

# Instructions on EzCad-LCC Cutting System Setup and Adjustment

EzCad-LCC cutting system software provides a variety of optional parameters for various equipments. For cutomers' easier use, we provide two programs to set up equipment parameters: DevDia.exe and LCCfg.exe (referred to as LCCfgEx.exe in some versions). DevDia.exe is the preferred program used to set up initial configuration, and LCCfg.exe is more commonly used for setup and adjustment while the equipment is in use.

## Instructions on DevDia.exe

When the program DevDia.exe is started, the software interface will appear as shown in Fig.1 below.

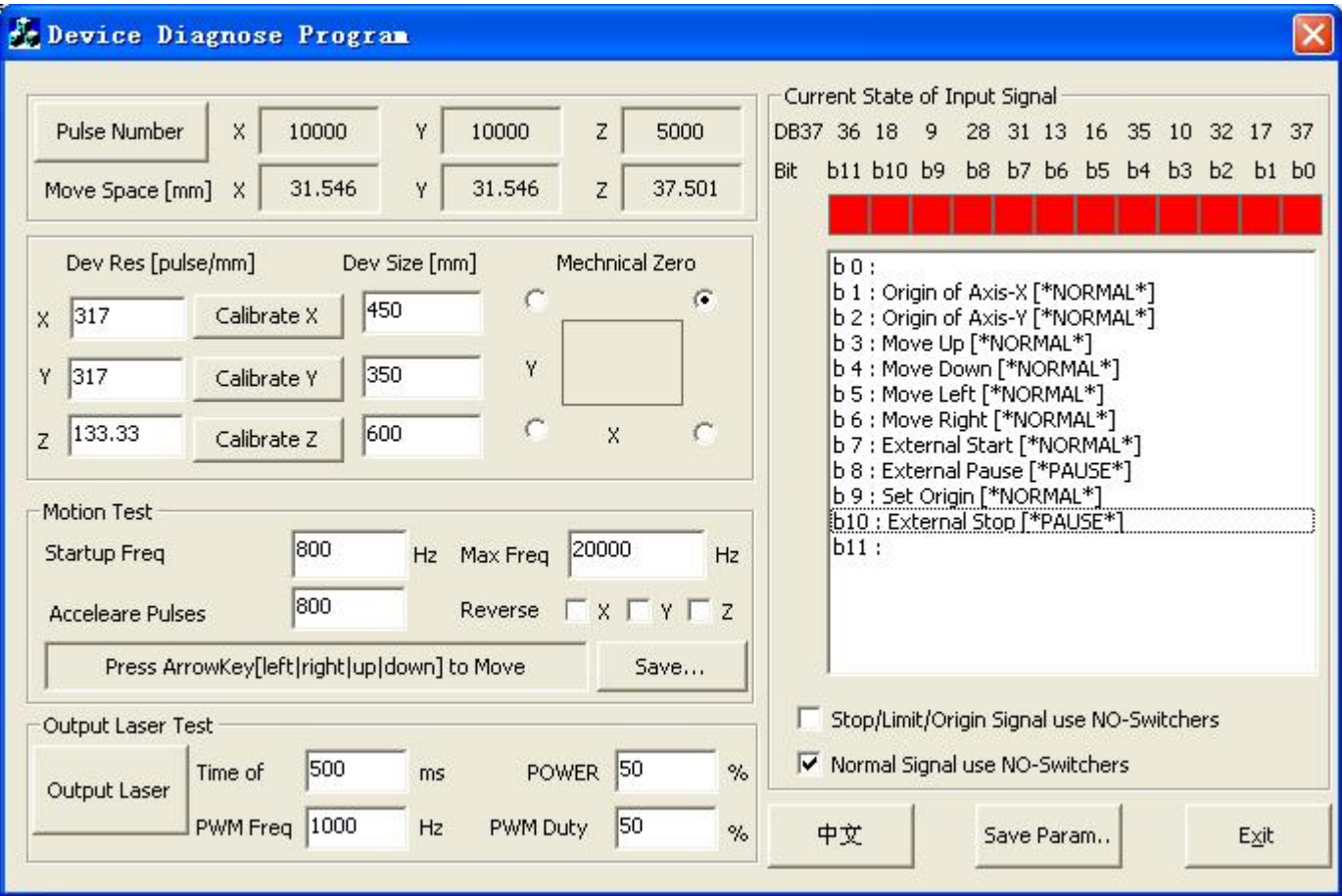


Fig.1

## Input terminal signal status

This part shows the input status of various input terminals of LCC control card. LCC has a total of 12 input terminals which are demonstrated as 12 squares and marked as b0~b11, with respective DB37 pin number

marked on the interface. The colors of the squares represent the signals' status. Green color means the specific terminal has signal input, and red color means the specific terminal has no signal input.

*Note: The software default setup uses normally closed switch. If the normally open switch is used instead, then the meanings of the colors are just the opposite of the above-mentioned meanings.*

Here, user can set up each terminal's features. Click the square that represents a terminal, and set up desired features in pop-up dialog box. For example, Fig.2 shows setting up terminal b1 as the origin signal of X-axis.

