

NcStudio Phoenix Stone Machining System Operation Manual

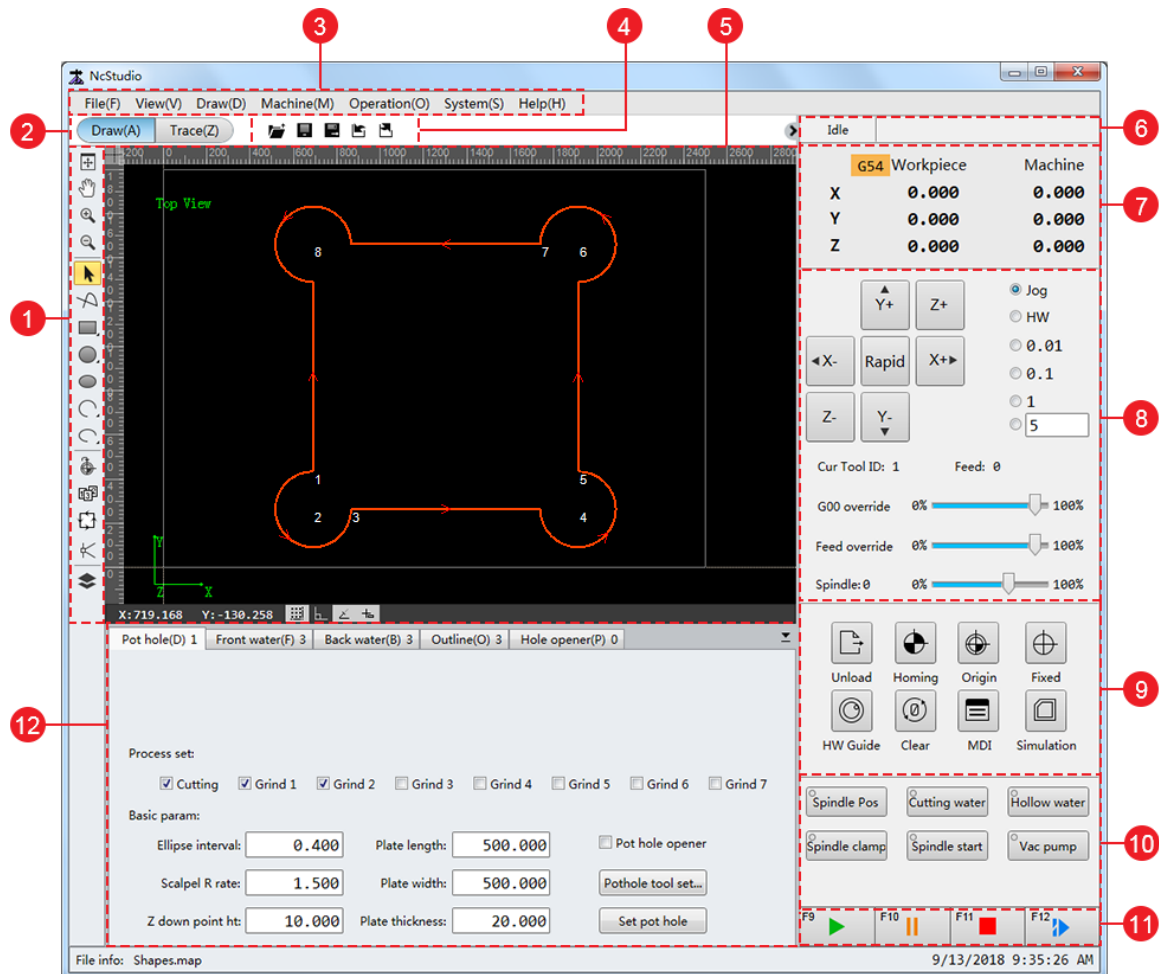
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1 Interface Overview

The interactive interface of NcStudio Phoenix Stone Machining System is as follows:

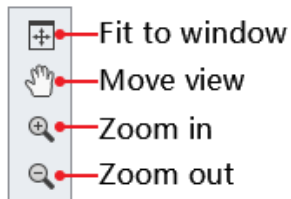


1. Drawing toolbar
2. Window switch buttons
3. Menu bar
4. File toolbar
5. Drawing/trace window
6. Status bar
7. Coordinate display area
8. Machine operating area
9. Buttons for common operations
10. Buttons for port control
11. Buttons for movement control
12. Technic setting area

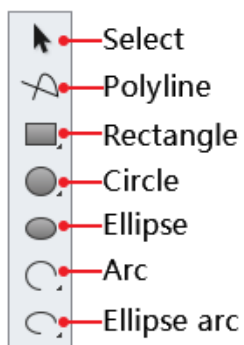
1.1 Drawing Toolbar

It includes four parts:

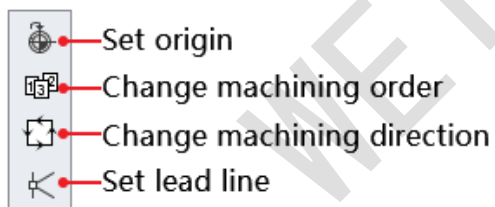
- View tools



- Drawing tools



- Settings for toolpath



- Layer



Please refer to [Drawing Graphics](#) and [Setting Toolpath](#) for details.

1.2 Window Switch Buttons

It is used to switch between **Draw** window and **Trace** window:








The active button is highlighted in blue.

- **Draw** window
Used to draw the machining toolpath and set its corresponding machining technics.
- **Trace** window
Used to view the real-time toolpath in running or simulation status of the machine.

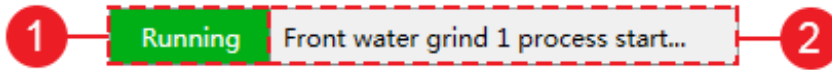
1.3 File Toolbar

It includes five common tools related to process toolpaths and its related technic parameters:

-  **Open**
Used to load a file.
 - In **Draw** window, load a ST file, which just contains related technic parameters and can not be machined directly.
 - In **Trace** window, load a NC, DXF, PLT, ENG or NCE file, which can be machined directly.
-  **Save**
Used to save the set technic parameters.
Before machining, the operation is required.
-  **Save As**
Used to save the set technic parameters as a ST file.
-  **Import**
Used to import a DXF file and a file containing related technic parameters.
-  **Export**
Used to export a DXF file and a file containing related technic parameters.

1.4 Status Bar

It includes two parts:



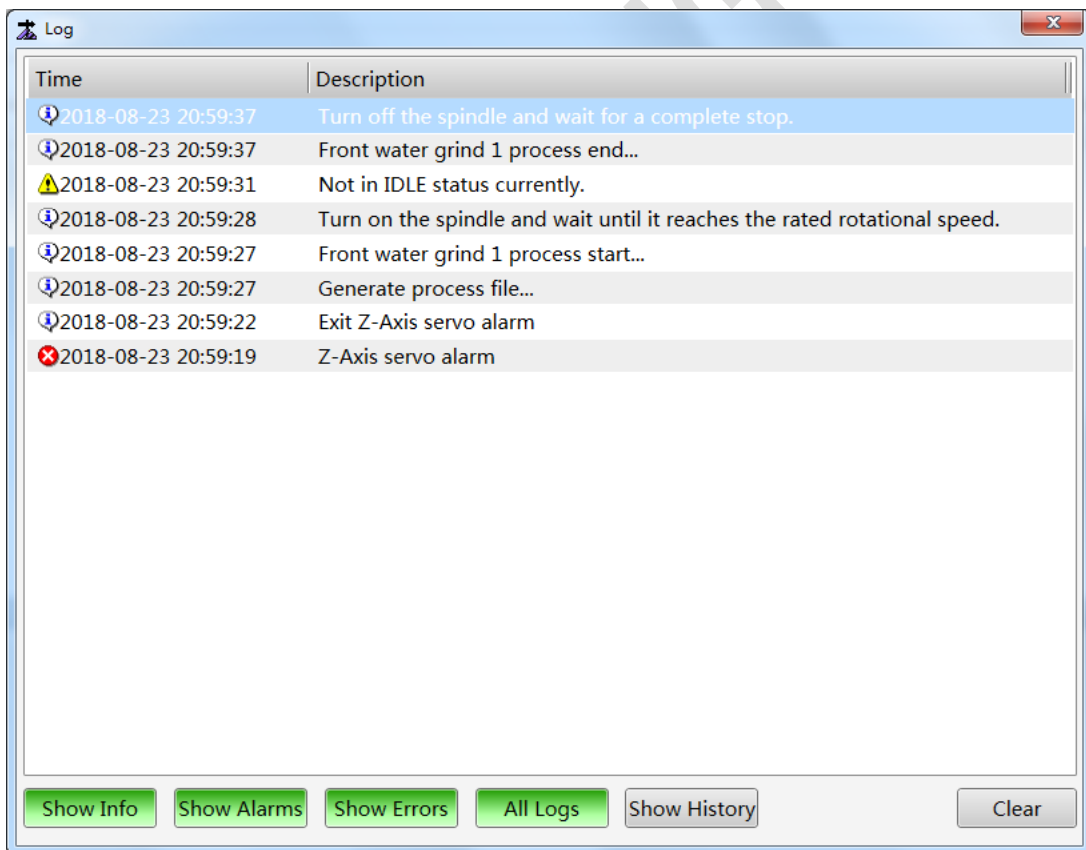
1. It shows the current status of the machine.

