Technologies

Online help

PP dependent functions for cncCUT

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Welcome to the help files for Technologies

General Tips for Navigation of the Program

Choosing the Control Method:

There are two ways to navigate the help pages for *cncCUT* .

1. Interactive Navigation
   This allows you to decide for yourself which texts you need to read. Place the mouse cursor over the rectangles drawn onto the screen shots to get a more detailed description.

2. Continuous Navigation
   This mode leads through the document sequentially. All details will be shown one after the other, simply press the 'Next' button (right arrow in the Navigation Panel [1]) to move through the document one step at a time.

The screen is split into four frames: The Menu to the left [1] with the navigation arrows for navigating the whole help document, and a box for entering a page number.

The top shows the Contents List [2] divided into chapters. The Glossary [4] of the most important technical terms is shown at the bottom. You can switch between the Glossary and an Index in this frame. Whichever you choose, clicking the catchwords will link you directly to the most relevant part of the corresponding help page.

The middle frame shows you the current help page [3].

Choose your favorite method controlling the document

interactive

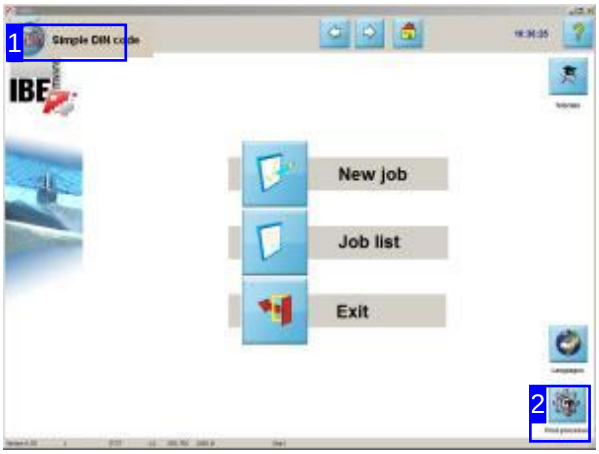
or

continuous

Important Note
The *cncCUT* program is not machine dependant. It offers an abundance of features, some of which will not be supported by your machine. This online help document describes the general functions based upon GUIs which, dependant on your machine, the modules you have installed and your post-processor(s) may appear differently on your copy. The post-processors have their own independent help files.
The continuous development of *cncCUT* can also lead to differences between the program's actual GUI and the GUI shown in the online help documents. If this occurs, please check the version and date of the help file against that of the program. If necessary, check our homepage for a newer version, or contact us.

Selecting A Post-Processor

How to select a suitable post-processor for your machine.



Certain cutting features in *cncCUT* are only enabled dependant on your post-processor, that is, they are machine dependant. These features are described collectively in this help program, while the individual features of each post-processor will be described in more detail in the corresponding help file.

You can only change program settings and your selected post-processor from a screen that is not directly accessible. Accessing the post-processor selection screen is explained in the Administrator's help pages.

You will need a post-processor to be able to work with *cncCUT* . You will need to have ordered a suitable post-processor together with your purchase of *cncCUT* .

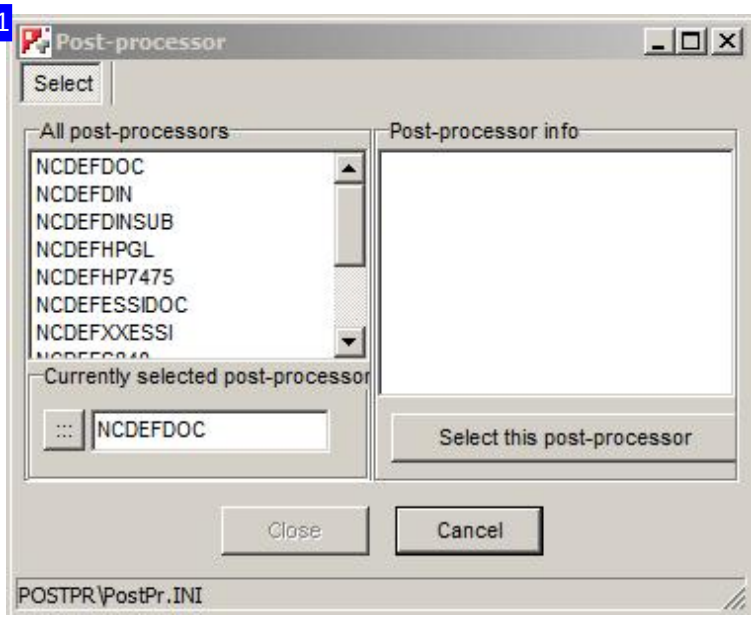
1

The currently installed post-processor is shown here.

2

If post-processor selection is enabled on your machine, then a corresponding button will be shown here. Clicking this button opens a dialog box for selecting a different post-processor to generate your NC code.

21

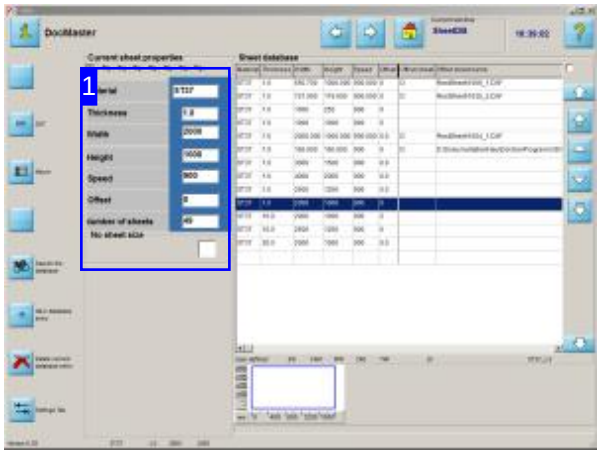


The left frame shows you all installed post-processors. Select an item from the list to show its details in the right frame. To switch to the selected post-processor, simply click 'Select this post-processor'.

The lower left frame shows the current post-processor. The button to the left of this display opens a dialog which allows you to load a post-processor.ini file.
You must restart *cncCUT* when changing post-processors.

The Sheet Database

Current sheet settings.



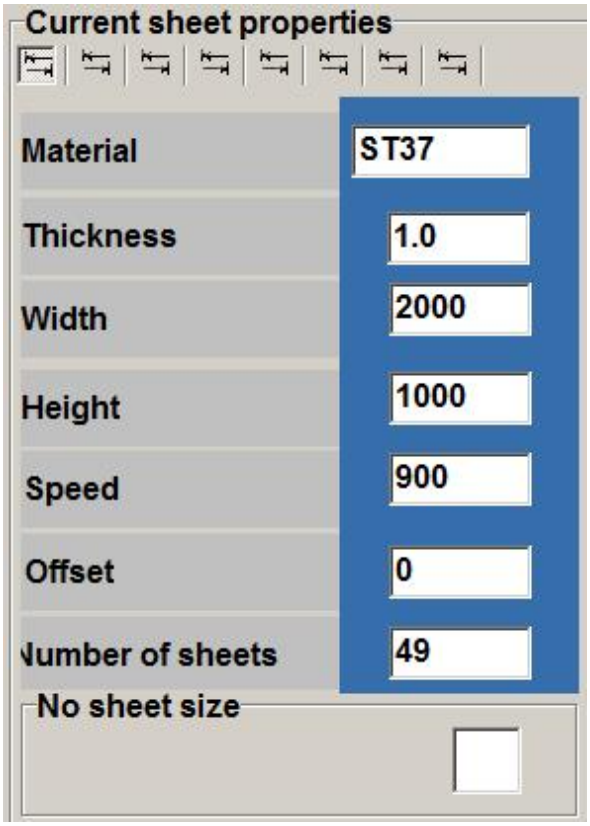
This screen allows you to change sheet settings and post-processor options. If "DRILL" and "TAP" are enabled in your machine's post-processor, the corresponding input fields will also be enabled.

This screen allows you to manage and maintain the sheet database. As well as editing the sheet database as described in the *cncCUT* online help, you can also access tool settings through the 'Current Sheet Parameters' frame [1].

- Use the fifth button to define Drills.
- Use the sixth button to define Taps.
- Use the next button to set Quality Attributes .
- Use the last button to determine the unit cost by setting fixed prices and constants for estimating from when costing your cutting parts.

  The buttons' positions may vary according to your post-processor's settings.

1

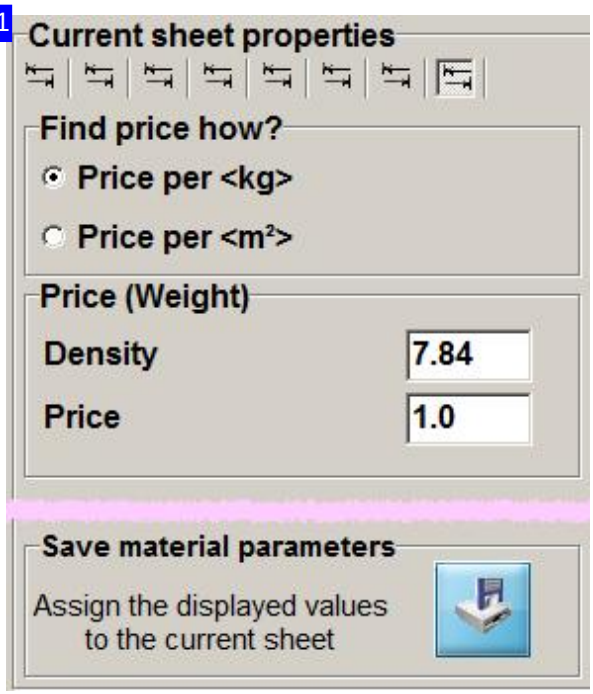


This frame shows you the data for a sheet highlighted in the database.

The header panel has six small buttons; use these buttons to display your post-processor's settings.

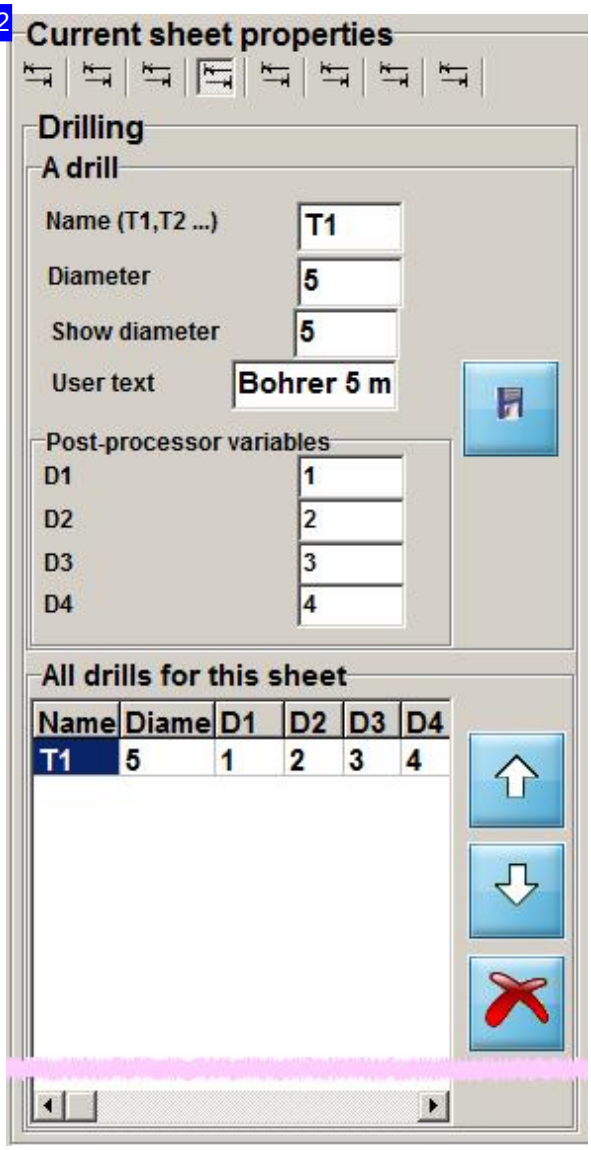
Click the fourth button to access the 'Drills' screen, and the fifth for the 'Taps' screen.

11



You can combine individual jobs from the job list to give a concise quotation. You can choose your sheet and make settings about how to calculate your price here. Mark the checkbox corresponding to how you wish to calculate the costs, and enter the material price in the 'Price (Area / Weight)' cell.

12



You can define your tools here. Enter their identifiers under 'Name', in the form 'T<1,2,..>' for drills and 'K<1,2,..>' for center punches. The tools are listed together in the drills list.

Enter the diameter that all holes cut with this tool will have in the 'Diameter' field.

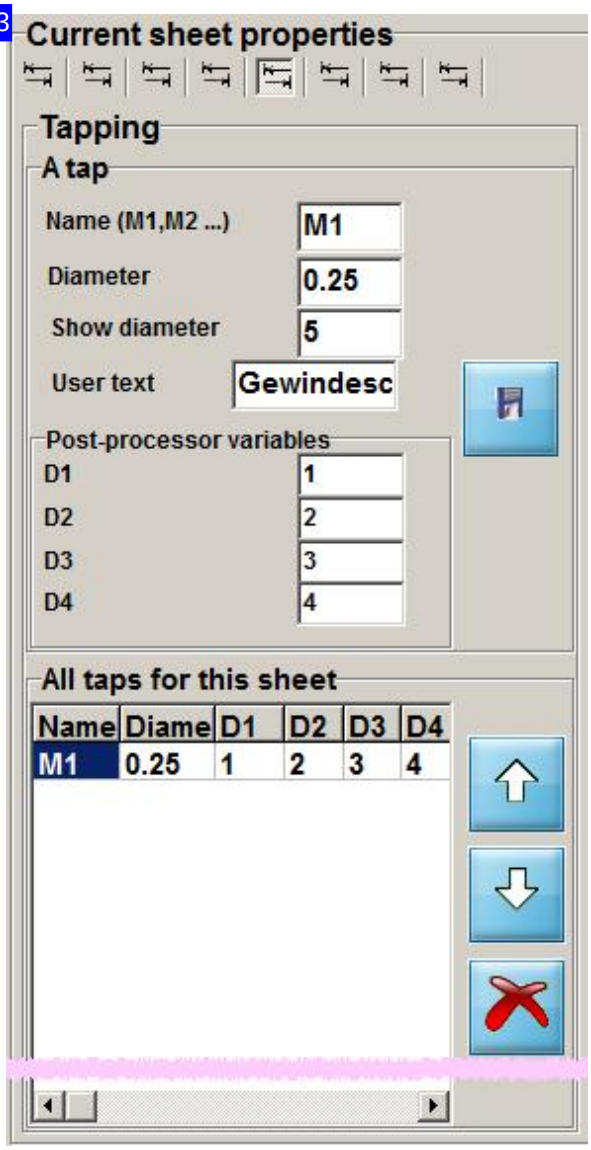
Enter the size circle that holes to be cut with this tool should be represented by in your drawings in the 'Draw Diameter' field.

To give the machine operator clear instructions as to which tools are required, you may enter an alphanumeric string to describe the tool in the 'User Text' field. This description will be given when accessing the job from the Job List.

The other parameters are post-processor dependant and will be described in each post-processor's own help page.

The bottom button deletes an entry from the list.

13



You can define your tools here. Enter their identifiers under 'Name', in the form 'M<1,2,..>' for taps. These tools are listed together in the taps list.

Enter the diameter that all threads cut with this tool will have in the 'Diameter' field.

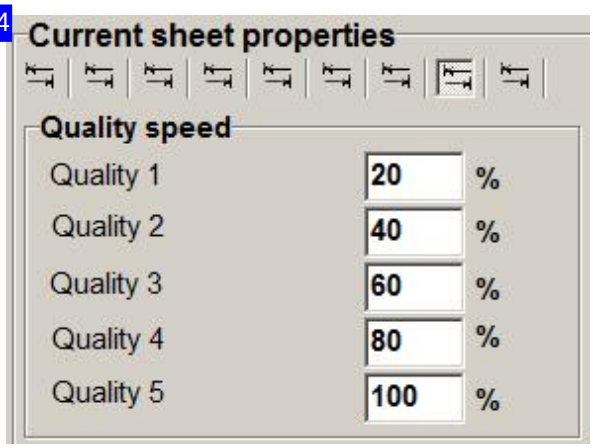
Enter the size circle that threads to be cut with this tool should be represented by in your drawings in the 'Draw Diameter' field.

To give the machine operator clear instructions as to which tools are required, you may enter an alphanumeric string to describe the tool in the 'User Text' field. This description will be given when accessing the job from the Job List.

The other parameters are post-processor dependant and will be described in each post-processor's own help page.

The bottom button deletes an entry from the list.

14

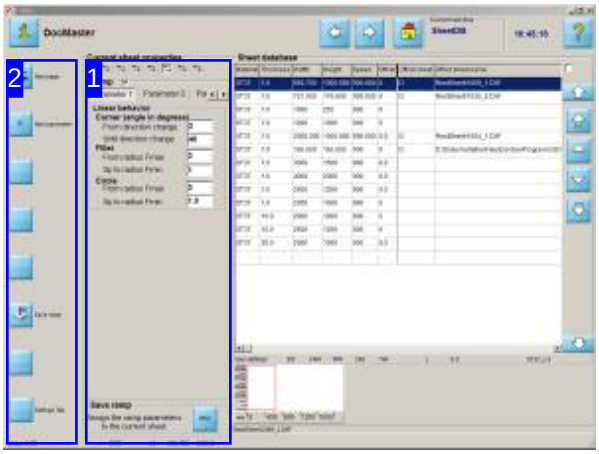


In order to increase the quality of drilled holes, you may wish to vary the speeds the tools should be used at. A lower speed will give a cleaner cut.

The allocation of quality to contours or contour elements is done in the Machine settings windows.

The allocation of line colors to quality gradations is to be done by the administrator.

Settings for Ramps when using a waterjet cutter

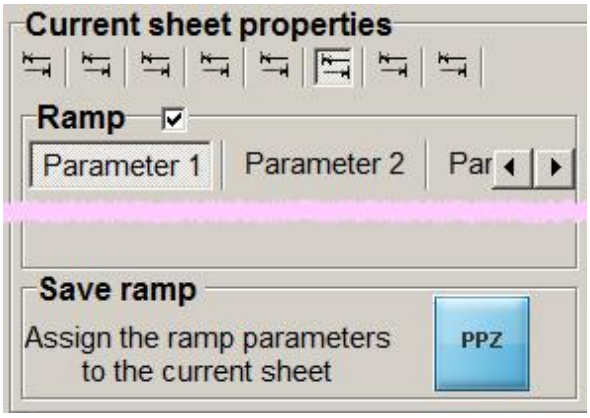


Enter the presets for use when cutting using ramps and the machine data for a sheet in this screen [1].

- Linear behavior
- Acceleration, Deceleration, Lead-in speed
- Machine data
- Quality levels

'Ramps' can be defined allowing control to be adapted to the particularities of water-jet cutting for cutting lead-ins and -outs as well as corners and circles.
You can also make presets about the machine settings for a sheet.

1



Click the last button in the button header panel of the 'current sheet parameters' frame to access the 'Ramps' screen.

From the 'Ramps' frame, use the buttons in the button panel to access the input fields for:

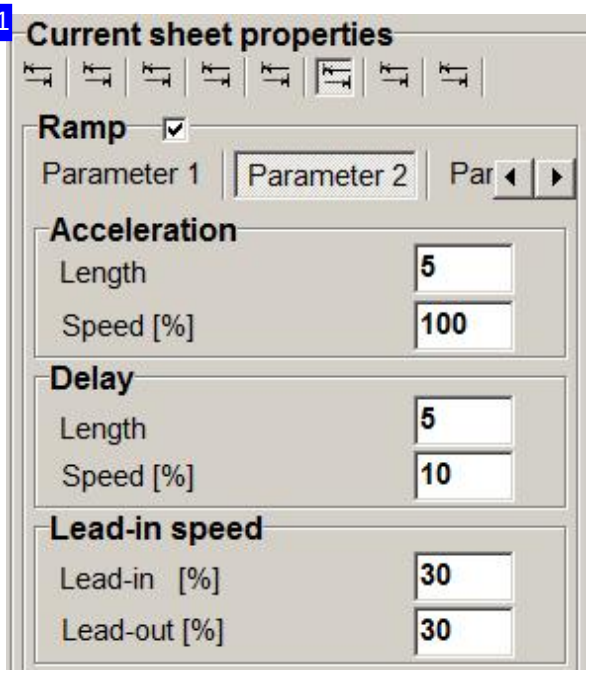
- Parameter 1: Linear behavior.
- Parameter 2: Acceleration, Deceleration, Lead-in speed.
- Parameter 3: Stop ramp.
- Variables: Machine data.
- Global: Speeds for quality levels.

If you wish to use Ramps, mark the checkbox at the top of the frame.

The 'Save Ramps' field allows you to save the data

for the current sheet to the Sheet Database. This button has the same effect as the 'Save Ramps' button in the left navigation panel [2].

11

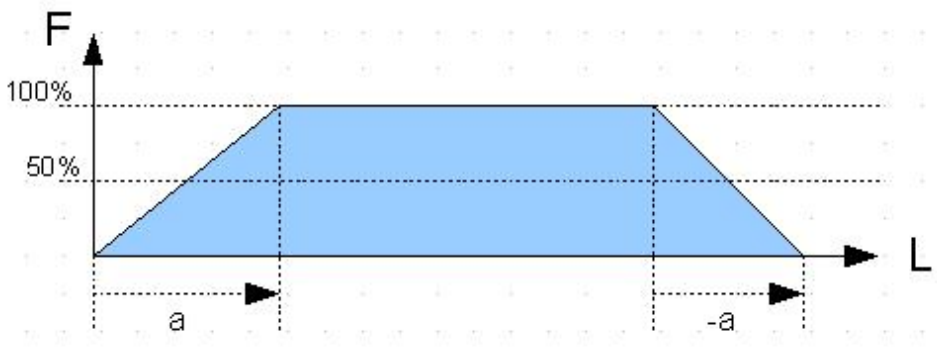


Enter the length of the cut, and the cutting speed as a percentage of maximum speed, for Ramps in the 'Acceleration' and 'Deceleration' frames.

A lower limit can be given for speed when decelerating. This allows you to cut with no warping or deformation at corners, for example.

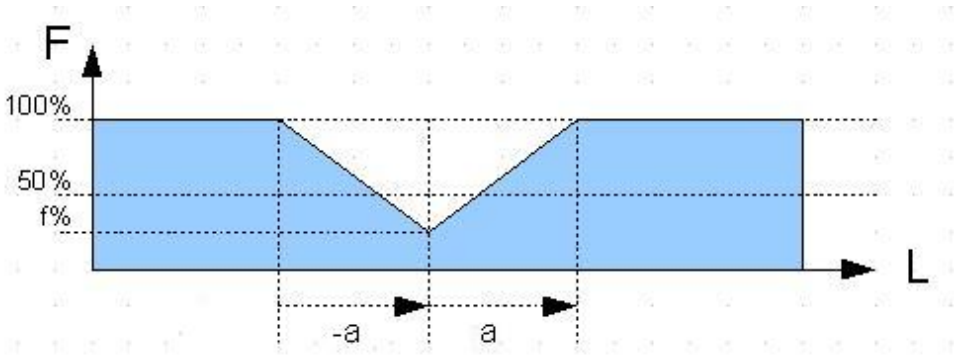
The 'Lead-in speed' frame allows you to give different speeds for lead-ins and lead-outs.

12



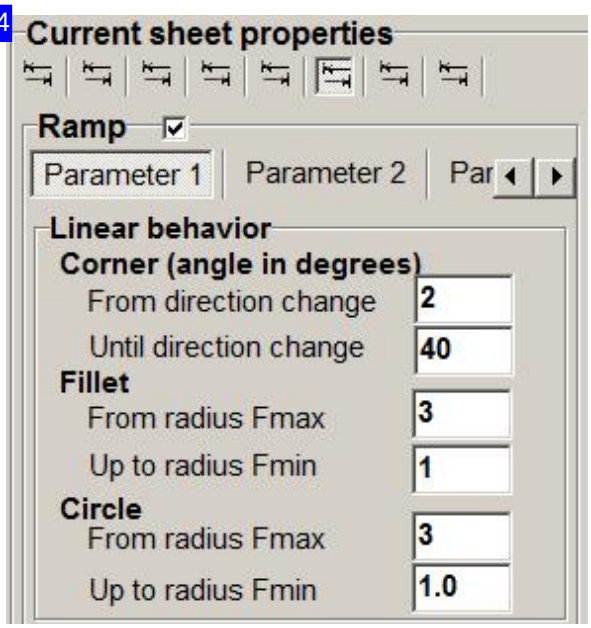
A ramp is defined as the gradation of speed when cutting. To start with, the head accelerates (a) and at the end, decelerates (-a). The gradation of speed is linear and controlled by the machine. The rate of increase is constant, but can be controlled by entering speed levels (F) und the length of the cuts (L) in the 'Parameter2' line.

13



To adapt cutting, for example, to cutting in a corner of the machine, a lower speed limit (f) can be set for deceleration (-a). The following cut can then be carried out with a new speed level or renewed acceleration (a). Speed levels (F) and the corresponding cut lengths (L) can be input in the 'Parameter2' frame.

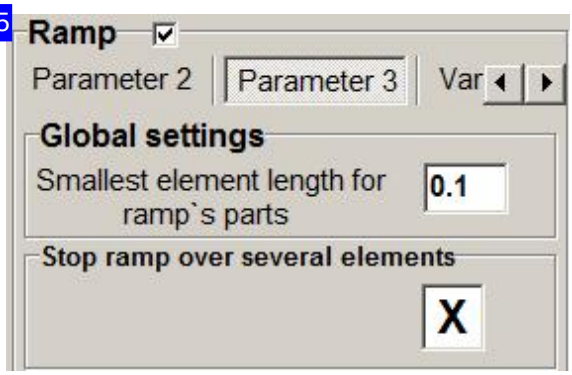
14



You can set the limits for a ramp-cut in the 'Linear behavior' frame.
A corner is defined by the degree of direction change. up to a minimum change of direction, the speed will remain constant. Above this value, but below the next level set, a change of direction will be cut at a gradated speed, and above this value, the cut will be made as a corner.

You may set the radii of rounded corners or circles from which to cut at full speed and below which to cut at minimum speed.

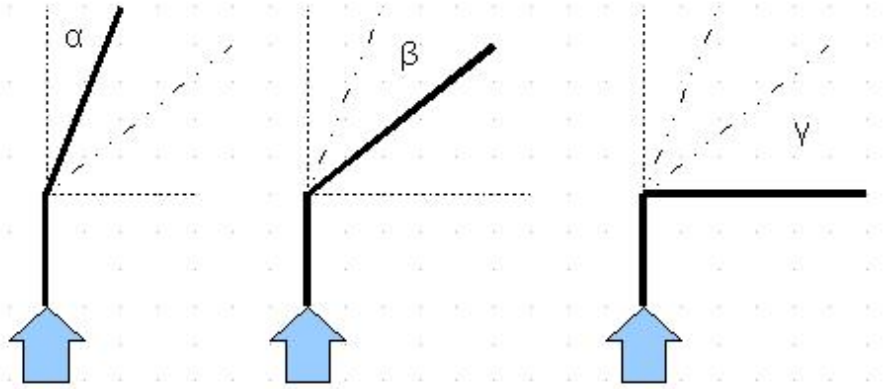
15



The 'Global Settings' frame allows you to set the length of the smallest element for which a gradation may be made.

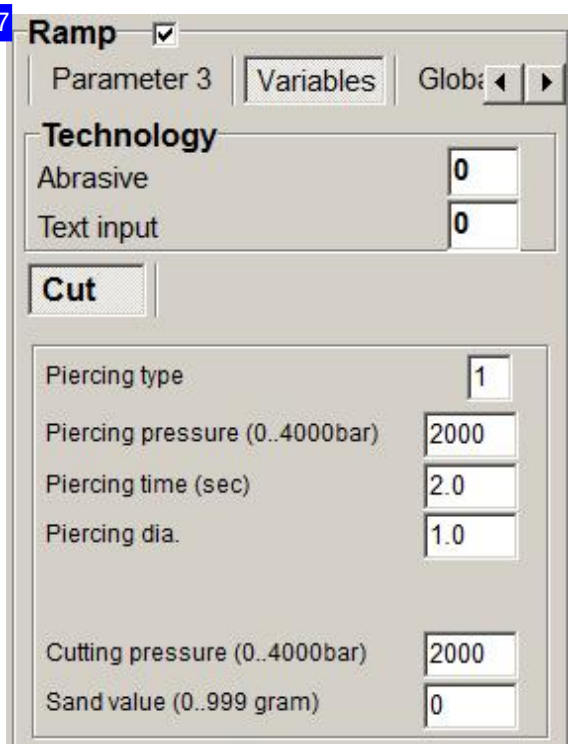
To bring the machine to a stop in appropriate way, a 'Stop Ramp' (deceleration) should always be enabled over multiple elements. Mark the bottom right checkbox (default) to prevent an abrupt stop!

16



The linear speed is defined by the degree of direction change. The cutting speed will be maintained up to a minimum value (). After this value, the speed will be gradated up to a given value (), after which a corner will be cut.
The limiting values can be set in the 'Parameter1' frame.

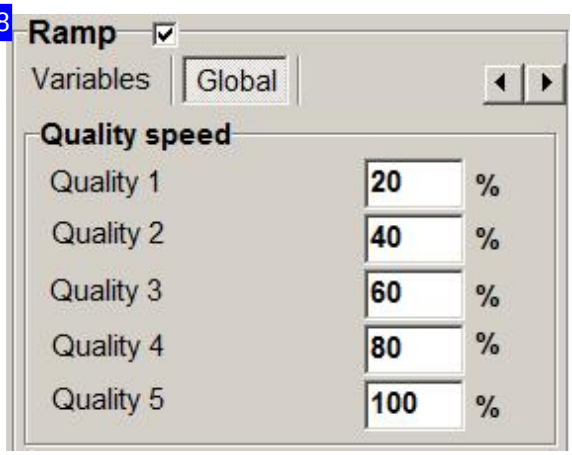
17



Enter whether abrasive media are to be used and whether to cut with low pressure in the 'Machine data' frame.

You can make inputs about cut-ins, cutting pressure and the abrasive medium in the bottom frame.

18

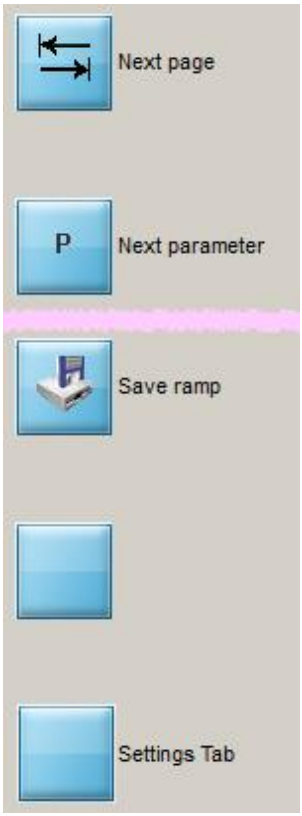


The 'Quality speeds' frame allows you to set 5 gradated speeds corresponding to the various quality levels.

Allocation of a quality to a contour or contour element is done in the 'Machine data windows'.

The allocation of line colors to quality levels can be done by the Administrator.

2



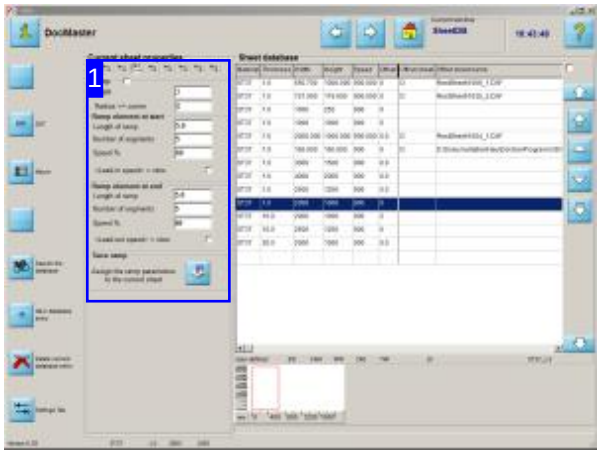
The top button allows you to toggle between the frames on this page.

The second button tabs through the input fields on the current frame.

The 'Save Ramps' button has the same effect as the button at the bottom right of the 'Current sheet parameters' frame [1], they both allocate the current settings to a sheet in the Sheet Database.

Click the bottom button to go to the next tab in the 'Current Sheet Parameters' tab [1].

Settings for Standard Ramps.

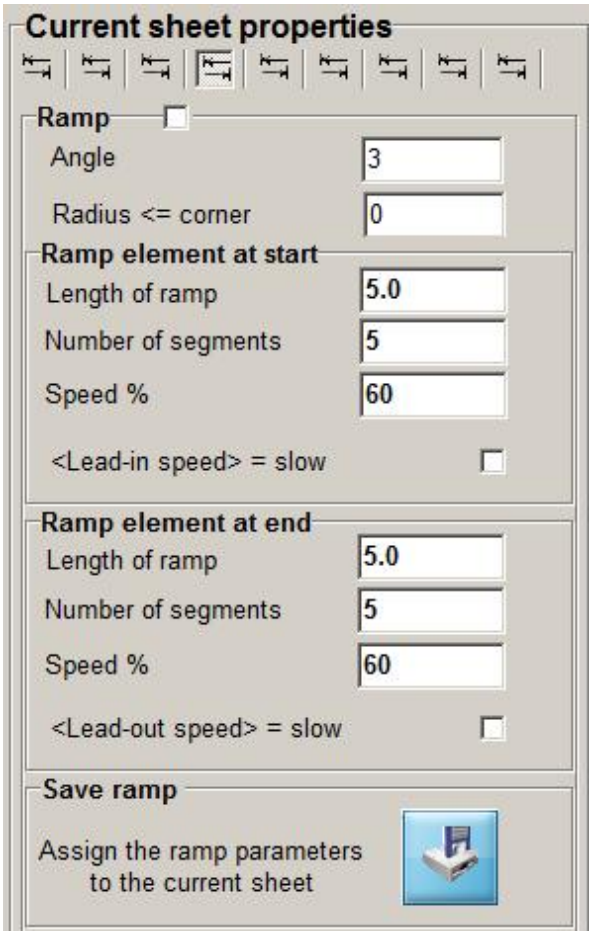


'Ramps' giving customized control when cutting lead-ins and outs and corners can be used to allow adjustment to the peculiarities of specific machines.
Ramp settings are allocated to a sheet.

