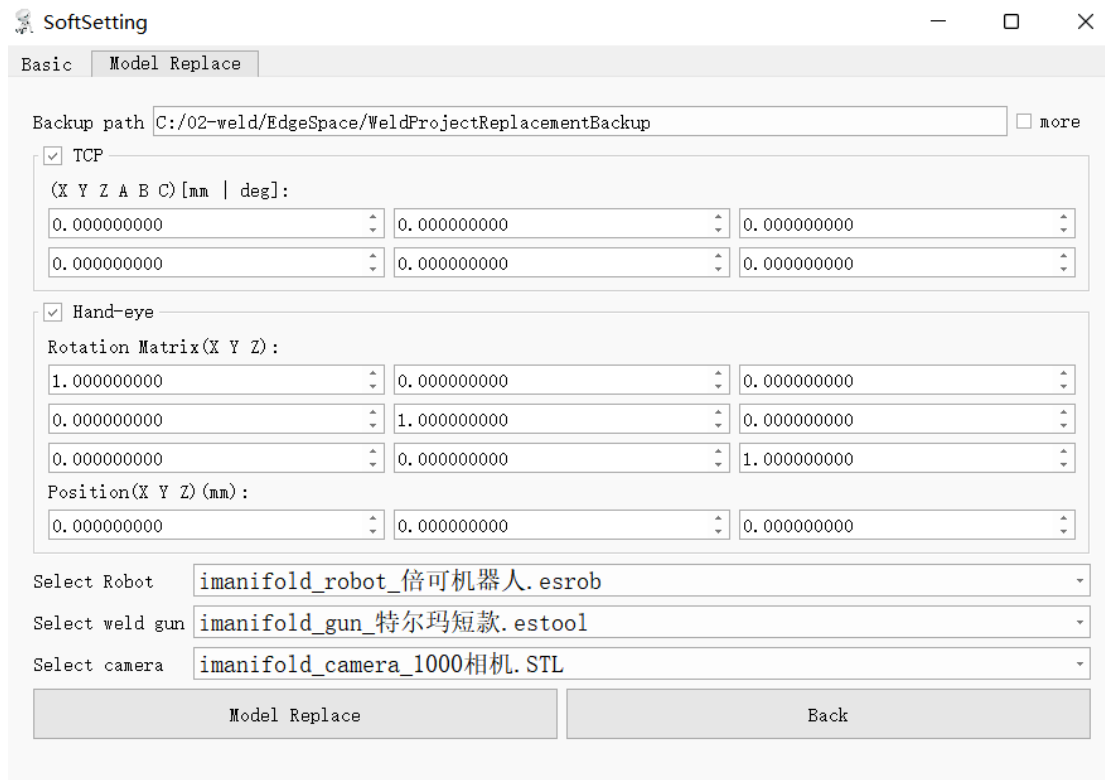
### 5.3 Introduction to Model Replacement and Software Parameter Comparison Tool

