Online help

ToPs 100

Use the functions of Acrobat Readers to look for a word.

Instructions for Acrobat Reader

- You can find the "Find" function under *Edit* in the 4.0 version of Acrobat Reader.
- The "Find" function" corresponds to the *binocular* in der icon bar.
- "Find next" can be activated with the F3 key.
- You can use the cursor keys in the icon bar alongside the bookmark for the navigation of the document.

Software manual

ToPs 100

Version 5.0

Software manual

ToPs 100

Version 5.0

Edition: **12/2001**

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Before you read further ...

ToPs 100 is a technology-oriented programming system for laser and water jet machining.

The manual is intended to explain how to use the software and to act as a reference work.

Content of the manual

- Chapter 1: Introduction to ToPs 100
- Chapter 2: Operating ToPs 100
- Chapter 3: Drawing module
- Chapter 4: Nesting module
- Chapter 5: Technology module
- Chapter 6: Data module
- Chapter 7: Information module
- Index

Complementary documentation

Further information can be found in the documentation included with the machine:

- Operator's manual
- Programming manual
- Data collection

TRUMPF

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Chapter 1

Introduction to ToPs 100

1. The ToPs concept

With the programming system ToPs 100 TRUMPF gives you access to its whole range of expertise in the field of laser and water jet machining.

The modular structure of ToPs gives it clarity. It gives support when you are producing a drawing for a single part just as when you are looking for the optimal layout for the sheet.

ToPs takes the specific possibilities of your machine into account in every phase of programming and guarantees uniform creation and data transfer of ready-to-use NC programs.

ToPs 100 is an open system which ensures a close relationship to the design process.

ToPs stands for: **T**echnology
oriented
Programming
system

Technology orientation

- ToPs 100 takes into account every aspect of the technology of your machine and your laser. For example, it takes into account the different acceleration potentials of the machine axes, or reduces the laser power in good time.
- ToPs automatically optimizes traversing paths and positioning sequences.
- ToPs checks for possible collisions in the machining plan which has been created.
- ToPs generates clear processing plans and NC programs and displays logs (e.g. of collision checks).

Closed process chain

ToPs is the link between the design and machining sections.

- The design process takes into account the requirements of machining.
- ToPs supports you in technology-oriented programming in three stages:
  - Creating or importing geometry in or to ToPs.
  - Defining processing on the basis of a uniform set of data (laser tables, water tables, piercing data, processing guidelines, machine data, material data, NC components) and generating NC data.
  - Data transfer to the machine.
- In the machining process, the machine's technological possibilities are exploited to the full.

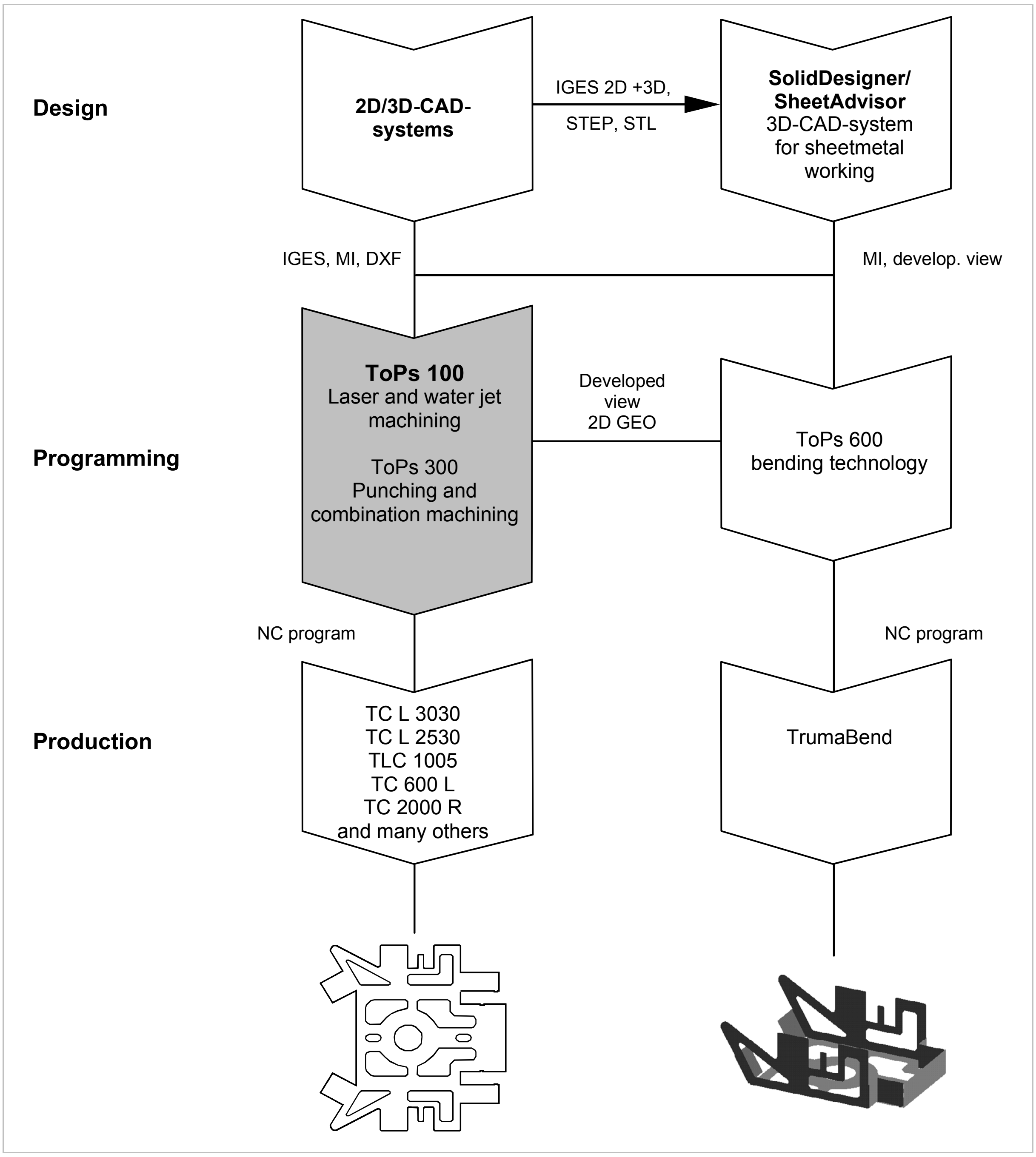


Fig. 28572EN

Platform ToPs 100 requires a PC with one of the following operating systems:

- Windows XP.
- Windows 2000.
- Windows NT.
- Windows 98.

2. Machines supported by ToPs 100

Machine	Designation in ToPs	Machine group	Control system (machine software)	Components
TC L 2503	L2503	L2503, TC1	Bosch	Pallet changer
TC L 2503 E	L2503E	TC3	Bosch	Pallet changer
TC L 2530	L2530	TC8	SINUMERIK 840D	Pallet changer
TC L 3003	L3003	L3003	Bosch	Pallet changer
TC L 3003 E	L3003E	TC1	Bosch	Pallet changer
TC L 3030	L3030	TC3	Bosch	Pallet changer
TC L 3030	L3030S	TC8	SINUMERIK 840D	Pallet changer, LiftMaster
TC L 3050	L3050	TC16	SINUMERIK 840D	Pallet changer, LiftMaster
TC L 4003	L4003	L4003	Bosch	Pallet changer
TC L 4003 E	L4003E	TC1	Bosch	Pallet changer
TC L 4030	L4030	TC3	Bosch	Pallet changer
TC L 4030	L4030S	TC8	SINUMERIK 840D	Pallet changer, LiftMaster
TC L 5005	L5005	L3003, TC1	TASC 500	Pallet changer
TC L 6030	L6030	TC3	Bosch	Pallet changer
TC L 6030	L6030S	TC8	SINUMERIK 840D	Pallet changer
TC LY 2500	LY2500	TC5	Bosch	Pallet changer
TLC 105	TLC105	L3003, TC1	TASC500	-
TLC 105 (DIAS height control system)	TL105D	L3003, TC1	TASC500	-
TLC 1005	TLC1005	TC9	SINUMERIK 840D	-
TLC 6005	TLC6005	TC13	SINUMERIK 840D	Pallet changer
TC HSL 2502 (two cutting heads)	HSL2502	TC10	SINUMERIK 840D	Pallet changer
TC HSL 2502 C (two cutting heads)	HSL2502C	TC12	SINUMERIK 840D	Pallet changer
TC HSL 4002 C (two cutting heads)	HSL4002C	TC12	SINUMERIK 840D	Pallet changer
TC WS 2500	WS2500	TCWS1	Bosch	-
TC HSL 2502 (two cutting heads)	-[1])	TCWS1	Bosch	-
TC WS 4000	WS4000	TCWS1	Bosch	-
TC WS 4020 (two cutting heads)	WS4020	TCWS1	Bosch	-

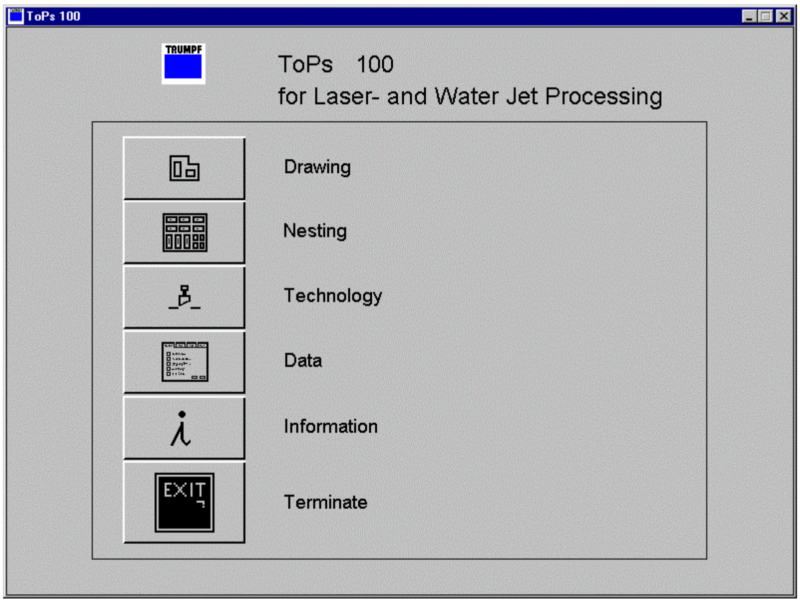
Table 1-1

[1] The second cutting head can be activated in ToPs 100 under the TC WS 2500

3. Brief description of the modules

Modular structure

ToPs 100 has a modular structure: The various functions are allocated to different software components known as modules. The central pivot point is the initial screen showing the different modules:



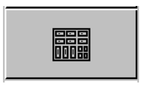
Initial screen

Fig. 28807EN

3.1 Drawing module

The Drawing module contains all the typical drawing functions which will be familiar to you from other ToPs products. For example, you have the option of defining a geometry as a macro. In addition, you may also import CAD drawings.

3.2 Nesting module



In the *Nesting* module, tasks are set and managed and parts are nested as single parts or mini nests.

You can nest processed and unprocessed parts and mini nests on the one sheet.

3.3 Technology module

The Technology module is the core of the programming system. Here laser machining is defined, machining is optimized and the NC program is automatically created. In addition ToPs produces a setup plan. This contains all the information needed for execution.

3.4 Data module

With the Data module, TRUMPF gives you access in the form of a database to its whole range of technical knowledge in the field of laser and water jet machining.

The database contains the following data:

- Machine data
- Material data
- Laser data
- NC modules
- Machining rules
- System data ...

3.5 Information module

In the Information module you can open information masks about software and database versions. You can select different language versions of ToPs 100 and delete files.

Chapter 2

Operating ToPs 100

1. User interfaces

1.1 Main menu and icon bar

ToPs displays the main menu points of the active module in the main menu bar. The submenus appear as pull-down menus.

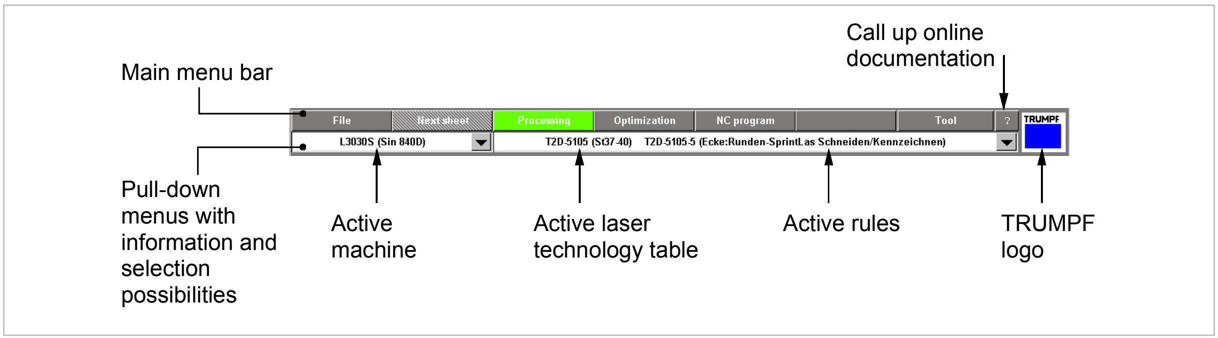
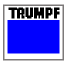


Fig. 21995E

Showing software version



1. Click on TRUMPF logo.
   ToPs shows the software version.
2. Select *OK*.

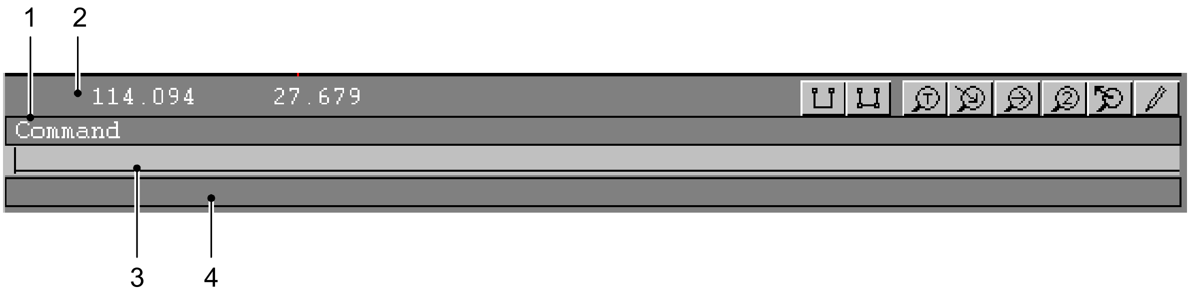
ToPs closes the mask.

Calling up online help

➢ Select *Question mark*.

ToPs shows the ToPs 100 manual as a '.pdf' file.

1.2 ToPs mask footer



1	Status line	2	Command line	3	Input line
				4	Message line

The ToPs mask footer — Fig. 29872EN

Status line

ToPs displays the current X and Y position of the mouse pointer in the status line (1).

Command line

ToPs gives you instructions in the command line (2).

Examples:

- `Enter 1st point`
- `Enter the start point of the arc`

Input line

You can enter all data required by ToPs in the input line (3):
Examples:

- X and Y coordinates of points.
- Commands such as `all`, `pick` ... (without square brackets).

Message line

ToPs informs you of what is currently being done in the message line (4).

Examples:

- `File .... finished reading`
- `Drawing deleted!`

2. Operating ToPs using the mouse

2.1 Activate functions with the left mouse button

1. Click on menu items and buttons with the left mouse button. Examples: *File >New.*

Cancel function? 2. Select *Cancel*.

End active function? 3. Select *End*.

2.2 Positioning the mouse pointer in masks automatically on *OK*

(See Chapter 6, Data module.)

2.3 Expert mode: Using the right mouse button

In ToPs you can call up some functions with the right mouse button:

Function	Description
Quickly closing a module.	➢ In the opened module, click with the right button on *File*. This action corresponds to a left click on *File >Return*.
Carrying out a window quick-zoom (detail).	➢ Click on the desired detail in the graphics area with the right mouse button. The pick point in the graphics area becomes the new center point. The graphic is zoomed in.
Reducing window quick-zoom (only possible with middle mouse button).	➢ Click on the desired detail in the graphics area with the middle mouse button. The pick point in the graphics area becomes the new center point. The graphic is zoomed out.

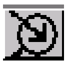
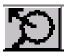
Function	Description
Activating *Detail*. 	➢ Right click on *Detail*. The program notes the current image section.
Activating *Previous zoom*. 	➢ Right click on *Previous zoom*. The noted image section will be displayed.
Activating *Total*. 	➢ Right click on *Total*. The sheet, and not the working range, is displayed in total.
Displaying files from NC programs with File manager.	1. Select *Technology module >NC program >Create*. 2. Right click on *Display* in "NC program". File manager is opened for selecting the file.
Display setup plan with File manager.	1. Select *Technology module >NC program >Create*. 2. In "Setup plan" right click on *Display*. File manager is opened for selecting the file.
Printing setup plan with File manager.	1. Select *Technology module >NC program >Create*. 2. In "Setup plan" right click on *Print*. File manager is opened for selecting the file.
Searching laser technology tables for exact stated laser power in the Technology module (Data module).	1. Select *Technology module >Tool >Laser tables*. 2. Mark "Max. power" with a cross and enter laser power. 3. Right click on *Find*. Only technology tables with the given laser power are searched for. If you click with the left mouse button, all laser technology tables are displayed which are smaller than or equal to the given laser power.

Table 2-1

3. Operating ToPs using the keyboard

3.1 Entering numerical values and coordinates

Entering decimal figures

1. Enter decimal figures separated by a point.
   Examples: Enter `30.5`.
2. Press <RETURN>.

Entering coordinates

1. Enter X and Y coordinates separated by a comma.
   Examples: X = "10 mm", Y = "20.5 mm": enter `10,20.5`.
2. Press <RETURN>.

3.2 Entering text in the input box

1. Click in the input box with the mouse pointer (cursor).
2. Enter characters one after the other.

Confirm input

3. Press <RETURN>.

3.3 Use key functions from ToPs or from Windows?

The ToPs key functions have been adapted to those of Windows. This means that ToPs can be operated using the keyboard more quickly. (For an overview of ToPs and Windows key functions, see next page.)

Note
The Windows key functions are automatically set at initial installation and when ToPs is updated.

You can select which key functions you wish to use (for Setting key functions, see Chapter 6, Data module).

Key	Configuration	
	Previously: ToPs key function	**New: Windows key function**
<↵>	Jump to next input box.	Confirm mask; corresponds to: pressing *OK*
<↑>, <↓>	-	Delete characters in input box.
<SHIFT>+<Backspace>	Delete characters in input box.	Delete characters in input box.
	-	Jump to next input box.
<SHIFT>+ <Tab>	-	Jump to previous input box
<Esc>	Delete characters in input box.	Close mask; corresponds to: pressing *Cancel*

Table 2-2

3.4 Using "Copy" – "Paste"

The Copy and Paste functions are available in all ToPs input boxes.

Depending on the position of the cursor in the input field, the content is copied either completely or only partly into the intermediate memory.

When pasting, the copied content is inserted at the point where the cursor is located.

The contents of the intermediate memory can also be inserted into ToPs input boxes from other programs and vice versa.

Copy		**Paste in empty input box**	
Cursor position│	**Key combination**	**Key combination**	**Result**
Example123│	<CTRL> + <C>	<CTRL> + <V>	Example123
│Example123	or	or	Example123
Exam│ple123	<Strg> + <C>	<Strg> + <V>	ple123

Table 2-3

3.5 Repeating entries

Entries and functions which are repeated do not have to be re-entered again every time.

Using the keyboard buffer

The keyboard buffer stores entries or functions which you have entered in the command line (see Fig. 29872, p. 2-4) or which have been executed as background commands:

1. Click in the command line with the mouse pointer (cursor).
2. Browse through the keyboard buffer with the cursor keys (<↑>, <↓>) until the desired command or entry appears.
3. Press <RETURN>.

ToPs repeats the command or entry.

3.6 The calculator

With the calculator you can enter numerical values and coordinates, carry out calculations and at the same time enter the results of the calculations.

The calculator can be operated in all modules with the mouse and with the keyboard:

Calculator function	Using mouse	Using keyboard
Delete line	*C / CL*	(not possible)
Leave calculator **without** transferring entry	*Cancel*	<Esc>[1]
Leave calculator, transfer entry	*OK*	(not possible)
Squaring	x^2	(not possible)
pi	π	(not possible)
Multiplying	*	<*>
Dividing	/	</>
Adding	+	<+>
Subtracting	-	<->
Result	=	<↵>

Table 2-4

Calculating, entering numerical values

1. Position the mouse pointer (cursor) in the input box for numerical values.
2. Double click.
   ToPs shows the calculator:

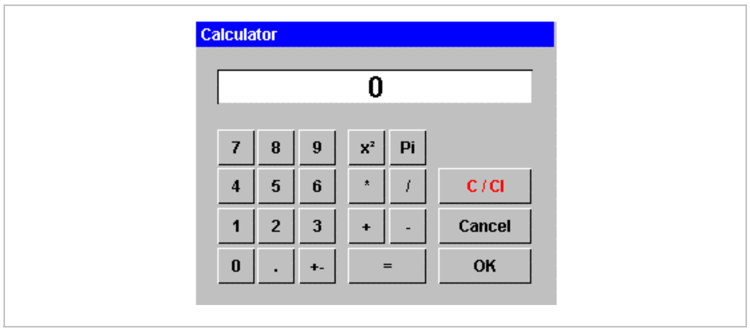


Fig. 20085EN

3. Click on the desired figures and arithmetic operations or input them via the keyboard.
4. Select *OK*.
5. ToPs closes the calculator.

1 Only when Windows key functions are set (for key functions see Section 3.3, p. 2-7, for setting key functions see Chapter 6, Data module).

Entering coordinates with the calculator

1. Position the mouse pointer in the command line (see Fig. 29872, p. 2-4).
2. Double click.
   ToPs shows the calculator with the extra "Coordinate" fields:

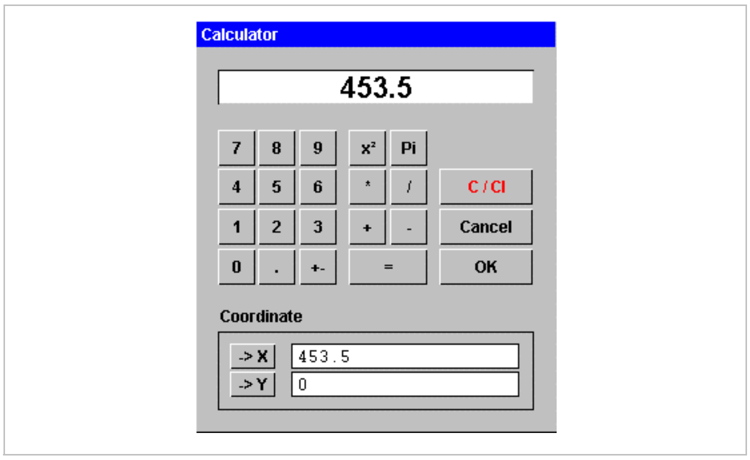


Fig. 20086EN

3. Enter the numerical value of the X coordinate in the input box at the top.
4. Select *→X*.
   ToPs imports the value into the lower input box.
5. Enter the numerical value of the Y coordinate in the input box at the top.
6. Select *→Y*.
   ToPs imports the value into the lower input box.
7. Select *OK*.
8. ToPs closes the calculator.

Switching the calculator "on" and "off"

You can choose whether you wish to work with the calculator on, or whether it should generally not be displayed during operation.

Note
When you modify variables in 'Tops100.ini', you have to restart ToPs 100 for the modifications to come into effect.

1. Open Explorer.
2. Go to the directory 'Trumpf\ToPs100w'.

3. Double click on the 'Tops100.ini' file.
4. If necessary select the program (Editor), with which the 'Tops100.ini' file should be opened (e.g. "Notepad").

   Editor opens the 'Tops100.ini' file.
5. To activate the calculator, set the following variable to `1`:

```
(...)
;;aktiviert Zahleneingabe mit Maus
ST_NumInputWithMouse = 1
(...)

(Translation:)
;;activates number entry using the mouse
ST_NumInputWithMouse = 1
```

6. To deactivate the calculator: set the variable to `0`.

Tip
Use the *>Find* menu in your Editor to find the variable quickly.

7. Save changes in 'Tops100.ini'.
8. Close 'Tops100.ini'.

4. Modifying screen display

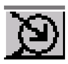
4.1 Modifying display of drawings

Displaying whole drawing

- ➢ Select *Total.*

ToPs shows the whole drawing in the working range of the mask.

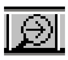
Selecting a detailed view of the drawing



1. Select *Detail*.
2. Click on the first point in the box with the mouse pointer (cursor).
3. Click on the opposite point in the box.

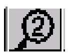
ToPs displays the content of the box in detail.

Panning a drawing



1. Select *Pan*.
2. Click on the reference point and the target position.

Enlarging or reducing the display of a drawing



1. Select *Zoom*.
2. Enter the enlargement or reduction factor. (To reduce the display to half its size: enter `0.5`. To double the size of the display: enter 2.)

Zoom with the right mouse button

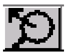
➢ Right click on the midpoint of the desired section.

ToPs triples the size of the screen section around the selected point.

Undo Zoom?

Select *Total.*

Restoring previous size of the drawing



➢ Select *Previous zoom*.

ToPs displays the drawing in its previous size again.

Reopening the drawing window

➢ Select *Redraw*.

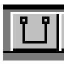
ToPs reopens the drawing window.

4.2 Showing or hiding contour points

Contour points can be shown or hidden in the tube drawing module.

Showing or hiding open contour points

Note
Open contour points can be shown or hidden only in the tube drawing module.



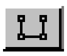
➢ Select *Open contour points*.

ToPs shows or hides all open points within a drawing.

Showing or hiding contour points

A drawing contains various contour points, which ToPs displays in different colors:

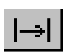
- Start and end point of a contour: red cross.
- Contour link points: green square.
- Center points of circles or partial circles: cyan cross.



➢ Select *Display points*.

ToPs shows or hides all open points within a drawing.

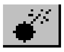
4.3 Showing or hiding positioning movements



➢ Select *Positioning*.

ToPs shows or hides the positioning movements inside the current display.

4.4 Showing or hiding collisions



➢ Select *Collisions*.

ToPs shows or hides collisions during processing inside the current display.

TRUMPF

Chapter 3

Drawing module

1. The Drawing module

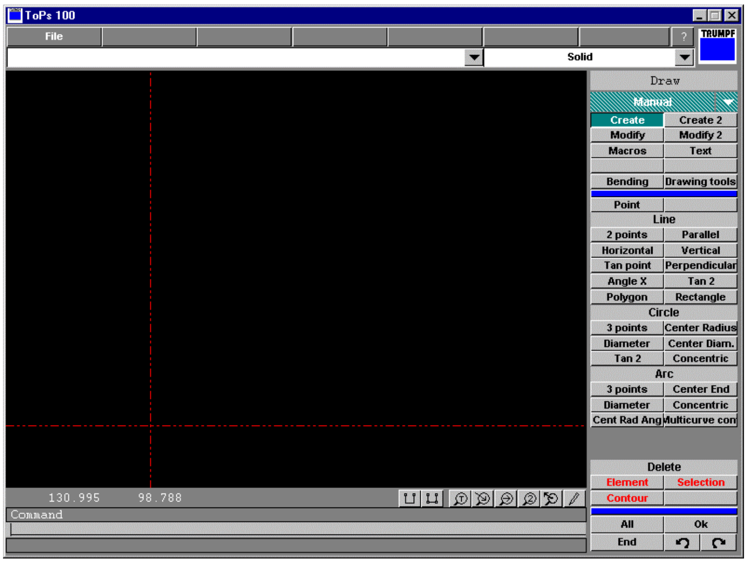
The Drawing module contains all the typical drawing functions which will be familiar to you from other ToPs products. For example, you have the option of defining a geometry as a macro. In addition, you may also import CAD drawings.

1.1 Opening and closing the Drawing module

Opening the Drawing module

1. Open ToPs 100 (see Chapter 2).
   The initial screen for ToPs 100 is displayed.

2. Select *Drawing*.
   ToPs displays the initial screen for the Drawing component. It includes the zero point of the new drawing (intersecting point of two perpendicular construction lines):



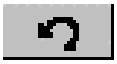
Drawing component of ToPs 100 Fig. 24965EN

Closing the Drawing module

- Select *File >Return*.

ToPs 100 returns to initial screen.

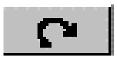
1.2 Undoing or restoring any/all actions



Using *Undo*, you can undo (almost) all actions in the Drawing module, without restrictions.

Exceptions:

- Prepared drawing of a single part (see Section 4, p. 3-61).
- Modified drawing data (see p. 3-106).
- Smashed parts structures of a drawing (see p. 3-101).



Using *Redo*, you can restore all actions which you have undone as long as you have not performed any new action.

Undo and *Redo* function back to the last "Load file" or "New file."

2. Drawing geometries

All typical drawing functions and more

The Drawing module contains all the typical drawing functions which will already be familiar to you from other ToPs products.

Interfaces to CAD systems

You can create drawings directly in ToPs or read them in from another system. For this purpose, TRUMPF offers you interfaces to foreign formats (see Section 8, p. 3-91).

Changing or supplementing CAD drawings

CAD drawings can be modified or supplemented with the drawing functions in ToPs.

2.1 Drawing points

1. Select *Create, Point*.
2. Click on the position of the point.

   or

   ➢ Enter the X and Y coordinates for the point.

Working with points

Points which are to be marked must be drawn in cyan.

(To change color and line type, see Section 3.9, p. 3-54).

2.2 Drawing lines

Drawing a line between two points

1. Select *Create, Line, 2 points*.

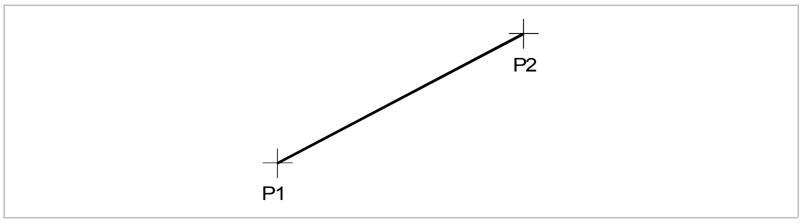


Fig. 4701

2. Click on the start point (P1).

   or

   ➢ Enter the coordinates of P1.
3. Click on the end point (P2).

   or

   ➢ Enter the coordinates of P2.

Drawing a line parallel to an existing line

Prerequisite

- The drawing contains at least one line (referred to here as the base line).

1. Select *Create, Line, Parallel*.

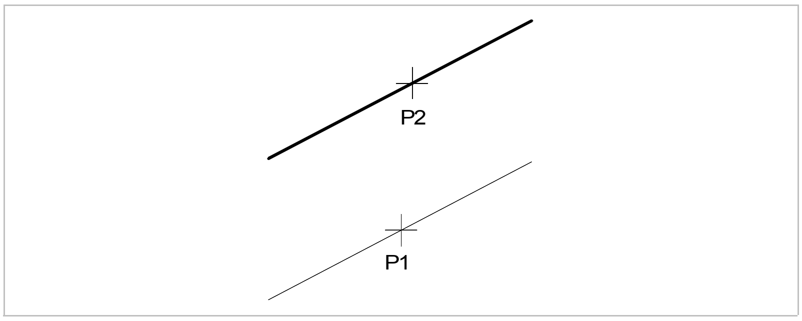


Fig. 4702

2. Click on the line (P1) for which you want to create a parallel line.
3. **Either**

   ➢ Click on the point (P2) through which the parallel line should pass.

   or

   ➢ Enter all distances from the base line at which a parallel line should be drawn. (Separate values with a space. Do not use commas.)

   ➢ Click on the side of the base line where the parallel line(s) should appear.

Example for entering several distances

`10 20 30`.

Drawing a horizontal line

1. Select *Create, Line, Horizontal*.

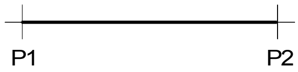


Fig. 4703

2. Click on the start point (P1).

   or

   ➢ Enter the coordinates of P1.
3. Click on the end point (P2).

   or

   ➢ Enter the coordinates of P2.

   or

   ➢ Enter the length of the horizontal line.

Drawing a vertical line

1. Select *Create*, *Line, Vertical*.

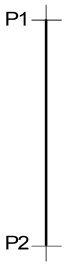


Fig. 15165

2. Click on the start point (P1).

   or

   ➢ Enter the coordinates of P1.
3. Click on the end point (P2).

   or

   ➢ Enter the coordinates of P2.

   or

   ➢ Enter the length of the vertical line.

Drawing a line as a tangent to an arc element or circle

Prerequisite

- The drawing includes at least one arc element or circle.

1. Select *Create, Line, Tan Pt*.

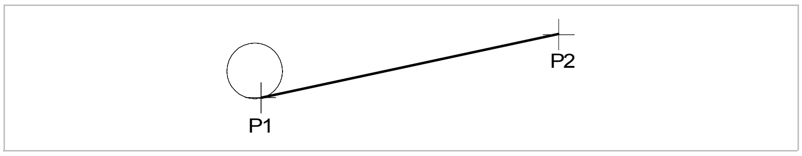


Fig. 4704

2. Click on the approximate tangential point on the arc or circle (P1).
3. Click on the end point (P2).

   or

   ➢ Enter the coordinates of P2.

Drawing a line at a right angle to another element

Prerequisite

- The drawing contains at least one other element.

1. Select *Create, Line, Perpendicular.*

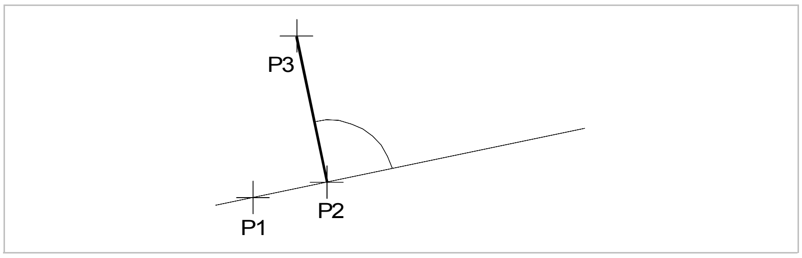


Fig. 4705

2. Click on a point (P1) on the base element.
3. Click on the second point (P2).

   or

- Enter the coordinates of P2.

  If P2 is on the base element (P1), ToPs takes P2 as the start point for the perpendicular line.

  If P2 is not on the base element (P1), ToPs drops the line from P2 at a right angle to the element.

4. Click on the third point (P3).

   or

   - Enter the coordinates of P3.

   or

   - Enter the length of the perpendicular line.

Drawing a line with a point, angle of inclination, and length

1. Select *Create, Line, Angle X*.

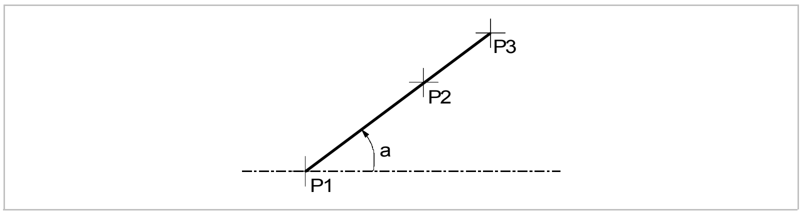


Fig. 4706

2. Click on the start point (P1).

   or

   - Enter the coordinates of P1.

3. Enter an angle (a) relative to the X-axis.

   or

   - Click on the second point (P2).

   or

   - Enter the coordinates of P2.

4. Click on the third point (P3).

   or

   - Enter the coordinates of P2.

   or

   - Enter the length of the line.

Drawing a line as a tangent to two arc elements or circles

Prerequisite

- The drawing includes at least two arc elements or circles.

1. Select *Create, Line, Tan 2*.

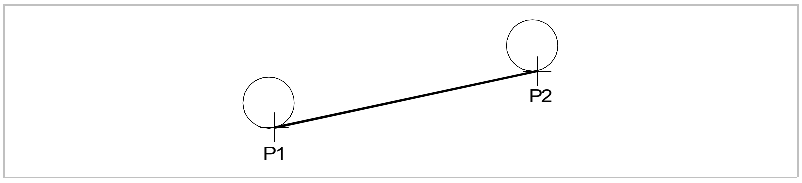


Fig. 4707

2. Click on the first approximate tangential point (P1).
3. Click on the second approximate tangential point (P2).

2.3 Drawing polygons

1. Select *Create, Line, Polygon*.

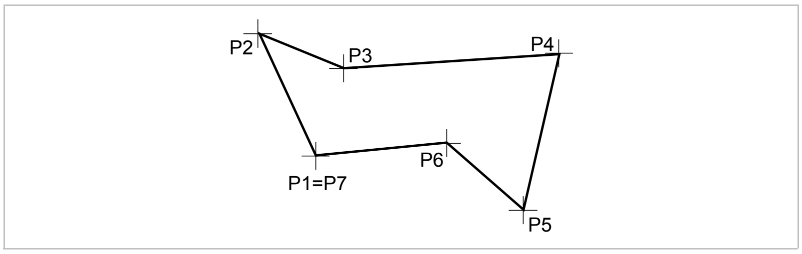


Fig. 4708

2. Click on the start point (P1).

   or

   ➢ Enter the coordinates of P1.
3. Click on the next several points (P2) to (P6).

   or

   ➢ Enter the coordinates of the points (separated by spaces).
4. To close the polygon contour:

➢ Click on the end point (same as start point) (P7=P1).

or

➢ Enter the coordinates of the end point.

2.4 Drawing rectangles

1. Select *Create, Line, Rectangle*.

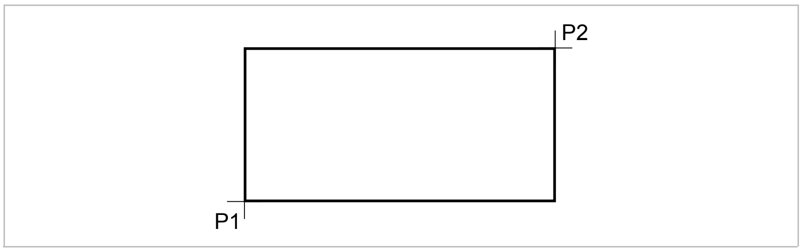


Fig. 4913

2. Click on the first corner point (P1).

   or

   ➢ Enter the coordinates of P1.

3. Click on the corner point diagonally across (P2).

   or

   ➢ Enter the coordinates of P2.

2.5 Drawing circles

Three points method of drawing circles

1. Select *Create, Circle, 3 points*.

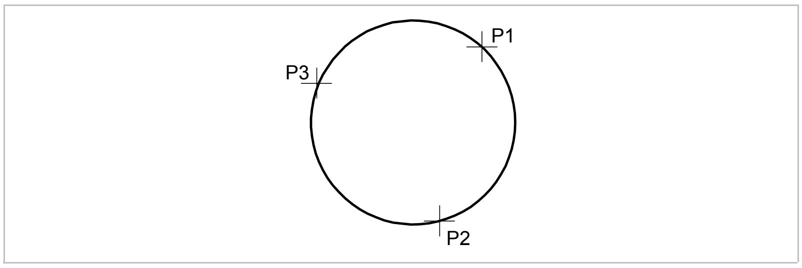


Fig. 4914

2. Click on the first point on the circle (P1).

   or

   ➢ Enter the coordinates of P1.
3. Click on the second point on the circle (P2).

   or

   ➢ Enter the coordinates of P2.
4. Click on the third point on the circle (P3).

   or

   ➢ Enter the coordinates of P3.

   or

   ➢ Enter the radius.

Center and radius method of drawing circles

1. Select *Create, Circle, Center Radius*.

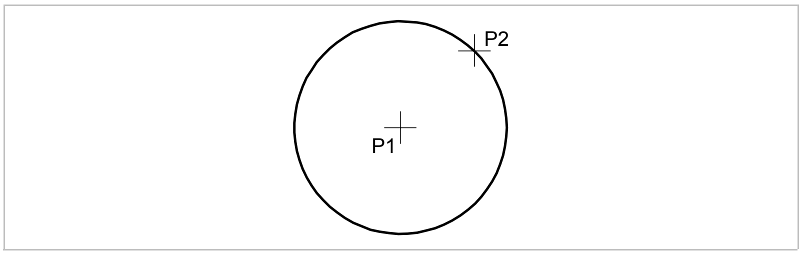


Fig. 4709

2. Click on the center (P1).

   or

   ➢ Enter the coordinates of the center (P1).

3. Click on the second point (P2) which is on the arc of the circle.

   or

   ➢ Enter the coordinates of P2.

   or

   ➢ Enter the radius.

Diameter method of drawing circles

1. Select *Create, Circle, Diameter*.

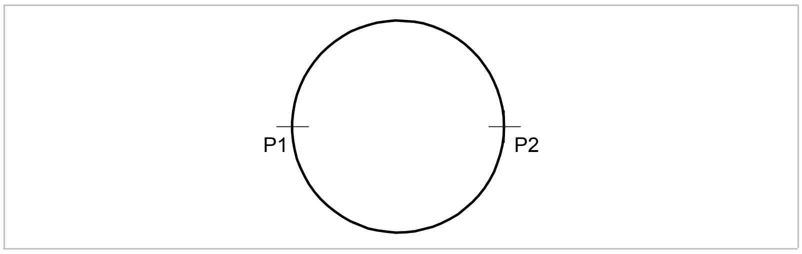


Fig. 4915

2. Click on the first point (P1) on the arc of the circle.

   or

   ➢ Enter the coordinates of P1.

3. Click on the second point (P2) on the arc of the circle.

   or

   ➢ Enter the coordinates of P2.

Center and diameter method of drawing circles

1. Select *Create, Circle, Center Diam.*

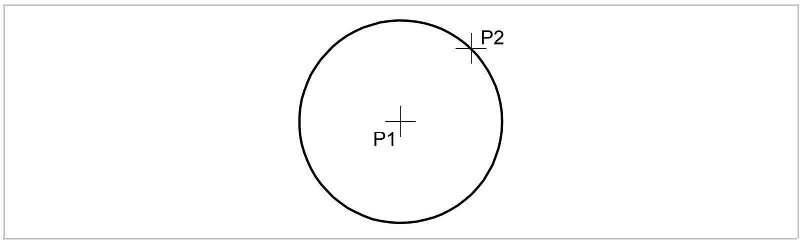


Fig. 4709

2. Click on the center (P1).

   or

   ➢ Enter the coordinates of the center (P1).
3. Click on the second point (P2) which is on the arc of the circle.

   or

   ➢ Enter the coordinates of P2.

   or

   ➢ Enter the diameter of the circle.

Drawing circles tangential to two elements

Prerequisite

- The drawing contains at least two elements.

1. Select *Create, Circle, Tan 2*.

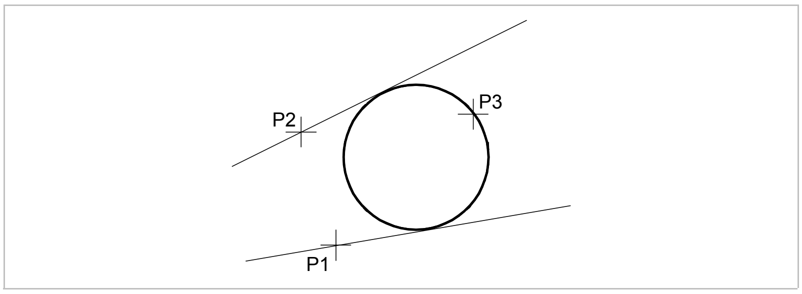


Fig. 4711

2. Click on a point (P1) on the first element.

   or

   ➢ Enter the coordinates of P1.

3. Click on a point (P2) on the second element.

   or

   ➢ Enter the coordinates of P2.

4. Click on a third point (P3) on the arc of the circle.

   or

   ➢ Enter the coordinates of P3.

   or

   ➢ Enter the radius.

Drawing concentric circles

1. Select *Create, Circle, Concentric*.

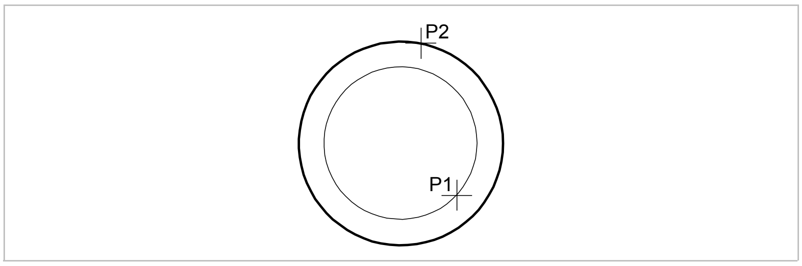


Fig. 4710

2. Click on a point (P1) on the base circle.
3. Click on the second point (P2) which is on the arc of the circle.

   or

   ➢ Enter the coordinates of P2.

   or

   ➢ Enter the distance between the concentric circles (positive value: concentric circle is outside the base circle; negative value: concentric circle is inside the base circle).

2.6 Drawing arcs

Three points method of drawing arcs

1. Select *Create, Arc, 3 points*.

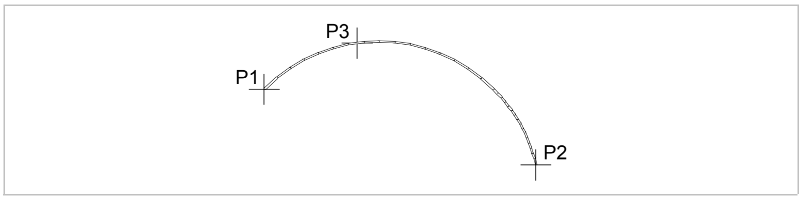


Fig. 4712

2. Click on the start point (P1).

   or

   ➢ Enter the coordinates of P1.
3. Click on the end point (P2).

   or

   ➢ Enter the coordinates of P2.
4. Click on a third point (P3) on the arc.

   or

   ➢ Enter the coordinates of P3.

Drawing arcs by defining center point, start and end points

1. Select *Create, Arc, Center End*.

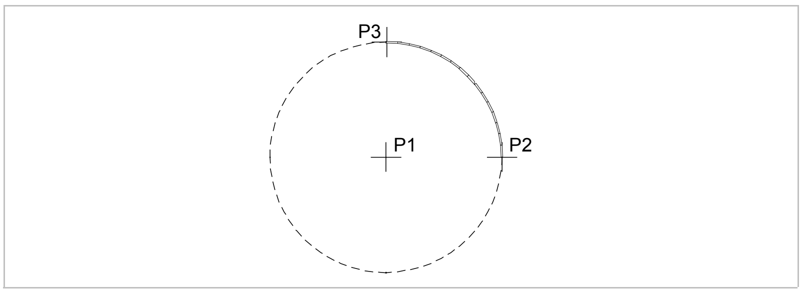


Fig. 4713

2. Click on the center point (P1).

   or

   ➢ Enter the coordinates of P1.
3. Click on the start point (P2).

   or

   ➢ Enter the coordinates of P2.
4. Click on the end point (P3) (in counterclockwise direction).

   or

   ➢ Enter the coordinates of P3.

Diameter method of drawing arcs

1. Select *Create, Arc, Diameter*.

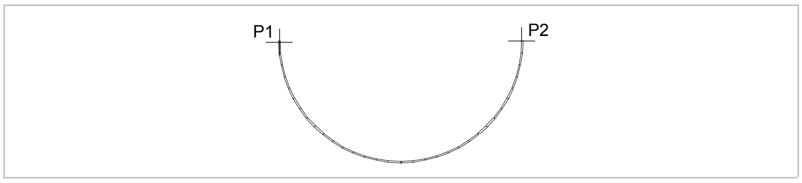


Fig. 4917

2. Click on the start point (P1).

   or

   ➢ Enter the coordinates of P1.
3. Click on the end point (P2) (in counterclockwise direction).

   or

   ➢ Enter the coordinates of P2.

Drawing concentric arcs

1. Select *Create, Arc, Concentric*.

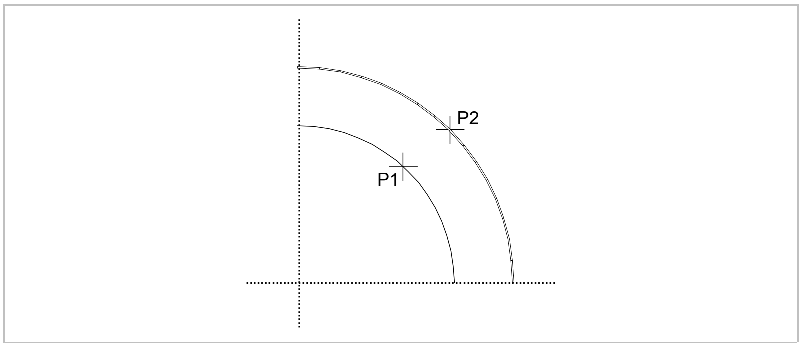


Fig. 4714

2. Click on the base arc (P1).
3. Click on the second point (P2) on the new arc.

   or

   ➢ Enter the coordinates of P2.

   or

   ➢ Enter the distance between the concentric arcs (positive value: concentric arc is outside the base arc; negative value: concentric arc is inside the base arc).

Drawing arcs by defining the center point, radius, start angle and final angle

1. Select *Create, Arc, Cent Rad Ang*.

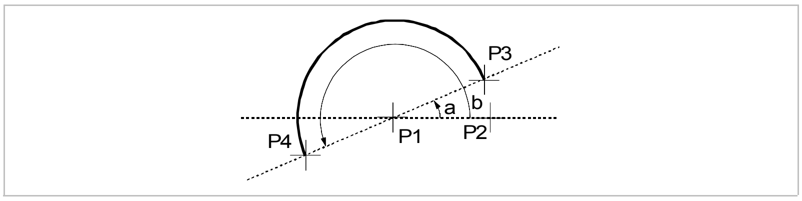


Fig. 4715

2. Click on the center (P1).

   or

- Enter the coordinates of P1.

3. Click on the second point (P2) which is on the arc of the circle.

   or

   - Enter the coordinates of P2.

   or

   - Enter the radius of the arc.

4. Enter the start angle (a).

   or

   - Click on a third point (P3) on the arc.

   or

   - Enter the coordinates of P3.

5. Enter the final angle (b).

   or

   - Click on a point (P4) on the arc.

   or

   - Enter the coordinates of P4.

Drawing multicurve contours

Multicurve contour = several connected arcs.

Note
ToPs will not draw a multicurve contour if a construction circle remains under an arc.

1. Select *Create, Arc, Multicurve cont.*

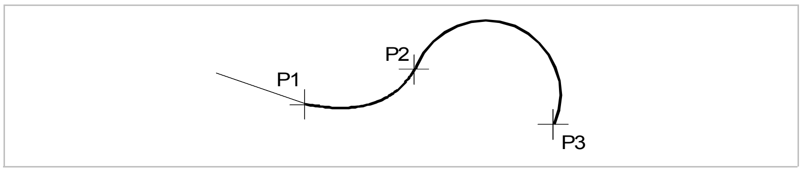


Fig. 4918

2. Click on an end point (P1) of an existing element (arc or line).

   or

   ➢ Enter the coordinates of P1.

   P1 is the start point of the arc.
3. Click on the end point (P2) of the arc.

   or

   ➢ Enter the coordinates of P2.

   P2 is now the start point of the subsequent arc.
4. Click on the next point on an arc (P3), etc.

2.7 Drawing notches

Notches can be defined as corner notches or as element notches. They can be created on line, arc and circle elements.

Prerequisite

- The contour on which the notch is to be created must already exist.

Corner notches

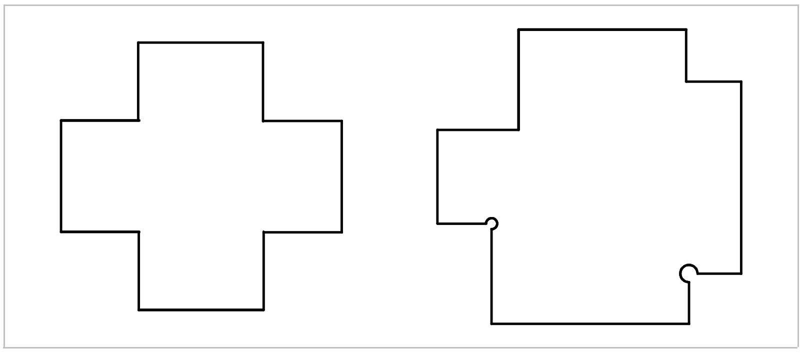


Fig. 19685

Element notches

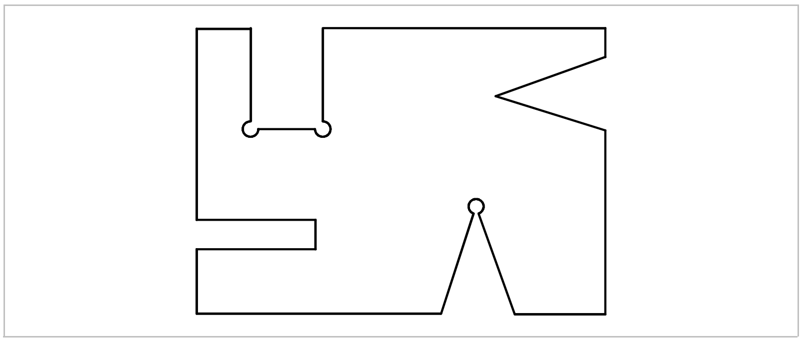


Fig. 18686

Creating corner notches with various spacing

1. Select *Create 2, Notches, Dist Dist*.

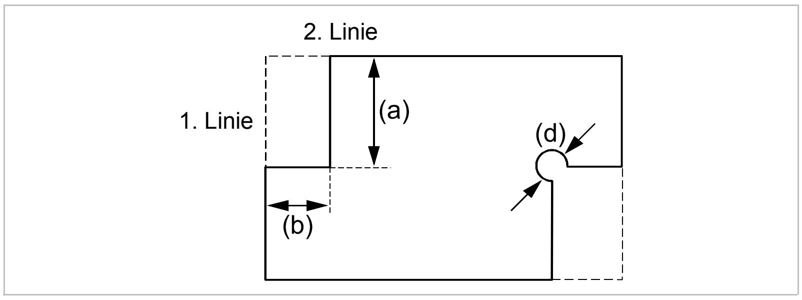


Fig. 19687

2. Enter distance (a) from 1st line.
3. Enter distance (b) from 2nd line.
4. Click on the 1st line.

   or

   ➢ Enter the diameter (d).

Note
If you specify a diameter, a partial circle (d) will be generated at the intersecting point of the notch.

5. Click on the 2nd line.

Creating corner notches with symmetrical spacing

1. Select *Create 2, Notches, Vertex*.

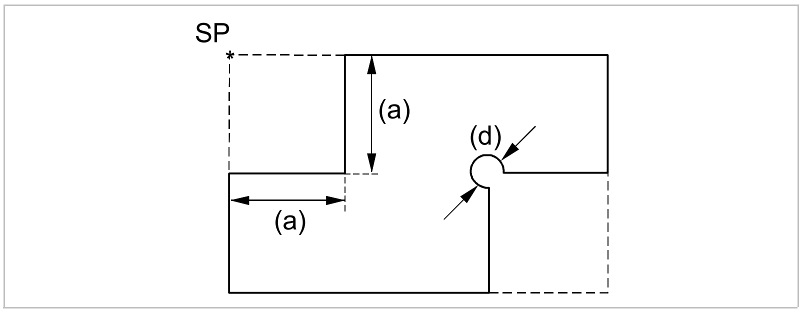


Fig. 19688

2. Enter the distance (a) from the vertex of the notch.
3. Click on the vertex (V).

   or

   ➢ Enter the diameter (d).

Note
If you enter a diameter before clicking on the vertex, ToPs creates a partial circle (d) at the intersecting point of the notch. If you enter "0" as the diameter, ToPs creates a notch without the partial circle.

Creating element notches with an acute angle

1. Select *Create 2, Notches, Acute angle*.

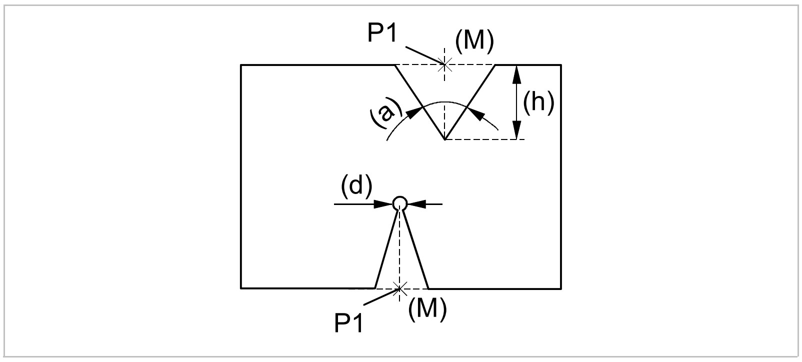


Fig. 19689

2. Enter the height (h) of the notch.
3. Enter the angle (α) of the triangle.
4. Enter the midpoint of notch (M).

   or

   ➢ Enter the punch diameter (d).
5. Click on the element position (P1) where the notch is to be created.

Note
If you enter a diameter before clicking the element, then a partial circle (d) is created for corner punching. If you enter "0" as the diameter, ToPs creates a notch without the partial circle.

Creating rectangular element notches

1. Select *Create 2, Notches, Rectangular*.

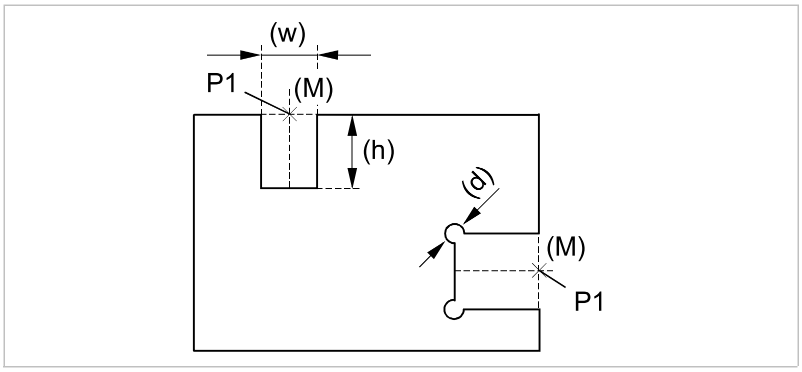


Fig. 19690

2. Enter the height (h) of the notch.
3. Enter the width (w) of the notch.
4. Enter the midpoint of notch (M).

   or

   ➢ Enter the punch diameter (d).
5. Click on the element position (P1) where the notch is to be created.

Note
If you enter a diameter before clicking the element, then a partial circle (d) is created for corner punching. If you enter "0" as the diameter, ToPs creates a notch without the partial circle.