Enter the settings for cutting ramps in this screen [1].

- Linear behavior
- Acceleration, Deceleration, Lead-in speeds

1



You can use ramps to adjust cutting settings eg. to the corners of a machine.
Enter your Ramp's length and speed (as a percentage of maximum speed) in the frames labeled 'Element at start' and 'Element at end'.

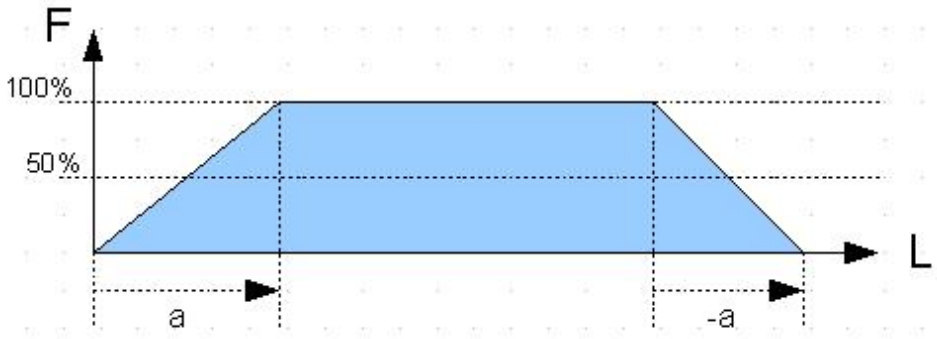
A corner is defined by the Change of direction. Up to a certain change of direction, your machine will continue to cut at a constant speed, above that speed a corner will be cut.

You can enter a limiting radius for rounded corners, below which the torch should slow and above which it should continue at a constant speed.

You can set the machine to use slow speed for lead-ins. Select the relevant checkbox to enable this function for the start or end.

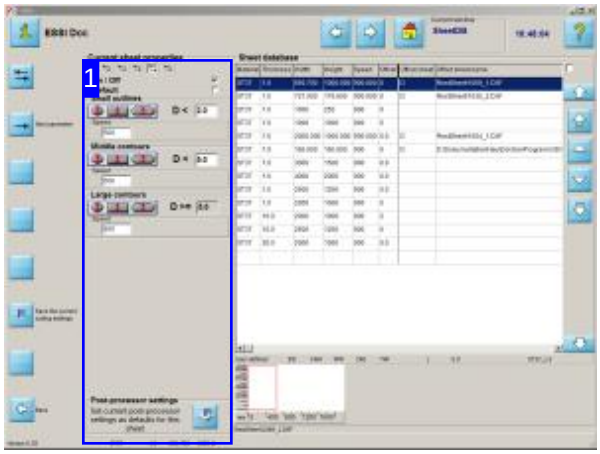
The 'Save ramps' field allows you to save the current settings to the sheet database.

11



A 'ramp' is defined as a gradation in head speed during cutting. The speed is increased at the beginning (a) and the brakes are applied at the end (-a). The gradation is controlled by your machine and can be stepped by entering segments.

Settings for Quality Steps



Setting 'Quality steps' allows you to customize the program to the special demands of plasma cutting, allowing for a suitable control of cutting and marking.

This function depends on the loaded postprocessor.

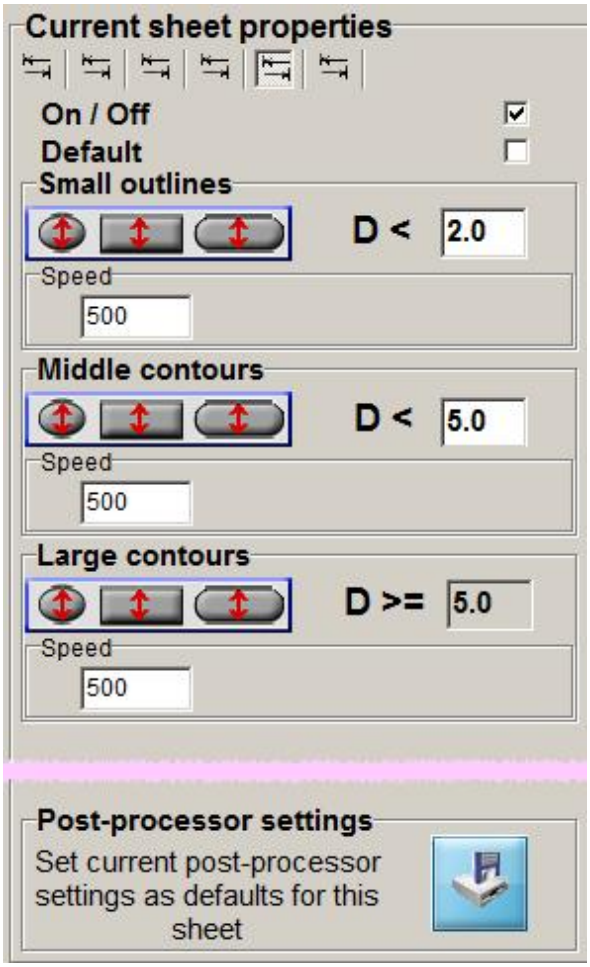
Enter the settings for your sheet's quality steps and markings in this screen [1].

You can set the cutting speed and kerf dependant upon contour size. Available options are:

1. Ignore - uncheck the 'On/Off' checkbox for this setting.
2. All Contours - mark the 'Default' checkbox. This selection opens an Input frame where you can set defaults.
3. Small Contours D < 1st limit.
4. Medium Contours D < 2nd limit.
5. Large Contours D >= 2nd limit.

The limiting value is the smallest side of a given contour!

1



Set the values for quality steps for cutting contours here.

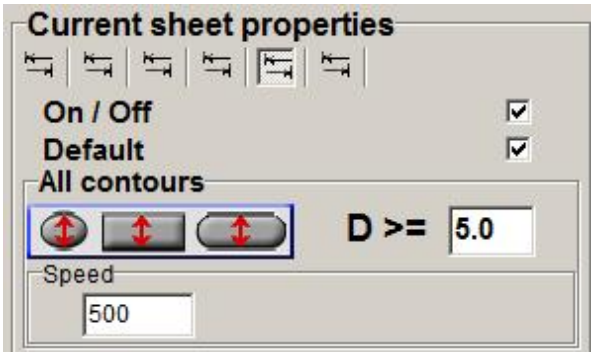
Enter a value for each contour type. Entering a zero means that the program should ignore this value.

Enter the value in mm for kerf, the speed should be entered in mm/second.

Each contour type can be allocated a different table, which is set with varying machine data dependant on machine type. Enter the corresponding 'T Number' for your machine.

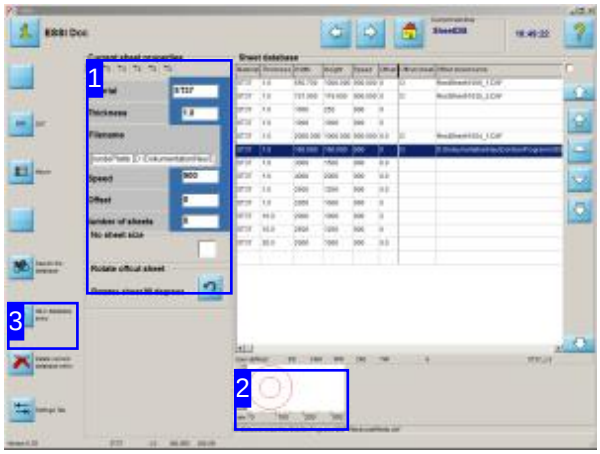
Click the bottom button to allocate the settings to the current sheet in your database.

2



If you have selected 'Default' then you can use this frame to enter values for all contours. The values have the same meaning as when using contour-dependant settings.

DXF Offcut Sheets with Internal Contours - round sheets



If your Sheet Database contains offcuts with internal contours or round sheets, a field will be shown in the 'Current sheet parameters' frame [1] containing the relevant information.

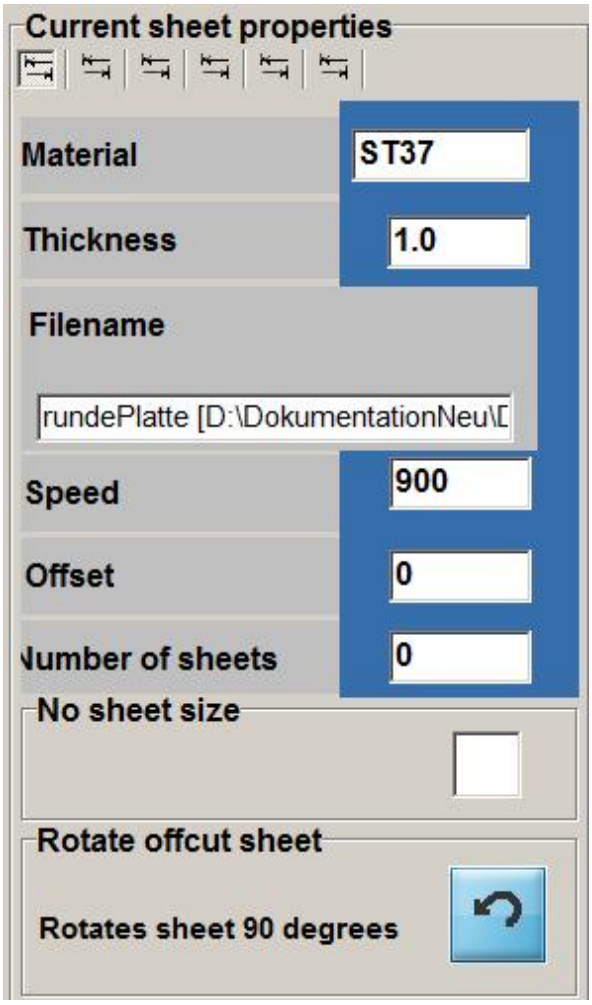
Your system must have the relevant permissions set in the 'POSTPR.INI' file in order to process DXF offcuts or round sheets in the Database.

If you wish to save a new sheet to the database [3] you can choose the form of the sheet. Options available are:

- Rectangular sheets
- Round sheets
- DXF offcuts

An extra button will be added to the header panel in the 'Current sheet parameter' frame [1] with which you can access the screen for defining a DXF offcut. If you wish to create a DXF offcut, switch to this tab and use it to define your sheet.

1



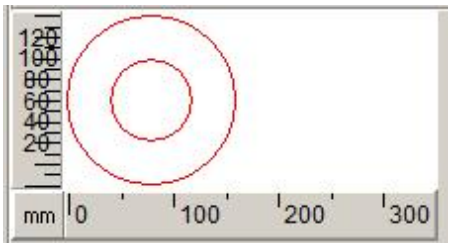
If your database contains DXF offcuts, they will be highlighted by a corresponding display in the parameter fields. There are distinctions between:

- Rectangular sheets
- Round sheets
- DXF offcuts

The sheet type is defined when saving the sheet to the database. If the sheet is a DXF offcut, the filename will be shown in the 'Filename' field and a button will be shown which you can use to rotate the offcut. This allows you to turn rough edges away from the offcut's null point.

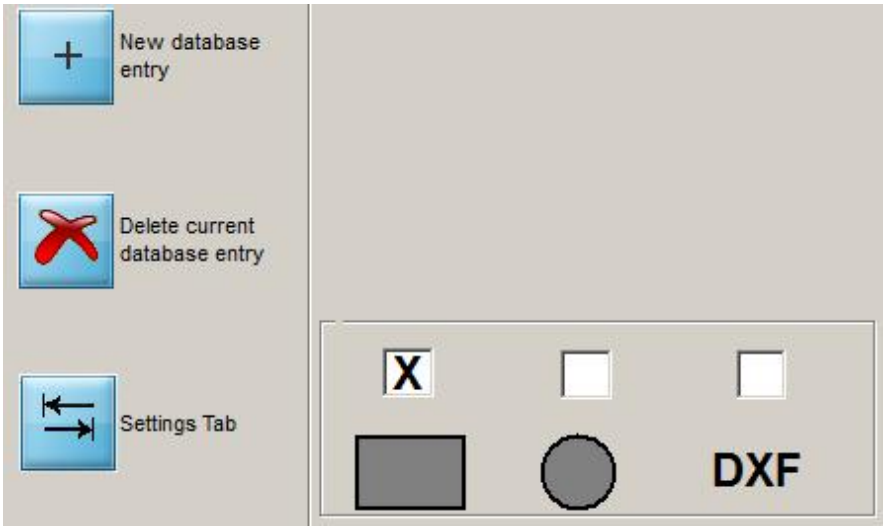
A button is added to the top button panel with which you can access the sheet definition screen.

2



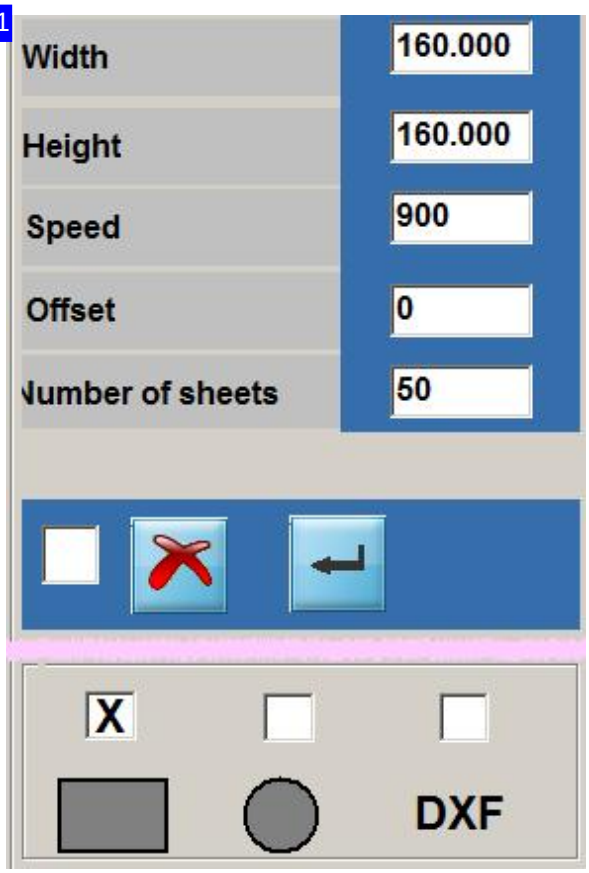
This frame shows the sheet selected from the list with its contours.

3



To enter a new rectangular, round or DXF offcut sheet in the Database, there is a choice of forms offered at the bottom of the 'Current sheet parameters' frame. Mark the corresponding checkbox to the type of sheet you wish to define. Click the 'new entry in the Database' button to create a sheet with the values entered in the parameter cells [1].

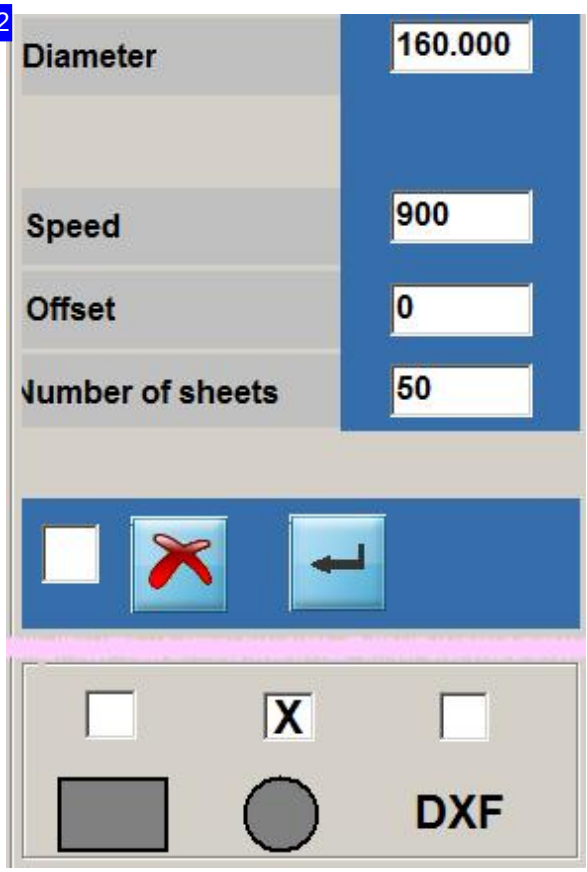
11



If you select a rectangular sheet, you need only enter its height and width.

Press the 'Enter' button to the right to save the sheet to the database. The left button aborts the function.

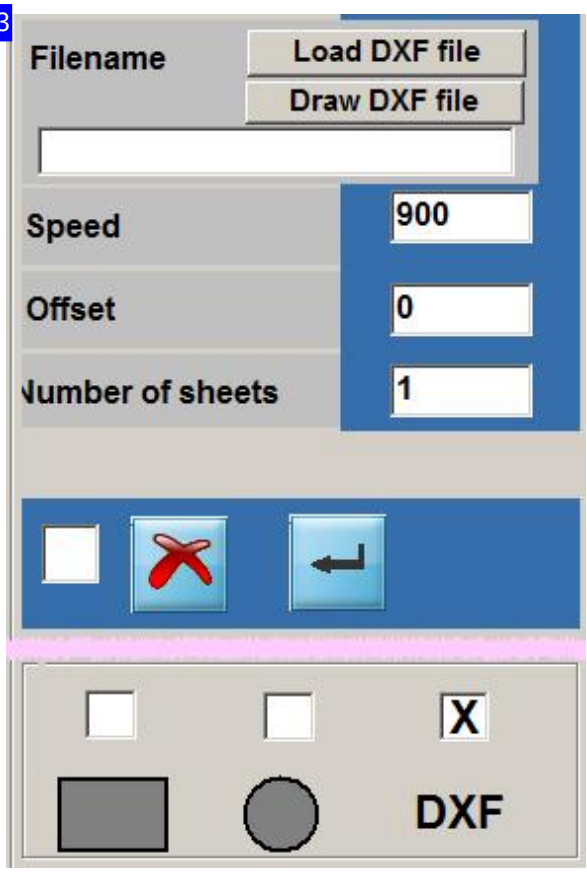
12



If you select a round sheet, you need only enter its diameter.

Press the 'Enter' button to the right to save the sheet to the database. The left button aborts the function.

13

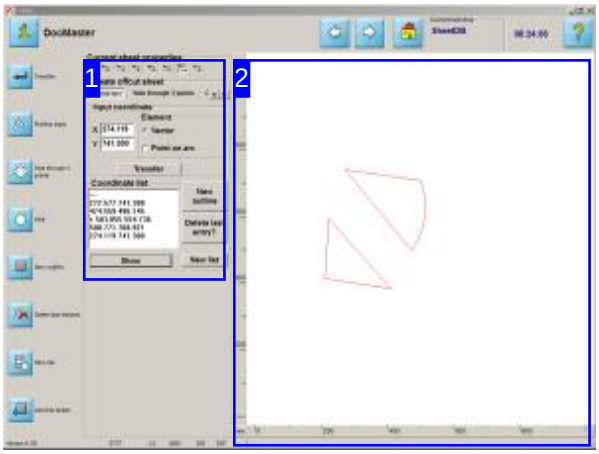


If you select a DXF offcut, you must specify the DXF file describing the sheet's form. Click the 'Load DXF file' button to open a file manager window to select the DXF file. Click 'Draw DXF File' if you wish to draw the offcut using the Sketcher (Option). The Sketcher has its own online-help system.

You may also define your own format in the supplementary tab.

Press the 'Enter' button to the right to save the sheet to the database. The left button aborts the function.

Defining DXF offcuts (exclusive)



Defining your offcut using a DXF file offers a further method of managing your offcuts. This allows you to place contours onto a sheet which, when nesting, should either be avoided or exclusively used (round sheets). If such a sheet is selected from the Database, you will only be able to use the automatic nesting routine, and you will not be able to use multiple cutting torches! This function must be enabled in your post-processor settings.

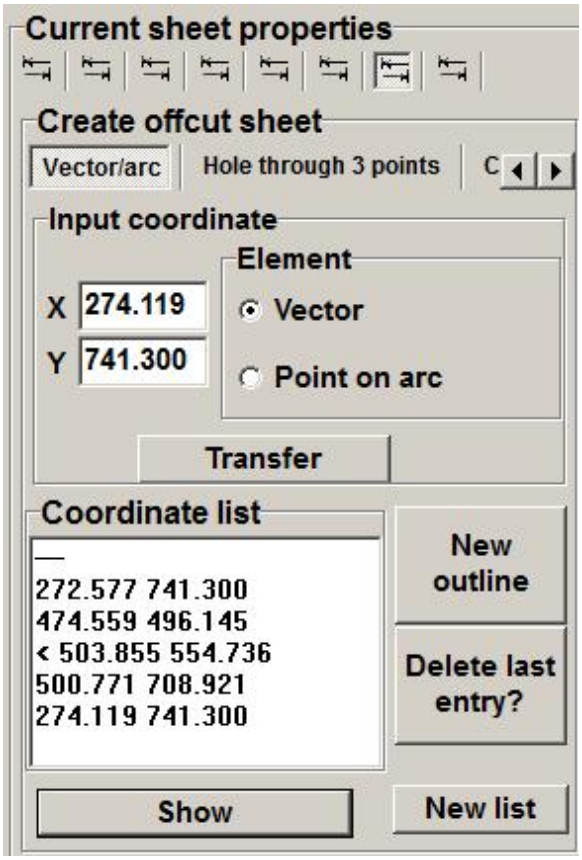
A DXF format offcut is defined by its individual contours. The contours are assembled in the coordinates list [1]. It is possible to combine lines to line groups (polylines) and enter arcs and circles in the 'current parameters' [1] screen.

The sheet and its contours are shown in the preview [2]. You can set the positions of the individual points using the mouse. Click at the relevant point.

Click the bottom button in the navigation panel to use the offcut sheet.

Select the 'Coordinate input' function from the 'Parameters' tab. The buttons in the left navigation panel have the same functions as the buttons in the work frame

1



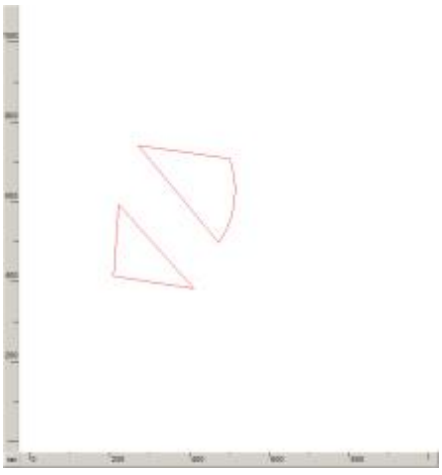
The coordinate list allows you to assemble individual contours. Click 'New List' to delete the list's contents and start from scratch.

To create a contour, enter the coordinates of a point in the 'Vectors/Arcs' tab. Press 'Accept' to transfer the point to the contour list. Construct a zigzagged line and keep going until you have the correct closed contour.
Enter the next point on either a vector (V) or an arc. An arc requires a V-start point, an arc point and an V-end point, in that order.
Press the 'New Contour' button to place further contours on the sheet. You can also enter circles as contours; switch to the 'Define hole by 3 pts' or 'Circles/holes' tab to do this.

If you wish to preview your contour, press 'Show' to show the selected sheet in the preview window [2].

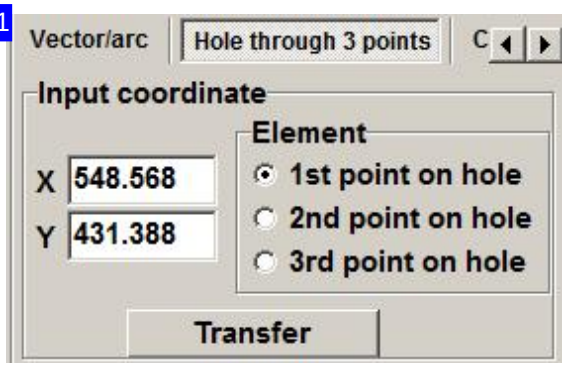
In order to be able to use the offcut, you must save it in the Database. Press 'Save' to open a file manager box to select the location and name of your DXF file.

2



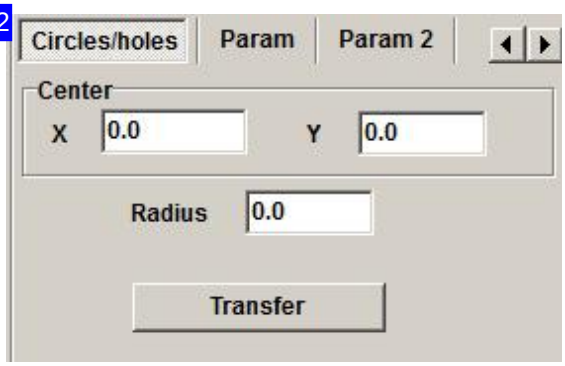
This frame shows the sheet and contours; click 'show' below the co-ordinates list [1]. You can also set the construction points by clicking with the mouse to enter the co-ordinates in the entry fields and list. Select the transfer type in the 'Parameters' tab. The position transfer from a machine laser can be normalized in the 'Param2' tab.

11



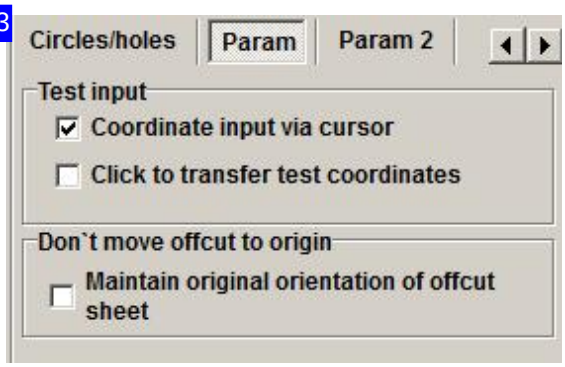
Round contours can be defined using 3 points. Enter the 3 points and click 'apply'.

12



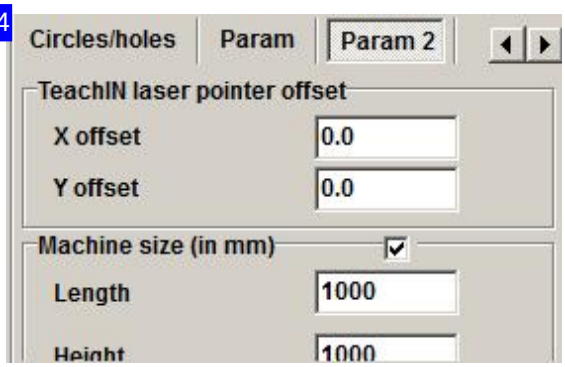
You can enter round contours here, and add them to the contour list. Enter the coordinates of the circle's center and its radius, and press 'Accept' or mark the position in the preview [2].

13



For position transfer using the mouse you can select between using the cursor position for individual point transfer, or sequential transfer with each mouse click. Mark the corresponding checkbox.

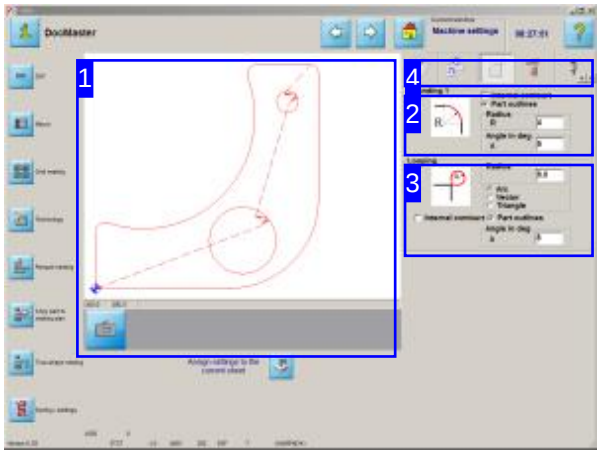
14



The 'Param2' tab allows you to read the coordinates of your machine's laser pointer. This function is machine-dependent.

Machine Data

Rounded corners and loops.



This screen allows you to automatically set filleting or looping properties for your workpiece's corners.

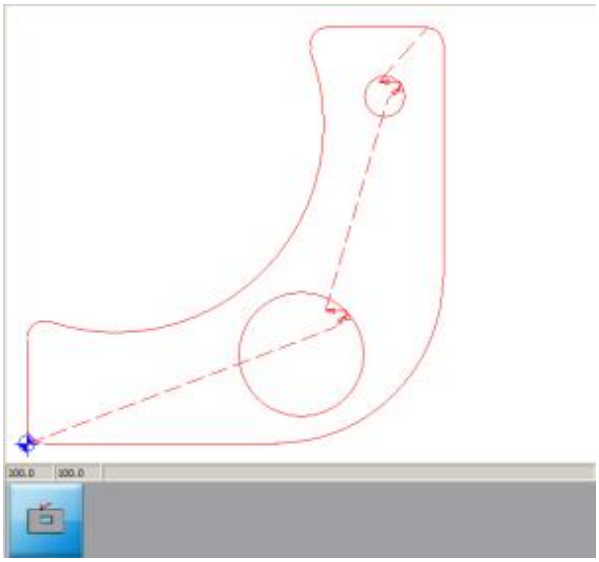
You can choose between rounding and looping when processing your workpiece's corners. You define what is considered a corner by giving an angle in degrees which describes the deviation from a tangential intersection of two elements to consider a corner.

cncCUT automatically allocates the machine data to all corners with just a simple button press.

4

The tab panel in the technologies' window allows you to set the various lead-ins and machine data for your workpiece's contours. This tab allows you to set loops and roundings for your part's corners.

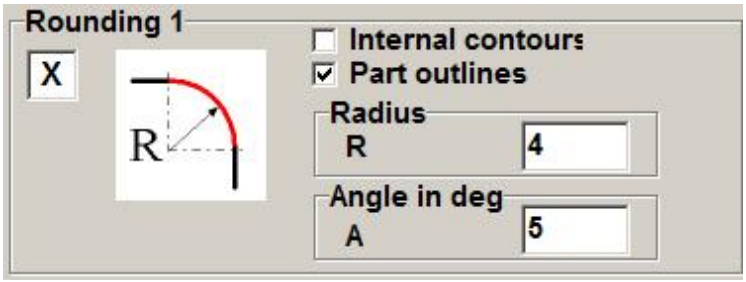
1



Here you can see the preview of a workpiece with roundings or loops. To better see details in the display, zoom by clicking the 'Zoom' button to the left.

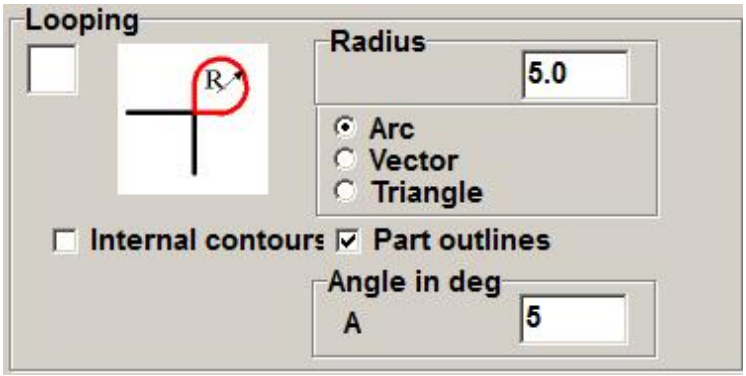
If you make changes in the Roundings [2] or Loops [3] frames, you must click the 'Enter' button to the right to confirm and apply the changes.

2



Mark the contour type on which the rounding should be made. Enter the radius in mm in the 'Radius' cell, and the deviation in degrees from a tangential intersection that must be met before a rounding is to be made.
If you mark the checkbox at the top left, a confirm button will appear in the preview frame [1]. Confirm your changes to make them effective.

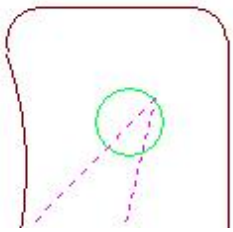
3



Select the type of loop (arc or vector) and mark the contour type to use this type of loop on. Enter the

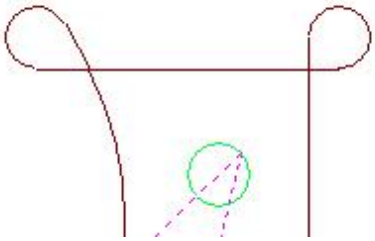
radius in mm in the 'Radius' cell, and the deviation in degrees from a tangential intersection that must be met before a loop is to be made.
If you mark the checkbox at the top left, a confirm button will appear in the preview frame [1]. Confirm your changes to make them effective.

11



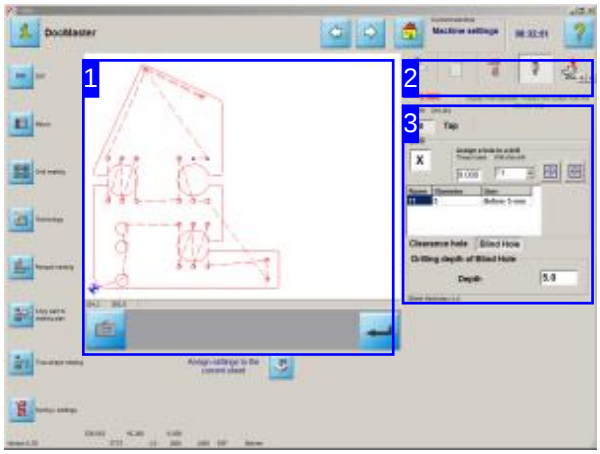
Roundings on a workpiece's corners.

12



Loops on a workpiece's corners

Drilling, Center-Punching, and Cutting Threads.

