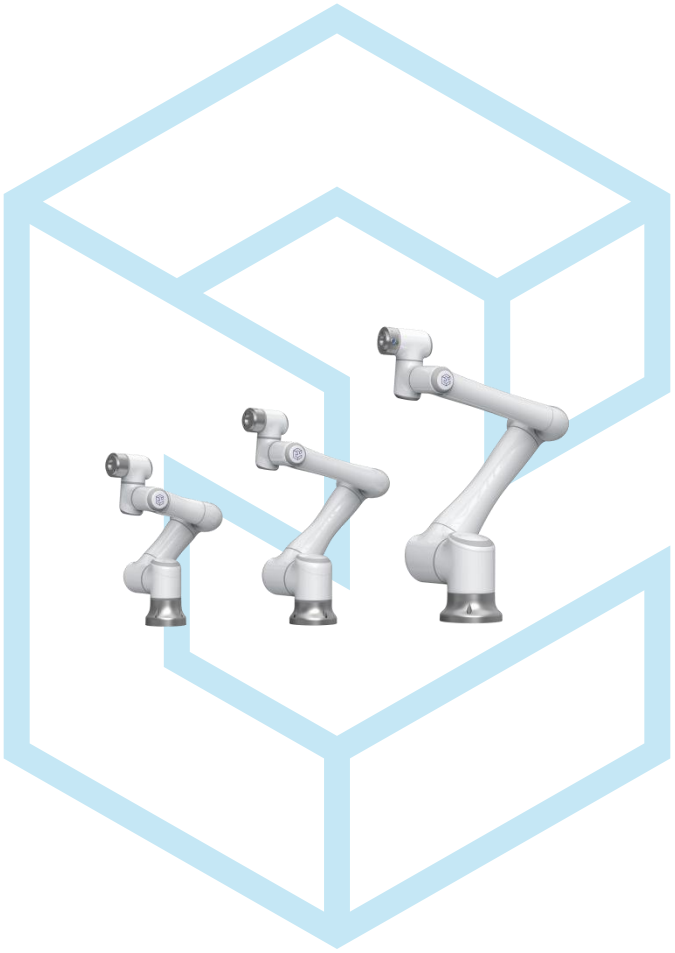
ELITE ROBOTS EC SERIES

Welding Operation Manual



Elite Robots Suzhou ltd.

2022-10-17

Ver3.5.2

Content

Chapter I Safety

1 Robot safety and safe-guard stop

1.1 Safety device

- Emergence Stop
- Safe-guard Stop
- Mode selector
- Soft limitation on joints

external Emergency stop can be configured as well as safe-guard stop.

1.2 Emergency Stop

There is local emergency stop on TP, please press the button in any urgent situation.

Once the emergency stop is pressed, rotate it back and confirmation alarm information on TP, then restart the program.

1.3 Mode select

Elite robot has three running mode：TEACH,PLAY and REMOTE. Please using the switch key to select mode. If change the mode during program running, the robot will stop immediately.

table 2.1 running mode

Running mode	Function	speed
TEACH	Programming, configuration	<=250mm/s
PLAY	Running the program without Superior control system	Based on instruction setting
REMOTE	Running the program with superior control system, for example using SDK to control the robot	Based on instruction setting

1.4 Simulation and real welding

Important: when program the robot in teach mode,prefer to run the movements without arc on, using the simulation to validate the motion.

- By clicking the button “ 

” to switch to simulation or real welding,switch to play mode, motion JBI will move and validate the welding path when “disable”, and welding instruction will arc on and carry out complete instructions when switch to enable.

1.5 Soft limitation on Joints

Please notice soft limitation is used to limit robot working range.