Possible status includes the following:




- E-stop
- Idle
- Running
- Pause

2. It shows the current system log.

Click on area ②. **Log** dialog box will pop up:



The type of log includes the following:




- : It shows machine actions in running status.
- : It reminds operators of potential danger. At this time, the machine can still work in a short time.
- : It shows error message. Such an alarm must be cancelled before continuing machining.

1.5 Coordinate Display Area

It displays two coordinate systems of the machine:

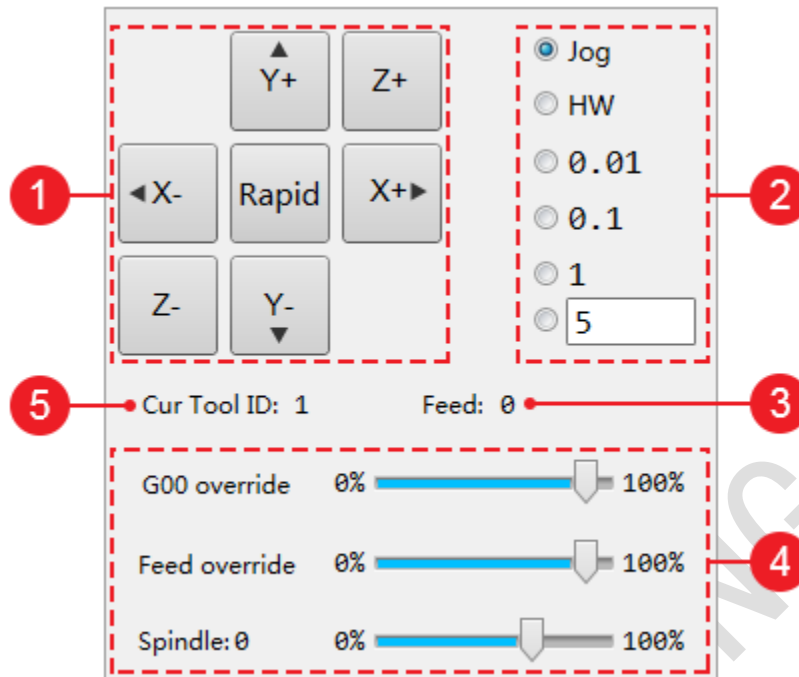
- Machine coordinate system
- Workpiece coordinate system

After doing **Homing**, the sign  will appear in front of the corresponding axis:

	G54 Workpiece	Machine
 X	0.000	0.000
 Y	0.000	0.000
 Z	0.000	0.000

1.6 Machine Operating Area

It is used to control the machine manually.



It includes the following:

1. Axis direction button

Used to move each axis towards positive or negative direction:

- Press **X- / X+ / Y- / Y+ / Z- / Z+**. The machine moves at jogging speed.
- Press **Rapid** and **X- / X+ / Y- / Y+ / Z- / Z+**. The machine moves at rapid jogging speed.

2. Mode Buttons

It includes three modes:

- Jog mode

Press an axis direction button. The machine keeps running until you release the button.

- HW mode

The machine is controlled by handwheel.

- Stepping mode

Click an axis direction button. The machine moves **0.01 mm(inch)**, **0.1 mm(inch)**, **1 mm(inch)** or customized step size.

The default customized step size is 5mm(inch) and the value should not be too large to avoid damage due to misoperation.

Note: Please do not click frequently for the system needs a certain time to execute the command.

3. Current feedrate

It shows the current feedrate of the machine.

4. Override control


Drag the slider to change G00 override, feed override and spindle override.


5. Current tool No.


It shows the currently used tool number.


1.7 Buttons for Common Operations


It includes buttons for eight common operations:


-  **Unload**
Used to unload the loaded program files.

-  **Homing**
Used to open **Homing** dialog box.

-  **Origin**
Used to move each axis to the workpiece origin.


-  **Fixed Point**
Used to move each axis to the set fixed point.

-  **HW Guide**
Used to enable **HW** mode.

-  **Clear**
Used to open **Clear** dialog box.

-  **MDI**
Used to open **MDI** dialog box.

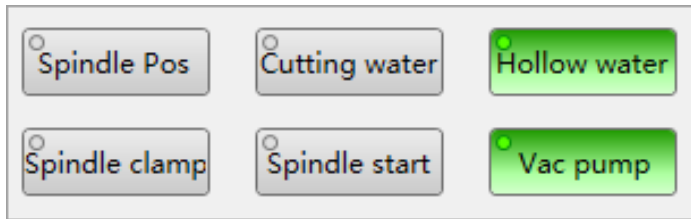
At most 8 user instructions can be input.

-  **Simulation**
Used to enable simulation mode.

After saving all drawings and settings, it is suggested to enable this function to check whether the trace is consistent with the expectation.

1.8 Buttons for Port Control

They are used to quickly turn on or turn off the following I/O ports:



When the button is highlighted in green, it indicates the related port is ON.


1.9 Buttons for Movement Control

They are used to control the movement of the machine.

-  **Start**

Used to start machining.

- Start to machine the set parameters if a file is saved directly.
- Start to machine the loaded program if a program file is loaded.

-  **Pause**

Used to pause machining.

-  **Stop**

Used to stop machining.

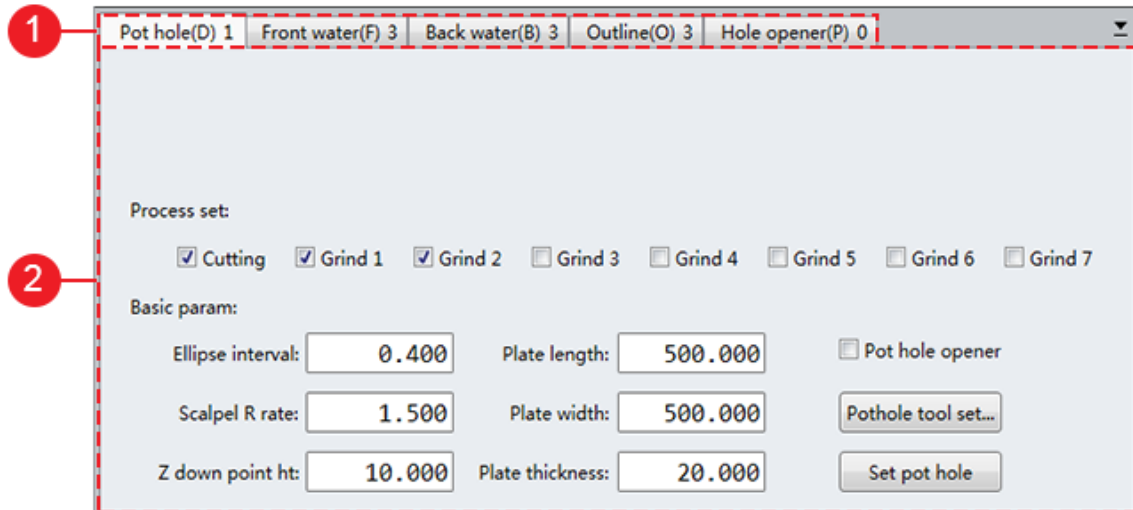
-  **Resume**

Used to resume machining from the exact interrupted position

- If a grinding wheel is enabled, the system resumes machining the interrupted graphic.
- If a program file is executed, the system resumes machining from the start of the interrupted line.

1.10 Technic Setting Area

It is used to set the specific parameters required for each technic in **Draw** window.



1. Technic bar
2. Parameter setting

Please refer to [Setting Technic Parameters](#) and [Technic Parameters](#) for details.

2 Quick Start

NcStudio Phoenix Stone Machining System is easy to operate with its own drawing function and technic setting function.

To operate **NcStudio Phoenix Stone Machining System**, do the following:

1. To debug the system, [set tool magazine](#).
2. [Draw graphic](#).
3. [Set toolpath](#).
4. [Set technic parameters](#).

3 Setting Tool Magazine

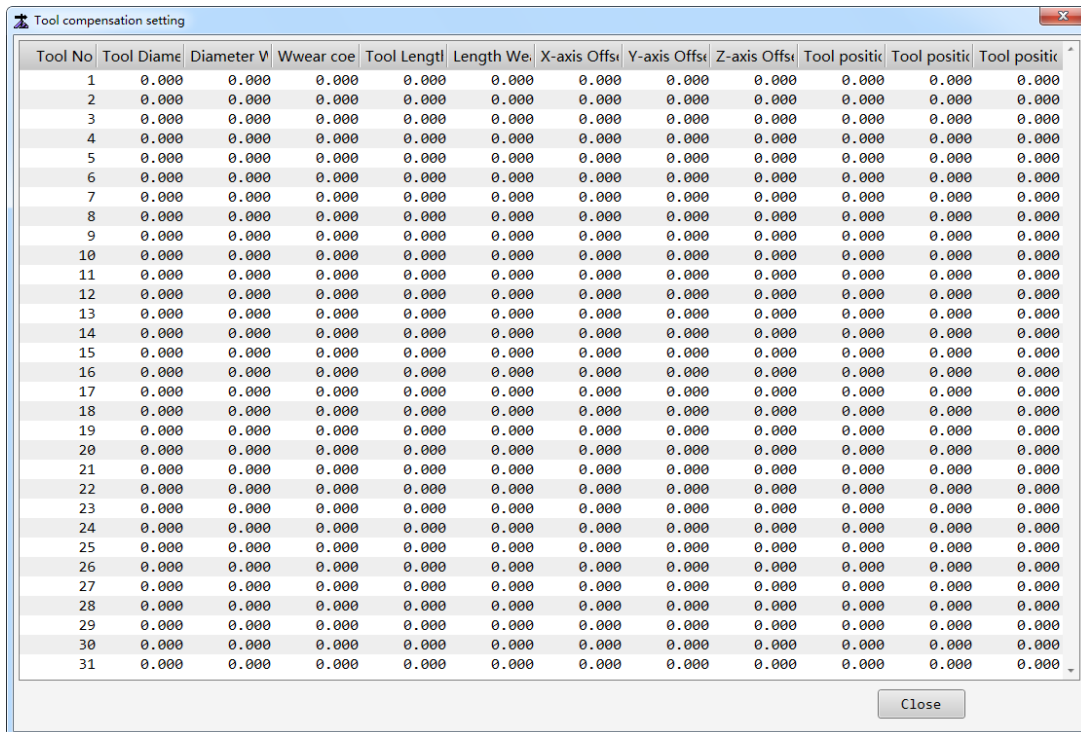
Magazine function can manage tool efficiently and improve machining efficiency. This chapter mainly introduces the following operations in **NcStudio Phoenix Stone Machining System**:

- [Setting tool](#)
- [Setting tool calibration](#)
- [Managing linear tool magazine](#)

3.1 Setting Tool

To set tool, do the following:

1. Click **Operation** → **Tool Setting**. **Tool Setting** dialog box pops up:



Tool No	Tool Diame	Diameter W	Wwear coe	Tool Lengtl	Length We	X-axis Offst	Y-axis Offst	Z-axis Offst	Tool positio	Tool positio	Tool positio
1	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
3	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
4	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
5	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
6	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
7	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
8	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
9	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
10	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
11	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
12	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
13	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
14	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
15	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
16	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
17	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
18	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
19	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
20	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
21	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
22	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
23	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
24	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
25	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
26	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
27	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
28	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
29	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
30	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
31	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

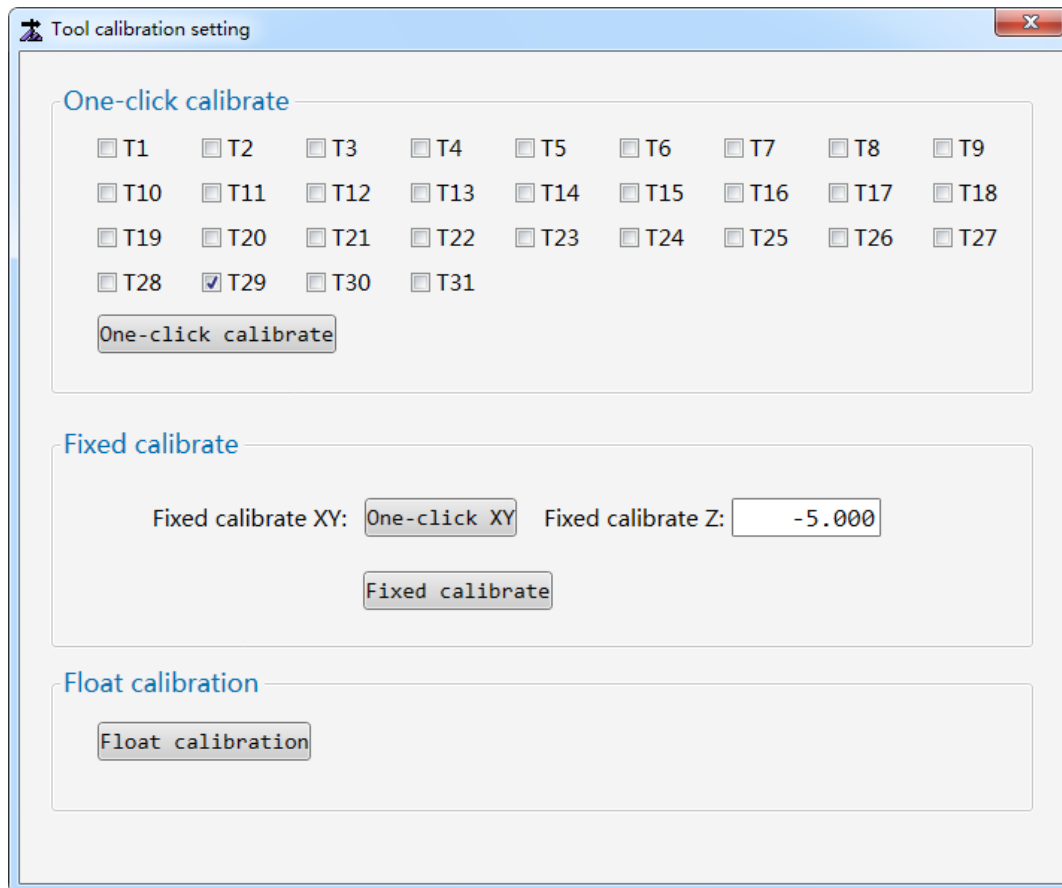
2. Double click corresponding parameter. Parameter setting input box pops up.
3. Enter the parameter value in the input box.

Please refer to [List of Parameters](#) for details of the parameters.

3.2 Setting Tool Calibration

To set tool calibration, do the following:

1. Click **Operation** → **Tool Calibration Setting**. **Tool Calibration Setting** dialog box pops up:



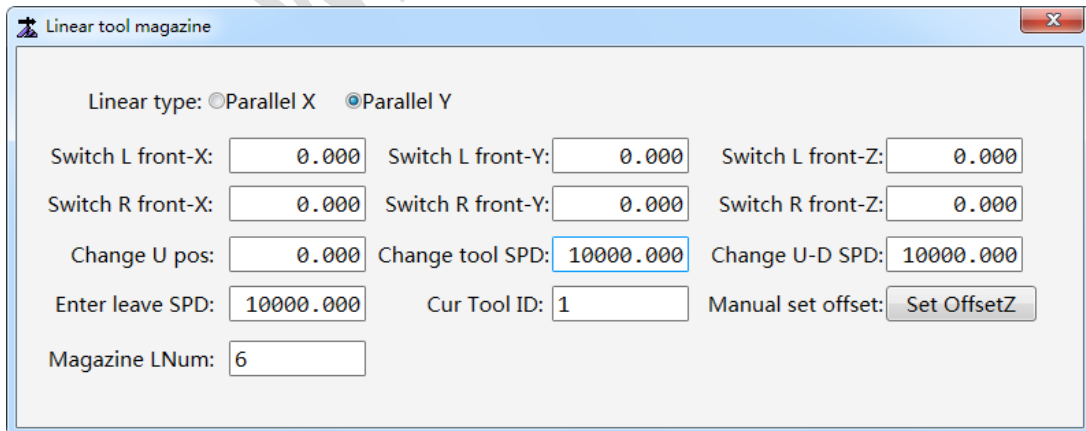
2. To select calibration modes, do one of the following:
 - Click **One-click Calibration**. The system automatically does the following:
 1. Execute tool change and then fixed tool calibration.
 2. Set the calibration value to Z-axis offset of corresponding tool.
 3. Repeat step 1 and step 2 until all tools have been fixed.
 - To select fixed calibration, do the following:
 1. Move X-axis and Y-axis above tool sensor. Then click **One-click XY**.
 2. Set parameter of **Fixed Calibration Z**.
 3. Click **Fixed Calibration**.

The system will set the calibration result to Z-axis offset of current tool No.
 - Click **Float Calibration**. The system does the following:
 1. Execute float calibration with current tool No.
 2. Set the calibration value to Z-axis offset of current coordinate system.

3.3 Managing Linear Tool Magazine

To manage linear tool magazine, do the following:

1. Click **Operation** → **Linear Tool Magazine**. **Linear Tool Magazine** dialog box pops up:



2. Select **Linear Tool Magazine Type**.
3. Enter the parameter value in the input box.

Please refer to [Tool Setting Parameters](#) for details of the parameters.

4 Drawing Graphic

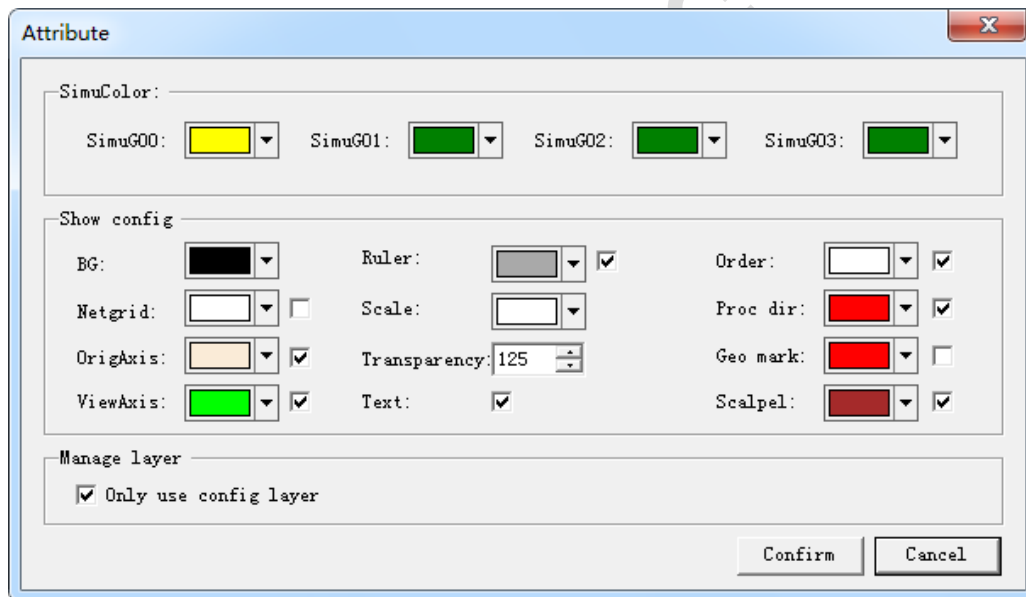
This chapter mainly introduces the following operations in **NcStudio Phoenix Stone Machining System**:

- Setting attribute
- Calling view tool
- Calling drawing tool
- Managing a layer

4.1 Setting Attribute

To set attribute, do the following:

1. Click **Draw** to switch to **Draw** window.
2. Right click to select **Attribute**. **Attribute** dialog box pops up:



At this time, the graphic should not be selected.