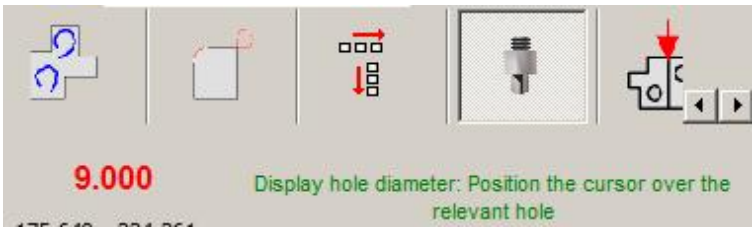


When drilling and cutting threads, the values from the current sheet's parameters are taken by default. This screen allows you to change those settings.

If different values are present in the forms of your drawing than in the sheet's parameters, those values can be overwritten here and a tool can be assigned a new diameter.

To apply your changes, you must press the 'Enter' button at the right of the screen. The workpiece will then be assigned the new values.

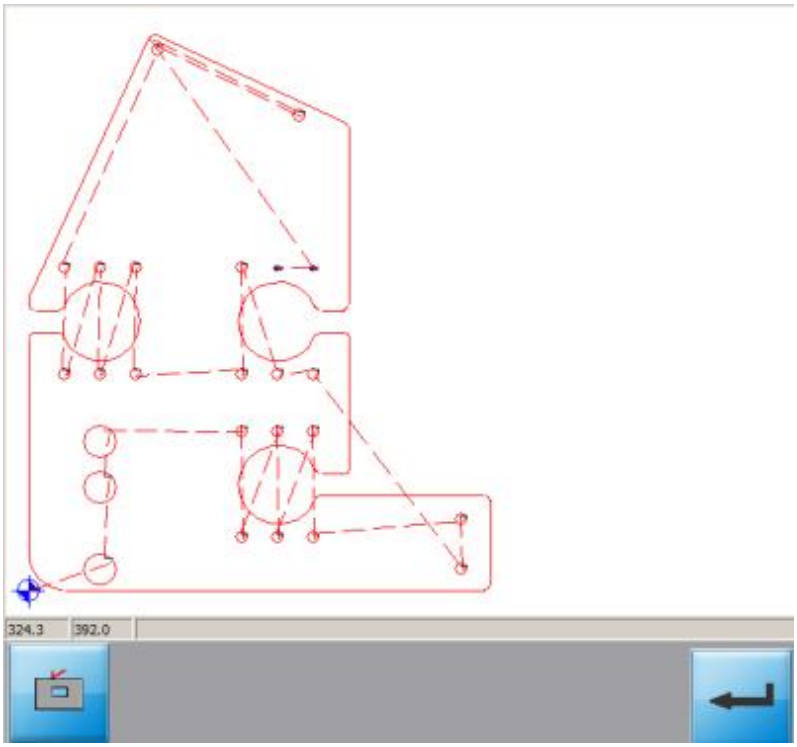
2



This tab takes you to the screen for setting up drills and taps.

The inputs apply generally for all holes of the same size. If you wish to edit an individual hole, use the cursor to mark the hole in the preview. You can then limit your work to this one item.

1



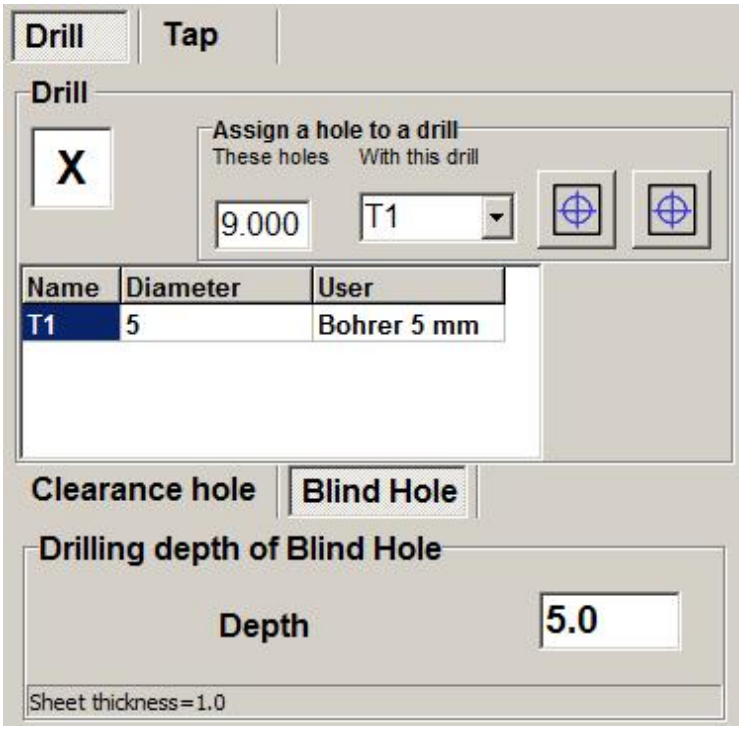
Here you can see a preview of a workpiece with drilled holes and threads. To better see Details in the drawing, you can zoom by clicking the preview window's 'Zoom' button' to the frame's left.

When making changes to the tools list, you must click the 'Enter' button to the right to apply your changes.

11

You can see a drilled hole to the left, a thread in the middle and a punch-mark to the right in this detailed view.

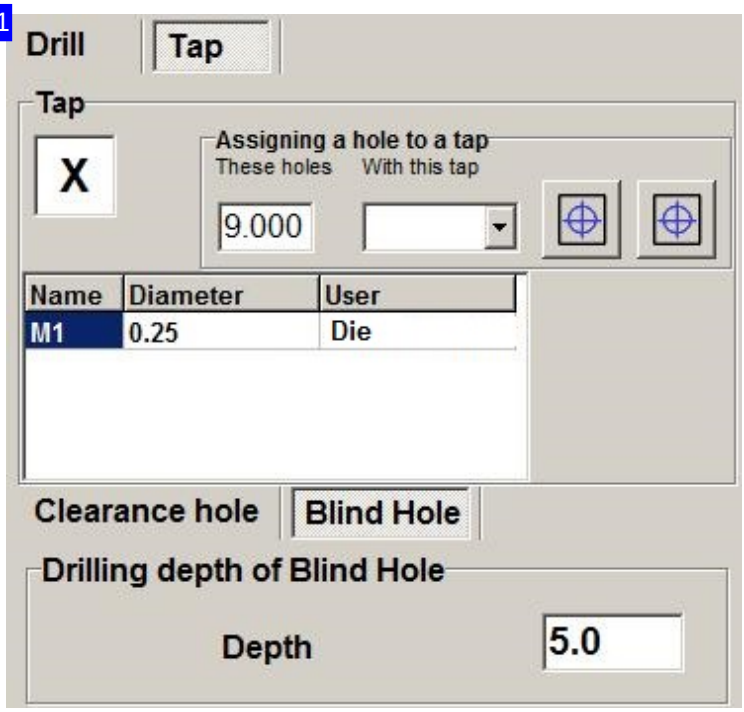
3



Select a drill from the drop-down list at the top-right of the 'Assigning a drill a hole diameter' frame, and assign its diameter in the cell to the left. Click the first button to the right to place the drill in the tools list below.
Mark the top-left check box if all holes in the list are to be drilled, else click the second button. If your workpiece has holes which match the tools you have defined, then they will be used. Edit the depth of the hole in the bottom frame

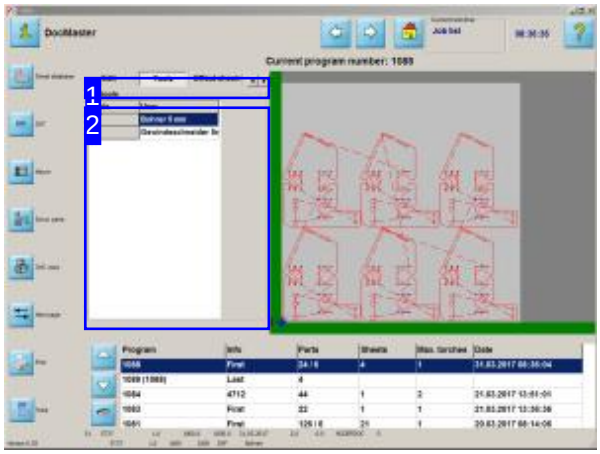
Select the tab 'Tap' for setting up taps.

31



Select a tap from the drop-down list at the top-right of the 'Assigning a tap a hole diameter' frame, and assign its diameter in the cell to the left. Click the first button to the right to place the tap in the tools list below.
Mark the top-left check box if all threads in the list are to be cut, else click the second button. If your workpiece has threads which match the tools you have defined, then they will be used.

Tools in the Job List.



If a nesting plan contains tools, these will be shown in this screen.

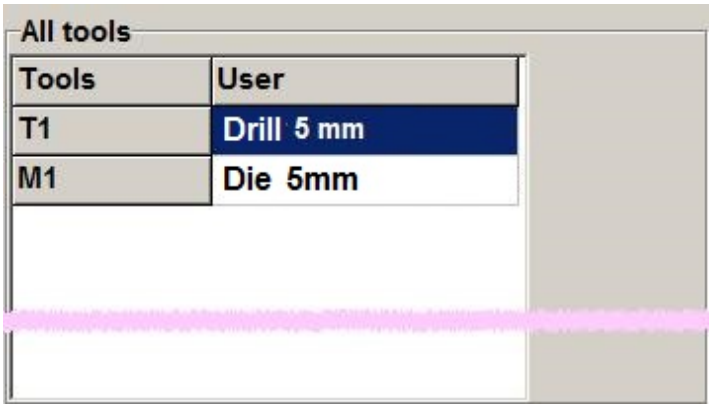
An allocated tool with a user name (for example 5mm Drill) can be selected from the 'All Tools' list [2] using its identifier (T1, M2, etc.)

1

Click the 'Tools' button to access the tools list.

If you are using a machine with multiple cutting torches then there will also be a 'Torches' button present.

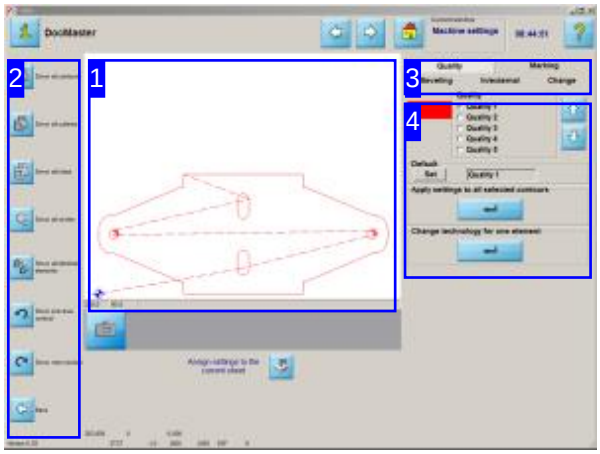
2



This frame shows you the tools with their names.
The tools will be sorted in the sequence: punches, drills, taps.

Cutting Technologies

Quality levels for contours.



This screen allows you to examine individual contours or groups of contours and set the Quality , Lead-ins and Cutting side for individual contours.

These buttons are optional and post-processor dependant.

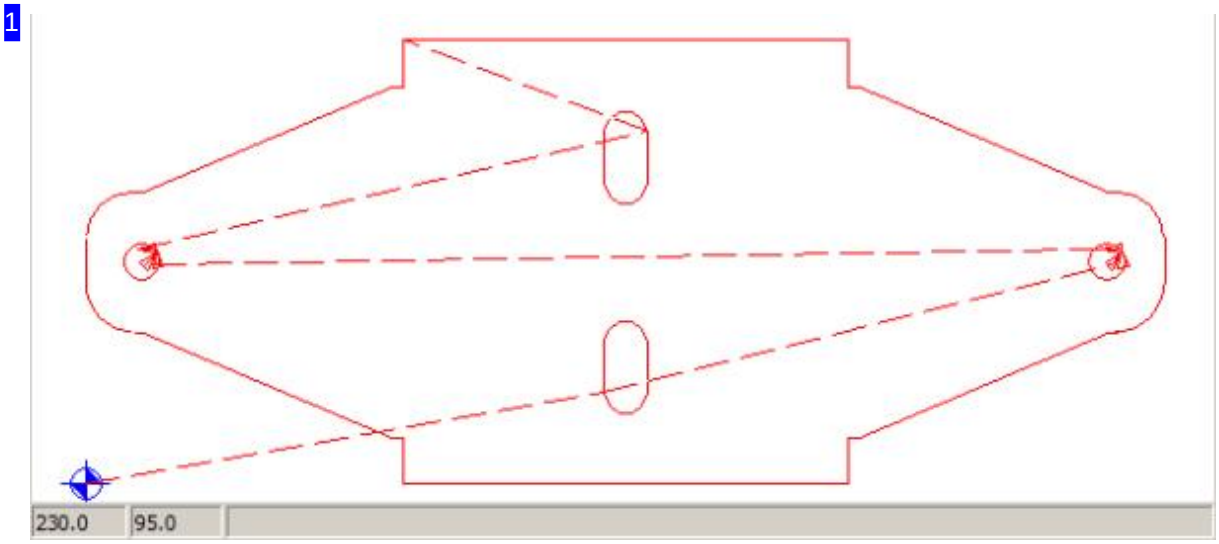
The default settings for quality levels are made in the Sheet Database.

Different settings can be allocated to the various contours of a workpiece. According to your selection from the header panel [3] a page will be offered in the main frame [4] for you to work from:

- Quality
- Cutting side
- Lead-ins
- Markings
- Chamfer

The navigation panels [1] and [5] allow you to navigate your contours, or contour groups.

The details will be shown in the preview [2] according to your selections. Click on the preview to switch into the 'Zoom' window and take control of the exact settings.



This frame shows you a preview of the contours according to your inputs in the course of using the program.

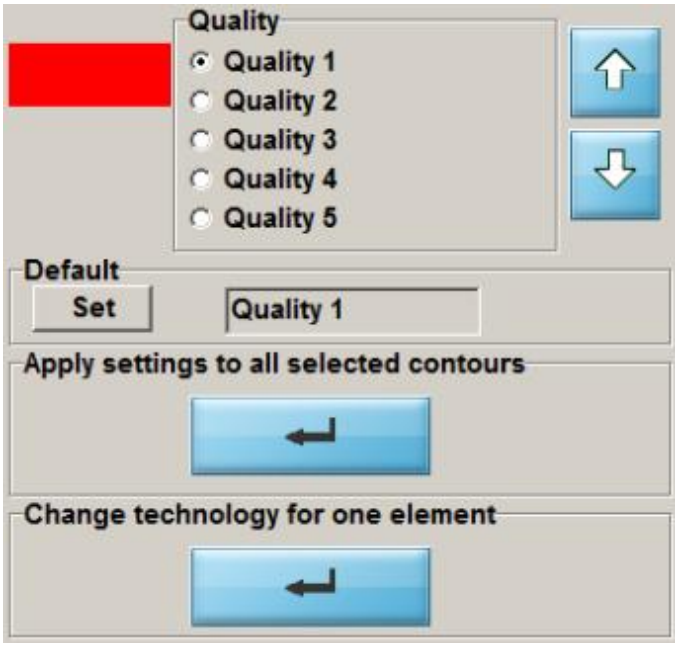
The contours are displayed according to your selection in varying form and color.

3

These buttons allow you to switch to the screens for:

- Quality - for setting the cutting quality resolution.
- Internal/External contours - for setting the side to cut along.
- Change Lead-ins - set lead-in length and position.
- Mark - for marking positions and contours.

4



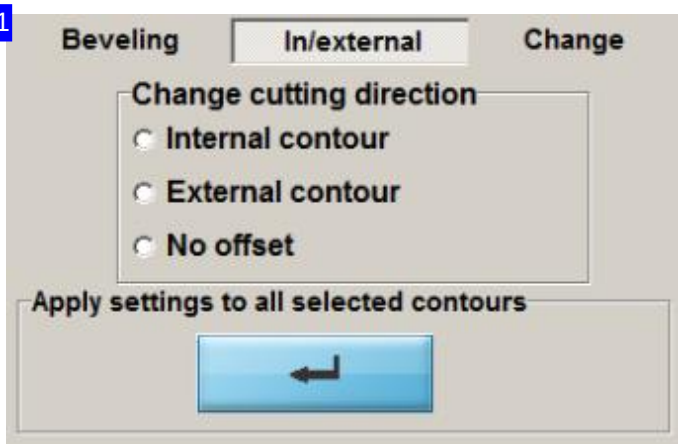
A cut's quality is dependant on the machine's cutting speed. Settings regarding quality levels can be made by the administrator, or from the Database under 'Current parameters'. The program offers a selection of qualities here.

Each quality level is allocated a color, allowing contour elements to be allocated a quality level individually, in groups, or all together.
Navigate to the relevant contour element or group and press the 'Enter' button for 'Settings to all selected contours'. These assignments apply for the current stage of you work.

Upon entering the machine data window the contours will be allocated the quality level saved as 'default'. This value can be adapted from this frame, and saved as default for future program starts by clicking the 'Set' button.

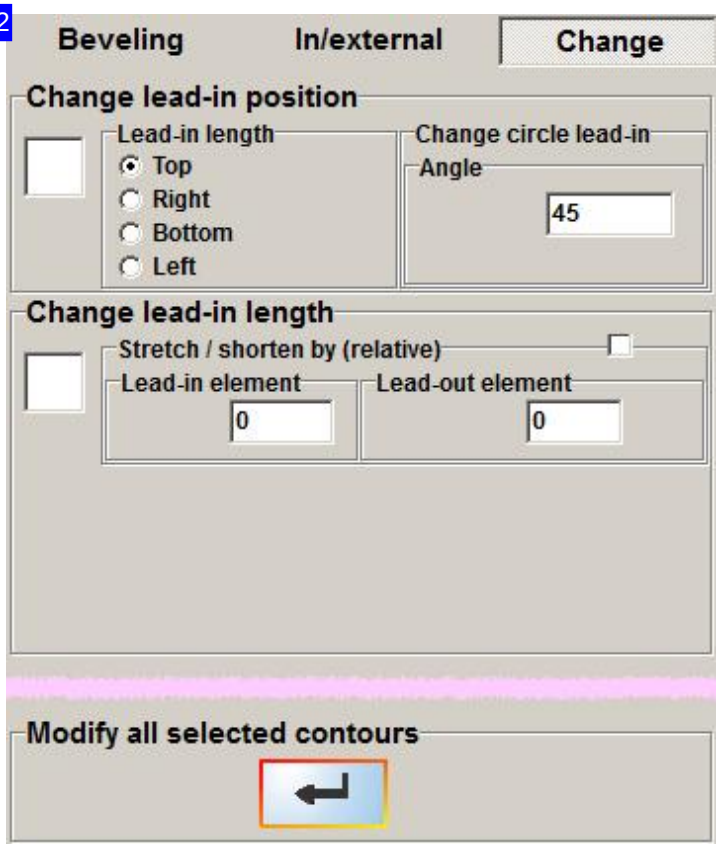
If you wish to set the machine data for one cutting path, click on the bottom button to switch to the 'Zoom' window, from which you can process individual contour elements.

41



You can choose the cutting side for each contour. Use the navigation panel [5] to define which contour or group of contours to be processed, and change the cutting side from the 'Change cutting side' frame. Click the 'Enter' button to apply the changes to all contours selected in the preview [2].

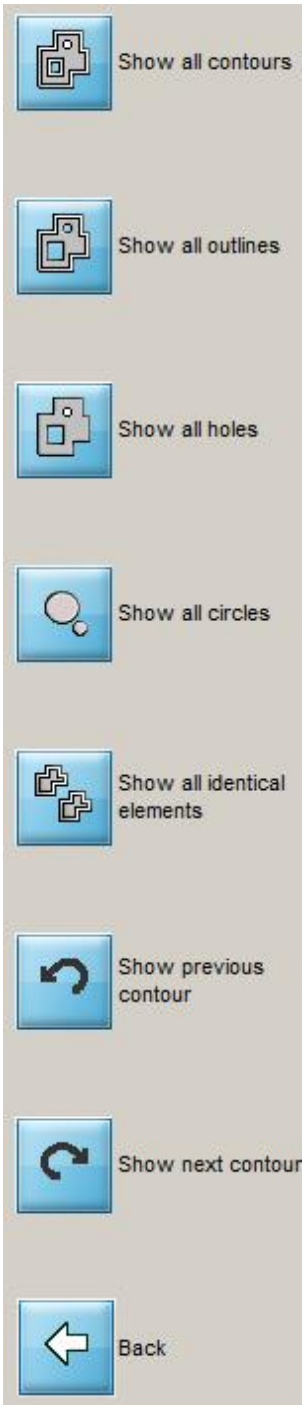
42



Modify the lengths and positions of your lead-ins from this screen. Mark the relevant checkbox and enter a suitable value. Lead-in lengths are incremental; enter a negative value to shorten a lead-in.

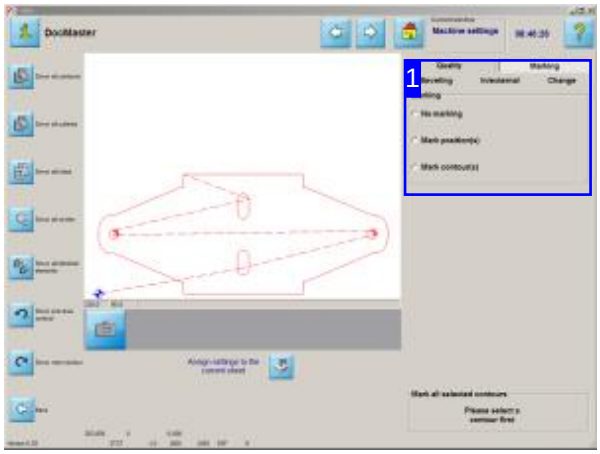
Click the 'Enter' button below to accept your values.

2



You can accurately select individual forms using the navigation panel [5]. The top button will always show the complete workpiece. The subsequent buttons sort the contours by form as shown on the button-face. The bottom button toggles through the groups.

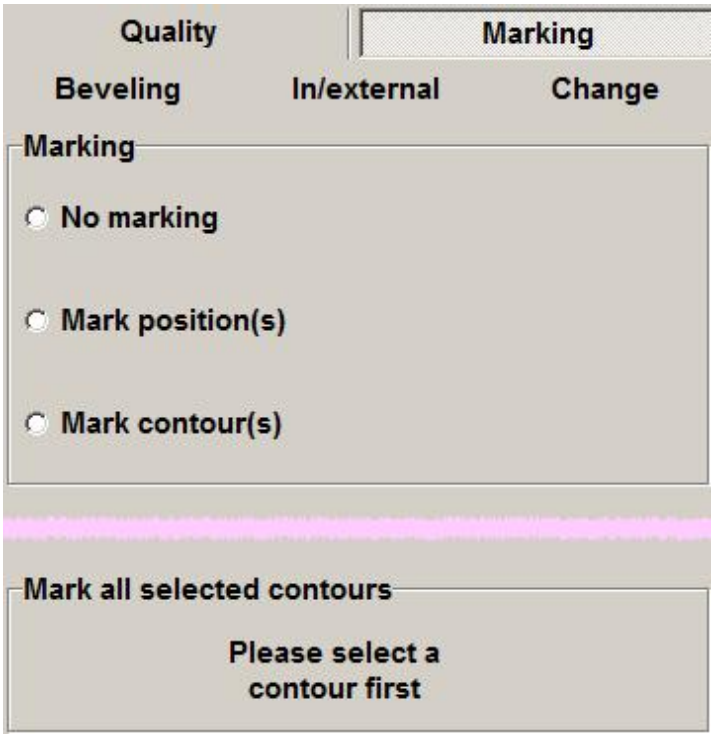
Cutting Settings for Contours - Markings.



The screen allows you to fix markings for individual contour elements. Access is gained to this screen from the 'Quality settings for contours' page. Certain post-processors allow for further settings to be made; you will find more details in those post-processors' own online help files.

You can set markings for individual contour elements here. Select the type of marking and the contour group to which you would like it applied. Click on the drawing board to identify elements.

1



You can use this frame to mark your contours or contour elements.

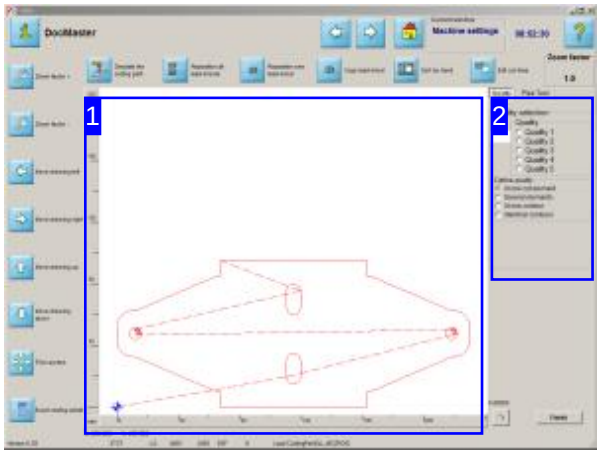
'Mark position' means a punch mark will be made at that point.

To make a marking you must first select a contour. An Enter button will appear in the bottom frame once this is done; click it to confirm a marking.

11

Press Enter to confirm the marking on the selected contours.

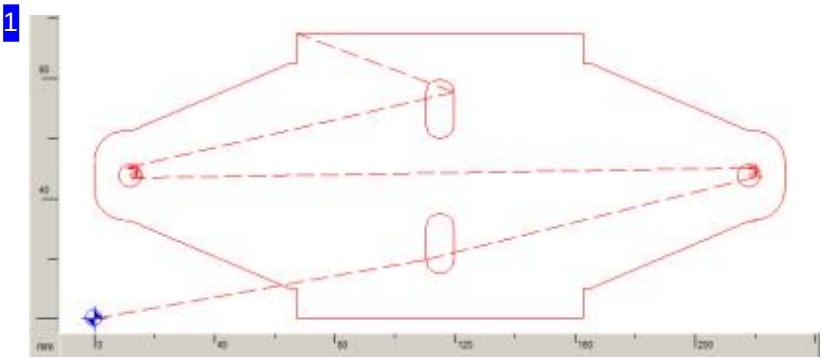
Quality selection for contour elements.



This screen allows you to set the quality level for cutting individual contour elements. Access this screen from the 'Quality levels for contours' screen.

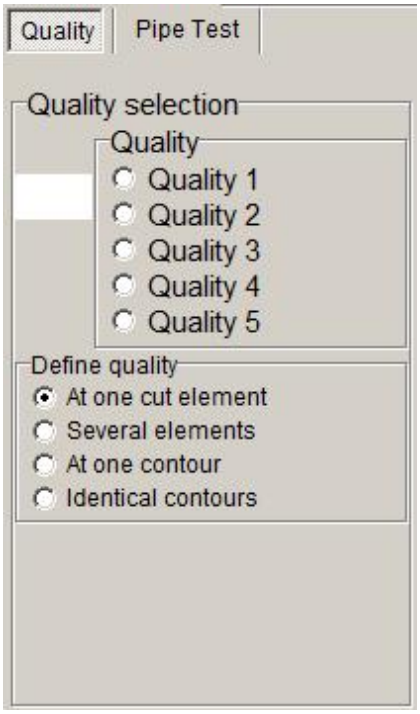
You can set the quality levels for individual contour elements here. Select the quality level and the contour group [2] to apply it to. Click in the drawing [1] to identify individual elements.

The 'Test' tab allows you to check the contours' offsets.



You can allocate a quality level to every part in the drawing. Select the quality level and the contour group [2] to apply it to and follow the instructions for the 'Quality' tab [2] below.

2

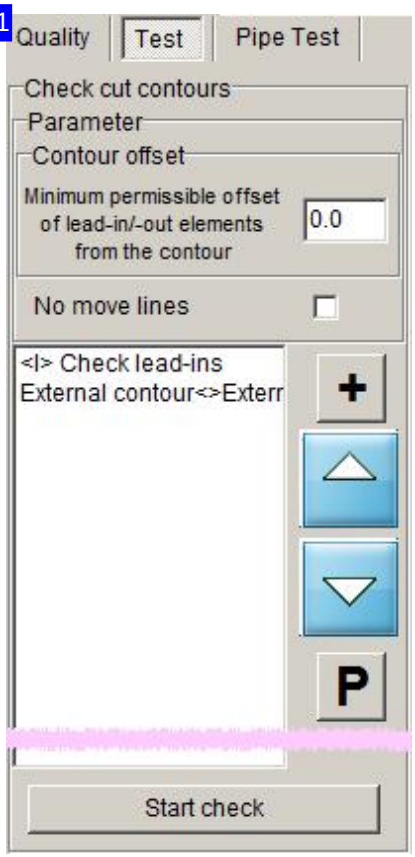


A cut's quality is dependant on the machine's cutting speed. Settings regarding quality levels can be made from the Database under 'Current parameters'. The program offers a selection of qualities here.

Each quality level is allocated a color, allowing contour elements to be allocated a quality level individually, in groups, or all together. The allocation of colors to quality levels is to be done by the Administrator.

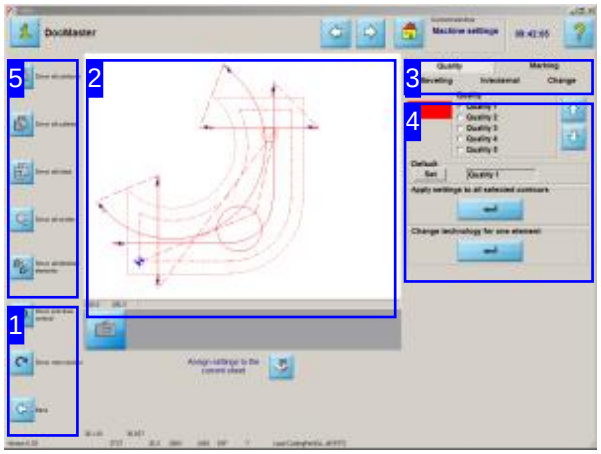
Mark whether you want to allocate a particular quality level to a single element or a whole contour in the 'Set Quality to:' frame. Follow the instructions in the bottom part of the frame next, and click the contour or contours in the drawing to the left [1].

21



You can test the offsets of lead-ins and -outs here and set a minimal offset to your existing contour elements. Any contour-collisions will be highlighted in the list such that you can take individual action. Click the 'P' button for a menu with options for adjusting the lead-in lengths specifically and individually.

Cutting contour settings - Bevels.



This screen allows you to view single contours or groups of contours, and define the Quality, Markings, Chamfers and Cutting side of individual contours.

cncCUT offers an extensive array of options for cutting chamfered parts with the widest range of chamfers. The program then sets the correct sequences and cutting paths (loops) for the different chamfer angles for you.

A workpiece's contours can be allocated different properties. According to your selection you will see a different screen in the main window [4] for processing your part. Access these tabs using the header panel [3].

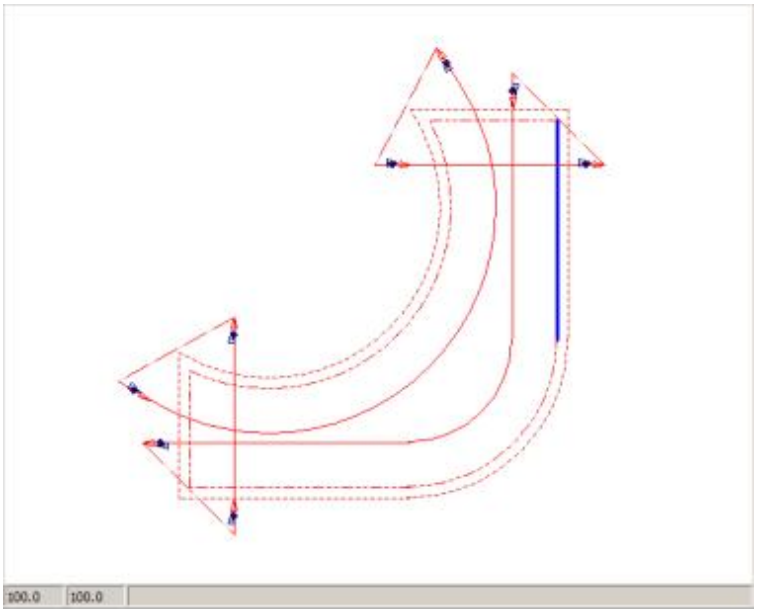
- Quality
- Markings
- Chamfer
  - Elements
  - Loops
  - Cutting Paths
  - Options
- Cutting Side

'Quality' and 'Cutting side' are described in their own page - 'Quality levels for contours'.

Use the navigation panels [1] and [5] to navigate your contours and contour groups.

Details of your selection are shown in the preview window [2]. You can use the mouse's scroll wheel to zoom in and out on the preview to check the settings entered.

2

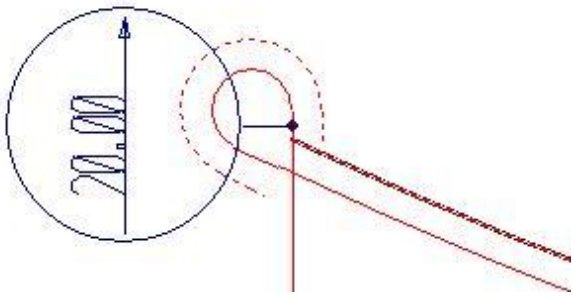


This frame shows you a preview of the contours according to your settings.

According to your selection the contours will be shown in varying sizes and colors. Individual elements are highlighted when working on their chamfers so that you can more easily focus on them.

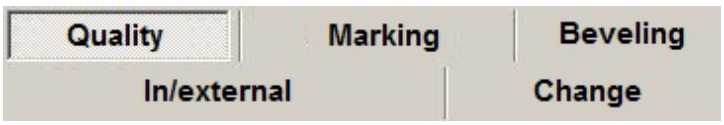
Your elements' lead-ins and lead-outs allow detailed examination of their forms and sequencing. Use the mouse's scroll wheel to zoom in on an element for a detailed view.

21



Detailed view of a chamfer transition. The circle shows the chamfer angle at the turning point and the cutting direction. The chamfer's top edge is represented as an unbroken line, the bottom edge (even if only virtual) as a dashed line.

