E-Serials Device

E300 Installation Manual

	■ Read and follow these instructions and all safety blocks carefully. ■ Have only trained and qualified persons install, operate, or service this unit.
	■ Give this manual to the operator.
	■ For help, call your distributor.

Contents

Preface

Purpose

This document provides guides to combine the E300 device with the machine for the jobs.

According to this document, you can learn how to mount, wire, configure, commission and maintenance of the E300 device.

Audience

This document is intended for:

- Technical support engineer
- Installation and Commissioning engineer

Organization

This document consists of six chapters and is organized as follows.

Chapter	Content
Chapter 1 Outline	This chapter describes the features, appearance, and electrical specification of the E300 device.
Chapter 2 Mounting and Wiring	This chapter guides the user how to mount and wire the device, as well as the signal description of the ports.
Chapter 3 Settings	This chapter describes the function settings from the interface.
Chapter 4 Diagnosis	This chapter describes the diagnosis methods for the E300 device.
Chapter 5 Commissioning	This chapter guides the user how to commission the machine.
Chapter 6 Maintenance	This chapter describes the maintenance methods for the E300 device.

Conventions

Symbol Conventions

The symbols that may be found in this document are defined as follows.

Symbol	Description
	**WARNING** Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury to personnel.
	**CAUTION** Indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury to personnel and damage to equipment. It may also be used to alert against unsafe practices.
	**MANDATORY** Always be sure to follow explicitly the items listed under this heading.
	**PROHIBITED** Must never be performed.
	**NOTE** or **TIP** Provides additional information to emphasize or supplement important points of the main text.

General Conventions

Convention	Description
Times New Roman	Normal paragraphs are in Times New Roman.
Boldface	Names of files, directories, folders, and users are in **boldface**. For example, log in as user **root**.
`Courier New`	Terminal display is in `Courier New`.
Italic	Book titles are in *italics*.

GUI Conventions

Format	Description
Boldface	Buttons, menus, parameters, tabs, windows, and dialog titles are in **boldface**. For example, click **OK**.

Format	Description
XX > XX	Multi-level menus are in **boldface** and separated by the ">" signs. For example, choose **File** > **Create** > **Folder**.

Keyboard Operation

Format	Description
Key	Press the key. For example, press **Enter** and press **Tab**.
Key 1+Key 2	Press the keys concurrently. For example, pressing **Ctrl+Alt+A** means the three keys should be pressed concurrently.
Key 1, **Key 2**	Press the keys in turn. For example, pressing **Alt**, **A** means the two keys should be pressed in turn.

Chapter 1 Outline

1.1 Introduction

The E300 is a dedicated NC (numerical control) device for the Torsion Bending Machine, which combines the expertise of ESTUN for many years and provides a complete economic solution for the Torsion Bending Machine with the support of unique drive control technology.

The E300 device adopts the integral product structure, built-in high-performance A8 processor, and configures 5.6 inch, 640 × 480 dot matrix, 18 full color display screen, and integrated IO ports, serial ports and USB port.

The E300 device is designed to be operated via the buttons on the front panel. At the same time, the pump switch and the emergency stop button are installed in the customized suspension cabinet to meet the user's requirements, as shown in Figure 1-1.

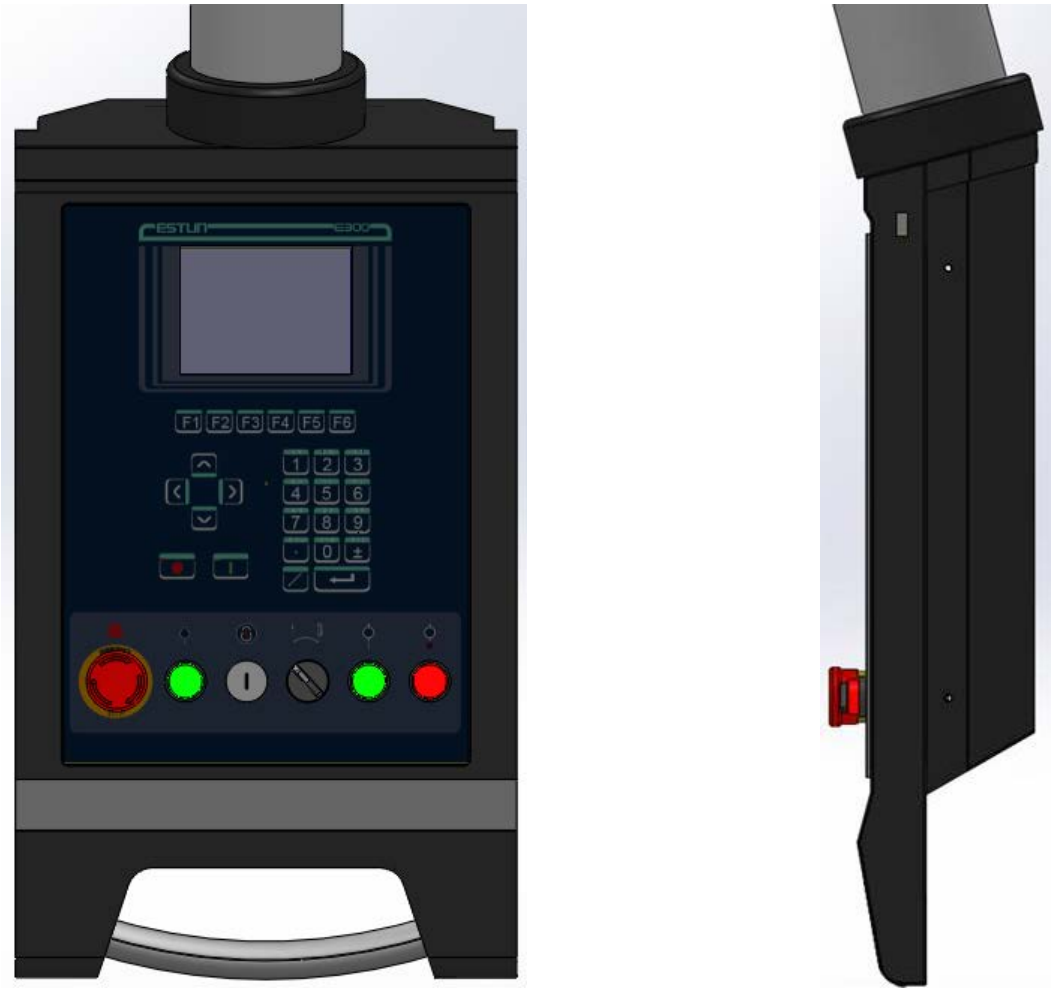


Figure 1-1 The suspension cabinet

1.2 Features

The E300 device inherits ESTUN classic mode of operation, through a simple and intuitive parameter configuration interface to complete the bending machine control operation. Its friendly interface, easy to use, practical function, and has the following features:

- 4 axes are supported, viz, X-axis, Y-axis, R-axis and C-axis.
- Automatic calculation of the block position, according to the bending angle, material, thickness and mold parameters.
- The back gauge can be controlled in a high-accuracy since the servo systems control X-axis and R-axis.
- Optional hydraulic or mechanical to control the C-axis.
- Program in absolute value or angle.
- You can backup, restore, import and export the parameters, for commissioning the machine easily.
- Edit the program in one page, for improving the operating efficiency.
- You can program the dwell time (holding time) and retracting delay by the device instead of the time relay.
- Interference or collision of the die can be avoided.
- The opening distance can be adjusted, for improving the operating efficiency.
- Automatically adjust the clamping point position.
- You can view the status of inputs, outputs, valves and faults on the **Monitor** page at any time.
- Automatically adjust the zero position of the R-axis.
- Materials and die information are programmable.
- Three of operation mode (Jog, Single, Continuous) for the jobs.
- Language setting and unit setting.
- IO ports can be allocated freely, and the device can detect them for avoid the repeat.
- Bilateral positioning and unilateral positioning.
- Slug clearance function.
- Teaching or search the reference point.
- The Axis, which is controlled by a servo system, can be manually moved.
- Real-time memory the parameters, positions and programs against the unexpected accidents such as interruption of power supply.

1.3 Appearance

Control Panel

Figure 1-2 is the appearance of the suspended device, and it includes many elements.

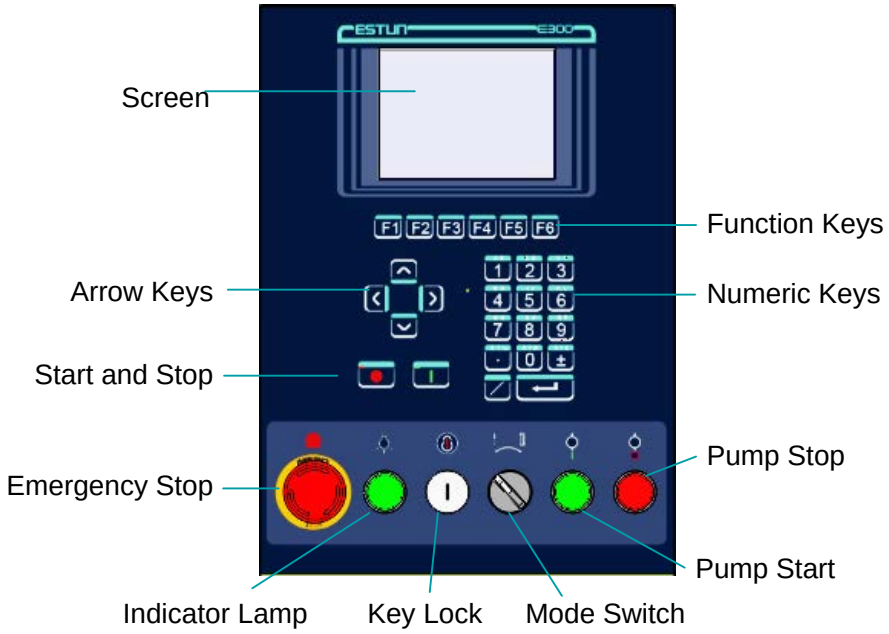


Figure 1-2 Appearance of the suspended device

Table 1-1 lists the description of each element.

Table 1-1 Description of each element

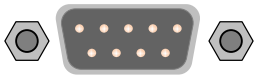
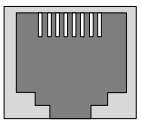
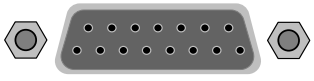
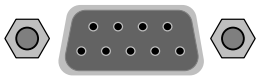
Element	Description
Screen	5.6 inch, 640 × 480 dot matrix, 18-bit full color display screen.
Function Keys	Function keys, which corresponding to options on below of each page.
Numeric Keys	It consists of **CLEAR**, **NUMBERS**, **POINT**, ± and **ENTER**. They are often used in programming and settings.
Arrow Keys	Press these buttons can move the cursor.
Start and Stop	Press **START** key when your program has been completed, and each axis can perform the positioning. Press **STOP** key, the machine can stop running.
Mode Switch	Turn this switch for switching the operation mode between **Single** and **Jog**. <**NOTE**>: For switching the operation mode to **Continuous** mode, turn the switch to **Single** mode, and set the parameter **Automatic** to **Enable** on the HMI.
Emergency Stop	In the case of emergency stop use the **EMERGENCY STOP** controller.
Key Lock	A key lock, which can turn ON or turn OFF the device.

Element	Description
Indicator Lamp	When the device is power on, the indicator lamp can be lighted.
Pump Start	Press this button can turn on the oil pump, indicating the machine is ready.
Pump Stop	Press this button can turn off the oil pump, indicating the machine is unable to run. In addition, this signal can be cut off when **EMERGENCY STOP** button was pressed down.

Ports

There are 6 kinds of ports on the E300 device, which can connect the external devices. Table 1-2 lists the description of them.

Table 1-2 The description of Ports

Port	Diagram	Amount	Description
USB	—	1	Connect a U disk, which can help the user by performing many operations such as update, import or export the parameters, dies and programs.
DB-9 (Male)		1	Reserved.
IO	 × 2 Inputs  × 2 Outputs	4	● 2 groups of inputs, each group have 9 pins. ● 2 groups of outputs, each group have 10 pins.
RJ45		1	Connect the servo system by CAN protocol.
DB-15 (Female)		1	Connect the external device, which controls C-axis.
DB-9 (Female)		2	Reserved.

1.4 Electrical Specifications

Power Supply

Item	Voltage	Rated Current	Starting Current
Minimum	20	1.2	-
Standard	24	2	-
Maximum	28.8	3	3
Unit	V	A	A

Inputs

Input Voltage	24VDC±10%
Input Current	5mA
Signal Characteristic	H-level is not greater than 30V L-level is not greater than 1.2V
Effective Level	H-level

Outputs

Output structure	Open Collector
Output Voltage	Not greater than 30VDC
Output Current	Not greater than 150mA
Signal Characteristic	H-level is not greater than 30V L-level is not greater than 1.0V
Effective Level	L-level

Encoder

Supported Type	Differential / Line Driver	Complementally / Voltage
Supply Voltage	5V DC	12V DC
Supply Current	500mA	
Response Frequency	500KHz	
Input Phases	A, B, C, A\, B\, C\	
Output Phases	A, A\, B, B\, C, C\	A, B, C
Output Voltage	H-level is not less than 80%VCC L-level is not greater than 0.3V	

Communication	Protocol	CAN	RS485	RS232
	Transmission Rate	1 Mbps	10 Mbps	115.2 Kbps
	Terminal Resistance	Build-in		None
	ESD	16KV HBM		15KV HBM

Analog Input	Type	Voltage
	Range	From －10V to ＋10V
	Resolution	12bit
	Channels	3 channels
	Sampling Frequency	Not greater than 78KHz

Analog Output	Type	Voltage
	Range	－10V to ＋10V
	Resolution	12bit
	Channels	2 channels (AO1 to AO4)

Environment	Operating TMP	0℃ to 40℃
	Operating Humidity	5% to 95%, no condensation
	Storage TMP	－20℃ to 70℃
	Storage Humidity	5% to 95%, no condensation

Chapter 2 Mounting and Wiring

In general, our engineers can help you mount the device. If you want to mount the device by yourself, please read this chapter carefully and design your own mounting.

2.1 Safety Notes

Matters Needing Attention

Before your mounting and wiring, please pay attention to the following matters:

- ❑ Power supply must be off during installation and wiring.
- ❑ Prohibit from pulling or inserting the electrified encoder.
- ❑ Avoid the incorrect wiring, such as misplug, short circuit, and misconnect.
- ❑ Never disassemble the device privately, to avoid any malfunctions.
- ❑ Prohibit from putting any foreign matters into the device, because the components in the device are sensitive to static electricity.
- ❑ The grounded terminal should ground well to ensure the safety working of the device.

Mounting Space and Direction

Generally, the device is embedded on control panel, keep a distance of 65mm from its neighboring components and damper (shell) on up and down, right and left, to facilitate operator install and maintain the device.

Environment Requirements

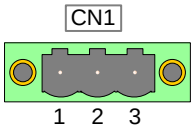
- ❑ Keep the device away from water, vapor, oil and dust.
- ❑ Keep the device away from flammable-substance, explosive-substance and corrosive-gas.
- ❑ Keep the device away from the interference of strongly electromagnetic.
- ❑ The Ambient temperature should be between 0℃ and 40℃. If the temperature is over 40℃, please put the device in a well-ventilated place.
- ❑ Relative humidity shall be below 90%RH.

2.2 Wiring

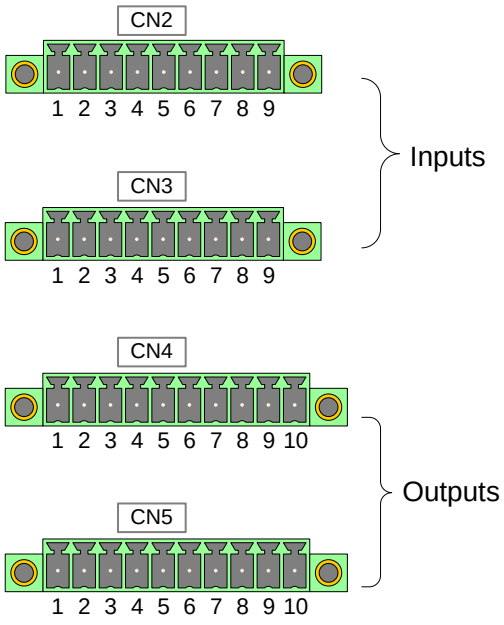
2.2.1 Signals Definition

To convenient for your wiring, you shall know and master the signal definition of the all ports.

Power Supply

Graphic	Pin	Signal
	1 2 3	+24V 0V EARTH

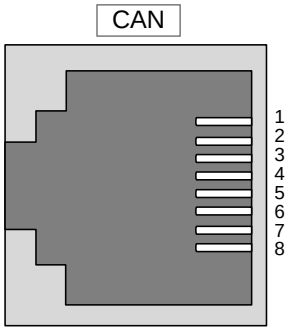
IO

Graphic	Pin	Signal
	1 2 to 9	COM1 IN 09 to IN 16
	1 2 to 9	COM2 IN 01 to IN 08
	1 2 to 9 10	24V (INPUT) OUT 9 to OUT 16 0V
	1 2 to 9 10	24V (INPUT) OUT 01 to OUT 08 0V

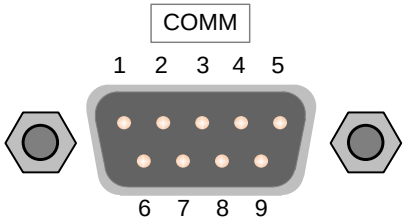
Communication

The E300 device supports RS232, RS485 and CAN industrial field bus protocol.

- The connector of CAN is RJ45 plug. Its diagram and defining are as following.

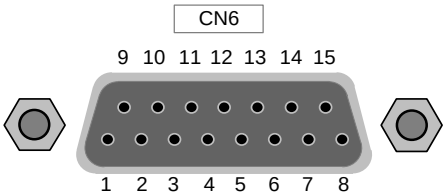
Graphic	Pin	Signal
	1, 2, 3, 6 4, 5 7 8 Shell	— DGND CANH CANL EARTH

❑ The connector of RS232 / RS485 is DB-9 plug (male). Its diagram and defining are as following.

Graphic	Pin	Signal
	Reserved	Reserved

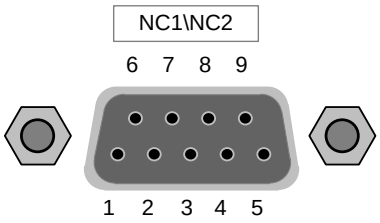
Analog Quantity

The connector of analog is DB-15 plug (female). Its diagram and defining are as following.

Graphic	Pin	Signal
	1 2 3 4 5 6 7 9 13 15 8, 10, 11, 12, 14 Shell	AI 1 + AI 1 - AI 2 - AI 2 + AI 3 - AI 3 + AO 1 AO 2 10V (OUTPUT) 24V (OUTPUT) GND EARTH

Encoder

The connector of encoder is DB-9 plug (female). Its diagram and defining are as following.

Graphic	Pin	Signal
	Reserved	Reserved

2.2.2 Connector Wiring

	The connector can plug into the receptacle on the PC board in only one direction. Before wiring the connector, mark its left and right ends when it is plugged in to make sure you wire the correct pin numbers.

Connect wires to terminal block connectors as follows:

Step 1 Find the correct terminal on the connector, and then press and hold against the corresponding spring button by using a proper tool, such as a screwdriver.

Step 2 Strip the correct wire for this terminal 1/4 in. (6.4 mm) from end.

Step 3 Insert bare wire into the terminal 90% of the way, and release the spring button. The metal tooth inside will clamp down on the bare wire for a tight connection. Make sure that the metal tooth is clamped down on the bare part of the wire, not on the insulation, as shown in Figure 2-1.

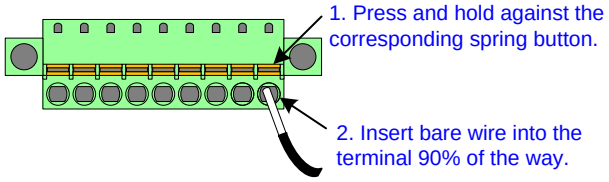


Figure 2-1 Attaching Wires to Connector

Step 4 Connect all wires. Double-check connections when done.

Step 5 Plug the connector firmly into the receptacle on the PC board. The connector can fit into the receptacle in only one direction.

----End

2.2.3 Terminating Cable Shields

⚠	Be sure to terminate cable shields at both ends.

For each shielded cable, perform the following steps, referring to Figure 2-2.

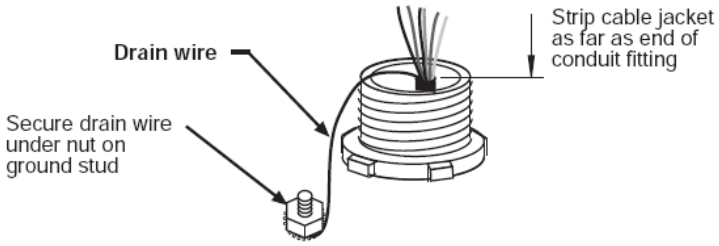


Figure 2-2 Connecting Shield Drain Wire to Ground

Step 1 Strip the cable jacket as far as the end of the conduit fitting.

Step 2 Cut the drain wire to a length that allows it to wrap at least once around the nearest grounding stud. Loosen the nut on the stud, wrap the drain wire clockwise around the stud, and tighten down the nut.

Step 3 Connect the rest of the wires in the cable to the terminal block.

