



Cnc Welding Robot  
2018-05-21  
Technical Manual

**Precautions**

Please read this manual carefully before installation, commissioning and operation

盐城市科力特焊割设备有限公司

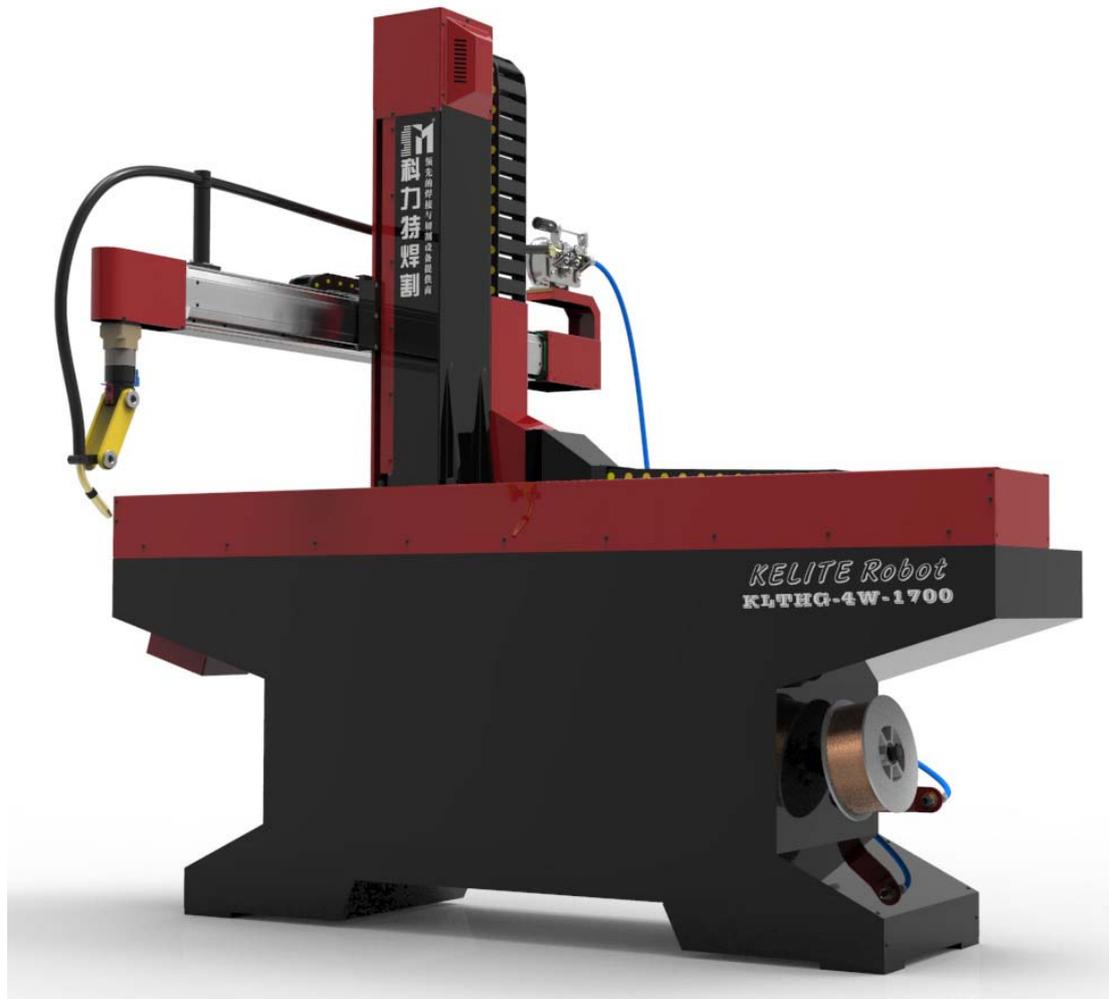
Yancheng City Kelite welding equipment Co. Ltd.

Contacts: Mr.Jason +86 18662025258 (what'app or wechat) E-mail:Jason\_Jiang@kltweld.com  
Address: No. 642 Century Avenue, Yandu Area, Yancheng, Jiangsu, China

## 1、 host equipment parameters and development instructions :

### 1.1 machine characteristics:

**KLTHG-4W-1700** CNC four axis welding machine is a digital, similar to the 6 axis joint robot, can achieve four axis simultaneous linkage, and efficient implementation of various types of plane 2D and space 3D arc welding special CNC welding equipment. The main machine is welded by four axis vertical coordinate system. X, Y and Z are linear axes, and the R axis is the rotating shaft.



### 1.2 Main technical parameters:

1.2.1 In the **teaching mode**, the welding track can be recorded automatically as long as the track is moved by hand and taken into each moving point. Greatly save programming time, simple learning

1.2.2 **Control system specific motion control chip technology can achieve 4 or 5 or 6 axis linkage, with PLC can achieve complex sequence of action requirements, high speed stability.**

1.2.3, The executive part adopts **AC servo motor** to realize high precision, high speed operation and high stability.

1.2.4, The transmission part uses the **Taiwan TBI precision ball screw** to improve the repetitive positioning accuracy and service life, guide the use of silver linear guide, accuracy and service life and reduce the noise of the machine, wire rod repeat positioning accuracy within 0.1mm.

1.2.5, The installation method adopts floor mounted type, greatly improving the flexibility of the machine.

1.2.6, The machine is simple to operate and has high stability. It can be operated by ordinary workers without professional welders.

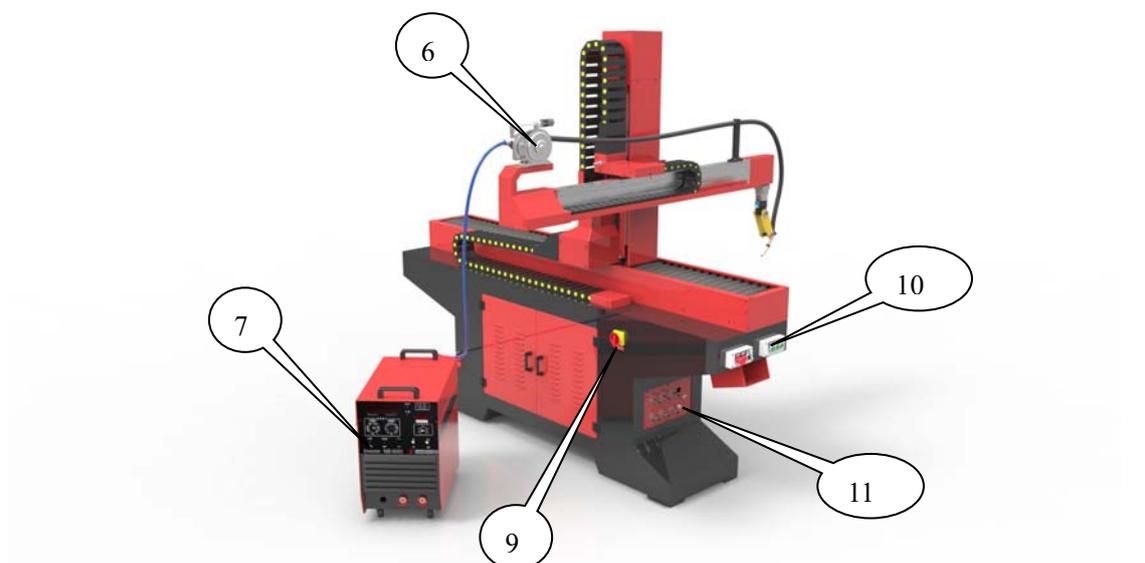
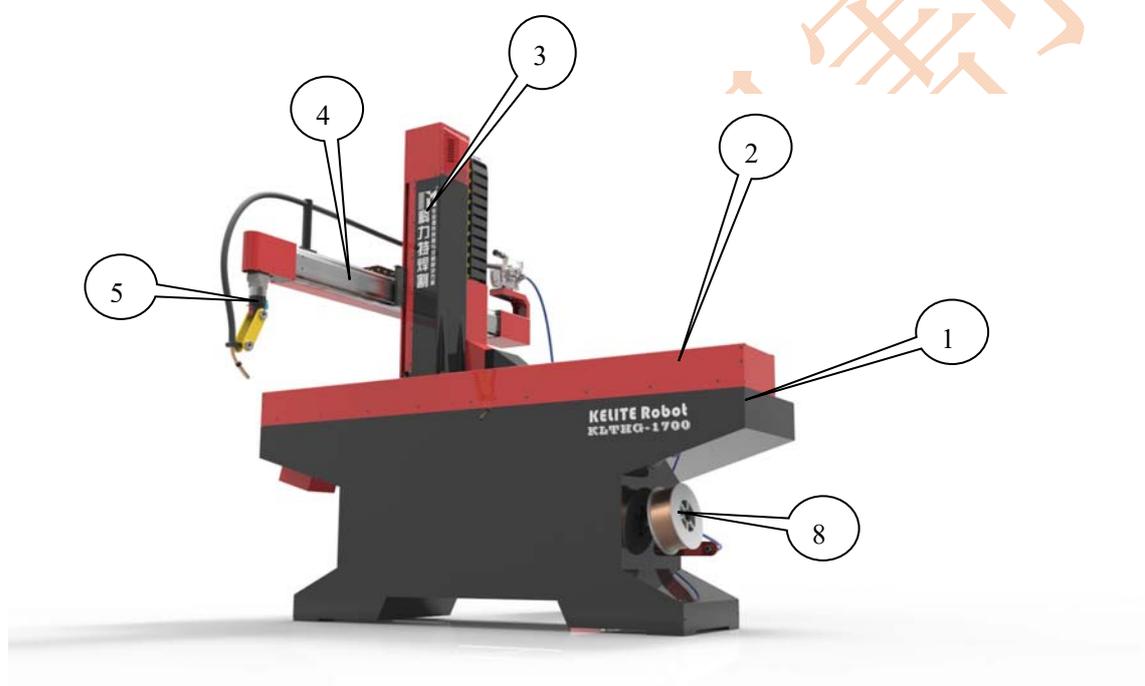
1.2.7, The price of the welding manipulator is only 20% of the joint manipulator and greatly reduces the use cost, and is the real manipulator.

Effective stroke of <b>X</b> axis	<b>1700mm</b>
Effective stroke of <b>Y</b> axis	<b>800mm</b>
Effective stroke of <b>Z</b> axis	500mm (Standard not customizable)
Effective stroke of <b>R</b> axis	0-400 degree
Maximum operating speed	<b>700mm/S or 42m/min</b>
Repeatability positioning accuracy( Depending on the mechanical part)	±0.1mm
Programming form	Teach mode and manual mode
X、Y、Z、R Axis motor	Absolute encoder servo motor
Drive parts	Taiwan TBI
Control system	<b>4 or 5 or 6axis linkage</b> , can be upgraded to expand
Input/output	24 inputs, 16 outputs
Program storage	Memory 30M
Main input power	220V 50HZ/60HZ
CNC system power	DC 24V
Welding method	MAG or MIG or CO2
Gas protection	CO2 or mixed gas

## 2、 Host overall arrangement

The equipment consists of welding main machine, control system, welding power supply and so on. Each system is connected by cable to form an organic whole, which is convenient for the installation and maintenance of equipment.

1、 Bed base, 2、 X axis walking slipway, 3、 Z axis lifting slide table, 4、 Y axis linear module, 5、 R axis rotation axis, 6、 Wire feeder assembly, 7、 Welding power 8、 Wire feed plate 9、 Power switch 10、 Control button 11、 External control signal port



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## 3 .Safety Precautions

### ⓘ Warning

Please pay attention to your safety and others, please read and understand this manual and knowledge before installation, debugging and operation!

This equipment installation, commissioning, operation, maintenance and repair must be qualified professionals!

The equipment production standards are based on the GB15579.1-2004 "arc welding equipment safety requirements" and GB / T8118-1995 "arc welding machine general technical conditions" in the relevant provisions.

The first priority for the safe use of this welding equipment user is to ensure that anyone who works on or in the vicinity of the equipment complies with all relevant safety precautions!

Safety precautions must meet the requirements of this type of equipment!

Read and follow all safety standards carefully!

Please do not use this welding machine for welding other than the purpose!

In addition to providing workplace rules and regulations, the following advice should also be observed!

All work must be carried out by specially trained personnel, who should be familiar with the operation of the welder!

Incorrect operation of the device can result in hazardous conditions resulting in personal injury and damage to the device!



### **3.1 Electric Shock**

1. Touching live parts can result in fatal electric shock or severe burns. Whenever the welder power is turned on, the electrode and the workpiece circuit will be energized at any time, and the input power circuit of the welder and the internal power circuit of the welder will also be energized after the welder power is turned on. When using the wire feeder, touching the wire, wire feeder, wire feeder, and all metal parts during soldering will cause electric shock. Incorrect installation of the welder and improper grounding are very dangerous and can result in electric shock.
2. Do not touch the live parts;
3. Wear dry, undamaged, insulated gloves and suitable clothing and protective equipment to protect the body;
4. In the installation, maintenance, repair before cutting off the input power supply welding machine;
5. In accordance with the instructions for use of the equipment, operation manuals, and relevant laws and regulations of the country and the company, correctly install the equipment and reliably ground it;
6. Always check the grounding cable and make sure that the input cable ground should be connected to the grounding cable connector or be securely connected

- to the grounding cable plug;
7. When connecting the input cable, connect the grounded conductor first and verify the connection is reliable.
  8. Always check the input cable for damage or cable exposed. If the cable is damaged, it should be replaced immediately. The bare cable can cause electric shock.
  9. Turn off the power of all devices when not using the welder
  10. If the work piece needs to be grounded, please use a separate cable directly to the ground, not to connect the welding clamp or welding cable;
  11. If you are standing on the work piece, on the grounding cable or on the electrode of another welder, do not touch the electrode of the welder directly;
  12. Only use a well-maintained welding equipment, if the parts of the welder are damaged, please repair or replace the damaged part immediately. According to user manual to maintain and maintain the equipment parts;
  13. If working at height, wear safety equipment.
  14. To keep the welding place on the ground or the surface of a solid, safe;
  15. Welding cable clamps should be connected to the workpiece using a well-conductive metal;
  16. It is forbidden to use lamps above AC36V in the work place for lighting.

### 3.2 Arc light



Electric arc radiation can burn eyes and skin. Noise can damage hearing, welding spatter and slag can damage the eyes.

Arc light is intense visible and invisible light (UV and IR) that is generated during soldering and can burn people's eyes and skin.

Noise is found in certain processes and can damage people's hearing. Welding spatter is from the workpiece metal on the slag, debris.

1. If the noise is very high, use a qualified earbud or earmuff for protection;
2. When welding or welding observation, please use a protective mask with a light-shielding filter protective glass to protect the face and eyes;
3. Wear a safety glass to protect the eyes;
4. In the vicinity of the welding set screen or curtain to protect others from the arc interference, remind others not to directly watch the arc;

wear long-sleeved clothes not easy to damage, protective gloves, aprons, boots and other protective clothing, protective clothing should be made of refractory materials (such as leather products, etc.) made;

### 3.3 Welding fumes and toxic gases



Welding process will produce a lot of smoke and toxic gases, inhalation of these fumes and gases will be harmful to health

Welding in tight places can result in insufficient air and the risk of suffocation.

1. Keep the head away from the welding fumes, do not inhale smoke generated by welding; If welding in a confined room, use ventilation and exhaust facilities to discharge fumes and toxic gases from welding;
2. If ventilation is not possible, use a standard air supply breathing apparatus;

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3. If ventilation is not possible, use a standard air supply breathing apparatus;
4. Read the knowledge about metal materials, consumables, coatings, detergents, and other materials that may react with the weld from the metal material safety data sheets or in-house instructions;
5. When welding at the bottom of containers, boilers, tanks, etc., gases heavier than air such as carbon dioxide and argon will be deposited on the bottom. To prevent oxygen deficiency, please fully ventilate or use air respirator.
6. Do not work near the degreasing, cleaning, spraying and other places for welding operations. Hot and electric arc with these operations produce dust, steam chemical reaction, resulting in highly toxic and irritating gases;
7. When welding on workpieces with coating or coating (such as galvanized, lead, cadmium and other materials), it will produce harmful fume and gas. Please be sure to fully ventilate or use respiratory protective equipment.

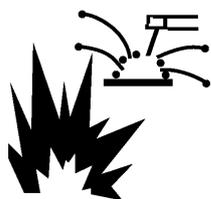


### **3.4 Gas cylinder**

The cylinder explodes when it is damaged.

Protection gas cylinder filled with high-pressure protective gas inside, if destroyed, the cylinder will explode. Cylinders should be placed in a safe place during welding and handled with caution.

1. Ensure cylinders with high pressure shielding gas are kept away from high temperatures, mechanical shocks, slag, flames and arcing;
2. Keep the cylinder in an upright position and secure the cylinder or use the cylinder bracket to prevent the cylinder from falling or tilting;
3. Remove the cylinder from the welding area or around other electronic equipment;
4. Do not weld on or near the gas cylinder, otherwise it will cause an explosion;
5. Maintain these devices and their associated components with gas cylinders, regulators, pressure gauges and accessories (which should be specifically designed for gas cylinder protection and for special applications) with proper shielding gas to keep them in good condition;
6. When opening the protective cylinder valve, keep the head and face away from the vent of the cylinder valve;
7. In the use of gas cylinders, cylinder gas cylinders should be used to cover the cylinder valve cover;
8. Read and follow the instructions for using compressed gas cylinders and related equipment.



### **3.5 Welding**

Welding can cause fire and explosion.

When welding closed containers, such as cans, boxes, pipes and other workpieces, they can cause them to explode. Sparks from welding arc spatter around. Splashes of sparks, hot workpieces and hot equipment can cause fire and burn. Electrode and metal accidental contact, poor welding cable connection, welding base material side current path poor contact, etc., can produce sparks, overheating, explosions and fire. Before welding should pay attention to check and ensure the safety of the work area. Protect themselves and others from welding splashes and hot metal danger;

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1. Do not weld on closed containers;
2. Do not flammable objects or in the vicinity of combustible gas welding;
3. Do not close the base metal just finished combustible objects;
4. Remove flammable materials from welding splashes by at least 10 m so that welding splashes do not come into contact with combustibles. If the object can not be removed, please use flammable cover reliably cover flammable objects;
5. Be aware that the sparks and hot slag generated during welding will cross the cracks and holes and reach the nearby area.
6. welding process to adjust the welding process parameters, try to use less splashing process parameters for welding;
7. The cable connection must be insulated and connected reliably;
8. The welding cable should be as close to the welding area as possible to prevent the welding cable from being too long. This will lead to unknown hidden danger and cause short circuit and fire;
9. At any time to watch for fire, the workplace should be equipped with fire-fighting equipment or articles, in the event of a fire extinguishing immediately, the fire extinguisher placed readily available;
10. Welder or electrical equipment on fire, you should first cut off the power, and then fire, cut off the power before the water or foam fire extinguishers are not allowed to use fire extinguishers, dry sand or asbestos cloth and other fire;

Wear oil and fire-resistant protective clothing such as leather gloves, long-sleeved overalls, work pants, high boots and protective caps.

