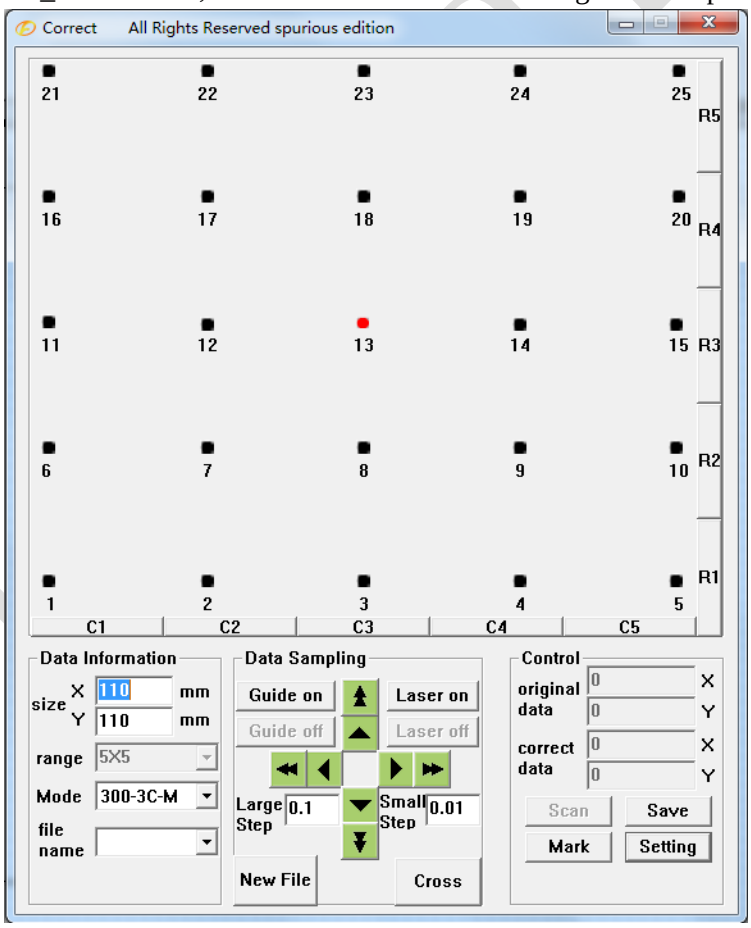
FEELTEK 菲镭泰克	Document Name	Version
APPROVED	Correction Instruction	2017.2.0

Chapter 1. Software Instruction

It is suit for precise correction on image, the grid correction method is recommend when formula correction method can't meet precision requirement.

Double click Correct_3D software, and will come out the following interface pic 1-1



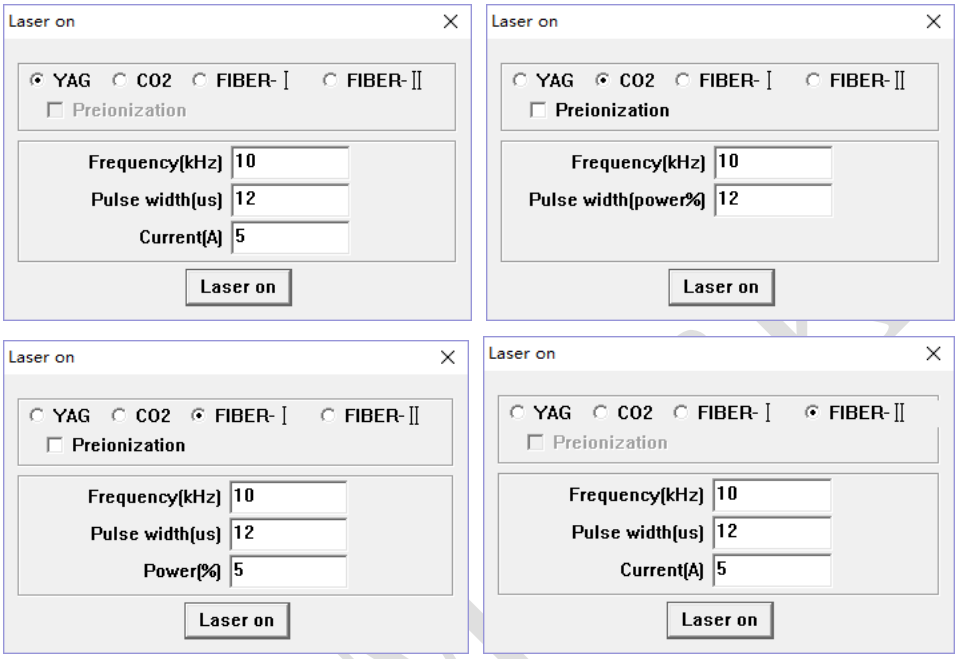
Pic 1-1 Correction software interface

Parameters instructions:

Size: Marking range, that is the scope of equipment debugging.