----End

2.2.4 Power Supply

⚠	If you use the controllable power supply, it is necessary to adjust the voltage into the below requirement before your operation.

We suggest you take two 24V DC power supplies. One is employed to the device, and the other is employed to IO terminals.

These DC power supplies must be isolated from the AC power grid. To keep the personal safety, the power supplies must comply with EN60950 standard.

- ❑ In the case of the device, the rated voltage of the power supply is 24V±10%, and the rated current is not less than 1.5A.
- ❑ In the case of IO terminals, the rated voltage of the power supply is 24V±10%, and the rated current is not less than 1.0A.

2.3 Grounding

2.3.1 Sorts of Grounding

The grounding in equipment cabinet can be divided into the following three sorts.

- Signal grounding (GND): signal reference in the NC device.
- Shield grounding (EARTH): in order to avoid the interference between components, it is necessary to make a shield of the cable. And the grounding terminal is shield grounding, which must connect to the earth.
- Protected grounding: the shield grounding of all the components in the cabinet shall be connected to the earth by one medium. For example, the medium can be an earthing rod, and the earthing rod must connect to the earth.

If the GND is not directly connected to the protected grounding, but it is separated by a high impedance circuit, we name the device as a non-grounded device.

The non-grounded device can be separated from the power frequency interference, so that it can effectively improve the system's anti-interference capability and keep the system stable operation. In addition, the non-grounded device can effectively improve the reliability of system communications if the shielding measures are well.

2.3.2 Grounding Design

Shell Grounding

Due to the housing of E300 device is conductive metal, it is necessary to ground in the low impedance for reducing the risk of short circuit or system failure. In addition, ground in the low impedance can reduce the interferences between the environment and the device.

There is a ground terminal on the outside of the housing, which must be connected to earth, and the ground impedance shall be no greater than 0.3 Ω.

Terminals Grounding

There is one PE pin in the power supply terminal, which must be connected to earth well, and the ground impedance shall be no greater than 0.3 Ω.

Cable Shield Grounding

In order to against the external interferences for improving the reliability of the system, it is necessary to add the shield grounding at the encoder cable, and the terminals of the shield must be connected to earth well. If there is a potential difference between the terminals, it may cause a current flow on the shield. So, you shall improve the grounding measures or connect one terminal to the earth.

2.4 Safeguard

2.4.1 Electromagnetic Compatibility

Although the E300 device and its components are designed for industrial environments, and the electromagnetic compatibility is strong, it is necessary to consider the possible external interferences when you perform the mounting and wiring.

Compatibility Measures

The measures for improving the electromagnetic compatibility are as following:

- ❑ Ground in the low impedance: you shall confirm that the uncharged metal parts (e.g. housing, shields) are well grounded and the ground conductor is connected to the earthing rod in the cabinet. The earthing rod corrosion shall be resistant to corrosion, good electrical conductivity and connect to the earth in the low impedance.
- ❑ Properly lay the cable.
  - Classify the cables as high-voltage lines, power cords, encoder cables, and signal cables.
  - Separately lay different class of the cables and keep them as far as possible. Especially for the high-voltage lines, which is strictly prohibited from laying with others cables.
  - The encoder cable shall keep away from power cords and signal cables as far as possible.
- ❑ Properly connect the shield.
  - The encoder cable shall be shielded, and the shield terminals must be connected to the earth.
  - The connection area between the shield and protected grounding shall be as large as possible. Never twists the shield into a rope to connect to the protected grounding.
  - The impedance between shield and protected grounding shall be as low as possible.
- ❑ Other requirements:
  - Keep the inductive loads, servodrives and frequency converters in the cabinet away from power cords, encoder cables and signal cables.
  - The earth potential difference between the different devices shall be as low as possible, however, theoretically zero is the best.

Suppress Interference

- ❑ The high inductive loads, such as contactor, repeater, which can bring some strong interference when they are breaking.
- ❑ The working device, such as frequency converters, servodrivers and the motors, which can bring some strong interference.

Coupling Interference

The methods for coupling interference are as shown in Table 2-1.

Table 2-1 The methods for coupling interference

Methods	Details	Apply to
Direct coupling	Two or more circuits share one wire	● Multiple devices share a power supply ● Electrostatic discharged
Capacitor coupling	A capacitor coupling can be formed between Any two conductors	When lay the force electricity and weak electricity parallel, the force electricity can affect the weak electricity.
Inductive coupling	The current loop flows through the varying current	● Frequency converters ● The connection and disconnection of the contactor and repeater ● The high frequency signal cable
Radio-frequency coupling	The space electromagnetic field causes the conductor to generate an induced voltage current	—

2.4.2 Compatibility Requirements

- ❑ The E300 device may be mounted on the outside of the cabinet, to consider the working environment is bad, please keep the E30 device close to the cabinet as far as possible.
- ❑ The metal housing shall be grounded by a grounding conductor to connect to the earth, and the grounding impedance is not greater than 0.3 Ω.
- ❑ Well grounding the cabinet to avoid the personal injury or death caused by leakage.
- ❑ Keep the power cord, encoder cable and signal cable away from force electricity and inductive loads, and never lay them parallel.
- ❑ The signal cable is as short as possible. Keep it away from the interference source if a long distance wiring is necessary.
- ❑ We suggest you take two 24V DC power supplies. One is employed to the device, and the other is employed to IO terminals.
- ❑ The shield is necessary to be used in encoder cable, and the connection area between the shield and the metal housing shall be as large as possible.

2.4.3 Install the Discharge Diode

The inductive loads, such as relay coil and contactor, can bring an instantaneous high voltage when they are breaking.

Take some protective measures to avoid the high voltage damage to the internal circuit is necessary.

The load of the output port is a DC relay, and the protective measure is to add a discharge diode in the relay coil, as shown in Figure 2-3. However, it can cause a delay when it turns off.

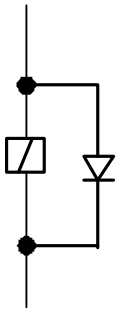


Figure 2-3 Install a discharge diode in the relay coil

Chapter 3 Settings

3.1 Timing Charts

As shown in Figure 3-1 and Figure 3-2, you can view two timing charts, which are taken one ordinary bending step as the examples for representing the working status of each component.

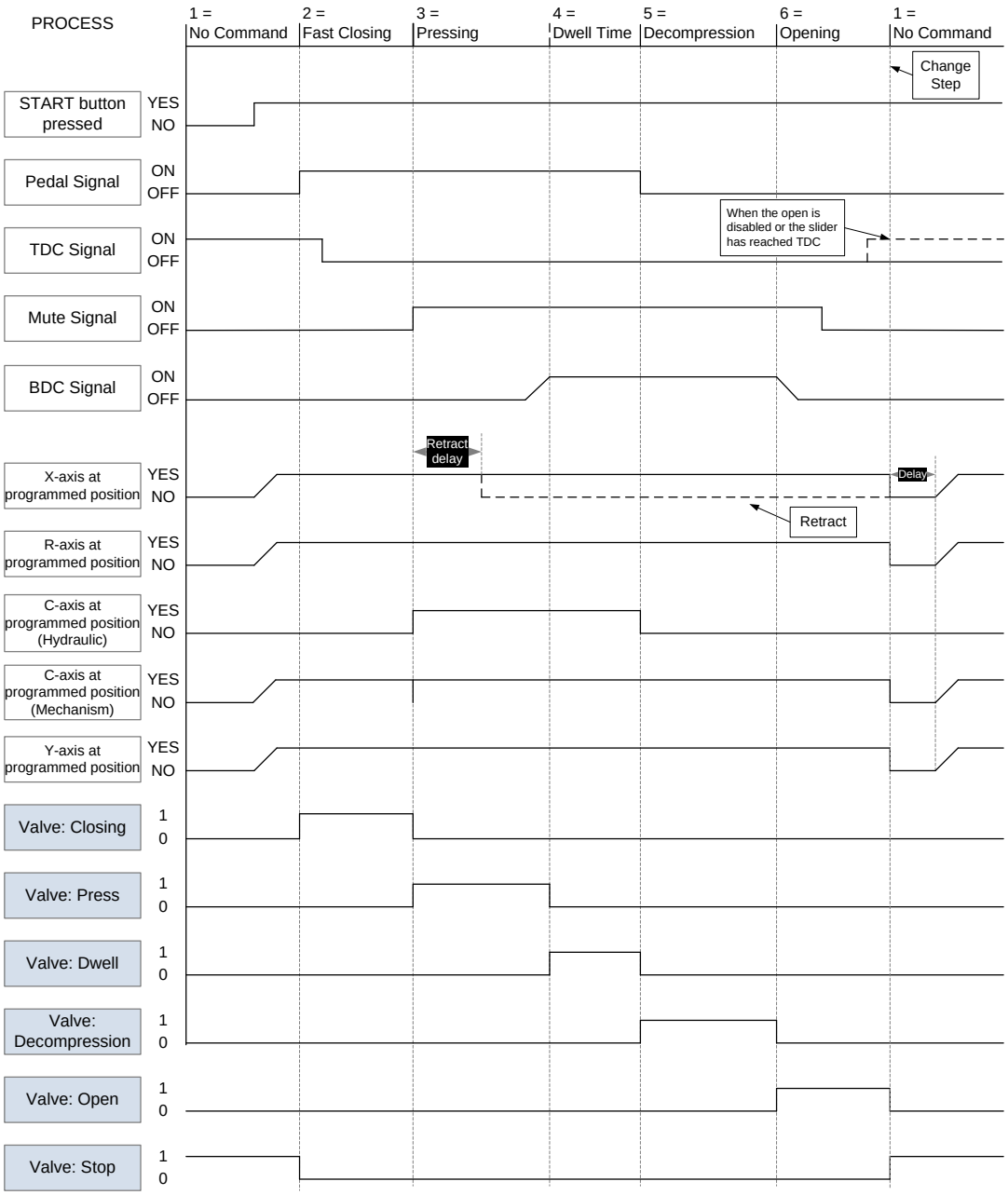


Figure 3-1 Timing Chart A

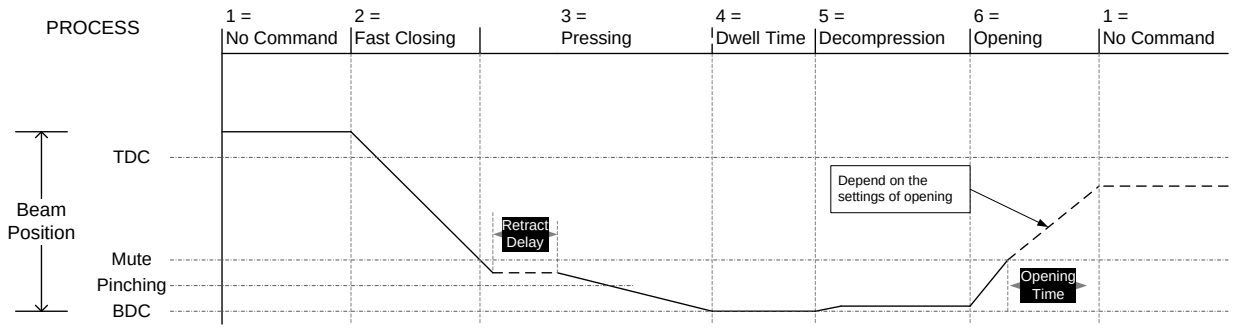


Figure 3-2 Timing Chart B

- In the case of retracting, let the Y-axis wait until the retract is finished, you shall set the parameter **Wait Retract** to **Yes**.
- When the beam has reached the TDC in opening, the **TDC signal** can be turned ON and the beam stops the moving.
- If you have set the parameter **Retract** in your programming, the X-axis can start retracting when the **Retr.DLY** time has been finished. Then, the X-axis will not reposition until the next step is started.
- The opening time is started when the **Mute Signal** is turned from ON to OFF.

3.2 Password Protection

The operation permissions are controlled by the password, that is to say, you shall type the correct passwords to enter some certain special pages. Follow the below procedure to enter the special pages.

Step 1 Power up the device and wait for a while, the screen can display the initial page (Single-Step) automatically, as shown in Figure 3-3.

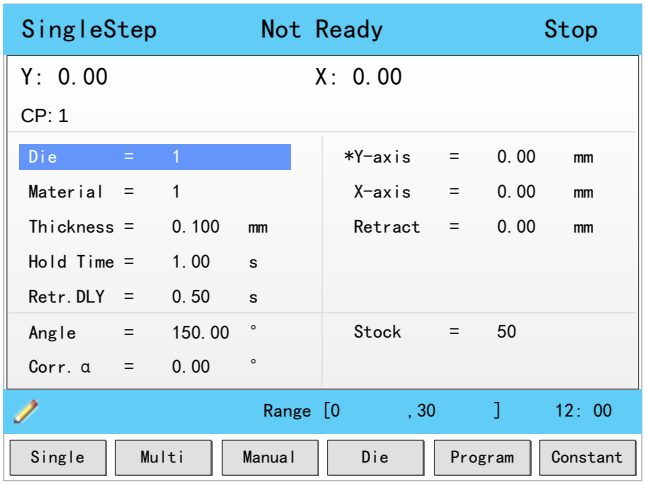


Figure 3-3 The initial page

INFO	■ The asterisk (*) at the left of **Y-axis** indicates the current programming is applied to angle programming. ■ All the pages in this document are based on the display of the **Standard** version, viz, R-axis and C-axis are not included.

Step 2 Press **F6** to enter **Constant** page, as shown in Figure 3-4.

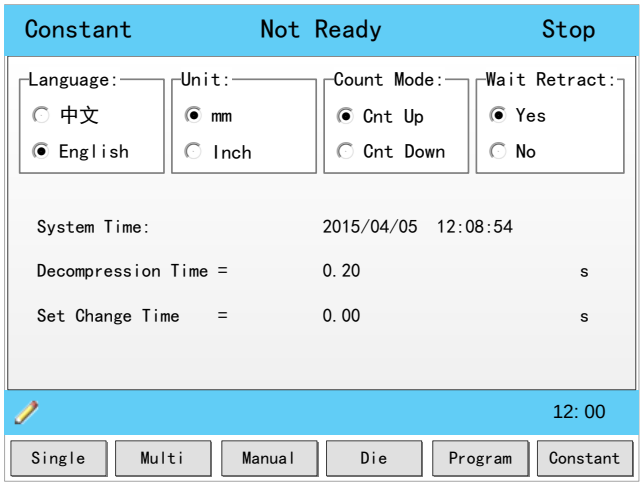


Figure 3-4 The Constant page

Step 3 Type the proper password and press **ENTER** to enter the corresponding page.

- ❑ Type **1212** to enter **TechIn Para** page
- ❑ Type **14789** to enter **Para** page
- ❑ Type **5656** to enter **SystemDiag** page

----End

3.3 Ports Allocation

INFO	Label IO terminals when you perform the wiring according to the actual wiring diagram, so that you can allocate the ports on the page conveniently.

Type the password **14789** to enter **Para** page and select **Port Config**, as shown in Figure 3-5.

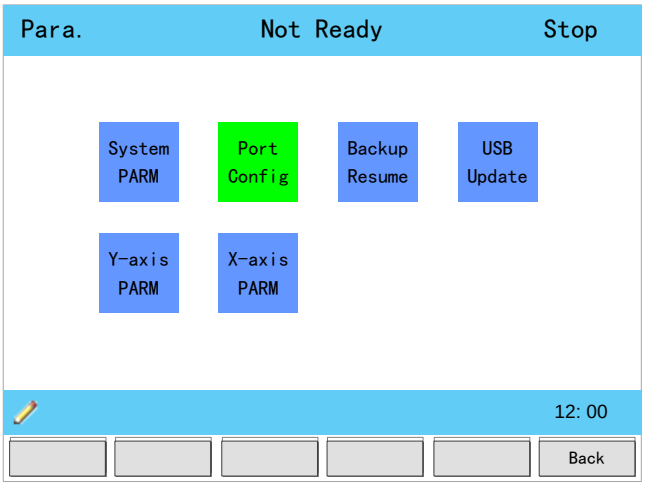


Figure 3-5 Select **Port Config** on **Para** page

3.3.1 Inputs Allocation

When **Input Config** page is displayed, you can view the page has listed all the allocable ports, as shown in Figure 3-6.

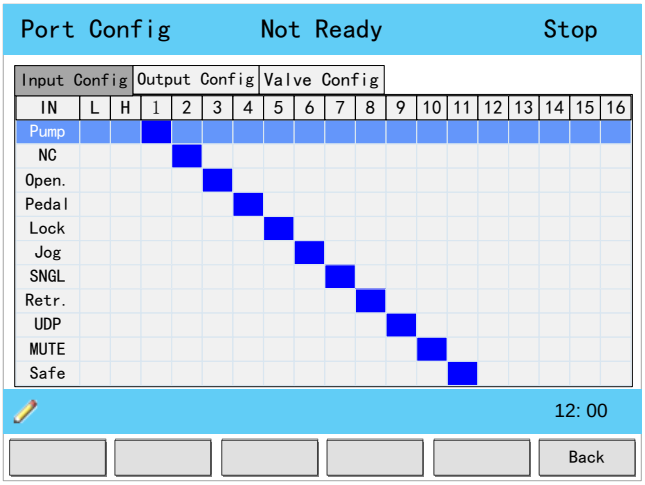


Figure 3-6 **Input Config** page

Ports Description

The E300 device can accept the input signals come from the external components (e.g. switch, sensor), and then it will perform the corresponding work. Table 3-1 lists the reference input signals and their descriptions.

Table 3-1 Description of input signals

Port Name	Refer to
Pump	In general, this port status is controlled by an external button (when the suspended device is used, it can be found on the operation panel).
NC	Reserved.

Port Name	Refer to
Open	When this port is turned ON, the beam starts to move up, until the UDP signal is turned ON.
Pedal	● When the machine is running, this port is turned ON, the beam starts to move down, and the process is in **Fast Closing**. ● If this port is turned OFF in the process of **Fast Closing**, the beam can move up at once, until the UDP signal is turned ON. ● If this port is turned OFF during the **Press** process, the beam can stop moving. ● All in all, in order to perform a complete step, it is necessary to keep this port ON until the process is in **Decompression**.
Lock	● Only when this port is turned ON, you can edit the parameters of the **Single-Step** and **Multi-Step**. ● When this port is turned OFF, you shall not edit the parameters of the **Single-Step** and **Multi-Step**, but you can view them.
Jog	In general, this port status is controlled by an external switch. ● When this port is turned ON, the system can be switch to **Jog** mode. ● In the **Jog** mode, the beam can move when the **Pedal** signal is on High-level, it can stop moving when the **Pedal** signal is on Low-level.
SNGL	In general, this port status is controlled by an external switch. ● When this port is turned ON, the system can be switched to **Single** mode. ● In the **Single** mode, in order to perform a complete step, it is necessary to keep **Pedal** signal ON until the process is in **Decompression**. ● In the **Single** mode, when the parameters **Automatic** is set to **Enable**, the system can be switched to **Continue** mode.
Retr.	● When this port is turned ON, the X-axis can prepare for retracting, and the process will be in **Press**. ● When this port is turned OFF, the process will be in **Opening**.
UDP	● When this port is turned OFF, indicating the beam has left the Upper Dead Point (UDP). ● When this port is turned ON, indicating the beam has reached the UDP, and then the beam can stop moving.
MUTE	In the process of **Fast Closing**, when this port is changed, the beam can move at a low speed.
Safe	In general, this port is connected a sensor for the light curtain function, when this port is turned OFF, the machine can stop moving immediately.

Allocate the Ports

Follow the below procedure to allocate a desired input port on the **Port Config** page.

Step 2 Press the arrow keys **UP** and **DOWN** to select a desired port name.

Step 3 Press **NUMERIC** keys to type a proper value.

Step 4 Press **ENTER** key to confirm your typing.

	**Never mix the pin number and signal number!** The allocation number on the pages is the signal number, not the pin number. For example, the number **1** on the page indicates the signal **I1**.

For example, if the **Lock** port is defined as **I8**, you shall move the cursor on **Lock** and type **8**, then press **ENTER** key. And now, the Lock port has been properly allocated.

In addition, the device can automatically detect the uniqueness of the port number. If a number has been allocated, you can view a tip dialog-box **Port Used** on the page. Then, you shall check the allocated number and reallocate a proper number.

----End

Analog Level

The E300 device provides with the analog high level and analog low level, corresponding to the page **L** (low level) and **H** (high level), which are convenient for your commissioning. Type **0** indicates turning the desired port to OFF while type **99** indicates turning the desired port to ON.

3.3.2 Outputs Allocation

When **Output Config** page is displayed, you can view the page has listed all the allocable ports, as shown in Figure 3-7.

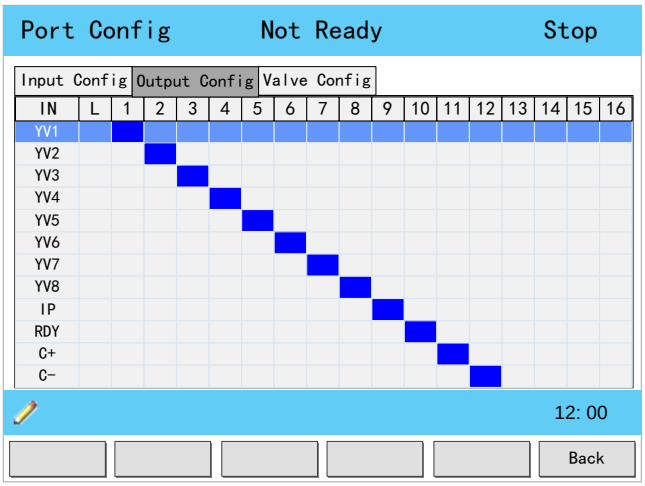


Figure 3-7 **Output Config** page

Ports Description

The E300 device can send the output signal come from the internal computation according to the production processes, so that the E300 device can combine the external components for the entire machine system to complete the production processes better. Table 3-2 lists the reference output signals and their descriptions.