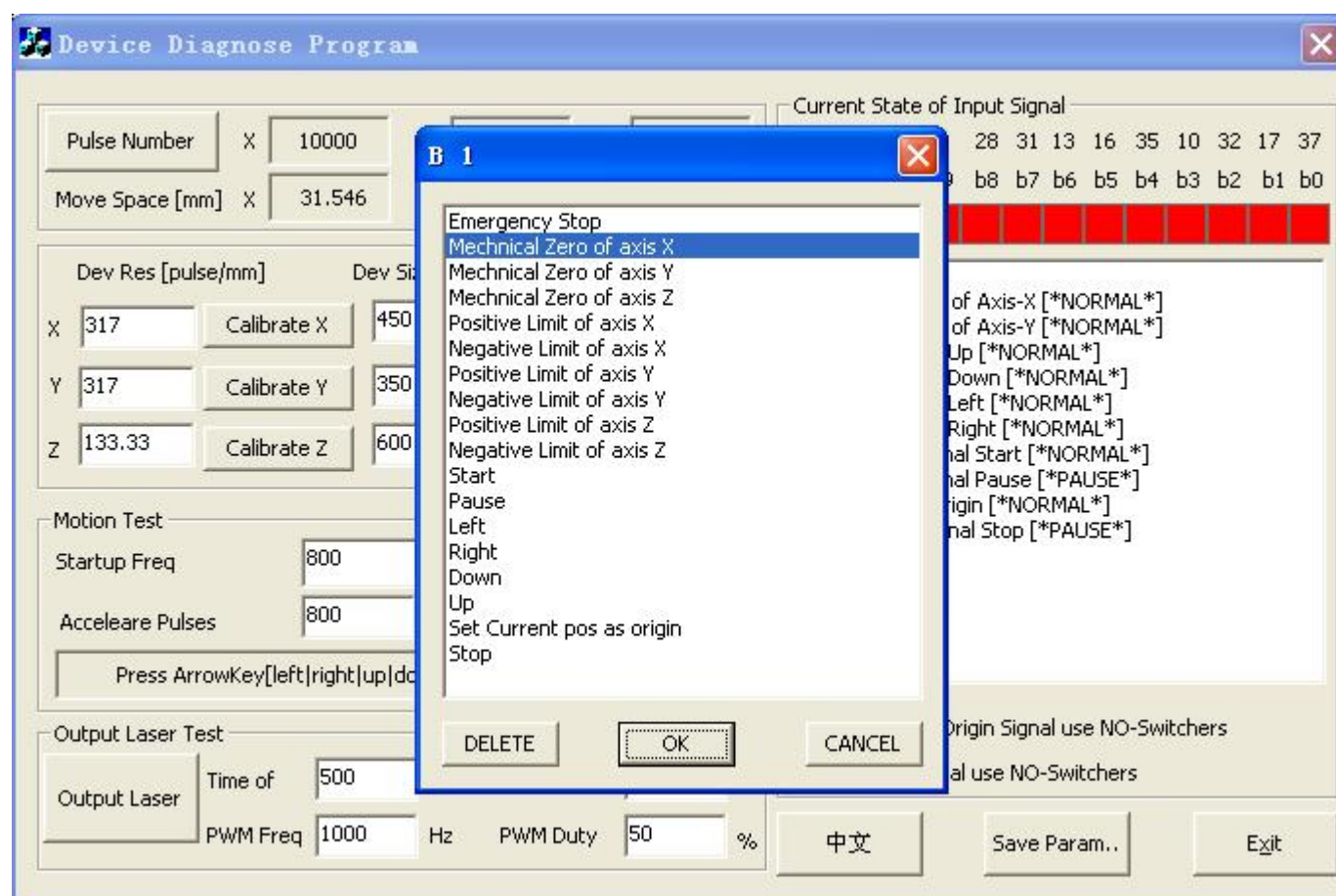


Fig.2 Set up b1 as the origin signal of X-axis

*Note: The software default setup of b0 is as urgent-stop signal input, and this setup cannot be changed. Refer to LCC control card instruction for relevant descriptions.*

Once setup, terminals' features will show in the following box. Meanwhile, user may or may not need to tick to choose the following two options, depending on actual situation.

Incorrect setup of terminals will lead to malfunction of equipment.

## Set up equipment resolution

To set up equipment's resolution is to inform the software of the relevant parameters of the electric motor used with the equipment, so that the software can deliver proper movement demands to the equipment. The setup procedures are as follows:

Put the laser head in the center of the movement platform and a piece of blank paper under the laser head.

Click “Pulse Number”. When dialog box pops up, set up the number (quantity) of pulse to output.

Click “X-calibration” and the software will send the set number of pulse to X-axis and meanwhile output laser. Equipment electric motor will start its movement as the effect of the pulses, and the traces of laser processing will be left and shown on the blank piece of paper. When the movement is over, a dialog box will pop up inquiring user to type in the distance of the actual movement. See Fig.3 below.

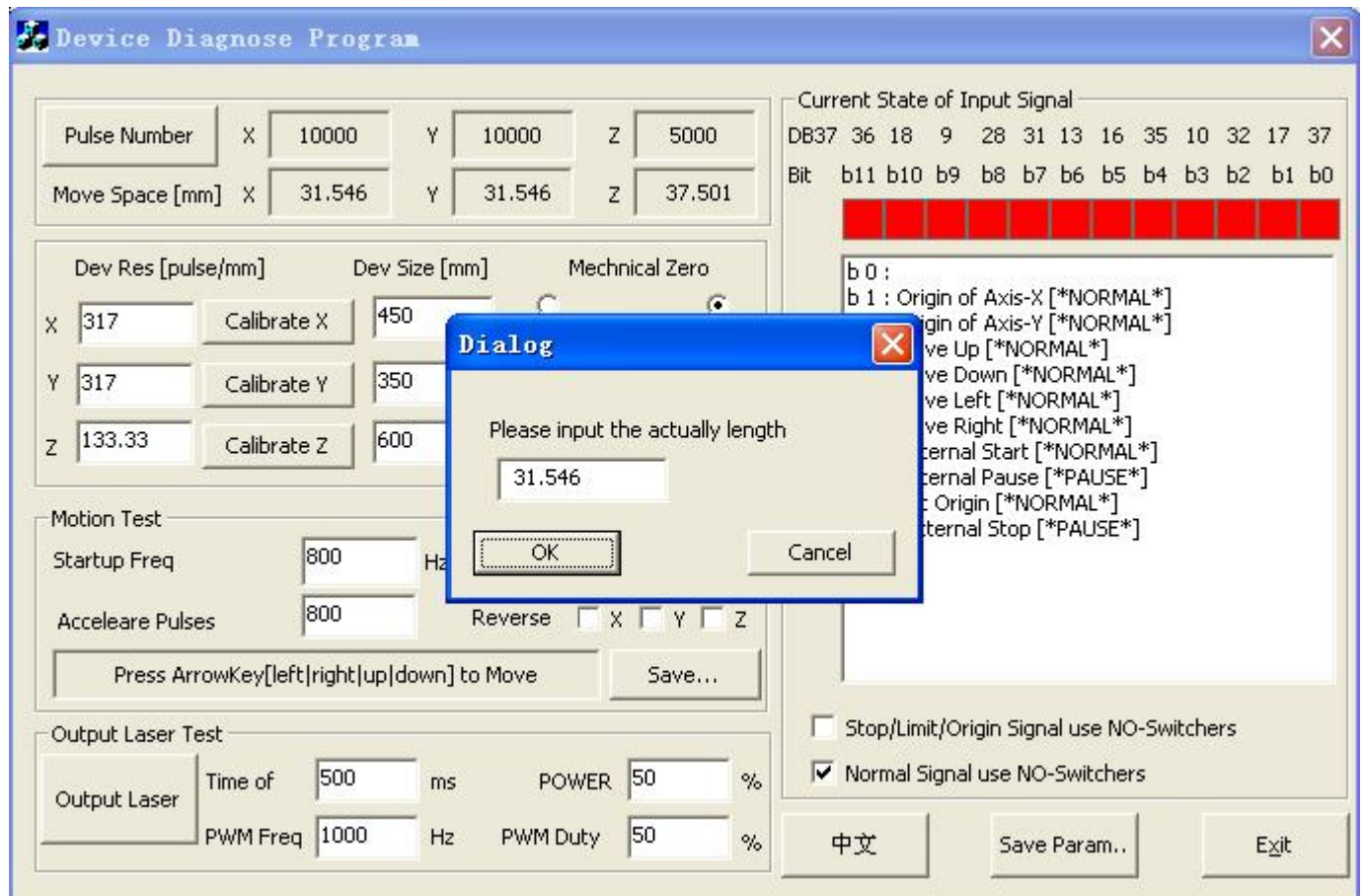


Fig 3. Resolution Set

Measure the length of the trace of the laser processing, and fill this length in the dialog box as Fig.3. Click “Yes” to see X resolution value has been set in pulse/mm as the unit.

Set the resolution of Y and Z axis in the same way.

Set up the equipment dimension and origin switch position according to actual situation.

*Note: Before using this function, user may need to first adjust laser parameters in order to ensure laser's normal output and the normal power under normal output. Refer to the part regarding laser output setup and adjustment in this instruction.*

## Movement testing

This part is to test and set up the equipment's movement features. As shown in Fig.1, set up the starting

frequency, maximum frequency, and number of accelerating pulses. Then use the direction keys on keyboard to control the moving direction of the equipment. Adjust these parameters as necessary to make the equipment operate move steadily and faster.

After setup and adjustment, the desired parameters must be saved. For example, if the equipment works best when X-axis's maximum frequency is 20000hz, starting frequency is 800hz, with 800 accelerating pulses, so click "save..." to save these parameters, and dialog box will pop up as Fig.4 below.

	60	100	200	300	500
Feed	60	100	200	300	500
Startup Speed X	10	10	10	10	10
Max Speed X	60	100	200	300	500
Acc Dist X	10	10	12	15	20
Accelerate X	175	495	1663	2997	6248
Startup Speed Y	10	10	10	10	10
Max Speed Y	60	100	200	300	300
Acc Dist Y	15	16	20	25	25
Acceleration Y	117	309	998	1798	1798

Fig.4 Save equipment's movement parameters

On this interface, above shows the actual speed that corresponds to the chosen frequency parameters, accelerating speed and accelerating distance parameters. According to the indicated values, the corresponding equipment's maximum moving speed is 63. Therefore, during actual processing, if the software interface has 60 as moving speed, these parameters can be used. Click 60 as the option, and choose to set the feed acceleration property of X-axis. Click to save. By then it can be seen that among the moving feature parameters in the right part of the interface, the parameters of which the feeding speed is 60 is changed.