2.8 Drawing bevels

Drawing bevels based on distances from the vertex

1. Select *Create 2, Bevel, Dist Dist*.

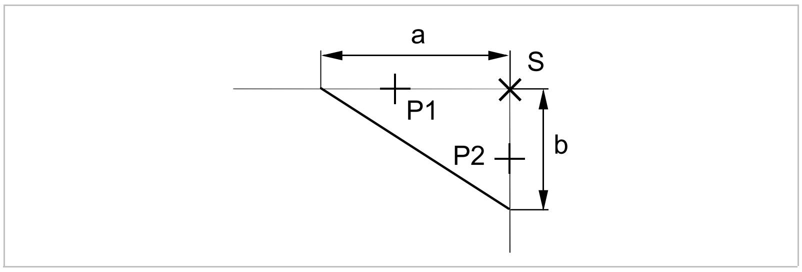


Fig. 4717

2. Enter the first distance (a) from the vertex (V).
3. Enter the second distance (b) from the vertex.
4. Click on the first element (P1).
5. Click on the second element (P2).

Drawing bevels equidistant from a vertex

1. Select *Create 2, Bevel, Vertex*.

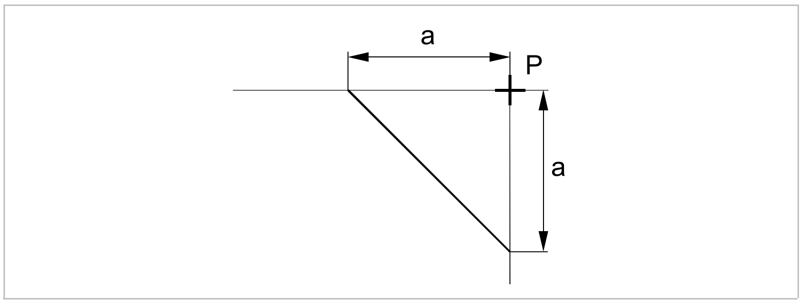


Fig. 4922

2. Enter the distance (a) from the vertex (V).
3. Click on the vertex (V).

   or

   ➢ Enter the coordinates of V.

2.9 Drawing roundings

1. *Create 2, Rounding, Radius*.

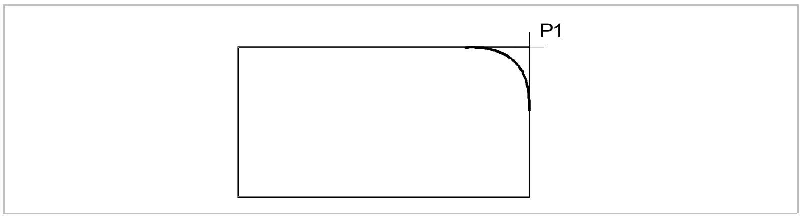


Fig. 4716

2. Enter the rounding of the radius in mm.
3. Click on the corner (P1).

   or

   ➢ Enter the coordinates of P1.
4. Click on the approximate tangential point on the first and second element.

Deleting roundings

(See Section 3.6, p 3-47)

2.10 Generating a contour which runs parallel to another contour

What are equidistants?

An equidistant is a second contour which runs parallel to the original contour. It is generated by defining a distance from the original contour:

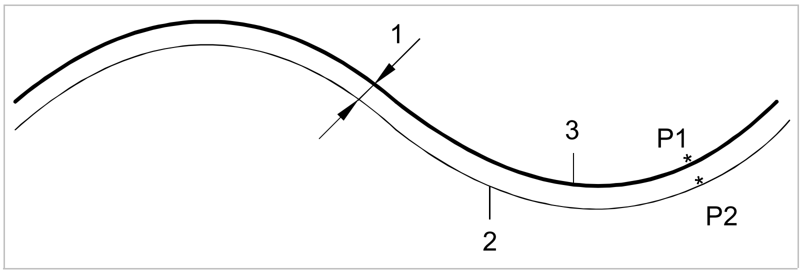


Fig. 21977

1. Select *Create 2, Equidistant, Generate*.

   ToPs displays the "Desired distance of equidistants" mask.
2. Enter the distance (1) of the equidistant (2) from the original contour (3).
3. Select *OK*.

4. Click on the original contour (P1).
5. In order to determine the position of the equidistant with respect to the original contour, click on P2.

ToPs draws the equidistant at a distance from the original contour based on the value entered.

Draw more equidistants at the same distance?

1. Click on a different original contour (P1).
2. In order to determine the position of the equidistant with respect to the original contour, click on P2.

Draw more equidistants at a different distance?

1. Enter a new distance in the command line.
2. Click on a new original contour (P1).
3. In order to determine the position of the equidistant with respect to the original contour, click on P2.

2.11 Deleting an element or contour

(See Section 3.10, p. 3-60)

3. Modifying drawn geometries

You can modify geometry elements in two ways:

- Modify the original elements.
- Modify copies of the original elements.

Prerequisite

- You have loaded a file which contains drawn geometries (for loading files, see Section 8, p. 3-91 ff) or ...

3.1 Repositioning geometries

Moving geometries by defining two points

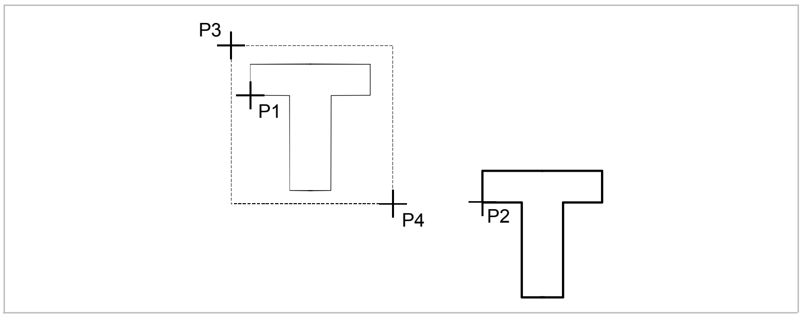


Fig. 27703

1. Select *Modify*.
2. To move the original, select *Mode, Original*.

   or

   ➢ To create copies of the original: select *Mode*, *Copy*.

   ➢ Enter the number of copies.

   ➢ Select *OK*.
3. Select *Move*, *2 points*.
4. Click on a reference point (P1) or enter the coordinates for P1.
5. Click on the target position (P2) or enter the coordinates of P2.
6. Click on the original geometry element you wish to move.
   ToPs moves the individual geometry element.

   or

   ➢ Draw a box around the entire geometry with the mouse (P3, P4).

   ToPs moves the entire geometry.

Moving geometries horizontally

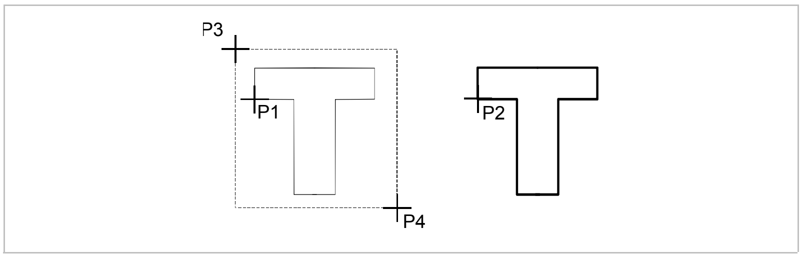


Fig. 27704

1. Select *Modify*.
2. To move the original, select *Mode, Original*.

   or

   ➢ To create copies of the original: select *Mode*, *Copy*.

   ➢ Enter the number of copies.

   ➢ Select *OK*.
3. Select *Move*, *Horizontal*.
4. Enter the distance to move horizontally.

   or

   ➢ Click on a reference point (P1) or enter the coordinates for P1.

   ➢ Click on second reference point (P2) or enter the coordinates for P2.
5. Click on the original of the geometry element you wish to move.

   ToPs moves the individual geometry element.

   or

   ➢ Draw a box around the entire geometry with the mouse (P3, P4).

   ToPs moves the entire geometry.

Moving geometries vertically

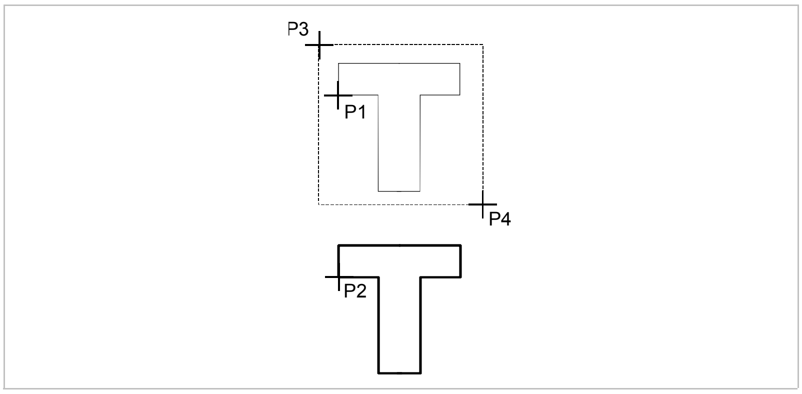


Fig. 28061

1. Select *Modify*.
2. To move the original, select *Mode, Original*.

   or

   ➢ To create copies of the original: select *Mode*, *Copy*.

   ➢ Enter the number of copies.

   ➢ Select *OK*.
3. Select *Move*, *Vertical*.
4. Enter the distance to move vertically.

   or

   ➢ Click on a reference point (P1) or enter the coordinates for P1.

   ➢ Click on the target reference point (P2) or enter the coordinates of P2.
5. Click on the original of the geometry element you wish to move.
   ToPs moves the individual geometry element.

   or

   ➢ Draw a box around the entire geometry with the mouse (P3, P4).

   ToPs moves the entire geometry.

3.2 Rotating geometries

Rotating geometries by defining two points

Rotating via two points corresponds to simultaneously turning and shifting the geometry.

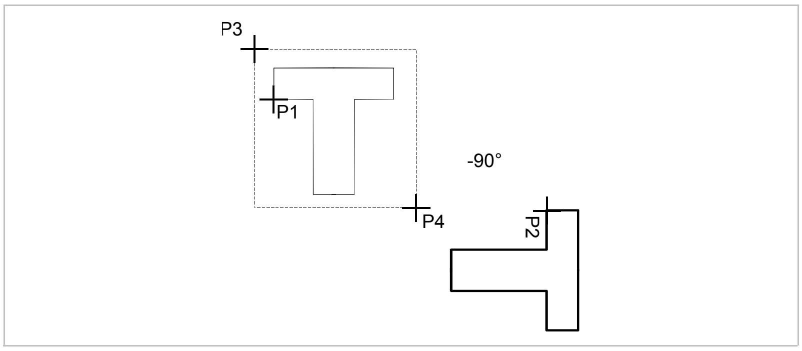


Fig. 28060

1. Select *Modify*.
2. To rotate the original, select *Mode, Original*.

   or

   ➢ To create copies of the original: select *Mode*, *Copy*.

   ➢ Enter the number of copies.

   ➢ Select *OK*.
3. Select *Rotate*, *2 points*.
4. Click on a reference point (P1) or enter the coordinates for P1.
5. Click on the target position (P2) or enter the coordinates of P2.
6. Enter angle of rotation, e.g. `-90`.
7. Click on the original of the geometry element you wish to rotate.
   ToPs rotates the individual geometry element.

   or

   ➢ Draw a box around the entire geometry with the mouse (P3, P4).

   ToPs rotates the entire geometry.

Rotating geometries around a center point

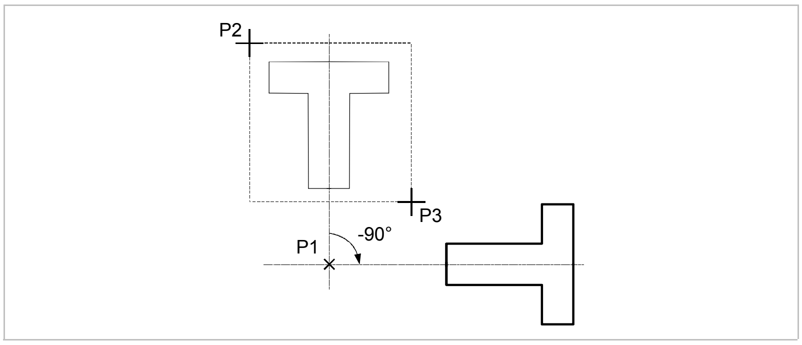


Fig. 28062

1. Select *Modify*.
2. To rotate the original, select *Mode, Original*.

   or

   ➢ To create copies of the original: select *Mode*, *Copy*.

   ➢ Enter the number of copies.

   ➢ Select *OK*.
3. Select *Rotate*, *Center*.
4. Click on a center point of rotation (P1) or enter the coordinates for P1.
5. Enter angle of rotation, e.g. `-90`.
6. Click on the original of the geometry element you wish to move.

   ToPs rotates the individual geometry element.

   or

   ➢ Draw a box around the entire geometry with the mouse (P2, P3).

   ToPs rotates the entire geometry.

3.3 Modifying the scale of geometries

Modifying the scale of geometries via two points

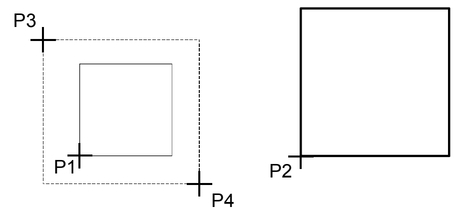


Fig. 28063

1. Select *Modify*.
2. To modify the original, select *Mode, Original*.

   or

   - To create copies of the original: select *Mode, Copy*.
   - Enter the number of copies.
   - Select *OK*.
3. Select *Scale, 2 points*.
4. Click on a reference point (P1) or enter the coordinates for P1.
5. Click on the target position (P2) or enter the coordinates of P2.
6. Enter the factor.
7. Click on the original of the geometry element you wish to rotate.

   ToPs modifies the individual geometry element.

   or

   - Draw a box around the entire geometry with the mouse (P3, P4).

   ToPs modifies the entire geometry.

Scaling geometries from a fixed point

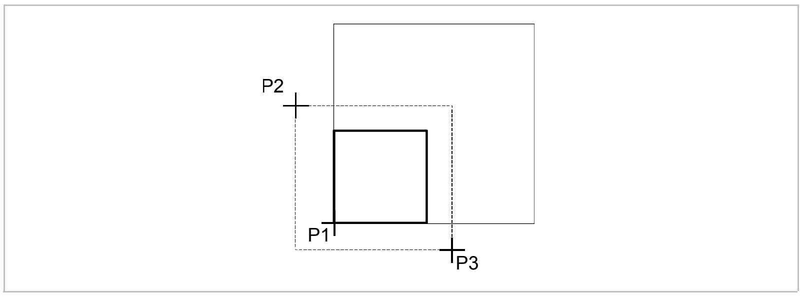


Fig. 28084

1. Select *Modify*.
2. To modify the original, select *Mode, Original*.

   or

   - To create copies of the original: select *Mode*, *Copy*.
   - Enter the number of copies.
   - Select *OK*.
3. Select *Scale, Center*.
4. Click on the point which remains fixed during scaling (P1) or enter the coordinates for P1.
5. Enter the enlargement or reduction factor.
6. Click on the original of the geometry element you wish to move.
   ToPs modifies the individual geometry element.

   or

   - Draw a box around the entire geometry with the mouse (P2, P3).

   ToPs modifies the entire geometry.

3.4 Mirroring geometries

Mirroring geometries around a given axis

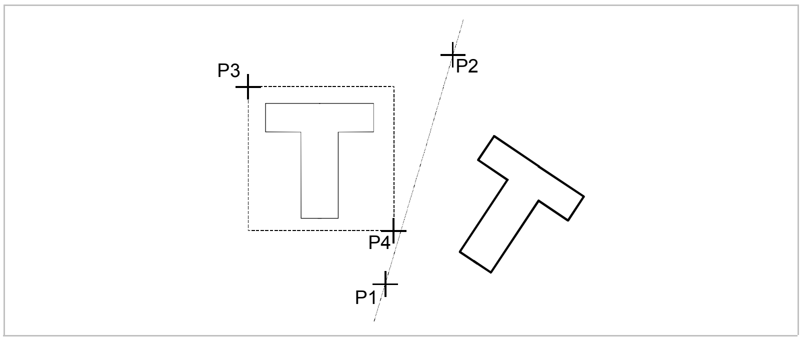


Fig. 28065

1. Select *Modify*.
2. To mirror the original, select *Mode, Original*.

   or

   - To create copies of the original: select *Mode, Copy*.
   - Enter the number of copies.
   - Select *OK*.
3. Select *Mirror, 2 points*.
4. Click on the 1st point of the axis (P1) or enter the coordinates for P1.
5. Click on the 2nd point of the axis (P2) or enter the coordinates for P2.
6. Click on the original of the geometry element you wish to move.
   ToPs mirrors the individual geometry element.

   or

   - Draw a box around the entire geometry with the mouse (P3, P4).

   ToPs mirrors the entire geometry.

Mirroring geometries around a single point of symmetry

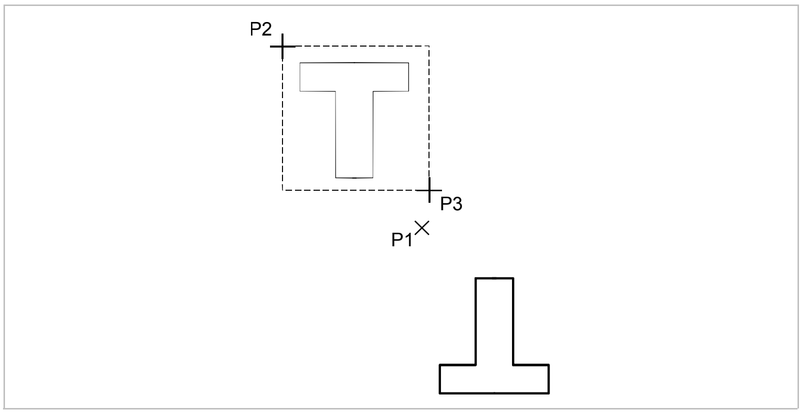


Fig. 28064

1. Select *Modify*.
2. To mirror the original, select *Mode, Original*.

   or

   ➢ To create copies of the original: select *Mode, Copy*.

   ➢ Enter the number of copies.

   ➢ Select *OK*.
3. Select *Mirror, Center*.
4. Click on a point of symmetry (P1) or enter the coordinates for P1.
5. Click on the original of the geometry element you wish to move.

   ToPs mirrors the individual geometry element at the point of symmetry (P1).

   or

   ➢ Draw a box around the entire geometry with the mouse (P2, P3).

   ToPs mirrors the entire geometry at the point of symmetry (P1).

Mirroring geometries on a horizontal axis

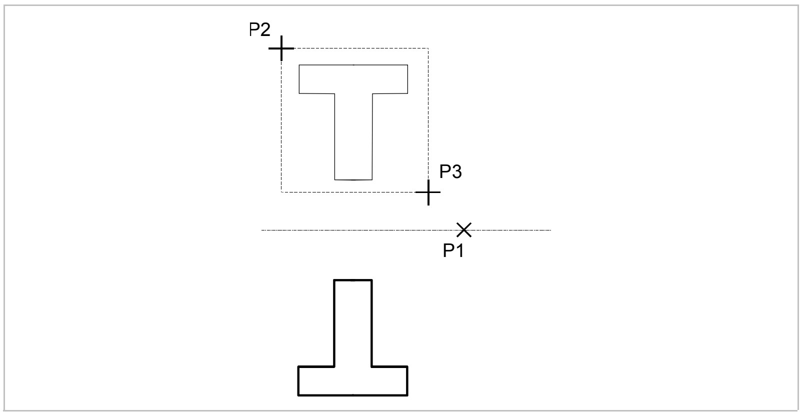


Fig. 28082

1. Select *Modify*.
2. To mirror the original, select *Mode, Original*.

   or

   - To create copies of the original: select *Mode, Copy*.
   - Enter the number of copies.
   - Select *OK*.
3. Select *Mirror, Horizontal*.
4. Click on the mirroring axis (P1) or enter the coordinates for P1.
5. Click on the original of the geometry element you wish to move.

   ToPs mirrors the individual geometry element.

   or

   - Draw a box around the entire geometry with the mouse (P2, P3).

   ToPs mirrors the entire geometry on the axis.

Mirroring geometries on a vertical axis

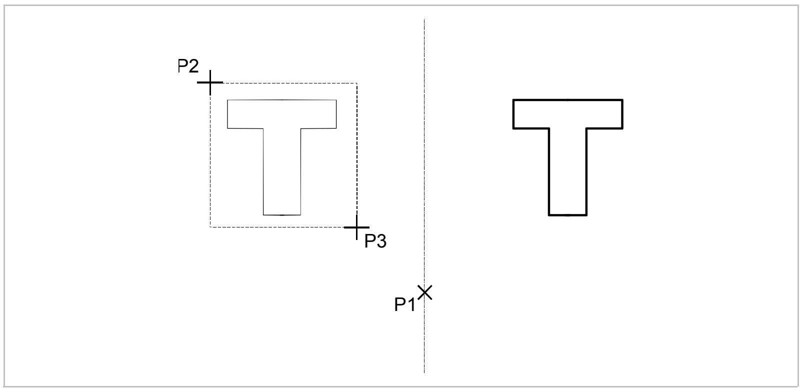


Fig. 28083

1. Select *Modify*.
2. To mirror the original, select *Mode, Original*.

   or

   - To create copies of the original: select *Mode*, *Copy*.
   - Enter the number of copies.
   - Select *OK*.
3. Select *Mirror, Vertical*.
4. Click on the mirroring axis (P1) or enter the coordinates for P1.
5. Click on the original of the geometry element you wish to move.

   ToPs mirrors the individual geometry element.

   or

   - Draw a box around the entire geometry with the mouse (P2, P3).

   ToPs mirrors the entire geometry on the vertical axis.

3.5 Stretching geometries

Stretching geometries by defining two points

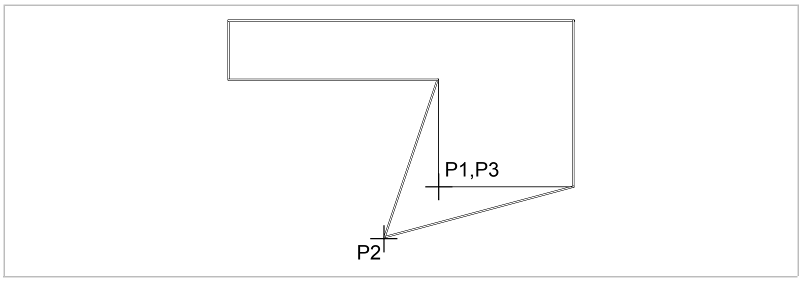


Fig. 4754

1. Select *Modify*.
2. Select *Mode, Original*.
3. Select *Stretch, 2 points*.
4. Click on a reference point (P1) to begin the stretch or enter the coordinates for P1.
5. Click on the target reference point (P2) or enter the coordinates of P2.
6. Click on the point which is to be stretched (P3) or enter the coordinates of P3.

Stretch several elements?

➢ Using the mouse, draw a box around all the elements which are to be stretched.

Note
All elements which are intersected by the box will be stretched. Elements which are completely located within the box will simply be shifted.

Stretching geometries horizontally

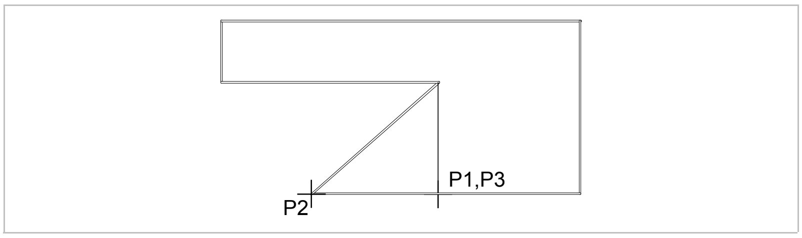


Fig. 4756

1. Select *Modify*.
2. Select *Stretch, Horizontal*.
3. Click on a reference point (P1) to begin the stretch or enter the coordinates for P1.

   or

   ➢ Enter the distance.
4. Click on the target reference point (P2) or enter the coordinates of P2.
5. Click on the point which is to be stretched (P3) or enter the coordinates of P3.

Stretch several elements?

➢ Using the mouse, draw a box around all the elements which are to be stretched.

Note
All elements which are intersected by the box will be stretched. Elements which are completely located within the box will simply be shifted.

Stretching geometries vertically

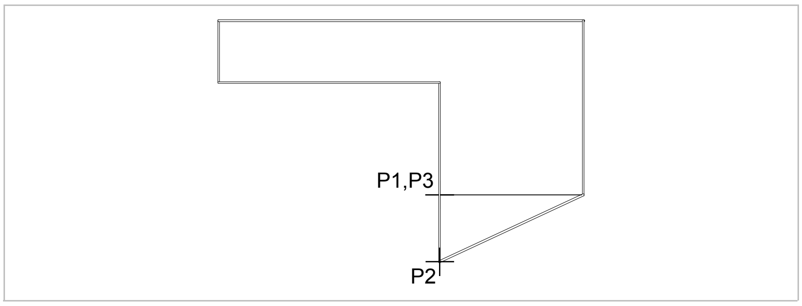


Fig. 4755

1. Select *Modify*.
2. Select *Stretch, Vertical*.
3. Click on a reference point (P1) to begin the stretch or enter the coordinates for P1.

   or

   ➢ Enter the distance.
4. Click on the target reference point (P2) or enter the coordinates of P2.
5. Click on the point which is to be stretched (P3) or enter the coordinates of P3.

Stretch several elements?

➢ Using the mouse, draw a box around all the elements which are to be stretched.

Note
All elements which are intersected by the box will be stretched. Elements which are completely located within the box will simply be shifted.

3.6 Modifying roundings

Prerequisite

- The drawing contains roundings.

Note
With *Rounding, Modify* you cannot create roundings. (For drawing roundings see Section 2.9, p. 3-30.)

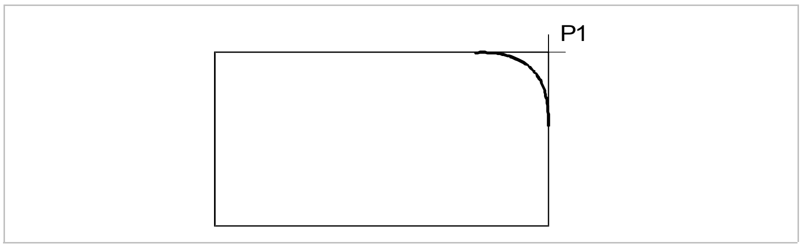


Fig. 4716

Modifying roundings

1. Select *Modify 2, Rounding, Modify*.
2. Enter a new rounding radius in mm.
3. Click on the rounding (P1) you want to change.

Delete rounding?

1. Enter 0 (zero) in the command line.
2. Click on the rounding (P1).

ToPs recreates the corner.

3.7 Splitting or merging elements

ToPs uses red squares to designate the starting and end points of elements.

If the end points are also element merge points, ToPs displays these points as green squares.

Splitting an element

Application: to delete a part of an element.

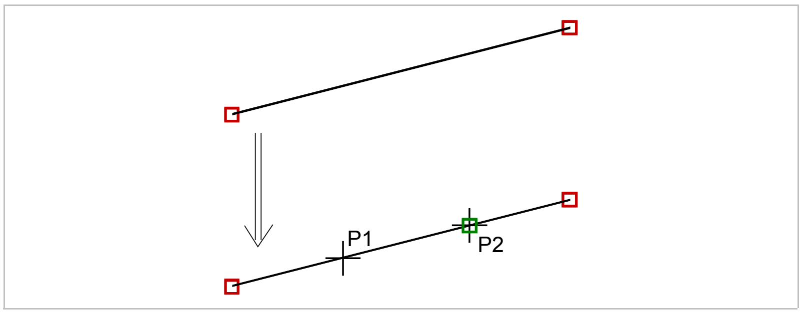
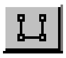


Fig. 4719

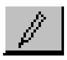


1. Select *Display points*.
   ToPs designates the starting and end points of elements with red squares. If the end points are also element merge points, ToPs displays these points as green squares.
2. Select *Modify 2, Elements, Split*.
3. Click on the element (P1).
   ToPs displays the element in yellow and with dashed lines.
4. Click on Point 2 (P2) where the split is to be made.

   or

   ➢ Enter the coordinates of P2.

ToPs splits the element.



5. To refresh the picture, select *Redraw*.

Splitting two elements at their intersecting points

Application: You want to delete parts of elements.

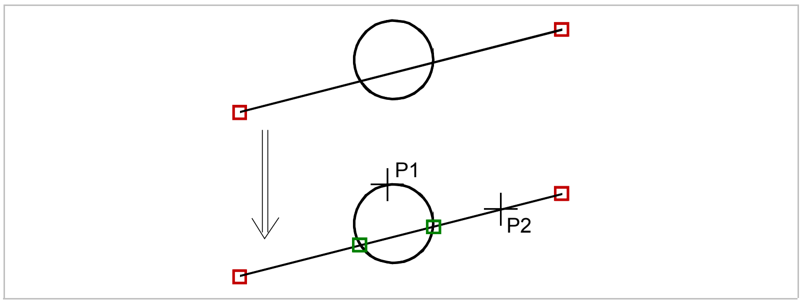
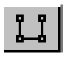


Fig. 4718



1. Select *Display points*.

   ToPs designates the starting and end points of elements with red squares. If the end points are also element merge points, ToPs displays these points as green squares.

2. Select *Modify 2, Elements, Split inters. pt.*

3. Click on the first element (P1).

   ToPs displays the element in yellow and with dashed lines.

4. Click on the second element (P2).

   ToPs displays the element in yellow and with dashed lines.

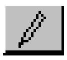
5. To determine which element is to be split at the intersecting points:

   ➢ Enter the number of the element.

   or

   ➢ Enter any other number to split both elements.

ToPs splits one or both elements at the intersecting point.



5. To refresh the picture, select *Redraw*.

Merging elements

Two straight lines having the same direction or angular position can be merged into one straight line.

Merging a line/arc or arc/arc or line/line is not possible if the pairing does not have the same angular position.

Prerequisite

- The end points of the parts must meet.

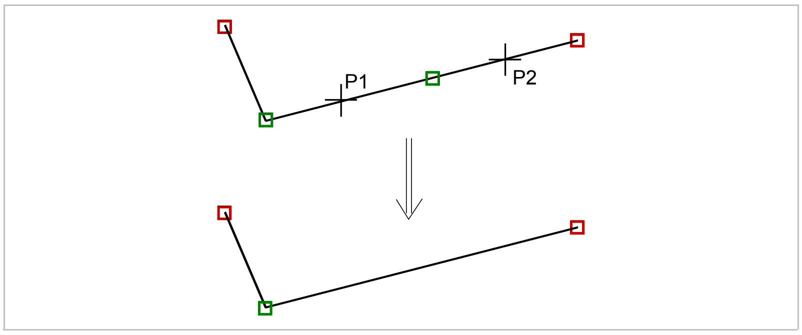


Fig. 4720

1. Select *Modify 2, Elements, Merge*.
2. Click on the first element (P1).

   ToPs displays the element (P1) in yellow and with dashed lines.
3. Click on the second element (P2).

ToPs displays this element (P2) also in yellow and with dashed lines. The lines are merged into one line.

4. To refresh the picture, select *Redraw*.

3.8 Shortening or extending elements

Prerequisite

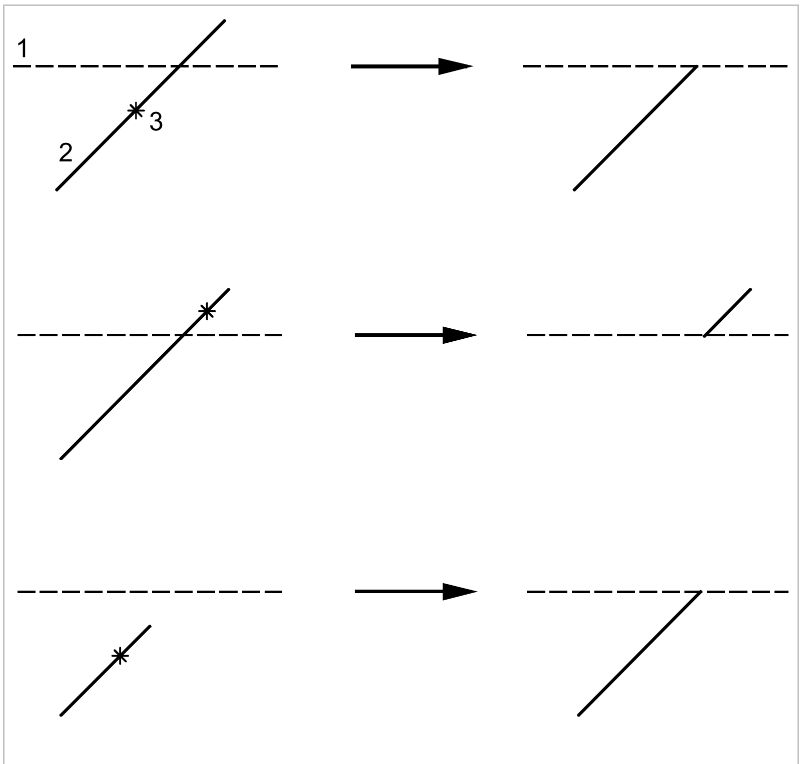
- Two elements must possess a shared intersecting point (real or virtual).
- One of the elements to be modified must be a line or arc.
- A reference element can be a line, arc, circle, rounding, bevel, construction line, construction circle.

Shortening or extending a single element

Application: Shortening or extending an element up to its point of intersection with a reference element.

If there are two shared points of intersection (e.g. with an arc), ToPs selects the one which is closest to the first pick point.

The element to be changed is cropped on the **opposite side of the reference element** from where the pick point lies. The side which was picked remains.



1 Reference element
2 Element to be changed
3 Selected pick point

Fig. 26960

1. Select *Modify 2, Shorten/Extend, First elem.*
2. Click on the side of the targeted element which is to remain.
3. Click on the reference element.

ToPs shortens or extends the targeted element up to the point of intersection.

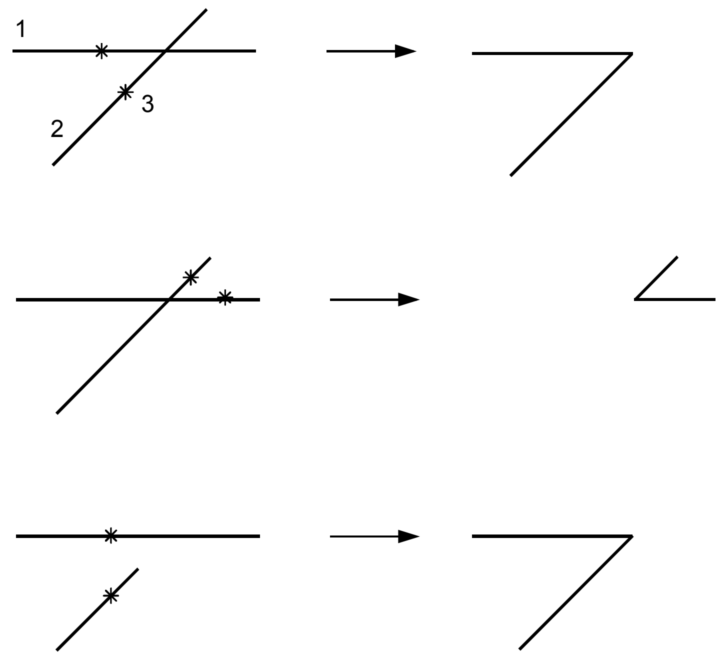
Shortening or extending two elements

Application

Shortening or extending both elements up to their common point of intersection.

If there are two shared intersecting points (e.g. with an arc), ToPs selects the one which is closest to the first pick point.

The elements to be changed are cropped on the **opposite side of the reference element** from where the pick point lies. The sides which were picked remain.



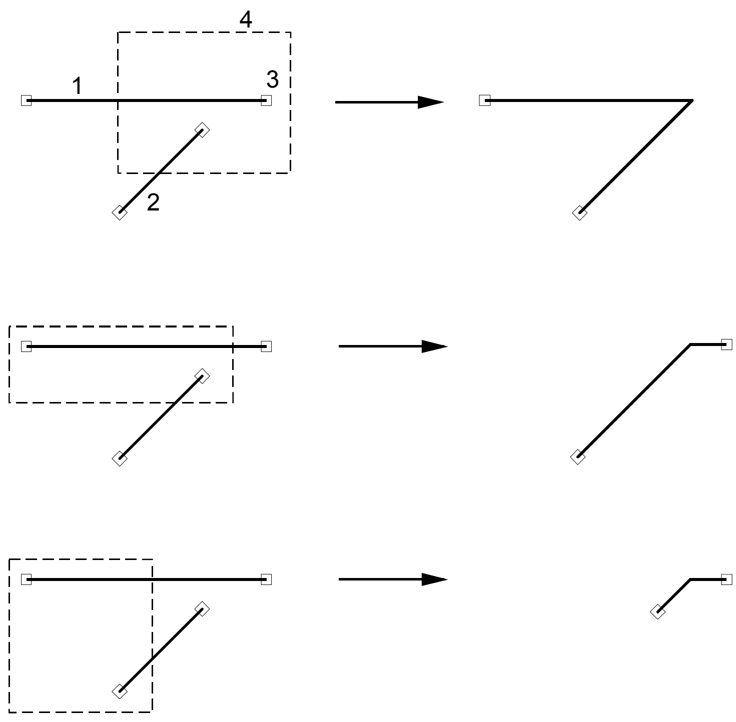
1	First element to be changed	3	Pick point
2	Second element to be changed		

Defining the modification by clicking on the appropriate sides — Fig. 26961

1. Select *Modify 2, Shorten/Extend, Both elem.*
2. Click on first element to be changed.
3. Click on second element to be changed.

   or

   ➢ Box-in one open point (ToPs display: red) of each of the two elements to be changed.



1	First element to be changed	3	Open contour point (red)
2	Second element to be changed	4	Box

Defining the modification by boxing-in the appropriate points Fig. 26962

ToPs shortens or extends the elements up to their point of intersection.

3.9 Modifying line attributes

Application The line attribute functions enable you to change the color and line type within a whole drawing.

Examples

- Change all red lines to blue.
- Change all dashed lines to dotted lines.

This is particularly useful if you have to prepare external drawings in which the line characteristics may have other meanings.

For an explanation of colors and symbols in ToPs 100, see Chapter 4.

Line color modification of individual elements

Changing the line color of existing elements

1. Select *Modify 2, Color, Selection*.
   ToPs displays the mask "Select color":

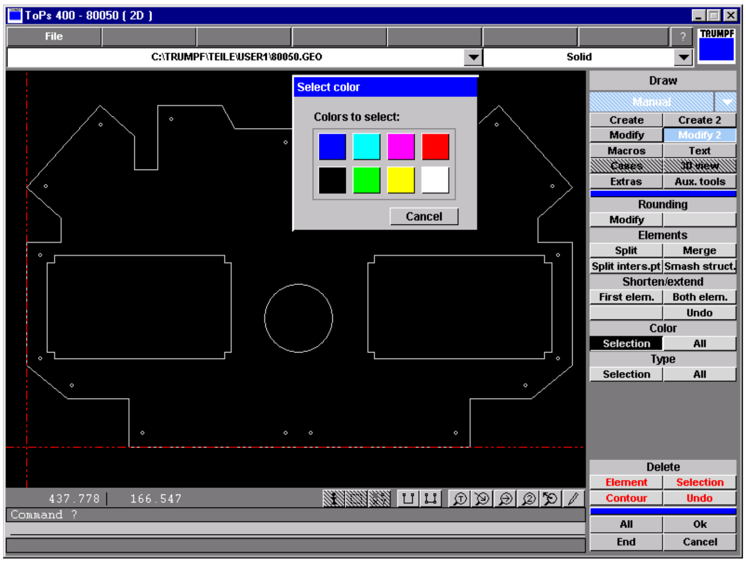


Fig. 26001EN

2. Click on the desired color.
3. Click on each element whose color should be changed to the new color (or draw a box around a group of elements).

The selected elements will be displayed in the new color.

Defining line color of new elements

1. Open the selection field in the upper right with ▼.
   ToPs displays the mask "Select line type":

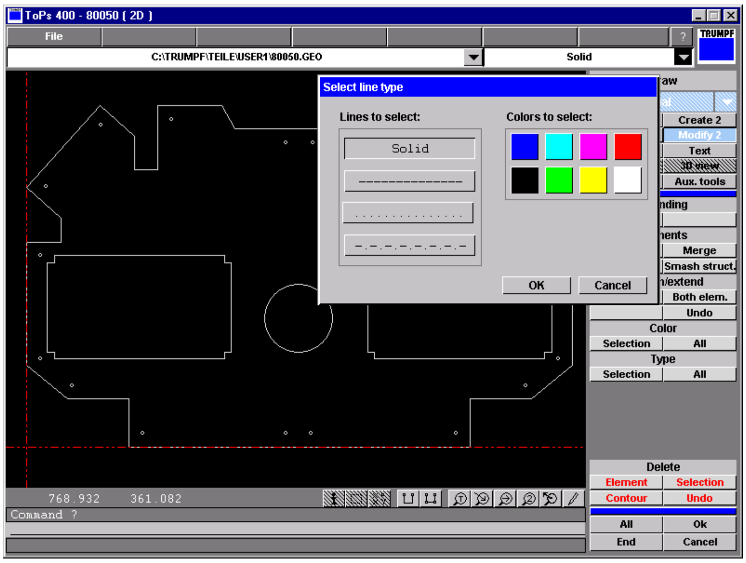


Fig. 26002EN

2. Click on the desired color.
3. Select *OK*.

ToPs displays subsequently drawn elements in the new line color.

Changing the line color of all elements having the same original color

With this function you can simultaneously change the line color of all elements of the same original color:

1. Select *Modify 2, Color, All*.
   ToPs shows the following mask:

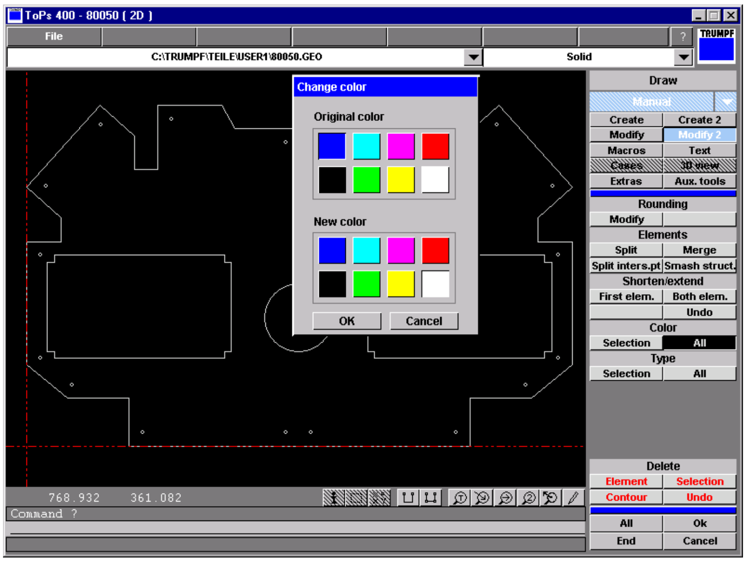


Fig. 26003EN

2. Click on the original color.
3. Click on the new color.
4. Select *OK*.

ToPs changes the line color of all elements of the original line color.

Changing the line type

Changing the line type of existing elements

1. Select *Modify 2, Type, Selection*.
   ToPs shows the following mask:

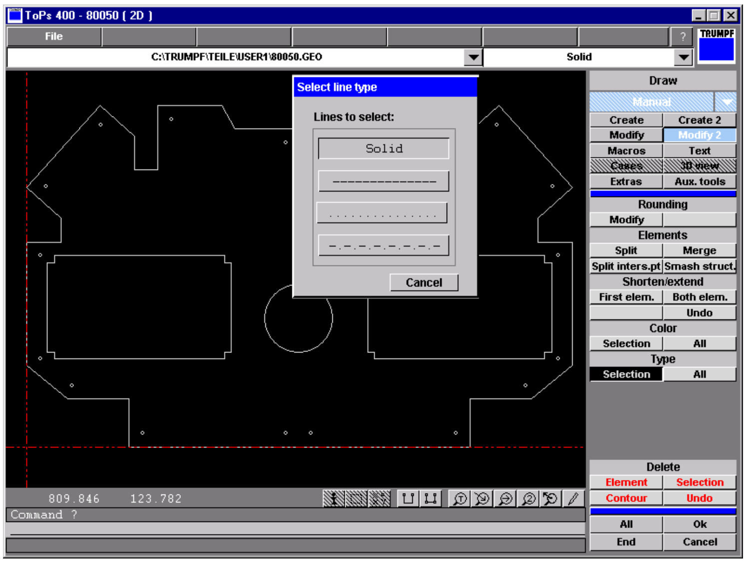


Fig. 26004EN

2. Click on the desired type of line.
3. Click on or box-in all elements for which you want to change the line type (also refer to the command line).

The selected elements will be displayed in the new line type.

Defining line type for new elements

1. Open the selection field in the upper right with ▼.
   ToPs displays the mask "Select line type":

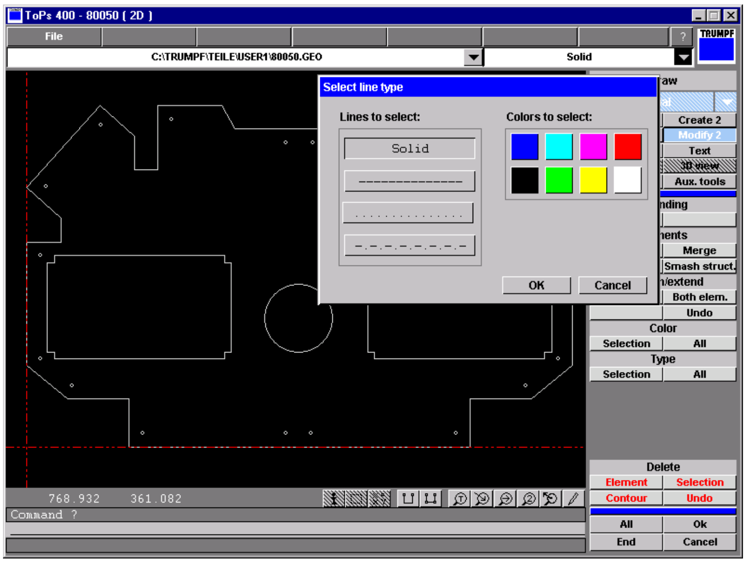


Fig. 26002EN

2. Click on the desired type of line.
3. Select *OK*.

ToPs displays subsequently drawn elements in the new line type.

Changing line type for all elements of the same original type

With this function you can simultaneously change the line type of all elements of the same original type:

1. Select *Modify 2, Type, All*.
   ToPs shows the following mask:

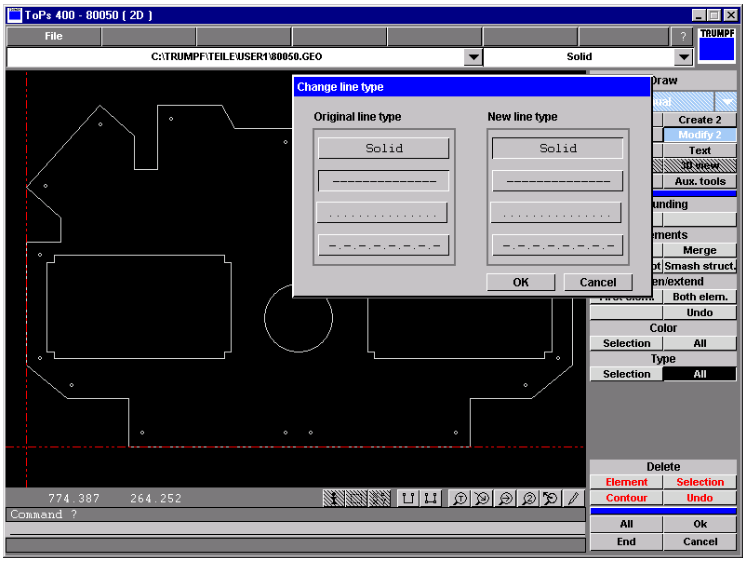


Fig. 26005EN

2. Click on the originating type.
3. Click on the new type.
4. Select *OK*.

ToPs changes the line type of all elements of the originating line type.

Deleting lines of a particular color and type

You can simultaneously delete the following:

- All lines of a particular color.
- All lines of a particular type.
- All construction geometries.
- All lines.

➢ Select *Delete, Selection*.
ToPs displays the mask "Delete selection".
Note
Delete, *Selection* is always present except in the mask "Drawing tools".

Delete all lines of a particular color?

1. Select the "Line color" tab.
2. Click on the color of the lines you wish to delete.

Delete all lines of a particular type?

1. Select the "Line type" tab.
2. Click on the type of lines you wish to delete.

Delete all construction geometries or all lines?

1. Select the "Miscellaneous" tab.
2. To delete all construction lines in a drawing: select "Constr geo".
3. To delete all lines in a drawing ('*.geo'): select "All".

➢ Select *Delete*.

3.10 Deleting elements or contours

You can delete individual elements in a contour, whole contours or all elements at once.

Prerequisite

- The drawing ('*.geo') in which you wish to delete elements or contours has been loaded (see Section 8.3, p. 3-92).

Delete single elements?

1. Select *Delete, Element*.
2. Click on the elements you wish to delete, one after the other.

   or

   ➢ Using the mouse, draw a box around all the elements you wish to delete.

Delete single contours?

1. Select *Delete, Contour*.
2. Click on the contours you wish to delete one after the other.

   or

   ➢ Using the mouse, draw a box around all the contours you wish to delete.

4. Preparing drawing of a single part

You can already define the machining start points and the machining sequence within a single part in the *Drawing* module.

ToPs stores this information in the '*.geo' file of the relevant single part and takes it into account when defining the machining of the part in the Technology module.

4.1 Preparing single part automatically

Prerequisite

- The geometry of the single part is saved as '*.geo' (see p. 3-105 ff).

Note
You cannot use single parts which you save with preparation in older versions of ToPs 100 (before 4.0).

1. Select *File >Prepare*.

   ToPs displays the mask "Load file". It displays as standard all unprocessed parts ('*.geo') located in the current directory.

Change directory upwards?

2. Click on the "*" symbol until the file manager displays the desired directory.

Change directory downwards?

3. Mark the directory which is one level deeper.
4. Repeat until the file manager displays the proper directory.

   Tip
   ToPs displays the current path under "Search in". If you open "Search in" using ▾, ToPs shows you the "Previous directories" from which you have already loaded a file at some point.

Preview the file?

5. Select "Look-ahead (Preview)".

   The preview function in ToPs is made continuously active.

   or

   ➢ Deselect "Look-ahead (Preview)".

   The preview function is no longer continuously active.

   ➢ Using the right mouse button, click on the file name.

6. Mark the desired file.

   ToPs enters the name of the file into "File name".

   or

   ➢ Enter the name of the file you want to find under "File name" (to search for file names with the help of wildcards, see p. 3-91).

7. Select *OK*.

   ToPs displays the mask "Preparation Create" and automatically determines the start points and the executing sequence.

8. Save prepared single part with or without drawing data (see Section 9.2, p. 3-104 ff).

End preparation

➢ Select *File >Return*.

4.2 Changing automatic preparation of a single part

You can change the start points and executing sequence of a single part as per the following:

- Determine strategy for selection of start points (see p. 3-62).
- Displace start points and reverse a contour's executing direction (see p. 3-63).
- Change executing sequence (see p. 3-64).
- Determine preferred executing direction (see p. 3-66).

Determining strategy for the selection of the start points

Prerequisite

- The single part has been loaded (see Section 8.3, p. 3-92).
- The mask "Preparation Create" is displayed.

1. **Either**
   - Select "Contour start", "Corner".

   ToPs searches for a corner in the contour which can be approached and sets the start point there. If the contour contains several suitable corners, ToPs selects the corner closest to the start point of the contour to be machined next. If the contour contains no suitable corners, ToPs selects a start point as close as possible to the start point of the contour to be machined next.

   or

   - Select "Contour start", "Element".

   ToPs calculates the start point so that it is as close as possible to the start point of the contour to be machined next. This makes the traverse paths within a single part as short as possible.

   or

   - Click in the input box next to "Surface".

   ToPs displays the mask "Max. contents of surfaces for contours to be processed first".

   - Enter surface or determine by picking.
   - Select *OK*.

   ToPs gives preference in its calculation to those contours which have surfaces smaller than/equal to the maximum surface content given.
2. Select *Start point*, *Calculate*.

   ToPs calculates a new start point for each contour. The executing sequence remains unchanged.
3. Save prepared single part with or without drawing data (see Section 9.2, p. 3-104 ff).

End preparation

- Select *File >Return*.

Displacing start points, reversing executing direction

Prerequisite

- The single part has been loaded (see Section 8.3, p. 3-92).
- The mask "Preparation Create" is displayed.

Displace start point?

1. Select *Start point*, *Displace*.
2. Click on the new start point on the contour.

Reverse executing direction?

1. Select *Start point*, *Invert*.
2. Click one after the other on the contours you wish to cut in the reversed direction.

   The contour will be cut in the reverse direction.

Recalculating start points

1. Select *Start point*, *Calculate*.

   ToPs calculates a new start point for each contour. In doing so, ToPs takes into account the settings under "Contour start" (see p. 3-62) and under "Preferred direction" (see p. 3-66).
2. Save prepared single part with or without drawing data (see Section 9.2, p. 3-104 ff).

End preparation

➢ Select *File >Return*.

Changing executing sequence

The machining sequence within a part can be changed via *Positioning sequence* and via *Rearrange*:

Difference between *Rearrange* and *Positioning sequence*

With *Rearrange*, individual contours can be rearranged and insertion positions can be preset. With *Rearrange* ToPs leaves the current machining sequence as it is and places only the selected contour at a different point in the machining process.

With *Positioning sequence*, you can likewise rearrange individual contours. However, ToPs' path optimizer subsequently recalculates the rest of the machining sequence automatically.

Prerequisite

- The single part has been loaded (see Section 8.3, p. 3-92).
- The mask "Preparation Create" is displayed.

Place a particular contour at the beginning of the machining process?

1. Select *Rearrange, Beginning*.
2. Click on contour.

ToPs places the contour at the beginning of the machining process. The rest of the machining sequence remains unchanged.

Place a particular contour at the end of the machining process?

1. Select *Rearrange, End*.
2. Click on contour.

ToPs places the contour at the end of the machining process. The rest of the machining sequence remains unchanged.

Specifically machine one particular contour before another?

1. Select *Rearrange, Before*.
2. Click on the contour before which the other contour is to be machined.
3. Click on the contour which is to be machined before it.

ToPs leaves the current machining sequence as it is and places only the picked contour at the desired position in the machining sequence.

Specifically machine one particular contour after another?

1. Select *Rearrange, After*.
2. Click on the contour after which the other contour is to be machined.
3. Click on the contour which is to be machined after it.

ToPs leaves the current machining sequence as it is and places only the picked contour at the desired position in the machining sequence.

Modifying positioning sequence, recalculating the rest

1. Select *Positioning sequence*, *Modify*.
2. Click on the contour starting from which you want to modify the executing sequence (the executing sequence up to this contour remains unchanged).
3. Click on the contours one after the other in the order in which ToPs should machine them.
4. Select *Positioning sequence*, *Path optim.*

ToPs will automatically recalculate the rest of the machining sequence.

- ➢ Save prepared single part with or without drawing data (see Section 9.2, p. 3-104 ff).

End preparation

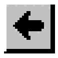
- ➢ Select *File >Return*.

Determining preferred executing direction

Prerequisite

- The single part has been loaded (see Section 8.3, p. 3-92).
- The mask "Preparation Create" is displayed.

1. **Either**

   - Set the preferred direction using  or 

   or

   - Holding mouse button down, push slide to desired position.
2. Select *New proposal*, *Calculate*.

ToPs recalculates the executing direction.

Restore default setting?

- Click on ←0→.

- Save prepared single part with or without drawing data (see Section 9.2, p. 3-104 ff).

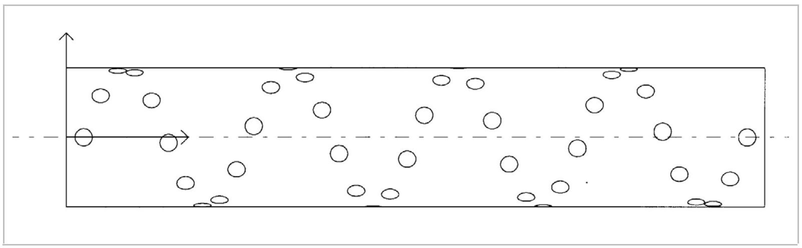
End preparation

- Select *File >Return*.

5. Creating single holes, circles of holes, and rows of holes

Using macros, you can create the following complex geometries in a simple way:

- Single holes
- Circles of holes
- Rows of holes



Row of holes on a circular tube — Fig. 24829

Circles of holes and rows of holes consist of a base element which is repeated.

The following base elements are possible:

- Circles/ellipses (see Section 5.1, p. 3-68).
- Rectangles/squares (see Section 5.2, p. 3-70).
- Oblong holes (see Section 5.3, p. 3-71).
- Self-defined geometry models (see Section 5.4, p. 3-73).

Process overview

- Define the base element and its parameters.
- Create the single hole, row of holes, or circle of holes.

5.1 Determining base element as circle or ellipse

Note
Base elements cannot be defined in bulk. Each time you create a single hole, circle of holes, or row of holes, you have to first define it.

Prerequisite

- The drawing in which you wish to create single holes, circles of holes or rows of holes has been loaded (for loading files, see Section 8, p. 3-91 ff).

