

# Operation Manual for CNC

## 1. Brief

Along with the property of PE material continuous perfecting and raising, PE pipes are extensively used in gas and water supply, sewage disposal, chemical industry, mine and so on.

For more than ten years, our factory has been researching and developing plastics pipe butt fusion machine that is suit for PE, PP, and PVDF. Our products have outstanding features in convenience, reliability, safety and lower price.

This manual is suit for automatic plastic pipe butt fusion welding machine. It's suggested to read and follow carefully the following safety rules and maintenance rules before operating the machine.

## 2. Special Description

Before operating the machine, anyone should read this description carefully and keep it well to ensure the equipment and operator's safety, as well as others' safety.

2.1 The machine is used to weld pipes made from PE, PP, PVDF and can not be used to weld material without description, otherwise the machine may be damaged or some accident may be resulted in.

2.2 Don't use the machine in a place with potential hazard of explosion

2.3 The machine should be operated by responsible, qualified and trained personnel.

2.4 The machine should be operated on a dry area. The protective measures should be adopted when it is used in rain or on wet ground.

2.5 The machine is operated by 220V±10% or 380V±10%, 50 or 60Hz. If extended wire should be used, it should have enough lead section according its length.

2.6 Before using the machine, fill 46# hydraulic oil. Make sure the hydraulic oil is enough for working; the oil level should be 2/3 of the tank. Replace the iron oil tank cap by the red plastic air bleed cap or the pressure can not be hold.



### 3. Safety

#### 3.1 Precautions for Safety

Take care when operating and transporting the machine according to all the safety rules in this instruction.

##### 3.1.1 Notice when using

- The operator should be responsible and trained personnel.
- Completely inspect and maintain the machine per year for the safety and machine's reliability.
- Dirty and crowded work site would not only lower working efficiency, but cause accident easily, so it is important to keep work site clean and no other obstacles.

##### 3.1.2 Power

The electricity distribution box should have ground fault interrupter with relevant electricity safety standard. All safety protection devices are indicated by easily understandable words or marks.

Earthing: The whole site should share the same ground wire and the ground connection system should be completed and tested by professional people.

##### 3.1.3 Connection of machine to power

The cable connecting machine to power should be mechanical concussion and chemical corrosion proof. If the extended wire is used, it must have enough lead section according to its length.

##### 3.1.4 Storage of electrical equipment

For the min. dangers, all equipment must be used and stored correctly as follows:

- ※ Avoid using temporary wire not complying with standard.
- ※ Do not touch electrophorus parts.
- ※ Forbid hauling off the cable to disconnect.
- ※ Forbid hauling cables for lifting equipment.
- ※ Do not put heavy or sharp object on the cables, and control the temperature of cable within limiting temperature (70°C).
- ※ Do not work in the wet environment. Check if the groove and shoes is dry.
- ※ Do not splash the machine.

##### 3.1.5 Check insulation condition of machine periodically

- ※ Check the insulation of cables specially the points extruded.
- ※ Do not operate the machine under extreme condition.
- ※ Check if the leakage switch works well at least per week.

※ Check the earthing of the machine by qualified personnel.

### 3.1.6 Clean and check the machine carefully

※ Do not use materials (like abrasive, and other solvents) damaging the insulation easily when cleaning the machine.

※ Make sure the power is disconnected when finishing job.

※ Make sure there is no any damage in the machine before reusing.

If only following above mentioned, the precaution can work well.

### 3.1.7 Starting

Make sure the switch of the machine is closed before powering it on.

### 3.1.8 Tightness of parts

Make sure the pipes are fixed correctly. Ensure that it can move well and prevent it from sliding down.

### 3.1.9 Work in environment with hazards

When work in a ditch, check if there is fender which stop the earth or stones from falling down to the machine, and also check if it has a water or other fluid leaking, if there be, the operator may get an electric shock.

When lift the machine to ditch, the weight of the machine should be within the rated lifting weight, and person is forbidden staying under the lifting arm.

Avoid using the machine in the environment full of paint, gas, smoke and deoil, since the infection of eyes and respiratory tract would be caused.

Do not put the machine in a dirty place.

### 3.1.10 Personnel safety while working

Remove jewelry and rings, and does not wear loose-fitting clothing avoid wearing shoe lace, long mustache or long hair that may be hooked into the machine

The following is the operation rules:

---Wear safety groove



---Wear safety shoes



---Dress work clothes



---Wear safety glasses



---Wear earmuffs



3.2.11 Untrained person is not allowed to operate the machine anytime.

### 3.2. Potential Dangers

#### 3.2.1 Butt fusion machine controlled by hydraulic unit:

This machine is only operated by professional person or others with a certificate for operation, otherwise unwanted accident maybe caused.

#### 3.2.2 Heating Plate

The max temperature can reach 270°C, so the following things should be noticed:

-----Wear safety groove



-----Never touch the surface of the heating plate



#### 3.2.3 Planing tool

Before shaving the pipes, ends of pipes should be cleaned, especially clean the sand or other draff crowd around the ends. By doing this, the lifetime of edge can be prolonged, and also prevent the shavings are thrown out to danger people.

#### 3.2.4 Basic Frame:

Make sure the pipes or fittings are fixed correctly to get the right alignment. When joining pipes, the operator should keep a certain space to the machine for personnel safety.

Before transporting, make sure all the clamps are fixed well and can not fall down during transportation.

Follow all the safety marks in the machine.

#### 4. Applicable Range and Technical Parameter

Model	CNC160	CNC250	CNC315	CNC450	CNC630
Fusion Range(mm)	Φ63-Φ160	Φ90-Φ250	Φ90-Φ315	Φ280-Φ450	Φ400-Φ630
Ambient Temp.	-5℃~+45℃	-5℃~+45℃	-5℃~+45℃	-5℃~+45℃	-5℃~+45℃
Input Voltage	220V±10%	220V±10%	220V±10%	380V±10%	380V±10%
Frequency	50/60Hz	50/60Hz	50/60Hz	50/60Hz	50/60Hz
Total Power	2.56KW	4.05KW	5.85KW	7.98KW	12.65KW
Total Weight	112KG	181KG	239KG	520KG	575KG

## 5. Descriptions

5.1 The whole equipment should be placed on a stable and dry plane to operate.

5.2 Before operation make sure the following things:

- ◆ The machine is in good conditions
- ◆ The power complies with the requirements according to the butt fusion machine
- ◆ Power line is not broken or worn
- ◆ All instruments are normal
- ◆ The blades of planning tool are sharp
- ◆ All necessary parts and tools are available

5.3 Connection and preparation

5.3.1 Connect the basic frame to hydraulic unit by quick couplers.

5.3.2 Connect the heating plate to the hydraulic unit with the special cable.

5.3.3 Install appropriate inserts to frame according to the outside diameter of pipes/fittings.

5.3.4 According to the requirements of fitting and welding process, select welding standard on LCD touch screen, set pipe OD and SDR value. (See section 7 this manual).