Set up the feeding features and free wheeling features of X and Y axis. Click "Yes" to save the setup.

## Laser output testing

This function is to test the equipment's laser output. Set the laser output time and then set the power parameters according to actual situation. If analog signal is used to adjust the power, then set the power percentage; if PWM signal is used to adjust the power, then the PWM power and duty ratio should be set. Power setup will be invalid if the equipment power is manually adjusted. After setup of parameters, click "laser output" and the system will control laser module to output laser and close the laser at the set time.

*Note: Be cautious for safety's sake while the laser is output.*

The button “中文” will change the language of the software to be Chinese.

When all parameters are set up, click “Save parameters” to save the parameters in the system.

## Instructions on LCCfg.exe

LCCfg.exe is a program mainly for micro-adjustment of equipment parameters. Start the program LCCfg.exe and the interface will appear as Fig.5 below. Under default setup, user can only check relevant parameters but cannot modify them. Under the “Device Type” directory, press “Ctrl+Shift+Z” keys and the interface will appear as Fig.6 and then the equipment model, equipment parameter, accelerating feature, and power calibration, etc can be modified.

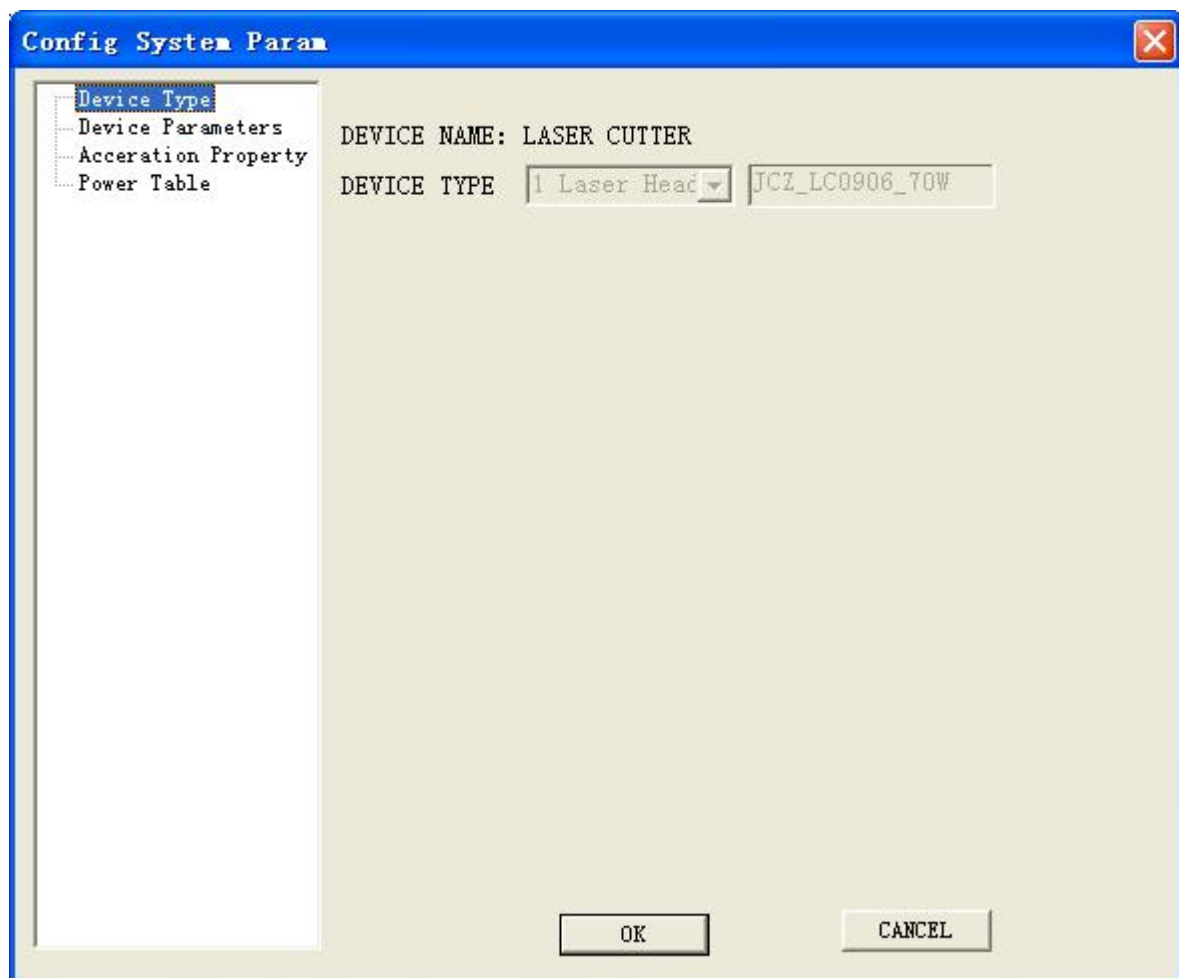


Fig.5



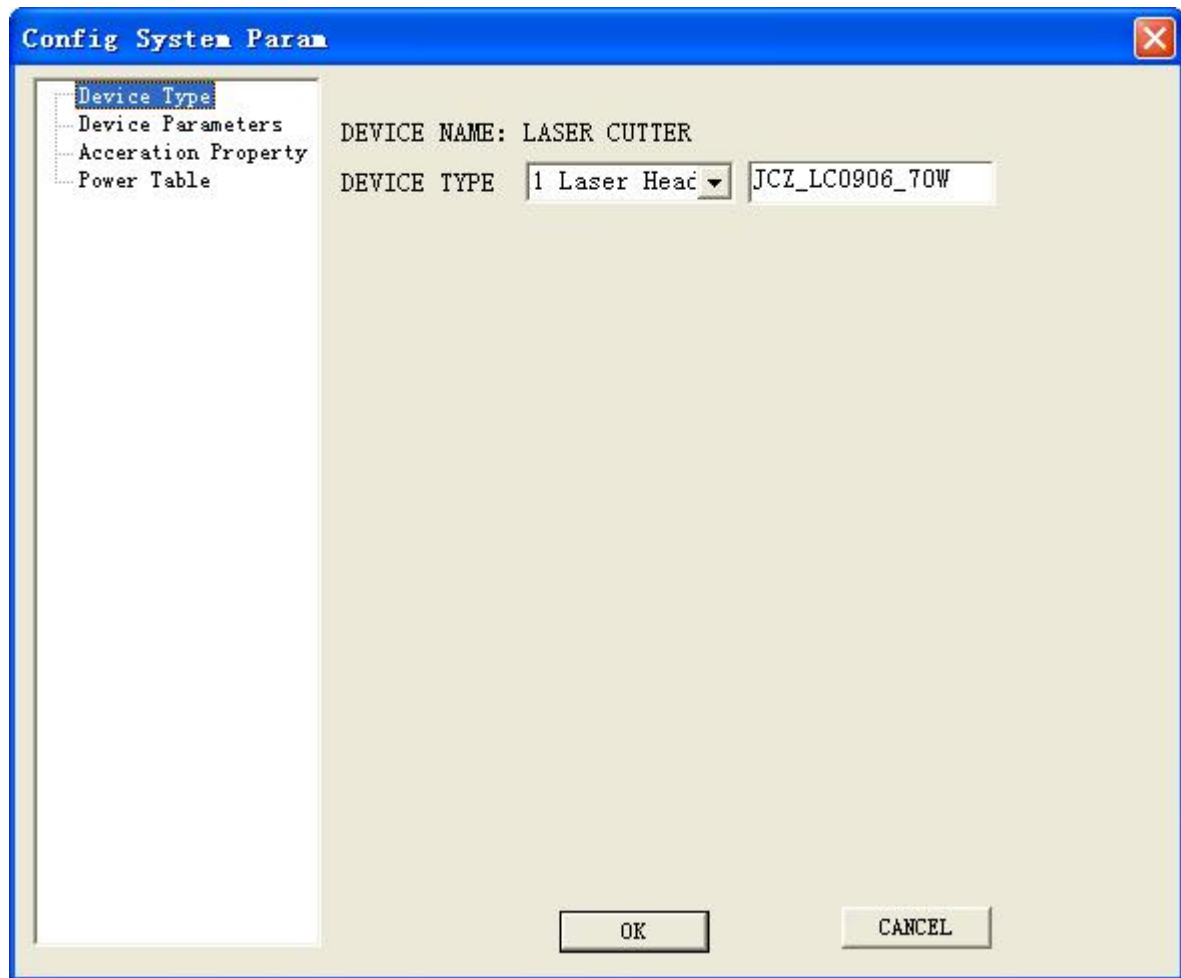


Fig.6

Under "Device Type" directory, press "Alt + Shift + A" keys and all functions will be open for user to modify and set up all parameters as desired. See Fig.7 below.

*Note: To avoid the equipment's malfunction, non-professional people are NOT supposed to modify each parameter.*

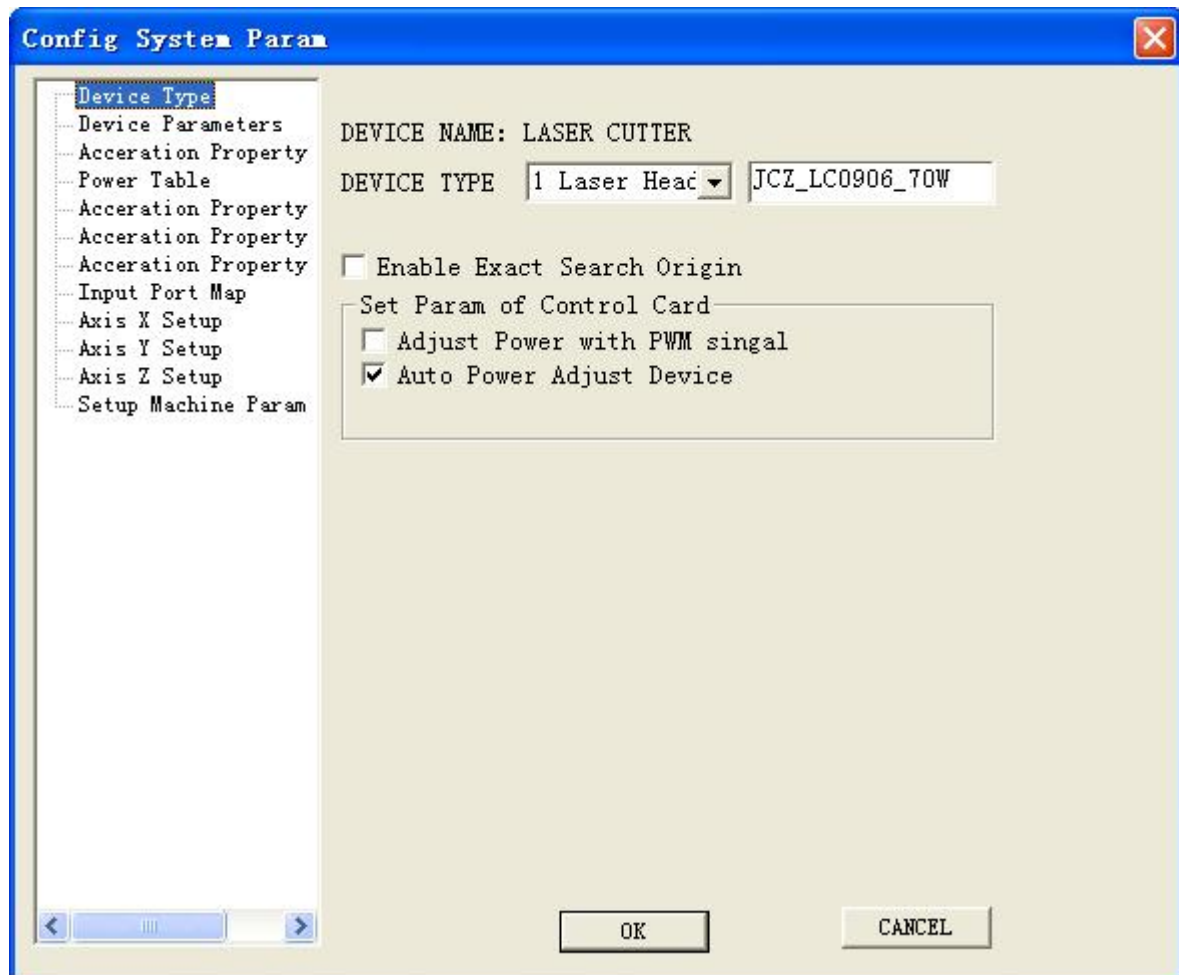


Fig.7

## Device Type

As shown in Fig.7, the equipment model and description can be set.

Enable Exact Search Origin: Accurate control method should be used for the movement back to origin. This applies to equipment that has the origin signal with optical switch and requires high accuracy.

Adjusting power with PWM signal: When the equipment's laser power is adjusted by PWM signal, this item should be ticked. Otherwise the laser power cannot be adjusted.