1. Select *Macros, Macros, Parameters*.
   ToPs shows the following mask:

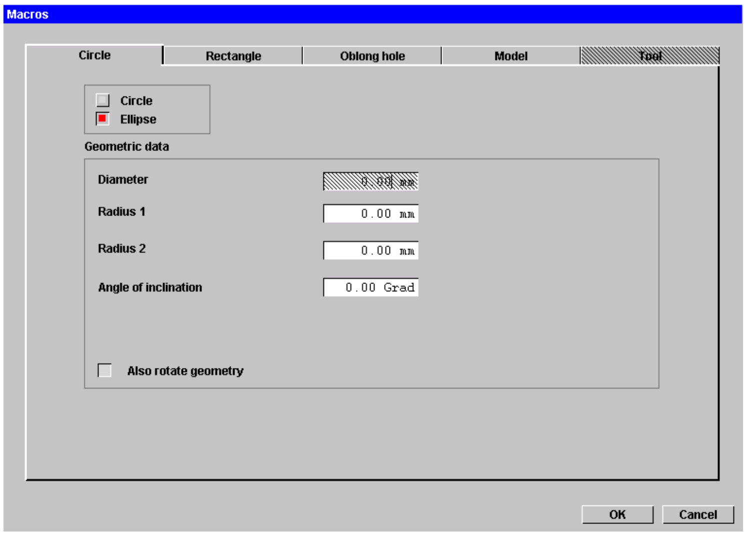


Fig. 19332EN

2. Select tab "Circle".
3. Choose between "Circle" or "Ellipse".
4. Enter the geometry data.

Geometry data for an ellipse

"Radius 1" = a/2, "Radius 2" = b/2:

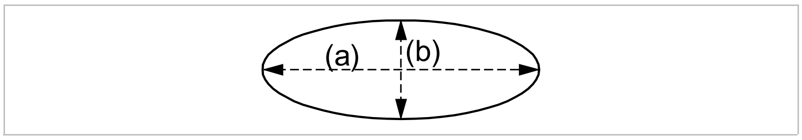
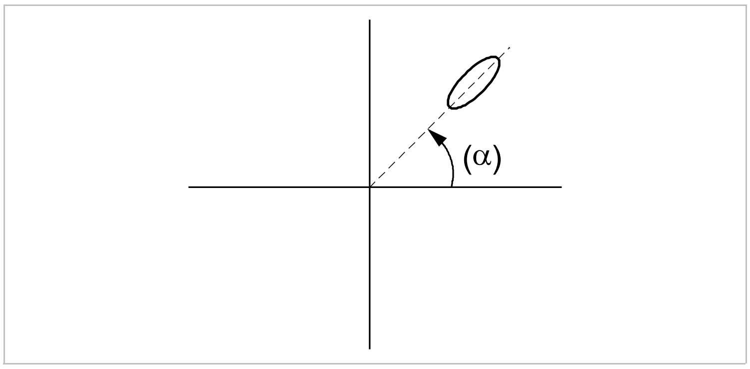


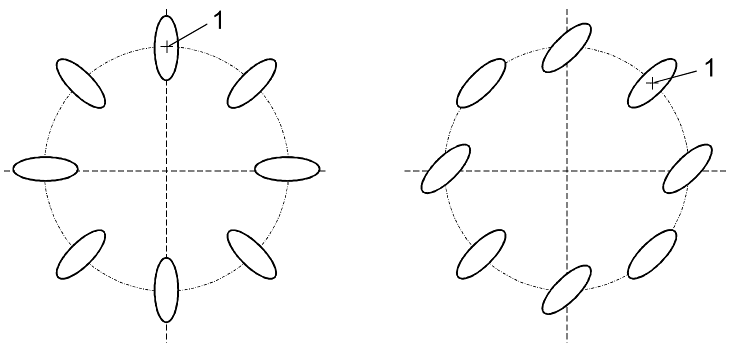
Fig. 19721

5. Enter the angle of inclination ("Angle of inclination" = angle (α) around which the ellipse is to be rotated):



Example: 45°angle of inclination Fig. 19722

6. Click in the "Also rotate geometry" box if the ellipse is also to be rotated:



Ellipse is rotated The ellipse is not rotated

1 Ellipse zero point

Fig. 27160

7. Select *OK*.

   The circle or ellipse base element is defined.

8. Create the single hole, circle of holes, or row of holes.

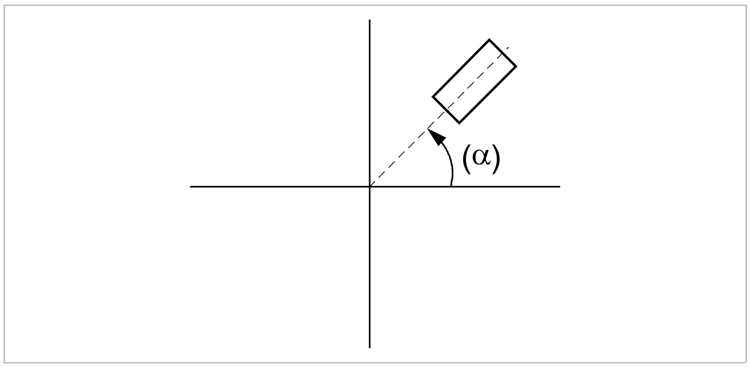
5.2 Determining base element as rectangle

Note
Base elements cannot be defined in bulk. Each time you create a single hole, circle of holes, or row of holes, you have to first define it.

Prerequisite

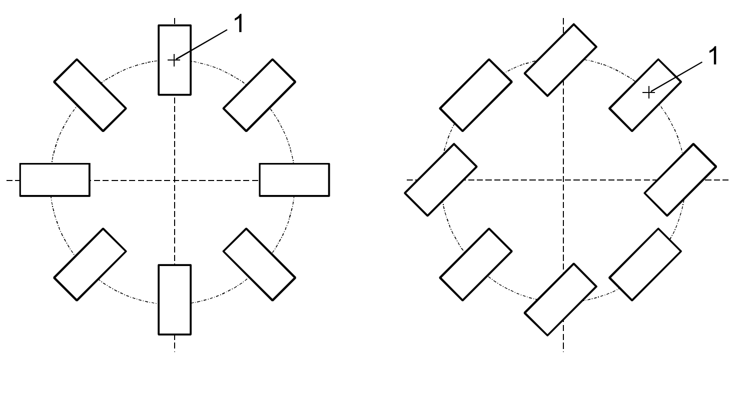
- The drawing in which you wish to create single holes, circles of holes or rows of holes has been loaded (for loading files, see Section 8, p. 3-91 ff).

1. Select *Macros, Macros, Parameters*.
   ToPs displays the mask for "Macros".
2. Select the tab "Rectangle".
3. Enter the geometry data.
4. Enter the angle of inclination ("Angle of inclination" = angle (α) around which the rectangle is to be rotated):



Example: 45°angle of inclination Fig. 19725

5. Click in the "Also rotate geometry" box if the rectangle is also to be rotated.



The rectangle is also rotated. The rectangle is not rotated
1 Rectangle zero point

Fig. 27159

6. Select *OK*.
   The rectangle base element is defined.
7. Create the single hole, circle of holes, or row of holes.

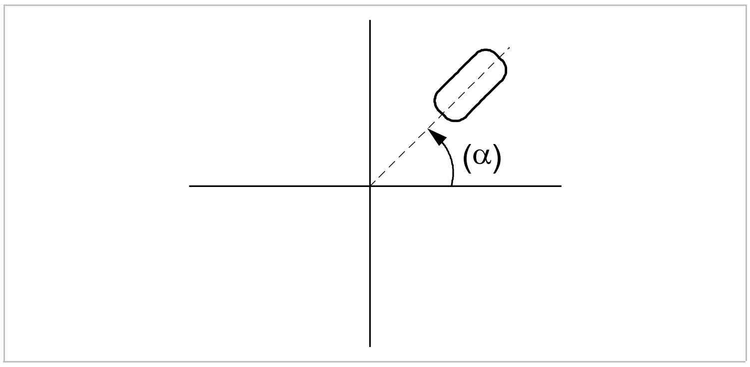
5.3 Determining base element as oblong hole

Note
Base elements cannot be defined "in bulk". Each time you create a single hole, circle of holes, or row of holes, you must first define the base element.

Prerequisite

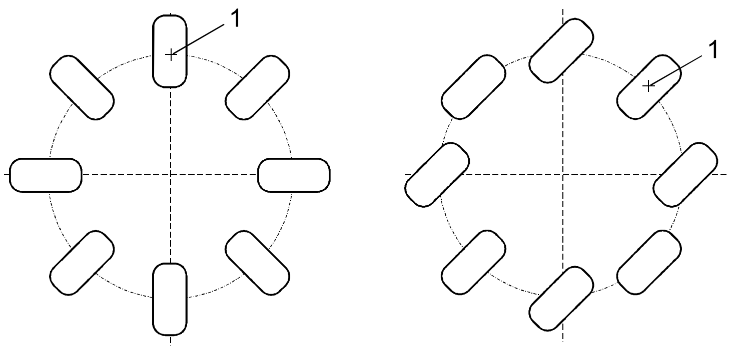
- The drawing in which you wish to create single holes, circles of holes or rows of holes has been loaded (for loading files, see Section 8, p. 3-91 ff).

1. Select *Macros, Macros, Parameters*.
   ToPs displays the mask for "Macros".
2. Select the tab "Oblong hole".
3. Set the length, width, and angle of inclination (Angle of inclination = angle (α) around which the oblong hole is to be rotated):



Example: 45°angle of inclination Fig. 19728

4. Click in the "Also rotate geometry" box if the oblong hole is also to be rotated:



Oblong hole is rotated The oblong hole is not rotated

1 Oblong hole zero point

Fig. 27161

5. Select *OK*.
   The oblong hole base element is defined.
6. Create the single hole, circle of holes, or row of holes.

5.4 Determining base element as self-defined geometry model

Note

Base elements cannot be defined "in bulk." Each time you create a single hole, circle of holes, or row of holes, you must first define the base element.

Prerequisite

- The drawing in which you wish to create single holes, circles of holes or rows of holes has been loaded (for loading files, see Section 8, p. 3-91 ff).

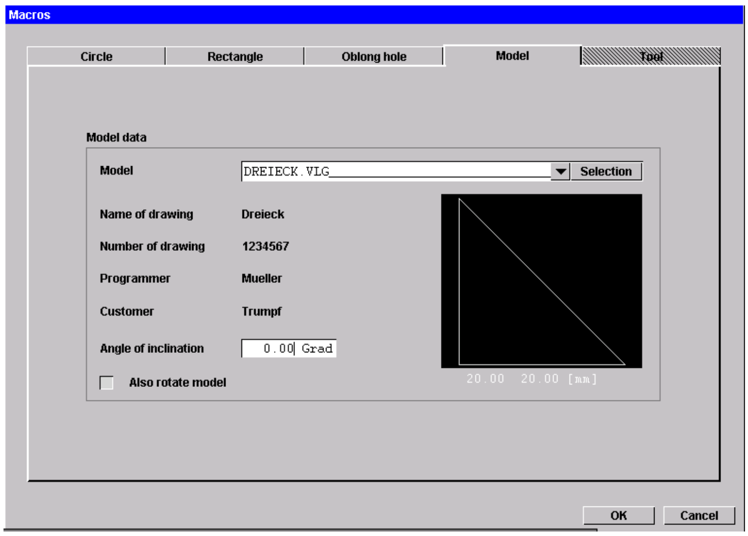
Drawing geometry models

1. Select *File >New*.
2. Draw geometry model (for drawing geometries see Section 2, p. 3-9).
3. Save geometry model as '*.vlg'.

Defining a geometry model as base element

1. Select *Macros, Macros, Parameters*.

   ToPs displays the mask for "Macros".
2. Select the tab "Model":



Using your own drawing as a model — Fig. 26007EN

3. To display geometry models previously used: open "Model" using ▼.

   ToPs displays the mask "Previous models".
4. To select from amongst all geometry models, click on *Selection*.

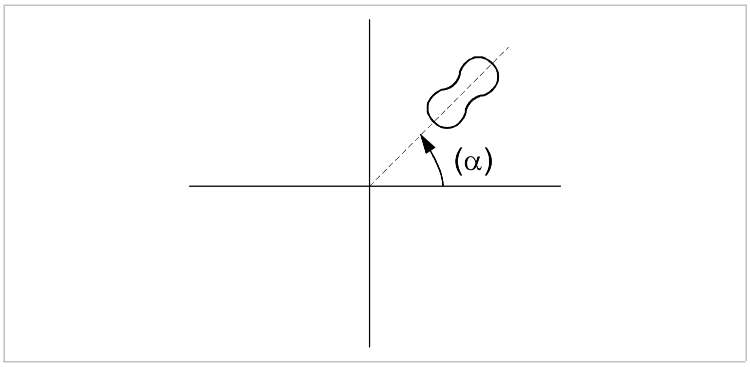
   ToPs displays the mask "Load file".

   ToPs indicates all geometry models that you have created.

5. Mark the desired model.

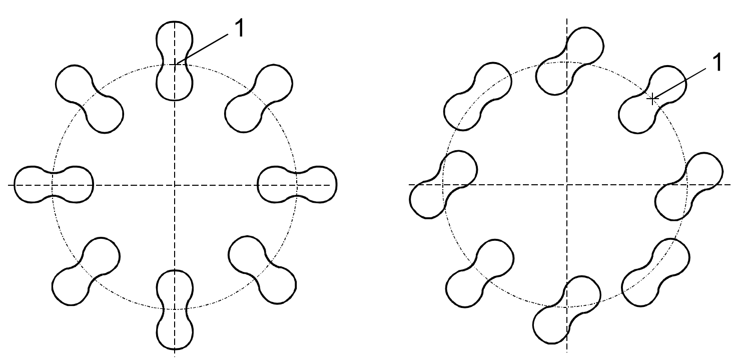
   ToPs displays a preview of the geometry. ToPs also displays the name of drawing, number of drawing, programmer and customer if drawing data was defined when the geometry model was saved (for more on saving drawing data, see p. 3-106).

6. Enter the angle of inclination ("Angle of inclination" = angle (α) around which the model is to be rotated):



Example: 45°angle of inclination — Fig. 27162

7. Check "Also rotate model" if the model should be rotated when creating rows of holes or circles of holes:



Model is rotated — The model is not rotated

1 Model zero point

Fig. 27163

8. Select *OK*.

   The model is defined as base element.

9. Create the single hole, circle of holes, or row of holes.

Shifting the zero point in geometry models

1. Load geometry model (for loading files, see Section 8, p. 3-91 ff).
2. Select *File >Save*.

   or

   ➢ Select *File >Save as ...* .

   ToPs displays the mask "Store file".

   ➢ Select *OK*.

   ToPs asks whether the existing file should be overwritten.
3. Select *Yes*.

   ToPs asks if you want to define a new midpoint (= new zero point).

Define a new zero point?

4. Select *Yes*.
5. Enter the X and Y coordinates for the new zero point (example below: `30,20`).

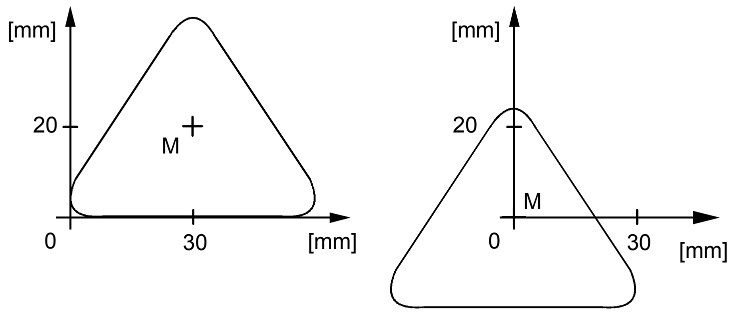
   or

   ➢ Click on the point which is to become the new zero point (example below: click on M).

ToPs redefines the zero point.

Example: Defining the midpoint as the new zero point

Before shifting ... ... afterward:



0 Previous zero point
M Midpoint of self-generated geometry model

M Midpoint and new zero point of model

Fig. 26986

ToPs sets the zero point of the model at the selected position. (New zero point in example: M.)

Saving the new zero point

1. Select *File >Save*.
   ToPs asks whether the existing file should be overwritten.
2. Select *Yes*.
   ToPs asks if you want to define a new midpoint.
3. Select *No*.

ToPs saves the model with the new zero point.

5.5 Drawing a single hole using macros

Prerequisite

- The drawing in which you wish to create single holes, circles of holes or rows of holes has been loaded (for loading files, see Section 8, p. 3-91 ff).
- You have just finished defining the base element:
  - Circle or ellipse (see Section 5.1, p. 3-68).
  - Rectangle (see Section 5.2, p. 3-70).
  - Oblong hole (see Section 5.3, p. 3-71).
  - Self-defined geometry model
    (see Section 5.4, p. 3-73).

1. Select *Macros, Macros, Single hole*.
2. **Either**
   - ➢ Enter or click on the target position for the single hole.

   ToPs sets the midpoint of the base element on the target point.

   or

   - ➢ Enter the angle of inclination for the base element.

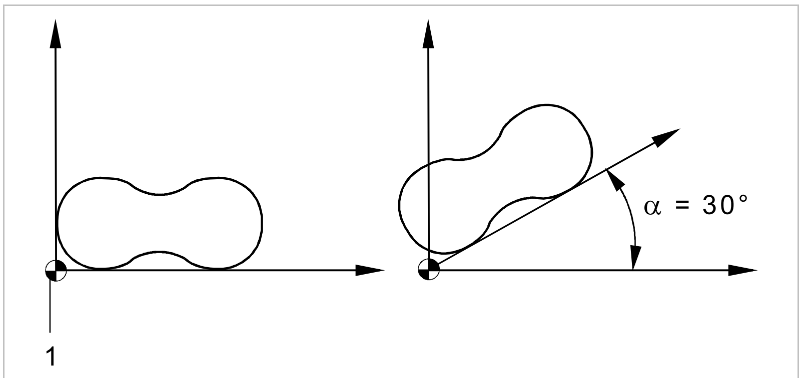
   ToPs "hangs" the single hole with the given angle on the cursor. If you enter an angle of inclination here, ToPs will ignore the angle of inclination defined for the base element.

   - ➢ Enter or click on the target position for the single hole.

   ToPs sets the midpoint of the base element on the target point.

Create additional single holes?

3. Enter or click on additional target positions.



1 Target position and zero point of the geo
α Angle of inclination for the single hole

Fig. 26988

5.6 Drawing a circle of holes using macros

You can create either a complete or partial circle:

Full circle

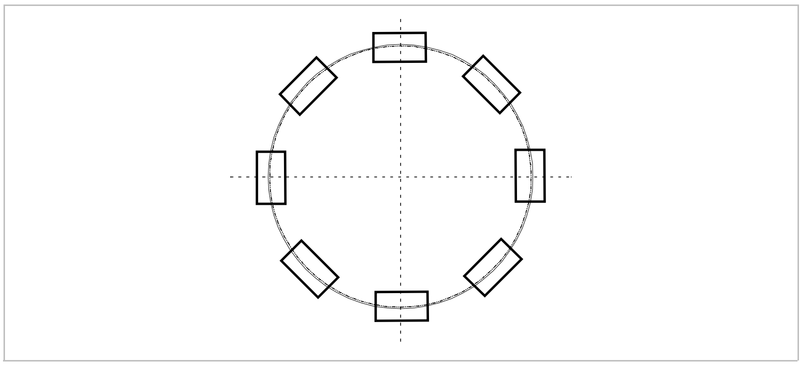


Fig. 4757

Partial circle

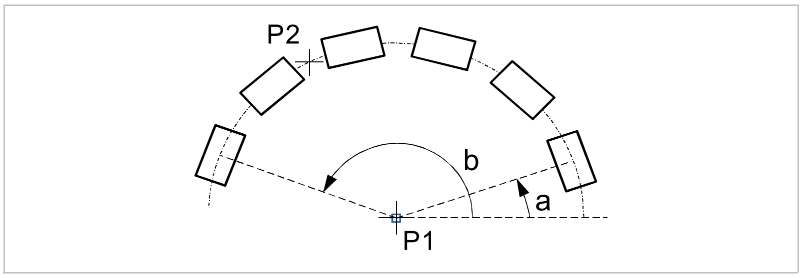


Fig. 4753

Prerequisite

- You have defined the base element:
  – Circle or ellipse (see Section 5.1, p. 3-68).
  – Rectangle (see Section 5.2, p. 3-70).

- Oblong hole (see Section 5.3, p. 3-71).
- Self-defined geometry model
  (see Section 5.4, p. 3-73).

1. Select *Macros, Macros, Circle of holes*.
2. Click on the midpoint (P1).

   or

   ➢ Enter the midpoint (P1).
3. Enter the number of holes.

Defining a circle

4. Enter the start angle (a).

   or

   ➢ Define the start angle (a) with two points.
5. Enter the final angle (b).

   or

   ➢ Define the final angle with two points.

Note
For full circles, the start and final angles must both be 0°.

6. Enter radius.

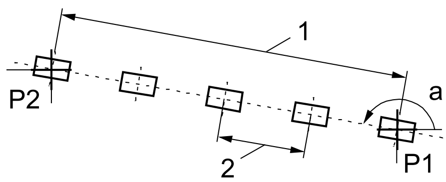
   or

   ➢ Define the radius with two points.

5.7 Drawing a row of holes using macros

Application

Creating several equally-spaced (2), identical holes in a straight line (1).



1	Length of the row of holes	P1	Start point
2	Space between the holes	P2	End point
		a	Angle of inclination

Fig. 4752

Prerequisite

- You have defined the base element:
  - Circle or ellipse (see Section 5.1, p. 3-68).
  - Rectangle (see Section 5.2, p. 3-70).
  - Oblong hole (see Section 5.3, p. 3-71).
  - Self-defined geometry models (see Section 5.4, p. 3-73).

1. Select *Macros, Macros, Row of holes*.
2. Follow the instructions in the command line.

6. Defining bending lines

6.1 Creating bending lines

Prerequisite

- The drawing must contain a line drawn in the color cyan.

Note
Bending lines are automatically adapted to the contour.

For the "folding" type of bend, 180° must be entered for the opening angle and the preangle must be entered.

If the "Pre- and postbend" bending technique is selected, the preangle applies to the prebend. The opening angle corresponds to the final angle.

The bending radius is used for display purposes. If the notches are not large enough, a small display radius should be chosen since otherwise problems occur when creating the bending part (as long as this edge isn't contacted).

Geometries which are to be further processed in ToPs 600 must not contain any other drawing components apart from the bending lines and unfolding. If external formats such as ".igs" or ".dxf" are imported, the drawing frames, views, fonts, etc. must be removed from the drawing.

Rule of thumb for bending radius

Notch and sheet thickness > bending radius.

1. Select *Bending >Create*.
2. Enter values in the "Define bending line" mask.
3. Select *OK*.
4. Click on the line drawn in cyan.

The line is defined as a bending line and is displayed by the program in green.

6.2 Assigning bending information

Bending information will not be transferred. It must be assigned. Exception: Files with '*.mi' format from SheetAdvisor.

Note
In the *Drawing module*, files with the formats '*.dxf', '*.igs', '*.mi' or '*.gra' can be imported (see Section 8.4, p. 3-94). The bend factors with which the model is created must in this case be entered and later converted in ToPs 600.
The upper and lower tools (see Modifying bending lines) should likewise be entered.

1. Select *File >Properties*.
2. Enter "Number of drawing", etc.
   You must enter: "Material" and "Material thickness".
3. Select *OK*.
4. Select *File >Save*.

   or

   - Select *File >Save as* if a name for the program is to be assigned.

6.3 Modifying bending lines

1. Select *Bending >Modify*.
2. Click on the bending line which is to be modified.
3. Enter modifications in the subsequent "Define bending line" mask.
4. Select *OK*.

The changes are adopted.

6.4 Transferring bending tools

Tool data from one bending can be transferred to other bendings.

1. Select *Bending >Tools*.
2. Click on the bending line from which the tools are to be transferred (reference bending line).
3. Click on the bending lines which are to receive the machining data of the reference bending line.

   or

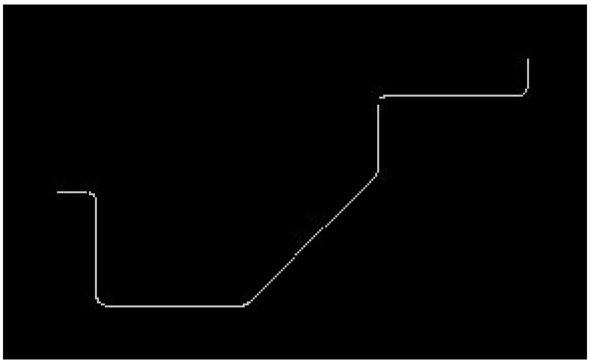
   ➢ Select *All.*

   The data will then be modified for all bending lines.

6.5 Unfolding bending profile

Bending parts with a rectangular unfolding and parallel bendings can also be drawn simply in the form of the desired profile after bending, with or without bending radiuses.

With the *Unfold* function, the profile can then be converted to an unfolding drawing.



Profile drawing Fig. 24586

1. Select *Bending >Unfold*.
2. Enter "Material name", "Material thickness" and "Profile depth" (width of the part for unfolding).
3. Enter "Upper tool group" and "Lower tool group."

   The upper and lower tool groups are required in order to determine the appropriate tools and the corresponding bend factors.
4. Select *OK*.

5. To define the placement of material in terms of the profile:
   - Click on a line element of the profile.
   - Click next to the element in the direction where the material is located.

   The profile is then replaced by the relevant unfolding.

6.6 Creating bending profile

Bending profiles can be created in order to check and modify an unfolding drawing. If the bending part contains internal contours, these will be deleted.

When unfolding again, only the external contour is rectangular.

1. Select *Bending >Create*.
2. Enter "Material name" and "Material thickness".
3. Select whether the profile is for the "top side" or "bottom side" of the bending part.
4. If the profile is to include bending radii: check "with radii".
5. Select *OK*.
6. Click on a suitable bending line.

   The bending direction and cross-section are defined for the desired profile.
7. Click once more on the bending line.

The profile is created vertically to the bending line on which you clicked. It takes into account all bendings parallel to the selected bending line.

6.7 Creating profile as construction geometry

The profile created can be displayed as construction geometry in the current drawing.

Prerequisite

- Under *Bending >Profile >Create*, "Create profile as construction geom." has been checked.

Note
Bending lines cannot be split. The line must be split before it is defined as a bending line.

If a bending line which runs through an internal contour is to be deleted, the entire bending line will be deleted.

Bending lines are open contours. The bending line end points are displayed via the *Open contour points* button in the icon bar.

1. If the bending lines do not end exactly on the contour, correct bending lines: correct bending lines via *Modify*, *Stretch*.

Deleting construction geometries

2. Select *Drawing tools*.
3. Select *Delete construction geo >All*.

   or

   ➢ Select *Bending >Delete >Selection >Line color*.
4. Select the color magenta.

The construction geometry is deleted.

7. Inserting or modifying text in a drawing

In ToPs 100, you can insert texts into drawings and edit them (cutting or marking).

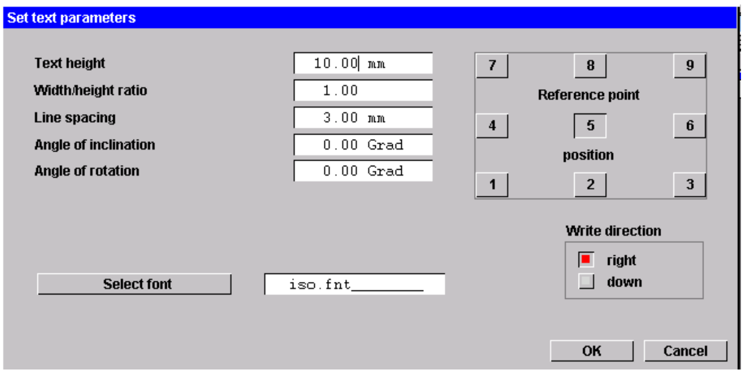
Notes
Texts to be cut must have the line color "white". Texts to be marked must have the line color "yellow" (for more on line colors, see p. 3-54 ff.)

When cutting the texts, ToPs does not generate approach or withdraw flags. The beam pierces directly on the contour.

The machining plan cannot be rearranged. This can result in uncontrolled scrap (depending on the font).

7.1 Setting text parameters, entering text

1. Select *Text, Create*.
   ToPs displays the mask "Set text parameters".



Standard text parameters — Fig. 26008EN

2. Set text parameters:

"Angle of inclination" A 0° angle of inclination corresponds to vertical characters. Positive values incline the text to the right.

"Angle of rotation" To indicate a 0° angle of rotation corresponds to horizontal lines. Positive values rotate the text counterclockwise.

"Reference point position" The position of the reference point indicates the position of the cursor on the text box.

"Write direction" "down": ToPs positions the characters vertically from top to bottom.
"right": ToPs positions the characters one next to the other.

3. Click on *Select font*.

   ToPs displays the mask "Load file". Here ToPs offers the following fonts:

   _ 'Bold.fnt'

   _ 'Iso.fnt'

   _ 'Isoprop.fnt'

Note
Only fonts with their font file ('*.fnt') in the directory 'trumpf/daten' can be selected. (To create the font yourself, see p. 3-88 ff.)

4. Mark the desired font.

   ToPs displays the mask "Set text parameters" again.

5. Once you have set all parameters, Select *OK*.

   ToPs automatically displays the mask "Enter text":

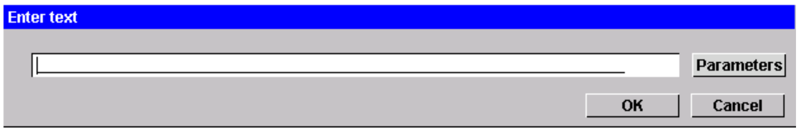


Fig. 26009EN

Modify text parameters?

6. Select *Parameters*.

   ToPs displays the mask "Set text parameters" again (see p. 3-85).

Enter text?

7. Enter text within the box.

Example:
`One-line text.`

Enter several lines of text?

8. If you wish to enter more than one line of text, Mark the end of a line with `\n`.

Examples:
`Multiple lines of text\nMultiple lines of text\n`

9. After you have entered the text, Select *OK*.

   ToPs displays a rectangle which surrounds the text The entered text will not be visible.

10. Position the rectangle, then click the mouse.

The text will be inserted at the position you click on.

7.2 Modifying text parameters

Prerequisite

- The drawing includes text.

1. Select *Text, Modify*.
2. Click on the text for which you want to change the parameters. ToPs displays the mask "Set text parameters".
3. Change the text parameters.

When you have made your changes to the parameters, select *OK*.

7.3 Creating the font yourself

The fonts bold.fnt, iso.fnt and isoprop.fnt are part of the ToPs standard range.

To create self-defined fonts, a reference file and a font file must be created.

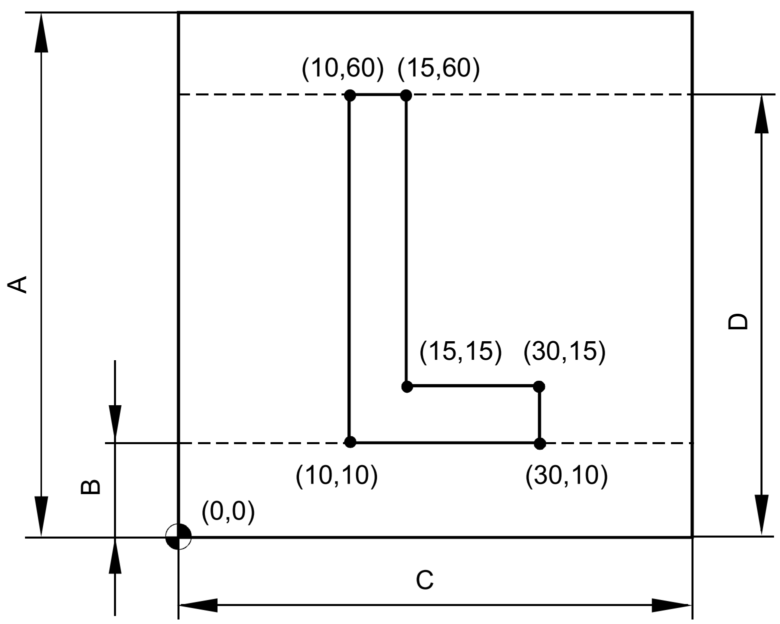
The names of all self-defined fonts are entered into the reference file.

The font file itself contains the coordinates for all characters.

Example:

Character	Name of reference file (prescribed)	Name of font file (as desired)	txt editor program (as desired)
L	font.ref	selfdef_font.fnt	Notepad

Table 3-1



A Cell height
B Descender
C Cell width
D Character height

Draft: dimensions and coordinates of a character Fig. 29052

Prerequisite

- A program for editing txt files like e.g. Notepad, Wordpad or Editor must be available.

Creating a reference file

1. Open Notepad.
   An empty page is displayed.
2. Enter 1005 in the first line.
   The numbers from 1001 to 1004 assigned to the ToPs standard fonts.
3. Enter selfdef_font.fnt into the second line.
4. Select *File >Save as*.
5. Under "Save in" change to the directory 'trumpf\daten'.
6. As "File type" select **.txt*.
7. Under "File name", enter `font.ref`.
   This file name is prescribed.
   All other self-defined fonts will be entered into this file. Every font is given a consecutive number 1006, 1007... In each line, a file name must come after each number.
8. Select *Save*.
   The reference file is created in the directory 'trumpf\daten'.

Creating font file

9. In Notepad, select *File >New*.
10. Enter data line by line as in the following example.

Example: Entries in Notepad (line by line)	Explanation	File format description
#~HEADER	Beginning of first block	Beginning of file header
selfdef_font.fnt	Name of font file	
40	Cell width	
80	Cell height	
70	Distance from zero point to the end of character height	
10	Start line of the character without descender	
1	Number of subsequent characters	
0.5	Ratio of cell width to height	
##~~	End of the block	End of file header
#~2	Start of description of a character	Beginning of character
L	Character to be displayed	
1	Number of groups	
#~2.1	Beginning of the group	
7	Number of subsequent points	
M 10 10	**M**ove to coordinate 10,10	
D 10 60	**D**raw a line from the coordinate 10,10 to the coordinate 10,60	
D 15 60	etc.	
D 15 15	etc.	
D 30 15	etc.	
D 30 10	etc.	
D 10 10	etc.	

Example: Entries in Notepad (line by line)	Explanation	File format description
C	**C**lose the polygonal contour	
|~	End of group description	
##~~	End of description of a character	End of character
###~~~EOF		End of file

Font file consisting of one character Table 3-2

11. Select *File >Save as*.
12. Under "Save in" change to the directory 'trumpf\daten'.
13. As "File type" select **.txt*.
14. As "File name", enter `selfdef_font.fnt`.
15. Select *Save*.

    The font file with the letter L has been created and can be used after restarting ToPs.

Tip
Creating a complete character set is time-consuming. Therefore, simply copy and rename a ToPs font file. Then write over the entries in the file with your own coordinates and data.

8. Loading files from ToPs and foreign formats

8.1 Entering file names using wildcards

Wildcards are dummies in a file name which replace a specific number of characters or character string.

Why use wildcards?

- They reduce the number of files displayed in a field.
- You can look for a file for which you don't know the exact name.

Wildcard options

?	Replaces any single character
*	Replaces any character string

Examples

test?.geo	replaces, e.g.	test1.geo
		test2.geo
		testa.geo
*.geo	replaces, e.g.	test1.geo
		test2.geo
		testa.geo

Combining wildcards - Example

*test?.geo	replaces, e.g.	1test1.geo
		p1testx.geo

Prerequisite

- The "Load file" mask is displayed at the tab "File manager".

1. Enter the file name using wildcards under "File name".
2. Select *OK*.

   or

   ➢ Press <RETURN>.

   Within the file manager, ToPs displays all files which meet the criteria of the wildcards.
3. Mark the desired file.

8.2 Loading workfile

Prerequisite

- You have previously saved a workfile (see Section 9.1, p. 3-103).

1. Select *File >Load*.
   The "Load file" mask is displayed at the tab "File manager".
2. Select file format *.geo.
3. Mark workfile (for workfile name, see p. 3-104).
4. Select *OK*.
5. ToPs loads the workfile.

8.3 Loading drawings and geometry models

You can load the following files:

- Drawings ('*.geo').
- Geometry models for single holes, circles of holes and rows of holes ('*.vlg').

1. Select *File >Load*.
   The "Load file" mask is displayed at the tab "File manager".
2. Check the file format you wish to load.
   The file manager displays all files of the selected format which are located in the current directory.

Change directory upwards?

3. Click on the "*" symbol until the file manager displays the desired directory.

Change directory downwards?

4. Mark the directory which is one level deeper.
5. Repeat until the file manager displays the proper directory.

   Tip
   ToPs displays the current path under "Search in". If you open "Search in" using ▾, ToPs shows you the "Previous directories" from which you have already loaded a file at some point.

Preview the file?

6. Select "Look-ahead (Preview)".

   The preview function in ToPs becomes continuously active.

   or

   ➢ Deselect "Look-ahead (Preview)".

   The preview function is no longer active.

   ➢ Using the right mouse button, click on the file name.

   ToPs displays the geometry in the preview window. Below you will see the geometry's dimensions.

7. Mark the desired file.

   ToPs enters the name of the file into "File name".

   or

   ➢ Enter the name of the file you want to find under "File name" (to search for file names with the help of wildcards, see p. 3-91).

8. Select *OK*.

9. If ToPs does not immediately display the file, select *Total*.

ToPs loads the file.

8.4 Loading foreign formats from CAD systems

You can load files in the following formats:

- Drawings:
  - '*.dxf' (= file format from CAD systems, e.g. AUTOCAD).

  Option:
  - '*.igs' (= file format for various CAD systems).

All drawings loaded or read in from external systems can be further edited with the ToPs drawing functions.

There is no CAD system integrated into ToPs even though functionally they are very similar. For this reason, it is advisable to create more complex drawings in a CAD system. To edit the drawing further in ToPs, it must be put into a form suitable for processing:

Loading 2D drawings in the formats 'dxf', 'igs' and 'mi'

Prerequisites

- ToPs can only read in 2D files with standardized Z coordinates. 3D drawings must be projected into a two-dimensional plane and saved as 2D drawings.
- '*.igs': The IGES standard stipulates a fixed format of 80 characters per line. Only drawings complying with this can be read in.
- '*.mi': ToPs can only read in uncompressed '*.mi' files as 2D drawings or tube unfoldings.
- The drawing may contain only contours which can be machined, in other words no frames or headers and no construction geometries. Bending lines are interpreted only in ToPs 600, otherwise they are skipped.
- Only geometry elements which ToPs recognizes may be transferred. This means, for example, that no splines may be transferred to ToPs. Avoid such geometric elements in your drawing. In general, splines can be easily replaced by arcs of circles.

1. Select *File >Load*.

   The "Load file" mask is displayed at the tab "File manager".

2. Check the desired format.

   The file manager displays all files of the selected format which are located in the current directory.

   Note
   If you select the '.mi' format, the file manager displays **all** files in the current directory (with and without suffix). Reason: The ME10 CAD system saves files in the '.mi' format without file extensions.

   If you only want to display drawings with the suffix '.mi':

   1. Open Explorer.
   2. Go to the directory 'Trumpf\ToPs100w'.
   3. Double click on the 'ToPs100.ini' file.
   4. If necessary select the program (editor), with which the 'ToPs100.ini' file should be opened (e.g. "Notepad").

      The editor opens the 'ToPs100.ini' file.
   5. Set the variable ST_MISelect = * to ST_MISelect = *.mi.

   Tip
   Use the *>Find* menu in your editor to find the variable quickly.

   6. Save the modifications in 'ToPs100.ini'.
   7. Close 'ToPs100.ini'.

   The changes become effective upon restart.

Change directory upwards?

3. Click on the "*" symbol until the file manager displays the desired directory.

Change directory downwards?

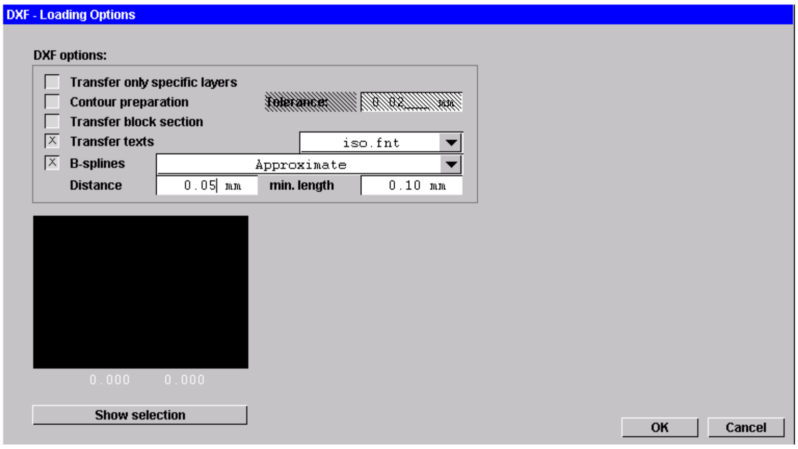
4. Mark the directory which is one level deeper.
5. Repeat until the file manager displays the proper directory.

   Tip
   ToPs displays the current path under "Search in". If you open "Search in" using ▾, ToPs shows you the "Previous directories" from which you have already loaded a file at some point.

6. Mark the file you wish to load.
7. Select *OK*.

   ToPs displays the mask "... Loading options" for the selected format.
8. Set the loading options (see following section).

Setting loading options for 2D drawings in '.dxf' format



"DXF - Loading options" Fig. 27702EN

Read in only particular layers?

By reading in specific layers, geometries from a specific layer can be read in selectively or left out selectively. Time-consuming changes (e.g. erasing dimensioning) can thus be avoided:

1. Check "Transfer only specific layers".

   ToPs displays the list field "Existing layers".

2. Mark the layer you want to transfer.
3. Using the *arrow* symbol, transfer the layer into the list field "Layers for transfer".
4. Repeat steps 2 and 3 as often as necessary until all required layers have been transferred.

Contour preparation?

For contour preparation of the drawing, a tolerance can be specified. Points which are not separated by more than the defined tolerance will be merged into one point:

1. Check "Contour preparation".
2. Enter the tolerance.

Read in block section?

All geometry elements are taken into account which were defined as a block when creating a drawing in '.dxf' format:

➢ Check "Transfer block section".

Transfer text?

1. Check "Transfer texts".
2. Open the list field with ▼.

ToPs displays the mask "Load file". It displays all available fonts.

Note
The fonts are found in the directory '...\Trumpf\Daten'. The directory cannot be changed.

3. Mark the font you want to transfer.
4. Select *OK*.

Setting B-spline options

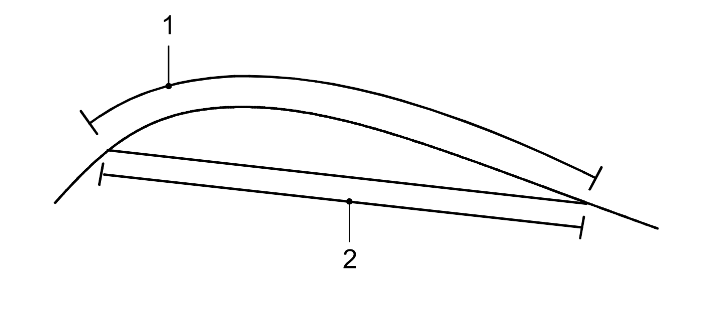
A "B-spline" is a mathematical description of a curve. With this form of description, the curve is defined as a series of points and additional parameters.

If a file in '*.dxf' format contains B-splines, these can be changed into the ToPs elements "lines" and "arcs":

1. Check "B-splines".
2. Open the list field with ▾.

Interpolate B-splines?

1. To convert B-splines into a continuous line:
   Mark *Interpolate*.
2. Enter distance (1) and minimum length (2).
   ToPs interpolates the curve by converting it into a continuous line:



1 Distance 2 Min. length

Interpolation of B-splines Fig. 25996

"Distance":
"Distance" corresponds to the increment along the curve.

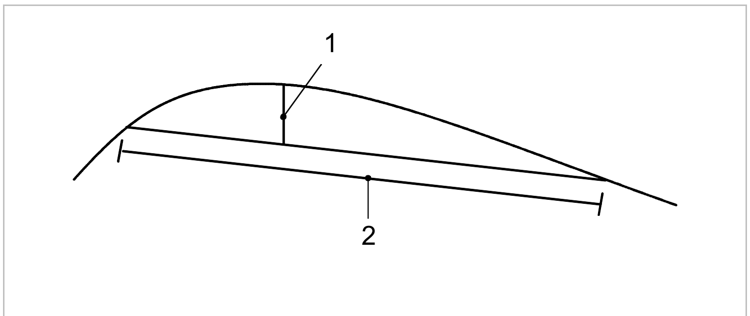
The smaller this value is, the more exactly will the interpolation match the curve. Disadvantage: The number of lines generated increases.

"Min. length":
Each line must be longer than the value given for "Min. length". If the total length of the B-spline is shorter than the value given for "Min. length", the B-spline will not be converted.

Approximate B-splines?

1. To convert B-splines into a continuous line comprised of lines and arcs, mark *Approximate*.
2. Enter distance (1) and minimum length (2).

In "Approximation", the curve is changed into a line comprised of lines and arcs.



1 Distance 2 Min. length

Approximation of B-splines Fig. 25997

"Distance":
This parameter defines the maximum distance from the lines and arcs to the curve.

The curve is divided until the distance between the approximated continuous line and the curve is less than the specified value.

"Min. length":
Each line must be longer than the preset "Min. length" value. If the total length of the B-spline is shorter than the value given for "Min. length", the B-spline will not be converted.

Display control polygon?

The control polygon joins the control points of B-splines with a continuous line, thereby indicating the approximate course of the curve. The control polygon helps to judge the position of B-splines.

Example of application:
The B-spline is too short and can therefore not be converted. Using the control polygon, it is possible to guess the position of the short B-spline.

➢ To display the B-spline control polygon, mark *Control polygon*.

Previewing the file

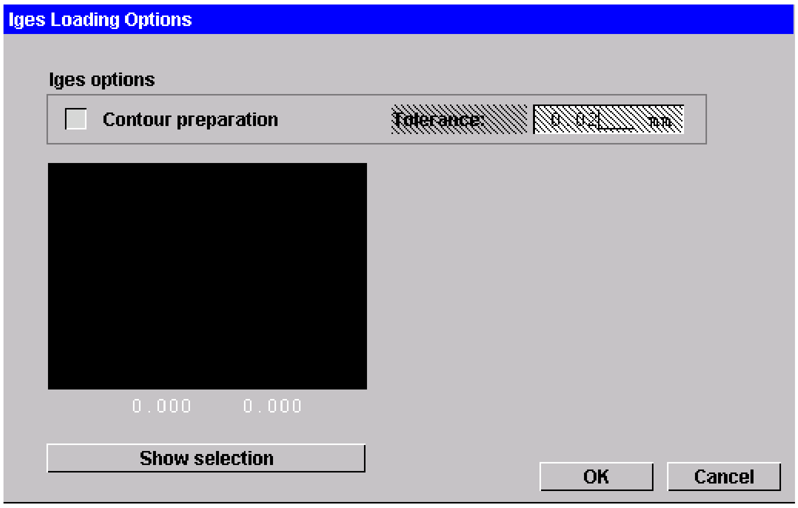
➢ Click on *Show selection*.
ToPs displays a preview of the file.

Once the loading options are set

➢ Select *OK*.

ToPs loads the 2D drawing in '.dxf' format.

Loading options for 2D drawings in '.igs'



"Iges - Loading options" Fig. 27701EN

Contour preparation?

For contour preparationof the drawing, a tolerance can be specified. Points which are not separated by more than the defined tolerance will be merged into one point:

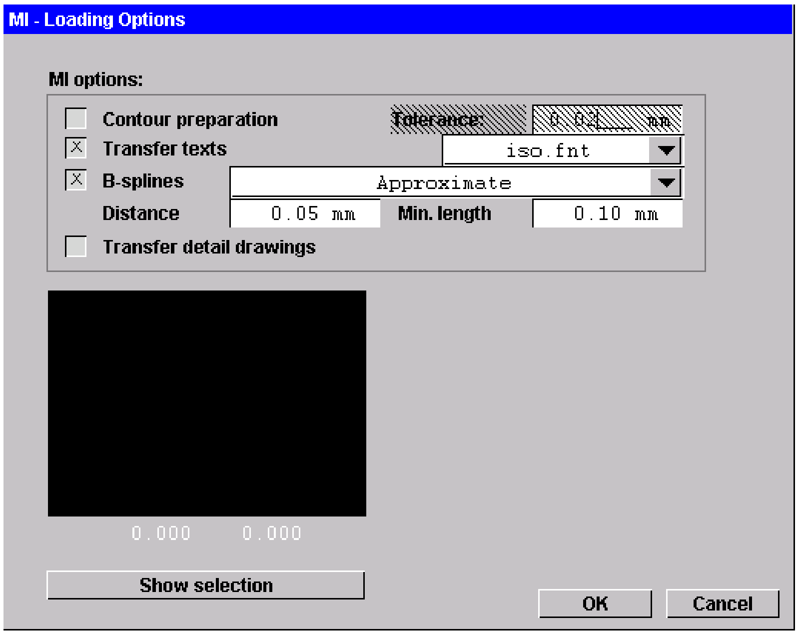
1. Check "Contour preparation".
2. Enter the tolerance.

Preview the file?

3. Click on *Show selection*.
4. Select *OK*.

ToPs loads the 2D drawing in '.igs' format.

Loading options for 2D drawings in '.mi'



"MI - Loading options" Fig. 27700EN

Contour preparation?

For contour preparationof the drawing, a tolerance can be specified. Points which are not separated by more than the defined tolerance will be merged into one point:

1. Check "Contour preparation".
2. Enter the tolerance.

Transfer text?

1. Check "Transfer texts".
2. Open the list field with ▾.

   ToPs displays the mask "Load file". It displays all available fonts.

   Note
   The fonts are found in the directory '...\Trumpf\Daten'. The directory cannot be changed.

3. Mark the font you want to transfer.
4. Select *OK*.

Setting B-spline options

(See p. 3-97 ff.)

Transfer detail drawings?

In the ME 10 program there is the option of generating detail drawings of a part. These detail drawings are given part names which begin with a dot.

Detail drawings of these parts are not normally loaded by ToPs.

➢ If you wish to transfer detail drawings:
Check "Transfer detail drawings".

Preview the file

➢ Click on *Show selection*.
ToPs displays a preview of the drawing in '.mi' format.

Once the loading options are set

➢ Select *OK*.

ToPs loads the 2D drawing in '.mi' format.

Smashing the parts structure of foreign formats

Foreign formats which consist of several parts must be converted by ToPs into a different structure. When you load these types of foreign formats, ToPs will display a corresponding message as it is loaded.

1. Load foreign format (see Section 8.4, p. 3-94).
2. Select *Modify 2*, *Smash struct.*

9. Saving files

You can save the following files:

- Drawings ...
  - ... as a workfile.
  - ... as '*.geo' without drawing data.
  - ... as '*.geo' with drawing data.
  - ... in the foreign formats '*.dxf' and '*.mi'.
- Geometry models for single holes, circles of holes and rows of holes ...
  - ... as a workfile.
  - ... as ('*.vlg') with and without drawing data.

Automatic geometry preparation when saving a 2D

When saving two-dimensional drawings, ToPs automatically carries out geometry preparation in order to avoid inaccuracies. All geometry elements are analyzed, and corrected if necessary:

- ToPs determines internal and external contours.
- ToPs removes superfluous lines.
- ToPs cleans up messy contour transitions.

Construction lines are not saved

When saving a drawing as a '*.geo' or '*.dxf', construction lines and construction circles are not saved.

Create a new directory to save to?

The ToPs 100 mask "Store file" does not allow for the creation of a new directory.

➢ Create the new directory in Explorer or in the file manager of your operating system.

9.1 Saving a file as a workfile

Application

Quick intermediate save of the current status of the following files without preparing geometries:

- Drawings
- Geometry models for single holes, circles of holes and rows of holes

Construction lines and construction circles remain.

Note
A workfile is always overwritten when saving another workfile.

Workfile directory

ToPs always saves the workfile to the directory which is located in 'Tops100.ini' under "ToPs - directory (start directory)".

The following directory structure is provided as standard:

;;ToPs - directory (start directory)
TOPS_PWD= $(TC_TRUMPF_PFAD)\teile\user1

Name of the workfile

ToPs always saves the workfile under the name stored in 'Tops100.ini' under the variable ST_WORKFILE.

The standard name here under which ToPs will save the workfile is 'Workfile_100.geo'.

Change the name of the workfile?

(See p. 3-104).

Saving the workfile

Prerequisite

- You have loaded or created a new file which you want to save as a workfile.

➢ *File >Save workfile*.

ToPs saves the file as a workfile.

Changing the name of the workfile

Note
When you modify variables in 'ToPs100.ini', you must restart ToPs 100 for the modifications to come into effect.

1. Open Explorer.
2. Go to the directory 'Trumpf\ToPs100w'.
3. Double click on the 'ToPs100.ini' file.
4. If necessary select the program (editor), with which the 'ToPs100.ini' file should be opened (e.g. "Notepad").
   The editor opens the 'ToPs100.ini' file.
5. Change the variable after ST_WORKFILE (without suffix). Examples: ST_WORKFILE= testworkfile.

   Tip
   Use the >*Find* menu in your editor to find the variable quickly.

6. Save the modifications in 'ToPs100.ini'.
7. Close 'ToPs100.ini'.
   ToPs will always save the workfile under the new name.
8. Restart ToPs.

The modifications come into effect.

9.2 Saving drawings

Note
When saving drawings as '*.geo', ToPs sets the zero point of the drawing automatically at the bottom left corner.

If a contour has no lower bottom corner, ToPs sets the zero point in the bottom left corner of a circumscribing rectangle.

Tip
To maintain a zero point for as long as you are working on a drawing, save the drawing as a workfile (see Section 9.1, p. 3-103).

Saving drawings as '*.geo' without drawing data

Under current name in current directory

Prerequisite

- You have loaded or created a drawing.

➢ Select *File >Save*.

ToPs saves the drawing in the previously selected directory under the current name. File format: '(file name).geo'.

Under a different name in a different directory

Prerequisite

- You have loaded or created a drawing.

1. Select *File >Save as ...*
   ToPs displays the mask "Store file":

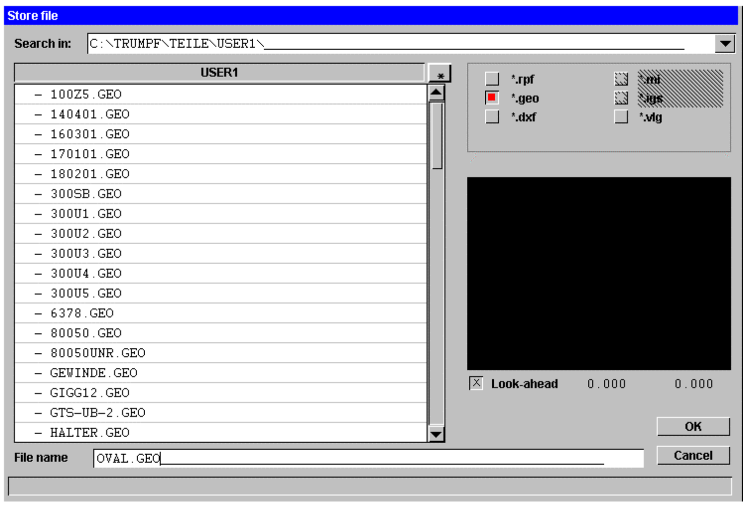


Fig. 25999EN

2. Select "*.geo."

Change directory upwards?

3. Click on "*" until ToPs displays the desired directory.

Change directory downwards?

4. Mark the directory which is one level deeper.
5. Repeat until ToPs displays the proper directory.

6. Enter the name of the file under "File name" (without suffix).
7. Select *OK*.

ToPs saves the file with the format '.geo'.

Saving drawings as '*.geo' with drawing data

Drawing data is additional information which ToPs refers to, for example when processing a part.

Prerequisite

- You have just created or loaded a drawing which you want to save with drawing data.

Saving drawing data to a drawing

1. Select *File >Properties ...*
   ToPs displays the mask "File information":

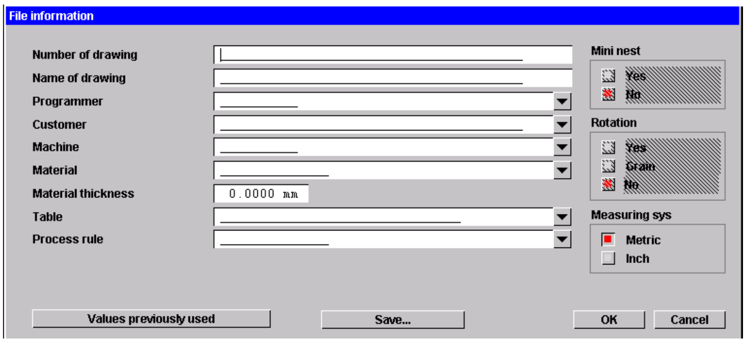


Fig. 25806EN

2. Enter the necessary information.
3. Open list fields with ▼.
4. If a selection is available, mark the desired information.
5. If no selection is available, enter the data manually.

Tip
By clicking on *Values previously used* the mask can be filled with the last values used. You need only then change individual items.

Note
Specify the number of the process rule only if the part is to be processed with a specific process rule (e.g., if you have created a process rule specifically for it).

6. Select the measurement system.

Save the drawing data immediately?

7. Select *Save...*.
   ToPs displays the mask "Store file".
8. Check "*.geo".
9. Select *OK*.

ToPs saves the drawing with the drawing data.

Save the drawing data later?

➢ Close the "File information" mask with *OK*.

If you save the drawing later, ToPs simultaneously saves the drawing data.

Saving drawings as '*.dxf'

Prerequisite

- You have loaded or created a drawing ('*.geo' or '*.dxf').

1. Select *File >Save as ...*
2. ToPs displays the mask "Store file".
3. To save the drawing as '*.dxf': click on "*.dxf".

Change directory upwards?

5. Click on "*" until ToPs displays the desired directory.

Change directory downwards?

6. Mark the directory which is one level deeper.
7. Repeat until ToPs displays the proper directory.
8. Enter the name of the file under "File name" (without suffix).
9. Select *OK*.

ToPs saves the file with the desired format.

9.3 Saving geometry models for single holes, rows of holes, and circles of holes

Prerequisite

- You have drawn a geometry model using ToPs drawing functions or ...
- ... have read in a geometry model from a CAD system (see p. 3-91).

Intermediate save as workfile

(See Section 9.1, p. 3-103).

"Normal" save

1. Select *File >Save as ...*
   ToPs displays the mask "Store file".

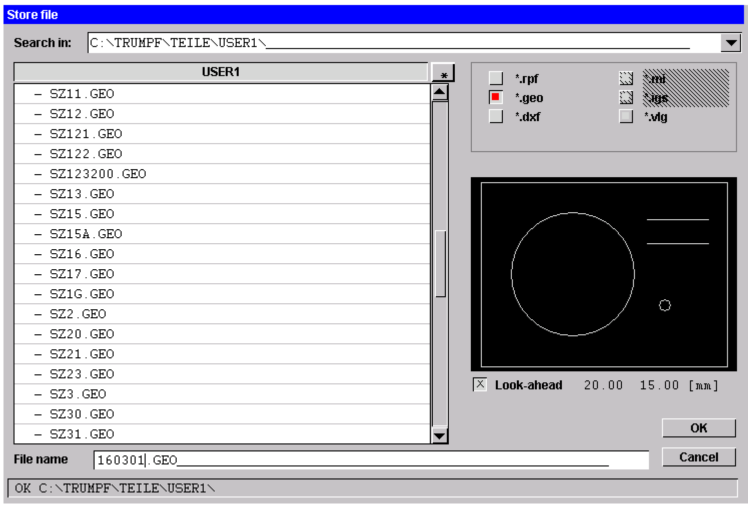


Fig. 27063EN

2. Select "*.vlg".

Change directory upwards?

3. Click on "*" until ToPs displays the desired directory.

Change directory downwards?

4. Mark the directory which is one level deeper.
5. Repeat until ToPs displays the proper directory.
6. Enter the name of the file under "File name" (without suffix).
7. Select *OK*.

ToPs saves the drawing as a geometry model with the format '.vlg'.