5.4 According to display on LCD screen to weld (see section 7 this manual)

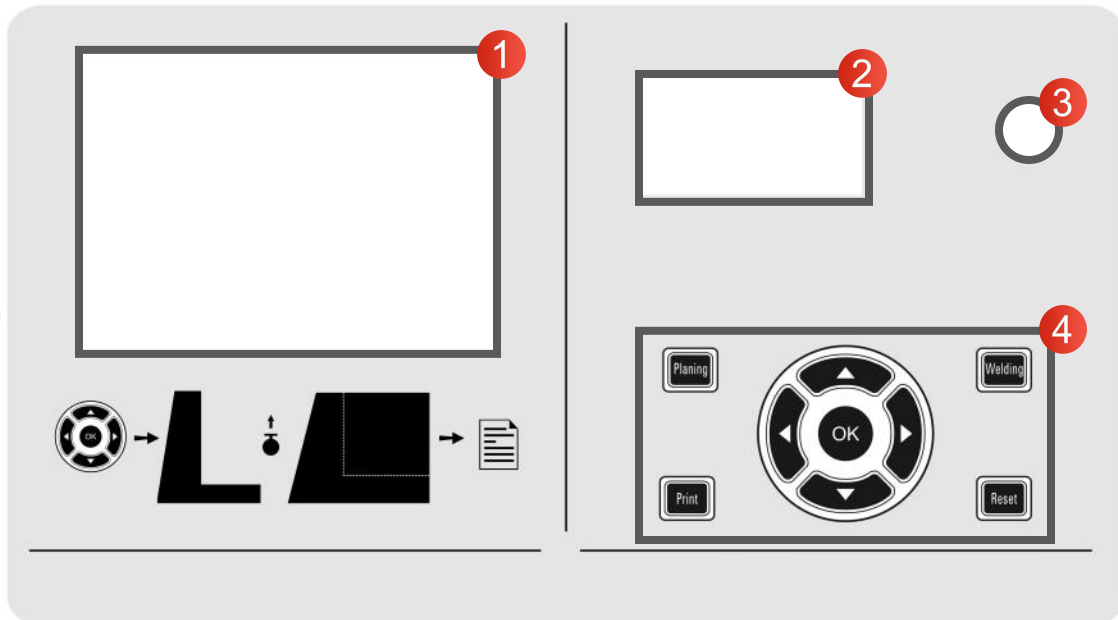
## 6、 Instruction for Use

### 6.1 Whole structure



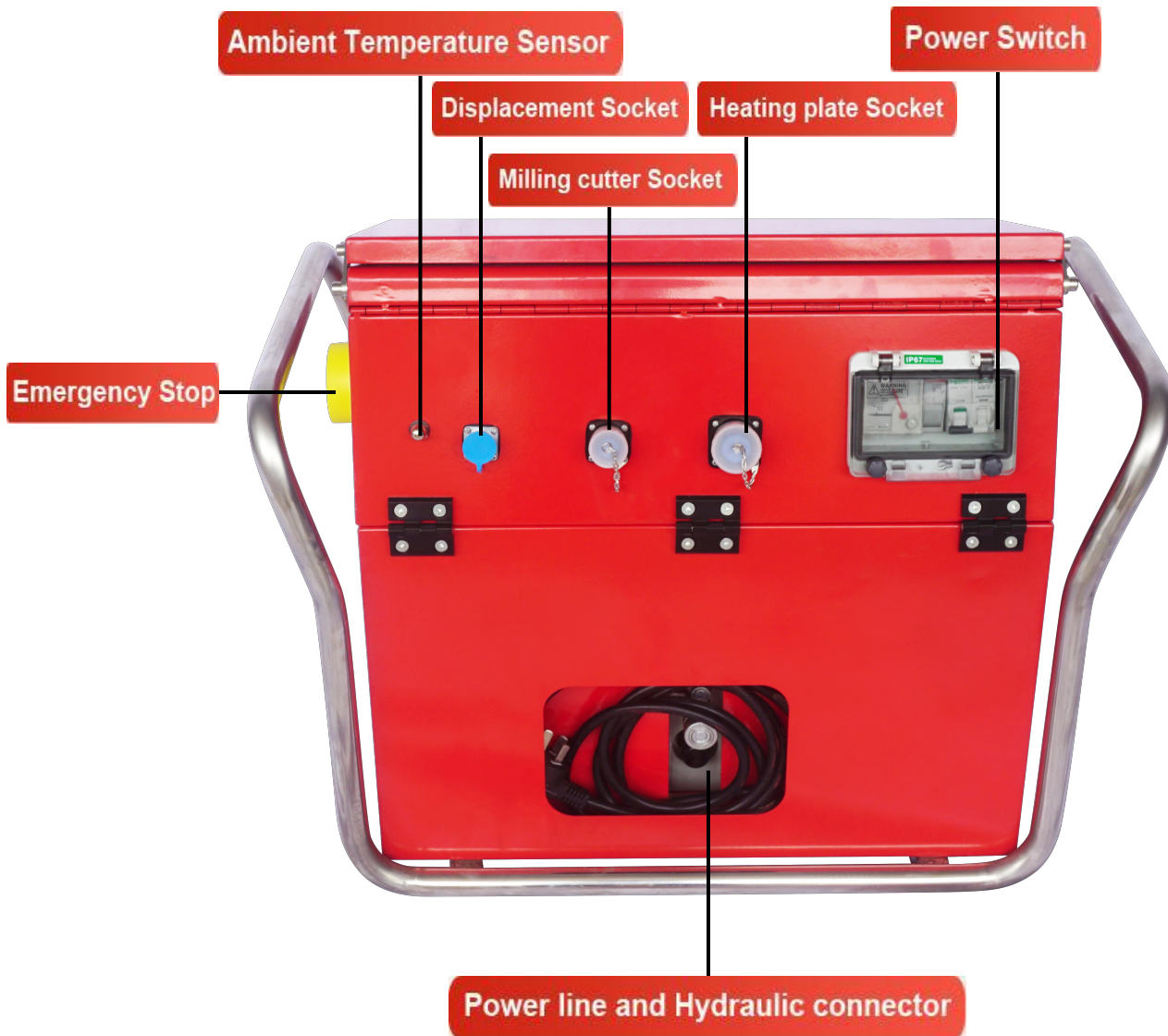
1. Control box | 2. Basic frame | 3. Heating plate | 4. Tool box | 5. Milling cutter

### 6.2 Control box structure



1. Touch Screen | 2. Printer | 3. USB Interface | 4. Control Button

### 6.3 Control box backside structure





## 7. Setting up and using of LCD screen

### 7.1 The operation button introduction



### 7.2 Method of operation

#### 7.2.1 The boot screen



1—WELDING: Click the 【WELDING】 button can enter the CONFIGURATION screen.

2—SET-UP: Only debugging personnel can use this button, users do not attempt to enter this menu.

- 3—RECORDS: Click **【RECORDS】** button can enter the inspection welding record.
- 4—LANGUAGE: Click **【LANGUAGE】** button to enter setting English/Chinese display.
- 5—ABOUT US: Click **【ABOUT US】** button to check our company introduction and contact information.
- 6—Heater/OFF: This button can switch on or switch off heating plate. **Before welding begins, please click **【Heater/OFF】** button to heat the heating plate. ( After clicking **【Heater/OFF】** button, it will display **【Heater/ON】** )**

**7.2.2 Welding process**

**7.2.2.1 Parameter setting**



**CONFIGURATION**

Project No.	<input type="text"/>	Cylinder Area	<input type="text" value="17.66"/>	cm <sup>2</sup>
Project Manager	<input type="text"/>	S D R	<input type="text" value="0.0"/>	>
Joint No.	<input type="text" value="0"/>	Material	<input type="text" value="0"/>	>
Operator No.	<input type="text"/>	Pipe OD	<input type="text" value="0"/>	> mm

ISO 11414-2009      FREE

1. Click the text box pops up the soft keyboard ( As the following diagram )




Entre number and character through soft keyboard.

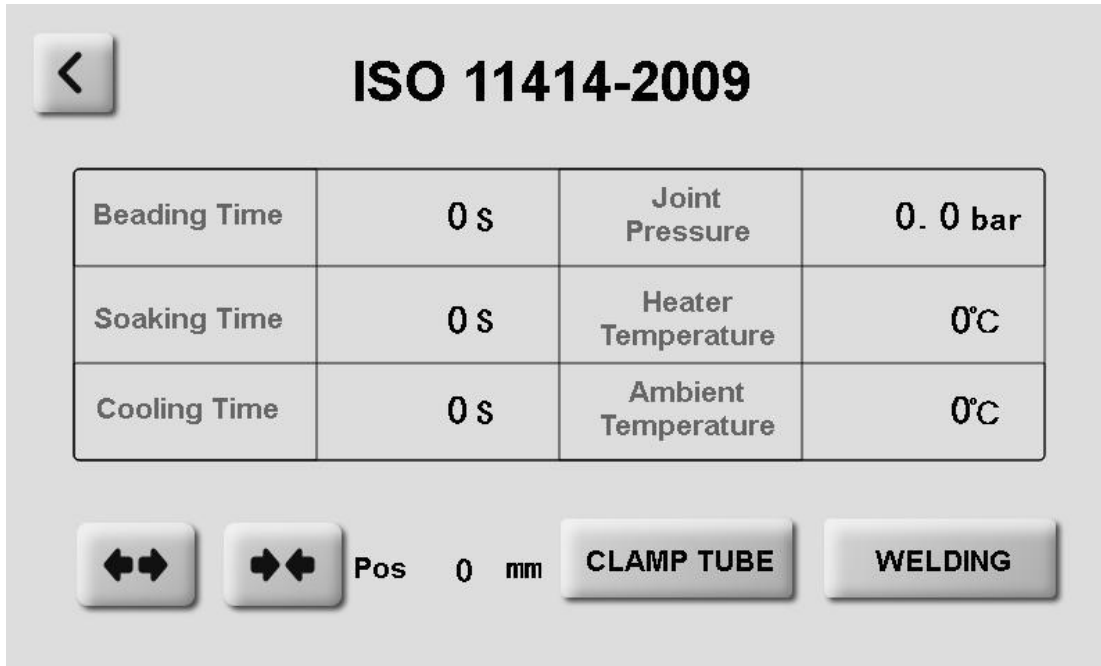
After typing the value of the setting, press <Ent> to save settings. If you want to reset the value of the setting, press<Esc> to clean it, then repeat above steps.