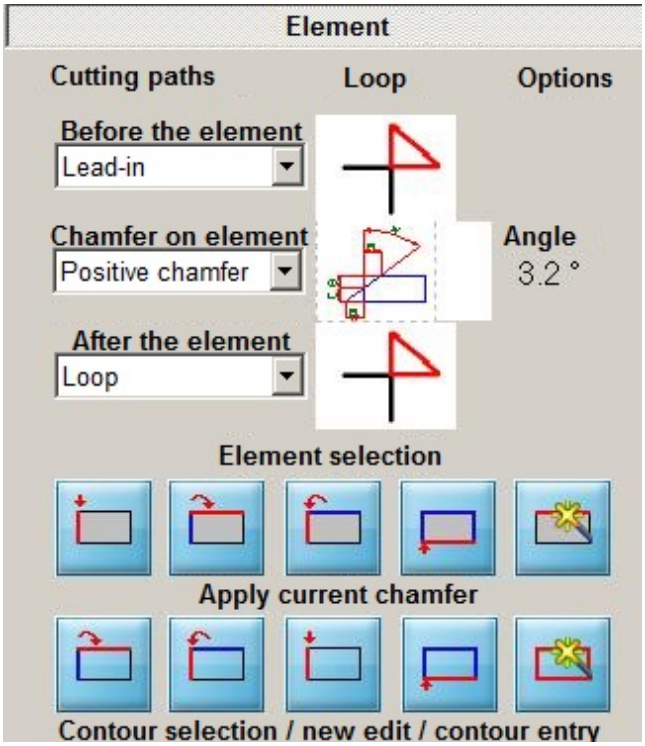
3



These buttons allow you to access the screens for:

- Quality - for the resolution of the cutting quality.
- Markings - Set an element as a marking.
- Chamfer - To set chamfer cutting on an element of a contour.
- Internal/ external contours - For setting the cutting side.

4



cncCUT provides an extremely flexible way of cutting edges with 'beveling'. Leave the fiddly control work to *cncCUT* and simply select the required chamfer from the comprehensive options on offer. Chamfers and lead-ins can be set for individual elements, and saved to a cutting path list. The cutting paths in the list can also join multiple elements together, and as such should be considered separately from elements. A contour element must be completely processed in order to set a chamfer on its edge. *cncCUT* automatically sets the correct cutting head movements (loops) for transitions from one chamfer angle to another.

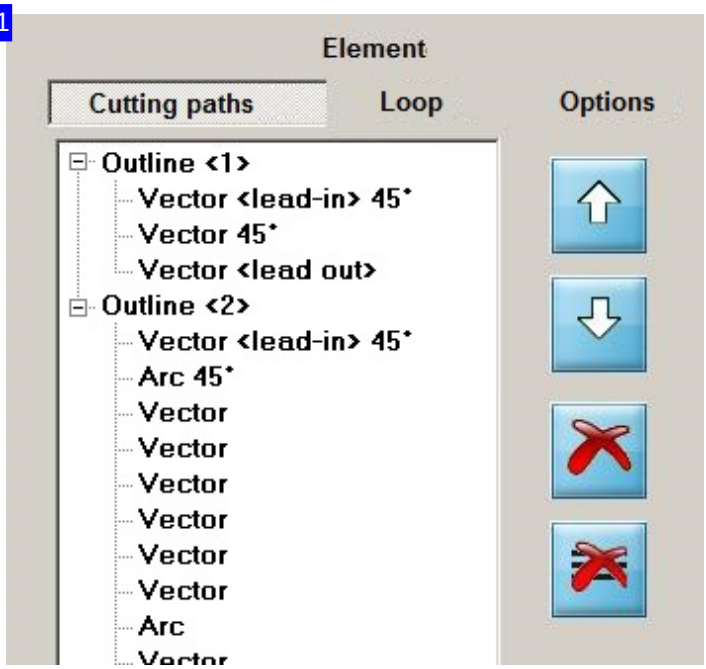
The cutting path list can be processed from the 'Cutting Paths' tab.

This frame allows you to:

- Add Introductory processing to a contour element.
- Set the chamfer for a contour element from the options list.
- Set the processing at the end of a contour element.
- View a Loop at an element's lead-in or lead-out.
- Navigate the contour elements.
- 'Spread' the chamfer on an element.
- Select elements.
- Delete and add chamfers from/to the cutting path.

If you wish to set the lead-ins or -outs for an element, switch to the 'Loops' tab in the tab panel on the top.

41

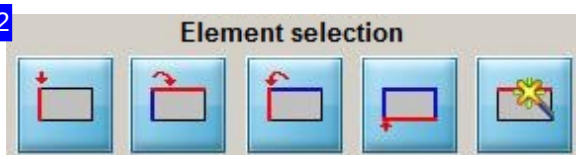


This list shows all the cutting paths you have set. Cutting paths are to be considered independent of a component's contour elements, although they are based on them. A cutting path can enclose multiple elements, while a contour element can also enclose be cut in several cutting paths. To achieve a controlled machining sequence, elements with a second entry in the processing procedure will not be shown in the preview.

The sum of the inputs made in the 'Elements' tab is a cutting path, entered in the list here. Open the 'tree' to view the individual elements that make up each cutting path.
Click an element to see it highlighted in color in the drawing [2].

Use the buttons to the right to sort the cutting paths, or delete one or all of them. Would you like to resume execution of a cutting path, mark the entry for the cutting path in the list (node) and press the bottom button.

42

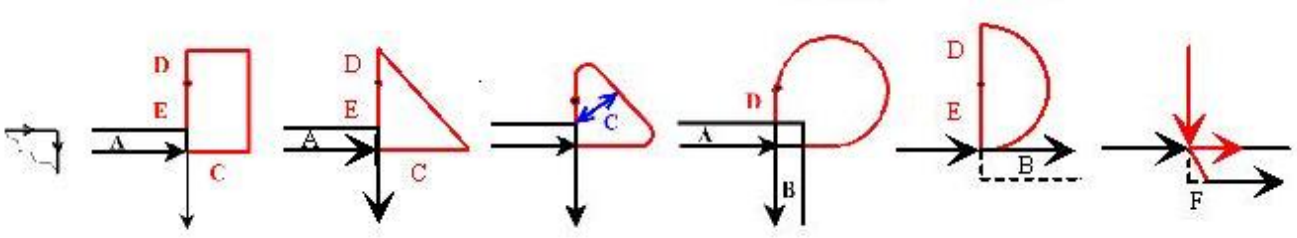


These buttons allow you to navigate through your contour's elements. The buttons from left to right:

- Go to the first contour element.
- Go to the next contour element.
- Go to the previous contour element.
- Go to the last contour element.

The button to the right allows you to select an element in the preview. Click the button, then the required element in the preview window.

6



The loops at lead-ins and -outs are shown by corresponding symbols. The loop selection depends on the setting in the post processor, this also applies to the settings.

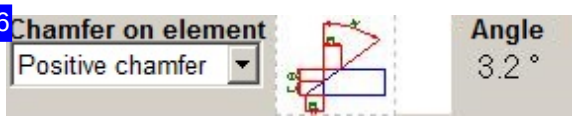
The symbols from left to right:

- No loop
- Rectangular loop
- Triangular loop
- Rounded triangle
- Loop
- Tangential loop
- Chamfer elements

45

Select the form for a lead-in before the contour element from this list.

46



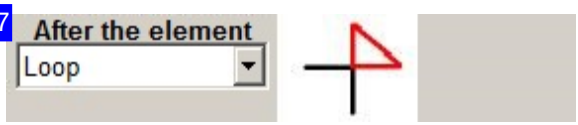
Loops can be cut with positive or negative angles.
A corresponding symbol will be shown in the frame to the right once selected.

When you select a chamfer a view will open into which the parameters for the cut can be entered.

- positive chamfer
- negative chamfer

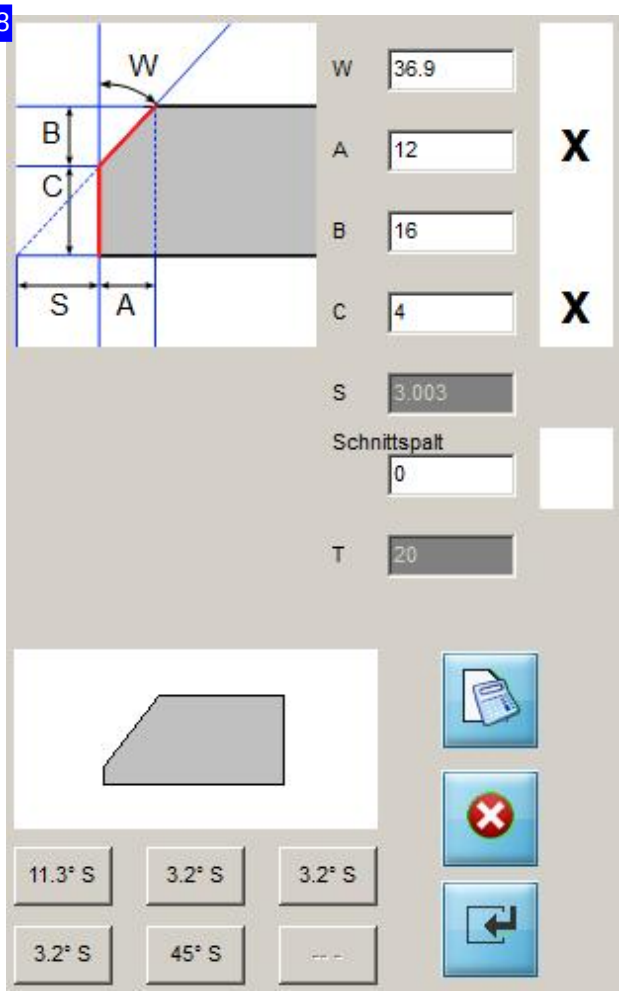
Click the beveling symbol to modify the values.

47



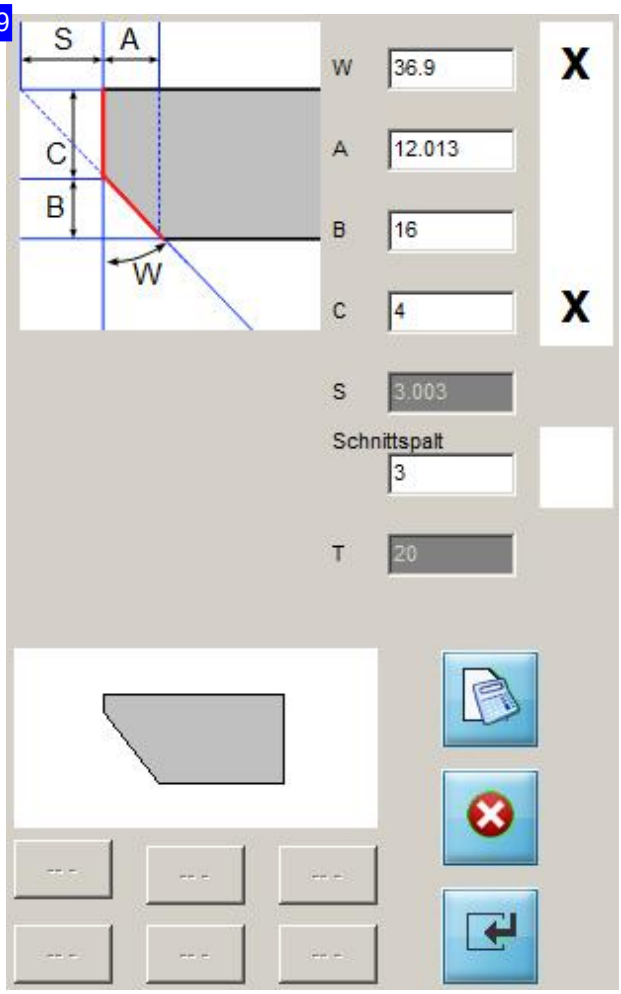
Select the form for a lead-out after the contour element from this list.

48



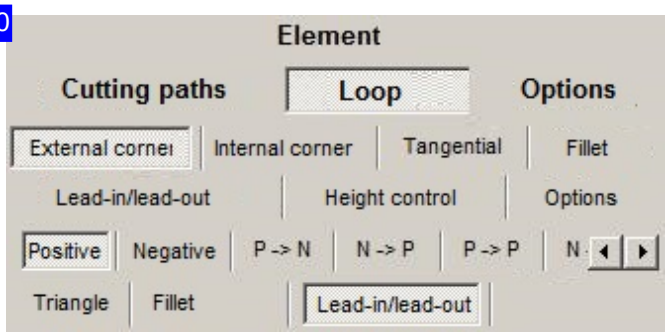
A positive chamfer with bridge can be defined using the angle (W), bridge height (C), cutting width (A) or cutting height (B). Enter the value, mark the checkboxes for two values, and click the 'Calculate Values' button. The current values will be displayed; press 'Rtn' to apply them.
Pay attention to the calculated cutting gap (S), as it is important for the offset to the next component. It is also important to check your sheet is thick (T) enough to cut a proper bevel on.

49



A negative chamfer with bridge can be defined using the angle (W), bridge height (C), cutting width (A) or cutting height (B). Enter the value, mark the checkboxes for two values, and click the 'Calculate Values' button. The current values will be displayed; press 'Rtn' to apply them.
Pay attention to the calculated cutting gap (S), as it is important for the offset to the next component. It is also important to check your sheet is thick (T) enough to cut a proper bevel on.

60



The second tab panel shows the options for the individual transitions between varying chamfer angles. The transitions on the current element are marked.

The third tab panel shows the possibilities for lesds in and out , the height control and other options:

- Parameters

- Tolerances
- Contours (tab-/flap-recognition and slots)
- Loops
- Formulas
- Seams (severances)

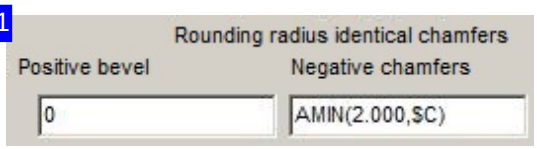
First of all make settings, that have general validity.

The next tab panels shows the possibilities for individual transitions between bevel edges. The transitions on the current element are marked too.
The identifiers on the tabs show the direction of the transition, following the arrow's direction. 'P' stands for positive, 'N' for negative and '0' for no chamfer.

The current lead-in is shown with the variable parameters in the tab. The lead-ins form can be adjusted using the buttons displayed. The available options are decided by the bevel transition.
Possibilities for outside corners (depending on settings in the post-processor):

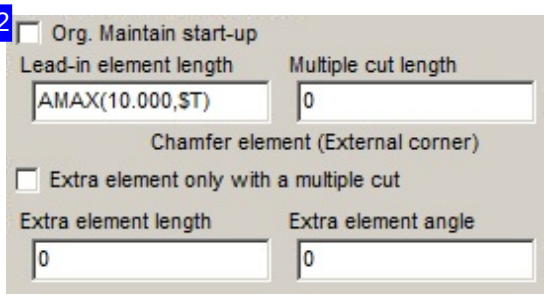
- Triangular (outside corners)
- Fillet (outside corners)
- Lead in/-out (outside corners)
- Triangular (outside corners for negative transition)
- Triangular (outside corners for positiv to negative transition)
- Fillet (inside corners)
- Loop (tangential to positive)
- Loop (tangential from negative)
- Bevel element (tangential)

61



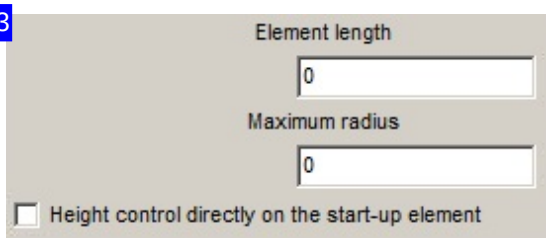
[Loop] [Fillet]
Fillet with variable radius for positive and negative chamfers. These settings are valid in general.

62



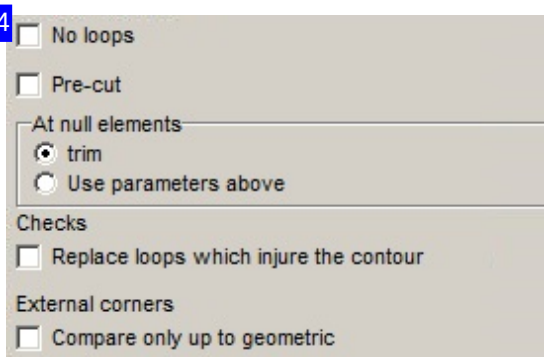
[Loop][Lead-in/Lead-out][Lead-in] or [Lead-out]
This frame offer input fields with which to define the lead-in lengths of elements with bridges (multiple cuts), separatet for lead-in and lead-out. You can set fixed values, or use variables and functions (e.g. 'AMAX') here. For more on this topic see also *cncCUT* - "Set your lead-ins for external contours" - "Parameters and their meanings" The variables' meanings are shown on the [Options][Formula] tab.

63



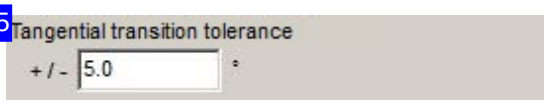
[Loop][Height control]
Automatic adjustment of the height control must be frozen in order to cut loops and transitions exactly and to avoid 'flutter edges'. You define the cutting path to do so befor or after the cut with the element length.
You determine to what radius the height control is used if you enter a value here. If the radius is smaller when cutting, the procedure for small radii is executed.

64



[Loop][Options][Settings]
'Null elements', e.g. small gaps or small cuts in the original contour arising from calculating the second contour line (bevel line), can be closed automatically or a loop can be added as required. Select 'trim' for automatic processing (recommended) or select a loop from the top pane.

65



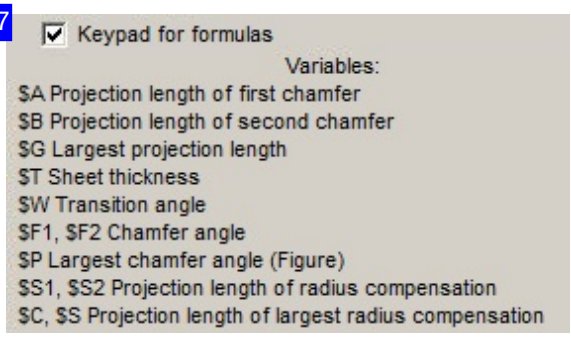
[Loop][Options][Tolerances]
You can set a limiting value for tangential transitions, up to which a transition should be considered tangential. You can setup the handling 'Parameters' under 'Null elements'.

66

[Loop][Options][Outline]
You enable automatic detection of grooves and tongues on outlines with the tab/flap recognition, where the frontages (parallel to the basic element) are cut with the same shape as the base element. The bevel head is practically fixed for these areas, whereby the cutting path in and the out will each become a upright cut.

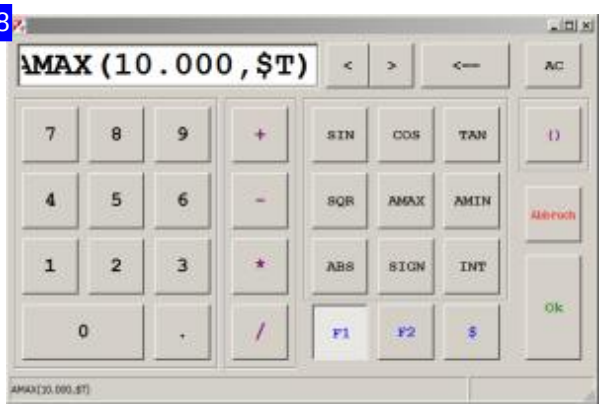
A slot is a incision in a base element, whereby the cutting path in is cut with the chamfer settings and the bevel angle for the cutting path out is set in the opposite direction. The frontage is thereby cut upright. You can determine a slot, by setting the slot width.

67



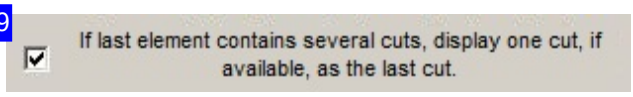
[Loop][Options][Formula]
You have an list of all possible variables ($) here which are read and processed by the system. You can also use a 'formula keyboard' to allocate formula in the edit fields, in this case highlight the selection box above.

68



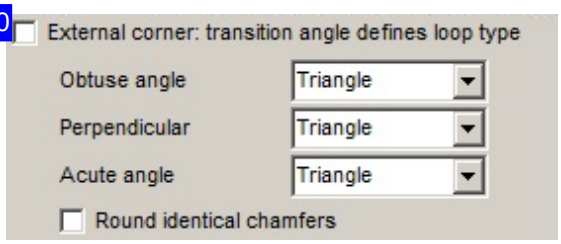
The formula keyboard gives you the opportunity to create the functions and system variables to a formula by simple use of keys. Click the 'ok' button and the formula displayed above is entered in the input field.

69



[Loop][Options][Cuts]
If the last contour element requires several cuts, the part would be solved with the first cut from the material. If you mark the selection Box (default), an element is searched backward that is cut with one cut to prevent this. If such an element exists, this is cut as last to solve the workpiece from the material.

70

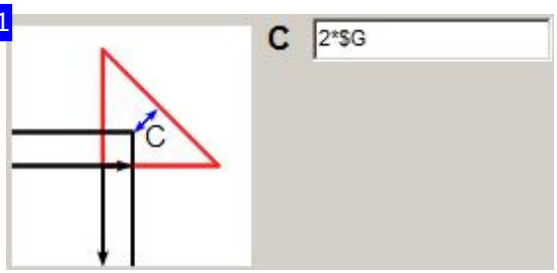


[Loop][Options][Loop]
The 'Options' tab allows you to make general settings regarding looping.

Use the top frame to set whether loops should be used at bevel transitions. Mark the checkbox if you do NOT wish to use loops. If you do this, all other settings for loops become irrelevant!

Optionally, you may set different looping types for different transition angles at the joining points of two external contour elements. Select the loop type for obtuse, perpendicular and acute angled transitions, then mark the corresponding checkbox to activate your selection.

71



[Loop][External corner][Positive][Triangle]
Triangular loop with variable distance. In case of postprocessor-settings also for the lead-in and -out.

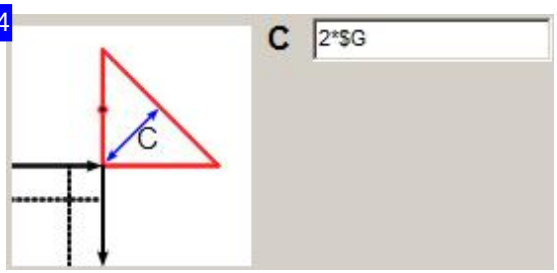
72

[Loop][External corner][Positive][Fillet]
Fillet with variable radius for a positive chamfer. This is set under the general settings for fillets.

73

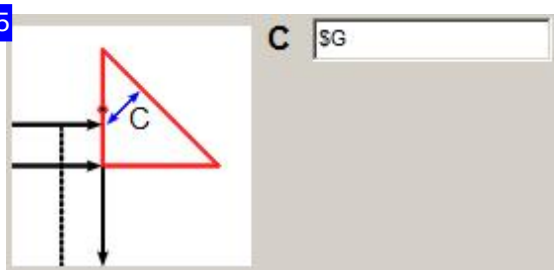
[Loop][External corner][Positive][Lead-in/Lead-out]
Transition through lead-ins and -outs - no treatment.

74



[Loop][External corner][Negative][Triangle]
Triangular loop with variable distance.

75

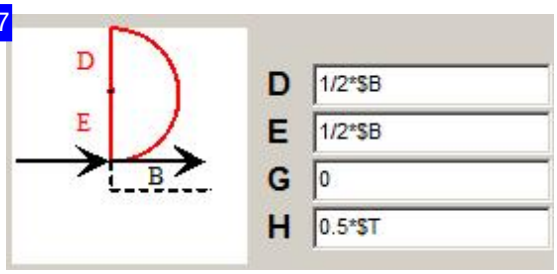


[Loop][External corner][P->N][Triangle]
Triangular loop with variable distance for transition from positive to negative.

76

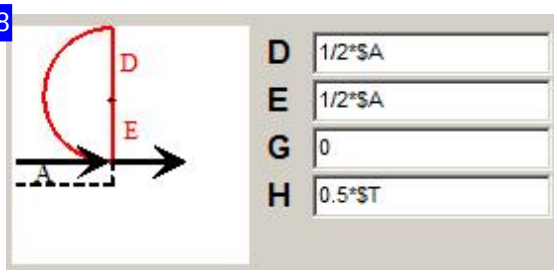
[Loop][Internal corner][Positive][Fillet]
Fillet with variable radius. This is set under the general settings for fillets.

77



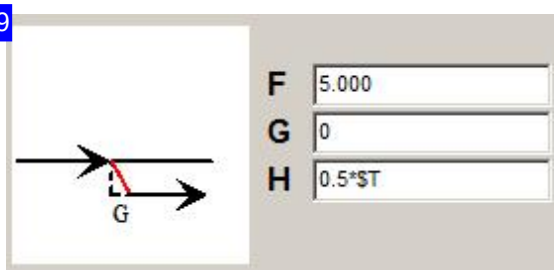
[Loop][Tangential][0->P][Loop]
A tangential transition can be set to or from an edge without a chamfer. Here, the transition to a positive chamfer.

78



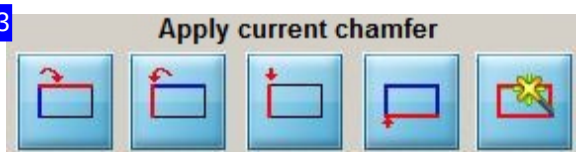
[Loop][Tangential][N->0][Loop]
A tangential transition can be set from or to an edge without a chamfer.

79



[Loop][Tangential][0->P][Chamfer element]
Dependent on the chamfer transition various chamfer elements will be offered here with the option to enter the element's length.

43



A chamfer can be carried over from one element to neighboring elements, or all elements. The arrows on the buttons show the transfer direction.

- Carry current chamfer over to the next element.
- Carry current chamfer over to the previous element.
- Carry current chamfer over to all elements up to the first.
- Carry current chamfer over to all elements up to the last.

Mit dem rechten Knopf können Sie ein Konturelement in der Vorschau auswählen.

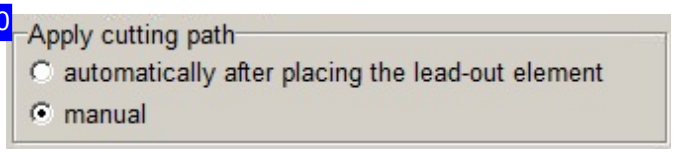
44 Contour selection / new edit / contour entry

The left button allows you to select a contour in the preview. Click the button, and then click the contour to zoom in on.

Click the second button to delete the entries for the current contour.

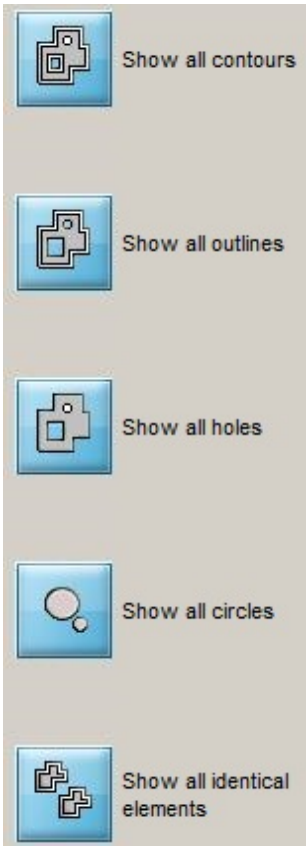
Click the right button to transfer the contour to the cutting list. Wollen Sie eine Kontur in die Schneidbahnliste übernehmen, drücken Sie auf den dritten Knopf; mit dem rechten Knopf übernehmen Sie alle Konturen. You can switch the transfer mode to automatic or manual from the 'Options' tab.

80



Choose between manual or automatic transfer of cutting paths into the cutting path list. If you select automatic, then a cutting path will be transferred as soon as you select a lead-out.

5

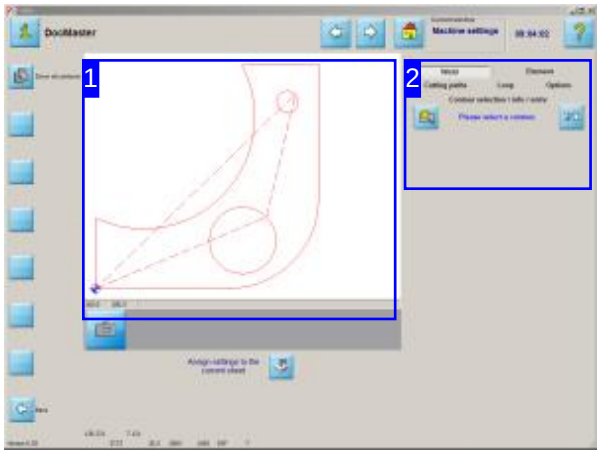


The Navigation panel [5] allows you to selectively choose individual forms. The top button always shows you all types of contours. The buttons beneath that show contours according to the button's icon.

1

Navigate back and forth between the individual contours. The buttons relate to the original contours. Any cutting paths from the beveling module will not be considered. Use the Element selection option in the beveling window. The bottom button allow you to exit the chamfering.

Cutting parameters for contours - Simplified chamfers.



cncCUT provides few settings for simple weldseams with corresponding chamfers for cutting parts.

A seam is composed of one, two or three cuts, depending on the shape of the weldseam. The seams of the individual contour elements are divided into cutting paths and composed into a cutting path list. See also the description in chapter chamfers.

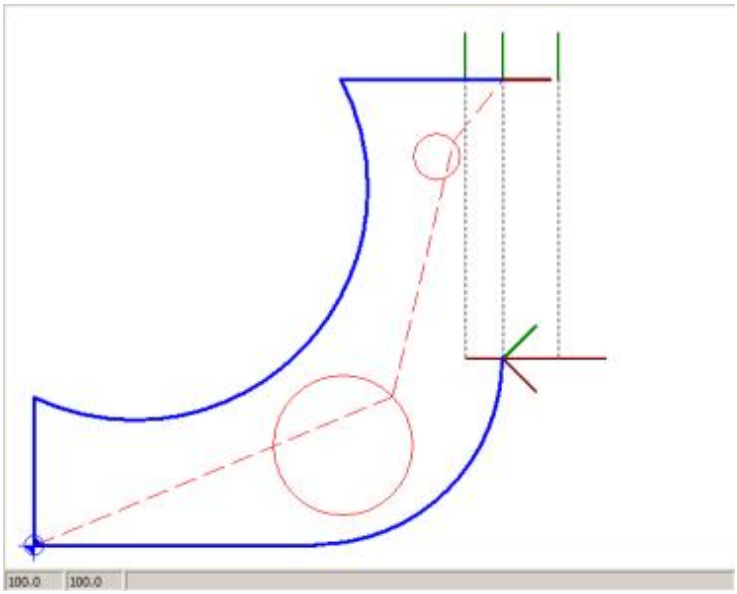
The application of weldseams is done by selecting the shape, size and cutting sequence of the individual split cuts for a weldseam. This process has to be carried out sequentially where the cuts will be assigned to a before selected contour. As a result, a cutting path list will be created that describes the total cutting part.

The sequence for the simplified bevel is as follows:

- Selection of a contour.
- Selection of a weldseam.
- Setting bevel values and assigning cutting sequence.
- Determination of starting position of the weldseam at the contour.
- Continuing weldseam and definition of transitions between any different bevels on the contour elements if only one cut (V- and I-seams) occurs.
- Determination of the last position of the weldseam.
- Transmission of cutting paths in the cutting path list.

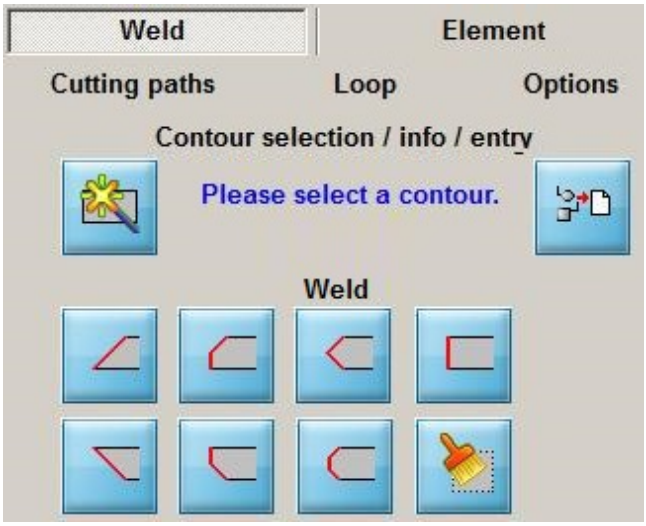
Performe this sequence for all contour elements until the corresponding weldseams are attached to the cutting part. Click the 'Next' button to continue with the cutting part.

1



The preview shows the cutting part with its contours and cutting paths, at the point of work in use of the program. Individual elements are highlighted to control the settings when editing the chamfers. Select here the contour you wish to work with.

2

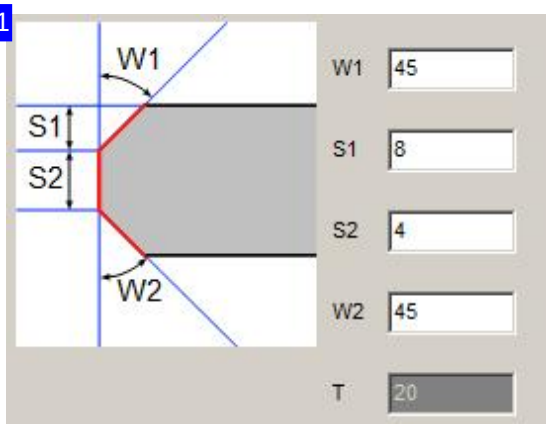


You start a processing sequence with the button in the top left and the selection of a contour in the preview [1]. After selecting a contour, buttons for the selection of the weldseam shape are displayed.

The button at the top right is the completion of a sequence; with a click on it, the cutting paths are transferred to the cutting path list.