3. Set related attribute parameters.
 - SimuColor: Specify the trace color of each instruction in **Trace** window.
 - Show Config: Select the displaying color of each configuration and whether to check the displaying color and **Text**.
 - Manage Layer: Select whether to only use configuration layer when importing a DXF file.
4. Click **Confirm** to close **Attribute** dialog box. Above setting takes effect immediately.

4.2 Using View Tool

To call view tool, do the following:

1. To select view tool, do one of the following:
 - In menu bar, click **View** → **Fit to window** / **Move view** / **Zoom in** / **Zoom out**.
 - In drawing toolbar, click view tools.
 - Right click to call context menu.
2. To execute related view tool instructions, do the following:
 - Select **Fit to window**, and click to automatically fit to **Draw** window. All graphics will be shown in the middle of the window.
 - Select **Move view**, and do one of the following:
 - Hold the left mouse button and drag the object.
 - Hold down mouse wheel and drag the object.
 - Select **Zoom in** / **Zoom out**, and do one of the following:
 - Click the left mouse button repeatedly to zoom in/out the graphic.
 - Scroll the mouse wheel to zoom in/out the graphic.

4.3 Using Drawing Tool

Before drawing, do one of the following to call drawing tool instructions:

- In menu bar, click **Draw** → **Select** / **Polyline** / **Rectangle** / **Circle** / **Ellipse** / **Arc** / **Elliptic Arc**.
- In drawing toolbar, click drawing tools.

When calling instructions of rectangle, circle, arc and ellipse arc to draw graphic, right click corresponding tool icon, then left click to select drawing method.

The default drawing direction of arc and elliptic arc is counterclockwise direction.

The default machining direction of the drawn graphics displays automatically. Except for rectangle, the default machining direction of polyline, circle, ellipse, arc and elliptic arc is counterclockwise direction.

4.3.1 Using Select Instruction

Select is used to edit graphic and set technic parameters.

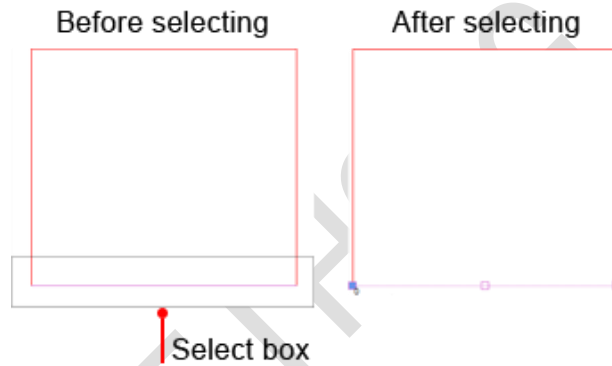
To use select instruction, do the following:

1. To select graphic, do one of the following:

- Click primitives one by one.

A primitive is the smallest unit to draw a graphic. Click a graphic in **Draw** window, and a primitive is what is selected.

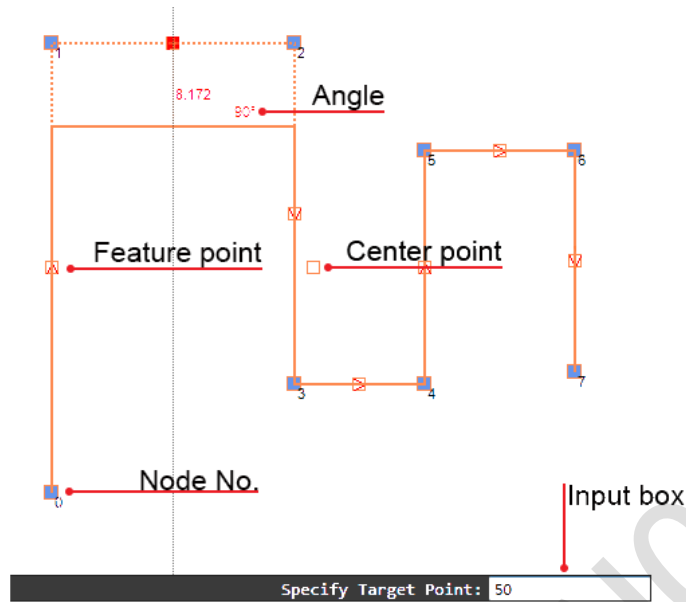
- Hold the left mouse button to drag the selected primitive.
 - Drag from upper left to lower right: Primitives contained in select box will be selected.



- Drag from upper right to lower left: Primitives intersected with or contained in select box will be selected.



When the graphic is selected, **Node No.**, **Feature point** and **Center point** will be shown as follows:



2. **Optional:** To change graphic by **Feature point** or **Center point**, do the following:
 - By adjusting feature point:
 1. Click a feature point.
 2. Drag mouse to specify direction and angle.
 3. Enter the size that needs change.
 - To change the coordinate of graphic by moving center point:
 1. Click the center point.
 2. Drag mouse to the target position.

4.3.2 Drawing a Polyline

To draw a polyline, do the following:

1. To specify a start point, do one of the following:
 - Click in **Draw** window.
 - Enter coordinate point in the input box.

Specify start point: 100,100

Separate coordinates with comma. Format: X-axis coordinate, Y-axis coordinate.

2. To specify the next point, do one of the following:
 - Click in **Draw** window.
 - Enter length value in the input box.
 - Enter coordinate point in the input box.

4.3.3 Drawing a Rectangle

To draw a rectangle, do one of the following:

- Select **Two points**, and specify the following in order:
 1. A start point.
 2. An end point on the diagonal.
- Select **Length width**, and do the following:
 1. Specify a start point.
 2. Enter the length and width.

Pick points in **Draw** window or enter coordinate in the input box to get the above specified points.

4.3.4 Drawing a Circle

To draw a circle, do one of the following:

- Select **Center, radius/diameter**, and do the following:
 1. Specify the circle center.
 2. Enter radius/diameter value.
- Select **Two points**, and specify a line as the diameter.
- Select **Three points**, and do the following:
 1. Specify three points.
 2. Draw a circle with the arc shaped by the three points.
- Select **Tangency, tangency, radius**, and do the following:
 1. Specify two tangency points.
 2. Enter radius value.
- Select **Tangency, tangency, tangency**, and specify three tangency points.

Pick in **Draw** window or enter coordinate in the input box to get above specified circle center, radius, diameter and points.

4.3.5 Drawing an Ellipse

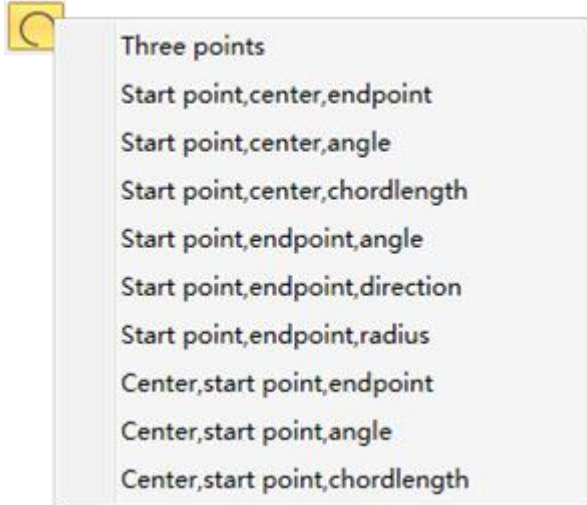
To specify two points to draw a rectangle, do one of the following:

- Pick two points in **Draw** window.
- Enter coordinate in the input box.

Ellipse is tangent to the four sides of the rectangle.

4.3.6 Drawing an Arc

To draw an arc, select one of the following methods and follow the order in the name of the method:



In the methods, angle refers to included angle of the arc. Direction refers to start point's tangential direction of the arc. And chordlength refers to chord length.

Pick in **Draw** window or enter coordinate or value in the input box to get the specified start point, circle center, endpoint, angle, chord length and radius.

e.g. To draw an arc by selecting **Start point, center, endpoint**, do the following:

1. Specify a start point.
2. Specify a circle center.
3. Specify an end point.

4.3.7 Drawing Elliptic Arc

To draw an elliptic arc, do one of the following:

- Select **Inscribed Ellipse in Rectangle**, and do the following:
 1. Draw an ellipse according to the painting of ellipse.
 2. Specify a start point.
 3. Specify an end point.
- Select **Center, Axis length**, and specify the following in order:
 1. The center.
 2. An endpoint of one axis.
 3. The length of another axis.
 4. A start point.
 5. An end point.


