

# Rotary Axis Marking

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## Rotary Axis Marking

# Chapter 1 Basic Concept of Rotary

### MarkingMate Marking functions with stepping (servo) motors

Since the limitation of marking range and laser focus, the marking jobs of big working areas and special work pieces like the cylinders and discs will need the stepping (servo) motors to help moving the work pieces.

The marking of the cylinders, we call it "Rotary Axis Marking"; while the marking of big working areas needs to use XY table, is called "X-Y Table Positioning". As the disc pieces, although they are close to the round pieces, its operation is more close to the X-Y Table Positioning. MarkingMate offers those different user interfaces for users to do the settings. You can choose according to your own requirements.

The way of controlling the motor the system used is to output some control signals through Digital Output that the stepping motor needs like PULSE and Direction signals. The motor rotating direction is also related to the wire arrangement. So if you find the rotating direction does not match your expectation, try to adjust the system setting or change the wire arrangements of the motor directly.

The motor related settings are in the Motor Setup and Graph Setup pages of Property Table.

The "Motor Setup" page is for settings of the rotary axis motor parameters. More detail descriptions can be found in later section. Please note that the setup unit is different from the version 2.0.14, be sure not to make mistakes. The "Graph Setup" page is mainly for the rotary axis marking. Since the motor can be put on top or down or left or right of the marking machine, users have to let the system know that which is the right direction. Left-right direction is so-called "X-axis"; while top-down direction is the so-called "Y-axis".

After the axis is appointed correctly, if you find the rotating direction is wrong, should go to the "Motor Setup" page and appoint the motor to rotate backward.

Before V2.0.14 version, the system support rotary axis only, and all of the graphics are considered to use the rotary axis marking function. But after the V2.1 version, there is a great improvement. The system can support rotary axis and XY table, and different layers can be assigned by different parameters. That means some of the layers can be marked by rotary axis and some of them use XY table; and of course also support the general marking mode.

# Rotary Axis Marking

For PCNCIO card, the output signal is limited to control only one axis. So if you use rotary axis, the table is unable to use. You can choose to use a single axis table (X-axis) or rotary axis.

For the PCMark card, it supports 4 axes stepping motor control signals, but the driver only provides 3 axes, X, Y, and rotary axis at present. Every axis has its own proprietary contact, no longer like PCNCIO to share the contact.

So the person who uses V2.0.14, please

- Move all pictures the same layer.
- Click the layer in Object Browser; you will see “XY Table” and “Rotary” in Property Table.
- Go to the “Rotary” page of Property Table, enable the rotary function.
- Set up all the parameters of the rotary axis.

The way of setting the rotary parameters of V2.1 is slightly different from V2.0.14. For V2.0.14, users must establish each rotating interval manually. But now, users only need to define the max acceptable width for rotating interval, the system will finish division automatically. (Please refer to page 4.) If the mark area greater than input range, system will mark separately. If this is not the result you want, change an acceptable range.

Presently, the setting of rotary axis in layer is still limited in X-axis (means Y-axis is rotating); the other direction will be available later.

Is it possible to use both rotary axis and XY table? The answer is yes, but certainly you have to use PCMark card because this is a restriction of the hardware.

Except these differences, the system has offered another close design. That is each of objects can define it own start position of rotary axis. This is mainly design for the texts. When you select a text object, you can define the start position and the space between characters. The system will first move to the start position, mark the first character, and then rotate an interval you defined, mark the second character, and so on. No matter how big the character is, the rotary axis will not be rotated, in order to make sure that no flaws occurred. The system does not support multiple line texts for rotary axis marking at the present time; users can break the texts into several single line texts instead.

However, you must be careful. If one object in the layer has used the function of rotary axis marking, the layer can not enable this function any more. On the contrary, if the layer has enabled the rotary axis function, the object of the layer can not use the function independently. They are not compatible.

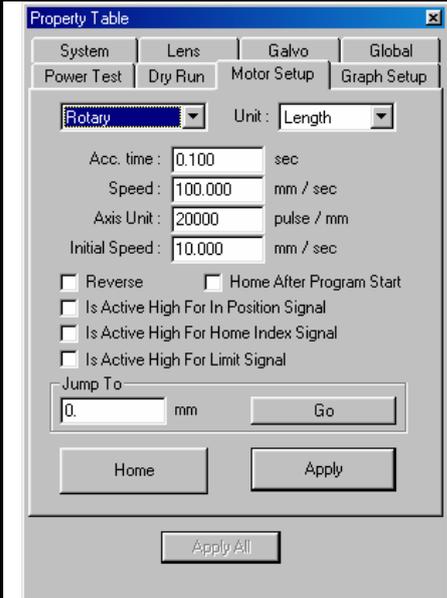
## Rotary Axis Marking

# Chapter 2 Operation Instructions of Rotary

## 2-1 Motor Setup:

When no object being selected, there are two rotary axis related setups for users to define.

1. Property Table – Motor Setup: For the settings of parameters of rotary axis motor
2. Property Table – Graph Setup: For the settings of rotary axis direction

	<p>There are four modes in the select bar:</p> <table border="1"> <tr> <td>● Rotary</td> <td>● X-axis</td> </tr> <tr> <td>● Y-axis</td> <td>● Z-axis</td> </tr> </table> <p>Unit:</p> <table border="1"> <tr> <td>● Length</td> <td>● Degree</td> </tr> </table> <p><b>Acc. Time:</b> the time for Rotary Axis to reach the speed you want. If the value is 5 sec and the speed is 100 degree/sec that means the rotary axis will reach 100 degree/sec in 5 seconds</p> <p><b>Speed:</b> the speed of Rotary Axis. If the value is 10 degree/sec that means the Rotary Axis turns 10 degree per second.</p> <p><b>Axis Unit:</b> the pulse amount needed for one degree ( or mm) Example: if the spec of the motor is 20000pulse/rev; the value should be set as 56 pulse/deg. (20000/360=56)</p>	● Rotary	● X-axis	● Y-axis	● Z-axis	● Length	● Degree
● Rotary	● X-axis						
● Y-axis	● Z-axis						
● Length	● Degree						

**Initial Speed:** the initial speed of the motor

**Reverse:** the motor turns in the reverse direction

**Home After Program Start:** Automatically go Home after program start

**Is Active High For In Position Signal:** Set the signal of In Position as “High” It is necessary for a servo motor to input the In Position Signal.

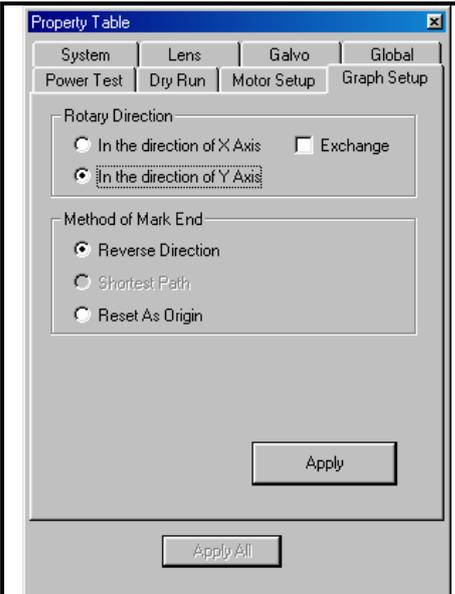
**Is Active High For Home Index Signal:** Set the signal of Home Index as “High”

**Is Active High For Limit Signal:** Set the signal of Limit as “High”

**Jump To:** Move to the assigned position

**Home:** Do the “Home” action immediately

# Rotary Axis Marking

	<h3>Rotary Direction</h3> <ul style="list-style-type: none"><li>● <b>Paralleled with X Axis:</b> the rotary will be paralleled with the X-axis</li><li>● <b>Paralleled with Y Axis:</b> the rotary will be paralleled with the Y-axis</li><li>● <b>Exchange:</b> exchange X/Y-axis <b>For example:</b> the rotary was paralleled with X-axis will become paralleled with Y-axis. This function is using when hardware can not adjust the direction.</li></ul> <h3>Method of Mark End</h3> <ul style="list-style-type: none"><li>● <b>Reverse Direction:</b> back to the origin in reverse direction</li><li>● <b>Reset As Origin:</b> the end-point being reset as origin. Some special process will need this function to save time</li></ul>
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# Rotary Axis Marking

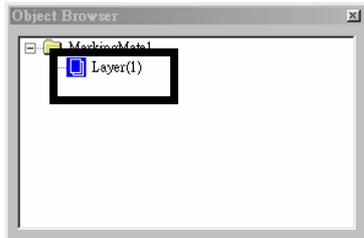
## 2-2 Rotary Axis Marking:

There are two types of rotary marking (users can only choice one):

- Layer-Rotary Axis The whole layer will be marked by rotary axis marking (image will be cut to segments automatically)
- Object-Rotary Axis The selected object will be marked by rotary axis marking (position is rotating)

### Layer-Rotary Axis

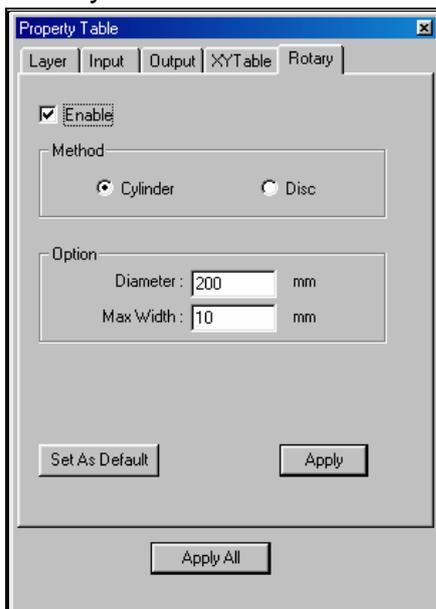
Select the layer in Object Browser.



Click the Rotary label of the Property Table can do the rotary axis-related settings.

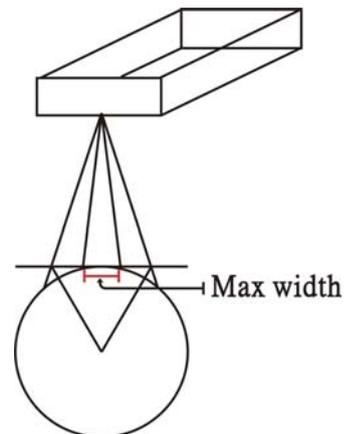
Click the XY Table label of the Property Table will be able to do the XY Table-related settings

### Rotary



### Cylinder:

- (1) **Enable:**  
Enable the function
- (2) **Method:**
  - Cylinder
- (3) **Option:**
  - Diameter:** the diameter of the work piece
  - Max Width:** the max width for marking (depend on the radius of axis)



# Rotary Axis Marking

	<p><b>Disc:</b></p> <ol style="list-style-type: none"> <li>(1) <b>Enable:</b> Enable the function of rotary axis</li> <li>(2) <b>Method:</b> <ul style="list-style-type: none"> <li>● Disc</li> </ul> </li> <li>(3) <b>Option:</b> <b>Step Angle:</b> the step angle of rotary axis after each marking</li> </ol>
--	---

# XY Table

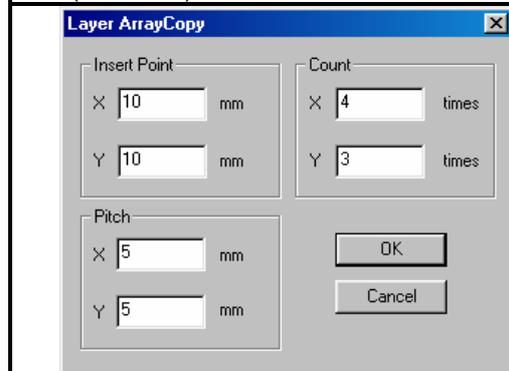
	<ol style="list-style-type: none"> <li>(1) <b>Enable:</b> Enable this function</li> <li>(2) <b>Y Disable:</b> Use single axis marking</li> <li>(3) <b>Show area of XY coordinate:</b> Display the XY coordinates</li> <li>(4) <b>Add:</b> Add a new point</li> </ol> <div data-bbox="1038 1055 1342 1249" style="border: 1px solid black; padding: 5px; margin: 5px;"> <p><b>Add/Edit XY Table Position</b></p> <p>X: [ 0 ] [ OK ]</p> <p>Y: [ 0 ] [ Cancel ]</p> </div> <ol style="list-style-type: none"> <li>(5) <b>Edit:</b> Input the XY value which the XY Table will move to and start marking</li> <li>(6) <b>Delete:</b> Delete the selected coordinate</li> <li>(7) <b>Delete All:</b> Delete all the coordinates</li> <li>(8) <b>Move Up:</b> Move the selected coordinate up</li> <li>(9) <b>Move Down:</b> Move the selected coordinate down</li> </ol>
--	--

	<ol style="list-style-type: none"> <li>(10) <b>Array Copy:</b> Increased by array copy             <ul style="list-style-type: none"> <li>● <b>Insert Point:</b> the start position</li> <li>● <b>Count:</b> the amount of copy</li> <li>● <b>Pitch:</b> the distance between each point</li> </ul> </li> </ol>
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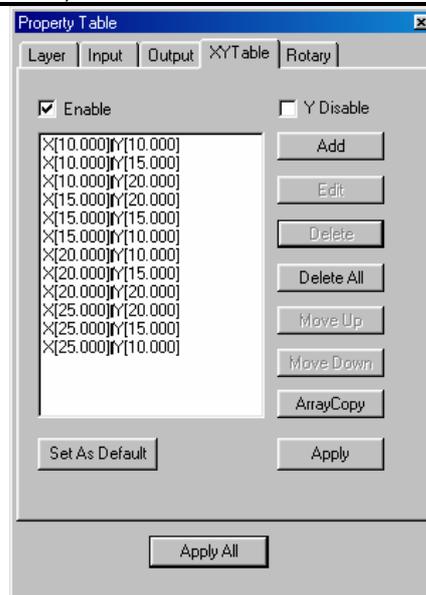
# Rotary Axis Marking

## Example:

Click the "Array Copy" button, Insert Point X=10, Y=10; Count X=4, Y=3; and Pitch X=5, Y=5 (as below)

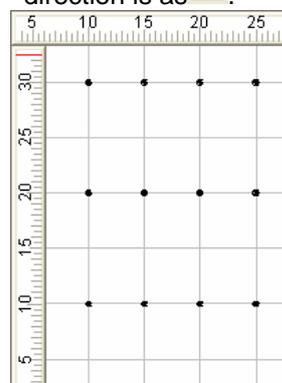


Click "OK" button, the Property Table will display all coordinates value in the Show Area (as below)



Execute marking, all the above coordinates will be marked (as below), and the marking

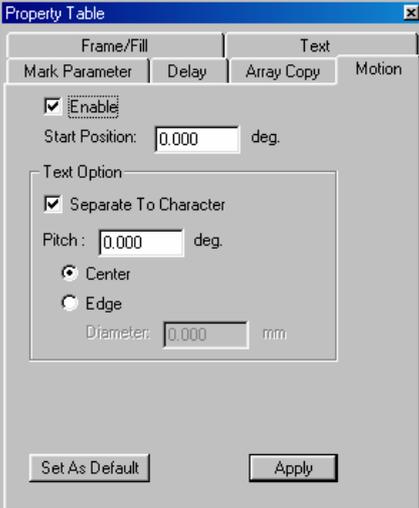
direction is as .



