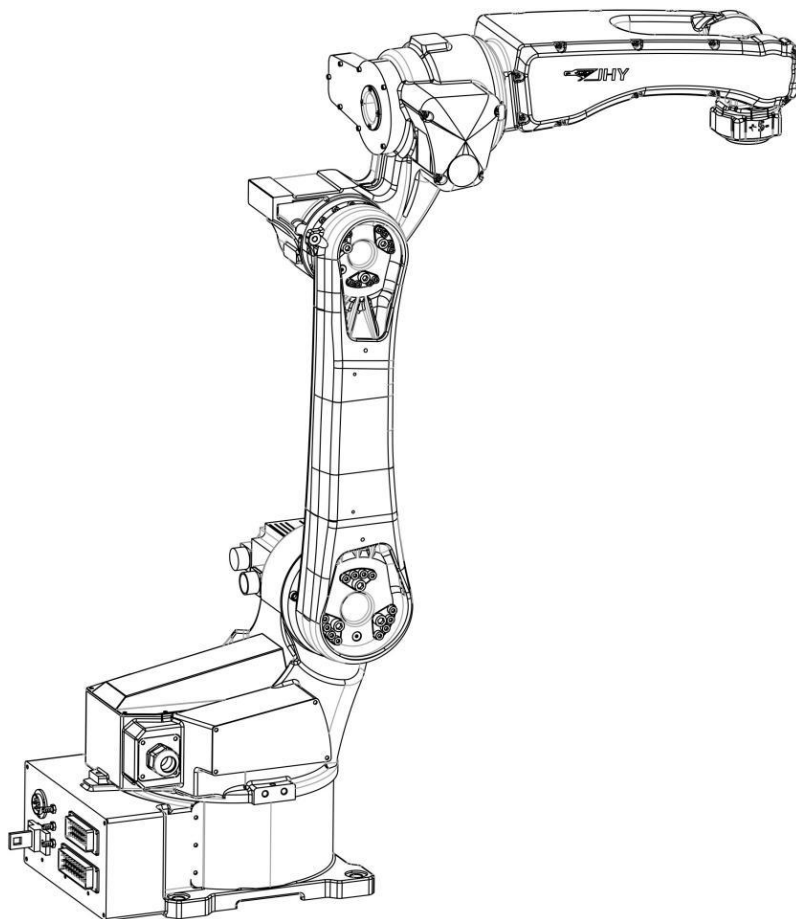# JHY welding robot series

WELDING MANUAL INSTRUCTIONS

Wuxi Jihoyen Industrial Automation Co.,Ltd.
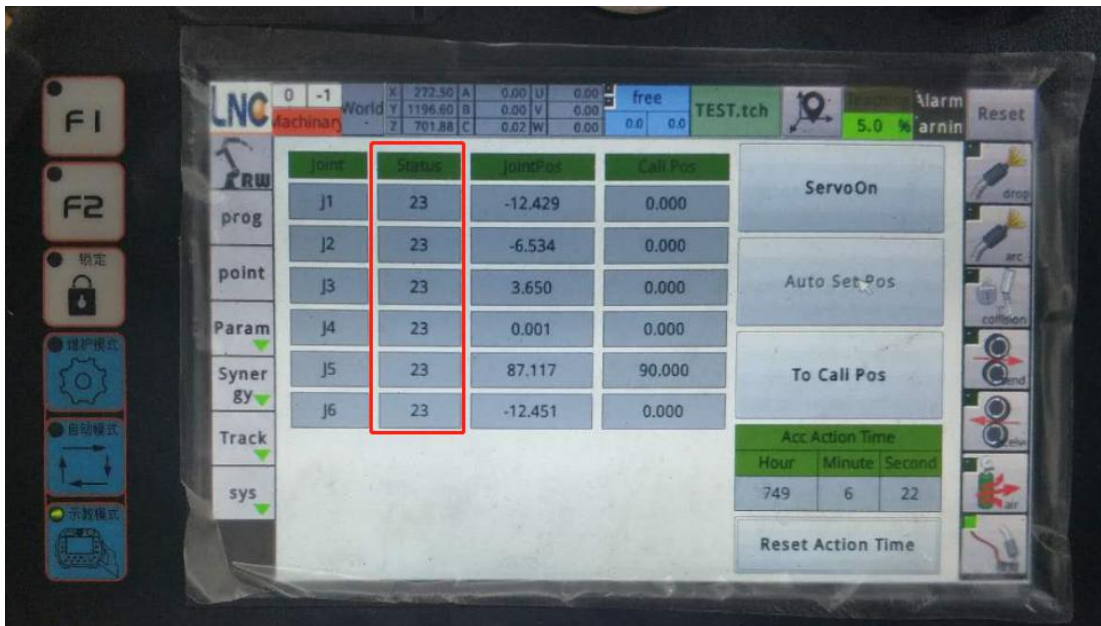
www.jhyrobotic.com
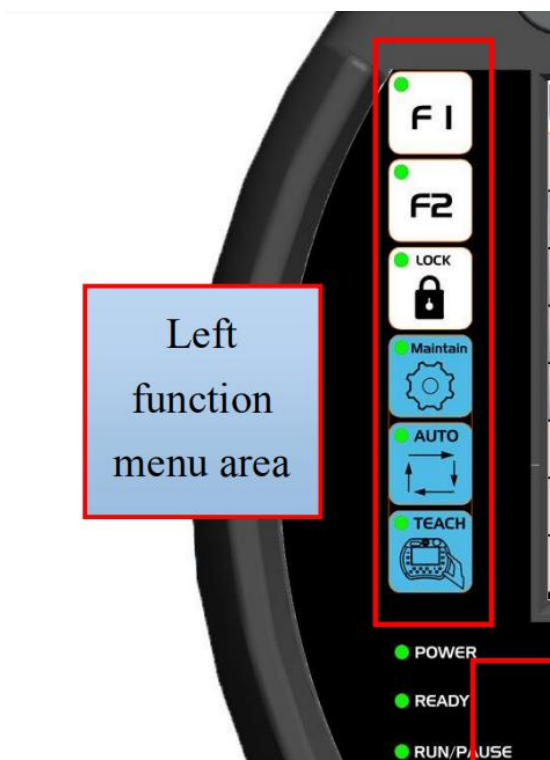
JHY ROBOT

Catalog

1.User interface introduction

First,open the teach pendant,now its in maintain mode,Press "Auto mode",only all the status numbers show as "23",then change into "Teach mode".

1.1 Left function menu area

F1.F2: User-defined button functions

Lock: When you click lock,the screen is locked and can not be edited.click the lock symbol on the screen and input "0" to release the lock.
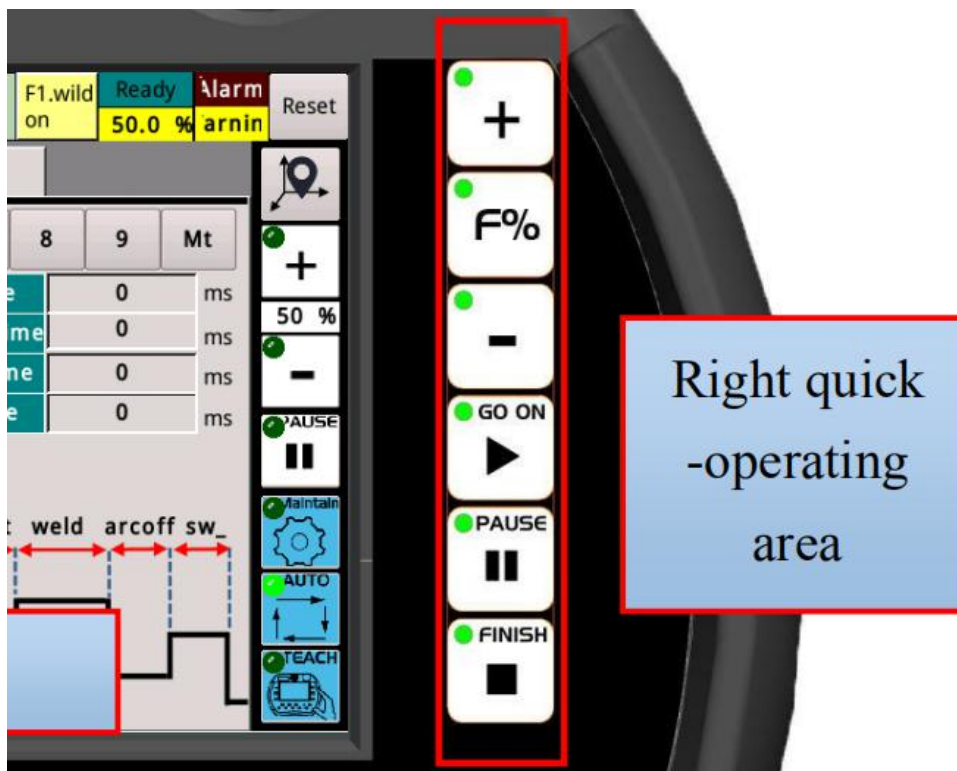
Maintain: Perform operation control of a single motor. Usually used for the time of d ebugging.

Auto: Used to launch a program or to operate a specific action on each page.

Teach: Move with the coordinate system direction such as "world", "work", "tool" and "joint" as a reference.

When you need to switch the mode,switch one by one.

1.2　Right quick-operating area:

"+" : Speed increase

"-" : Speed reduce

"F%"　Speed to 50%

In Auto mode,adjust the percentage of speed during automatic operation.

In Maintain/Teach mode,adjust the percentage of speed when the machine is manually operated.

JHY ROBOT

These buttons shows as their word meaning.

Go on: In the automatic mode,program execution can be performed

Pause: In the automatic mode,make the running program enter the pause state

Finish: In the automatic mode,the executed program stops running

1.3   Head column

USB interface: it's used for input files,backup program,and update the system.

Hand-wheel: This function equals to the shortcut key,press the "MPG" button in the bottom,light up any direction button and rotate the hand-wheel then it can control the robot joints to move.Or you can display the program in Auto mode by using hand-wheel. (in this way you can control the moving speed and avoid welding torch collision).

Emergency:press down the emergency button,the robot out of electric,the alarm sign appears on screen.then rotate the emergency button, click "Reset" to

clear the current alert warning.
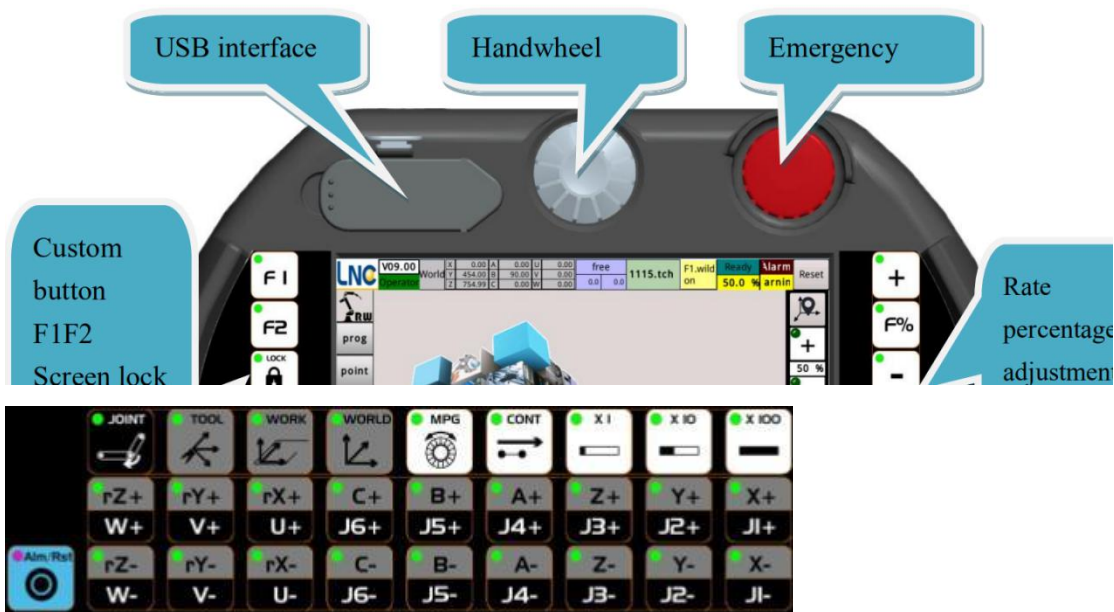
1.4 Manual operating area

Manual operating area
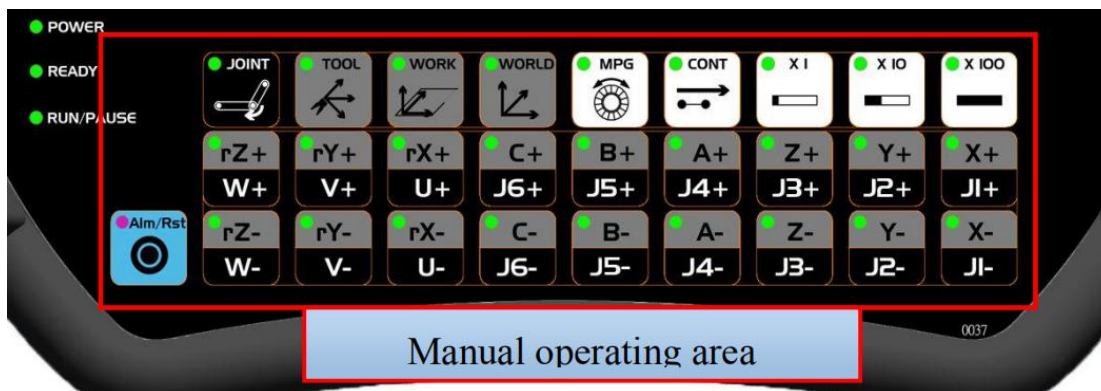
Use to select the coordinate, continuity, and speed ratio of the moves, then press the move button to move manually.

Alarm/Reset: The light signal shows the current alarm and the button reset system (equivalent to the reset button on the screen),click it to clear the current alarm.

JOINT,**TOOL**,**WORK**,**WORLD** coordinates

Among them,**JOINT** and **WORLD** coordinates are the most commonly used.

Under the **WORLD** coordinate,these buttons from X+,X- ...to A+,A- stands for X axis、Y axis、Z axis、A axis、B axis、C axis.

Under the **TOOL** coordinate,these buttons X+,X- ...to A+,A- stands for Robot J1 axis, J2 axis ....J6 axis, rX±...rZ± stands for additional axis J7,J8,J9

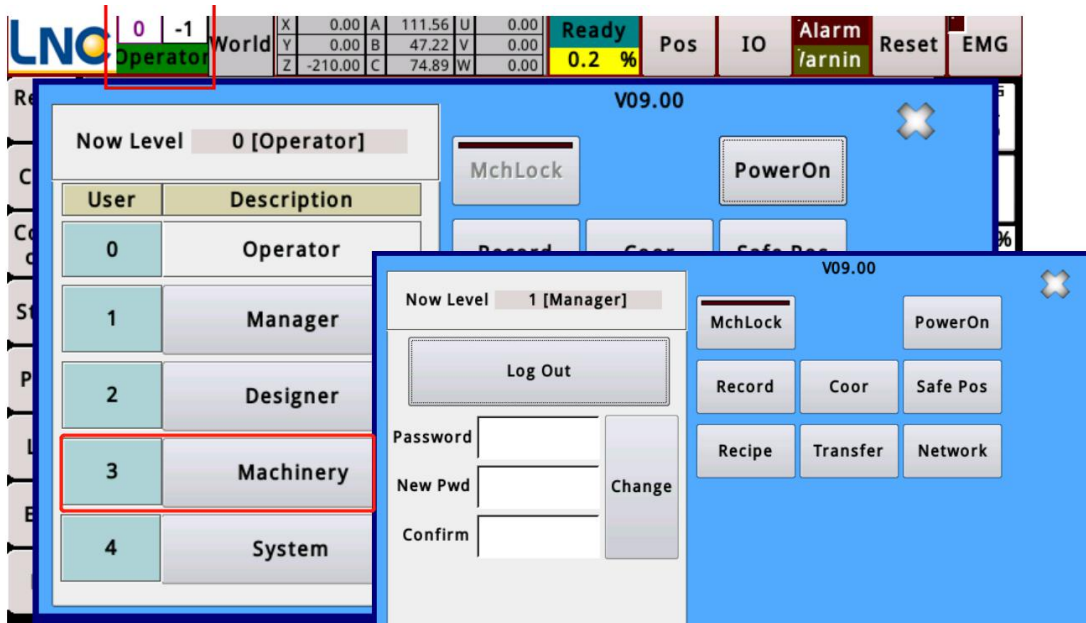**CONT** button means continue,when you press it,move the robot joints,then the joints will move continually.

x1%,x10%,x100% these means the speed increased by 1%,10% and 100%.

2 Basic operation

2.1 Some basic operations

2.1.1 Enter the system

click "LNC",enter into the main menu, these 5 levels means different permissions.

Here are the passwords for each level below:

No.0 Operator.when you open the system,its in Operator system.
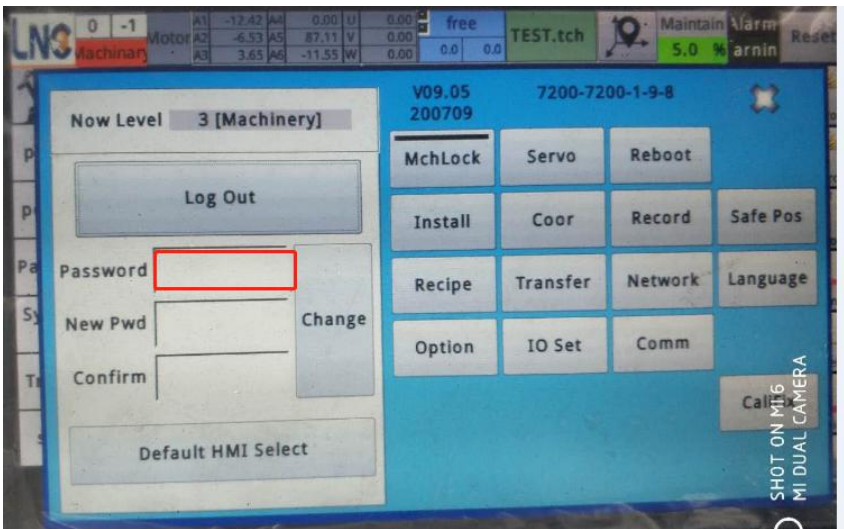
No.1 **Manager**. Password:1111

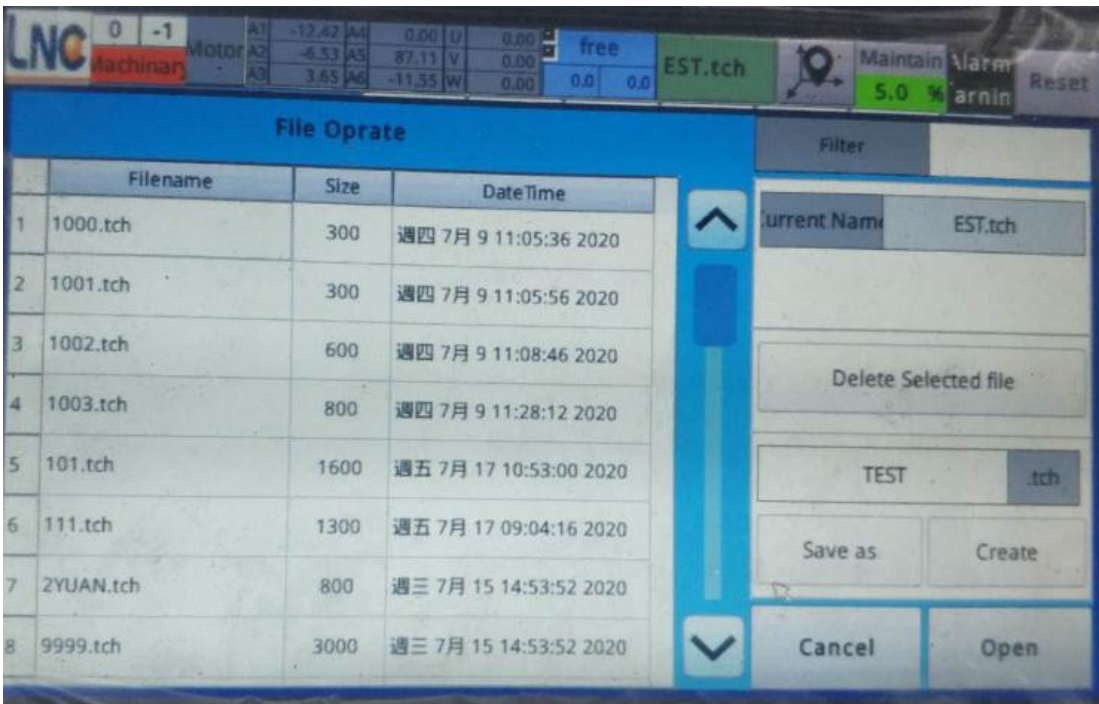No.2 **Designer**. Password: 2222

No.3 **Machinery.** Password:3333

We usually use the No.3 Machinery level to operate.

After entered Machinery level,press "LNC" Logo at the left top corner,you can see a program list which contains the one you saved last time.If you want to see all the pr ogram lists,click the program name on the top,then you can see it,click one you need and open it.

2.1.2 Editing program in right area

First area,block operating(BlockOp),like cut/cope/paste...For example,
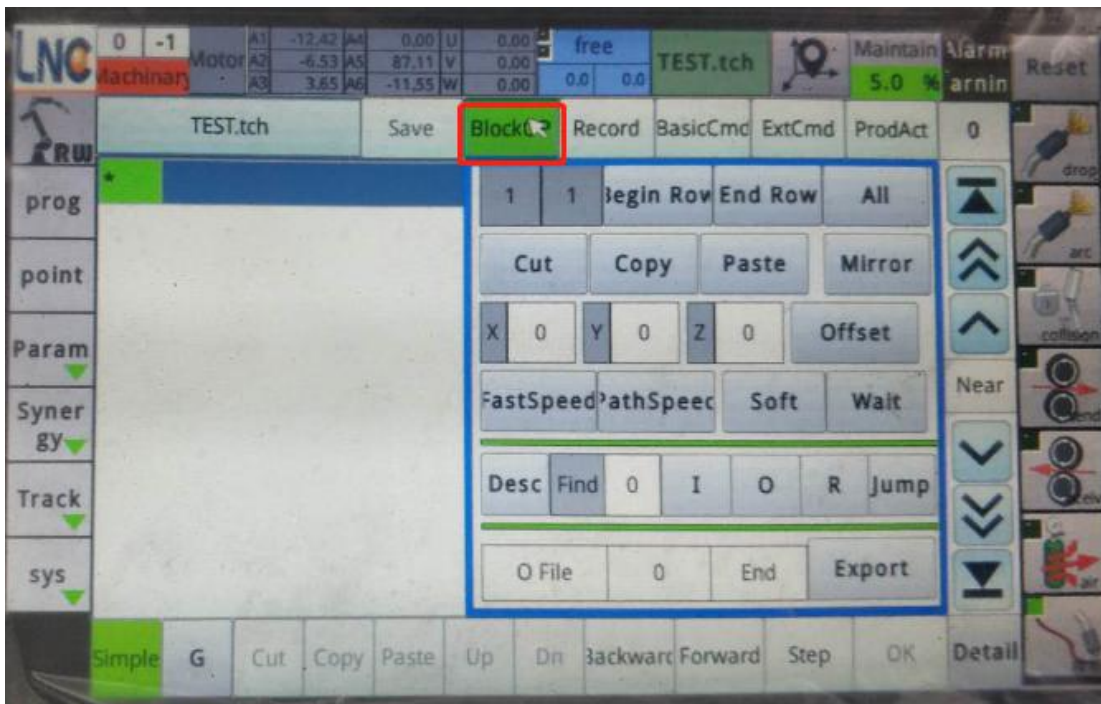
Copy: If you want to copy one line or several lines order,input "Begin row" number,"End row" number then click "Copy",choose the blank area below then click "Paste".

Copy just one line,click "Copy" below.

**Cut**: If you want to delete one line,it's ok to click "Cut"

If you want to delete all lines,just cick "all" then "Cut"

The second area (**Record**) is for the instructions you may use when creating a program,such as

● "Fast",moving from one point to another point directly.

● "Line",moving from one point to another point in straight line,this often used in straight line welding bead.