Auto Power adjust device: LCC system temporarily blocks this function.

## Device parameters

As shown in Fig.8, device resolution and device size parameters have the same meanings as in DevDia.exe and user can modify the parameters here. In addition, on this interface user can set up relevant parameters of equipment origin. The relevant parameters include the position of origin switch, and respective input position of origin signal. The maximum zero-resetting speed limits the speed at which the equipment is reset to zero. This is intended to protect the equipment.

**Config System Param**

Device Type  
**Device Parameters**  
 Acceration Property  
 Power Table  
 Acceration Property  
 Acceration Property  
 Acceration Property  
 Input Port Map  
 Axis X Setup  
 Axis Y Setup  
 Axis Z Setup  
 Setup Machine Param

**Device Resolution (pulses/mm)**

X  Y  Z

**Size of WorkArea (mm)**

X  Y  Z

**Zero Switch Setup**

☐ ☐ ☒ Input Bit of Origin X b   
 Y ☐ ☐ ☐ Input Bit of Origin Y b   
☐ ☐ ☐ Input Bit of Origin Z b

☒ Origin of Z axis is on upside

The Max Velocity When Go Zero  mm/s

OK CANCEL

Fig.8

**Config System Param**

Device Type  
 Device Parameters  
**Acceration Property**  
 Power Table  
 Acceration Property  
 Acceration Property  
 Acceration Property  
 Input Port Map  
 Axis X Setup  
 Axis Y Setup  
 Axis Z Setup  
 Setup Machine Param

Feed[mm/s]	Accelerate Time[ms]	Compensate[mm]	L
5.00	1	0.00	
50.00	100	0.00	
100.00	150	0.00	
200.00	200	0.10	
250.00	200	0.10	
300.00	250	0.15	
500.00	300	0.40	
800.00	350	0.40	
1000.00	400	0.40	
1200.00	400	0.40	

☐ Enable the General Motion Property

OK CANCEL

Fig.9



## Accelerating property

As shown in Fig.9, there are a group of common movement parameters. In LCC system, user can set up different movement parameters according to different requirements for different movements. For example, cutting, scanning, and positioning can use different accelerating parameter setup (see later part for details). If user click to choose “Enable the General Motion Property” on this interface, then the equipment will use the fixed accelerating feature parameters during movement, as set up on this interface, instead of using separately set accelerating feature parameters for cutting, scanning, and positing.