**Welding model replacement:** Select the corresponding robot welding gun and camera according to the actual situation.

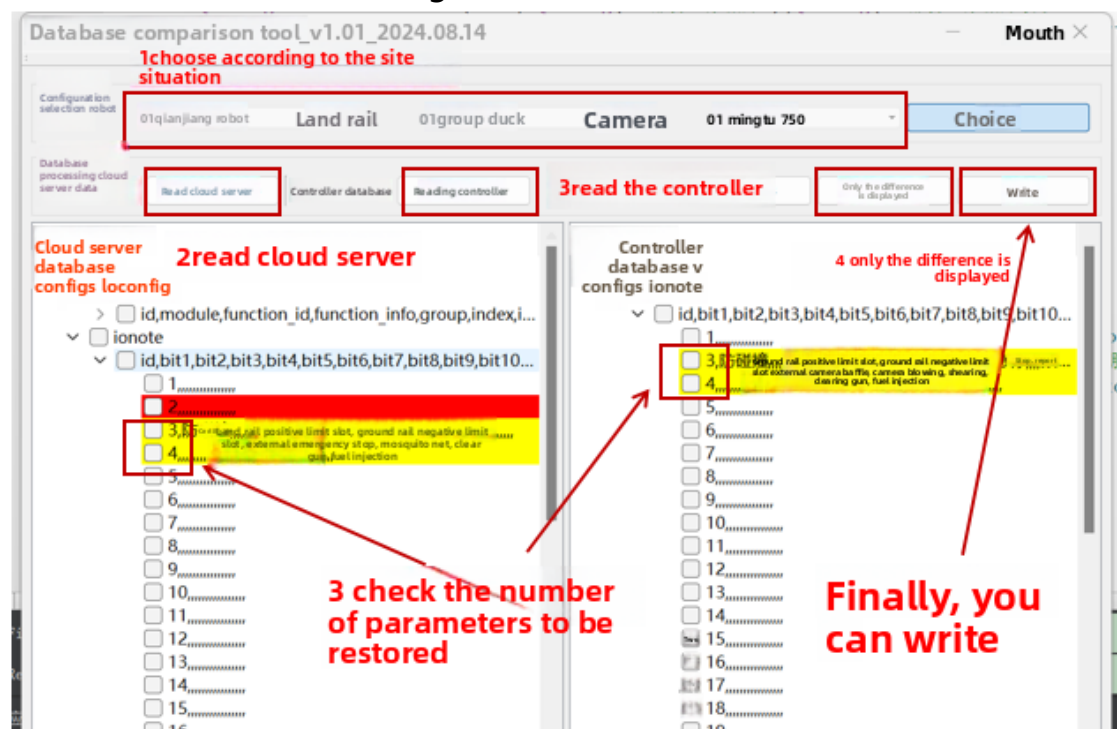
Two robot options: Qianjiang Robot and Beike Robot.

Three welding guns: Apollo, Telma (short version), Telma (long version).

Camera: 1000 model camera.



**Parameterized comparison tool:** Check the parameter settings in the software for troubleshooting software anomalies.



## 5.4 Introduction to Cloud Data Functions

**The main function of cloud data:** Download workpiece drawings and upload welding data. At the end of each day's work, work logs can be generated in the cloud data for reporting work.

### 5.4.1 Cloud data download drawings

**Operation steps:** Distribute drawing files internally within the company  
→ Use software to distribute drawings → Import drawings and start welding.



### 5.4.2 Cloud data intelligent reporting

**Requirements for the use of intelligent reporting system:**

The software version requirement is at least **166.113**, and the device needs to be connected to the company's internal network.

**User login:**

The first login requires filling in one's name and phone number, and the phone number registered by the HR department shall prevail.

**On the login interface, click to modify the configuration ->fill in your name and phone number ->complete the filling ->click save ->check the record of working hours ->lock the user.**(Name and phone number must be genuine and valid, please do not use username or pseudonym, phone number cannot have special symbols and spaces)

**Note:** Assuming that there are three people using this device, all three of them need to fill in their personal information to bind with this device. After filling in the information, they can see their name and phone number in the locked user section. Clicking lock user will switch the device user to themselves, and clicking anywhere outside the pop-up

window will exit.

The screenshot shows a configuration window for a welding robot workstation. At the top, a large text field displays '123456789'. Below it, a row of controls includes a button labeled '1 Modify configuration', a checkbox labeled '4 check and record work hours' (which is checked), and a button labeled '5 Lock the user'. The main section is titled 'Configuration adjustment' and contains three rows of user information. A red box labeled '2 Fill in your personal information' encompasses the first two rows. The first row shows 'User 1 mobile phone number' as '123456789' and 'Name three'. The second row shows 'User 2 mobile phone number' as '0987654321' and 'Name li si'. The third row shows 'User 3 mobile phone number' as '147258369' and 'Name king five'. At the bottom, a checkbox is labeled '3 Storage' and has a note: 'Is it necessary to turn on the machine to lock the user and calculate the welding data according to the individual'.

| User   | Mobile phone number | Name      |
|--------|---------------------|-----------|
| User 1 | 123456789           | three     |
| User 2 | 0987654321          | li si     |
| User 3 | 147258369           | king five |

### **Intelligent reporting welding data upload:**

We select data statistics in the cloud data function → confirm whether the personal information in the upper right corner is accurate (if we find that the user in the upper right corner is not us, we need to uncheck the lock user, click the small arrow after the name, change the user name to ourselves, and recheck the personal information) → lock the user after ensuring accuracy → generate a daily report.

### **Note:**

Please generate a daily report for the day before each end of work. When the device is turned off, do not directly turn on the main power switch to prevent abnormal device data. If there is an abnormality in daily report generation, please contact relevant personnel immediately for handling.

## Welding Robot Workstation User Manual