● "Mid" the middle point of a semicircle,this often used in arc welding program.
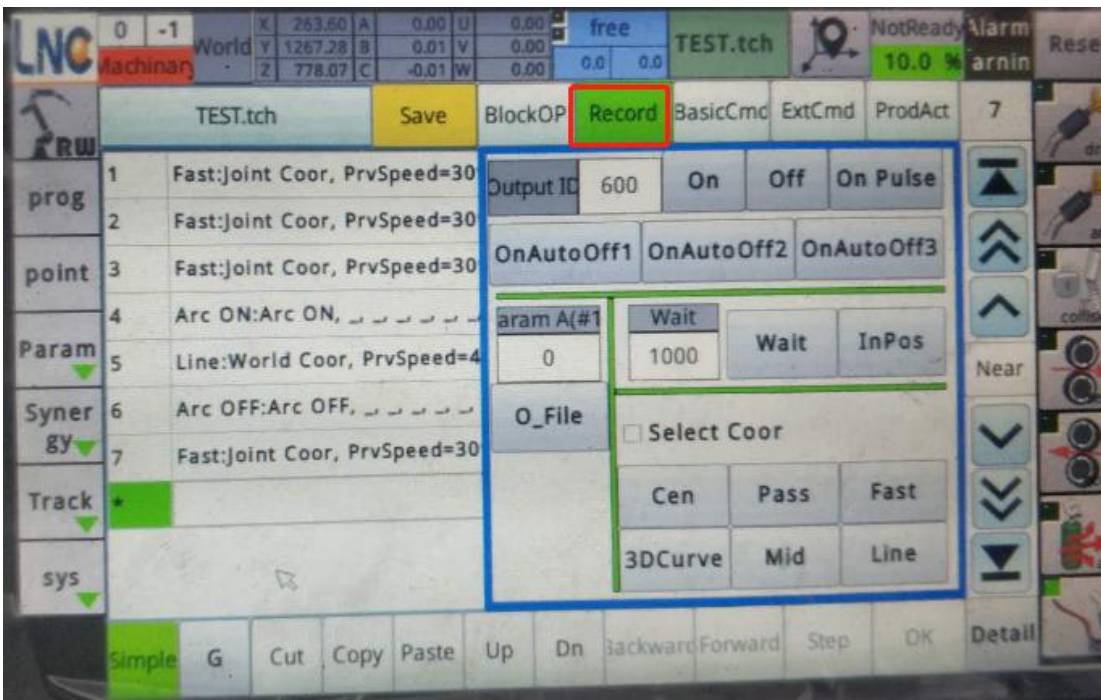
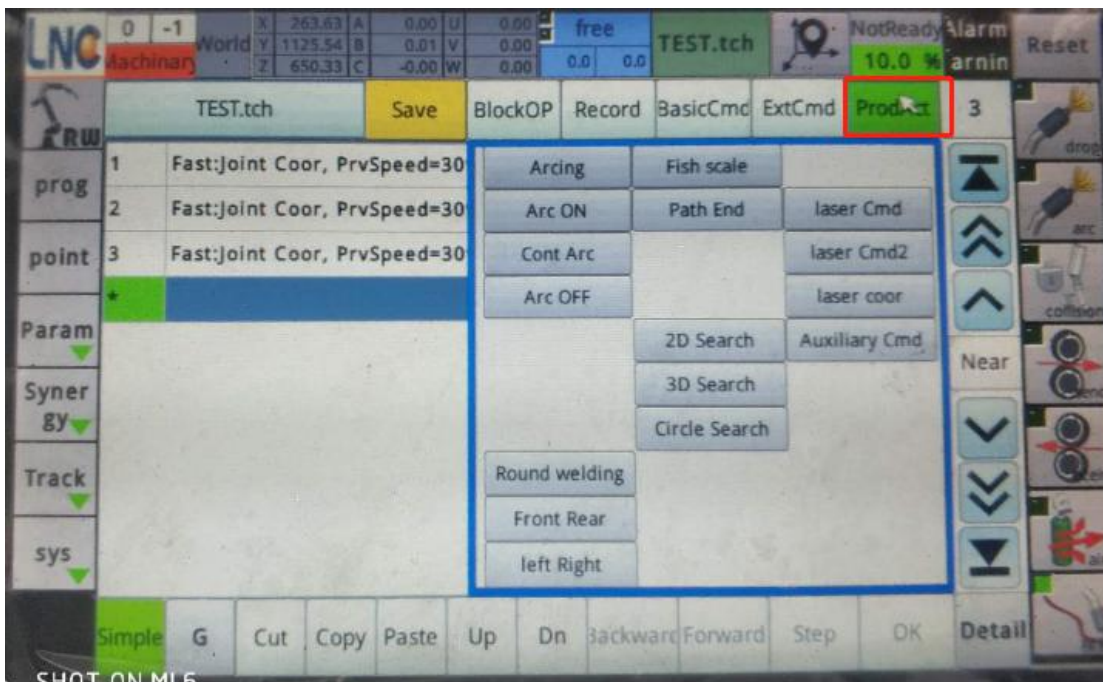The third area (**BasicCmd**) this area is for some basic instructions such as Jump,Wait,Set O,Set R,etc.
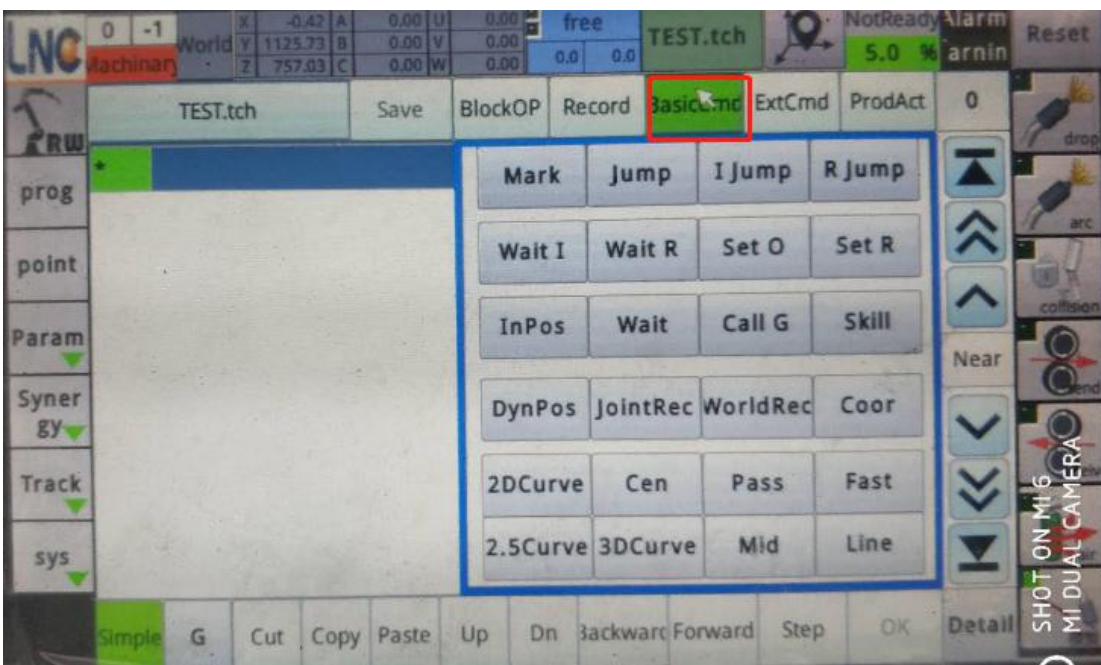
The fourth area(ExtCmd) some external directions we may not use.

The fifth area(ProdAct) this area is for the welding technology,such as "Arc on"、 "Arc off"、"Fishscale"

2.2 TCP correction

How to do the TCP Correction?

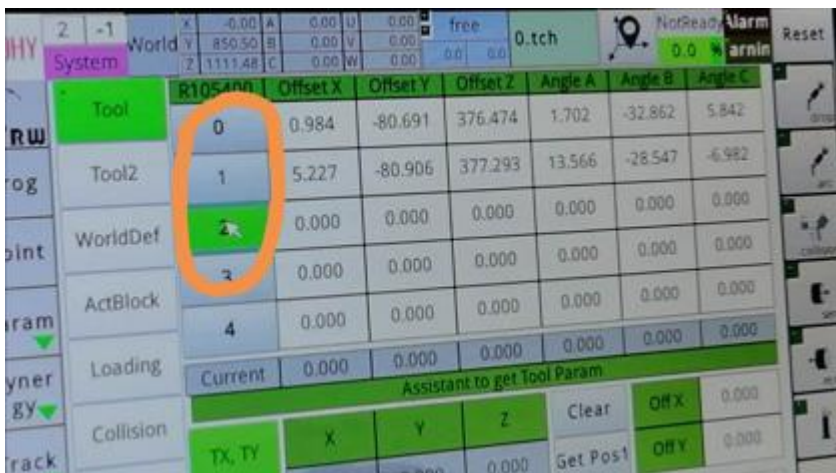What you need: something that can be fixed on ground without shaking and has a c usp.like below:

2.2.1 Tool coordinate correction

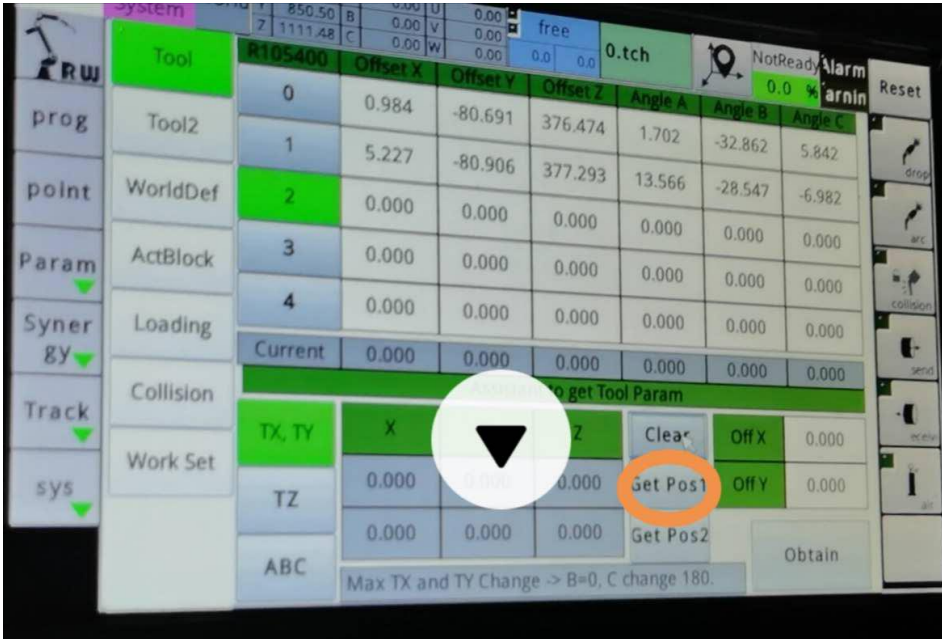(including TX/TY Correction + TZ correction +ABC Correction)

Ⅰ.TX,TY Correction:

**LNC** --**Instal**l--**Tool** --choose tool number.(pic attached,You can choose either one,for example choose No. 2)　　--**clear**

Then:

Move the torch make the wire tip is aligned with the tool tip,and click **Get Pos. 1**

Then change the welding torch attitude(C axis rotate 180°) to align the wire tip with the tool tip again, and then click the button**"Get Pos. 2**"--**obtain**--Error values are displayed,in below area.
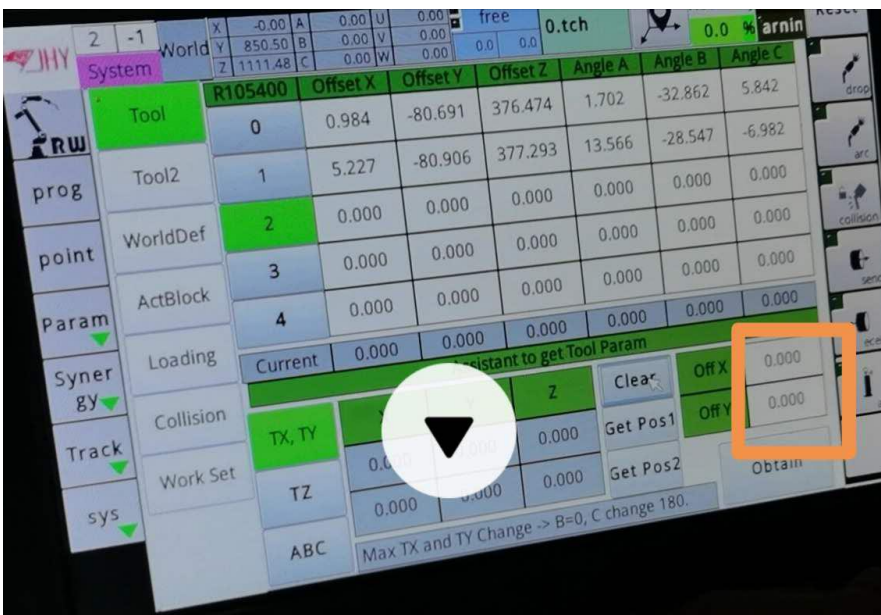
Click each Error value--choose **Yes. --** Press emergency button to save--Rotate the e mergency button--clear alarm

Ⅱ. **TZ Correction:**

Click **TZ----clear**

Then: Move the torch make the wire tip is aligned with the tool tip,and click **Get Pos. 1**

After that, change the welding torch attitude((B axis rotate more than 30°) to align the wire tip with the tool tip again, and then click the button "**Get Pos. 2**"--**obtain**--Er ror values are displayed --Click each Error value--choose **Yes. --** Press emergency bu tton to save--Rotate the emergency button--clear alarm

Ⅲ. ABC Correction:

Click **ABC----clear**

Then Make the torch perpendicular to the ground--click **Get Pos. 1**

After that, move in **Y+** direction for a short distance--**Get Pos. 2"**--**obtain**--Error values are displayed --Click each Error value--choose **Yes. --** Press emergency button to save--Rotate the emergency button--clear alarm.

2.2.2 Origin correction

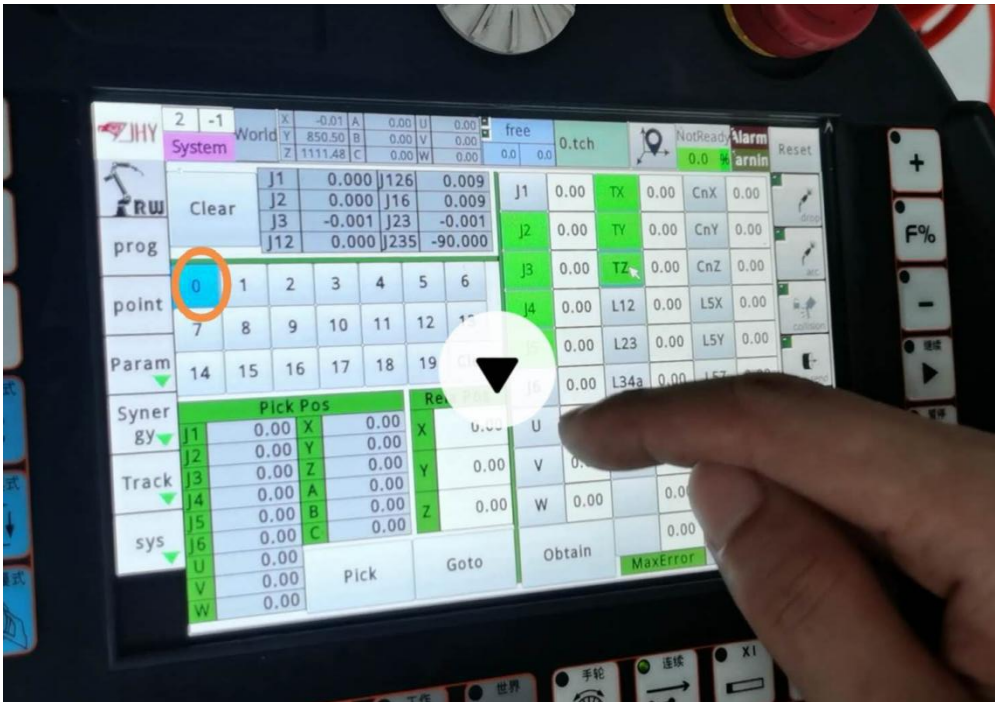**(get 8 different points for correction)**

LNC--**CaliFix**
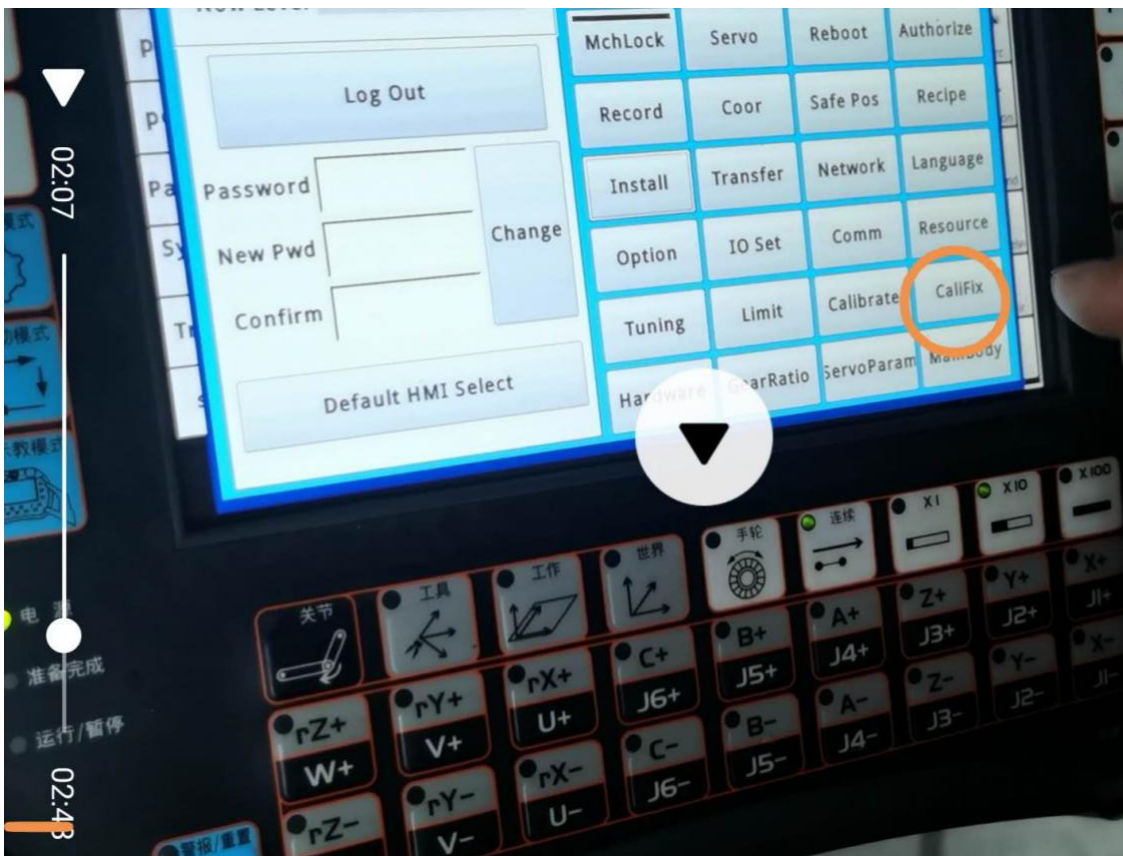
Then click **Clear**--click **J2-J5,TX,TY,TZ** in turn together (no J1 and J6)-- choose **0** (sh

ow below)

Move the torch make the wire tip is aligned with the tool tip,and click **Pick**
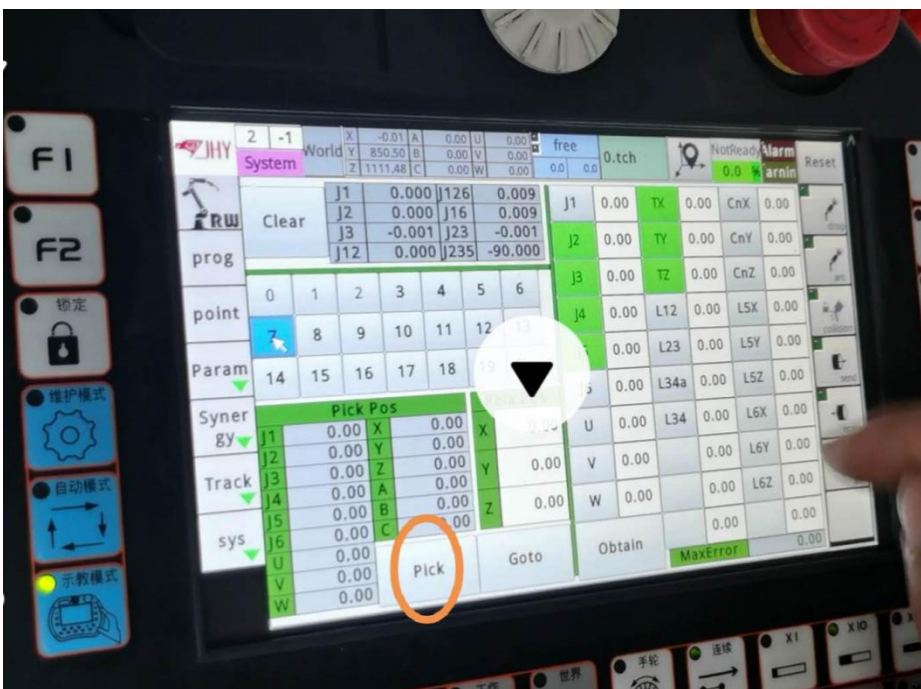
Then choose **1**--Move the torch make the wire tip is aligned with the tool tip,and clic k **Pick**

Repeat until you have reached 8 points (get values for Numbers 0-7)

Attention: The more different the position of the 8 points you get, the better (the higher the accuracy)
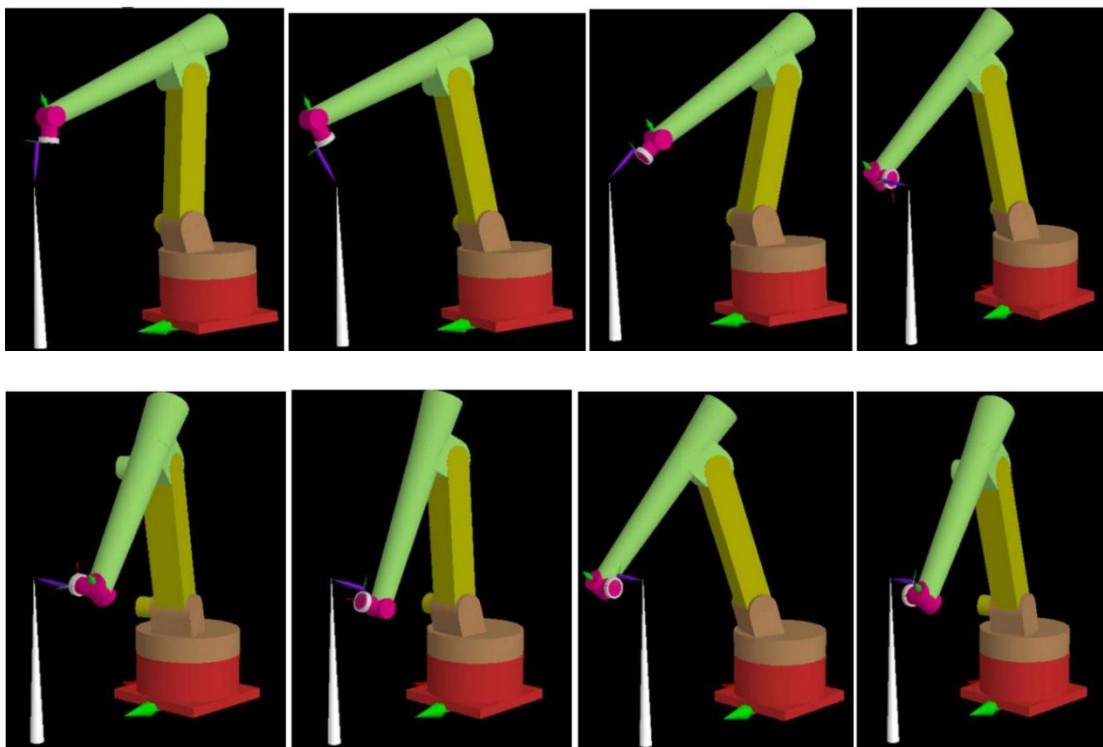
Then click **Obtain--**The max error column displays the error value

If the maximum error is less than 2 ,--Click on the value of J2--Yes

Click on the value of J3--yes -- Repeat for J4,J5,TX,TY,TZ-- Press emergency button

to save

Finish:

If the max. Error is more than 2, Reselect the positions of these 8 points until the final maximum error is less than 2 .

3. Welding technology

3.1 Straight line welding

Log in the "Machinery" level,create a file first,find the files list

then input a new file name in the frame before ".tch". (like TEST)

click "OK" -"Create". open your new file.

The straight line welding program is shown as below steps:
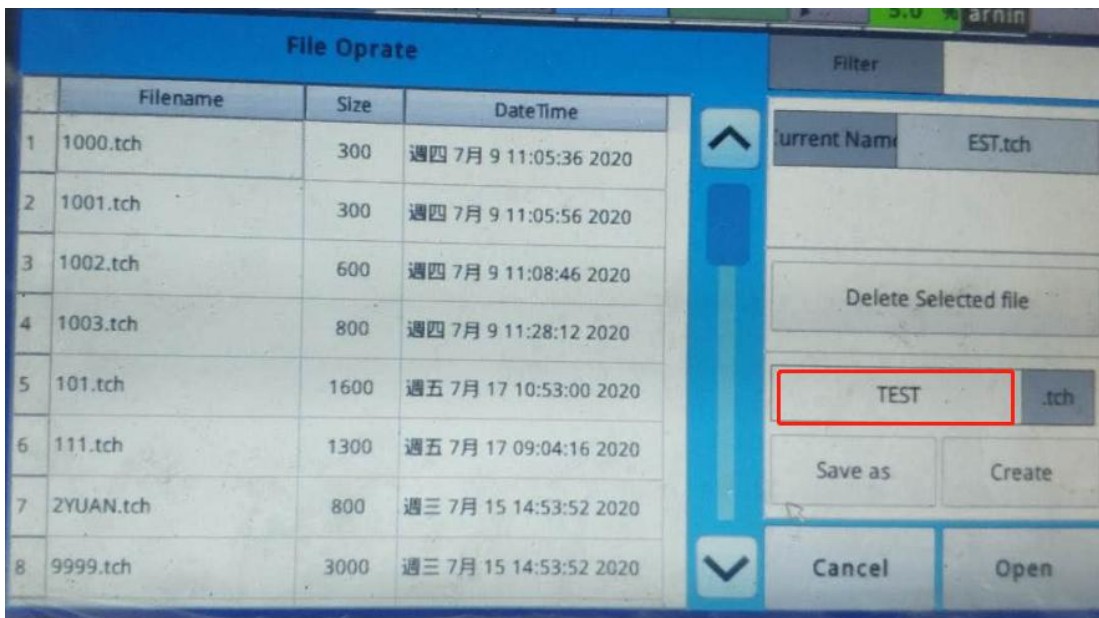
Firstly,make sure it's in "Teach mode" now.

Ready step: click "LNC" -"Servo",then holding pressing the enable button at the back

 of the teach pendant, click"To Cali Poss'' one time,it changes to blue,then continuou

sly pressing until it changes to gray,the robot backed to its origin point

Now the number under "JointPos" and "CaliPos" are almost the same.
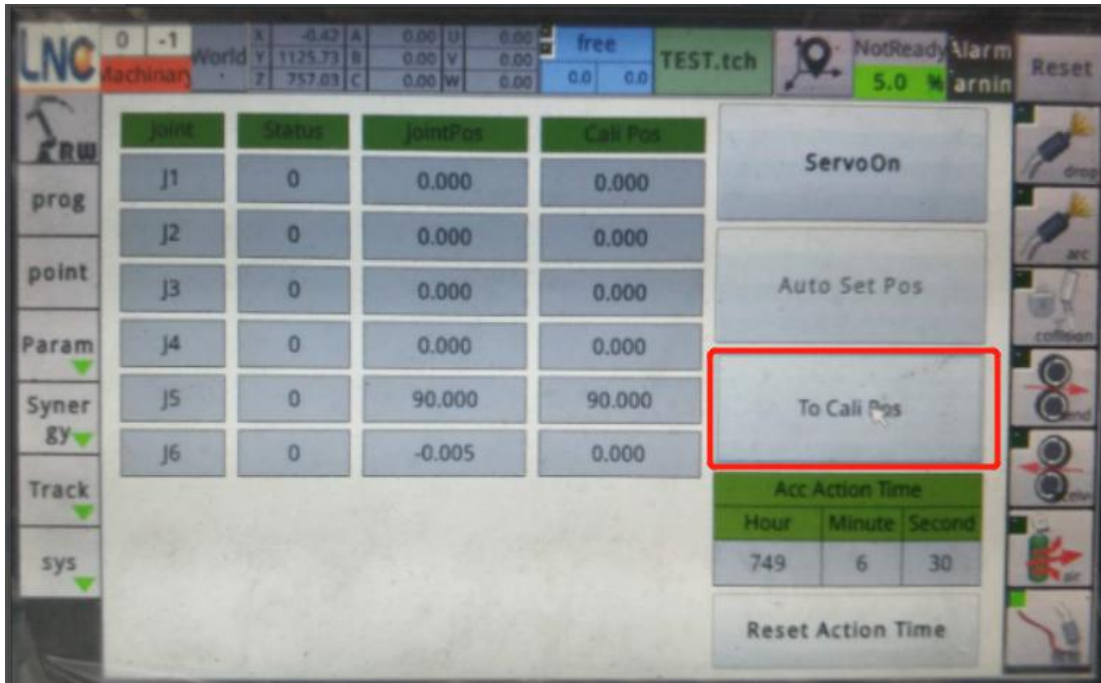
Secondly,go back to the new file.Let's begin the real step.