# Rotary Axis Marking

## Object – Rotary Axis

Select an object and go to the Motion page of Property Table; you can choose to enable or disable the rotary axis function for the object.

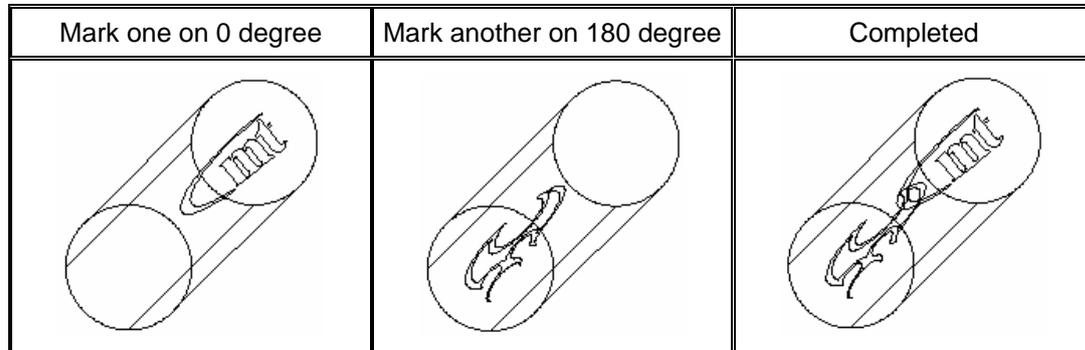
	<p><b>For a general object</b></p> <p><b>Enable:</b> Enable the function of rotary axis</p> <p><b>Start Position:</b> The start position for marking (mm or angle)</p>
	<p><b>For a Text object</b></p> <p><b>Enable:</b> Enable the function of rotary axis</p> <p><b>Start Position:</b> The start position for marking (mm or angle)</p> <p><b>Text Option</b></p> <p><b>Separate To Character:</b> Separate the text to characters</p> <p><b>Pitch:</b> The space between characters</p> <ul style="list-style-type: none"><li>● <b>Center:</b> based on the center of character</li><li>● <b>Edge:</b> based on the edge of character</li><li>■ <b>Diameter:</b> the diameter of rotary axis</li></ul>

# Rotary Axis Marking

## 2-3 Sample:

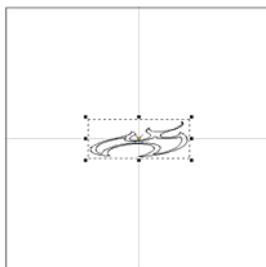
### 2-3.1 Graph Marking :

Mark two logos on the 0 degree and 180 degree of the cylinder object as below:

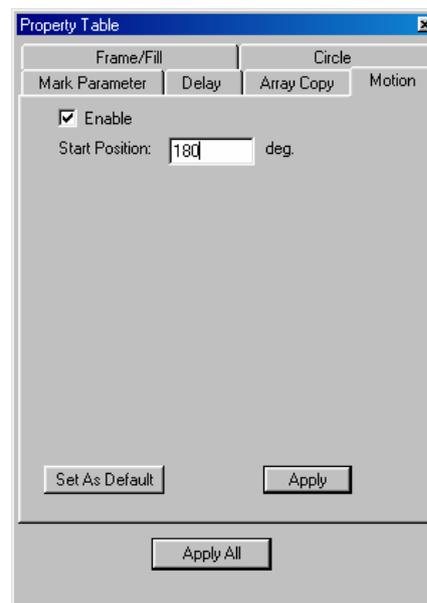
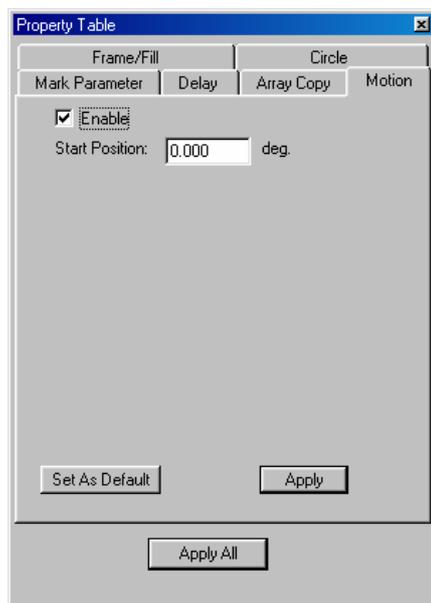


#### \* Object – Rotary Axis

1. Import a logo and put in the center of the work area (align center).

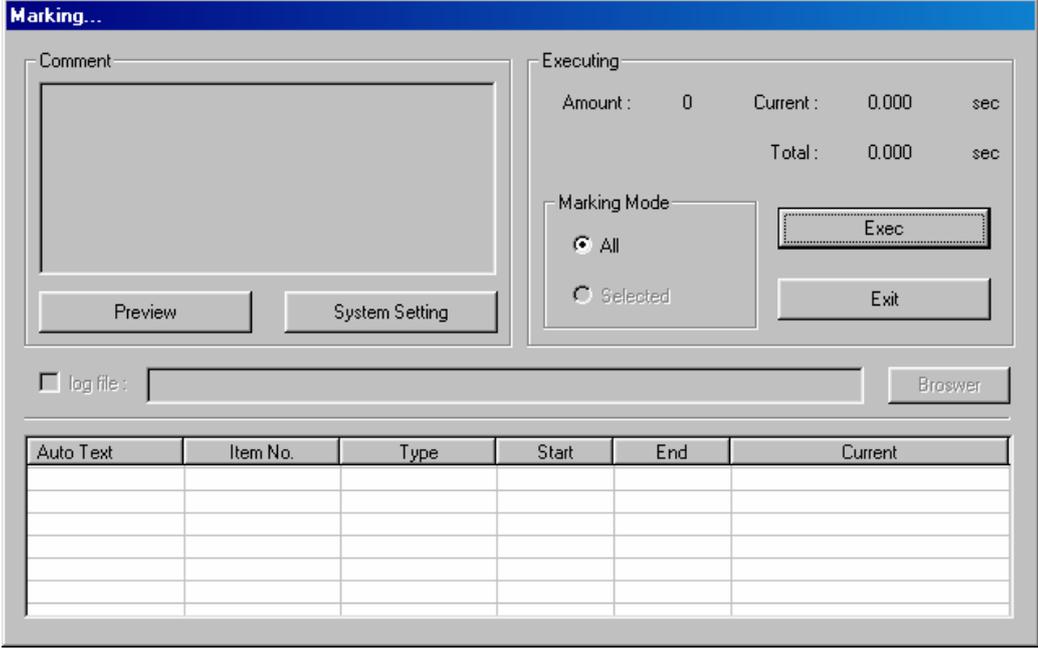


2. Select the logo and go to the Motion page of the Property Table, checked the box of "Enable".
3. Set the Start Position as 0 degree. Use the same way to import another logo, and set the Start Position as 180 degree.



## Rotary Axis Marking

4. When the setting has done, click the button of “Execute Mark”,  , a dialogue box as below will be displayed. Click the “Exec” button will start marking.



The dialog box titled "Marking..." contains the following elements:

- Comment:** A large text area for entering comments.
- Executing:** A panel showing "Amount : 0", "Current : 0.000 sec", and "Total : 0.000 sec".
- Marking Mode:** Radio buttons for "All" (selected) and "Selected".
- Buttons:** "Preview", "System Setting", "Exec", and "Exit".
- log file:** A checkbox and a text field with a "Browser" button.
- Table:** A table with columns: Auto Text, Item No., Type, Start, End, Current.

Auto Text	Item No.	Type	Start	End	Current

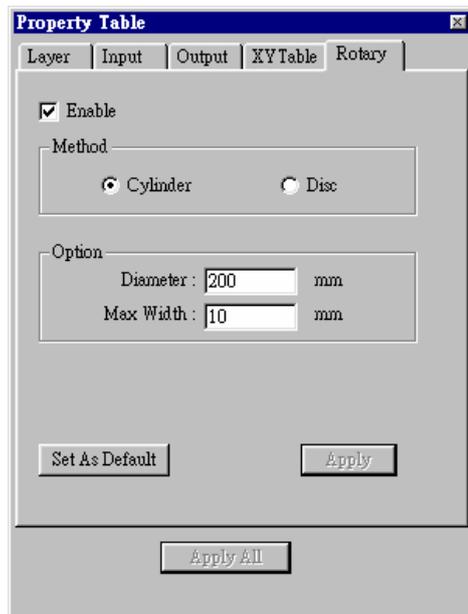
- \* If there are more than one picture to be marked by rotary axis marking, use “Object – Rotary Axis” function will be more easier. All you need to do is enable the “Motion” function and define the mark degree.

# Rotary Axis Marking

## \* Layer – Rotary Axis

### ■ Cylinder

1. Select the layer in Object Browser.
2. Go to the Rotary page of the Property Table, checked the box of enable, and select the Cylinder method.
3. Set the diameter of the object as 200mm and the max width as 10mm (means the mark range is 10mm).



4. Import two logos, calculate and adjust the position of the object (as below).  
The expanding of the object will be considered as its work area. We will calculate the logo position according to the work area.

### Object Property Bar: Page



How to calculate the coordinate:

The top of the work area is default set as 0 degree, its coordinate is (0, 0)

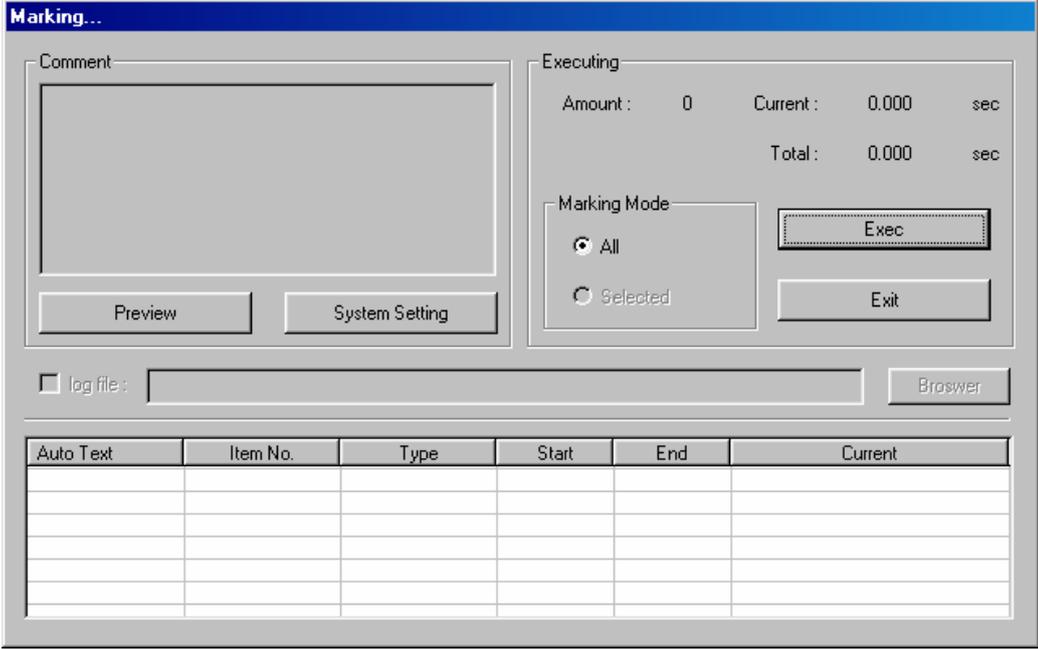
If you place the object in center of the work area, its coordinate will be X=0, Y=628.319 / 2 = 314.159 (because the height of the work area is 628.319)

So, if you want to mark on the position of 180 degree, just move the object to the center (see the right side picture)



## Rotary Axis Marking

5. After finish settings, click the button of execute mark  , a dialogue box as below will be displayed, click "Exec" button will start marking.