Saving geometry models with drawing data

(For saving drawing data, see p. 3-106).

9.4 Viewing drawing data

Prerequisite

- You have saved the file with drawing data (for saving drawing data, see p. 3-106).

1. Load the file containing the drawing data which you want to view (for loading files, see Section 8, p. 3-91 ff).
2. Select *File >Properties ...*

ToPs displays the mask "File information". It includes all drawing data.

10. Using auxiliary tools

The following auxiliary tools are available:

- Drawing construction lines and construction circles.
- Measuring coordinates, lengths, radiuses, diameters, and angles.

Construction lines and construction circles are geometry elements which facilitate the creation of drawings.

ToPs displays these construction lines and circles in dashed red lines.

10.1 Drawing construction lines

Drawing construction lines with two points

1. Select *Drawing tools, Construction line, 2 points*.

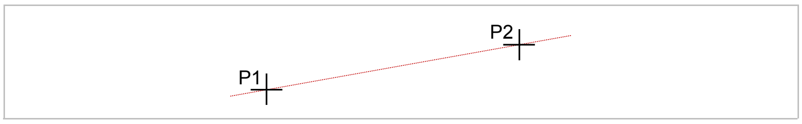


Fig. 4725

2. Click on the start point (P1).

   or

   ➢ Enter the coordinates of P1.
3. Click on the end point (P2).

   or

   ➢ Enter the coordinates of P2.

Drawing a construction line parallel to an existing line

Prerequisite

- The drawing contains at least one construction line.

1. Select *Drawing tools, Construction line, Parallel*.

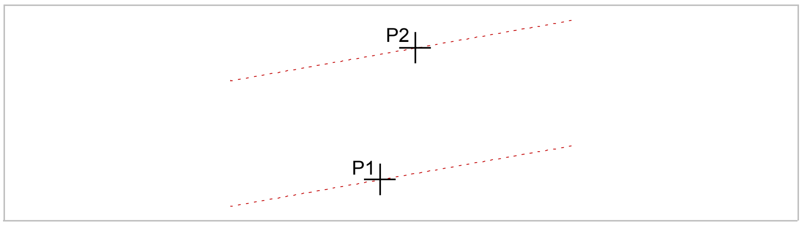


Fig. 4726

2. Click on the base line (P1) for which you want to create a parallel construction line.

Draw a parallel construction line?

3. **Either**
   - ➢ Enter the distance between the base line and the parallel construction line.
   - ➢ Click on the side of the base line where the parallel construction line should appear.

   or
   - ➢ Click on the point (P2) through which the parallel construction line should pass.

Draw several parallel construction lines?

4. Enter several distances between the base line (P1) and the parallel construction lines, one after the other.

Note
Separate values with a space. Do not use commas.

Examples: `10 20 30.`

5. Press <↵>.
6. Click on the side where the parallel lines should appear.

Drawing horizontal and vertical construction lines

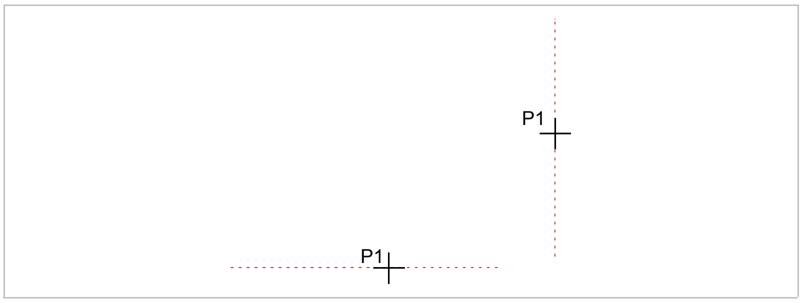


Fig. 4727

1. To draw horizontal construction lines, select *Drawing tools, Construction line, Horizontal*.

   or

   ➢ To draw vertical construction lines, select *Drawing tools, Construction line, Vertical*.

2. Click on P1.

   or

   ➢ Enter the coordinates of P1.

Drawing a tangent as construction line between an arc element and a point

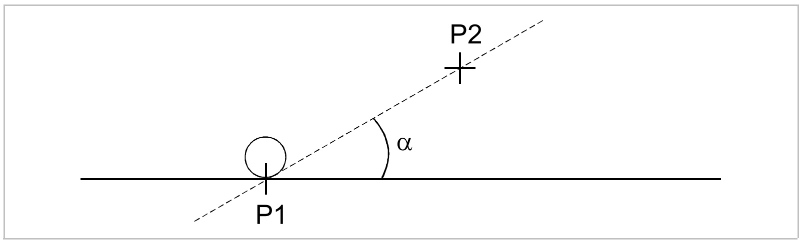


Fig. 27381

1. Select *Drawing tools, Construction line, Tan Pt*.
2. Click on the approximate point of tangency (P1) on the arc element.
3. Click on the second point (P2) of tangency.

   or

   ➢ Enter the coordinates of P2.

   or

   ➢ Enter angle α.

Drawing a perpendicular construction line

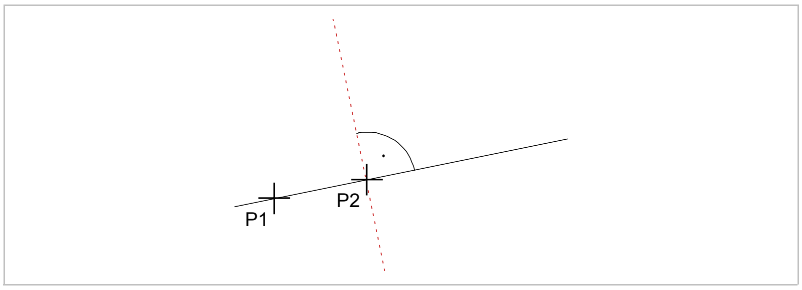


Fig. 4729

1. Select *Drawing tools, Construction line, Perpendicular*.
2. Click on the base element (P1).
3. Click on a second point (P2) on the element.

   or

   ➢ Enter the coordinates of P2.

Drawing a construction line with a point and angle of inclination

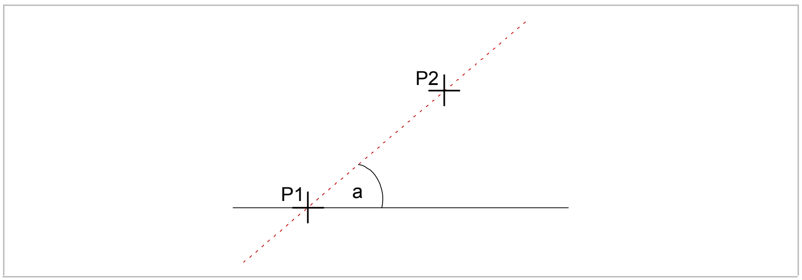


Fig. 4730

1. Select *Drawing tools, Construction line, Angle X*.
2. Click on the first point (P1).

   or

   ➢ Enter the coordinates of P1.
3. Click on the second point (P2).

   or

   ➢ Enter the coordinates of P2.

   or

   ➢ Enter an angle (a) relative to the X axis.

Drawing construction line as tangent to two arc elements

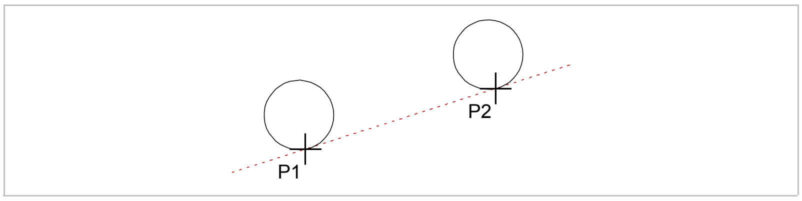


Fig. 4731

1. Select *Drawing tools, Construction line, Tan 2 el.*
2. Click on the first approximate tangential point (P1).
3. Click on the second approximate tangential point (P2).

Drawing construction line with a point and an angle relative to base line

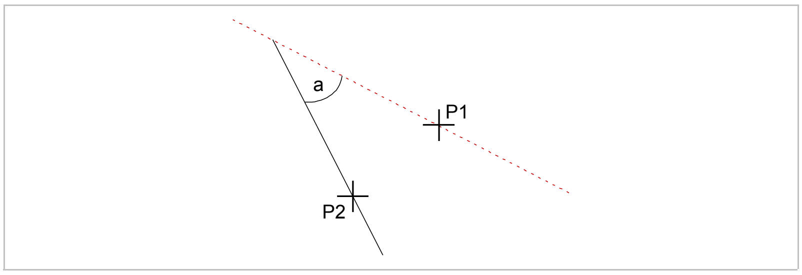


Fig. 4732

1. Select *Drawing tools, Construction line, Angle/line*.
2. Enter angle (a) relative to the base line.
3. Click on the point P1.

   or

   ➢ Enter the coordinates of P1.
4. Click on the base line (P2).

Dividing an element using a construction line

Application: Dividing an element between any two points (P1 and P2) with a vertical construction line.

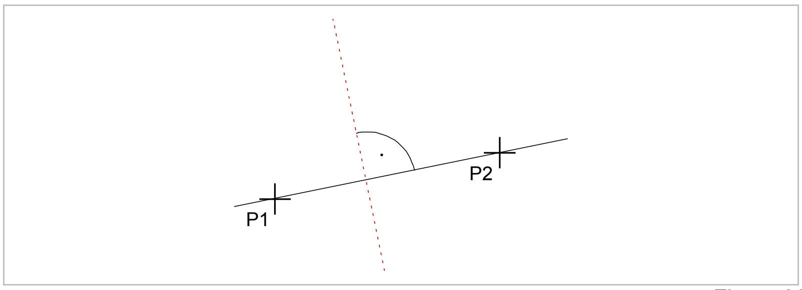


Fig. 4733

1. Select *Drawing tools, Construction line, Division*.
2. Click on the first point (P1).

   or

   ➢ Enter the coordinates of P1.

   or

- Enter the division factor (between 0 and 1). For a division factor of 0.5, ToPs places the construction line in the center of the base element. A division factor of 0.2 means that the construction line is place a fifth of the way into the base element.
- Click on the first point or enter the coordinates of the point.

3. Click on the second point (P2).

   or

   - Enter the coordinates of P2.

10.2 Drawing construction circles

Drawing construction circles with three points

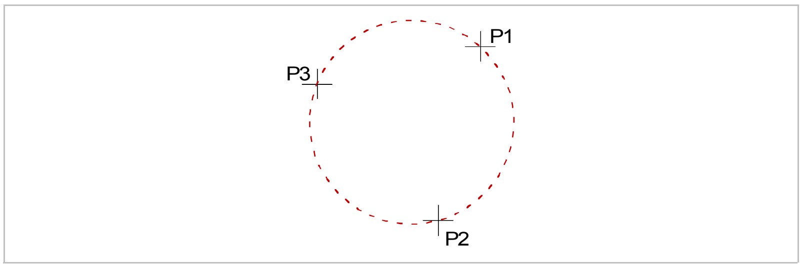


Fig. 4734

1. Select *Drawing tools, Construction circle, 3 points*.
2. Click on the first point on the circle (P1).

   or

   - Enter the coordinates of P1.
3. Click on the second point on the circle (P2).

   or

   - Enter the coordinates of P2.
4. Click on the third point on the circle (P3).

   or

   - Enter the coordinates of P3.
5. Enter radius.

Drawing construction circles using center and radius

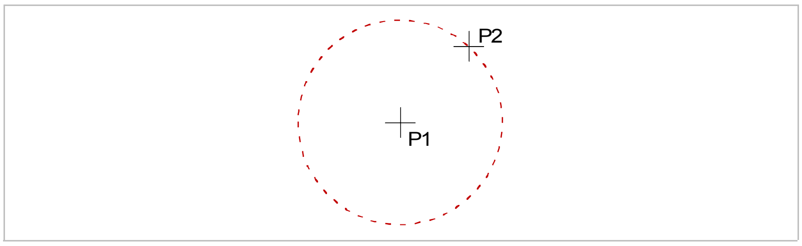


Fig. 4735

1. Select *Drawing tools, Construction circle, Center/radius*.
2. Click on the center (P1).

   or

   ➢ Enter the coordinates of P1.
3. Click on the second point (P2) which is on the arc of the circle.

   or

   ➢ Enter the coordinates of P2.

   or

   ➢ Enter the radius.

Drawing construction circles using diameter

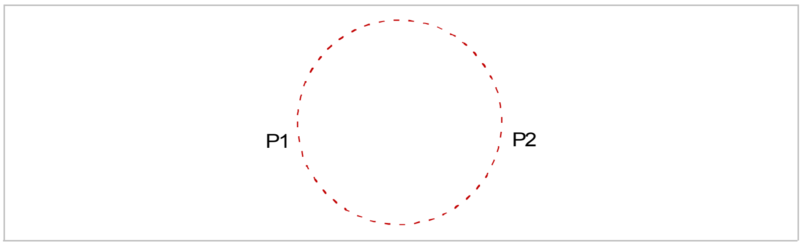


Fig. 4736

1. Select *Drawing tools, Construction circle, Diameter*.
2. Click on the first point (P1) on the arc of the circle.

   or

   ➢ Enter the coordinates of P1.
3. Click on the second point (P2) on the arc of the circle.

   or

   ➢ Enter the coordinates of P2.

Drawing construction circles using center and diameter

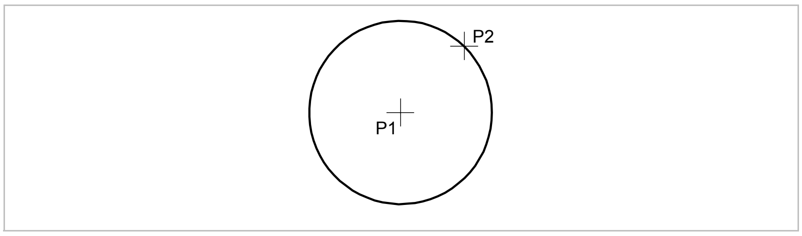


Fig. 4709

1. Select *Drawing tools, Construction circle, Center/dia*.
2. Click on the center (P1).

   or

   ➢ Enter the coordinates of P1.
3. Click on the second point (P2) which is on the arc of the circle.

   or

   ➢ Enter the coordinates of P2.

   or

   ➢ Enter the diameter.

Drawing concentric construction circles

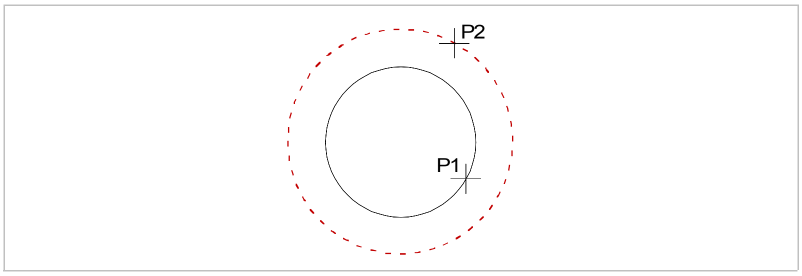


Fig. 4737

1. Select *Drawing tools, Construction circle, Concentric*.
2. Click on the base circle (P1).
3. Click on the second point (P2) which is on the arc of the circle.

   or

➢ Enter the coordinates of P2.

or

➢ Enter the distance between the concentric circles (positive value: concentric circle is outside the base circle; negative value: concentric circle is inside the base circle).

Drawing construction circles tangential to two elements

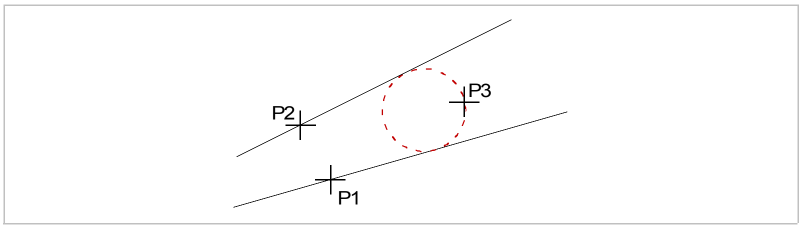


Fig. 4738

1. Select *Drawing tools, Construction circle, 2tan 1pt*.
2. Click on a point (P1) on the first element.

   or

   ➢ Enter the coordinates of P1.
3. Click on a point (P2) on the second element.

   or

   ➢ Enter the coordinates of P2.
4. Click on a third point (P3) on the arc of the circle.

   or

   ➢ Enter the coordinates of P3.

   or

   ➢ Enter the radius.

Drawing construction circles tangential to one element and two points

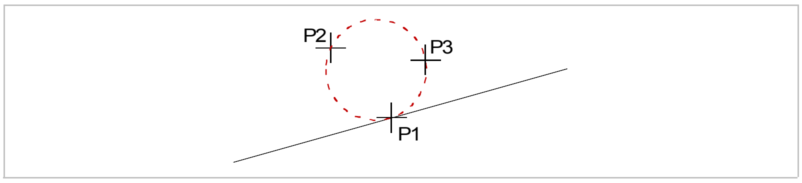


Fig. 4739

1. Select *Drawing tools, Construction circle, Tan 2 pts*.
2. Click on the first approximate tangential point (P1).
3. Click on the second point (P2) which is on the arc of the circle.

   or

   ➢ Enter the coordinates of P2.
4. Click on a third point (P3) on the arc of the circle.

   or

   ➢ Enter the coordinates of P3.

   or

   ➢ Enter the radius.

Drawing construction circles tangential to three elements

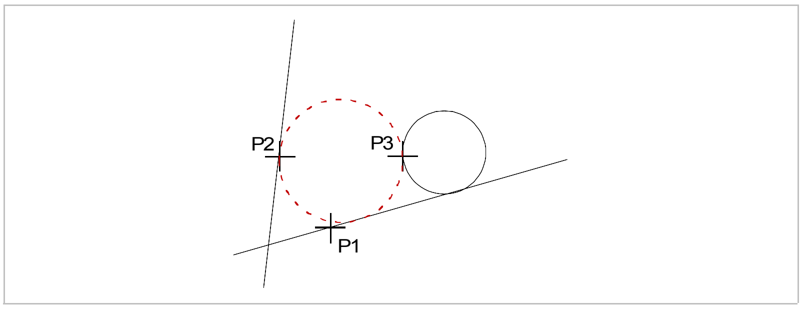


Fig. 4740

1. Select *Drawing tools, Construction circle, Tan 3*.
2. Click on the first approximate tangential point (P1).
3. Click on the second approximate tangential point (P2).
4. Click on the third approximate tangential point (P3).

Drawing construction circles with a defined center tangential to one element

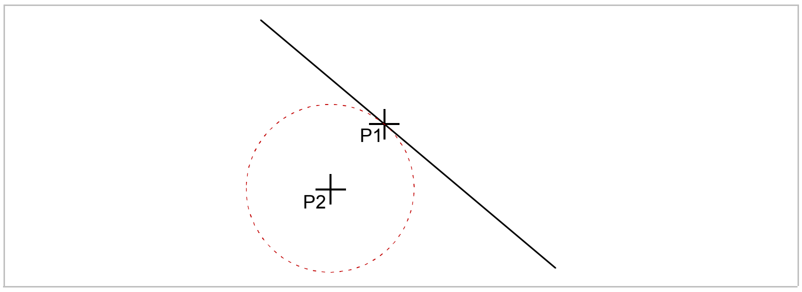


Fig. 4741

1. Select *Drawing tools, Construction circle, Tan center*.
2. Click on the first approximate tangential point (P1).
3. Click on the center (P2).

   or

   ➢ Enter the coordinates of the center (P2).

10.3 Deleting construction geometry

You can partially or completely delete construction geometries.

1. Select *Drawing tools, Delete construction geo*.
2. If you wish to delete the construction geometry completely, select *All.*
3. If you wish to delete parts of the construction geometry, click on individual elements.
4. To refresh the screen after deleting construction geometries:

   ➢ Select *Total*.

   or

   ➢ Alter the window setting.

11. Measuring

11.1 Measuring the distance between two points

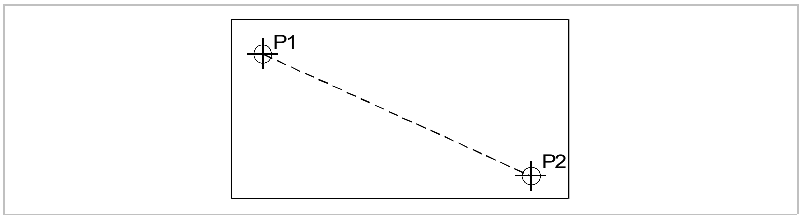


Fig. 4721

1. Select *Drawing tools, Measuring, 2 points*.
2. Click on the first point (P1).
3. Click on the second point (P2).

ToPs displays the measured value.

11.2 Measuring the coordinates of a point

1. Select *Drawing tools, Measuring, Point*.
2. Click on the point.

ToPs displays the coordinates.

11.3 Measuring the horizontal distance between two points

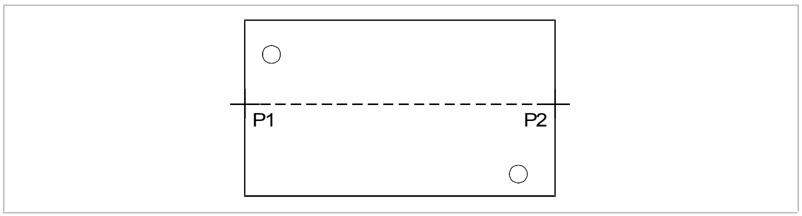


Fig. 4722

1. Select *Drawing tools, Measuring, Horizontal*.
2. Click on the first point (P1).
3. Click on the second point (P2).

ToPs displays the distance.

11.4 Measuring the vertical distance between two points

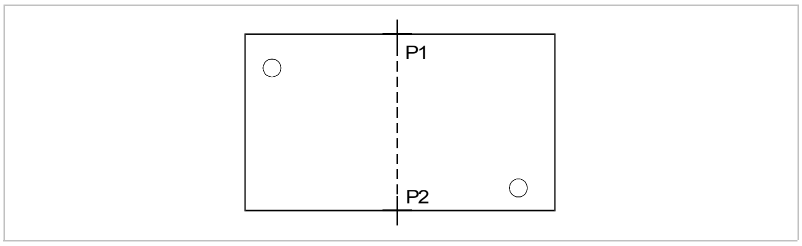


Fig. 15166

1. Select *Drawing tools, Measuring, Vertical*.
2. Click on the first point (P1).
3. Click on the second point (P2).

ToPs displays the distance.

11.5 Measuring the center point coordinates and radius of a circle

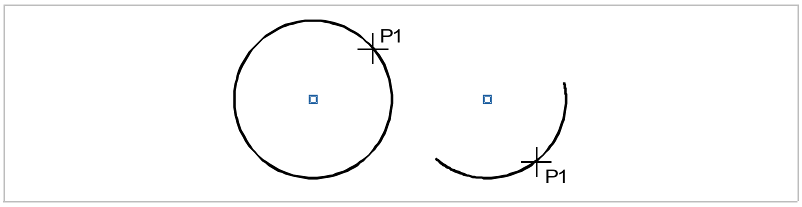


Fig. 4723

1. Select *Drawing tools, Measuring, Circle*.
2. Click on any point on a circle or arc (P1).

ToPs displays the results.

11.6 Measuring an angle

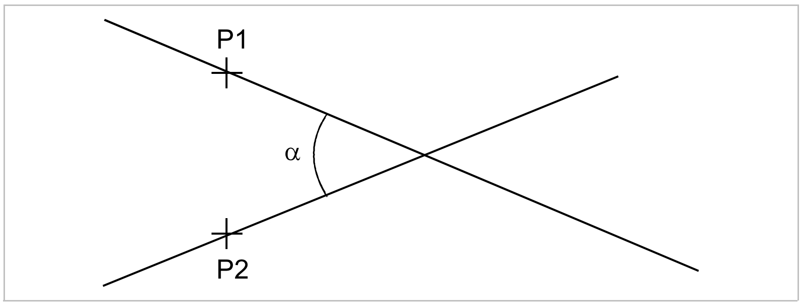


Fig. 27382

1. Select *Drawing tools, Measuring, Angle*.
2. Click on the first line (P1).
3. Click on the second line (P2).

ToPs displays the angle α in degrees.

12. Sending NC program to the machine

(See Chapter 5, Technology module).

13. Printing

(See Chapter 5, Technology module).

Chapter 4

Nesting module

1. The Nesting module

In the *Nesting* module you can create and manage nesting jobs. The nesting processor can calculate sheet layout according to a variety of strategies with identical or different single parts.

You can choose between two different nesting processors. Both processors function according to the principle of "free geometry" or "enlarged rectangle".

You can carry out the following specifications on the nesting processor e.g.:

- Select the part with which the nesting processor should begin the nesting process.
- Select the starting corner where the nesting processor should begin sheet layout.
- Lay out the sheet so that parts can be processed with common cuts.
- Free inner surfaces for layout.

New in ToPs You can nest not only unprocessed but also processed parts and mini nests on one sheet.

1.1 Opening and closing the Nesting module

Opening Nesting module

1. Start ToPs (see chapter 2).
   The initial screen will appear.

2. Select *Nesting*.

Closing Nesting module

➢ Select *File >Return*.

or

➢ Right click on *File*.

ToPs returns to initial screen.

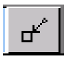
1.2 "Catch mode" in the Nesting module

If Catch mode is active, ToPs corrects the pick point to a point available nearby (if one is available) when picking with the mouse pointer.

Prerequisite

- With a nesting job loaded: the single sheet view is displayed (see p. 4-71).

Activating Catch mode

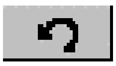


Select *Catch mode*.

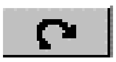
1.3 Undo or redo any/all actions?

Prerequisite

- You have loaded a single sheet or a nested job. (For loading files see Section 9, p. 4-103 ff.)
- With nesting jobs: the single sheet view is displayed (see p. 4-71).



Using *Undo*, you can undo all actions on individual sheets, without restrictions.



Using *Redo*, you can restore without restrictions all actions on an individual sheet which you have undone.

Undo and *Redo* function beyond the saving of a sheet, until you create/load a new sheet or in the case of nesting jobs until you go back to the sheet overview.

2. Mini nests

2.1 Creating mini nests

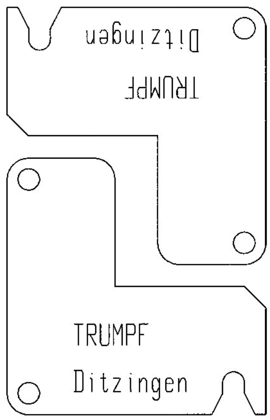
A mini nest is a single part nested with itself. ToPs creates mini nests as two part sets.

Advantage of mini nests

The nesting processor can calculate for a more efficient use of the sheet when parts are logically grouped in mini nests. (The nesting processor always uses a part drawing as the basis for nesting. A part drawing can be either a single part or even a mini nest.)

All single parts whose exterior geometries can be fitted together, as is the case for e.g. L-shaped geometries, are suitable for mini-nests.

With rectangular single parts mini nests are not useful.



Example for a mini nest Fig. 29783

Prerequisite

- The part geometry is suitable for mini nests.

1. Select *File >New... >Mini nest...*.
   ToPs displays the mask "Select file", "File manager" tab. It shows all single parts ('*.geo') which are located in the current directory.
2. If necessary change directories (see p. 4-103; to create new directory see p. 4-101).

Activate preview?

3. Check "Look-ahead (Preview)".
   The preview function in ToPs becomes continuously active.
   or
   - Deselect "Look-ahead (Preview)".
   The preview function is not continuously active.

- ➢ Right click on the file name.

4. Mark the required single part.

   ToPs enters the name of the file into "File name".

   or

   - ➢ Enter the name of the required single part under "File name" (to enter file names with the aid of wildcards see p. 4-84).

5. Select *OK*.

   ToPs displays the mask "Data for creating a mini nest".

6. Enter the distance between the single parts.

   Note
   With this distance, nesting cannot be carried out at parting cut width for machining with common cuts (CSC). (For positioning single parts in mini nests at CSC distance, see Section 2.3, p. 4-16 ff.)

7. Select *OK*.

ToPs creates the mini nest and shows the original in Magenta and the copy in white. ToPs automatically saves the mini nest under the name of the '*.geo' in '*.mtl' format.

2.2 Modifying mini nests

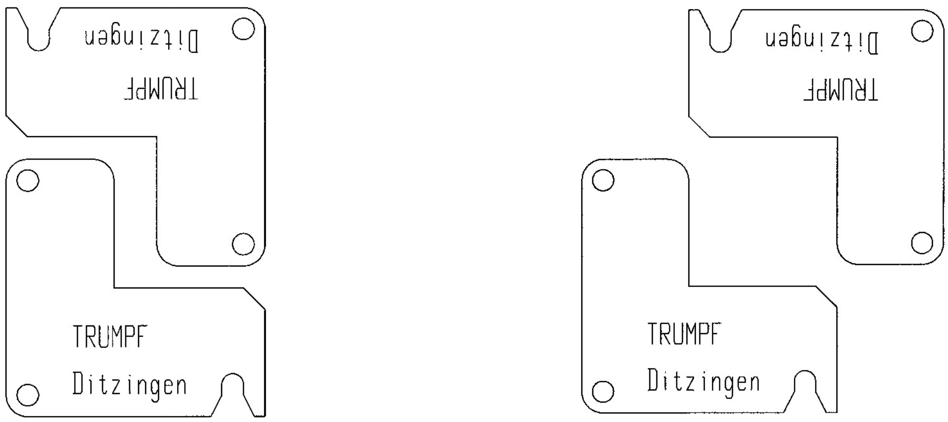
Mini nests can be modified in the following ways:

- Reposition mini nests horizontally or vertically by defining two points (see following section).
- Rotate mini nests round two points or round a midpoint (see p. 4-13 ff).
- Position single parts of mini nests at distance for common cuts (CSC) (see Section 2.3, p. 4-16 ff).

Note
ToPs automatically saves mini nests ('*.mtl') under the name and directory of the single part ('.geo'). Therefore you cannot save modified mini nests under another name.

Repositioning mini nests

When you reposition mini nests, the original and the copy of the mini nest are "torn apart".



Before repositioning, horizontal ... After repositioning, horizontal ...

Fig. 29783, 29784

1. Load the mini nest you wish to reposition (for loading files see Section 9, p. 4-103).

   ToPs displays either the menu *Mini nest, Automatic* or the menu *Mini nest, Manual*.

2. If the menu *Mini nest, Automatic* is displayed: click on *Automatic*.

   ToPs changes to *Mini nest*, *Manual*.

or

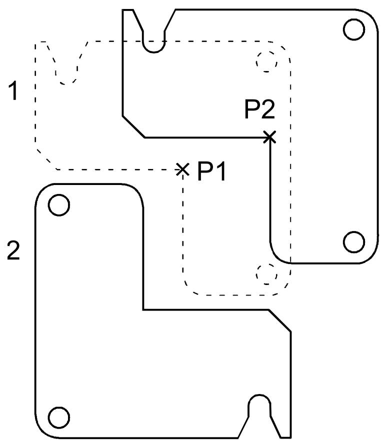
- ➢ Open the list field using ▼.
- ➢ Select *Manual*.

ToPs changes to *Mini nest*, *Manual*.

3. Select *Modify*.

Note
A mini nest consists of the original (magenta) and a copy of the single part (white). Only ever modify the copy. The original cannot be modified.

Reposition mini nests via two points?



1 Copy 2 Original

Repositioning the copy via two points Fig. 29863

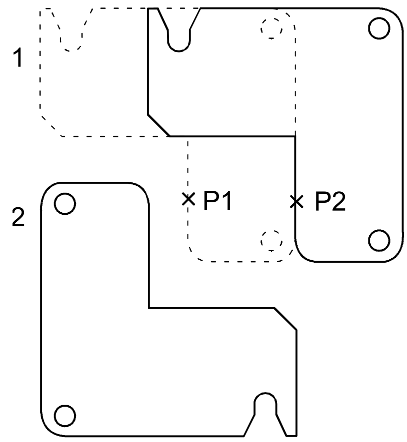
1. Select *Move*, *2 points*.
2. Click on a reference point (P1) or enter the coordinates for (P1).
3. Click on the target position (P2) or enter the coordinates of (P2).
4. Click on any geometry element in the copy (white).

   or

   ➢ Draw a box around the entire geometry with the mouse.

ToPs moves the copy of the mini nest.

Reposition mini nests horizontally?



1 Copy 2 Original

Repositioning the copy horizontally Fig. 29784

1. Select *Move*, *Horizontal*.
2. Enter distance for horizontal movement.

   or

   ➢ Click on a reference point (P1) or enter the coordinates for (P1).

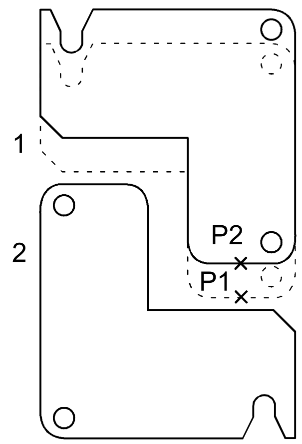
   ➢ Click on second reference point (P2) or enter the coordinates for (P2).
3. Click on any geometry element in the copy (white).

   or

   ➢ Draw a box around the entire geometry with the mouse.

ToPs moves the copy of the mini nest.

Reposition mini nests vertically?



1 Copy 2 Original

Repositioning the copy vertically Fig. 29862

1. Select *Move*, *Vertical*.
2. Enter distance for vertical movement.

   or

   - Click on a reference point (P1) or enter the coordinates for (P1).
   - Click on second reference point (P2) or enter the coordinates for (P2).
3. Click on any geometry element in the copy (white).

   or

   - Draw a box around the entire geometry with the mouse.

ToPs moves the copy of the mini nest.

Saving the modifications

- Select *File >Store*.

ToPs saves the modified mini nest under its present name.

Rotating mini nests

1. Load the mini nest you wish to rotate (for loading files see Section 9, p. 4-103).
2. If the menu *Mini nest, Automatic* is displayed: click on *Automatic*.
   ToPs changes to *Mini nest*, *Manual*.

   or

   ➢ Open the list field using ▾.

   ➢ Select *Manual*.

   ToPs switches to *Mini nest*, *Manual*.
3. Select *Modify*.

Note
A mini nest consists of the original (magenta) and a copy of the single part (white). Only ever modify the copy. The original cannot be modified.

Rotate mini nests round two points?

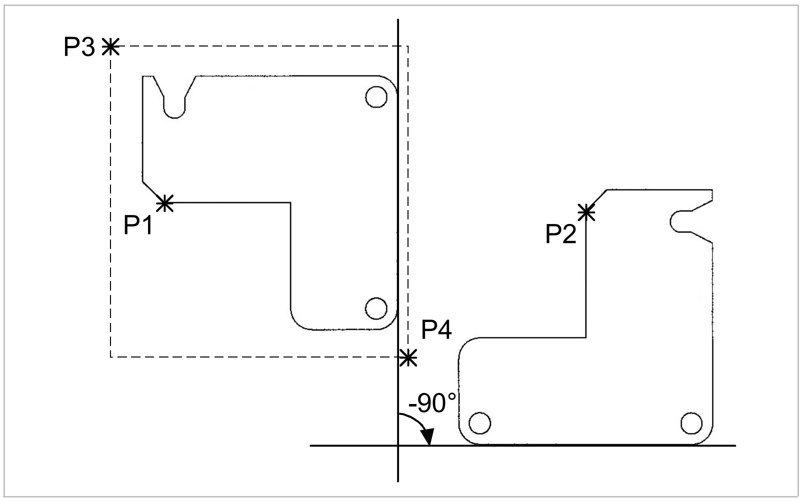


Fig. 29867

1. Select *Rotate*, *2 points*.
2. Click on a reference point (P1) or enter the coordinates for (P1).
3. Click on the target position (P2) or enter the coordinates of (P2).
4. Enter angle of rotation, e.g.: `-90`.

   or

   ➢ Enter first and second point for the angle of rotation.
5. Click on any geometry element in the copy.

or

- Draw a box around the entire geometry with the mouse (P3, P4).

ToPs rotates the copy of the mini nest.

Rotate mini nest round a midpoint?

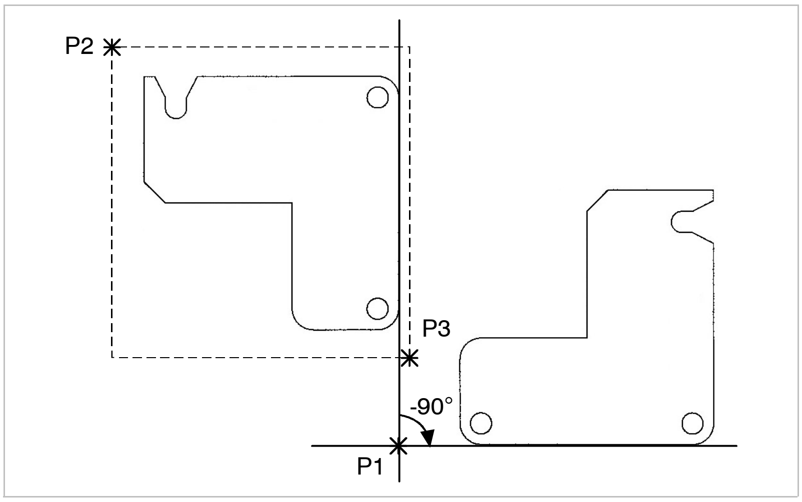


Fig. 29864

1. Select *Rotate, Center*.
2. Click on a center point of rotation (P1) or enter the coordinates for (P1).
3. Enter angle of rotation, e.g.: `-90`.

   or

   - Enter first and second point for the angle of rotation.
4. Click on any geometry element in the copy.

   or

   - Draw a box around the entire geometry with the mouse (P3, P4).

ToPs rotates the copy of the mini nest.

Saving modifications

- Select *File >Store*.

ToPs saves the modified mini nest under its present name.

Automatically rejecting modifications to mini nests

You can have a manually modified mini nest automatically re-created.

1. Load the manually modified mini nest (for loading files, see Section 9, p. 4-103).

   ToPs displays either the menu *Mini nest, Automatic* or the menu *Mini nest, Manual*.

2. If the menu *Mini nest, Manual* is displayed:
   click on *Manual*.

   ToPs switches to *Mini nest*, *Automatic*.

   or

   - Open the list field using ▾.
   - Select *Automatic*.

   ToPs switches to *Mini nest*, *Automatic*.

3. Select *Create, Start*.

   ToPs displays the mask "Data for creating a mini nest".

4. Enter the distance between the single parts.

   Note
   With this distance, nesting cannot be carried out at parting cut width for machining with common cuts (CSC). (For positioning single parts in mini nests at CSC distance, see Section 2.3, p. 4-16 ff.)

5. Select *OK*.

ToPs rejects manual modifications to the mini nests and automatically resaves the recalculated mini nest.

2.3 Positioning single parts in mini nests at distance for common cuts (CSC)

... By repositioning

If you want to machine single parts of mini nests using common cuts, you must position the parts at kerf width from each other.

Note
A mini nest consists of the original (magenta) and a copy of the single part (white). Only ever modify the copy. The original cannot be modified.

1. Load the mini nest (for loading files, see Section 9, p. 4-103).
2. If the menu *Mini nest, Automatic* is displayed: click on *Automatic*.
   ToPs changes to *Mini nest*, *Manual*.

   or

   - Open the list field using ▼.
   - Select *Manual*.

   ToPs changes to *Mini nest*, *Manual*.

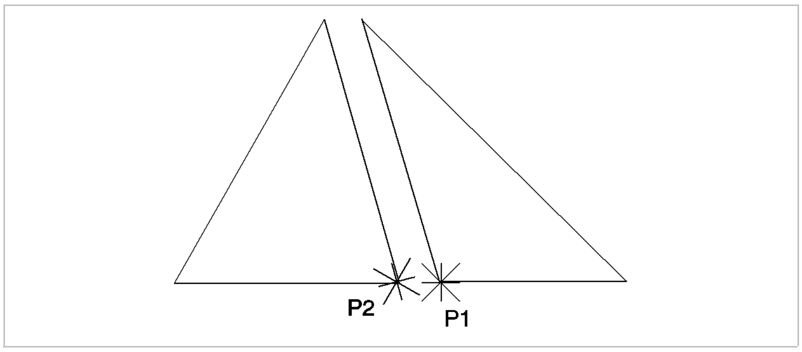


Fig. 5990

3. Select *Modify*, *Distance*, *2 points*.
4. Click on point (P1) in the copy (white) or enter the coordinates of (P1).
5. Click on point (P2) in the original (magenta) or enter the coordinates of (P2).
6. Enter distance (e.g. `0.1500`).

... By rotating

If you want to machine single parts of mini nests using common cuts, you must position the parts at kerf width from each other.

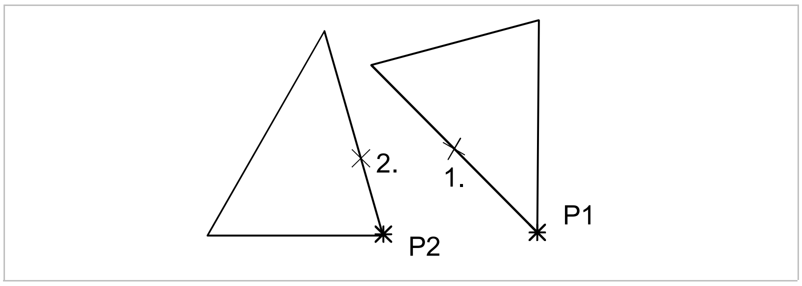
Note
A mini nest consists of the original (magenta) and a copy of the single part (white). Only ever modify the copy. The original cannot be modified.

1. Load the mini nest (for loading files, see Section 9, p. 4-103).
2. If the menu *Mini nest, Automatic* is displayed: click on *Automatic*.
   ToPs changes to *Mini nest*, *Manual*.

   or

   ➢ Open the list field using ▼.

   ➢ Select *Manual*.
   ToPs switches to *Mini nest*, *Manual*.



The mini nest position **before** rotating to kerf width Fig. 30339

3. Select *Modify*, *Distance, Rotate*.
4. Click on copy (1., white).
5. Click on original (2., magenta).
6. Click on point (P1) in the copy.
7. Click on point (P2) in the original.
8. Enter distance (e.g. `0.1500`).

2.4 Using auxiliary tools

For mini nests the same auxiliary tools are available that you are already familiar with from the *Drawing* module:

- Drawing construction lines and construction circles.
- Measuring coordinates, lengths, radiuses, diameters, and angles.

Construction lines are always represented as endless, construction circles always as full circles. Color of construction geometries: red, line type: dashed.

Prerequisite

- You have loaded a mini nest (for loading files see Section 9, p. 4-103).

➢ Select *Mini nest*, *Manual, Drawing tools*.

ToPs displays the mask with all auxiliary tools.

Using auxiliary tools

For description see chapter 3.

3. Creating sheets and laying out parts

3.1 Creating a new single sheet

1. Select *File >New... >Sheet....*
   ToPs displays the mask "Sheet selection".

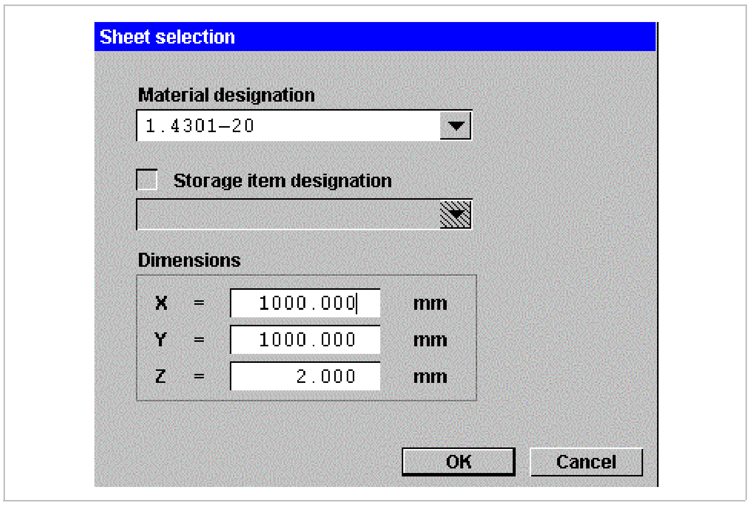


Fig. 29068EN

Select material and dimensions of sheet via "Storage item"?

When making a selection via "Storage item designation" material, dimensions and storage location of a sheet are predetermined.

Note
In order to be able to select a storage item here, you must have entered storage item designations in the *Data* module under *Material >Blanks* (see also chapter 6, Data module).

2. Check "Storage item designation".
   ToPs displays the mask "Select storage item".
3. Mark the desired storage item.

Change storage item again?

4. Open list field under "Storage item designation" using ▼.
   ToPs displays the mask "Select storage item".
5. Mark another storage item.

Enter sheet material and dimensions manually?

6. Open material designation using ▼.
7. ToPs displays the mask "Select material".
8. According to the particular machine for which you want to nest sheets, select "Laser" or "Water jet".
9. Select the desired material.

10. Enter sheet dimensions.
11. Select *OK*.
12. ToPs creates the new sheet.

Saving new sheet

13. Select *File >Store*.

    or

    ➢ Select *File >Store as*.

    ToPs displays the mask "Store file".
14. If necessary change directory (see p. 4-103; to create a new directory, see p. 4-101).
15. Under "File name" enter the name of the new sheet.
16. Select *OK*.

3.2 Loading parts onto a sheet

You can load the following parts on to a sheet:

- Processed and unprocessed single parts ('*.geo' or '*.gmt').
- Mini nests ('*.mtl').

Note
A laid-out sheet contains only references to the single parts and/or mini nests that are nested on it. If you modify a single part or a mini nest after you have loaded it onto a sheet, the single part/mini nest changes automatically on the sheet.

Prerequisite

- You have loaded or created a new sheet. (To create a new sheet see Section 2.1, p. 4-7, for loading files see Section 9, p. 4-103).

1. Select *File >Load... >Load additional part...*.
   ToPs displays the mask "Load file".
2. Select file format ('*.geo', '*.gmt' or '*.mtl').
3. If necessary change directory (see p. 4-103; to create new directory, see p. 4-101).

Activate preview?

4. Check "Look-ahead (Preview)".
   The preview function in ToPs becomes continuously active.
   or
   ➢ Deselect "Look-ahead (Preview)".
   The preview function is not continuously active.
   ➢ Using the right mouse button, click on the file name.
5. Mark the part with which you want to load the sheet.
6. Select *OK*.
   The selected part "hangs" with its zero point on the ToPs mouse pointer. (You can see this if you move the mouse pointer over the sheet.)

Placing a part on the sheet

7. Enter the part's target position.
   or
   ➢ Place the part on the sheet using the mouse.
   or
   ➢ Enter the relative angular position of the part. E.g.: `-45`
   ➢ Enter the target position for the part or position the part with the mouse.

Tip
If you want to lay out the sheet with the part to be loaded several times over using *Number of parts*, *Section* or *Number pcs* (see Section 3.4, p. 4-30 ff): position the part outside the sheet. Delete this part again once you have loaded the sheet with it several times over.

Load further parts?

8. Repeat steps 1 to 7.

(For positioning parts on the sheet several times over see following section.)

3.3 "Hanging" parts on the mouse, placing somewhere else, positioning several times on the sheet ...

You can do the following:

- Hang the original part to be laid out on the sheet (see Section 3.2, p. 4-21) back on the mouse and deposit at another place.
- Hang copies of the original part on the mouse and deposit at another place.

Prerequisite

- You have loaded a sheet (see Section 6.9, p. 4-85) or a nested job (see p. 4-106).
- With nesting jobs: the single sheet view is displayed (see p. 4-71).

1. Select *Sheet, Modify 2*.
2. **Either**

   ➢ In the list field select *Copy*.

   A copy of the identified part (it could also be several copies, see below) is directly moved or nested with the cursor. The original remains unchanged.

   or

   ➢ In the list field select *Original*.

   The original of the identified part (it could also be several original parts, see below) is directly moved or nested with the cursor.

Move and deposit the part at will using the mouse?

➢ Select *Pick*.

Afterwards, the part hangs with the pick point on the mouse pointer and can be moved as required.

or

➢ Select *Option*, *At will*.

Afterwards, the part hangs with the pick point on the mouse pointer and can be moved as required.

Move and deposit the part horizontally with the mouse?

➢ Select *Option*, *Horizontal*.

Afterwards, the part hangs with the pick point on the mouse pointer and can only be moved horizontally.

Move and deposit the part vertically with the mouse?

➢ Select *Option Vertical*.

Afterwards, the part hangs with the pick point on the mouse pointer and can only be moved vertically.

1. Click on or box in part.

   Note
   You can also click on or box in several parts one after the other. ToPs will thereafter treat the parts as **one** part.

   ToPs shows the picked part/s in magenta.

2. Select *OK*.

   The part now hangs from the pick point at the mouse cursor.

   (If you have clicked on several parts, ToPs uses the last pick point as the reference point for the mouse.

   If you have boxed in the parts, ToPs uses the nearest corner point of the part which is closest to the second clicked point of the box as the reference point for the mouse).

3. Change Option if necessary (*At will*, *Horizontal* or *Vertical*).

Modify position of reference point?

1. (See next section.)
2. Move part in the required direction and deposit (click with the mouse).

   Note
   When depositing, it is crucial whether you have activated catch mode or not (for catch mode see Section 1.2, p. 4-6).

3. Repeat step 2 as often as needed.

Modifying the reference point of the mouse pointer

When you hang one or several parts on the mouse pointer, the mouse pointer always refers to the last pick point.

The reference point for the mouse pointer can be moved horizontally or vertically, or at will.

Prerequisite

- You have loaded a sheet (see Section 6.9, p. 4-85) or a nested job (see p. 4-106).
- With nesting jobs: the single sheet view is displayed (see p. 4-71).
- The part whose pick point you want to move is hanging on the mouse (see Section 3.3, p. 4-22).

1. Select *Reference point*, *At will*.
   The position of the pick point can be modified as desired.
   or
   - Select *Reference point*, *Horizontal* .
   The position of the pick point can only be moved horizontally.
   or
   - Select *Reference point*, *Vertical* .
   The position of the pick point can only be moved vertically.
2. Deposit part (click with the mouse).
   ToPs shows the part in yellow.
3. Click on the new position of the pick point.
   or
   - With *Horizontal* or *Vertical*: enter the distance of the old pick point from the new one.

The part now hangs from its new pick point at the mouse cursor.

Modifying number of parts on the mouse

The number of parts or the number of rows and columns with parts which are hanging on the mouse can be raised or lowered in steps in the X and Y directions.

For the distance between the parts, ToPs uses the absolute distance between parts (see "Data for piecewise placing of parts on sheet", Fig. 19821, p. 4-26).

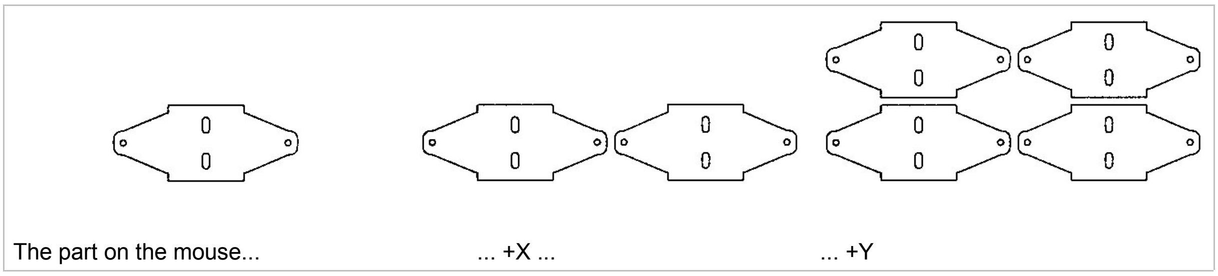


Fig. 29659, 29658, 29656

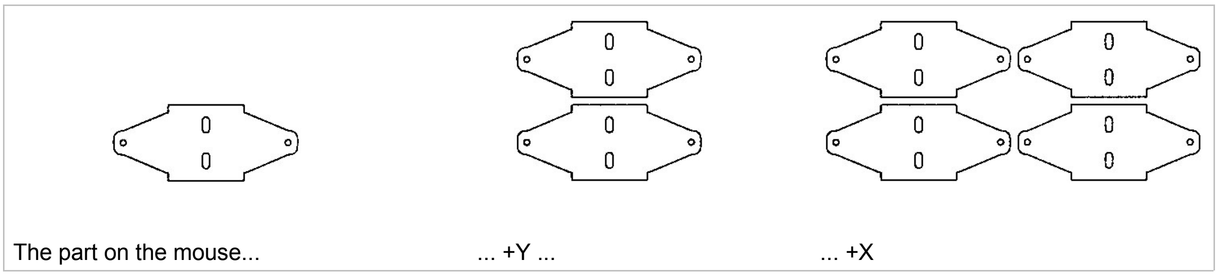


Fig. 29659, 29657, 29656

Prerequisite

- You have loaded a laid-out sheet (see Section 6.9, p. 4-85) or a nested job (see p. 4-106).
- With nesting jobs: the single sheet view is displayed (see p. 4-71).
- The part/s is/are hanging on the mouse (see p. 4-22 ff).

Note
You can only raise or lower the number or **copies** of a part that is hanging on the mouse.

If you have several parts hanging on the mouse as **one** part, it is the number of this part, which consists of several parts, which is increased or decreased.

Increasing number in steps

➢ Select *+X* or *+Y*.

or

- ➢ Press <Ctrl>+<F2> or <Ctrl>+<F4>.

ToPs updates the display.

Decreasing number in steps

- ➢ Select *-X* or *-Y*.

or

- ➢ Press <Ctrl>+<F1> or <Ctrl>+<F3>.

ToPs updates the display.

Presetting and modifying the distance between parts on the mouse

Presetting absolute distance between parts hanging on the mouse

You can preset an absolute distance to separate the parts hanging on the mouse.

Prerequisite

- You have loaded a laid-out sheet (see Section 6.9, p. 4-85) or a nested job (see p. 4-106).
- With nesting jobs: the single sheet view is displayed (see p. 4-71).
- At least one part is hanging on the mouse (see also p. 4-22 ff).

1. Select *Sheet*, *Modify 2*, *Number of parts*, *Number pcs*.
2. ToPs displays the mask "Data for piecewise placing of parts on sheet":

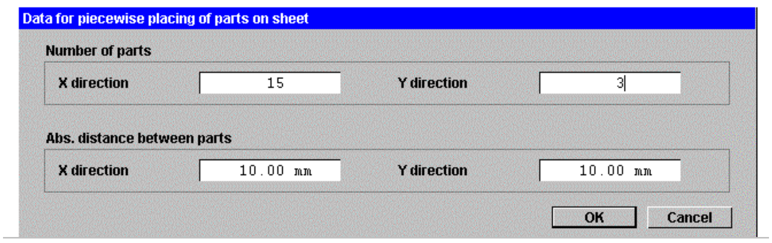


Fig. 19821EN

3. Enter absolute distance between parts in X and Y directions.
4. Select *OK*.

ToPs updates the display.

Presetting distance between parts hanging on the mouse step-by-step

You can increase or decrease the distance between the parts hanging on the mouse step-by-step.

Prerequisite

- You have loaded a laid-out sheet (see Section 6.9, p. 4-85) or a nested job (see p. 4-106).
- With nesting jobs: the single sheet view is displayed (see p. 4-71).
- At least two parts are hanging on the mouse (see also p. 4-22 ff).

Note
If you have several parts hanging on the mouse as **one** part, it is the distance between such parts, which consist of several parts, which is increased or decreased.

Setting increment

1. Select *Part distance*, *Parameters*.
   ToPs displays the mask "Sheet layout parameters":

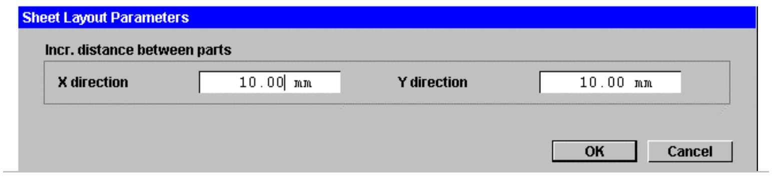


Fig. 29660EN

2. Enter incremental distances between parts in X and Y direction. ("Incremental" means: the distance between parts is raised or lowered by this value.)
3. Select *OK*.

Modifying distance between parts step-by-step

4. To increase distance between parts in X or Y direction: select *Part distance*, *+dx* or *Part distance*, *+dy*.

   or

   ➢ Press <SHIFT>+<F2> or <SHIFT>+<F4>.
5. To decrease distance between parts in X or Y direction: select *Part distance*, *-dx* or *Part distance*, *-dy*.

   or

   ➢ Press <SHIFT>+<F1> or <SHIFT>+<F3>.
6. Repeat step 4 or 5 until the desired distance between parts is reached.

Rotating parts hanging on the mouse by an incremental angle of rotation

You can rotate and then deposit parts hanging on the mouse by a preset angle using the wheel mouse or with buttons, step-by-step. This angle is added to the current part angle each time (= incremental angle of rotation).

Current part angle	Incremental angle	New part angle
90°	15°	105°
90°	-15°	75°

Example Table 4-1

The incremental angle of rotation for the buttons *Rotate* – and *Rotate* + is set as standard to 45°; the incremental angle of rotation for the wheel mouse is set to 10°.

ToPs uses the mouse pointer as the center of rotation.

Prerequisite

- You have loaded a laid-out sheet (see Section 6.9, p. 4-85) or a nested job (see p. 4-106).
- With nesting jobs: the single sheet view is displayed (see p. 4-71).
- The parts which you want to rotate are hanging on the mouse (see p. 4-22 ff).

1. Select *Sheet*, *Modify 2*.

Preset a different incremental angle of rotation?

2. Select *Rotate*, *Parameters*.
   ToPs displays the mask "Sheet layout parameters":

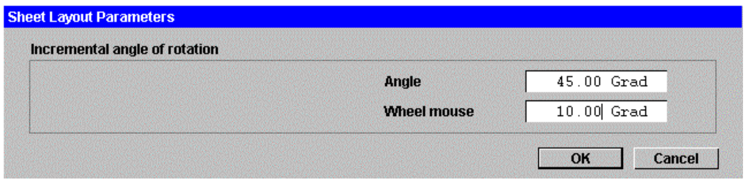


Fig. 29663EN

3. To modify the incremental angle for the buttons: modify value under "Angle".
4. To modify the incremental angle for the wheel mouse: modify value under "Wheel mouse".
5. Select *OK*.

Select part

6. To rotate the original: select *Original*.
   or

➢ To create copies of the original: select *Copy*.

7. Select *Pick*.

   The part then hangs on the mouse pointer from the pick point and can be rotated using the wheel on the mouse or using the buttons.

8. Click on or box in part.

   Note
   You can also click on or box in several parts one after the other. ToPs will thereafter treat the parts as **one** part.

   ToPs shows the part in magenta.

9. Select *OK*.

   The part now hangs on the mouse cursor from the pick point.

   (If you have clicked on several parts, ToPs uses the last pick point as the reference point for the mouse.