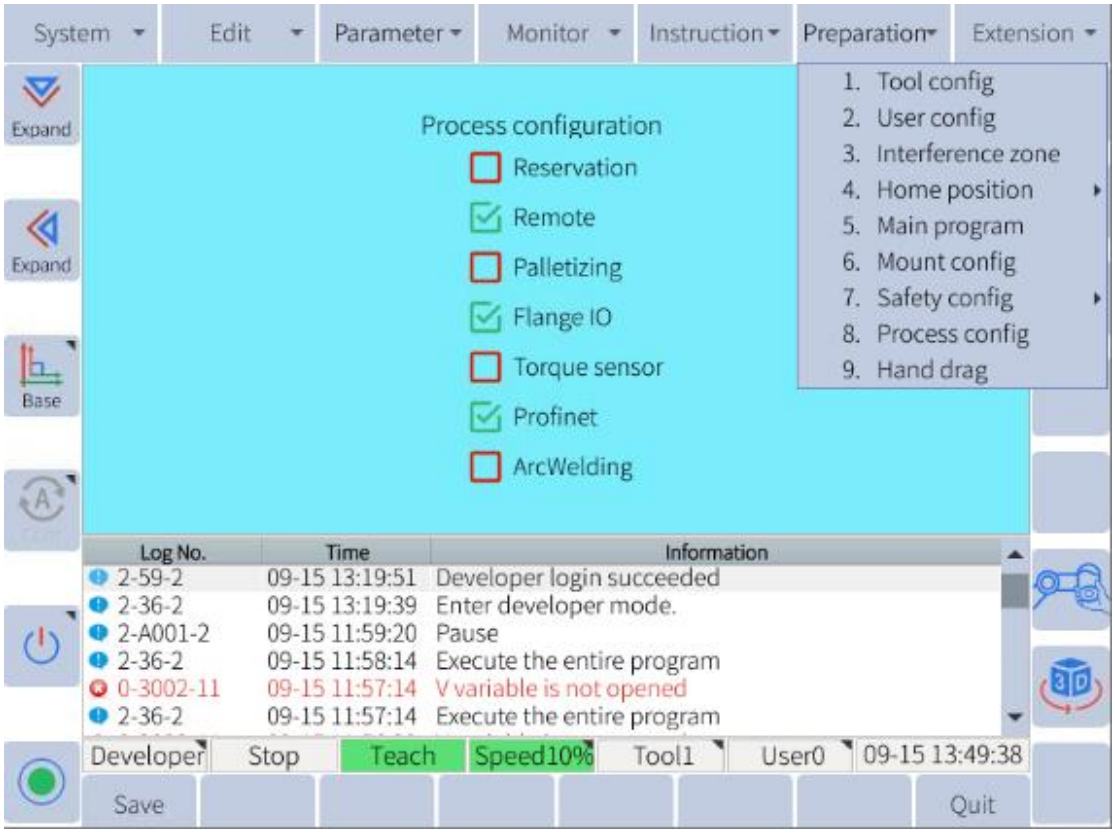
Chapter II Arc Welding Application

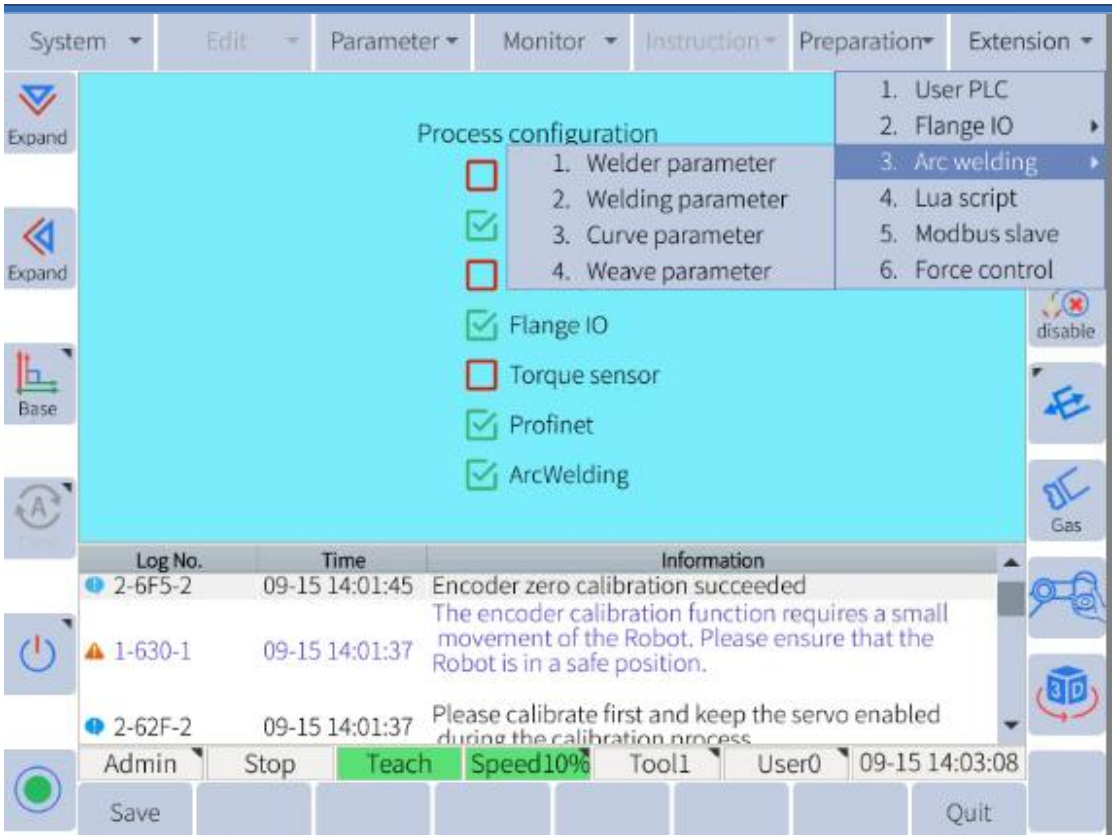
2.1 Configuration and parameter setting

Activate Function: “preparation”-“process config”， and check“ArcWelding”

parameter setting: “extension”-“Arc welding”

Just shown as below:





Shortcut key

- **Simulation Mode/Actual Mode**

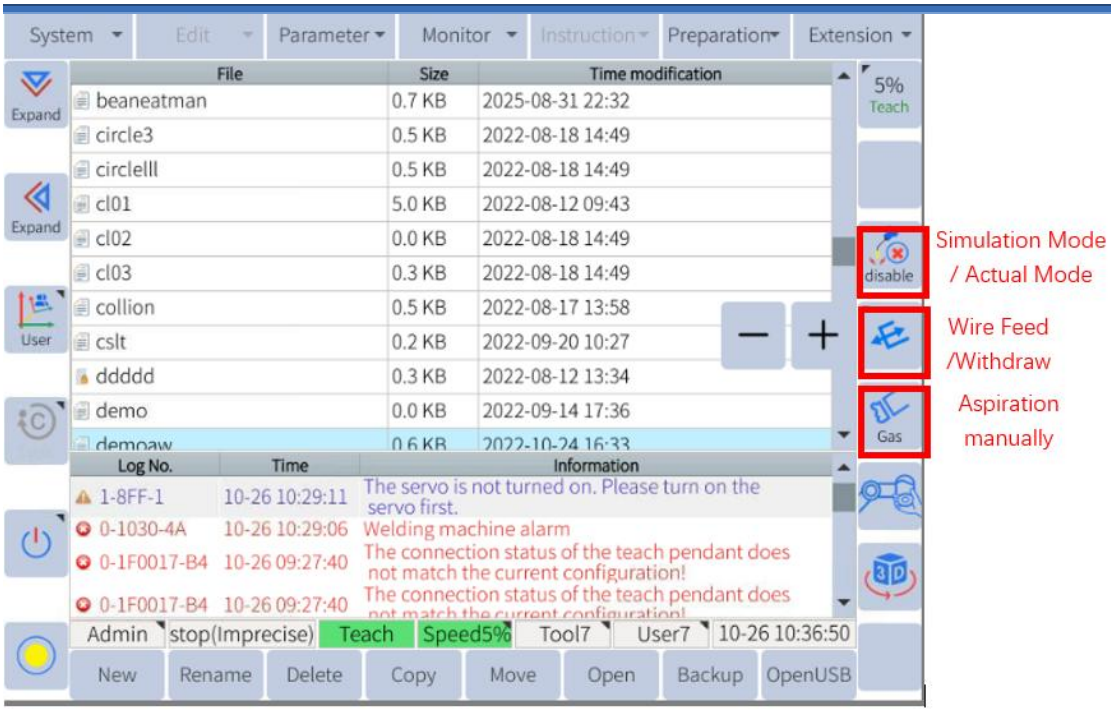
  When “ disable ” is triggered， the commands of JBI take no effect， robot in simulation mode with motion，and shows the actual movement。