Step1:   Set the original point as the first point (click "Record"--"Fast");

Enter the Number of the welding parameter package needed you already set.
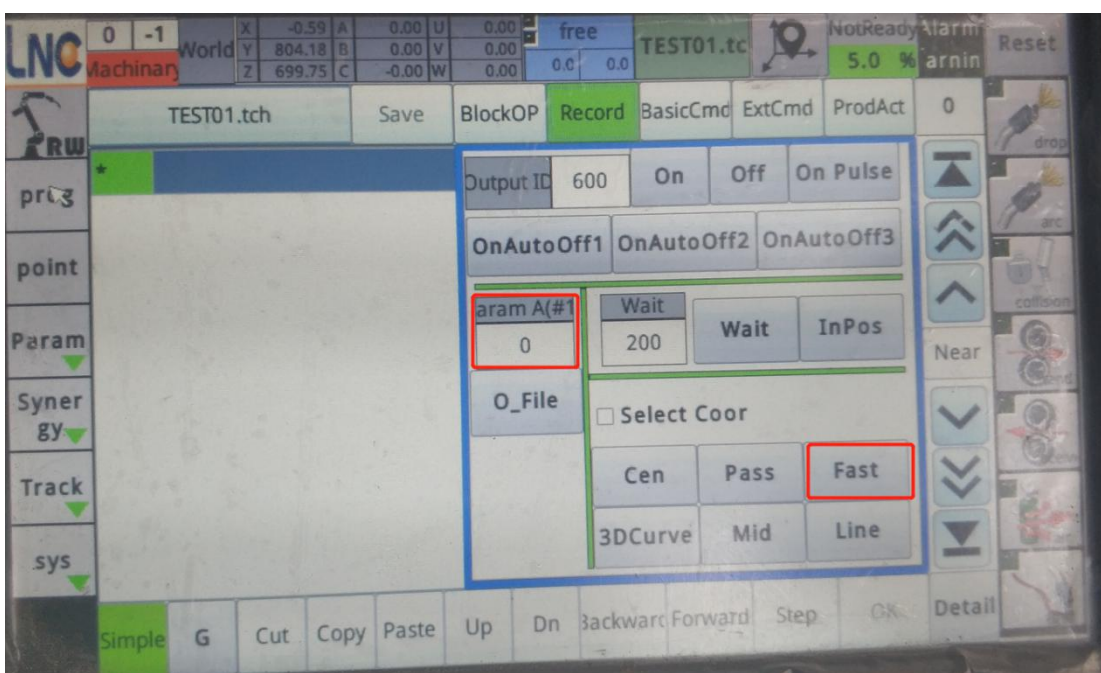
You can also put in the moving speed you need.
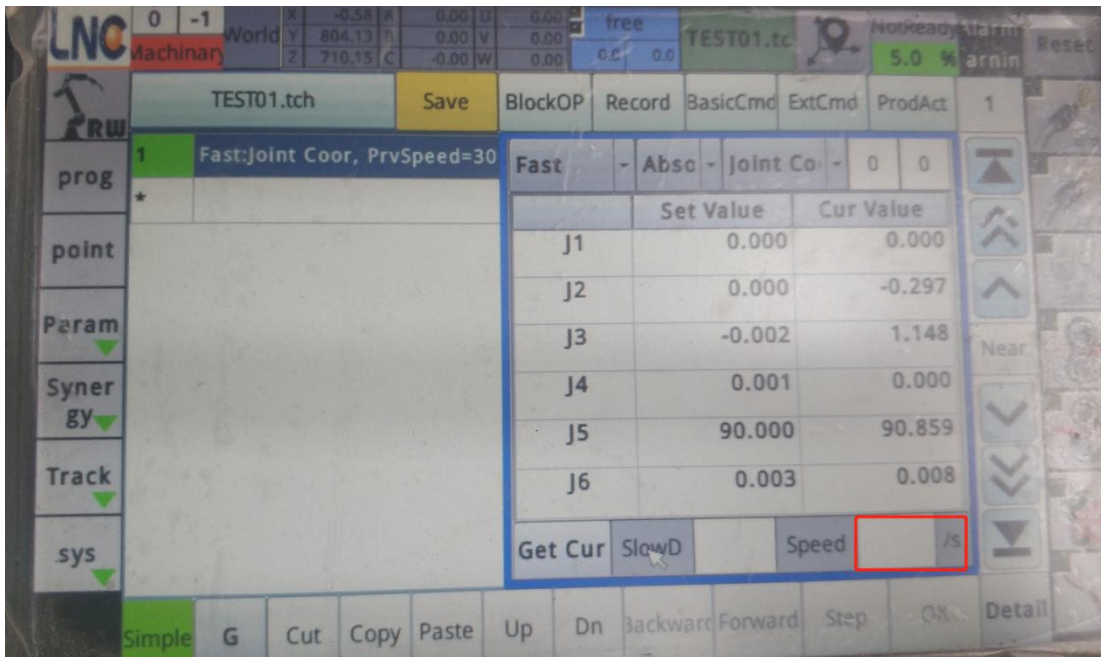
Step2: Move the welding torch to a point about 10cm above the weld seam.

(by pressing the brake while holding clicking"X+"or"X-",then click"Record"- "Fast")
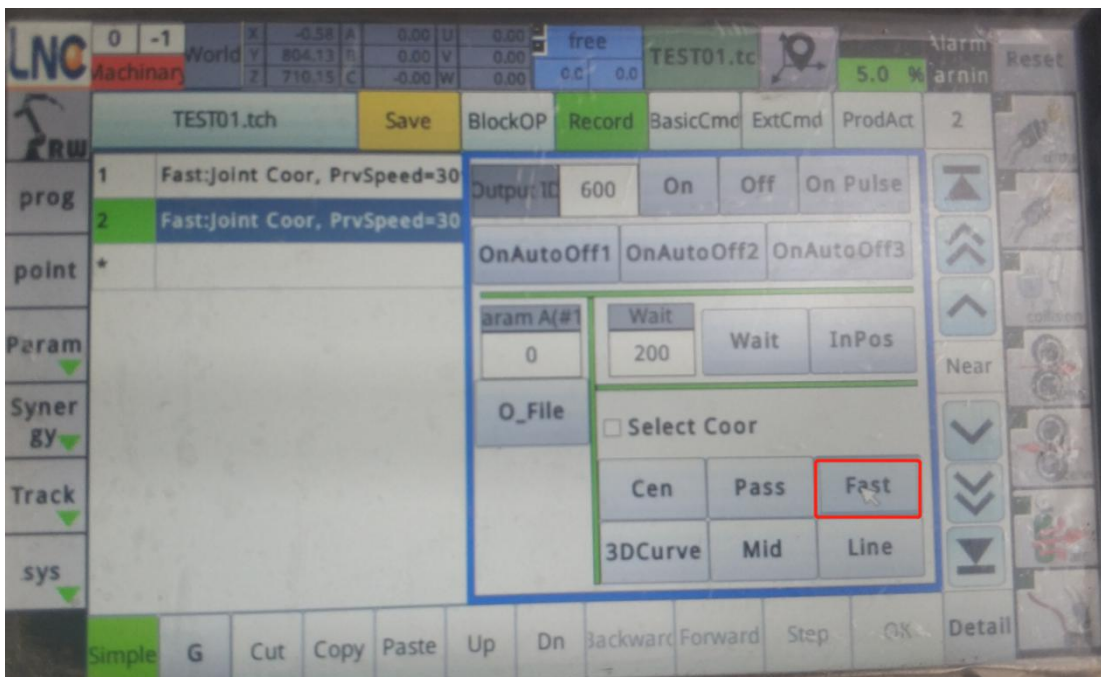
Step3: Move the welding torch to the point where welding start and record it.

(by pressing the brake while holding clicking"Z-", click "Record"- "Fast".)
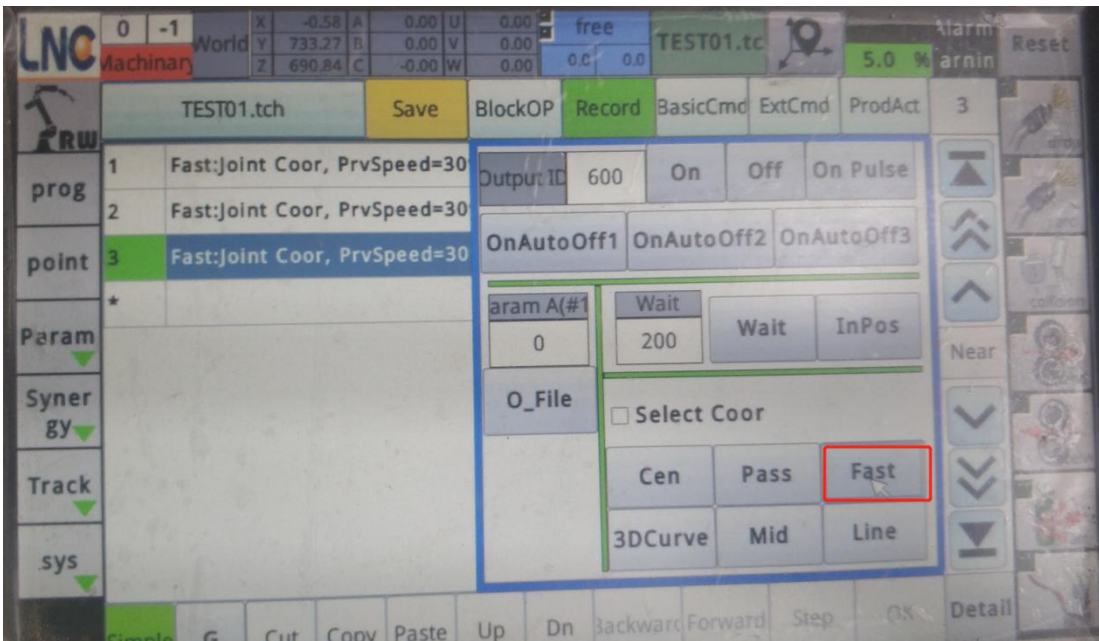
Step4: Give an arc start direction. (Click "Prodact" -"Arc on").
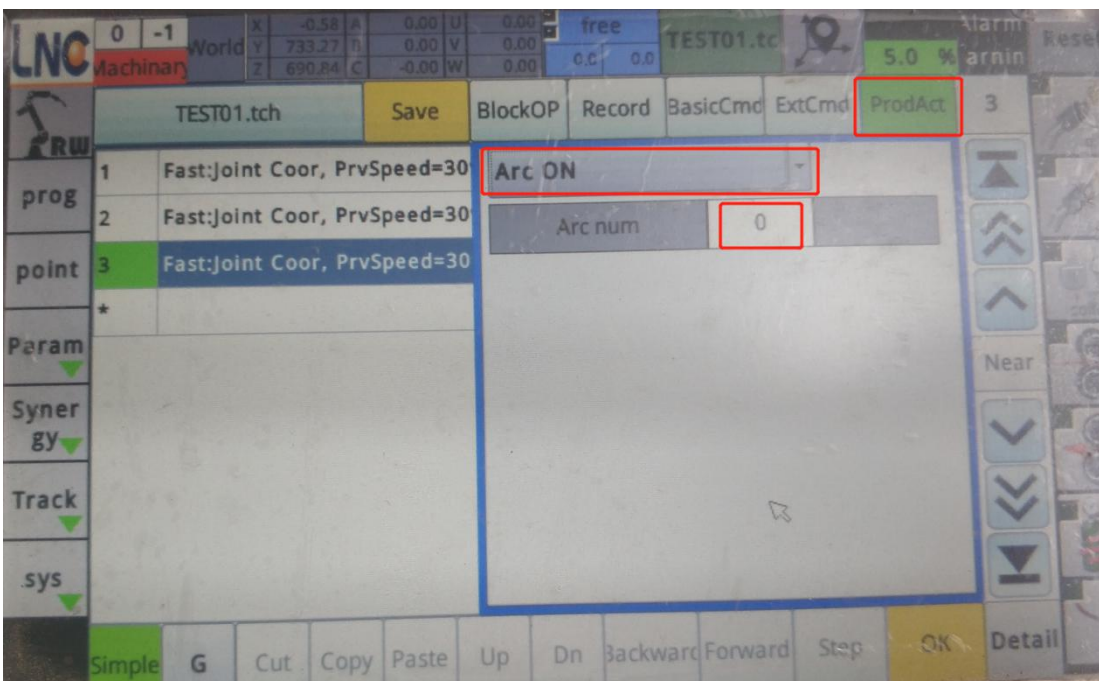
Step5: Start straight line welding.

(by pressing the brake while holding clicking"Y-"or"Y+",then click"Record"-"Line") .
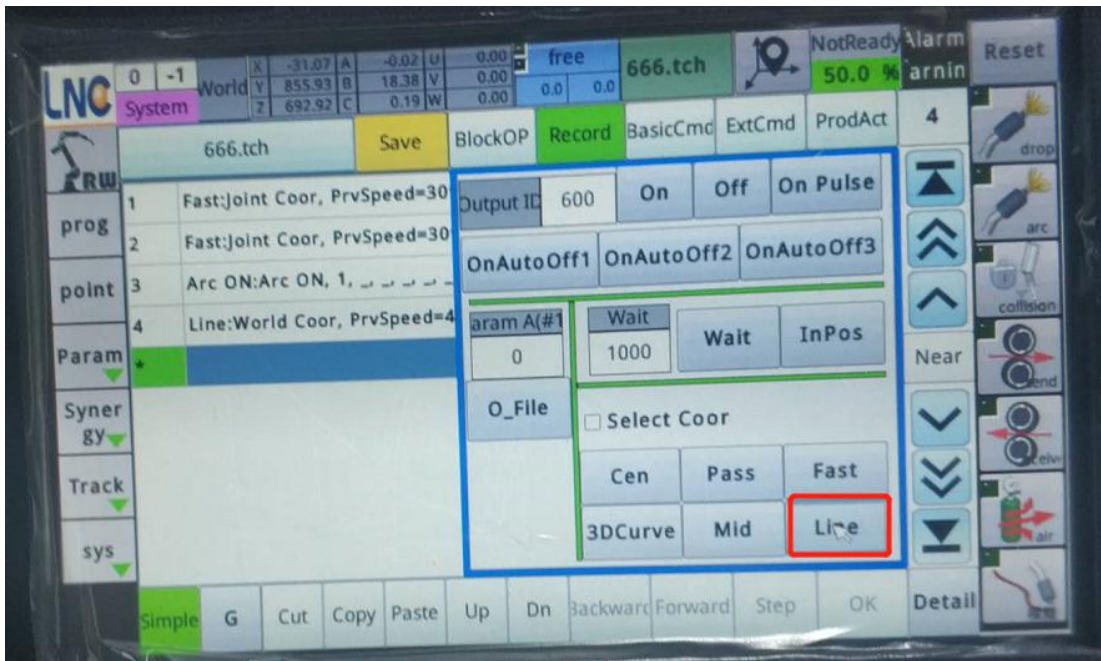
Step6: Give an arc off direction (click "Prodact" - "Arc off").
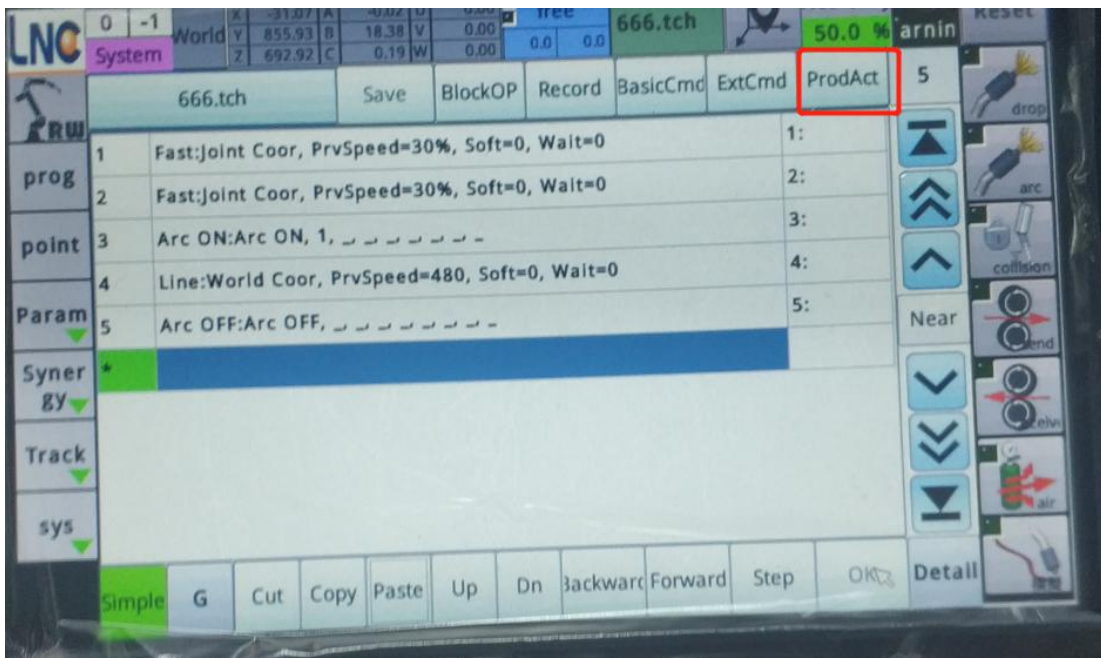
Step6: Move the welding torch to a point about 10cm above the end weld seam.

(by pressing the brake while holding clicking"Z+", click "Record"- "Fast".)
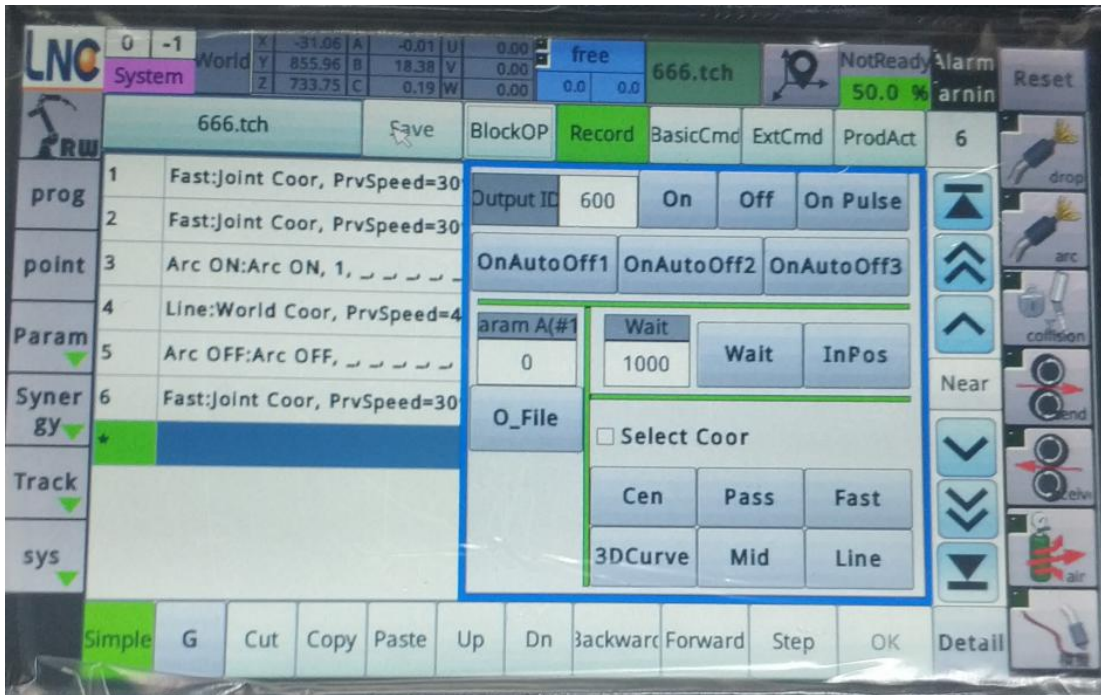
Don't forget to click "Save".
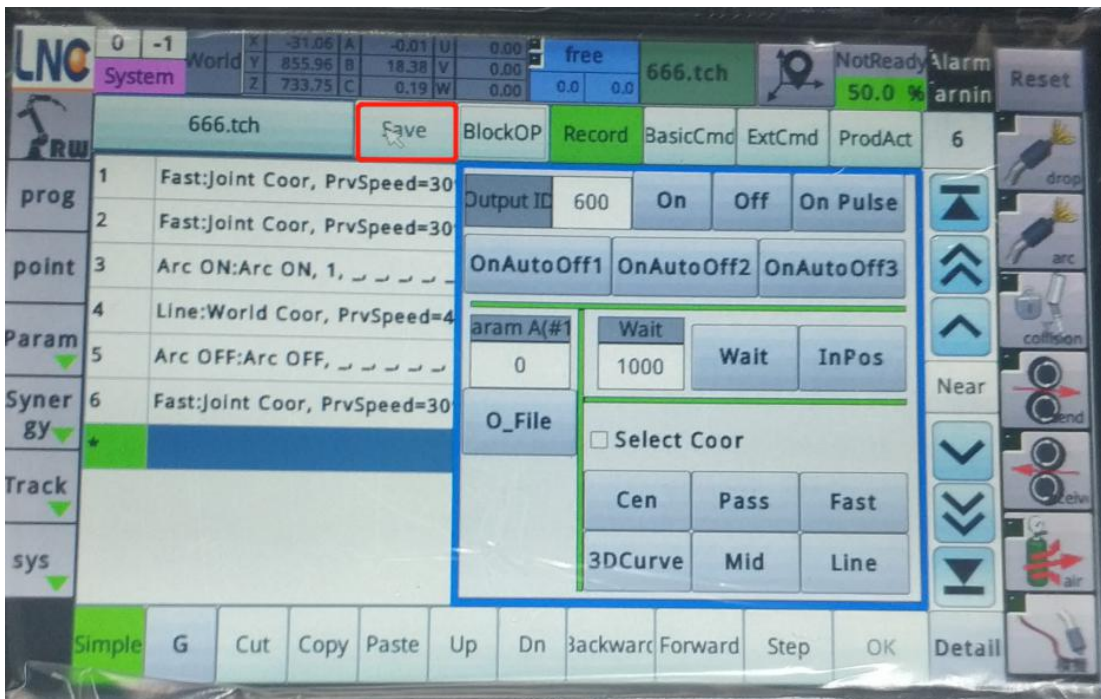
At last,move the welding torch to the original point by repeat the ready step before S

tep1

Simulate program running

At last, switch the system to "Auto mode" and simulate this program to see if there exists any problem (Press "Auto"-click "Simu" to light it.-cilck"Start head")

then the robot would run the program automatically.
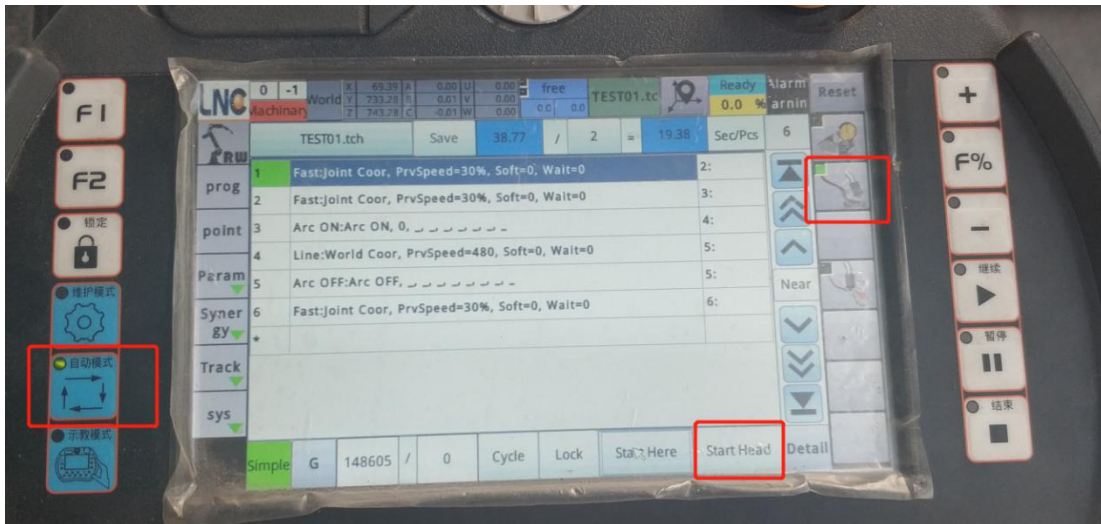
If there is any problem,switch the system to teach mode and change the step which may have a problem.

3.2 Round arc welding
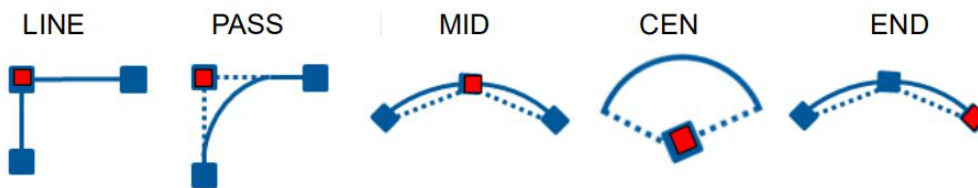
First,label 4 average points on the work-piece and name them as point1,point2, point 3,point4,point5.(point5 is the same position as point1) we need to follow this path moving rules,point1(line)-point2(mid)-point3(line)-point4(mid)-point5(line).

First,create a file and name it,then open the file.

Before this program,switch the system to "Teach mode",click "LNC"-

"servo", make the robot moving to "CaliPos".