- Select **Axis length, Endpoint**, and specify the following in order:
 1. An endpoint of one axis.
 2. Another endpoint of the axis.
 3. The length of another axis.
 4. A start point.
 5. An end point.

Pick in **Draw** window or enter coordinate or value in the input box to get above specified start point, axial length and endpoint.

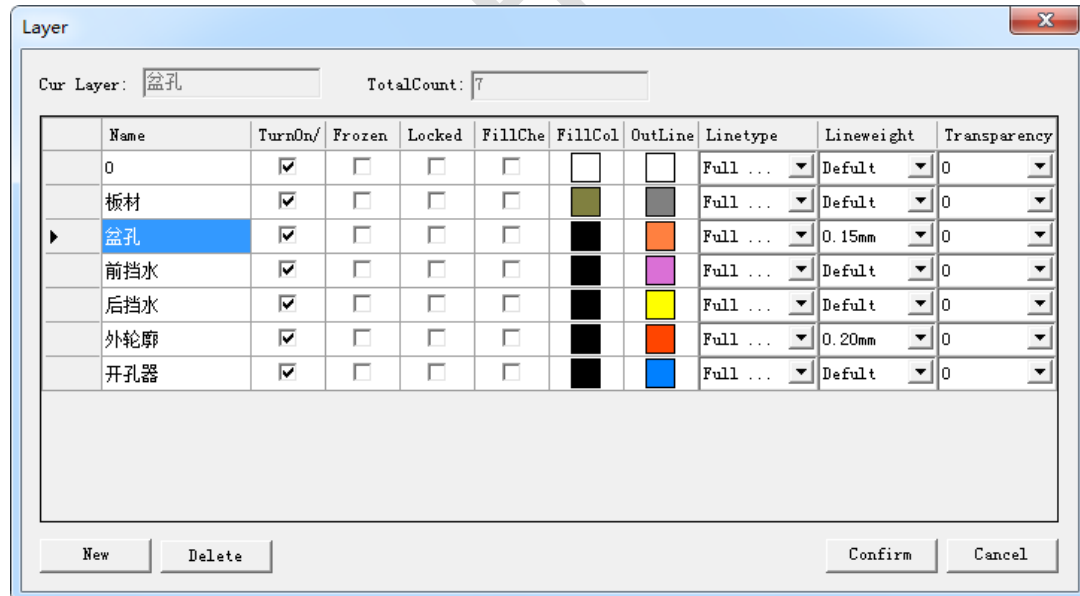
4.4 Managing a Layer

Layer is used to deal with a group of graphics without affecting other graphics.

To manage a layer, do the following:

1. To call **Layer** instruction, do one of the following:
 - In menu bar, click **View** → **Layer**.
 - In drawing toolbar, click .
 - In **Draw** window, right click to select **Layer**.

Layer dialog box pops up.



2. In the dialog box, do the following:
 - Set **Name, FillColor, Outline, Linetype, Linewidth** and **Transparency**.
 - **Optional:** Check **TurnOn/TurnOff, Frozen, Locked, FillCheck**.
 - Create a new layer.


5 Setting Toolpath

This chapter focuses on the following settings related to toolpath in **NcStudio Phoenix Stone Machining System**:

1. [Setting origin](#)
2. [Changing machining order](#)
3. [Changing machining direction](#)
4. [Setting lead line](#)


5.1 Setting Origin

To set workpiece origin, do the following:

1. Do one of the following:
 - In menu bar, click **View** → **Set Origin**.
 - In drawing toolbar, click .
2. Click on the target position in **Draw** window. The position sets as the workpiece origin.

5.2 Changing Machining Order


To change machining order, do the following:

1. Do one of the following:
 - In menu bar, click **View** → **Change Machining Order**.
 - In drawing toolbar, click .
2. Click on the target primitives in order. The machining order starts from one.

If you need to change the machining order of the subsequent primitives from a selected primitive, right click to select **Change Machining Order**.


5.3 Changing Machining Direction

To change machining direction, do one of the following:

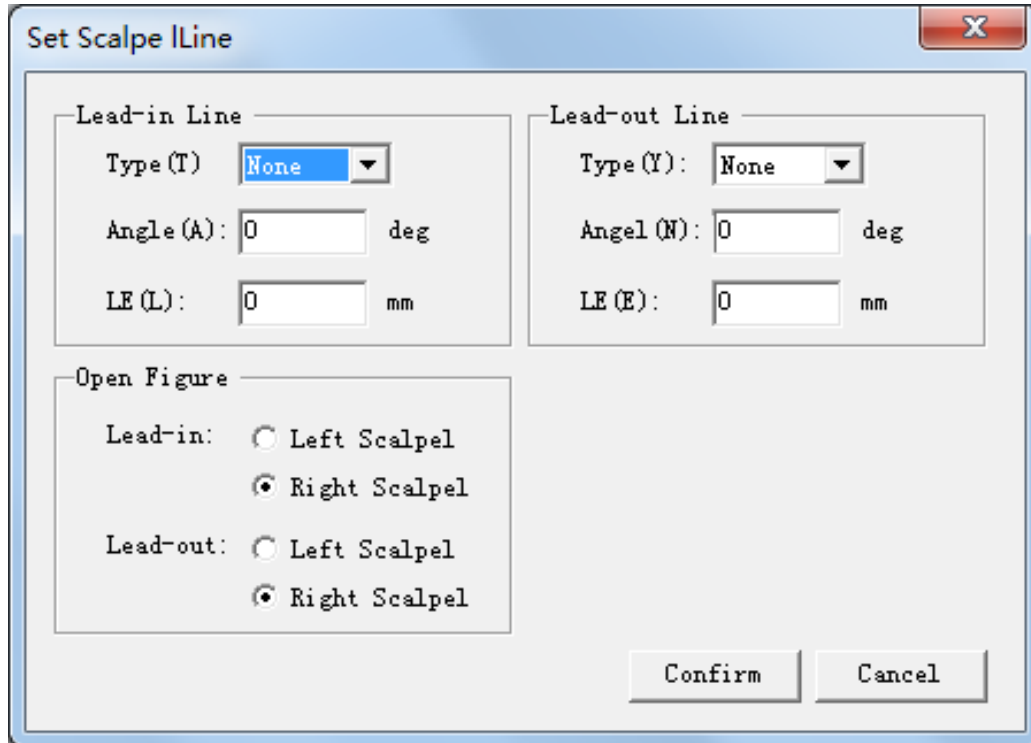
- In menu bar, click **View** → **Set Machining Direction** and click on the target primitive.
- In drawing toolbar, click  and click on the target primitive.
- Select one or several primitive(s) and right click to select **Change Machining Direction**.

5.4 Setting Lead Line

To set lead line, do the following:

1. Select one or several primitive(s), and do one of the following:
 - In menu bar, click **View** → **Set Lead Line**.
 - In drawing toolbar, click .

Set Lead Line dialog box pops up:



2. Set parameters of lead-in line and lead-out line and select lead-in method and lead-out method for the selected primitive(s).

If the selected primitives are continuous, you just need to set parameters of **lead-in line** for the first primitive and set parameters of **lead-out line** for the last primitive.

3. Click **OK**. The set lead line automatically shows on the selected primitive(s) in **Draw** window.

Note: If the machining direction of a primitive is changed, its lead-in line and lead-out line of will be exchanged automatically. Thus, if the setting does not accord with the reality, please set it again.

6 Setting Technic Parameters

This chapter focuses on setting the following technic parameters in **NcStudio Phoenix Stone Machining System**:

- Setting basin parameters
- Setting front retaining water parameters
- Setting rear retaining water parameters
- Setting outline parameters
- Setting hole opener parameters

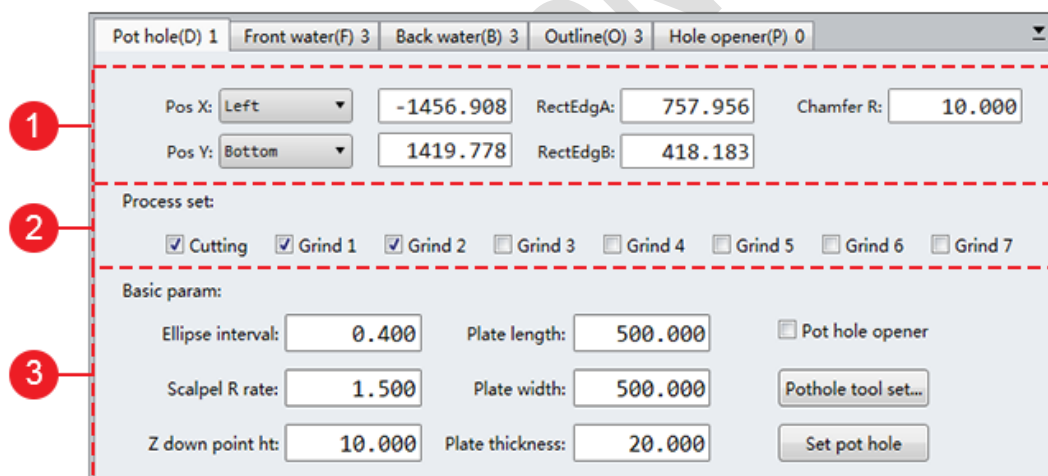
For details of technic parameters, please refer to [Technic Setting Parameters](#).

6.1 Setting Basin Parameters

This operation is only available to a rectangular, a circle and an ellipse.