- **Wire Feed/ Withdraw**

  Control the wire feeder to forward rotate or reverse rotate, in order to feed the wire or withdraw the wire

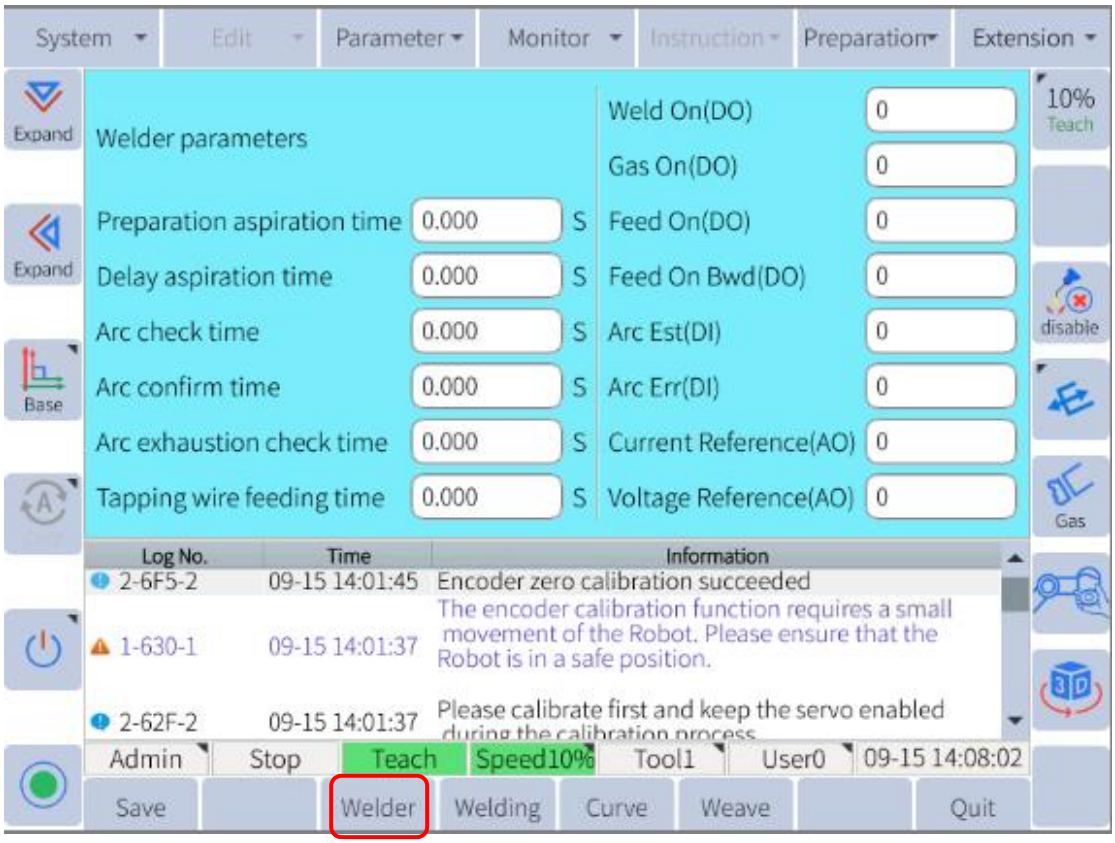
- **Aspiration manually**

  Control the aspiration manually to check the gas supply


System
Edit
Parameter
Monitor
Instruction
Preparation
Extension
Expand
Expand
User
File
Size
Time modification
beaneatman 0.7 KB 2025-08-31 22:32
circle3 0.5 KB 2022-08-18 14:49
circlelll 0.5 KB 2022-08-18 14:49
cl01 5.0 KB 2022-08-12 09:43
cl02 0.0 KB 2022-08-18 14:49
cl03 0.3 KB 2022-08-18 14:49
collion 0.5 KB 2022-08-17 13:58
cslt 0.2 KB 2022-09-20 10:27
ddddd 0.3 KB 2022-08-12 13:34
demo 0.0 KB 2022-09-14 17:36
5%
Teach
disable
Gas
Simulation Mode / Actual Mode
Wire Feed /Withdraw
Aspiration manually
Log No.
Time
Information
1-8FF-1 10-26 10:29:11 The servo is not turned on. Please turn on the servo first.
0-1030-4A 10-26 10:29:06 Welding machine alarm
0-1F0017-B4 10-26 09:27:40 The connection status of the teach pendant does not match the current configuration!
0-1F0017-B4 10-26 09:27:40 The connection status of the teach pendant does
Admin
stop(Imprecise)
Teach
Speed5%
Tool7
User7
10-26 10:36:50
New
Rename
Delete
Copy
Move
Open
Backup
OpenUSB