Table 3-2 Description of output signals

Port Name	Refer to
YV1 to YV8	To allocate a proper number for the valves, for details see the section **3.3.3 Valves Allocation**.
IP	All the axes have been ready. When all the servo axes and the C-axis of the hydraulic mode have been completed the positioning, this port can be changed, indicating all the axes are ready and the machine can start working. The C-axis of the hydraulic mode is ignored in this case.
RDY	The system has been ready. In general, when the input port **Pump** was changed, this port can be changed if no fault was occurred. And then, you can press **START** key to run the device.
C＋	When the machine is in **Press** process, turned this port ON, and the workbench (C-axis) can move upwards for the deflection compensation.
C－	When the machine is in **Press** process, turned this port ON, and the workbench (C-axis) can move downwards for the deflection compensation.

<**Note**>: the ports **C＋** and **C－** is become effective when the parameter **Mode** is **1: Mechanism** in **C-PARM** page.

Allocate the Ports

Follow the below procedure to allocate a desired output port on the **Port Config** page.

Step 1 Press the arrow keys **UP** and **DOWN** to select a desired port name.

Step 2 Press **NUMERIC** keys to type a proper value.

Step 3 Press **ENTER** key to confirm your typing.

Never mix the pin number and signal number!
The allocation number on the pages is the signal number, not the pin number. For example, the number **1** on the page indicates the signal **I1**.

For example, if the **YV8** port is defined as **O8**, you shall move the cursor on **YV8** and type **8**, then press **ENTER** key. And now, the Lock port has been properly allocated.

----End

Analog Level

The E300 device provides with the analog low level, corresponding to the page **L** (low level), which is convenient for your commissioning. Type **0** indicates turning the desired port to OFF.

3.3.3 Valves Allocation

When **Valve Config** page is displayed, you can view the page has listed all the allocable processes, as shown in Figure 3-8.

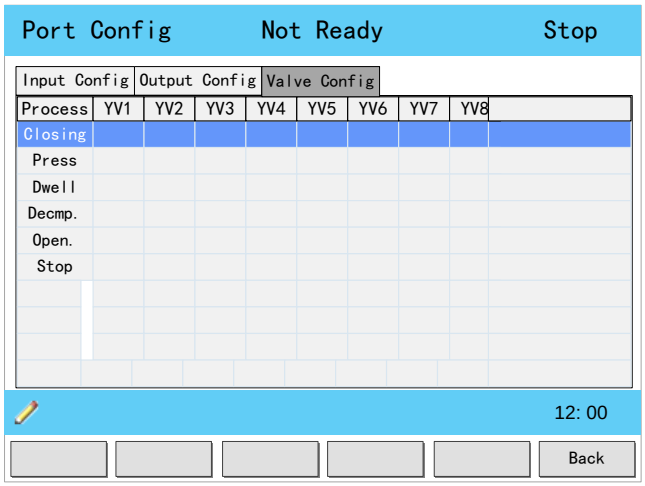


Figure 3-8 **Valve Config** page

Allocation Description

The left side of the page lists all the production processes, and you shall select a desired process and type the proper number for allocating the output signals (YV1 to YV8), that is to say, when the machine is in the desired process, the corresponding output signals can be turned ON.

Allocate the Valves

Follow the below procedure to allocate a desired valve on the **Port Config** page.

Step 1 Press the arrow keys **UP** and **DOWN** to select a desired process.

Step 2 Press **NUMERIC** keys to type a proper value.
In which, YV1 is corresponding to **1**; YV2 is corresponding to **2**; and so on.

Step 3 Press **ENTER** key to confirm your typing.

INFO	You can allocate multi output ports for one process if necessary.

For example, if the **Dwell** process wants to be defined as **YV3** and **YV4**, you shall move the cursor on **Dwell**, and type **3** and press **ENTER** key, then type **4** and press **ENTER** key. The **Dwell** process has been properly allocated.

----End

3.4 Axes

The term **Axis**, which is commonly used in the field of CNC, is a reference direction of the machine components that can perform straight or rotary motion. The E300 device can control the back-gauge (X-axis and R-axis), block (Y-axis) and workbench (C-axis) to perform the movements.

X-axis, Y-axis and R-axis, which are controlled by the servo system, are called Servo-Axis. The C-axis, which is controlled in mechanism mode or in hydraulic mode, is called Auxiliary-Axis.

INFO	The **Standard** version can only control X-axis and Y-axis. If you want to enable R-axis and C-axis, please contact ESTUN or your distributor, and then follow the section **Appendix E Updating** to update the software.

As shown in Figure 3-9, to enable the desired axis and set its parameters, you shall type the password **14789** to enter **Para** page on **Constant** page. Then, select the desired option and press ENTER key to enter the corresponding page.

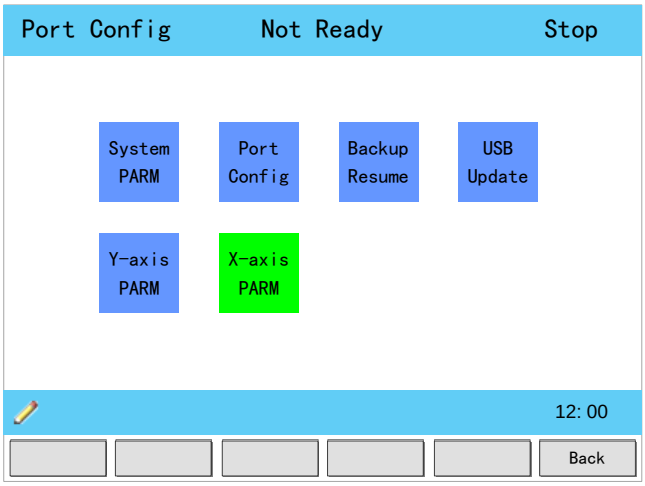


Figure 3-9 Move the cursor on the desired option

3.4.1 Servo-Axis

It is necessary to learn the direction of these servo-axes, before setting the parameters of them, as shown in Figure 3-10.

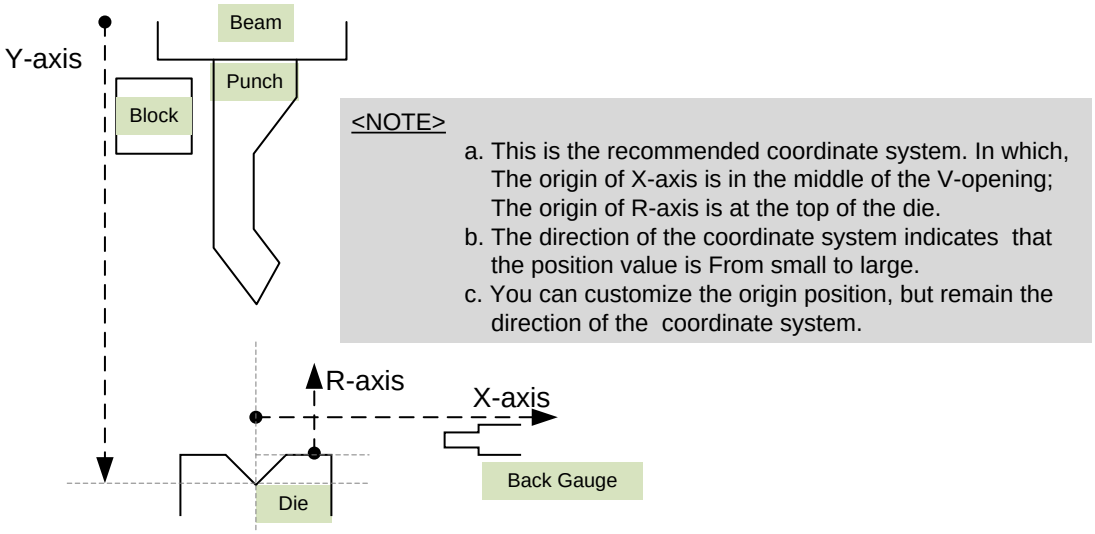


Figure 3-10 The direction of servo-axes

The parameters of the servo-axes X-, Y-, and R-axis are the same, for convenience of explanation, this section will be described in detail by the X-axis example, as shown Table 3-3.

Table 3-3 The description of X-axis parameters

Parameter	Description
Axis	Select whether to enable the X-axis control function. ● To select **Disable**, indicating the X-axis control function is disabled. ● To select **Enable**, indicating the X-axis control function is enabled.
Servo	Two servo types can be supported by E300 device: **EDS** and **ProNet**. Because the protocols of two servos are different, the user must set this parameter properly according to the actual application.
Logic ID	This parameter is valid when the **Servo** is set to **EDS**. Because the EDS servo drive can control two axes of motor at the same time, it is necessary to set the logic ID for each axis: **EDS-A** and **EDS-B**.
Motor Rev.	Since the motor may be mounted in an uncertain direction, you shall set these parameters for your actual application. **Motor Rev** indicates the rotation direction of the motor, and **Encoder CNT** indicates the feedback information from the encoder. You need not to know the actual rotation direction of the motor, but try to combine **Motor Rev** with **Encoder CNT** for the motion, and keep the movement of the X-axis is met the desired.
Encoder CNT	

Parameter	Description
Teach	Set the teach method for teaching the current position value. ● To select **Disable**, search reference is employed. In this case, the user shall set the parameter **SearchDir** and **Reference Position**, and then repower up the system. The X-axis can orientate according to the set **Reference Position** from the next movement. ● To select **Enable**, teaching is employed. In this case, the use shall perform the teaching operation on the **TechIn Para** page. For details see the section **3.7.2 Teaching Operation**.
SearchDir	This parameter is valid when the **Teach** is set to **Disable**. When search reference is employed, you shall set the direction of X-axis for the forward or backward. There are two options for this parameter, **Increased** and **Decreased**, which indicates the feedback status of the encoder. The purpose of setting this parameter is to let the X-axis move towards the reference position.
Servo ID	Set this parameter according to the ID has been set in the servo drive.
Fact A	**Fact A** is multiplication factor, which equals to the numbers of driven gear teeth divided by the numbers of driving gear teeth. In general, the driven gear is the machine tool drive screw, and the driving gear is motor gear that controls the movement of shaft. **Fact B** is division factor, which indicates the travel distance of the machine tool parts when the screw rotates for one cycle. **Fact A** combines with **Fact B** for calculating a scale factor, which is the number of pulses emitted by the encoder when the control shaft is running at a distance of 1mm. The scale factor is calculated as follows: Scale Factor = Pulse number of encoder × **Fact A** ÷ **Fact B**
Fact B	
Overrun	● When this parameter is 0, the positioning method is bilateral. ● When this parameter is greater than 0, the positioning method is unilateral. Since the principle of the unilateral positioning is move the shaft from great value to little value, if the current position of X-axis is less than programming value, X-axis can move towards the programming value and exceed it for a certain distance, what is called as **OVERRUN** distance, and then move backwards to the programming value.
Overrun Delay	When **Overrun** is greater than 0, this parameter can let the X-axis stays for a while when it reaches the overrun distance.
Position Velocity	To set the motor speed when the X-axis is positioning.
Manual Speed	To set the motor speed when manual movement is active and when X-axis is in Safety Zone.
Search Speed	To set the motor speed when the X-axis is searching reference.
Min. Value	To set the minimum position value and maximum position value of the X-axis. The X-axis shall not exceed this range, which is called as **Software Limit**.
Max. Value	

Parameter	Description
Position Tolerance	When the **START** button has been pressed down, the X-axis starts positioning. This parameter indicates the tolerance between positioning value and programming value. If the tolerance is greater than this value, the machine fails to positioning, and the user shall press **STOP** button, then restart the positioning.
Reference Position	This parameter is valid when the **Teach** is set to **Disable**. In general, this value is the distance between the sensor (e.g. proximity switch) and a certain position (e.g. midline of V-opening).
Acc/Dec Time	To set the acceleration time and deceleration time for controlling the motor rotating from current speed to programming speed.

3.4.2 Auxiliary-Axis

The deflection compensation can guarantee the accuracy of the bending process. Since the main application force is on both sides of the beam during the bending process, which causes the middle of the sheet is unevenly pressed. It is necessary to properly commissioning and using the deflection compensation control the worktable slightly lift to avoid this problem, as shown in Figure 3-11.

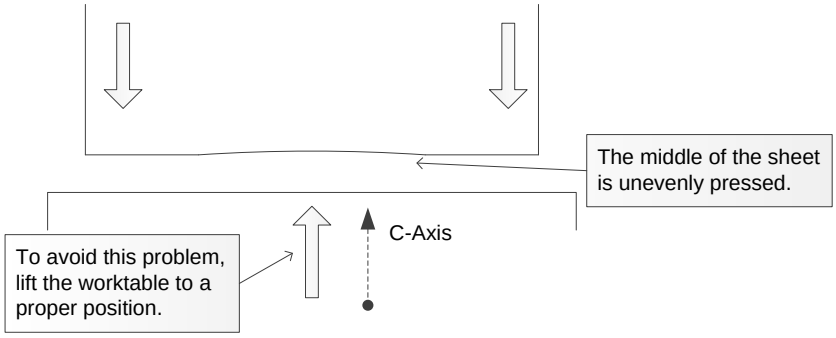


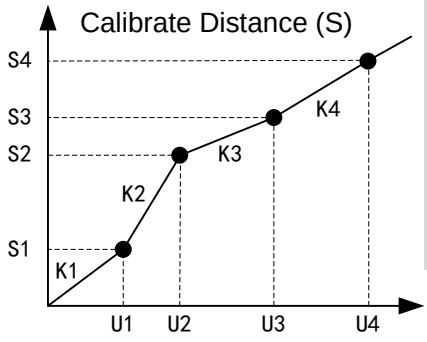
Figure 3-11 The direction of auxiliary-axis (C-axis)

There are two modes for the deflection compensation: Mechanism Mode and Hydraulic Mode.

Mechanism Mode

In this mode, the worktable is controlled by the motor. The use shall program the linear relation between **Calibrate Distance** and **Feedback Voltage**.

When the **START** button has been pressed down, all the servo-axes start positioning, meanwhile, E300 starts detect the feedback voltage (0V to 10V) from C-axis's motor continually, and calculate the calibrate distance according to the programmed linear relation. The motor can stop when the C-axis has reached the programmed position. The linear relation is as shown in Figure 3-12.



Kn is the slope of each segment. When C-axis has been programmed on Single-Step or Multi-Step page, E300 starts detect the **Feedback Voltage** continually, and calculates the **Calibrate Distance** according to this linear relation. The motor can stop when the C-axis has reached the programmed position.

Figure 3-12 Linear relation between **Calibrate Distance** and **Feedback Voltage**

The user shall perform the calibration operation for at least twice, and the procedure of performing is as following:

Step 1 Type the password **14789** to enter **Para** page and select **C-axis PARM**.

Step 2 Set the parameter **Mode** to **1: Mechanism**, as shown in Figure 3-13.

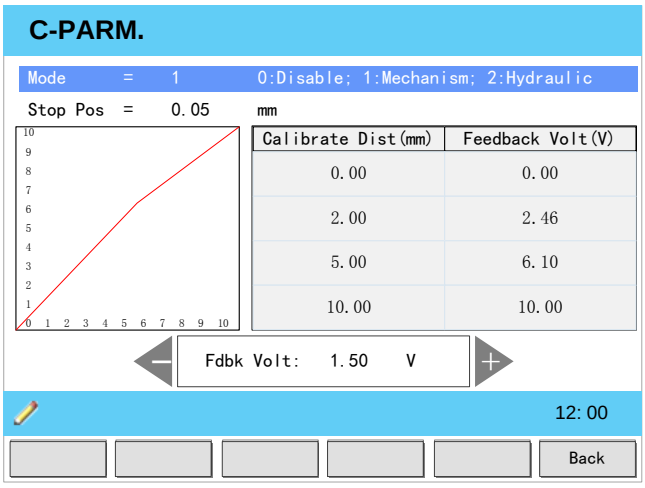


Figure 3-13 Set the mode to mechanism

Step 3 Press arrow keys **LEFT** and **RIGHT** to adjust the desired **Feedback Voltage**.

Step 4 Measure and record the moving distance when the worktable has moved at a proper position.

Step 5 Move the cursor on the column of **Calibrate Dist (mm)**, and fill the record data, the corresponding **Feedback Volt (V)** can be filled automatically.

Step 6 Repeat Step 3 to Step 5 to get others data, and fill them into this table as well.

----End

The inertia of the motor can cause the movement of table to deviate; therefore, it is necessary to set the parameter **Stop Position** to avoid the deviation. That is to say, the motor has been stopped before reaching the programmed position, and then continue to move by the inertia of the motor.

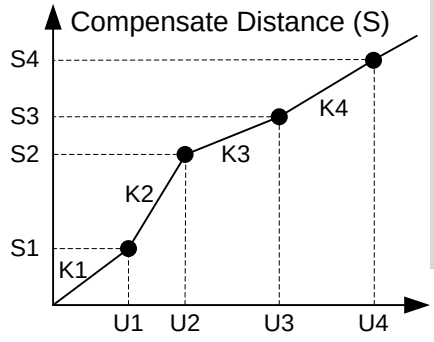
To set the parameter **Stop Position**, you can set its value to **0**, and then edit any Single-Step

programming, which need to set the parameter **C-axis**. When the programming is completed, you can measure the actual moving distance of the worktable. The difference between this value and programmed value is the value of **Stop Position**.

Hydraulic Mode

In this mode, the worktable is controlled by the hydraulic system. The use shall program the linear relation between **Compensate Distance** and **Compensate Voltage**.

When the **START** button has been pressed down, all the servo-axes start positioning, meanwhile, E300 calculates the voltage according to the programmed linear relation, and applies the calculated voltage to the hydraulic system. And then, the hydraulic system controls the worktable move to the programmed position. The linear relation is as shown in Figure 3-14.



Kn is the slope of each segment. When **C-axis** has been programmed on Single-Step or Multi-Step page, E300 calculates the voltage according to the programmed linear relation, and applies the calculated voltage to the hydraulic system. And then, the hydraulic system controls the worktable move to the programmed position.

Figure 3-14 Linear relation between **Compensate Distance** and **Compensate Voltage**

The user shall perform the calibration operation for at least twice, and the procedure of performing is as following:

Step 1 Type the password **14789** to enter **Para** page and select **C-axis PARM**.

Step 2 Set the parameter **Mode** to **2: Hydraulic**, as shown in Figure 3-15.

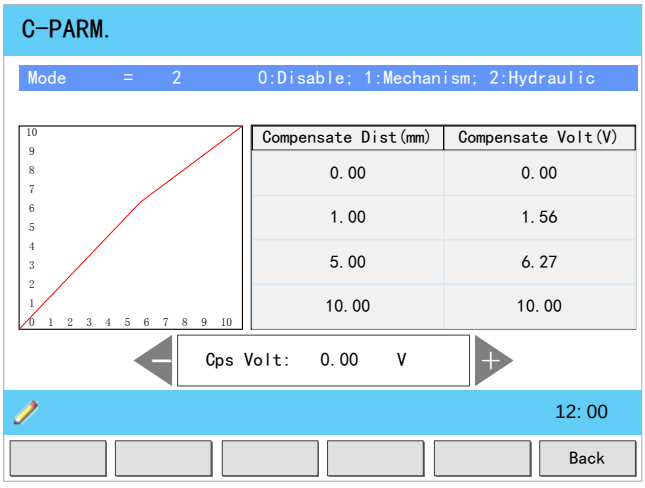


Figure 3-15 Set the mode to hydraulic

Step 3 Press arrow keys **LEFT** and **RIGHT** to adjust the desired **Compensate Voltage**.

Step 4 Measure and record the moving distance when the worktable has moved at a proper position.

Step 5 Move the cursor on the column of **Compensate Dist (mm)**, and fill the record data, the corresponding **Compensate Volt (V)** can be filled automatically.

Step 6 Repeat Step 3 to Step 5 to get others data, and fill them into this table as well.

----End

3.5 System Settings

Type the password **14789** to enter **Para** page and select **System PARM**.

3.5.1 Opening Settings

E300 can control the opening according to your programming. When the beam reaches the mute in opening process, the opening settings takes effect. According to your custom, program the linear relation between opening **Distance** and opening **Time**. Since E300 can calculate the time for turning on the valve of opening, you do not care what method you should set.

INFO	You can set the parameter **Opening** on **System PARM** page for enabling or disabling this function. ■ To select **Disable**, the beam will move upwards after completing the bending until it reaches the UDP. ■ To select **Enable**, the beam will move according to the programmed opening setting.

To set the opening function, type the password **14789** to enter **Para** page and select **System PARM**. Press arrow key **LEFT** to enter the page 2 of System parameters, as shown in Figure 3-16.