The dialog box titled "Marking..." contains the following elements:

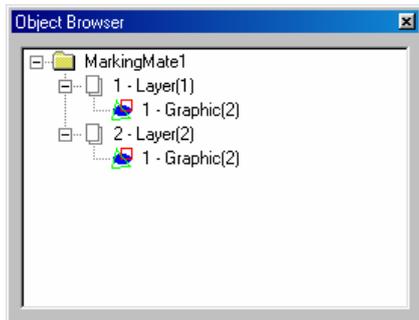
- Comment:** A large text area for entering a comment.
- Executing:** A section showing progress with "Amount : 0", "Current : 0.000 sec", and "Total : 0.000 sec".
- Marking Mode:** Two radio buttons, "All" (selected) and "Selected".
- Buttons:** "Preview", "System Setting", "Exec", and "Exit".
- Log File:** A checkbox labeled "log file:" followed by a text field and a "Browser" button.
- Table:** A table with 6 columns: "Auto Text", "Item No.", "Type", "Start", "End", and "Current". The table is currently empty.

- \* If select the Disc method of the "Layer – Rotary Axis" function, you need to calculate the position for every object.

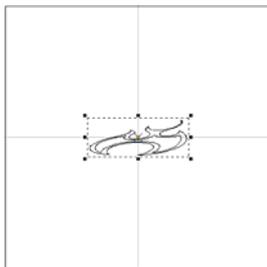
# Rotary Axis Marking

- **Disc**

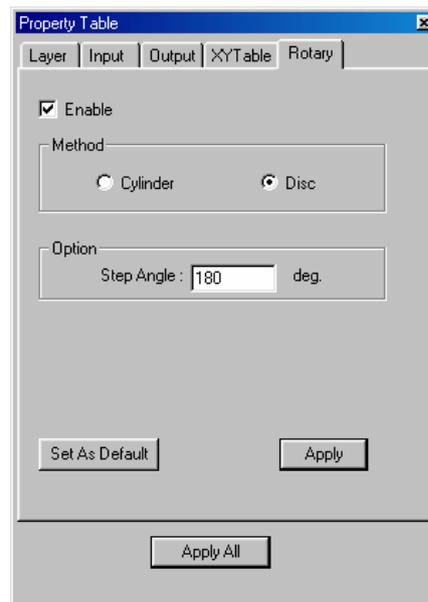
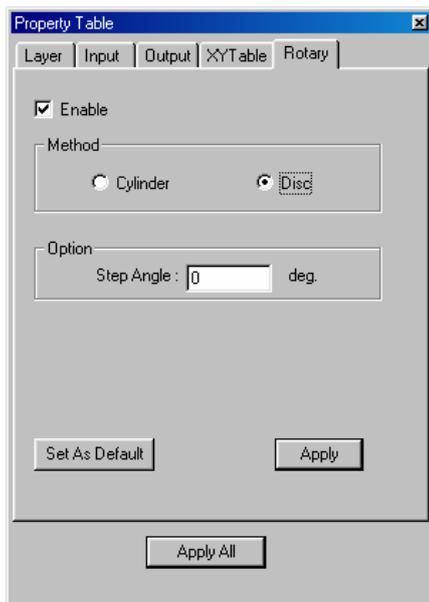
1. Create a new layer, import two logos into different layers individually (as below).



2. Place the logo in the center of the Work Area (align center)

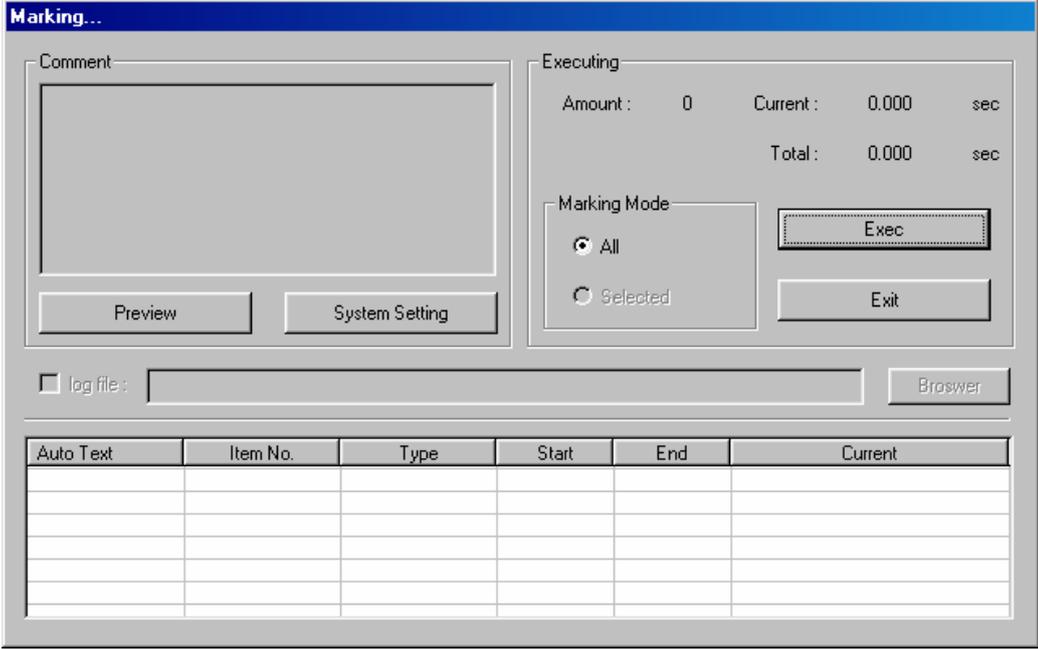


3. Select the layer in Object Browser.
4. Go to the Rotary page of the Property Table, check the box of "Enable", and select the "Disc" method.
5. Set the Step Angle as 0 degree (for the other logo, set as 180 degree).



## Rotary Axis Marking

6. After finish the setting of parameters, click the button, , a dialogue box as below will be displayed. Click the "Exec" button will start marking.



The dialog box titled "Marking..." contains the following elements:

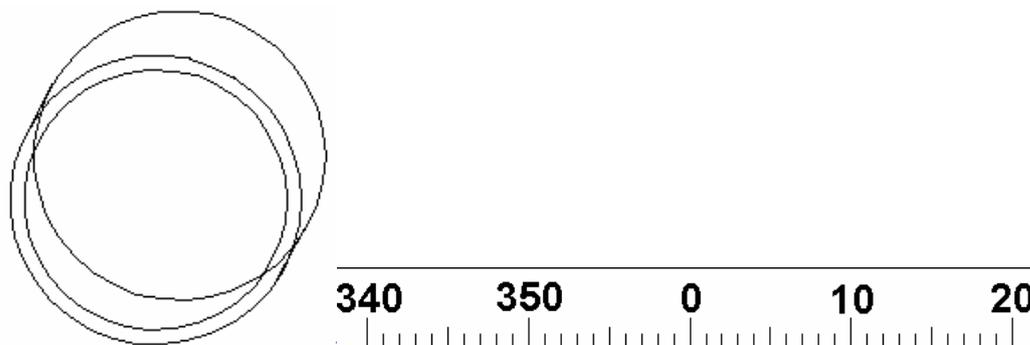
- Comment:** A large text area for entering a comment.
- Executing:** A panel showing execution statistics:
  - Amount : 0
  - Current : 0.000 sec
  - Total : 0.000 sec
- Marking Mode:** Two radio buttons: "All" (selected) and "Selected".
- Buttons:** "Preview", "System Setting", "Exec", and "Exit".
- Logfile:** A checkbox labeled "logfile:" followed by a text field and a "Browser" button.
- Table:** A table with 6 columns: "Auto Text", "Item No.", "Type", "Start", "End", and "Current". The table is currently empty.

- \* If you use the Rotary Axis – Disc function to mark many pictures, you need to create a new layer for every object first and then enable the function and then set the step angle.

# Rotary Axis Marking

## 2-3.2 Scale Ring (Loop) (I)

To mark a scale from 0 degree to 360 degree in a ring as below:

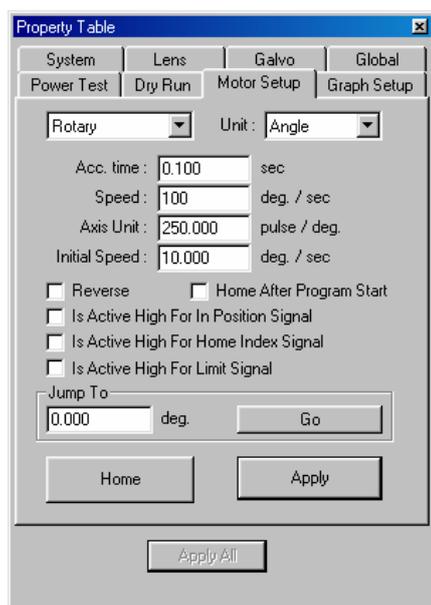


1. Do not select any object, and go to the Motor Setup page of the Property Table for settings of rotary axis.

We define the Y-axis as rotary axis, and continue the motor settings as below:

If the motor needs 90000 pulses for rotating one circle, the Axis Unit will be:

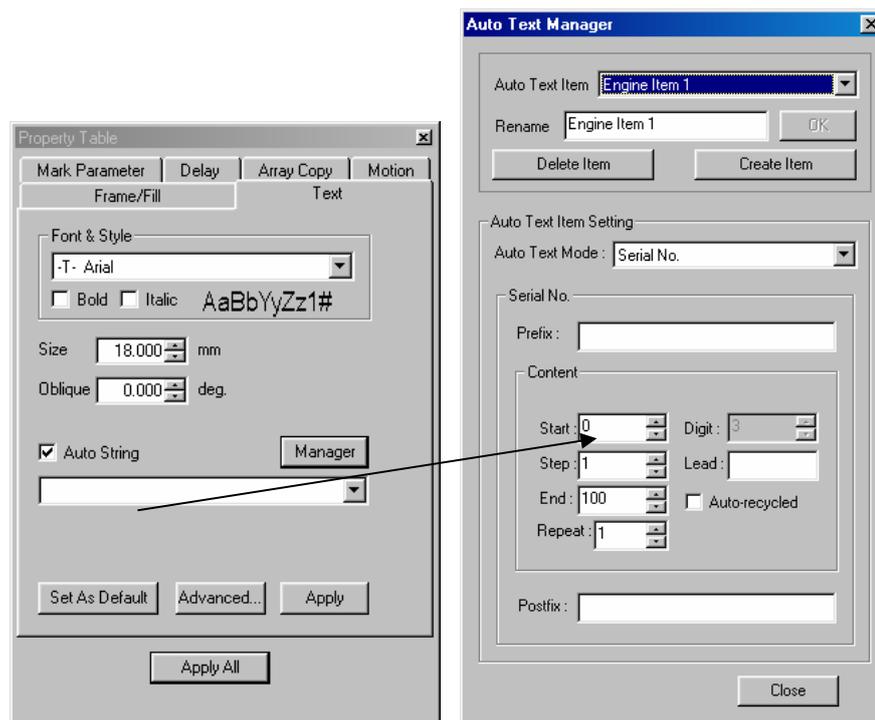
$90000 \text{ pulse} / 360 \text{ degree} = 250 \text{ pulse/deg}$  (the pulse number needed for rotating one degree)



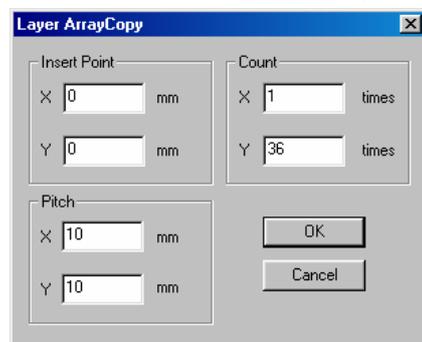
2. Using MarkingMate to mark scale as right: 
3. Go to the "Text" page of Property Table, checked the box of "Auto String", select "Serial No." in the Auto Text Manage dialogue box and do the following settings:  
Start: 0  
Step: 10  
End: 360

# Rotary Axis Marking

The mark result will be 0, 10, 20, 30, 40, 50, 60, and so on.