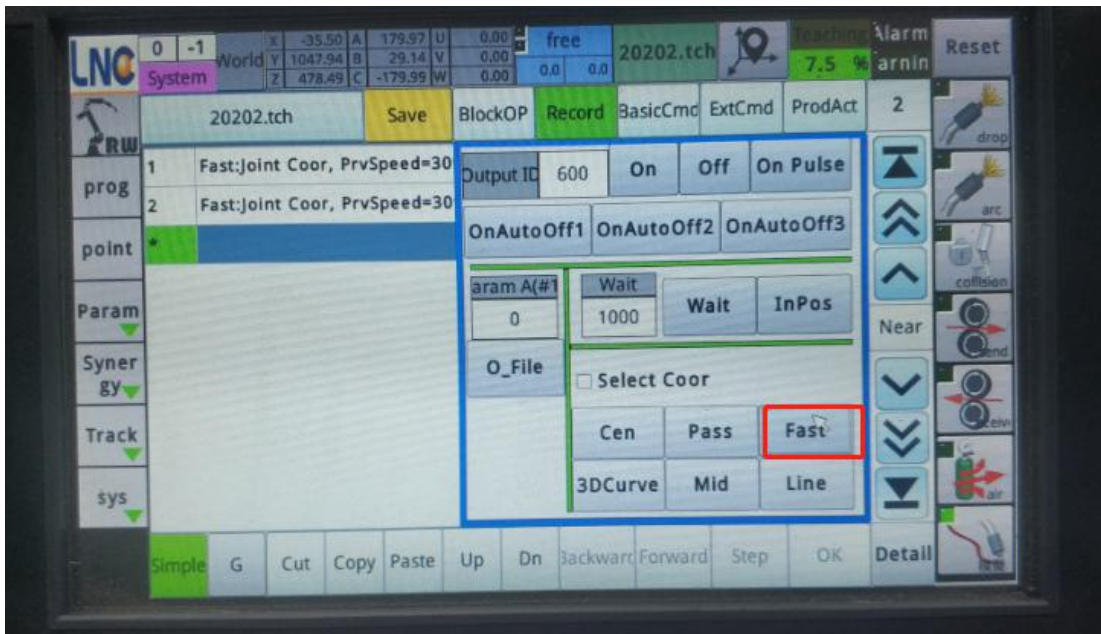Now lets edit the round arc welding program.
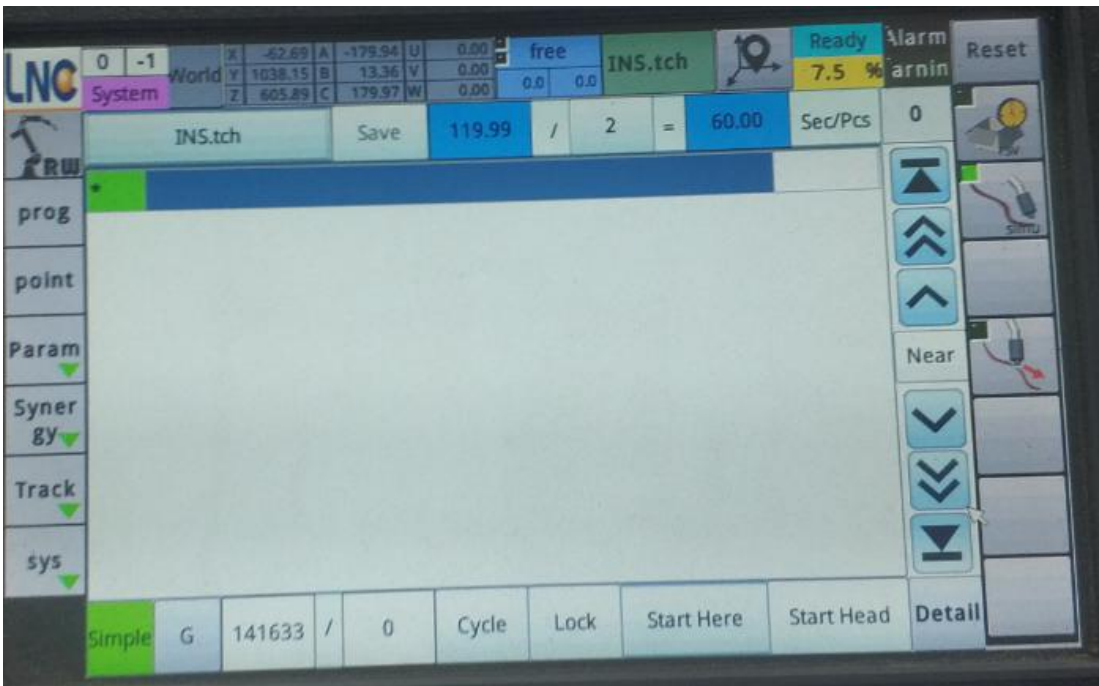
Step1: set the original point as the first step point (Click "Record"- "Fast")
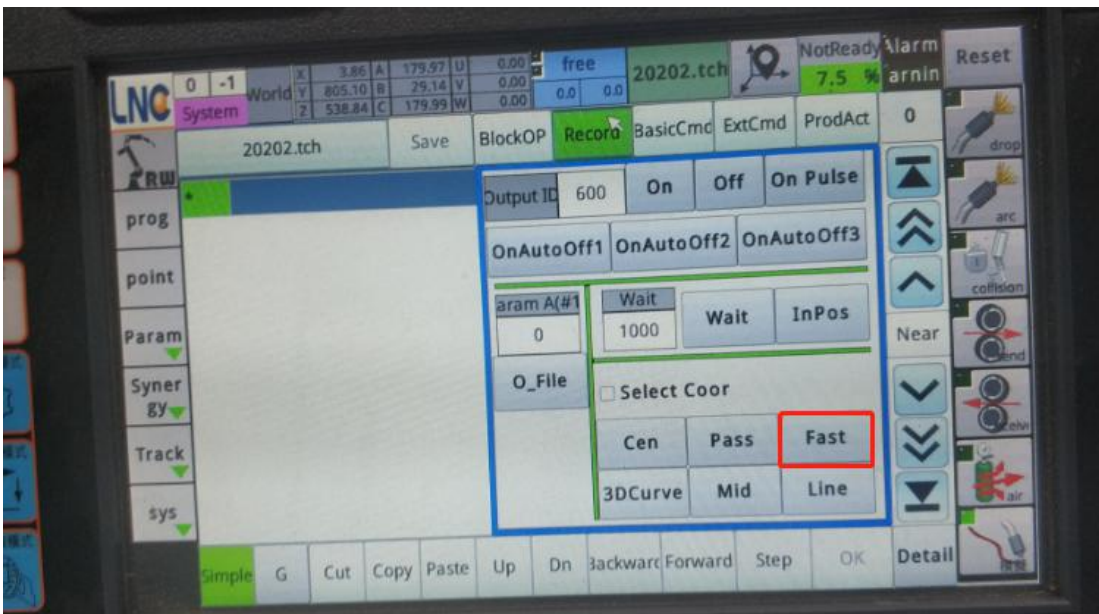
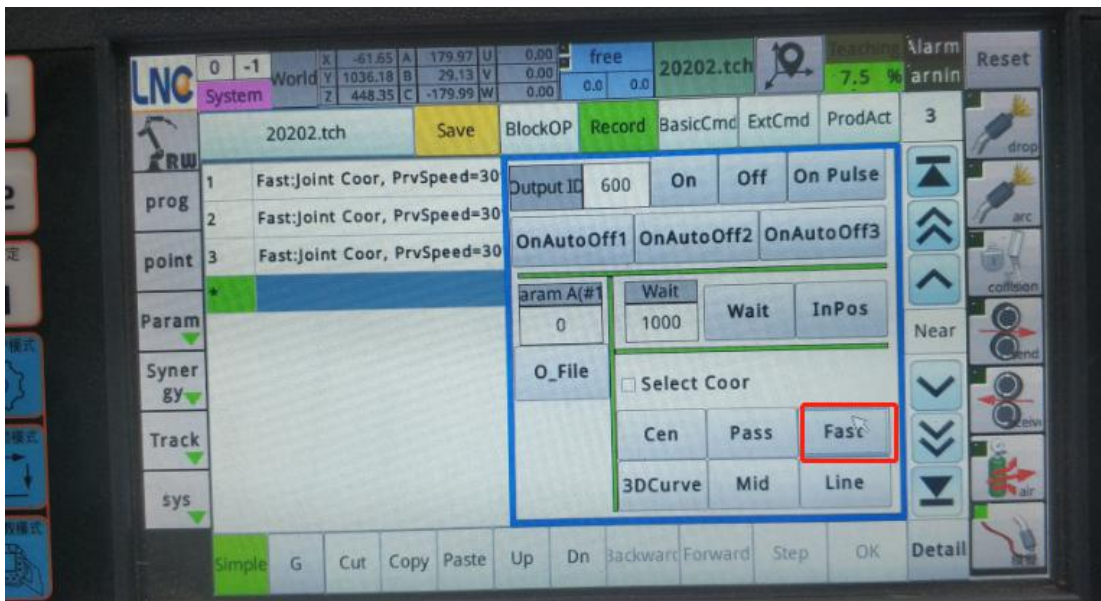Step2 Move the welding torch to about 10 cm above point1 as a safety point,
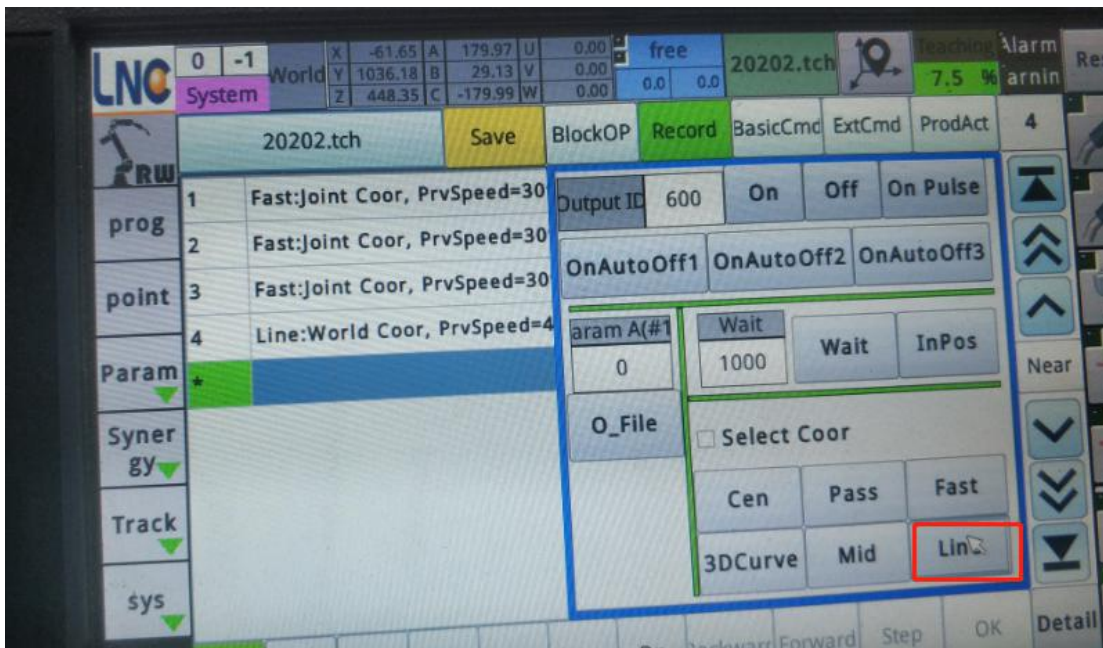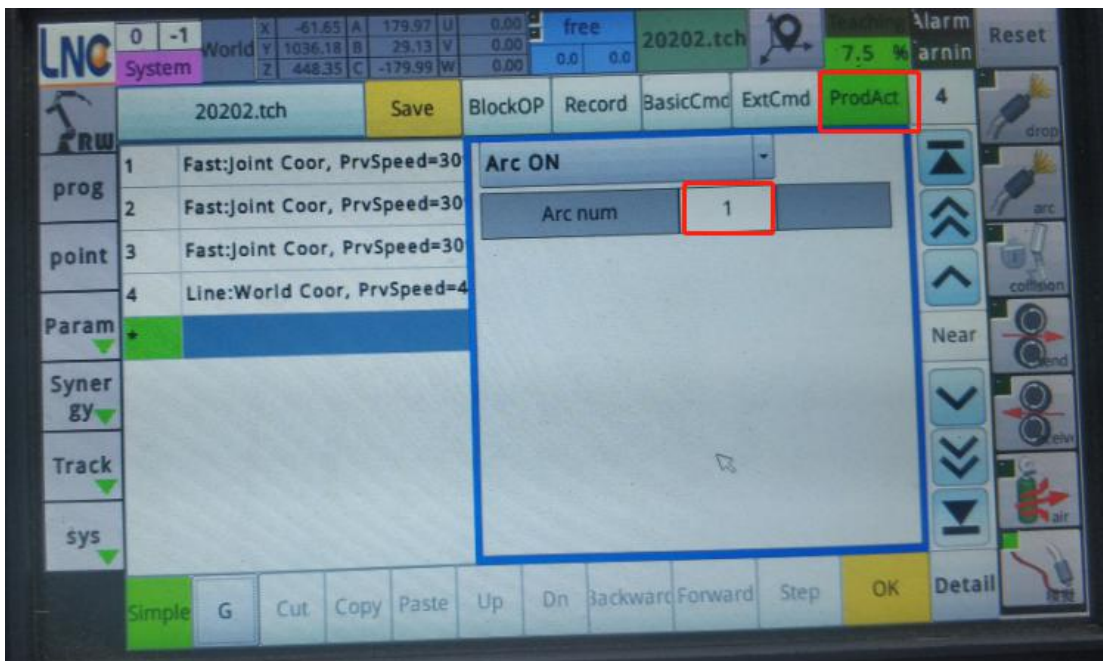
(click"Record"- "fast")

Step3 lowered down the welding torch to point1,that means it's ready to start weld.(C lick "Record"- "fast" to record the path motion).
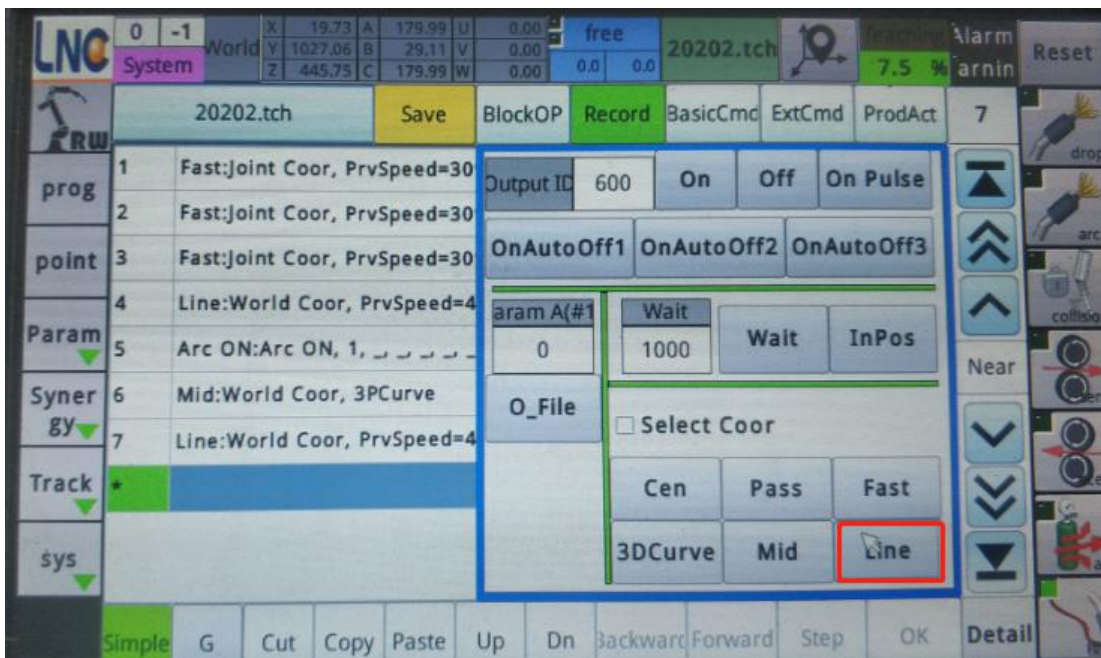

Step4 set point1 as the start point of first semicircle

(Click "Record"- "line")

Step5 Give an arc start direction (click " ProdAct"- "arc on",input the arc number you
already set)

Step6 Raise and move the welding torch to make the wire tip aligned with point2.
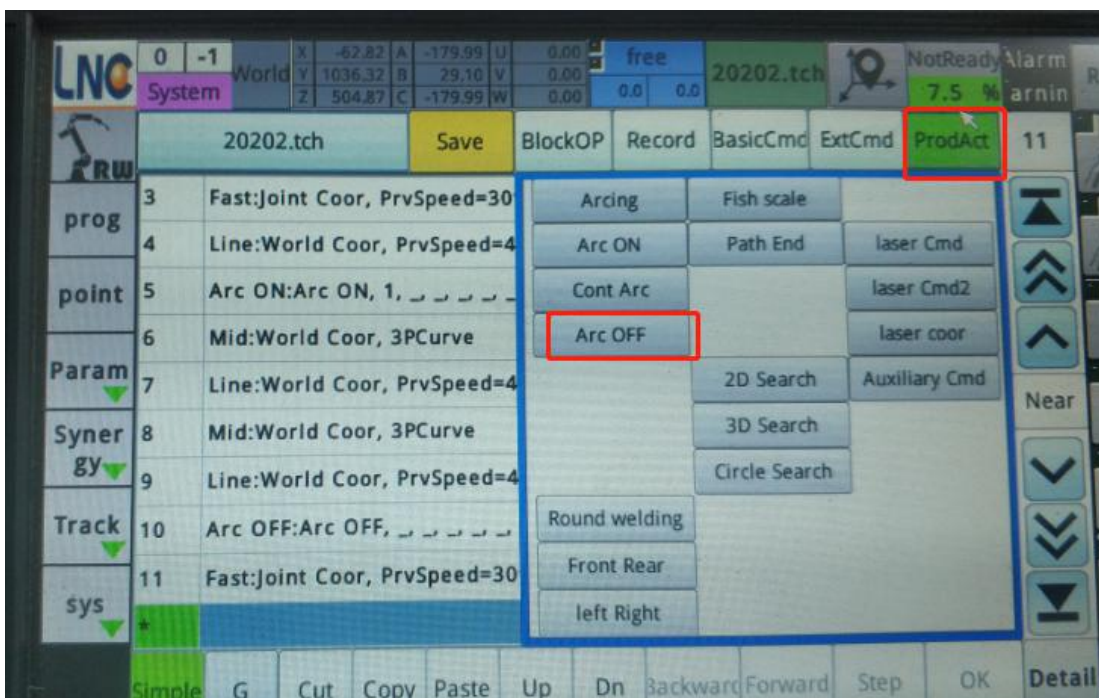
(Click "Record"-"Mid")

Step7 Raise and move the welding torch to make the wire tip aligned with point3.
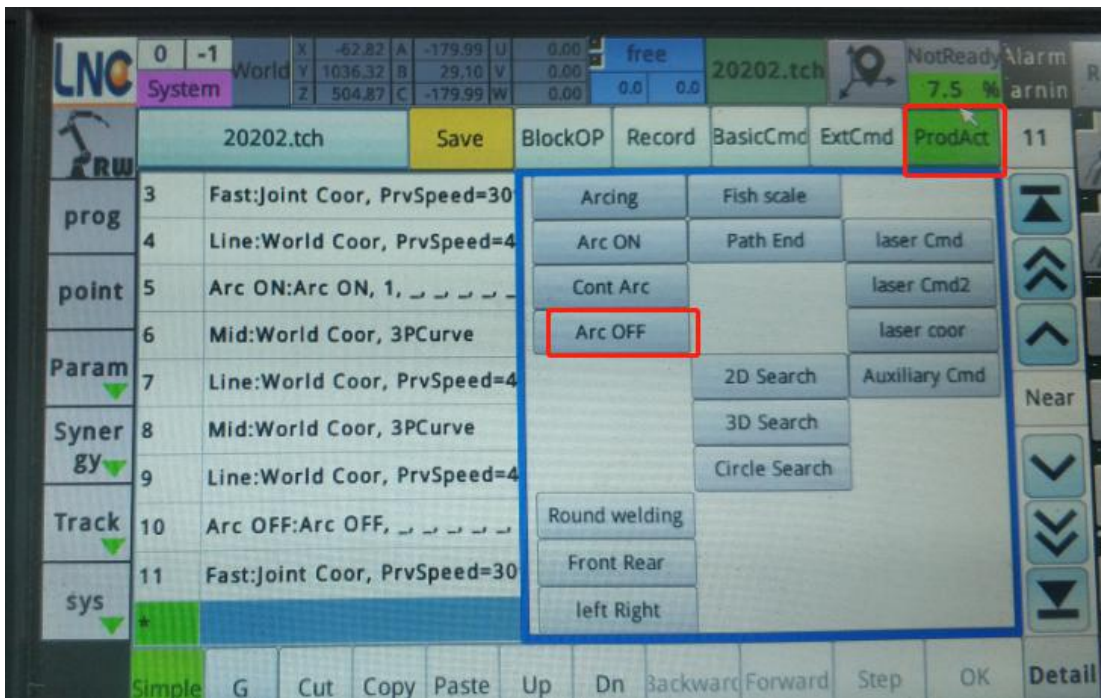
(Click "Record"-"Line")

Step8 Raise and move the welding torch to make the wire tip aligned with point4.

(Click "Record"-"Mid")
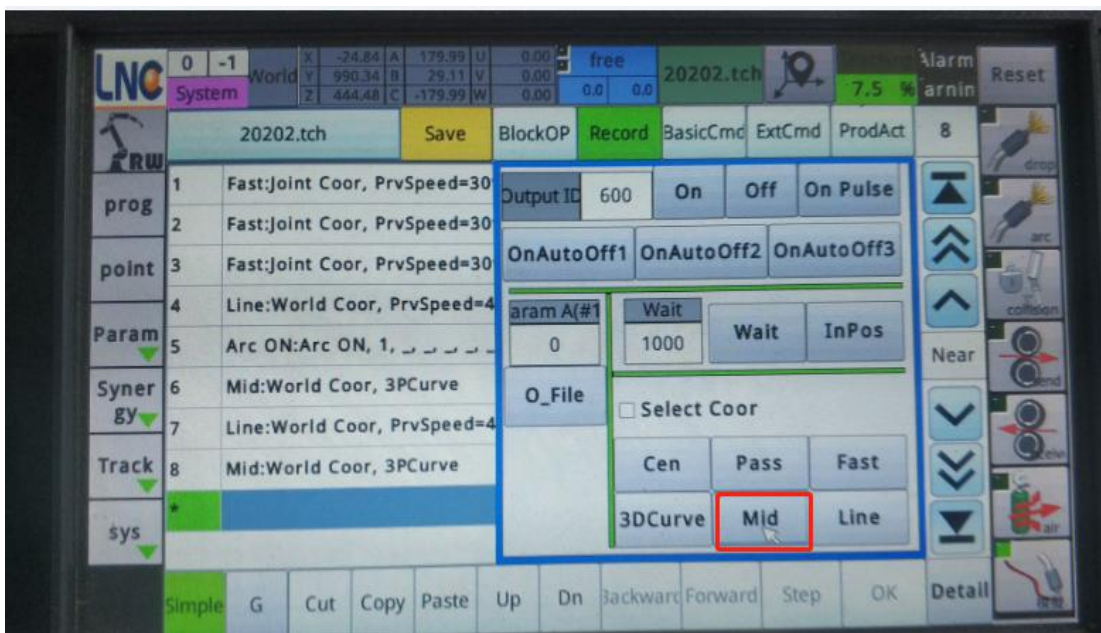
Step9 Raise and move the welding torch to make the wire tip aligned with point5.