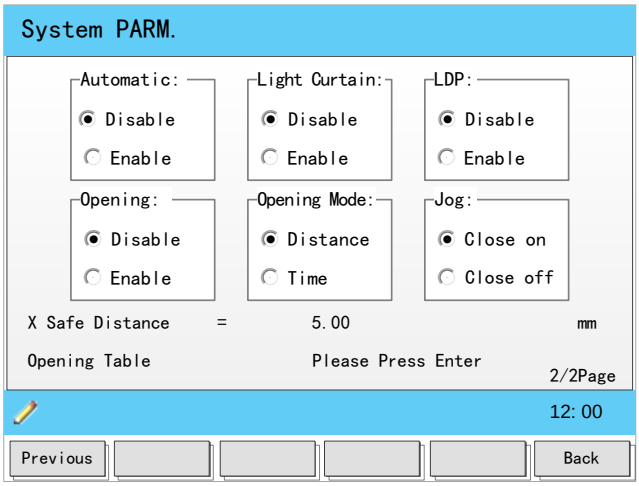


Figure 3-16 Page 2 of System parameters (2/2)

Select parameter **Opening Table** and press **ENTER** key to enter **Opening Table** page, as shown in Figure 3-17.

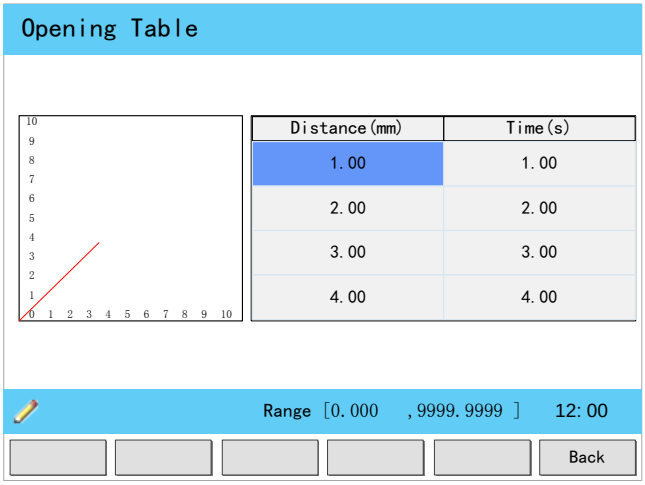


Figure 3-17 Opening table page

The Opening table is used for programming the linear relation between opening **Distance** and opening **Time**. All in all, E300 calculates the time for turning on the valve of opening by this linear relation, as shown in Figure 3-18.

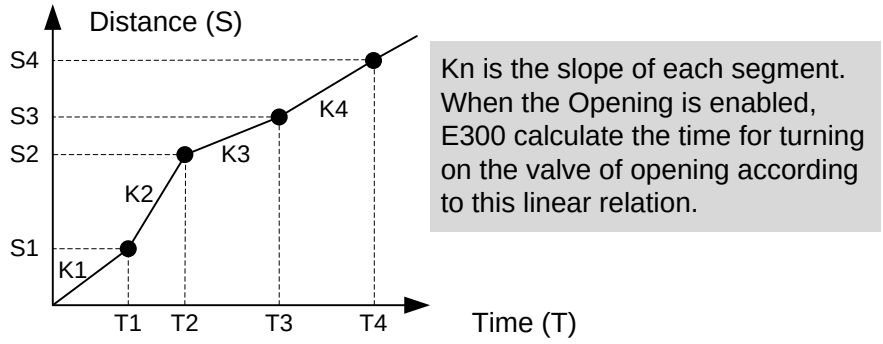


Figure 3-18 Linear relation between **Distance** and **Time**

There are many methods for programming the opening, and the following procedure is one of them.

Step 2 Type the password **14789** to enter **Para** page and select **System PARM**. Press arrow key **LEFT** to enter the page 2 of System parameters.

Step 3 Set the parameter **Opening** to **Enable**.

Step 4 Set the parameter **Opening Mode** to **Time**.

Step 5 Return to Single-Step page, and edit any Single-Step programming, which you need to set the parameter **Opening** to a certain time value. For example, set it to **1** second.

Step 6 Run and perform one bending step, when the beam stops (the opening had been completed), measure the distance between Mute and the current positon of beam.
That is, you have got one group of data about opening **Distance** (S) and opening **Time** (T).

Step 7 Repeat Step 5 to Step 6 to get other three groups of the data.
It is necessary to set the opening **Time** to greater than previous value.

Step 8 Enter the page 2 of System parameters again, and select parameter **Opening Table**. Press **ENTER** key to enter **Opening Table** page

Step 9 Fill the 4 groups of data you have got into this page, as shown in Figure 3-19, which is an example of programming.

Distance(mm)	Time(s)
89.90	1.00
256.18	2.00
640.40	3.00
1000.00	5.60

Figure 3-19 An exampling of programming

Step 10 Validate your opening programming.

1. Enter the page 2 of System parameters and Set the parameter **Opening Mode** to **Distance**.
2. Return to Single-Step page, and edit any Single-Step programming, which you need to set the parameter **Opening** to a programmed distance value.
3. Run and perform one bending step, when the beam stops (the opening had been completed), count the time between Mute and the current positon of beam.
4. Properly adjust the value of them according to the result.
   Certainly, the above steps shall be performed for many times.

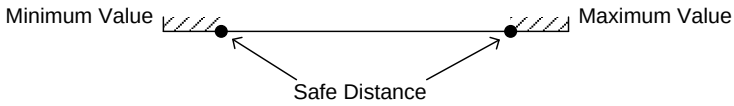
----End

3.5.2 Other Settings

Table 3-4 lists the other parameters on **System PARM** page and their description.

Table 3-4 The description of the other parameters

Parameter	Description
Y Decimal Digits	The range of this parameter is from 0 to 4, which can be used for displaying decimal places of Y-axis. If the decimal places of the input value was exceeded this range, the device can round your input value to be proper. For example, set this parameter to 1, when the input value is 5.67, the device can round it and display 5.7.
X Decimal Digits	The range of this parameter is from 0 to 3, which can be used for displaying decimal digits of X-axis. If the decimal places of the input value was exceeded this range, the device can round your input value to be proper. For example, set this parameter to 1, when the input value is 5.67, the device can round it and display 5.7.
R Decimal Digits	The range of this parameter is from 0 to 3, which can be used for displaying decimal places of R-axis. If the decimal places of the input value was exceeded this range, the device can round your input value to be proper. For example, set this parameter to 1, when the input value is 5.67, the device can round it and display 5.7.
C Decimal Digits	The range of this parameter is from 0 to 4, which can be used for displaying decimal places of C-axis. If the decimal places of the input value was exceeded this range, the device can round your input value to be proper. For example, set this parameter to 1, when the input value is 5.67, the device can round it and display 5.7.
Automatic	Set whether let the machine change step automatically. ● To select **Disable**, the user shall step on the pedal switch to change step. ● To select **Enable**, the machine can change step automatically.
Light Curtain	When the safety light curtain was equipped on the machine, the user shall properly wire and allocate the input port **Safe**, and set this parameter to **Enable**. When the signal of **Safe** is changed during Fast Closing process, the beam can stop immediately.
LDP	Set whether enable the LDP function, which can affect the settings of **Hold Time**. ● To select **Disable**, when the Mute signal is turned from OFF to ON, the **Hold Time** starts count. ● To select **Enable**, when the beam has reached LDP, the **Hold Time** starts count.
Jog	Set whether let the Mute signal affect the movement of beam in JOG mode. ● To select **Close on**, the beam moves downwards fast when the Mute signal is turned OFF, and the beam moves downwards slowly when the Mute signal is turned ON. ● To select **Close off**, the Mute signal is turned ON always, and the beam moves downwards slowly.

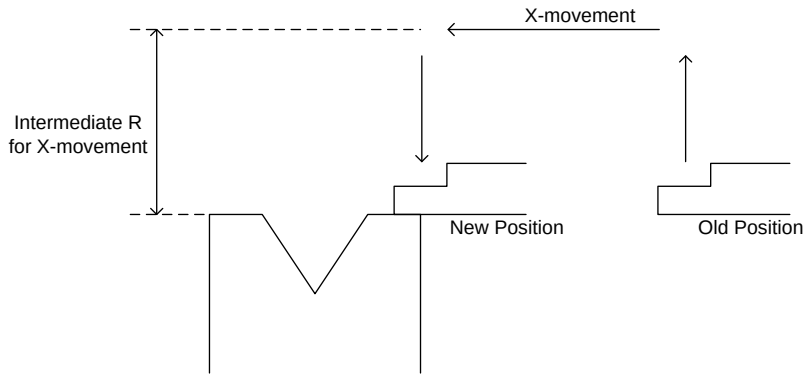
Parameter	Description
X Safe Distance	Set a safe distance for the movement of X-axis, as shown in the following figure, when the programmed positon of X-axis is in the area covered by solidus, it will move at a low speed always.  The X-axis moves slowly in the area covered by solidus

3.6 Constant

The commonly used parameters are displayed on **Constant** page. Table 3-5 list these parameters and their description.

Table 3-5 The description of the parameters on **Constant** page

Parameter	Description
Language	Select a desired language for the pages.
Unit	Select a desired length scale for the dimensions. E300 can convert the current dimensions automatically when you change this parameter.
Count Mode	Select a desired stock count mode. ● To select **Cnt Up**, the stock counter in production mode is increased by 1 after each product cycle. ● To select **Cnt Down**, the stock counter in production mode is decreased by 1 after each product cycle. When the counter has reached 0, the control is stopped. Down counting can be useful if a pre-planned quota must be produced. Up counting could be used to give a report on production progress.
Wait Retract	In the case of a retract, let the Y-axis wait until the retract is finished. ● To select **Yes**, when the Y-axis reaches the clamping point, the Y-axis is stopped and the retract is started. When the retract is completed, the Y-axis moves on. ● To select **No**, the retract is started when the Y-axis passes the clamping point, the Y-axis does not stop.
System Time	Set to a proper time for the system. The format is **yyyy/MM/dd HH:mm:ss**. For example, 2015/11/23 14:51:00.
Decompression Time	Set the duration for the decompression process. This parameter affects the time for tuning ON the valve of **Decmp**.

Parameter	Description
Set Change Time	Set a waiting time for entering next step when the previous step is completed.
Intermediate R	Temporary position for the R-axis, to avoid collision as a result of movement of the X-axis. The value 0 disables this functionality. When programmed not equal to zero this position will be active when the X-axis has to move inside the safety zone of the die. The sequence will be as follows: a. The R-axis is moved to the intermediate position; b. then the X-axis is moved to its intended position; c. finally the R-axis is moved to its intended position. 

3.7 Teaching

3.7.1 Material Table

E300 can automatically calculate the bend depth according to the **Material Table** set in the programming, which is depended on the material table set by the user in the system parameters.

To get the desired bending accuracy, it is necessary to consider the material is flexible for reducing the bending error. E300 provides users with six pre-numbered materials, which can affect the actual bending depth in Single-Step and Multi-Step program.

To set the **Material Table**, type the password **1212** to enter **TechIn Para** page and select **Material Table** option, and press **ENTER** key to enter **Material Table** page, as shown in Figure 3-20.

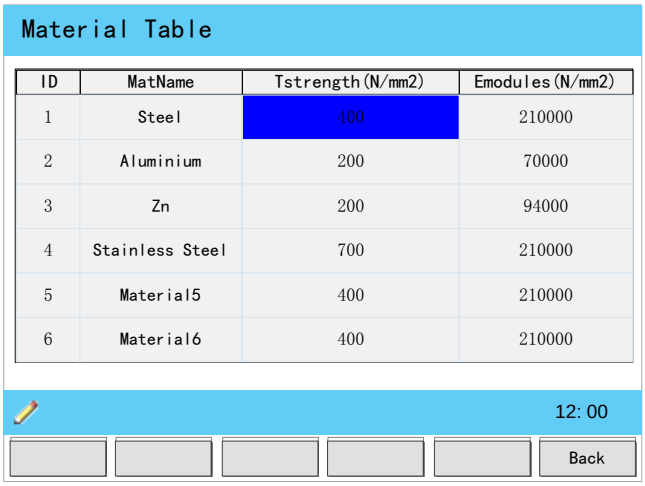


Figure 3-20 **Material Table** page

In the **Material Table**, you shall set the parameter **Tstrength** and **Emodules** for each material. Both of their unit are N/mm² . You can modify the parameters according to the actual requirements of the workpiece; however, it is recommended that users keep in mind their **ID**.

In order to obtain the position values of the servo axes, the user needs to perform **Teaching** operation before the bending process, which can indicate the current position of the servo axis.

The diagram of machine coordinate system is as shown in Figure 3-21. You can refer to this diagram to complete the teaching value of the measurement and set.

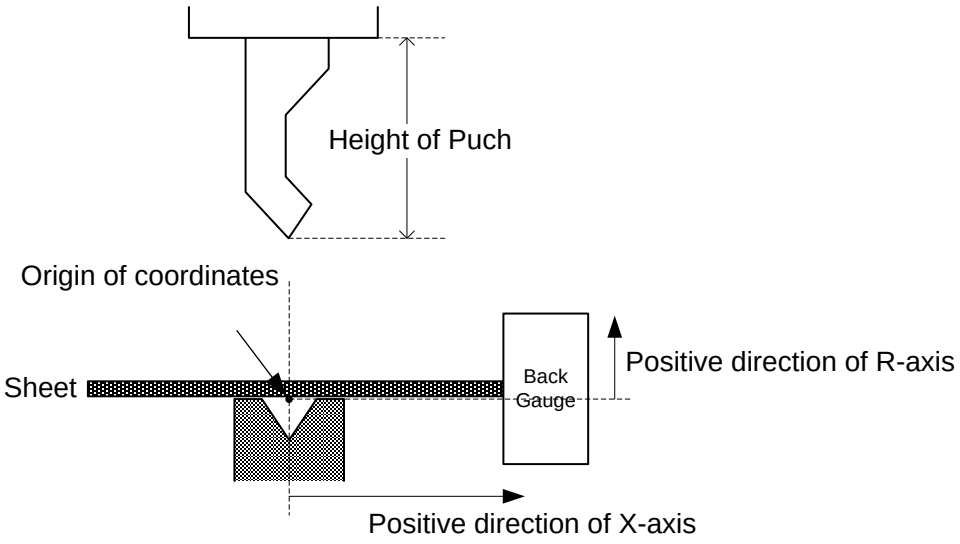


Figure 3-21 Coordinate system of machine

Type the password **1212** in **Constant** page to enter **TechIn Para** page, as shown in Figure 3-22.

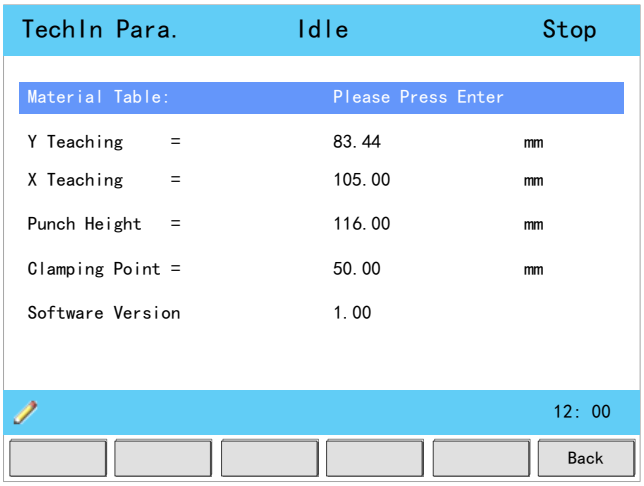


Figure 3-22 **TechIn Para** page

Press the arrow keys **UP** and **DOWN** to select a parameter, and type the desired value for them.

3.7.2 Teaching Operation

Y Teaching and Clamping Point

The purpose of teaching Y-axis is obtaining the comparative positon value of clamping point. When you teach Y-axis, it is necessary to estimate the position value of the Y-axis in advance. For example, if the position of the Y-axis is estimated to be 50mm, and the procedure is as follows:

Step 1 Select the parameter **Y Teaching** in **TechIn Para page**, and set it to **50**.

Step 2 Return to the Single-Step page, and set the parameter **Angle** to **180**, and the other parameters can be set arbitrarily.
In general, when the machine is in clamping, the punch just against the top of the sheet, so the bending Angle is set to 180, in order to ensure that the sheet was clamped.

Step 3 Run the device, and record the Y-axis position displayed on the device when the process is in **Dwell**.

Step 4 Enter the **TechIn Para** page again, and fill the recorded value in the parameter **Clamping Point**.

INFO	The relation between **Y Teaching** and **Clamping Point** is comparative. If the position of Y-axis has been changed, you must perform the above procedure for obtaining the value of **Clamping Point** again.

----End

X Teaching

To teach the X-axis, you can measure the actual position of the X-axis, that is to say, measure the

linear distance between the V-opening center of the die and back gauge.

Although there are many methods for teaching X-axis, their purpose is to ensure the processing accuracy. It is recommended that the user can run the machine once after roughly measuring the distance, that is, program a simple Single-Step program. For example, the measurement of the X-axis distance of 100mm, and the procedure is as follows:

Step 1 Select the parameter **X Teaching** in **TechIn Para** page, and set it to **100**.

Step 2 Return to the Single-Step page, and set the parameter **X-axis** to **100**, and the other parameters can be set arbitrarily.
Here we need not to consider the error from the machine itself.

Step 3 Run the machine. When the bending step has been completed, measure and record the worked sheet.

Step 4 Enter the **TechIn Para** page again, and fill the recorded value in the parameter **X Teaching**.

INFO	It is necessary to perform the above procedures for several times for ensuring the accuracy of the working.

----End

R Teaching

To teach the R-axis, you can measure and record the actual position of the R-axis directly, that is, measure the vertical distance between the top of the die and the back gauge. Then, enter the **TechIn Para** page again, and fill the recorded value in the parameter **R Teaching**.

3.8 Data Operation

3.8.1 Backup and Resume

You can back up and resume the machine parameters in E300 device. When you have completed the parameter modification, the current settings can be saved, in order to prevent errors that occur afterwards.

To set the opening function, type the password **14789** to enter **Para** page and select the **Back/Resume** option. Press **ENTER** key to enter **Backup/Resume** page, as shown in Figure 3-23.

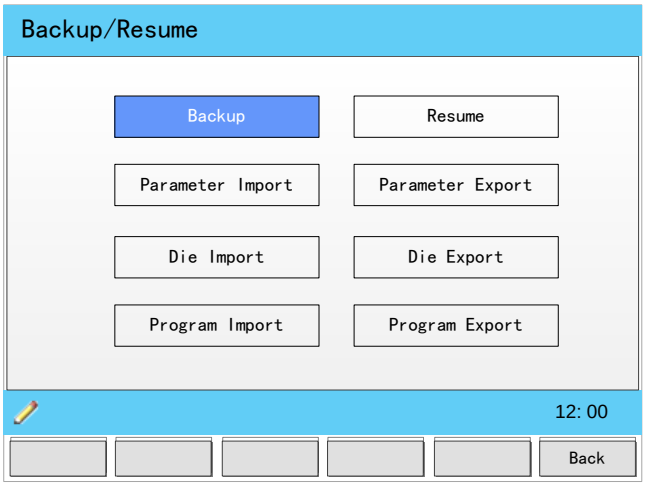


Figure 3-23 **Backup/Resume** page

INFO	The parameters can be back up, including the **System Parameters**, **Port Configurations** and all of the **Axis Parameters**.

Backup Parameter

Select **Backup** on **Backup/Resume** page, and press **ENTER** key to perform this operation. After a while, the page can pop up a dialog box: **Backup Success!**

Resume Parameters

Select **Resume** on **Backup/Resume** page, and press **ENTER** key to perform this operation. After a while, the page can pop up a dialog box: **Resume Success, Please Restart!** Then, repower up the device to take effect the settings.

3.8.2 Import and Export

Please prepare a U-disk for the Import operation and Export operation, and insert it into the USB port of the device. Then, perform the desired operation on **Backup/Resume** page.

The data files are imported from or export into the root directory of the U-disk, and Table 3-6 lists their description.

Table 3-6 The description about the format of the data files

Category	File Name	Description
Parameters	E300_ParConfig.ini	The parameters can be imported and exported, including the **System Parameters**, **Port Configurations** and all of the **Axis Parameters**.
Die	E300_DIEConfig.ini	The die parameters are set on **Die** page.

Category	File Name	Description
Programs	E300_ProgConfig.ini	The programs dates are set on **Program** page, including the parameters set on **Multi-Step** page.

Import Data

Data importing refers to the E300 device reads the relevant files from the U-disk and loads into the inside of the device. Please check whether the data files are in the root directory of the U disk before inserting it.

According to your requirements, select the desired option **Parameter Import**, **Die Import** or **Program Import** on **Backup/Resume** page. And the page can pop up a dialog box **Importing *XX***. After a while, the page can pop up a dialog box: **Import *XX* success!** In which, *XX* indicates **Parameter**, **Die** or **Program**.

If the page pops up a dialog box: **Import *XX* failed!** Please check whether the U-disk can read and write, whether the desired data file can be found, or whether the USB port is intact.

Export Data

Data Exporting refers to the E300 device transfers the data file into the U-disk. Please check whether the U-disk has sufficient storage space and keep the U-disk can read and write.

According to your requirements, select the desired option **Parameter Export**, **Die Export** or **Program Export** on **Backup/Resume** page. And the page can pop up a dialog box **Exporting *XX***. After a while, the page can pop up a dialog box: **Export *XX* success!** In which, *XX* indicates **Parameter**, **Die** or **Program**.

If the page pops up a dialog box: **Export *XX* failed!** Please check whether the U-disk can read and write, or whether the USB port is intact.

- If you fail to import the data, export the data, or unable to update the software, as well as crash during the operation, please backup the data of the U-disk and formatting the u-disk by FAT/FAT32 file system. Then try again.
- The maximum space of the U-disk is 16 Gb.