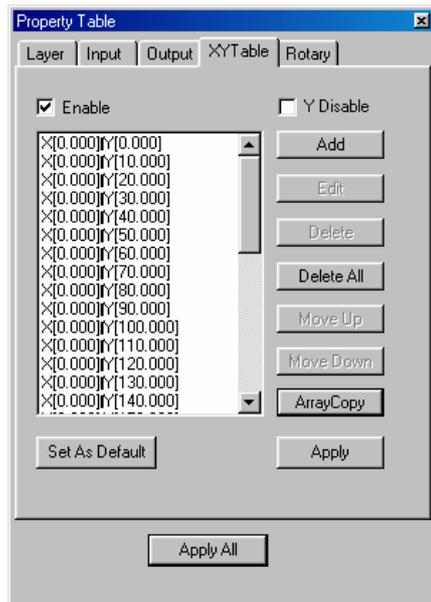


4. Select a layer in Object Browser, and go to the XY Table page of the Property Table for the settings of XY position.
5. Click the button of “Array Copy” and do the settings as below:

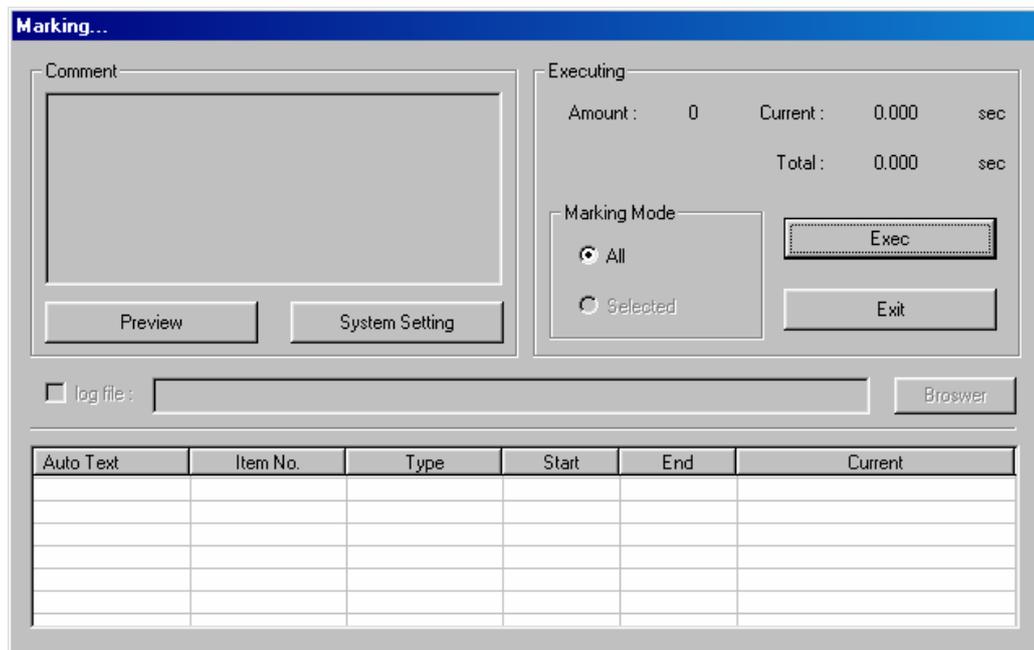


6. Press the “OK” button, all the mark position will be listed as below:

# Rotary Axis Marking



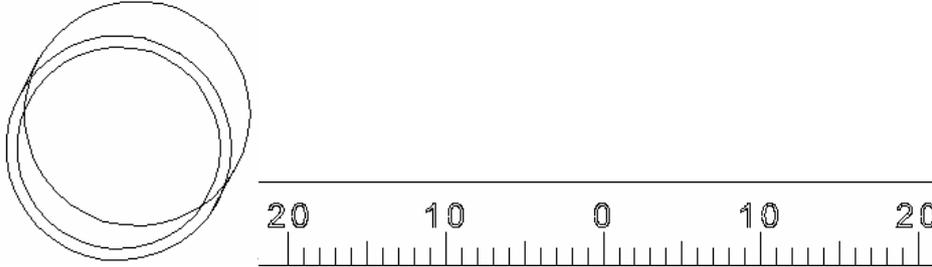
7. After finishing the above settings, click the mark button, , a dialogue box will be displayed as below, just press the "Exec" button will start the marking.



# Rotary Axis Marking

## 2-3.3 Scale Ring (Loop) (II)

If we want to mark a scale ring from 0 degree to 90 degree, 90 degree to 0 degree, and 0 degree to 90 degree, and then 90 degree to 0 degree as below:



1. First, calculate the distance between each scale, the conditions you need to know include:

- How many scales you want for the ring.
- The diameter of the work piece.
- The formula of distance between each scale is: **(diameter \* pi) / scale**

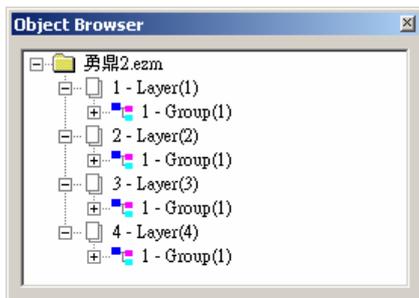
If the diameter is 110mm, scale number is 360, the distance between each scale will be :  $(110 * \pi) / 360 = 0.96 \text{ mm}$

2. After finishing calculation, open the MarkingMate program, mark as below:



Select all the objects and group them.

3. Create new layers:  
Divided the number we want to mark (0~90~0~90~0) into four auto strings. Create three new layers, copy the scale, and paste it to the other three layers.
4. At this time, you will see four layers in Object Browser, and each layer contains a group object.



5. Auto String settings:

# Rotary Axis Marking

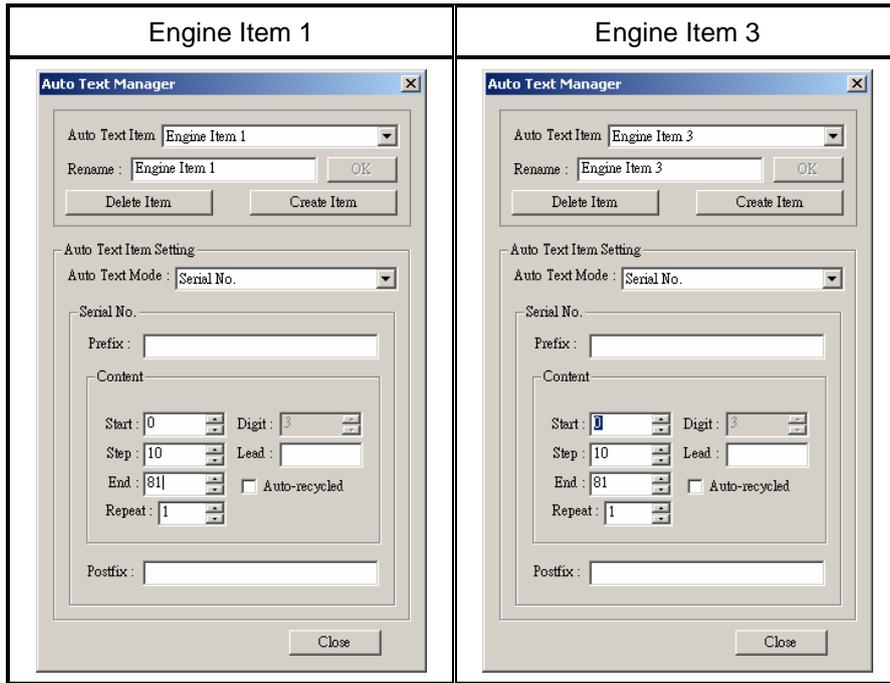
Select the text object, and go to the Text page of Property Table, choose the “Auto String – Serial No.” function.

\* If you want to select an individual object of a group, you can use:

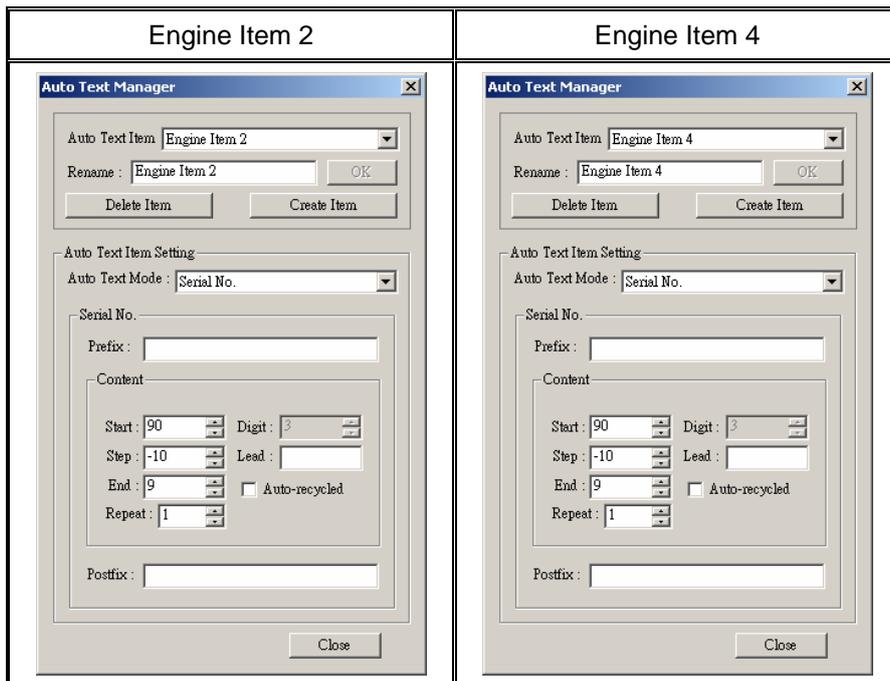
1. UnGroup function
2. After selecting the group object, press the “Ctrl” key and select the object at one time.

Edit the four auto text objects as below:

The first and the third one (0 to 80), start from 0, step 10, and end by 81.



The second and the fourth one (90~10), start from 90, step -10, and end by 9.

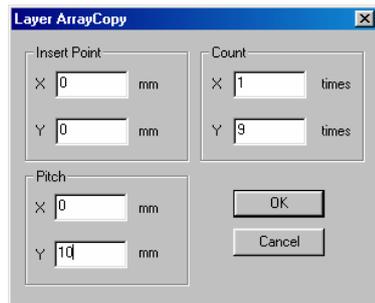


# Rotary Axis Marking

We can name the first auto text as “Engine Item 1”, the second one as “Engine Item 2” and so on. Put all of the group objects in the center of the work area.

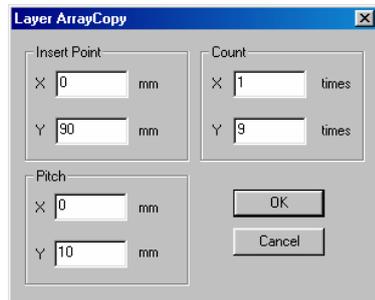
## 6. Define the XY Table parameters

- Select the first layer, go to the XY Table page of the Property Table, enable the function, and press the “Array Copy” button to do the following settings:



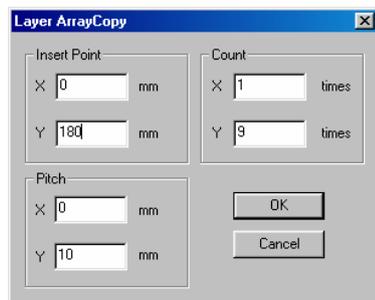
Insert Point X=0, Y=0, Count X=1, Y=9, Pitch X=0, Y=10mm. (pitch is depend on scale)

- Select the second layer, go to the XY Table page of the Property Table, enable the function, and press the “Array Copy” button to do the following settings:



Insert Point X=0, Y=90, Count X=1, Y=9, and Pitch X=0, Y=10mm.

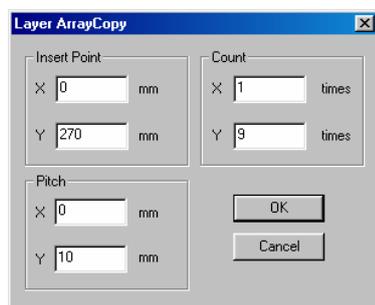
- Select the third layer, go to the XY Table page of the Property Table, enable the function, and press the “Array Copy” button to do the following settings:



Insert Point X=0, Y=180, Count X=1, Y=9, and Pitch X=0, Y=10mm.

## Rotary Axis Marking

- Select the fourth layer, go to the XY Table page of the Property Table, enable the function, and press the “Array Copy” button to do the following settings:



Insert Point X=0, Y=270, Count X=1, Y=9, and Pitch X=0, Y=10mm.

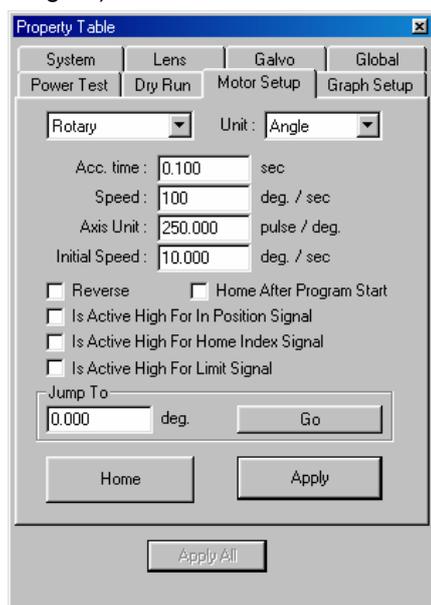
### 7. Motor Setup

Do not select any object, and go to the Motor Setup page of the Property Table for settings of rotary axis.

We define the Y-axis as rotary axis, and continue the motor settings as below:

If the motor needs 90000 pulses for rotating one circle, the Axis Unit will be:

$90000 \text{ pulse} / 360 \text{ degree} = 250 \text{ pulse/deg}$  (the pulse number needed for rotating one degree)



8. After finishing the above settings, click the mark button, , a dialogue box will be displayed as below, just press the “Exec” button will start the marking.

# Rotary Axis Marking

**Marking...**

Comment

Executing

Amount : 0      Current : 0.000 sec

Total : 0.000 sec

Marking Mode

All     

Selected     

log file :      

Auto Text	Item No.	Type	Start	End	Current

## **Chapter 3 Basic Concept of Rotary Marking**

### **3-1 Application of Rotary Marking**

The Rotary Marking is mainly applied in the following situations:

1. The marking objects are rings or discs
2. When the marking must be done on curved surface
3. When repeated rotation is required

### **3-2 Advantages of Rotary Library**

1. Push-button interface
2. The rotary setting and laser setting can be done independently for each function.
3. Specific and independent marking function
4. Quick Setting and Instant Marking

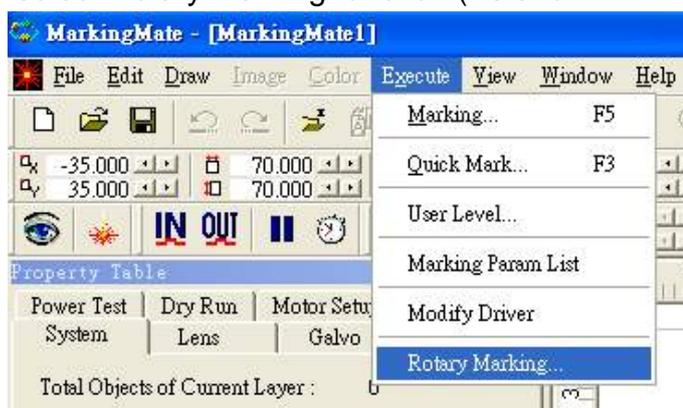
## Rotary Axis Marking

# Chapter 4 Operation Instructions of Rotary Marking

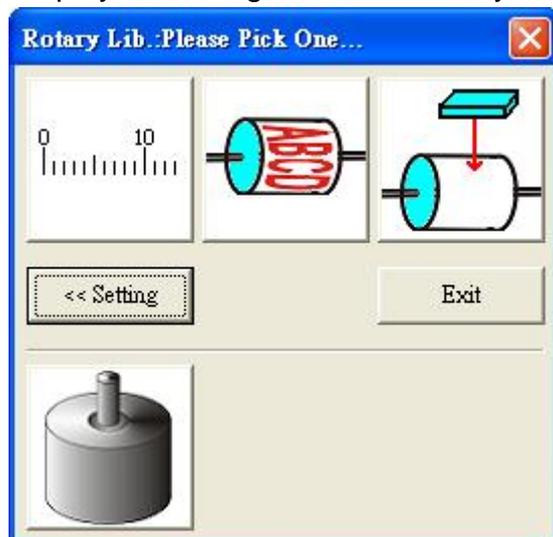
## 4-1 Operating Interface

Please follow the following steps:

1. Start the MarkingMate program, click Execute from main menu, and select Rotary Marking function (As shown in the Fig.)