As shown below the setting of PE80 Dn=250mm SDR=17



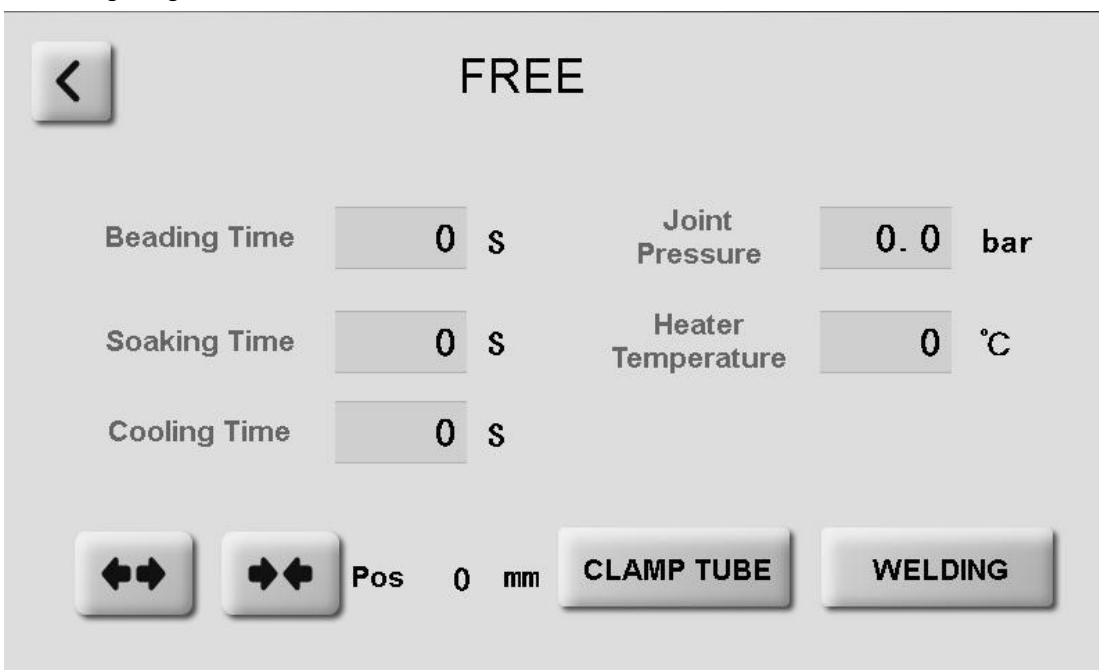
2.After entering parameters, set the welding standard ( ISO 11414-2009 or **FREE** )

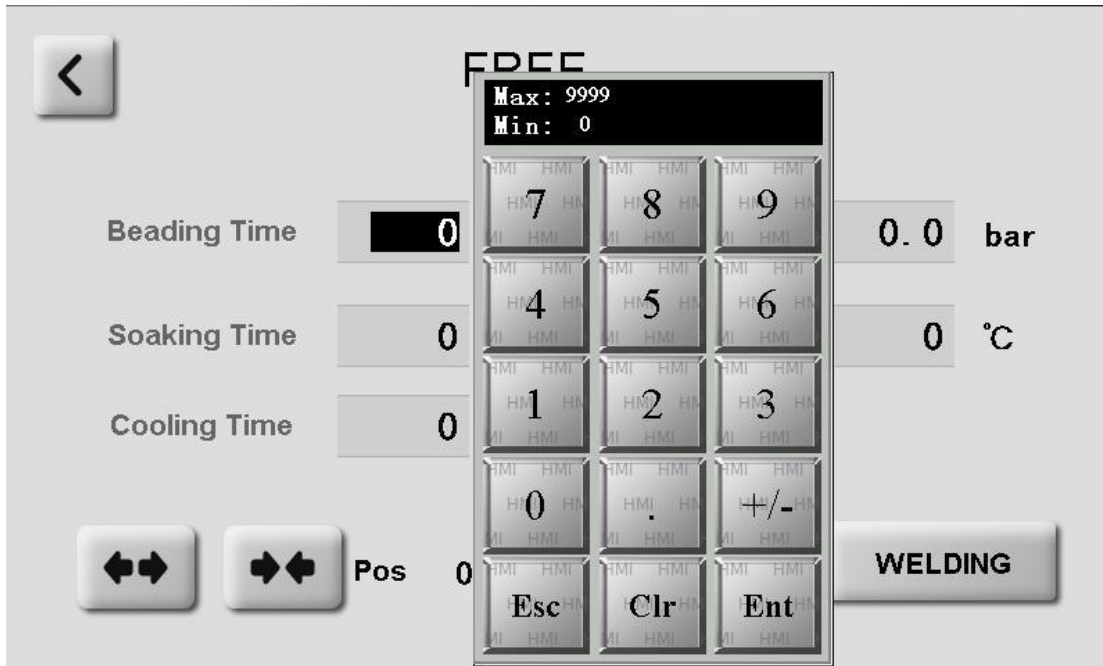
(1)—If you choose ISO 11414-2009 standard , Click  button to enter into next screen ( As following diagram )



Click  button to enter Welding process. If you need to reset parameters, please press  button.

(2)—If you choose FREE , Click  button to enter into next screen ( As following diagram )



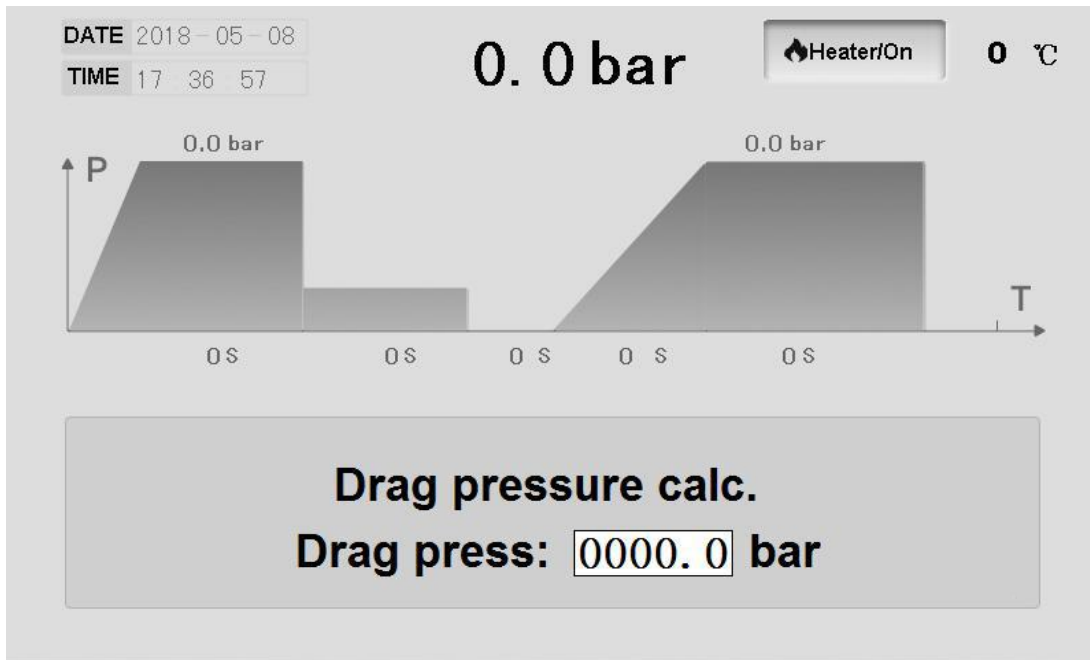


After setting all the parameters , click **WELDING** into welding Process.

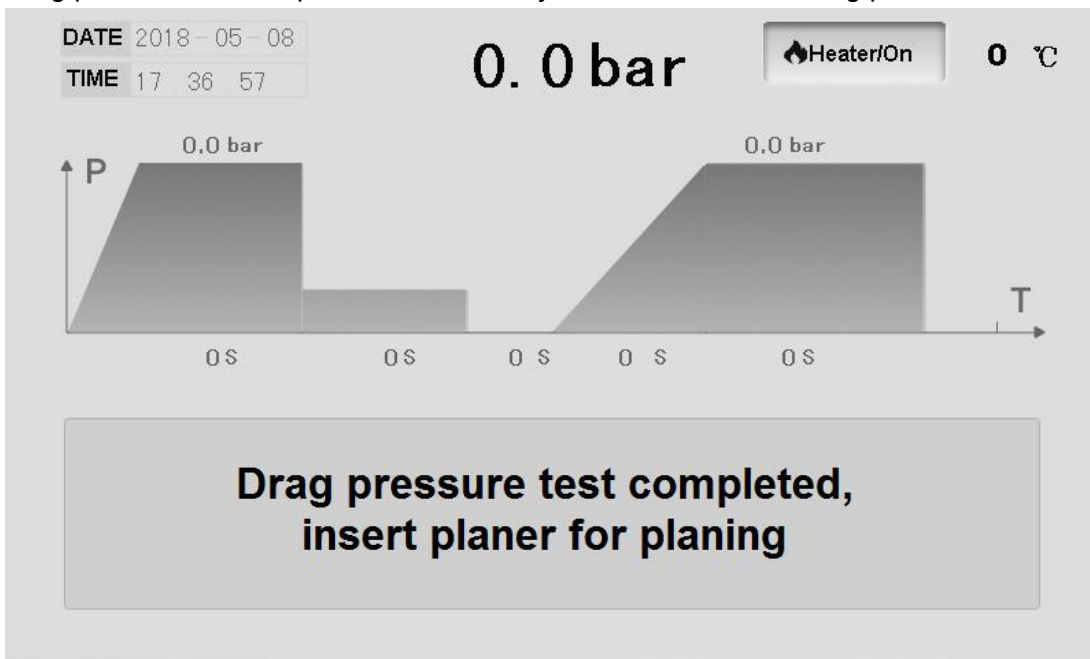
### 7.2.2.2 The choice of planing or welding



Press **PLANEING** key, system automatic test dragging pressure and pipe clamp conditions, after test display dragging pressure value:



Drag pressure test completed, automatically switches to the following picture:



### 7.2.2.3 Planing

( Tip: After put the milling cutter into the rack, the system will prompt, the beginning of planing ) . Press **OK** key to stop planing.