Chapter 4 Diagnostics

E300 device provides with some diagnostics pages, which can help you check the hardware. This chapter guides you how to perform the relevant operation by using these pages.

To set the opening function, type the password **5656** to enter **SystemDiag** page.

	Please let the professional or under the guidance of them to perform these operations.

4.1 Inputs Diagnostic

Function

Check whether the wiring of input ports is correct or whether they were turned on.

Description

Press arrow keys **RIGHT** and **LEFT** to select **Input** label on **SystemDiag** page, as shown in Figure 4-1.

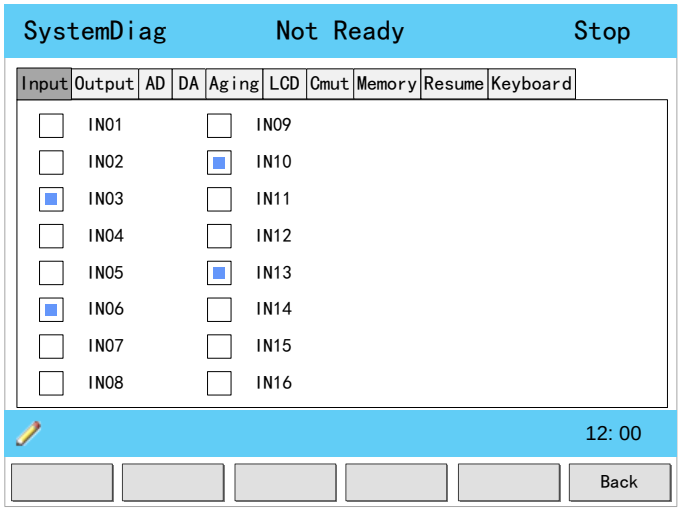


Figure 4-1 Input diagnostic page

Turn the relay switch of the corresponding port to change their signals, and the E300 device shall detect changes in them.

In which, the quadrate symbol front each port number indicates the status of their signals. ▣

indicates the High-level, while ☐ indicates Low-level. Please follow the results displayed on this page to check:

- ❑ If the corresponding relay switch has been turn from OFF to ON, the symbol is changed from ▣ to ☐ on the page, and vice versa, please check whether the wiring of the port was reversed.
- ❑ If the symbol is always not changed on the page no matter how turn the corresponding relay switch, please check whether the wiring of the port was intact.
- ❑ If another symbol on the page is changed when you turn the relay switch, please check whether the wiring of the port was correct.

4.2 Outputs Diagnostic

Function

Check whether the wiring of output ports is correct or whether they were turned on. Certainly, you can manually turn on the output port by this page.

Description

Press arrow keys **RIGHT** and **LEFT** to select **Output** label on **SystemDiag** page, as shown in Figure 4-2.

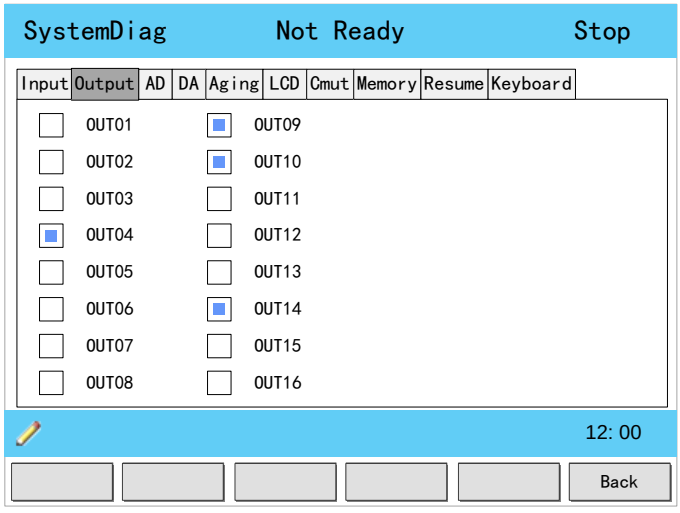


Figure 4-2 Output diagnostic page

Press arrow keys to select the desired port ID, then press ± key to change the output status (level), and check whether the corresponding relay jumps.

In which, the quadrate symbol front each port number indicates the status of their signals. ▣ indicates the High-level, while ☐ indicates Low-level. Please follow the results displayed on this page to check:

- ❑ If the symbol has been changed from ☐ to ▣ on the page, the corresponding relay switch is turned from ON to OFF, and vice versa, please check whether the wiring of the port was reversed.
- ❑ If the corresponding relay switch is always not jumped no matter how change the symbol on the page, please check whether the wiring of the port was intact.
- ❑ If the symbol is always not changed on the page whatever turn the corresponding relay switch, please check whether the wiring of the port was intact.
- ❑ If another relay switch is jumped when you change the symbol on the page, please check whether the wiring of the port was correct.

4.3 AD Diagnostic

Function

Check whether the analog input status is correct. In addition, you can calibrate voltage by this page.

Description

Press arrow keys **RIGHT** and **LEFT** to select **AD** label on **SystemDiag** page, as shown in Figure 4-3.

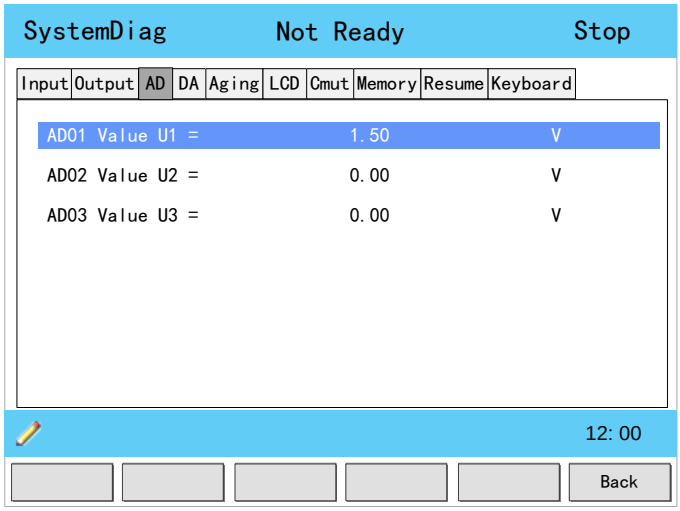


Figure 4-3 AD diagnostic page

AD, Analog to Digital, which is converted analog signal into digital signal. Properly wiring the motor according to the wiring diagram, and when the motor is running, this page can display the feedback voltage from the potentiometer.

4.4 DA Diagnostic

Function

Check whether the analog output status is correct.

Description

Press arrow keys **RIGHT** and **LEFT** to select **DA** label on **SystemDiag** page, as shown in Figure 4-4.

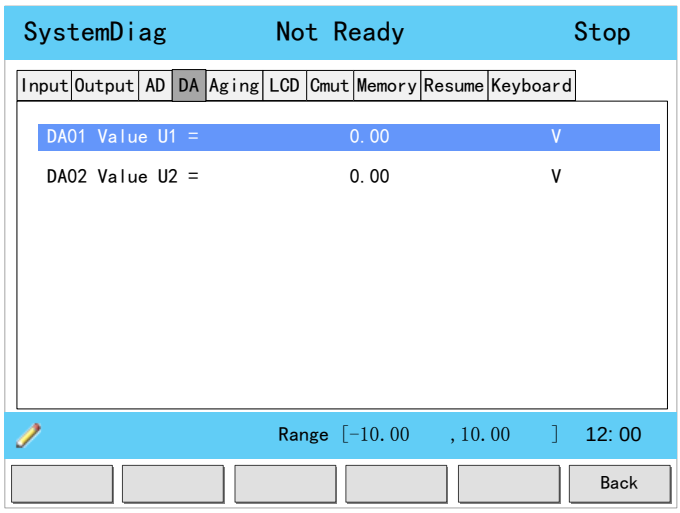


Figure 4-4 DA diagnostic page

DA, Digital to Analog, which is converted digital signal into analog signal. For example, select the parameter **DA01 Value U1** on the page, and set it to a certain value, then detect the corresponding output port by using the multimeter, and watch whether the measured value is consistent with the set value.

4.5 Aging

Function

This function is applied to running the hardware and the software. In general, electronic products are required to perform this operation process to ensure that the product is more reliable.

Description

Press arrow keys **RIGHT** and **LEFT** to select **Aging** label on **SystemDiag** page, as shown in Figure 4-5.

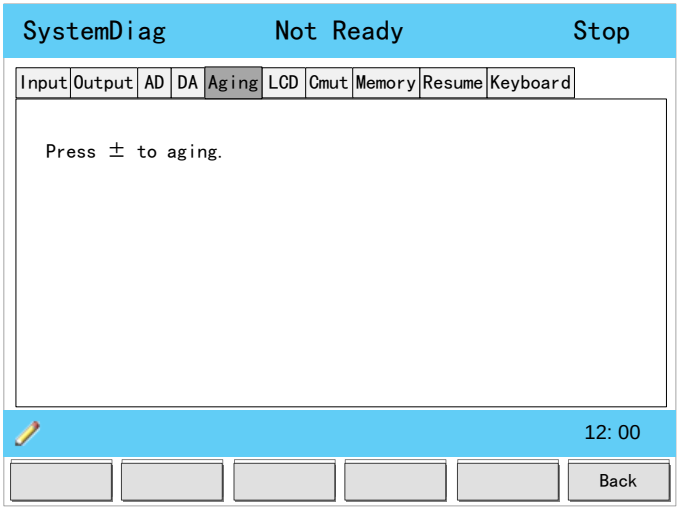


Figure 4-5 Aging page

Follow the prompts on the page, press ± key to start aging. During this operation, the device can turn on all the output ports at intervals of 1 second, and then turn off them at intervals of 1 second, and so on.

⚠	This operation has been performed before the device leaves the factory, so the user shall not perform it again. If necessary, please let the professional or under the guidance of them to perform this operation.

4.6 LCD Diagnostic

Function

This function is applied to detect whether there is any bright spots or dark spots on the screen.

Description

Press arrow keys **RIGHT** and **LEFT** to select **LCD** label on **SystemDiag** page, as shown in Figure 4-6.

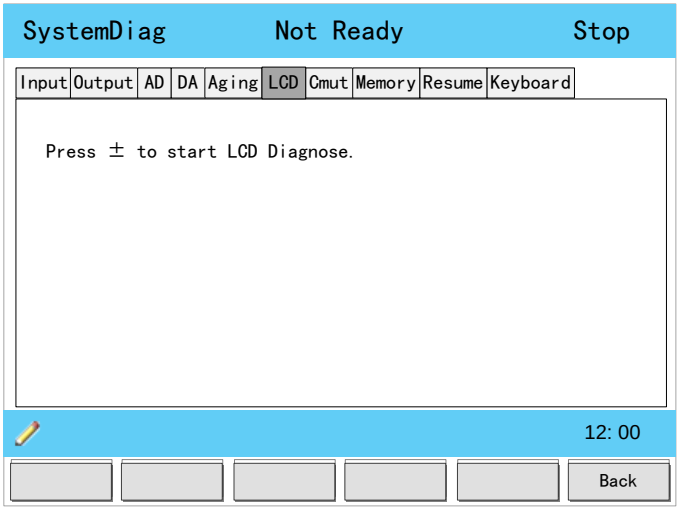


Figure 4-6 LCD diagnostic page

Follow the prompts on the page, press ± key to start LCD diagnostic. During this operation, the screen can continue to switch in a variety of background colors, so that users find the bright spots or dark sports in the screen. Press any key to return.

4.7 Communication Diagnostic

Function

Check whether the wiring of communication port is correct or intact.

Description

Press arrow keys **RIGHT** and **LEFT** to select **Cmut** label on **SystemDiag** page, as shown in Figure 4-7.

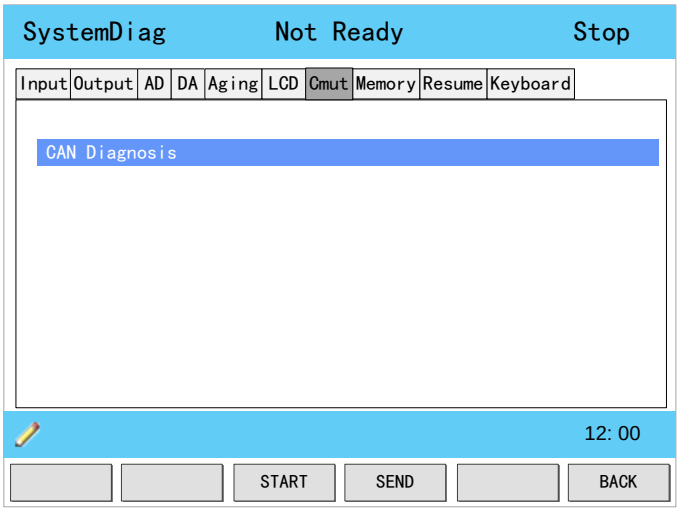


Figure 4-7 Communication diagnostic page

Connect two E300 devices by using the communication cable, and both of them enter communication diagnostic page. Press the **F3** key (START) on one device, then press **F4** key (SEND) on the same device, wait for a while, the page can display the result. And then, perform the same operation on the other device again.

If the diagnostic is failed, check whether the cable is intact and whether the wiring of the port is correct.

4.8 Memory Diagnostic

Function

Check whether the internal memory of the device is available.

Description

Press arrow keys **RIGHT** and **LEFT** to select **Memory** label on **SystemDiag** page, as shown in Figure 4-8.

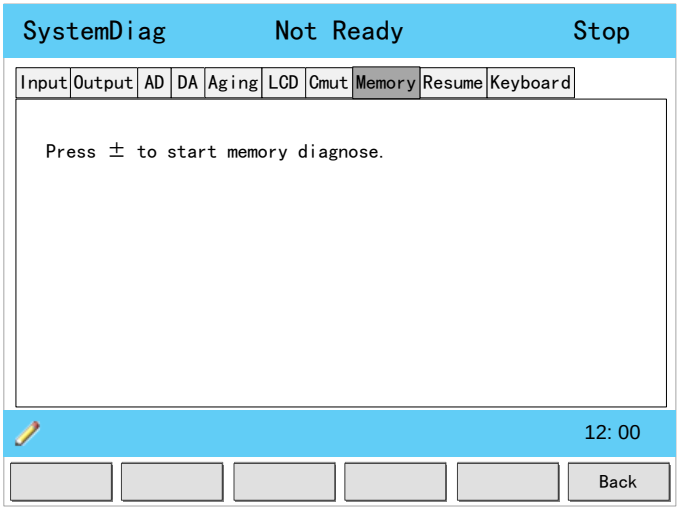


Figure 4-8 Memory diagnostic page

Follow the prompts on the page, press ± key to start memory diagnostic. During this operation, the device automatically diagnoses the memory, and feedback the result on the page.

4.9 Restore

Function

Perform this operation can restore all the parameters on **Constant** page and **Para** page, including

Port Settings, Axis Parameters and System Parameters to the default value.

<**Note**>: the program parameters cannot be restored by this operation.

Description

Press arrow keys **RIGHT** and **LEFT** to select **Resume** label on **SystemDiag** page, as shown in Figure 4-9.

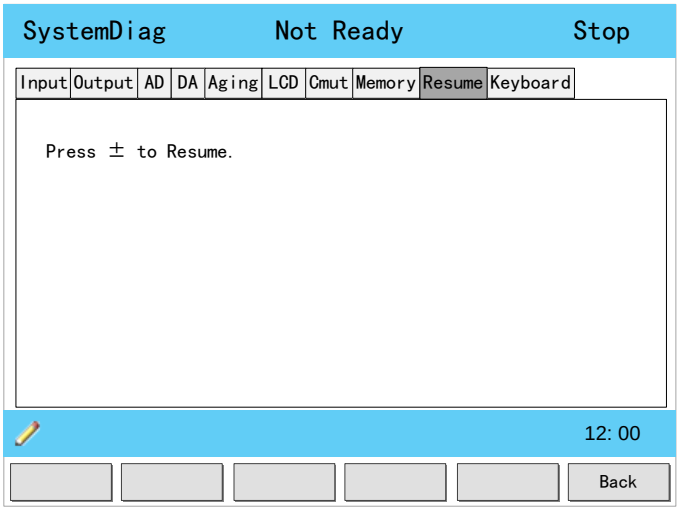


Figure 4-9 Restore page

Follow the prompts on the page, press ± key to start restore operation. When this operation has been done, the use shall repower up the device to take effect the settings.

4.10 Keyboard Diagnostic

Function

Check whether the keys on the panel are available.

Description

Press arrow keys **RIGHT** and **LEFT** to select **Keyboard** label on **SystemDiag** page, as shown in Figure 4-10.

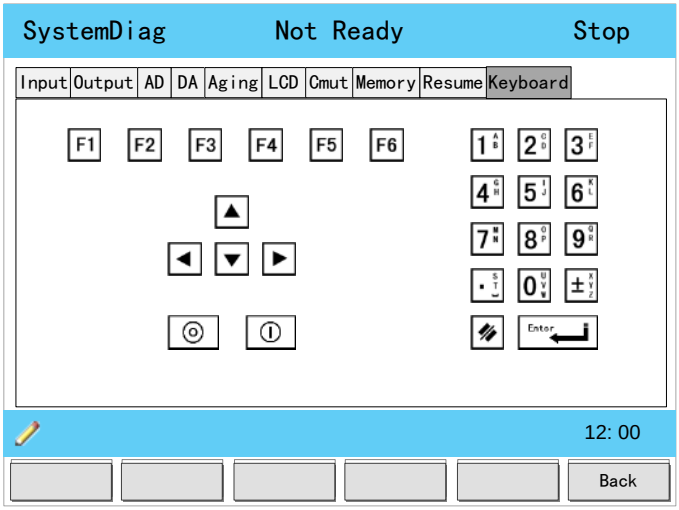


Figure 4-10 Keyboard diagnostic page

Press down the keys on the panel, and watch whether the corresponding background color of the button is changed on the screen.

- If the background color has no change, maybe the corresponding wiring of the key was loose or disconnected, please check it.
- If the non-corresponding background color has changed, indicating the connection of the key was error, please check and reconnect it.

Chapter 5 Commissioning

There are many ways for the commissioning of the machine, and this section gives some guidance for the user, which can make the device combine with the machine better.

5.1 Preparation

Please check the wiring carefully!
Before commissioning, focus on the connection of inputs and outputs, due to the wrong connection may damage the device.

Make sure you have completed the following proceedings before performing the commissioning.

- ❑ Check whether the power cord, ground wire, inputs/outputs cable and encoder plug is correct.
- ❑ Check whether the power supply voltage is in the correct range.
- ❑ Make sure the DC power supply to the device is normal.
- ❑ Make sure you have completed the above proceedings, and then turn on the air switch.
- ❑ Check whether the power supply and ground wire is normal before power up the device.
- ❑ The commissioner must have the relevant theory and operational knowledge.
- ❑ All the ports have been allocated by the device.
- ❑ All the parameters have been set properly by the device.
- ❑ If the machine cannot work properly, please check the electrical of the machine.

5.2 Check Signals

Follow the below procedure to check the whether the wiring of input / outputs ports.

1. Press **F6** key to enter **Constant** page, when the device is powered up.
2. Type the password **5656** to enter **SystemDiag** page.
3. See the section **4.1 Inputs Diagnostic** to check the input signals.
   In general, you shall check the **Pump** signal first, and then check **Open**, **Pedal**, **UDP** and other input signals.
4. See the section **4.2 Outputs Diagnostic** to check output signals.

5.3 Allocate Valves

The commissioner shall acquire the system wiring diagram, which can be referred to set the valves.

Type the password **14789** to enter **Para** page, and then choose **Port Config** > **Valve Config**.

You shall learn and know the repeater connection of the output ports in the system wiring diagram, and set the desired output port in the corresponding process.

For details about allocating the valves, see the section **3.3.3 Valves Allocation**.

5.4 Set Servodrive

The movement of each axis in the machine is controlled by the motors, and the motor is controlled by the servodrive. So, it is necessary to set the parameters of the servodrive properly.

There are two serials of servodrive can be used in E300 device, ProNet and EDS. In which, EDS is a dual-axis servo drive, that is, a drive can simultaneously control the movement of two axes.

For details about setting the parameter of the servodrive, see the section **Appendix B Servodrive Settings**.

5.5 Set Parameters

5.5.1 Set Servo Parameters

Please record the settings of the servodrive parameters, and then type the password **14789** to enter **Para** page, and then set the each Axis parameters. For details about the description of parameters, see the section **3.4.1 Servo-Axis.**

We take the setting of X-axis as the example for the procedure.

Step 1 Type the password **14789** to enter **Para** page, and choose **X-axis PARM** option.

Step 2 Set the parameter **Servo** (Servo type) and **Servo ID** (on the page 2).
If the servo type is EDS, you also shall set the parameter **Logic ID**.

Step 3 Repower up the device to make sure the device is communicated with the servo properly.

Step 4 Enter the **X-axis PARM** page again, and set the parameters **FactA** and **FactB**.

Step 5 Set the parameter **Tech** to **Enable** (on the page 1).

Step 6 Return to **Constant** page and type the password **1212** to enter **TechIn Para** page.

Step 7 Perform the teaching operation for X-axis.
The teaching operation is intended to facilitate the control device to record the current position of the X-axis, so that the movement of the X-axis can be controlled accurately.

Step 8 Set the parameters **Reference Position** and **Acc/Dcc Time**.

----End

5.5.2 Adjust Movement

Since the motor may be mounted in an uncertain direction, you shall set these parameters for your actual application. **Motor Rev** indicates the rotation direction of the motor, and **Encoder CNT** indicates the feedback information from the encoder.