2. Display the dialogue box of "Rotary Library" (As shown in the Fig.)

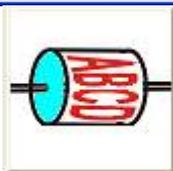
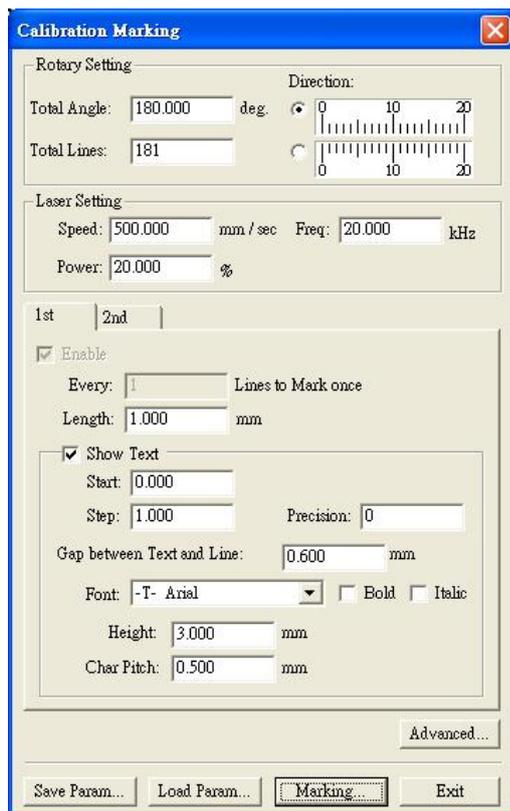


3. Press the functional button as required for Rotary Marking

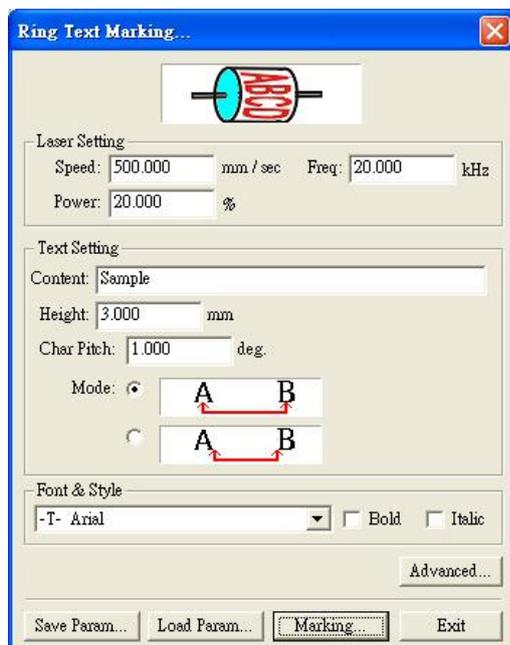


- (1) Press  to display the dialogue box of "Calibration Marking"

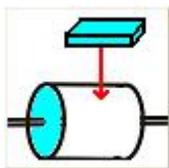
# Rotary Axis Marking

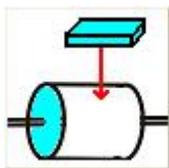


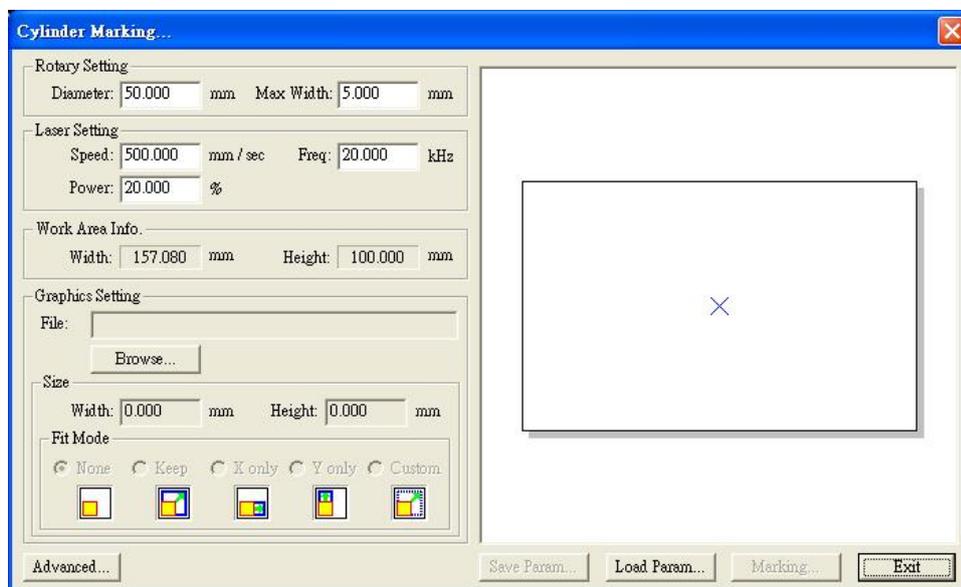
- (2) Press  to display the dialogue box for “Ring Text Marking”



## Rotary Axis Marking



- (3) Press  button will display a dialogue box for “Cylinder Marking”

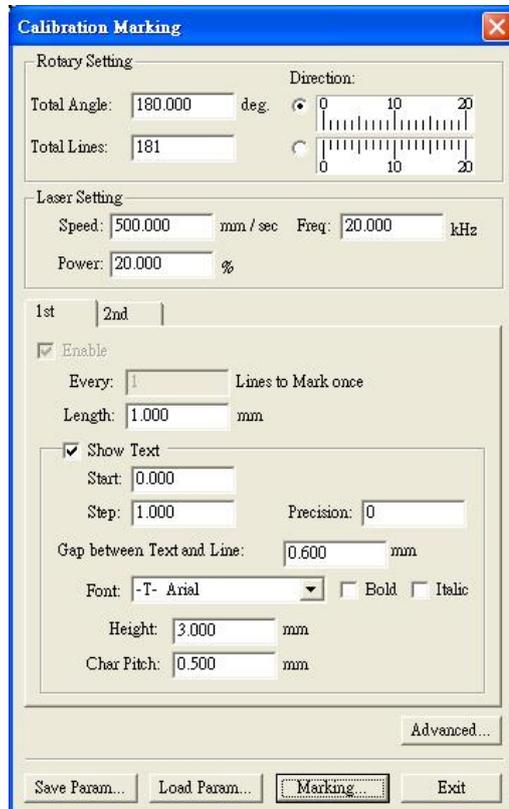


## Rotary Axis Marking

### 4-2 Rotary Marking Supported Function

Presently, the Rotary Marking is applied to the following fields:

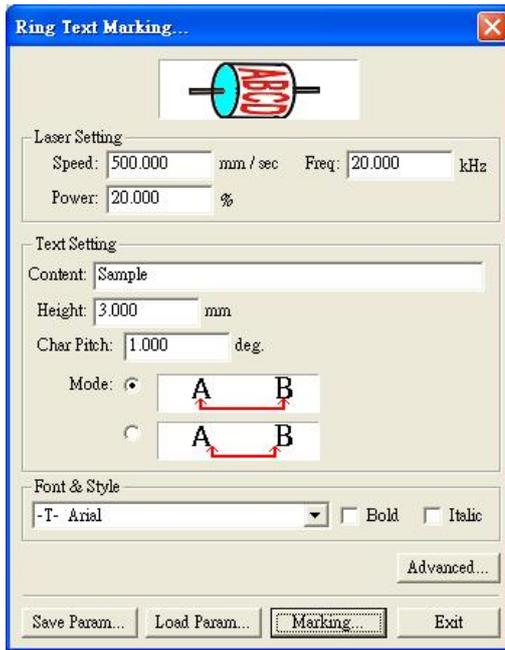
1. Scale Ring/Scale Plate: (As shown in the Fig.)



- A. Input the scale spacing, scale length and scale text for scale marking
- B. Create various scale patterns through the start angle setting and laser setting
- C. Please set the marking parameter, delay parameter and rotary setting parameter to the default values in the MarkingMate system

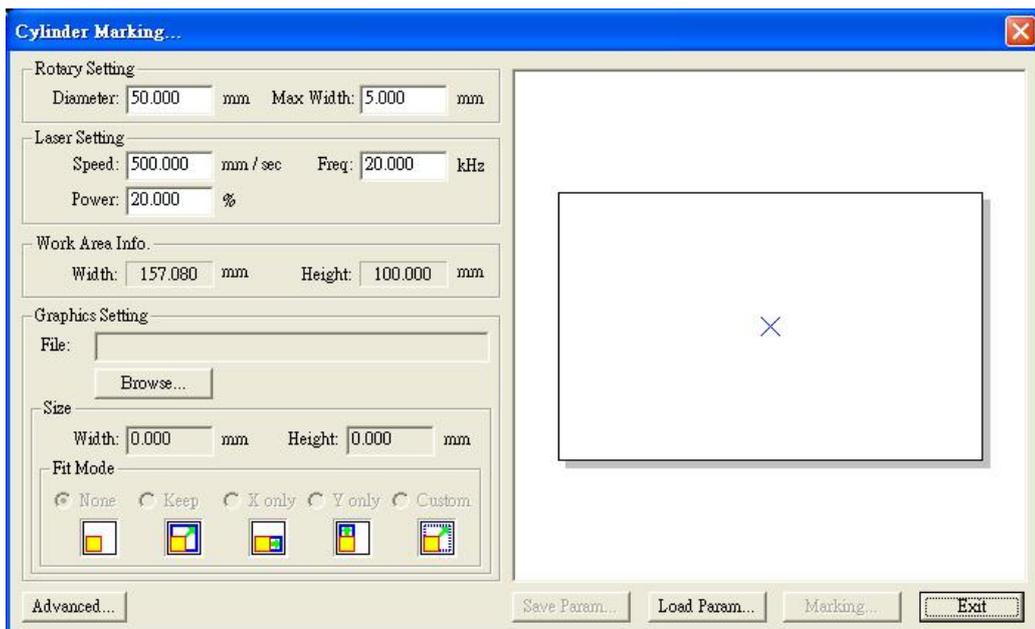
# Rotary Axis Marking

## 2. Ring Text: (As shown in the Fig.)



- A. Input the text content, font size and character spacing for ring text marking
- B. Create various ring texts through the start angle setting and laser setting
- C. Please set the marking parameter, delay parameter and rotary setting parameter to the default values in the MarkingMate system

## 3. Cylinder: (As shown in the Fig.)

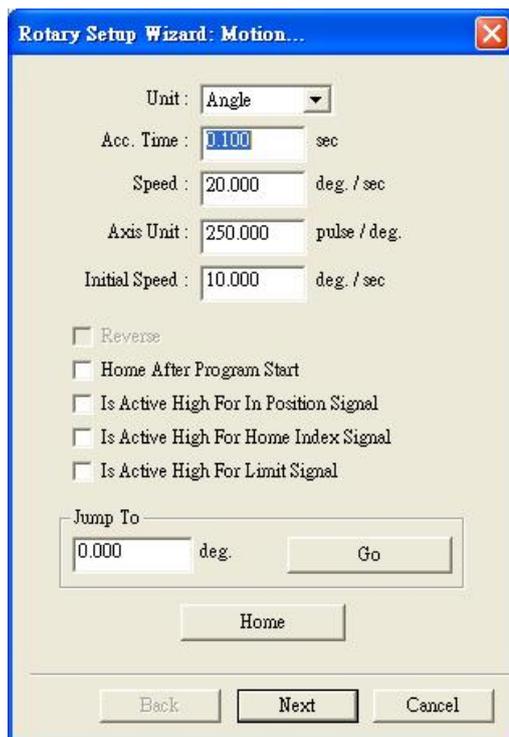


- A. Read a graphic file, input the dimension of the graphic for graphic

## Rotary Axis Marking

marking

- B. Create various graphics through the start angle setting and laser setting
  - C. Please set the marking parameter, delay parameter and rotary setting parameter to the default values in the MarkingMate system
4. Rotary Setting: (As shown in the Fig.)



- A. Input rotary related parameters to complete the settings
- B. Click "Next" to complete more settings on rotary direction.