(Click "Record"-"Line")
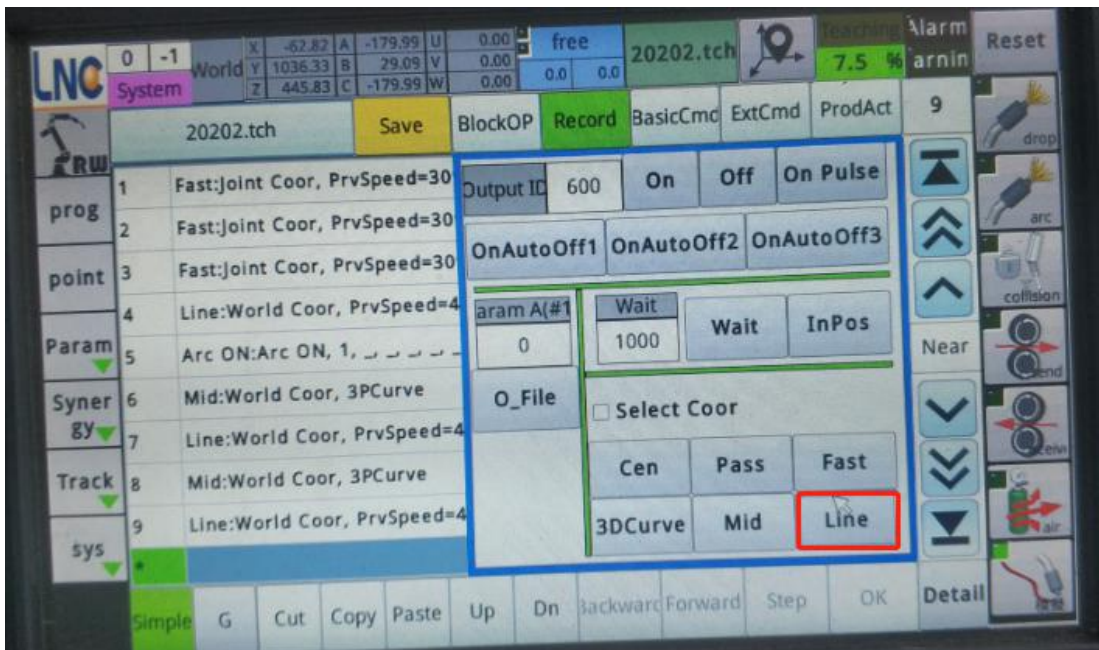
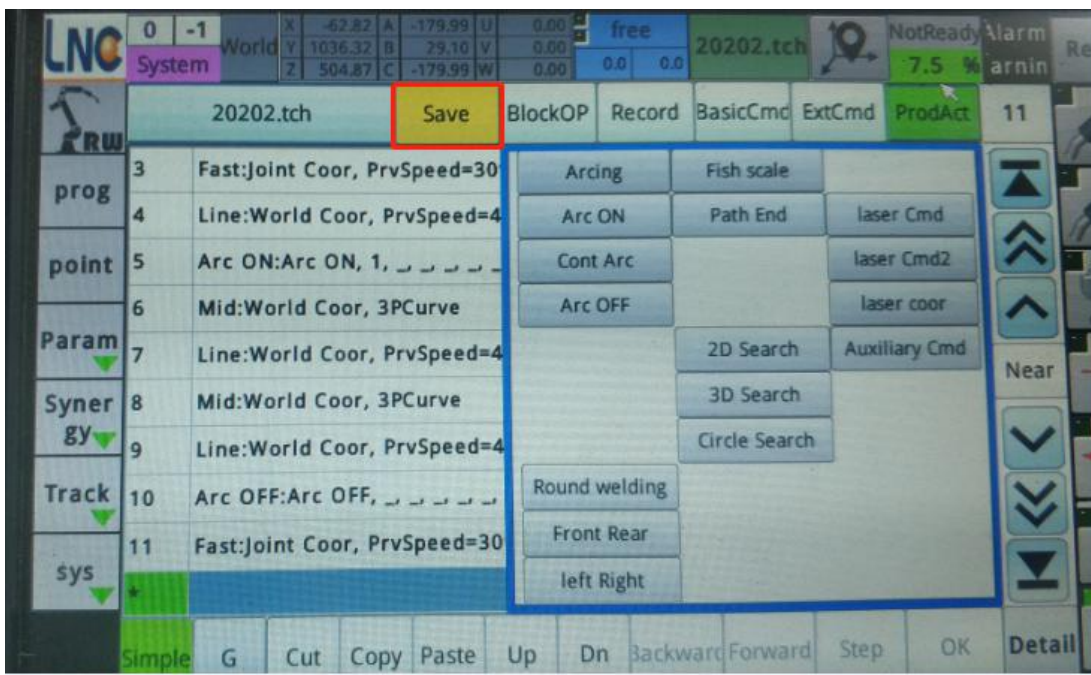Step 10 Give an arc end direction (click" ProdAct"- "arc off ")

Step11 Raise the welding torch up to a safety point

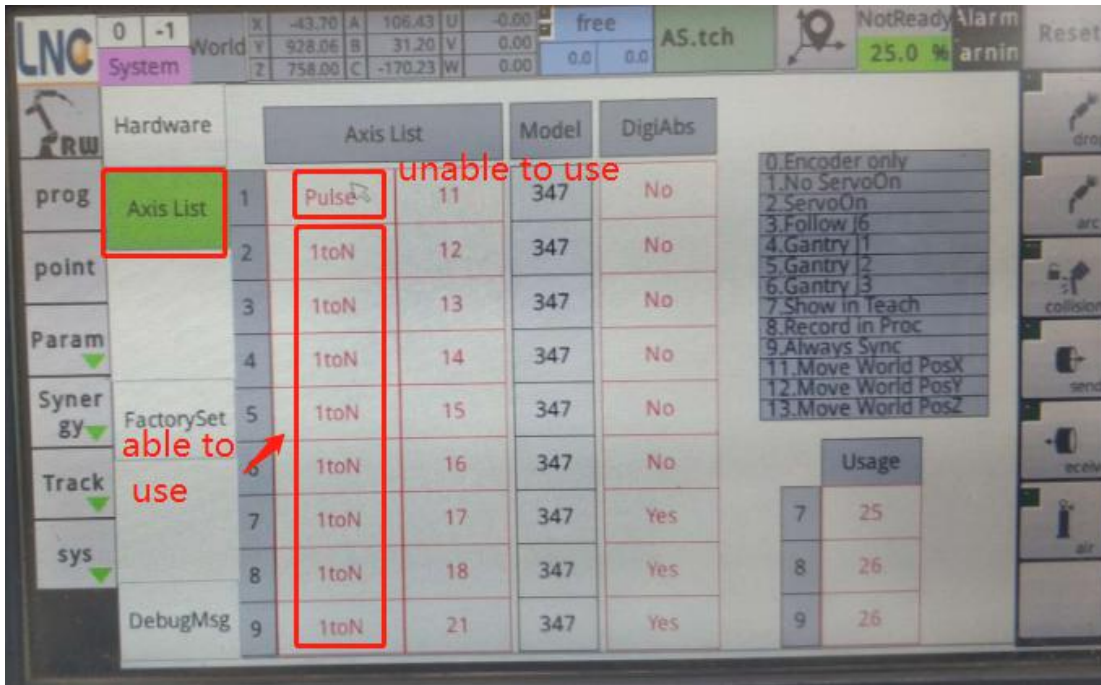(Click "Record"- "fast")

Then don't forget to click "Save".

At last, switch the system to "Auto mode" and simulate this program to see if there exists any problem (Press "Auto"-click "Simu" to light it.-cilck "Start head")

4. Robot accessories device operation

4.1 The additional shaft

Step1. Press "LNC" to the main menu,click "Hardware"

Step2. Click "Axis list",make the status shows "1toN" after serial number. " Pulse" is unable to use.

Step3. If the robot only support IO/Pulse communication way,make sure the "DigiAbs" shows "No" in all rows.

If the robot support Bus communication way,change all "No" to "Yes" in "DigiAbs" line.
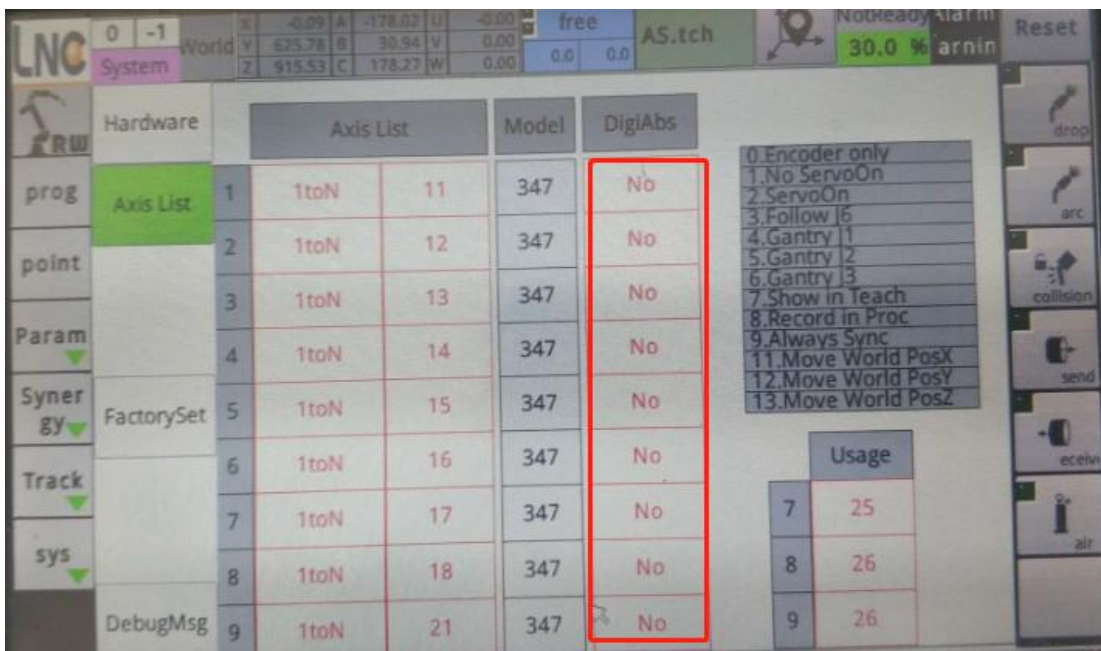
Step4.The serial number 1-6 stands for robot axis J1-J6

The serial number 7-9 stands for additional axis, which number was linked with which additional axis is unknown,so try to move "rX"/ "rY"/ "rZ" ,check the machine moving one by one and remember.
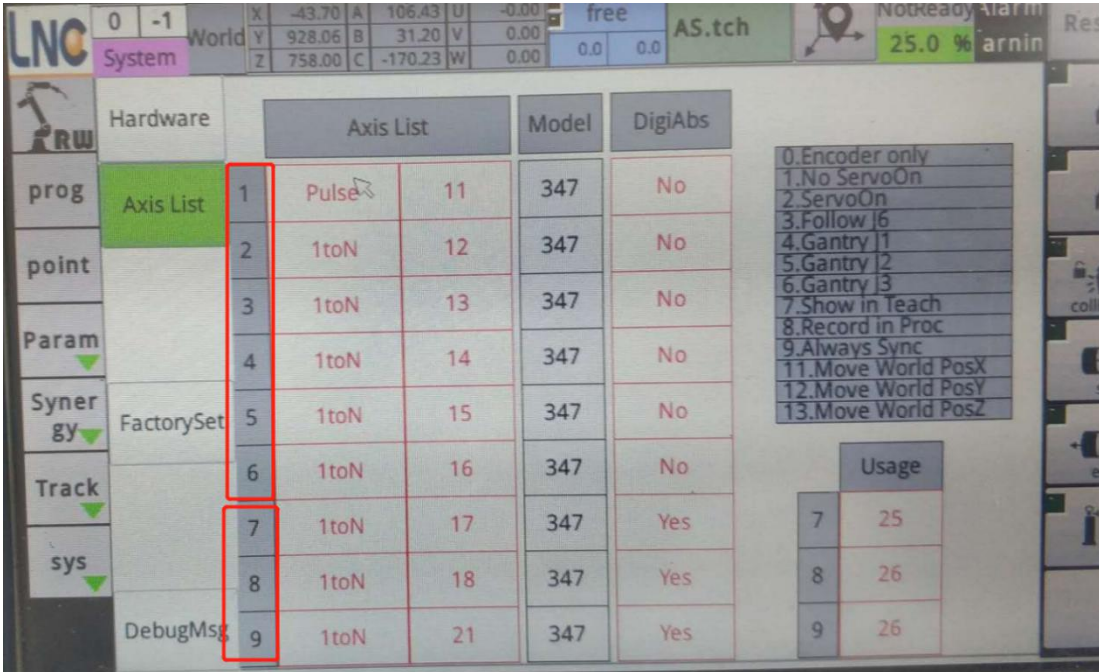
4.2 IO set
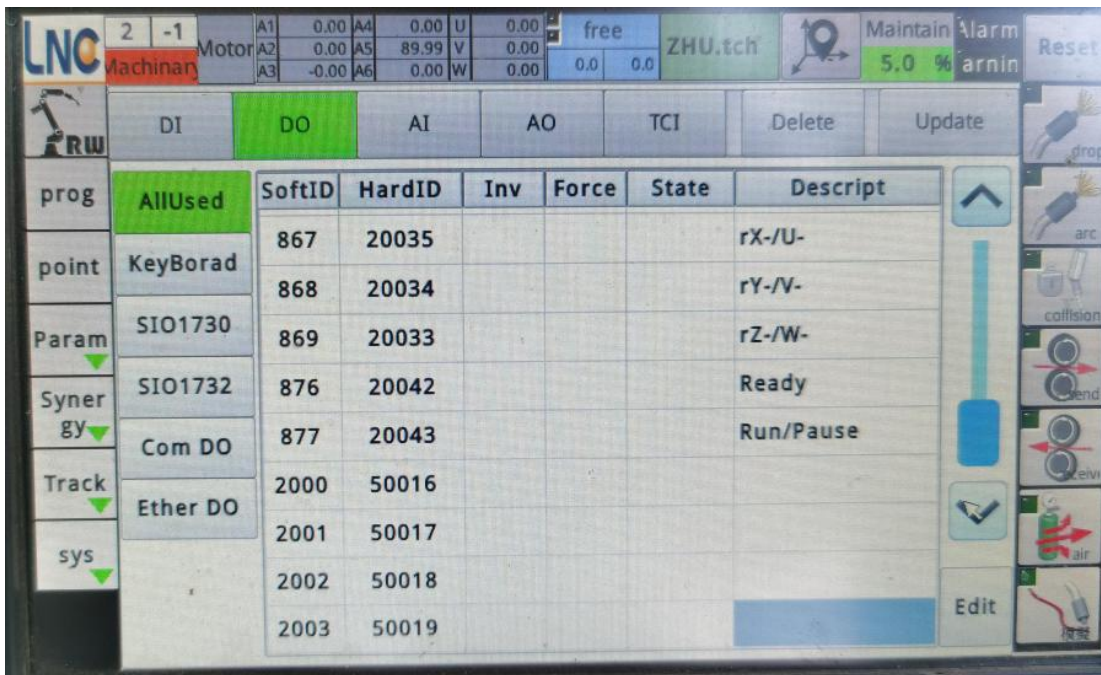
Click "LNC"- "IO set"

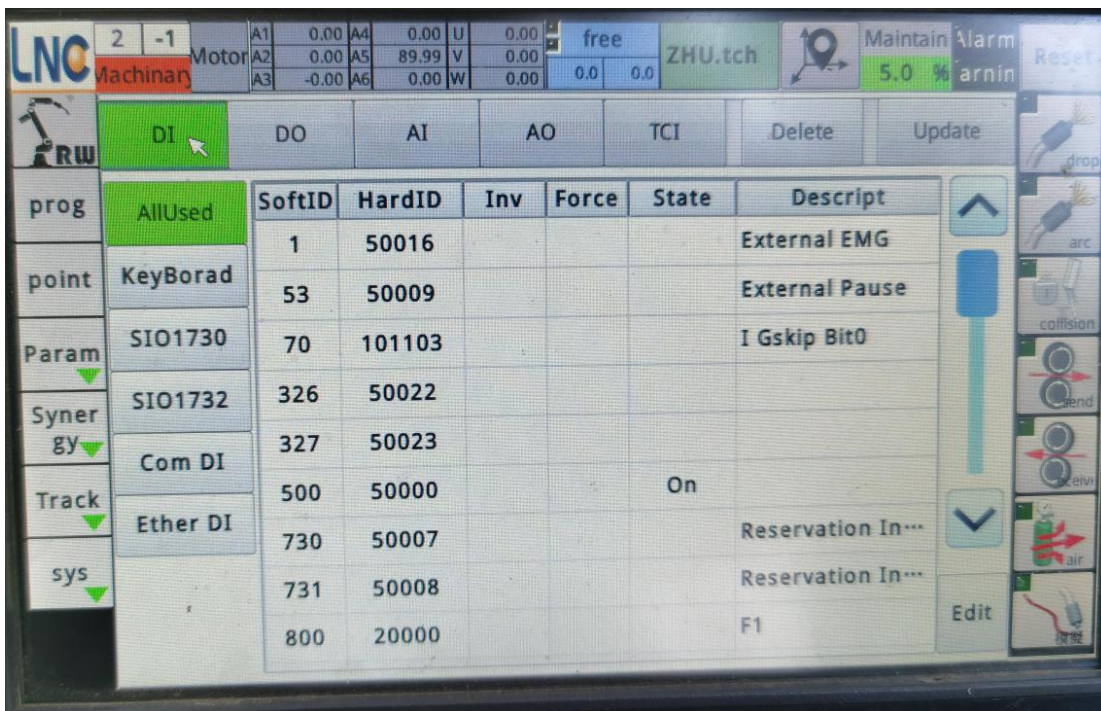It shows all the softID and HardID which has already been set here,after that it comes with the ID description.

"DO" shows the output command

"DI" shows the input command

Click "Edit" to name the function after the software you set.

List of commonly used I/O signals

[Input commend]

1=External Emergency stop

42=Safety grating1

43=Safety grating2

47=mechanical homing

50=Forced release of brake

51=start NC

52=Start the current program

53=External pause signal

54=External path reset

70=I point Gskip function Bit0

71=I point Gskip functionBit1

72=I point Gskip functionBit2

73=I point Gskip functionBit3

80=The list page program selects 0

81=The list page program selects1

82=The list page program selects2

83=The list page program selects3

84=The list page program selects4

100=Positive limit of the Axis 1

101=Positive limit of the Axis 2

102=Positive limit of the Axis 3

103=Positive limit of the Axis 4

104=Positive limit of the Axis 5

105=Positive limit of the Axis 6

106=Positive limit of the Axis 7

107=Positive limit of the Axis 8

108=Positive limit of the Axis 8

132=Negative limit of the Axis 1

133=Negative limit of the Axis 2

134=Negative limit of the Axis 3

135=Negative limit of the Axis 4

136=Negative limit of the Axis 5

137=Negative limit of the Axis 6

138=Negative limit of the Axis 7

139=Negative limit of the Axis 8

140=Negative limit of the Axis 9

730=Control box (reservation box) input (0)

731=Control box (reservation box) input(1)

732=Control box (reservation box) input(2)

733=Control box (reservation box) input(3)

734=Control box (reservation box) input(4)

735=Control box (reservation box) input(5)

736=Control box (reservation box) input(6)

737=Control box (reservation box) input(7)

738=Control box (reservation box) input(8)

739=Control box (reservation box) input(9)

740=Control box (reservation box) input(10)

741=Control box (reservation box) input(11)

742=Control box (reservation box) input(12)

743=Control box (reservation box) input(13)

744=Control box (reservation box) input(14)

745=Control box (reservation box) input(15)

746=Control box (reservation box) input(16)

747=Control box (reservation box) input(17)

748=Control box (reservation box) input(18)

749=Control box (reservation box) input(19)

871=safety switch1

872=Control box (reservation box) input2

873=External Emergency stop

875=Safety grating

876=Safety grating

[Output commend]

60= In the operation of S0

61=In the pause of S1

62=path resetS2

63=alarm S3000

64=warningS3001

65=Emergency stop

66=emergency stop flashes

67=Axial emergency

68=Ready to complete

69=Programable start

90=starting up is "On", Break 1 second on reset

91="On 1second" when emergency stop s released

92=System reset signal C3000

730=Control box(Reservation box)output(0)

731=Control box(Reservation box)output(1)

732=Control box(Reservation box)output(2)

733=Control box(Reservation box)output(3)

734=Control box(Reservation box)output(4)

735=Control box(Reservation box)output(5)

736=Control box(Reservation box)output(6)

737=Control box(Reservation box)output(7)

738=Control box(Reservation box)output(8)

739=Control box(Reservation box)output(9)

740=Control box(Reservation box)output(10)

741=Control box(Reservation box)output(11)

742=Control box(Reservation box)output(12)

743=Control box(Reservation box)output(13)

744=Control box(Reservation box)output(14)

745=Control box(Reservation box)output(15)

746=Control box(Reservation box)output(16)

747=Control box(Reservation box)output(17)

748=Control box(Reservation box)output(18)

749=Control box(Reservation box)output(19)

4.3. Torch clean station programming

1. Check the interface No. on the IO board in the control cabinet which the torch cle an station has been connected to.see example below:

Green wire stand for "CUT WIRE",the interface No. Is "Y9"

Brown wire stand for "CLEAN TORCH",the interface No. Is "Y10"

Grey wire stand for "SPRAY OIL",the interface No. Is "Y10"
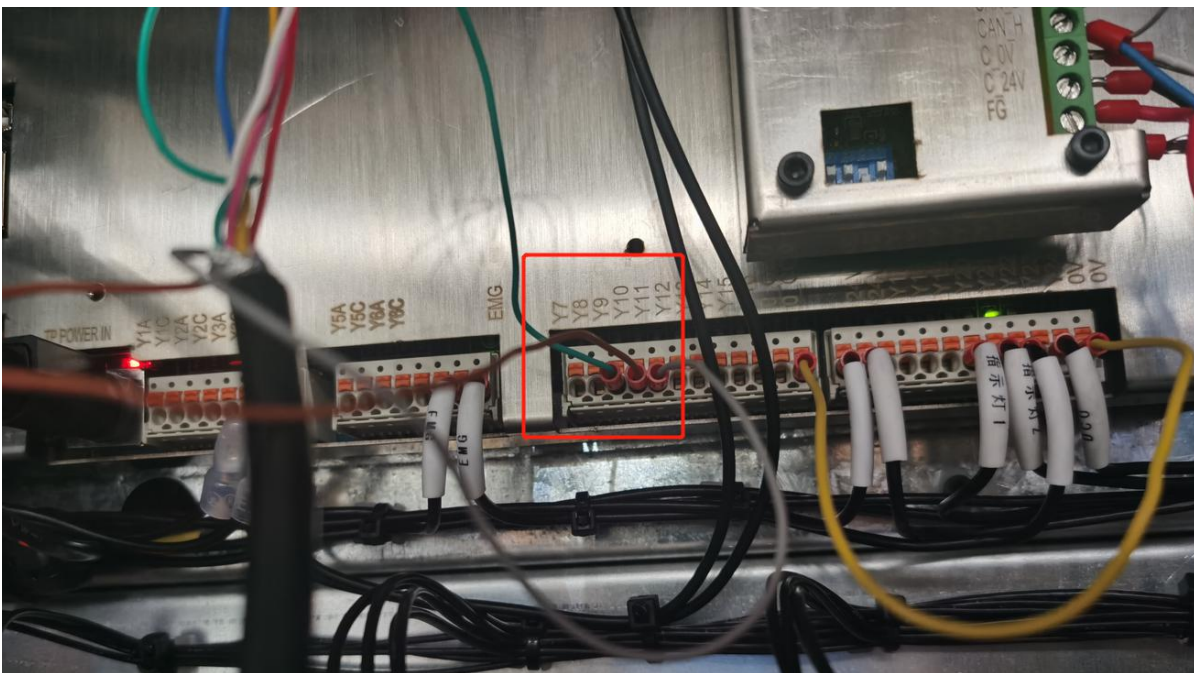
2. Set the soft ID for torch cleaning output command from this range.

The interface No. are consistent with the HardID in the teach pendant.

Click: "IO Set"- "DO"-input "201" "202" "203" before Hard ID "9" "10" "11"-Click "Edit" at the right bottom corner-input "CUT WIRE" "CLEAN TORCH" "SPRAY OIL" to name each function.
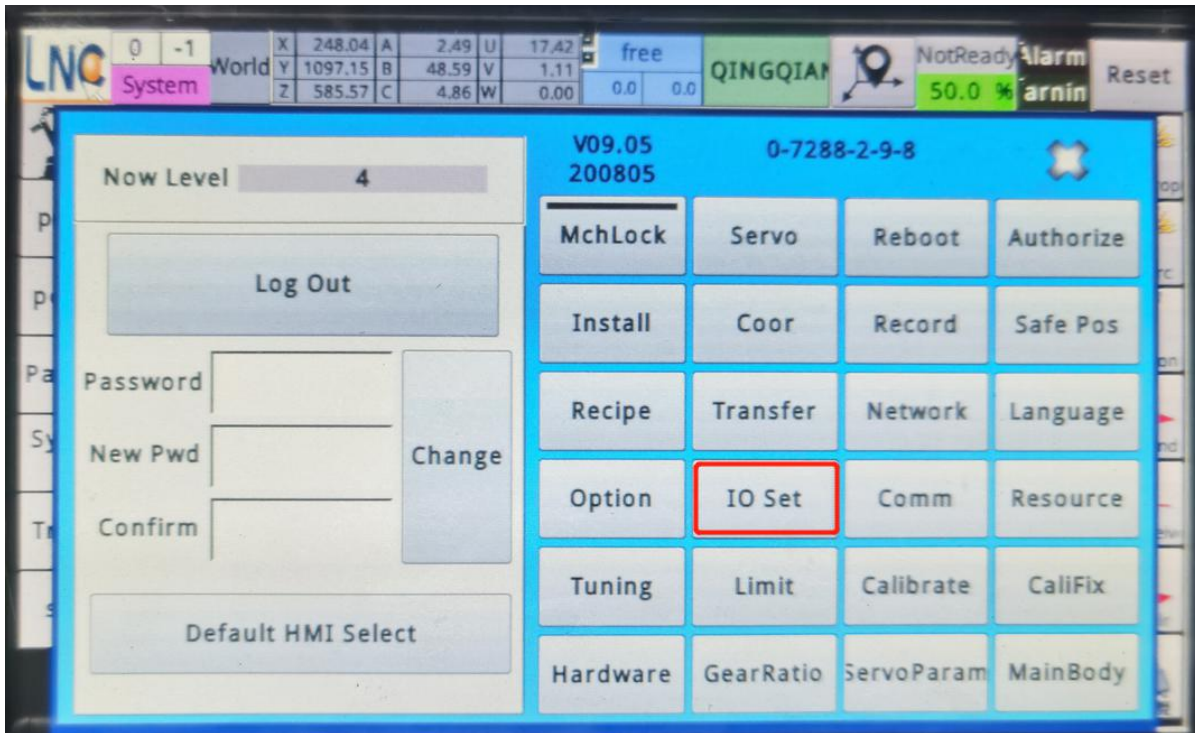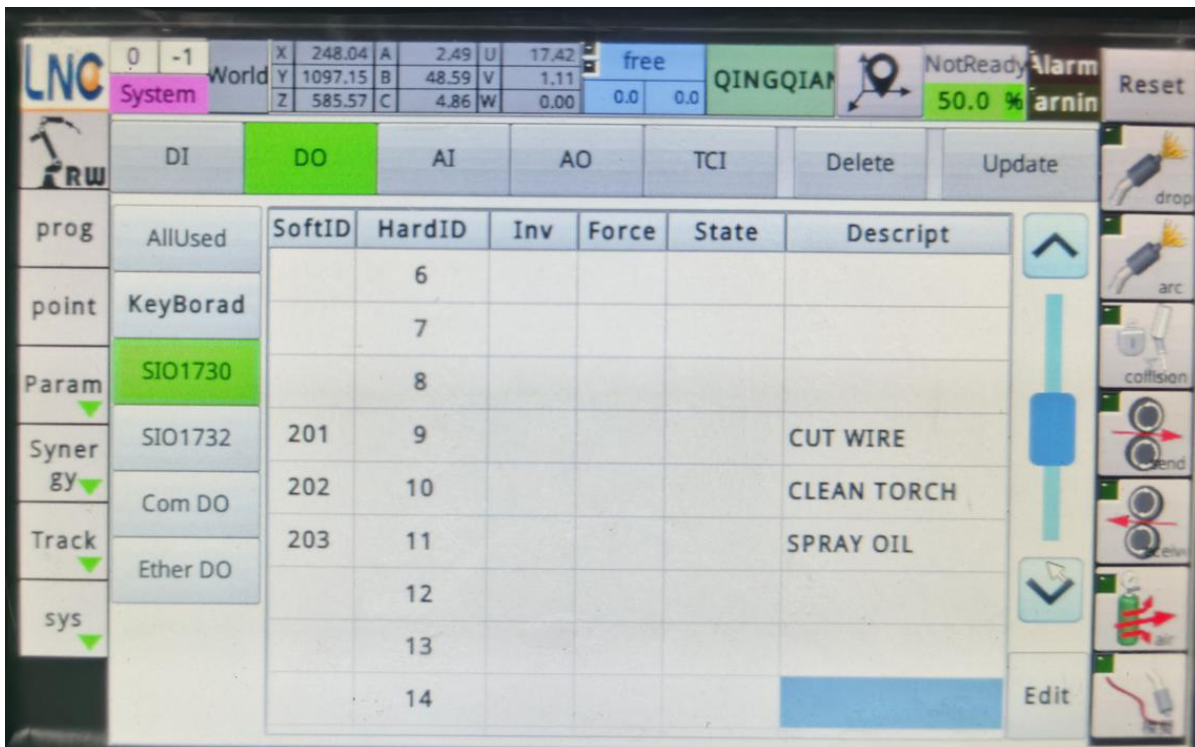
Step1. Set the origin point as the 1ˢᵗ point and record its location.