**Feed:** Maximum speed value for equipment’s operating.

**Accelerate time:** Accelerating time taken for the equipment to move at maximum speed from still status.

**Compensate:** Tolerance might occur during equipment’s movement due to mechanical reasons. This parameter is compensating the tolerance.

### Power Table

This shows the relationship between set value and actual output value when PWM signal is set to adjust laser power. As shown in Fig.10, user sets the value as 10, and the actual output value is 10, if in the software user sets power output as 10, then LCC control card outputs 10% PWM signal; if actual output is set as 11, then LCC control card will output 11% instead.

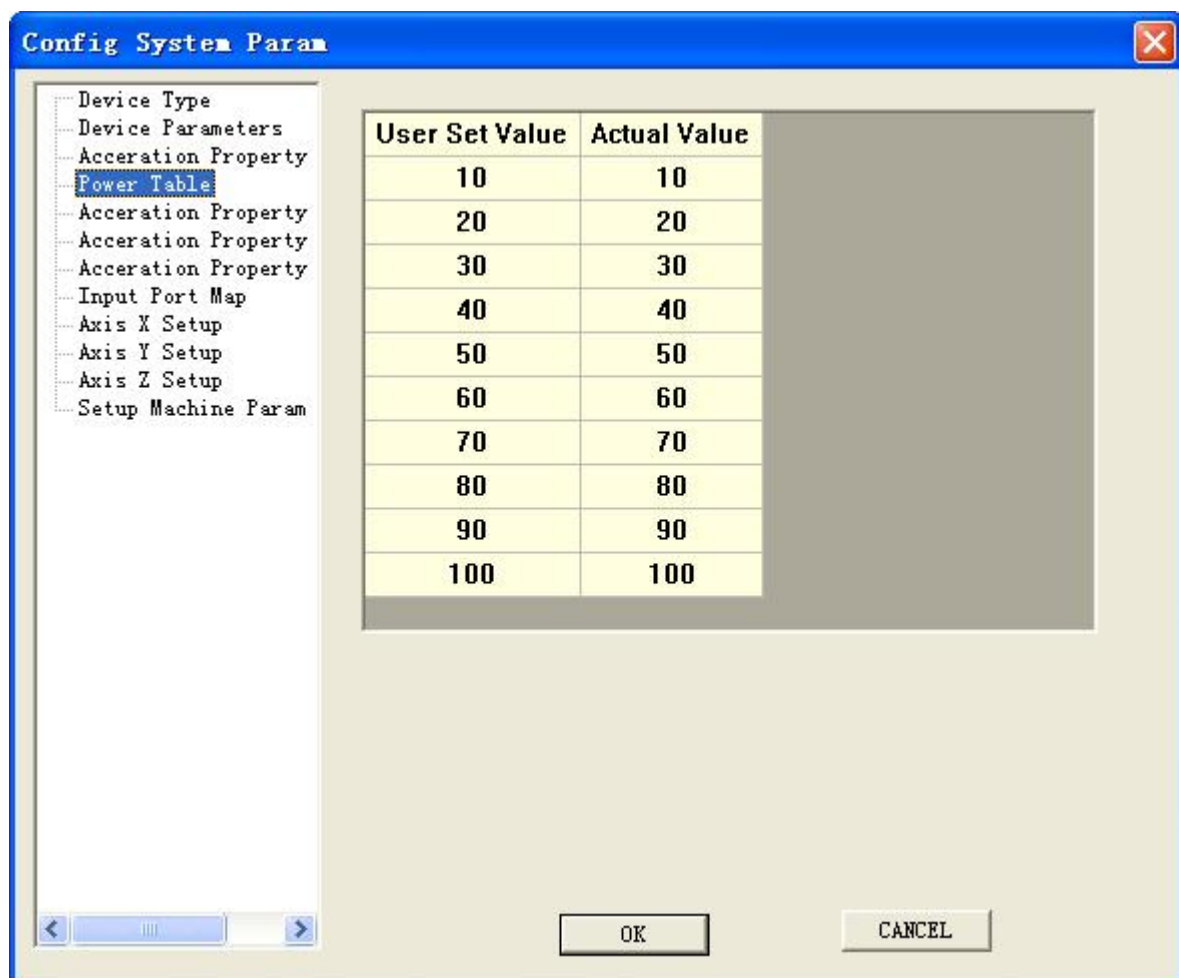


Fig.10

## Accelerating Property (Cutting)

As shown in Fig.11, the movement features of EzCad under cutting mode are set.

**Feed:** This corresponds to the feeding speed value set in the software.

**X startup speed:** X-axis's starting speed under the set feeding value. In actual movement, X-axis will directly start movement at this speed from still status.

**X max speed:** X-axis's maximum speed under the set feeding speed. For example, in the column of feeding speed 60, if X maximum is set as 50, then X-axis's maximum speed in actual movement will be 50 instead of 60.

**X Acc(elerating) Dist(ance):** Under the feeding speed, the distance that X-axis goes through at the maximum speed from starting speed.

Y-axis has the same group of parameters that have the same meanings as the respective parameters of X-axis. In this chart, to revise the numbers, double click the mouse and directly revise them.