## **Chapter 5 Scale Ring/Scale Plate**

### **5-1 Scale Applications**

1. It is mainly applied to the surface of rings or discs.
2. It is used to show the size or angle
3. There are angular scale and length scale

### **5-2 Difference between Scale Ring and Scale Plate**

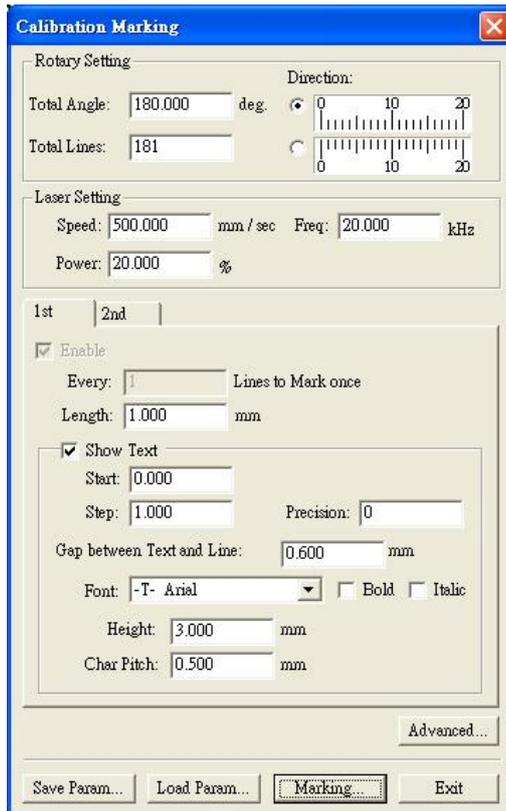
1. The rings refer to pipes, finger rings, etc.
2. The plates refer to round plates and similar articles.
3. Different direction of rotation: X Axis and Y Axis for rings and Z Axis for plates
4. The different directions of rotation will lead to different marking results, thus proper selection should be made according to the application environment.

### **5-3 Diversified Scale Setting and Instant Marking**

1. Decimal point of the provided numerical values can be displayed
2. Inverse calculation is permitted
3. The numerical range, spacing and display can be set freely
4. 3 kinds of scales are provided and their quantity can be set freely
5. Press the Marking button after the above setting and the rotary setting and laser setting are completed

### **5-4 Description of the Setting of Scale Ring**

# Rotary Axis Marking



## 1. Rotary Setting



**Total Angle** Set the angle range of rotary

**Total Lines** The number of scale line for marking in the total angle range.

**Upper Right Option** Set the direction of scale lines as well as the corresponding position of text, and here the text is above the scale lines.

**Lower Right Option** Set the direction of scale lines as well as the corresponding position of text, and here the text is under the scale lines.

## 2. Laser Setting



## Rotary Axis Marking

- Speed** It is used to set the speed of the lens and a bigger value indicates a faster moving of the laser spot and a shorter marking time. The normal value is 500-3000, and please input a proper value if the motor supports a higher speed.
- Power** It is used to set the percentage of laser power. If a 20W laser is adopted, then the output laser power should be 4W according to the setting in the figure. The laser power percentage must be adjusted when the marked materials are different, and the normal range is 20-100%. If the driver used restricts the laser power percentage, please use an applicable percentage when error message is given.
- Freq** It is used to set the laser frequency with kHz as the unit, and a higher frequency indicates denser laser spots. It is 5-20 normally and should be adjusted according to the marked materials and practical situation. If the driver used restricts the laser frequency range, an applicable laser frequency should be adopted when error message is given for beyond the scope.

### 3. First Scale Line

1st | 2nd

Enable

Every:  Lines to Mark once

Length:  mm

Show Text

Start:

Step:  Precision:

Gap between Text and Line:  mm

Font:   Bold  Italic

Height:  mm

Char Pitch:  mm

**Enable** Check to enable this function

**Every xxx lines to mark once**

For example: if the value is 10, means to mark the first scale line every 10

# Rotary Axis Marking

lines

<b>Length</b>	Length of the first scale line (unit: mm)
<b>Show Text</b>	Check this option to set text font and so on. Check this option to mark text and leave it unchecked to cancel the text marking
<b>Start</b>	Starting value which can be reversed calculation
<b>Step</b>	Data spacing of each scale line
<b>Precision</b>	Set the decimal digits (scope 0-3), and 0 indicates the integer mode.
<b>Text-Line Gap</b>	Set the distance from the baseline of text to the top of scale lines, corresponding to B in the above figure, and a positive value indicates being away from the scale lines and a negative value indicates superimposition with scale lines.
<b>Font</b>	Set the font ( TrueType, SHX, FON, FNT, etc.)
<b>Bold</b>	Check this option to set the font selected to Bold
<b>Italic</b>	Check this option to set the font selected to Italic
<b>Height</b>	Set the height of text in accordance with practical situation
<b>Char Pitch</b>	Set the character pitch freely and the unit is mm

## 4. Advanced Setting

Advanced...



**Start Angle** Set the angle of the first scale line, namely the initial rotary point

## Rotary Axis Marking

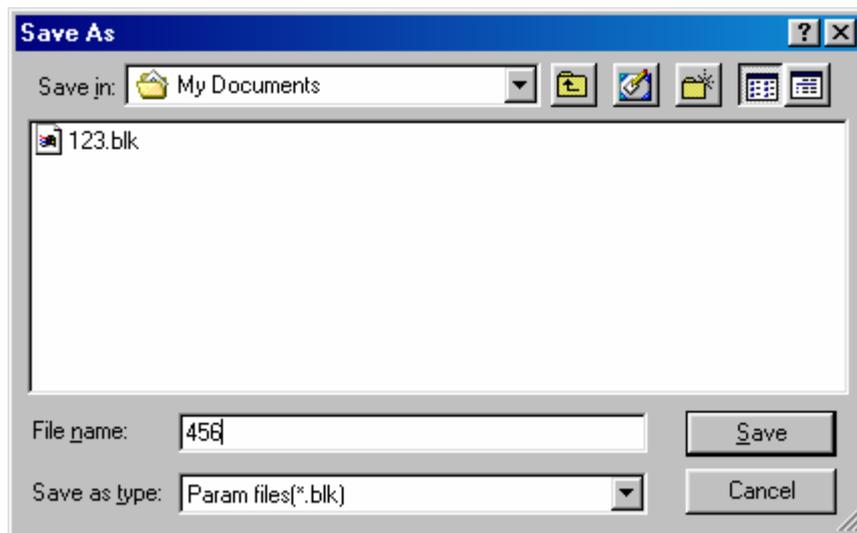
**Center Offset** The default value is 0

**Line's Layer** Set the layer number of scale line. The default layer is 3 which means there will be three kinds of scale lines

### 5. Save Parameters

Save Param...

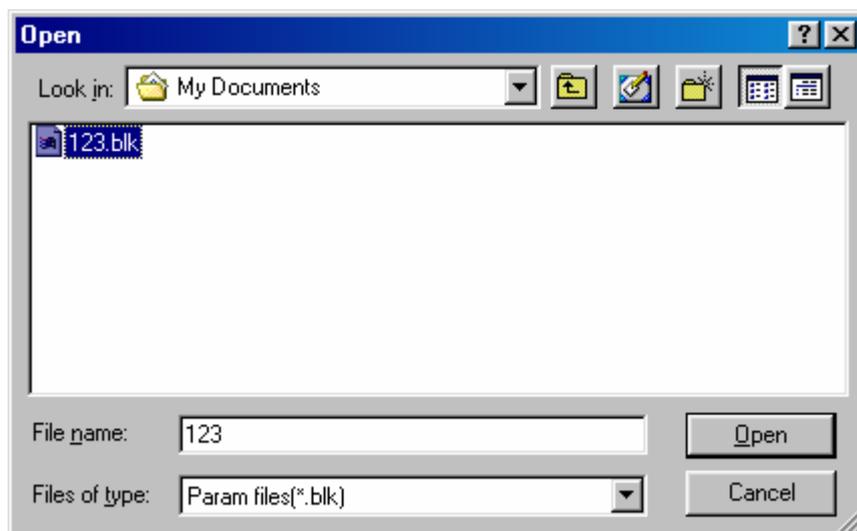
**Save Param** Save the set values to specified file (as shown in the following figure.). Refer to [Specification of Parameter File](#) for the file format.



### 6. Load Parameter

Load Param...

**Load Param** Load the parameter file to update all set values in the current dialogue box.



# Rotary Axis Marking

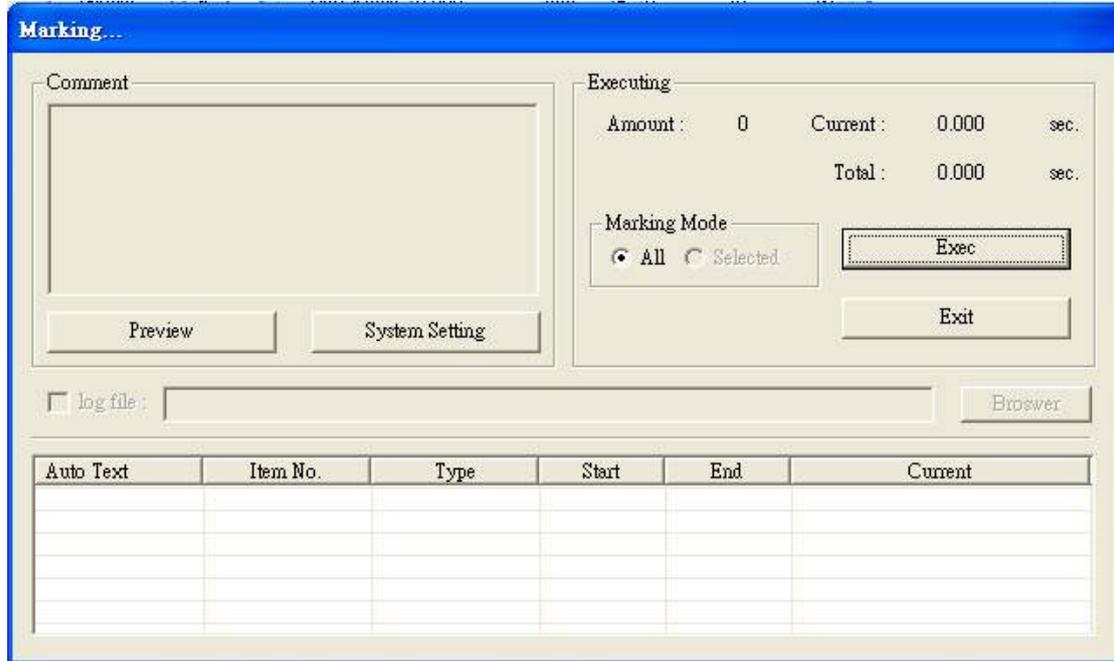
## 7. Marking



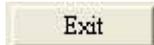
### Marking

Click it to display the following figure and:

1. Click "Exec" button to mark scale pattern
2. Click "Exit" button to return to the dialog box for setting scale functions



## 8. Exit



### Exit

Click this button to end the marking and return to the dialog box for rotary setting. Here, one may conduct rotary setting for marking or exit

## 5-4.1 Explanation of Exceptional Uses

### Scale Text: decimal point

- (1) Sometimes, decimal point is required for the data, and please modify the value of Precision
- (2) Precision=0, indicating integer output, and all values to be displayed will be changed to integers.
- (3) Precision=1, indicating the output of one decimal number and decimal point, and it is the same principle when it is set to 2 or 3
- (4) Precision can be set to 0-3 and errors will occur if it is set to other value.

## Rotary Axis Marking

### **5-4.2 Points for Attention for Scale Plate**

Basically, the setting of scale plate is the same as that of scale ring, but the following items should be noted:

1. Remember the rotary direction must be in parallel with the laser direction
2. The surface to be marked is perpendicular to the rotary direction

## Rotary Axis Marking

# Chapter 6 Ring Text

## 6-1 Application of Ring Text

1. The ring text is mainly applied to ring articles, for instance, the finger rings, aluminum tubes and steel tubes.
2. The ring text mainly shows the date, manufacturer and other information

## 6-2 Quick Setting and Instant Marking

1. Text input
2. Font and size selection
3. Click Marking after the above setting as well as the rotary setting and laser setting are completed

## 6-3 Explanation of Ring Text Setting

### 1. Rotary Setting

Rotary Setting

Start Angle:	0.000	deg.	Diameter:	50.000	mm.
Start X:	0.000	mm			

**Start Angle** Set the starting central angel of the first character, namely the initial position of rotary axis

**Start X** Set the initial central position of the first character in the X-direction, which is used for offsetting figures; if it is set to 0, the first character will be marked from the center of lens

**Diameter** Set the diameter of work piece, with which the spacing required in the [Margin Spacing Mode of Char Pitch](#) can be figured out

### 2. Laser Setting

Laser Setting

Speed:	800.000	mm/sec	Freq:	20.000	kHz
Power:	20.000	%			

**Speed** It is used to set the marking speed and a bigger value indicates a faster moving of the laser spot and a shorter marking time. The normal values is 500-3000, and please input a proper value if the laser machine supports a higher speed

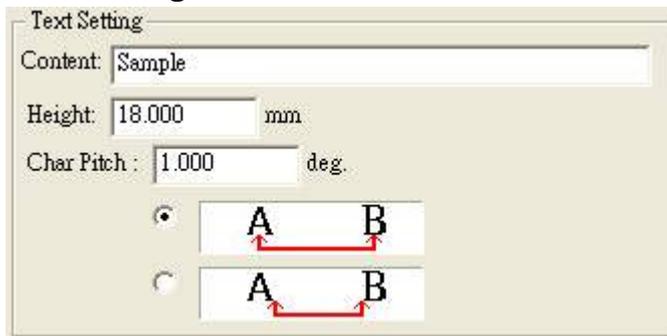
**Power** It is used to set the percentage of laser power. If a 20W laser is

## Rotary Axis Marking

adopted, then the output laser power should be 4W according to the setting in the figure. The laser power percentage must be adjusted when the marked materials are different, and the normal range is 20-100%. If the driver used restricts the laser power percentage, please use an applicable percentage when error message is given

**Freq** It is used to set the laser frequency with kHz as the unit, and a higher frequency indicates denser laser spots. It is 5-20 normally and should be adjusted according to the marked materials and practical situation. If the driver used restricts the laser frequency range, an appropriate laser frequency should be adopted when message is given for beyond the scope.