### **3.6 Moving parts**



Moving parts, such as fans, gears, belts and other parts can hurt the operator's hand or fingers, as well as the hair and loose clothing wrapped around.

1. Do not use the welding machine with the case removed;
2. Welder work, be sure to hand, hair, clothing and tools away from fans, wire wheels and other rotating parts.
3. operators can not wear loose clothes and accessories, such as shawls, bracelets and the like, these things may become a security risk;
4. Only qualified personnel or experienced personnel can install, operate, overhaul and maintain the welder.

### **3.7 Electromagnetic field**



Electromagnetic fields (EMF) are generated locally when the current passes through the conductor and the electromagnetic field caused by the welding current is around the welding cable and the welding machine.

1. Electromagnetic field generated when the welder is energized will adversely affect the pacemaker's action. People with pacemakers should not approach the welders in use and work around the site without a physician's permission;
2. Exposure to electromagnetic fields during soldering may have unknown effects on health; Electromagnetic fields may interfere with some electronic equipment and proper precautions should be taken to prevent them;

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3. Do not wrap the welding cable around the body;
4. In the welding operation, as far as possible welding power and welding cables away from the welding area;
5. Place the cable on the side of the operator and away from the operator;
6. Minimize the distance between the welding workpiece and the welding power source.



### 3.8 Comprehensive preventive measures

1. Please be sure to follow the precautions listed in this operation manual during operation. Around the welding and welding places, to prevent other people's involuntary entrance.
2. Guaranteed feedback welding cable safety connection.
3. The maintenance of the welder inspection, repair by the person who is qualified or the welder know.
4. The operation of this welder should be carried out by a person who fully understands the operation manual and has the knowledge and skills of safe operation.
5. Fire equipment must have a distinctive sign, and handy.
6. Do not lubricate and maintain equipment while the welding equipment is in operation.

## 4 Equipment installation and job preparation

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### 4.1 Equipment installation

Equipment devanning, should be in accordance with the packing list to check the welding host, control cabinet, accessories, accessories and packing documents and other items are complete, intact. If the host is damaged, or parts are not complete, please contact the manufacturer in time.

Wipe the dust and rust-proof oil (grease) on the equipment with clean cotton yarn, and add anti-rust lubricant (grease) to the welding host non-treated surface and the sports fit surface.

● Before installing the device, please confirm whether the following conditions are met by this device:

CNC welding robot input voltage:	Single-phase AC 220V ± 10% (with ground)
Welding power supply voltage:	Three-phase AC 380V ± 10%
Total input cable:	> 16mm <sup>2</sup>
Enter the controller cable:	> 2.5mm <sup>2</sup>

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Compressed air source: 0.4~0.6MPa

Protect gas source: 0.3~1MPa

- Grid voltage and frequency confirmation

Device controller is based on China's power grid AC220V 50Hz design; also confirm the requirements of the welding power supply grid frequency and input voltage. (Refer to the welding power supply manual)

#### 4.2 Homework preparation

Working conditions:

- Ambient air temperature range

When welding -10°C ~ +40°C

Transport and storage process -25°C ~ +55°C

- Relative humidity

At 40 °C ≤50%

At 20 °C ≤90%

- Ambient air dust, acid, corrosive gases and other substances does not exceed the normal content

- Altitude not exceeding 1000 meters

- Power supply:

Control power 50Hz、220V、Single phase (with ground)

Welding power 50Hz、380V、Three-phase (reference welding power supply

manual)

- Grid voltage fluctuations: Within  $\pm 10\%$  (when grid frequency is rated)
- Grid frequency fluctuations:  $\leq \pm 1\%$  (when the grid voltage is rated)

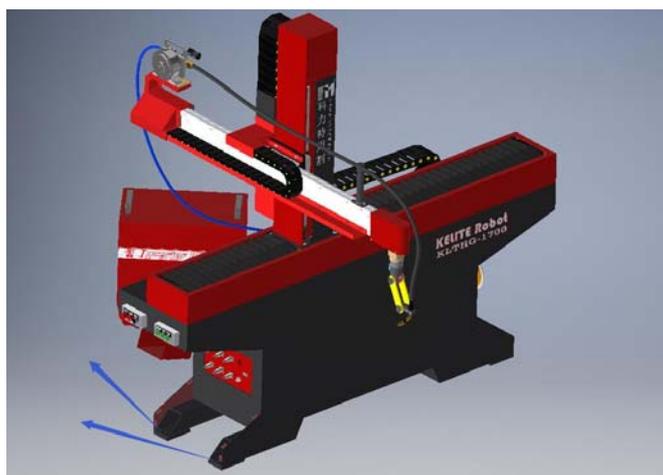
Working environment:

The device should be placed to avoid direct sunlight, rain, dry and ventilated, dust-free environment, try to avoid seriously affecting the equipment used gas vapor, chemical deposition, mold and other explosive, corrosive media, and should be far away from the severe vibration and bumpy The occasion

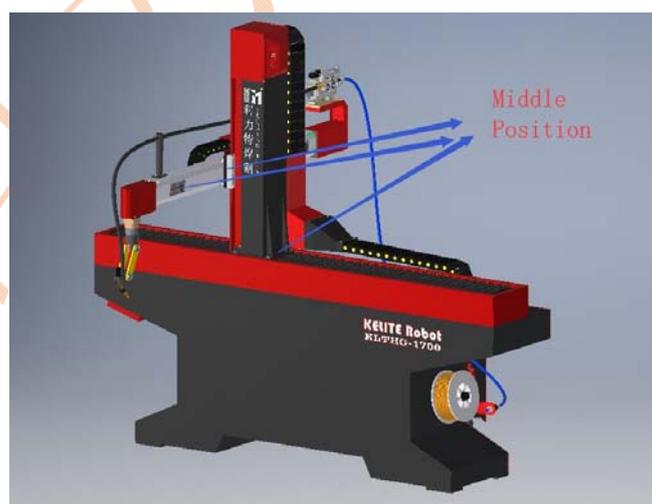
## 4, CNC welding robot power preparation (First power status)

Operation sequence:

(1) When the equipment enters the workshop and the position of the machine is fixed (fixed holes are installed on the legs of the machine), please consider the trajectory of the machine and give the machine sufficient exercise space to prevent the machine from colliding with the surrounding objects.



(2) Ask the operator to use the hands to push each shaft part to move the middle position of each axis of the machine. This will make it easier for the machine to go home at a later time so that the machine will not go beyond the stroke position at home.



(3) Before powering on, check if the cables of the machine are loose. Please tighten the cable screws. Check the main circuit for a short circuit. And check that the servo motor cables are all connected. If there is no problem, please power the machine.

(4) During the inspection, if the encoder motor cable of each axis has been removed, if the encoder cable is removed, perform encoder clearing at the corresponding servo driver. This step is very important! Please perform this process after the machine is powered on. (The following instructions)

(5) In the manual mode of the controller, move each axis slowly to check if the machine is operating normally. And check whether the direction of movement of each axis is the same as the direction marked on the machine. If the direction is incorrect, please set according to the instructions of the servo driver.

If any of the axes does not move, see if the servo driver has an alarm code. Check the cause of the alarm according to the English instructions of the driver. If there is no alarm code, please turn off the power of the machine and check whether the servo motor cable of the non-moving axis is connected properly. If you cannot solve the problem, please contact the manufacturer.

(6) There is no problem with the above, please execute the robot home command.

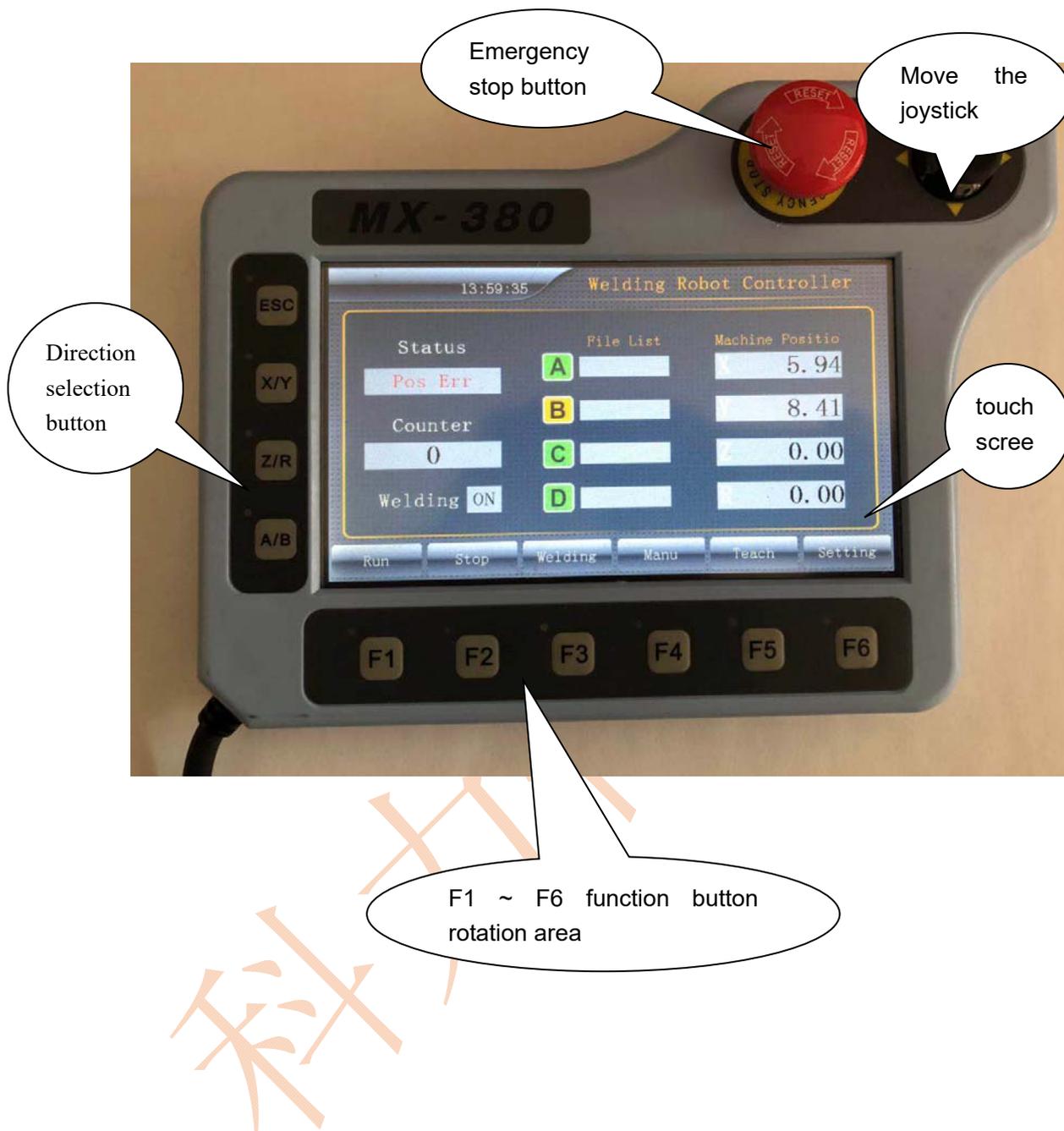
Note: The robot's home position can be set according to your needs. But you need to understand the limit position of the set machine, the following instructions.

(7) All previous correct, you can perform training and start programming.

## How to set the servo driver to clear? (Step 4 above)

Video URL: <https://youtu.be/RTPCiqJDiac>

### 5、 Controller instructions



## 5.1 Home (boot interface) instructions

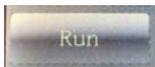


**Status** : Shows the current status of the controller. Run, stop, emergency stop, position error, communication error and so on

**Counter** : Since the operation of electricity, the number of processing. Power-down is not saved, automatically cleared after power-on.

**Welding** : Indicates whether the welding torch is open when the equipment is running or not, and can be switched by the button "Torch Control". (When the torch status is "OFF", the device only tracks and does not weld. You can use this function to check whether the edited track position is correct)

**File List** : A, B, C, D For processing 4 machining files. A shows the file name corresponding to the controller's "Station A" button, B corresponds to "Station B" button, C corresponds to "Station C" button, and D corresponds to "Station D" button.

File not selected, File is selected. Press the button "F1" or , Execute the file.

**Machine Position** : Display the current position coordinates of each axis.

## 5.2 Button Description



: Executes the selected machining program. After the emergency stop, press this button to continue the execution of the unprocessed machining program.



: Stop processing, press this button, then stop processing, the implementation of the processing program is not implemented.

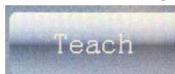


: Control the torch switch. Display status is "OFF" and "ON"



: Manue Mode.

- Manually check or set the coordinate position of the machine to be moved and the operation speed of each axis.
- Manually check I / O test status
- Manual check Set the coordinate and speed of the external axis displacer.
- Manually check or set the order and process of each axis home
- Manually set the current and voltage of the welding power supply.
- Manually read the machine's position coordinates.



Teaching programming mode

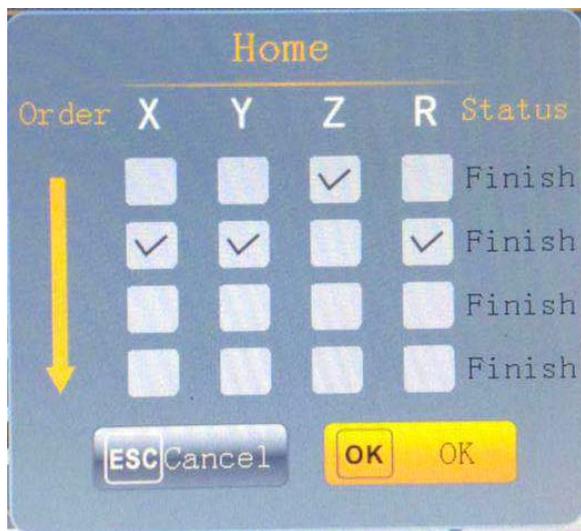


Robot parameter settings

- Robot motion parameters settings: such as the cycle, pulse number, effective stroke setting
- Robot speed parameter settings: for example, teaching slow and fast, start speed, maximum speed, acceleration
- Robot's home settings: for example, the order of robots to go home on each axis, set Zero, Clear Zero, home speed.
- Robot input and output settings
- Robot's Joystick calibration



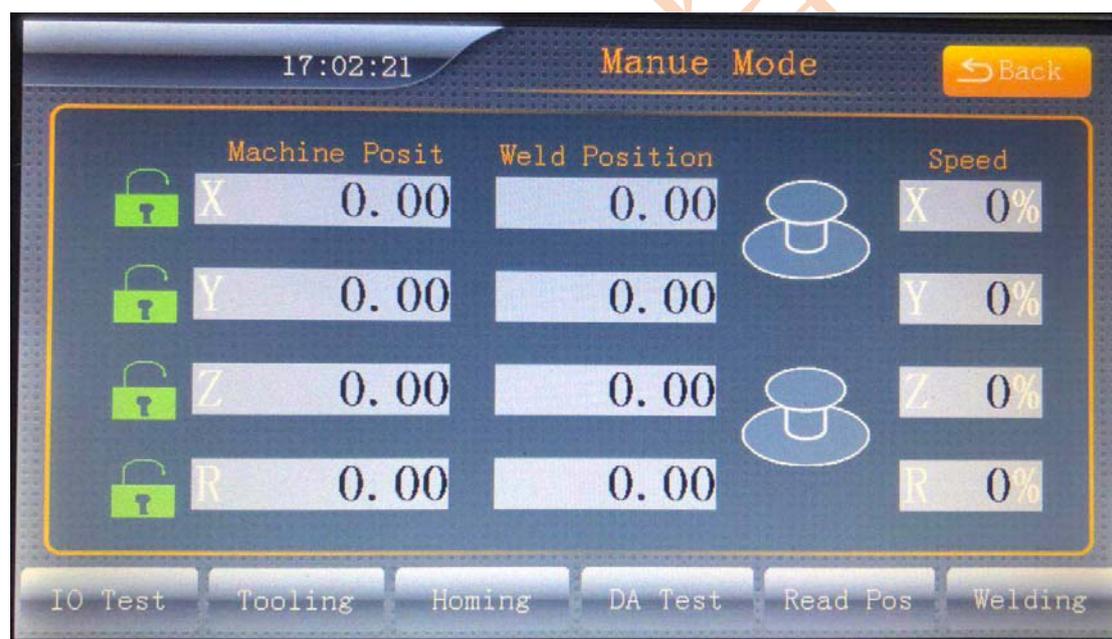
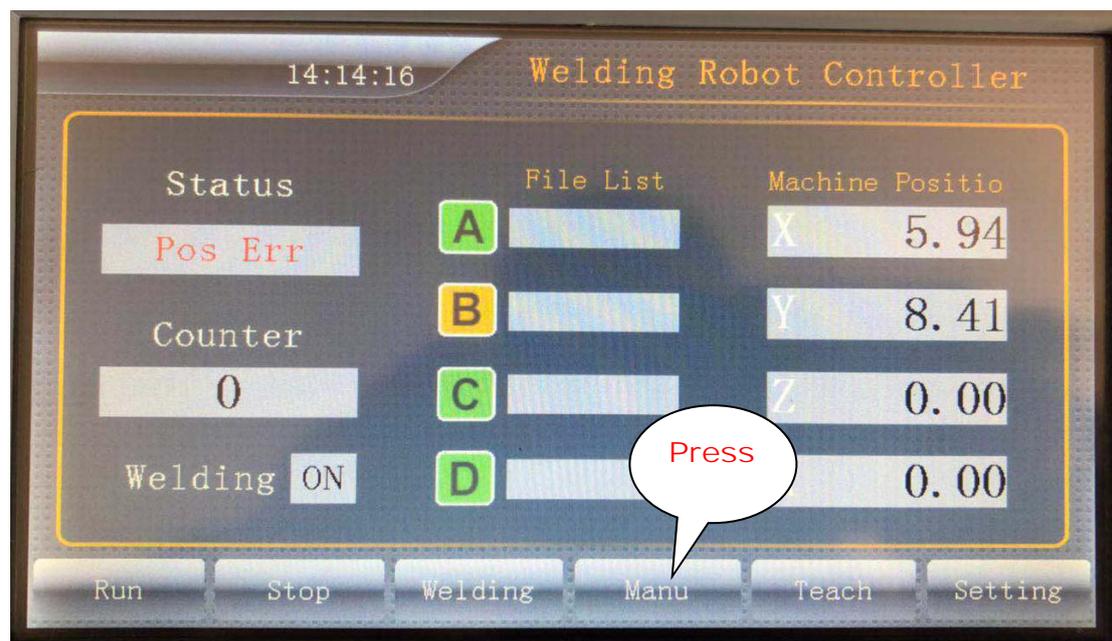
Reset process explained



During reset, press  Button or "ESC" key to cancel the reset operation.