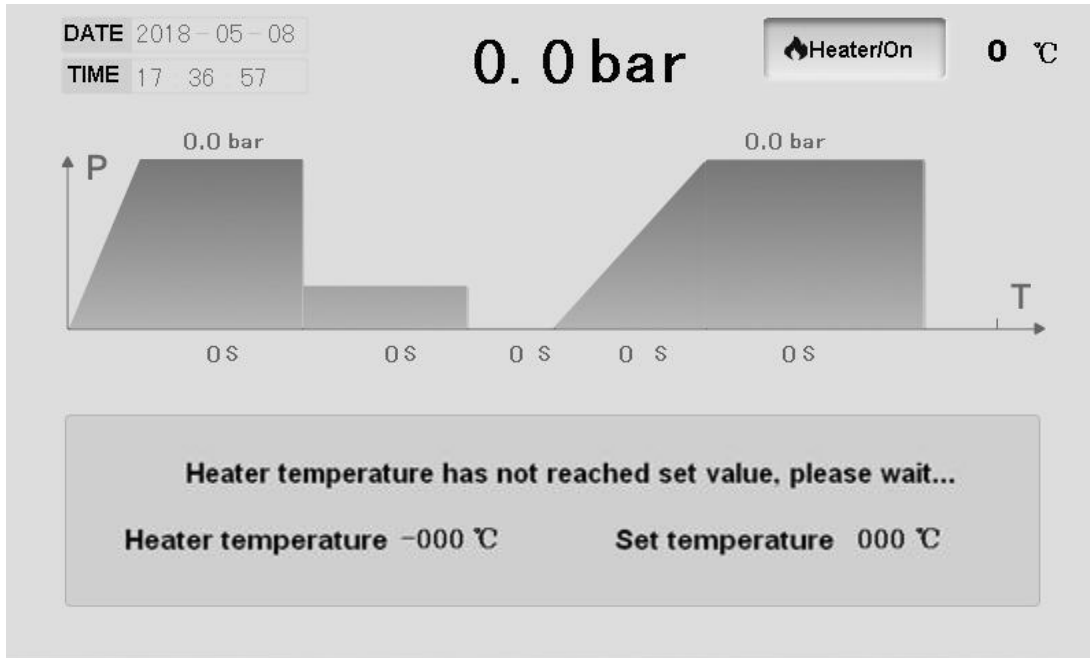
Remove the milling cutter on the frame and automatically prompts inspection.



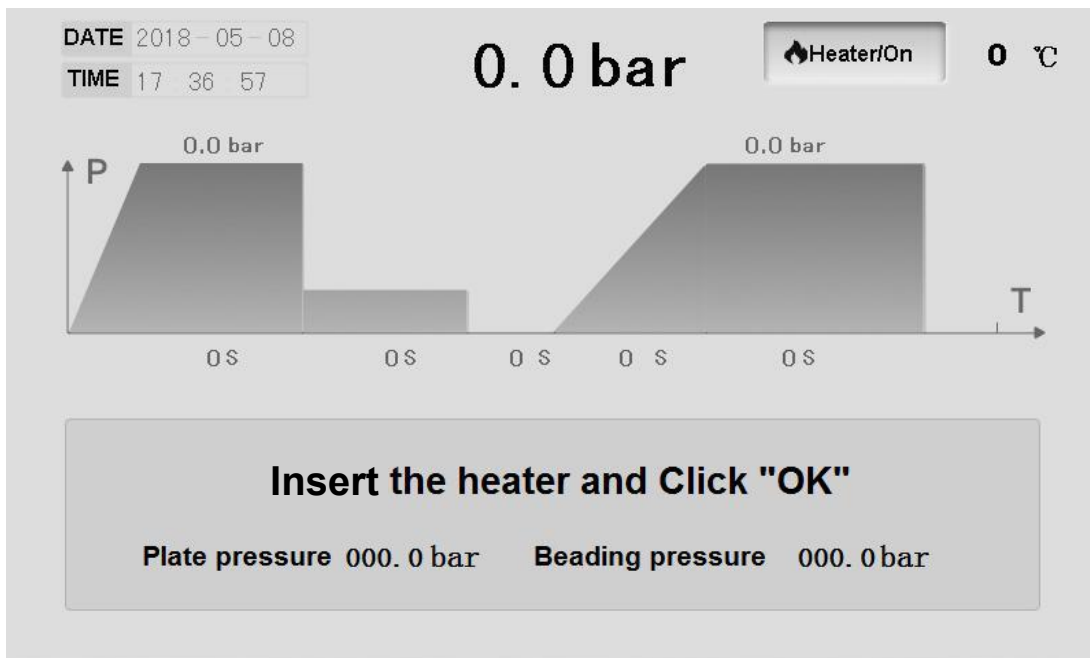
If you need restart planing, open the frame by manual then put into the milling cutter, after that Press **PLANEING** key , passed examination press **WELDING** key into welding process.

### 7.2.2.4 Welding process

If heating plate do not reach the set value, shows the following picture.

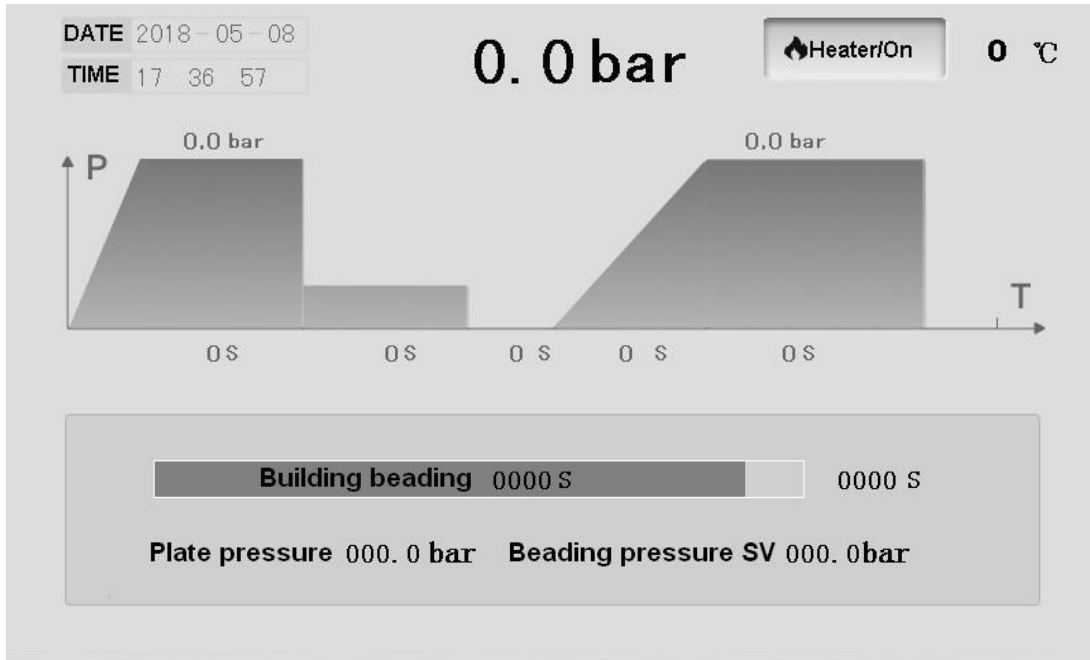


When the temperature reaches the set value, insert the heater and press “OK” key on the touch screen.