2.2 Basic Function

2.2.1 Arc Welding Parameter



Parameter Setting：

Preparation aspiration time： The time of aspiration triggering signal sent in advance before sending the arc starting signal

Delay aspiration time： The time of ending aspiration signal sent after ending arc

Arc check time： after triggering Arc, the positive feedback signal (successful arcing signal) from welding machine should be sent out during this time, or the robot will alarm

Arc confirm time： the lasting period of positive feedback signal (successful arcing signal) from welding machine

The signal with welding machine，contains the wire and gas supply（The hardware connection should corresponds to the definition

Arc exhaustion check time：After robot send out ending arc signal, welding machine should reset the positive feedback signal (successful arcing signal) during this period

Weld On：The triggering arc signal

Feed On：Wire feeding signal

Feed On Bwd：Wire withdraw signal

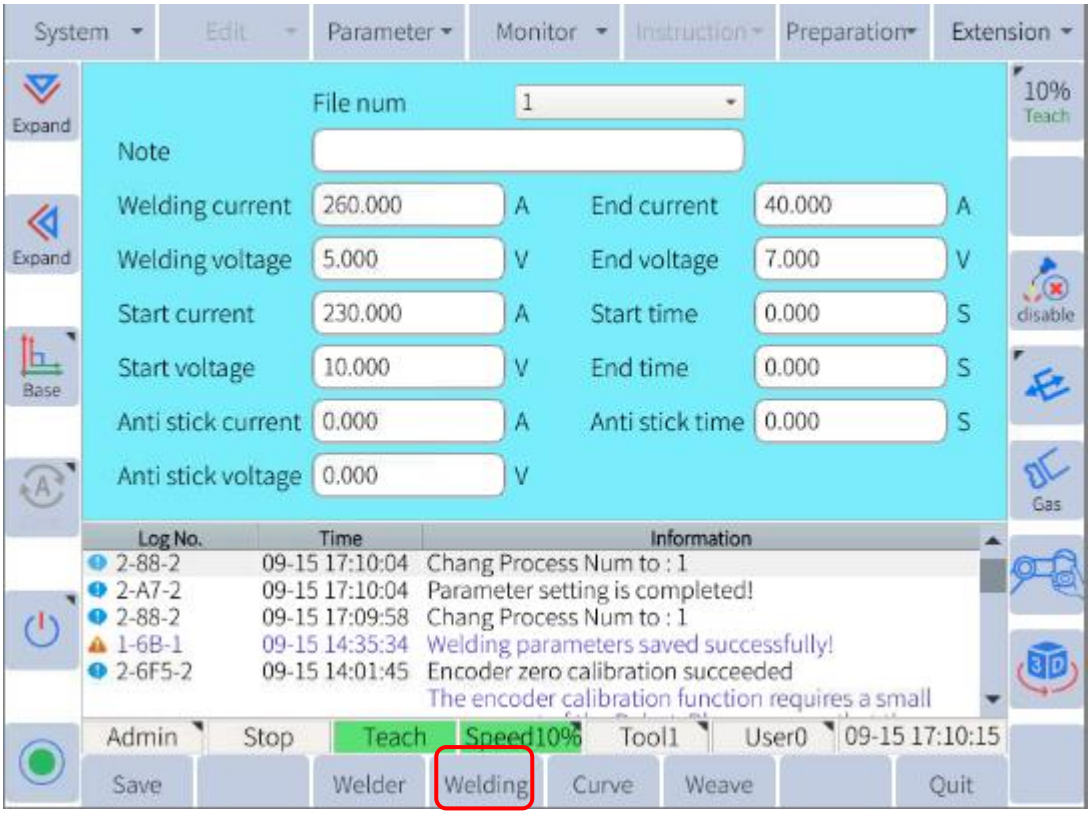
Arc Est：Successful arc signal from welding machine

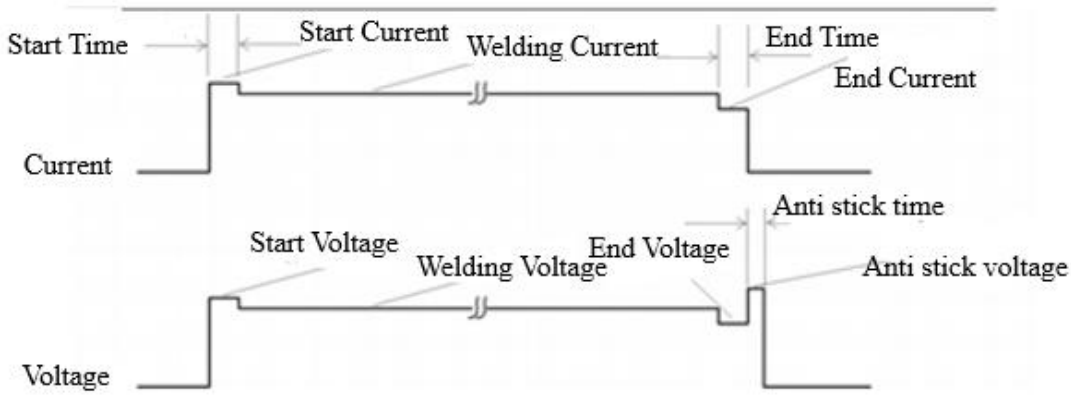
Arc Err：Alarm from welding machine

Current Reference：The analog signal to control the current of weld machine（0-10v）

Voltage Reference：The analog signal to control the voltage of weld machine（0-10v）

2.2.2 Welding Parameter





File num:

The process id of current welding parameter setting， which could apply in JBI ArcOn command based on the detail requirement

Welding Voltage、Welding Current:

The parameter for normal welding

Start voltage、Start current:

Set different parameters based on different requirements

End current:

Applied when ending arc is not full. Usually end current and voltage are smaller than normal welding

Anti stick voltage & current:

Applied only if the wire is stuck. Usually the anti stick current is 0, while the voltage is bigger than normal welding

Start time:

The holding time for starting current and voltage. If the value is too big, the starting position will weld too much.