Mode: Select scanner type.

File name: Call the default path of the existing data file, just click the drop-down button and then select.
Guide on: Click the button to open the preview light, the same position as the laser.
Guide off: Single click and close the preview light.
Laser on: Single click the button and pop up the dialog box pic 1-2, it can control YAG、CO2、fiber laser.



Pic1-2 Laser on dialog box

As show in the above pic, the parameters settings are different according to different lasers, please see following parameters instruction:
Preionization: In the use of preionization function, after election, when the laser does not light, there will be a frequency signal discharge waveform in accord with the setting of frequency and duty cycle.
Frequency: Limiting laser frequency.
Pulse width: Indicate effective pulse duration.
Current: Output current of laser power supply.
Power: Laser output frequency setting.
Laser off: Single click the button can close preview light and laser.
Direction button: It can control the scanner under the direction of top, bottom, left, right to move. Every click the double-arrow button, the scanner move a large step, the shortcut Ctrl+ is the direction key. Every click the single-arrow, the scanner move a small distance adjustment, shortcut key Shift+ is the direction key.
Large step: stride length settings.
Small step: small step length minor adjustment.
New life: Create new correction database.
Cross: Mark the cross with the center of selected point.
Original data: Point coordinators before correction.
Correct data: point coordinators after correction.
Scan: Scan the current calibration to get the corrected value.

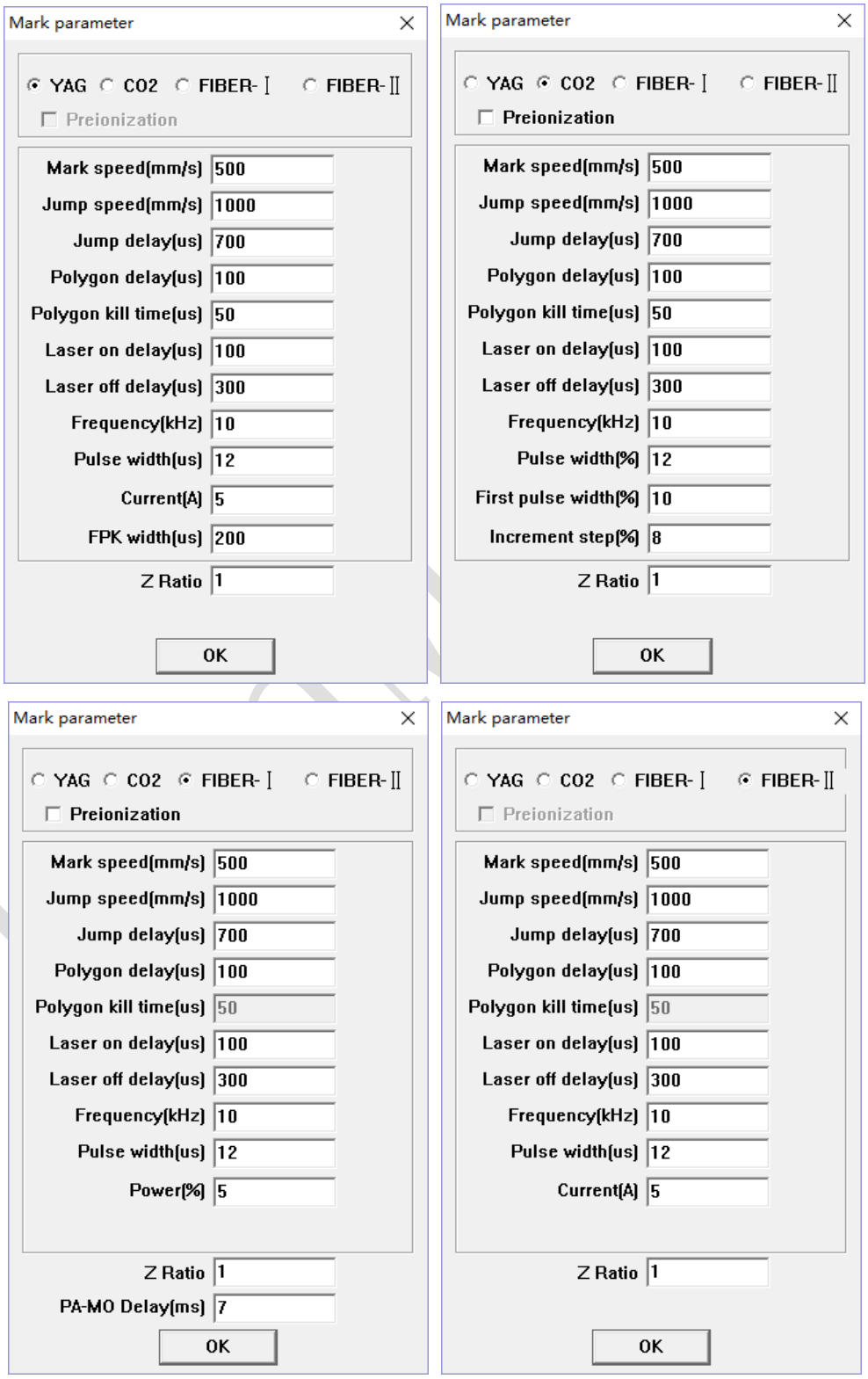
Save: Save current point correction data.