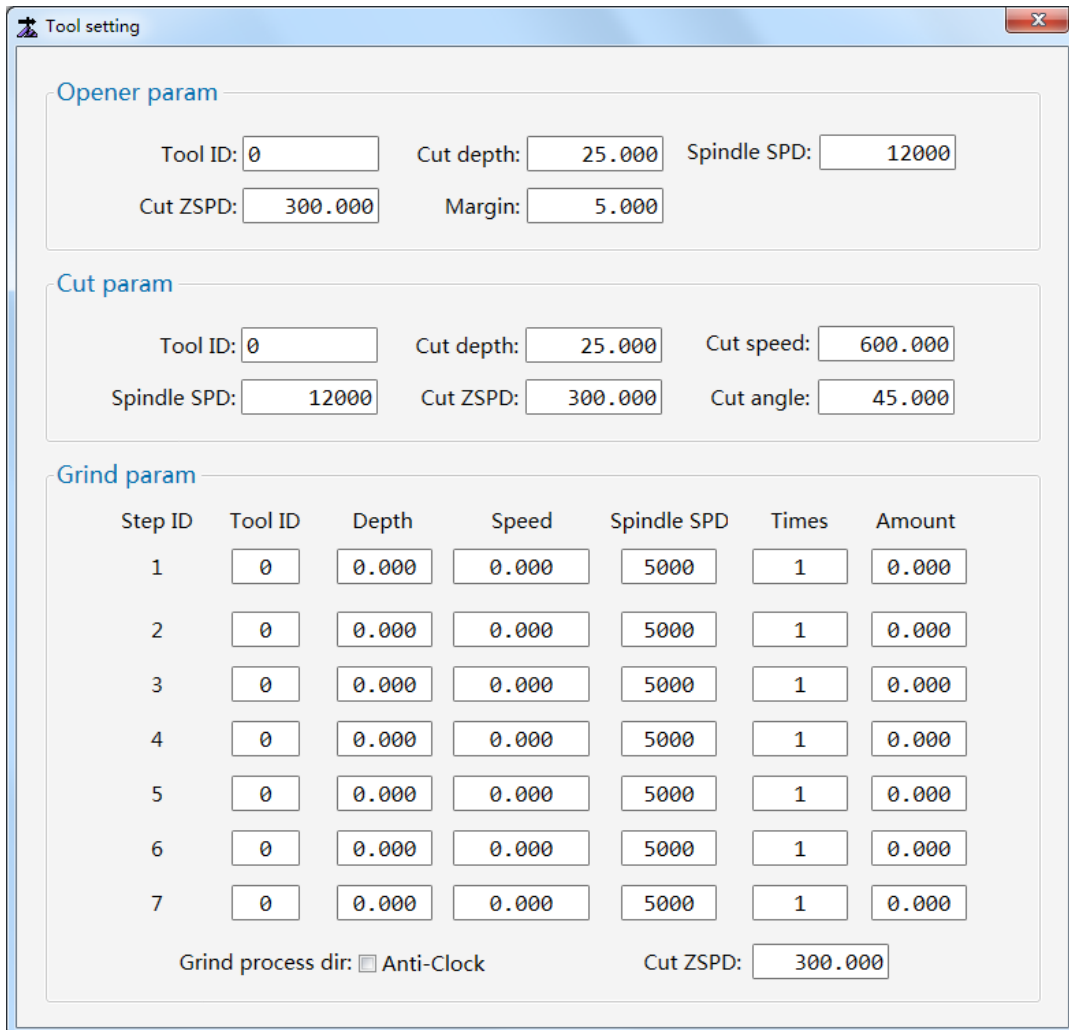
To set technic parameters of basin, do the following:

1. In technic setting area, select **Basin** to switch to its parameter setting area:



2. Select a primitive. Its positioning method and size automatically show in area ① and the information can be modified manually as needed.
3. Check the needed machining technic in area ② (Check more than one if needed).
4. **Optional:** Check **Hole Opener** to punch a hole in basin.
5. Set basic parameters in area ③.

6. Click **Tool Setting**. The dialog box **Tool Setting** pops up:



Opener param

Tool ID: Cut depth: Spindle SPD:
 Cut ZSPD: Margin:

Cut param

Tool ID: Cut depth: Cut speed:
 Spindle SPD: Cut ZSPD: Cut angle:

Grind param

Step ID	Tool ID	Depth	Speed	Spindle SPD	Times	Amount
1	<input type="text" value="0"/>	<input type="text" value="0.000"/>	<input type="text" value="0.000"/>	<input type="text" value="5000"/>	<input type="text" value="1"/>	<input type="text" value="0.000"/>
2	<input type="text" value="0"/>	<input type="text" value="0.000"/>	<input type="text" value="0.000"/>	<input type="text" value="5000"/>	<input type="text" value="1"/>	<input type="text" value="0.000"/>
3	<input type="text" value="0"/>	<input type="text" value="0.000"/>	<input type="text" value="0.000"/>	<input type="text" value="5000"/>	<input type="text" value="1"/>	<input type="text" value="0.000"/>
4	<input type="text" value="0"/>	<input type="text" value="0.000"/>	<input type="text" value="0.000"/>	<input type="text" value="5000"/>	<input type="text" value="1"/>	<input type="text" value="0.000"/>
5	<input type="text" value="0"/>	<input type="text" value="0.000"/>	<input type="text" value="0.000"/>	<input type="text" value="5000"/>	<input type="text" value="1"/>	<input type="text" value="0.000"/>
6	<input type="text" value="0"/>	<input type="text" value="0.000"/>	<input type="text" value="0.000"/>	<input type="text" value="5000"/>	<input type="text" value="1"/>	<input type="text" value="0.000"/>
7	<input type="text" value="0"/>	<input type="text" value="0.000"/>	<input type="text" value="0.000"/>	<input type="text" value="5000"/>	<input type="text" value="1"/>	<input type="text" value="0.000"/>

Grind process dir: Anti-Clock Cut ZSPD:

- If **Cutting** is checked in area ②, set parameters of **Cutting**.
 - If **Grinding** is checked in area ②, set parameters of **Grinding**. The Step No. 1~7 corresponds to grinding 1~7 respectively.
 - If **Hole Opener** is checked, set parameters of **Hole Opener**.
7. Click **Set Basin** to set the selected primitive as basin technic.

The color of the selected primitive turns to the set color and the selected primitive will be machined according to the above set parameters.

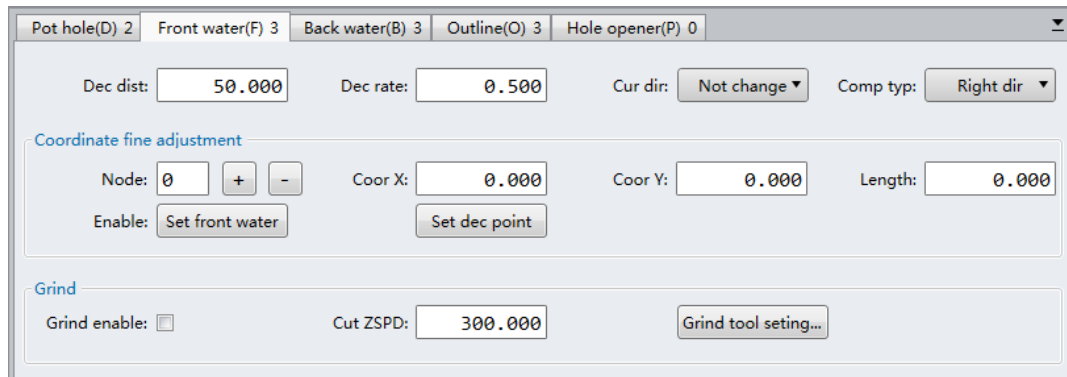
6.2 Setting Front Retaining Water / Rear Retaining Water / Outline Parameters

This operation is only available to unclosed graphics, such as polyline, arc, etc.

To set technic parameters of front retaining water/rear retaining water/outline, do the following:

1. In technic setting area, select **Front Retaining Water / Rear Retaining Water / Outline** to switch to its corresponding parameter setting area:

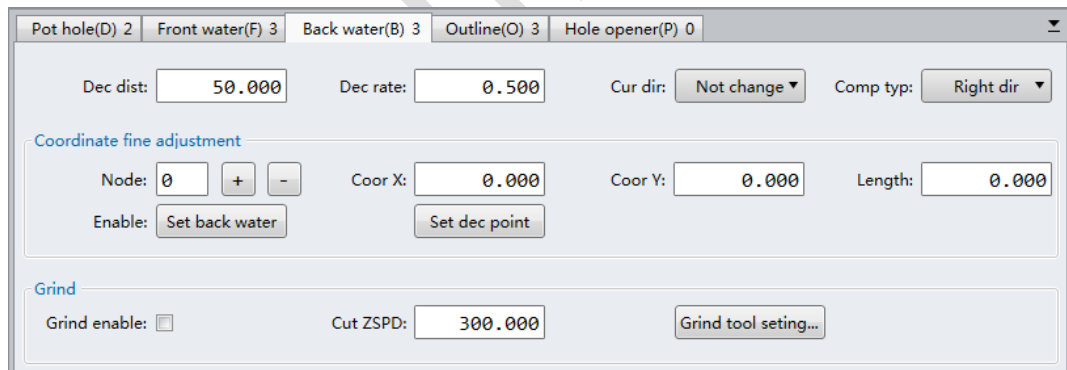
- **Front Retaining Water**



The dialog box shows the following settings:

- Tab: Front water(F) 3
- Dec dist: 50.000
- Dec rate: 0.500
- Cur dir: Not change
- Comp typ: Right dir
- Coordinate fine adjustment:
 - Node: 0
 - Coor X: 0.000
 - Coor Y: 0.000
 - Length: 0.000
 - Enable: Set front water
 - Set dec point
- Grind:
 - Grind enable:
 - Cut ZSPD: 300.000
 - Grind tool setting...