End time:

The holding time for ending current andvoltage. If it is too big, the ending position will weld too much. If too small, it will weld too less

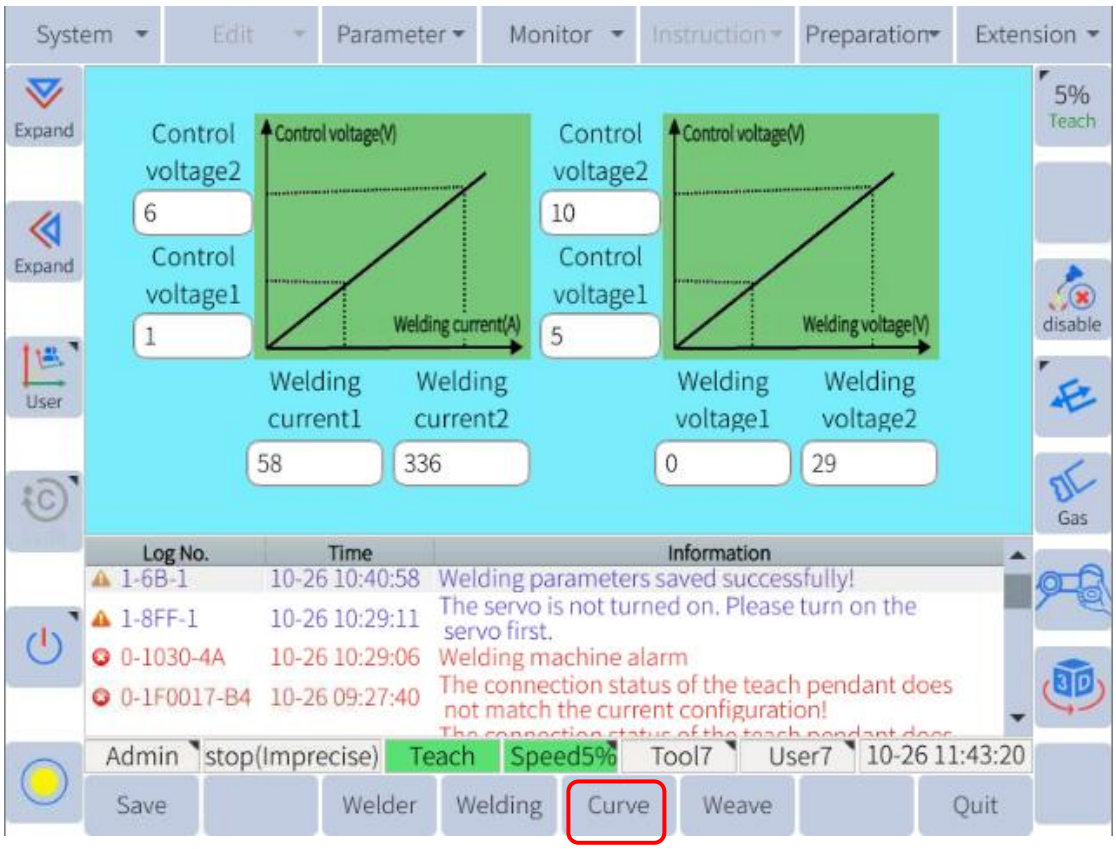
Anti stick time:

The holding time for anti stick current and voltage

2.2.3 Welding Curve

Parameter setting

Based on the calibration result between robot and welding machine, users could control the welding machine output current and voltage via analog signal