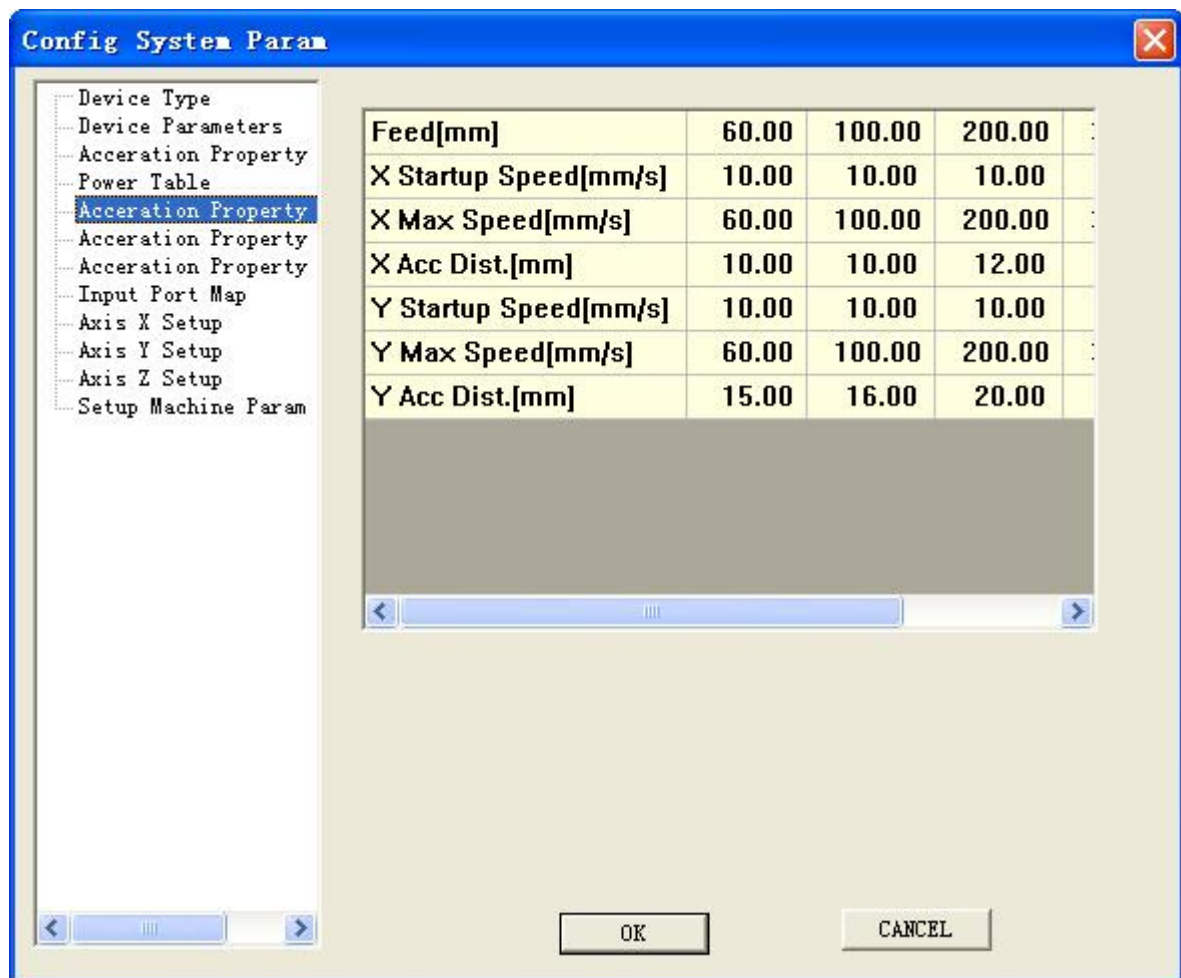


Fig.11

## Accelerating Property (Scanning)

Relevant parameters have the same meanings as the ones of cutting accelerating property. These parameters apply when the system runs under scanning mode. Under scanning mode, the equipment may have to compensate each movement tolerance, and the compensation value can be set in "movement compensation" parameter. See Fig.12.

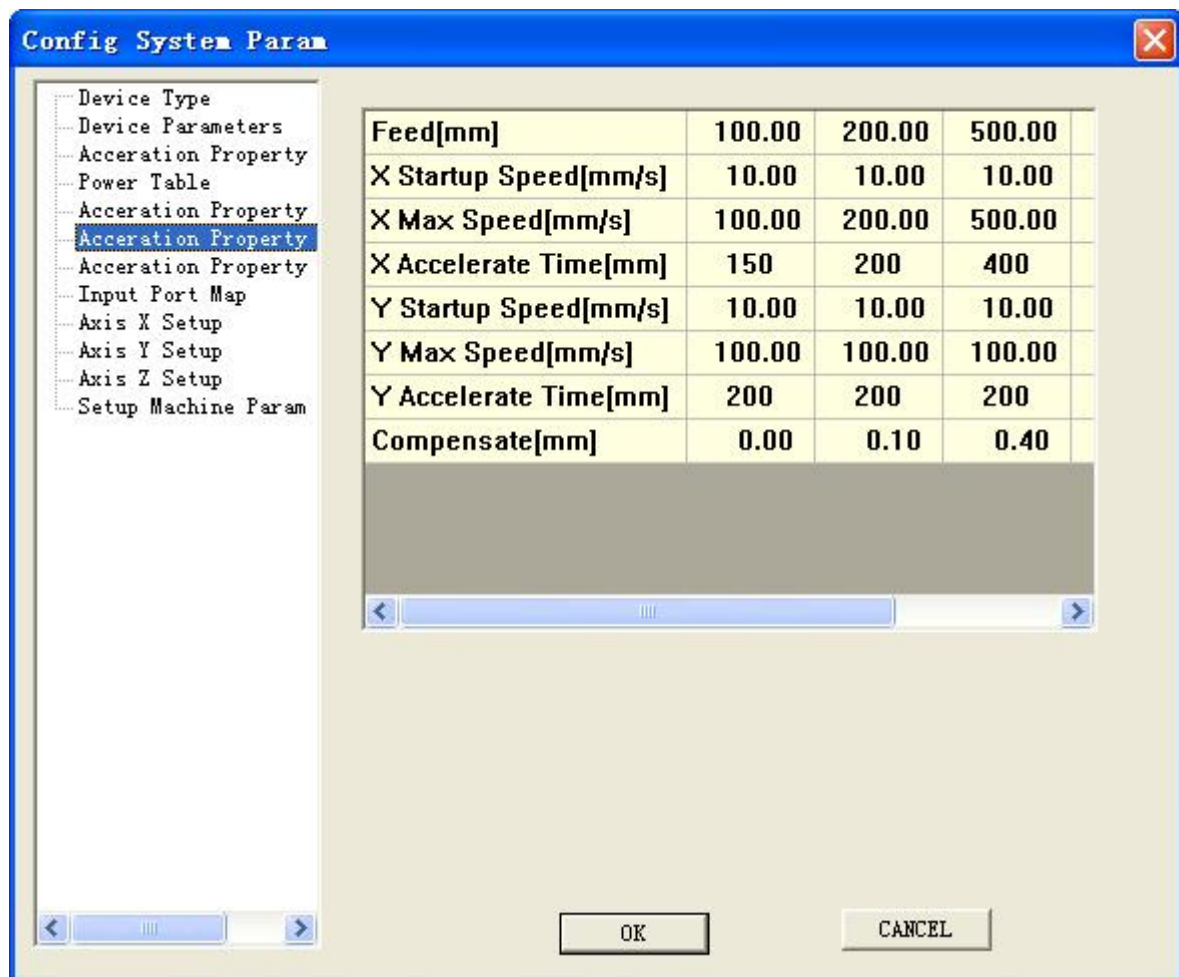


Fig.12

## Accelerating Property (Positioning)

Relevant parameters have the same meanings as the ones of cutting accelerating features. These parameters apply when the system runs under positioning mode, that is, when the system runs without laser output. See Fig.13.