After reset, press the button  or "OK" button to return.

### 5.3 Controller Manu Mode



can press: ESC, OK, or on the screen  "Back" button to exit the settings page, return to the "Home".

While pressing the X / Y button, manipulate the "Joystick". You can control the device's X-axis, Y-axis movement.

While pressing the Z / R button, operate the "Joystick". You can control the device's Z axis, R axis movement.

While pressing the A / B button, operate the "Joystick". You can control the A-axis

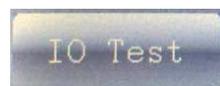
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equipment, B-axis movement.

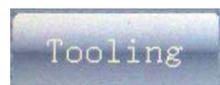
Machine Position: Displays the mechanical coordinate position of each axis.



Weld Position: The coordinates of the lance tip of each axis are displayed.



:Enter the controller input / input "IO" test interface.



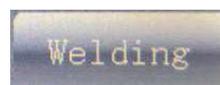
:Test system for the seat machine, tooling transposition.



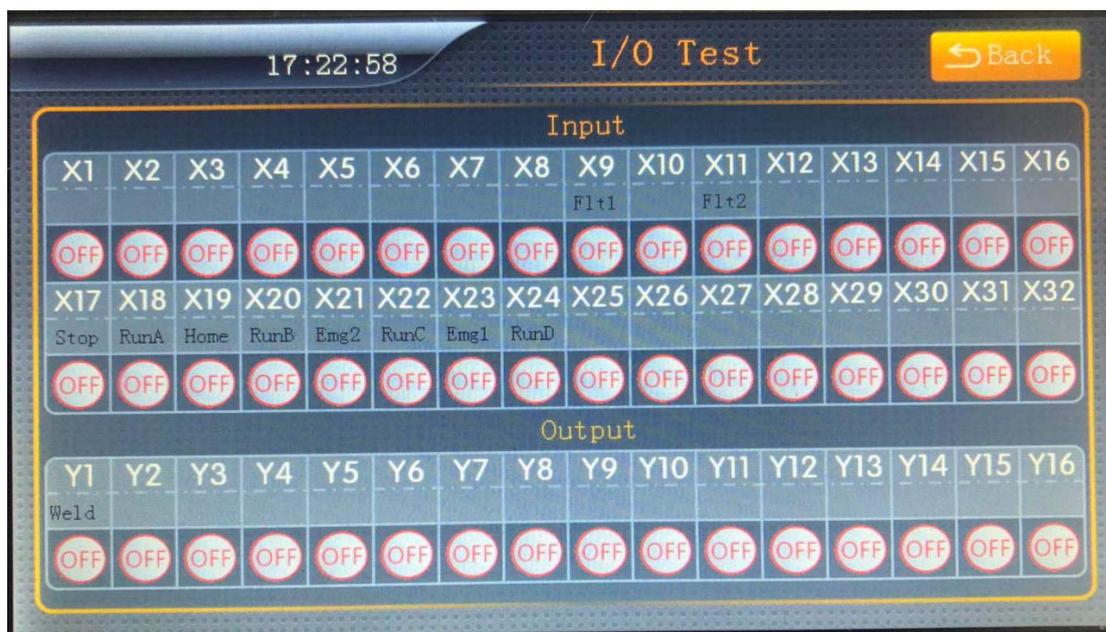
: Set the robot reset parameters(Has been introduced above)



: Into the "analog test" page, need to be equipped with analog output module (optional).



## 5.3.1 IO Test



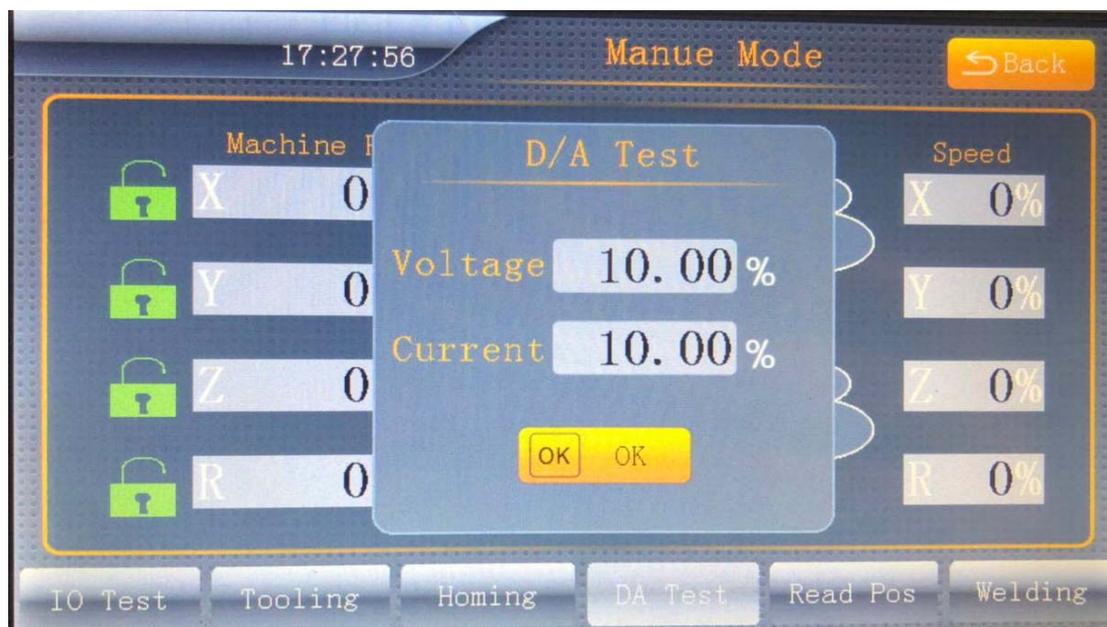
**Input:** Read-only, showing the current status of the input.  Enter valid;  Invalid input.

**Output:** Displays the status of the current output. Each point, the output state will switch.

Note: When inputting the test on the IO test page, first test the "emergency stop" input, and then perform other input tests under the condition of "emergency stop" to prevent misoperation and damage to the machine tool or tooling and welding torch

You can press ESC, OK, or the "Back" button on the screen to exit the setup page and return to "System Test".

## 5.3.2 DA Test (optional function)



Click the voltage and current edit box will pop-up interface, directly enter the voltage and current, then the analog module will output the corresponding voltage on the welder to check the voltage and current equipment is correct.

**Note: You need to buy analog communication module, its analog voltage range 0-10V,**

**The premise requires welding power supply with analog communication!**

### 5.4 Controller setting function



**The password is: 888 888**



## 5.4.1 Device parameters

	X	Y	Z	R
Enable	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Pitch	25.00	10.00	10.00	360.00
Pulse	10000	10000	10000	100000
TripLimit+	500.00	500.00	500.00	9999.00
TripLimit-	-500.00	-500.00	-500.00	-55555.
EncoderDir	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Up and move  Up pos (Z)

**Pitch:** the distance the motor travels by one revolution. (R axis pitch must be 360)

**Pulse:** The number of pulses required to rotate the motor one revolution. (R-axis pulse = number of pulses required for motor revolution \* speed reducer acceleration ratio)

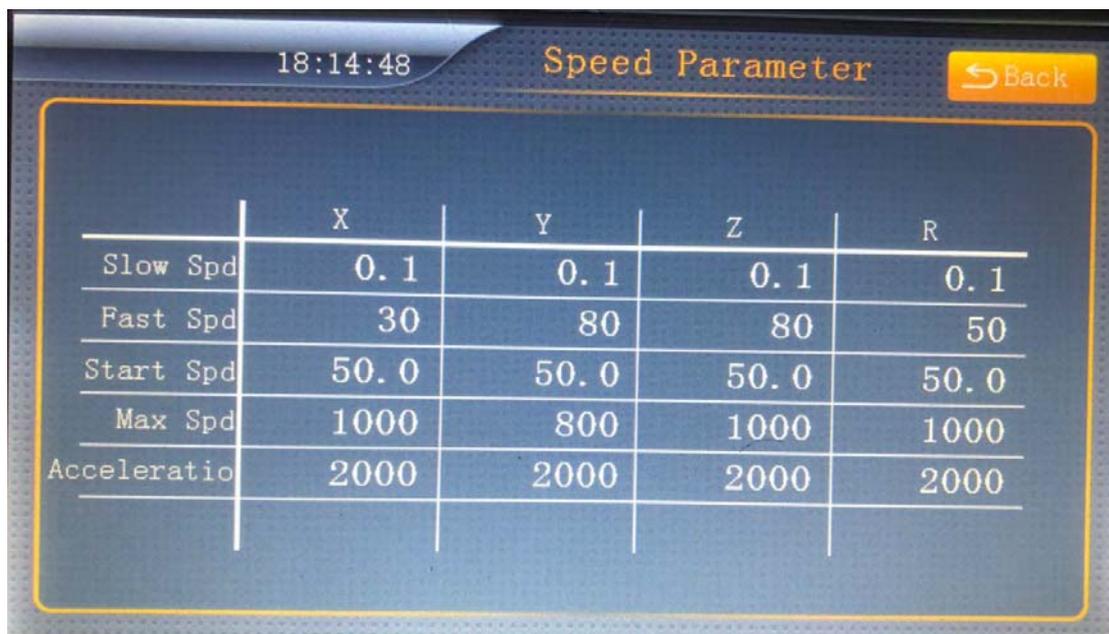
**Trip Limit+:** A valid travel in the positive direction of the coordinate

**Trip Limit-:** Coordinates of the negative direction of effective stroke (generally X \ Y \ Z-axis negative travel to 0)

**How to set a valid trip (limits), video**

**URL: <https://youtu.be/r6a3vHbs0jg>**

## 5.4.2 Speed parameters



	X	Y	Z	R
Slow Spd	0.1	0.1	0.1	0.1
Fast Spd	30	80	80	50
Start Spd	50.0	50.0	50.0	50.0
Max Spd	1000	800	1000	1000
Acceleratio	2000	2000	2000	2000

**Teaching slow speed** of 0.1mm / s :manual teaching low speed

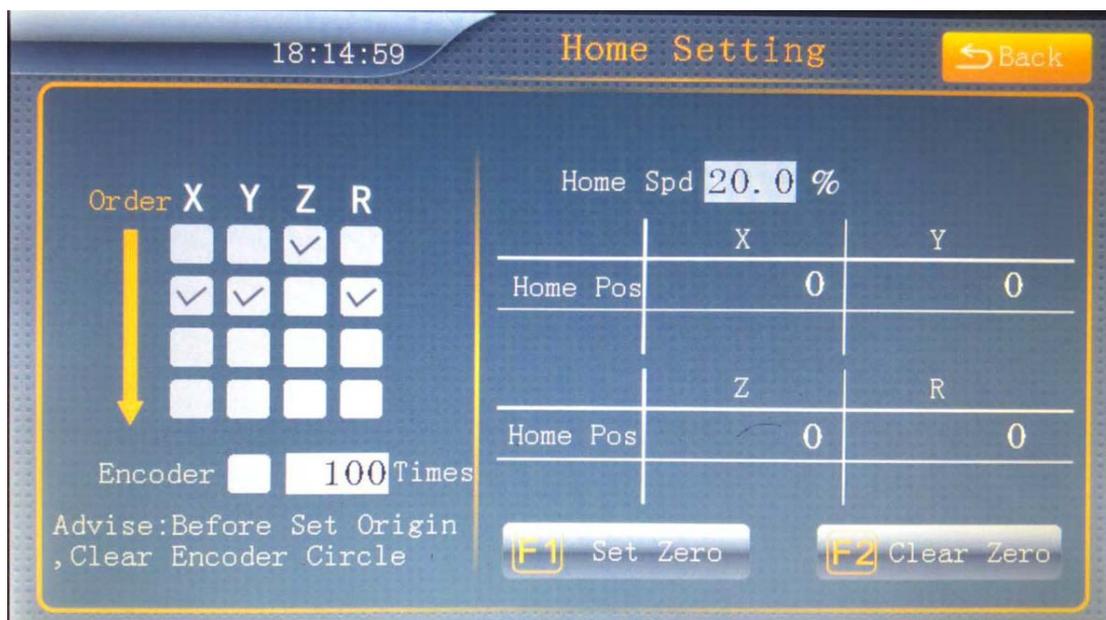
**Teaching fast speed** of 100mm / s is the high-speed speed when running

**The starting speed** is 10mm / s, which is the running speed when the track starts to run

**The maximum speed** of 1000mm / s is the maximum speed of the track running

Acceleration is 2000mm / s acceleration acceleration when the track is running

## 5.4.3 Home settings ;



**Reset order:** Choose from the top

**Home speed:** 20% of the maximum speed

**Home Pos:** Offset distance relative to Home pos after reset.

**How to set the robot home, video**  
**URL: <https://youtu.be/r6a3vHbs0jg>**

## 5.4.4 Input settings

18:15:16 Input Setting ← Back

Function	Enb	Set	Function	Enb	Set	Function	Enb	Set
	<input type="checkbox"/>	X01	RunA	<input checked="" type="checkbox"/>	X18	Emg1	<input checked="" type="checkbox"/>	X23
	<input type="checkbox"/>	X03	RunB	<input checked="" type="checkbox"/>	X20	Emg2	<input checked="" type="checkbox"/>	X21
	<input type="checkbox"/>	X05	RunC	<input checked="" type="checkbox"/>	X22	Emg3	<input type="checkbox"/>	X01
	<input type="checkbox"/>	X07	RunD	<input checked="" type="checkbox"/>	X24	Coll	<input type="checkbox"/>	X01
	<input type="checkbox"/>	X02	Flt1	<input checked="" type="checkbox"/>	X09	Stop	<input checked="" type="checkbox"/>	X17
	<input type="checkbox"/>	X04	Flt2	<input checked="" type="checkbox"/>	X11	Home	<input checked="" type="checkbox"/>	X19
	<input type="checkbox"/>	X06	Flt3	<input type="checkbox"/>	X01	Weld	<input type="checkbox"/>	X10
	<input type="checkbox"/>	X08	Flt4	<input type="checkbox"/>	X01		<input type="checkbox"/>	X01

## 5.4.5 Output settings

18:15:29 Output Setting ← Back

Function	Enb	Set
Weld switch	<input checked="" type="checkbox"/>	X01
Clear fault	<input type="checkbox"/>	X02
Run State	<input type="checkbox"/>	X05
Stop state	<input type="checkbox"/>	X06
Emg state	<input type="checkbox"/>	X07
Fault state	<input type="checkbox"/>	X08
	<input type="checkbox"/>	X01
	<input type="checkbox"/>	X01

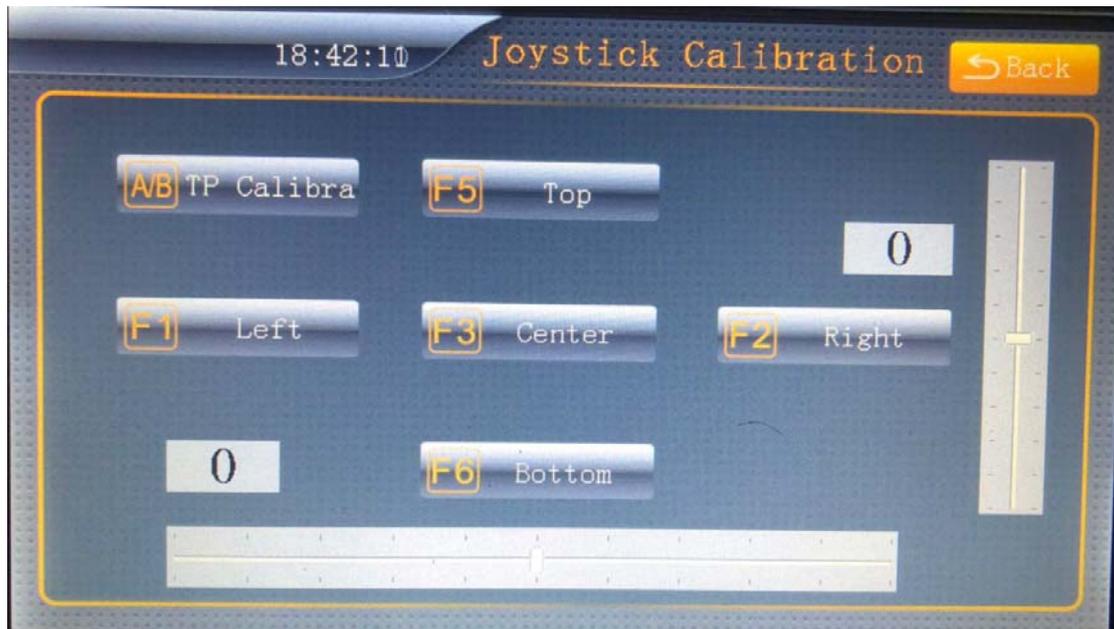
Emergency Out

F1 Set

OUT MASK

OUT

## 5.4.6 Joystick calibration



## 6, programming operation

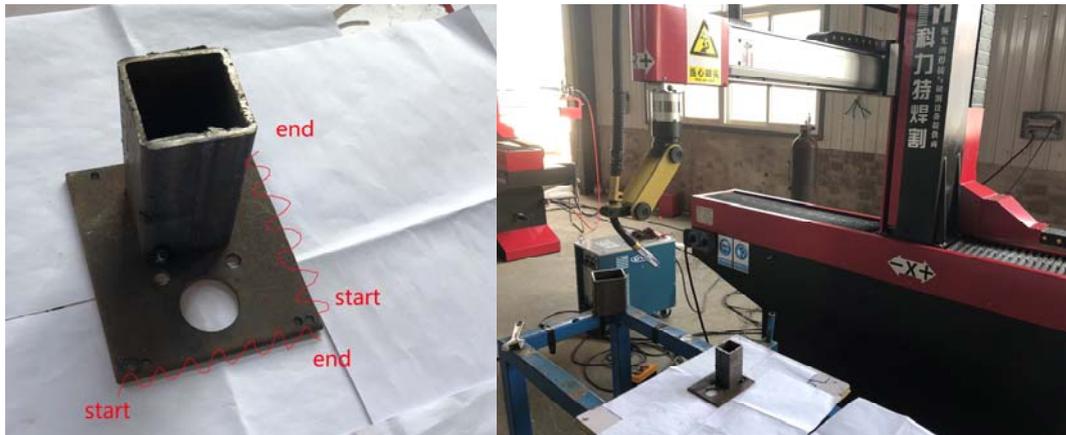
**How to teach a simple line and arc program,  
video URL: <https://youtu.be/gglfubX3qs0>**