Mark: Mark the 5*5 grid line.

R1-R5: Mark the line of 5 points on the button.

C1-C5: Mark the vertical line of 5 points on the button.

Setting: Select laser type and set marking parameters, as shown in pic 1-3



Pic1-3 Setting interface

As show in the above pic, the parameters settings are different accord to different lasers, here introduce the parameters for the four interfaces.

Preionization: In the use of preionization function, after election, when the laser does not light, there will be a frequency signal discharge waveform in accord with the setting of frequency and duty cycle.

Mark speed: The actual movement speed of scanner when marking on the work piece

Jump speed: The transfer(positioning)speed between stroke and image during marking process.

Jump delay: After the last instruction given by the stroke, due to the scanner hysteresis, it will take proper time to reach the designated position, so it is necessary to set this parameters for the scanner to reach the designated position;

Polygon delay: A stroke issue an end instruction, the next stroke issue a start instruction, there's no empty stroke between them. Due to the scanner hysteresis, it will take a period of time to reach the designated position. If the parameter is too large, the scanner has been fully transferred, the laser does not stop the light at this time, then the inflection point will form the focus, increase the marking time. If the parameter is too small, the scanner has not fully transferred to the beginning of marking the next line, the arc will turn up.

Polygon inhibit time: Due to the inflection point at the point of delay, the inflection points will be focused, the value of the appropriate setting can be removed, the greater the value, the more suppressed energy;

Laser on delay: A delay of a stroke after the end to start another stroke, due to the existence of the first pulse, the starting point will form a key, delay the laser, let the scanner move forward a distance can avoid this phenomenon.

Laser off delay: When the last instruction is given after stroke, due to the scanner hysteresis, it will take a period of time to reach the designated position. If the light delay is too large, scanner has been fully transferred, laser is not closed, the end points will be key strokes, and increase the marking time. If it is too small, scanner has not been fully transferred, the laser is closed, the end of stroke will not be long enough and will cause the phenomenon of lack strokes

Frequency: Limiting laser frequency

Pulse width: Indicate effective pulse duration

First pulse width: The first pulse duration time. When under CO2 laser type, the essence is the first pulse duty cycle

Increment step: the increment step for every first pulse width.