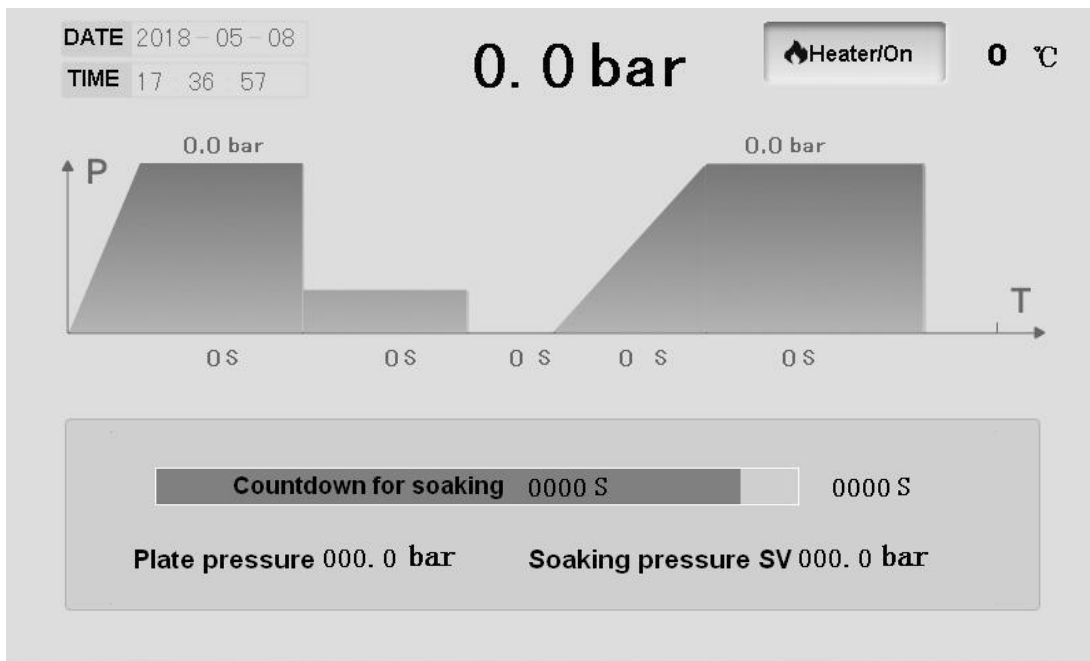


**(1) Beading stage**

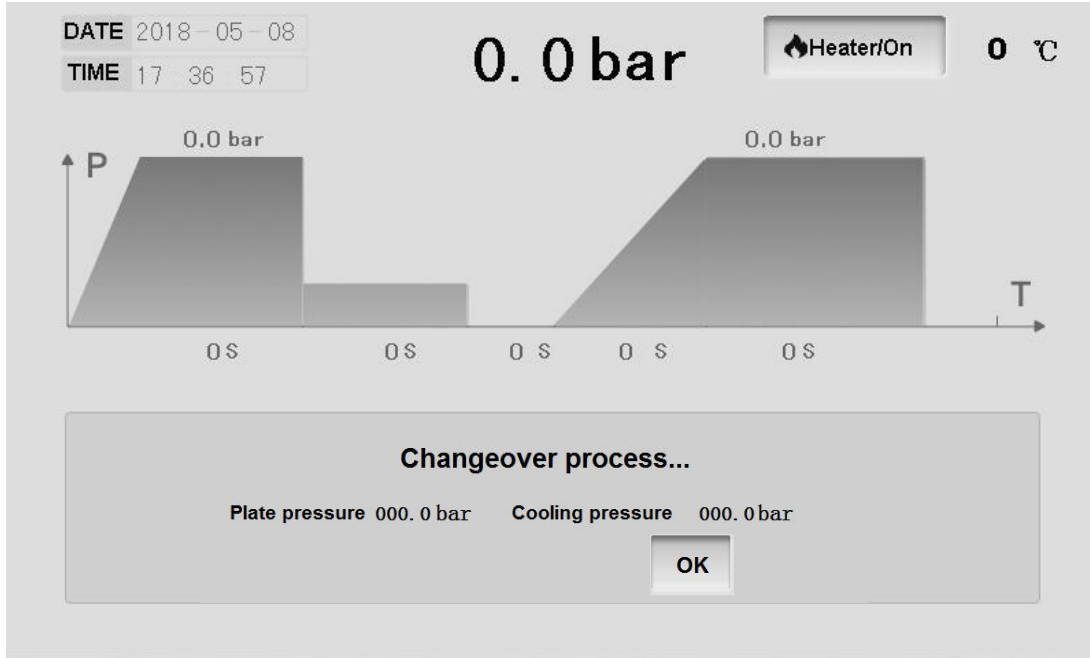


After beading time, the pressure will automatic back to soaking pressure and enter the soaking time.

**(2) Soaking stage**

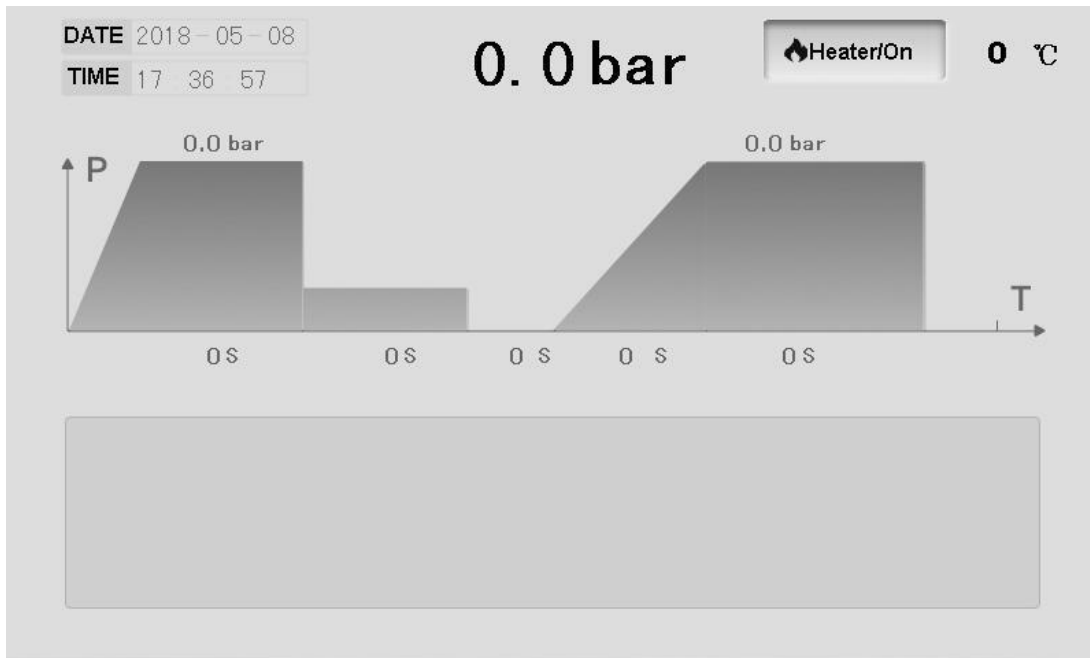


**( 3 ) Change satge**



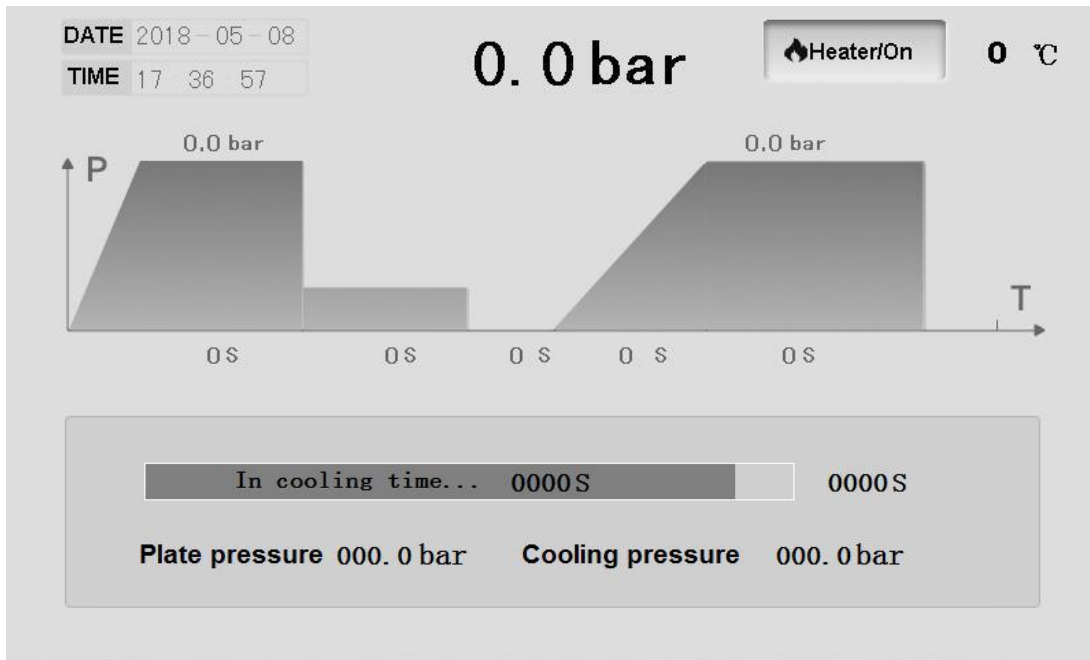
Remove the heating plate by hand. Then press  key to welding pipes and recording the switching time automatically.

**( 4 ) Rising stage**



Machine according to the proportion rises to a set value and record the pressure gradually rise time.