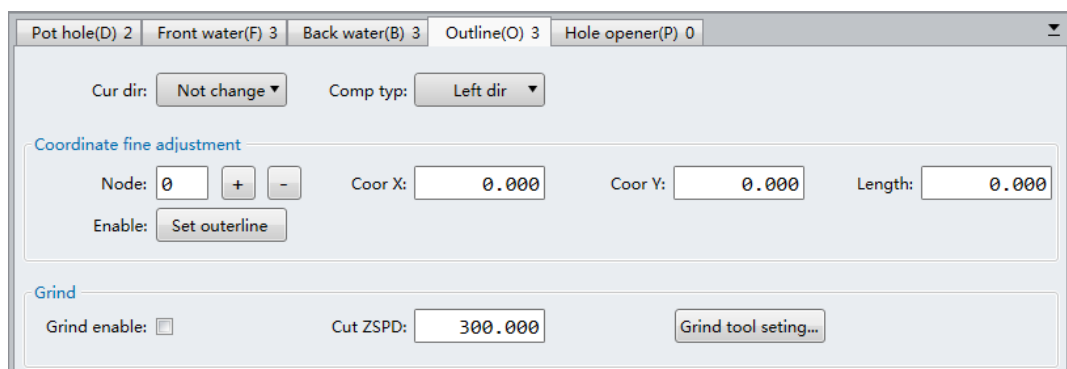
- **Rear Retaining Water**



The dialog box shows the following settings:

- Tab: Back water(B) 3
- Dec dist: 50.000
- Dec rate: 0.500
- Cur dir: Not change
- Comp typ: Right dir
- Coordinate fine adjustment:
 - Node: 0
 - Coor X: 0.000
 - Coor Y: 0.000
 - Length: 0.000
 - Enable: Set back water
 - Set dec point
- Grind:
 - Grind enable:
 - Cut ZSPD: 300.000
 - Grind tool setting...

- **Outline**

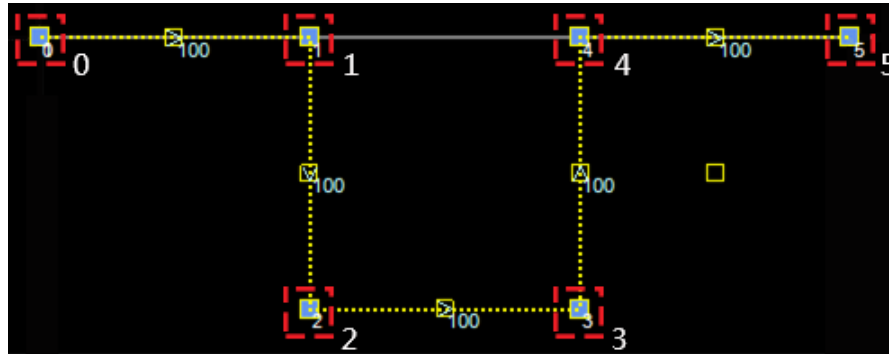


The dialog box shows the following settings:

- Tab: Outline(O) 3
- Cur dir: Not change
- Comp typ: Left dir
- Coordinate fine adjustment:
 - Node: 0
 - Coor X: 0.000
 - Coor Y: 0.000
 - Length: 0.000
 - Enable: Set outline
- Grind:
 - Grind enable:
 - Cut ZSPD: 300.000
 - Grind tool setting...

2. To set deceleration point for front retaining water and rear retaining water, do the following:

1. Select a primitive. The selected primitive shows as a dotted line and the node index starting from zero appears:



2. Click + or - to switch to the node that you would like to set as the deceleration point.



3. Click **Set Dec Point**. The selected node sets as the deceleration point.
More than one deceleration point can be set.

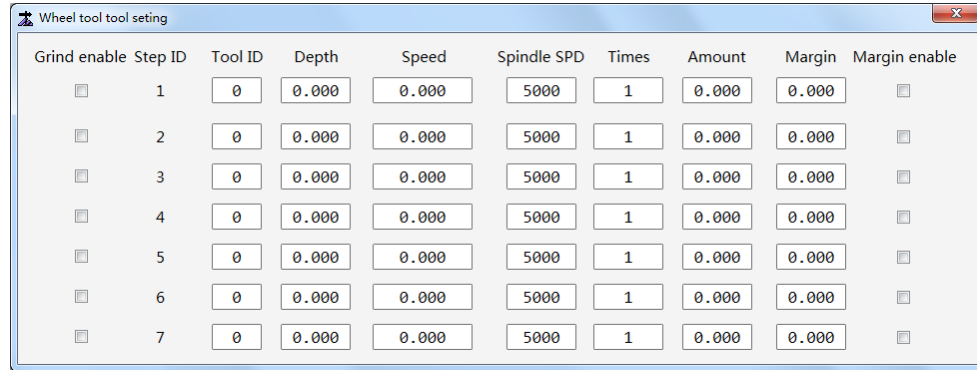
3. **Optional:** Take the length from node 2 to 3 as an example. To modify its length, do the following:

1. Click + or - to switch to node 3.
2. Do one of the following:
 - Enter a value in the input box of **Coor X** or **Coor Y** to adjust coordinates of node 3.
 - Enter a value in the input box of **Line Length**.

4. Set the following parameters:
 - Deceleration distance
 - Deceleration rate
 - Current direction
 - Tool compensation type

5. **Optional:** To enable grinding wheel, do the following:

1. Check **Enable Grinding Wheel**.
2. Set **Z Down Feedrate** in its input box.
3. Click **Tool Setting**. **Tool Setting** dialog box pops up:



Grind enable	Step ID	Tool ID	Depth	Speed	Spindle SPD	Times	Amount	Margin	Margin enable
<input type="checkbox"/>	1	0	0.000	0.000	5000	1	0.000	0.000	<input type="checkbox"/>
<input type="checkbox"/>	2	0	0.000	0.000	5000	1	0.000	0.000	<input type="checkbox"/>
<input type="checkbox"/>	3	0	0.000	0.000	5000	1	0.000	0.000	<input type="checkbox"/>
<input type="checkbox"/>	4	0	0.000	0.000	5000	1	0.000	0.000	<input type="checkbox"/>
<input type="checkbox"/>	5	0	0.000	0.000	5000	1	0.000	0.000	<input type="checkbox"/>
<input type="checkbox"/>	6	0	0.000	0.000	5000	1	0.000	0.000	<input type="checkbox"/>
<input type="checkbox"/>	7	0	0.000	0.000	5000	1	0.000	0.000	<input type="checkbox"/>

4. Set related parameters for grinding wheel.
6. Click **Set Front Retaining Water** / **Set Rear Retaining Water** / **Set Outline** to set the selected primitive as front retaining water/ rear retaining water/ outline.

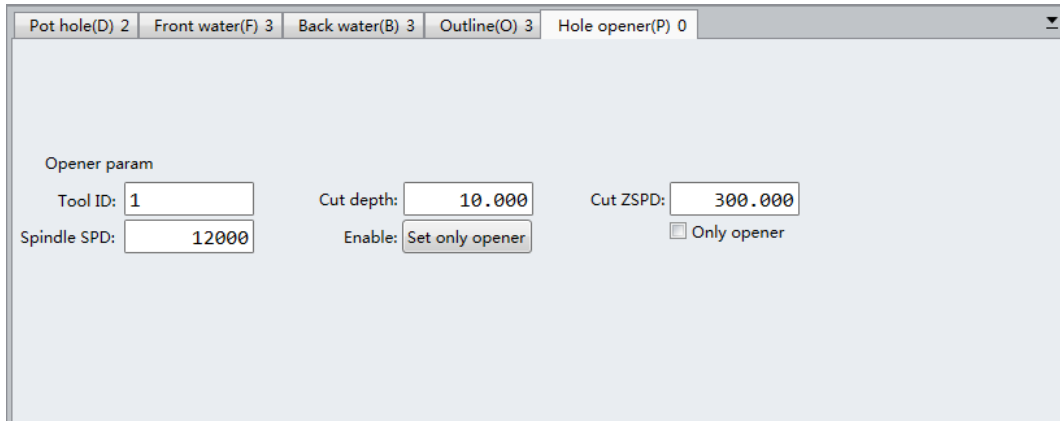
The color of the primitive turns to the set layer color, and the primitive will be machined according to the above set parameters.

6.3 Setting Hole Opener Parameters

This operation is only available to a circle.