   If you have boxed in the parts, ToPs uses the nearest corner point of the part which is closest to the second clicked point of the box as the reference point for the mouse).

Rotate part

10. Rotate part using the wheel mouse.

    or

    ➢ Select *Rotate,* – or *Rotate,* +.

    or

    ➢ Select <SHIFT><←> or <SHIFT>+<→>.

3.4 Automatically laying out single sheets

Laying out sheet sectionally

Prerequisite

- You have loaded a sheet (see Section 6.9, p. 4-85) or a nested job (see p. 4-106).
- With nesting jobs: the single sheet view is displayed (see p. 4-71).

1. Select *Sheet, Modify 2.*
2. In the list field select *Copy*.
3. Select *Number of parts*, *Section*.
   ToPs displays the mask "Sheet layout parameters":

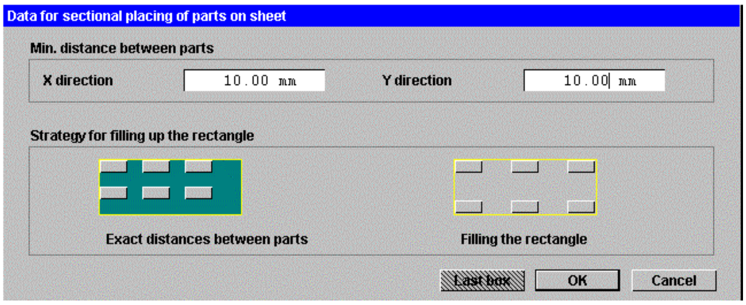


Fig. 29069EN

4. Enter minimum offset of parts in X and Y direction.
5. Select strategy to be used in laying out the section with the part:
   - Exact distance between parts: ToPs adheres to the specified distances between the parts. Unoccupied strips may remain at the margins of the sheet.
   - Filling the rectangle: if necessary, ToPs increases the distances between the parts so that they fill the whole section.
6. Select *OK*.
7. Click on or box in part(s) with which you want to lay out the sheet in sections. (The part should preferably be situated outside the sheet: see too Tip, Section 3.2, p. 4-21.)
   ToPs shows the part in magenta.
8. Select *OK*.
9. Box in the section which is to be filled with the part.
   The section filled with the part "hangs" on the mouse.

Change strategy/distance between parts before depositing the parts?

10. Select *Number of parts*, *Section* again.

    ToPs displays the mask "Sheet layout parameters" again. The button *Last box* is now active.

11. Modify minimum distance between parts and/or change strategy.

12. Select *Last box*.

    The section with modified distances between parts and/or strategies hangs on the mouse pointer again.

13. Enter target position for the section.

    or

    ➢ Place the section with the mouse.

    or

    ➢ Enter the relative angular position of the section.

    ➢ Enter the target position for the section or position the section using the mouse.

14. Delete the part which was loaded to begin with. (The part should preferably be situated outside the sheet: see too Tip, Section 3.2, p. 4-21.)

Laying out sheets via the number of parts

Prerequisite

- You have loaded a laid-out sheet (see Section 6.9, p. 4-85) or a nested job (see p. 4-106).
- With nesting jobs: the single sheet view is displayed (see p. 4-71).

1. Select *Sheet, Modify 2*.
2. In the list field select *Copy*.
3. Select *Number of parts*, *Number pcs*.

   ToPs displays the mask "Data for piecewise placing of parts on sheet":

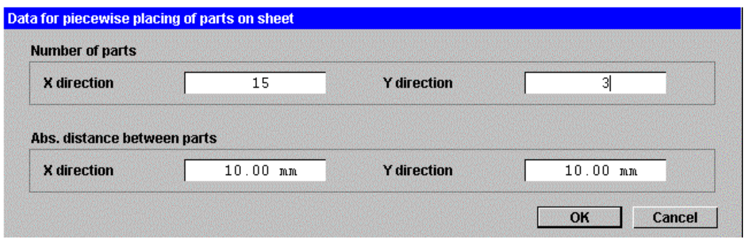


Fig. 19821EN

4. Enter number of parts in X and Y directions.
5. Enter absolute distance between parts in X and Y direction.
6. Select *OK*.
7. Click on or box in part which you want to lay on the sheet. (The part should preferably be situated outside the sheet: see too Tip, Section 3.2, p. 4-21.)

   ToPs shows the part in magenta.
8. Select *OK*.

   The parts are now hanging on the mouse.

Modify number of parts hanging on the mouse?

The number of parts that you have on the mouse can be increased or decreased step-by-step in the X and Y directions (see p. 4-25).

9. Enter the target position for the parts hanging on the mouse.

   or

   - Place the parts using the mouse.

   or

   - Enter the relative angular position of the parts.
   - Enter the target position for the parts or position the parts using the mouse.
10. Delete part that was loaded to begin with (the part should preferably be situated outside the sheet: see too Tip, Section 3.2, p. 4-21).

4. Manually modifying sheet layout

You can modify the sheet layout of a single sheet or a sheet from a nesting job (for nesting jobs see Section 6, p. 4-44 ff).

4.1 Modifying part position, copying part at the same time

You can do the following:

- Reposition the original part on the sheet **or** when repositioning it, create copies of the original part. The original part remains unchanged (see following sections).
- Rotate the original part on the sheet **or** when rotating it, create copies of the original part. The original part remains unchanged (see p. 4-37).

Repositioning parts

Repositioning parts via two points

Prerequisite

- You have loaded a sheet (see Section 6.9, p. 4-85) or a nested job (see p. 4-106).
- With nesting jobs: the single sheet view is displayed (see p. 4-71).

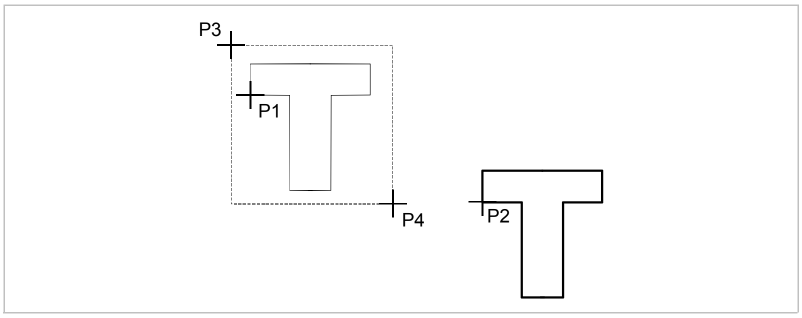


Fig. 27703

1. Select *Sheet*, *Modify*.
2. To move the original, select *Original*.

or

➢ To create copies of the original: select *Copy*.

3. Select *Move part*, *2 points*.
4. Click on a reference point (P1) or enter the coordinates for P1.
5. Click on the target position (P2) or enter the coordinates of P2.

Move original or create one **copy?**

6. Click on any geometry element in the part you wish to reposition or copy and reposition, **or** box in the entire geometry with the mouse (P3, P4).

   ToPs moves the original or creates **one** copy of the original.

   or

Create several copies?

➢ Enter repetition factor.

➢ Click on any geometry element in the part you wish to reposition or copy and reposition, or box in the entire geometry using the mouse (P3, P4).

ToPs creates the desired number of copies and moves them respectively.

Repositioning parts horizontally

Prerequisite

- You have loaded a sheet (see Section 6.9, p. 4-85) or a nested job (see p. 4-106).
- With nesting jobs: the single sheet view is displayed (see p. 4-71).

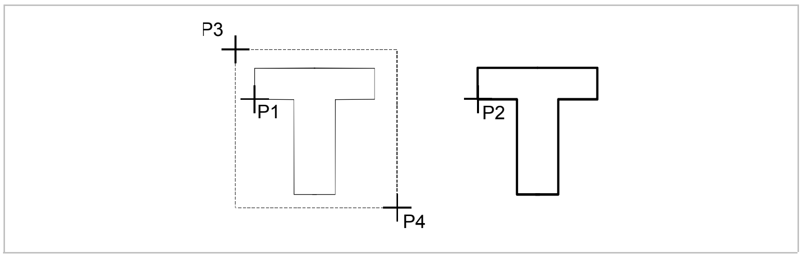


Fig. 27704

1. Select *Sheet*, *Modify*.
2. To move the original horizontally: select *Original*.

   or

   ➢ To create copies from the original and move them horizontally: select *Copy*.

3. Select *Move part*, *Horizontally*.
4. Enter the distance for horizontal movement.

   or

   ➢ Click on point (P1) or enter the coordinates for (P1).

   ➢ Click on the reference target point (P2) or enter the coordinates of (P2).

Move original or create one **copy?**

5. Click on any geometry element in the part you wish to reposition or copy and reposition, **or** box in the entire geometry with the mouse (P3, P4).

   ToPs moves the original or creates **one** copy of the original.

   or

Create several copies?

   ➢ Enter repetition factor.

   ➢ Click on any geometry element in the part you wish to reposition or copy and reposition, or box in the entire geometry with the mouse (P3, P4).

   ToPs creates the desired number of copies and moves them respectively.

Repositioning parts vertically

Prerequisite

- You have loaded a sheet (see Section 6.9, p. 4-85) or a nested job (see p. 4-106).
- With nesting jobs: the single sheet view is displayed (see p. 4-71).

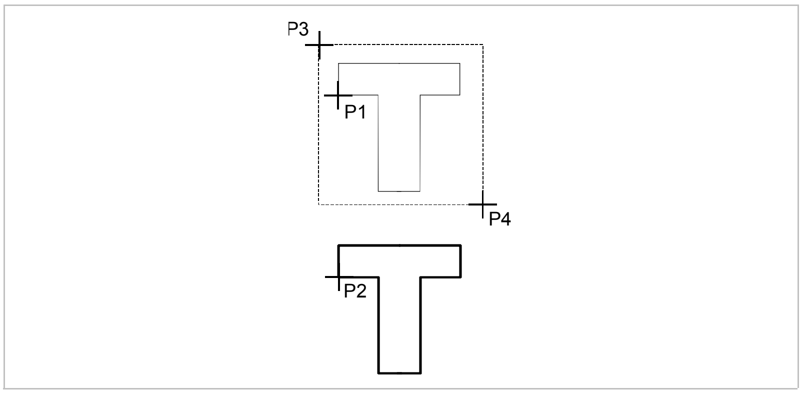


Fig. 28061

1. Select *Sheet*, *Modify*.
2. To move the original vertically: select *Original*.

   or

- To create copies from the original and move them vertically: select *Copy*.

3. Select *Move part*, *Vertically*.
4. Enter distance for vertical movement.

   or

   - Click on point (P1) or enter the coordinates for (P1).
   - Click on the reference target point (P2) or enter the coordinates of (P2).

Move original or create one **copy?**

5. Click on any geometry element in the part you wish to reposition or copy and reposition, **or** box in the entire geometry with the mouse (P3, P4).

   ToPs moves the original or creates **one** copy of the original.

   or

Create several copies?

   - Enter repetition factor.
   - Click on any geometry element in the part you wish to reposition or copy and reposition, or box in the entire geometry with the mouse (P3, P4).

   ToPs creates the desired number of copies and moves them respectively.

Rotating parts

You can rotate the parts on a sheet in the following ways:

- Rotate parts via two points (see following section).
  Rotating via two points corresponds to moving and then rotating the part.
- Rotate parts round a midpoint (see p. 4-38).

Rotating parts via two points

Prerequisite

- You have loaded a sheet (see Section 6.9, p. 4-85) or a nested job (see p. 4-106).
- With nesting jobs: the single sheet view is displayed (see p. 4-71).

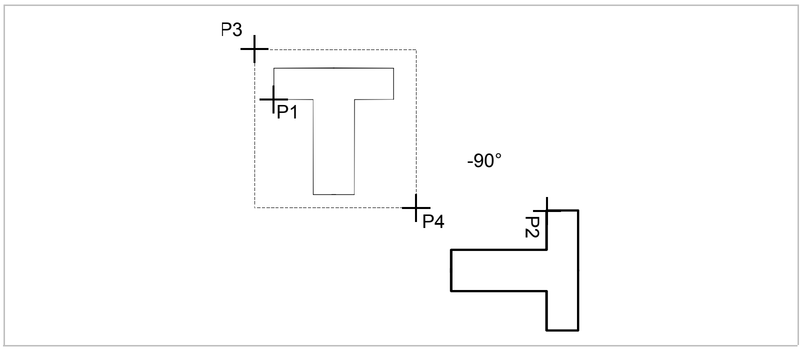


Fig. 28060

1. Select *Sheet*, *Modify*.
2. To rotate the original, select *Original*.

   or

   ➢ To create copies of the original: select *Copy*.
3. Select *Rotate part*, *2 points*.
4. Click on a reference point (P1) or enter the coordinates for (P1).
5. Click on the target position (P2) or enter the coordinates of (P2).
6. Enter angle of rotation, e.g.: `-90`.

   or

   ➢ Enter first and second point for the angle of rotation.
7. Click on any geometry element in the part you wish to rotate or copy and rotate.

or

➢ Draw a box around the entire geometry with the mouse (P3, P4).

ToPs moves and rotates the original or creates one copy of the original.

Rotating parts round a midpoint

Prerequisite

- You have loaded a sheet (see Section 6.9, p. 4-85) or a nested job (see p. 4-106).
- With nesting jobs: the single sheet view is displayed (see p. 4-71).

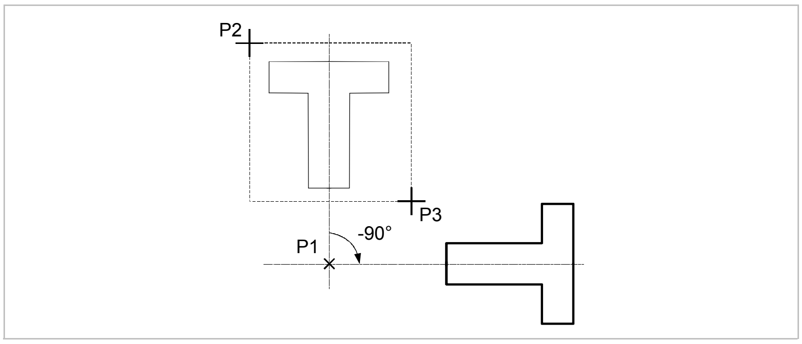


Fig. 28062

1. Select *Sheet*, *Modify*.
2. To rotate the original, select *Original*.

   or

   ➢ To create copies of the original: select *Copy*.
3. Select *Rotate part*, *Center*.
4. Click on a center point of rotation (P1) or enter the coordinates for (P1).
5. Enter angle of rotation, e.g.: `-90`.

   or

   ➢ Enter first and second point for the angle of rotation.
6. Click on any geometry element in the part you wish to rotate or copy and rotate.

   or

   ➢ Draw a box around the entire geometry with the mouse (P3, P4).

ToPs moves and rotates the original or creates one copy of the original.

Positioning parts at the exact distance for common cuts (CSC)

With common cuts (CSC) the contours of contiguous parts are cut at the same time. No waste skeleton is created.

If you want to cut parts using common cuts, the distance between the parts (web width in X and Y directions) must correspond to the kerf in the technology table. (For technology tables and CSC preparation see chapter 5, Technology module.)

Prerequisite

- You have loaded a sheet (see Section 6.9, p. 4-85) or a nested job (see p. 4-106).
- With nesting jobs: the single sheet view is displayed (see p. 4-71).
- The sheet contains parts that are suitable for common cuts.

Adjusting distance between parts to kerf width via two points

ToPs adjusts parts to kerf width by repositioning them.

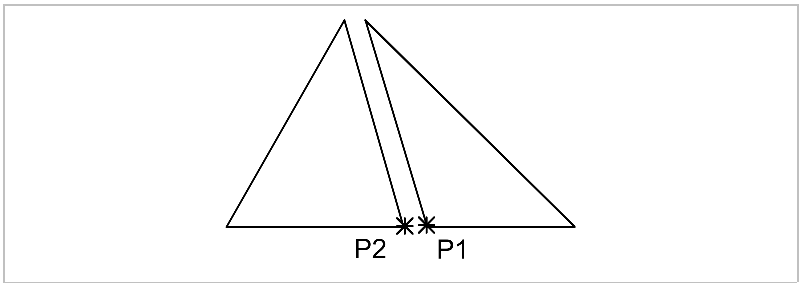


Fig. 5990

1. Select *Sheet >Modify >CSC distance >2 points*.
2. Click precisely on the first point (P1) or enter the coordinates for (P1).
   Note
   It is not sufficient just to click on the sides of those parts you wish to move to the exact distance for common cuts.
3. Click precisely on the second point (P2) or enter the coordinates for (P2).
4. Enter kerf width in mm.

Adjusting distance between parts to kerf width by rotating

ToPs adjusts parts to kerf width by rotating them.

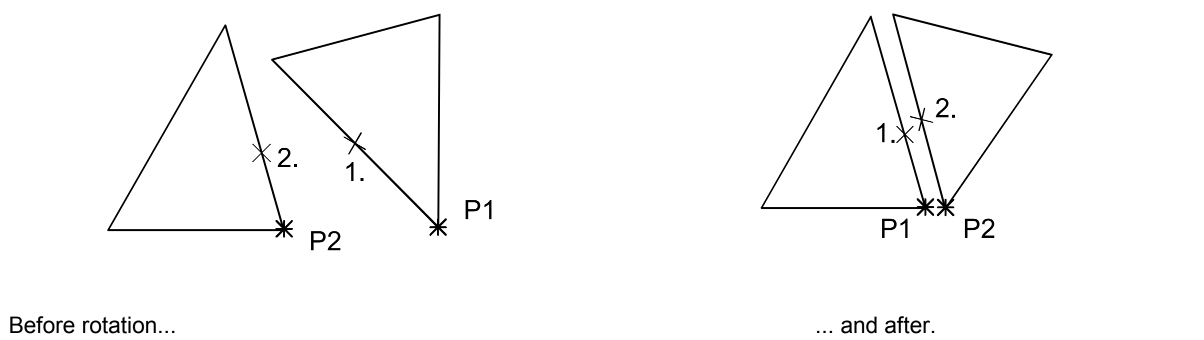


Fig. 30353, 29661

Prerequisite

- You have loaded a sheet (see Section 6.9, p. 4-85) or a nested job (see p. 4-106).
- With nesting jobs: the single sheet view is displayed (see p. 4-71).
- The sheet contains parts that are suitable for common cuts.

1. Select *Sheet >Modify >CSC distance >Rotate*.
2. Click on the first geometry element (1).
2. Click on the second geometry element (2).
4. Click precisely on the first point (P1) or enter the coordinates for (P1).

   Note
   It is not sufficient just to click on the sides of those parts you wish to move to the exact distance for common cuts.
5. Click precisely on the second point (P2) or enter the coordinates for (P2).
6. Enter kerf width in mm.

4.2 Deleting parts from a sheet

Prerequisite

- You have loaded a sheet (see Section 6.9, p. 4-85) or a nested job (see p. 4-106).
- With nesting jobs: the single sheet view is displayed (see p. 4-71).

1. Select *Sheet*, *Modify*, *Delete*, *Part*.

   or

   ➢ Select *Sheet*, *Modify 2*, *Delete*, *Part*.
2. Click on or box in the parts you wish to delete.

4.3 Modifying sheet format

You can only modify the format of a sheet if you have manually entered its dimensions when it was created.

If you created the sheet using a storage item, the format cannot be changed. (Sheet dimensions are included in the storage item. They cannot be changed.)

Prerequisite

- You have created (see Section 3.1, p. 4-19) or loaded (for loading files see Section 9, p. 4-103) a new sheet.

1. Select *Sheet*, *Sheet*, *Sheet format*, *Modify*.

   ToPs displays the mask "Redefine sheet format".

   The sheet dimensions suggested in the mask represent the maximum expansion of the parts on the sheet (surrounding rectangle, zero point at 0.0 ...), including sheet margins and a "safety allowance".

   These are the smallest dimensions you can select for the new sheet format.
2. Enter new sheet dimensions.
3. Select *OK*.

5. Displaying sheet with machine surroundings

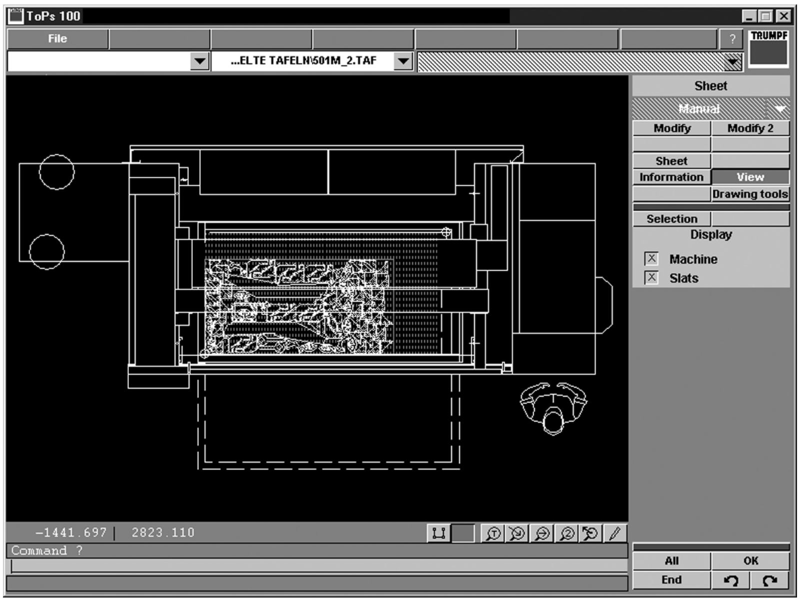
When you display the sheet with the machine surroundings, you can position the sheet on the machine in a way that corresponds with real conditions.

Prerequisite

- You have loaded or created a single sheet or a nesting job (for loading data see Section 9, p. 4-103).
- With nesting jobs: the single sheet view is displayed (see p. 4-71).

1. Select *Sheet*, *View*, *Selection*.
   ToPs displays the mask "Machine selection".
2. Mark the desired machine.
3. Select *OK*.
4. To display the machine surroundings: check "Machine".
5. To display the support slats: check "Slats".

ToPs shows the sheet with the machine surroundings:



Example: machine surroundings of the TC L 2530 Fig. 29782EN

Change machines?

1. Select *Selection* again.
2. Answer query from ToPs with *No*.
3. Mark the desired machine.
4. Select *OK*.

6. Nesting jobs

Nesting processors

Two nesting processors are integrated into ToPs, which nest the part drawings (single part drawings or mini nests) on the sheet according to various criteria:

- The rectangle nesting processor uses the circumscribing rectangles of the parts as part boundaries.
- The free geometry nesting processor observes the actual geometry of the single part or mini nest drawing.

Nesting job

In the nesting job you determine which parts are to be nested in what quantities.

To achieve the best possible utilization of the sheet, ToPs takes into account during nesting all parts and their possible combinations (which always lie between a minimum and maximum number).

Nesting jobs can be created with ToPs or read in from a higher-level system (ASCII file).

Example 1: nesting identical parts

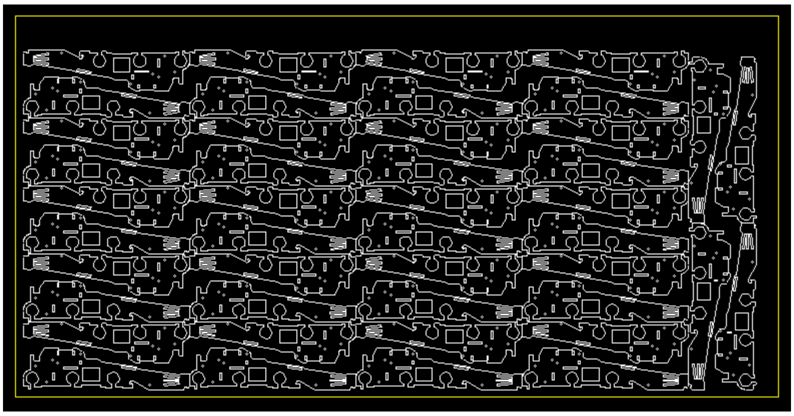


Fig. 19814

Example 2: nesting different parts

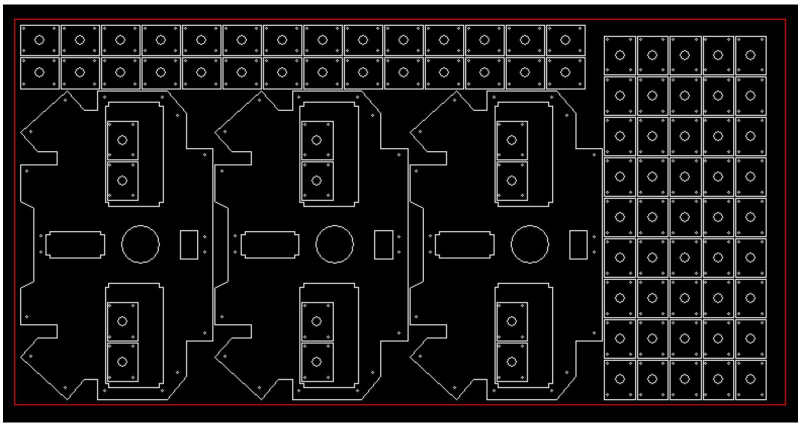


Fig. 19813

Defining nesting options

Various "nesting options" are available (e.g. enabling inner surfaces for layout, degree of optimization of nesting process, position orientation of parts... see also p. 4-60 ff). Select the optimal strategy according to the geometry of the various parts to be nested. The nesting is based on the part geometry or the encompassing rectangle.

Nesting result and nesting logfile

ToPs displays the sheets and nesting result graphically on screen. In the nesting result (file), you can read how many parts were nested in total, how many sheets were produced etc.

In the nesting logfile ("protocol"), ToPs also states where appropriate why individual parts could not be nested.

Nesting remainder sheets

If remainder sheets are left over after processing, these can also be used in nesting.

ToPs lays out remainder sheets as a priority.

Manually influencing sheet layout

You can modify the sheets generated by ToPs in any way:

- Delete single parts from the sheet (see Section 4.2, p. 4-41).
- Add parts to the sheet (see Section 3.2, p. 4-21).
- Modify the position of individual parts (see Section 4.1, p. 4-33 ff).
- ...

6.1 Compiling new nesting job

1. Select *File >New... >Job....*

   ToPs displays the mask "Job management":

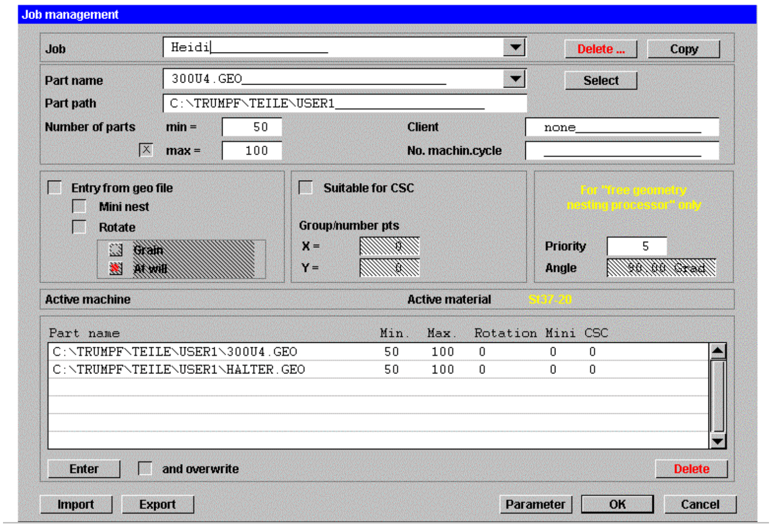


Fig. 19802EN

If you have already compiled nesting jobs, ToPs shows the parts of the previous job in the list field.

Tip

When ToPs opens the "Job management" mask, the cursor is automatically placed in the "Job" input box. You can go from one input box to the next using <TAB>.

Naming nesting job

2. Enter the name of the new nesting job under "Job" (modify or overwrite old name).

   Notes

   The file name can be up to 35 characters long. It can contain digits, letters or a combination of the two. Full stops, spaces, umlauts and special characters such as ^ are not permitted.

   In the "Part name" list field, the parts from the previous nesting job remain displayed until you have either entered a new part in the nesting job or have clicked once in the "Job" input field.

Entering parts in a nesting job

You can:

- Transfer a part from the previous nesting job to the new nesting job (see following description).
- Enter new parts in the nesting job (see following description).
- Search for several parts by means of their drawing data and transfer them to the job (see p. 4-52).

Prerequisite

- The mask "Job management" is displayed (see Fig. 19802, p. 4-46).

Notes
A laid-out sheet contains only references to the single parts which are nested on it. If you modify a single part after you have laid out a sheet with it, the single part changes automatically on the sheet.

Mini nests cannot be entered in a nesting job.

Selecting part

1. To transfer a part from the previous job into the new job: mark the desired part in the list field.

   ToPs enters the name of the file into "File name".

   or

   ➢ To enter a new part in the nesting job: open "Part name" with ▾.

   ToPs displays the "Select file" mask. It displays as standard all unprocessed parts ('*.geo') located in the current directory.

   ➢ If necessary select processed parts ('*.gmt').

   ➢ If necessary change directory (see p. 4-103; to create a new directory, see p. 4-101).

   ➢ Mark the part you wish to transfer into the nesting job.

   ➢ Select *OK*.

   In the mask "Job management" ToPs updates the "Part name" and "Part path".

   or

   ➢ Enter the file name (including suffix) under "Part name".

   ToPs loads the part and displays the part path.

or

- Use *Select* to enter several parts from the same directory into the nesting job at the same time (see p. 4-52 ff).

Defining number of parts

2. **Either**

   - Enter the desired number of parts under "Min".

   or

   - Check "Max".
   - Enter minimum and maximum quantities.

Allocate client and number of machining cycle?

3. If required enter client name and number of machining cycle.

Allocate place value (priority)?

When nesting using the free geometry nesting processor, you can allocate a place value here to each individual part. (When nesting using the rectangle nesting processor, the place value is set for the whole job in the "Options". (see p. 4-60 ff))

The lower the number, the higher the priority and with it the probability that ToPs nests that part first.

Examples:

- ToPs will give a part with a priority of `2` precedence over a part with a priority of `3` when laying out a sheet.
- Parts with the same priority are sorted according to their area. (ToPs begins with the part having the greatest area.)

4. Enter priority.

Read in information from the 'geo file'?

5. To read in information from the 'geo file': mark "Entry from geo file".

   ToPs reads into the nesting job the following drawing data from the '*.geo' or '*.gmt' file. (On drawing data, see chapter 3, Drawing module):

   – "Mini nest": If there is a mini nest for the part, ToPs nests the mini nest. If there is no mini nest, ToPs nests the single part.

     Note
     With '*.gmt' files, no mini nests can be entered in the job.

   – "Rotate": When active, ToPs rotates the single part.

     "At will": When nesting using the free geometry nesting processor, ToPs rotates the part according to the incremental angle entered under "Angle" (see p. 4-50). In the rectangle nesting processor, ToPs rotates the part by 90°. The sheet's grain (its direction of rolling) is not taken into account.

– "Grain": ToPs places the part on the sheet to align with the selected direction of grain (for sheet direction of grain, see p. 4-59, for remainder sheet direction of grain, see p. 4-68).

  Note
  If "Grain" has been activated for a part, ToPs places that part only on a remainder sheet if that sheet also has a direction of grain (for loading remainder sheets, see p. 4-67, for remainder sheet direction of grain, see p. 4-68).

  If only the standard sheets were defined with direction of grain (see p. 4-59), ToPs places this part on standard sheets.

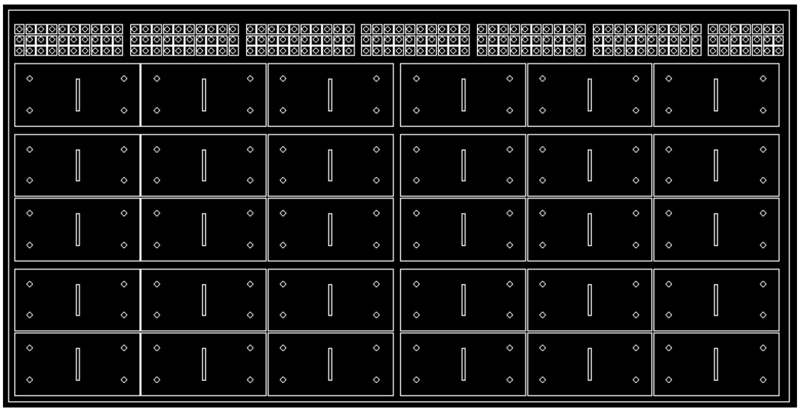
or

➢ Deactivate "Entry from geo file".

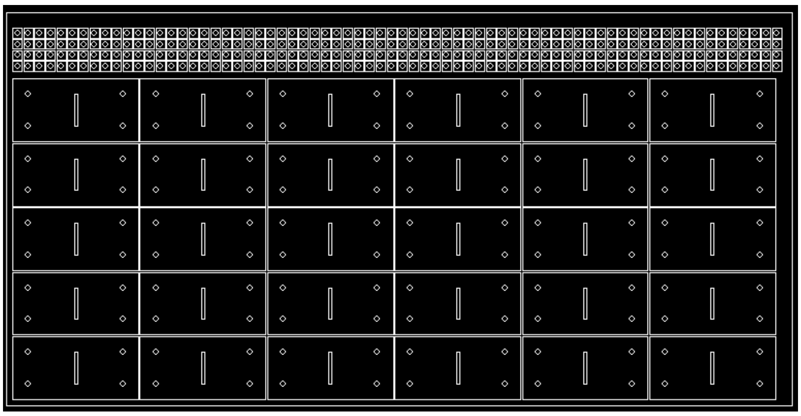
ToPs ignores the entries in the 'geo file'. You can activate "Mini nest" and "Rotate" ("Grain", "At will") yourself.

Is the part suitable for common cuts (CSC)?

When nesting using the rectangle nesting processor, ToPs can place a CSC suitable part on the sheet either in groups (see Fig. 15454) or in specific numbers in the X and Y directions (see Fig. 15455).



Sheet layout with several groups of each CSC part Fig. 15454



Sheet layout with one group per CSC part Fig. 15455

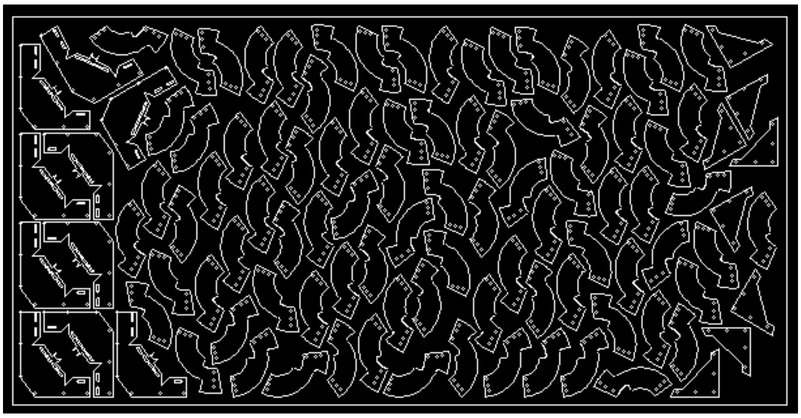
6. To place the part on the sheet in groups: check "Suitable for CSC".
7. Under "Group/number pts", enter the number of parts in a group in X and Y directions.

Define angle for possible rotation?

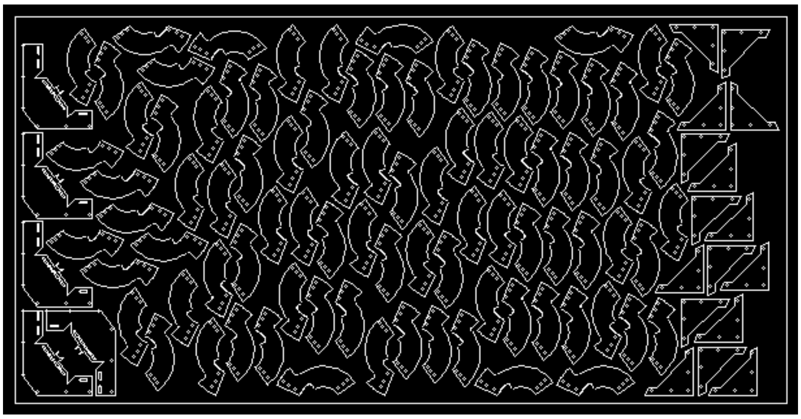
When nesting using the free geometry nesting processor, an incremental angle can be allocated to parts able to be rotated at will, which ToPs may then use to rotate the sheets when nesting. (Incremental angle: angle is added to the absolute angle).

Prerequisite

- The part must have been defined as able to be rotated via "Rotate", "At will".



Example: sheet layout with angle increment of 30° for all parts — Fig. 15456



Example: sheet layout with angle increment of 90° for all parts — Fig. 15457

8. Enter angle.

When all data for the part have been entered

9. Select *Enter.*

   or

   ➢ Press <CTRL>+<E>.

Modify data of an entered part?

10. Mark part in the list field.
11. Modify data (example: different number of parts, different priority).
12. **Either**

    ➢ Check "and overwrite".

    ToPs overwrites the old data. (In the example: the old number of parts is replaced by the new. The parts have the new priority.)

    or

    ➢ Deactivate "and overwrite".

    ToPs "adds on" the new data. (In the example: the old and new numbers of parts are added together. The parts all have the new priority.)
13. Select *Enter.*

    or

    ➢ Press <CTRL>+<E>.

Save new nesting job and close?

14. Select *OK* or press <RETURN>.

ToPs saves the nesting job in the database and displays the "Job Automatic" mask.

Importing and exporting nesting jobs

(See Section 6.9, p. 4-85 ff.)

Entering several parts from a directory simultaneously in a nesting job?

Prerequisite

- The mask "Job management" (see Fig. 19802, p. 4-46) is displayed.

1. Select *Select*.

   ToPs displays the "Choose files" mask. It displays as standard all processed and/or unprocessed parts located in the current directory:

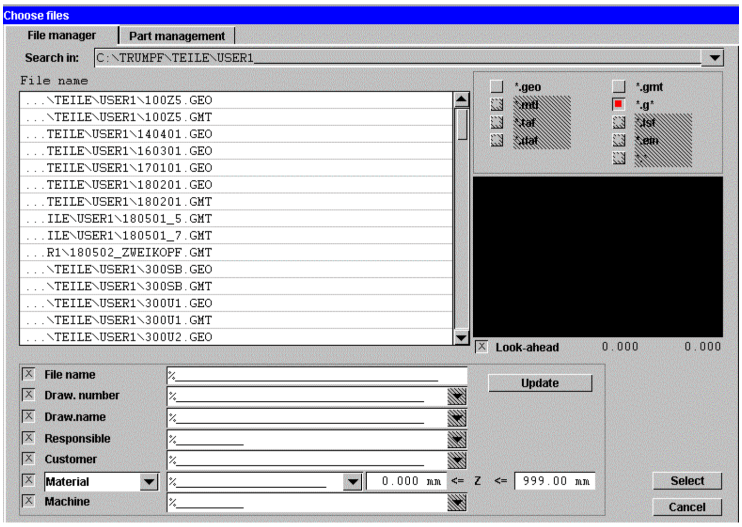


Fig. 29665EN

2. Select file format ('*.geo', '*.gmt' or both - '*.g*').
3. To change the directory: open "Search in" using ▼.

   ToPs displays the "Select directory" mask.
4. To change the directory upwards: click on "*" until the file manager displays the desired directory.

   or

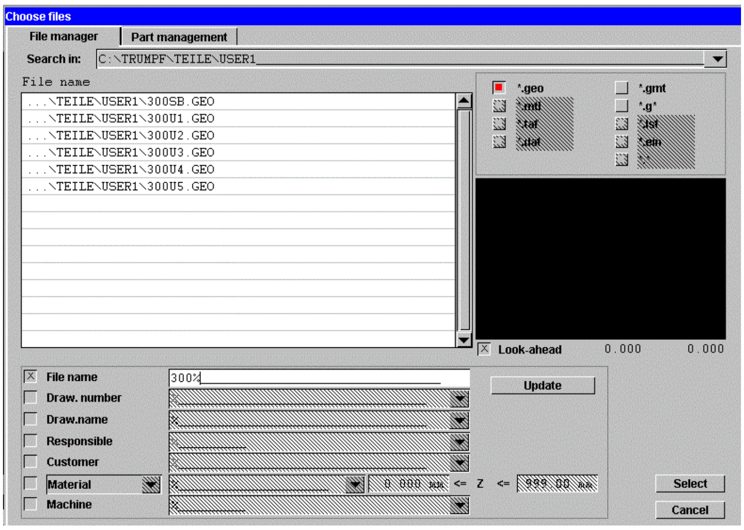
   ➢ To change the directory downwards: mark the directory which is one level deeper.

   ➢ Repeat until the file manager displays the correct directory.
5. Select *OK*.
6. To activate preview: check "Look-ahead (Preview)".

Filter parts via their drawing data?

7. Check the boxes of desired elements for filtering (e.g. "Customer").
8. To switch from "Material" to "Storage item" (and back): check box and click on *Material* or *Storage item*.
9. Enter filter values (on using wildcards, see p. 4-84).
10. Once you have entered all filter criteria: select *Update*.

    ToPs displays all parts in the list field which meet the filter criteria:



Example of filtering by file name Fig. 29666EN

11. To transfer all parts in the list field into the job: select *Select*.

    ToPs displays the mask "New part". The first part from the list field is entered under "Part name".

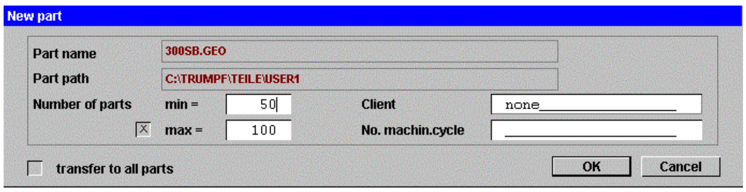


Fig. 29866EN

12. Enter minimum number of parts.
13. If required, check "Max" and enter maximum number of parts.
14. If required enter name of client and number of machining cycle.

15. If numbers of parts, customer name and number of machining cycle are the same for all parts: check "Transfer to all parts" and select *OK*.

    ToPs enters the selected parts into the nesting job all at the same time.

16. If numbers of parts, customer name or number of machining cycle are different for each part: select *OK* **without** checking "Transfer to all parts".

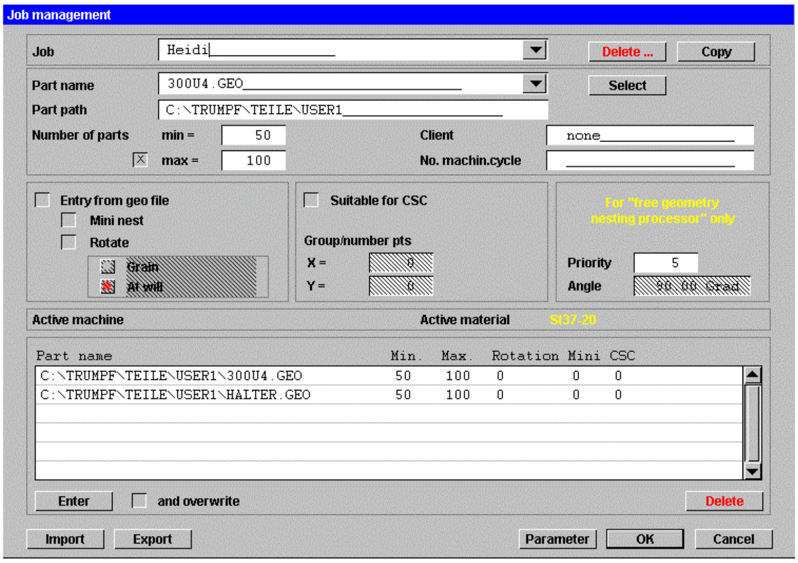
    ToPs displays the "New part" mask again until you have entered all selected parts into the nesting job.

At the end, ToPs returns to the "Job management" mask.

Deleting parts in the nesting job

Prerequisite

- You have loaded the nesting job in which you want to delete parts (for loading nesting job, see p. 4-106).



The mask "Job management" Fig 19802EN

1. In the list field mark the part you want to delete.
2. Select *Delete* in the lower right corner of the mask.

ToPs deletes the part in the nesting job.

Activating quick display of parts in nesting jobs

The quick display corresponds to the file preview in the "File manager" (which opens when, e.g., you wish to load a part or a sheet).

You can activate the quick display in the following masks:

- "Job management" (see Fig. 19802, p. 4-46).
- "Selection of parts" (see Fig. 29865, p. 4-79).

The quick display is limited to processed and unprocessed parts ('*.geo', '*.gmt') and (additionally in the "Selection of parts" mask) mini nests (*.mtl').

Example: quick display in "Job management"

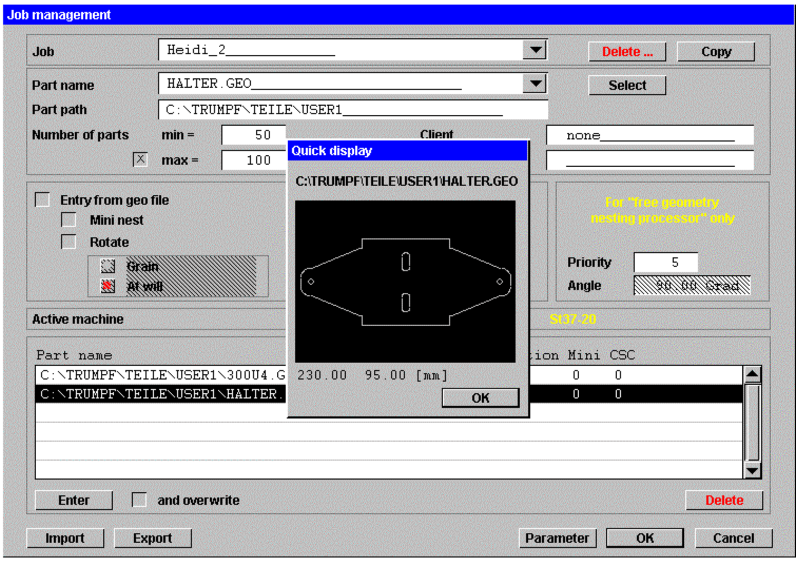


Fig. 29868EN

1. Right click on the file.
   ToPs activates the "Quick display".
2. Close the quick display with *OK*.

6.2 Defining nesting parameters

You can define the "Sheet data" (see below) either when you are compiling a nesting job, or afterwards (preferably before the job is nested).

You can only define the "Options" for the nesting job (e.g. filling internal surfaces with other parts) and the parameters for "CSC" and "Remainder sheets" after you have compiled the nesting job, confirmed it with *OK* and selected one of the two nesting processors.

Defining sheet data for a nesting job

The "Sheet data"

- Sheet name and sheet path.
- Sheet material.
- Dimensions and material thickness.
- Sheet margins.
- Webs (distances between the parts).
- Observe direction of grain yes/no.
- Sheet corner at which ToPs is to commence layout.

Prerequisite

- You have loaded the nesting job for which you want to define the nesting parameters (to load nesting jobs, see p. 4-106); the "Job, Automatic" mask is displayed.

or

- The mask "Job management" is still displayed (e.g. when creating the job for which you want to define the nesting parameters; see Fig. 19802, p. 4-46).

1. If the "Job, Automatic" is displayed:
   Select *Enlarged rect.*, *Parameters* or *Free Geometry*, *Parameters*.

   ToPs then uses the rectangle nesting processor or the free geometry nesting processor and displays the "Nesting parameters" mask, at the "Sheet data" tab.

   or

   ➢ If the mask "Job management" is still displayed: select *Parameter*.

   ToPs likewise displays the "Nesting parameters" mask, at the "Sheet data" tab.

   Note
   You have no access by this path to the "Options", "CSC", and "Remainder sheets" tabs (to define nesting job options, see p. 4-60 ff).

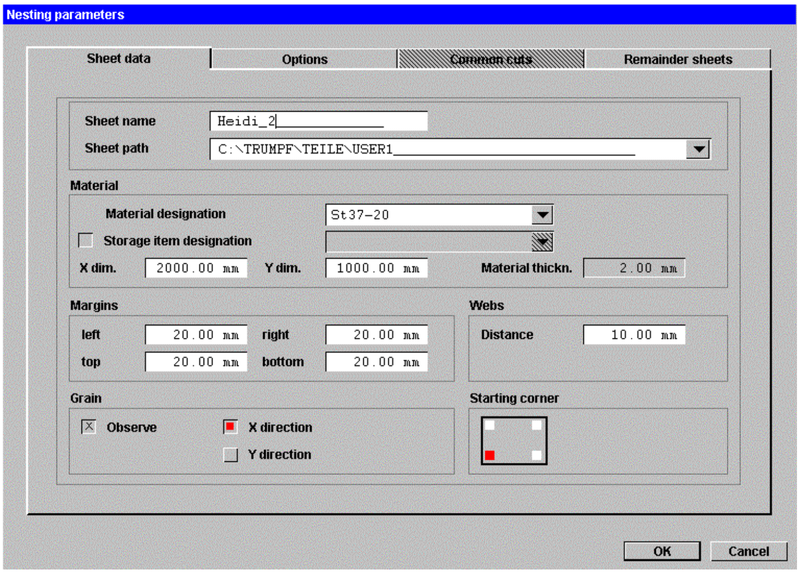


Fig. 19804EN

Tip
When ToPs opens the "Nesting parameters" mask, the cursor automatically appears in the "Sheet name" input box. You can go from one input box to the next using <TAB>.

Defining sheet name

ToPs always suggests the job name as the name of the sheet. If the nesting job consists of several sheets (whether the same or different), ToPs counts up the sheet names as follows:

- Name of nesting job: Sheet
- Name of the first sheet: Sheet_1.taf
- (...)
- Name of the nth sheet: Sheet_n.taf

2. Modify sheet names if necessary.

   Notes
   The file name can be up to 35 characters long. It can contain digits, letters or a combination of the two. Full stops, spaces, umlauts and special characters such as ^ are not permitted.

Defining the path under which the sheets are saved

3. Open "Sheet path" using ▾.

   ToPs displays the "Select directory" mask.

4. If necessary change directory (see p. 4-103; to create new directory see p. 4-101).

5. Select *OK*.

   ToPs displays the "Sheet data" mask again.

Select material and dimensions of sheet via "Storage item"?

6. To select material and dimensions of the sheet via "Storage item": check "Storage item designation".

Notes
If you are nesting processed single parts ('*.gmt') in the job, the first processed single part determines the material of the sheet and the machine with which the sheet is machined.

When making a selection via "Storage item designation", the material, dimensions and storage location of a sheet are predetermined.

In order to be able to select a storage item, you must have entered storage item designations in the *Data* module under *Material >Blanks* (see also chapter 6, Data module).

ToPs displays the mask "Select storage item".

➢ Mark the desired storage item.

➢ To change the storage item again: open list field under "Storage item designation" using ▾.

ToPs displays the mask "Select storage item" again.

➢ Mark another storage item.

or

Enter sheet material and dimensions manually?

➢ Open material designation using ▾.

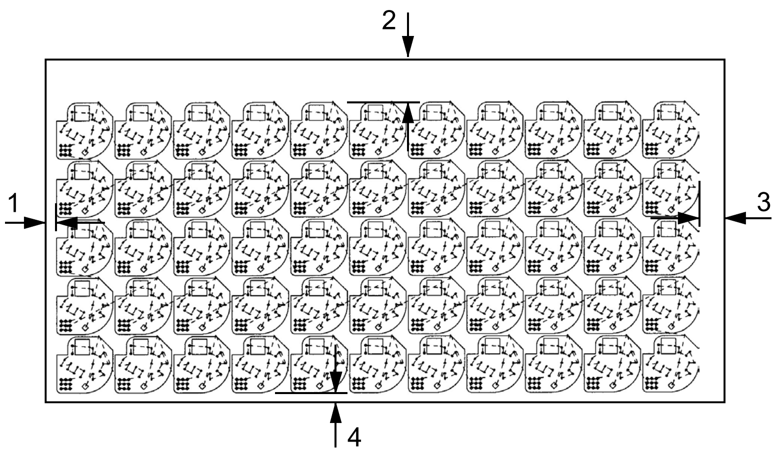
ToPs displays the mask "Select material".

➢ According to the particular machine for which you want to nest sheets, select "Laser" or "Water jet".

➢ Select the desired material.

➢ Enter sheet dimensions.

Sheet margins and web widths



1	Left margin	3	Right margin
2	Top margin	4	Bottom margin

Margins of a sheet — Fig. 21867

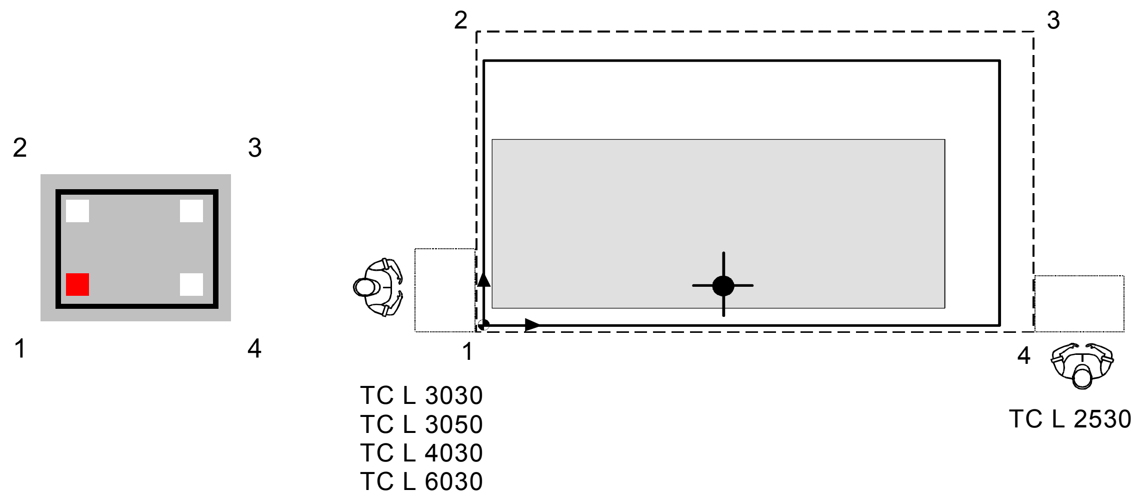
7. Enter sheet margins.
8. Under "Webs", enter the distance between the parts. (In the case of rectangle nesting processor: distances in X and Y direction.)

   Note
   If the margins are smaller than the distances between the parts, ToPs sets the margins to web width.

Observe direction of grain of sheet?

9. Check "Observe".
10. Enter direction of grain:
    – "X direction": part is rotated by 180° or not at all.
    – "Y direction": part is rotated by 90° or 270°.

    ToPs displays the direction of grain in the sheet overview (under the sheet) as follows:
    – *: Direction of grain not observed.
    – - (horizontal line): Grain in X direction.
    – I (vertical line): Grain in Y direction.



1 Front left
2 Back left
3 Back right
4 Front right

Starting corners: example using the TC L 3030, TC L 3050, TC L 4030, TC L 6030 and TC L 2530 Fig. 29668, 29669

11. Click on "Starting corner". (Starting corner = sheet corner at which ToPs commences layout.)

When all settings are defined

12. Select *OK*.

Defining options for a nesting job

Prerequisite

- You have loaded the nesting job for which you want to define the nesting parameters (see p. 4-106); the "Job, Automatic" mask is displayed.

➢ **Either**

Use rectangle nesting processor?

➢ Select *Enlarged rect.*, *Parameters*.

ToPs displays the "Nesting parameters" mask.

➢ Select "Options" tab.

ToPs displays the "Options" tab for the rectangle nesting processor (see Fig. 19815, p. 4-60).

or

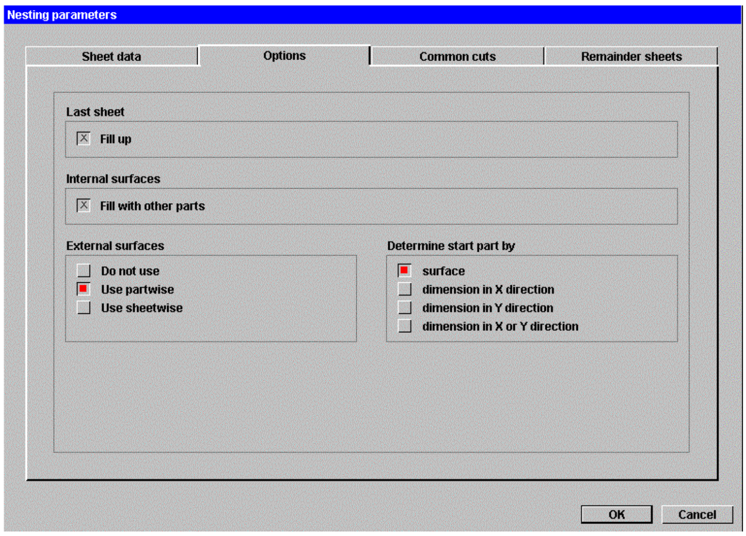
Use free geometry nesting processor?

➢ Select *Free geometry*, *Parameters*.

ToPs displays the "Nesting parameters" mask.

➢ Select "Options" tab.

ToPs displays the "Options" tab for the free geometry nesting processor (see Fig. 29775, p. 4-63).



"Options", rectangle nesting processor Fig. 19815EN

Options independent of nesting processor

Fill last sheet?

1. Select "Last sheet", "Fill up".

   Prerequisite

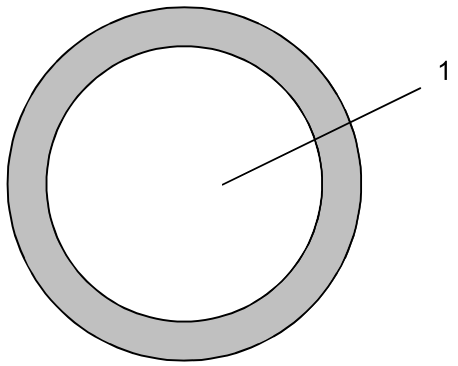
   The minimum number of parts is smaller than the maximum number of parts (see Fig. 19802, p. 4-46).

   If the minimum number of parts has been reached but not the maximum, ToPs fills the last sheet with parts. In doing so, ToPs does not exceed the maximum number of parts.

Enable internal surfaces to be laid out with parts?

2. Select "Internal surfaces", "Fill with other parts".

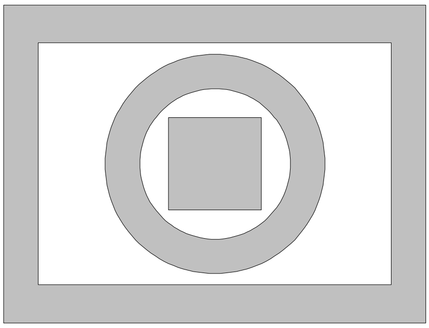
   The internal surfaces of a part are enabled for laying out with parts. This strategy recommends itself for parts with large internal surfaces.