Power: Laser output frequency setting

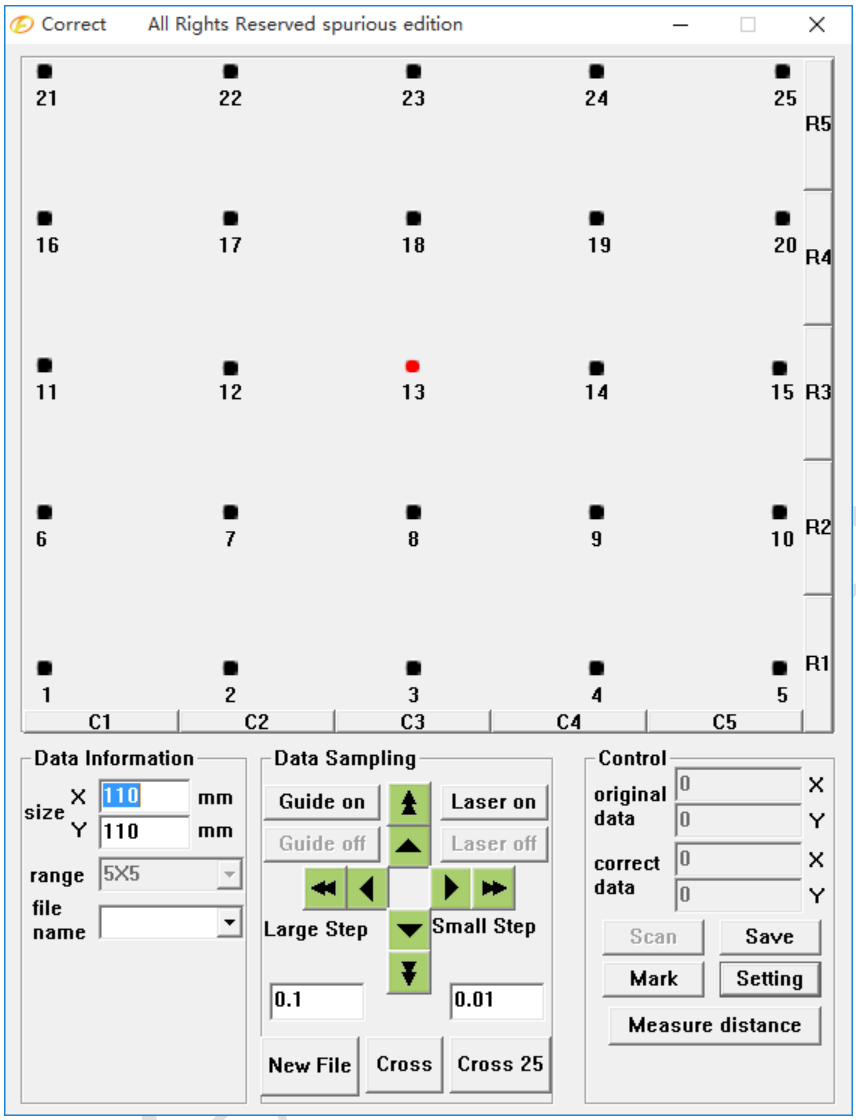
Current: Output current of laser power supply

FPK width: Pulse width of the first pulse

Z Ratio: Z direction scale factor, correct the deformation of the marking range

PA-MO Delay: In the use of FIBER-Ⅰ laser, PM-MO delay time.

Note: After adding the wizard setting module to the 3DS marking software, the type of the scanner in the correction software is not optional, and working filed can be modified only in the correction software, if need to change type of scanner, please switch wizard module, correction keep unchanged. The modified interface is shown in Pic 1-4:



Pic1-4 correction interface for NEW version

Chapter 2. Operation Instruction

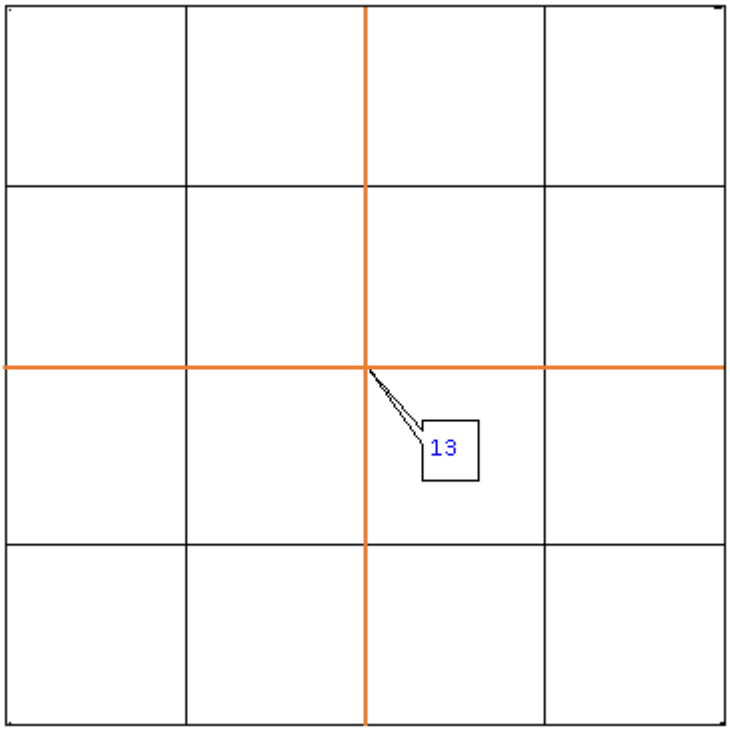
1. Preparation

1) Align the thirteenth point of the template with the marked area origin

2) Workbench and template required horizontal placement, center line of template and X axis of scanner should in the same axis

3) When do correction, don't move the laser, scanner and workbench

4) The size of template should be the same as selected marking range. For example, the selected marking range is 400*400(mm), template range is also the 400*400(mm). In this range, the average distribution of 25 points, the grid line for 5*5, as shown in pic 2-1



Pic 2-1 correction template

2. Operation Procedure

1) Open correction software, input marking scope and file name, select the corresponding laser and light parameters

2) Select the 13 point(midpoint), then open laser, please be attention the laser energy should not be too large in case of wounding, especially for CO2 laser. Move the template, make the laser hits the center of point 13, save the correction data.

3) Select point 11 or point 15, move the template to adjust, make the laser hit in the line11-15. Don't use the trimming function during this process.

4) Make the rest of points to be corrected through software, make the light spot coincide with the template point, save every points' correction data.

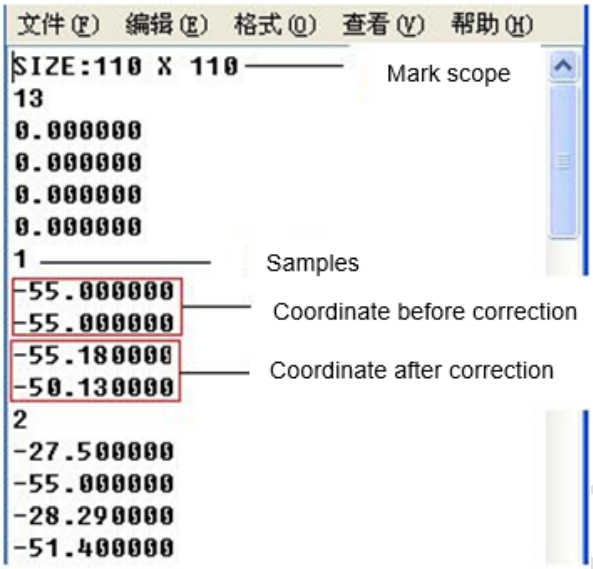
5) Leave the marking paper on the template (don't touch the template), select "Mark", test the result, measure and check whether the marked image is standard. If some points are not correct, please continue to do trimming until correct, and save the data.

6) Save the data under the installation path LenMark\Correction File, and save it as *.txt format.

3. Modify correction file

According to the result of marking, the error can be adjusted manually. For example: if the first point still need to turn left 0.01mm, select the first point, move it to left and adjust a small step, then save data, the original correction coordinate will be replaced by updated data.