To set technic parameters of hole opener, do the following:

1. Select a circle.
2. In technic setting area, select **Hole Opener** to switch to its parameter setting area:



Opener param

Tool ID: Cut depth: Cut ZSPD:

Spindle SPD: Enable: Only opener

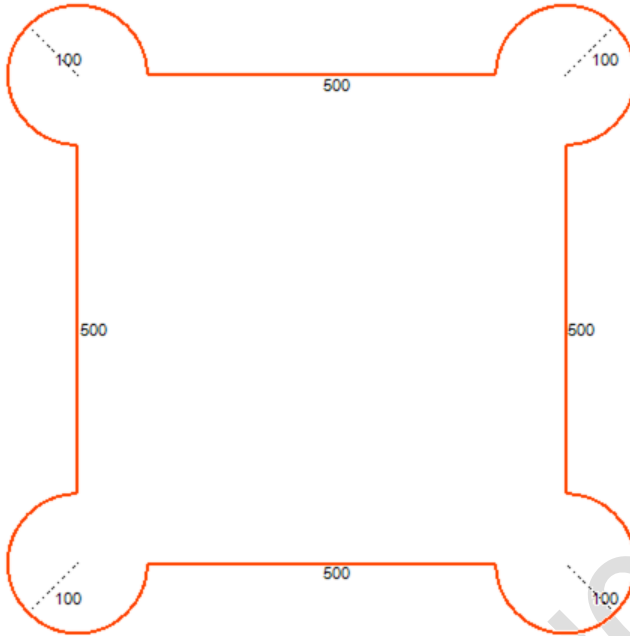
3. Check **Hole Opener** to enable hole opener.
4. Set the following parameters:
 - Tool No.
 - Z Down Depth
 - Z Down Speed
 - Spindle Speed
5. Click **Set Hole** to set the selected circle as hole opener.

The color of the circle turns to the set layer color, and the circle will be machined from its center. The size of the hole opener is the same with the hole.

At most 6 holes can be set.

7 Operation Example

This chapter shows how to use **NcStudio Phoenix Stone Machining System** to machine the standard arc-angled plate. Take outer contour technic as an example:



Graphic Analysis

Reason:

- This graphic consists of four lines and four arcs.
- Each arc is a three fourths circle.
- Each circle center is the intersection of extension cords of adjacent lines.

Suggestion:

Take start point, center, angle drawing method to draw the four arcs.

Operation

Please refer to the following video for operation.

<https://v.qq.com/x/page/p07115gr13o.html>

8 List of Parameters

This chapter introduces important parameters in the following:

- Tool setting
- Linear tool magazine management
- Technic setting

8.1 Tool Setting

Tool No.

Tool No. is the number of each tool and can be 31 at most.

Tool Diameter

Tool diameter is used in radius compensation during machining.

X/Y/Z Offset

X/Y/Z offset is the offset value of each tool and can be set directly or by using tool sensor.

X/Y/Z Tool Position

X/Y/Z tool position is the machine coordinate of each tool and used during tool change.

8.2 Linear Tool Magazine Management

Tool Change Ahead Position of X/Y/Z

Tool change ahead position of X/Y/Z is used to set machine coordinate of ahead position during automatic tool change.

Manual Set Offset

Set current Z-axis machine coordinate to Z-axis offset corresponding to current tool.

Current Tool No.

Current tool No. is used to change current tool No. directly and call corresponding tool offset. At this time, there is no tool change.

8.3 Technic Setting

Ellipse Division Precision

Ellipse division precision refers to ellipse precision.

The smaller the value is, the higher the precision is.

Too high precision may cause machine oscillation. Too low precision may cause ellipse distortion.

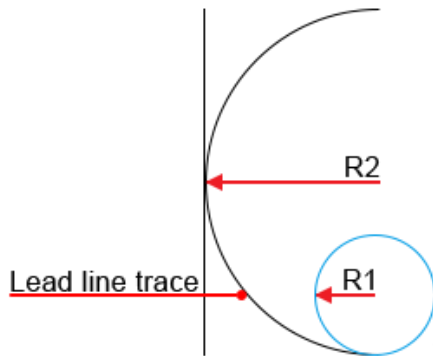
The recommended setting range of precision is (0.1,1).

Lead Line Radius Override

Lead line radius override meets the following formula:

Lead line radius of arc plunge (R2)= Lead line radius override * Corresponding tool radius (R1).

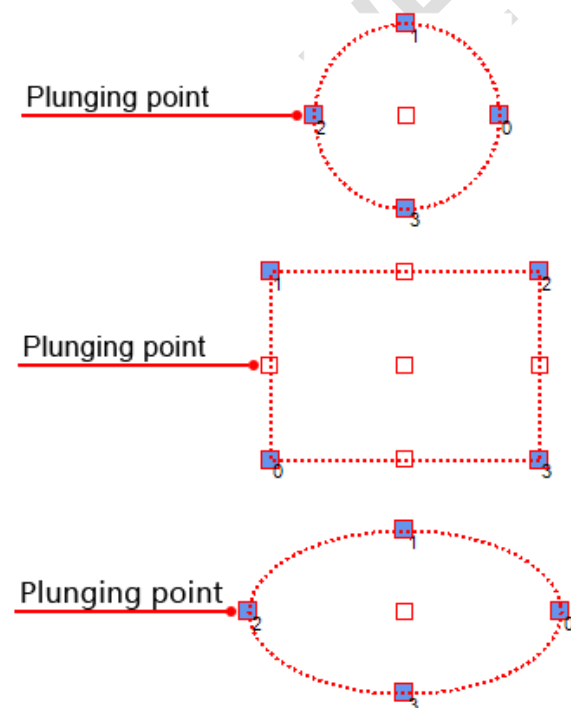
e.g. When the wheel of basin is grinded, the arc shapes from plunging point to cut point:



Z Plunging Point Height

Z-axis plunging point is above the workpiece. Height of Z-axis plunging point refers to the height of Z-axis starting to plunge when the machine is cutting.

Z-axis plunges from the highest position to this position in G00 speed. When Z-axis arrives at the plunging point position, Z-axis starts to plunge in plunging speed of each set tool. Plunging point refers to the fixed left feature point:



Sheet Size

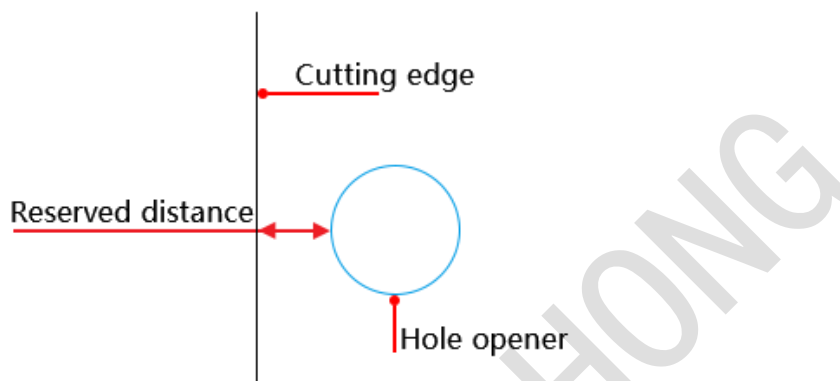
Sheet size includes the length, width and thickness of sheet and displays in graphic immediately.

Sheet size affects the position of graphic, and must be entered according to actual sheet size.

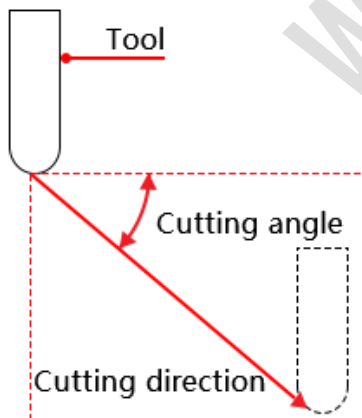
Reserved Distance

If the hole opener is enabled, the hole opener will punch a hole at the plunging point before the machine starts machining.

Thus, this parameter refers to the distance from the outer edge of the hole opener to the cutting edge:

**Cutting Angle**

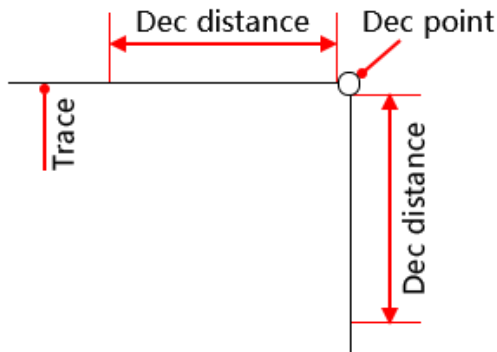
If the hole opener is disabled, the machine starts machining at the set cutting angle.



Deceleration Distance

There is a deceleration distance before and after the set deceleration point.

Actual feedrate within the deceleration distance = Set feedrate * Deceleration override

**Current Direction**

Unchange: Current direction is the same with the arrow direction in the drawing.

Reverse: Current direction is opposite to the arrow direction in the drawing.

Grinding

Check to select the corresponding grinding wheel to start machining.

Cutting Depth

Cutting depth from the workpiece origin of Z-axis.

Machining Speed

Speed during machining with grinding wheel.

Spindle Speed

Spindle speed during machining with grinding wheel.

Engagement

The feed engagement when a grinding wheel is enabled after cutting.

Each engagement = Engagement / Engagement times

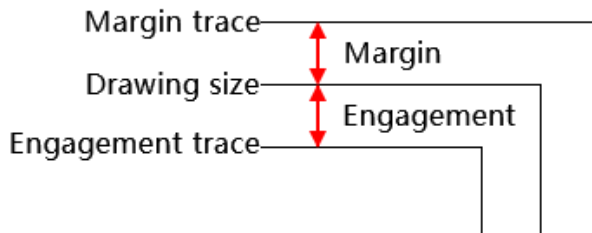
Margin

The difference between the drawing size and the size after the first-time machining.
The maximum engagement times for margin is 2.

Enable Margin

Enable margin or engagement (not both).

The values of margin and plunge distance have no correlation and they are all based on the drawing size.



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