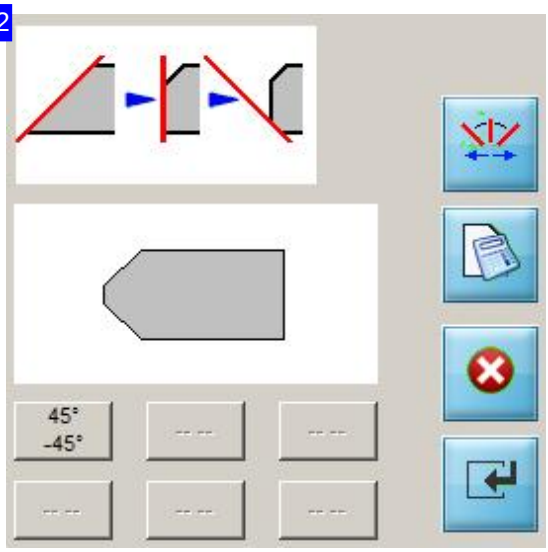
Select a weldseam form by clicking on the corresponding button in the lower rows; a workspace opens where you can enter the bevel values. When crossing the buttons with the mouse, the corresponding identifier is displayed in the heading.

21



A chamfer is displayed with the required input fields for the bevel values is displayed in the upper part of the frame. The lower panel shows the thickness of the selected sheet. Enter the angles or the lengths in the fields 'W' and 'S'. Then go forward to the next step to determine the cutting sequence.

22

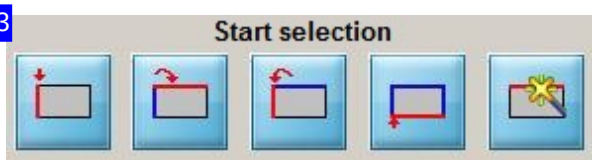


Have you entered the bevel values in the top, and the seam has more than one cutting path, determine the cutting sequence here. Click on the top button to toggle through the cutting sequences until your preferred sequense appears in the diplay.

If you click the second button, the chamfer is calculated and displayed in the preview next to the button with the current values.

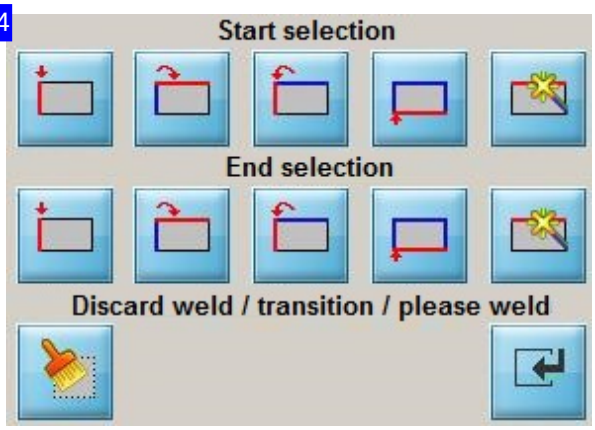
You cancel editing with a click on the penultimate button and you switch to the contour selection with a click on the last button.

23



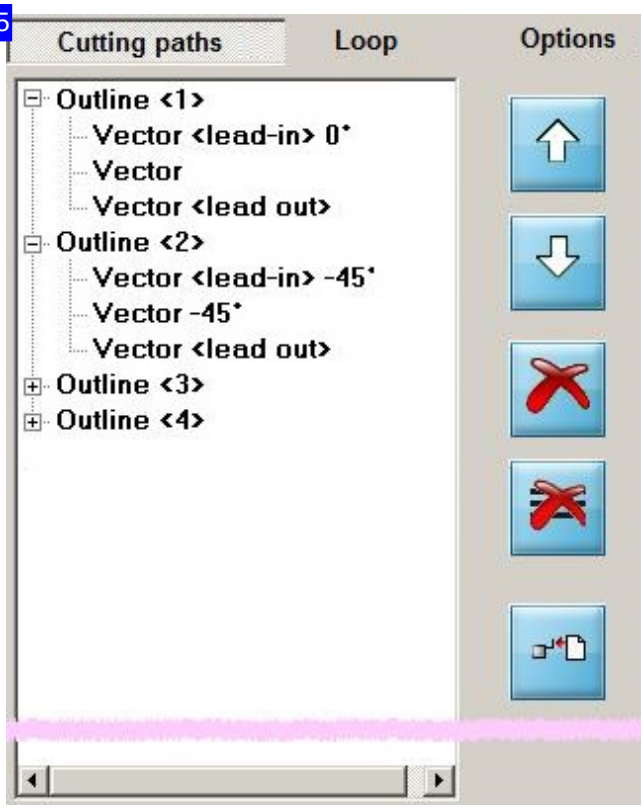
If the chamfer is determined in shape and sizes, the contour elements must be assigned. A button placket is displayed, where the start position can be set (see chapter chamfers). When the starting position is determined, additional buttons appear for finishing.

24



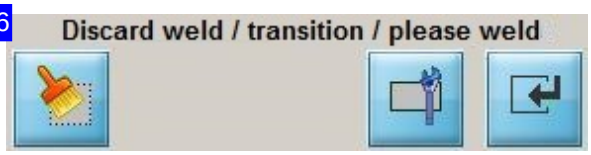
You can carry on the initiated chamfer on the contour elements to a desired end element using the lower buttons (see chapter chamfers). If the bevel path is fixed, press the button at the bottom right to transfer the cutting paths in the cutting path list.

25



All cutting paths of the contour elements of a workpiece will cumulated in the cutting path list (see Chapter chamfers).

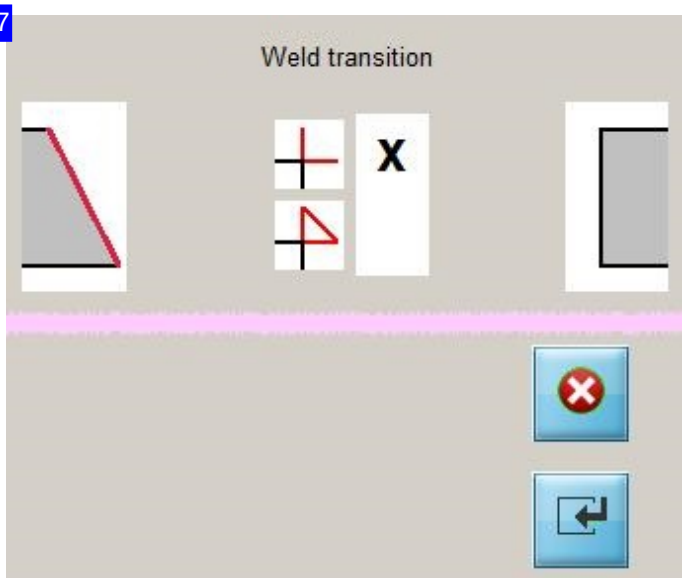
26



Additional buttons appear in the bottom button bar where you can determine the transition form at the

weldseams made with one cut (V- and I-seams) according to transition. Seams with more cuts will always performed with lead-in and lead-out.
In order to select the form, you go to a special setting that offers the choices. Press the second button for the beginning of a chamfer. The next buttons are for an middle transition or an ending of a chamfer.

27

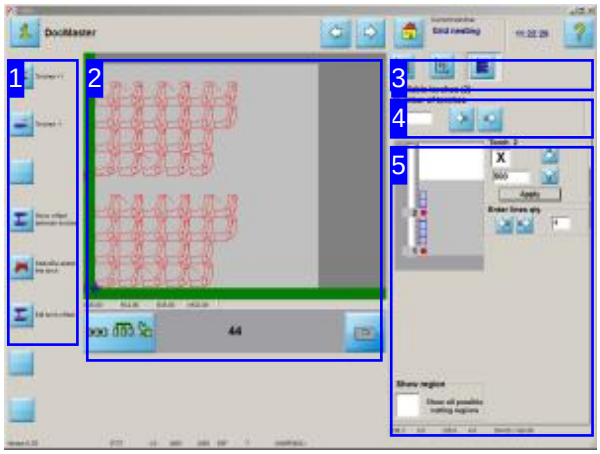


For the chamfers done with one cut (V- and I-seams) selections are offered for a transitional form in case of transitions. The selection is variable and depends on the position and the shape of the transition.

Mark the desired shape and accept the shape by clicking on the bottom button. Cancel the action with a simple click on the top button.

Multi-Torch Cutting When Grid Nesting

Grid nesting for multiple torches



Grid nesting allows you to use multiple cutting torches. Since the program knows the parts' sizes, it can automatically set the torches' offsets optimally.

The torch offset is calculated in conjunction with the sheet height. The available sheet height is divided between the torches. By entering a line number the torch offsets will be optimized dependant upon part height and offset.

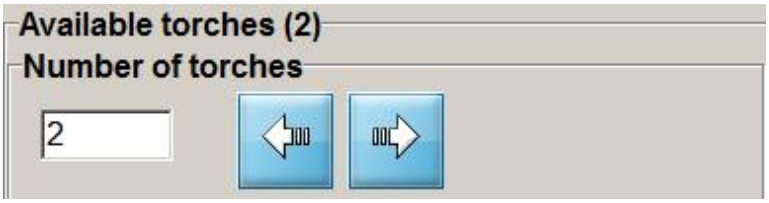
The status bar at the bottom right below the torches frame [5] shows the values for:

- Start position of the parts in each row.
- Part height
- Part offsets in each row.

3

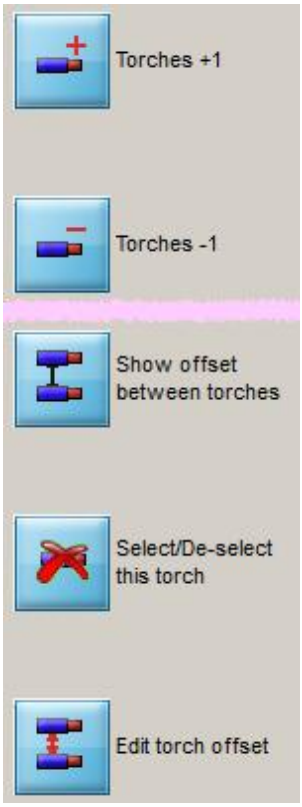
The last tab allows you to manage your machine's torches.

4



The two buttons allow you to set the number of torches. The current number of torches is shown in the cell to the left.
The buttons are the same as the top buttons in the navigation panel [1].

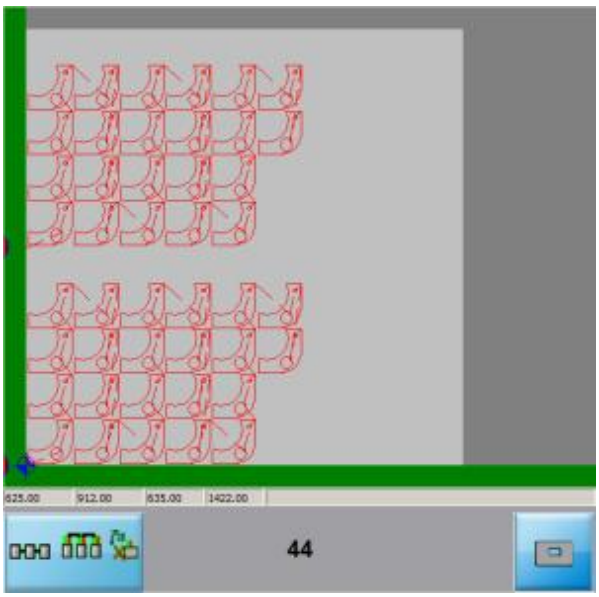
1



The top buttons have the same effect as the buttons in the 'Torch quantity' frame [4].

The bottom buttons are identical to the settings buttons in the 'Torch set-up' frame [5].

2



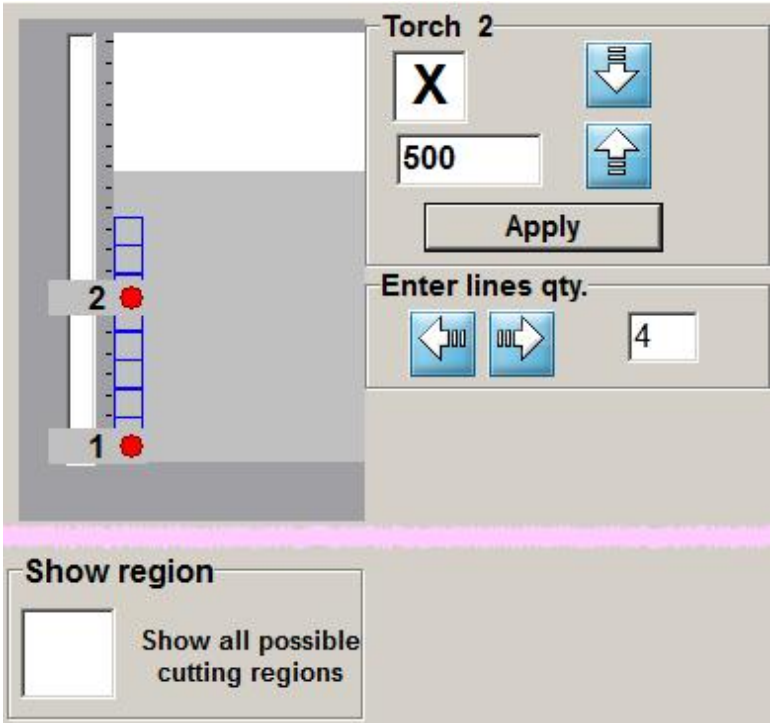
This frame shows the current parts nest in accordance with the torch settings.

The values in the status bar under the preview represent, from left to right:

- Width and...
- Height of the parts including their offsets. The values relate to one torch when using multiple torches.
- Width and...
- Height of the space required including part and margin offsets

The bottom left button is a toggle button for switching between a detailed view of a single part or a wider view of all parts.

5



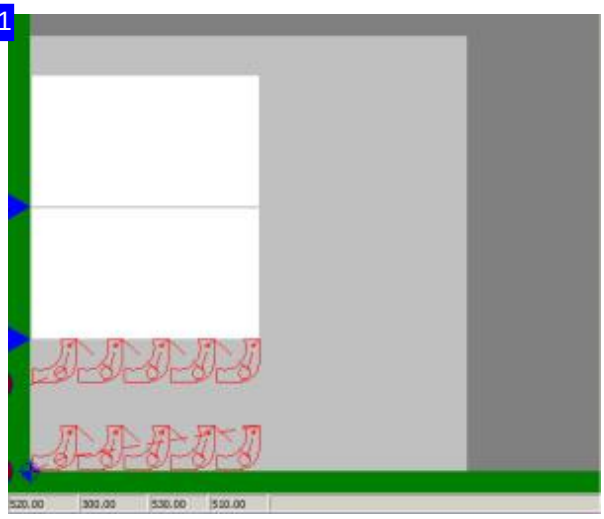
You can see the settings for one torch here.

You can switch between torches using the buttons to the mid-right of the 'Torch' frame. The current torch number is shown in the frame's header line, and its settings displayed in that frame.
Mark the checkbox if you wish to include or exclude a specific torch. If entering the torch offset specifically, you must subsequently confirm by clicking 'Apply'.

Entering a quantity of rows in the 'Number of Lines' tab allows you to optimize the use of your sheet, since the program calculates the row offsets according to the parts. The values in the status bar show: to the left, the parts' height including offsets and lead-ins/outs; to the right the height per torch across the number of rows given.

To view all cutting areas , mark the checkbox at the bottom left.

51

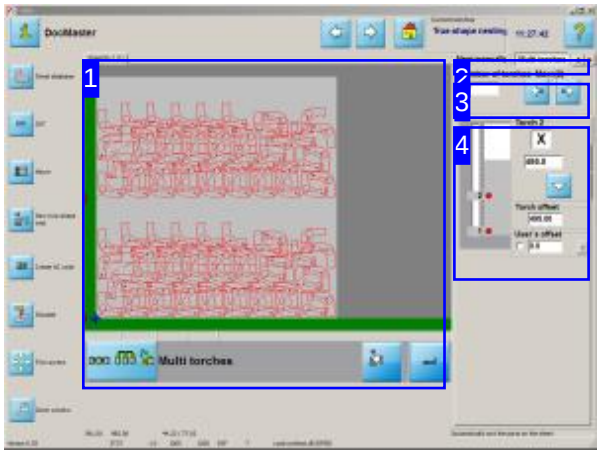


Cutting machines with multi-torches across a processing axis with a limited working area (offset), can only work given cutting areas on a wider sheet. To do this, all parts must be nested in the correct manner in this area.
To exploit the full sheet width you can select the offset such that multiple strips fit on your sheet. You can display the areas in the preview to allow you to select the best option for using your material.

Here you see a sheet with two torches, and two cutting paths in the bottom area. In the top half you see a second area beginning from the blue arrow. If multiple areas are possible, these will be displayed here.

Multi-Torch Cutting When Parquet Or True-Shape Nesting

Parquet and True-Shape nesting for multiple cutting-torches

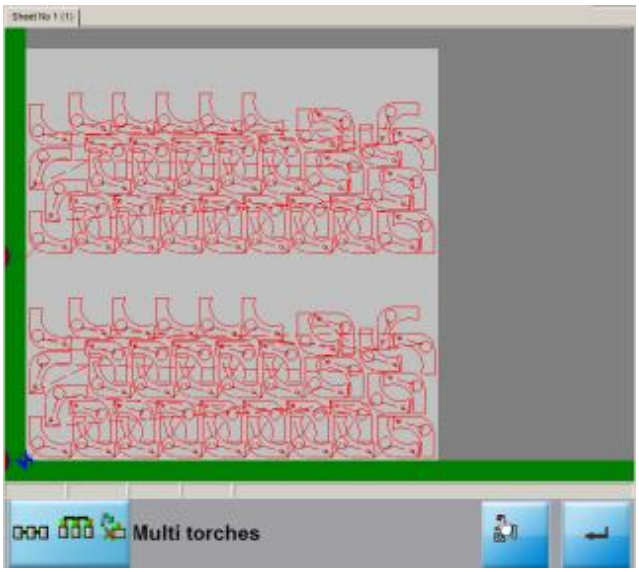


Parquet nesting allows you to use multiple cutting torches. The setting is available in the 'Parquet Nesting' window.

You can select torches individually.
Switch to the 'Multi-torches' tab in the 'Parquet Nesting' window in order to make settings.

The values in the status bar below the preview [1] show the width and height of the space currently required.

1



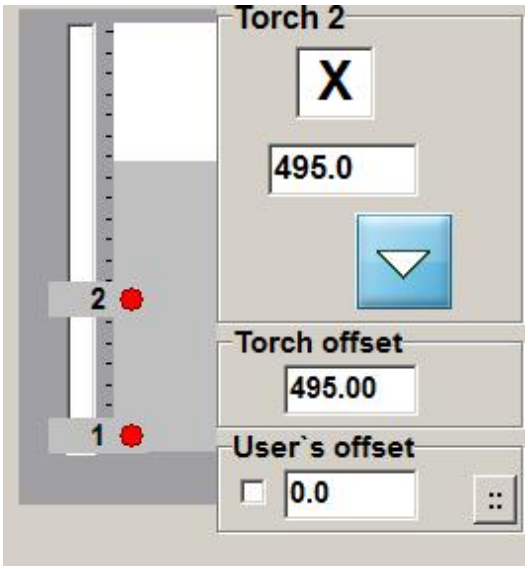
The current nesting plan in accordance with the given torch settings is shown here.
Click the 'Enter' button in the 'Torches' frame [5] to confirm any changes made to the torch offsets.

2

The last tab allows you to manage your machine's torches.

3

The two buttons allow you to set the number of torches. The current number of torches is shown in the cell to the left.

4 

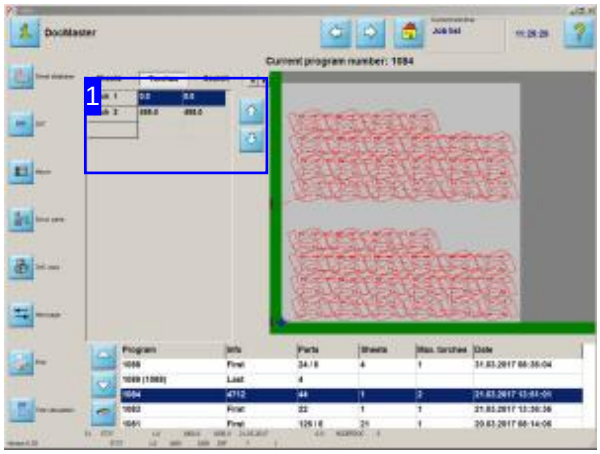
You can see the settings for one torch here.

You can switch between torches using the buttons to the mid-right of the 'Torch' frame. The current torch number is shown in the frame's header line, and its settings displayed in that frame.
Mark the checkbox if you wish to include or exclude a specific torch. The cell above the buttons shows the position (height) of the torch.

The 'Torch Offset' frame shows you the offset from one torch to the next.

The 'User's Offset' setting allows you to individually define your own torch offset. Note that the margin offset is considered when calculating the torch offset (this is simply sheet height minus margins divided by the number of available torches). If you enter a manual offset and want to use it in preference to the automatically calculated value, mark the checkbox to the left of the input cell, and confirm by clicking the 'Enter' button in the preview frame [1].

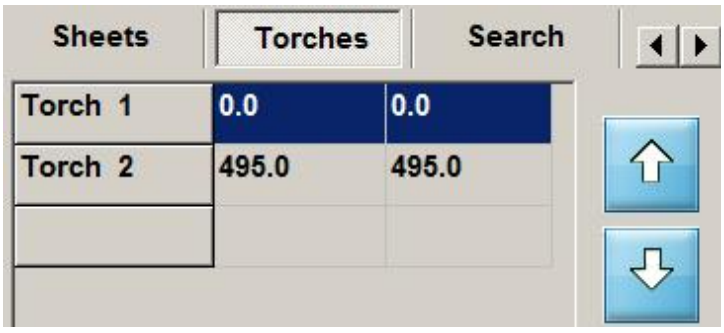
Representation of the torches within the Job List



The Job List will show if multiple torches were used when nesting.

The number of torches used when nesting with multi-torches is shown in an extra tab, accessed via an extra button in the header panel of the Job List's 'Sheet Data' frame.
Press the 'Torches' button to access the display.

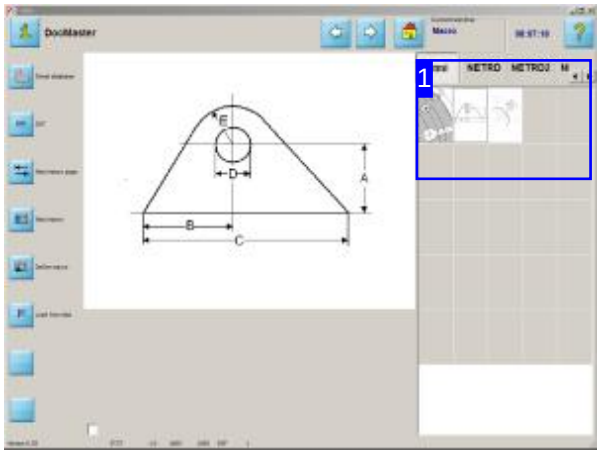
1



Here you can see the torches that were used when nesting. The table shows the torches' offsets. Use the buttons to the right to navigate the list.

HTML Macros

Selecting an HTML Macro

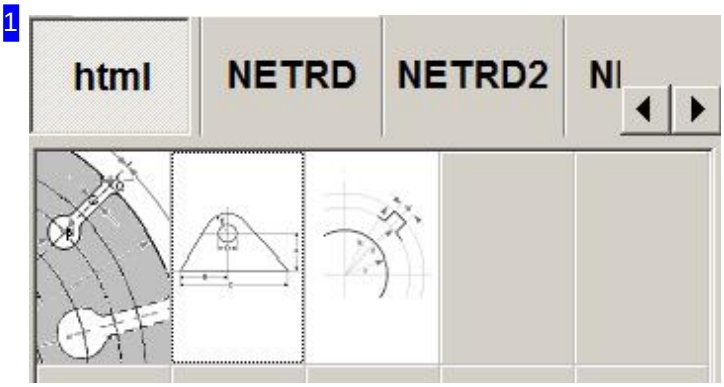


Another method of macro creation is to design your own macros using HTML files. HTML macros are not included with *cncCUT* . *IBE Software GmbH* offers HTML macros for suitable varied industries as optional extras.

If your system is capable of editing HTML macros then the 'HTML' tab next to the blocks of pre-prepared macros in the macro selection screen will be enabled.
Select a prepared macro by double-clicking its thumbnail in the preview.

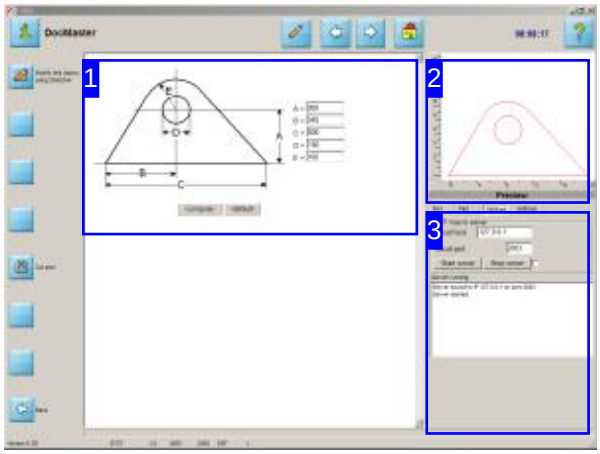
Note: HTML macros are controlled only by the HTML file's content. *cncCUT* has no 'control' over these files as such - the connection is run solely through your TCP interface or an ActiveX object. For this reason the buttons in the left navigation panel have no effect on HTML macros - they must be controlled through their HTML coding.

Your computer must have network access if the macros are to be controlled using a TCP interface.



The 'HTML' tab offers a display of all available user-created HTML macros. Double-click a thumbnail to start defining the corresponding macro's parameters.

Working with HTML macros

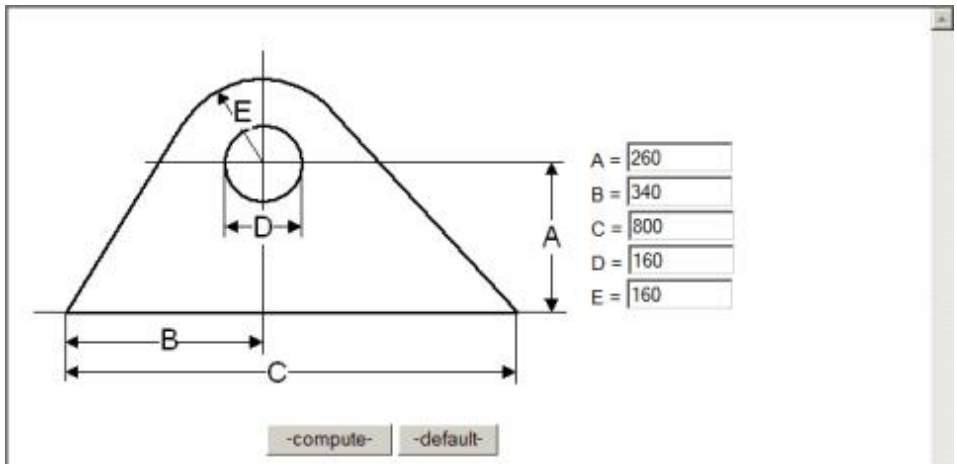


This screen allows you to mold your workpiece into the required form.

HTML macros are sent to your computer through its TCP/IP interface or as an ActiveX object. To receive a macro, you must first launch the server [3], then enter the variables to define your macro and press 'Compute'. The workpiece will be generated and displayed in the preview frame [2].

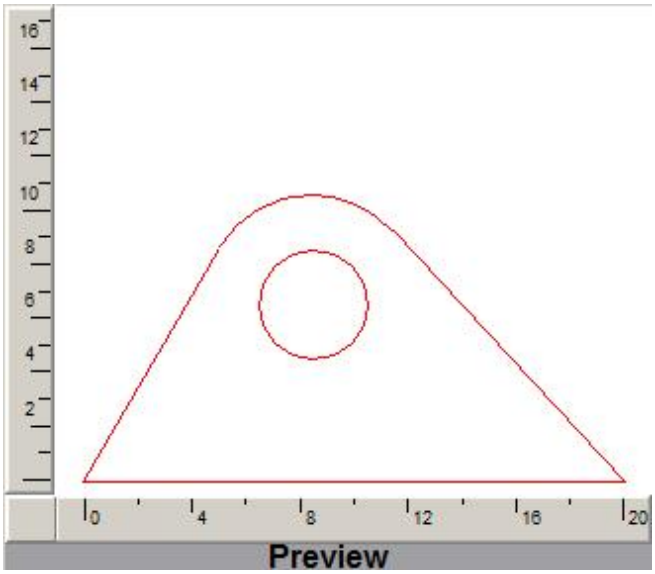
The server is programmed to send using 'POST' to secure the transmission of larger amounts of data. The form to be sent must use this method when submitted!

1



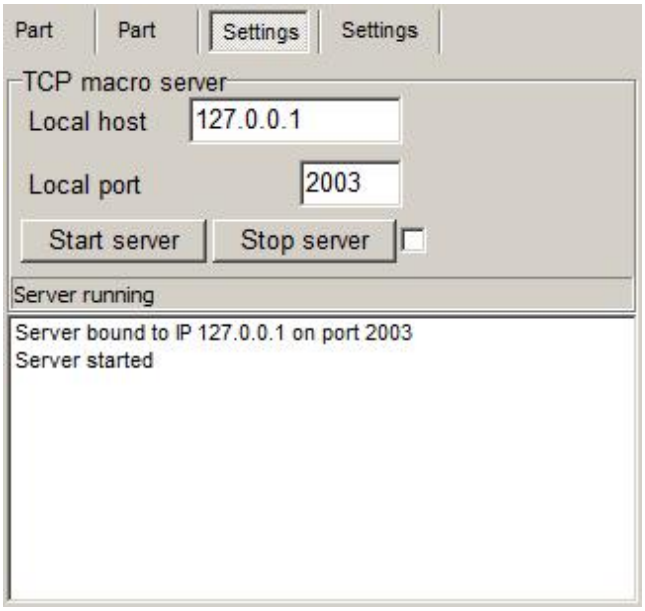
This frame shows the basic form of the workpiece with its variables. Enter the required values into the cells and click the button for sending data - in this case 'Compute'.

2



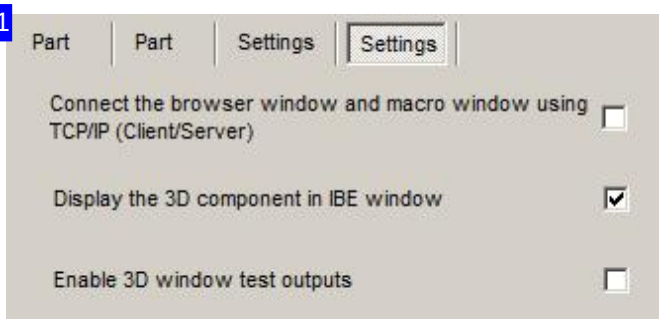
This is a preview of the part based on your inputs in the macro screen [1].

3



To send a macro in HTML form over your TCP/IP interface, a server which can handle the macro must be setup to receive it, and the function must be activated in the next tab. Click the 'Start server' button to open the TCP/IP interface. You can see the TCP address and the port number in the input fields to the right. These entries must be used as the server address for a successful transfer.

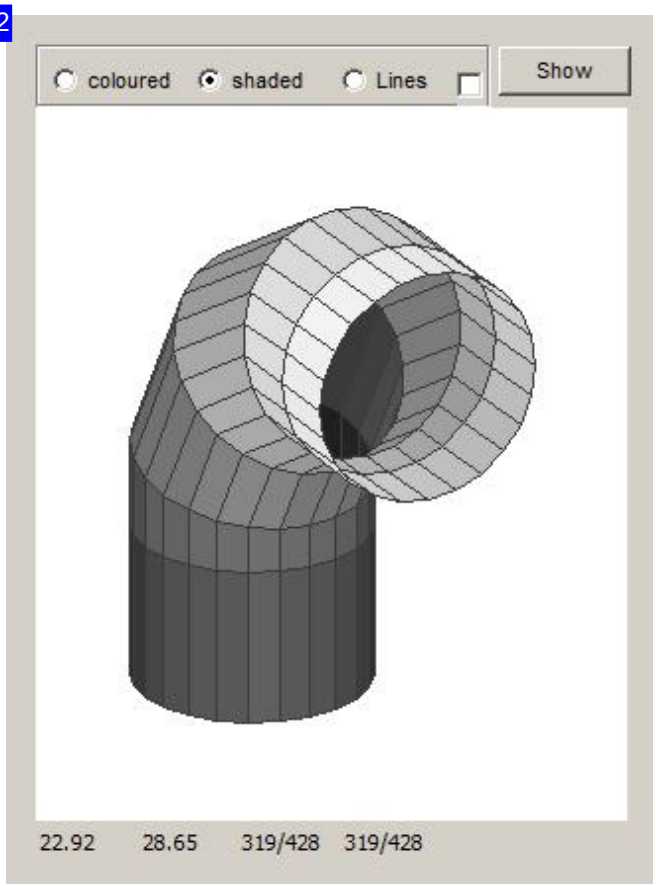
31



A macro can be exported to *cncCUT* as an ActiveX object, or using the TCP/IP interface. Mark the top checkbox when using the TCP/IP interface.

If you have defined a more-detailed representation of the macro in its control file, a tab displaying it will be offered here. Use the bottom checkboxes to control the tab's appearance and how it outputs test values.

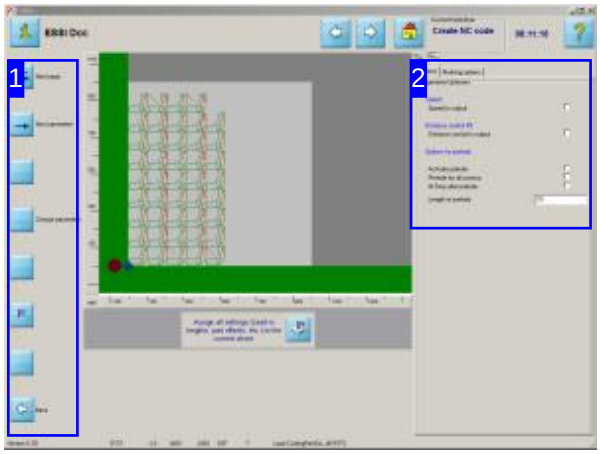
32



This frame's content is dependant on a supplementary HTML file, identified as 'PART' in the main HTML file. Notifications from this window can be viewed in the 'Parameter' tab if the corresponding checkbox in the 'Parameter' tab is marked.