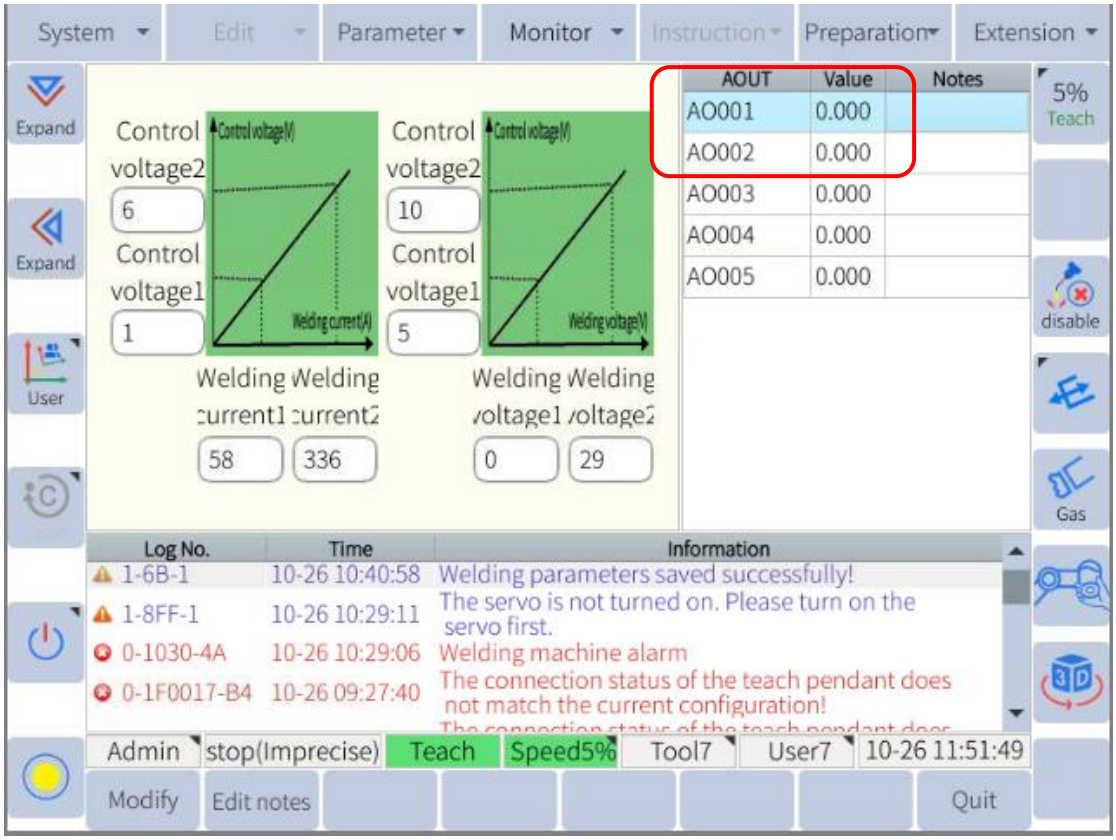


Parameter setting:

Observe the values of control current and control voltage displayed by the welding machine, input the corresponding values at the control voltage 1 and 2, confirm the current and voltage values of the welding machine, type in the value into the interface above

Eg:type in “5” into the control voltage 1 dialog box, and then welding machine will output “0” and record value into welding voltage 1.

Detail Application



Application:

This function is to control the weld parameter via 0~10V analog output

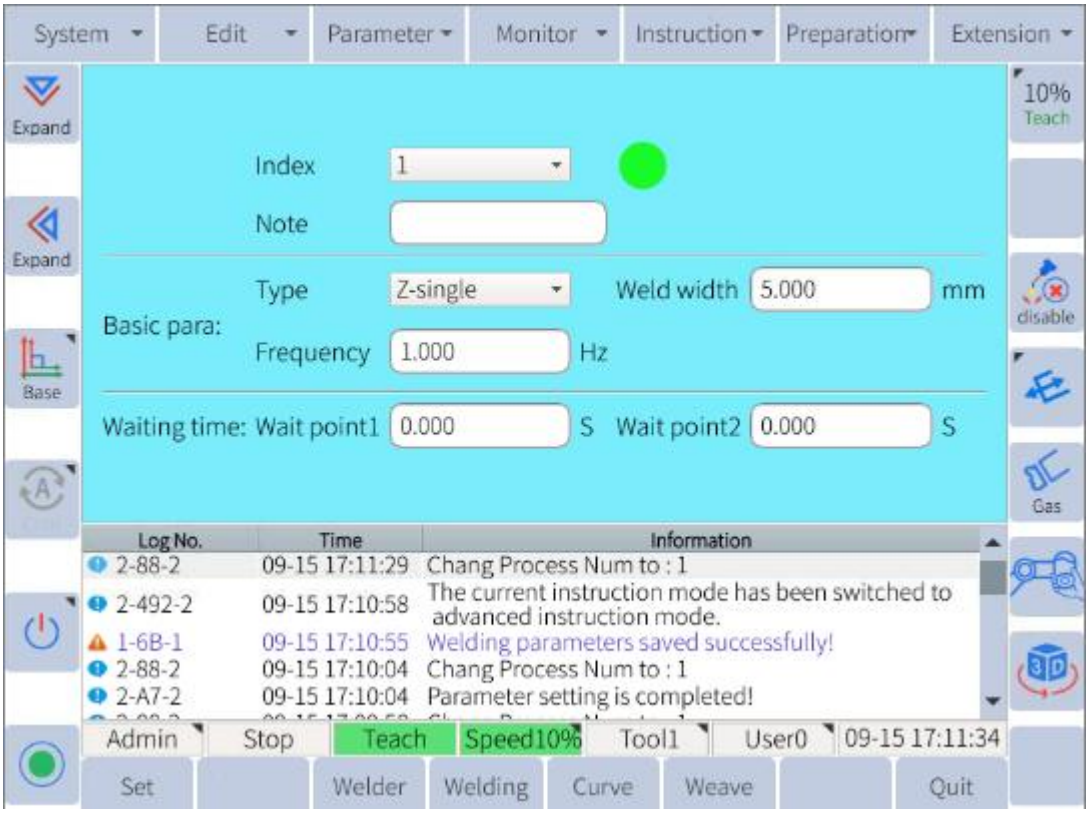
For example, if AO001 is 1V corresponding to weld current 58A, AO001 is 6V corresponding to weld current is 336A

if AO002 is 5V corresponding to weld voltage 0V, AO002 is 10V corresponding to weld voltage is 29V

2.2.4 WEAVE

Weave function is for Z shape weave welding

Weave welding parameter set as below:



Index:

The index of weave welding parameter setting，which could call in JBI command based on the detail requirement

Type:

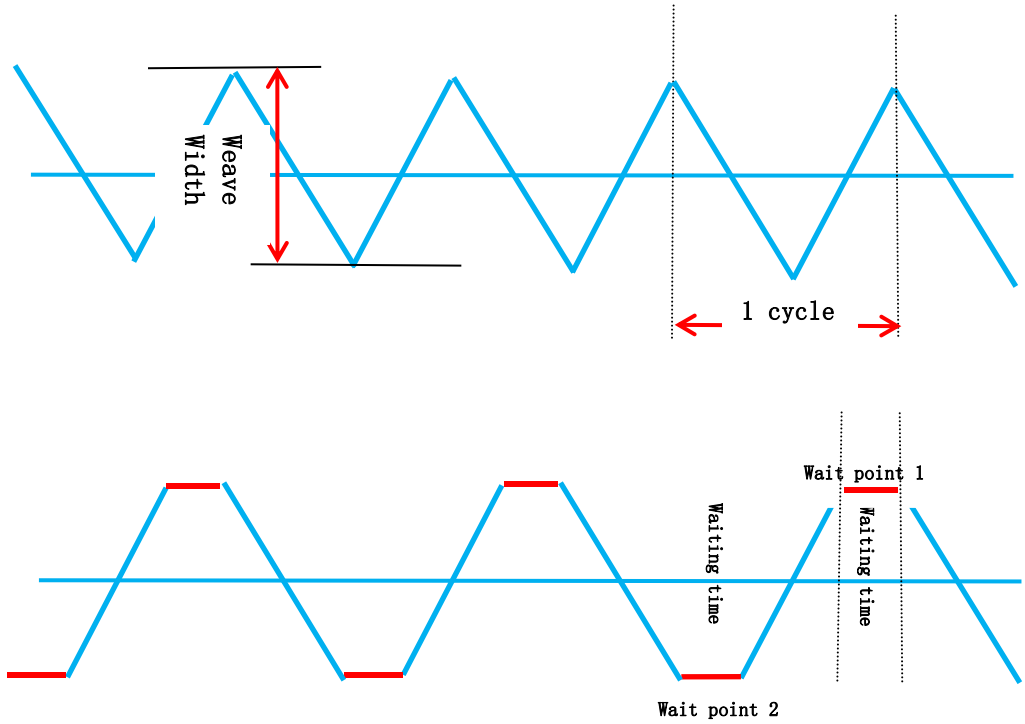
Only Z shape weave welding supported

Weld width:

The distance between lowest and highest point

Frequency:

The cycle number in 1s



Just shown as up, the waiting time decides the settle time at the corner of Z weave. If the time is long, it will weld too much. Meanwhile if the time is short, it will weld too weak. So users should adjust this number.

Waiting time:

Wait point 1: The highest point of Z weave weld

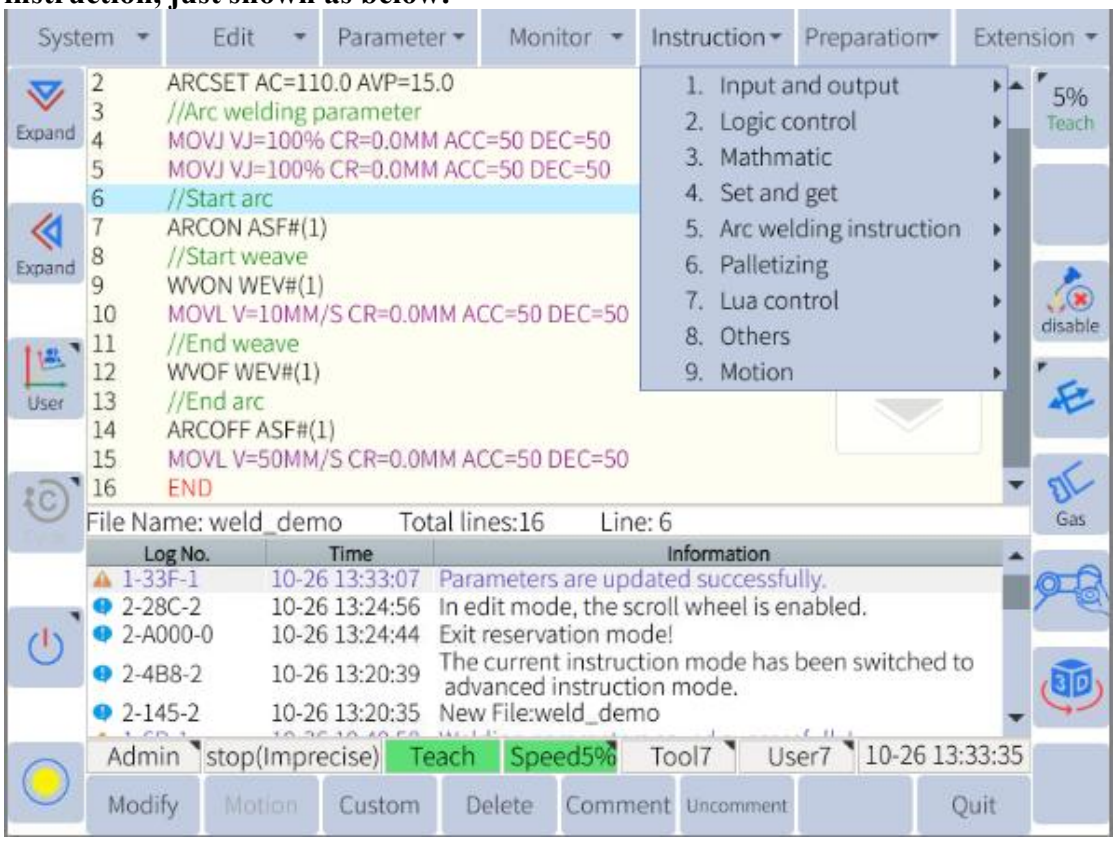
Wait point 2: The lowest point of Z weave weld