**( 5 ) Cooling stage**



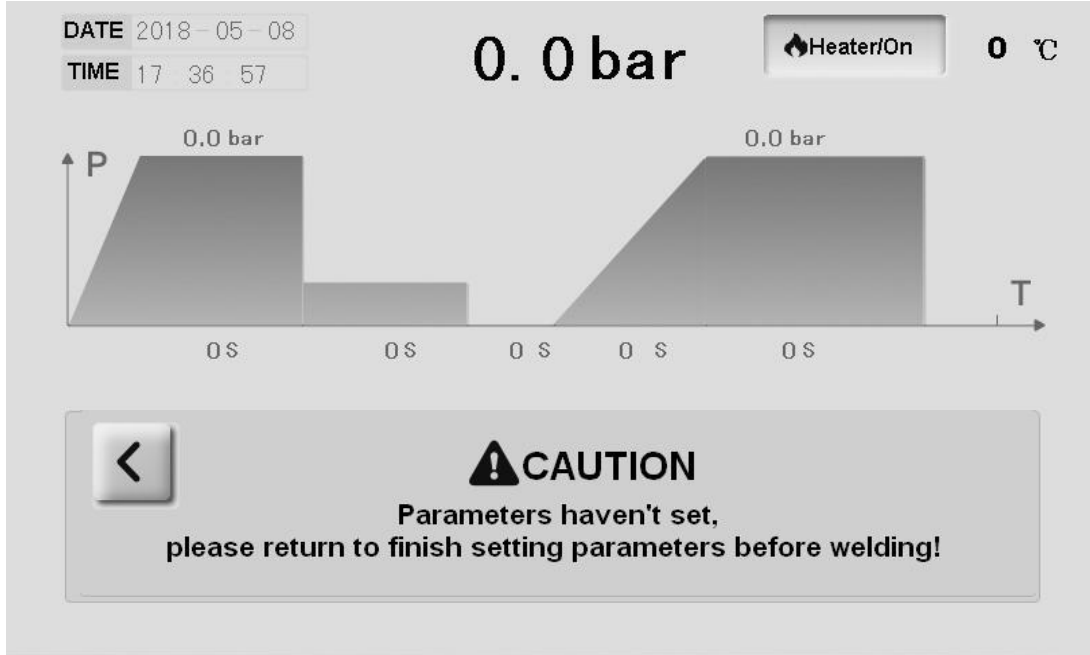
After cooling time count down, the display screen is as follows:



**Alarm all the welding process finish !**

**7.2.3 Alarm and processing method**

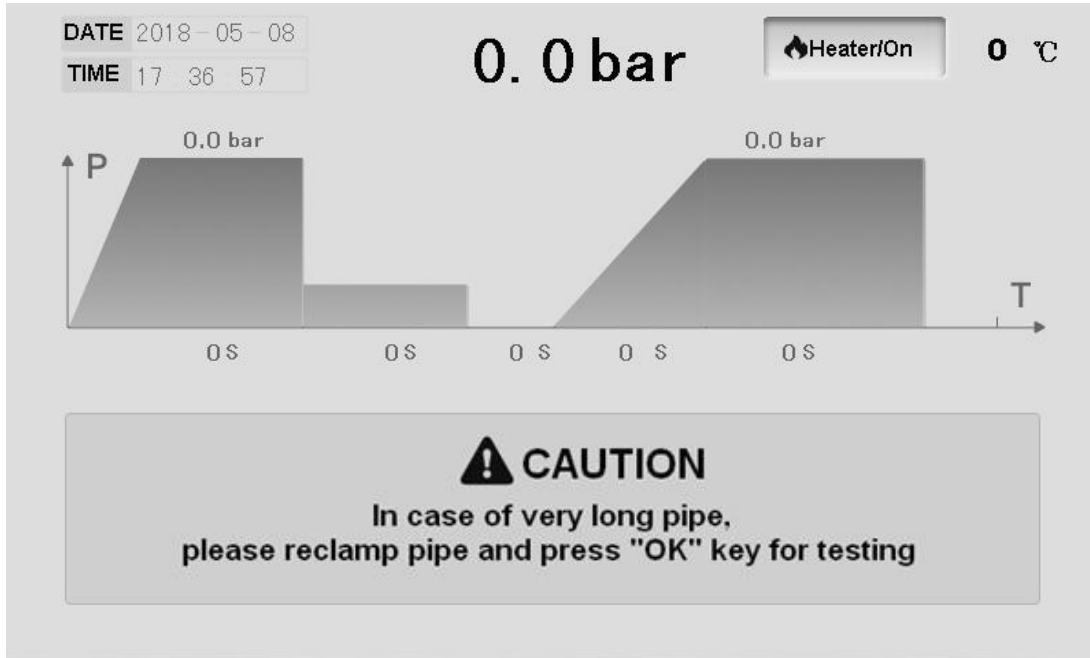
**7.2.3.1 Parameters haven't set, please return to finish setting parameters before welding!**



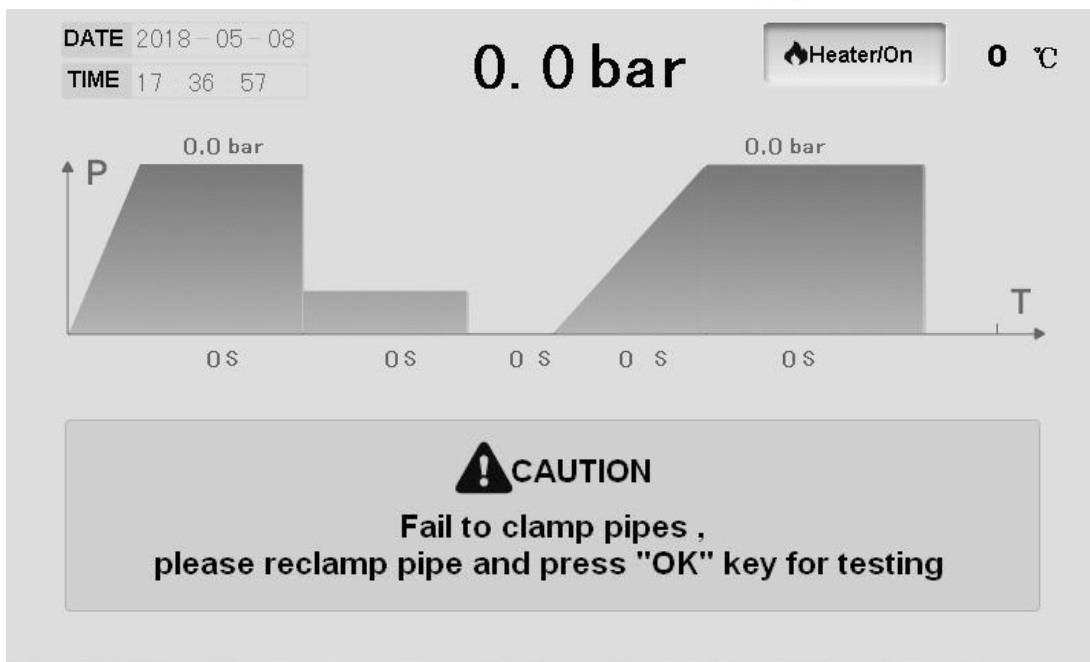
**7.2.3.2 Exceed dragging pressure! Please reduce it, then click "OK" to re-test.**



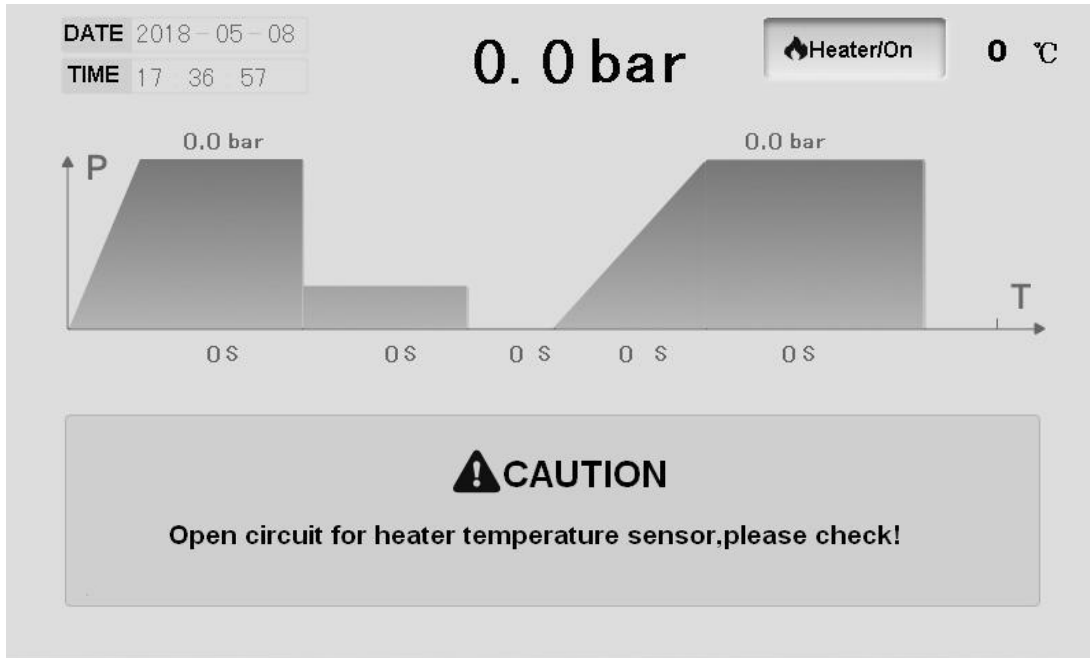
7.2.3.3 In case of very long pipe. Please re-clamp pipe and press **OK** key for testing.