1 Internal surface

Fig. 4776

ToPs enables internal surfaces automatically across several levels:



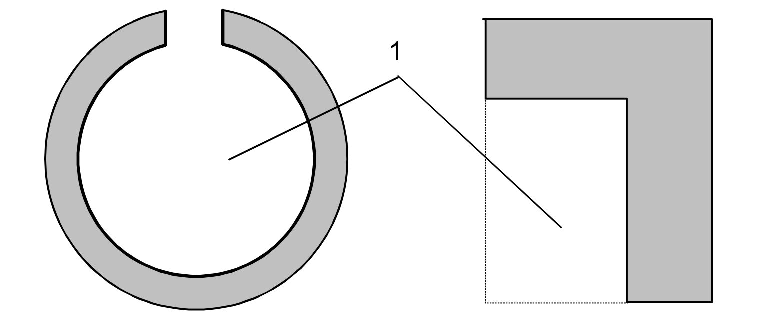
Example: laying several parts in internal surfaces which become free in succession

Fig. 9121

Options specific to the rectangle nesting processor

External surfaces

External surface = free surface not laid out with parts, between the geometry of the part and the circumscribing rectangle.

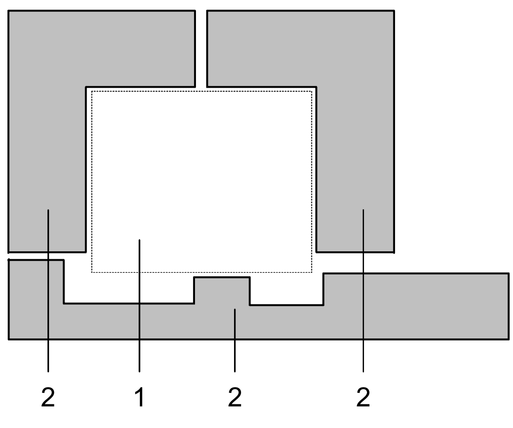


1 External surfaces of parts

Fig. 4778

Lay out external surfaces?

1. Select the desired box:
   - "Do not use external surfaces": ToPs does not lay out external surfaces.
   - "Use partwise": ToPs enables the external surfaces of **one** part for laying out with parts.
     (This strategy recommends itself for parts with large external surfaces.)
   - "Use sheetwise": ToPs links up the external surfaces of several parts in a practical way to form one residual surface and lays it out with parts.
     (This strategy recommends itself if you wish to nest a mixture of large parts and many small parts.)



1 External surface, "sheetwise" 2 Individual parts

Fig. 29880

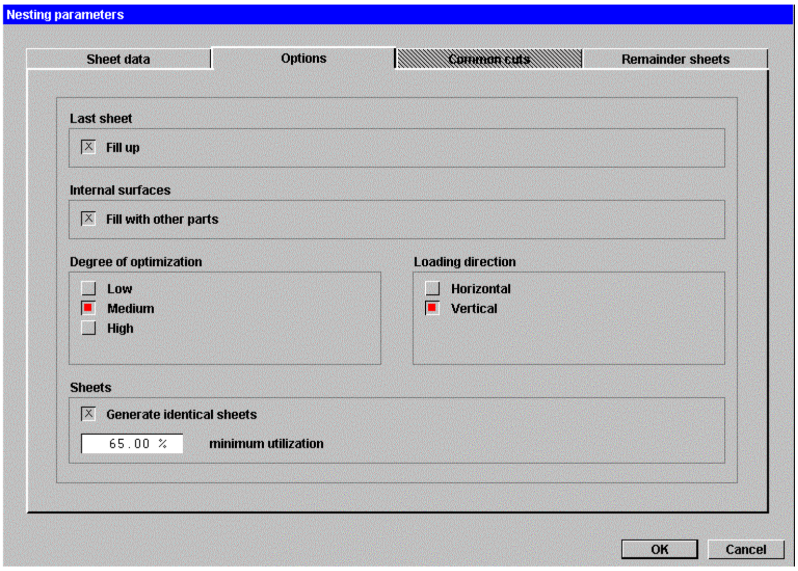
Defining start part

2. Select the desired box.

   The nesting processor begins nesting with the part you define as the start part:

   – "surface": ToPs begins with the part which has the greatest surface area.
   – "dimension in X direction": ToPs begins with the part which has the greatest extension in the X direction.
   – "dimension in Y direction": ToPs begins with the part which has the greatest extension in the Y direction.
   – "dimension in X or Y direction": ToPs begins with the part with the greatest edge lengths.

Options specific to the free geometry nesting processor



"Options", free geometry nesting processor — Fig. 29775EN

Defining degree of optimization

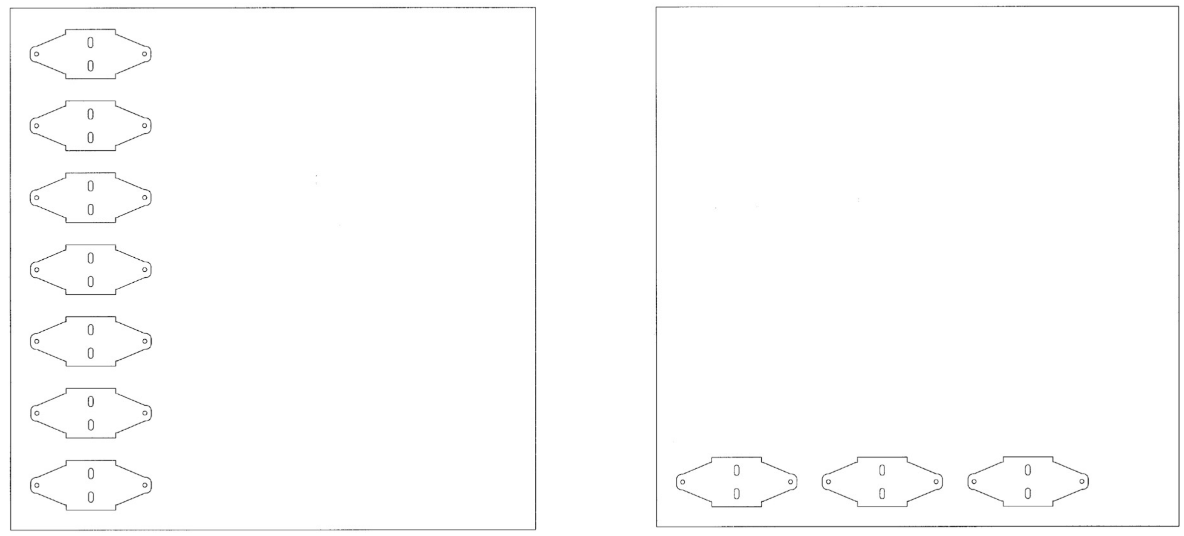
1. Select the desired box:

   – "Low": degree of optimization is lowest, calculation proceeds most quickly.
   – ...
   – "High": degree of optimization is highest, calculation proceeds most slowly.

Defining loading direction

2. Select the desired box:

   – "Horizontal": ToPs lays out the sheet moving from the starting corner in a horizontal direction (see Fig. 30354, p. 4-64).
   – "Vertical": ToPs lays out the sheet moving from the starting corner in a vertical direction (see Fig. 30354, p. 4-64).



Vertical loading direction ... ... and horizontal.

Fig. 30354, 30355

Only generate identical sheets?

Advantage: if ToPs only generates identical sheets, you have correspondingly fewer manual modifications/optimizations to make in the Technology module and you end up with fewer NC programs.

3. Select "Generate identical sheets".
4. Enter minimum utilization.

When all settings are defined

5. Select *OK*.

Activating common cuts (CSC) in nesting jobs

You can only process a nesting job using common cuts if you are using the rectangle nesting processor.

(For an exact description of common cuts parameters, see chapter 5, Technology module.)

Prerequisite

- You have loaded the nesting job for which you want to define the nesting parameters (see p. 4-106); the "Job, Automatic" mask is displayed.
- The nesting job contains CSC suitable parts.

1. Select *Enlarged rect.*, *Parameters*.

   ToPs displays the "Nesting parameters" mask.

2. Select the "CSC" tab.

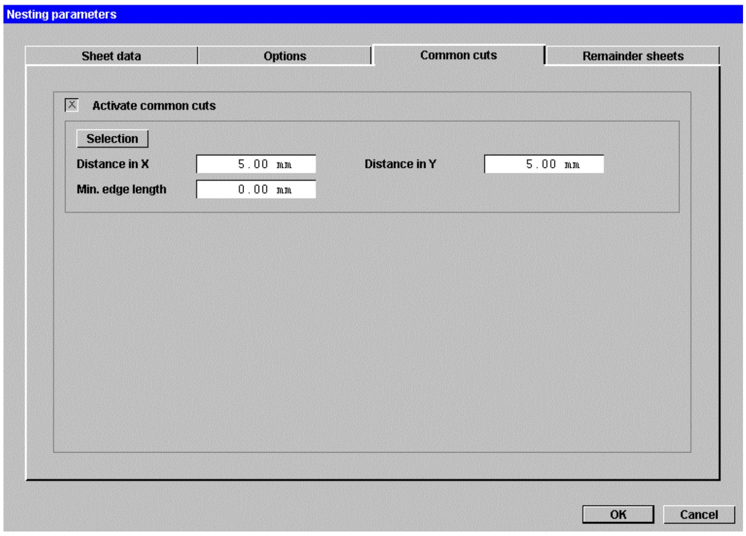


Fig. 19816EN

3. Check "Activate common cuts".

   Tip
   After you check "Activate common cuts", you can go from one input box to the next using <TAB>.

4. **Either**

   ➢ Select *Selection*.

   ToPs displays the mask "Machine selection".

   ➢ Mark the machine with which you want to process the nesting job.

- Select *OK*.

ToPs displays the "Selection of Technology Tables" mask.

- Select technology table and process rule (see chapter 5, Technology module.)

  The kerf (and with it the web width between the contours to be cut with common cuts) is now defined.

or

- Enter manually web widths in X and Y directions under "Distance in X" and "Distance in Y".

  Note
  The web widths must correspond to the kerf from the technology table which ToPs later uses to process the nesting job. (For creating processing plans see chapter 5, Technology module; for an exact description of technology tables see chapter 6, Data module.)

5. Enter the minimum edge length (= minimum edge length a part must have for it to be placed along common cuts).

When all settings are defined

6. Select *OK*.

ToPs displays the "Job, Automatic" mask again.

Nesting parts of a nesting job on remainder sheets

You can nest the parts from a nesting job on "standard" sheets and on "remainder" sheets.

You have defined the standard sheets of a nesting job under "Sheet data" (see p. 4-56 ff). You define the remainder sheets here and then allocate them to a nesting job.

With automatic nesting of the nesting job (see Section 6.3, p. 4-71), ToPs will lay out the remainder sheets first, then the standard sheets.

Free geometry nesting processor

The free geometry nesting processor can nest parts onto remainder sheets with random geometries. The remainder sheets with random geometries must be created in the *Drawing* module and saved as '*.geo' files.

Rectangle nesting processor

You can only nest rectangular remainder sheets using the rectangle nesting processor.

Prerequisite

- You have loaded the nesting job which has the parts you wish to nest onto remainder sheets (see p. 4-106); the "Job, Automatic" mask is displayed.
- If you are nesting remainder sheets using the free geometry nesting processor and you wish to use "Random sheet geometries" for the remainder sheets: the remainder sheets must be present as drawings in '*.geo' format.

Defining remainder sheets

When you define remainder sheets, this occurs independently of the active nesting job at first (the standard sheet of the nesting job only specifies material type and sheet thickness).

1. Select *Enlarged rect.*, *Parameters*.

   or

   ➢ Select *Free geometry*, *Parameters*.

   ToPs displays the "Nesting parameters" mask.

2. Select the "Remainder sheets" tab:

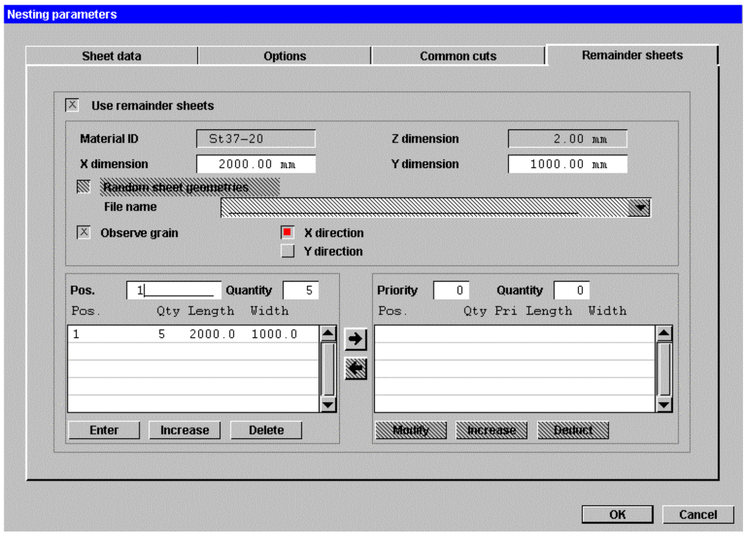


Fig. 19817EN

3. Check "Use remainder sheets".

   Note
   The nesting job's standard sheet specifies the material type ("Material ID") and sheet thickness ("Z dimension") of remainder sheets.

4. Enter the dimensions of the remainder sheet the X and Y directions under "X dimension" and "Y dimension".

   or

Only with free geometry nesting processor

- Mark "Random sheet geometries".
- (Enter the remainder sheet file name) or open "File name" using ▼.

ToPs displays the "Select file" mask.

- If necessary change directory (see p. 4-103; to create a new directory, see p. 4-101).
- Mark desired file (drawing of remainder sheet).
- Select *OK*.

ToPs displays the "Residual sheets" tab again.

Note
ToPs displays sheets with random geometry as circumscribing rectangles in the general view of the nested sheets in the *Nesting* module and when loading in the *Technology* module.

Observe grain for remainder sheet?

5. Check "Observe grain".
6. Enter direction of grain:
   - "X direction": part is rotated by 180° or not at all.
   - "Y direction": part is rotated by 90° or 270°.

Note
ToPs only observes direction of grain of the remainder sheet if "Observe grain" has been activated both for the part to be nested as well as for the nesting job's standard sheet (for direction of grain for standard sheet, see p. 4-59; for direction of grain when nesting part, see p. 4-49).

ToPs then displays the direction of grain in the sheet overview (under the remainder sheet) as follows:

- *: Direction of grain not observed.
- - (horizontal line): Grain in X direction.
- I (vertical line): Grain in Y direction.

Entering remainder sheets in the management system

ToPs displays remainder sheets contained in the management system in the left section of the list field.

1. Enter position (= storage location of the residual sheets).
2. Enter the quantity of remainder sheets which are managed at this storage location.
3. Select *Enter.*

Modifying quantity of remainder sheets in the management system?

1. Mark the remainder sheet whose quantity you wish to modify.
2. Under "Quantity" enter the amount by which you want to increase/decrease.

   Note
   Negative numbers are permitted. The number of remainder sheets then decreases correspondingly.
3. Select *Increase*.

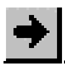
Delete remainder sheets in the management system?

1. Mark the remainder sheet you wish to delete.
2. Select *Delete*.

Allocating remainder sheets to the nesting job

ToPs displays remainder sheets allocated to a nesting job in the right section of the list field.

1. Mark the desired remainder sheet in the left list field.

   ToPs displays the storage location and the quantity of remainder sheets.
2. Select .

   ToPs displays the "Sheet selection" mask.
3. Enter priority. (The lower the number, the higher the probability that ToPs selects that remainder sheet to lay out first. Remainder sheets with the same priority are laid out "at random".)

4. Enter the quantity of remainder sheets from this storage location which you want to allocate to the nesting job.
5. Select *OK*.

ToPs allocates the desired quantity of remainder sheets to the nesting job (right list field) and deducts them from the management system (left list field).

Modify priority/quantity of the remainder sheets in a job?

1. Mark remainder sheets in the right list field for which you want to modify priority or quantity.
2. Modify priority and/or quantity.
3. Select *Modify*.

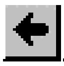
ToPs saves the modified data record.

Deducting remainder sheets following nesting

Following nesting of the nesting job (see Section 6.3, p. 4-71), you can deduct the quantity of used remainder sheets from the nesting job:

1. Mark the remainder sheets in the right list field.
2. Enter the quantity you wish to deduct.
3. Select *Deduct*.

Remainder sheets of a job back into the management system?

1. Mark remainder sheets in the right list field (= remainder sheets allocated to the nesting job).
2. Select .

ToPs transfers the remainder sheets to the management system (left list field).

When all settings are defined

➢ Select *OK*.

When you start the nesting process (see next page), ToPs first nests parts on the remainder sheets. Subsequently, ToPs lays out the standard sheets.

6.3 Starting automatic nesting process

Prerequisite

- You have loaded the nesting job which you want to nest using one of the two nesting processors (to load nesting jobs, see p. 4-106); the "Job, Automatic" mask is displayed.
- The nesting parameters have been defined (see Section 6.2, p. 4-56).

1. Select *Job*, *Automatic*.

Selecting nesting processor

2. Select *Enlarged rect.*

   ToPs orientates itself when nesting by the part boundaries as a circumscribing rectangle (rectangle nesting processor).

   or

   ➢ Select *Free geometry*.

   When nesting, ToPs observes the actual geometry of the single part or mini nest (free geometry nesting processor).

3. Select *Start*.

   ToPs begins nesting.

   If ToPs cannot nest individual parts, a nesting protocol is displayed. Here ToPs reports which parts could not be nested.

4. Close nesting protocol when required using *Continue*.

   ToPs completes nesting.

5. Close "Nesting - Result" with *OK*.

   ToPs displays all the various sheets in the nesting job as a sheet overview. ToPs represents the geometries with their circumscribing rectangles (each part type in a different color).

Selecting single sheet view

➢ (Select → *Single sheet*), click on sheet which you want to have displayed individually.

ToPs displays the individual sheet with its geometries.

"Browsing" through the single sheet view

1. To display the next (different) sheet: select *Next sheet*.
2. To display the previous (different) sheet: select *Previous sheet*.

Return to sheet overview?

➢ Select ← *Display all sheets*.

Select particular sheets to be displayed?

1. Open central list field in mask header using ▼.
   ToPs displays the mask "Sheet selection".
2. Mark the desired sheet.

ToPs displays the sheet.

6.4 Modifying nesting jobs via job management

You can modify the following in a nesting job:

- Enter further parts in the nesting job.
- Delete parts in the nesting job.
- Modify nesting parameters.

1. To modify a nesting job already loaded:
   Select ← *Display all sheets*.
   - ➢ Select *Manage, Modify*.

   or

   - ➢ Load nesting job (see Section 9.3, p. 4-106).
   - ➢ Select *Modify*.

   ToPs displays the mask "Job management" (see Fig. 19802, p. 4-46).
2. To activate the quick display for a part: right click on the part; close quick display with *OK*.
3. Modify/expand desired data:
   - Enter further parts in the nesting job (see p. 4-47 ff).
   - Delete parts in the nesting job (see p. 4-54).
   - Modify nesting parameters (to define nesting parameters, see Section 6.2, p. 4-56 ff).
4. When all modifications have been completed: select *OK*.

ToPs displays the previously nested sheets unchanged. Reason: If you, e.g., delete a part from the nesting job, it is certainly no longer contained in the nesting job but can still be on a previously laid-out sheet.

5. If required, nest the job again (see Section 6.3, p. 4-71).

6.5 Manually modifying nesting job

You can modify the sheets of a nesting job as for sheets you have created manually and laid out with parts:

- Modify part positions (for repositioning parts, rotating parts ..., see Section 4.1, p. 4-33 ff).
- Delete parts from the sheet (see Section 4.2, p. 4-41).
- Manually add parts to the nesting job (see both of following sections).

Manually nesting parts afterwards which are already present in a job

Prerequisite

- You have loaded a nested job (to load nesting job, see p. 4-106).
- The single sheet view is activated for the sheet on which you want to nest parts afterwards manually (see p. 4-71).

1. Select *Modify 2*.

Hang current part from list field on the mouse?

2. If ToPs has displayed the name and path of a '*.geo' file in the top right list field in the mask header and you want to nest this part afterwards: select *Current part*.

   ToPs hangs the part on the mouse. (You can see this if you move the mouse pointer over the sheet.)

   or

ToPs does not give a part in the list field or you want a different one?

   ➢ If ToPs has not yet displayed the name of a '*.geo' file in the top right list field in the mask header: open the list field using ▾ **or** select *Current part*.

   ToPs displays the mask "Selection of parts". Here ToPs displays all parts on the sheets: parts contained in the job and parts not contained in the job because they were nested afterwards manually (see p. 4-75). ToPs marks the latter with *.

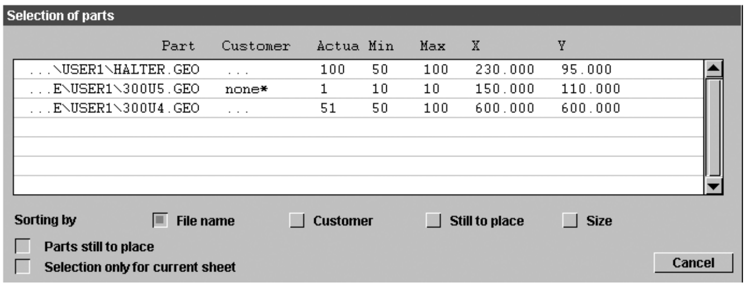


Fig. 29865EN

- To activate the quick display for a part: right click on the part. Close the quick display again with *OK*.
- To sort the parts for selection: select the desired box:
  - "Still to place": difference between the number of parts which should be nested in the nesting job as a minimum, and the number of parts ToPs has actually nested so far.
  - "Size": surface area of the parts.
- To display only the parts which ToPs has not yet nested in the nesting job: check "Parts still to place".
- To display which parts ToPs has nested on the currently displayed sheet of the job and how often: select "Selection only for current sheet".
- Mark the part you wish to hang on the mouse.

ToPs hangs the part on the mouse. (You can see this if you move the mouse pointer over the sheet.)

You can now

- Deposit part at the desired position (click with the mouse; repeat if needed).

or

- Change number of parts hanging on the mouse (see p. 4-25).
- Change distance between the parts hanging on the mouse (see p. 4-26).
- Lay out nesting job sheet automatically (in the same way as in Section 3.4, p. 4-30).
- Rotate parts hanging on the mouse by an incremental angle of rotation (see p. 4-28).
- Change reference point of mouse pointer (see p. 4-24).

Manually nesting parts afterwards which are not yet present in a job

You can add the following parts to a job manually:

- Unprocessed single parts ('*.geo').
- Processed single parts ('*.gmt').
- Mini nests ('*.mtl').

Prerequisite

- You have loaded a nested job (to load nesting job, see p. 4-106).
- The single sheet view is activated for the sheet on which you want to nest parts afterwards manually (see p. 4-71).

1. Select *Modify 2, New part*.
   ToPs displays the "Select file" mask. It displays all unprocessed parts ('*.geo') located in the current directory.
2. Change file format if necessary ('*.mtl' or '*.gmt').
3. If necessary change directory (see p. 4-103; to create new directory, see p. 4-101).

Activate preview?

4. Check "Look-ahead (Preview)".
   The preview function in ToPs becomes continuously active.

   or

   ➢ Deselect "Look-ahead (Preview)".
   The preview function is no longer active.

   ➢ Using the right mouse button, click on the file name.
5. Mark the desired file.
6. Select *OK*.
   ToPs displays the mask "New part":

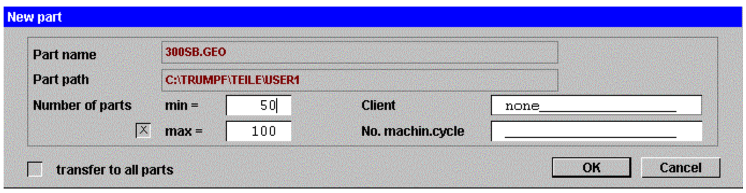


Fig. 29866EN

7. If you wish to transfer the parts later to the job: enter minimum number of parts. If required, check "Max" and enter maximum number of parts.

8. If required enter name of client and number of machining cycle.
9. Select *OK*.
   The part hangs on the mouse.

You can now

- Deposit part at the desired position (click with the mouse; repeat if needed).

  or

  - Change number of parts hanging on the mouse (see p. 4-25).
  - Change distance between the parts hanging on the mouse (see p. 4-26).
  - Lay out nesting job sheet automatically (in the same way as in Section 3.4, p. 4-30).
  - Rotate parts hanging on the mouse by an incremental angle of rotation (see p. 4-28).
  - Change reference point of mouse pointer (see p. 4-24).

Note
If you have manually nested parts afterwards which did not yet belong to the job, you can transfer these into the job.

Transferring parts nested afterwards to the job

1. Select *File >Save*.
2. Select ← *Display all sheets*.
   ToPs reports that the sheet contains parts which do not belong to the job.
3. To add the part to the job: select *Yes*.

ToPs displays the sheets of the nesting job in the sheet overview (depending on the display you chose when loading the nesting job, all sheets, all different sheets or a particular number of sheets from 1 to n).

4. If required, nest the job again (see Section 6.3, p. 4-71.)

Copy nesting job sheet

You can do the following:

- Increase the number of identical sheets within a nesting job.
- Modify copied sheets (see Section 4, p. 4-33 ff).

Prerequisite

- You have loaded (see p. 4-106) and nested the nesting job (see Section 6.3, p. 4-71); the "Job, Automatic" mask is displayed.
- The single sheet view is activated for the sheet you wish to copy (see p. 4-71).

1. Select *Sheet*.
2. Click in the "Quantity" input box.
   ToPs displays the "Number" mask.
3. Enter the desired number of copies and click on *OK*.
4. Select *Sheet copy*, *Generate*.
5. Select *← Display all sheets*.

ToPs automatically saves the modification and displays the nesting job including the copied sheets.

Adding new (empty) sheets to the nesting job

Prerequisite

- You have loaded (see p. 4-106) and nested the nesting job (see Section 6.3, p. 4-71); the "Job, Automatic" mask is displayed.
- The single sheet view is activated for one of the sheets of the nesting job (see p. 4-71).

1. Select *Sheet*.
2. Select *New sheet*, *Generate*.
3. Select *← Display all sheets*.

ToPs adds a new (empty) sheet to the end of those already present and saves the modification automatically.

Deleting nesting job sheets

Prerequisite

- You have loaded (see p. 4-106) and nested the nesting job in which you want to delete sheets (see Section 6.3, p. 4-71); the "Job, Automatic" mask is displayed.

Delete a single sheet?

➢ To delete a single sheet of a nesting job: (Select → *Single sheet*), click on sheet you wish to delete.

 ➢ Select *Sheet*.

 ➢ Select *Delete*, *Sheet*.

 ToPs deletes this one sheet.

 ➢ Select ← *Display all sheets*.

 or

Delete several or all sheets?

 ➢ To delete several or all sheets of a nesting job: select sheet overview (see p. 4-71).

 ➢ Select *Sheet*.

 ➢ Select *Delete*, *Sheet*.

 ➢ Click one after the other on sheet(s) you wish to delete, or box them in, or enter `all` (in command line) and press <RETURN>.

 ToPs deletes all sheets or those selected (as required).

ToPs saves the modification automatically.

TRUMPF

6.6 Displaying parts which lie on the sheets of a job

Prerequisite

- You have loaded a job (to load nesting job, see p. 4-106).

Note

You can display the parts contained in a nesting job in the single sheet view (see p. 4-71) as well as in the sheet overview (see p. 4-71).

1. Open top right list field in mask header using ▾.

   ToPs displays the mask "Selection of parts". Here ToPs displays all parts on the sheets: parts contained in the job and parts not contained in the job because they were nested afterwards manually (see p. 4-75). ToPs marks the latter with *.

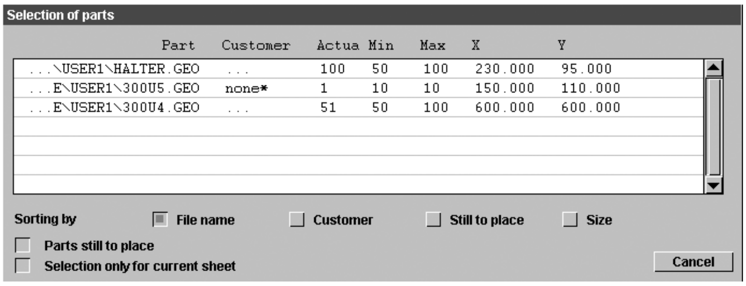


Fig. 29865EN

2. To activate the quick display for a part: right click on the part. Close the quick display with *OK*.
3. To sort the parts for selection: select the desired box:
   - "Still to place": difference between the number of parts which should be nested in the nesting job as a minimum, and the number of parts ToPs has actually nested so far.
   - "Size": surface area of the parts.
4. To display only the parts which ToPs has not yet nested in the nesting job: check "Parts still to place".

Only in the single sheet view

5. To display which parts ToPs has nested on the currently displayed sheet of the job and how often: check "Selection only for current sheet" (for single sheet view, see p. 4-71).

6.7 Deleting nesting jobs

When deleting nesting jobs, you have the following options:

- Deleting all nesting jobs contained in the database at the same time.
- Deleting individual nesting jobs one after the other.
- Deleting a group of nesting jobs by entering wildcards for the names.

1. Select *File >New... >Job...*.
   ToPs displays the mask "Job management" (see Fig. 19802, p. 4-46).
2. Select *Delete ...* in the top right corner of the mask.
   ToPs displays the "Delete job" mask:

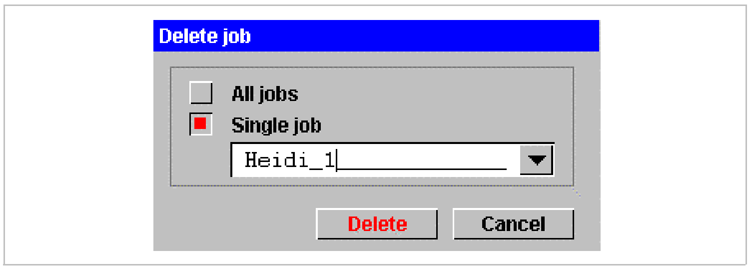


Fig. 29778EN

3. **Either**

Delete all nesting jobs at the same time?

➢ Select "All jobs".

or

Delete single nesting job?

➢ Select "Single job".

➢ (Enter job name) or open list field using ▼.

ToPs displays the mask "Selection of jobs":

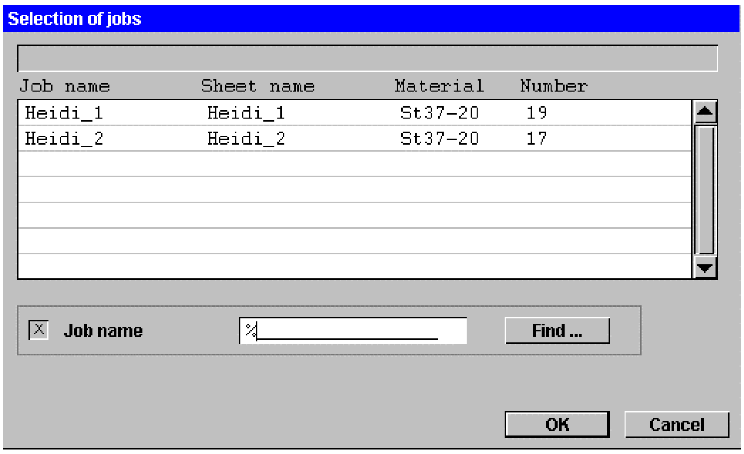


Fig. 29664EN

- ➢ To search for the nesting job you wish to delete: check "Job name".
- ➢ Enter name of desired job. (For entering name of desired job with the aid of wildcards, see p. 4-84.)
- ➢ Select *Find*.

ToPs filters the selection of nesting jobs according to your specifications.

- ➢ Mark the nesting job you wish to delete.
- ➢ Select *OK*.

ToPs displays the "Job, Automatic" mask again.

or

Delete a group of nesting jobs?

- ➢ Select "Single job".
- ➢ Enter the name of the group of nesting jobs you wish to delete in the input box using wildcards (to enter job names using wildcards, see p. 4-84).

4. Select *Delete*.

6.8 Copying nesting jobs

Here you can:

- Copy a complete nesting job and use it as the basis of a "new" nesting job.
- Modify and add to data in the "new" nesting job.

Note
When you copy a nesting job, only the database entries of the nesting job are copied; not, however, any sheets ('*.taf').

1. Select *File >New... >Job...*.

   ToPs displays the mask "Job management" (see Fig. 19802, p. 4-46).
2. Select *Copy*.

   ToPs displays the "Copy job" mask:

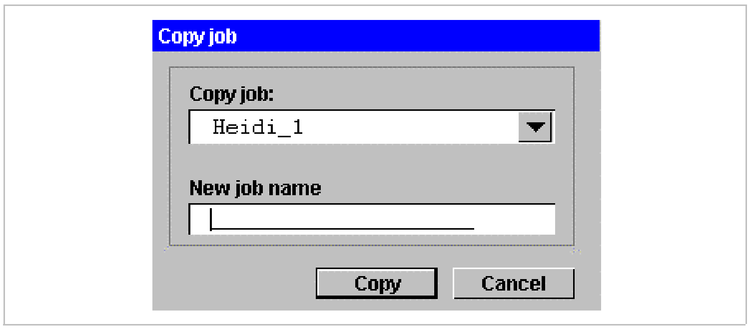


Fig. 29779EN

Under "Copy job", ToPs displays the last nesting job you loaded.

Copy a different nesting job?

3. Open the "Copy job" list field using ▼.

   ToPs displays the mask "Selection of jobs":

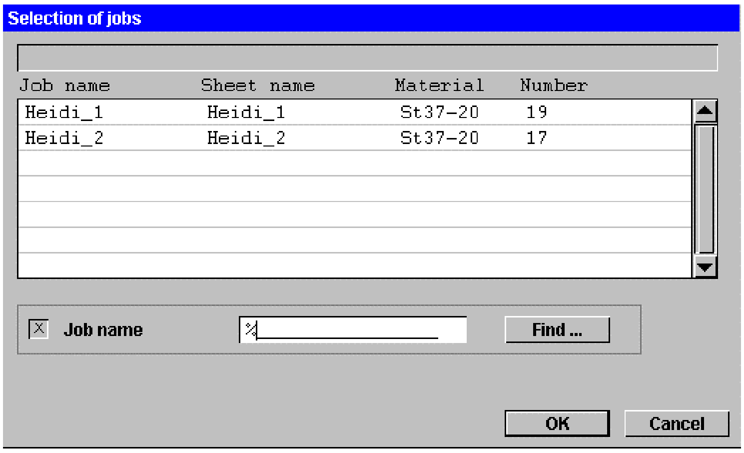


Fig. 29664EN

4. To search for the nesting job you wish to copy: check "Job name".
5. Enter name of desired job. (For entering name of desired job with the aid of wildcards, see p. 4-84.)
6. Select *Find*.

   ToPs filters the selection of nesting jobs according to your specifications.
7. Mark the nesting job you wish to copy.
8. Select *OK*.

   ToPs displays the "Copy job" mask again.
9. Enter new job name.
10. Select *Copy*.

ToPs copies the nesting job, saves it automatically in the database and displays the "Job management" mask.

11. **Either**

    - Modify data of the copied nesting job (e.g. enter further parts, delete sheets ...).

    or

    - Select *OK*.

    The copied nesting job corresponds to the original.

Finding nesting jobs, entering job names using wildcards

If you want to find a nesting job and you do not know its exact name, you can enter the name using wildcards.

Wildcards in a job name replace a set number of characters or a character string and reduce the range of nesting jobs offered by ToPs for selection.

Prerequisite

- One of the two "Selection of jobs" masks is displayed.

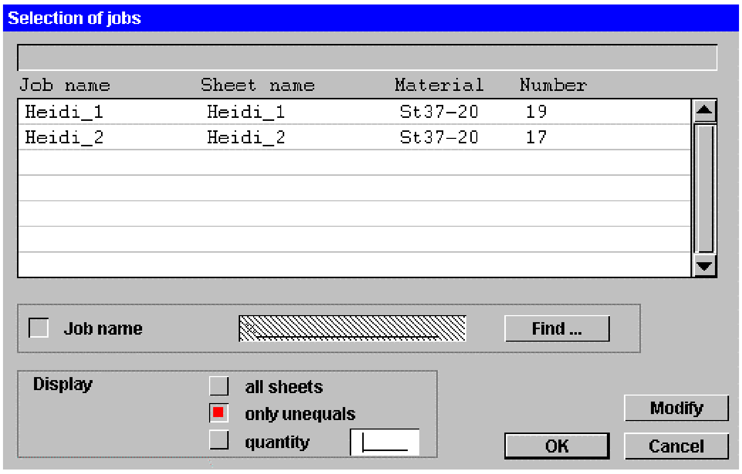


Fig. 29667EN

1. To search for the nesting job you wish to modify: check "Job name".
2. Enter name of desired job.

   or

   ➢ Enter the name of desired job with the aid of wildcards.

Possible wildcards

Wildcard	Function
?	Replaces any single character
%	Replaces any character string

Table 4-2

Combining wildcards

Wildcard	Example
?Job%	1Job_Customer1

Table 4-3

➢ Select *Find*.

ToPs filters the selection of nesting jobs according to your specifications.

6.9 Importing and exporting nesting jobs

Each nesting job you create in the Nesting module is automatically saved in the ToPs data base. The management (e.g. deleting) of the nesting jobs is therefore not possible using Explorer in Windows.

Exporting nesting jobs

To store job data in another directory or to save it in a storage medium, you must export the nesting job. In the process, ToPs creates a "job file" with the format '*.dat'.

Example: the nesting job "Gearwheel" becomes 'Gearwheel.dat'. You can manage this job file in Explorer.

The job file contains only the basic job data. It contains neither the processed or unprocessed geometries or mini nests ('*.geo', '*.gmt', '*.mtl') nor the sheets ('*.taf').

Exporting the job data is particularly useful for job data which you do not need on a daily basis and wish to archive.

Exported nesting jobs are retained in the ToPs database. If you do not want this to be the case, you must specifically delete them (see Section 6.7, p. 4-80).

Importing nesting job

You can import foreign jobs (e.g. from superordinate systems) and then, for example, modify them in ToPs.

Exporting nesting jobs as job files

Note
All nesting jobs are deleted in the database when ToPs is reinstalled. If you wish to reinstall ToPs: first export nesting jobs.

The nesting jobs are retained in the database during a ToPs update.

1. If the "Job management" mask is displayed (see Fig. 19802, p. 4-46): select *Export*.

   ToPs displays the "Select file" mask. It displays as standard all exported nesting jobs ('*.dat') located in the current directory.

   or

- Select *File >Job export ...*.

  ToPs displays the mask "Selection of jobs".

- If necessary, find nesting job you wish to export (see p. 4-84).

- Mark nesting job.

- Select *OK*.

  ToPs displays the "Select file" mask. It displays as standard all exported nesting jobs ('*.dat') located in the current directory.

2. If necessary change directories (see p. 4-103; to create new directory see p. 4-101).

   Note
   Do not change "File name"!

3. Select *OK*.

ToPs exports the nesting job.

Importing job file for a nesting job

If you wish to import a "foreign" nesting job (e.g. a nesting job which you have not exported on your computer), you need, in addition to the exported '*.dat' file, all geometries or mini nests ('*.geo', '*.gmt', '*.mtl') and (if relevant) all sheets ('*.taf') belonging to the nesting job as well.

Tip
With foreign nesting jobs, instead of the exported '*.dat' file, obtain all '*.geo', '*.gmt', '*.mtl' and '*.taf' files which have been created via *>Backup copy* (for creating a backup copy, see Section 6.10, p. 4-92).

1. If the "Job management" mask is displayed (see Fig. 19802, p. 4-46): select *Import*.

   or

   - Select *File >Job import ...*.

   ToPs displays the "Select file" mask. It displays as standard all exported nesting jobs ('*.dat') located in the current directory.

2. If necessary change to the directory in which you manage exported nesting jobs (see p. 4-103; to create new directory see p. 4-101).

3. Mark job file (= exported nesting job).
4. Select *OK*.

   If the nesting job is already contained in the database, ToPs displays the "Import job into data base" mask:

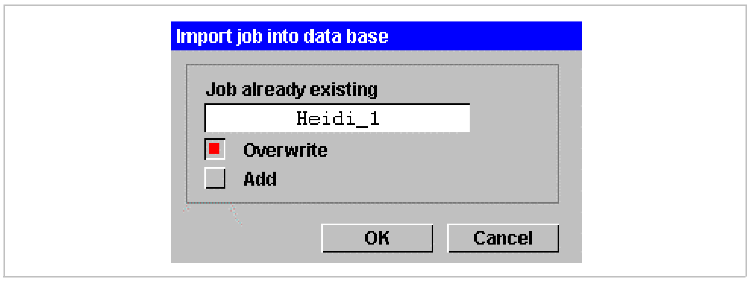


Fig. 29781EN

5. To overwrite the currently available nesting job: select "Overwrite".
6. To add the numbers of parts from the imported nesting job to the numbers of parts in the nesting job in the database: select "Add".
7. Select *OK*.

   ToPs checks the name of the computer to which the nesting job was exported and the directory.

   If the '*.dat' file was e.g. exported to a different computer, or the directory root (= lowest common directory) does not match up, ToPs displays the "Replace directory root found" mask:

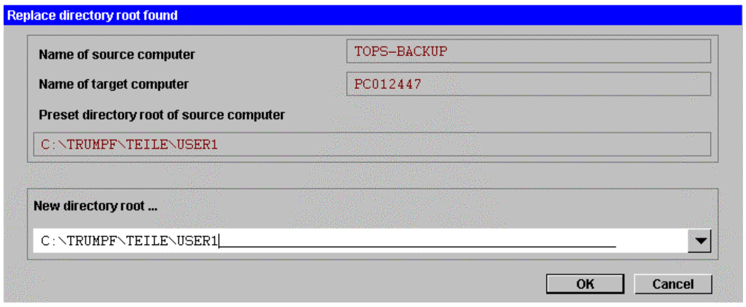


Fig. 29780EN

8. Open "New directory root ..." using ▼.

   ToPs displays the "Select directory" mask.

Change directory upwards?

9. Click on *"*"* until the file manager shows the desired directory (to create new directory see p. 4-101).

Change directory downwards?

10. Mark the directory which is one level deeper.

11. Repeat until the file manager displays the correct directory.

    Tip
    ToPs displays the current path under "Search in". If you open "Search in" using ▾, ToPs shows you the "Previous directories" which you had selected.

12. Double click on *OK*.

    If, in addition to '*.geo', '*.gmt', and '*.mtl' files, '*.taf' files are also located in the current directory, you can import these as well. ToPs displays a query to this effect.

13. Confirm the query as to whether the sheet files should be transferred with *Yes*.

ToPs writes the nesting job to the database and shows the different sheets in the sheet overview. ToPs represents the geometries with their circumscribing rectangles (each part type in a different color).

(For single sheet view, "browsing" through the single sheet view, returning to sheet overview ... see Section 6.3, p. 4-71).

Format description and structure of job file ('*.dat') in detail

File format

The job file which ToPs is to read in must be constructed in accordance with a defined scheme.

Job files created with previous versions of ToPs can still be read in.

The job file is divided into the following blocks.

Block	Designation	Description
Block 1	#~11	General information
Block 2	#~25	Job data
Block 3	#~40	Sheet data and remainder sheet data
Block 4	#~35	Part identification

Table 4-4

- Start of block: #~*n* (n = block designation).
- End of block: #~END.
- End of file: #~EOF.
- The job file must always begin with #~11 (Block 1).
- No empty lines are permitted within individual blocks.

Example

#~11	**Start of block 1**
PCNN	Computer name
C:\TRUMPF	Root directory
2.1	Version no. of the DAT file (ToPs100 V5.00 and after)
11-2000-3	Storage item ID (ToPs100 V5.00 and after)
TCL3030	Machine name (Version no. 2.1 and after)
1	Machine type (Version no. 2.1 and after)
Sin 840D	Control system (Version no. 2.1 and after)
1	Control system type (Version no. 2.1 and after)
#~END	**End of block 1**
#~25	**Start of block 2**
part1	Job name
part1	Sheet name
St37-20	Material ID number
2000.000000	Sheet length
1000.000000	Sheet width
10.000000	Web in X
10.000000	Web in Y
20.000000	Top margin
20.000000	Bottom margin
20.000000	Left margin
20.000000	Right margin
1	Internal surfaces (1/0=Y/N)
1	External surfaces (0=No, 1=part, 2=sheet)

1	Start corner (1=LB, 2=LT, 3=RB, 4=RT)
5.000000	CSC distance X
5.000000	CSC distance Y
1	CSC number, parts in block in X
1	CSC number, parts in block in Y
1	Lay out remainder sheets (1/0=Y/N)
0	CSC layout (1/0=Y/N)
2	Resolution (1=small, 2=medium 3=large)
1	Sorting criterion (1=surface area 2=perimeter)
1	Fill last sheet (1/0=Y/N)
1	Start part (1=surface area, 2=X, 3=Y, 4=X/Y)
2.000000	Sheet thickness
	Sheet geometry name
	Sheet path name
3	Direction of grain (1=X, 2=Y, 3=unknown)
1	Positioning direction (1=X, 2=Y)
1	MasterPlate (1/0=Y/N)
0	Exact distance (1/0=Y/N)
1	Sheet is not rectangular (1/0=Y/N)
2	Number of MasterPlate (1=one, 2=several)
52	Clean last sheet (52/2=Y/N)
65.000000	Min. % laying out, MasterPlate
5.000000	Min. % improvement mini-nests
70.000000	Max. % limit recalculation last sheet
0.000000	Min. element length for common cuts
0.000000	Min. distances for securing corners with CSC
PCNN	Computer name for sheets
#~END	**End of block 2**
#~40	**Start of block 3**
St37-20	Remainder sheets material
2	Sheet thickness (Z)
500	Sheet length (X)
500	Sheet width (Y)
taf1.geo	Sheet name
C:\TRUMPF...USER_JO2	Sheet path
2	Number of remainder sheets
2	Remaining number of remainder sheets
3	Direction of grain (1=X, 2=Y, 3=unknown)
1	Positioning direction (1=X, 2=Y)
5	Priority of sheet
rest1	Name of remainder sheet
1	Sheet is not rectangular (1/0=Y/N)
1	Start corner (1=LB, 2=LT, 3=RB, 4=RT)
Part 1	Job name of remainder sheet
20.000000	Top margin
20.000000	Bottom margin
20.000000	Left margin
20.000000	Right margin
PCNN	Computer name for sheets
|~	
:	
:	
|~	

#~END	**End of block 3**
#~35	**Start of block 4**
C:\TRUMP...USER_JO2\GEO_	File name with path specification
MTL\SZ600PLA.GEO	
30	Minimum quantity
100	Maximum quantity
1	Rotate (1/0=Y/N)
4	Mini nest (0=No, 1=Horizontal, 2=Vertical,
	3=Auto, 4=MTL)
0	CSC suitable (1/0=Y/N)
C:\TRUMPF\TEILE\USER_JO2\	Sheet path name
GEO_MTL\SZ600PLA.GEO	
5	Priority
90.000000	Angle of rotation increment
3	Direction of grain (1=X, 2=Y, 3=unknown)
2	Positioning method (1=FirstFit, 2=center of gravity)
0	Part in mini nest (1/0=Y/N)
MiniNest	Name of mini nest
0	Place part in coil
1	Number of rows in coil
1	Number of columns in coil
PCNN	Computer name for parts
none	Customer of the part (not an empty line!!)
AGA no.	Machining cycle designation (ToPs100 V5.00 and after)
|~	
#~END	**End of block 4**
#~EOF	**End of file**

Table 4-5

6.10 Creating backup copy

In ToPs, you can create backup copies of nested sheets and of entire nesting jobs. You can save backup copies and exchange them for others. They contain all required data.

The backup copy of a nested sheet is comprised of the following files:

- '*.taf'.
- '*.geo'.
- '*.gmt'.
- '*.mtl'.

The backup copy of an entire nesting job is comprised of the following files:

- '*.dat'.
- '*.taf'.
- '*.geo'.
- '*.gmt'.
- '*.mtl'.
- '*.erg' (if present).

Backup copies of nesting jobs can - in contrast to exported nesting jobs - be managed using Explorer in Windows (e.g. copying or saving to a different storage medium).

You can store backup copies on your computer's hard drive or directly onto other storage media (e.g. floppy disk). In this way you can save sheet or job data located in various directories in one directory.

Creating backup copies of nested sheets

Prerequisite

- You have saved the sheets you wish to make backup copies of (to save sheets, see Section 8, p. 4-101 ff).

1. Select *File >Backup copy ... >Sheet...*.

   ToPs displays the "Save sheet file including Geo/Mtl/Gmt files" mask.

2. Enter name of sheet.

   or

   ➢ Open "Sheet file" using ▼.

   ToPs displays the "Select file" mask. It displays as standard all nested sheets ('*.taf') located in the current directory.

   ➢ If necessary change directory (see p. 4-103; to create a new directory, see p. 4-101).

   ➢ Check "Look-ahead (Preview)" if needed.

   ➢ Mark the sheet you want to make a backup copy of.

   ➢ Select *OK*.

3. Open "Target directory" using ▼.

   ToPs displays the "Select directory" mask.

4. Select directory in which you want to store the backup copy of the sheet (see p. 4-103; to create new directory see p. 4-101).

   Note
   ToPs only saves backup copies of nested sheets in a different directory to the original directory of the sheet.

5. Select *OK*.

   ToPs displays the "Save sheet file including Geo/Mtl/Gmt files" mask again.

6. Select *OK*.

ToPs saves all necessary data for the sheet in the directory selected.

Creating backup copies of nesting jobs

The backup copy of a nesting job contains, in addition to the job file ('*.dat'), all processed or unprocessed geometries or mini nests ('*.geo', '*.gmt', '*.mtl') and all sheets ('*.taf') belonging to the nesting job as well.

1. Select *File >Backup copy ... >Job ...*.

   ToPs displays the "Save complete job" mask. Here ToPs offers the nesting job which you created last.

Back up a different nesting job?

2. (Enter job name) or open "Job" using ▾.
   ToPs displays the mask "Selection of jobs".
3. If necessary, find nesting job you wish to back up (see p. 4-84).
4. Mark the desired nesting job.
5. Select *OK*.
6. (Enter target directory) or open "Target directory" using ▾.
   ToPs displays the "Select directory" mask.
7. Select directory in which you want to store the backup copy of the nesting job (see p. 4-103; to create new directory see p. 4-101).
8. Select *OK*.
   ToPs displays the "Save complete job" mask again.
9. Select *OK*.
10. Confirm query with *Yes*.

ToPs saves all necessary data for the nesting job in the directory selected.

6.11 Allocating nesting job parts to customers

When you enter parts in a nesting job, you can allocate the parts to a customer (for allocating customer, see p. 4-48).

If you wish to produce the same part within a nesting job for more than one customer, you can enter the part in job management several times under different customer names (for "Job management" mask, see Fig. 19802, p. 4-46).

The default is for ToPs to ignore the customer allocation when automatically nesting a nesting job.

Why ignore customer allocation?

If parts are in fact identical and only differ from each other in their allocation to various customers, ToPs views them during automatic nesting as different parts and (unnecessarily) nests more "different sheets".

If ToPs ignores customer allocation, however, it nests more "identical sheets".

If you require customer allocation, you can deactivate the ignoring of customer allocation in the 'ToPs100.ini' file:

Activate customer allocation?

1. Open Explorer.
2. Go to the directory '...\Trumpf\ToPs100w'.
3. Double click on the 'ToPs100.ini' file.
4. If needed, select the program (editor), with which the 'ToPs100.ini' file should be opened (e.g. Notepad).
   The editor opens the 'Tops100.ini' file.
5. To activate customer allocation, set the following variable to `0`:

```
;;Gleiche Teile mit verschiedenen Kunden werden im Schachtler als gleiche Teile behandelt (1 = ja, 0 = verschiedene Teile)
(..)
ST_SchachtelAuftragKundenIgnorieren= 0
(..)
(Translation:)
(..)
;;Identical parts with different customers to be treated as identical parts in nester (1 = yes, 0 = different parts)
(..)
ST_SchachtelAuftragKundenIgnorieren= 0
```

6. To ignore customer allocation, set the following variable to `1`:

```
(..)
ST_SchachtelAuftragKundenIgnorieren= 1
(..)
```

Tip
Use the *>Find* menu in your editor to find the variable quickly.

7. Save the modifications in 'ToPs100.ini'.
8. Close 'ToPs100.ini'.
9. Restart ToPs 100 to make the modification effective.

7. Information for sheet layout and nesting jobs

7.1 Displaying and hiding geometries of single parts

Displaying geometries of single parts

In the sheet overview for nesting jobs, you can display the geometries of the single parts instead of the circumscribing rectangles of the nested single parts.

With a single sheet and in the single sheet view of a sheet from a nesting job, ToPs automatically displays the single parts (not just the circumscribing rectangles). You can also display the geometries of all identical single parts in colors.

Prerequisite

- You have loaded a single sheet or a nested job. (For loading files see Section 9, p. 4-103 ff.)

Displaying geometries in the sheet overview

1. Select sheet overview (see p. 4-71.)

   Note
   With a single sheet and in the single sheet view of a sheet from a nesting job, ToPs automatically displays the single parts.
2. Select *Job*, *Information*, *Single part*, *Display.*
3. Click on circumscribing rectangles of single parts one after another, box them in using the mouse, or select *All.*

   Note
   If you first click on a part and then select *All*, ToPs displays the geometries of **that** part and all its copies.

   If you do not click on a part but select *All* directly, ToPs displays the geometries of **all** parts on the sheet.

Show displayed single parts in color

1. With a nesting job: select single sheet view (see p. 4-71.)
2. Select *Sheet*, *Information*, *Single part*, *Display.*
3. Click on single part(s) or box them in using the mouse.

ToPs shows all identical single parts in color. (ToPs shows each group of identical single parts in a different color.)

Hiding geometries of single parts

When you hide the geometries of single parts on a sheet in a nesting job, ToPs only displays their circumscribing rectangles (with the circumscribing rectangles of all identical single parts in the same particular color).

Prerequisite

- You have loaded a nested job. (To load a nesting job, see p. 4-106.)

1. Select ← *Display all sheets*.
2. Select *Information*, *Single part*, *Hide.*
3. Click on single parts you wish to hide one after another, box them in using the mouse, or select *All.*

   Note
   If you first click on a part and then select *All*, ToPs hides the geometries of **that** part and all its copies.

   If you do not click on a part but select *All* directly, ToPs hides the geometries of **all** parts on the sheet.

7.2 Displaying file names of single parts and sheets

Prerequisite

- You have loaded a single sheet or a nested job. (For loading files see Section 9, p. 4-103 ff.)

1. Select *Job* or *Sheet*, *Information*, *Display*, *File name*.
2. Click on the sheet for which you want to display the path and file name.

   or

   ➢ Click on the single part for which you want to display the path and file name.

7.3 Displaying drawing names

Prerequisite

- You have loaded a single sheet or a nested job. (For loading files see Section 9, p. 4-103 ff.)
- With nesting jobs: the single sheet view is displayed (see p. 4-71).

1. Select *Job* or *Sheet*, *Information*, *Display*, *Drawing*.
2. Click on the part for which you want to display the drawing name.

7.4 Displaying waste for a sheet or waste total

ToPs counts all waste areas in the waste for a sheet: not merely the waste skeleton but also all waste parts separated.

Prerequisite

- You have loaded a single sheet or a nested job. (For loading files see Section 9, p. 4-103 ff.)

1. Select *Job* or *Sheet*, *Information*, *Display*, *Waste*.

   With a single sheet and in the single sheet view of a nesting job, ToPs displays the sheet waste immediately (for the single sheet view of a nesting job, see p. 4-71).

In the sheet overview of nesting job

2. To display the waste for a single sheet: click on the sheet.
3. To display the waste for the entire nesting job: enter `all` and press <RETURN>.

   or

   ➢ Select *All*.

7.5 Displaying nesting result and nesting protocol

Nesting result

The nesting result gives you the following:

- General information: job name, sheet designations, sheet path, material, sheet thickness, production date and sheet dimensions.
- Information on single parts: number, file name, customer job, rotation yes/no, surface area.
- Information on sheets: sheet size, number of sheets with identical part layout, sheet waste.
- Overall result: number of sheets produced in total, actual and maximum/minimum number of parts, part names and path, sheet dimension and number.

Nesting protocol

In the nesting protocol or logfile, ToPs states where relevant which individual parts could not be nested.

Prerequisite

- You have loaded a nested job. (For loading nesting job, see p. 4-106); the "Job, Automatic" mask is displayed.

1. To display and print the nesting result:
   Select *Information*, *Display*, *Result*.
2. To display and print the nesting protocol (logfile):
   Select *Information*, *Display*, *Logfile*.

8. Saving files

You can save the following files:

- Single sheets as '*.taf'.
- Mini nests as '*.mtl'.

ToPs stores the sheets of a nesting job in the file system automatically under the sheet path and the sheet name (see p. 4 57). They cannot be saved in the "traditional" sense. (To create backup copies of nesting jobs, see p. 4-92 ff.)

Create a new directory to save to?

The ToPs mask "Store file" does not currently allow for the creation of a new directory.

➢ Create the new directory in Explorer or in the file manager of your operating system.

8.1 Saving single sheets

ToPs stores the sheets of a nesting job in the file system automatically under the sheet path and the sheet name (see p. 4 57). They cannot be saved in the "traditional" sense. (To create backup copies of nesting jobs, see p. 4-92 ff.)

If you save a nesting job's sheet via *File >Store as ...* under a different name, ToPs automatically takes the sheet out of the nesting job.

Prerequisite

- You have created the sheet new (see Section 3.1, p. 4-19 ff) or have loaded an existing sheet (see Section 6.9, p. 4-85).

1. To save the sheet under its current name in the current directory: select *File >Store*.
2. To save the sheet under a different name and/or in a different directory: select *File >Store as*.

   ToPs displays the mask "Store file". It displays as standard all sheets ('*.taf') located in the current directory.

3. Enter new file name and/or change directory (to change directory, see p. 4-103; to create new directory, see p. 4-101).
4. Select *O*K.

8.2 Saving (modified) mini nests

When you create a new mini nest (see Section 2.1, p. 4-7 ff), ToPs saves the mini nest automatically under the name of the '*.geo' file in '*.mtl' format.

When you modify a mini nest (see Section 2.2, p. 4-9 ff), you must actively save the modifications.

1. Create and modify mini-nest.

   or

   ➢ Load and modify mini nest.
2. Select *File >Store*.

ToPs saves the modified mini nest under its present name.

9. Loading files

Changing directory in file manager

Prerequisite

- The "Load file" mask is displayed at the tab "File manager" (you arrive here automatically when loading a file).

Change directory upwards?

1. Click on *"*"* until the file manager shows the desired directory.

Change directory downwards?