NC Programming

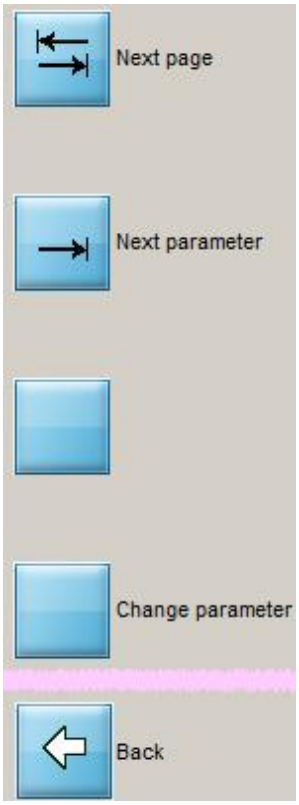
PP Parameter Setup.



This screen allows you to setup your machine individually for any program.

Check or uncheck checkboxes to suit the settings you require. Setting or clearing these flags allows you to change the default settings for NC programs in the Database. This can increase flexibility when generating your NC code.

1



The navigation panel gives you control of the checkboxes and input cells in the 'Setup' frame [2].

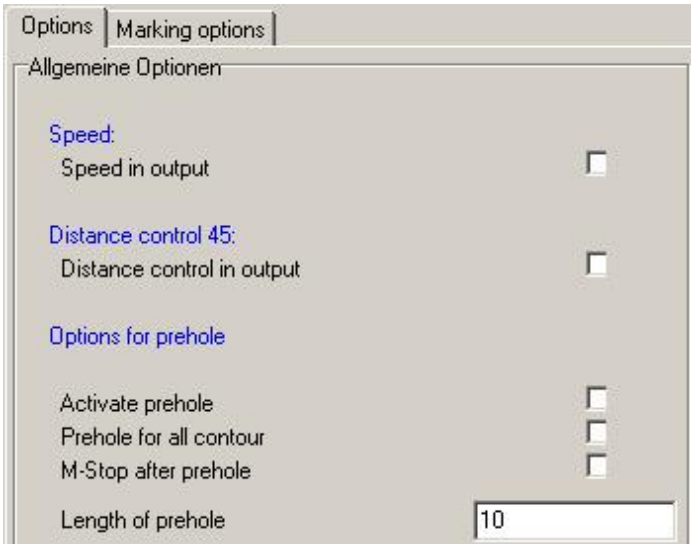
Use the top button to switch between the tabs in the header panel.

Use the 'Next Parameter' button to switch between the individual settings.

To toggle a checkbox, click the 'Change Value' button.

Click the bottom button to return to the NC code generation screen.

2



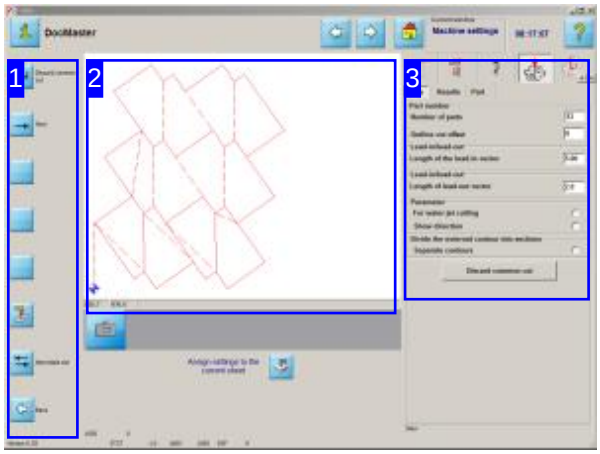
This frame allows you to take settings pre-defined in the Sheet Database and overwrite them for the creation of your NC code. This allows you to have more individual control of your NC program.

The checkboxes in the screen correspond to the post-processor's flags, which are considered by the code generating module of cncCUT, for example to activate sub-routines built into your machine's firmware.
These flags are then evaluated by the post-processor.

'Pre-drilling' means, in this case, that the cut-ins should be pre-cut before the cutting procedure begins with a particular technique; pre-drilling.

Machine Data

Shared separating cuts.



A part is examined for possible parqueting in the 'Common separating cuts' procedure. This means that a part will be checked for common, congruent contours or contour-sections, which will then be grouped together to form a cluster. A cluster can consist of two or more parts, where the cluster can then be nested as a single part. This 'parqueting' of parts into a cluster allows maximal material usage due to the shared cuts.

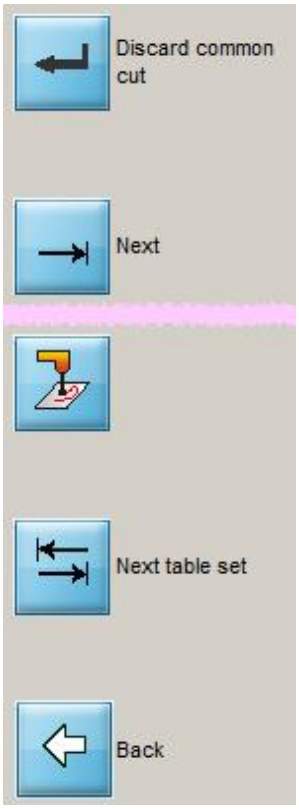
A complete and closed use of the available area is not always possible when parquet nesting! In this case a closed area with some waste, or a group with rows will be sought. This search requires much processing power, and so can take a while.

For a simple, quick parquet nest in a grid pattern, see the next chapter.

To define shared separating cuts for parts, you must join the parts to form clusters. Individual parts must not be provided with lead-ins; the lead-in cut is made once for the cluster. The lead-ins for individual parts are made at crossovers, which have already been cut. The same applies for lead-outs - the cluster should not require a lead-out, this will be made at a point that has already been cut.

- Set the framework for clusters.
  - Area size
  - Cutting offset
- Let the parquet nesting routine calculate the cluster's layout.
- Check the cluster's positioning and the number of clustered parts [2] and select the best option for you from the List.
- Check the cluster for Part collisions.
- Continue in the program [1] to nest the cluster.

1



The navigation panel allows you to control the fields, checkboxes and tabs in the frame to the right [3].

The top button calculates a new layout for the parquet. Once the parquet is finished, switch functions and you can use the button to reject the shared cut.

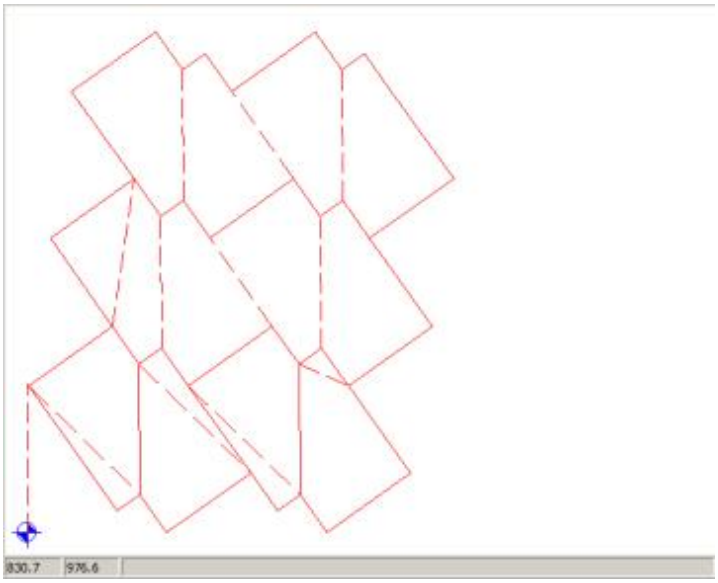
Click the 'Next' button to go through the individual input and list elements.

Use the middle button to start a cutting simulation in the results screen.

To switch to another tab, click the penultimate button.

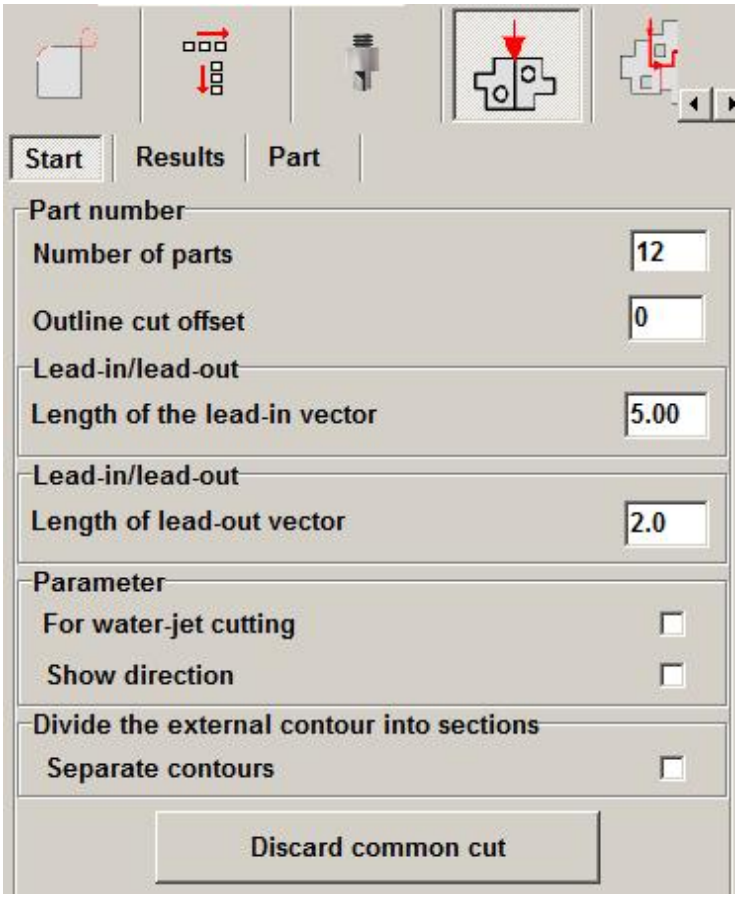
Click the bottom button to return to the machine data window and nest the cluster.

2



This frame shows you the parts' cluster laid out as a parquet nest.

3



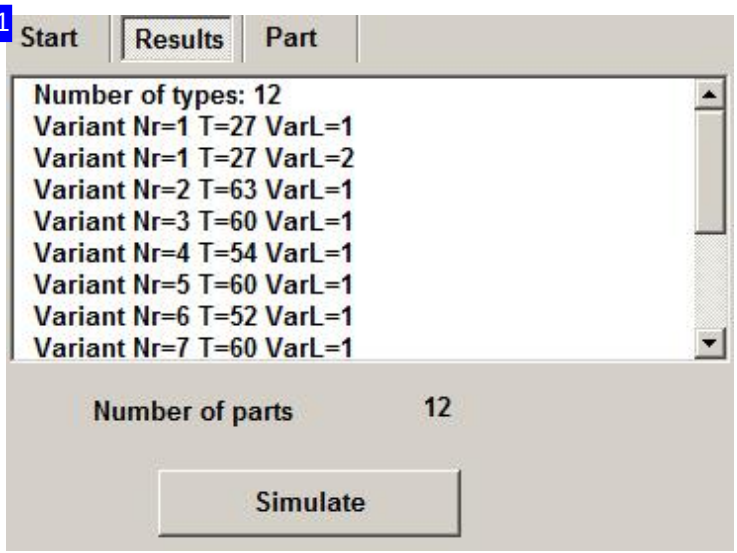
These tabs allow you to make the settings for a parquet layout. Enter the maximum number of parts to consider for a cluster. the final layout of your cluster is, however, dependant on how many parts can be fit together - it will not necessarily contain the maximum number of parts!
Enter the cutting offset's (1/2 cutting beam width) for external contours, and the length of the lead-in for the cluster. The parts within the cluster may not have their own lead-ins. If the cutting offset has been allocated to a sheet, you must delete this from the sheet database. If the value is kept it will be used for the parquet; no further changes can then be made.

Click 'Calculate new layout' to begin the parquet routine.

You will see the results of possible parquet nests in the 'Results' tab.

Press the top button in the left navigation panel [1] to calculate a new layout.

31



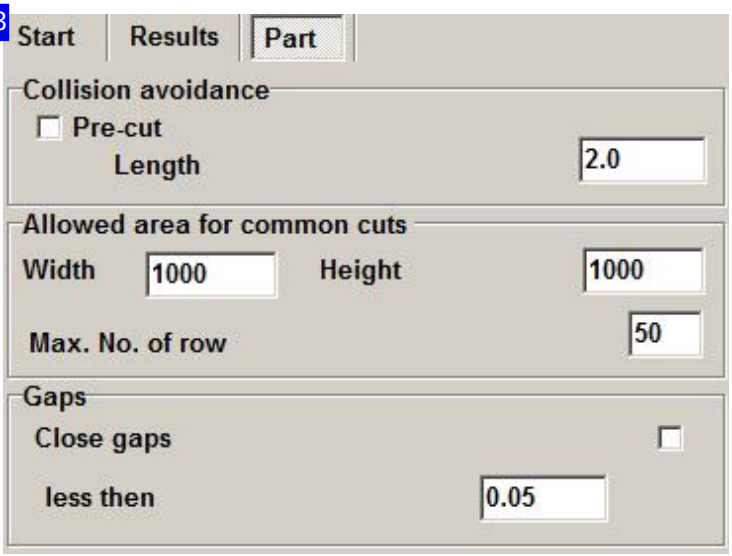
The various parquets available are displayed in a list. Click on a list entry to see a preview of the part cluster [2]. The number of parts in the cluster is shown below the list.

Select one type and click 'Simulation' to define the cutting paths. Once the simulation has run a new button will appear. This button opens the 'sorting' tab, where you can define the cutting sequence. To define the cluster size, switch to the 'Parts' tab.

32

Click 'Change cutting sequence' to switch to the 'Sorting' tab.

33

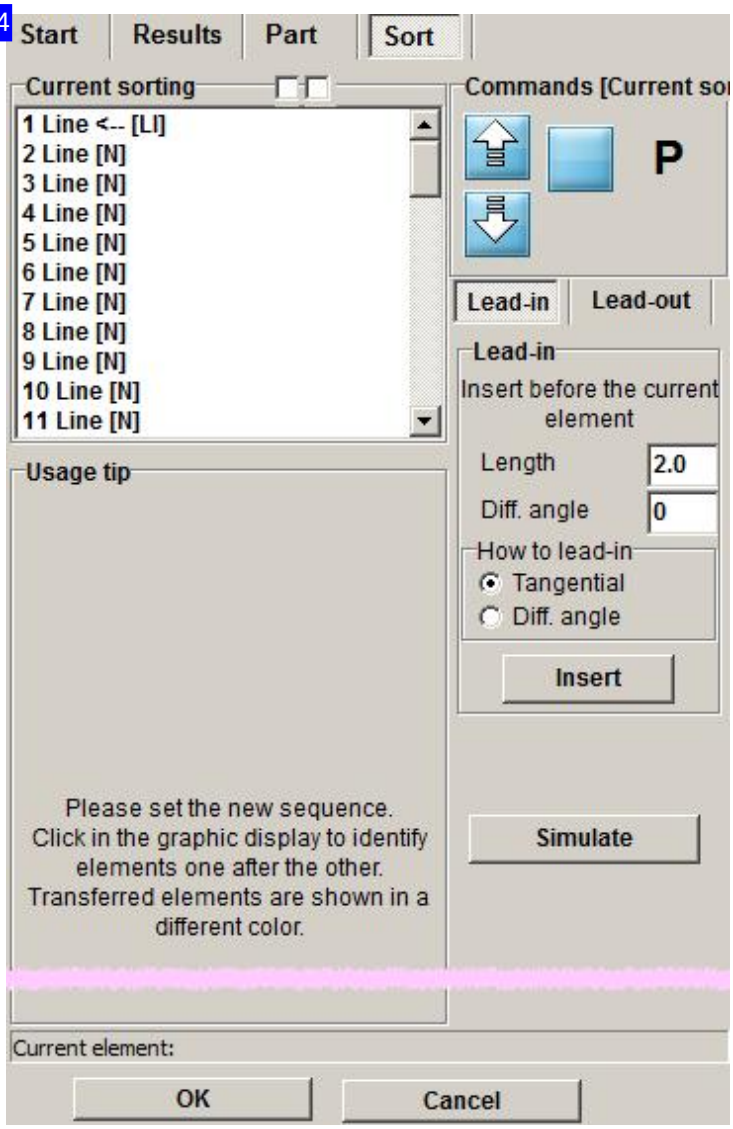


You can define the dimensions of a cluster here. Enter the width and height of the area that may be used for a cluster. If you wish to limit the number of lines that can make up a cluster, enter the maximum number of rows in the cell at the bottom right.

To avoid a collision with parts that have already been cut and may be leaning, you can allocate the parts a pre-cut. The pre-cut's length must be regulated by the size of the cutting head, and should be chosen such that cut parts are not traveled over. Mark the 'Pre-cut' checkbox if you would like to carry this out.

The frame below allows you, to close gaps that falls below a given value.

34



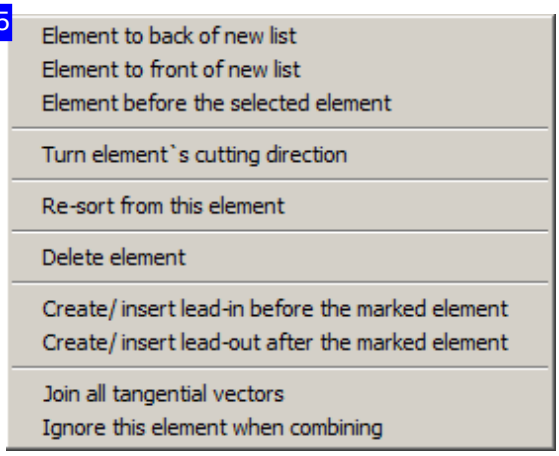
The top-left list shows the current cutting sequence for your elements. This order can be changed by transferring individual elements from the top to the bottom list.

To transfer the parts, mark the left checkbox above the current list and click the individual elements in sequence. Those elements you have selected will change color. You can hide the cutting paths to allow yourself to see hidden elements; mark the right-hand check-box above the current positions list.

You can also re-sort the elements in the current list. Use the buttons to the right of the list. Click 'P to open a pull-down menu for selecting special functions. These commands can also be accessed using a pull-down menu by right-clicking.

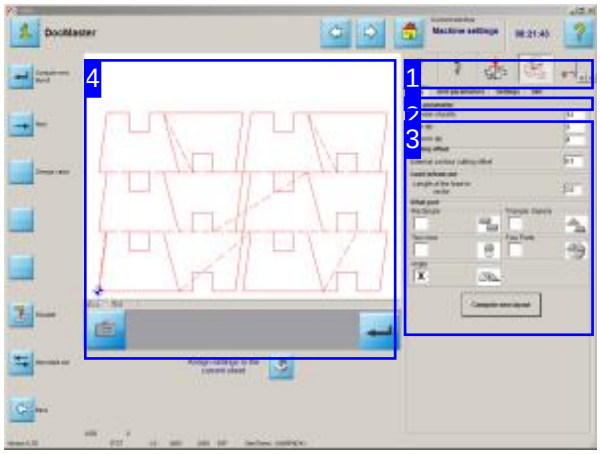
The 'lead-in element' frame allows you to give an element a lead-in. Select the lead-in's length and angle and choose the lead-in type. Click 'insert' to place your lead-in.

35



This menu allows you to move or partially re-sort the elements in the sorting list. You can change the cutting direction, place lead-in elements, delete elements or combine vectors.

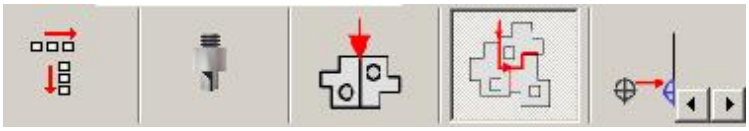
Combine Parts For Common Separating Cuts.



Parquet layouts follow preset patterns. You can adjust rows and columns to control the grid size.

The common separating cuts feature allows you make various parquet nests using simple single cuts which cut along two or more elements with shared edges. This feature is post-processor dependent.

1



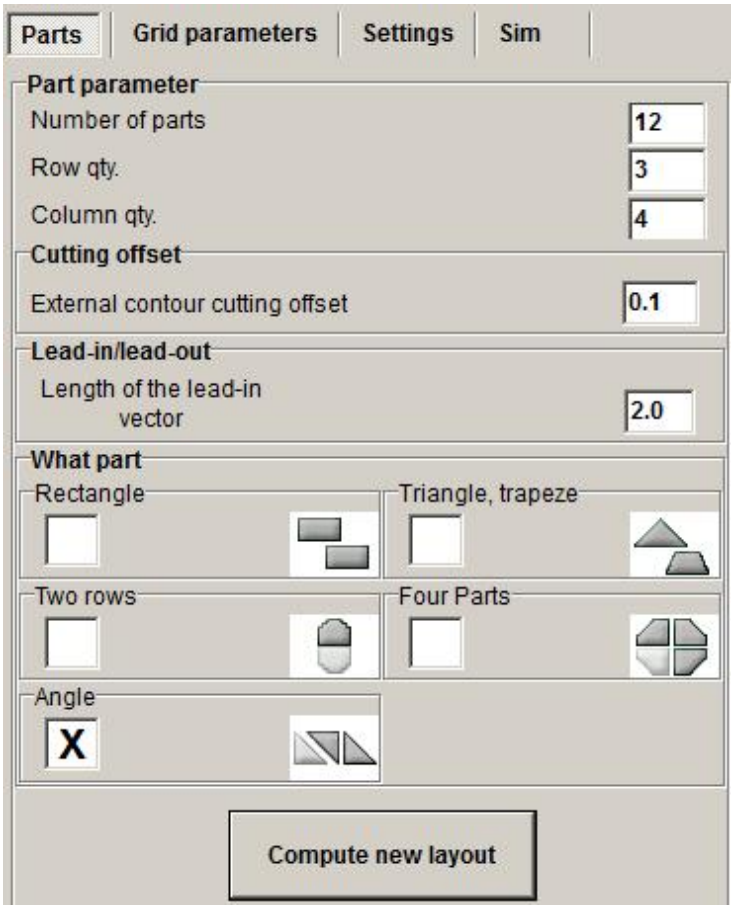
This tab gives access to the frame for laying out your parts quickly and easily in predetermined parquet patterns suitable for making shared cuts.

2

You can make settings about your parquet under the 'Grid parameter' tab and settings about how to display the cutting direction under the 'Parameter' tab.

Select your parquet under 'Part' and check the cutting sequence using the 'Simulation'.

3



The parquet is laid out under the 'Part' tab. Enter the quantity of parts required and set the number of columns and rows.

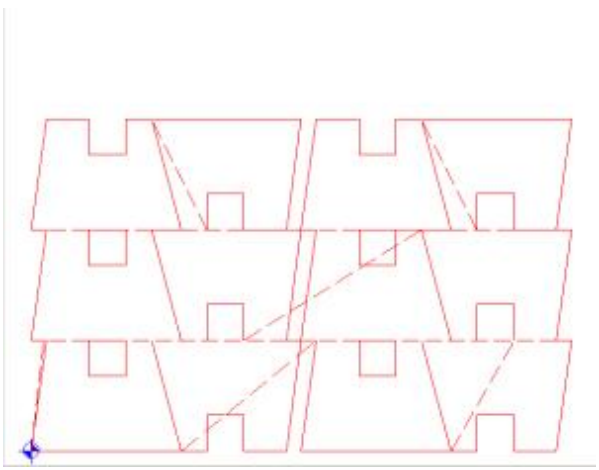
Enter the cutting offset and set the lead-in length for the entire parquet.

Set the parquet's pattern in the bottom frame:

- Rectangles
- Triangles, Trapezes
- Two Rows
- Four Parts
- Angle

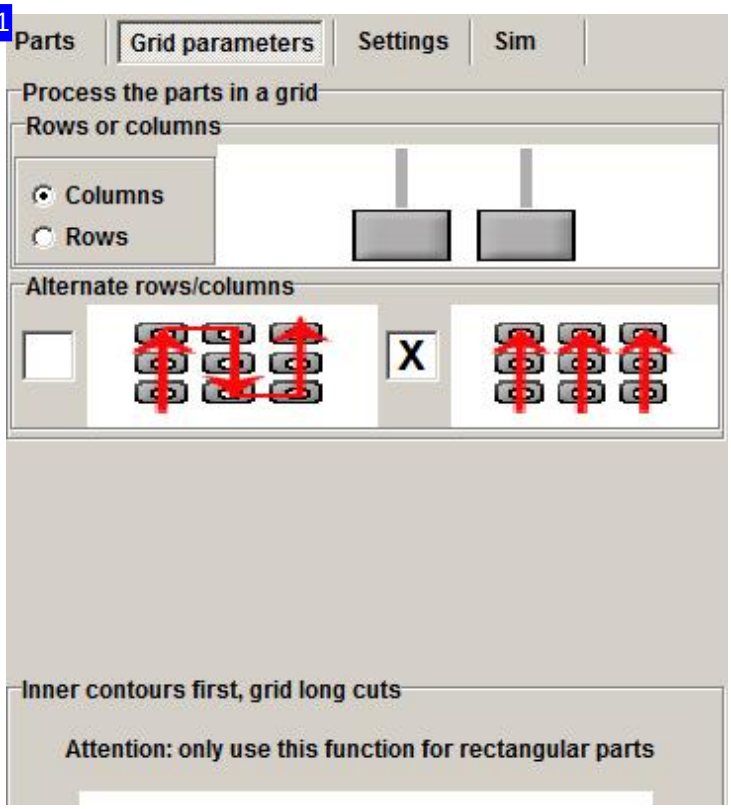
Next, click the bottom button to recalculate the layout according to your selections.

4



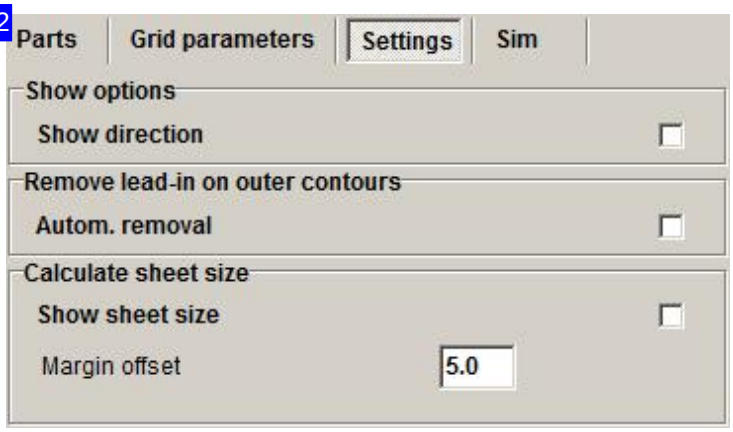
The preview shows you the complete grid layout.

31



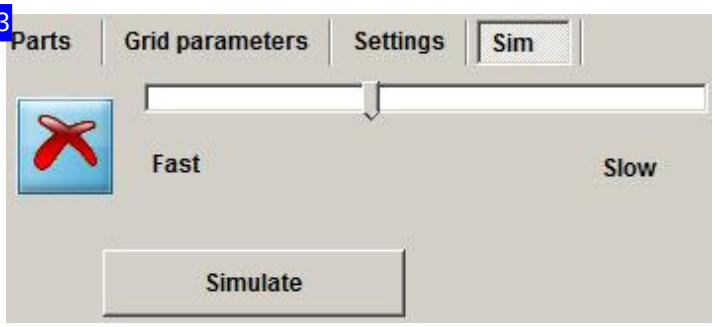
This tab allows you to set the processing - and thus also the cutting - sequence for your parts. You can work through the grid in rows or columns, using the checkboxes to specify whether to change direction at each row ('meandering' to save traverse time), or whether to go back to the start (allowing the material time to cool).

32



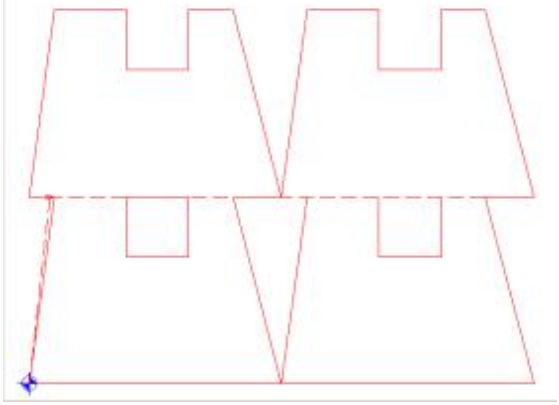
To display the cutting direction in the preview, mark the checkbox at the bottom right. A directional arrow will be shown at each contour, and its sequence number.

33



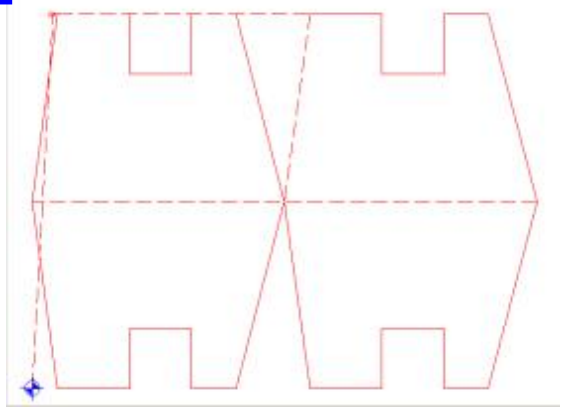
The 'Sim' tab allows you to simulate the cutting of your sheet, checking that everything is processed in the right order. Start the simulation, controlling its speed with the slider bar. Click the button to the left to stop the simulation.

41



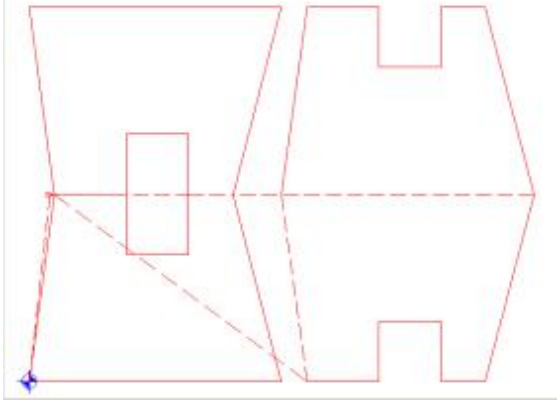
This is the normal grid layout for parts. This is arrived at automatically without changes to the column and row counts.

42



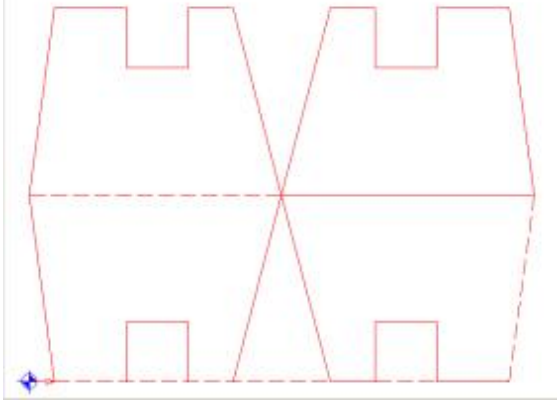
This is the two rows layout. The second part is mirrored.

43



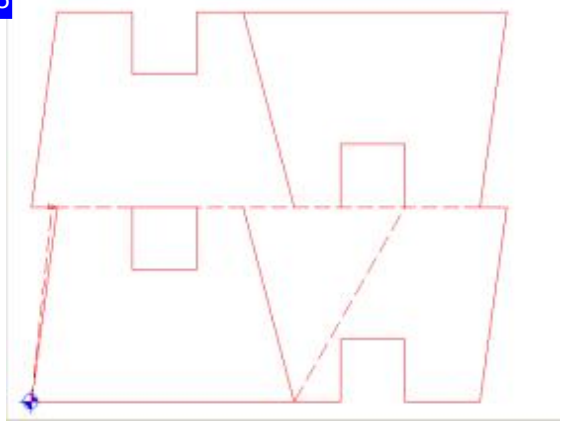
The layout for triangles/trapezes mirrors each second part in the row against the first, allowing better material usage in each row.
Select this method if your part has diagonal sides which the program can push together.

44



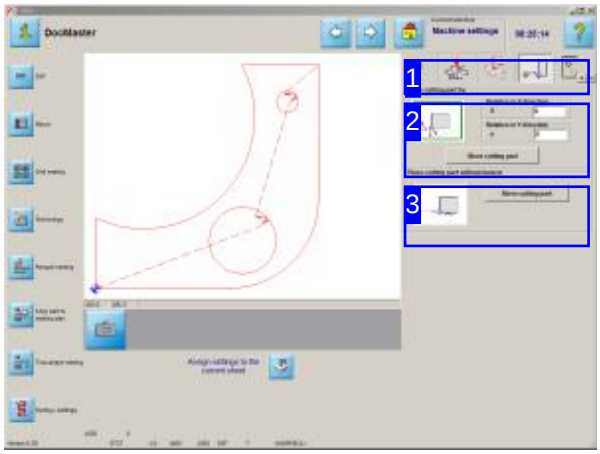
Four parts are mirrored in rows and columns. This allows parts with one right angle to be joined, allowing an optimal common cut. To get the right angle in the middle, mirror or rotate the first part to the direction required.

45



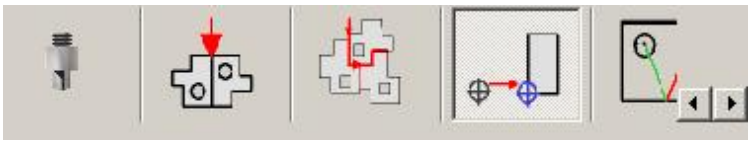
The 'Angle' layout mirrors in columns, allowing parts to be combined across columns.
Select this method if your part has differing diagonal sides which the program can push together.