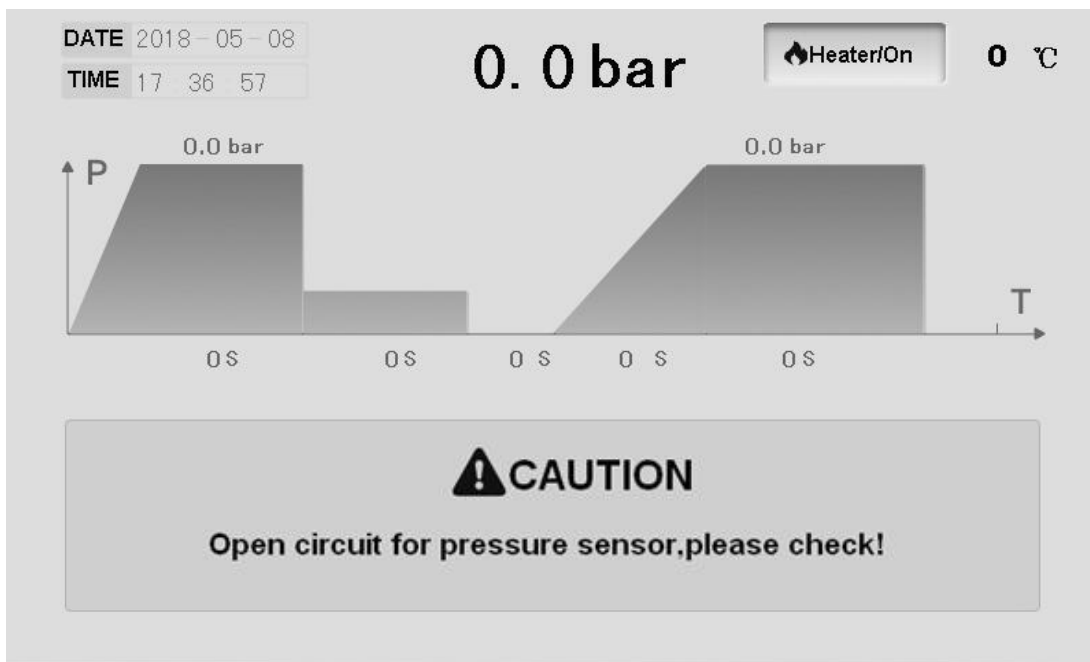
7.2.3.4 Fail to clamp pipes, please re-clamp pipe and press **OK** key for testing.



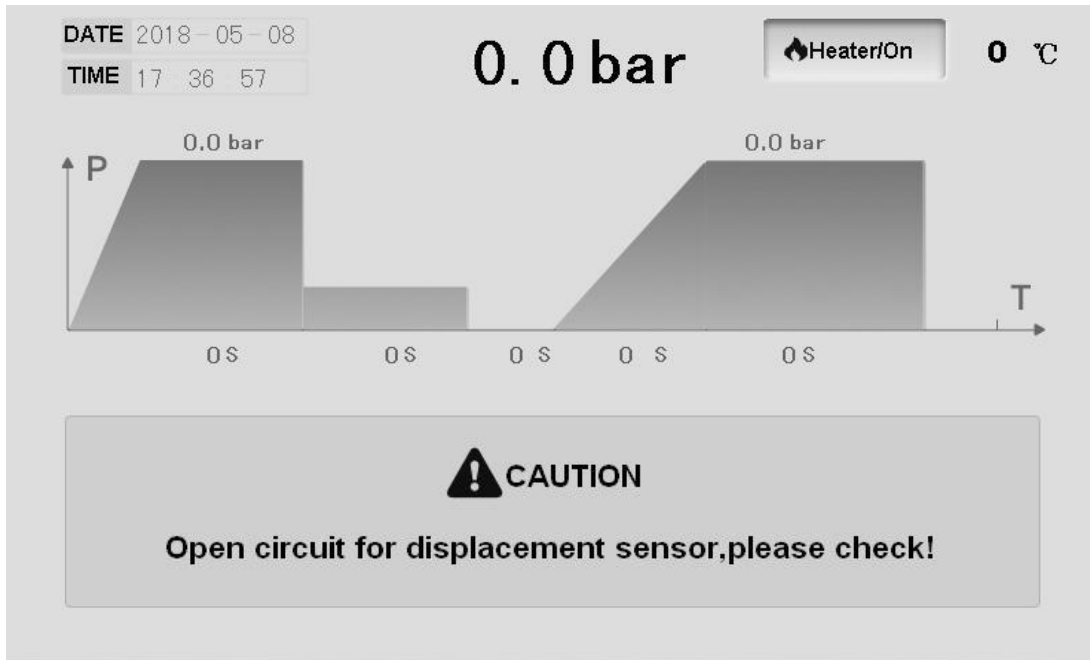
**7.2.3.5** Open circuit for heater temperature sensor. Firstly, check the heating plate connection, then check the platinum resistance temperature sensor circuit and electric box.



**7.2.3.6** Open circuit for pressure sensor. First check the hydraulic station and the electrical box connection, check again that the pressure transmitter plug and the electric appliance box line.



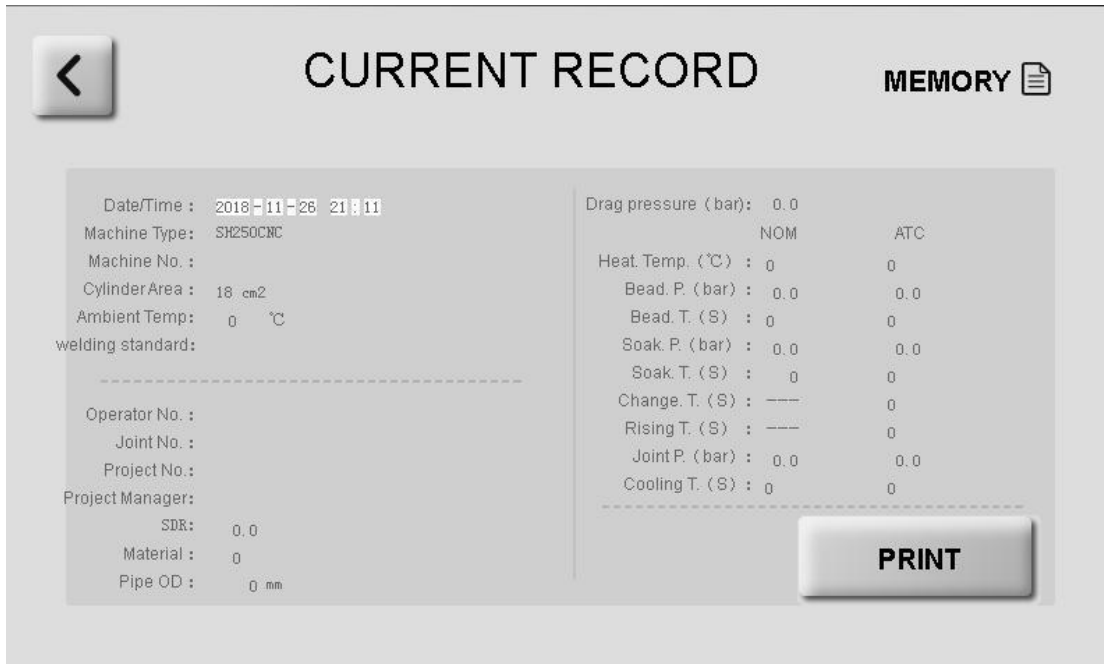
**7.2.3.7** Open circuit for displacement sensor. Firstly, check the displacement sensor connection, check the wiring connector displacement sensor and electric box again.(There stand can not retreat and process cannot be checked when displacement sensor is off).



### 7.2.4 Check and download welding record



Click **RECORDS** button on the boot screen to enter the welding records to view and print the picture.