### 3. Text Setting



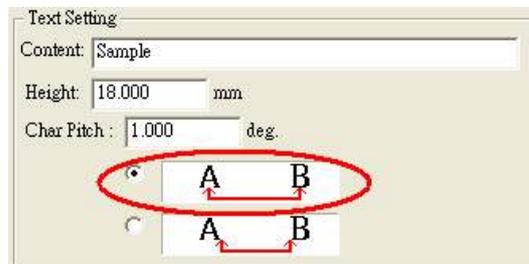
**Content** Set the text content. Now a line of characters can be marked

**Height** Set the text height, which will influence the overall size of text

**Char Pitch** Set the character pitch with angle as the unit, and two spacing modes are introduced below:

(1) Center to center spacing

A. Check the first option below "Char Pitch" (As shown in the Fig.)



B. Here, each character will work out the rotation axis with the character in the center in accordance with the character pitch (angle)

C. For instance, the text content is "Text", the character pitch is 5 degrees in the center mode, the Start Angle is 90 degrees, then

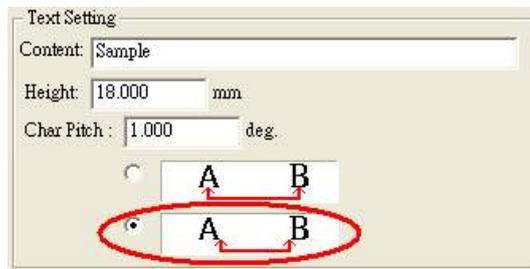
# Rotary Axis Marking

the marking flow is as follows:

- i. Turn the rotary axis by 90 degrees
- ii. Mark T (T in the center of the lens)
- iii. Turn the rotary axis forward by 5 degrees
- iv. Mark e (e in the center of the lens)
- v. Turn the rotary axis forward by 5 degrees
- vi. Mark x (x in the center of the lens)
- vii. Turn the rotary axis forward by 5 degrees
- viii. Mark t (t in the center of the lens)
- ix. Turn the rotary axis to the 0 degree position

## (2) Margin spacing mode

- A. Check the second option below "Char Pitch" (As shown in the Fig.)



- B. Here, each character will work out the rotary axis in accordance with the character pitch (angle) and character edge.
- C. For instance, the text content is "Ring", the font size is 2mm, the character pitch is 5 degrees in the margin mode, the Start Angle is 90 degrees, the diameter of work is 50mm, then the marking flow is as follows:
  - i. Turn the rotary axis by 90 degrees
  - ii. Mark R (R in the center of lens)
  - iii. Turn the rotary axis forward by  $(2/50 * 360 + 5 = 19.4)$  degrees
  - iv. Mark i (i in the center of lens)
  - v. Turn the rotary axis forward by  $(2/50 * 360 + 5 = 19.4)$  degrees
  - vi. Mark n (n in the center of lens)
  - vii. Turn the rotary axis forward by  $(2/50 * 360 + 5 = 19.4)$  degrees
  - viii. Mark g (g in the center of lens)
  - ix. Turn the rotary axis to the 0 degree position

## Rotary Axis Marking

### 4. Font & Style

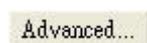


**Font (Drop-down menu)** set the font (TrueType, SHX, FON, FNT, etc.)

**Bold** Check this option to set the font selected to Bold

**Italic** Check this option to set the font selected to Italic

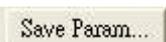
### 5. Advanced Setting



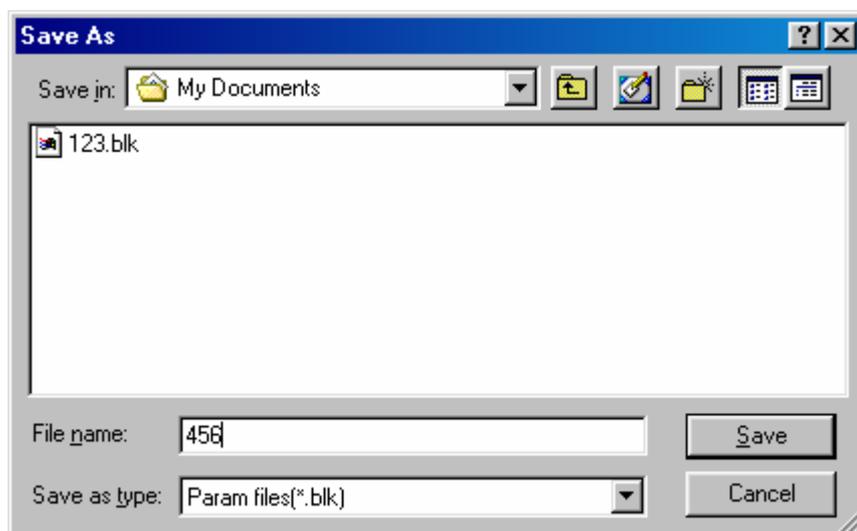
**Start Angle** Set the angle of the first scale line, namely the initial rotary point

**Center Offset** The default value is 0

### 6. Save Parameters

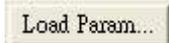


**Save Param** Save the set values to specified file (as shown in the following figure.). Refer to [Specification of Parameter File](#) for the file format.

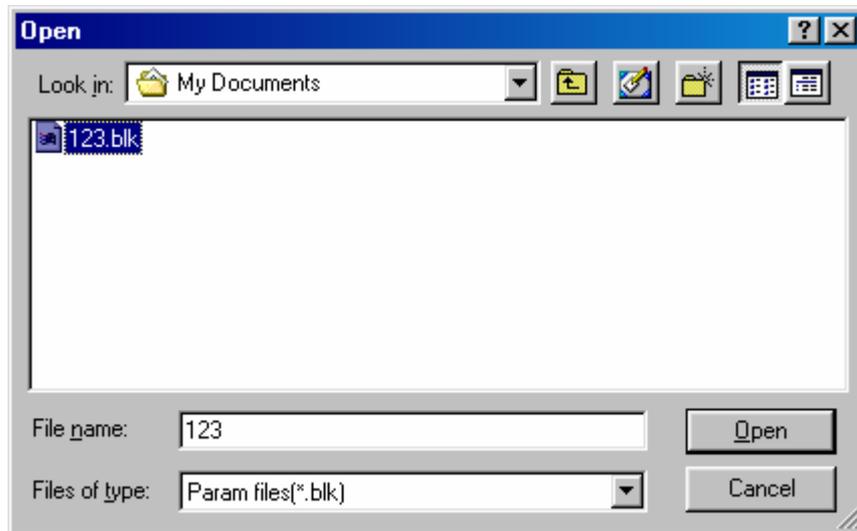


# Rotary Axis Marking

## 7. Load Parameter



**Load Param** Load the parameter file to update all set values in the current dialogue box.

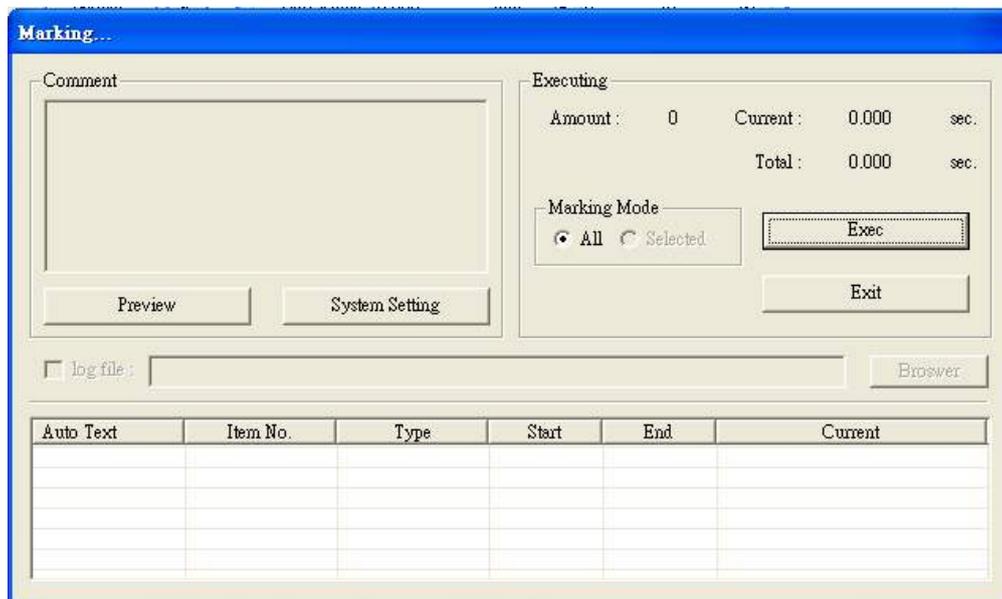


## 8. Marking

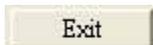


**Marking** Click it to display the following figure and:

1. Click "Exec" button to mark scale pattern
2. Click "Exit" button to return to the dialog box for functional setting



## 9. Exit



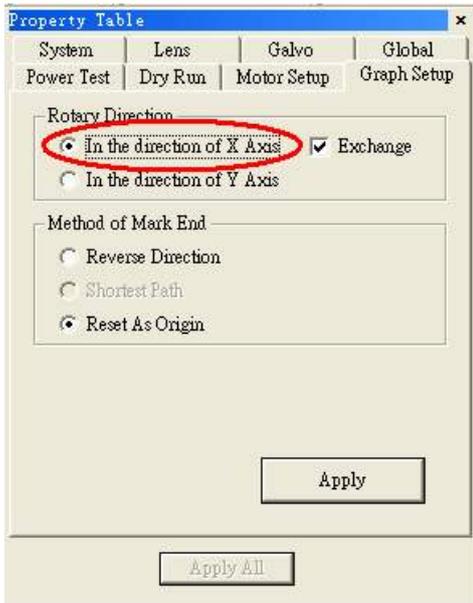
**Exit** Click this button to end the marking and return to the dialog box on rotary setting, from where you can conduct rotary setting for

## Rotary Axis Marking

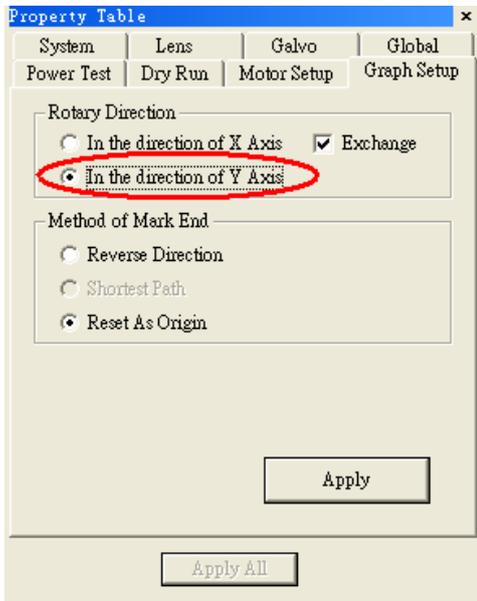
further marking or choose to exit.

### 6-3.1 Points for Attention for Ring Text

1. Remember that the rotary direction must be perpendicular to the laser direction
2. The surface to be marked is in parallel with the rotary direction
3. If the rotary direction is the X Axis direction, check "In the direction of X Axis" on the following page



4. Otherwise, check "In the direction of Y Axis" (As shown in the Fig.)



## Chapter 7 Cylinder

### 7-1 Application of Cylinder

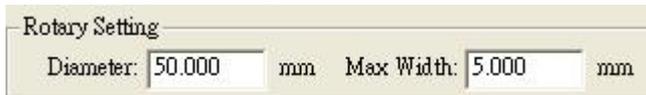
The cylinder marking is mainly applied to ring articles, for instance, the finger rings, aluminum tubes and steel tubes.

### 7-2 Quick Setting

1. Graphic input
2. Or import existed DXF or PLT files
3. Click Marking after the rotary setting and laser setting are completed.

### 7-3 Explanation of Cylinder Setting

#### 10. Rotary Setting



Rotary Setting	
Diameter: 50.000 mm	Max Width: 5.000 mm

**Diameter** Set the diameter of work piece, with which the spacing required in the [Margin Spacing Mode of Char Pitch](#) can be figured out

**Max Width** The best width for marking, depend on radius of rotary.

#### 11. Laser Setting



Laser Setting	
Speed: 800.000 mm/sec	Freq: 20.000 kHz
Power: 20.000 %	

**Speed** It is used to set the speed of the lens and a bigger value indicates a faster moving of the laser spot and a shorter marking time. The normal vale is 500-3000, and please input a proper value if the motor supports a higher speed.

**Power** It is used to set the percentage of laser power. If a 20W laser

# Rotary Axis Marking

is adopted, then the output laser power should be 4W according to the setting in the figure. The laser power percentage must be adjusted when the marked materials are different, and the normal range is 20-100%. If the driver used restricts the laser power percentage, please use an applicable percentage when error message is given.

**Freq** It is used to set the laser frequency with kHz as the unit, and a higher frequency indicates denser laser spots. It is 5-20 normally and should be adjusted according to the marked materials and practical situation. If the driver used restricts the laser frequency range, an applicable laser frequency should be adopted when error message is given for beyond the scope.