You need not to know the actual rotation direction of the motor, but try to combine **Motor Rev** with **Encoder CNT** for the motion, and keep the movement of the X-axis is met the desired.

To adjust the movement, you shall enter **Manual** page, and manually moving the axis to confirm the direction of movement of the servo axis. Table 5-1 gives the corresponding correct operation and adjustment results.

Table 5-1 Corresponding correct operation and adjustment results

Keys	Servo-Axis	Direction	Encoder
+	Y	Downward	Increasing
	X	Backward	Increasing
	R	Upward	Increasing
−	Y	Upward	Decreasing
	X	Forward	Decreasing
	R	Downward	Decreasing

If the actual axis movement direction and encoder count direction are different, you can modify the parameter **Motor Rev** or **Encoder CNT** of the corresponding axis separately.

INFO	Table 5-1 lists the adjustment requirements, that is, the adjustment results we wanted. However, this may be different from the options on the page, which is just easy to distinguish. In addition, you also shall check whether the limited switch is correct during the manual movement.

5.6 Search Reference

If the parameter **Tech** was set to **Disable**, search reference as the method for teaching the current position value is employed.

Search reference, which is a function to search the reference point by the **HOME** signal from the servo. And make sure the input signal from the servo is **HOME** signal at the same time.

In addition, the user shall set the parameters **SearchDir** and **Reference Position**, and then repower up the system. The X-axis can orientate according to the set **Reference Position** from the next movement.

- **Reference Position**: In general, this value is the distance between the sensor (e.g. proximity switch) and a certain position (e.g. midline of V-opening).
- **SearchDir**: When search reference is employed, you shall set the direction of X-axis for the forward or backward. There are two options for this parameter, **Increased** and **Decreased**, which indicates the feedback status of the encoder. The purpose of setting this parameter is to let the X-axis move towards the reference position.

5.7 Beam Testing

There are three operation modes in the E300 device, and you shall enter these three operation modes respectively to test action of the beam.

JOG

Turn the **Mode Switch** to **JOG**, and watch whether the top right corner of the display is **JOG**. If not, check the wiring of input port **Jog**.

In the **JOG** mode, the beam can carry out two processes, Fast-Closing and Pressing. The action of the beam is controlled by the input signals **Open** and **Pedal**. When the **Open** or **Pedal** is turned from OFF to ON, the beam can move follow the change of the level. i.e., move when level is high and stop when the level is low.

Single

Turn the **Mode Switch** to **Single**, and watch whether the top right corner of the display is **Single**. If not, check the wiring of input port **SNGL**.

In the **Single** mode, it is necessary to keep the input signal **Pedal** to H-Level until the process is in Decompression for fulfilling a complete bending step.

Continuous

Turn the **Mode Switch** to **Single**, and then type the password **14789** to enter **Para** page. Select

System PARM to enter the page 2 of the **System PARM** page. Set the parameter **Automatic** to **Enable**. When you return to the main pages, watch whether the top right corner of the display is **Continue**.

In the **Continuous** mode, the system can change the step automatically when one bending step has been completed.

5.8 Check Retract

Retract, usually refers to X-axis retract, which is to avoid the collision between back gauge and sheet.

In general, when the beam move to the Mute point, the MUTE signal can be turned from OFF to ON, the X-axis can perform the retract operation after a retract delay time if necessary, and the beam continue to move after the retract has been done.

The full operation about the retract is as below, and you can check whether the machine is in accordance with the following steps.

Step 1 When the retract is started, the system calculates the setting value of the parameter **Retr. DLY**.

Step 2 If the **Wait Retract** is set to **Yes**, the beam will wait for the X-axis retract has been done, and then continue to move.
If the **Wait Retract** is set to **No**, the beam moves downwards without waiting for the X-axis retract.

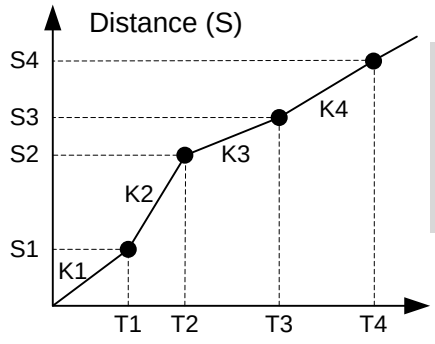
Step 3 When the X-axis retract has been done, it will not move until the next bending step starts.

----End

5.9 Set Opening

E300 can control the opening according to your programming. When the beam reaches the mute in opening process, the opening settings takes effect. According to your custom, program the linear relation between opening **Distance** and opening **Time**. Since E300 can calculate the time for turning on the valve of opening, you do not care what method you should set.

The Opening table is used for programming the linear relation between opening **Distance** and opening **Time**. All in all, E300 calculates the time for turning on the valve of opening by this linear relation, as shown in Figure 5-1.



Kn is the slope of each segment. When the Opening is enabled, E300 calculate the time for turning on the valve of opening according to this linear relation.

Figure 5-1 Linear relation between **Distance** and **Time**

To set the opening function, type the password **14789** to enter **Para** page and select **System PARM**. Press arrow key **LEFT** to enter the page 2 of System parameters.

There are many methods for programming the opening, and the following procedure is one of them.

Step 1 Type the password **14789** to enter **Para** page and select **System PARM**. Press arrow key **LEFT** to enter the page 2 of System parameters.

Step 2 Set the parameter **Opening** to **Enable**.

Step 3 Set the parameter **Opening Mode** to **Time**.

Step 4 Return to Single-Step page, and edit any Single-Step programming, which you need to set the parameter **Opening** to a certain time value. For example, set it to **1** second.

Step 5 Run and perform one bending step, when the beam stops (the opening had been completed), measure the distance between Mute and the current positon of beam.
That is, you have got one group of data about opening **Distance** (S) and opening **Time** (T).

Step 6 Repeat 3.5.1 Step 5 to 3.5.1 Step 6 to get other three groups of the data.
It is necessary to set the opening **Time** to greater than previous value.

Step 7 Enter the page 2 of System parameters again, and select parameter **Opening Table**. Press **ENTER** key to enter **Opening Table** page

Step 8 Fill the 4 groups of data you have got into this page, as shown in Figure 5-2, which is an example of programming.

Distance(mm)	Time(s)
89.90	1.00
256.18	2.00
640.40	3.00
1000.00	5.60

Figure 5-2 An exampling of programming

Step 9 Validate your opening programming.

1. Enter the page 2 of System parameters and Set the parameter **Opening Mode** to **Distance**.
2. Return to Single-Step page, and edit any Single-Step programming, which you need to set the parameter **Opening** to a programmed distance value.
3. Run and perform one bending step, when the beam stops (the opening had been completed), count the time between Mute and the current positon of beam.
4. Properly adjust the value of them according to the result.
   Certainly, the above steps shall be performed for many times.

----End

5.1 Change Step

Change step, that is, when the previous bending step has been completed, the system will enter the next bending step.

To fulfill the change step, it is necessary that the system determines the beam has completed all the process such as Fast Closing, Pressing, Dwell Time, Decompression and Opening in one bending step.

If the dwell time has not finished in one bending step, and the input signal **Open** is turned from OFF to ON at this time, the change step is invalid (no change for the workpiece counting). Unless an external logic function (e.g. PLC) was added into the system, and let the input signals **UDP** and **Pedal** are accessed into the system, or the change step is also invalid.

5.2 Angle Programing Testing

Although the E300 device can automatically calculate the bend depth according to the set angle, it is necessary to set the following parameters, as shown in Table 5-2.

Table 5-2 The necessary parameters to be set

Item	Refer to
Die	According to the actual requirements to fill out the relevant technical parameters on **Die** page.
Thickness	According to the actual thickness of the sheet to set the parameter Thickness on Single-Step page and Multi-Step page.
Material	Type the password **1212** to enter **TechIn Para** page and select **Material Table** option, and press **ENTER** key to enter **Material Table** page, and fill out the relevant technical parameters.
Clamping Point	Type the password **1212** to enter **TechIn Para** page and program the parameter **Clamping Point**, for details see the section **3.7.2 Teaching Operation**.

We take the Die **ID** is **1** as the example, and the procedure of testing the angle programming is as following:

Step 1 Enter **Die** page, and fill out the parameters **Height**, **V-width**, **Angle**, **Radius**, and **SafeZone** where the **ID** is **1**.

Step 2 Measure the height of current punch, and then enter **TechIn Para** page, and set the parameter **Punch Height** to the measured value.

Step 3 When the punch is changed, it is necessary to modify the above parameter, and the value of the parameter **Clamping Point** can be corrected automatically.

Step 4 Determine the parameter **Clamping Point**.
The following describes a method for teaching the clamping point, what need you estimate the position value of the Y-axis in advance. For example, if the position of the Y-axis is estimated to be 50mm.

1. Select the parameter **Y Teaching** in **TechIn Para page**, and set it to **50**.
2. Return to the Single-Step page, and set the parameter **Angle** to **180**, and the other parameters can be set arbitrarily.
   In general, when the machine is in clamping, the punch just against the top of the sheet, so the bending Angle is set to 180, in order to ensure that the sheet was clamped.
3. Run the device, and record the Y-axis position displayed on the device when the process is in **Dwell**.
4. Enter the **TechIn Para** page again, and fill the recorded value in the parameter **Clamping Point**.

Step 5 Program a Single Step process with an arbitrary angle, and measure whether the bending angle is in accord with the programmed.

If measuring result is incorrect, repeat the above steps until you have get the desired result.

----End

Chapter 6 Maintenance

6.1 Instructions to maintenance

Follow the below instructions to safely and properly use the device.

- ❑ Never open the cover plate or panel as it may damage the components, when the power is on or the system is running.
- ❑ Let the professional to perform the wiring and check operations.
- ❑ Never touch the IC pin or contact of joint.
- ❑ Never place the device on the metal that can cause leakage, and never place it on static wood, plastic or vinyl products.
- ❑ If there is an alarm message displayed on the page, you shall try to find the cause according to the alarm message, and clear the fault. When you have released the alarm, you can repower up the device if necessary.
  For details about the alarm message, see Appendix D Alarm List.
- ❑ Please use the voltage specified in the manual as it may damage the circuit.
- ❑ Never mistake the terminals connection.
- ❑ Never mistake the positive and negative terminals of the power supply.
- ❑ Keep control and communication cable away from main line or strong electric power lines at least 100mm.

6.2 Daily Maintenance

Table 6-1 lists the proceedings for the daily maintenance.

Table 6-1 Proceedings for the daily maintenance

No.	Item	Details	Requirement	Solution
1	The mounting status of the device	Check whether the set screw is loosening, and whether the seal is dropped.	The device shall be mounted properly.	Fasten the screws.
2	The connection status of IO ports	Check whether the wiring of the IO ports is loosening.	The wiring of the IO port shall be properly connected.	The wiring of the IO port shall be properly connected.

No.	Item	Details	Requirement	Solution
3	Connection status of the connectors	Check whether the screws in the connector are loosening.	The screws in the connector shall not be loosening.	Fasten the screws.
4	Display status	Check whether the display is normal.	—	—

6.3 Periodic Maintenance

Table 6-2 lists the proceedings for the periodic maintenance, which shall be performed once or twice every 6 months to 1 year. These operations shall be also performed if the device has been removed or remodeled, or if the wiring has been changed.

Table 6-2 Proceedings for the periodic maintenance

No.	Item		Details	Requirement	Solution
1	Surrounding	Temperature	Measure the temperature with a thermometer, measure the humidity with a hygrometer, and determine if there is any corrosive gas.	0 to 40 ℃	—
		Humidity		5% to 95% RH	—
		Air		No corrosive gas	—
2	Source Voltage	—	The voltage between the terminals shall be 24V DC	The effective range is from 20V to 29V DC	Change the power supply.
3	Mounting	Tightness, Activity	Try to move the components	The components must be mounted firmly.	Tighten the screws.
		Dust and foreign matter attached	Visual observation	No dust, foreign matter attached.	Clear up the surface.
4	Connection Status	The tightening of the terminal screws	Rotate with a screwdriver	No loosening	Tighten the screws.
		The tightening of the crimp terminal	Visual observation	The crimp terminals must be secured between an appropriate intervals	Try to adjust it.

No.	Item		Details	Requirement	Solution
		The tightening of the connector	Visual observation	No loosening	Tighten the set screws.
5	Relay	—	Multimeter and visual observation	The contact shall be attracting normally, and the impedance of the coil shall be a proper value.	Change the relay,

Appendix A Glossary

Glossary	Description
Axis	A reference direction, which can make the parts of the machine do the linear motion or rotation motion.
Machine Coordinate System	Cartesian coordinate system based on machine zero, which is fixed on the machine.
Computerized Numerical Control, CNC	Fulfill the numerical control the processing functions by the computer.
Reference Position	A fixed point along the axis, which can be referenced to the origin of the machine.
Hardware Limit	A limit position, which is mounted in the machine, can limit the movement of the parts.
Software Limit	A limit range, which is programmed in the device, can limit the movement of the parts.
Mute	A position where the process switches from Fast-Closing to Pressing.
DA (Digital to Analog)	To convert the Digital signal into the Analog signal. In general, decode the digital signal and convert into a corresponding level, which can form a step shape signal, and then perform a low-pass filtering.
AD (Analog to Digital)	To convert the Analog signal into the Digital signal. The analog signal is subjected to a line filter, and then samples the hold circuit to be a step shape signal, and then the step shape signal is converted into a binary code by the encoder, that is, the desired digital signal.
Upper Dead Point, UDP	The critical position for the movement of the beam, where the beam cannot continue to move upwards.
Punch	Also known as male mold, which is a die part forming the shape of the end face.
Die	Also known as female mold, which is a die part forming the shape of the outer.
Lower Dead Point, LDP	The critical position for the movement of the beam, where the beam cannot continue to move downwards. The theoretical position is at the lowest point of the V-Opening.
Fast Closing	One process of the bending step, which can make the beam moves to Mute fast.
Pressing	One process of the bending step, which can make the beam moves from Mute to bending point.
Dwell	In order to ensure the formation of the workpiece, it is necessary to keep the pressure for a period of time when the punch has been reached the bending point, against the tensile strength of the material.
Decompression	One process of the bending step, which can remove the pressure from the sheet.
Opening	One process of the bending step, which can make the beam moves towards the UDP.

Appendix B Servodrive Settings

E300 communicates the servo-axes (Y-axis, X-axis, and R-axis) with the CAN bus method to fulfill the control function, which has many advantages: the simple wiring, low cost, no servo zero floating, and never out of control. There are two kinds of servodrive for the communication: ProNet (Single-axis drive) and EDS (dual-axis drive).

⚠	The contents of this section are set according to the factory value of the E300 device. You need not to set the parameters of the E300 device any more. However, if the one of side (E300 or drive) changes the parameters, it is necessary to change other side and keep the settings in same.

B.1 EDS Settings

EDS is a dual-axis servo drive with two build-in servo parameters to control the operation of the motors.

<**Note**>: only one EDS servo drive can be used in the system.

The operation panel of the EDS is as shown in Figure B-1.

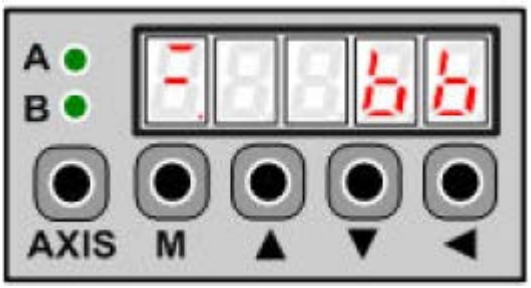


Figure B-1 The operation panel of the EDS

The indicator **A** is on, indicating the current display is A-axis parameters. The indicator **B** is on, indicating the current display is B-axis parameters. You can switch them by pressing AXIS key.

Table 6-3 lists the A-axis parameters shall be set.

Table 6-3 Set the A-axis parameters in EDS

Parameter	Value	Description
Fn001	—	Restore factory value.

Parameter	Value	Description
Pn006.0	3	Set control method of the drive to CAN bus. When power up the drive and device, they can communicate each other. If there is an error occurred, the drive can display the alarm No A.66.
Pn703	4	Set the communication rate of CAN bus. To keep the same setting between system and drive, this parameter shall be set to 4.
Pn704.0	—	Set the ID for the communication. Keep this setting same with the axis parameter **Servo ID** of the device. For example, when this parameter is set to 1, you shall set the parameter **Servo ID** to 1.
Pn000.1 Pn000.2	—	Set these parameters according to the connection of the signals P-OT and N-OT. ● In the case of no signals P-OT and N-OT is connected, set both of them to 1. ● In the case of the signals P-OT and N-OT are connected, set both of them to 0.
Pn509	32C0	Set whether to enable the homing (search reference point) function. The search reference shall be connected to pin 15 of the CN1 on the drive. This setting is only valid under CANopen protocol. If the search reference function is not employed, keep this parameter to default.
PN840.0	—	Set the encoder type according to the actual one, in general, the motor manual has been told you the encoder type. [3] 17-bit absolute encoder; [4] 17-bit incremental encoder; [5] Resolver; [6] Wire-saving encoder; [7] 20-bit absolute encoder; [8] 20-bit incremental encoder.
Pn840.2	2	According to the actual power of the motor to set. [2] 750W; [3] 1KW

EDS servo can drive two motors. In general, A-axis is used for driving 1KW motor, while B-axis is used for driving 800W motor. It is recommended that the A-axis is used to drive the Y-axis of the machine.

Since the parameters Pn006, Pn703, Pn704 are unable to set at B-axis, these parameters at A-axis can be mapped into B-axis automatically when you have set the these parameters in A-axis.

B.2 ProNet Settings

For the first time to connect the ProNet serials servo, you shall set the following parameters, as shown in Table B-1.

Table B-1 Set the parameters in ProNet

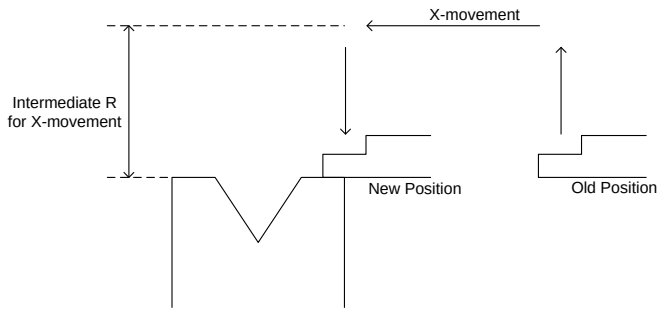
Parameter	Value	Description
Fn001	—	Restore factory value.
Pn006.0	3	Set control method of the drive to CAN bus. When power up the drive and device, they can communicate each other. If there is an error occurred, the drive can display the alarm No A.66.
Pn703	4	Set the communication rate of CAN bus. To keep the same setting between system and drive, this parameter shall be set to 4.
Pn704.0	—	Set the ID for the communication. Keep this setting same with the axis parameter **Servo ID** of the device. For example, when this parameter is set to 1, you shall set the parameter **Servo ID** to 1.
Pn000.1 Pn000.2	—	Set these parameters according to the connection of the signals P-OT and N-OT. ● In the case of no signals P-OT and N-OT is connected, set both of them to 1. ● In the case of the signals P-OT and N-OT are connected, set both of them to 0.
Pn509	32C0	Set whether to enable the homing (search reference point) function. The search reference shall be connected to pin 15 of the CN1 on the drive. This setting is only valid under CANopen protocol. If the search reference function is not employed, keep this parameter to default.
PN840.0	—	Set the encoder type according to the actual one, in general, the motor manual has been told you the encoder type. [3] 17-bit absolute encoder; [4] 17-bit incremental encoder; [5] Resolver; [6] Wire-saving encoder; [7] 20-bit absolute encoder; [8] 20-bit incremental encoder.

Appendix C Parameters Lists

	■ The double asterisk (**) at the front of the parameter indicates this parameter is displayed when you have updated the function. ■ You shall repower up the device when the following parameters are modified. Servo ID Servo Logic ID Axis Motor Rev Acc/Dec Time Search Dir Search Speed Position Tolerance

Constant

Language	**Default** 中文 **Range** 中文; English **Unit** — **Description** Select a desired language for the pages.
Unit	**Default** mm **Range** mm; Inch **Unit** — **Description** Select a desired length scale for the dimensions. E300 can convert the current dimensions automatically when you change this parameter.
Count Mode	**Default** Cnt up **Range** Cnt up; Cnt Down **Unit** — **Description** Select a desired stock count mode. ● To select **Cnt Up**, the stock counter in production mode is increased by 1 after each product cycle. ● To select **Cnt Down**, the stock counter in production mode is decreased by 1 after each product cycle. When the counter has reached 0, the control is stopped. Down counting can be useful if a pre-planned quota must be produced. Up counting could be used to give a report on production progress.