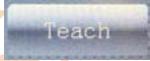
### 6.1 New documents

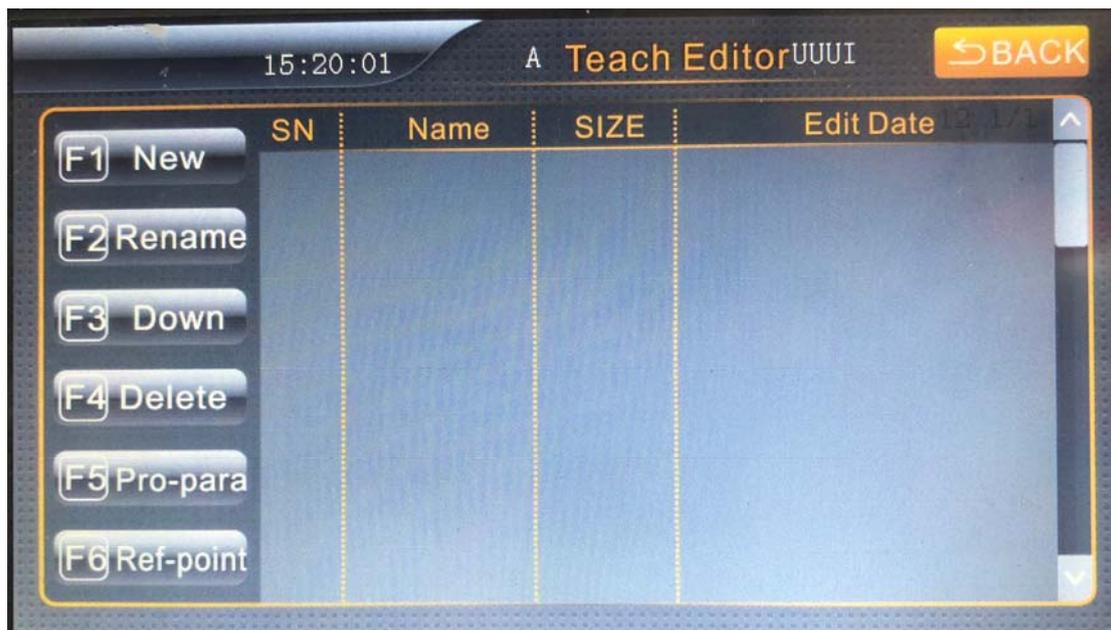
Note: when you plan to build a new program, the following are generally the following steps (their order is: the next):

- 1, Establish the name of the name of the program
- 2, The welding robot is going home
- 3, Setting the processing parameters for welding
- 4, Set up the TCP of the robot welding gun (two datum points, two R axis position difference 90 degrees)
- 5, Save the above parameters
- 6, Carry out the instruction programming movement, which includes track, fast movement, welding, program, etc.
- 7, Save the program, and upload the operation

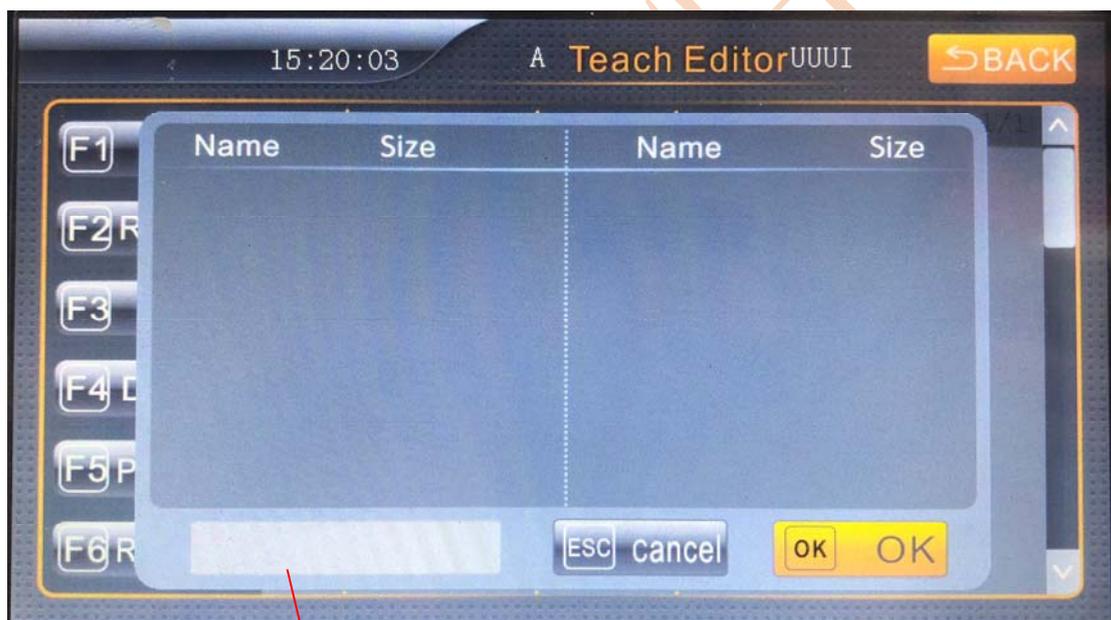
## How to write two straight (swing) programs?



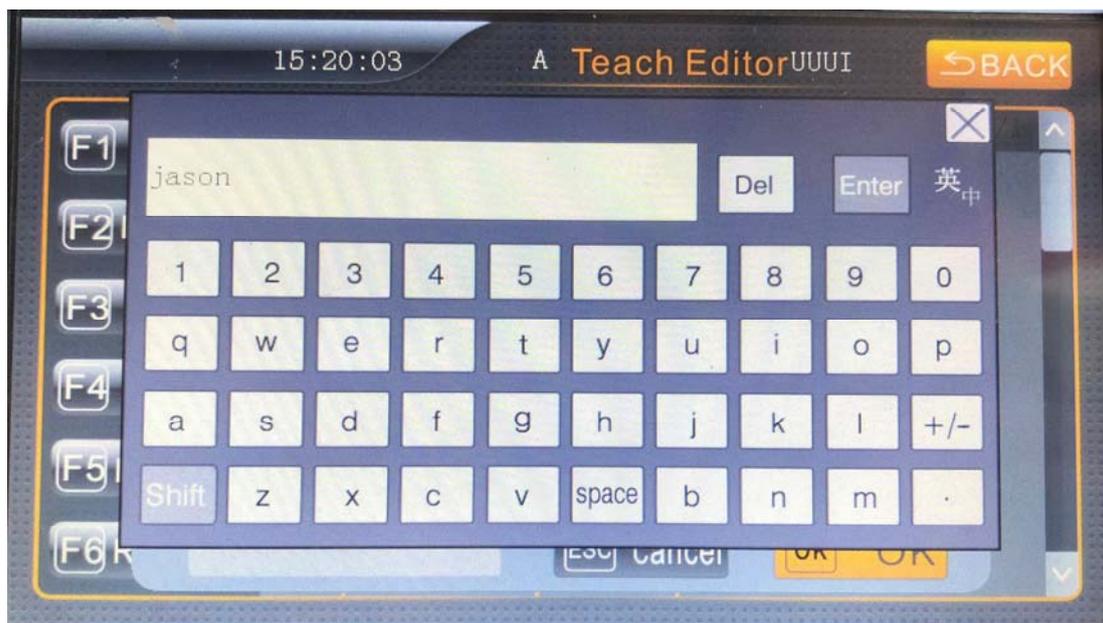
Press: F5  Enter the picture



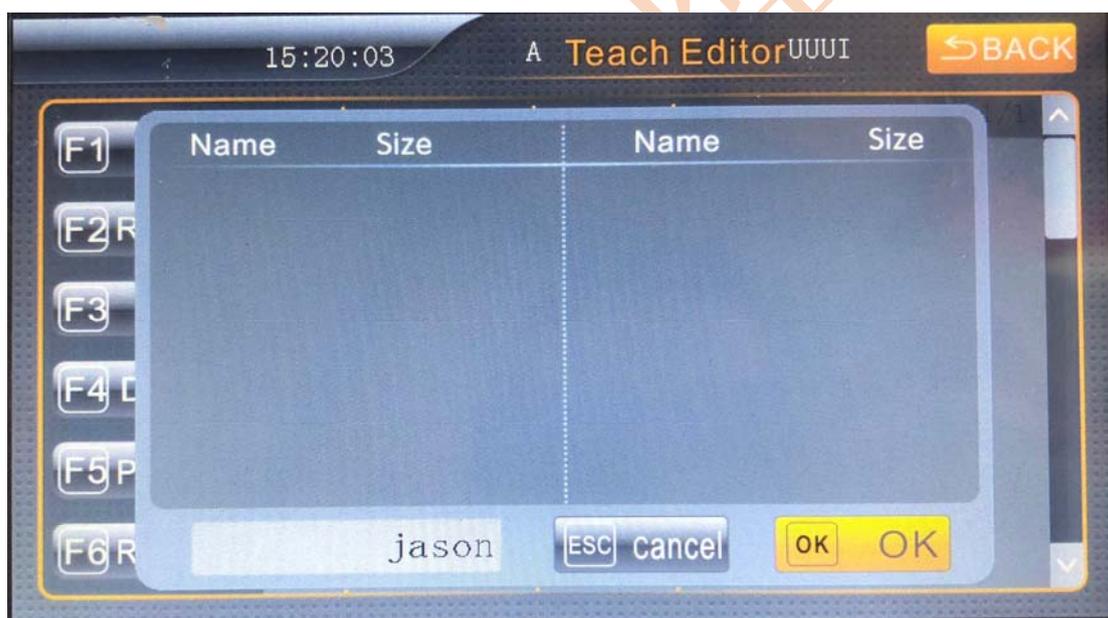
Press:  Enter the picture



Click: text box, pop out the keyboard

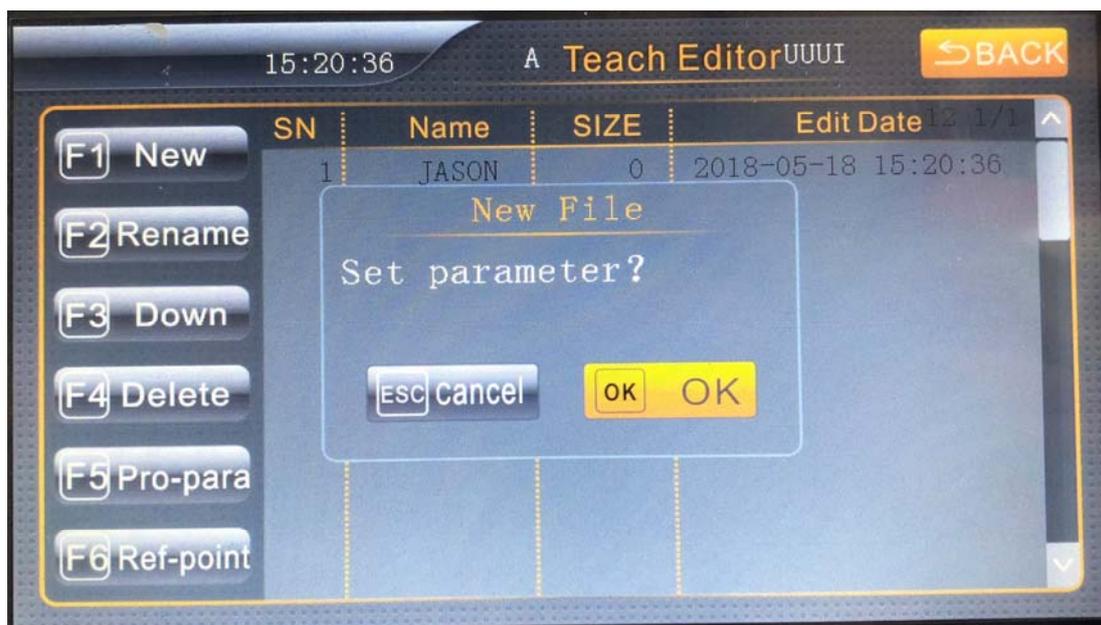


After entering the file name, press:  Enter the picture

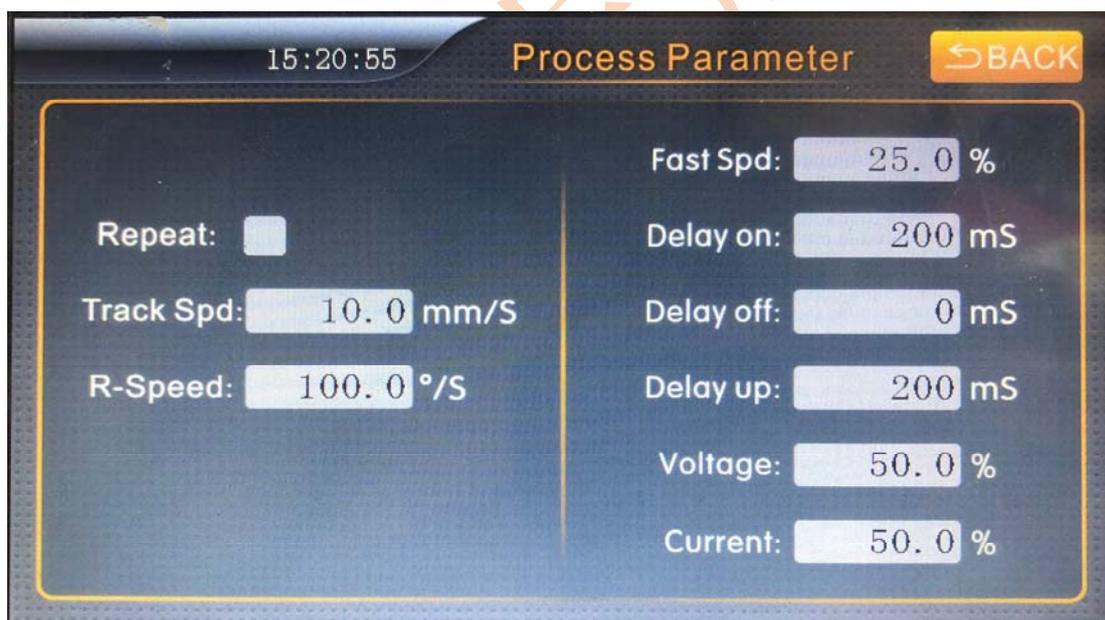


Press:  Enter the picture

**At this point, the name "jason" program has been set up, and then the next step is set to set its processing parameters**



Press:  Enter the picture



**Repeat:** It means that the welding robot circulates the welding workpiece without stopping.

**Track Spd:** It means the trajectory welding linkage speed of each axis (X\Y\Z) of CNC welding robot.

**R-Speed:** It means the speed of the R-axis welding

**A-Speed:** It means the speed of the A-axis welding

Contacts: Mr.Jason +86 18662025258 (what'app or wechat) E-mail:Jason\_Jiang@kltweld.com  
Address: No. 642 Century Avenue, Yandu Area, Yancheng, Jiangsu, China

**B-Speed:** It means the speed of the B-axis welding

**FastSpd:** It means the speed at which CNC welding robots do not process (weld) when they execute the program.

**Delay on:** Arc firing delay time during robot welding

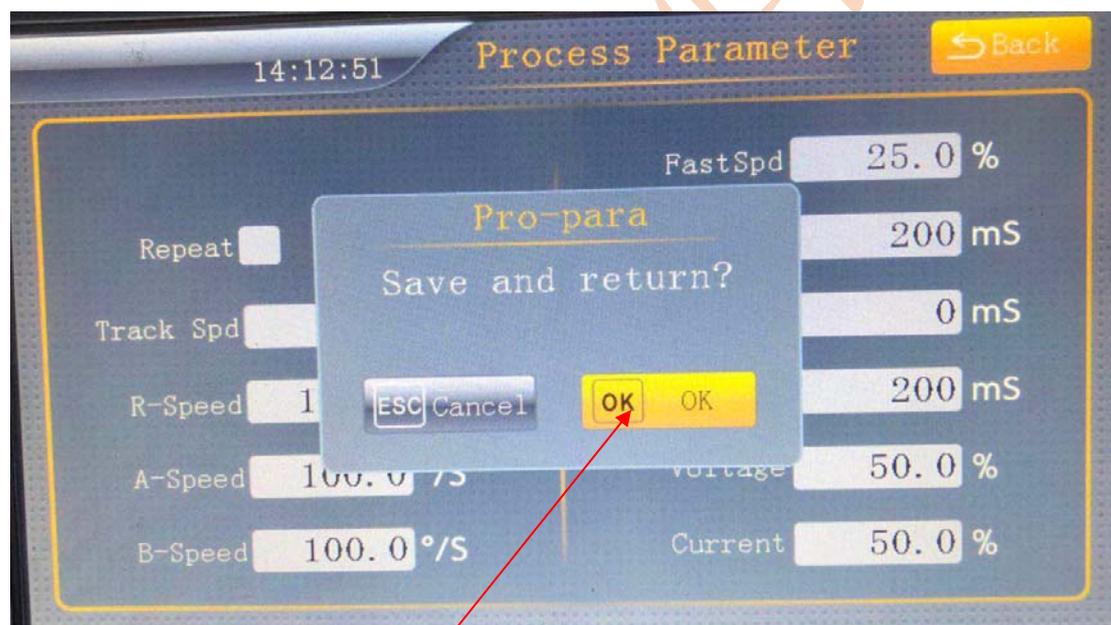
**Delay off:** Arc shutdown delay time during robot welding

**Delay up:** It means that the delay of the robot welding gun rises

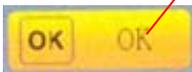
**Voltage:** Percentage of maximum voltage of welding power supply (only applicable to analog control)

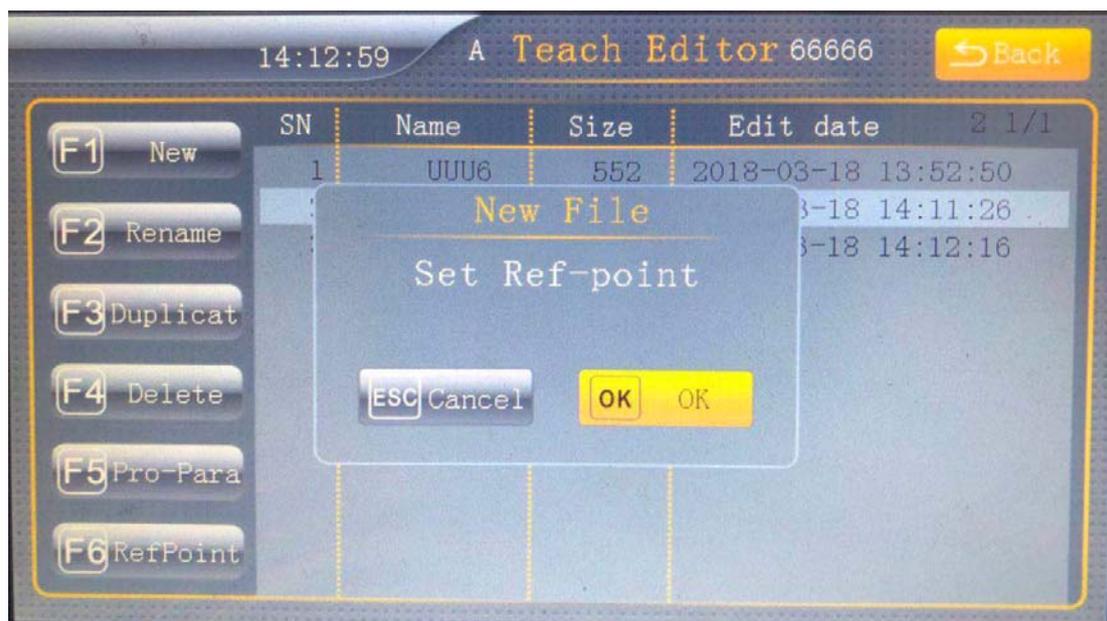
**Current:** Percentage of maximum current of welding power source (only applicable to analog control)