Click "Record"- "Fast",the PrvSpeed 30%,it means 30% moving speed,then click "ok".
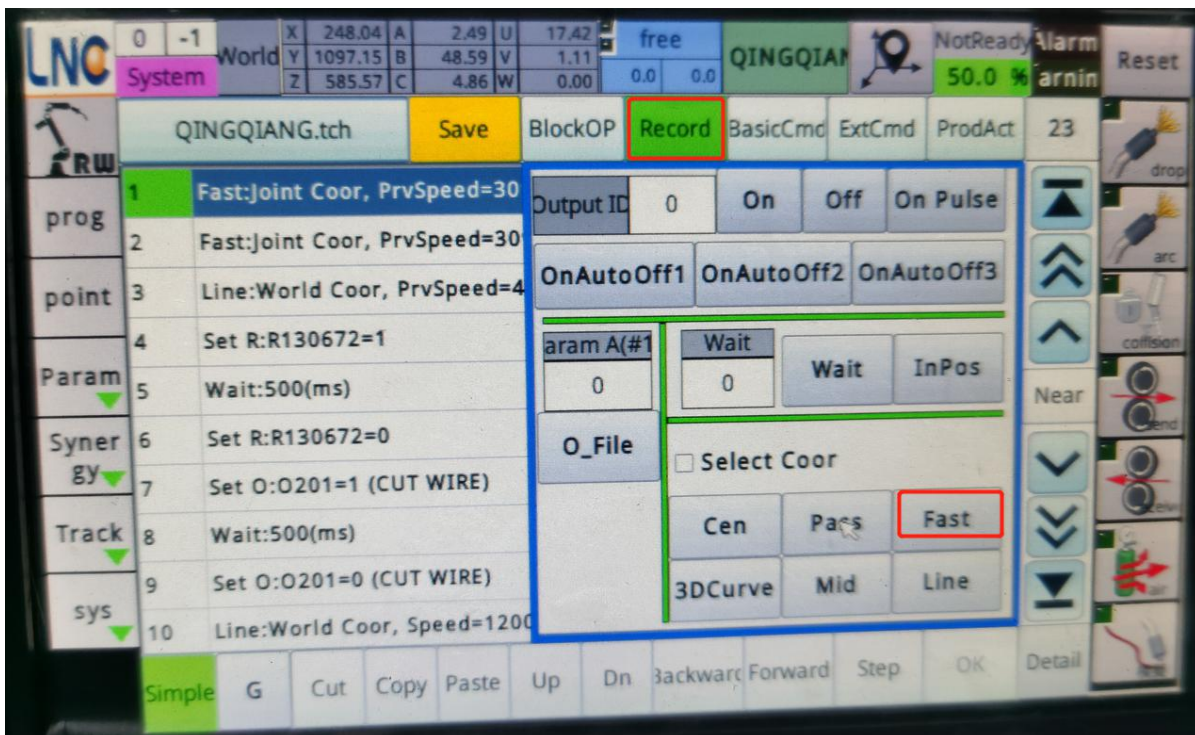
Step2. Move the welding torch above the wire cutting port and record its locati on.

Click "Record"- "Fast"- "OK"
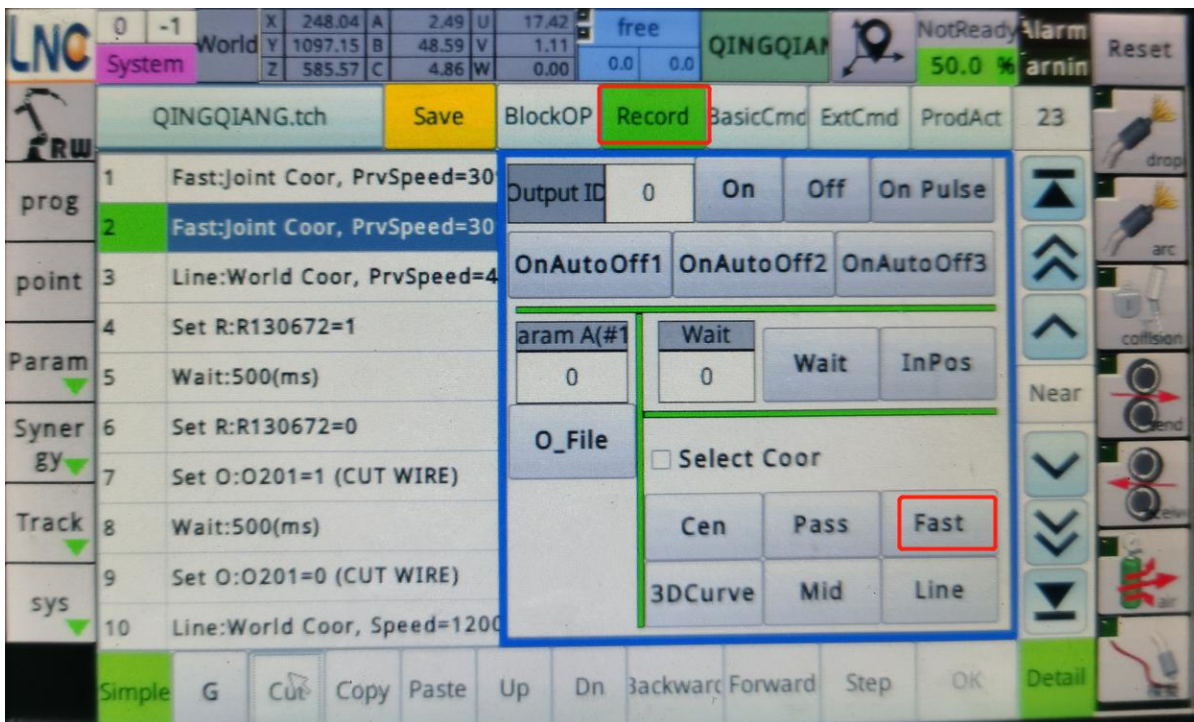
Step3. Move the welding torch until the wire ball in the end down into the wire cutting port.

Click "Record"- "Line",the PrvSpeed=480 means the line moving speed 480mm/min-click "OK".
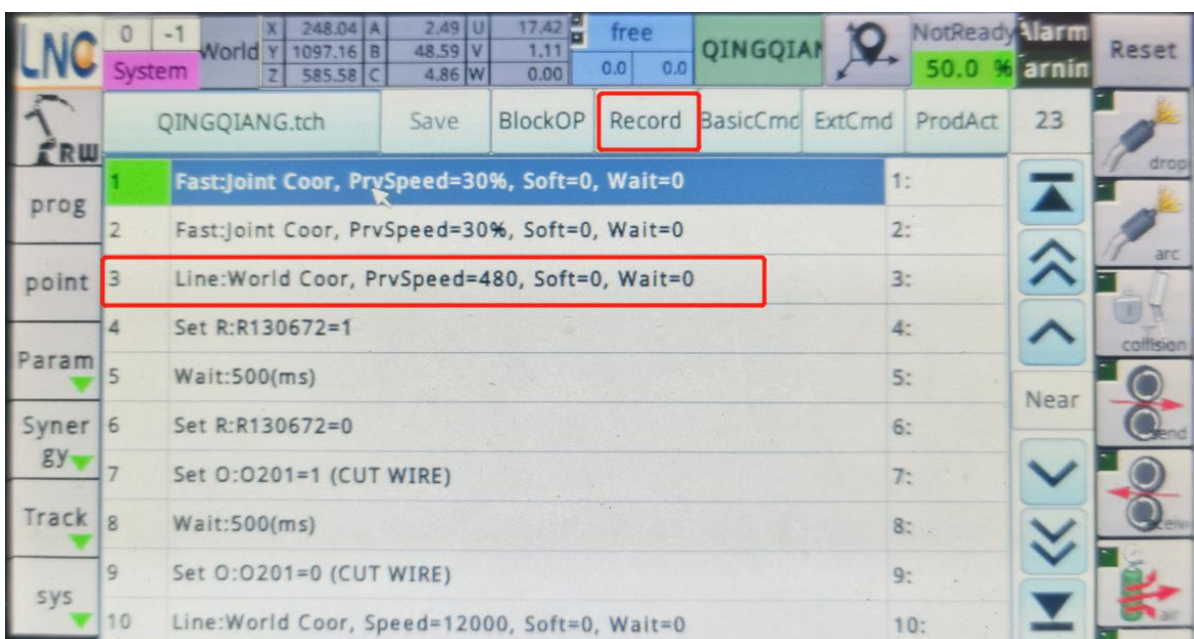
Step4. Give a wire feeding start instruction.

Click "BesicCmd"- "Set R"-Input "130672" after "Reg ID",select "Absolute" for Value typ
e,input "1" after "Value"
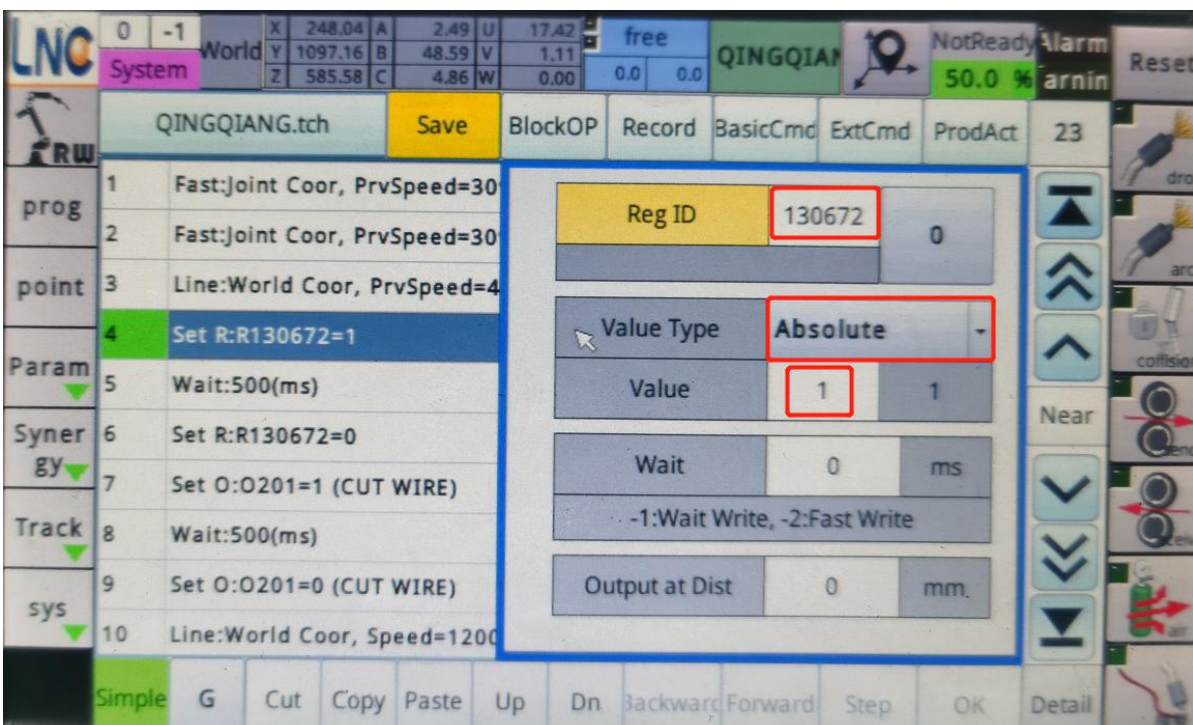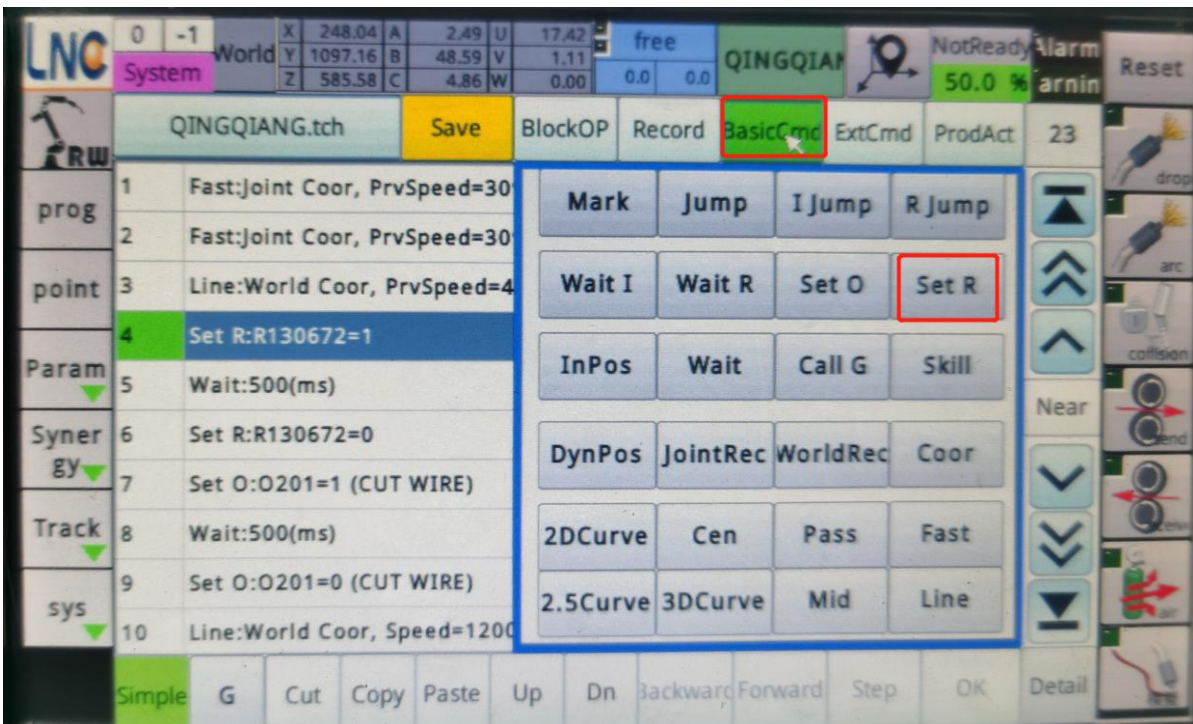
Step5. Set a wait time.

Click "Record"- input"500" below "Wait"- "OK"
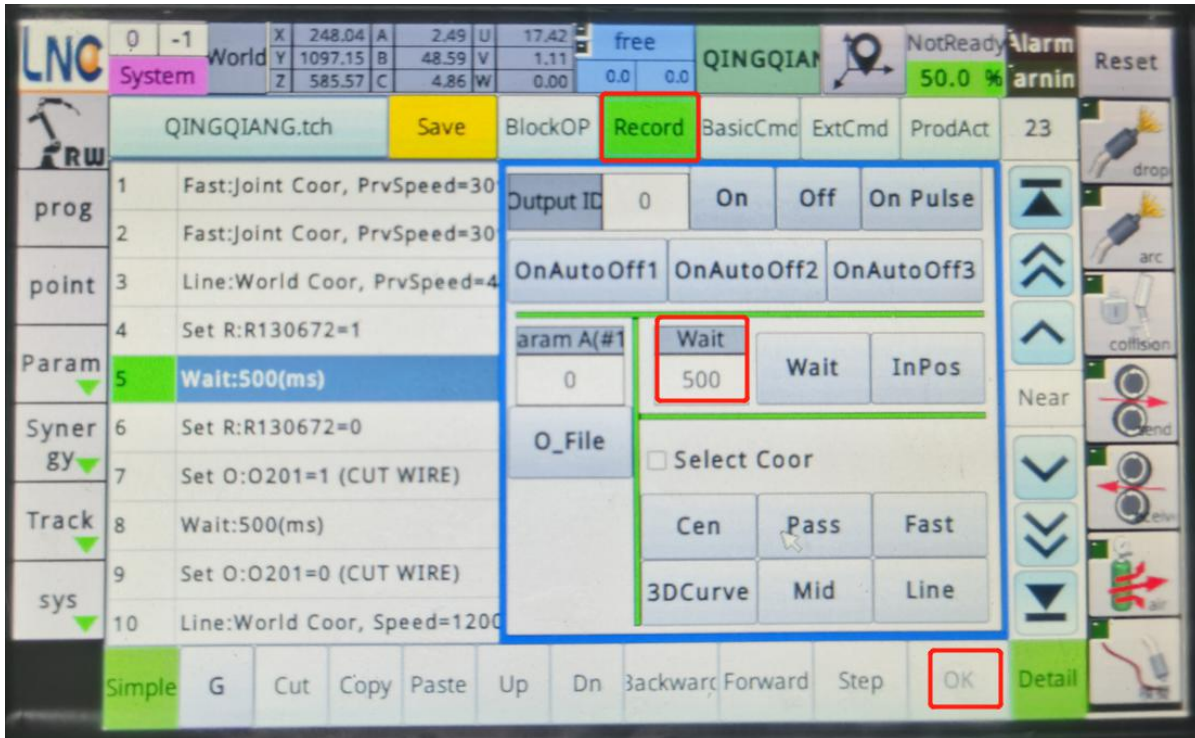
Step6.Give an instruction the wire feeding process end.

Click "BasicCmd"-input "130672" after Reg ID,select "Absolute" for the Value Type,input "1" for the Value,click "OK".
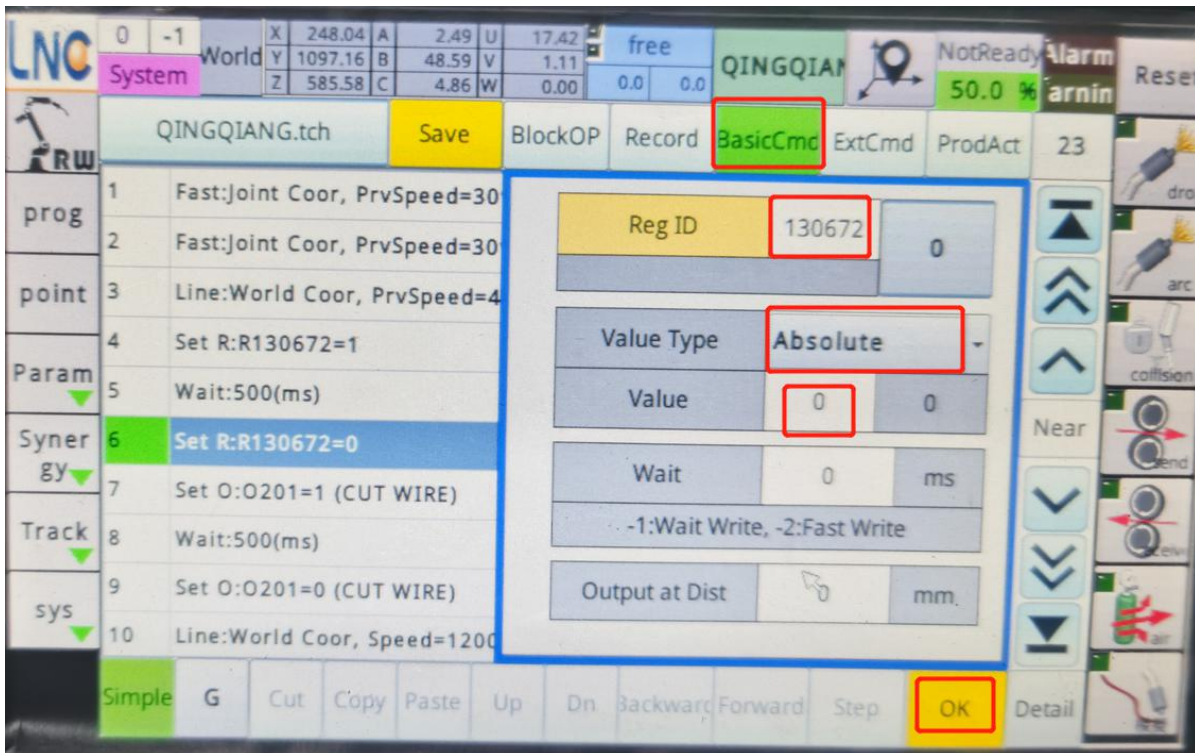
Step7. give a wire cutting instruction on the system.

Click "BasicCmd" - "Set O" -input the software ID which stands for cut wire,here it is "201"-select the status as "on" -click "OK".
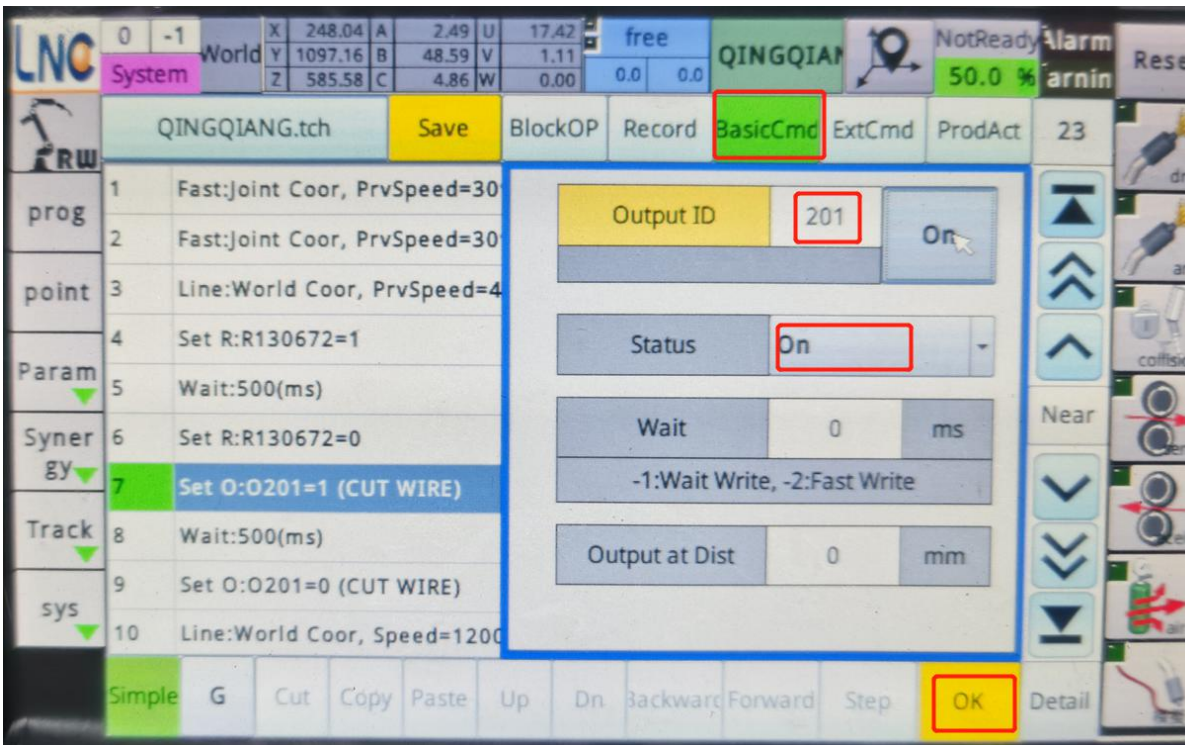
Step8. Setting a wait time for the wire cutting process.

Click "Record"- input "500" below "Wait"-click "OK"
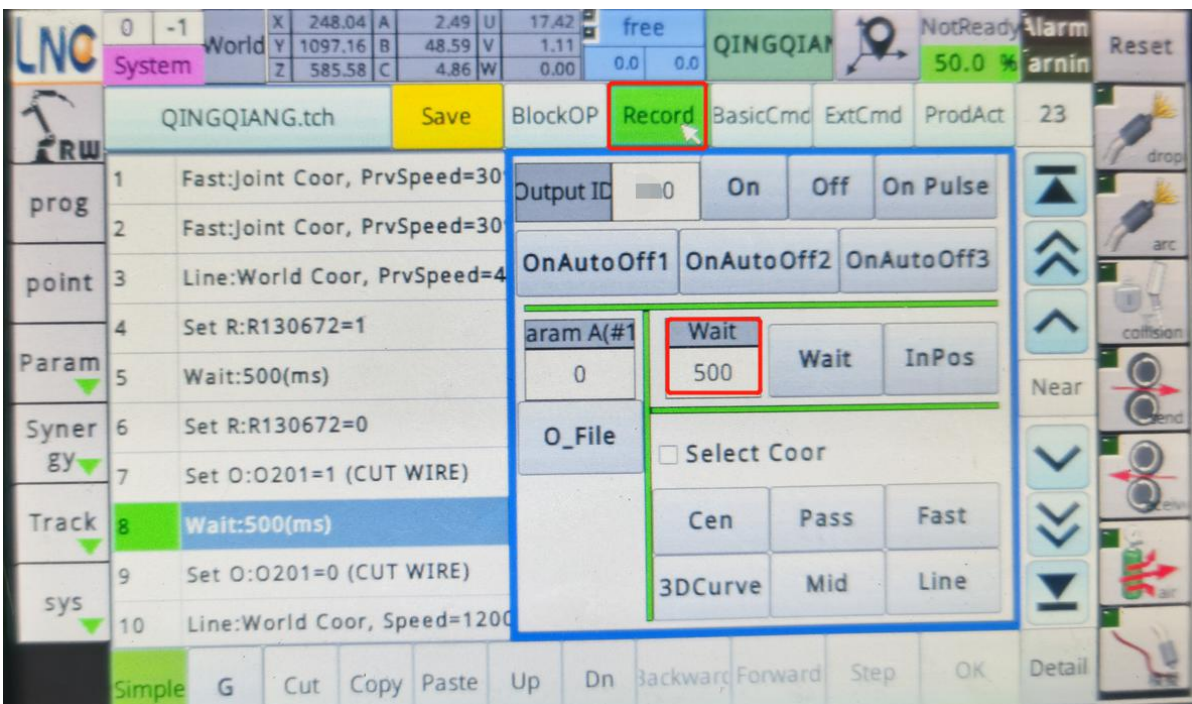
Step9. Give an end instruction for the wire cutting process.