Click **PRINT** button can print the new crater record. Click **MEMORY** button can check all welding records and download all the welding records (picture below)

No.	Operator No.	Joint No.	SDR	Material	Pipe OD	Drag p.	Set Heat.Temp.	Actual Heat. Temp.	Set Bead. P.
0									
1									
2									
3									
4									
5									
6									
7									
8									
9									
10									
11									





Download records steps:

**Step1-** Plug U disc into the USB interface and waiting for 5 seconds.

**Step2-** Click **Download** button, then will see below dialog box.

**Step3-** Press **Confirm** button. After finish download, unplug the U disc. All the records which are downloaded into U disc can be open and check with OFFICE software in the computer.

No.	Operator No.	Joint No.	SDR	Material	Pipe OD	Drag p.	Set Heat.Temp.	Actual Heat. Temp.	Set Bead. P.
0									
1									
2									
3									
4									
5									
6									
7									
8									
9									
10									
11									

**Please confirm whether to start downloading welding records**

**Confirm**      **Return**

<
↑
↓
←
→
Download
Delete

To confirm the computer already imported welding records, users can deleted welding record in the prompt device.

No.	Operator No.	Joint No.	SDR	Material	Pipe OD	Drag p.	Set Heat.Temp.	Actual Heat. Temp.	Set Bead. P.
0									
1									
2									
3									
4									
5									
6									
7									
8									
9									
10									
11									

**Note!**

**Please verify Clear all welding records**

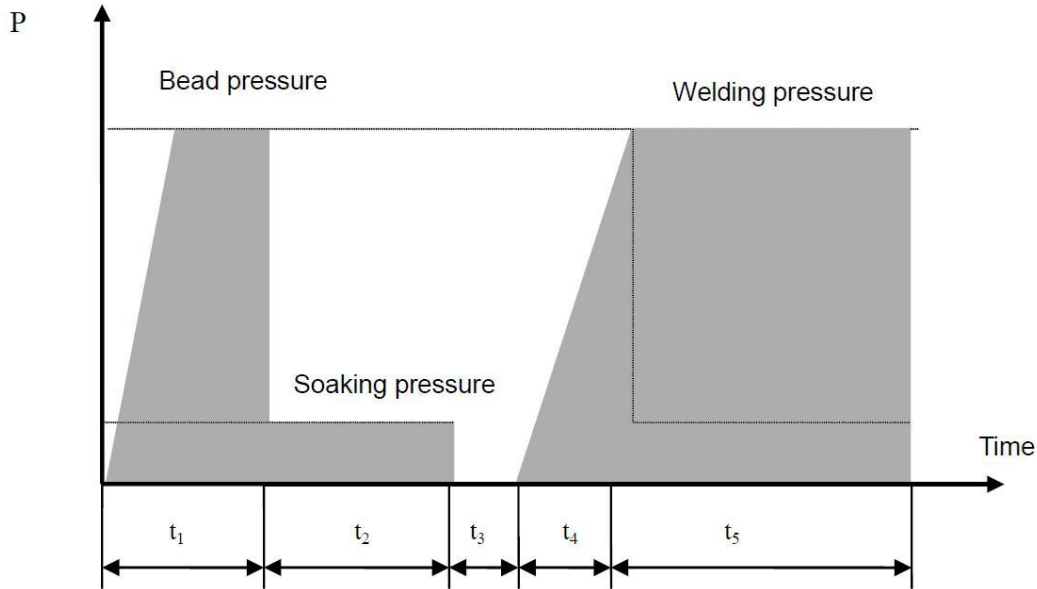
**Confirm**      **Return**

<
↑
↓
←
→
Download
Delete

### 8. Reference of Welding Standard (DVS2207-1-1995)

8.1 Because of difference in welding standard and PE material, the time and pressure vary in different phases of welding. It suggests that the actual welding parameters should be offered by pipes and fittings' manufacturers.

#### 8.2 Reference standard DVS2207-1-1995

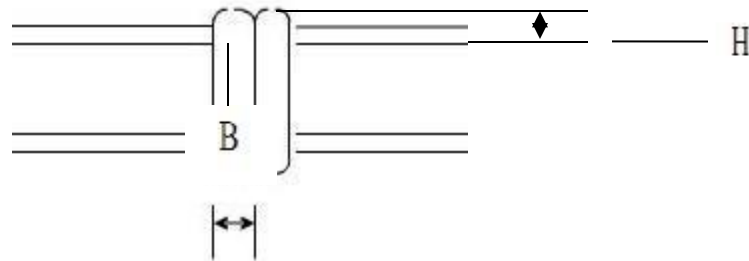


Wall thickness (mm)	Bead height (mm)	Bead build-up pressure (N/mm <sup>2</sup> )	Soaking time t <sub>2</sub> (sec)	Soaking pressure (N/mm <sup>2</sup> )	Change-over time t <sub>3</sub> (sec)	Pressure build-up time t <sub>4</sub> (sec)	Welding pressure (N/mm <sup>2</sup> )	Cooling time t <sub>5</sub> (min)
0~4.5	0.5	0.15	45	≤0.02	5	5	0.15±0.01	6
4.5~7	1.0	0.15	45~70	≤0.02	5~6	5~6	0.15±0.01	6~10
7~12	1.5	0.15	70~120	≤0.02	6~8	6~8	0.15±0.01	10~16
12~19	2.0	0.15	120~190	≤0.02	8~10	8~11	0.15±0.01	16~24
19~26	2.5	0.15	190~260	≤0.02	10~12	11~14	0.15±0.01	24~32
26~37	3.0	0.15	260~370	≤0.02	12~16	14~19	0.15±0.01	32~45
37~50	3.5	0.15	370~500	≤0.02	16~20	19~25	0.15±0.01	45~60
50~70	4.0	0.15	500~700	≤0.02	20~25	25~35	0.15±0.01	60~80

Remark : Bead build-up pressure and welding pressure in the form is the recommended interface pressure, the gauge pressure should be calculated with the following formula.  
Expressions:

$$\text{welding pressure} = \frac{\text{Section of welding pipe ends}}{\text{Total section of cylinders}} \times 0.15 + \text{drag pressure (MPa)}$$

### 8.3 The quality inspection of the appearance of weld



Ring width  $B=0.35 \sim 0.45 \times \text{wall thickness}$

Ring height  $H= 0.2 \sim 0.25 \times \text{wall thickness}$

## 9. Malfunctions Analyses and Solutions

### 9.1 Frequent joints quality problems analyze:

- ◆ Visually check: round bead, good joint
- ◆ Narrow and fall bead. Too high pressure while welding
- ◆ Too small bead. Pressure is not enough while welding
- ◆ There is a ditch between the welding surfaces. Temperature is not enough or change-over time is too long while welding.
- ◆ High & low bead. Different heating time or fusion temperature causes that.
- ◆ Misalignment. Welding under the condition that the misalignment exceeds 10% of pipe wall thickness while align the two ends.



### 9.2 Maintenance and inspection periods

#### 9.2.1 Maintenance

##### ※ Heating plate coating

Please take care on handling the heating plate. Keep a certain distance away from heating plate. Cleaning of its surface must be done with surface still warm by using a soft cloth or paper, avoid abrasive materials in that might damage the coating.

At regular intervals check as follows

- 1) Clean the surface by using a quick evaporation detergent (alcohol)
- 2) check the tightening of the screws and the cable and plug condition
- 3) Verify its surface temperature by using infrared-ray scanning

##### ※ Planing tool

It is strongly suggested to keep always clean the blades and wash the pulleys by using a detergent. At regular intervals, carry out a complete cleaning operation.

##### ※ hydraulic unit

Maintain it as follows

- 1) check periodically the oil level.
- 2) Replace totally the oil every 6 months. Keep tank and oil circuit clean

### 9.2.2 Maintenance & Inspection

#### Ordinary inspection

Item	Description	Inspect before use	First month	Every 6 months	Every year
Planning tool	Mill or replace the blade Replace the cable if it is broken Retighten mechanical connections	• •	•		• •
Heating plate	Rejoined the cable and socket Clean surface of heating plate, recoat PTFE layer again if necessary Retighten mechanical connections	• • •	•		•
Temp. control system	Checkout the temperature indicator Replace the cable if it is broken	•			• •
Hydraulic system	Checkout pressure gauge Replace seals if the hydraulic unit is leak Clean the filter Make sure the oil is enough for operation Change the hydraulic oil Replace if the oil hose is breakage	• • •		•	• • •
Basic Frame	Retighten screws in the end of frame axis Spray antirust paint again if necessary	•	•	•	•
Power Supply	Press the testing button of circuit protector to make sure it can working normally Replace the cable if it is broken	• •		•	

“•”..... maintenance period

## 10. Guarantee Clauses

1. The guarantee range refers to the whole machine.
2. Maintenance for malfunctions during normal utilization is free of charge within guarantee time that is 12 months
3. The guarantee time starts with the date of delivery.
4. Fees are charged in case of the following condition:
  - 4.1 Malfunction caused by improper operation
  - 4.2 Damages caused by fire, flood, and abnormal voltage
  - 4.3 Working exceeds its normal function
5. Fees are charged as actual expense. A contract about the fees shall be abided if there is one.
6. Please contact us or our agent if any questions.