Wait Retract	**Default**	Yes
	Range	Yes; No
	Unit	—
	Description	In the case of a retract, let the Y-axis wait until the retract is finished. ● To select **Yes**, when the Y-axis reaches the clamping point, the Y-axis is stopped and the retract is started. When the retract is completed, the Y-axis moves on. ● To select **No**, the retract is started when the Y-axis passes the clamping point, the Y-axis does not stop.
System Time	**Default**	—
	Range	—
	Unit	—
	Description	Set to a proper time for the system. The format is **yyyy/MM/dd HH:mm:ss**. For example, 2015/11/23 14:51:00.
Decompression Time	**Default**	0.20
	Range	0.00 to 99.99
	Unit	s
	Description	Set the duration for the decompression process. This parameter affects the time for tuning ON the valve of **Decmp**.
Set Change Time	**Default**	0
	Range	0.00 to 9.99
	Unit	s
	Description	Set a waiting time for entering next step when the previous step is completed.
** Intermediate R	**Default**	5
	Range	0.00 to 99.99
	Unit	mm
	Description	Temporary position for the R-axis, to avoid collision as a result of movement of the X-axis. The value 0 disables this functionality. When programmed not equal to zero this position will be active when the X-axis has to move inside the safety zone of the die. The sequence will be as follows: a. The R-axis is moved to the intermediate position; b. then the X-axis is moved to its intended position; c. finally the R-axis is moved to its intended position. 

Material Table

ID	**Default**	—
	Range	1 to 6
	Unit	—
	Description	The number of the material, which shall be set on the programming page.
MatName	**Default**	—
	Range	Steel; Aluminum; Zn; Stainless Steel; Material5; Material6
	Unit	—
	Description	The name of the material, which is unable to set.
TStrength	**Default**	—
	Range	0 to 9 999 999
	Unit	N/mm^2
	Description	The tensile strength of the selected material.
EModulus	**Default**	—
	Range	0 to 9 999 999
	Unit	N/mm^2
	Description	The elastic modulus of the selected material.

TechIn Para

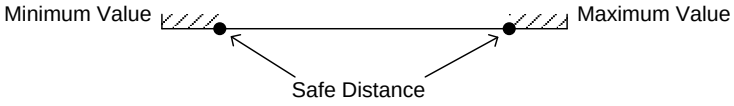
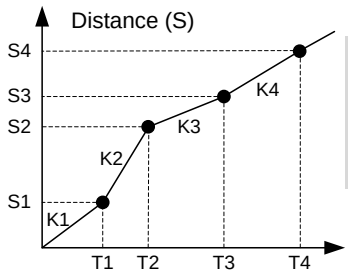
Y Teaching	**Default**	0
	Range	0.000 to 9 999.999
	Unit	mm
	Description	Set a taught position for Y-axis. See the section **3.7.2 Teaching Operation** to perform the teaching operation.
X Teaching	**Default**	0
	Range	0.000 to 9 999.999
	Unit	mm
	Description	Set a taught position for X-axis. See the section **3.7.2 Teaching Operation** to perform the teaching operation.
** R Teaching	**Default**	0
	Range	0.000 to 9 999.999
	Unit	mm
	Description	Set a taught position for R-axis. See the section **3.7.2 Teaching Operation** to perform the teaching operation.
Punch Height	**Default**	0
	Range	0.000 to 9 999.999
	Unit	mm
	Description	Set this value according to the technical parameters of the punch.
Clamping Point	**Default**	0
	Range	0.000 to 9 999.999
	Unit	mm
	Description	Set a taught position for the clamping point. See the section **3.7.2 Teaching Operation** to perform the teaching operation.

Software Version	**Default**	—
	Range	—
	Unit	—
	Description	Display the current version of the software.

System PARM

Y Decimal Digits	**Default**	2
	Range	0 to 4
	Unit	—
	Description	Set the number of decimal places of Y-axis. If the decimal places of the input value was exceeded this range, the device can round your input value to be proper. For example, set this parameter to 1, when the input value is 5.67, the device can round it and display 5.7.
X Decimal Digits	**Default**	2
	Range	0 to 3
	Unit	—
	Description	Set the number of decimal places of X-axis. If the decimal places of the input value was exceeded this range, the device can round your input value to be proper. For example, set this parameter to 1, when the input value is 5.67, the device can round it and display 5.7.
** R Decimal Digits	**Default**	2
	Range	0 to 3
	Unit	—
	Description	Set the number of decimal places of R-axis. If the decimal places of the input value was exceeded this range, the device can round your input value to be proper. For example, set this parameter to 1, when the input value is 5.67, the device can round it and display 5.7.
** C Decimal Digits	**Default**	2
	Range	0 to 4
	Unit	—
	Description	Set the number of decimal places of C-axis. If the decimal places of the input value was exceeded this range, the device can round your input value to be proper. For example, set this parameter to 1, when the input value is 5.67, the device can round it and display 5.7.
Automatic	**Default**	Disable
	Range	Disable; Enable
	Unit	—
	Description	Set whether let the machine change step automatically. ● To select **Disable**, the user shall step on the pedal switch to change step. ● To select **Enable**, the machine can change step automatically.

Light Curtain	**Default**	Disable
	Range	Disable; Enable
	Unit	—
	Description	When the safety light curtain was equipped on the machine, the user shall properly wire and allocate the input port **Safe**, and set this parameter to **Enable**. When the signal of **Safe** is changed during Fast Closing process, the beam can stop immediately.
LDP	**Default**	Disable
	Range	Disable; Enable
	Unit	—
	Description	Set whether to enable the LDP function, which can affect the settings of **Hold Time**. ● To select **Disable**, when the Mute signal is turned from OFF to ON, the **Hold Time** starts count. ● To select **Enable**, when the beam has reached LDP, the **Hold Time** starts count.
Opening	**Default**	Disable
	Range	Disable; Enable
	Unit	—
	Description	Set whether to enable the opening control function. ● To select **Disable**, the beam can move upwards until it reaches the UDP. ● To select **Enable**, the beam can move upwards according to the settings of opening control.
Opening Mode	**Default**	Distance
	Range	Distance; Time
	Unit	—
	Description	When the beam reaches the mute in opening process, the opening settings takes effect. According to your custom, program the linear relation between opening **Distance** and opening **Time**. Since E300 can calculate the time for turning on the valve of opening, you do not care what method you should set.
Jog	**Default**	Close on
	Range	Close on; Close off
	Unit	—
	Description	Set whether let the Mute signal affect the movement of beam in JOG mode. ● To select **Close on**, the beam moves downwards fast when the Mute signal is turned OFF, and the beam moves downwards slowly when the Mute signal is turned ON. ● To select **Close off**, the Mute signal is turned ON always, and the beam moves downwards slowly.

X Safe Distance	**Default**	5
	Range	0.000 to 9999.999
	Unit	mm
	Description	Set a safe distance for the movement of X-axis, as shown in the following figure, when the programmed positon of X-axis is in the area covered by solidus, it will move at a low speed always.  The X-axis moves slowly in the area covered by solidus
Distance	**Default**	0
	Range	0.000 to 9999.999
	Unit	mm
	Description	Program the linear relation between opening **Distance** and opening **Time** by the Four groups of value. All in all, E300 calculates the time for turning on the valve of opening by this linear relation.  Kn is the slope of each segment. When the Opening is enabled, E300 calculate the time for turning on the valve of opening according to this linear relation.
Time	**Default**	0
	Range	0.00 to 99.99
	Unit	—
	Description	See the description of the parameter **Distance**.

Y-PARM

Axis	**Default**	Disable
	Range	Disable; Enable
	Unit	—
	Description	Set whether to enable Y-axis control function. ● To select **Disable**, indicating the Y-axis control function is disabled. ● To select **Enable**, indicating the Y-axis control function is enabled.
Servo	**Default**	EDS
	Range	EDS; ProNet
	Unit	—
	Description	Two servo types can be supported by E300 device: **EDS** and **ProNet**. Because the protocols of two servos are different, the user must set this parameter properly according to the actual application.

Logic ID	**Default**	EDS-A
	Range	EDS-A; EDS-B
	Unit	—
	Description	This parameter is valid when the **Servo** is set to **EDS**. Because the EDS servo drive can control two axes of motor at the same time, it is necessary to set the logic ID for each axis: **EDS-A** and **EDS-B**.
Motor Rev	**Default**	C.W.
	Range	C.W.; C.C.W.
	Unit	—
	Description	Since the motor may be mounted in an uncertain direction, you shall set these parameters for your actual application. **Motor Rev** indicates the rotation direction of the motor, and **Encoder CNT** indicates the feedback information from the encoder.
Encoder CNT	**Default**	Decreased
	Range	Decreased; Increased
	Unit	—
	Description	See the description of the parameter **Motor Rev**.
Teach	**Default**	Enable
	Range	Disable; Enable
	Unit	—
	Description	Set the teach method for teaching the current position value. ● To select **Disable**, search reference is employed. In this case, the user shall set the parameter **SearchDir** and **Reference Position**, and then repower up the system. The Y-axis can orientate according to the set **Reference Position** from the next movement. ● To select **Enable**, teaching is employed. In this case, the use shall perform the teaching operation on the **TechIn Para** page. For details see the section **3.7.2 Teaching Operation**.
SearchDir	**Default**	Increased
	Range	Increased; Decreased
	Unit	—
	Description	This parameter is valid when the **Teach** is set to **Disable**. When search reference is employed, you shall set the direction of Y-axis for the upward or downward. There are two options for this parameter, **Increased** and **Decreased**, which indicates the feedback status of the encoder. The purpose of setting this parameter is to let the Y-axis move towards the reference position.
Servo ID	**Default**	1
	Range	1 to 16
	Unit	—
	Description	Set this parameter according to the ID has been set in the servo drive.

FactA	**Default**	100
	Range	0.00 to 9 999.99
	Unit	—
	Description	**Fact A** is multiplication factor, which equals to the numbers of driven gear teeth divided by the numbers of driving gear teeth. In general, the driven gear is the machine tool drive screw, and the driving gear is motor gear that controls the movement of shaft. **Fact B** is division factor, which indicates the travel distance of the machine tool parts when the screw rotates for one cycle. **Fact A** combines with **Fact B** for calculating a scale factor, which is the number of pulses emitted by the encoder when the control shaft is running at a distance of 1mm. The scale factor is calculated as follows: Scale Factor = Pulse number of encoder × **Fact A** ÷ **Fact B**
FactB	**Default**	1
	Range	0.00 to 999.99
	Unit	—
	Description	See the description of the parameter **FactA**.
Overrun	**Default**	0.00
	Range	0.000 to 9 999.999
	Unit	mm
	Description	● When this parameter is 0, the positioning method is bilateral. ● When this parameter is greater than 0, the positioning method is unilateral. Since the principle of the unilateral positioning is move the shaft from great value to little value, if the current position of Y-axis is less than programming value, Y-axis can move towards the programming value and exceed it for a certain distance, what is called as **OVERRUN** distance, and then move backwards to the programming value.
Overrun Delay	**Default**	0.20
	Range	0.00 to 9.999
	Unit	s
	Description	When **Overrun** is greater than 0, this parameter can let the Y-axis stays for a while when it reaches the overrun distance.
Position Velocity	**Default**	1500
	Range	0 to 3 000
	Unit	r/min
	Description	To set the motor speed when the Y-axis is positioning.
Manual Speed	**Default**	20%
	Range	0 to 100
	Unit	%
	Description	To set the motor speed when manual movement is active and when Y-axis is in Safety Zone.
Search Speed	**Default**	30%
	Range	0 to 100
	Unit	%
	Description	To set the motor speed when the Y-axis is searching reference.

Min. Value	**Default**	5
	Range	0.000 to 9 999.999
	Unit	mm
	Description	To set the minimum position value of the Y-axis. The Y-axis shall not less than this value.
Max. Value	**Default**	500
	Range	0.000 to 9 999.999
	Unit	mm
	Description	To set the maximum position value of the Y-axis. The Y-axis shall not greater than this value.
Position Tolerance	**Default**	0.02
	Range	0.000 to 99.999
	Unit	mm
	Description	When the **START** button has been pressed down, the Y-axis starts positioning. This parameter indicates the tolerance between positioning value and programming value. If the tolerance is greater than this value, the machine fails to positioning, and the user shall press **STOP** button, then restart the positioning.
Reference Position	**Default**	400.00
	Range	0.000 to 9 999.999
	Unit	mm
	Description	This parameter is valid when the **Teach** is set to **Disable**.
Acc/Dec Time	**Default**	0.20
	Range	0.00 to 99.99
	Unit	s
	Description	To set the acceleration time and deceleration time for controlling the motor rotating from current speed to programming speed.

X-PARM

Axis	**Default**	Disable
	Range	Disable; Enable
	Unit	—
	Description	Set whether to enable X-axis control function. ● To select **Disable**, indicating the X-axis control function is disabled. ● To select **Enable**, indicating the X-axis control function is enabled.
Servo	**Default**	EDS
	Range	EDS; ProNet
	Unit	—
	Description	Two servo types can be supported by E300 device: **EDS** and **ProNet**. Because the protocols of two servos are different, the user must set this parameter properly according to the actual application.

Logic ID	**Default**	EDS-A
	Range	EDS-A; EDS-B
	Unit	—
	Description	This parameter is valid when the **Servo** is set to **EDS**. Because the EDS servo drive can control two axes of motor at the same time, it is necessary to set the logic ID for each axis: **EDS-A** and **EDS-B**.
Motor Rev	**Default**	C.W.
	Range	C.W.; C.C.W.
	Unit	—
	Description	Since the motor may be mounted in an uncertain direction, you shall set these parameters for your actual application. **Motor Rev** indicates the rotation direction of the motor, and **Encoder CNT** indicates the feedback information from the encoder.
Encoder CNT	**Default**	Decreased
	Range	Decreased; Increased
	Unit	—
	Description	See the description of the parameter **Motor Rev**.
Teach	**Default**	Enable
	Range	Disable; Enable
	Unit	—
	Description	Set the teach method for teaching the current position value. ● To select **Disable**, search reference is employed. In this case, the user shall set the parameter **SearchDir** and **Reference Position**, and then repower up the system. The X-axis can orientate according to the set **Reference Position** from the next movement. ● To select **Enable**, teaching is employed. In this case, the use shall perform the teaching operation on the **TechIn Para** page. For details see the section **3.7.2 Teaching Operation**.
SearchDir	**Default**	Increased
	Range	Increased; Decreased
	Unit	—
	Description	This parameter is valid when the **Teach** is set to **Disable**. When search reference is employed, you shall set the direction of X-axis for the forward or backward. There are two options for this parameter, **Increased** and **Decreased**, which indicates the feedback status of the encoder. The purpose of setting this parameter is to let the X-axis move towards the reference position.
Servo ID	**Default**	1
	Range	1 to 16
	Unit	—
	Description	Set this parameter according to the ID has been set in the servo drive.

FactA	**Default**	100
	Range	0.00 to 9 999.99
	Unit	—
	Description	**Fact A** is multiplication factor, which equals to the numbers of driven gear teeth divided by the numbers of driving gear teeth. In general, the driven gear is the machine tool drive screw, and the driving gear is motor gear that controls the movement of shaft. **Fact B** is division factor, which indicates the travel distance of the machine tool parts when the screw rotates for one cycle. **Fact A** combines with **Fact B** for calculating a scale factor, which is the number of pulses emitted by the encoder when the control shaft is running at a distance of 1mm. The scale factor is calculated as follows: Scale Factor = Pulse number of encoder × **Fact A** ÷ **Fact B**
FactB	**Default**	1
	Range	0.00 to 999.99
	Unit	—
	Description	See the description of the parameter **FactA**.
Overrun	**Default**	0.00
	Range	0.000 to 9 999.999
	Unit	mm
	Description	● When this parameter is 0, the positioning method is bilateral. ● When this parameter is greater than 0, the positioning method is unilateral. Since the principle of the unilateral positioning is move the shaft from great value to little value, if the current position of X-axis is less than programming value, X-axis can move towards the programming value and exceed it for a certain distance, what is called as **OVERRUN** distance, and then move backwards to the programming value.
Overrun Delay	**Default**	0.20
	Range	0.00 to 9.999
	Unit	s
	Description	When **Overrun** is greater than 0, this parameter can let the X-axis stays for a while when it reaches the overrun distance.
Position Velocity	**Default**	1500
	Range	0 to 3 000
	Unit	r/min
	Description	To set the motor speed when the X-axis is positioning.
Manual Speed	**Default**	20%
	Range	0 to 100
	Unit	%
	Description	To set the motor speed when manual movement is active and when X-axis is in Safety Zone.
Search Speed	**Default**	30%
	Range	0 to 100
	Unit	%
	Description	To set the motor speed when the X-axis is searching reference.

Min. Value	**Default**	5
	Range	0.000 to 9 999.999
	Unit	mm
	Description	To set the minimum position value of the X-axis. The X-axis shall not less than this value.
Max. Value	**Default**	500
	Range	0.000 to 9 999.999
	Unit	mm
	Description	To set the maximum position value of the X-axis. The X-axis shall not greater than this value.
Position Tolerance	**Default**	0.02
	Range	0.000 to 99.999
	Unit	mm
	Description	When the **START** button has been pressed down, the X-axis starts positioning. This parameter indicates the tolerance between positioning value and programming value. If the tolerance is greater than this value, the machine fails to positioning, and the user shall press **STOP** button, then restart the positioning.
Reference Position	**Default**	400.00
	Range	0.000 to 9 999.999
	Unit	mm
	Description	This parameter is valid when the **Teach** is set to **Disable**.
Acc/Dec Time	**Default**	0.20
	Range	0.00 to 99.99
	Unit	s
	Description	To set the acceleration time and deceleration time for controlling the motor rotating from current speed to programming speed.

R-PARM

** Axis	**Default**	Disable
	Range	Disable; Enable
	Unit	—
	Description	Set whether to enable R-axis control function. ● To select **Disable**, indicating the R-axis control function is disabled. ● To select **Enable**, indicating the R-axis control function is enabled.
** Servo	**Default**	EDS
	Range	EDS; ProNet
	Unit	—
	Description	Two servo types can be supported by E300 device: **EDS** and **ProNet**. Because the protocols of two servos are different, the user must set this parameter properly according to the actual application.

** Motor Rev	**Default**	C.W.
	Range	C.W.; C.C.W.
	Unit	—
	Description	Since the motor may be mounted in an uncertain direction, you shall set these parameters for your actual application. **Motor Rev** indicates the rotation direction of the motor, and **Encoder CNT** indicates the feedback information from the encoder.
** Encoder CNT	**Default**	Decreased
	Range	Decreased; Increased
	Unit	—
	Description	See the description of the parameter **Motor Rev**.
** Teach	**Default**	Enable
	Range	Disable; Enable
	Unit	—
	Description	Set the teach method for teaching the current position value. ● To select **Disable**, search reference is employed. In this case, the user shall set the parameter **SearchDir** and **Reference Position**, and then repower up the system. The R-axis can orientate according to the set **Reference Position** from the next movement. ● To select **Enable**, teaching is employed. In this case, the use shall perform the teaching operation on the **TechIn Para** page. For details see the section **3.7.2 Teaching Operation**.
** SearchDir	**Default**	Increased
	Range	Increased; Decreased
	Unit	—
	Description	This parameter is valid when the **Teach** is set to **Disable**. When search reference is employed, you shall set the direction of R-axis for the forward or backward. There are two options for this parameter, **Increased** and **Decreased**, which indicates the feedback status of the encoder. The purpose of setting this parameter is to let the R-axis move towards the reference position.
** Servo ID	**Default**	1
	Range	1 to 16
	Unit	—
	Description	Set this parameter according to the ID has been set in the servo drive.

** FactA	**Default**	100
	Range	0.00 to 9 999.99
	Unit	—
	Description	**Fact A** is multiplication factor, which equals to the numbers of driven gear teeth divided by the numbers of driving gear teeth. In general, the driven gear is the machine tool drive screw, and the driving gear is motor gear that controls the movement of shaft. **Fact B** is division factor, which indicates the travel distance of the machine tool parts when the screw rotates for one cycle. **Fact A** combines with **Fact B** for calculating a scale factor, which is the number of pulses emitted by the encoder when the control shaft is running at a distance of 1mm. The scale factor is calculated as follows: Scale Factor = Pulse number of encoder × **Fact A** ÷ **Fact B**
** FactB	**Default**	1
	Range	0.00 to 999.99
	Unit	—
	Description	See the description of the parameter **FactA**.
** Overrun	**Default**	0.00
	Range	0.000 to 9 999.999
	Unit	mm
	Description	● When this parameter is 0, the positioning method is bilateral. ● When this parameter is greater than 0, the positioning method is unilateral. Since the principle of the unilateral positioning is move the shaft from great value to little value, if the current position of R-axis is less than programming value, R-axis can move towards the programming value and exceed it for a certain distance, what is called as **OVERRUN** distance, and then move backwards to the programming value.
** Overrun Delay	**Default**	0.20
	Range	0.00 to 9.999
	Unit	s
	Description	When **Overrun** is greater than 0, this parameter can let the R-axis stays for a while when it reaches the overrun distance.
** Position Velocity	**Default**	1500
	Range	0 to 3 000
	Unit	r/min
	Description	To set the motor speed when the R-axis is positioning.
** Manual Speed	**Default**	20%
	Range	0 to 100
	Unit	%
	Description	To set the motor speed when manual movement is active and when R-axis is in Safety Zone.
** Search Speed	**Default**	30%
	Range	0 to 100
	Unit	%
	Description	To set the motor speed when the R-axis is searching reference.

****** Min. Value	**Default**	5
	Range	0.000 to 9 999.999
	Unit	mm
	Description	To set the minimum position value of the R-axis. The R-axis shall not less than this value.
****** Max. Value	**Default**	500
	Range	0.000 to 9 999.999
	Unit	mm
	Description	To set the maximum position value of the R-axis. The R-axis shall not greater than this value.
****** Position Tolerance	**Default**	0.02
	Range	0.000 to 99.999
	Unit	mm
	Description	When the **START** button has been pressed down, the X-axis starts positioning. This parameter indicates the tolerance between positioning value and programming value. If the tolerance is greater than this value, the machine fails to positioning, and the user shall press **STOP** button, then restart the positioning.
****** Reference Position	**Default**	400.00
	Range	0.000 to 9 999.999
	Unit	mm
	Description	This parameter is valid when the **Teach** is set to **Disable**.
****** Acc/Dec Time	**Default**	0.20
	Range	0.00 to 99.99
	Unit	s
	Description	To set the acceleration time and deceleration time for controlling the motor rotating from current speed to programming speed.