**Please set the required welding parameters according to your product. Press the **Back** button to save the parameters and go directly to the next step.**

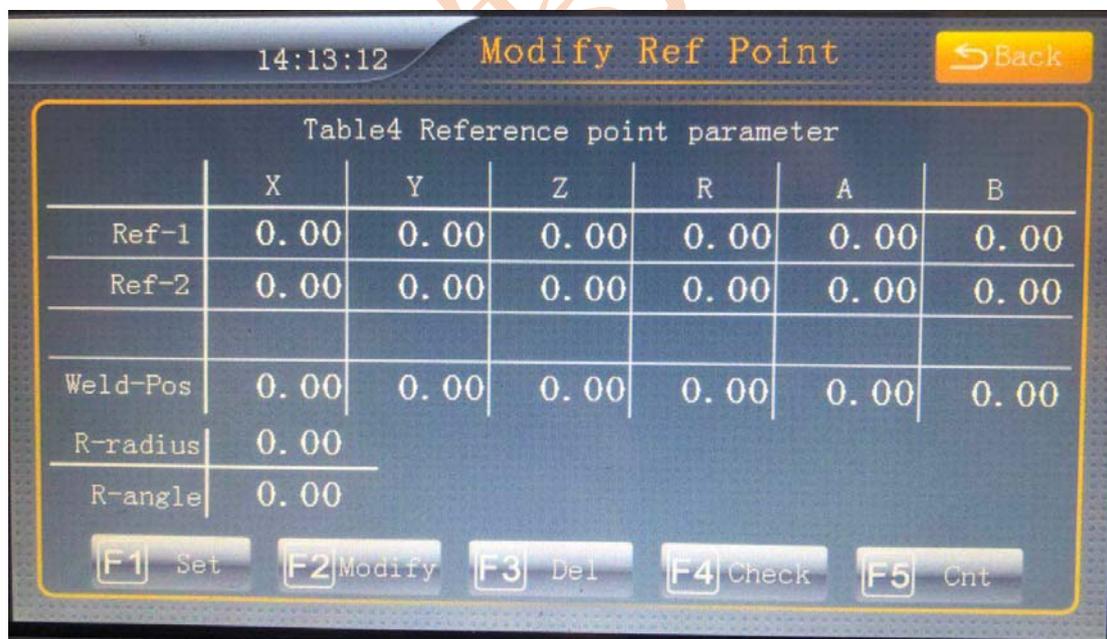


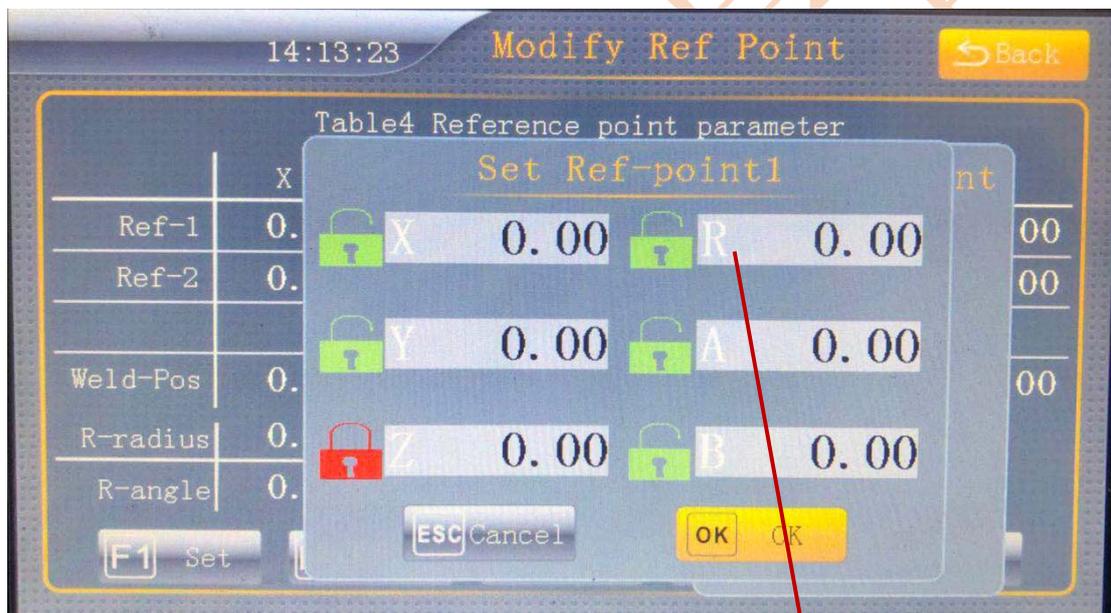
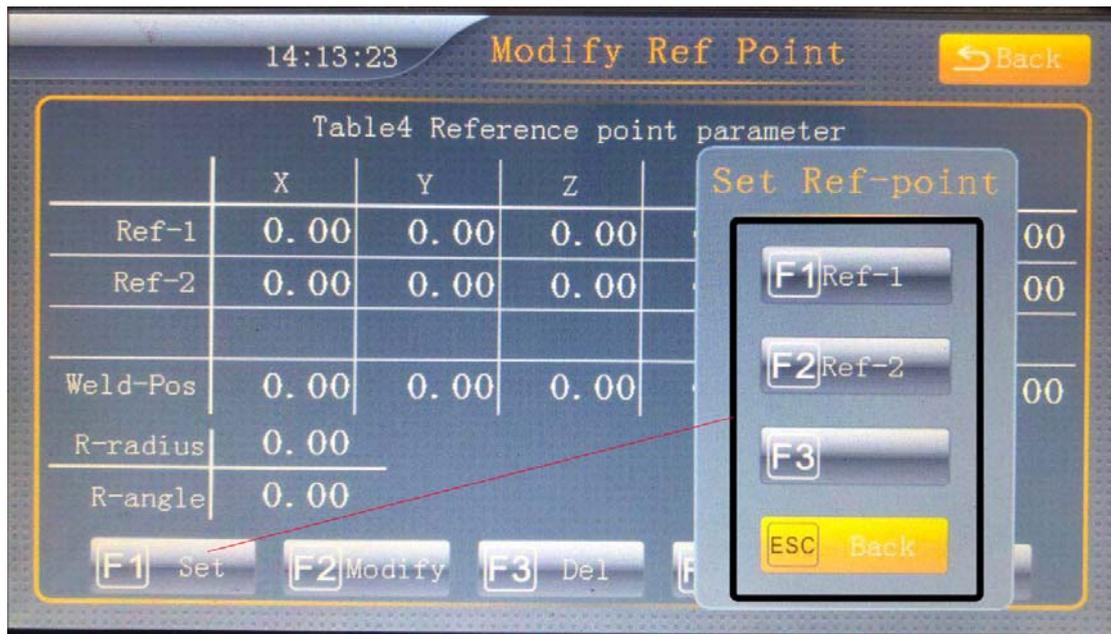
**The following is the TCP setting of the welding robot**

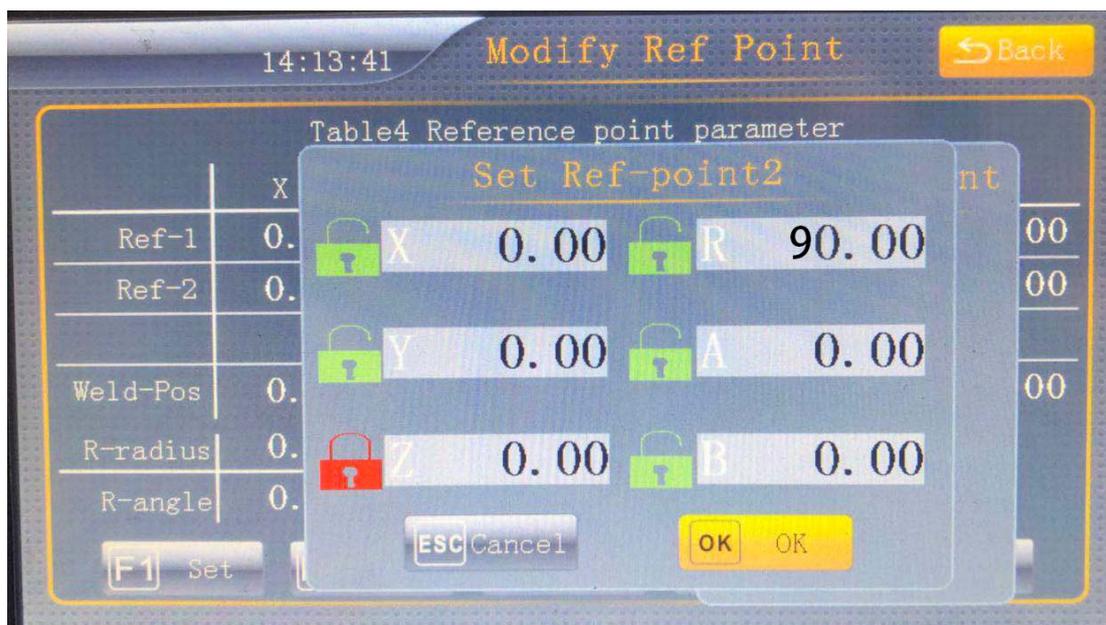
Press:  Enter the picture



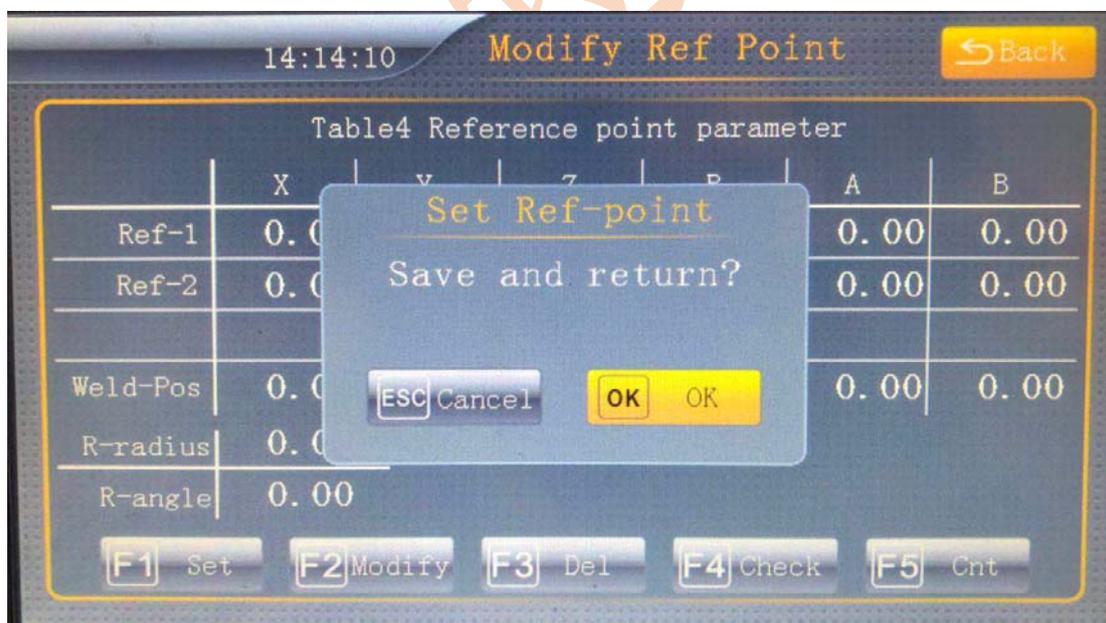
Press:  Enter the picture



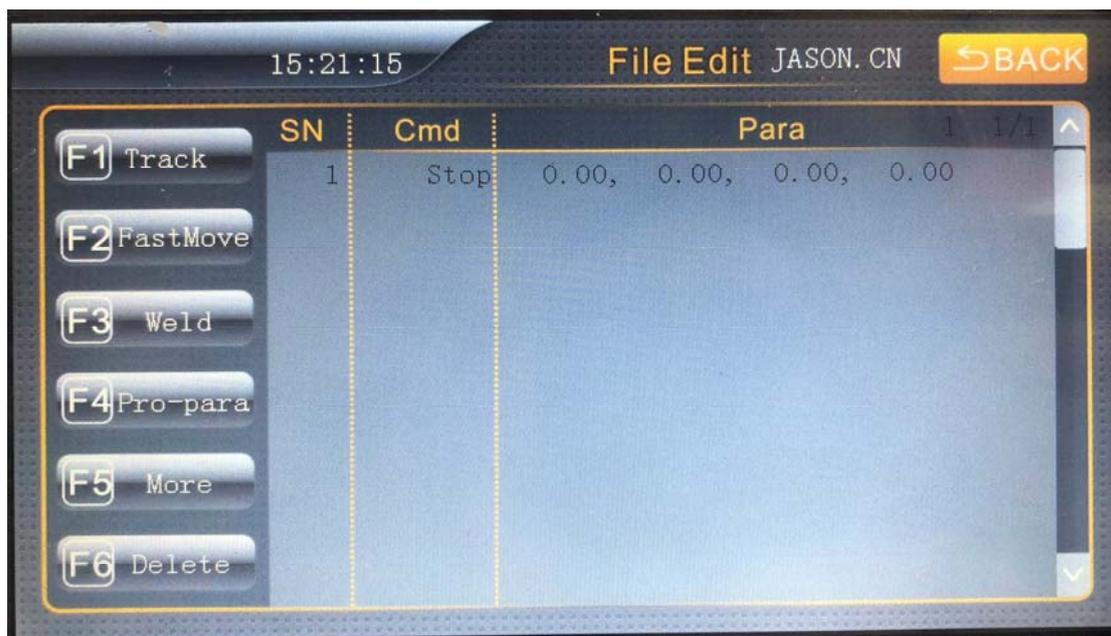




- (1) After the R axis is rotated by 90 degrees ( $\pm 10$  degrees), move to the reference position and press OK to enter the file editing page.
- (2) If the R-axis does not reach 90 degrees ( $\pm 10$  degrees), the system indicates that the angle between the first point and the second point of the R-axis needs to be 90 degrees.



**At this point, the teaching procedure can be performed.**

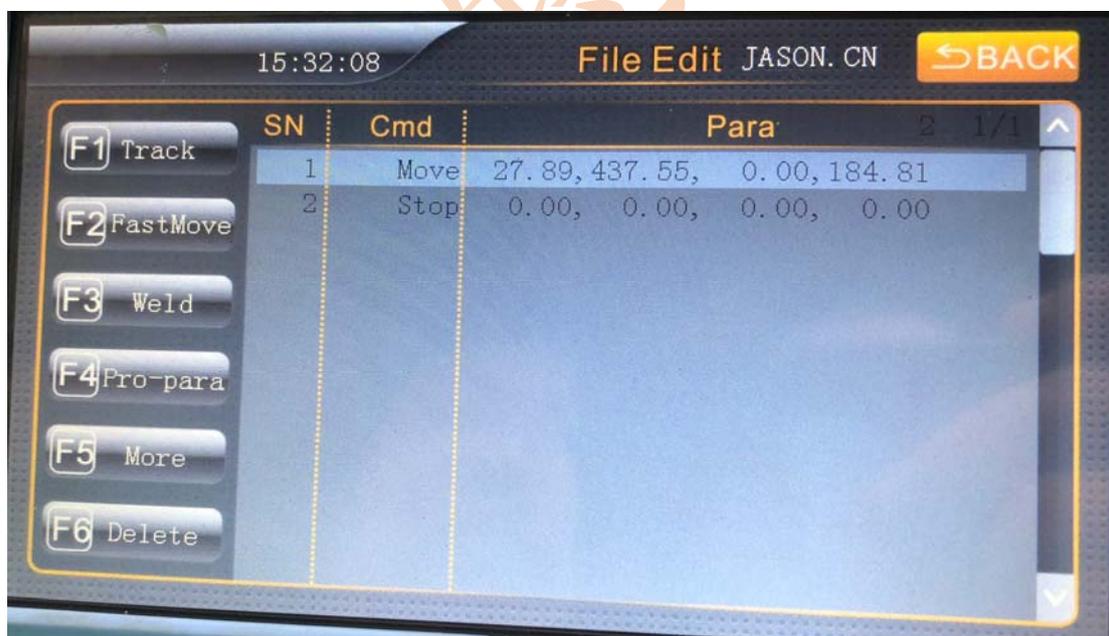


Press: **F2 Fastmove** Enter the picture





After moving each axis to a specified position via a stick, press

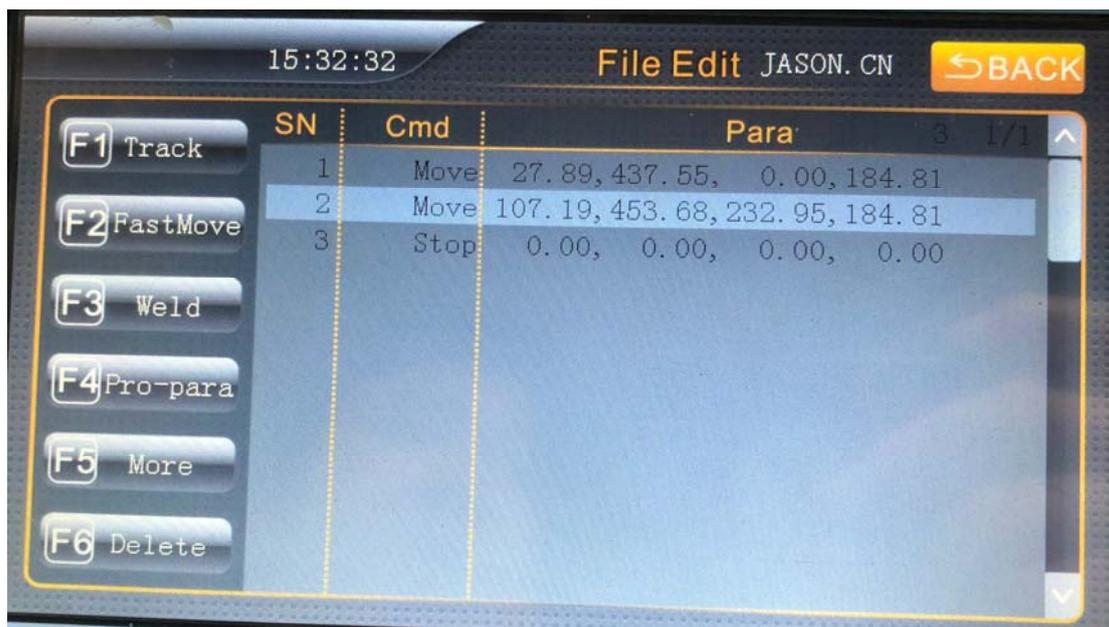


Press:  Enter the picture

Contacts: Mr.Jason +86 18662025258 (what'app or wechat) E-mail:Jason\_Jiang@kltweld.com  
Address: No. 642 Century Avenue, Yandu Area, Yancheng, Jiangsu, China