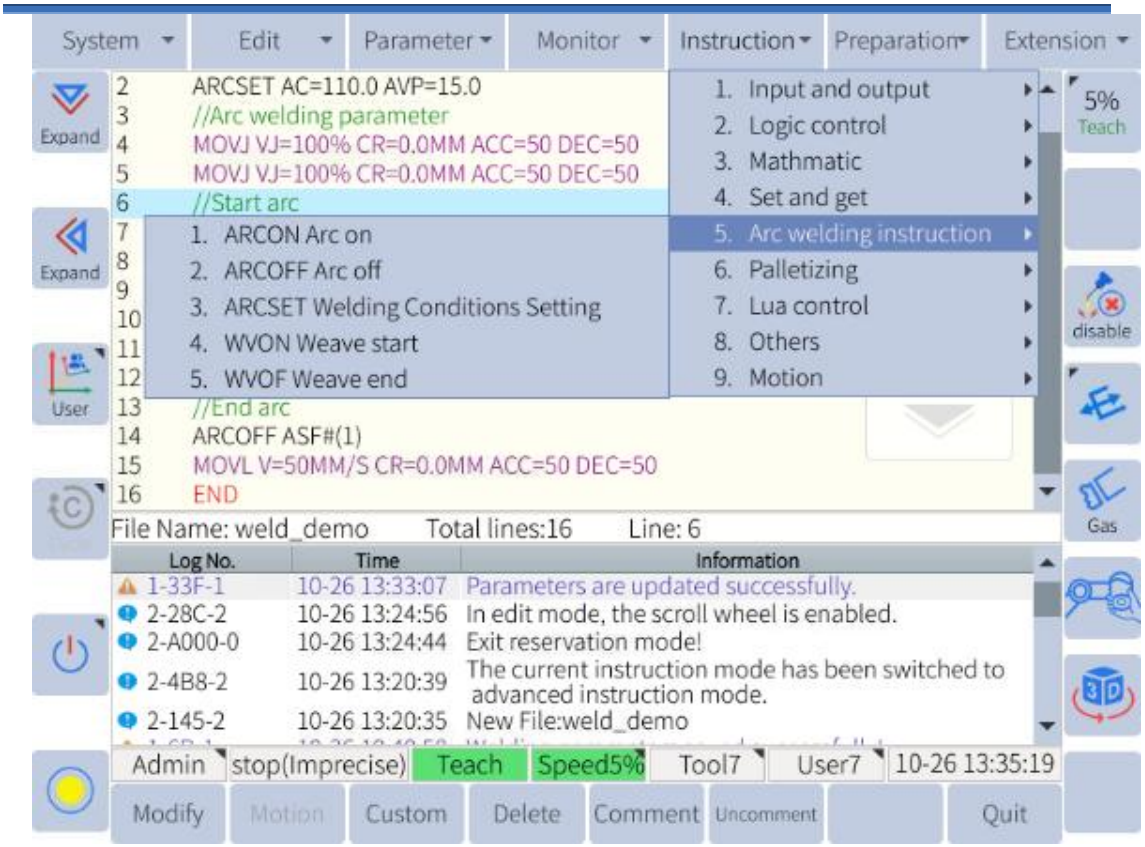
2.3 Instructions

This section introduces the basic function of welding in JBI, including variables and commands

2.3.1 Welding Commands

To insert welding commands, please click Instruction->5. Arc welding instruction, just shown as below:





ARCON：

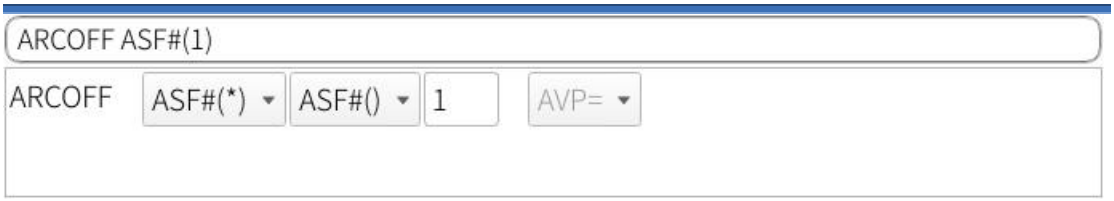
Start arc command, call the start arc parameter setting in process 1, contains the current, voltage and other parameters

Users could also select the specified start arc current and voltage parameters

ARCOFF：

End arc command, call the end arc parameter setting in process 1, contains the ending current, voltage and other parameters

Users could also select the specified end arc current and voltage parameters



ARCSET:

Welding parameter setting, users could adjust the current and voltage with this command

WVON:

Weave start command, call the parameter setting (contains frequency, weave width and other parameter) of Z shape weave welding

WVOF:

Weave end command

2.3.2 Demo

```
1   NOP
2   ARCSET AC=110.0 AVP=15.0
3   //Arc welding parameter
4   MOVJ VJ=100% CR=0.0MM ACC=50 DEC=50
5   MOVJ VJ=100% CR=0.0MM ACC=50 DEC=50
6   //Start arc
7   ARCON ASF#(1)
8   //Start weave
9   WVON WEV#(1)
10  MOVL V=10MM/S CR=0.0MM ACC=50 DEC=50
11  //End weave
12  WVOF WEV#(1)
13  //End arc
14  ARCOFF ASF#(1)
15  MOVL V=50MM/S CR=0.0MM ACC=50 DEC=50
16  END
```

About the motion setting, please refer to the user manual and take the training of ELITE

Notes：

This is a simple demo for Z shape weave welding。Please note：

```
NOP
ARCSET AC=110.0 AVP=15.0
//Arc welding parameter
MOVJ VJ=100% CR=0.0MM ACC=50 DEC=50
MOVJ VJ=100% CR=0.0MM ACC=50 DEC=50
//Start arc
ARCON ASF#(1)
//Start weave
WVON WEV#(1)
MOVL V=10MM/S CR=0.0MM ACC=50 DEC=50
//End weave
WVOF WEV#(1)
//End arc
ARCOFF ASF#(1)
MOVL V=50MM/S CR=0.0MM ACC=50 DEC=50
END
```

- The point before ARCON is the starting point for welding, the point after ARCOFF is the ending point of welding. Users could insert any commands between them, but notice the compatibility between welding speed and the wire supply process
- Please double check the installation settings first, the higher frequency, the higher robot motion frequency
- The motion speed decides the welding speed
- Please adjust the current and voltage setting according to the real application