2. Mark the directory which is one level deeper.
3. Repeat until the file manager displays the proper directory.

   Tip
   ToPs displays the current path under "Search in". If you open "Search in" using ▾, ToPs shows you the "Previous directories" from which you have already loaded a file at some point.

9.1 Loading mini nests

The "quick" way for mini nests you loaded last

Prerequisite

- You have already loaded a mini nest and want to load another.

1. Open the central list field in the mask header using ▾.

   ToPs displays the "Selection of mini nest (mtl)" mask. Here you find the mini nests you have loaded last.
2. Mark the desired mini nest.

The "normal" way

Prerequisite

- You have created mini nests in the *Nesting* module (see Section 2.1, p. 4-7).

1. Select *File >Load... >Mini nest....*
   ToPs displays the mask "Select file", "File manager" tab. It shows all mini nests ('*.mtl') located in the current directory.
2. If necessary change directories (see p. 4-103; to create new directory see p. 4-101).

Activate preview?

3. Check "Look-ahead (Preview)".
   The preview function in ToPs becomes continuously active.

   or

   ➢ Deselect "Look-ahead (Preview)".
   The preview function is no longer active.

   ➢ Using the right mouse button, click on the file name.
4. Mark the desired mini nest.
   ToPs enters the name of the file into "File name".

   or

   ➢ Enter the name of the required mini nest under "File name" (to enter file names with the aid of wildcards see p. 4-84).

   Note
   If you enter the file name, ToPs does not update the preview of the mini nest.
5. Select *OK*.

ToPs loads the mini nest and automatically displays the *Mini nest* menu.

9.2 Loading sheets

Prerequisite

- You have nested single sheets or a complete nesting job in the *Nesting* module.

1. Select *File >Load ... >Sheet...*.

   ToPs displays the mask "Select file", "File manager" tab. It displays as standard all nested sheets ('*.taf') located in the current directory.

2. If necessary change directories (see p. 4-103; to create new directory see p. 4-101).

Activate preview?

3. Check "Look-ahead (Preview)".

   The preview function in ToPs becomes continuously active.

   or

   ➢ Deselect "Look-ahead (Preview)".

   The preview function is no longer active.

   ➢ Using the right mouse button, click on the file name.

4. Mark the desired sheet.

   ToPs enters the name of the file into "File name".

   or

   ➢ Enter the name of the required sheet under "File name" (to enter file names with the aid of wildcards see p. 4-84).

   Note
   If you enter the file name, ToPs does not update the preview of the sheet.

5. Select *OK*.

9.3 Loading nesting jobs

1. Select *File >Load ... >Job....*

   or

   ➢ (The quicker way): click in the list field under *File* or open the list field using ▼.

   Note
   The shorter way does not work if you previously loaded a mini nest.

   ToPs displays the mask "Selection of jobs":

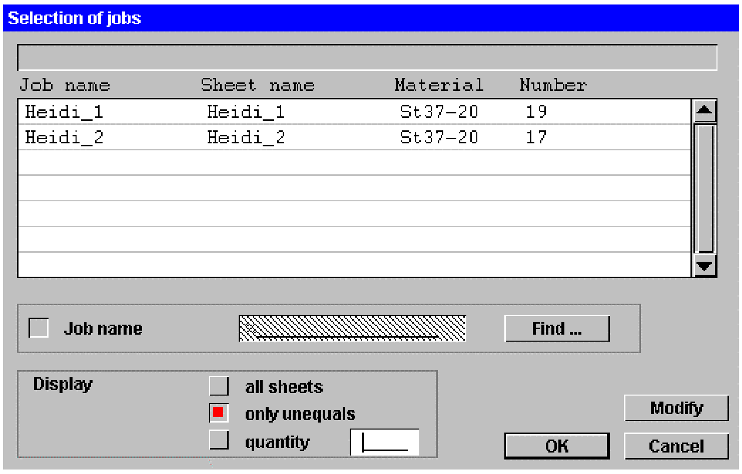


Fig. 29667EN

2. To search for the nesting job you wish to modify: check "Job name".

3. Enter name of desired job. (For entering name of desired job with the aid of wildcards, see p. 4-84.)

4. Select *Find*.

   ToPs filters the selection of nesting jobs according to your specifications.

5. Mark the nesting job you wish to modify.

Selecting sheet display for job

6. To display all sheets regardless of whether different or identical: select "all sheets".

   or

   ➢ To only display non-identical sheets of the job:
   Select "only unequals".

   or

   ➢ To display only a specific number of sheets: select "Quantity" and enter desired number of sheets (e.g. total `17`, desired quantity `9`. ToPs displays sheets 1-9).

7. Select *OK*.

10. Using auxiliary tools

The *Nesting* module contains the same auxiliary tools that you are already familiar with from the *Drawing* module:

- Drawing construction lines and construction circles.
- Measuring coordinates, lengths, radiuses, diameters, and angles.

Prerequisite

- You have created or loaded a mini nest or a sheet.
- With nesting jobs: the single sheet view is displayed (see p. 4-71).

1. Select *Sheet*, *Drawing tools*.
   ToPs displays the mask with all auxiliary tools.

Using auxiliary tools

2. See chapter 3, Drawing module.

11. Printing

(See chapter 3, Drawing module.)

12. Sending NC program to the machine

(See Chapter 5, Technology module.)

Chapter 5

Technology module

1. The Technology module

The *Technology* module is the core of the programming system. In this module you can:

- Define the laser and water jet machining plans.
- Modify and optimize machining plans.
- Generate the NC program.
- Create production plans and send them direct to the machine.

ToPs automatically creates a setup plan for every NC program. This contains all the information needed for execution.

1.1 Opening and closing the Technology module

Opening Technology module

1. Start ToPs 100 (see Chapter 2).
   The initial screen will appear.

2. Select *Technology*.
3. Select machine (see Section 2.2, p. 5-10).

Closing Technology module

- ➢ Select *File >Return*.

  or

  - ➢ Using the right mouse button, click on *File*.

ToPs 100 returns to the initial screen.

1.2 Explanation of colors and symbols

In the default setting, the following colors and symbols in the *Technology* module have the following meanings:

Color	Symbol, line type	Meaning
Red	Line type: dashed	Pallet workpiece supports (can be switched on and off via "Processing," "View," "Slats")
Cyan	Point	Point marking
Yellow	Line type: solid	Marking
White	Line type: solid	Sheet, geometry
Cyan	Line type: solid	'*.gmt', highlighted
Green	Line type: solid	Laser processing
Cyan	Line type: solid	Positioning paths between the parts (except with SprintLas)
Cyan	Line type: dashed	Positioning paths between parts: with SprintLas
Blue	Line type: solid	Positioning paths between the contours (except with SprintLas)
Blue	Line type: dashed	Positioning paths between contours: SprintLas
Red	Line type: solid	Approach flag for laser machining: normal approaching
Magenta	Line type: solid	Approach flag for laser machining: reduced approaching
Green	Line type: solid	Approach flag for laser machining: precut
Red	Asterisk	Piercing point: normal piercing (laser) / point (water jet)
Red	Asterisk with slash	Piercing point: point (water jet)
Red	Asterisk with circle	Piercing point: point (water jet)
Red	Cross with circle	Piercing point: drilling (water jet)
Magenta	Asterisk	Piercing point: soft piercing (laser)
Yellow	Circle	Collision point with processing definition
Red	Circle	Radius of spatter circle for piercing
Red	Line type: solid	Geometry and machining of the first part in the positioning sequence
Blue	Line type: solid	Common cuts using CSC preparation
Magenta	Line type: solid	Contour part (no common cuts)
Green	Line type: solid	For common cut: preparatory cut
Yellow	Line type: solid	For common cut: overlapping cut
Red	Line type: solid	For common cut : "scrap area," connected area which will be cut out
Green	Line type: solid	Precut in thick plate
Yellow	Asterisk	Cooling at corners

Table 5-1

2. Selecting and changing machines

When you install ToPs 100, all data about the machines that ToPs 100 supports is entered in the database included in delivery. If there are different control systems for the same machine, a separate machine is defined for each control system.

2.1 Machines supported by ToPs 100

Machine	Designation in ToPs	Machine group	Control system (machine software)	Components
TC L 2503	L2503	L2503, TC1	Bosch	Pallet changer
TC L 2503 E	L2503E	TC3	Bosch	Pallet changer
TC L 2530	L2530	TC8	SINUMERIK 840D	Pallet changer
TC L 3003	L3003	L3003	Bosch	Pallet changer
TC L 3003 E	L3003E	TC1	Bosch	Pallet changer
TC L 3030	L3030	TC3	Bosch	Pallet changer
TC L 3030	L3030S	TC8	SINUMERIK 840D	Pallet changer, LiftMaster
TC L 3050	L3050	TC16	SINUMERIK 840D	Pallet changer, LiftMaster
TC L 4003	L4003	L4003	Bosch	Pallet changer
TC L 4003 E	L4003E	TC1	Bosch	Pallet changer
TC L 4030	L4030	TC3	Bosch	Pallet changer
TC L 4030	L4030S	TC8	SINUMERIK 840D	Pallet changer, LiftMaster
TC L 5005	L5005	L3003, TC1	TASC 500	Pallet changer
TC L 6030	L6030	TC3	Bosch	Pallet changer
TC L 6030	L6030S	TC8	SINUMERIK 840D	Pallet changer
TC LY 2500	LY2500	TC5	Bosch	Pallet changer
TLC 105	TLC105	L3003, TC1	TASC 500	-
TLC 105 (DIAS distance control system)	TL105D	L3003, TC1	TASC 500	-
TLC 1005	TLC1005	TC9	SINUMERIK 840D	-
TLC 6005	TLC6005	TC13	SINUMERIK 840D	Pallet changer
TC HSL 2502 (two cutting heads)	HSL2502	TC10	SINUMERIK 840D	Pallet changer

Machine	Designation in ToPs	Machine group	Control system (machine software)	Components
TC HSL 2502 C (two cutting heads)	HSL2502C	TC12	SINUMERIK 840D	Pallet changer
TC HSL 4002 C (two cutting heads)	HSL4002C	TC12	SINUMERIK 840D	Pallet changer
TC WS 2500	WS2500	TCWS1	Bosch	-
TC WS 2502 (two cutting heads)	-[1])	TCWS1	Bosch	-
TC WS 4000	WS4000	TCWS1	Bosch	-
TC WS 4020 (two cutting heads)	WS4020	TCWS1	Bosch	-

Table 5-2

2.2 Selecting machine

When you open the *Technology* module for the first time after installing ToPs, the "Machine selection" mask appears. It includes all the machines you selected when installing ToPs 100:

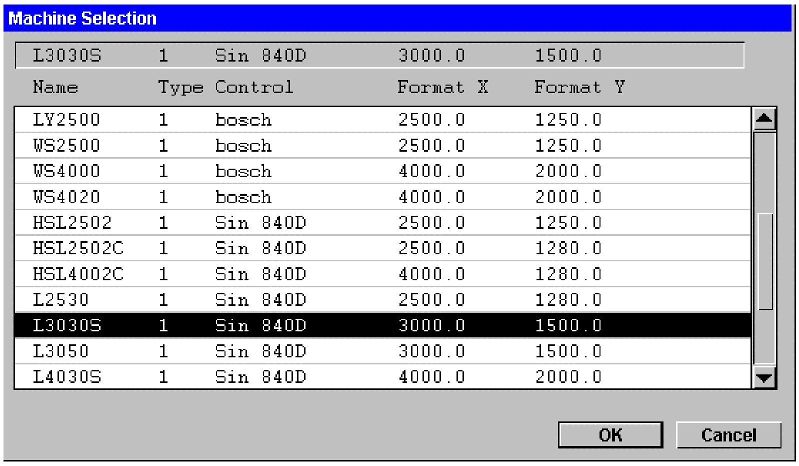


Fig. 25790EN

1. Mark the desired machine.
2. Select *OK*.

ToPs opens the *Technology* module for the selected machine.

Machine selection is self-holding. When you go from one module into another, you only have to confirm your choice of machine.

[1] The second cutting head can be activated in ToPs 100 under the TC WS 2500

2.3 Changing machines

Changing machines within the Technology module

1. Open the list field which displays the active machine with ▾.
   ToPs displays the "Machine selection" mask.
2. Mark the desired machine.
3. Select *OK*.

Changing machines after processing

Application Processing a processed sheet or processed single part with another machine.

Note
When you want to process a processed sheet with another machine, you must select new technology data and then process the sheet using the new data. (The processing plan for the sheet or single part remains intact during the change of technology tables.)

Manual changes in processing are lost when processing with the new technology data.

1. Load processed sheet or processed single part which you want to process with another machine (for Loading files, see Section 3, p. 5-13 ff).
2. Open the list field which displays the active machine with ▾.
   ToPs displays the "Machine selection" mask.
3. Mark the new machine.
4. Select *OK*.
   ToPs automatically displays the "Selection of Technology Tables" mask (see Fig. 29046, p. 5-34).
   In the mask ToPs offers technology tables for the new machine.
5. Select technology table and process rule (see Section 5.1, p. 5-33 ff).
   When changing between machines with Bosch and Siemens control systems ToPs automatically shows the following mask:

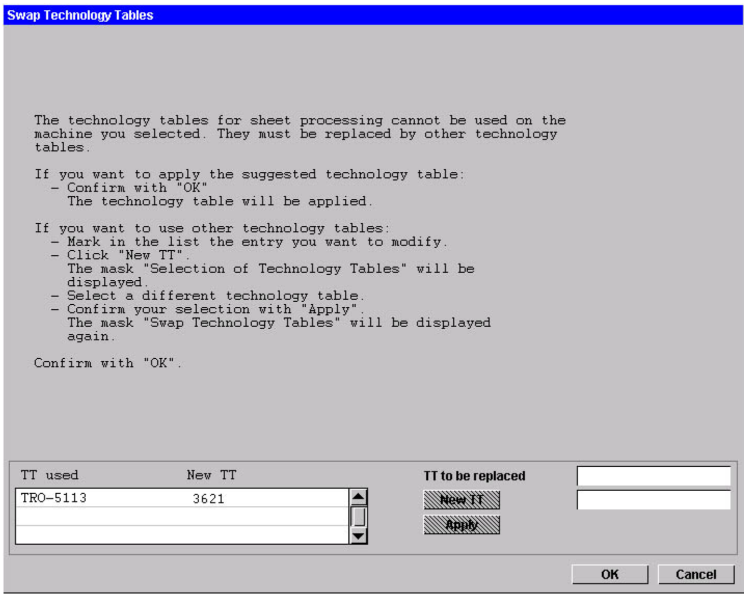


Fig. 27695EN

6. Select *OK*.

   ToPs imports the new technology table.

7. Process sheet or single part with the new data (see Section 5.3, p. 5-41 ff).

3. Loading files

Searching for files, entering names using wildcards

Wildcards are dummies in a file name which replace a specific number of characters or character string.

Why use wildcards?

- They reduce the number of files displayed in a field.
- You can look for a file for which you don't know the exact name.

Wildcard options

?	Replaces any single character
*	Replaces any character string

Examples

test?.geo	replaces, e.g.	test1.geo
		test2.geo
		testa.geo
*.geo	replaces, e.g.	test1.geo
		test2.geo
		testa.geo

Combining wildcards - Example

*test?.geo	replaces, e.g.	1test1.geo
		p1testx.geo

Prerequisite

- The "Load file" mask is displayed at the tab "File manager".

1. Enter the file name using wildcards under "File name".
2. Select *OK*.

   or

   ➢ Press <RETURN>.

   Within the file manager, ToPs displays all files which meet the criteria of the wildcards.
3. Mark the desired file.

Changing directory in file manager

Prerequisite

- The "Load file" mask is displayed at the tab "File manager" (you arrive here automatically when loading a file).

Change directory upwards?

1. Click on "*" until the file manager shows the desired directory.

Change directory downwards?

2. Mark the directory which is one level deeper.
3. Repeat until the file manager displays the proper directory.

   Tip
   ToPs displays the current path under "Search in". If you open "Search in" using ▾, ToPs shows you the "Previous directories" from which you have already loaded a file at some point.

3.1 Loading drawings, mini nests and sheets and processing them at the same time

Application

Drawings, mini nests, and laid-out sheets are loaded and processed during loading.

Advantages

- You load and process "in one go". You do not have to actively "trigger" the processing.
- You save time if you are always working with the same materials – and with them the same technology data.
- If you have not yet selected a technology table, you will be automatically led through the selection process.

Prerequisite

- You have generated and saved the respective files in the *Drawing* module.

1. Select *File >Load & process ...*
   ToPs displays the "Load file" mask at the tab "File manager".
2. Select the desired file format (single part: '*.geo', mini nest: '*.mtl', sheet: '*.taf').
   The file manager displays all files of the selected format which are located in the current directory.
3. If necessary, change directory (see p. 5-14).

Activate Look-ahead (Preview)?

4. Check "Look-ahead (Preview)".
5. Mark the desired file.
   ToPs enters the name of the file under "File name".

   or

   - Enter the name of the file you want to find under "File name" (to search for file names with the help of wildcards, see p. 5-13).
6. Select *OK*.

No technology data is active?

ToPs automatically displays the "Selection of Technology Tables" mask. (For Selecting technology table and process rule see Section 5.1, p. 5-33 ff.)

ToPs loads the file and processes it with the active or selected technology data.

3.2 Loading processed or unprocessed drawings, mini nests and sheets

You can load the following files:

- Unprocessed single parts ('*.geo'), mini nests ('*.mtl') or laid-out sheets ('*.taf').
- Processed single parts ('*.gmt') or sheets ('*.tmt').

Prerequisite

- You have created and saved appropriate files in the *Drawing/Nesting* module or in the *Technology* module.

Note
If you load a processed sheet or processed single part which was not processed with the currently active machine, ToPs automatically changes the machine.

1. Select *File >Load ... >Sheet/single part*.
   ToPs displays the "Load file" mask at the tab "File manager".
2. Select the desired file format.
   The file manager displays all files of the selected format which are located in the current directory.
3. If necessary, change directory (see p. 5-14).

Activate Look-ahead (Preview)?

4. Check "Look-ahead (Preview)".
5. Mark the desired file.
   ToPs enters the name of the file under "File name".

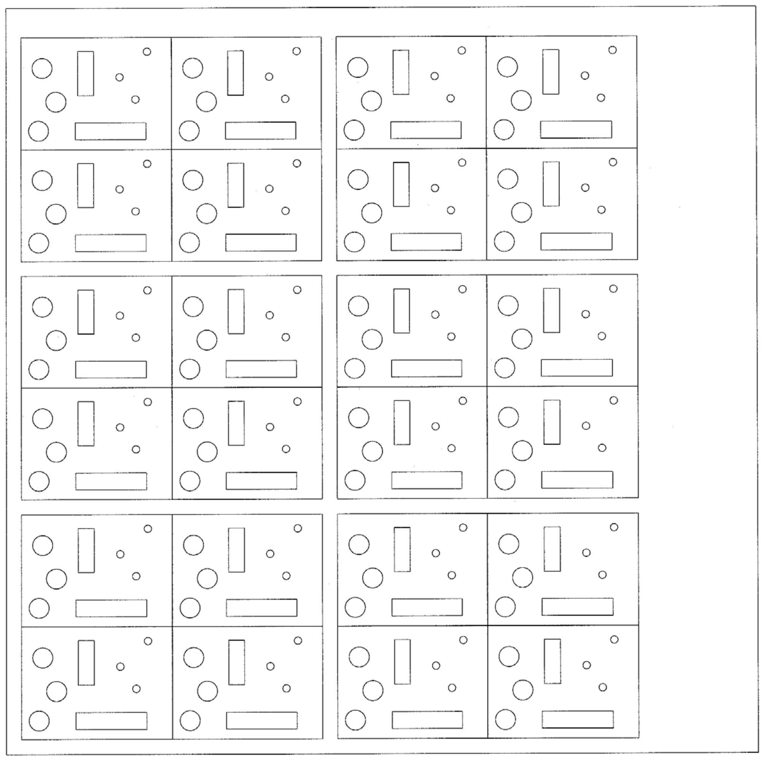
   or

   ➢ Enter the name of the file you want to find under "File name" (to search for file names with the help of wildcards, see p. 5-13).
6. Select *OK*.

ToPs loads the file.

3.3 Loading CSC suitable sheet (common cuts) and CSC preparation

With common cuts, the contours of parts lying next to each other are cut at the same time. The parts are laid out in such a way that the distance between them corresponds to the kerf width. No waste grid is produced.



1 Single part 2 Sheet

Fig. 17142

What is CSC preparation?

- ToPs creates a common parting cut for all contours which are separated from each other by a distance corresponding to the kerf in the active technology table.
- In CSC preparation, the sequence of cuts is determined (common cut, preparatory cut in the next contour, overlapping cut, withdrawal ...).
- If the sheet also contains sheet parting cuts, the preparatory cuts will be integrated into the CSC preparation.

Prerequisite

- You have created CSC suitable sheets or CSC suitable mini nests in the *Nesting* module.
- The web widths in the X and Y directions match the kerf from the active technology table. (Ideally, the active technology table is the one which you selected in the *Nesting* module for CSC preparation. If necessary, modify the kerf in the technology table (see Chapter 6, Data module)).

Notes
The distance between the parts must correspond to the kerf in the technology table.

Always carry out CSC preparation **before** the processing of a sheet.

1. Select *File >Load ... >Sheet & CSC*.

   ToPs displays the "Load file" mask at the tab "File manager".
2. Select the desired file format.

   The file manager displays all files of the selected format which are located in the current directory.
3. If necessary, change directory (see p. 5-14).

Activate Look-ahead (Preview)?

4. Check "Look-ahead (Preview)".
5. Mark the desired file.

   ToPs enters the name of the file under "File name".

   or

   ➢ Enter the name of the file you want to find under "File name" (to search for file names with the help of wildcards, see p. 5-13).
6. Select *OK*.
7. If there is no technology data active: select technology table and process rule (see Section 5.1, p. 5-33 ff).

   ToPs displays the mask "Parameters for Common Slitting Cuts".

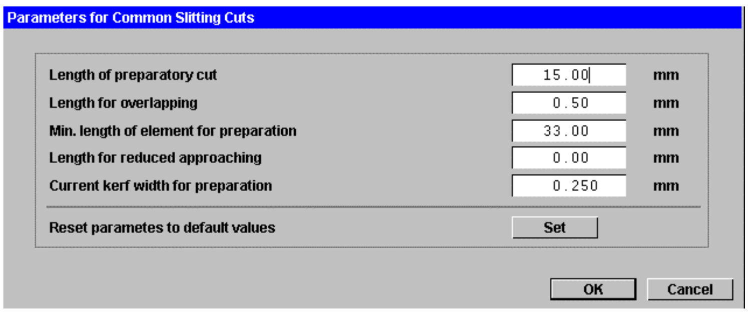


Fig. 21940EN

The parameters entered here are the default values recommended by TRUMPF from the active process rule. They can be temporarily modified here (for a description of the parameters, see following section).

Note
The changes will be lost as soon as you select a new process rule. Parameters can only be permanently changed in the process rule (see Chapter 6, Data module).

8. Modify parameters if necessary.
9. Supplement sheet parting cuts if necessary (see Section 7.1, p. 5-70 ff).

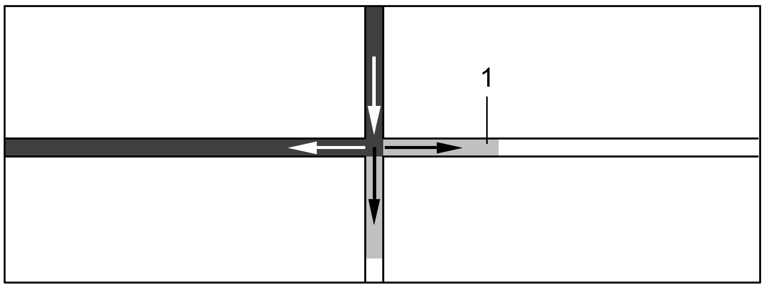
Starting CSC preparation

1. Select *OK*.
   ToPs prepares the sheet for common cuts.
2. Select *Processing >Create >Start*.

Parameters for common cuts

"Length of preparatory cut"

The preparatory cut goes over and beyond the parting cut to the neighboring contour:



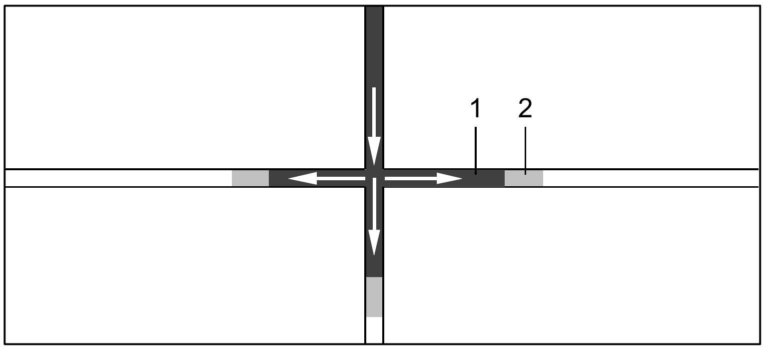
1. Preparatory cut

Fig. 29043

"Length for overlapping"

The length for overlapping extends the preparatory cut. It prevents the formation of slats when the preparatory cut and the actual cutting of the contour later "come together". The overlapping length is thus cut "twice".

The length for overlapping is dependent on the material.



1. Preparatory cut 2 Length for overlapping

Fig. 29044

Example:

Length of preparatory cut:	15 mm
Length for overlapping:	1 mm
Total length of the cut into the neighboring contour:	16 mm

Table 5-3

"Minimum length of element for preparation" This value ensures that a workpiece will not be already cut out by two preparatory cuts.

"Length for reduced approaching" The reduced approach is mainly used for stainless steel and aluminum. ToPs reads the value from the process rule.

"Current kerf width" ToPs merely displays the kerf in this mask. It cannot be modified here. (For modifying kerf see Data module.)

3.4 Loading single part as blank and processing immediately

With blank machining, you produce **one** singe part from one sheet.

The dimensions of the raw sheet correspond to the dimensions of the single part's circumscribing rectangle. The entire outer contour of the single part is not machined because the contour of the raw sheet corresponds in sections to the outer contour of the single part.

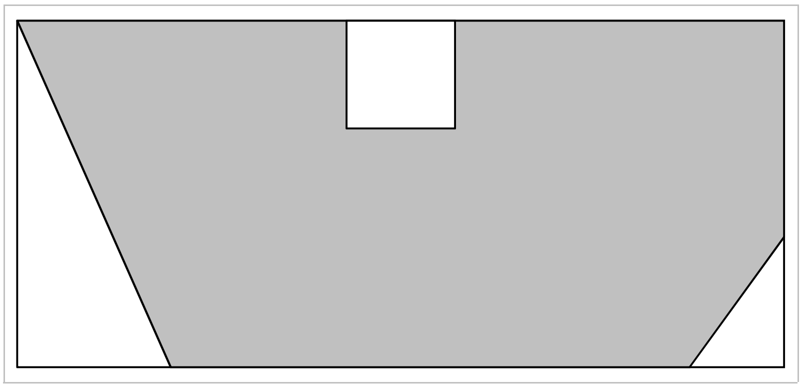


Fig. 29051

1. Select *File >Load ... >Single part as blank*.
   ToPs displays the "Load file" mask at the tab "File manager".
2. Select the desired file format ("*.geo", "*.mtl", "*.taf").
   The file manager displays all files of the selected format which are located in the current directory.
3. If necessary, change directory (see p. 5-14).

Activate Look-ahead (Preview)?

4. Check "Look-ahead (Preview)".
5. Mark the desired file.
   ToPs enters the name of the file under "File name".

   or

   ➢ Enter the name of the file you want to find under "File name" (to search for file names with the help of wildcards, see p. 5-13).
6. Select *OK*.
7. If there is no technology data active: select technology table and process rule (see Section 5.1, p. 5-33 ff).
   ToPs displays the mask "Parameters for blank processing":

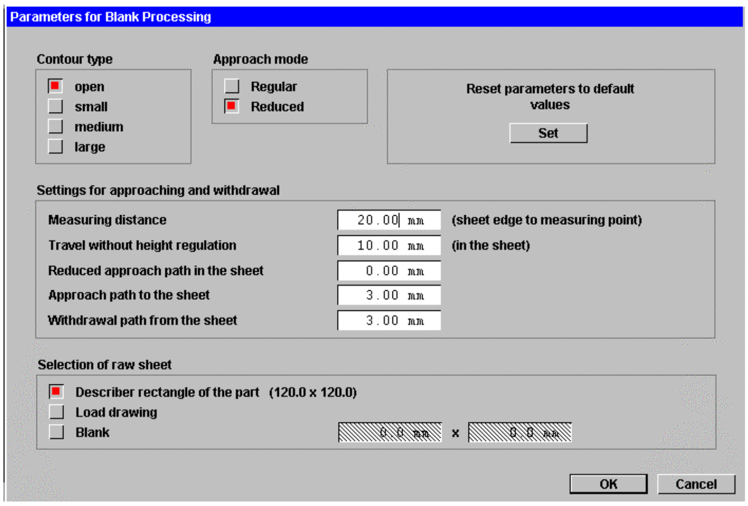


Fig. 21936EN

The parameters entered here are the default values recommended by TRUMPF from the active process rule. They can be changed temporarily here.

The changes will be lost as soon as you select a new process rule. (To permanently change parameters see Chapter 6, Data module.)

Defining parameters for blank processing

Selecting contour type

- Select "Open".

ToPs reads the contour type from the active process rule. Depending on the process rule, an "open contour" means a small, medium, or large contour.

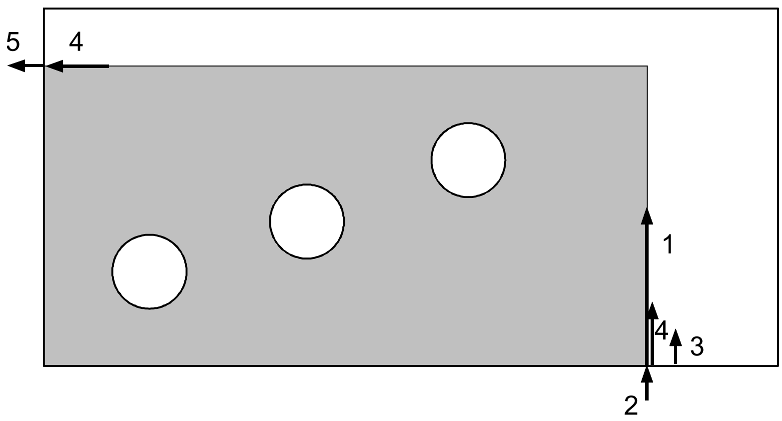
or

- Select contour type "Small", "Medium" or "Large".

ToPs assigns the contour type independent of the specification in the process rule.

Selecting approach mode

- Select "Normal" or "Reduced". (For an overview of piercing and approaching for various materials, refer to the current data collection for your machine).



1	Measuring distance	3	Path for reduced approach inside sheet
2	Path for approach to sheet		
2+4	Distance traveled without height regulation	4+5	Distance traveled without height regulation
		5	Path for withdrawal from sheet

Settings for approach and withdrawal Fig. 29678

Defining approach and withdrawal settings

1. Enter "Measuring distance" (1).
   At this distance (starting from the sheet edge), the distance control system measures the position of the sheet surface.
2. Enter "Travel without height regulation" (2+4 and 4+5): The distance control system must not be switched on when the beam moves into the sheet from outside it. (Risk of collision: the cutting head would move down to its lowest point and hit the sheet when it moves to cut into it.)
   The machine therefore switches the distance control system on only when the laser has covered the "Travel without height regulation" distance.
3. For approaching with reduced laser power, in the case of laser cutting machines ("Approach mode" "Reduced" is active):
   Enter "Path for reduced approach inside sheet" (3).
4. Enter "Path for approach to sheet" (2). (= Distance between the switch-on position of the beam (outside the sheet) and the sheet edge. The distance control system is switched off.)
5. Enter "Path for withdrawal from sheet" (5). (= Distance between the sheet edge and the switch-off position of the beam. The distance control system is switched off.)

Select raw sheet

1. If the precut sheet is exactly the size of the single part's circumscribing rectangle: select "Describer rectangle of the part".

2. To place the single part on a sheet blank: select "Load drawing".

   Note
   The sheet blank must be present as a drawing in '*.geo' format. (Later, ToPs automatically guides you up to the loading of this drawing; see below).

3. If at least one edge of single part corresponds to the outer edge of the raw sheet: select "Blank" and enter the dimensions of the sheet.

   ToPs places the sheet at the zero point of the part.

Reset parameters to values from the process rule?

➢ Select *Set*.

Confirm entries?

➢ Select *OK*.

To "Load drawing" as raw sheet

If you selected "Load drawing", ToPs displays the mask "Load file".

➢ Select sheet blank and *OK*.

ToPs loads the blank, processes it using the active technology data and automatically issues the technology log.

3.5 Loading and processing nesting job, creating NC program and production plan

When you load a nesting job, you can set the following actions. ToPs will then automatically take you to the required masks:

- CSC[1] preparation, nesting job.
- Automatically creating sheet parting cuts to cut off the waste skeleton.
- Generating processing plans.
- Creating NC program.
- Printing out setup plan automatically.
- Saving processed sheets as *.tmt files.
- Generating production plan directly from the job.

Prerequisite

- You have created nesting jobs and nested sheets in the *Nesting* module.

Note
You can only load unprocessed nesting jobs. When you save an unprocessed nesting job, it is always the individual sheets of the nesting job which are saved and never the processed nesting job as such.

➢ Select *File >Nesting job ... >Load job*.
ToPs displays the mask "Sheet job processing defaults":

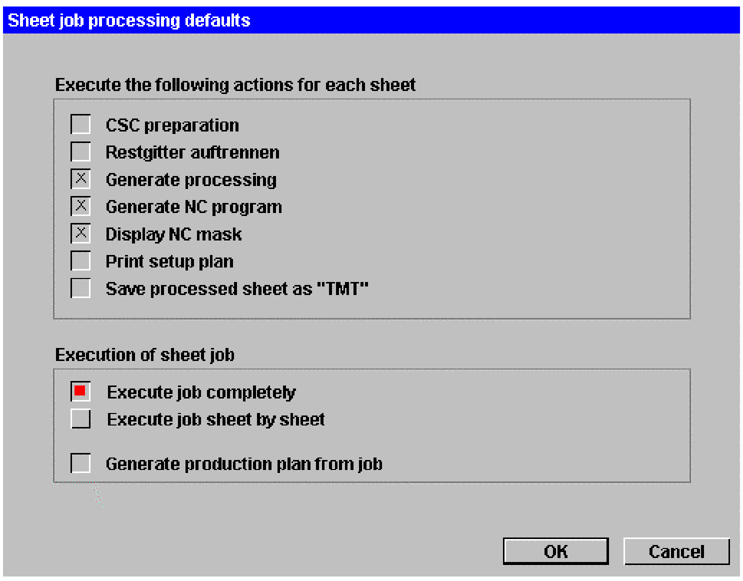


Fig. 29042EN

[1] CSC = Common (slitting) cuts

1. Mark the desired actions.
   Notes
   The actions are valid for each individual sheet of the nesting job.

Create processing plans, NC program, production plan?

   If you deselect "Generate processing" and "Generate NC program," you can only execute the nesting job sheet by sheet and cannot create a production plan.

   If you deselect "Display NC mask", ToPs only displays the NC mask for the first sheet of the job and creates the NC programs afterwards with the settings for the first sheet. If you check "Display NC mask", ToPs displays the NC mask for all sheets of the job in succession.

   If you wish to create the production plan in ToPs and your machine is linked to Cell Server or TC Cell: change *NcLinkLiteModus* variable in the Data module under *Rules >Customer machine* from `1` to `0` (see Chapter 6, Data module, Machine-dependent process rule).

   If data is missing in your production plans: change *NcLinkProduktionsPlanTyp* variable (see Chapter 6, Data module, Machine-dependent process rule).

2. To execute the complete nesting job:
   select "Execute job completely".

   or

   - To load the individual sheets of a nesting job one after the other and to process them one after the other: select "Execute job sheet by sheet".
3. To create a production plan in ToPs from the nesting job: check "Generate production plan from job".
4. Select *OK*.
   ToPs displays the mask "Selection of jobs". It contains all nesting jobs which you have created in the *Nesting* module.

Search for nesting job?

5. Check "Job name".
6. Enter desired job name. (For entering job names with the help of the wildcards when searching for nesting jobs, see Chapter 4).
7. Select *Find*.
   ToPs filters the selection of nesting jobs according to your specifications.
8. Mark the desired nesting job and select *OK*.
9. If there is no technology data active: select technology table and process rule (see Section 5.1, p. 5-33 ff).

Prepare CSC for nesting job?

If you selected "CSC preparation", ToPs displays the "Parameters for Common Slitting Cuts" mask.

10. If necessary, modify parameters for common cuts and select *OK*. (For explanation of the parameters see p. 5-19 ff.)

Cut off waste grid?

If you selected "Separate waste grid", ToPs displays the mask "Parameters for separation of waste grid."

11. If necessary, modify parameters and select *OK*. (For explanation of the parameters see p. 5-28 ff.)

    Note
    If you carry out the sheet parting cuts for cutting off the waste grid **before** the processing of the sheet, you cannot combine them with common cuts (CSC).

The nesting job is to be processed completely?

If you selected "Execute job completely", ToPs executes the entire nesting job, creates the NC program and ends by showing the last sheet of the nesting job.

If you also selected "Generate production plan", ToPs creates the production plan and opens it using Microsoft Internet Explorer.

The nesting job is to be processed sheet by sheet?

If you selected "Execute job sheet by sheet", ToPs loads the first sheet of the nesting job.

1. If you deselected "Generate processing":
   process the sheet via *Processing >Create >Start*.
2. If you deselected "Generate NC program": select *NC-program >Create >Start*, enter parameters for the NC program and select *OK* (see also Section 18, p. 5-128).
3. Select *Next sheet*.

   or

   - Select *File >Nesting job ... >Next sheet*.
4. Repeat steps 1 to 3 until all sheets have been processed.

Parameters for separation of waste grid

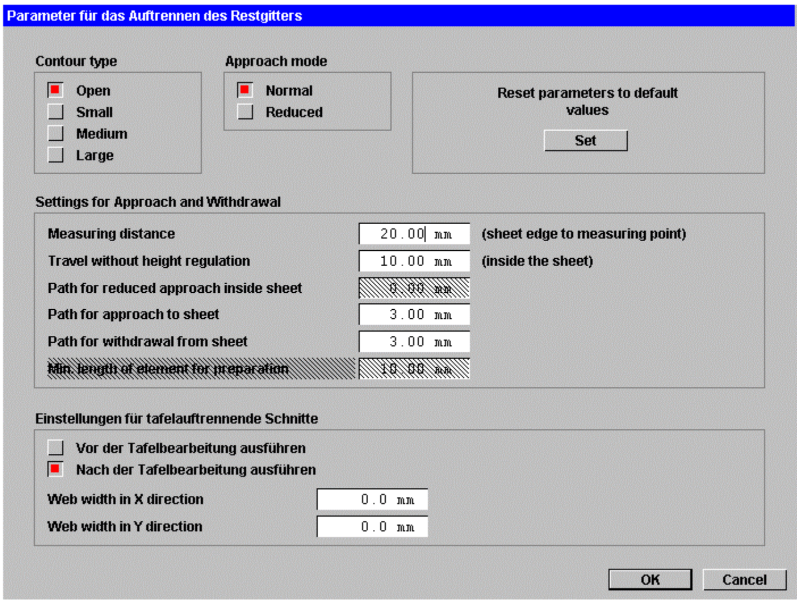


Fig. 29670EN

The parameters entered in the mask are the default values recommended by TRUMPF from the current process rules. They can be changed temporarily here.

The changes will be lost as soon as you select a new process rule. (To permanently change parameters see Chapter 6, Data module.)

Defining parameters for separation of the waste grid

Selecting contour type

➢ Select "Open".

ToPs reads the contour type from the active process rule. Depending on the process rule, an "open contour" means a small, medium, or large contour.

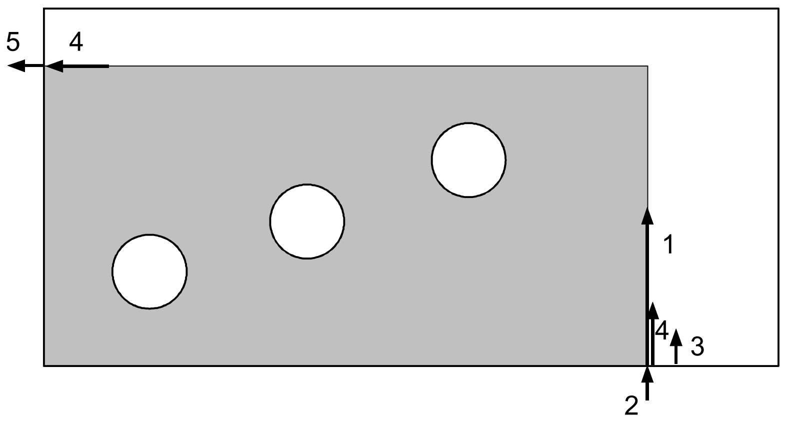
or

➢ Select contour type "Small", "Medium" or "Large".

ToPs assigns the contour type independent of the specification in the process rule.

Selecting approach mode

➢ Select "Normal" or "Reduced". (For an overview of piercing and approaching for various materials, refer to the current data collection for your machine.)



1	Measuring distance	3	Path for reduced approach inside sheet
2	Path for approach to sheet		
2+4	Distance traveled without height regulation	4+5	Distance traveled without height regulation
		5	Path for withdrawal from sheet

Settings for approach and withdrawal Fig. 29678

Defining approach and withdrawal settings

1. Enter "Measuring distance" (1).
   At this distance (starting from the sheet edge), the distance control system measures the position of the sheet surface.

2. Enter "Travel without height regulation" (2+4 and 4+5):
   The distance control system must not be switched on when the beam moves into the sheet from outside it. (Risk of collision: the cutting head would move down to its lowest point and hit the sheet when it moves to cut into it.)
   The machine therefore switches the distance control system on only when the laser has covered the "Travel without height regulation" distance.

3. For approaching with reduced laser power, in the case of laser cutting machines ("Approach mode" "Reduced" is active): Enter "Path for reduced approach inside sheet" (3).

4. Enter "Path for approach to sheet" (2). (= Distance between the switch-on position of the beam (outside the sheet) and the sheet edge. The distance control system is switched off.)

5. Enter "Path for withdrawal from sheet" (5). (= Distance between the sheet edge and the switch-off position of the beam. The distance control system is switched off.)

6. Select desired "Settings for sheet separating cuts" (before or after processing of the sheet?).

Note
If you carry out the sheet parting cuts for cutting off the waste grid **before** the processing of the sheet, you cannot combine them with common cuts (CSC).

7. Enter the web widths in X and Y.

Reset parameters to values from the process rule?
- Select *Set*.

Confirm entries?
- Select *OK*.

Creating production plan from nesting job "afterwards"

(See Section 20.1, p. 5-151.)

4. Saving files

ToPs standard directory

ToPs suggests as default '...\TRUMPF\TEILE\USER1' as the directory to save files to.

Self-defined directories

You can create your own directories using the file manager or the Explorer program in your Windows operating system and later select them in the ToPs file manager.

Create a new directory to save to?

The ToPs mask "Store file" does not allow for the creation of a new directory.

➢ Create the new directory in Explorer or in the file manager of your operating system.

4.1 Saving processed single parts

You can save one or more single parts as processed single parts ('*.gmt'). The parts can be loaded separately or can be laid out on a single sheet.

Prerequisite

- You have loaded and processed a single part or a laid-out sheet (to Load files, see Section 3, p. 5-13 ff; to generate processing, see Section 5, p. 5-33 ff).

1. Select *File >Save selection ...*

   ToPs displays the mask "Store file". In it, the file format is set as default to '*.gmt'. The file format cannot be changed.
2. If necessary, change directory (see p. 5-14).
3. If necessary, change "File name".
4. Select *OK*.

   If you loaded and processed a single part, ToPs shows the single part in yellow. The processed single part is saved as a '*.gmt' file.
5. If you loaded and processed a laid-out sheet: click on or box in those parts on the sheet which you want to save as a **single** processed part, and select *OK*.

The nested sheet contains information about its material and its thickness. If you processed the sheet with technology data for a different material and/or a different sheet thickness, ToPs displays the "Select material for GMT" mask.

6. Select the desired material.

ToPs saves the processed single part/mini nest as a '*.gmt' file with the newly selected material.

4.2 Saving processed sheets

Prerequisite

- You have loaded a processed sheet.

1. Select *File >Save all ...*

   ToPs displays the mask "Store file". In it, the file format is set as default to '*.tmt'. The file format cannot be changed.

2. If necessary, change directory (see p. 5-14).
3. If necessary, change "File name".
4. Select *OK*.

ToPs saves the processed sheet in the chosen directory.

5. Processing single parts or sheets

5.1 Selecting technology table and process rule (technology data)

ToPs shows the active machine, the technology table and the process rule in the mask header:

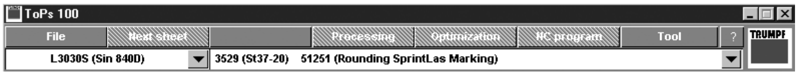


Fig. 21947EN

Selecting last used technology data

Prerequisite

- The machine with which you want to process the sheet or the single part has been selected (for Selecting machine, see Section 2, p. 5-9).

1. Open "Last used technology tables" list field using ▼ in the mask header.

   ToPs displays the last 10 technology tables and process rules used.

2. Mark the technology table and the associated process rule which is suitable for the active machine.

   (If the selected technology table is not suitable for the active machine, ToPs displays a message to this effect.)

ToPs displays the technology table and the process rule in the mask header.

Selecting "new" technology data

Prerequisite

- The machine with which you want to process the sheet or the single part has been selected (for Selecting machine, see Section 2, p. 5-9).

➢ Select *Tool*.

ToPs opens the "Selection of Technology Tables" mask:

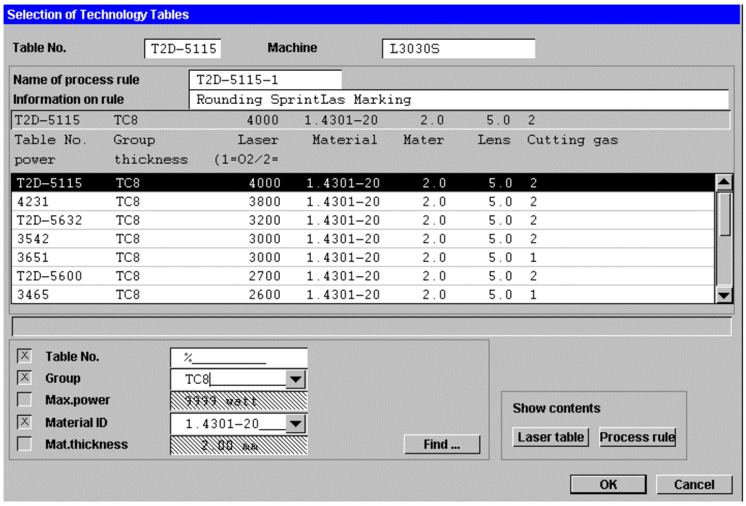


Fig. 29046EN

Note
When you move the mouse pointer over the technology tables displayed, ToPs displays information about the currently marked technology table below the selection field.

Determining selection criteria for technology tables

You can search for the desired technology table according to various selection criteria. The selection criteria can be selected individually or combined.

"Table No.", "Group" and "Material ID" are activated as default.

Tip
The percent sign ("%") is a wildcard for various characters. It makes searching easier when you do not know the exact designation or number.

Examples: "1%" = "1", and then no symbol or one or more symbols.

"%1" = no symbol or one or more symbols and then "1".

Determining the number of the technology table

1. Check "Table No.".
2. Enter the number of the technology table.

Determining the machine group

1. Check "Group".
2. Enter the desired machine group in the input box.

or

➢ Open "Group" list field using ▾.

ToPs displays the "Selection of group" mask:

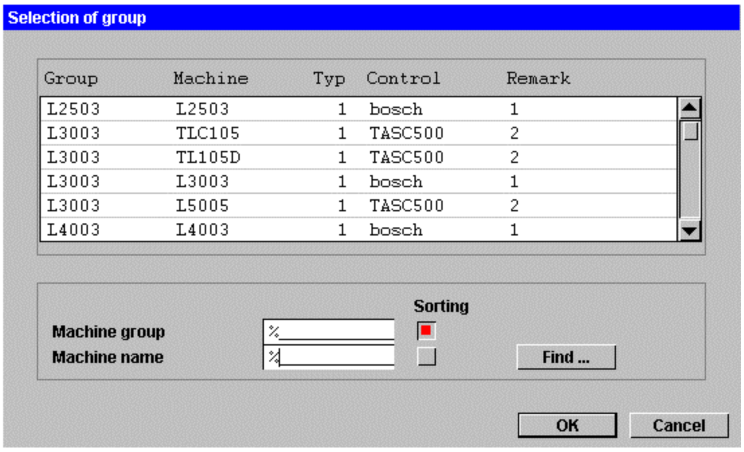


Fig. 29063EN

➢ To re-sort the listing of groups: click on the box for the "Sorting" desired.

Note
The new sorting order will only come into effect on the next search for a technology table.

➢ To filter results for a particular machine or machine group: enter filter in input box.

Tip
The percent sign ("%") is a wildcard for various characters. It makes searching easier when you do not know the exact designation or number.

Examples:

"1%" = "1", and then no symbol or one or more symbols.

"%1" = no symbol or one or more symbols and then "1".

➢ Select *Find*.

➢ Mark the desired machine group.

➢ Select *OK*.

Determining the maximum laser power

1. Check "Max. power".
2. Enter the power in watts.

Determining the type of material

1. Check "Material ID".
2. Open list field using "▾".
   ToPs displays the mask "Select material".
3. Mark material type.

Determining the material thickness

1. Check "Mat. thickness".
2. Enter the material thickness in mm.

Starting the search for the suitable technology table

When the search criteria have been determined ...

1. Click on *Find ...* with the left mouse button.
   ToPs filters laser power for values smaller than/equal to value entered.

   or

   ➢ Click on *Find ...* with the right mouse button.

   ToPs filters laser power for precisely the power value entered.
2. Mark the desired technology table.
   ToPs displays the "Select Process Rule" mask:

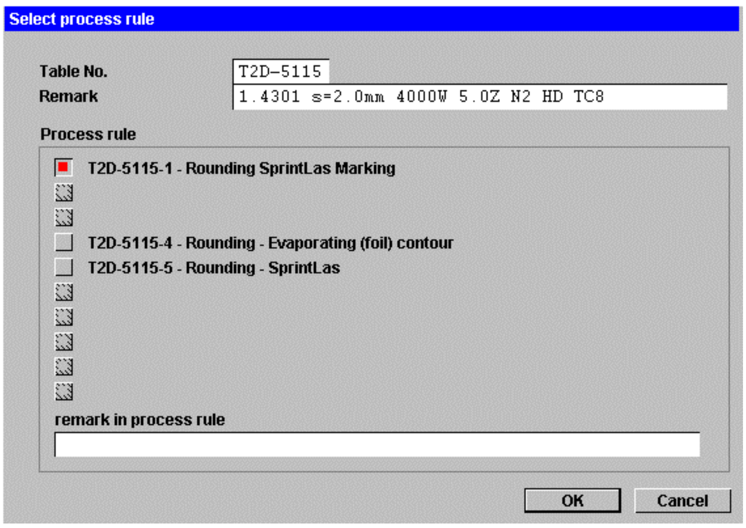


Fig. 29652EN

Selecting the corresponding process rule

3. Select the desired process rule.

   Tip
   When you move the mouse pointer over the process rules, ToPs displays information about the process rule under "remark in process rule".

4. Select *OK*.

   The "Selection of Technology Tables" mask now also displays the name of the process rule.

5. Select *OK*.

The technology table and process rule are now set.

Display contents of the technology table?

➢ Select *Laser table*.

ToPs opens the technology table using an editor program.

Display the contents of the process rule?

➢ Select *Process rule*.

ToPs opens the process rule with Editor.

5.2 Changing process rule

Here you can:

- Select another process rule that fits the technology table
- Use a process rule which is not assigned to the active technology table.

and then ...

- Process the entire sheet or the entire single part with the new process rule (see p. 5-41).
- Process individual contours with the new process rule (for Selective processing, see p. 5-43).

1. Load the processed sheet into which you want to set a different process rule (for Loading files, see Section 3, p. 5-13 ff).
2. Select *Processing >Create >Current process rule >Set*.
   ToPs displays the "Select process rule" mask:

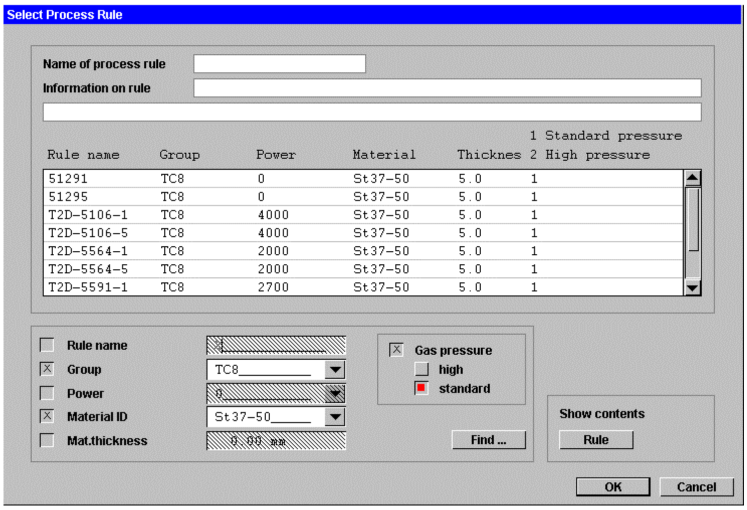


Fig. 29047EN

Determining selection criteria for process rules

You can search for the desired process rule according to various selection criteria. The selection criteria can be selected individually or combined.

"Group" and "Material ID" are activated as default.

Tip

The percent sign ("%") is a wildcard for various characters. It makes searching easier when you do not know the exact designation or number.

Examples: "1%" = "1", and then no symbol or one or more symbols.

"%1" = no symbol or one or more symbols and then "1".

Determining the process rule name

1. Check "Name of process rule".
2. Enter the process rule name.

Determining the machine group

1. Check "Group".
2. Enter the desired machine group in the input box.

   or

   ➢ Open "Group" list field using ▾.

   ToPs displays the "Select group" mask.

   ➢ Mark the desired machine group.

Determining the maximum laser power

1. Check "Power".
2. Enter the power in watts.

Determining the type of material

1. Check "Material ID".
2. Open list field using ▾.
   ToPs displays the mask "Select material".
3. Mark material type.

Determining the material thickness

1. Check "Mat. thickness".
2. Enter the material thickness in mm.

Determining gas pressure

1. Check "Gas pressure".
2. Select "Standard" or "High".

When the search criteria have been determined ...

1. Click on *Find ...* with the left mouse button.
   ToPs filters laser power for values smaller than/equal to value entered.

   or

   ➢ Click on *Find ...* with the right mouse button.

   ToPs filters laser power for precisely the power value entered.
2. Mark the desired process rule.

Display the content of the new process rule?

3. Under "Show contents", select *Process rule*.
4. Select *OK*.
   ToPs closes the process rule display.
5. Select *OK*.

The new process rule is now active. ToPs uses this process rule the next time you generate a new processing plan.

Displaying process rule with which contours have been processed

Prerequisite

- You have loaded a processed sheet or a processed single part (for loading files, see Section 3, p. 5-13 ff).

1. Select *Processing >Show >Process rule*.
2. Click on contour.

ToPs shows the process rule with which the contour was processed.

5.3 Generating processing plans

You can:

- Process an entire sheet or an entire single part automatically (see following section).
- Process a processed sheet or processed single part with different technology data (see p. 5-42).
- Process selectively (see p. 5-43).
- Display the process rule with which contours were processed (see p. 5-40).
- Disable processing plans, enable disabled processing plans (see Section 5.4, p. 5-44 ff).
- Delete processing plans (see Section 5.5, p. 5-46).
- Test collisions (see Section 5.6, p. 5-47).
- Display processing status and error status of parts and contours (see Section 5.7, p. 5-49 ff).

Processing entire sheet or entire single part automatically

Prerequisite

- You have loaded the sheet or the single part which you want to process (for Loading files, see Section 3, p. 5-13 ff).

Note
When you process a sheet/a single part, the entire sheet/single part is processed using the active technology table and the active process rule.

Manual modifications and optimizations of already processed sheets or single parts will be lost during reprocessing.

1. Select technology table and process rule (see Section 5.1, p. 5-33 ff).

   ToPs displays the technology table and the process rule in the mask header.
2. Select *Processing >Create >Start*.

ToPs processes the single part or sheet using the active technology data. If the processing was trouble-free, ToPs displays it on the screen:

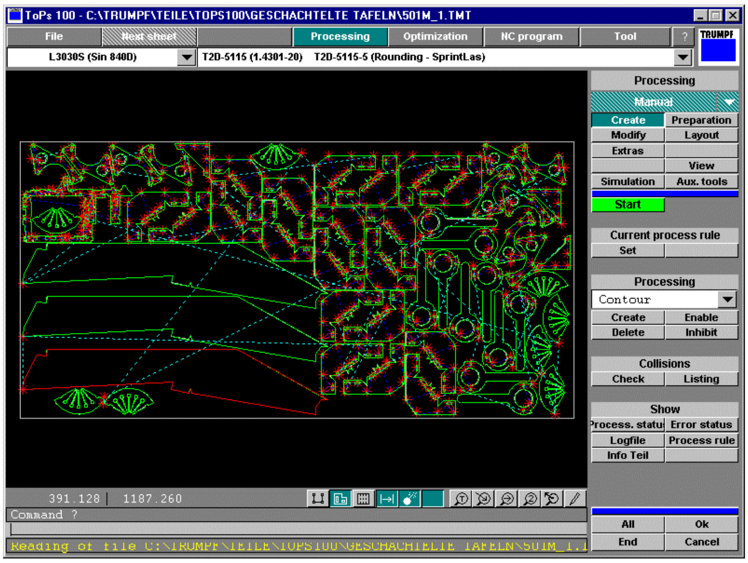


Fig. 29048EN

If processing did **not** proceed without problems (e.g. due to disabled contours or collisions), ToPs displays the technology log file. The log file contains information as to why processing did not proceed without problems (see Section 5.9, p. 5-51).

Processing processed sheet or processed single part with different technology data

1. Load processed sheet or processed single part which you want to process with different technology data (for Loading files, see Section 3, p. 5-13 ff).
2. Select new technology table and new process rule (see Section 5.1, p. 5-33 ff).