Moving Cutting Parts.

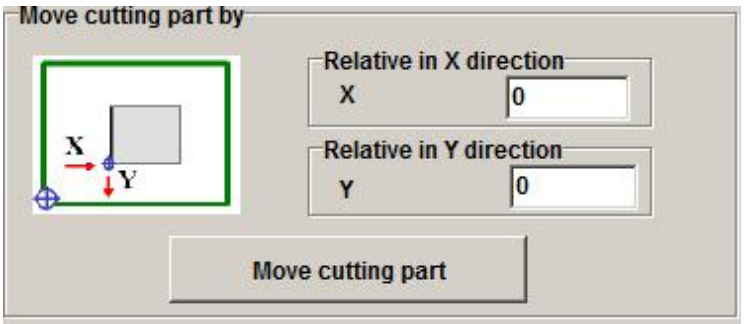


To move parts on your sheet, simply enter the new position relative to the old position.

Cutting parts can be hard-tacked on your sheet. Simply enter the new position to fix contours to a location on your sheet.

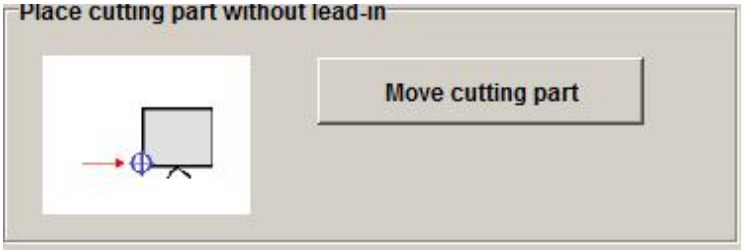
1 

This tab allows access to the screen for placing a part at a specified position.

2 

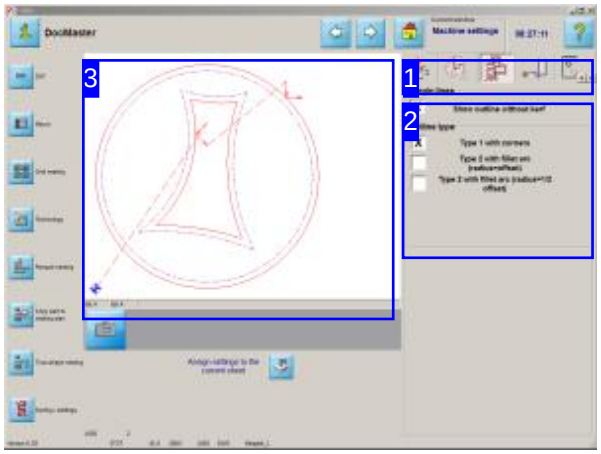
The new position is specified incrementally from the first, that is to say the new position is viewed not from the sheet's origin but from the old part origin.

3



Move the part back to its original origin with a single click.

Removing Overlaps.



Internal contours with sharp angles can easily end up with overlapping cuts. This feature allows you to resolve this issue. This feature requires installation of a particular DLL, which should be loaded into your program folder.

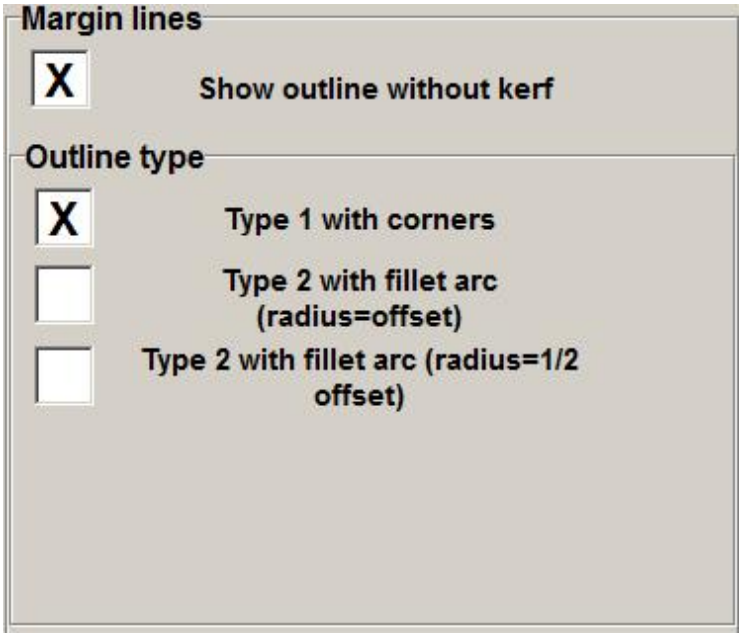
To fix contours with overlapping cuts, simply select the checkbox in the 'border lines' frame. This will automatically resolve any overlaps between contours and lead-ins. Lead-ins are relocated such that collisions are avoided.

For special cases you also have the option to change the lead-in length in order to avoid a collision. Click on the preview to enter the zoom window. The 'Test' tab in the 'Sort manually' function allows you to adjust lead-in lengths. This feature is described in this help page: 'manually sorting your cutting contours'.

1

This tab gives access to the collision control function.

2

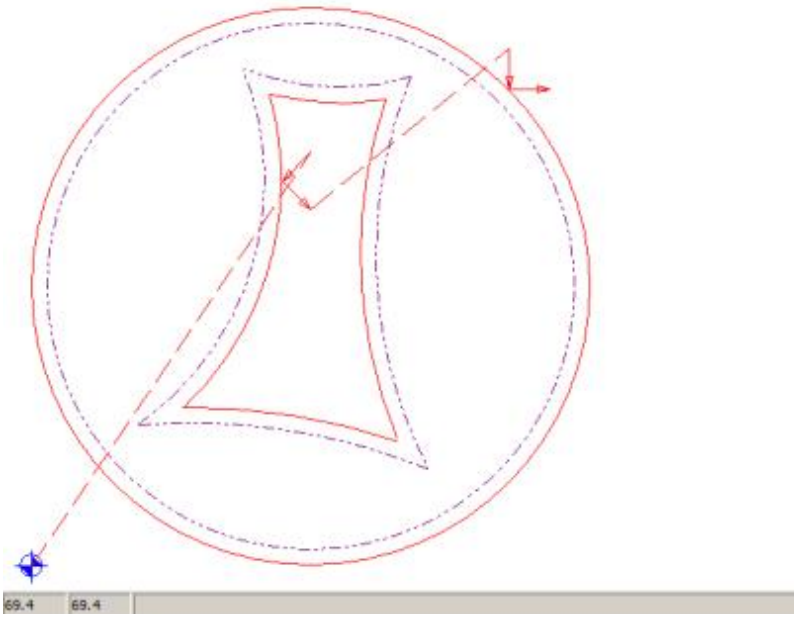


A cutting parts border lines can be added to your drawing board view; click the corresponding checkbox. This function requires a cutting offset to be entered in the sheet database.

You can cut the contour itself with three different corner types. Mark the first checkbox in the 'contour' frame for a sharp corner. The other two options are a rounded corner with the offset or one half offset as the radius.

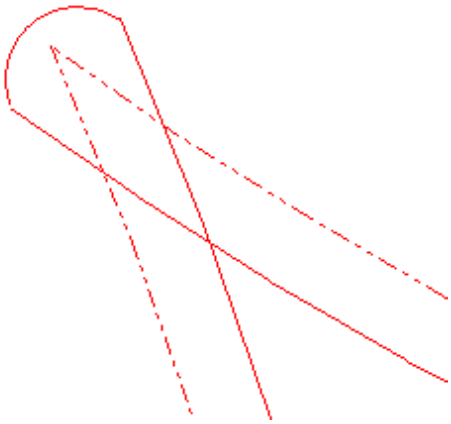
To allow the program to remove an overlapping cut, mark the checkbox in the bottom frame.

3



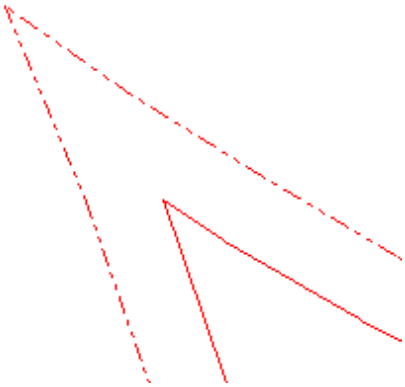
The part is shown with cutting lines in the preview. Click in the preview to access the zoom window, for a closer look at individual corners.

31



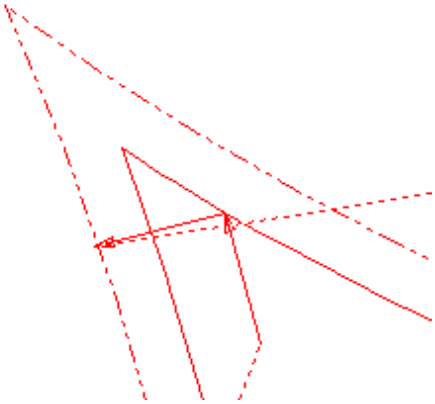
This corner exhibits an overlapping cut which can be removed by the program automatically.

32



This corner has been fixed - the Overlapping cut has been resolved.

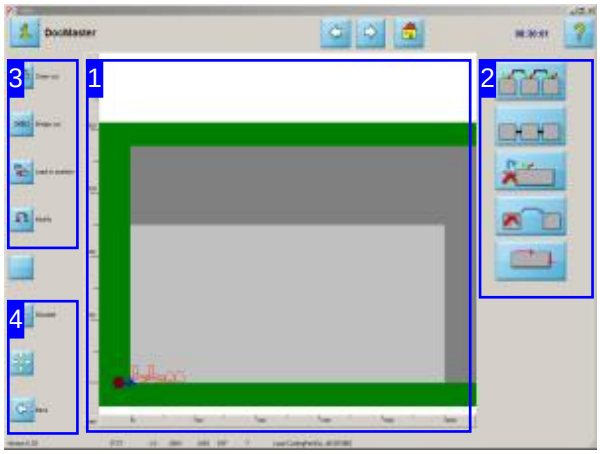
33



Lead-ins can sometimes collide with contours. You can either resolve this problem automatically with a single click, or switch to the 'test' tab in the 'Sort manually' function's zoom window to make changes manually. Mark the relevant element in the list and right-click it to access a menu to adjust its length.

Joined Cuts

Joining cuts and lead-in positions.



Cut parts can be joined into a continuous chain using joined cuts. Chain cuts join the lead-ins of each part together into a fixed path; bridge cuts join parts using cutting bridges.

Bridge cuts join various parts using an 'Endless cut'. The parts must be organized into a nesting plan; this makes bridge-cutting part of true-shape nesting.
In order to set a chain cut on your parts, the following conditions must be met:

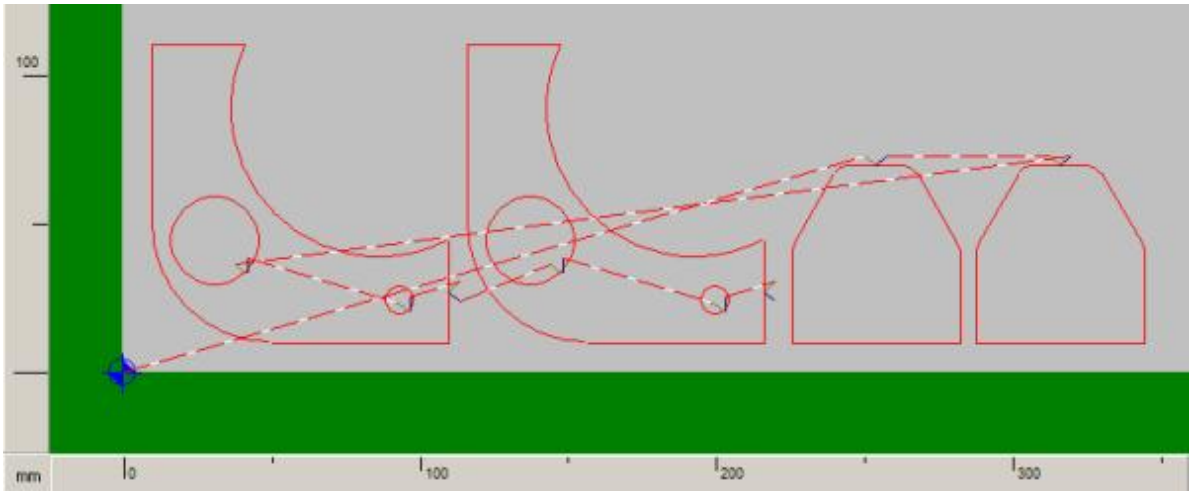
- A cutting offset must be set.
- The safety offset must be big enough that the cutting beam and subsequent contours do not collide.
- The parts must have lead-ins in order to maintain the lead-in type.

The cutting offset can be entered in the Sheet Database or direct in the 'Settings' tab in the 'True-shape Nesting' window.

To enter a chain cut, press the top button in the navigation panel [2] or in the right frame [1]. Use the second button to start a bridging cut.
This switches between the chain and bridge cut windows.

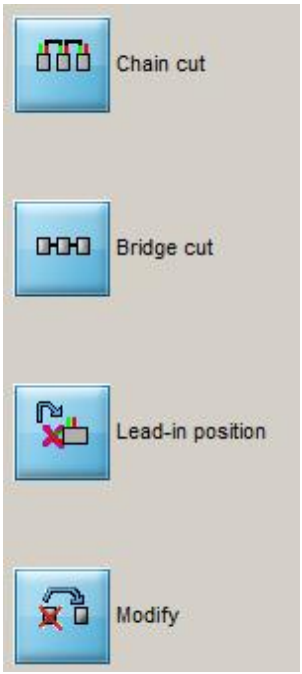
To access the window for setting the parts' lead-ins to the correct positions, click the third button.

1



The preview window allows you to check and prepare your parts for your joined cut. The parts must have a lead-in set and a suitable offset between each other. Set the lead-ins such that you can make the most efficient path around your sheet.
Note the cutting sequence for your contours when building the common path. To set the cutting sequence quickly, switch to the cutting sequence screen by clicking the forth button in the navigation panel [3].

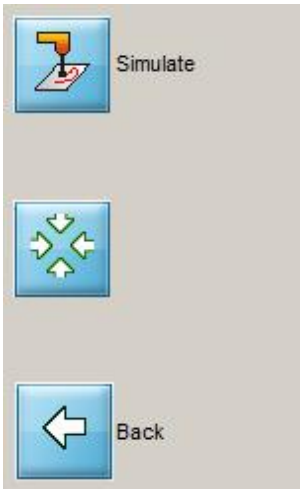
3



The top buttons have the same functions as those in the right frame [2].

The bottom button leads to a screen for setting the cutting sequence and set stops.

4

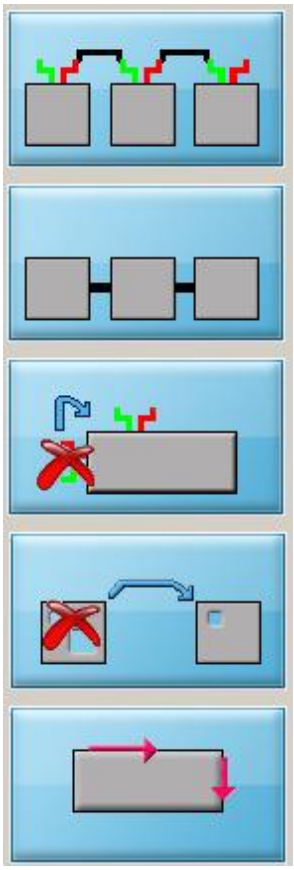


Click the top button to simulate how your parts will be cut in the preview window [1].

Click the middle button to fit the whole sheet back onto the drawing board.

Click the bottom button to go back one process step.

2



These buttons provide access to the screens for creating linked cutting paths.

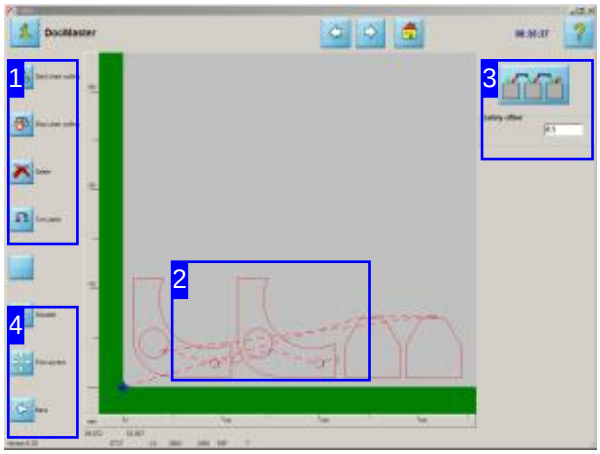
To position the lead-ins correctly, click the middle button.

Click the top button to access chain cuts and the second button for bridge cuts.

To create a chain cut, you must first put the parts in the correct sequence. Click the fourth button to access the 'Cutting Sequence' screen.

Click the bottom button to change a contour's cutting direction or line type - this switches to the 'Cutting Direction' screen.

Endless cuts using chain cuts



To cut parts with an 'endless cut', in a continuous chain, the lead-ins and -outs must be linked up, and the cutting path fixed. This screen allows you to take the necessary steps easily on-screen.

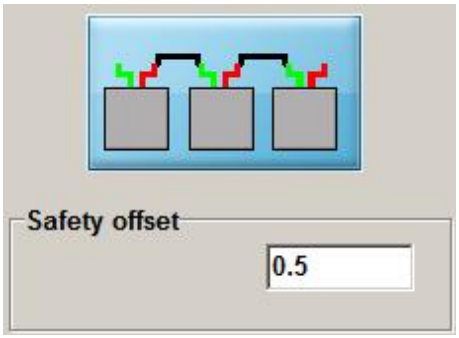
Chain cuts join various parts with an endless cut. The parts must be in a nesting plan; Chain cuts are a part of true-shape nesting.
In order to set a chain cut on your parts, the following conditions must be met:

- A cutting beam width (2 * cutting offset) must be set.
- The safety offset must be big enough that the cutting beam and subsequent contours do not collide.
- The parts must have lead-ins in order to maintain the lead-in type.

The cutting offset can be entered in the Sheet Database or direct in the 'Settings' tab in the 'True-shape Nesting' window.

To enter a chain cut, press the 'Start chain cut' button in the navigation panel [1]. You will continue processing a group until you press <Esc> or the second button in navigation panel [1] to close the chain cutting offering.

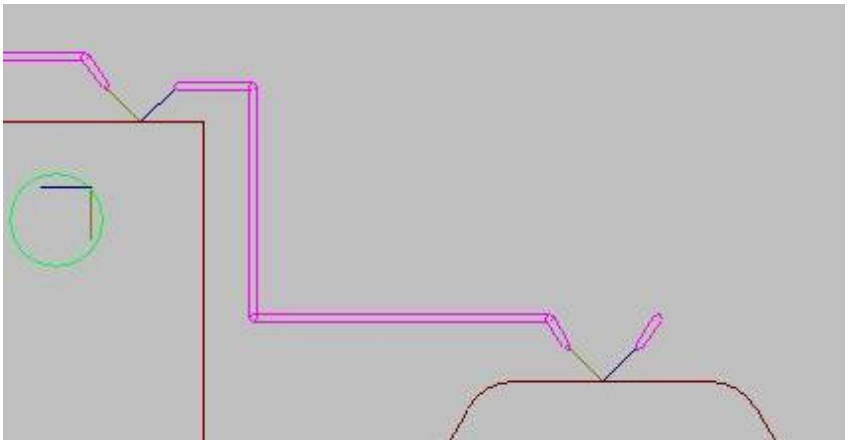
3



The 'Safety offset' cell allows you to set your minimum required gap between cutting beam and contour. If this value is undercut when laying a chain-cut then your chain-cut will be rejected.

If you have already started a chain-cut, this window will help with your next step.

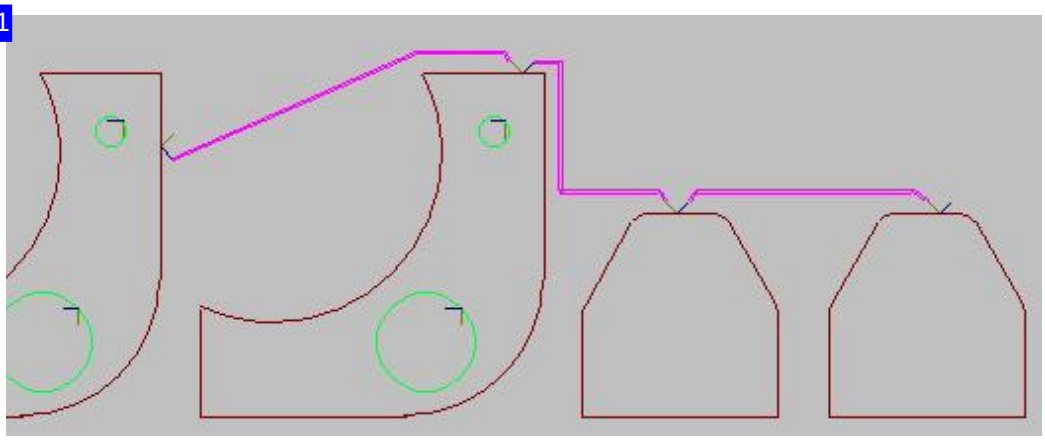
2



Joining parts to form a group:

- Zoom in on the first part to such a view that you can edit its lead-in.
- Move the mouse to the required lead-in position; a cursor 'runs' across the cutting path and marks the current position.
- Click the mouse button to place the lead-in at the current position. The new cutting path will be 'hung' onto the cursor. If the cutting path is not hung on the cursor you should check the safety offset, cutting beam gap and lead-in lengths. Cutting beam gaps and subsequent contours may not collide!
- Move to the next position and click to fix it. Continue in this fashion to create your chained cutting path.
- Move to the next part's lead-in position. If a lead-in is possible at this position, the crosshair cursor will be shown, and a simple mouse click will place the lead-in.
- Link all parts in the Group and leave the function by pressing <Esc> or clicking the second button in the navigation panel.
- Link all required parts together in a chain using this procedure.

21



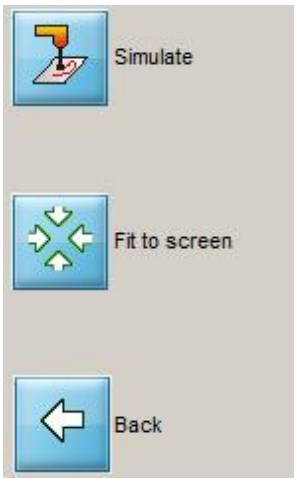
This is what a chained group looks like. There is one lead-in, made at the first part. The cutting path flows over each part's contour to the its lead-out, and to the next part's lead-in without stopping cutting. This continues through all joined parts until the lead-out.

1

Click the top button to access the 'Chaining' screen. You will continue processing a group until you press <Esc> or the second button in navigation panel [1] to close the chain cutting offering.

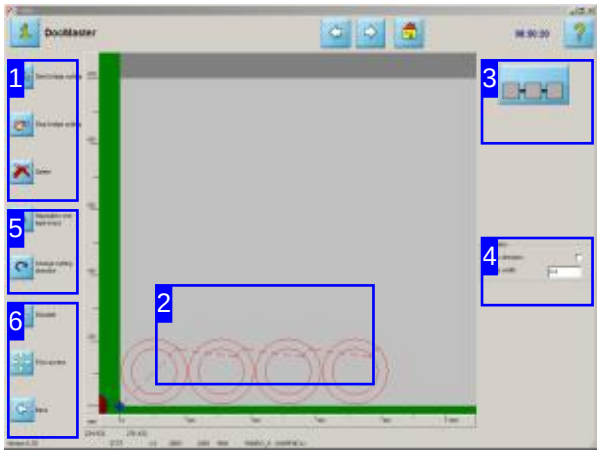
The third button Undoes your last action.

4



These buttons' functions are described in the 'Joining cuts and lead-in positions' chapter.

Join parts using a bridge cut.



You must join parts together with bridges in order to cut them in a continuous chain using an 'endless cut'. This screen allows you to take the necessary steps to do this simply using a graphical interface.

Bridge cuts join various parts using an 'Endless cut'. The parts must be organized into a nesting plan; this makes bridge-cutting part of true-shape nesting.
To set a bridge cut, a cutting gap (2 * cutting offset) must be set.
You can enter the cutting offset in the sheet database or direct in the 'Settings' tab of the true-shape nesting window.

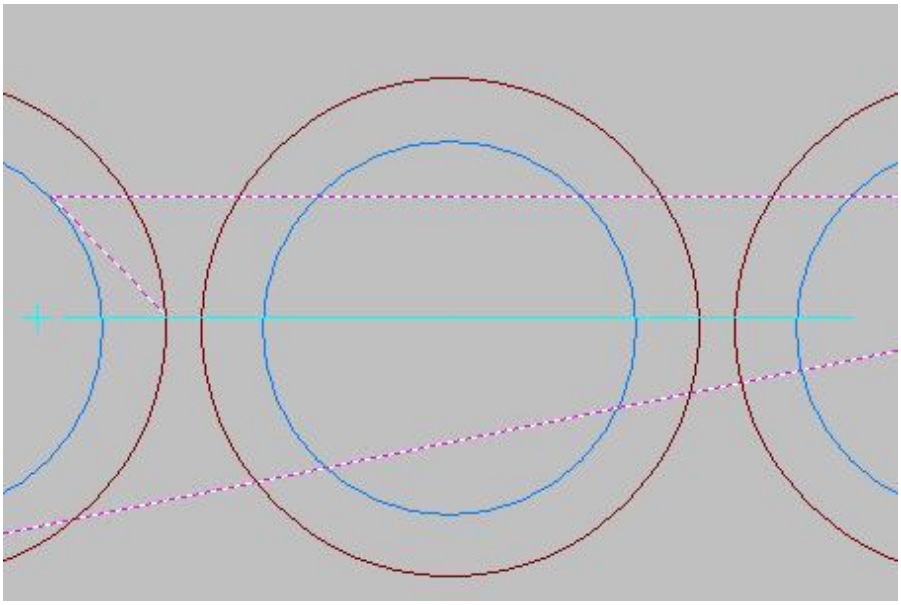
Click 'Start bridge-cut' in the navigation panel [1] to enter the bridge-cut offering. You will continue adding to your bridge cut until you click the second button in the navigation panel [1].

1

Click the top button to begin the 'chaining' function. The function remains active until you click the second button.

The third button Undoes your last action.

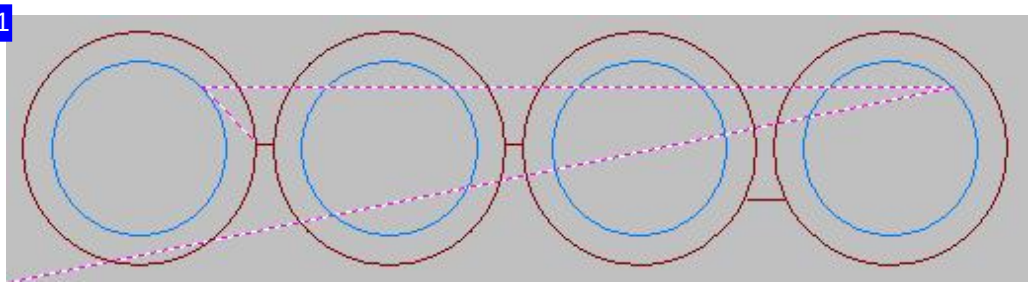
2



To join parts into a group:

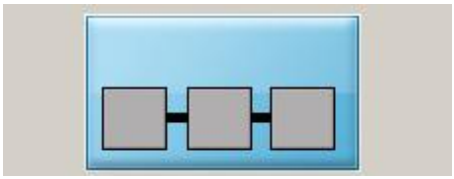
- Zoom in on the part so you can locate your joining line.
- Click to place the joining line's start position; the line will be shown attached to the cursor and follow it.
- Drag the line to its end position; click to fix the end position and join all parts the line crosses with cutting bridges.
- Use this method to chain all required parts into a group, even with multiple lines.
- Exit the offering by clicking the second button.

21



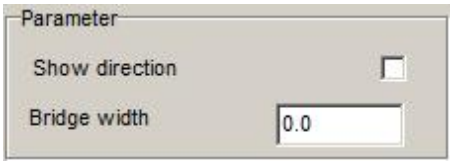
This is what a chained group looks like. The cutting path enters at the first part's lead-in, the travels across each part in turn without stopping, until the last part's lead-out.

3



If you have started chaining, this frame will help you with the next step.

4



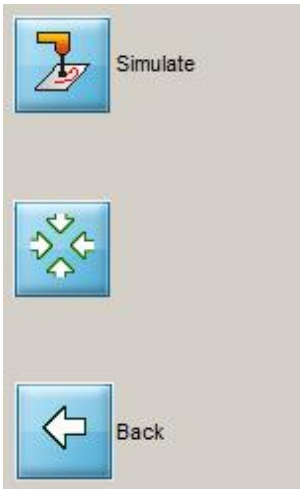
The 'parameter' frame allows you to enter the bridge width, and view the cutting direction in the preview [2]. Mark the checkbox to show the directional arrow.

5

The top button allows you to place a lead-in. Simply left-click in the preview [2] to relocate it.

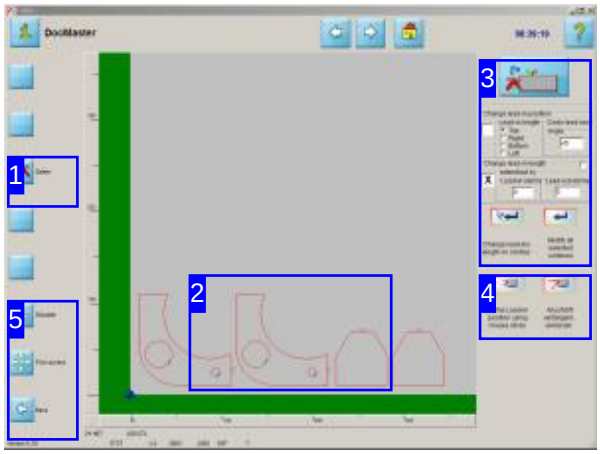
Use the bottom button allows you to change the cutting direction. Click the relevant contour in the preview [2].

6



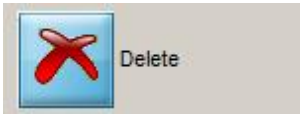
These buttons' functions are described in the 'Joining cuts and lead-in positions' chapter.

Set lead-in positions for bridge cuts.



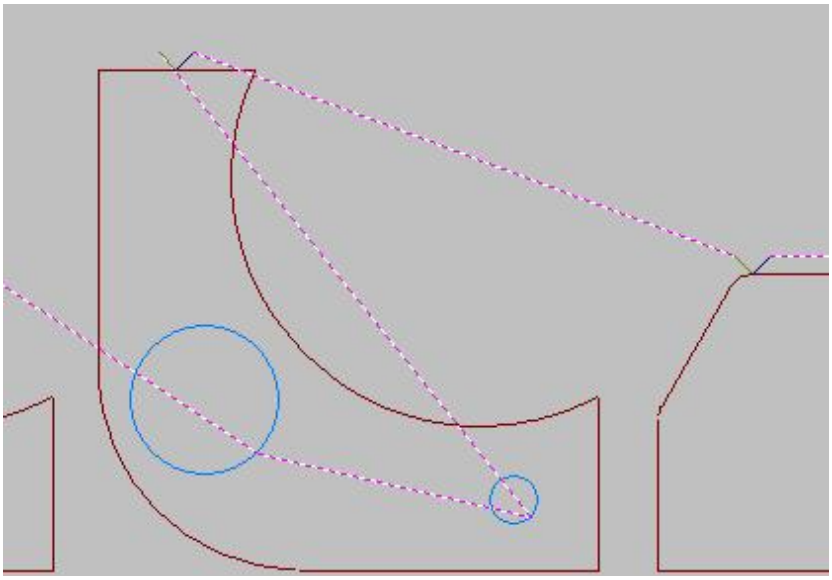
To make your parts part of a chain cut they must already have a lead-in so this can be switched to the appropriate type.
Allocate all your lead-ins automatically [3], or set their positions manually using the cursor on your drawing board [2].

To cut your parts together in a continuous chain using an 'endless-cut' means joining the lead-ins together, so creating one cutting path. This screen allows you to move those lead-ins manually one at a time, or automatically as a complete set.

1 

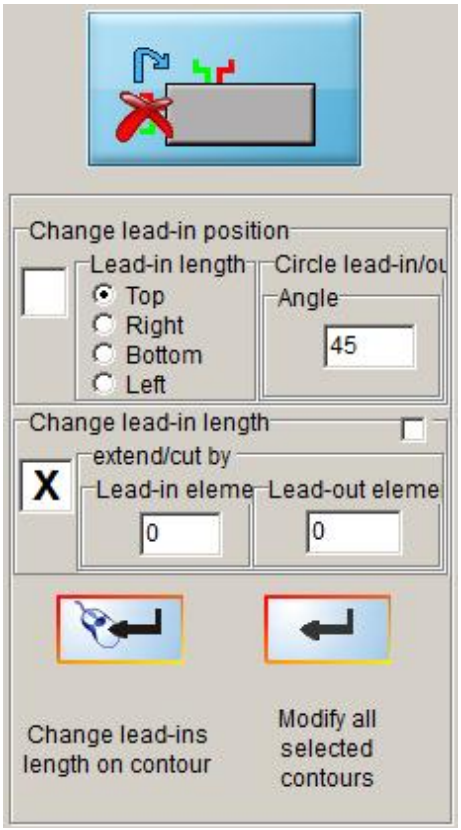
Click this button to Undo your last action.

2



Zoom in to a level where you can process your lead-ins. Move the cursor around the drawing and use the scroll-wheel to zoom in and out about the cursor.

3



This frame allow you to set your cut parts' lead-ins simply and easily. Mark the checkbox in the 'Change lead-in positions' frame and choose which side of your part to put the lead-in on. Click the 'modify all identified contours' button to set the new lead-ins on all parts the program identifies as suitable.