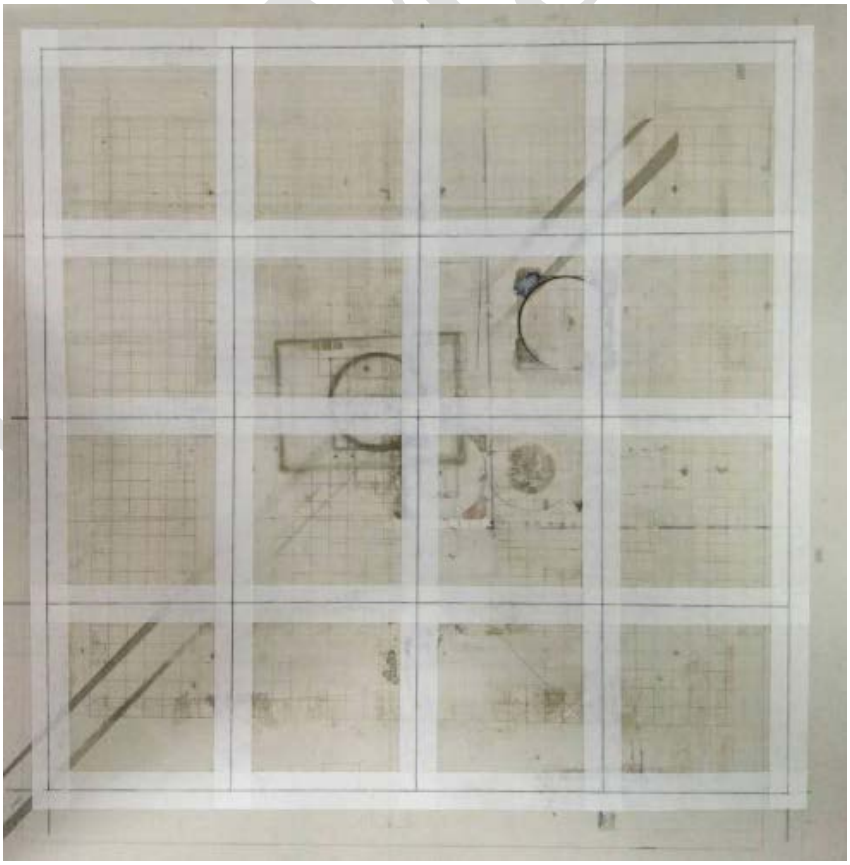
It can also open the saved file to modify the coordinates. For example: open the saved correction file Lenmark.txt: installation path LenMark\Correction File\2D Standard\Lenmark.txt. See below pic 2-2 (Due to limited space, here is only part of interception for reference)



Pic2-2 Correction file interface

Chapter 3. Correction Procedure

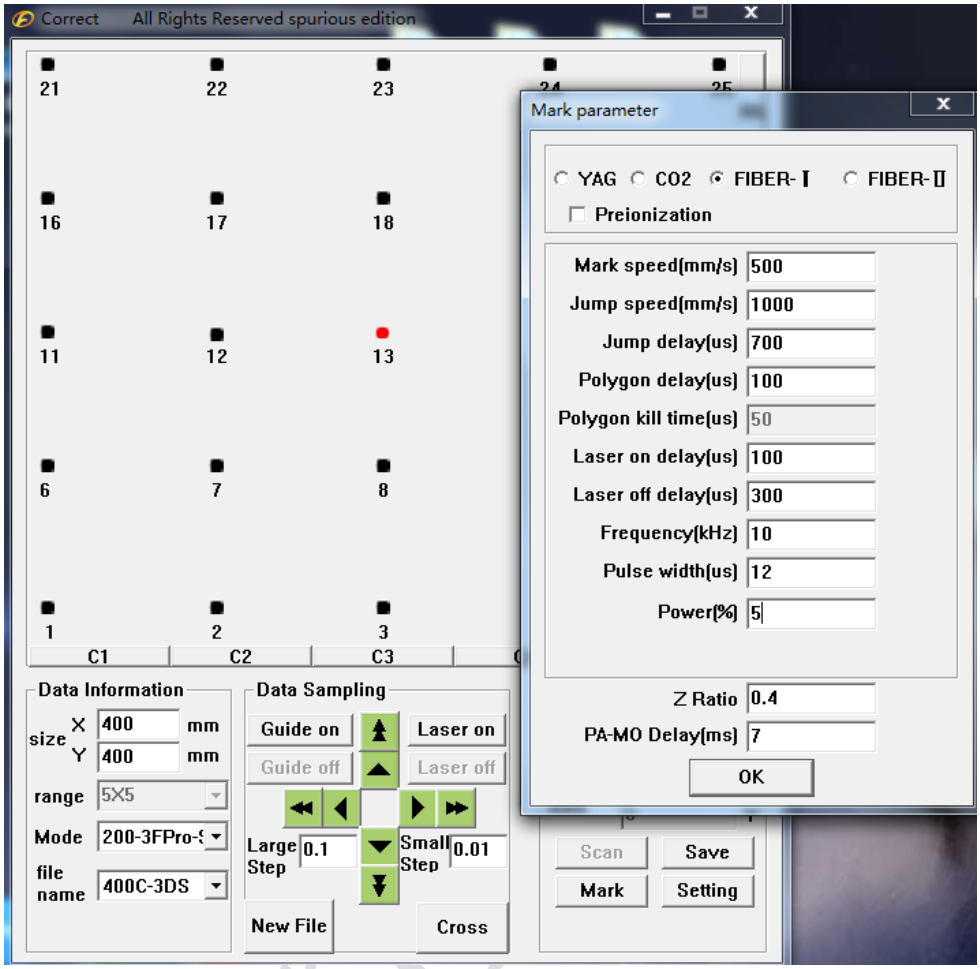
1. Draw a 5*5 grid on the template, equal line spacing is required. Take 400 filed for example, see below pic 3-1