After moving each axis to a specified position via a stick, press 

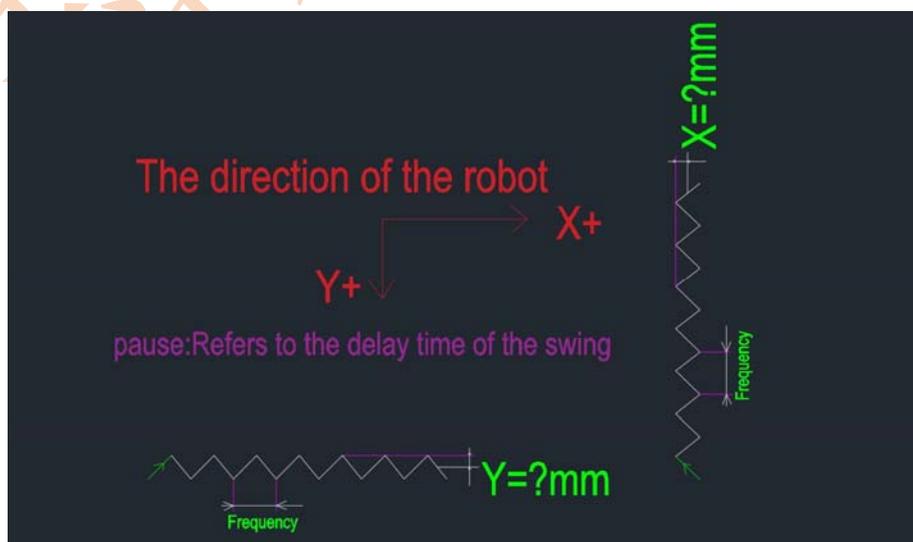
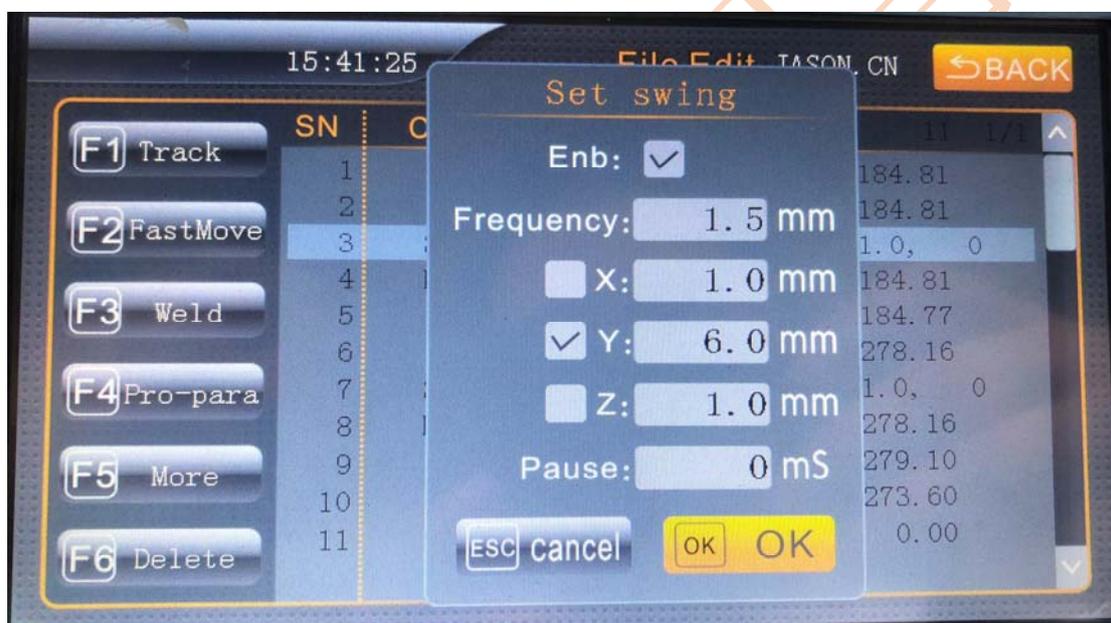
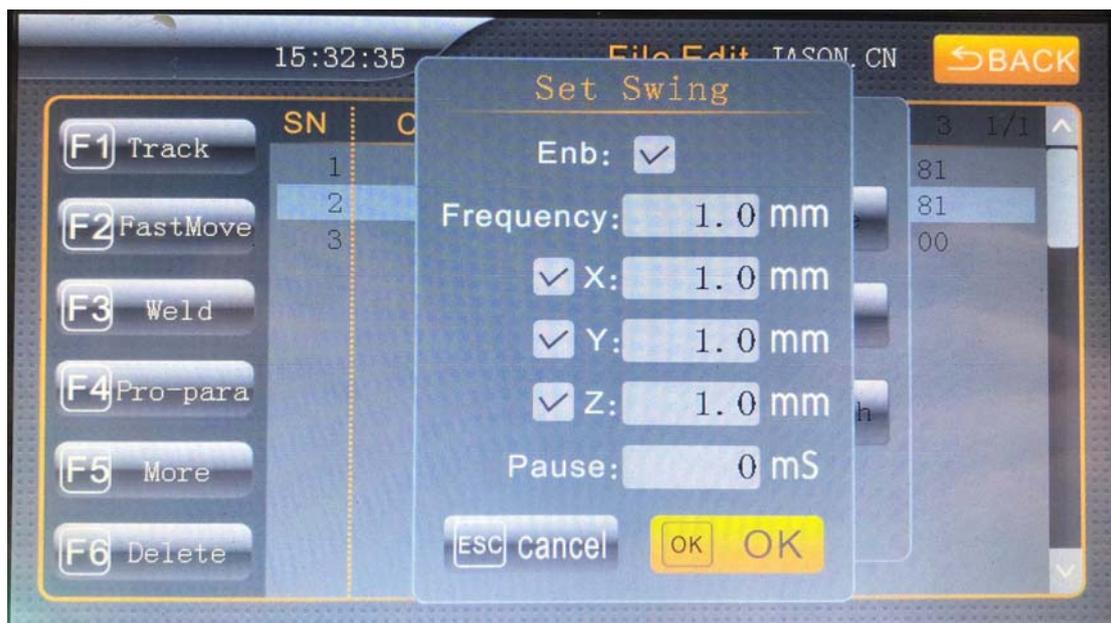


Press:  Enter the picture

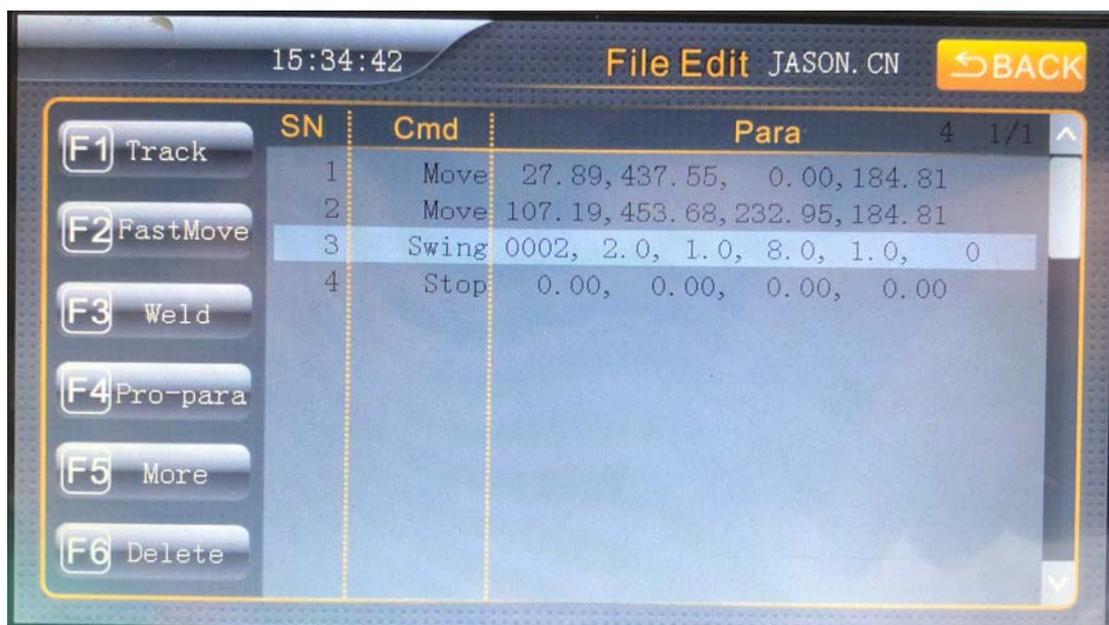


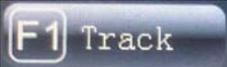
Press:  Enter the picture

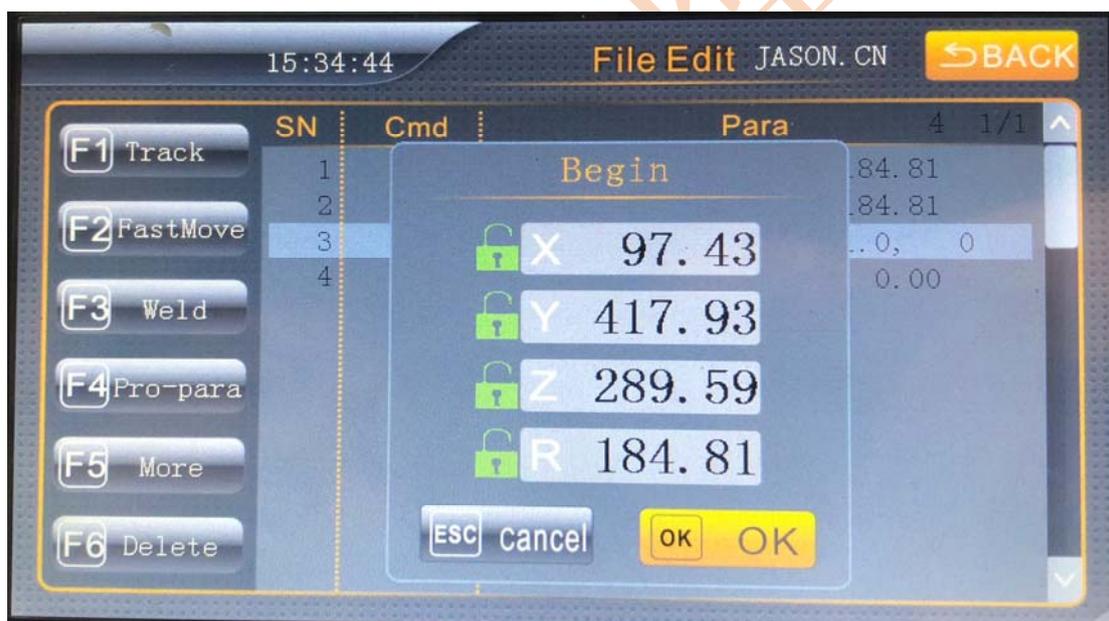
**Note: You need to note that this weld is the axis that needs the robot to swing**



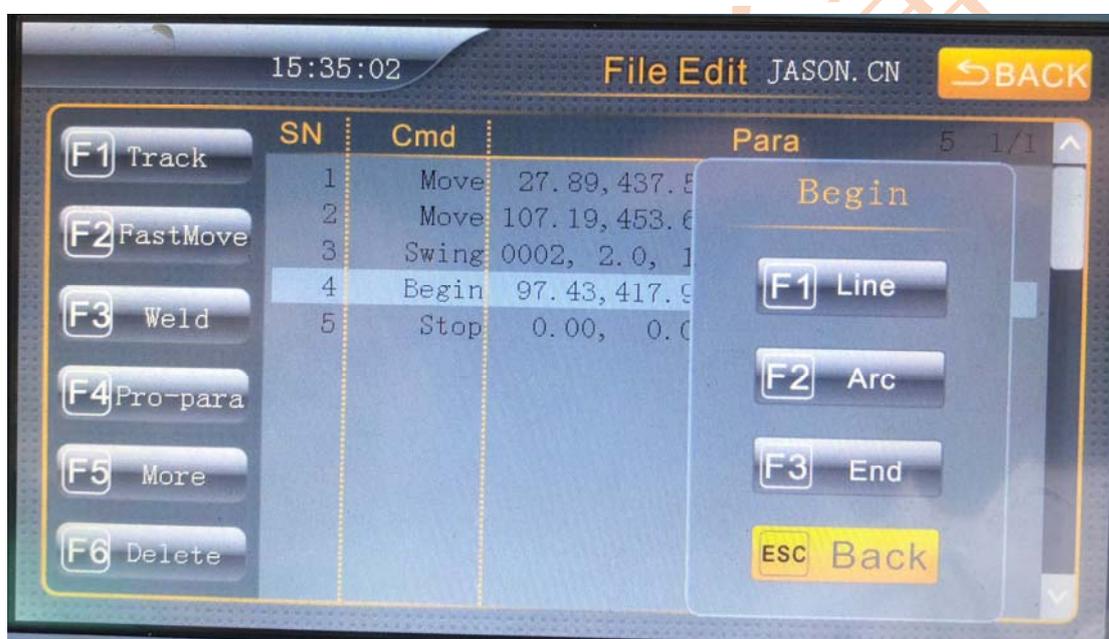
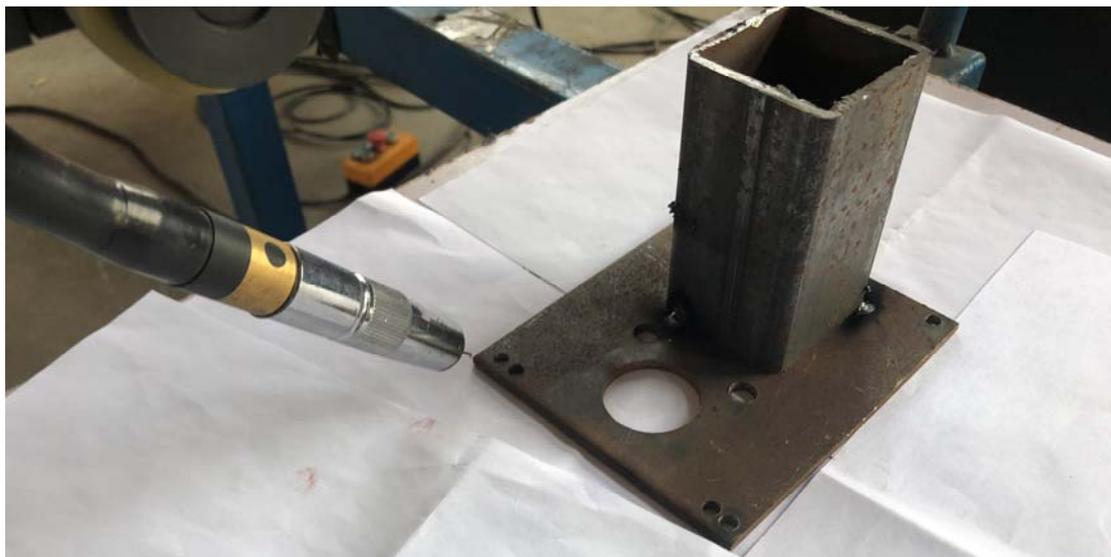
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 Address: No. 642 Century Avenue, Yandu Area, Yancheng, Jiangsu, China

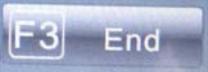


Press:  Enter the picture

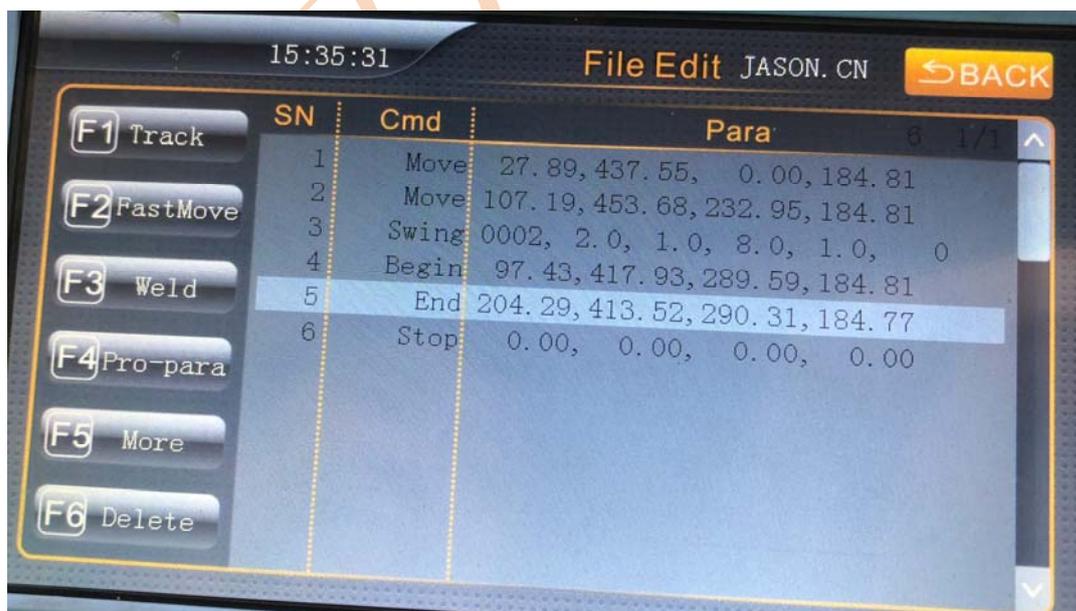
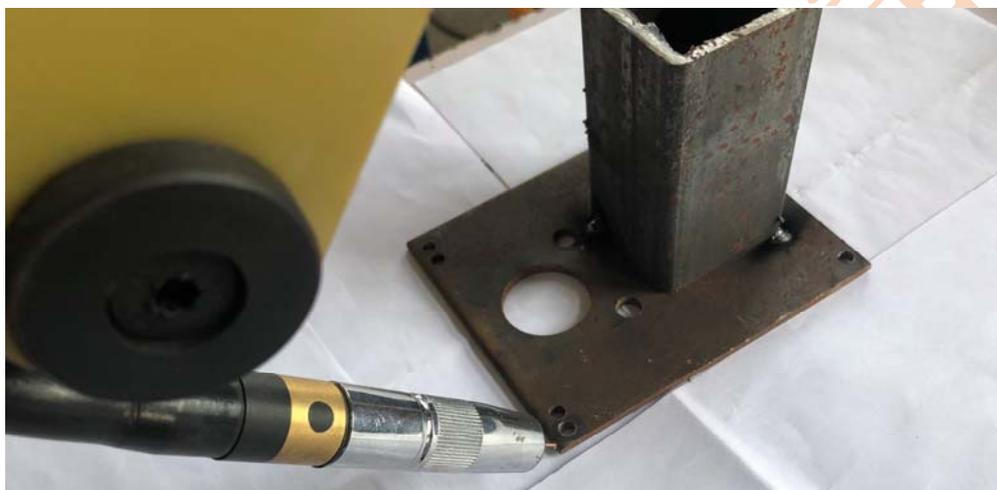