C-PARM

****** Mode	**Default**	0
	Range	0: Disable; 1: Mechanism; 2: Hydraulic
	Unit	—
	Description	Set whether to enable C-axis control function. ● To set it to **0**, indicating the C-axis control function is disabled. ● To set it to 1, indicating the C-axis is controlled by the motor. ● To set it to 2, indicating the C-axis is controlled by the hydraulic system.

** Stop Pos	**Default**	0.05
	Range	0.000 to 9 999.999
	Unit	mm
	Description	This parameter is valid when the parameter **Mode** is set to **1**. The inertia of the motor can cause the movement of table to deviate; therefore, it is necessary to set the parameter **Stop Position** to avoid the deviation. That is to say, the motor has been stopped before reaching the programmed position, and then continue to move by the inertia of the motor. To set the parameter **Stop Position**, you can set its value to **0**, and then edit any Single-Step programming, which need to set the parameter **C-axis**. When the programming is completed, you can measure the actual moving distance of the worktable. The difference between this value and programmed value is the value of **Stop Position**.
** Calibrate Dist	**Default**	0
	Range	—
	Unit	mm
	Description	This parameter is valid when the parameter **Mode** is set to **1**. For details about the procedure of calibration, see the section **3.4.2 Auxiliary-Axis**.
** Feedback Volt	**Default**	0
	Range	0 to 10
	Unit	V
	Description	This parameter is valid when the parameter **Mode** is set to **1**. For details about the procedure of calibration, see the section **3.4.2 Auxiliary-Axis**.
** Compensate Dist	**Default**	0
	Range	—
	Unit	mm
	Description	This parameter is valid when the parameter **Mode** is set to **2**. For details about the procedure of calibration, see the section **3.4.2 Auxiliary-Axis**.
** Compensate Volt	**Default**	0
	Range	0.00 to 10.00
	Unit	V
	Description	This parameter is valid when the parameter **Mode** is set to **2**. For details about the procedure of calibration, see the section **3.4.2 Auxiliary-Axis**.

Program

Name	**Default**	—
	Range	The maximum length is 12 characters, which may contain letters and numbers as available on the keyboard.
	Unit	—
	Description	A unique name to identify a product program.

 Die	**Default** 1 **Range** 0 to 30 **Unit** — **Description** Set a desired die ID for the program. The parameters of the die can be edited on **Die** page.
M Material	**Default** 1 **Range** 1 to 6 **Unit** — **Description** Set a desired material ID for the program, which is used for calculating the bending depth. The parameters of the material can be edited on **Material Table** page.
 Thickness	**Default** 0 **Range** 0.000 to 99.999 **Unit** mm **Description** The thickness of the sheet.
 Hold Time	**Default** 0 **Range** 0.00 to 99.99 **Unit** s **Description** The hold (dwell) time of punch at the bending point.
 Retr.DLY	**Default** 0 **Range** 0.00 to 99.99 **Unit** s **Description** The wait time before the X-axis performs the retract.
P Stock	**Default** 0 **Range** -1 to 999 999 **Unit** — **Description** The stock counter is incremented or decremented after each end of a program cycle, which depends on the settings of the parameter **Count Mode**. Set it to -1, indicating the stock count is disabled. Set it to other value: When the **Count Mode** is **Cnt Down**, the stock counter in production mode is decreased by 1 after each product cycle. When the counter has reached 0, the machine is stopped. When the **Count Mode** is **Cnt Up**, the stock counter in production mode is increased by 1 after each product cycle.
	**Default** 0 **Range** -90.00 to 90.00 **Unit** ° **Description** This parameter is valid when the bending method is angle, which indicates the correction on angle to the whole bending. For example: If the programmed value is 90, while the actual measured value is 92, then this parameter shall be set to -2. If the programmed value is 90, while the actual measured value is 88, then this parameter shall be set to 2.

Steps	**Default**	1
	Range	1 to 25
	Unit	—
	Description	This parameter displays how many steps in the selected program.
BN	**Default**	1
	Range	1 to 25
	Unit	—
	Description	This parameter indicates the current bending step in the program.
X-axis	**Default**	0
	Range	0.000 to 9 999.999
	Unit	mm
	Description	The programmed value for the X-axis.
Y-axis	**Default**	0
	Range	0.000 to 9 999.999
	Unit	mm
	Description	The programmed value for the Y-axis.
** R-axis	**Default**	0
	Range	0.000 to 9 999.999
	Unit	mm
	Description	The programmed value for the R-axis.
** C-axis	**Default**	0
	Range	0.000 to 9 999.999
	Unit	mm
	Description	The programmed value for the C-axis.
Retract	**Default**	0
	Range	0.000 to 9 999.999
	Unit	mm
	Description	Retract distance of the selected axis in the current bend. The "backgauge retract" is started when the beam is pinching the sheet.
Corr. α	**Default**	0
	Range	-90.00 to 90.00
	Unit	°
	Description	This parameter is valid when the bending method is angle, which indicates the correction on angle to the current bending step . For example: If the programmed value is 90, while the actual measured value is 92, then this parameter shall be set to -2. If the programmed value is 90, while the actual measured value is 88, then this parameter shall be set to 2.
Corr.Y	**Default**	0
	Range	-99.99 to 99.99
	Unit	mm
	Description	Correction on the Y-axis position, in case absolute programming is used or bottoming is selected for a bend.

Angle	**Default**	0
	Range	0.00 to 180.00
	Unit	°
	Description	Set a desired angle value in the selected bending step.
Repeat	**Default**	1
	Range	1 to 99
	Unit	—
	Description	Set the repetition times for the selected bending step.
Open	**Default**	0
	Range	0.00 to 99.99 or 0.000 to 9 999.999
	Unit	s or mm
	Description	Set the opening distance or opening time for the opening process.

Die

Height	**Default**	0
	Range	0.000 to 999.999
	Unit	mm
	Description	The length from the top to the bottom of the die.
V-width	**Default**	0
	Range	0.000 to 999.999
	Unit	mm
	Description	The width of the V-opening.
Angle	**Default**	88
	Range	0.00 to 180.00
	Unit	°
	Description	The angle of the V-opening.
Radius	**Default**	1
	Range	0.000 to 999.999
	Unit	mm
	Description	The radius of the V-opening edges.
SafeZone	**Default**	10
	Range	0.000 to 999.999
	Unit	mm
	Description	To prevent back gauge to die collision, the movement of the R-axis shall be kept in this value add half of V-width.

Appendix D Alarm List

No.	Alarm Name	Cause	Solution	Remove
A.02	Beam not in UDP	The beam is not on UDP when the process is performed.	You must manually move the beam to the UDP, and then continue your processing.	Automatic
A.03	Beam in mute	Both UDP signal and MUTE signal become effective at the same time.	Check the UDP signal and MUTE signal; only one signal shall be turned ON at the same time.	Automatic
A.04	Over MIN Pos.X	The position value of X-axis is less than minimum value.	Modify **Min. Value** in **X-PARM** page.	Automatic
A.05	Over MAX Pos.X	The position value of X-axis is greater than maximum value.	Modify **Max. Value** in **X-PARM** page.	Automatic
A.06	Over MIN Pos.Y	The position value of Y-axis is less than minimum value.	Modify **Min. Value** in **Y-PARM** page.	Automatic
A.07	Over MAX Pos.Y	The position value of Y-axis is greater than maximum value.	Modify **Max. Value** in **Y-PARM** page.	Automatic
A.08	Over MIN Pos.R	The position value of R-axis is less than minimum value.	Modify **Min. Value** in **R-PARM** page.	Automatic
A.09	Over MAX Pos.R	The position value of R-axis is greater than maximum value.	Modify **Max. Value** in **R-PARM** page.	Automatic
A.10	Safe Err	External safety signal such as Emergency Stop, Safety Door, and Safety Light Curtain was error.	Please check its wiring and port allocation.	Automatic
A.21	Counter Over	If the **Count Mode** is **Cnt Down**, when the **Stock** is **0**, the running machine can stop automatically.	Just modify **Stock** to another desired value, the machine can run again.	Manual
A.22	Pedal Err	The pedal signal is error.	Please check its wiring and port allocation.	Manual
A.23	Dies Collision	There may be a collision occurring, which is calculated by the system.	Please check and modify the correlative parameters to a properly value.	Manual
A.31	Machine not ready	The oil-pump signal is error.	Please check its wiring and port allocation.	Automatic

No.	Alarm Name	Cause	Solution	Remove
A.32	Mode Err	No mode signal or both the **Single** and **JOG** signals become effective at the same time.	Check whether the signals of **Single** and **Jog** is properly wired and allocated.	Manual
A.33	Mode_OPT_Err	Switch the operation mode when the machine was running.	This fault message will be displayed, and the machine stops right now.	Automatic
A.35	Communication Err	In the non-initialized state, the internal communication of the device is interrupted.	Contact ESTUN.	Manual
A.36	X-axis Lost	The system has no communication with the servo drive of X-axis.	Check the servodrive of X-axis and Check whether the CAN communication port is disconnected.	Manual
A.37	Y-axis Lost	The system has no communication with the servo drive of Y-axis.	Check the servodrive of Y-axis and Check whether the CAN communication port is disconnected.	Manual
A.38	R-axis Lost	The system has no communication with the servo drive of R-axis.	Check the servodrive of R-axis and Check whether the CAN communication port is disconnected.	Manual
A.39	Can Send Err.	Send the data by CAN failed.	Check whether the CAN communication port is disconnected.	Manual
A.40	Drive Para. Err.	The setting of parameter **Servo ID** is incorrect.	Modify the **Servo ID** and then press **Clear** to reset the alarm.	Manual
A.41	X-axis Err	The servo s in the alarm state.	See the servo user manual.	Manual
A.42	Y-axis Err	The servo is in the alarm state.	See the servo user manual.	Manual
A.43	R-axis Err	The servo is in the alarm state.	See the servo user manual.	Manual
A.51	DIO port Err	The port allocation is incorrect.	Check and renumber the port allocation.	Manual
A.52	System locked	The license of the device is incorrect.	Contact ESTUN or manufacturer.	Manual
A.53	Power Off	The power supply is lower than the rated value.	—	Manual
A.60	DRV Err Code 2310	Overcurrent	See the servo user manual.	Manual
A.61	DRV Err Code 3100	The servo was instantaneous outage.	See the servo user manual.	Manual
A.62	DRV Err Code 3110	Overvoltage	See the servo user manual.	Manual
A.63	DRV Err Code 3120	Under voltage	See the servo user manual.	Manual

No.	Alarm Name	Cause	Solution	Remove
A.64	DRV Err Code 5080	RAM chip exception	See the servo user manual.	Manual
A.65	DRV Err Code 5210	AD sampling exception	See the servo user manual.	Manual
A.66	DRV Err Code 5420	The bleeder resistor was damaged	See the servo user manual.	Manual
A.67	DRV Err Code 5421	Regeneration exception	See the servo user manual.	Manual
A.68	DRV Err Code 5581	Parameter sum check exception	See the servo user manual.	Manual
A.69	DRV Err Code 5582	Electronic gear error	See the servo user manual.	Manual
A.70	DRV Err Code 5583	Motor type parameter or drive type parameter error	See the servo user manual.	Manual
A.71	DRV Err Code 6100	Illegal error code	See the servo user manual.	Manual
A.72	DRV Err Code 6120	PDO mapping error	See the servo user manual.	Manual
A.73	DRV Err Code 6300	CAN communication error	See the servo user manual.	Manual
A.74	DRV Err Code 7303	Serial encoder error	See the servo user manual.	Manual
A.75	DRV Err Code 7305	Incremental encoder error	See the servo user manual.	Manual
A.76	DRV Err Code 7380	Resolver error	See the servo user manual.	Manual
A.77	DRV Err Code 8100	CAN communication error	See the servo user manual.	Manual
A.78	DRV Err Code 8110	CAN bus overflow	See the servo user manual.	Manual
A.79	DRV Err Code 8120	CAN bus was on PASSIVE	See the servo user manual.	Manual
A.80	DRV Err Code 8130	Heartbeat error	See the servo user manual.	Manual
A.81	DRV Err Code 8140	CAN bus was on BUS OFF	See the servo user manual.	Manual
A.82	DRV Err Code 8200	The length of CAN received message error	See the servo user manual.	Manual
A.83	DRV Err Code 8210	Received PDO length error	See the servo user manual.	Manual
A.84	DRV Err Code 8311	Overload	See the servo user manual.	Manual
A.85	DRV Err Code 8480	Overspeed	See the servo user manual.	Manual

Appendix E Updating

E.1 Update the Function

E.1.1 Precondition

In general, the default issued E300 device is the standard version, which only supports the control of X-axis and Y-axis.

For the more features, you can contact ESTUN, and then follow the below procedure to perform the updating. If there is any problem during your updating, please contact ESTUN.

E.1.2 Procedure

Export the Machine Code

Please prepare an available U-disk, which shall be at least 100 Mb of remaining space, and then following the below procedure to export the machine code file.

Step 1 Power up the device and press **F6** key to enter the **Constant** page.

Step 2 Type the password 14789 to enter the **Para** page.

Step 3 Move the cursor on the **USB Update** option, and press **ENTER** key enter the **USB Upgrade** page, as show in Figure E-1.

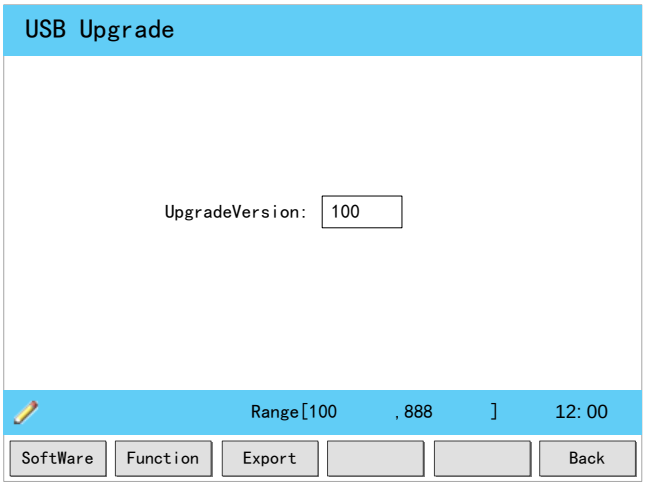


Figure E-1 The USB Upgrade page

Step 4 Insert the U-disk into the USB port of E300 device.
The top left of the page can display the connection symbol , which indicates the U-disk has been read normally, and the user can continue the next step.

If the connection symbol has not been displayed for a long time, please check whether the U-disk is available, and then re-power up the device, and repeat Step 1 to Step 4 to try again.

Step 5 Press F3 key (Export), and the page can prompt ***Export machine success*** on the editing bar soon. If it prompts ***Export machine failed***, please check whether the U-disk is available, and whether the U-disk has enough space.

Step 6 Remove the U-disk from the E300 device, and insert it into a PC. And then, find and save the machine code file in the folder ***\\ESTUN*** of the U-disk. That is, the path of the file is ***\\ESTUN\xxxxxxxxxxxxxxxxxx.txt***. In which, ***xxxxxxxxxxxxxxxxxx*** is the machine code, a total of 16 characters. For example, T8vhY1005L7000iN.txt.

Step 7 Contact ESTUN, and send the machine code file to us.

----End

Obtain the License

We will feedback you a proper license file within the agreed time when we received your machine code file. The format of the license file is ***xxxxxxxxxxxxxxxxxx_RC.txt***, in which, ***xxxxxxxxxxxxxxxxxx*** is the machine code you sent to us, a total of 16 characters. For example, the license file corresponding to machine code file ***T8vhY1005L7000iN.txt*** is ***T8vhY1005L7000iN_RC.txt***.

When you obtain the license file, follow the below procedure to fulfill the updating.

Step 1 Insert the U-disk into the PC, and copy the obtained license file into the folder ***\\ESTUN*** of the U-disk.

Step 2 Remove the U-disk from the PC, and inset it into the USB port of the E300 device.

Step 3 Enter the **USB Upgrade** page, and watch whether the top left of the page can display the connection symbol , which indicates the U-disk has been read normally, and the user can continue the next step.
If the connection symbol has not been displayed for a long time, please check whether the U-disk is available, and then re-power up the device, and try again.

Step 4 Press **F2** key (Function), and the page can prompt ***Update successful*** on the editing bar soon.

- If it prompts ***Import Failed***, you shall check whether the license file was existed on the folder ***\\ESTUN*** of the U-disk or whether the license file was correct.
- If it prompts ***Match secret key failed***, please contact ESTUN for re-obtaining the license file.

----End

E.1.3 Verification

When you have performed the updating, you can enter the Para page, and now you can watch two new options (R-axis and C-axis)are displayed on the page, as shown in Figure E-2.

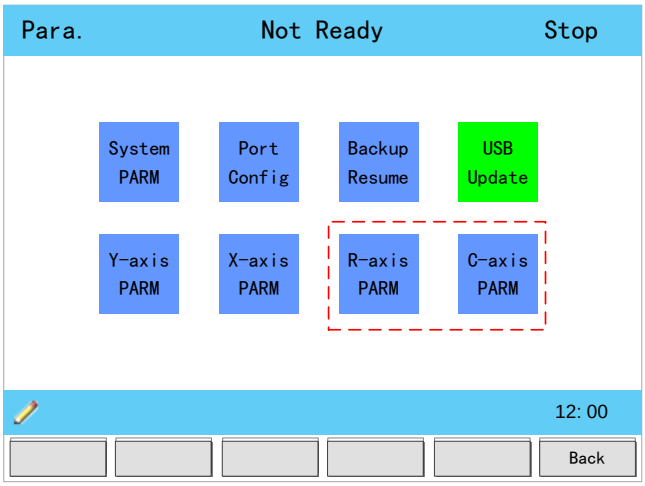


Figure E-2 Update the function successfully

E.2 Update the Software

E.2.1 Precondition

If you have new requirements, please contact ESTUN and tell us your requirements. We will feedback you a proper updating file within the agreed time. The format of the updating file is ***e300vxxx.bin***, in which, ***xxx*** indicate the number of software version. For example, the file ***e300v102.bin*** indicates this updating file is for V1.02 software version.

E.2.2 Procedure

When you obtain the updating file, follow the below procedure to fulfill the updating.

Step 1 Insert the U-disk into the PC, and copy the obtained license file into the folder ***\\ESTUN*** of the U-disk.

Step 2 Remove the U-disk from the PC, and inset it into the USB port of the E300 device.

Step 3 Enter the **USB Upgrade** page, and watch whether the top left of the page can display the connection symbol , which indicates the U-disk has been read normally, and the user can continue the next step.

If the connection symbol has not been displayed for a long time, please check whether the U-disk is available, and then re-power up the device, and try again.

Step 4 Type the desired value for the new version by **NUMERIC** keys, and then press **ENTER** key. For example, to upgrade to version 1.02, type **102**.

Step 5 Press **F1** key (Software), and the page can prompt ***Updating*** on the editing bar. Then, the device can read the updating file from the U-disk and perform the updating, please wait for a while.

- ❑ If it prompts ***Upgrade success, please reboot***. Please repower up the device.
- ❑ If it prompts ***Upgrade failed***, please check whether the updating file was existed on the folder ***\\ESTUN*** of the U-disk or whether the updating file was correct.

INFO	If you fail to update, export the data, or unable to update the software, as well as crash during the operation, please backup the data of the U-disk and formatting the u-disk by FAT/FAT32 file system. Then try again.

----End

E.2.3 Verification

Follow the below procedure to verify the updating was successful. Please contact ESTUN if you have any problem.

Step 1 Repower up the device when you have performed the updating.

Step 2 Press **F6** key to enter the **Constant** page.

Step 3 Type the password **1212** to enter **TechIn Para** page, as shown in Figure E-3. Check whether the value of parameter **Software Version** is correct.

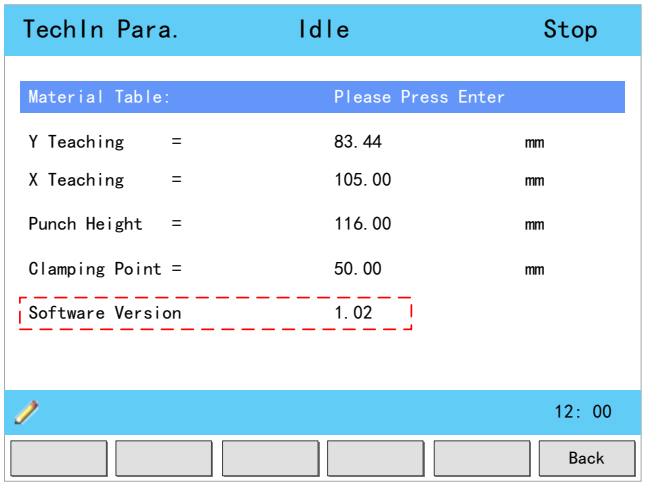


Figure E-3 Check the software version

----End

Appendix F Dimensions for Customization

In general, the E300 device has been mounted in the suspension cabinet. For your customization, you can contact ESTUN, and the following figure gives you the required dimension.