Pic 3-1 400 field template

2. Double click correction software, click “New File” and start new correction file name, select scanner type, and its corresponding laser and light parameters, please see below pic 3-2

settings interface:



Pic 3-2 correction software settings interface

3. Select the 13 point(midpoint), click Cross open light to do focus adjustment, after center focus length adjustment, select the position of the 15,3,11,23 number in order to adjust the edge focal length.

4. After focus length adjustment, click center position of point 13, click “Laser on” to open laser, user the shift button to do trimming, make the laser hit the center of template. See below pic3-3



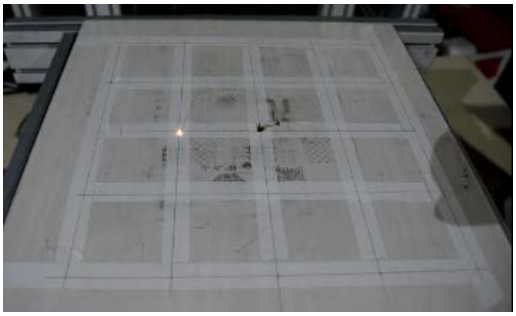
Shift adjustment (Before) Shift adjustment (After)

Pic 3-3 central position correction effect

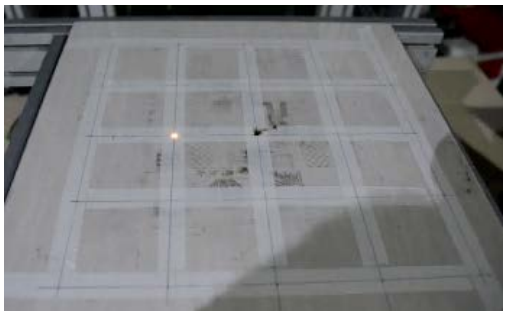
After correction, click “save” to save data.

5. After correction of central point, click the point 12 position and correct, change the

horizontal coordinate whist keep the vertical coordinate, make point 12 and point 13 position on the same horizontal line. As shown in Pic3-4



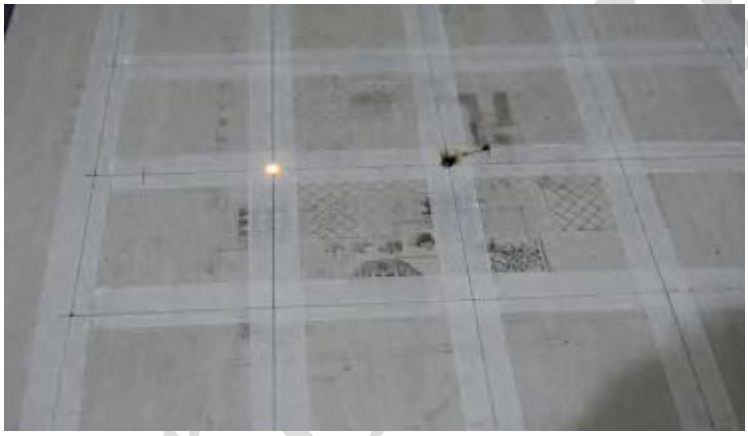
Laser Trimming (Before)



Laser Trimming (After)

Pic3-4 point 12 position laser trimming effect

Use the shift button to adjust the vertical coordinate position of point 12, make laser hit point 12 on the template, as shown in pic 3-5



Pic 3-5 12 position laser trimming effect

Save data after adjustment.

6. Select the center of the cross point of the line to adjust in accord to above method. After completion, adjust the position for the remaining point in turn. Please save data after every adjustment.

After the completion of all the points, you can click on the software C1-C5, R1-R5 button, line by line to check the correction effect.

You can also click on the "Mark" button for the whole standard mark, check the test result and whether the measurement of the graphics is standard, if some points are not accurate, and then do fine tune until accurate, save the data.