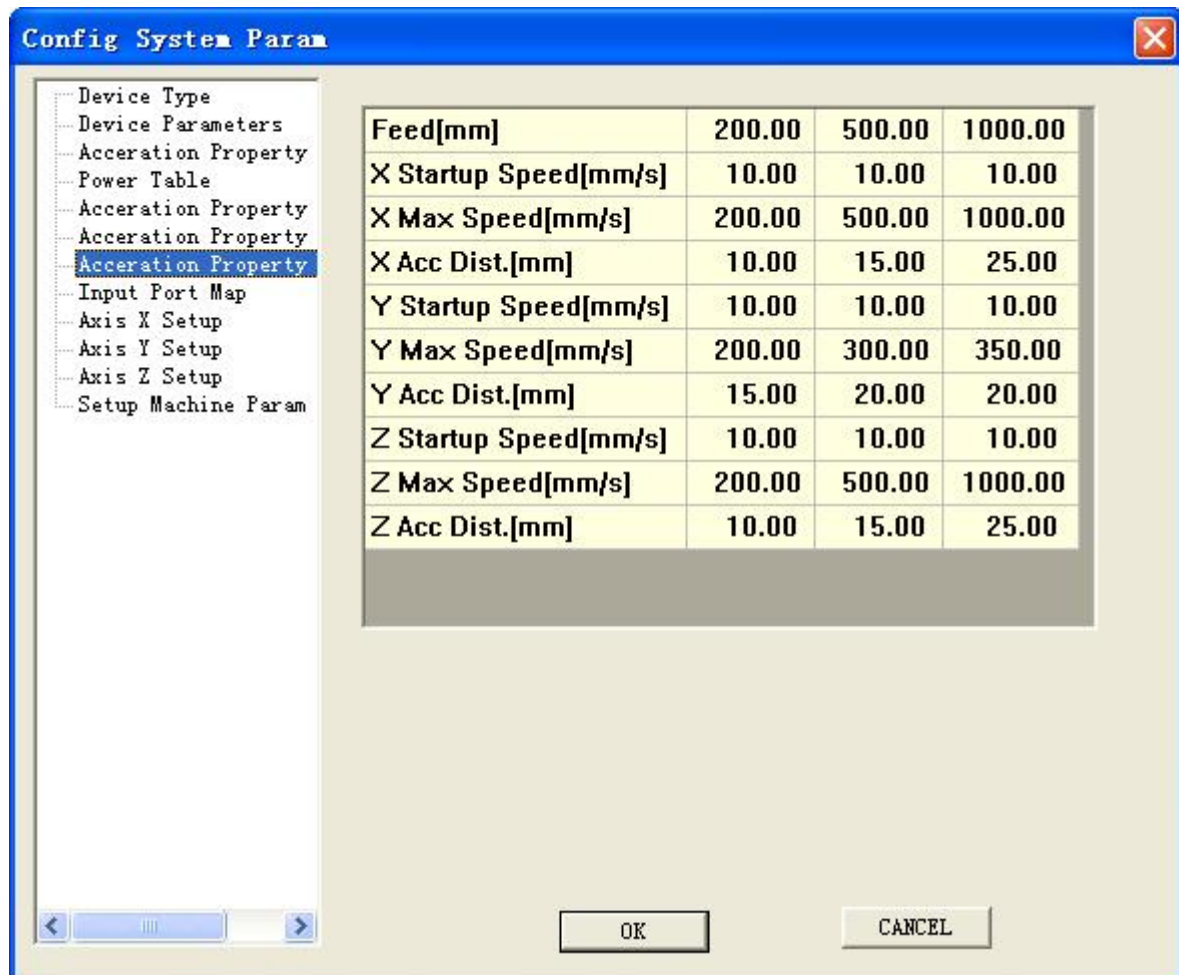


Fig.13

## Input terminal mapping

This interface shows the features of set input terminals. This feature can be checked and modified after being set up in DevDia.exe as shown in Fig.14. To modify certain terminal's feature, just double click the terminal, and choose correct features in the pop-up dialog box.

The system default setup is to use normally closed switch. If the equipment is set to use normally open switch instead, then the respective option should be ticked on this interface.

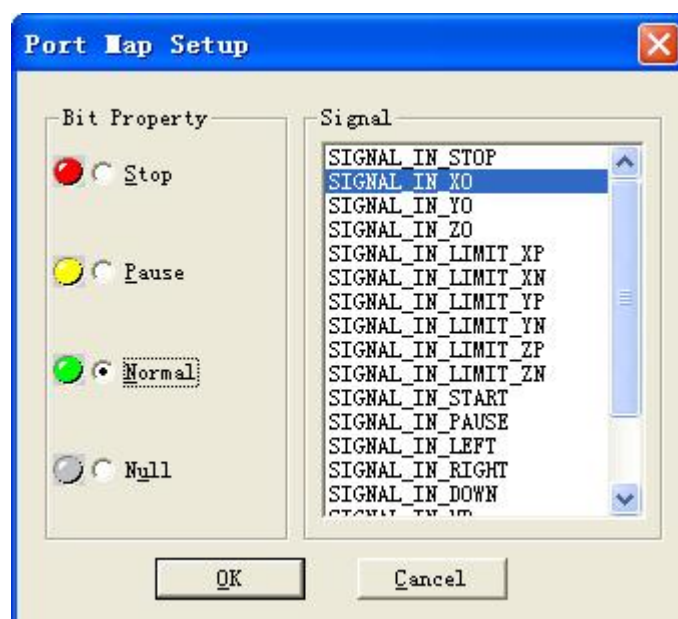
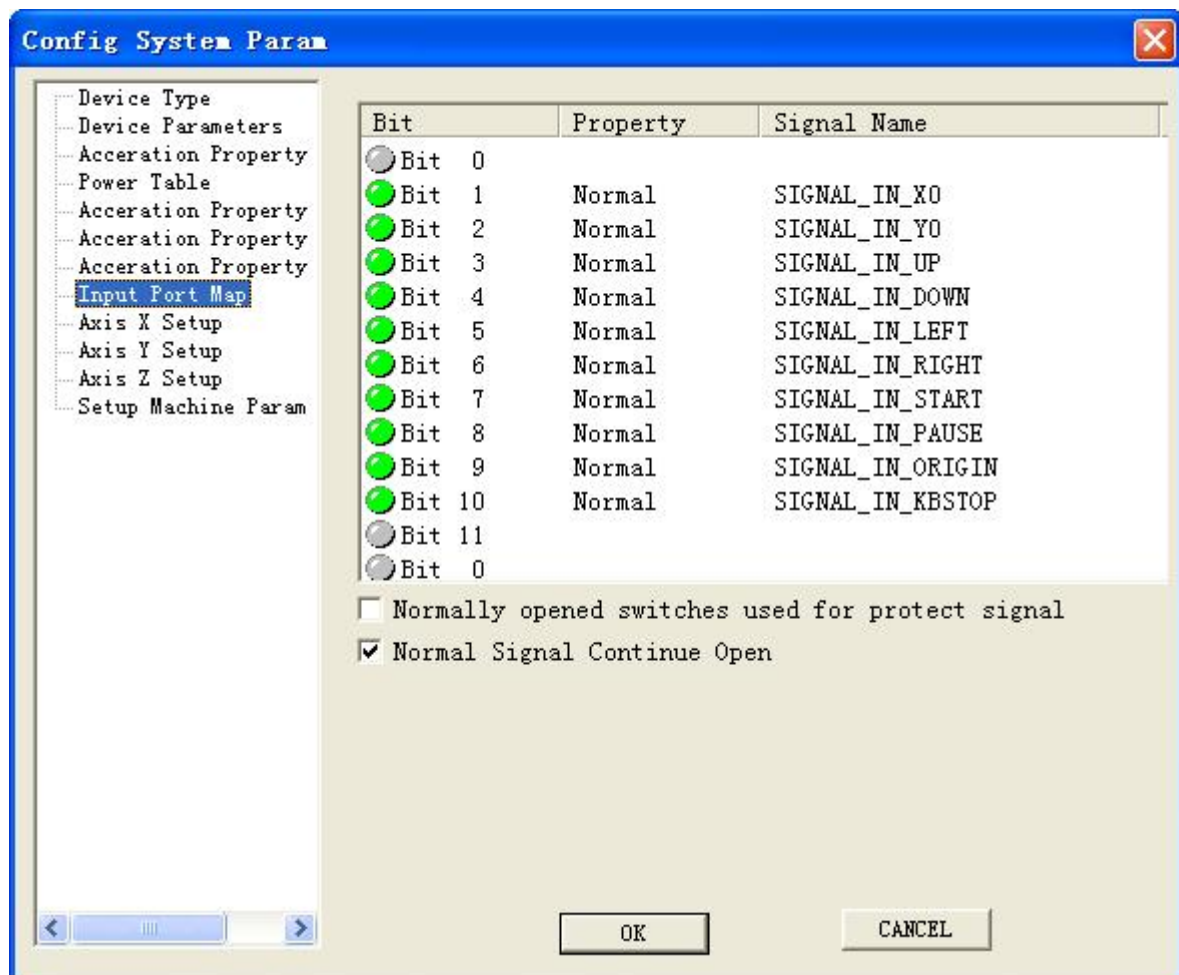