Click "Basic"- "Set O"- input "201"before the output ID-select the Satus as "Off"-click " OK".
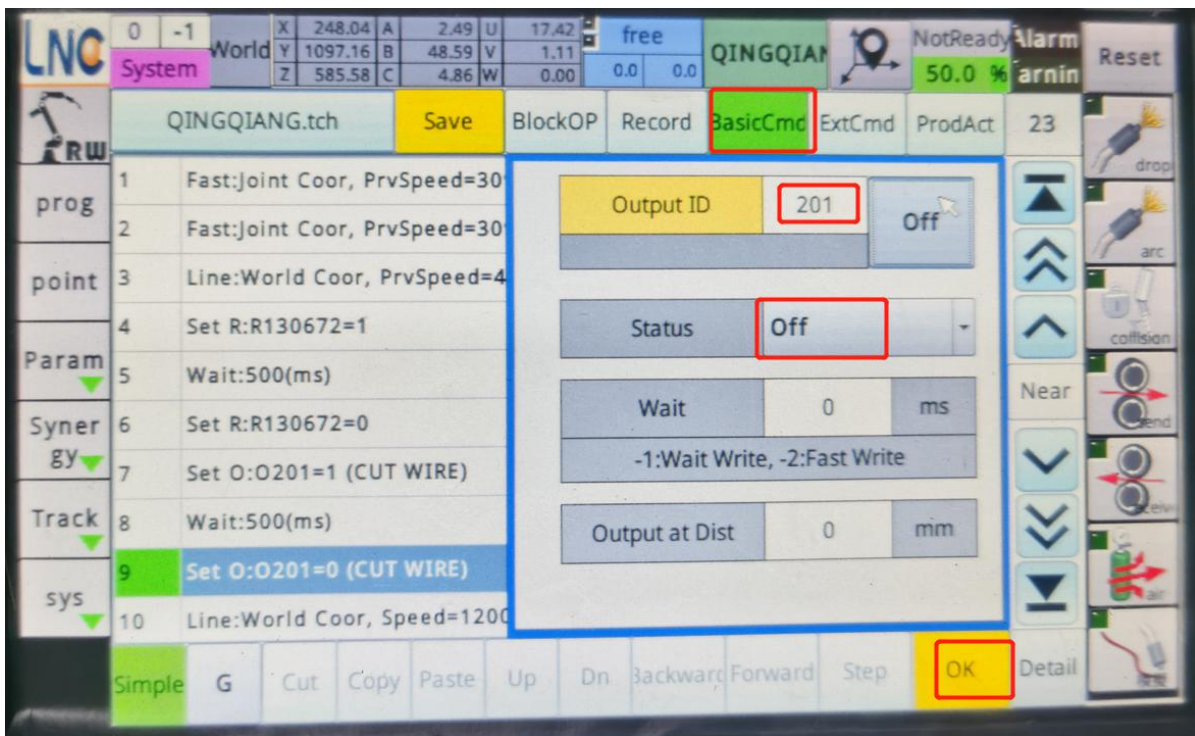
 Step10. Raise the welding torch and let it leave the cutting port.

Click "BasicCmd"- "Line"-input the speed as "20mm/s",click "OK",then it shows as 120 0mm/min
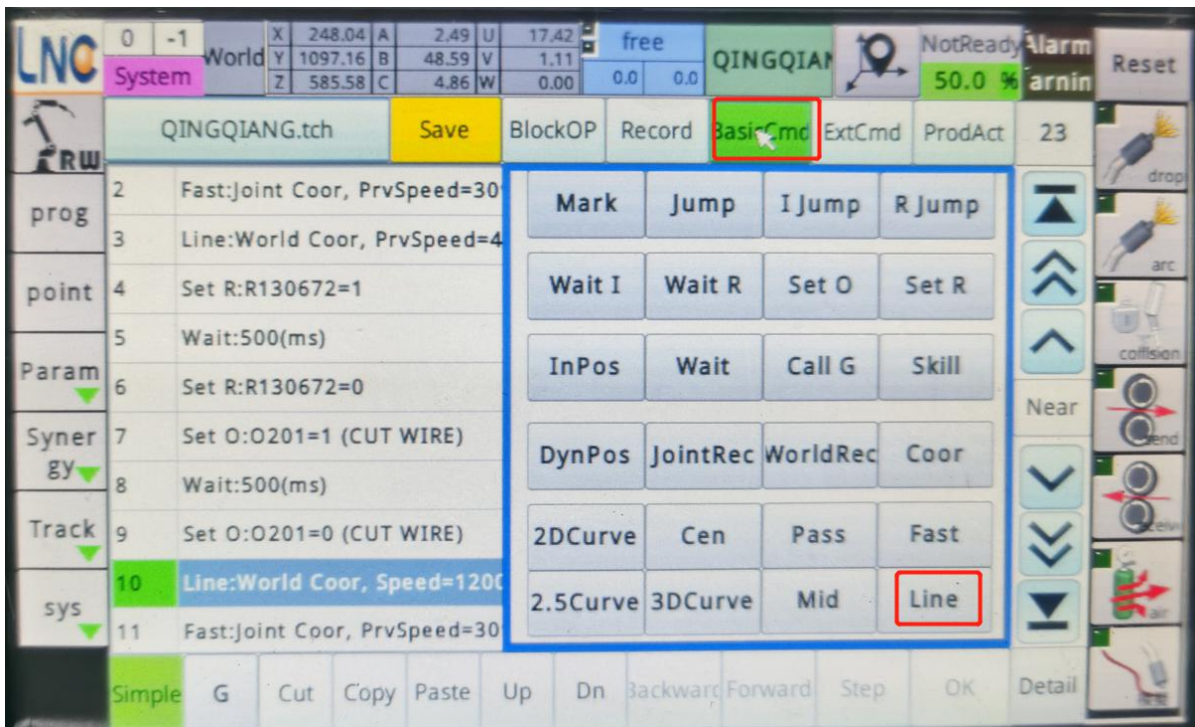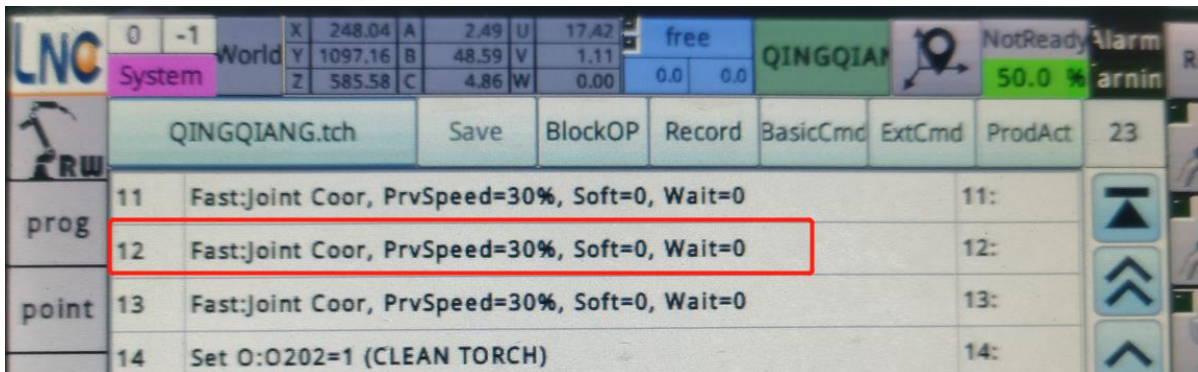
Step11. Record the current location.

  Click "Record"- "Fast"- "OK"
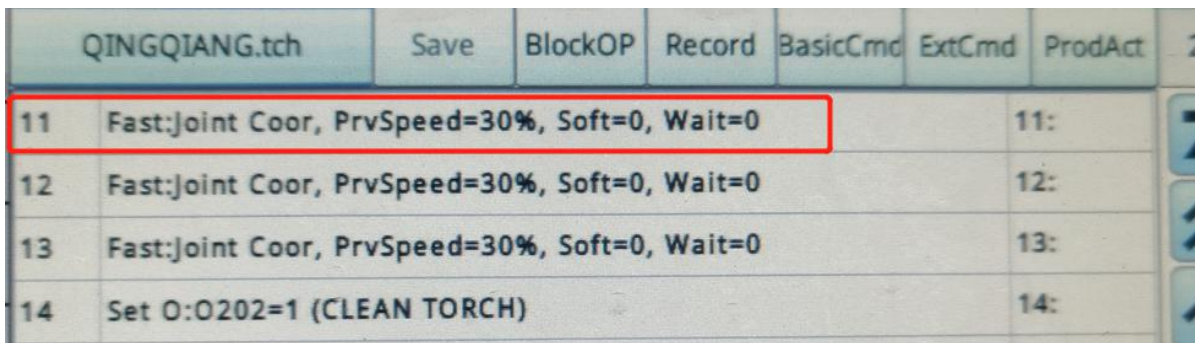
Step12. Move the welding torch above the torch clean port and record this location.

  Click "Basic Cmd"- "Fast"- "OK"

Step13. **Carefully move the welding torch to make the nozzle down into the cleaning port,adjust the nozzle and make it close to the locater block,then record this location.**

Click "Basic Cmd"- "Fast"- "OK"
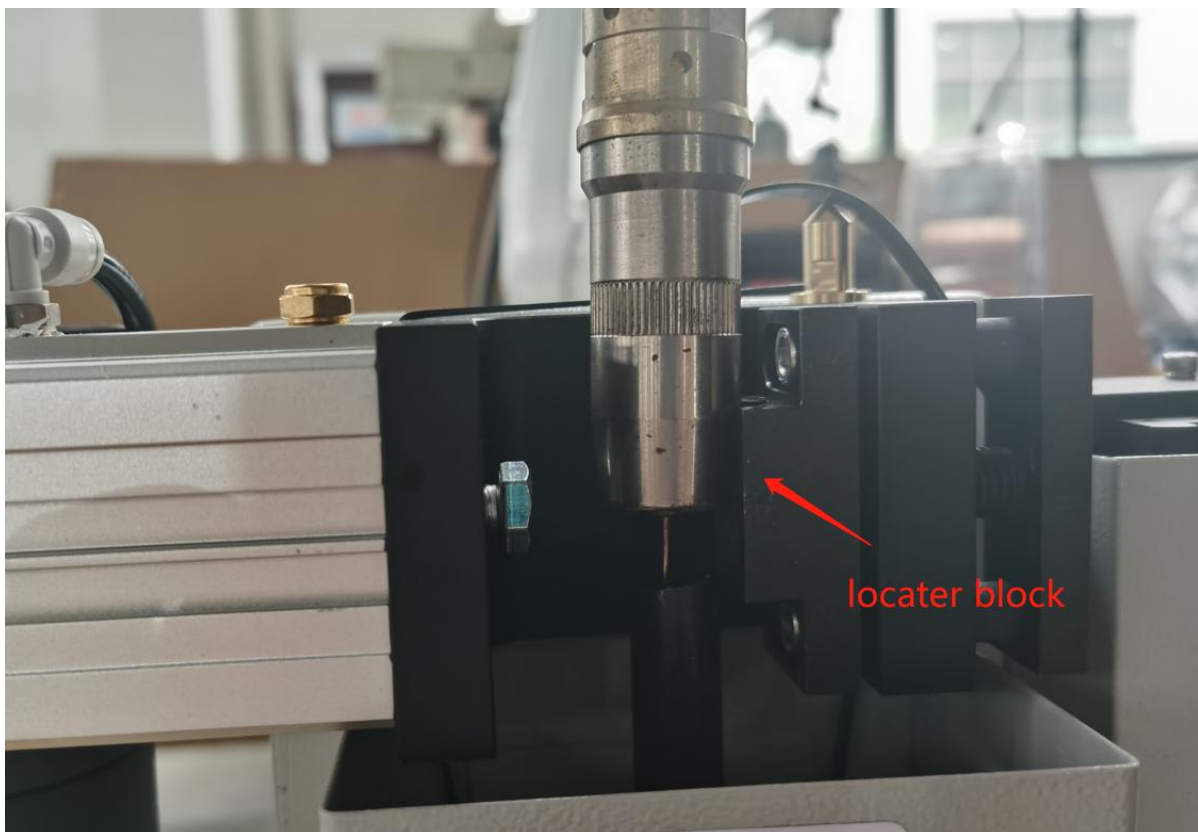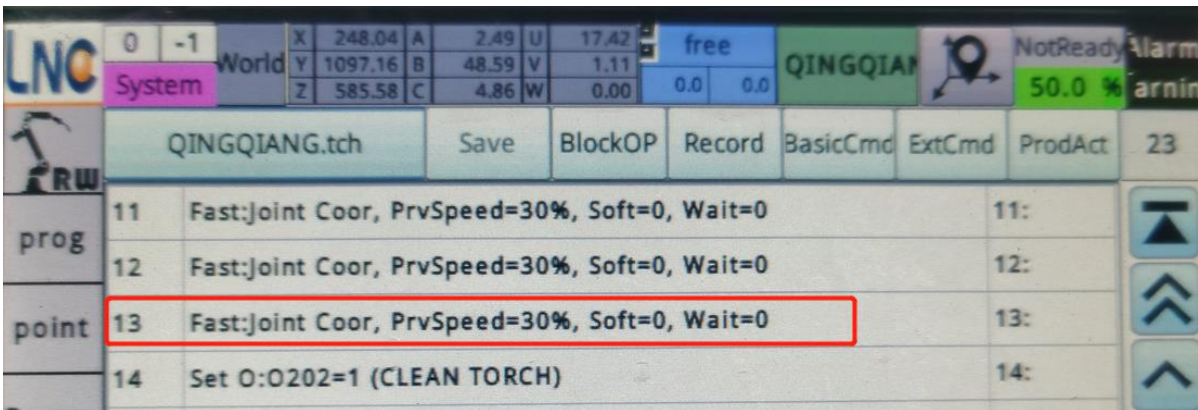
Step14. Give a torch cleaning start direction.

Click "Basic Cmd"- "Set O"- input "202" before Output ID-select the status as "On"-cli ck "OK".(here 202 stands for the soft ID of the torch clean)
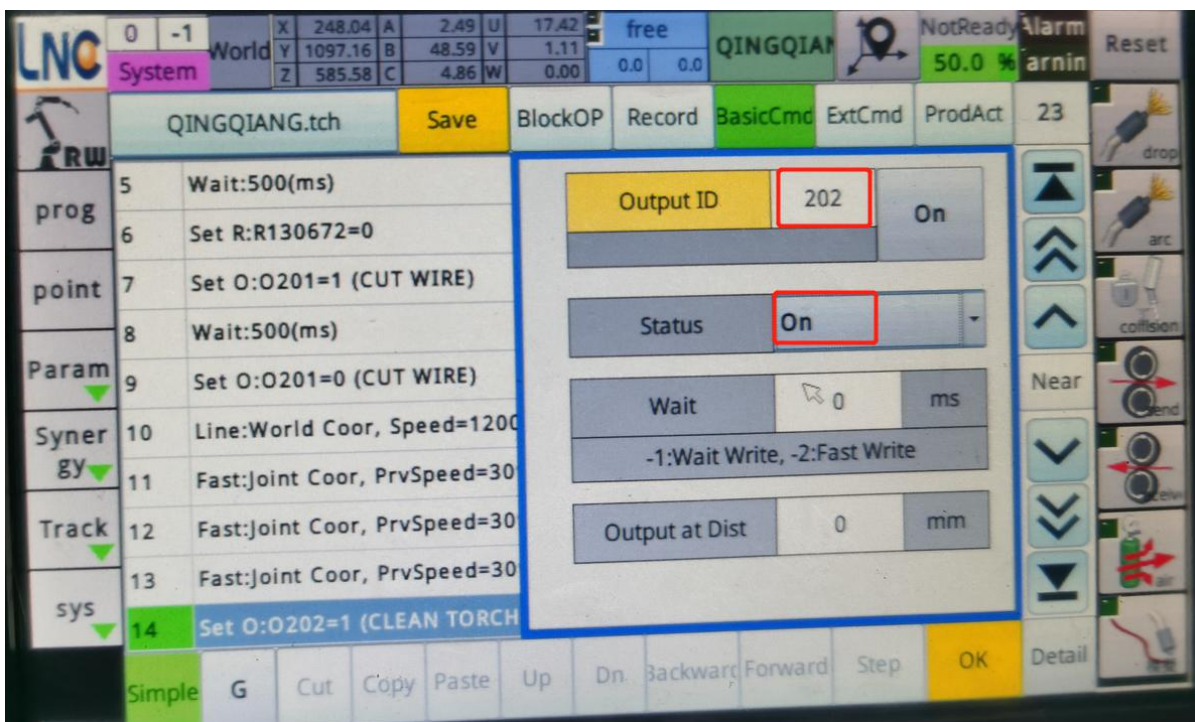
Step15. Setting a wait time for torch clean process.

Click "Basic Cmd"- "Wait"- input "500" ms-click "ok"
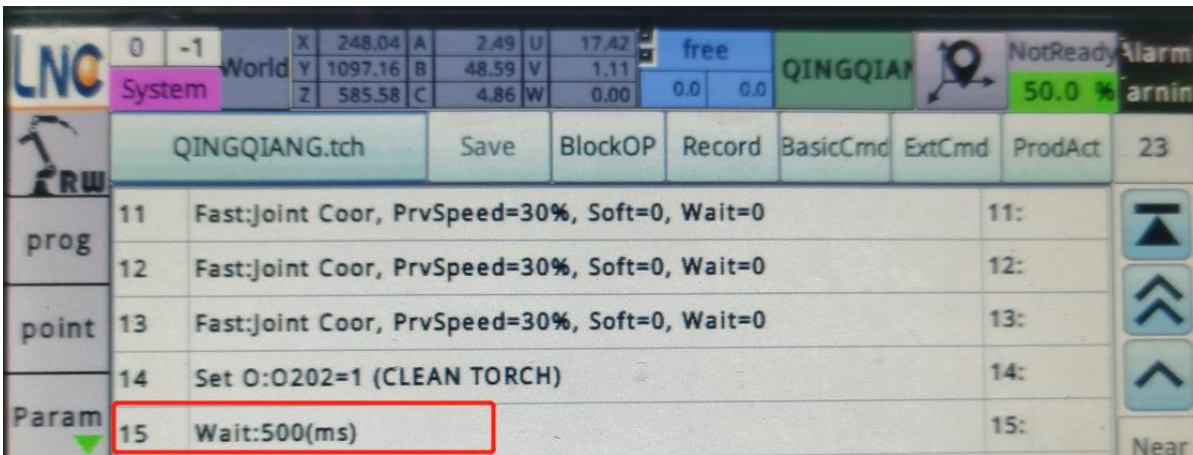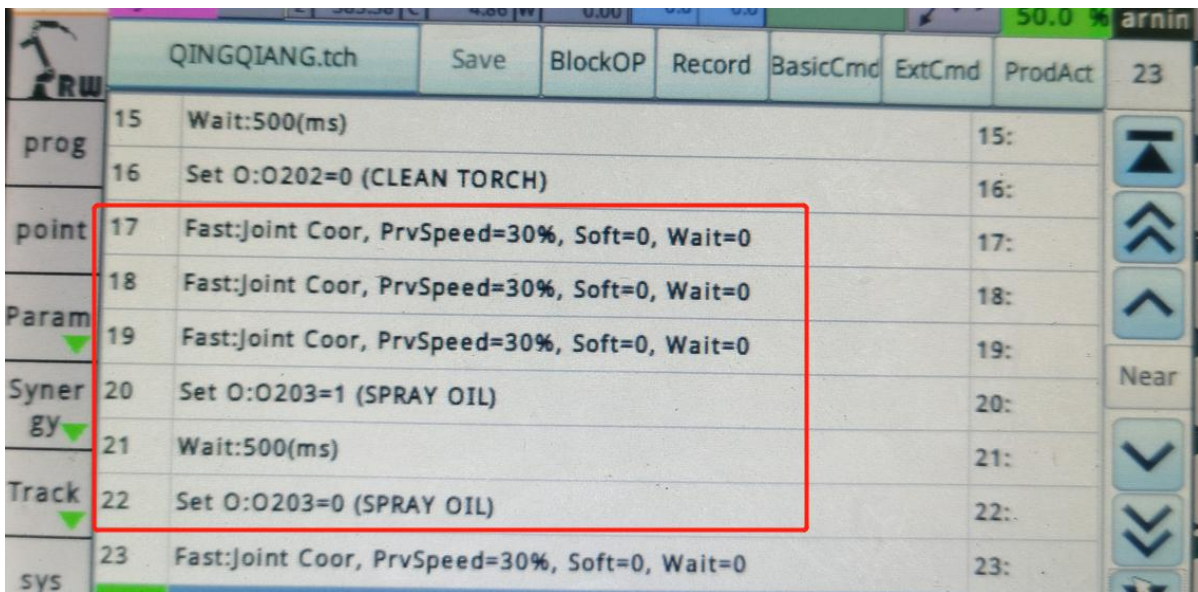
Step16.Give an end instruction of the torch clean process.

Click "BasicCmd"-input "202" after Output ID,select "Off" for Status.
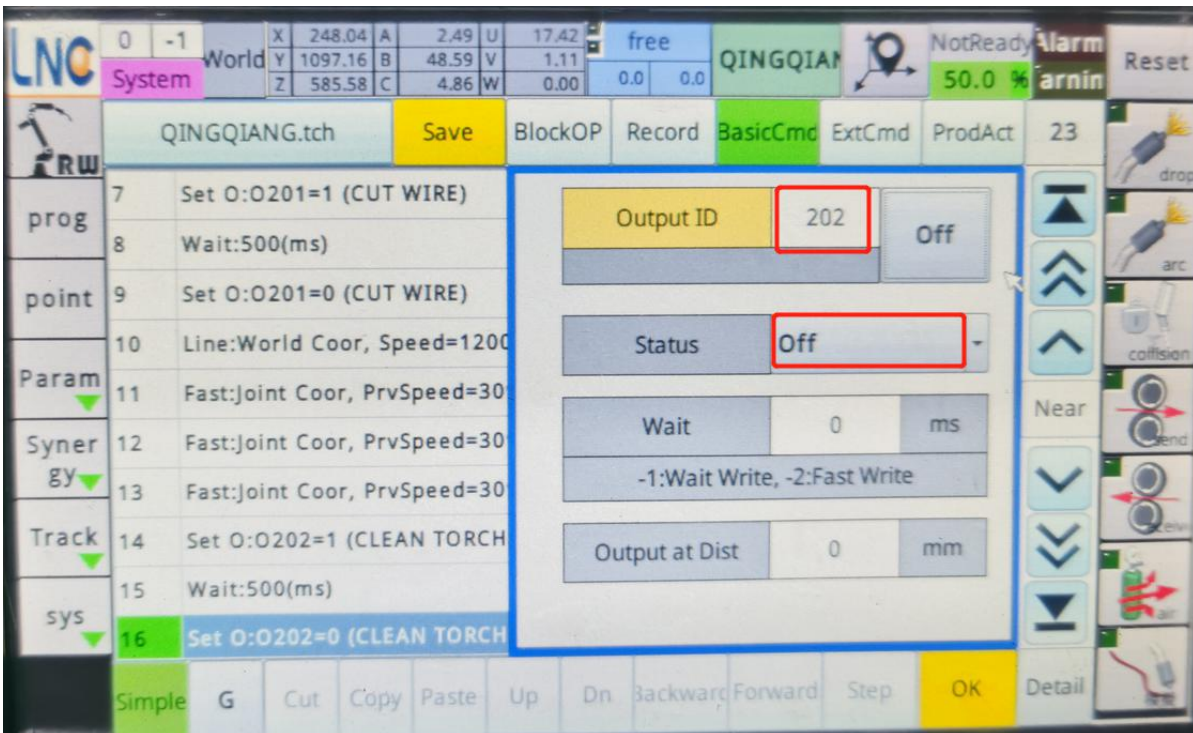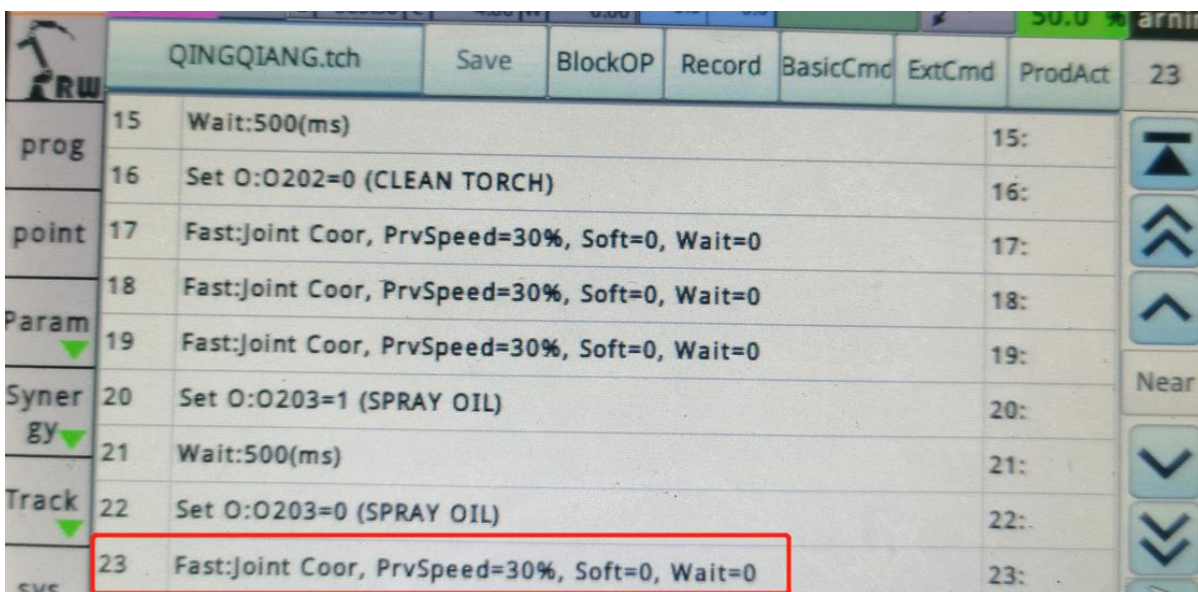
Step17-Step 22. See the **Step7-Step13** for reference.

Step23. Raise the welding torch above the oil spraying port and record this point.

Click: Fast "Record"- "Fast"- "OK".

4.4. Automatic torch cleaning programming

1. First create a whole set program of torch cleaning/wire cutting/oil spraying .
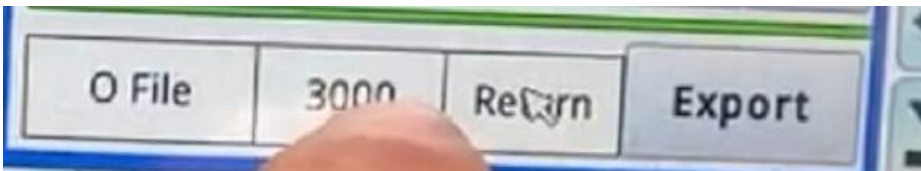
(Torch clean programming pls see the *JHY control system manual* for reference)

Then set an "O file export" for this program.