The 'Change lead-in/out element length' frame allows you to incrementally change the machine-cuts' lengths.

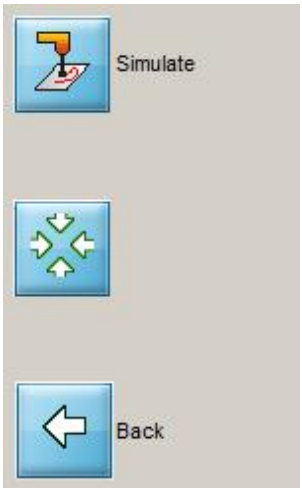
Enter a negative value to shorten the lead-in.
Mark the checkbox in the 'Change lead-ins and -outs' frame and enter the values for your tech cuts. Click the 'modify all identified contours' button and the program will apply the lead-ins to all contours it judges relevant.
To set a position directly, click the bottom button and then use the mouse to set a lead-in position graphically on the drawing board - click where you would like the lead-in placed.

4

To set a position directly, click the top button and then use the mouse to set a lead-in position graphically on the drawing board [2] - click where you would like the lead-in placed. Proceed in this manner until you are satisfied, then click the escape button in the preview.

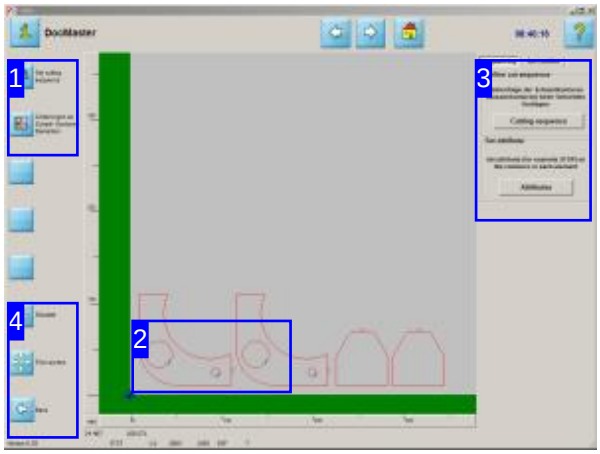
Click the bottom button if you wish to change one specific lead-in. Click the lead-in and drag to the required new position, then click to fix it there. Proceed in this manner until you are satisfied, then click the escape button in the preview.
If you wish to maintain a safety offset, mark the relevant checkbox in the preview's header. Enter the required offset, and the system will show this offset at the cursor position when setting a position. This will help you avoid collisions between your lead-ins and contours.

5



These buttons' functions are described in the 'Joining cuts and lead-in positions' chapter.

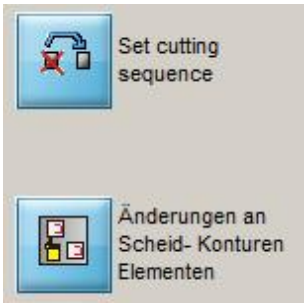
Setting the Cutting Sequence and Attributes.



Parts must be in the correct sequence in order to link them using a chain cut.
Set the sequence - markings, holes, outlines - with just a few clicks.

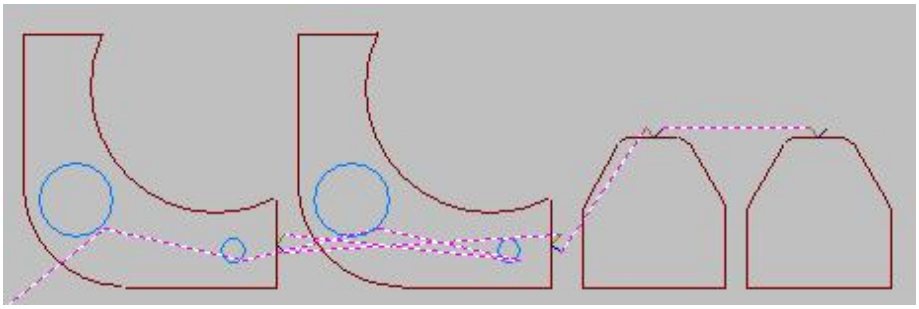
Parts must be sorted into the correct sequence in order to link them using an 'endless' chain cut. This screen allows you to set that order and place breaks where needed.

1



These buttons have the same functions as those in the right frame [3].

2

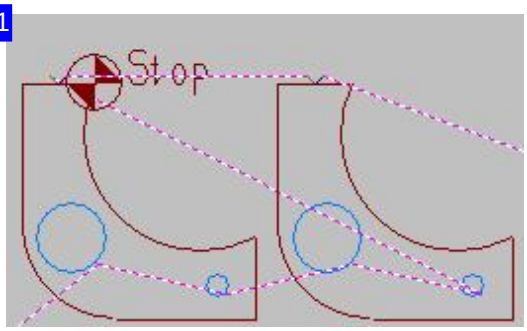


In order to cut parts' outlines with one continuous cut, the contours must be set in the right order. This order is markings, holes, outlines, and can be set with a simple click in the right-hand frame.

If you have allocated such attributes as a 'stop' to your parts, they will also be shown in the preview.

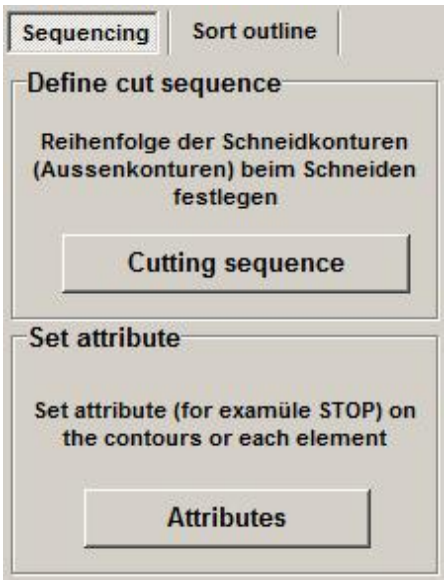
To set the sorting settings for outlines go to the 'Sort outline' tab.

21



A stop you placed on a contour or contour element will be shown like this.

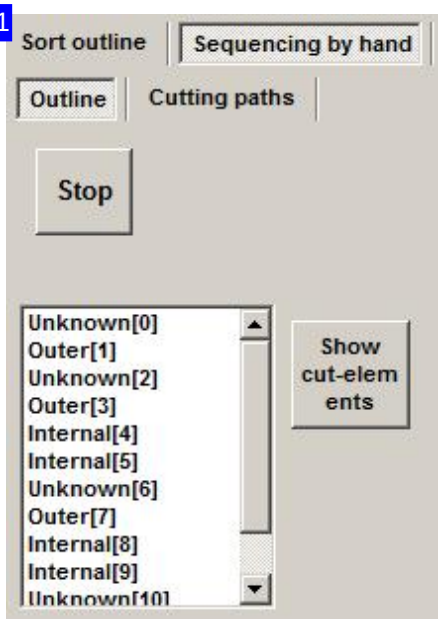
3



The top frame allows you to set the cutting sequence. Click the 'Cutting sequence' button and *cncCUT* will automatically sort the parts in this order: markings, holes, outlines. This then allows you to create an endless cut.

To place 'breakpoints' around your parts, click the 'Attribute' button. This takes you to a window for selecting and editing individual contours or contour elements; the navigation panel [1] contains the buttons for this.

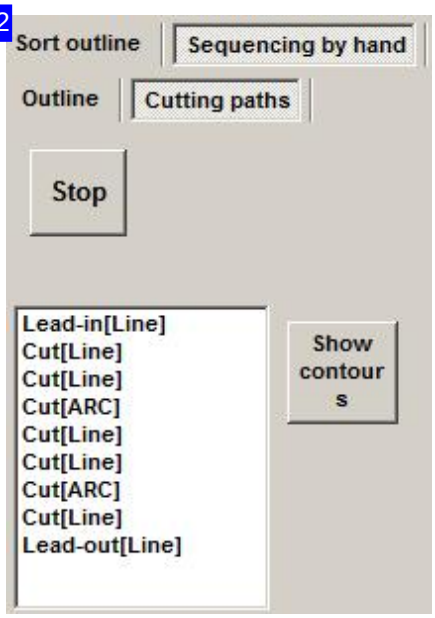
31



You can process your contours and add breakpoints here. Highlight the relevant element in the list and click the top-left button, or the 'Set Stop' button in the navigation panel [1]. The buttons are toggles; they can place new stops or remove existing ones.

The right button (or the third button in the navigation panel) allows you to switch between tabs.

32

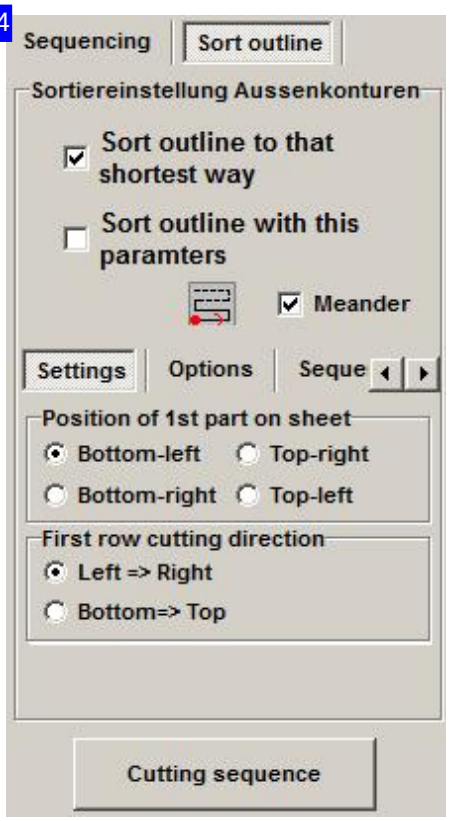


Process elements and add breakpoints in this frame in the same way as contours.

33

These buttons' functions are the same as those in the right-hand frame [3]. The tabs' content adapts to that of the right frame.

34



Mark the top check-box if you would like *cncCUT* to automatically calculate the cutting path. This will be set using a shortest-path algorithm.

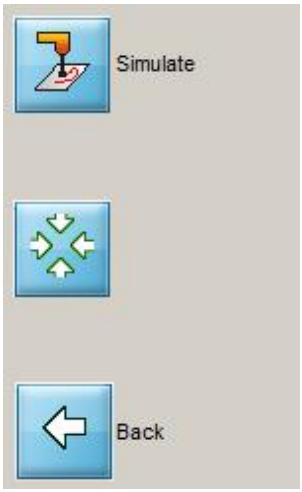
If you prefer to set the cutting path yourself, mark the second check-box, then use the options available from the bottom tab panel to set the cutting sequence..

The central icon will always show the pattern your current settings result in. The position of the first contour to be cut is shown with a red dot, the cutting direction is indicated with a red arrow.
If you wish to change the cutting direction after each pass, mark the 'Meander' check-box. This saves time in non-cutting movements. Leave the box blank if there is a risk of your material warping under the heat.

The 'Parameter' tab allows you to set the position of the first contour from the part to be cut, and dependant on this, you can then set the direction for the head to travel to cut the other contours in the first row.

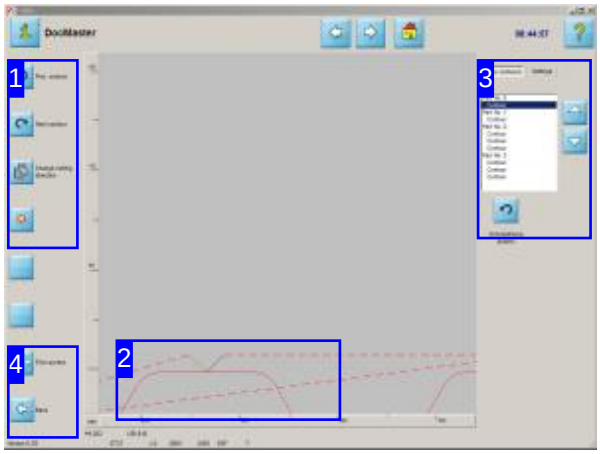
The 'Options' tab allows you to set the lead-in point for sorting. If you wish to change the sequence, you may do so from the

'Sequence' tab.
To set the sequence of processing method go to the 'Contour Position' tab.

4 

These buttons' functions are described in the 'Joining cuts and lead-in positions' chapter.

Change the cutting direction.



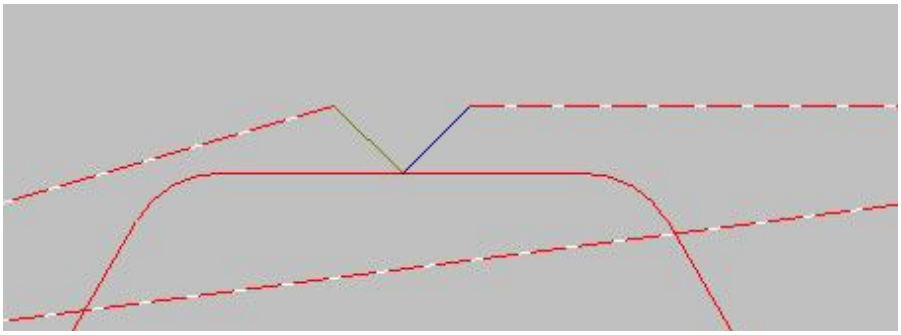
To change a cutting direction, select a contour in the preview using the top two buttons in the navigation panel [1]. The contour will be highlighted in the list and the button for changing the cutting direction will appear under the list [3].

Optimize traversing paths by changing the direction your parts are cut in.

1

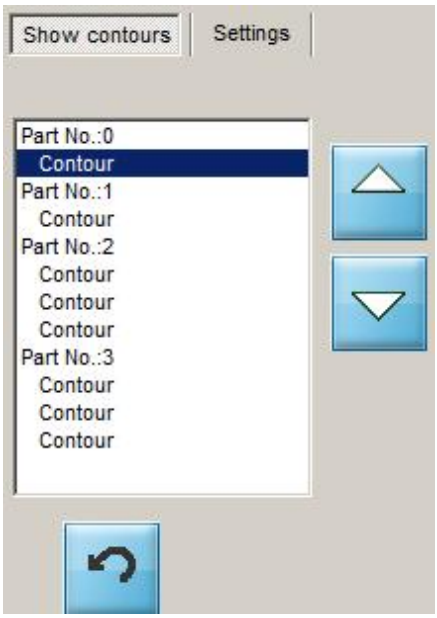
Use the top two buttons to select the contour whose cutting direction you would like to change.
Click the bottom button to turn the direction, which you can check in the preview [2].

2



You can zoom in on the lead-in for the contour you wish to edit in the preview. This allows you to easily check up on any other changes required when changing the cutting direction.

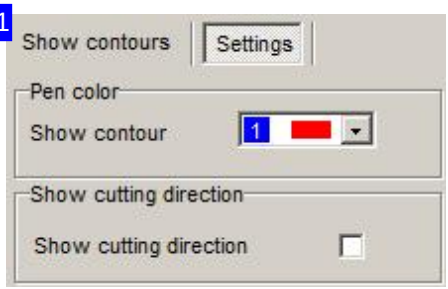
3



The top list shows the parts with contour elements. To turn a cutting direction, select a part with the mouse or using the buttons next to the list or in the Navigation panel [1]. Then press the 'Change cutting direction' button under the list.

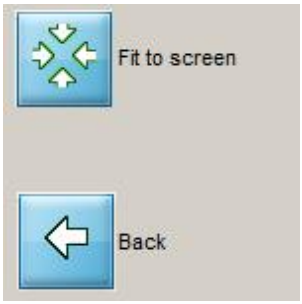
To change the line color displayed, switch to the Parameter tab.

31



You can change the line color here. Choose the color from the list and mark the checkbox in the 'Show cutting direction' frame. The selected contours will be shown in the selected color in the preview window.

4

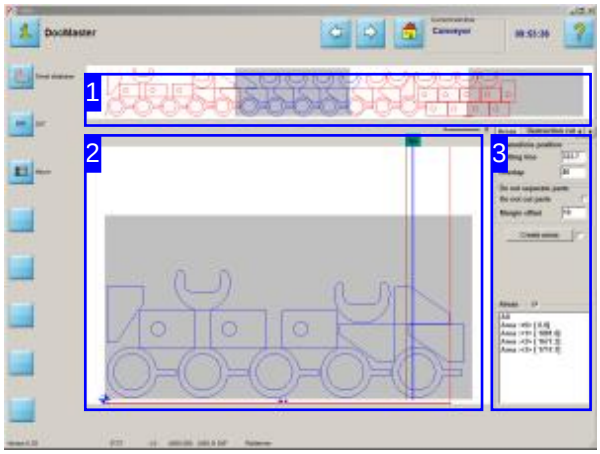


The 'Show all' function brings the preview window back to the original display position. Press the top button to see your whole sheet.

Press the bottom button to return to connecting cuts.

Conveyor

Cut large sheets with repositioning.

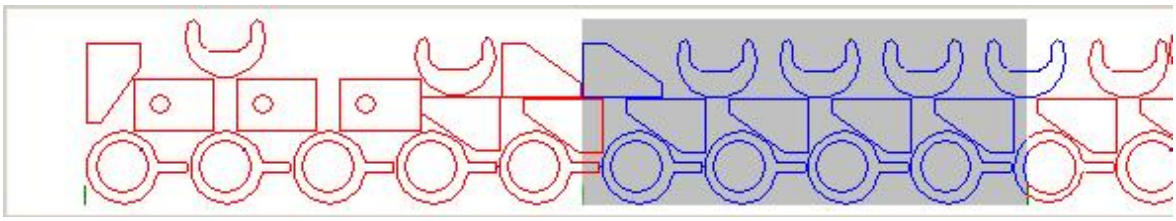


The optional feature 'Conveyor-operation' was developed for machines that allow resetting the sheets. This function is protected by the dongle and must be released before use.

In Conveyor-mode, it is possible to cut sheets larger than the cutting table. Thereby a sheet is divided into individual cutting areas, which are then cut with appropriate settings one by one.
The instructions for dealing with the parts in the cutting regions can be controlled by an extensive parts management on nesting plans up to the instruction to divide individual parts when it becomes necessary.

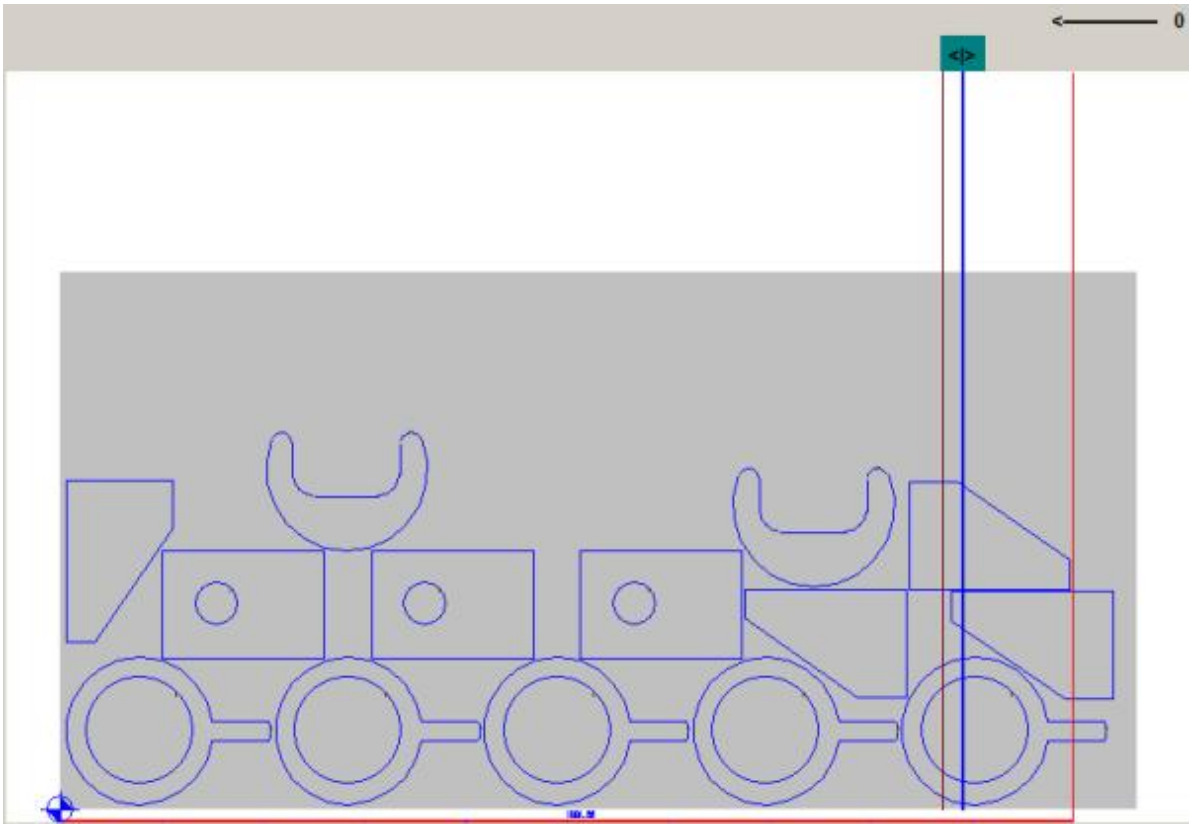
The overview [1] shows you the complete nesting area and a selected part of it is shown in the preview [2].
You can adjust the settings for controlling the operation on the right side.

1



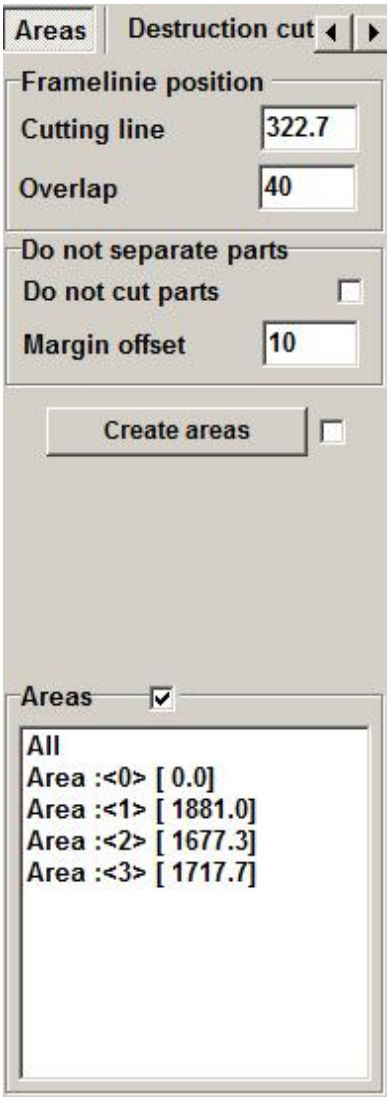
This overview shows an overly long nesting plan on the cutting table (one gray area) that protrude much. This presentation will change when a new separation takes place.

2



The preview shows a nesting plan with the cutting area. The blue line on the right shows the dividing line with a handle. This line allows you to move freely in a convenient location. This means that you can create individual areas, which are then individually cut by resetting the sheet on the cutting table. The brown line next to left, shows an overlap region, which is described in more detail below.
You modify the assignment of parts to the cutting areas by changing the settings on the tab 'Areas' [3].

3



The assignment of the parts in the respective areas can be controlled by parameters. As a basis, the dividing line or cut line is provided with a handle on the line and can be moved freely on the cutting table.

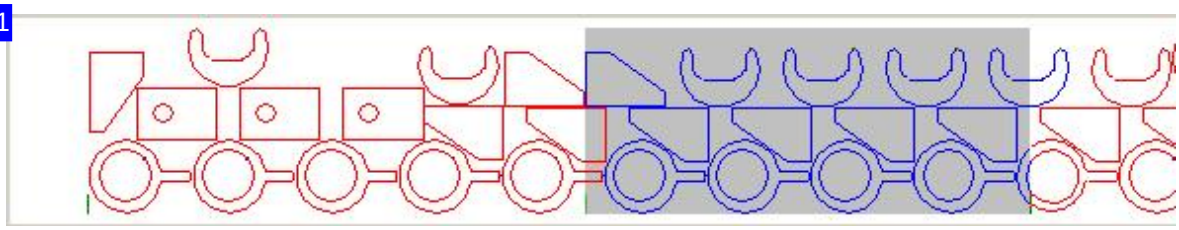
You have to distinguish whether individually parts may be severed, which is likely to be true in parts that are longer than the cutting area, or whether the parts must be kept. You make the decision, by marking the selection box 'Do not cut' (see left). If parts may be cut, there is defined an overlapping area, where the parts are still not cut. This allows you to prevent parts from unnecessarily cutting off small pieces that have an unfavorable position from the view of the sheet division. You can specifically define the width of the overlap region.

Click on 'Create areas' to assign parts to the individual areas like the settings. The display in the overview is adapted. Choose the area that you will see in the preview from the list below. The effects of the settings for the field of cutting areas is illustrated by the following examples.

You can make further adjustments on the tabs in the header:

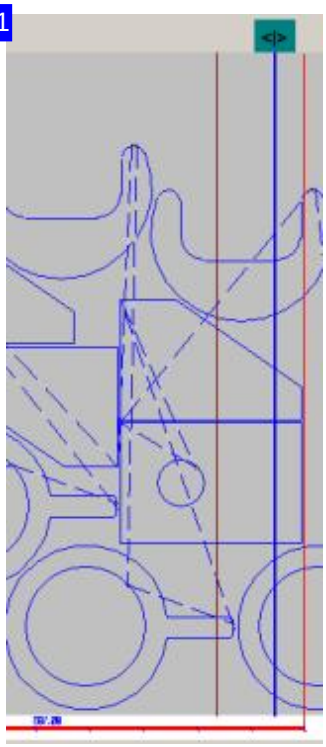
- Destruction cuts
- Leads in/- out
- Machine
- Sorting preferences
- Time calculation
- Simulation
- Deletion

11



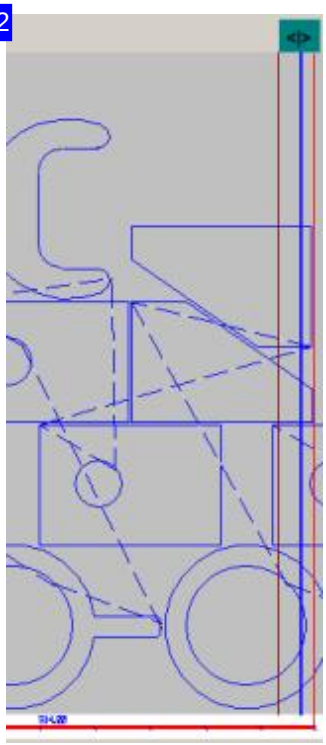
The display is adjusted when setting the cutting areas. You can identify the assignment of parts to the areas well due to the different colors of the contours. Select from the list the area you want to see in the preview in order to control a cutting range.

21



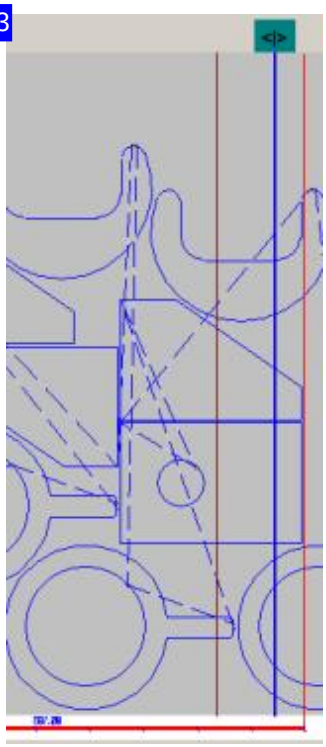
This is the result of part positions with a small overlap region and the requirement that the parts may be cut. Small pieces are cut off from the parts right up and down. You can avoid this by increasing the overlap region, shown in the example below.

22



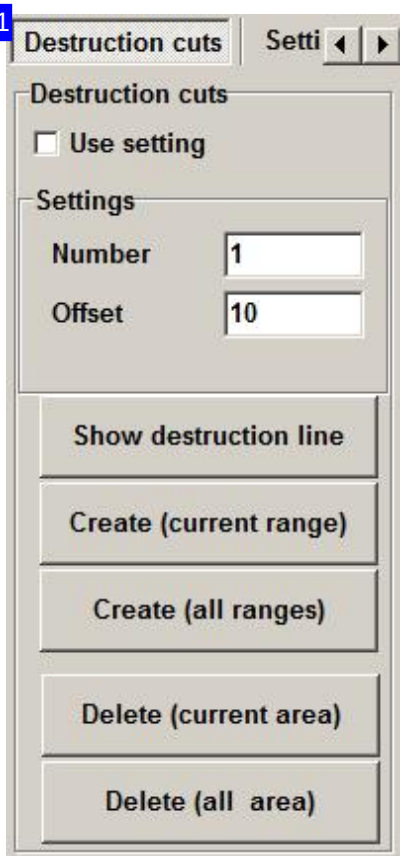
The brown line on the left marks the overlap region, the red line indicates the range limit. In this setting, the overlapping area was enlarged, with the result that the parts right above and below are moved to the next area and thus not cut. Mark the respective checkbox to prevent that all parts will not be cut. The following example shows the result.

23



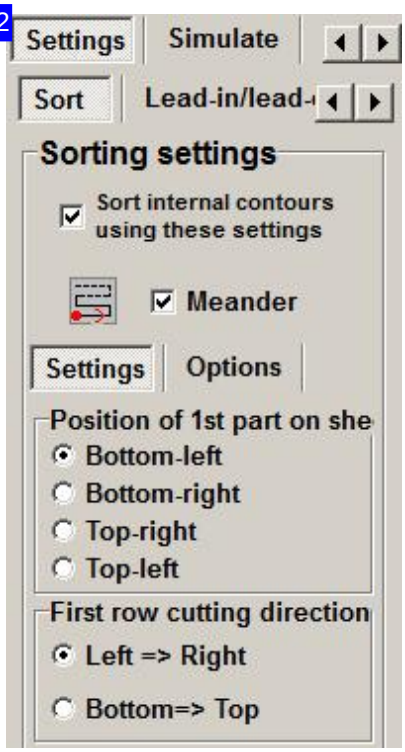
This is the result of part position if the parts may not be cut. The central part of the preceding examples is moved to the next area too.

31



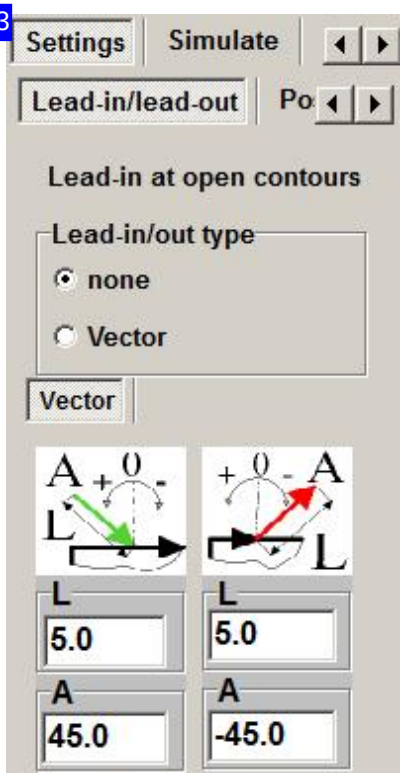
You can attach destruction cuts to facilitate the removal of parts and reacting the sheet. These go parallel to the slide edge and are cut after the parts have been cut in a cutting area. You specify the requirements for the destruction cuts here.

32



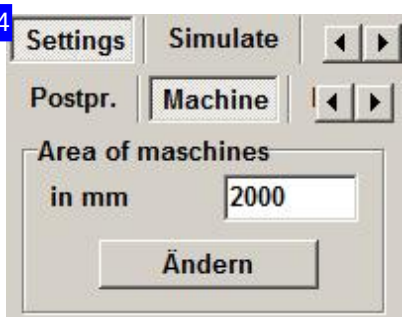
You can set preferences for the sorting of the areas under the tab 'Sorting', like usual in *cncCUT* . You get more information on this in the online help for *cncCUT* .

33



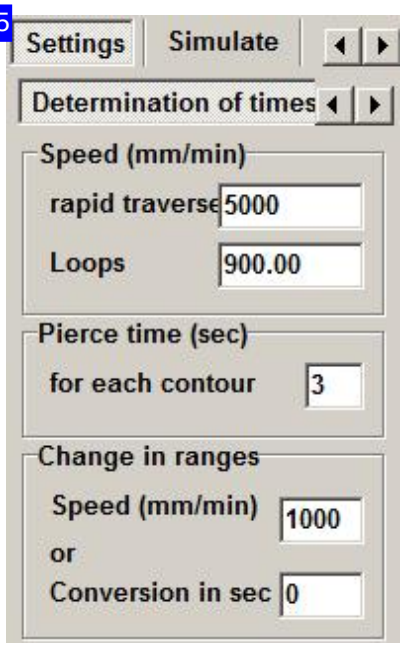
It is important that new leads in/-out are set where parts are severed. The tab 'Leads in/-out' offers known opportunities specifically for these cuts from *cncCUT* .

34



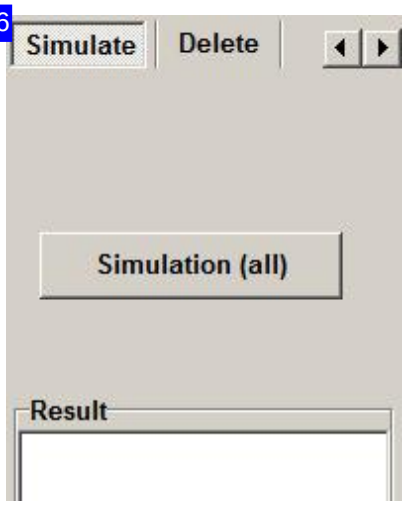
You can make settings for the working area on the Tap 'Machine'.

35



To calculate cutting in several areas also means a change in the calculations in order to move the sheet metal. Here you can make the specifications for the calculation.

36



Check the cutting order of the parts and the destruction cuts in the simulation. If necessary, change the sort order.

37

If a realignment of the parts to the areas makes trouble, you can selectively delete individual parts here.

38

You can assign the settings to the selected sheet permanently.

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