Fig.14



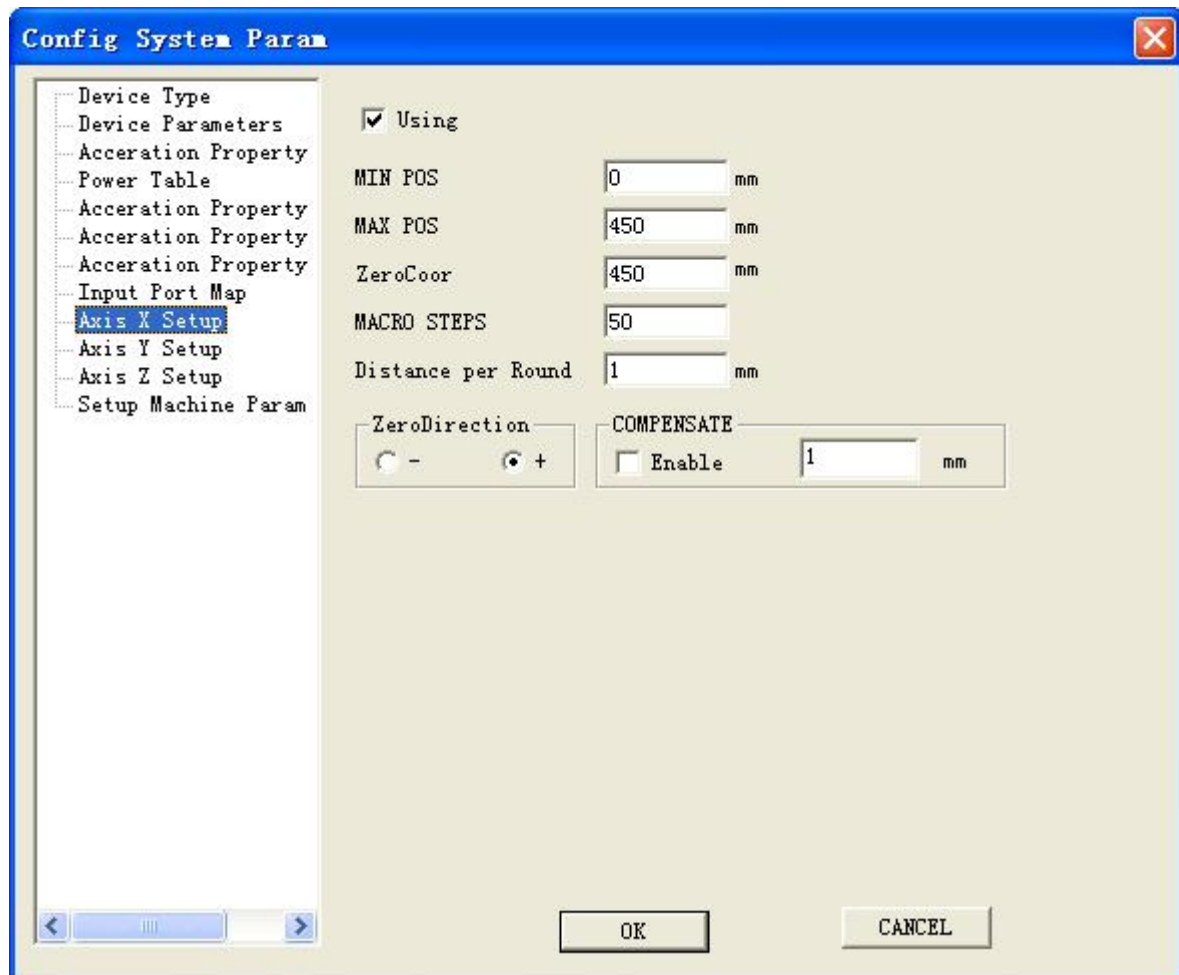


Fig.15

## X-axis features

This is to set the relevant features of X-axis. X-axis will function only when the “Using” option is ticked. Otherwise the system will assume that the equipment has no X-axis and will not output respective control signals.

**Min Pos(ition):** This means the minimum coordinate on X-axis. The EzCad software takes the left bottom corner as the origin coordinate of the system, and this corresponds to the minimum coordinate value of an image that can be processed by the software. That is, if an image’s minimum coordinate value is smaller than this value, then the system will not process this image, and error message will be prompted.

**Max Pos:** The maximum coordinate on X-axis. This values corresponds to the maximum value of an image which can be processed by the software. If an image’s maximum coordinate value exceeds this value, then the system will not process this image, and error message will be prompted.

**Zero Coor:** The equipment’s zero point’s relative distance in X direction.

**Micro steps:** Number of micro steps of the motor used by X-axis.

**Distance per round:** This is the upward moving distance in X direction per resolution of X-axis motor.

**Zero direction:** This is to set the zero-resetting direction. Resetting to the right is the positive value.

**Compensation:** This is to compensate the mechanical tolerance during X-axis’s movement.

## Y and Z axis features

Same as X-axis's features.

## Setup of processing parameters

This is to set the device's operation parameters. Same as the parameter setup in EzCad software. Here the detailed instructions are omitted. Please refer to EzCad instructions for relevant details.

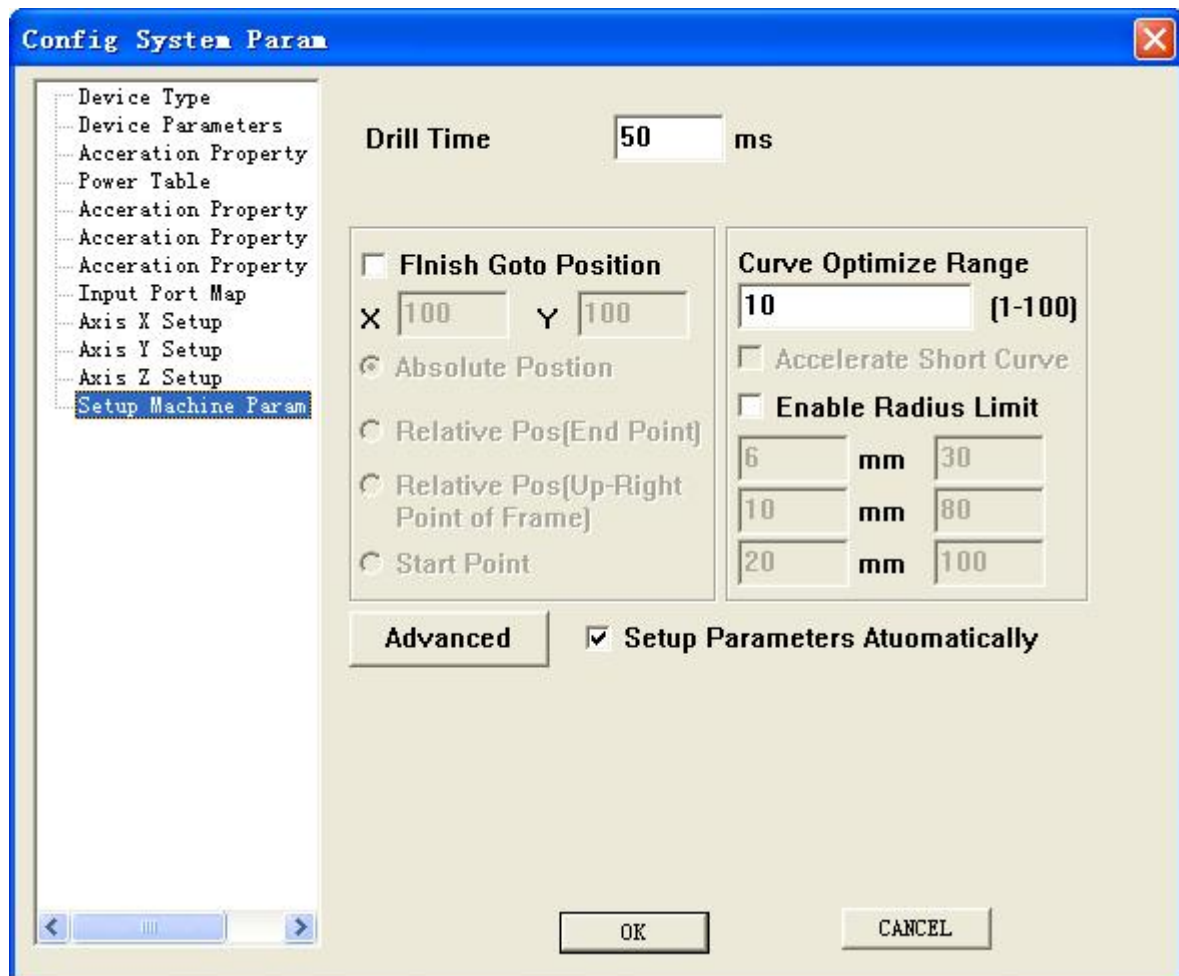


Fig.16