After the torch cleaning program created,click BlockOP",input a number ≥3000 for th e O file,make the status shows as "Return" then click "All" at the right top corner,at l ast click "Export".
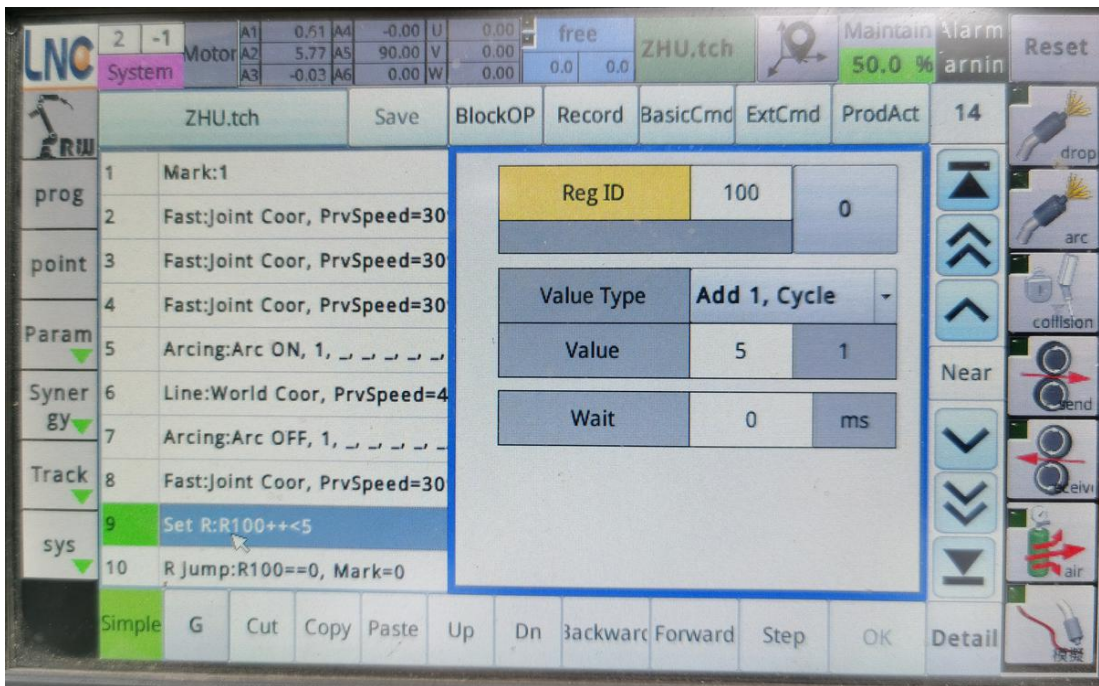

2. Creating a counting program in the welding program.
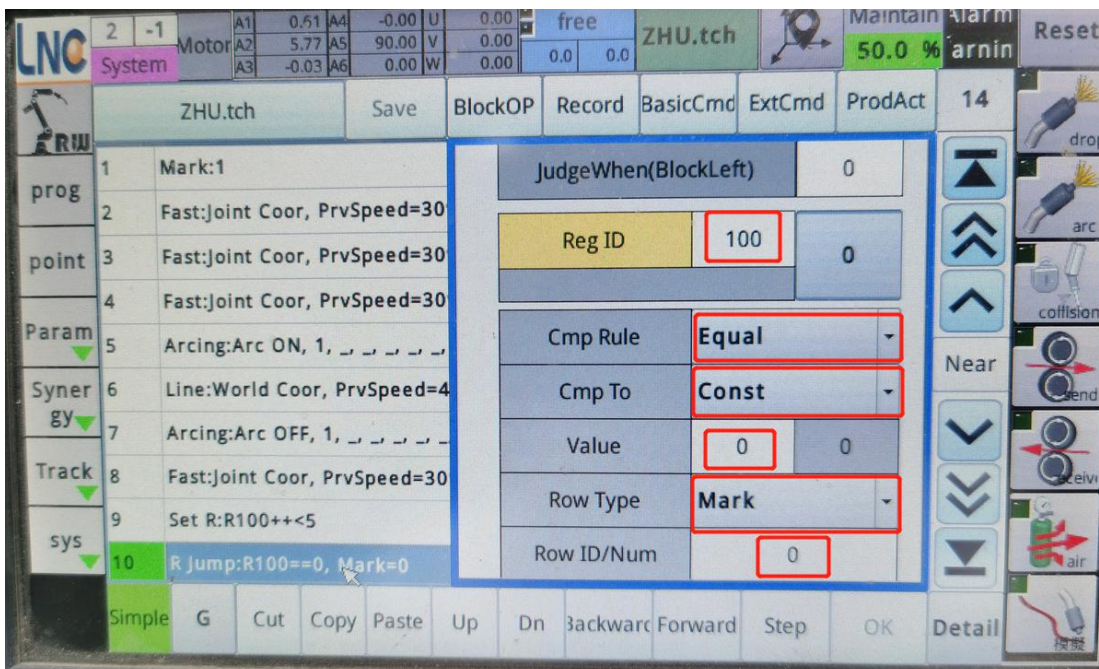
Step 1: click "BasicCmd"- "Mark",set a mark "1",click "OK".
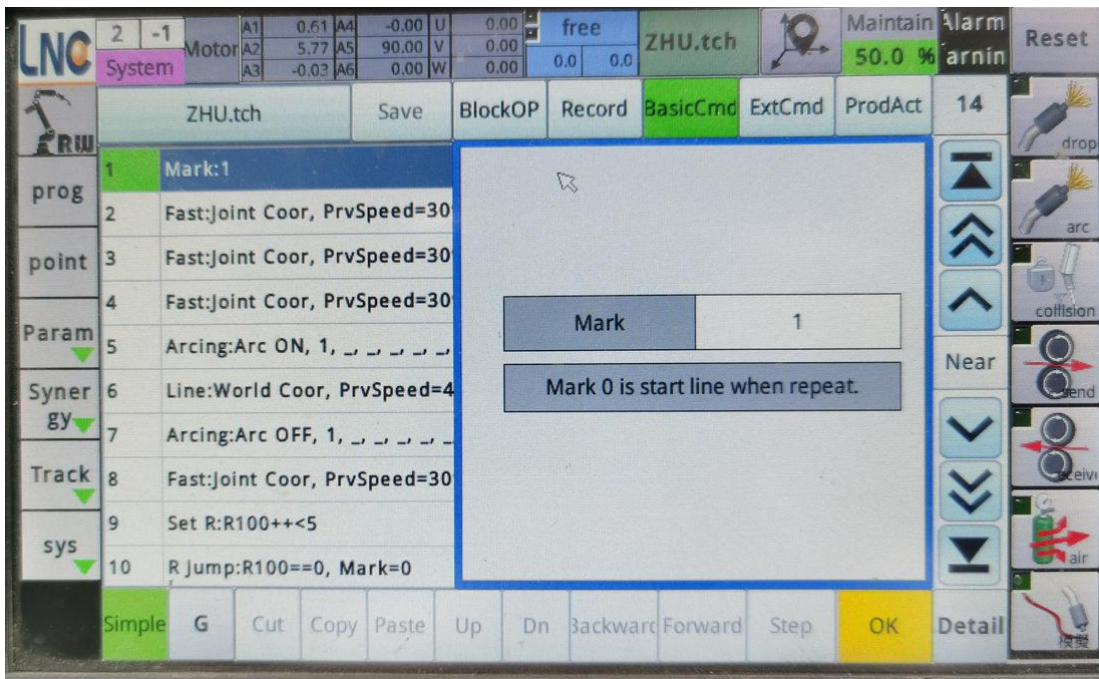
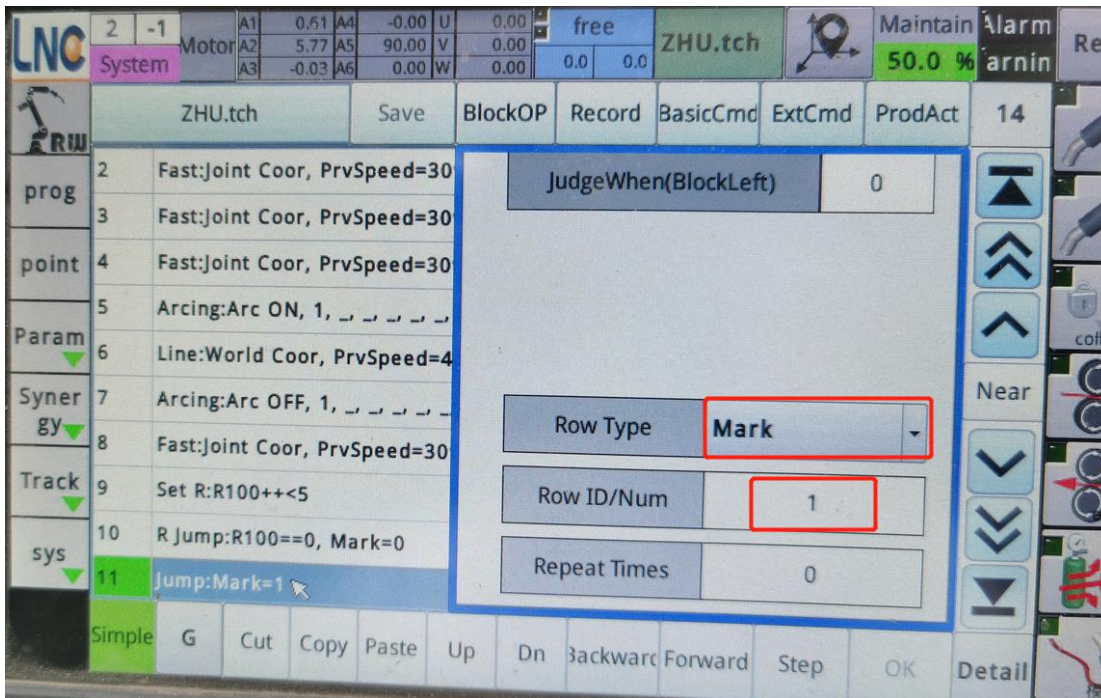Step 2-Step 8 is the straight line welding program.

Step 9: Click "BasicCmd"- "Set R",input 100 for "Reg ID" and 5 for "Value", choose " Add1,cycle " as Value Type, click "OK".
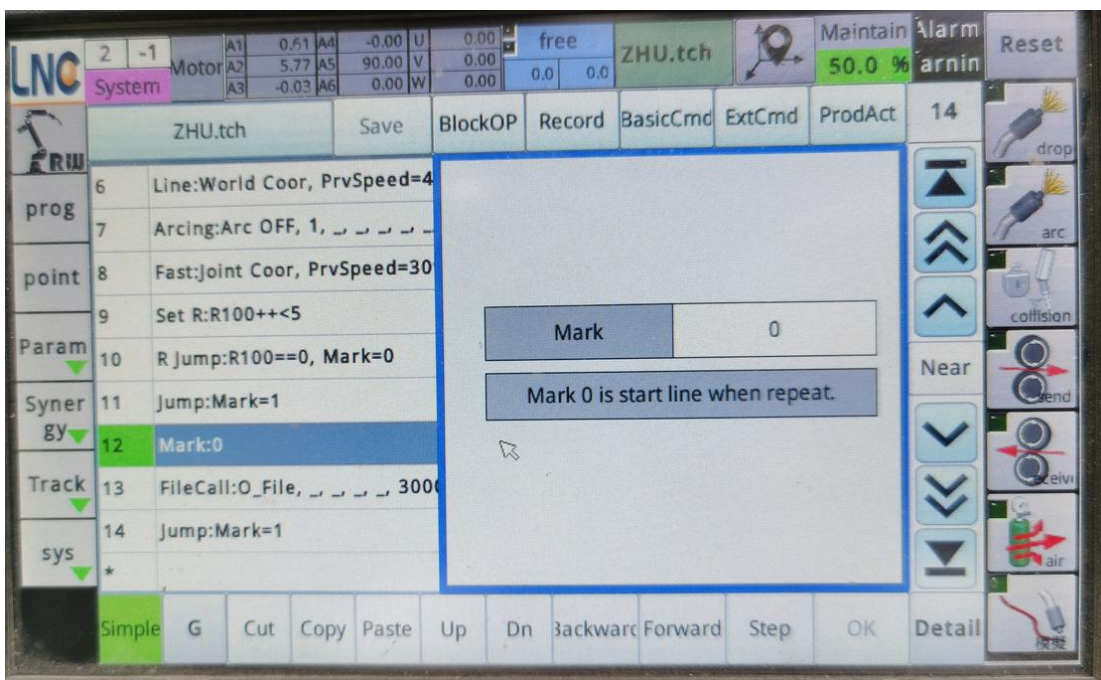
Step 10: click "BasicCmd"- "R Jump",input 100 for "Reg ID",select "Equal" as "Cmp R ule",select "Const" as "Cmp To",input 0 for Value,select "Mark" as Row type, input 0 f or "Row ID",click "OK".
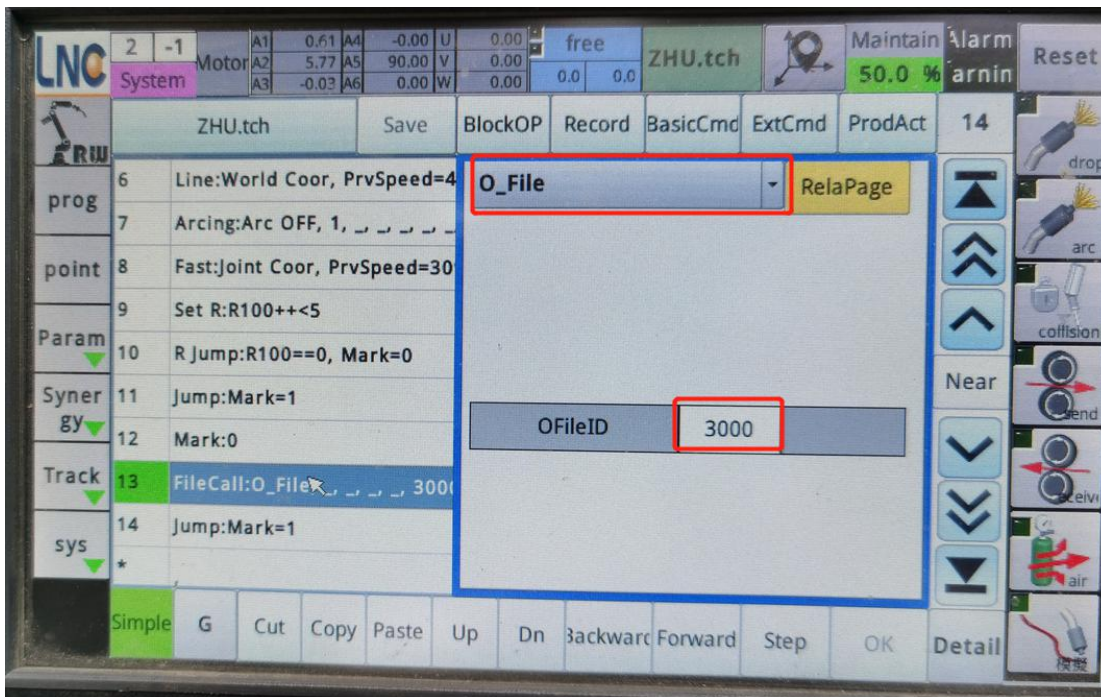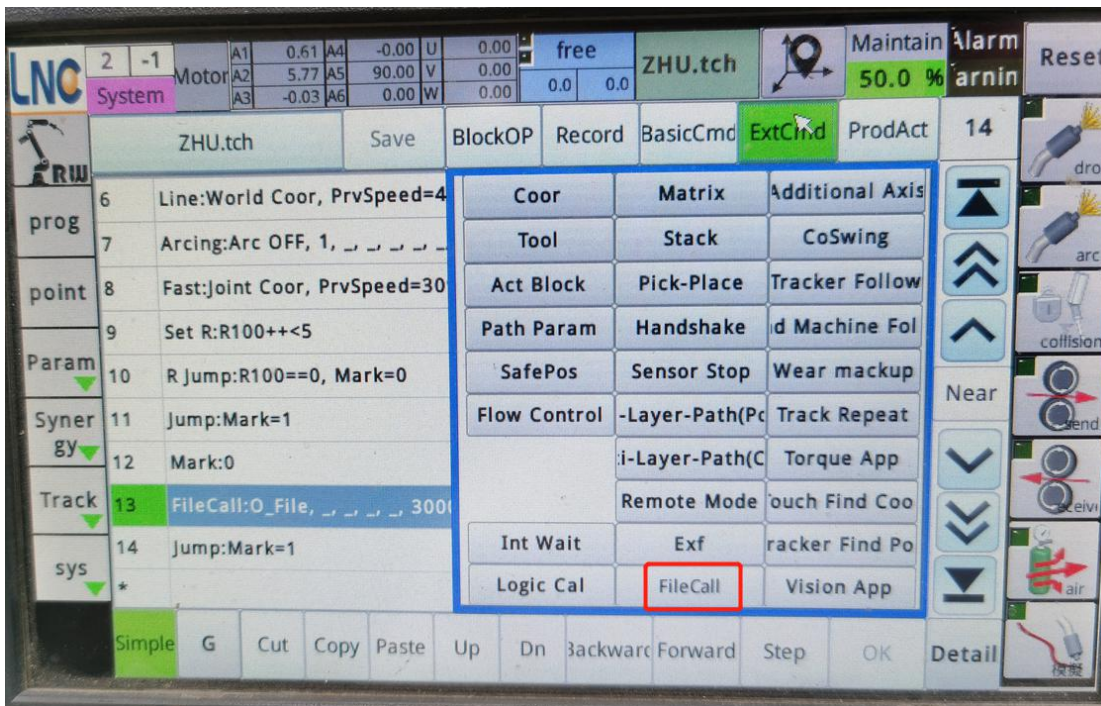

Step11: click "BasicCmd"- "Jump",set the mark as 1,click "OK".

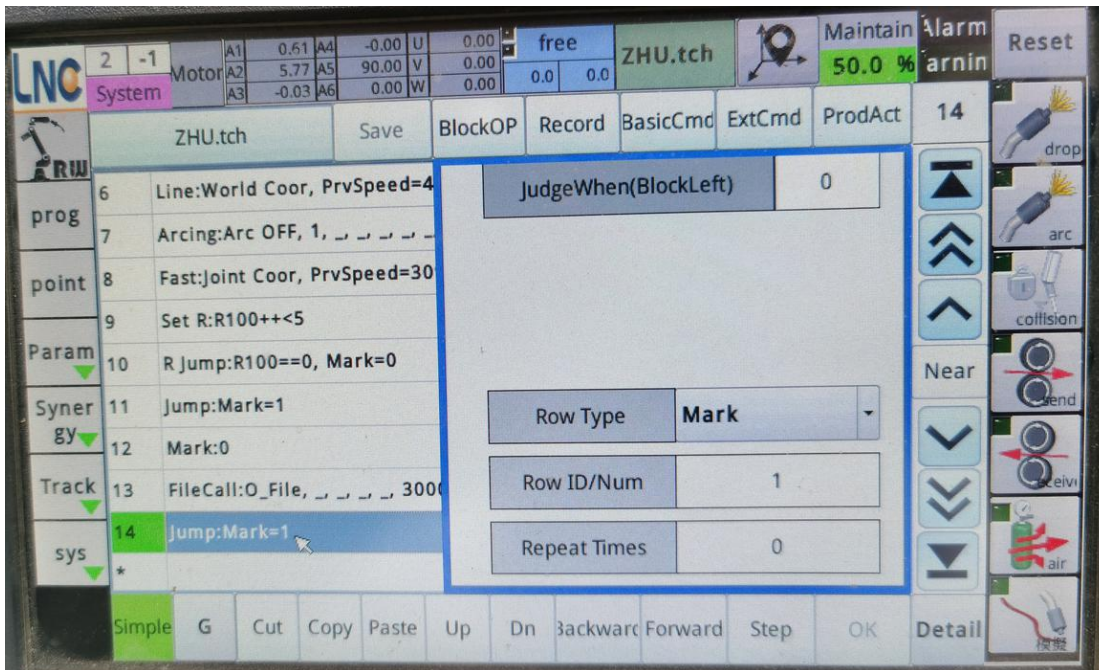Step12: click "BasicCmd"- "Mark",set a mark "0",click "OK"

Step13: Click "ExtCmd"- "FileCall"- "O_file",input the OFileID：3000.

Step 14: Click "BasicCmd"- "Jump",select "Mark" as the Row ID/Type,input the mark number:1.
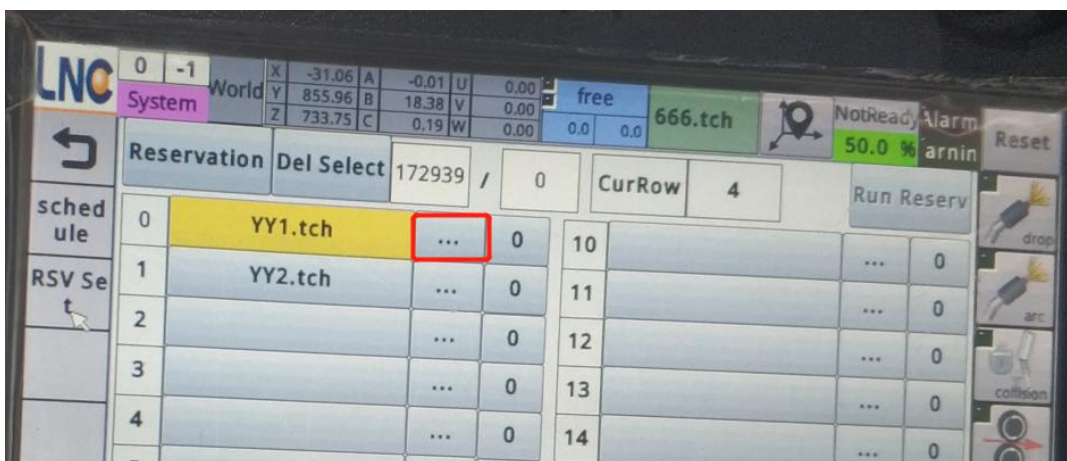
4.5 The usage of reservation box

Click "LNC"- "Param"- "RSV"

The number "0" stands for No.1 Reservation box

The number "1" stands for No.2 Reservation box

Click "..." after the file name,then choose a file to connect it with No.1 Reservation box.

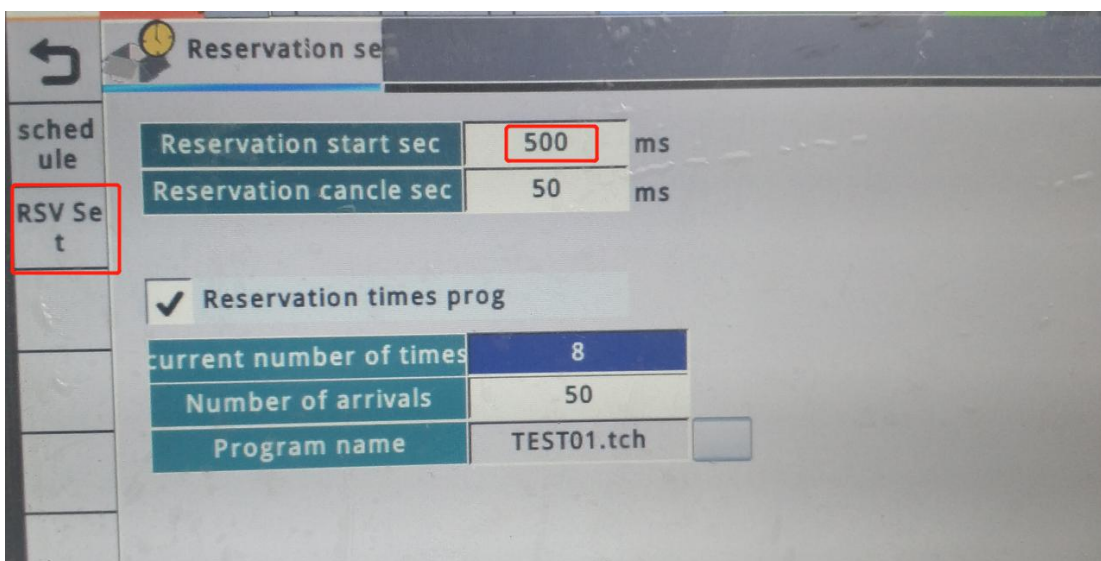Choose another file to connect it with No.2 Reservation box.

RSV SET (Reservation Set):
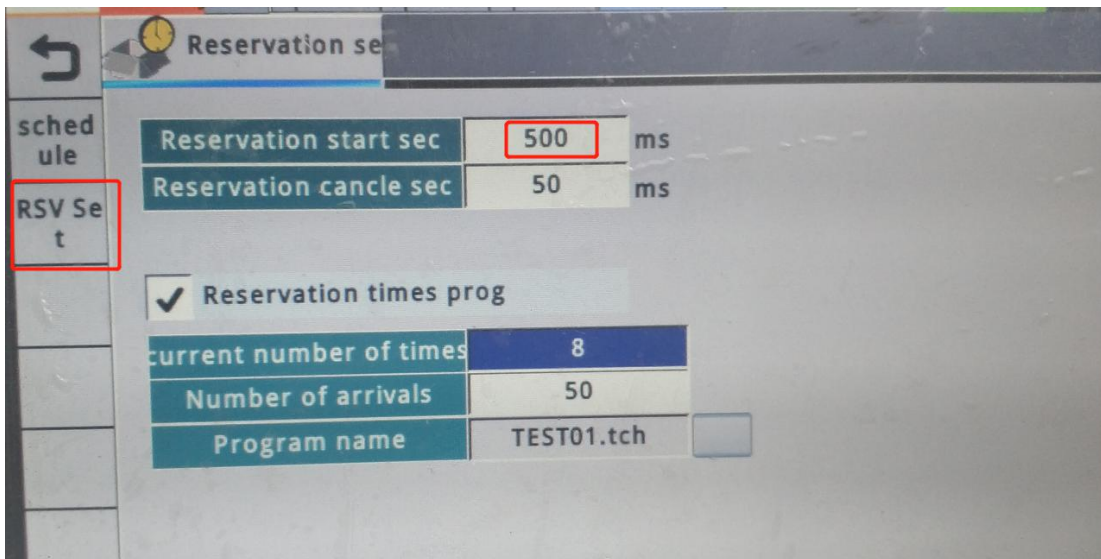
Click "RSV" to set the reservation parameter.

Reservation start sec:

This means you need to press "Start" buttons for 0.5s,then the program begin to start running.the time can be changed as you need.

Reservation cancel sec:

This means you need to press "Start" buttons for 0.05s,then the program begin to stop running.the time can be changed as you need.

Reservation times prog.

Number of arrivals: this means when the programs runs for 50 times,then it will jump to another program.

Such as jump to the **Torch clean program** when it reach 50s

Program name:

This is the program name which would jump to from current program