Move each axis to the picture below (welding start point)

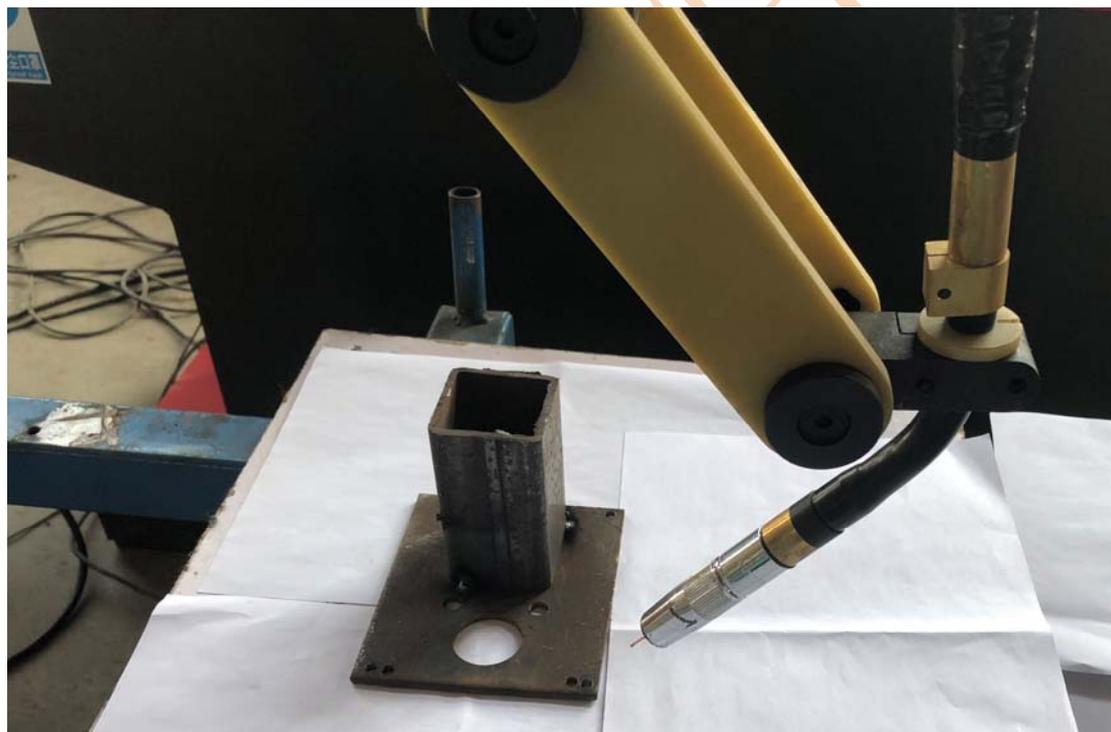


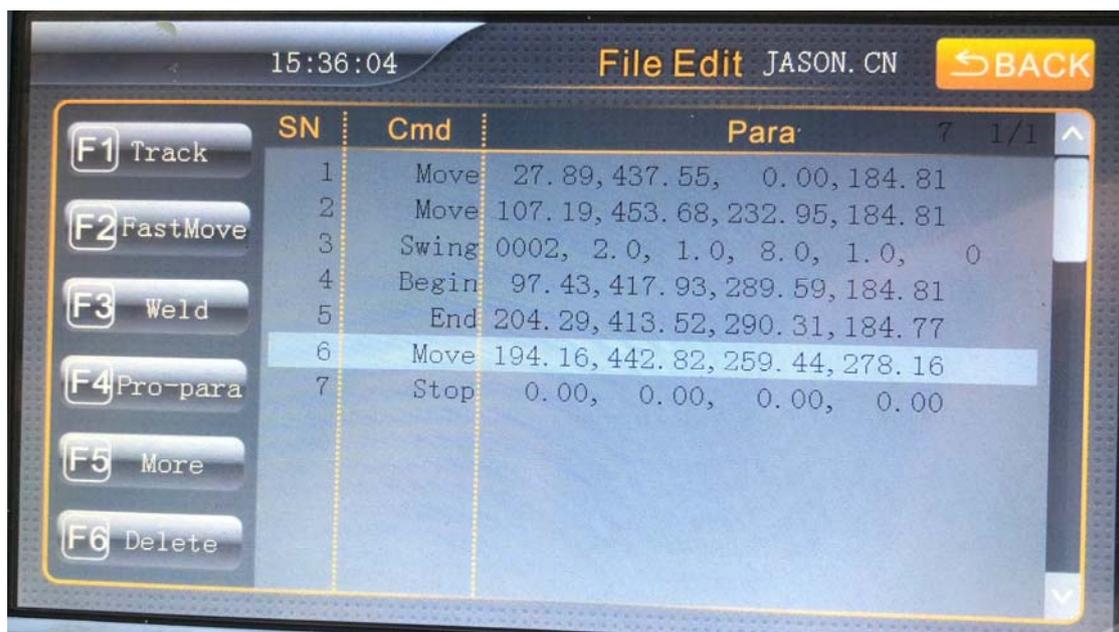
Press:  Enter the picture

**Remarks: If there is a straight line to be programmed, you can press F1 Line directly, only wait until the last point will press F3 End.**



Press:  Enter the picture



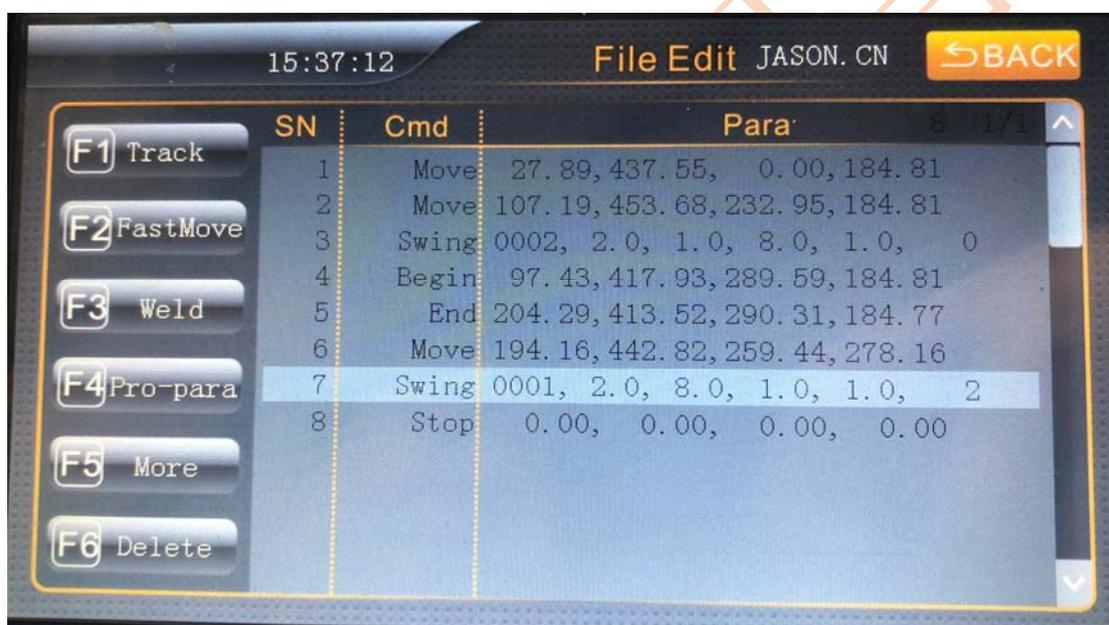
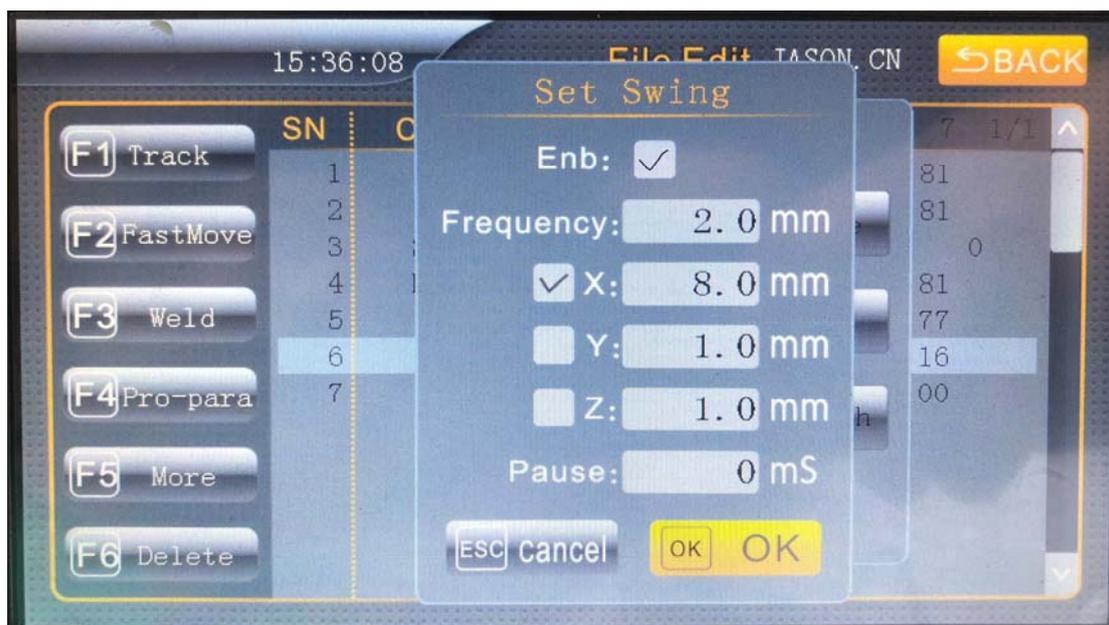


Press: **F3 Weld** Enter the picture



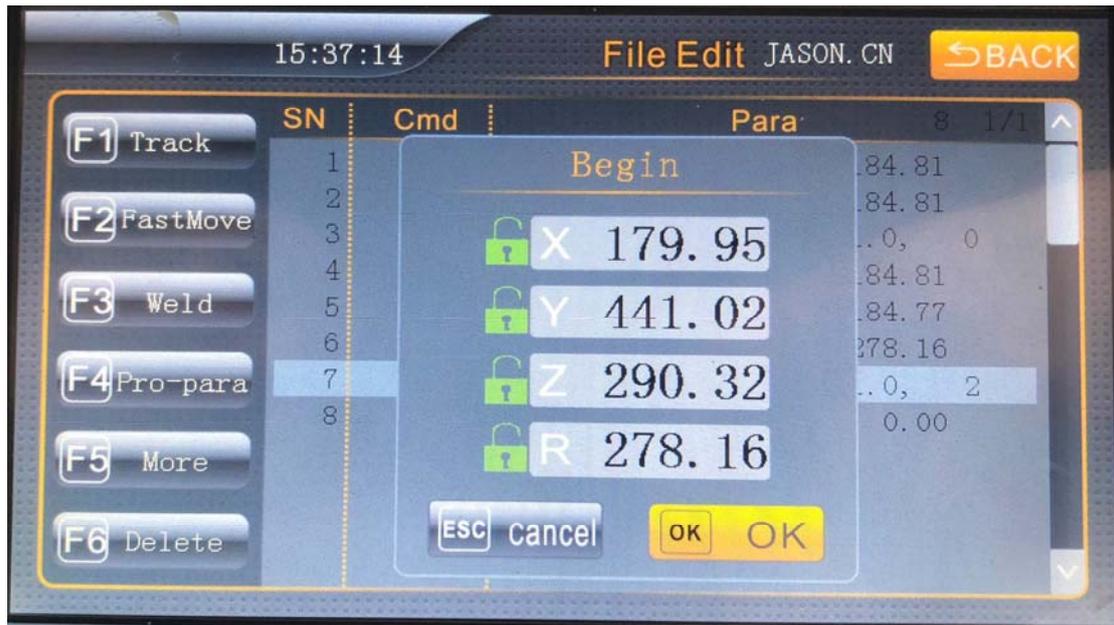
Press: **F1 Swing** Enter the picture

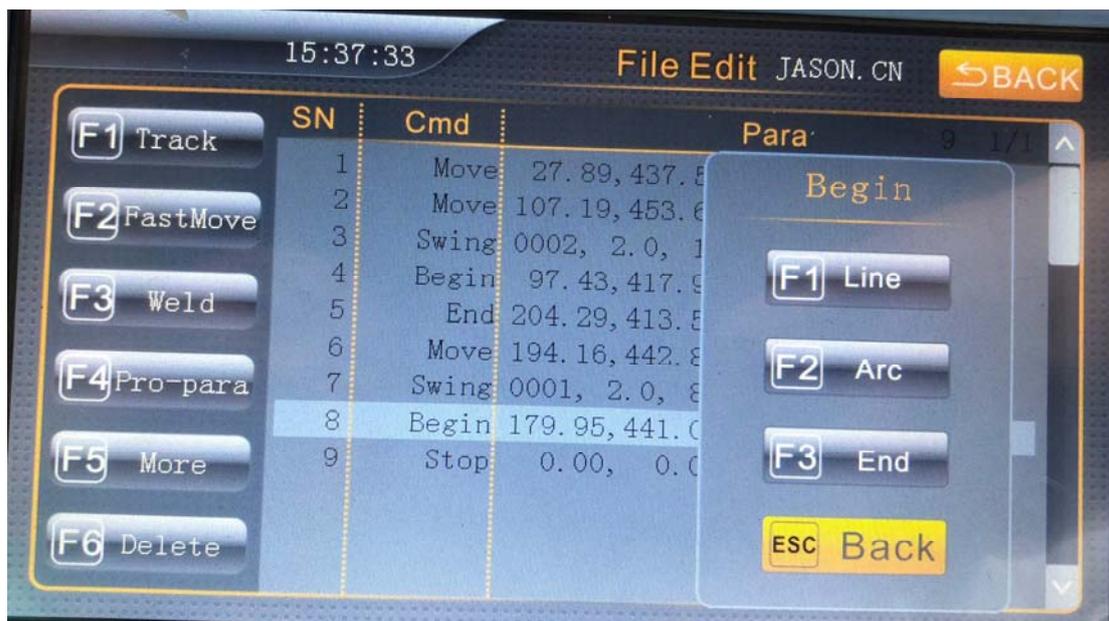
**Remark: At this time, the weld swing is performed through the X axis, so we only need to set the swing distance of the X axis.**



Then, repeat the above steps and perform the welding starting and ending points.

Press:  Enter the picture

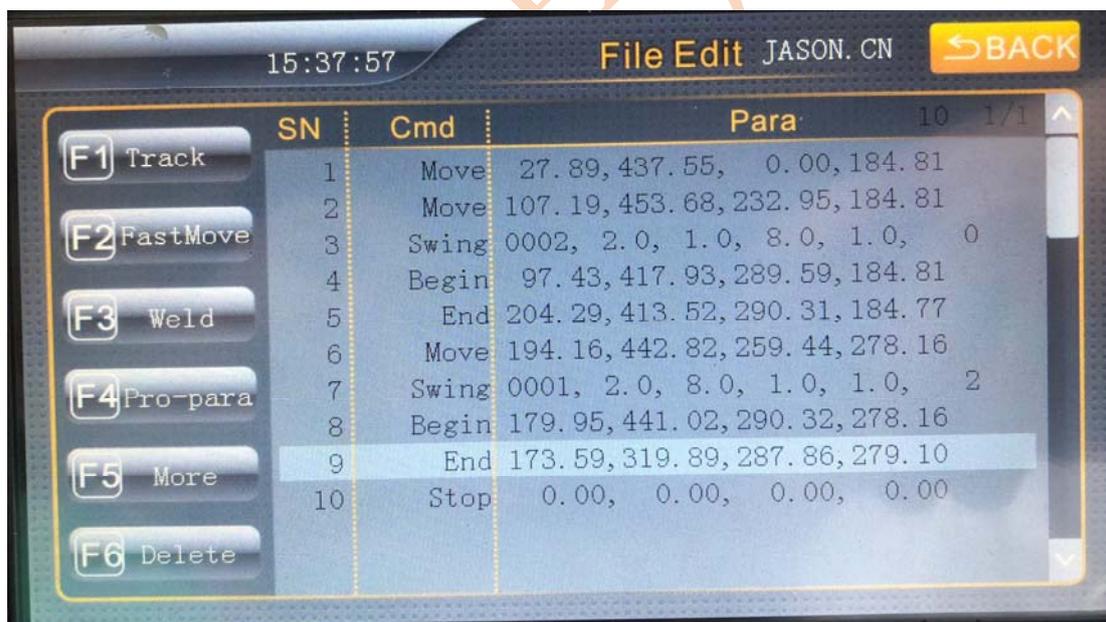
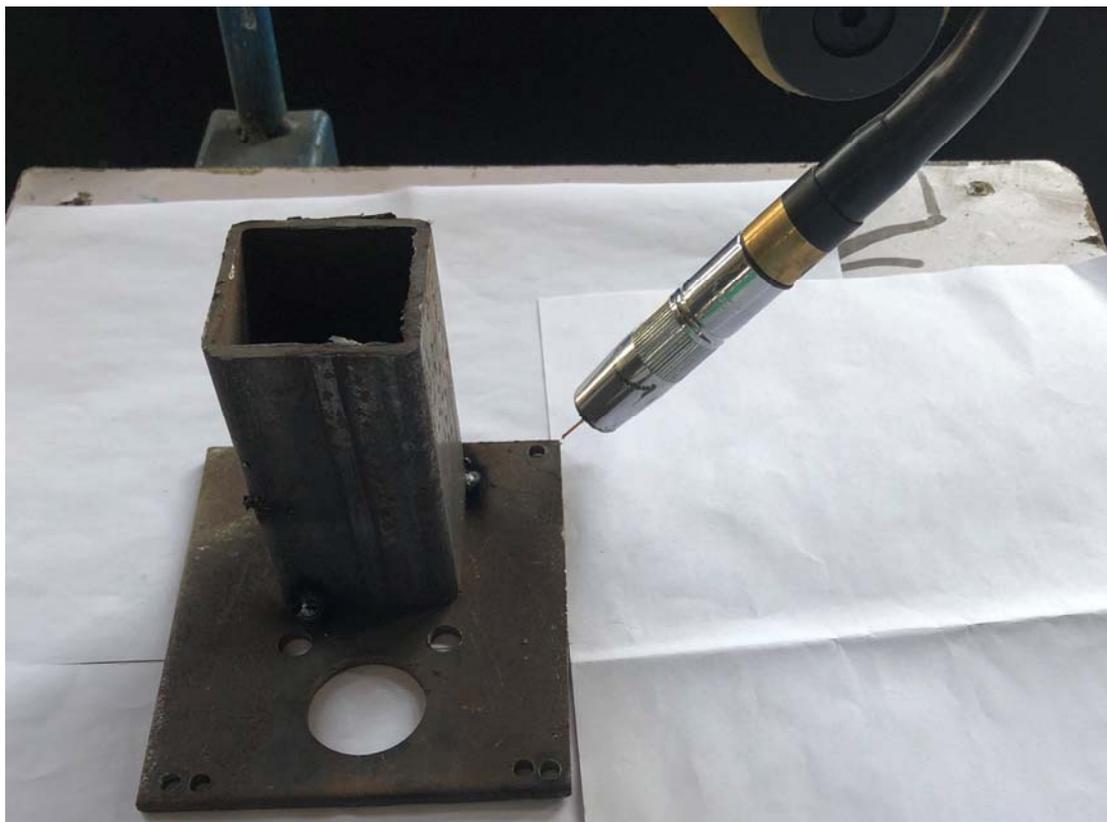