## 12. Work Area

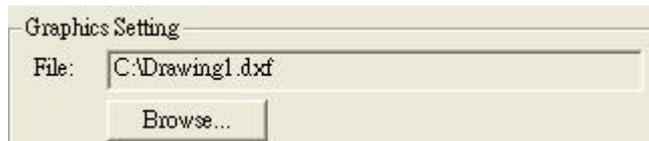


Display the work area of the rotary

## 13. Graphic Setting

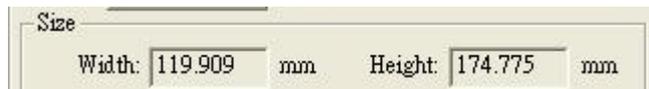
### A. File:

Click the "Browse" button and select the file for marking (As shown in the Fig.)



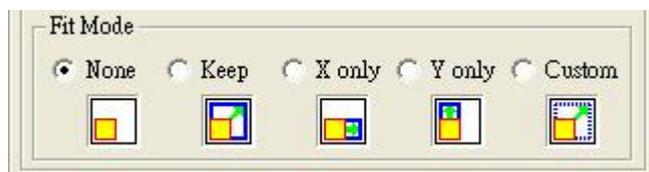
### B. Size:

After reading the file, the dimension of the graphic will be displayed as below.



### C. Fit Mode:

Selectable modes (As shown in the Fig)

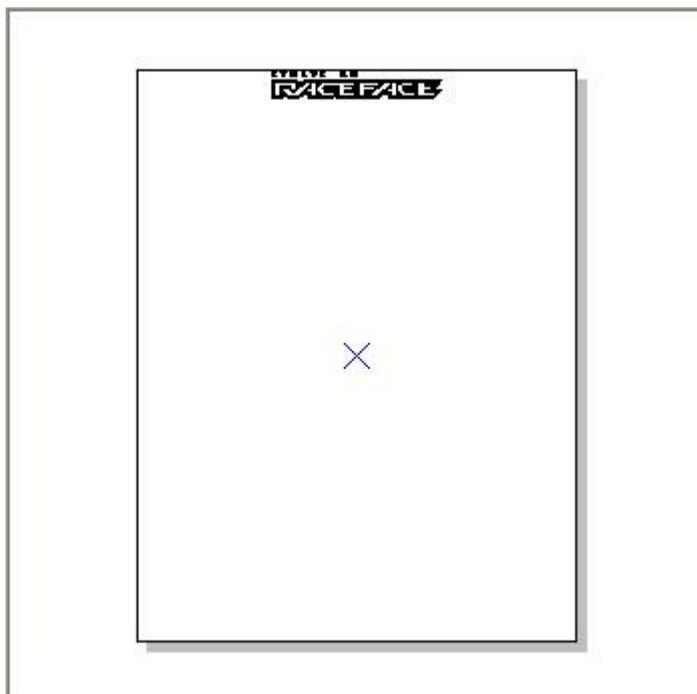


## Rotary Axis Marking

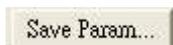
- **None: No change**
- **Keep:** Enlarged in a ratio of equality
- **X only:** Enlarged X only.
- **Y only:** Enlarged Y only.
- **Custom:** Freely changed as you want

### 14. Preview Window:

The graphic file you selected will be displayed in the Preview Window. Any changes you made will show in the Preview Window synchronously.

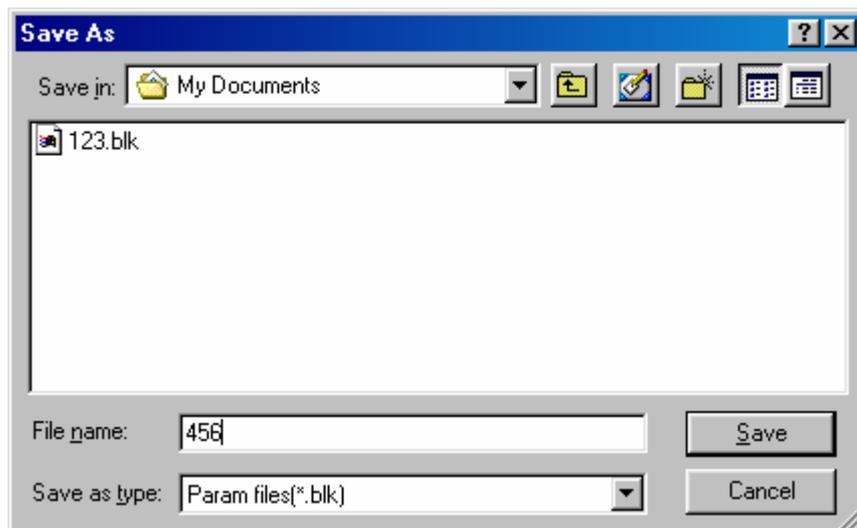


### 15. Save Parameter

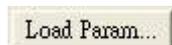


**Save Param** Save the set values to specified file (as shown in the following figure.)

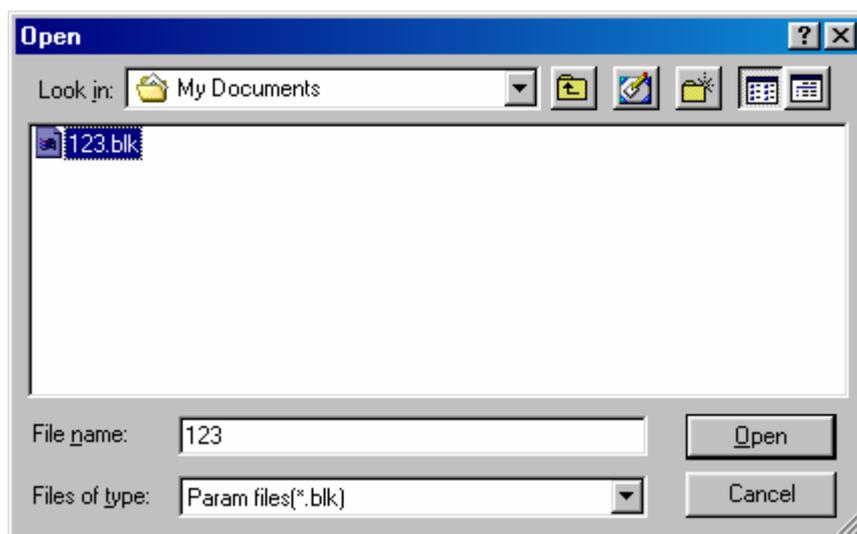
## Rotary Axis Marking



### 16. Load Parameter



**Load Param** Load the parameter file to update all set values in the current dialogue box.



### 17. Marking



**Marking** Click it to display the following figure and:

1. Click "Exec" button to mark scale pattern
2. Click "Exit" button to return to the dialog box for setting scale functions

## Rotary Axis Marking

Marking...

Comment

Executing

Amount : 0    Current : 0.000    sec.

Total : 0.000    sec.

Marking Mode

All     Selected

Exec

Exit

Preview    System Setting

log file :    Browser

Auto Text	Item No.	Type	Start	End	Current

### 18. Exit



**Exit**    Click this button to end the marking and return to the dialog box for rotary setting. Here, one may conduct rotary setting for marking or exit

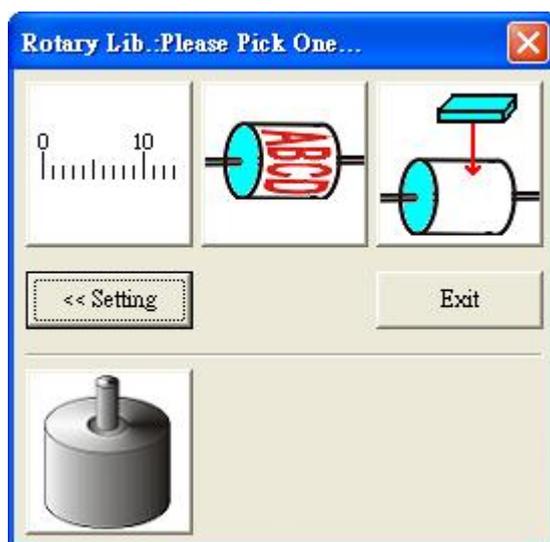
# Chapter 8 Motor Setup

## 8-1 Application of Motor Setup

Motor Setup provides step-by-step settings for rotary.

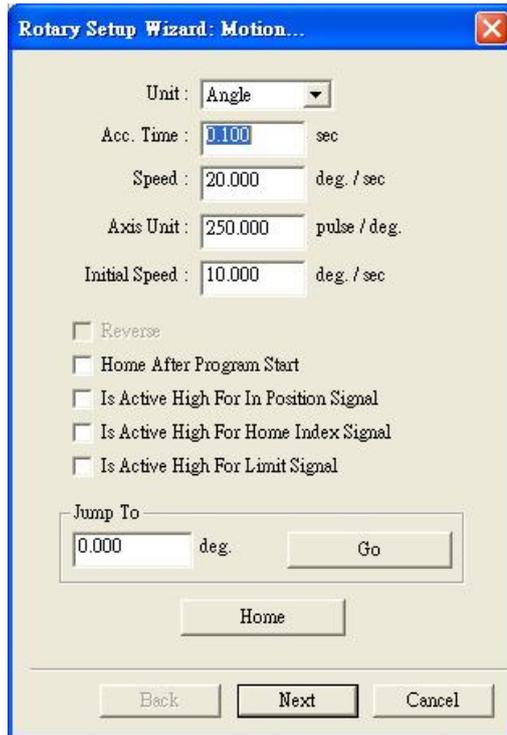
## 8-2 Explanation of Motor Setup

1. Start the MarkingMate program, click “Execute” from the main menu, and select “Rotary Marking” function, and then click the “Setting” button to enter the Motor Setup (As shown in the Fig.)



2. Enter the Motor Setup Wizard (as below):

# Rotary Axis Marking



**Unit:** select Length or Degree

**Acc. Time:** the time for Rotary Axis to reach the speed you want. If the value is 5 sec and the speed is 100 degree/sec that means the rotary axis will reach 100 degree/sec in 5 seconds

**Speed:** the speed of Rotary Axis. If the value is 10 degree/sec that means the Rotary Axis turns 10 degree per second.

**Axis Unit:** the pulse amount needed for one degree (or mm)

Example: if the spec of the motor is 20000pulse/rev; the value should be set as 56 pulse/deg. ( $20000/360=56$ )

**Initial Speed:** the initial speed of the motor

**Reverse:** the motor turns in the reverse direction

**Home after Program Start:** Automatically go Home after program start

**Is Active High For In Position Signal:** Set the signal of In Position as "High" It is necessary for a servo motor to input the In Position Signal.

**Is Active High For Home Index Signal:** Set the signal of Home Index as "High"

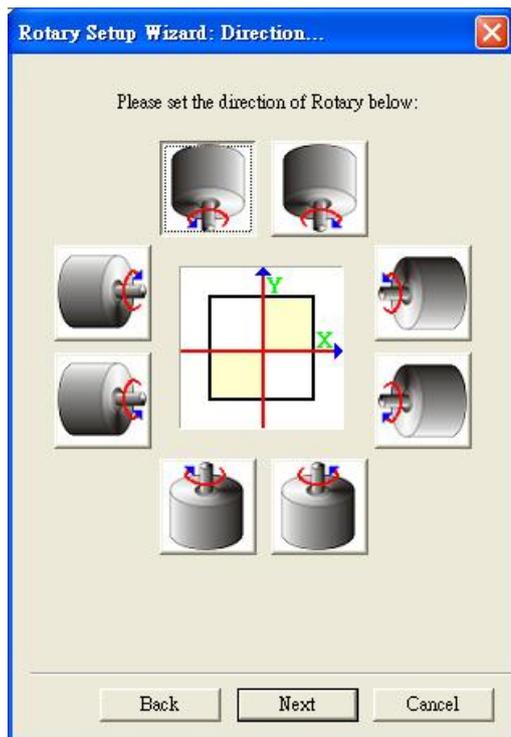
**Is Active High For Limit Signal:** Set the signal of Limit as "High"

**Jump To:** Move to the assigned position

**Home:** Do the "Home" action immediately

3. Click "Next" button to select rotary direction (As shown in the Fig.)

## Rotary Axis Marking

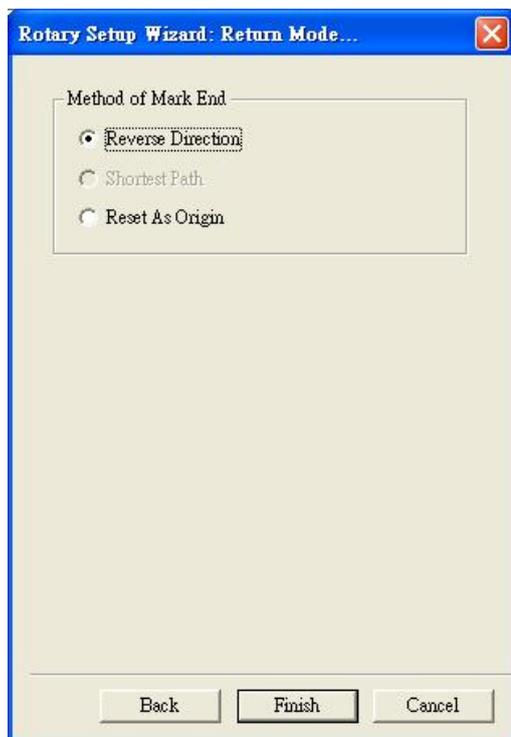


4. Click "Next" for Return Mode setting:

### Method of Mark End:

There are two ways for Mark End

- **Reverse Direction:** back to the origin in reverse direction
- **Reset As Origin:** the end-point being reset as origin



## Rotary Axis Marking

5. Press  button for complete Motor Setup.
6. Press  button to go back the previous setting.
7. Press  button to cancel the setting.

## **Appendix**

### **A. Specification of Parameter File**

1. The standard Windows ini file format
2. The parameter file name will be \*.ini
3. The Section of this function is [CALIBRATION]