Press:  Enter the picture

**Remarks: If there is a straight line to be programmed, you can press F1 Line directly, only wait until the last point will press F3 End.**

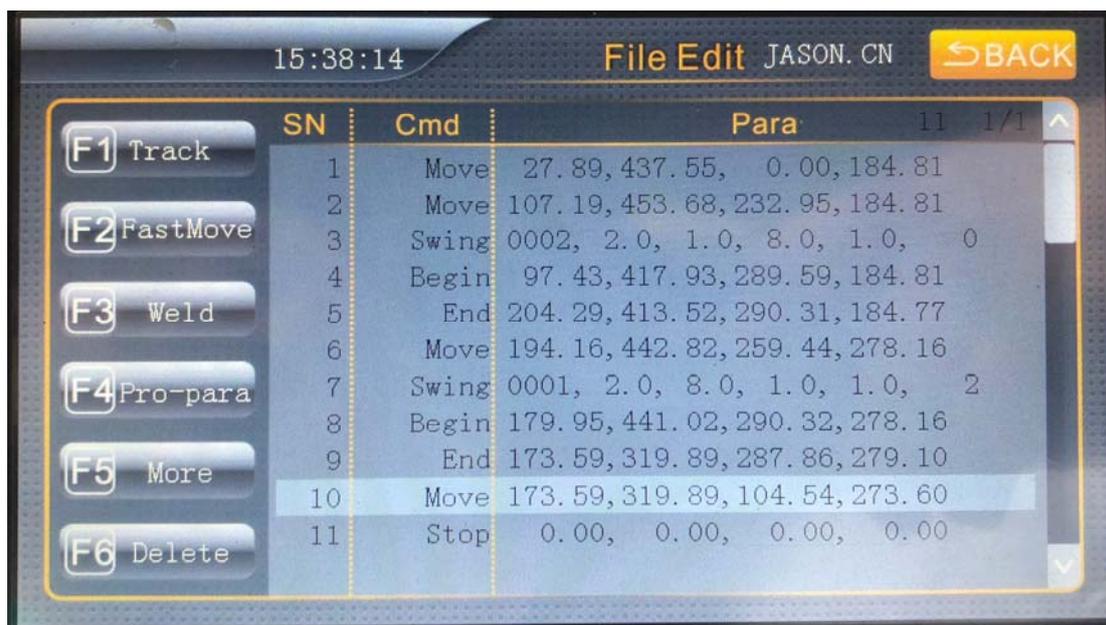




Press: **F2** Fastmove Enter the picture

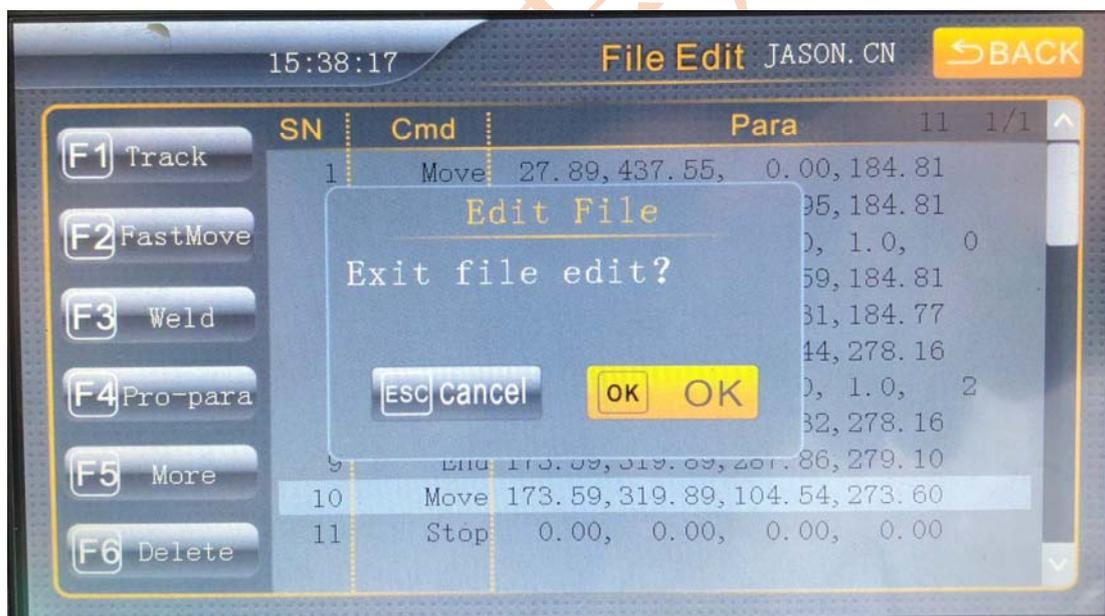
**Remark:** At this time, the welding procedure of the two welds is taught, then we must keep the welding gun away from the welding workpiece and only need to execute the Fastmove command.

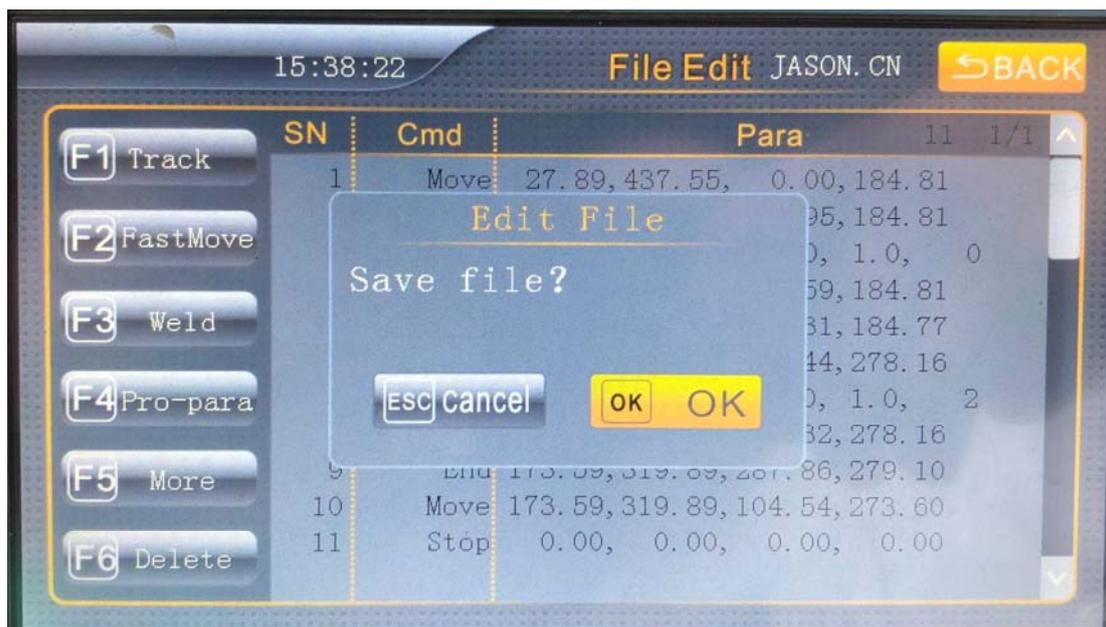




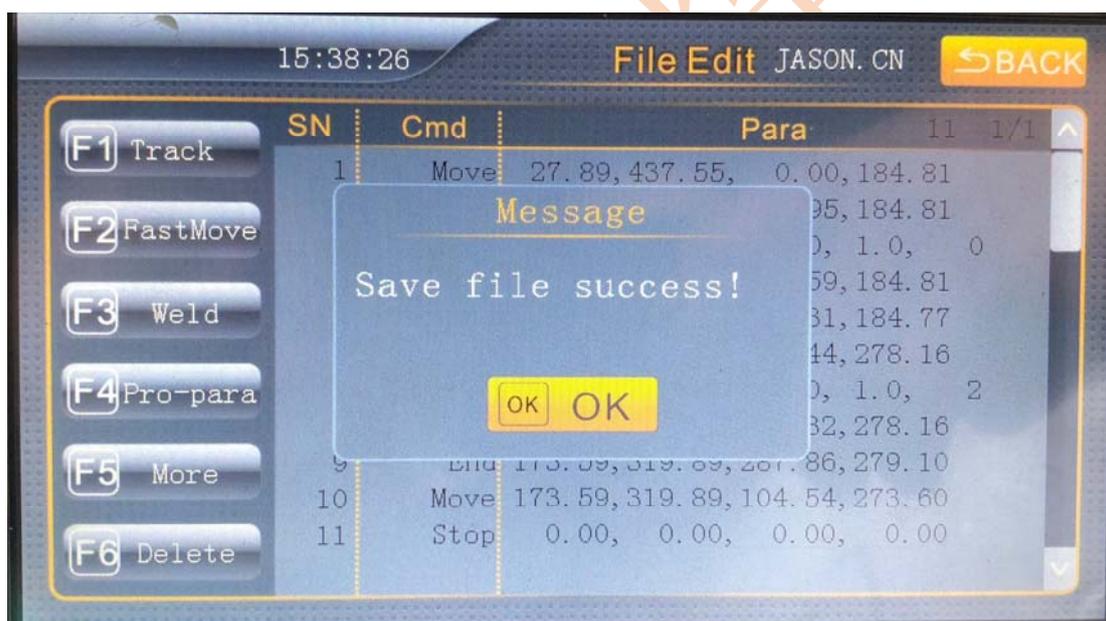
Then work, we want to save the program, upload the program to the main controller. See the operation picture below

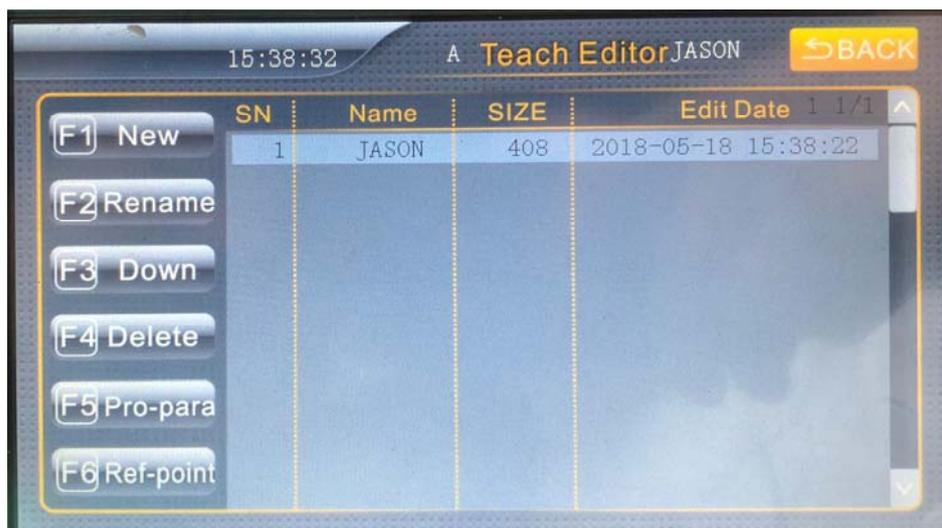
Press  button or ESC



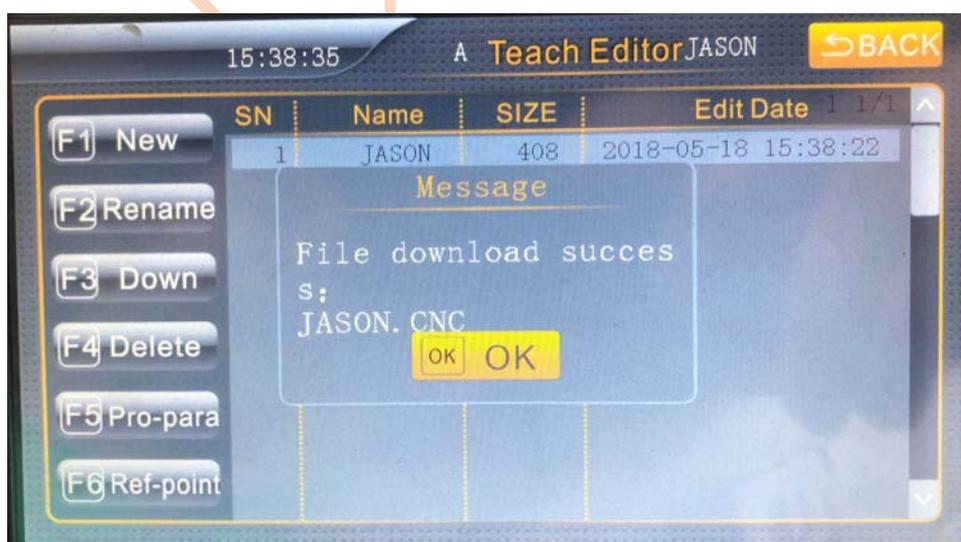
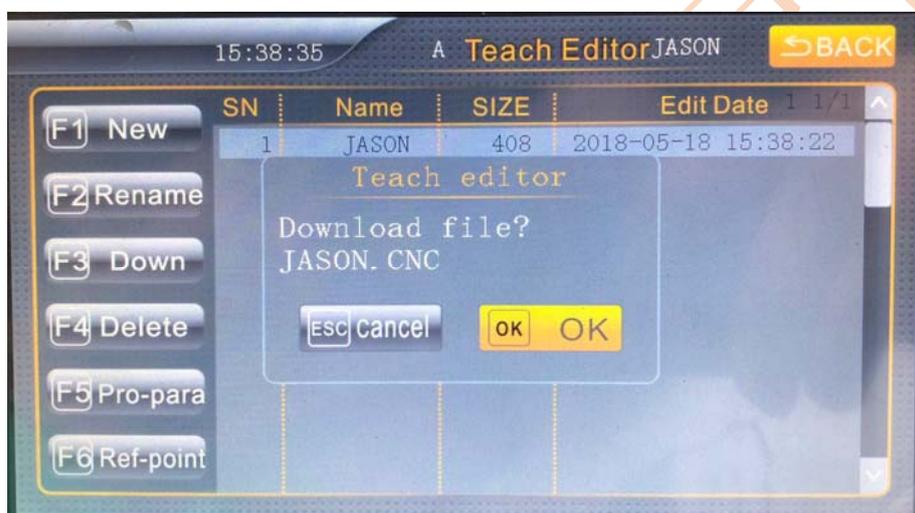


Press OK





In this interface, again Press  button or ESC



Below, we can detect the action of the program just written. Test it for accuracy. We return to the main interface



In the above picture, we need to check if the program name we just created. If it is correct, you can execute the Run button and the robot will execute according to the sequence of actions just now.

Weld in the picture is ON state, it means that when the program is running, the welding power is working. If you only want to check the running program, you only need to press F3 or Weld to make Weld OFF.

## 7 Maintenance and troubleshooting

### 7.1 Maintenance

- (1) Lubricating oil must be added once a day to the lubrication point of the equipment.
- (2) Clean the control box dust weekly with dry compressed air
- (3) Please keep the surrounding environment clean

### 7.2 Troubleshooting

Fault name	cause of issue	Detection method	Method of exclusion
<b>Servo driver alarm</b>	Servo motor driver error	Open the control box door, refer to the motor manual to check the cause of the motor alarm	Refer to the following method to troubleshoot
<b>Drive overload alarm at reset</b>	Equipment stuck phenomenon	After power can promote each axis。	If you can push, push to the middle position and then power-on reset; if you can not push, check whether the device has a foreign body stuck device.
	Reset open light fault	Check the alarm axis reset switch is normal (enter the system test - IO test - touch with a metal sensor light	Display  , Then pushed to the middle position after power on reset (if not enough, please contact the manufacturer)

		对应的感应开光是否显示 	If not displayed  , Replace the sensor switch or replace the sensor open the cable.
<b>Servo driver overload alarm during operation</b>	Equipment stuck phenomenon	After power can promote each axis.	If you can push, then pushed to the middle position after power reset
			If it can not be pushed, check whether there is any foreign body stuck in the equipment.
<b>Z axis servo drive overload alarm</b>	Motor brake failure	Check the brake relay is normal (the relay is not closed when the drive is not alarmed)	If the suction then replace the relay
			If not, check if the drive's brake setting is correct
			Check whether the Z axis motor brake plug has 24V voltage.
			If there is voltage change the motor
			If there is no voltage change the brake signal cable
<b>Drive alarm code</b>	Encoder line fault	Check the encoder cable and connector	Replace the encoder cable or replace the motor

<b>Work, the welding torch is not welded, only walking</b>	Torch control is turned off	Check Teach pendant main page torch control status	Turn on torch control
	The welding relay is damaged	Into the system test - IO test page test, manually open the welding torch, the welding relay whether there is a signal.	Replace the welding relay
	Welder control line poor contact	Check connectors and control wires	Replace the control line
	Welder fault	Refer to the welding machine manual	Change the welder

### Yancheng City Kelite Welding Equipment Co., Ltd.

E-mail: Jason\_Jiang@kltweld.com

Tel: +86 18662025258

WhatsApp: +86 18662025258

Skype: jiangxi131622@hotmail.com

Address: No. 642 Century Avenue, Yandu Area, Yancheng, Jiangsu, China

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