   ToPs displays the "Changing the technology table" mask:

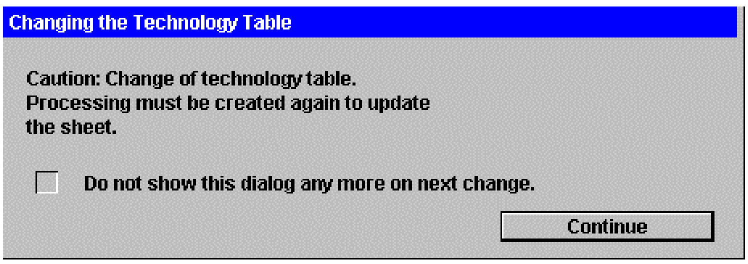


Fig. 21939EN

3. Select *Continue*.

4. Select *Processing >Create >Start*.

ToPs processes the sheet or single part using the new technology data.

Selective processing

Example of application

- Processing processed contours or single parts using a different technology table or a different process rule.
- Processing unprocessed contours or single parts in sections only.

Prerequisite

- You have loaded a processed sheet or a processed single part (for Loading files, see Section 3, p. 5-13 ff).
- The technology data you wish to use for selective processing are active (see Section 5.1, p. 5-33).

Note
ToPs can only generate a processing plan for an original part together with all its copies. Areas of application which ToPs will not permit are shaded grey.

1. Select *Processing >Create*.
2. Open the list field under "Processing" using ▾.
3. Select range of application:
   - *Contour:* ToPs selectively processes a contour in all identical parts.
   - *Part + copies:* ToPs selectively processes a single part and all copies of it.
   - *Sheet:* ToPs processes everything (as with *Processing >Create >Start*).
4. Select *Processing, Create*.

Range of application: *Sheet*

ToPs generates a processing plan for everything.

Range of application: *Contour* or *Copies*

5. Click one after the other on the contours or single parts for which ToPs is to selectively generate a processing plan.

Displaying the process rule with which contours were processed

(See p. 5-40)

5.4 Selectively disabling processing plans

Disabling processing plans

What effect does "disabling a processing plan" have?

The processing plans of the disabled contours, including all manual modifications and optimizations, are retained but not carried out.

Examples of use

- Selectively hiding contours, in order to cut different parts from one prototype.
- Parts of a sheet have already been cut.
- You do not require all the parts of a nested sheet.

Prerequisite

- You have loaded a processed sheet or a processed single part (for loading files, see Section 3, p. 5-13 ff).

Note
Areas of application which ToPs will not permit are shaded grey.

1. Select *Processing >Create*.
2. Open the list field under "Processing" using ▾.
3. Select range of application:
   - *Contour:* ToPs disables the processing of a contour in all identical parts.
   - *Single part:* ToPs disables the processing of a single part.
   - *Until part:* ToPs disables the processing plan up to a particular part.

     Note
     Disabled processing plans in the *Until part* range of application cannot be enabled again.
   - *Sheet:* ToPs disables all processing plans.
4. Select *Processing, Inhibit*.

Range of application: *Sheet*

ToPs disables all processing plans.

Range of application: *Contour, Single part* or *Until part*

5. Click one after the other on the contours or single parts for which processing is to be disabled.

Enabling disabled processing plans

Prerequisite

- You have loaded a processed sheet or a processed single part (for Loading files, see Section 3, p. 5-13 ff).
- The sheet or single part contains disabled processing plans.

Note
Areas of application which ToPs will not permit are shaded grey.

1. Select *Processing >Create*.
2. Open the list field under "Processing" using ▾.
3. Select range of application:
   - *Contour:* ToPs enables the processing of a contour in all identical parts.
   - *Single part:* ToPs enables the processing of a single part.
   - *Sheet:* ToPs enables all disabled processing plans.
4. Select *Processing, Enable*.

Range of application: *Sheet*

ToPs enables all disabled processing plans.

Range of application: *Contour* or *Single part*

5. Click one after the other on the contours or single parts for which processing is to be enabled.

ToPs redisplays the processing plans including manual modifications.

5.5 Selectively deleting processing plans

"Delete" erases the processing plan for the selected contours. All manual modifications to the processing plan, including any optimizations, will be lost.

Tip
If you do not delete processing plans but only disable them, all manual modifications and optimizations are retained.

Prerequisite

- You have loaded a processed sheet or a processed single part (for Loading files, see Section 3, p. 5-13 ff).

Note
ToPs can only delete a processing plan for an original part/original contour together with all its copies. The ranges of application which ToPs will not permit are therefore shaded grey.

1. Select *Processing >Create*.
2. Open the list field under "Processing" using ▼.
3. Select range of application:
   - *Contour:* ToPs deletes the processing plan of a contour in all identical parts.
   - *Part + copies:* ToPs deletes the processing plan of a single part and all copies of it.
   - *Sheet:* ToPs deletes all processing plans.
4. Select *Processing, Delete*.

Range of application: *Sheet*

ToPs deletes all processing plans.

Range of application: *Contour* or *Copies*

5. Click one after the other on the contours or single parts for which processing is to be deleted.

5.6 Collision check

What are collisions?

Collisions are violations of a contour.

Example:

- Piercing holes are larger than the contours to be cut.
- Approach flags are too close to other contours.

Checking collisions

Prerequisite

- You have loaded a processed sheet or a processed single part (for Loading files, see Section 3, p. 5-13 ff).

1. Select *Processing >Create >Collisions >Check*.
   ToPs displays the "Collision check" mask:

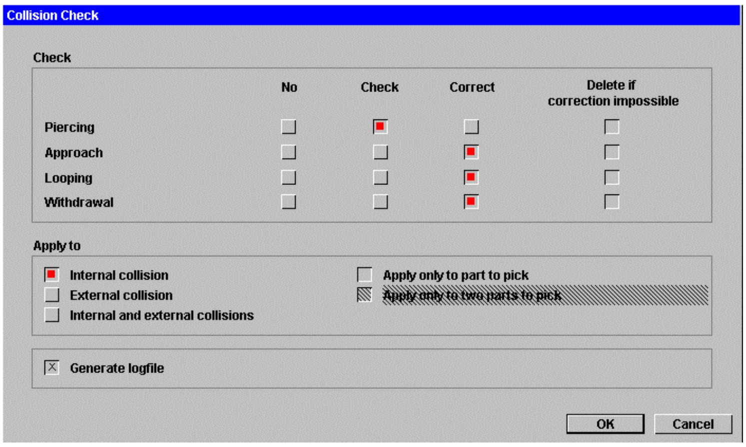


Fig. 27699EN

Select parameters

2. Click on the desired parameters under "Check":
   - "No":
     This switches off the collision check for certain processing plans (e.g. for piercing).
   - "Correct":
     ToPs independently modifies processing strategies which lead to collisions (example: the length of the approach flag is reduced). The specifications from the process rule are retained.
   - "Delete if correction impossible":
     Collisions which cannot be avoided are not processed. The processing is deleted.

3. If necessary select "Generate logfile".

Selecting the range of application

4. To check collisions within a part: select "Internal collision".
   To further restrict the check to **a specific part**: select "Apply only to part to pick".
   Confirm with *OK* and click on part.
5. To check collisions between parts: select "External collision".

   To further restrict the check to **two specific parts**: select "Apply only to two parts to pick". Confirm with *OK* and click on the two parts.
6. To check collisions within and between all parts: select "Internal and external collisions" and confirm with *OK*.

ToPs displays collision points on the screen with yellow circles and issues the logfile listing if required.

Displaying the collision check logfile

You can view and print the logfile listing from the last collision check.

Prerequisite

- You have loaded a processed sheet or a processed single part (for Loading files, see Section 3, p. 5-13 ff).

➢ *Processing >Create >Collisions >Listing*.
  ToPs opens the most recently generated logfile.

Print logfile?

1. Select *Print*.
2. Select *OK*.

ToPs closes the logfile.

5.7 Displaying processing status of parts and contours

You can: Display the number of parts on a sheet or the number of contours in a part which are able to be processed or are disabled. (To disable/enable processing plans, see Section 5.4, p. 5-44 ff.)

Prerequisite

- You have loaded a processed sheet or a processed single part (for Loading files, see Section 3, p. 5-13 ff).

1. Select *Processing >Create >Show >Process. status*.
   ToPs displays the "Object selection" mask.
2. **Either**
   - ➢ Select *Part + copies*.

   ToPs reports the number of parts on the sheet which are able to be processed or which are disabled.

   or
   - ➢ Select *Contour*.
   - ➢ Click on any contour in the desired part.

   ToPs reports the number of parts on the sheet which are able to be processed or which are disabled.
3. Select *OK*.
   ToPs closes the message.

5.8 Displaying error status of parts and contours

Example You have given a contour a line color which cannot be processed. This contour will be disabled by ToPs during automatic processing. (For explanation of colors and symbols, see Section 1.2, p. 5-8.)

Prerequisite

- You have loaded a processed sheet or a processed single part (for Loading files, see Section 3, p. 5-13 ff).

2. Select *Processing >Create >Show >Error status*.
   ToPs displays the "Object selection" mask.
3. **Either**
   - Select *Part + copies*.
   - Click on the part (original part or one of its copies).

   ToPs displays the error status of the part and its copies.

   or
   - Select *Contour*.
   - Click on the contour (in the original part or one of its copies).

   ToPs displays the contour's error status.
4. Select *OK*.
   ToPs closes the message.
5. Click on the next part or contour if necessary.

5.9 Displaying technology logfile

If the processing of a part or a sheet did not proceed without problems (a part was e.g. not completely processed), this will be recorded in the technology log (logfile).

The technology log contains the following entries:

- Name of the sheet and path under which it is saved.
- Machining strategy (e.g. "grid machining" or "CSC").
- Number of nested, processed and disabled parts and contours on the sheet.
- Name of the parts and path under which the parts are saved.
- Process rule which is used when processing the parts.
- Overview of contour machining (e.g. "vaporizing", "marking" ...).
- Collisions

1. Load processed sheet or processed single part which you want to show the technology log for (for Loading files, see Section 3, p. 5-13 ff).
2. Select *Processing >Create >Logfile*.

   or

   ➢ Select *Processing >View >Logfile*.

   ToPs displays the technology log.

Print technology log?

3. Select *Print*.
4. Select *OK*.

ToPs closes the technology log.

6. Modifying processing plans

You can:

- Change type of piercing (see Section 6.1, p. 5-52).
- Change the form of the approach flag and the position of the piercing point (see p. 5-54).
- Displace approach flags (see p. 5-55).
- Invert approach flags so that the contour is cut in the reverse direction (see p. 5-56).
- Generate and modify withdrawal flags (see Section 6.3, p. 5-57).
- Show and modify contour size (see Section 6.4, p. 5-59).
- Generate modify and delete corner treatment (see Section 6.5, p. 5-61 ff).

6.1 Modifying piercing

ToPs automatically decides how to pierce the contour, based on its size:

Laser cutting machines Softly with reduced power or normally, with full power.

Water jet cutting machines As a "point", in the form of a "straight line", a "circle" or by "drilling".

Prerequisite

- You have loaded a processed sheet or a processed single part (for Loading files, see Section 3, p. 5-13 ff).

Note
If you change the type of piercing for a contour, it will be effective for all identical parts on the sheet if you have not constructed any parts groups (for Parts groups, see Section 12.1, s. 5-111).

If you change the processing sequence manually, you must not subsequently generate a new processing plan. Otherwise the manual modifications will be lost.

1. Select *Processing >Modify >Piercing >Properties*.
   ToPs displays the "Piercing" mask.
2. Click on the piercing type.
3. Select *OK*.

4. One after the other click on all contours which the laser or water jet should pierce in the desired way.

ToPs displays the different piercing type with a color change (laser cutting machine) or a change of symbols (water jet cutting machine). (For explanation of colors and symbols, see Section 1.2, p. 5-8.)

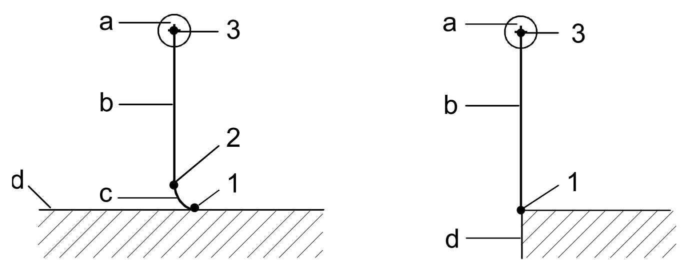
6.2 Modifying approach flags

Approach flags consist of the following elements:

- Piercing point
- Approach path (for laser cutting machines possibly in part "reduced"), with or without approach radius.

Approach radius and angle

- Approach radius 0 mm = linear approach.
- Angle 0° on approaching a corner = tangential approach.
- Angle 0° on approaching a line = perpendicular approach.



a	Piercing point	1	Start point of the approach path
b	Straight part of approach path	2	Switch straight to arc
c	Approach radius	3	End point of approach flag
d	Contour		

Approach flag with and without approach radius Fig. 27688

Note
When you modify approach flags, collisions can occur with previously defined processing plans. Perform collision check following modifications (see Section 5.6, p. 5-47).

Modifications to approach flags will always be effective for all identical parts on a sheet if you have not constructed any parts groups (for Parts groups, see Section 12.1, p. 5-111).

Modifying form of approach flag and/or position of piercing point

Here you can:

- Displace piercing points.
- Modify length and angle of approach flags.
- Modify approach radii.

If you modify the angle of an approach flag, the approach radius will be retained. The changeover from the approach radius to the straight part of the approach flag will no longer be tangential.

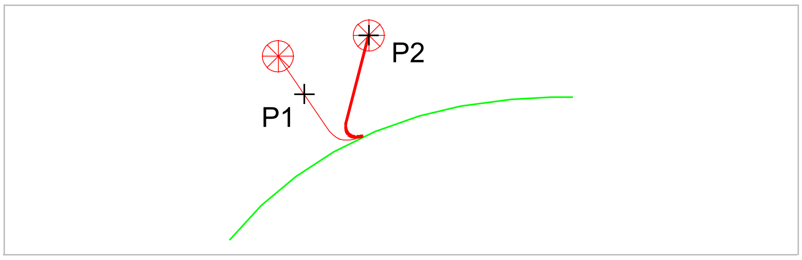


Fig. 4769

Prerequisite

- You have loaded a processed sheet or a processed single part (for Loading files, see Section 3, p. 5-13 ff).

Note
ToPs always offsets the end points of the individual elements of an approach flag which have been altered from a contour.

Modifications to approach flags will always be effective for all identical parts on a sheet if you have not constructed any parts groups (for Parts groups, see Section 12.1, p. 5-111).

➢ Select *Processing >Modify >Approach >Form*.

Displace piercing point?

➢ Click on piercing point (a) or straight part of approach path (b) (see Fig. 27688, p. 5-55).

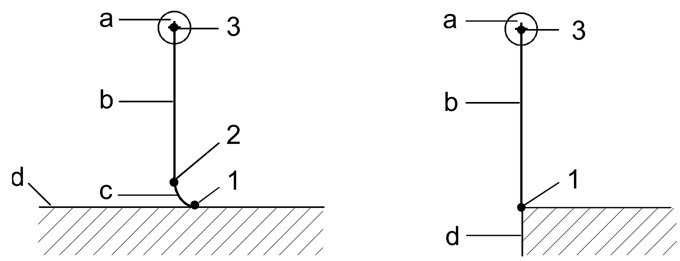
  ➢ Click on the new end point (3).

  or

  ➢ Enter the coordinates of the new end point (3).

Modify approach radius?

1. Click on the approach radius (c) (see Fig. 27688, p. 5-55).
2 Click on the new end point (3).



a	Piercing point	1	Start point of the approach path
b	Straight part of approach path	2	Switch straight to arc
c	Approach radius	3	End point of approach flag
d	Contour		

Fig. 27688

Displacing approach flags

When you displace approach flags, the contour will be started at a different point when the workpiece is processed.

Prerequisite

- You have loaded a processed sheet or a processed single part (for Loading files, see Section 3, p. 5-13 ff).
- The contour whose approach flag you want to displace has to be closed.

Note
If you displace approach flags, ToPs automatically deletes any microjoints present. (For Microjoints, see Section 8.3, p. 5-89).

If you previously changed the piercing type (e.g. from normal to reduced): ToPs automatically resets piercing to the specifications from the process rule.

Modifications to approach flags will always be effective for all identical parts on a sheet if you have not constructed any parts groups (for Parts groups, see Section 12.1, p. 5-111).

1. Select *Processing >Modify >Approach >Displace*.
2. Click on the new point (P1) on the contour where the approach flag should be attached:

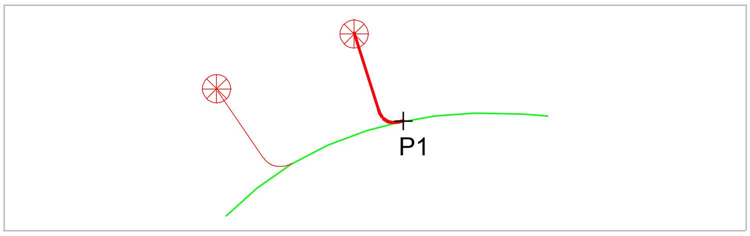


Fig. 4770

Inverting approach flags

When you invert the approach flag, the contour will be cut in the reverse direction.

Prerequisite

- You have loaded a processed sheet or a processed single part (for Loading files, see Section 3, p. 5-13 ff).

Note
If you previously changed the piercing type (e.g. from normal to reduced): ToPs automatically resets piercing to the specifications from the process rule.

Modifications to approach flags will always be effective for all identical parts on a sheet if you have not constructed any parts groups (for Parts groups, see Section 12.1, p. 5-111).

1. Select *Processing >Modify >Approach >Invert*.
2. Click on the desired contour.

   ToPs inverts the approach flag. The workpiece will be cut in the reverse direction.

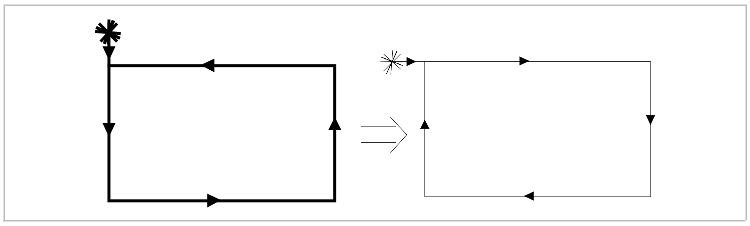


Fig. 4771

6.3 Withdrawal flags

Withdrawal flags consist of the following elements:

- Withdrawal path with or without withdrawal radius.

Generating withdrawal flags

Prerequisite

- You have loaded a processed sheet or a processed single part (for Loading files, see Section 3, p. 5-13 ff).

Note
If you generate withdrawal flags, you must not subsequently generate a new processing plan. Otherwise the withdrawal flags will be lost.

1. Select *Processing >Modify >Contour >Parameters*.
2. Click on the contour on which you want to create a withdrawal flag.
   ToPs displays the "Set contour parameters" mask:

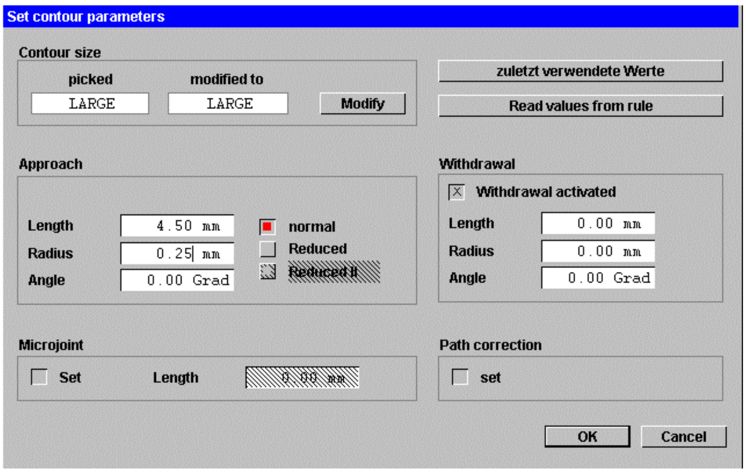


Fig. 29049EN

The data displayed in the mask are the actual contour parameters of the selected contour – including any modifications made (e.g. shortened approach flag).

If you change the contour size of the selected contour, the contour parameters are retained. The contour is simply cut using different technology data.

Creating withdrawal flags

3. Select "Withdrawal activated".

   The input boxes change color and can be overwritten:

   – "Radius" 0 mm: linear withdrawal.
   – "Angle" 0° when withdrawing from a corner: tangential withdrawal
   – "Angle" 0° when withdrawing from a line: perpendicular withdrawal.

4. To reset the contour parameters to the specifications from the process rule: select *Read values from rule*.
5. To use the contour parameters which you last confirmed with *OK* in the "Set contour parameters" mask: select *Zuletzt verwendete Werte* (*Values last used*).

Confirm contour parameters

6. Select *OK*.
7. Click equidistant from the contours on which a withdrawal flag with the selected parameters should be created.

ToPs displays the withdrawal flag as an "extension" of the contour in green.

Modifying the form of the withdrawal flag

Here you can:

- Modify the length and angle of the withdrawal flags.
- Modify the withdrawal radii.

Prerequisite

- You have loaded a processed sheet or a processed single part (for Loading files, see Section 3, p. 5-13 ff).
- The sheet or single part contains withdrawal flags.

Note
If you modify the angle of a withdrawal flag, the withdrawal radius will be retained. The changeover from the withdrawal radius to the straight part of the withdrawal flag will no longer proceed tangentially.

When you subsequently modify withdrawal flags, collisions can occur with previously defined processing plans. Perform collision check following modifications (see Section 5.6, p. 5-47).

1. Select *Processing >Modify >Withdrawal >Form*.
2. Procedure as described under "Form of approach flag and/or position of piercing point" (see p. 5-54).

6.4 Contour size

Displaying contour size

Prerequisite

- You have loaded a processed sheet or a processed single part (for Loading files, see Section 3, p. 5-13 ff).

1. Select *Processing >Modify >Contour >Parameters*.
2. Click on the contours you wish to see the size of.

ToPs displays the "Set contour parameters" mask. It shows the size of the selected contour.

Modifying contour size

Here you can:

- Modify contour size so that the contour is processed with the technology data for the new contour size. Manual modifications (e.g. to the form of the approach flag) are retained.
- Modify contour size and adopt the parameters for the new contour size. ToPs discards manual modifications for piercing and in the form of the approach and withdrawal flags and resets them to the specifications from the process rule for the new contour size.
- Modify contour size and set all contour parameters to the default values from the process rule for the new contour size.

Prerequisite

- You have loaded a processed sheet or a processed single part (for Loading files, see Section 3, p. 5-13 ff).

1. Select *Processing >Modify >Contour >Parameters*.
2. Click on one of the contours whose size you want to modify.

   ToPs displays the "Set contour parameters" mask. It shows the parameters of the selected contour.

3. Select *Modify*.

   ToPs displays the "Modify contour size/set default values" mask:

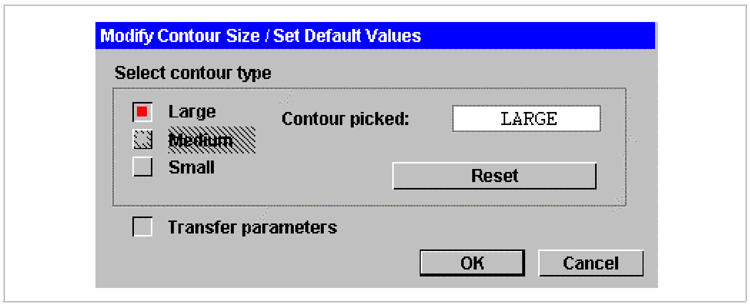


Fig. 29653EN

4. Select new desired contour size ("Contour type").

Transfer the parameters for the new contour size?

5. Check "Transfer parameters".

   ToPs discards manual modifications for piercing and in the form of the approach and withdrawal flags and resets them to the specifications from the process rule for the new contour size.

6. Select *OK*.

   ToPs displays the "Set contour parameters" mask again.

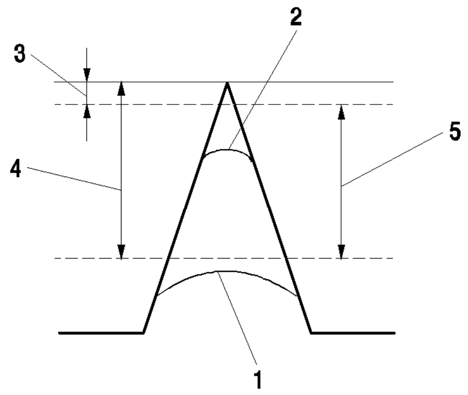
7. Select *OK*.

8. Click one after the other on all contours which you want to set to the (same!) contour size (and if applicable contour parameters).

6.5 Corner treatment

Corner rounding

When you round corners, they are cut with a rounding radius instead of sharply:



1	Maximum rounding radius	4	Maximum deviation
2	Minimum rounding radius	5	Tolerance range within which the rounding can lie
3	Minimum deviation		

Rounding Fig. 4750

(To generate corner treatment, see p. 5-63 ff.)

Corner cooling

Note
This form of corner treatment is only possible with laser cutting machines.

Corner cooling – the procedure

The laser cut is interrupted in the corner, and the corner is cooled using cutting gas. After the programmed corner cooling time, the laser continues cutting.

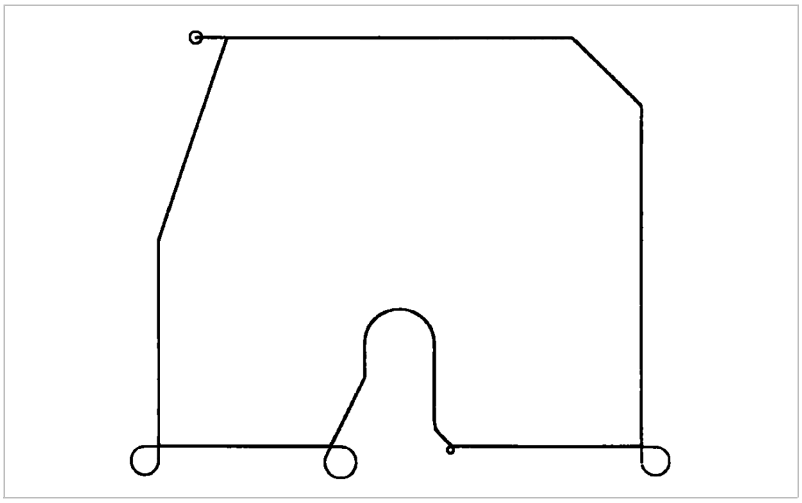
When programming corner treatment, "Corner rounding" or "Looping" is standard. Both strategies are selected directly via the process rule. "Corner cooling" is not contained in any process rule, but must rather be programmed "by hand".

The "Corner cooling" strategy is used exclusively with thick sheets.

Looping

"Circular looping"

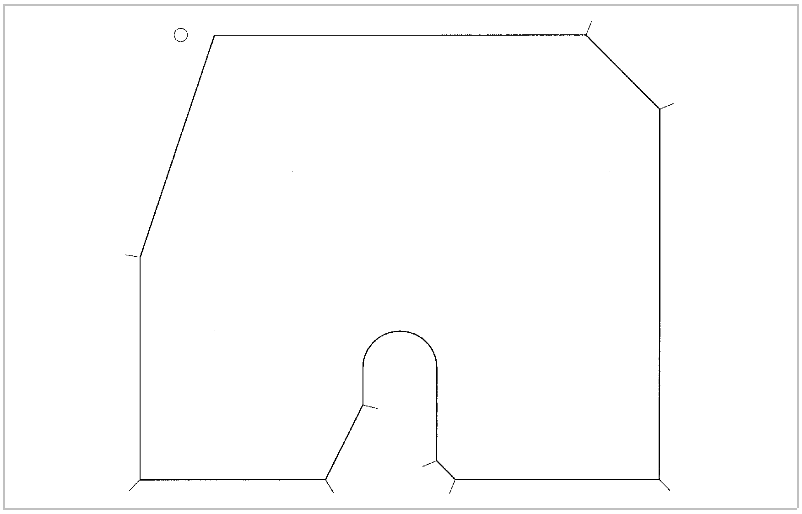
The cutting head moves in a straight line away from a corner, makes a looping, and moves into the second half of the corner in a straight line:



Looping, circular Fig. 21864

"Bisecting line angle looping"

The cutting head moves out of the first half of the corner with the head tilted up, turns around, and moves into the second half of the corner:



Looping, bisecting line angle Fig. 22250

Parameters for looping

"Circular":
Length = distance of the corner from the outermost point of the looping.

"Bisecting line angle":
Length = path which the cutting head moves out of the corner

(To generate corner treatment, see p. 5-63 ff.)

Creating corner treatments

ToPs draws the information about how corners should be processed generally on a sheet from the process rule (see Chapter 6, Data module, "General 1").

In the process rules, either "Corner rounding" or "Looping" has priority.

You can interactively modify, delete or (if none is yet present) generate corner treatment (for description see following sections).

Prerequisite

- You have loaded a processed sheet or a processed single part (for Loading files, see Section 3, p. 5-13 ff).
- The sheet or single part contains corners without corner treatment.

Note
You can only create new corner treatment at corners without any already present. If a corner treatment is already present, you must delete it before you can generate a new one (see p. 5-68).

1. Select *Processing >Modify >Corner treatment >Create*.
   ToPs displays the "Corner treatment" mask:

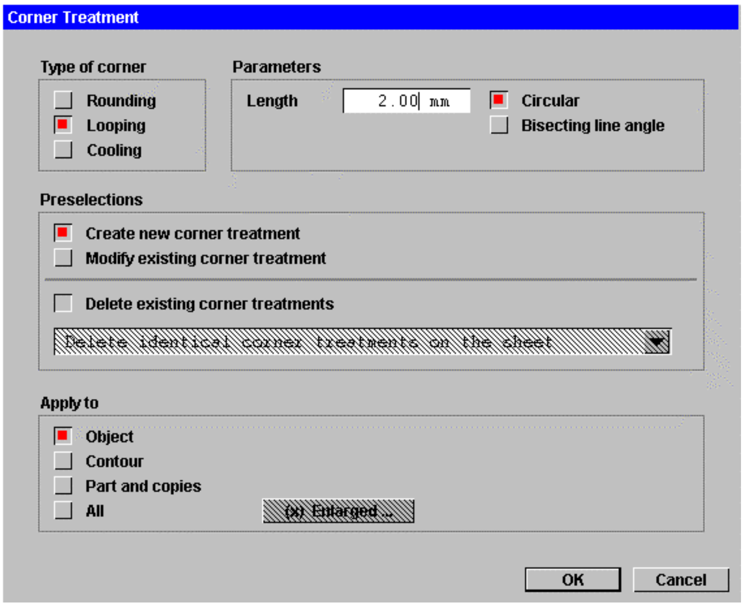


Fig. 29050EN

2. To create corners with rounding: select "Rounding", enter radius.

3. To create corners with loopings: select "Looping", select "Circular" or "Bisecting line angle", enter parameters:
   - For "Circular": Length = distance of the corner from the outermost point of the looping.
   - For "Bisecting line angle": Length = path which the cutting head moves out of the corner.
4. To cool corners: select "Cooling".

   Note
   "Corner cooling" is only possible with laser cutting machines.

   If you wish to process a sheet generally with "Corner cooling": create a self-defined process rule (see Chapter 6, Data module). For machines with Siemens control systems: also create a self-defined technology table and enter corner cooling time in "Cutting, general".
5. Select "Create new corner treatment".
6. Define range of application (see p. 5-65).
7. Set filter if required (see p. 5-65).
8. Select *OK*.
9. If required, click on the objects or contours where you want to create corner treatments.

   Note
   When you have selected "Object" as the range of application: first click on the first element of the equidistant, then the second. It is not sufficient to click on the contour on which the object is located.

Filtering corner treatments, defining range of application

You can filter the corner treatment according to the following criteria:

- Limit corner treatment to corners within a certain angle range.
- Limit the path before or after a corner to a certain dimension. If the free path before or after the corner is too short or too long the corner will not be treated. This prevents e.g. the corner treatment from damaging contour elements which are too close.
- Limit corner treatment to inner or outer corners.

Prerequisite

- You are in the process of creating, modifying or deleting a corner treatment.
- The "Corner treatment" mask is displayed.

Defining the range of application

1. To limit the corner treatment to a single corner: mark "Object".
2. To apply the corner treatment to the corners of individual contours in all identical parts: mark "Contour".
3. To apply the corner treatment to all corners of all identical parts: mark "Part and copies".
4. To treat all corners: mark "All".

Defining filter parameters

➢ Select *Enlarged* (*Advanced*) (with "Object" does not make sense and therefore not possible).
ToPs displays the "Apply to" mask:

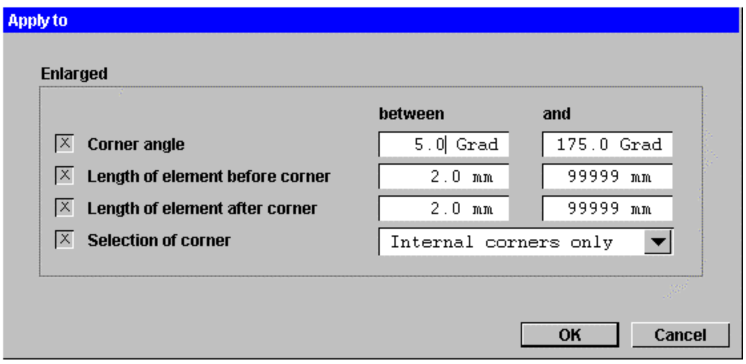


Fig. 22017EN

When you define parameters for filters, the name of the *Enlarged ...*(*Advanced ...*) button changes:

(x) Enlarged ... ((x) Advanced)*:* the filter is set.

Enlarged ... (Advanced)*:* no filter is set. Corner treatment is not limited.

Limit the angle area of the corners?

1. Check "Corner angle".
2. Enter corner angle.

ToPs will only use the corner treatment on those corners which lie within the entered angles.

Defining acceptable paths before the corner

1. Check "Length of element before corner".
2. Enter the minimum and maximum treatable paths before the corner. The minimum path prevents the corner treatment from damaging elements of the contour which are too close.

If the free path before the corner is too short or too long, the corner will not be treated.

Defining acceptable paths after the corner

1. Check "Length of element after corner".
2. Enter the minimum and maximum treatable paths after the corner.

If the free path after the corner is too short or too long, the corner will not be treated.

Treat only internal or external corners?

1. Check "Selection of corner".
   Note
   In the case of looping, "Selection of corner" makes no sense and is therefore not possible.
2. Open the list field beside corner selection using ▾.
3. To limit corner treatment to internal corners, mark *Internal contours only*.
4. To limit corner treatment to external corners, mark *External corners only*.

Setting filter

➢ Select *OK*.

The filter is set. ToPs displays the "Corner treatment" mask again.

Modifying corner treatment

Note
You can only modify one kind of corner treatment at a time, e.g. all looping radii. If, for example, you want to make a loop out of a rounded corner, you must apply "Delete existing corner treatments" to the rounded corner and create the loop with "Create new corner treatment" (see p. 5-68).

Prerequisite

- You have loaded a processed sheet or a processed single part (for Loading files, see Section 3, p. 5-13 ff).
- The sheet or single part contains corner treatments whose parameters you want to modify.

1. Select *Processing >Modify >Corner treatment >Create*.
   ToPs displays the "Corner treatment" mask.
2. To modify corners with rounding: select "Rounding", modify radius.
3. To modify corners with loops: select "Looping", select "Circular" or "Bisecting line angle", and modify parameters:
   - For "Circular": Length = distance of the corner from the outermost point of the looping.
   - For "Bisecting line angle": Length = path which the cutting head moves out of the corner.
4. Select "Modify existing corner treatment".
5. Define range of application (see p. 5-65).
6. Set filter if required (see p. 5-65).
7. Select *OK*.
8. If necessary click on the objects or corners where you want to modify a corner treatment.

   Note
   When you have selected "Object" as the range of application: click directly on the looping, rounding or cooling. It is not sufficient to click on the contour on which the corner treatment is located.

Deleting corner treatments and simultaneously creating new ones

Prerequisite

- You have loaded a processed sheet or a processed single part (for Loading files, see Section 3, p. 5-13 ff).

1. Select *Processing >Modify >Corner treatment >Create*.

   ToPs displays the "Corner treatment" mask.
2. To create corners with rounding: select "Rounding", enter radius.
3. To create corners with loopings: select "Looping", select "Circular" or "Bisecting line angle", enter parameters:
   – For "Circular": Length = distance of the corner from the outermost point of the looping.
   – For "Bisecting line angle": Length = path which the cutting head moves out of the corner
4. Select "Create new corner treatment".
5. Check "Delete existing corner treatments".
6. Open the list field using ▼.
7. If you have loaded a processed sheet: mark the corner treatments which are to be deleted:
   – All identical corners on a sheet/in a part *(Delete identical corner treatments on the sheet)*.
   – All corners on a sheet *(Delete all)*.
8. Define range of application (see p. 5-65).
9. Set filter if required (see p. 5-65).
10. Select *OK*.
11. If necessary click on the objects or corners whose corner treatment you want to delete and recreate.

    Note
    If you selected "Object" as the range of application: first click on the first element of the equidistant, then the second. It is not sufficient to click on the contour on which the object is located.

Deleting corner treatments

Prerequisite

- You have loaded a processed sheet or a processed single part (for Loading files, see Section 3, p. 5-13 ff).

1. Select *Processing >Modify >Corner treatment >Delete*.

   ToPs displays the "Delete corner treatment" mask.
2. Under "Type of corner", mark the type of corner treatment you wish to delete.
3. Define range of application (see p. 5-65).
4. Select *OK*.
5. Click on the objects, contours or parts for which you want to delete corner treatment.

   Note
   When you have selected "Object" as the range of application: click directly on the looping, rounding or cooling. It is not sufficient to click on the contour on which the corner treatment is located.

7. Preparing processing plans

You can prepare the processing on a sheet in the following way:

- Creating sheet parting cuts and – if necessary – CSC preparation (CSC = common slitting cuts).
- Preparing common cuts on a sheet (for CSC preparation, see Section 7.2, p. 5-78).

7.1 Sheet parting cuts

With sheet parting cuts, you can separate unprocessed remainders of a sheet or crop the waste skeleton.

You can create sheet parting cuts automatically or manually.

The difference:

- Automatic sheet parting cuts **must** be integrated into CSC preparation.
- Manual sheet parting cuts **can** be integrated into CSC preparation.

Setting parameters of sheet parting cuts

You can set the parameters of sheet parting cuts (e.g. minimum length of element for preparation). ToPs then applies these until you select a different process rule.

... for subsequent CSC preparation?

1. Load unprocessed sheet without CSC preparation or load processed sheet(for Loading files, see Section 3, p. 5-13 ff).

   Note
   If you load a processed sheet, the processing plan will be deleted prior to CSC preparation.

2. Select *Processing >Preparation >Cut on sheet >Parameters*.

... without subsequent CSC preparation?

1. Load processed sheet/unprocessed sheet without CSC preparation or load processed sheet(for Loading files, see Section 3, p. 5-13 ff).

2. Select *Processing >Extras >Cut on sheet >Parameters*.

ToPs displays the mask "Parameters for cut on sheet" mask.

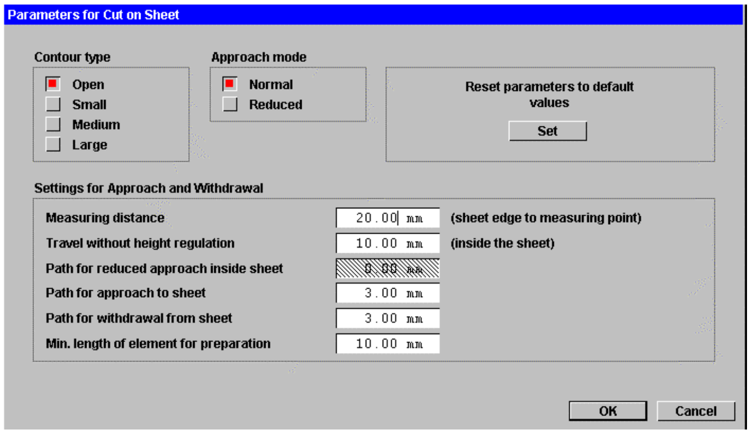


Fig. 22021EN

The parameters entered in the mask are the values recommended by TRUMPF from the current process rules. They can be changed temporarily here.

The changes will be lost as soon as you select a new process rule. (To permanently change parameters see Chapter 6, Data module.)

Selecting contour type

➢ Select "Open".

ToPs reads the type of contour from the current process rules. Depending on the process rule, an "open contour" means a small, medium, or large contour.

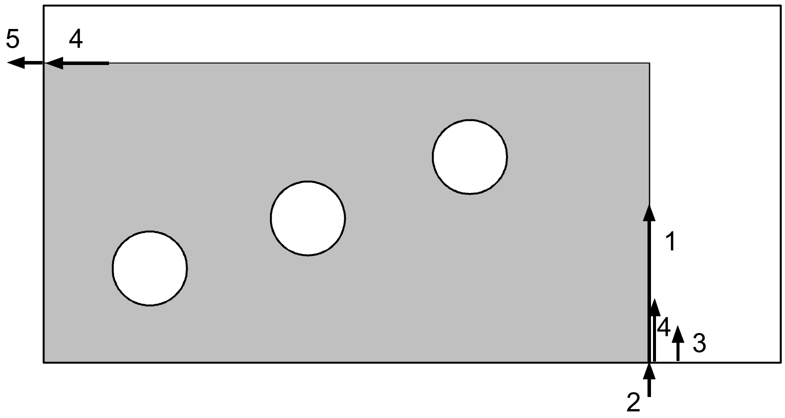
or

➢ Select contour type "Small", "Medium" or "Large".

ToPs assigns the contour type independent of the specification in the process rule.

Selecting approach mode

➢ Select "Normal" or "Reduced". (For an overview of piercing and approaching for various materials, refer to the current data collection for your machine.)



1	Measuring distance	3	Path for reduced approach inside sheet
2	Path for approach to sheet	4+5	Distance traveled without height regulation
2+4	Distance traveled without height regulation	5	Path for withdrawal from sheet

Fig. 29678

Defining approach and withdrawal settings

1. Enter "Measuring distance" (1).
   At this distance (starting from the sheet edge), the distance control system measures the position of the sheet surface.
2. Enter "Travel without height regulation" (2+4 and 4+5): The distance control system must not be switched on when the beam moves into the sheet from outside it. (Risk of collision: the cutting head would move down to its lowest point and hit the sheet when it moves to cut into it.)
   The machine therefore switches the distance control system on only when the laser has covered the "Travel without height regulation" distance.
3. For approaching with reduced laser power, in the case of laser cutting machines ("Approach mode" "Reduced" is active):
   Enter "Path for reduced approach inside sheet" (3).
4. Enter "Path for approach to sheet" (2). (= Distance between the switch-on position of the beam (outside the sheet) and the sheet edge. The distance control system is switched off.)
5. Enter "Path for withdrawal from sheet" (5). (= Distance between the sheet edge and the switch-off position of the beam. The distance control system is switched off.)

For cuts which are to be integrated into CSC preparation[1]

6. Enter "Min. length of element for preparation." (If the sheet parting cut is shorter than the "Min. length of element for preparation", ToPs will not program a preparatory cut.)

[1] CSC = Common (slitting) cuts

Confirming entries

➢ Select *OK*.

ToPs applies the set parameters to future sheet parting cuts.

Reset parameters to values from the process rule?

➢ Select *Set*.

Creating automatic sheet parting cuts for CSC preparation

Always create sheet parting sheet parting cuts which are to be integrated into CSC preparation prior to CSC preparation.[1]

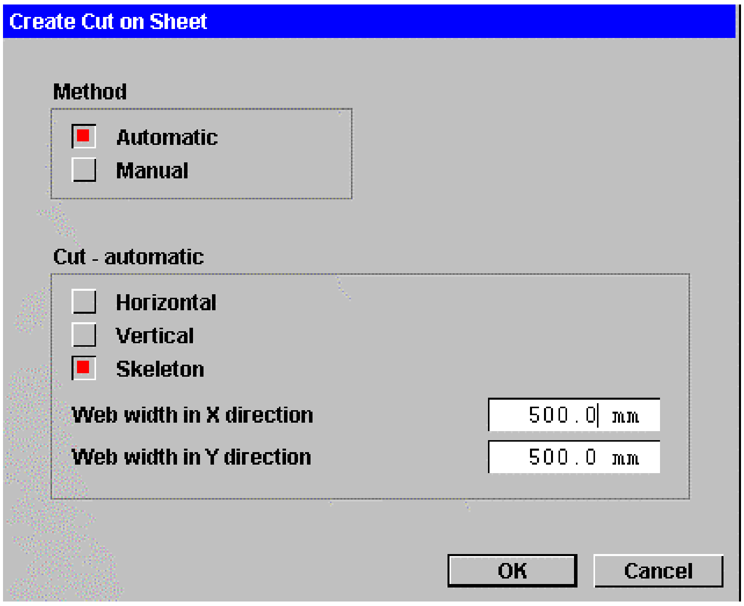
Prerequisite

- You have loaded an unprocessed sheet without CSC preparation or a processed sheet (for Loading files, see Section 3, p. 5-13 ff).
- Technology data have been selected (for Selecting technology table and process rule, see Section 5.1, p. 5-33 ff).

Notes
If you load a processed sheet, the processing plan will be deleted prior to CSC preparation. Only manual sheet parting cuts can be created on a processed sheet and these cannot be integrated into CSC preparation (see p. 5-76).

1. Select *Processing >Preparation >Cut on sheet >Create*.
   ToPs displays the "Create cut on sheet" mask.
2. Select "Automatic."
   The "Create cut on sheet" mask then looks as follows:

[1] CSC = Common (slitting) cuts



The mask "Cut on sheet," "Automatic" Fig. 22019EN

3. To create either horizontal or vertical cuts: select "Horizontal" or "Vertical".
4. To create both horizontal and vertical cuts: select "Skeleton" and enter web widths.
5. Select *OK*.
6. Follow the instructions in the command line.

Creating sheet parting cuts manually

Sheet parting cuts created manually can be of any length. The beginning and end points can be set freely.

With manual cuts, you have the choice of whether you integrate them into CSC preparation[1] or not (see following sections).

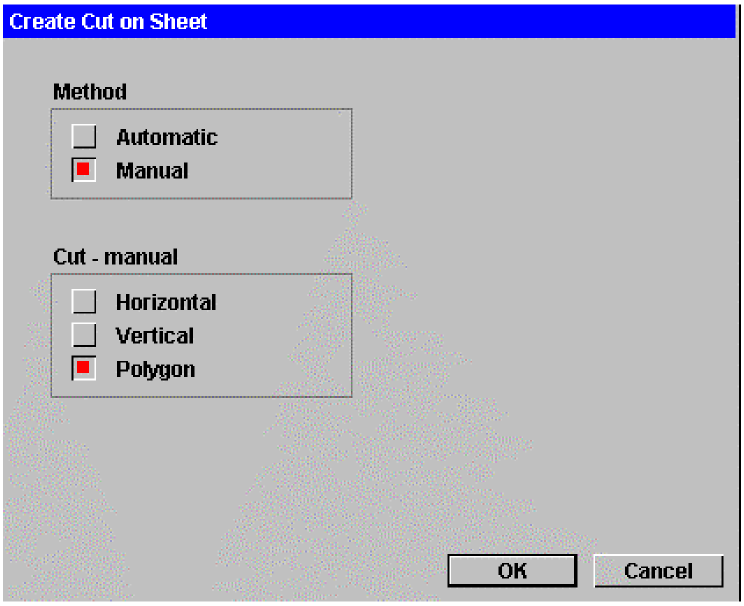
You can create manual sheet parting cuts which you do not wish to integrate into CSC preparation either before or after the processing of the sheet. If the sheet has already been processed, ToPs processes the cuts automatically.

Note
With sheet parting cuts on processed sheets, processing plans are deleted prior to CSC preparation.

[1] CSC = Common (slitting) cuts

Integrate manually created sheet parting cuts into CSC preparation?

1. Load unprocessed sheet without CSC preparation (for Loading files, see Section 3, p. 5-13 ff).
2. Select *Processing >Preparation >Cut on sheet >Create*.
   ToPs displays a "Create cut on sheet" mask.
3. Select "Manual".
   The "Create cut on sheet" mask then looks as follows:



The mask "Cut on sheet," "Manual" Fig. 22375EN

4. Under "Cut – manual", select "Horizontal", "Vertical" or "Polygon".

   Note
   Horizontal and vertical cuts can be created one after the other on a sheet.

   Polygonal cuts are composed of several contiguous cuts, each of which can take any course.

5. Select *OK*.
6. Follow the instructions in the command line.
7. When you have created all cuts: select *End*.

Starting CSC preparation

8. Select *Processing*, *Preparation*, *Start*.

ToPs integrates the manual cuts into the CSC preparation.

Do not integrate manually created sheet parting cuts into CSC preparation?

If the sheet has already been processed, ToPs processes manual sheet parting cuts automatically.

1. Load processed or unprocessed sheet (for Loading files, see Section 3, p. 5-13 ff).
2. Select *Processing >Extras >Cut on sheet >Generate*.

   ToPs shows the following mask:

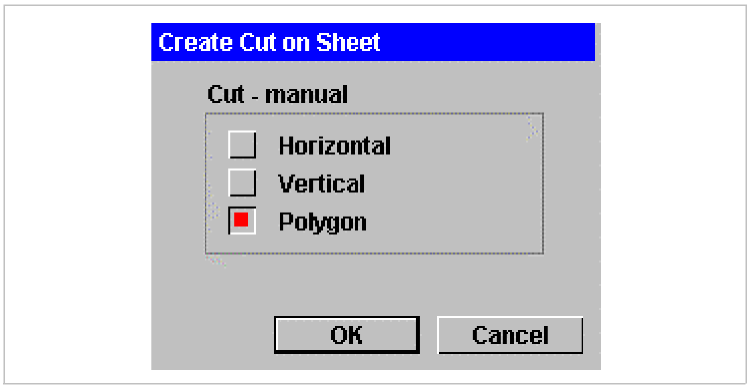


Fig. 22272EN

3. Under "Cut – manual", select "Horizontal", "Vertical" or "Polygon".

   Note
   Horizontal and vertical cuts can be created one after the other on a sheet.

   Polygonal cuts are composed of several contiguous cuts, each of which can take any course.

4. Select *OK*.
5. Follow the instructions in the command line.
6. When you have created all cuts: select *End*.

Deleting polygonal sheet parting cuts step-by-step while creating

You can delete polygonal cuts step-by-step while creating them. This is not possible with horizontal or vertical cuts.

Prerequisite

- You have not yet confirmed the polygonal cuts using *OK*.

1. Select *Processing >Extras >Cut on sheet >Undo*.
   ToPs deletes the cut created last.
2. Repeat until the desired cuts have been deleted.

Deleting sheet parting cuts

Prerequisite

- You have loaded an unprocessed or processed sheet without CSC preparation (for Loading files, see Section 3, p. 5-13 ff).

Note
Deleted cuts cannot be restored.

An existing CSC preparation can neither be modified nor deleted.

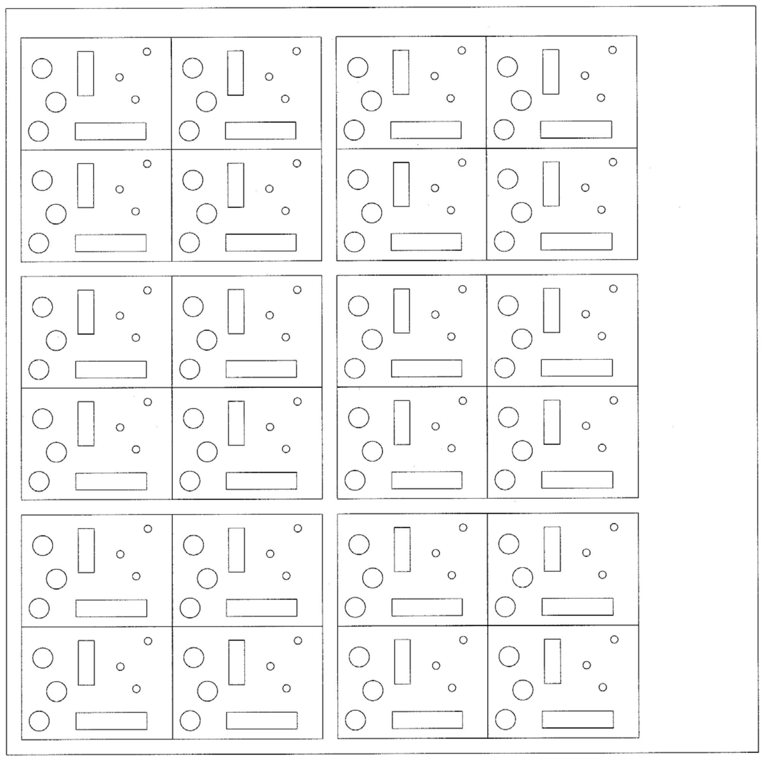
1. Select *Processing >Preparation >Cut on sheet >Delete*.

   or

   ➢ Select *Processing >Extras >Cut on sheet >Delete*.
2. Click on all the sheet parting cuts successively which you want to delete.

7.2 Preparing common cuts on a sheet (CSC preparation)

With common cuts, the contours of parts lying next to each other are cut at the same time. The parts are laid out in such a way that the distance between them corresponds to the kerf width. No waste grid is produced.



1 Single part 2 Sheet

Fig. 17142

What is CSC preparation?

- ToPs creates a common parting cut for all contours which are separated from each other by a distance corresponding to the kerf in the active technology table.
- In CSC preparation, the sequence of cuts is determined (common cut, preparatory cut in the next contour, overlapping cut, withdrawal ...).
- If the sheet also contains sheet parting cuts, the preparatory cuts will be integrated into the CSC preparation.

Notes
Always create sheet parting sheet parting cuts which are to be integrated into CSC preparation prior to CSC preparation.

Existing processing plans will be deleted by the CSC preparation. When you do CSC preparation on processed sheets, you will subsequently have to create the processing plan anew.

An existing CSC preparation can neither be modified nor deleted.

1. **Either**

   ➢ Load CSC suitable sheet via *File >Load ... >Sheet & CSC* (see also Section 3.3, p. 5-17).

   ToPs takes you to the "Parameters for Common Slitting Cuts" mask.

   or

   ➢ Load CSC suitable sheet via *File >Load >Sheet/single part* (see also Section 3.2, p. 5-16).

   ➢ Select *Processing >Preparation >Parameters*.

ToPs displays the "Parameters for Common Slitting Cuts" mask:

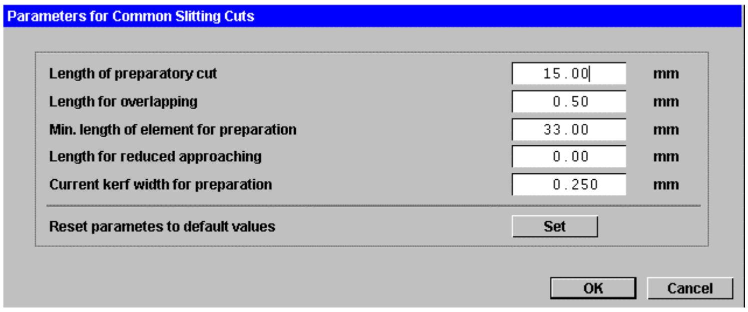


Fig. 21940EN

The parameters entered in the mask are the default values recommended by TRUMPF from the current process rules. They can be temporarily modified here (for a description of the parameters, see following section).

Note
The changes will be lost as soon as you select a new process rule. Parameters can only be permanently changed in the process rule (see Chapter 6, Data module).

2. Modify parameters if necessary. (For a description of the parameters, see the following section.)

3. Supplement sheet parting cuts if necessary (see Section 7.1, p. 5-70 ff).

4. Select *OK*.

Starting CSC preparation

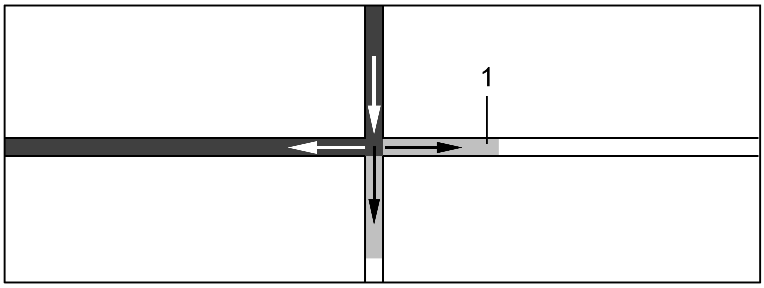
1. If you loaded the CSC suitable sheet via *File >Load ... >Sheet & CSC:* select *Processing >Create >Start*.
2. If you loaded the CSC suitable sheet via *File >Load ... >Sheet/single part:* select *Processing >Preparation >Start*.

ToPs prepares the sheet for common cuts.

Parameters for common cuts

"Length of preparatory cut"

The preparatory cut goes over and beyond the parting cut to the neighboring contour:



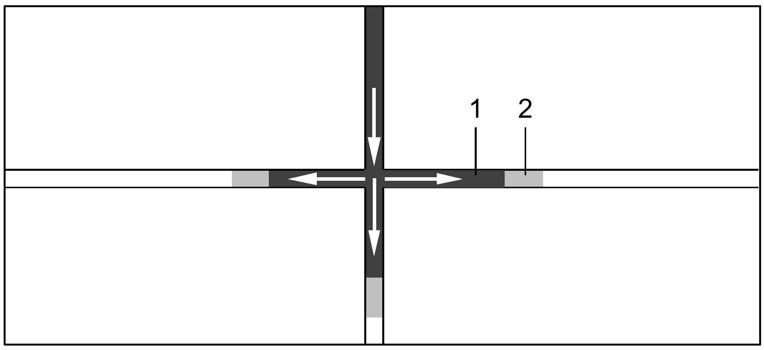
1 Preparatory cut

Fig. 29043

"Length for overlapping"

The length for overlapping extends the preparatory cut. It prevents the formation of slats when the preparatory cut and the actual cutting of the contour later "come together". The overlapping length is thus cut "twice".

The length for overlapping is dependent on the material.



1 Preparatory cut 2 Length for overlapping

Fig. 29044

Example:

Length of preparatory cut:	15 mm
Length for overlapping:	1 mm
Total length of the cut into the neighboring contour:	16 mm

Table 5-4

"Minimum length of element for preparation"

This value ensures that a workpiece will not be already cut out by two preparatory cuts.

"Length for reduced approaching"

The reduced approach is mainly used for stainless steel and aluminum. ToPs reads the value from the process rule.

"Current kerf width"

ToPs merely displays the kerf in this mask. It cannot be modified here. (For modifying kerf see Data module.)

8. Processing plan "Extras"

8.1 Using "customized cycles" to insert NC texts in a processing plan

You can insert NC texts that you have written yourself into the processing of a sheet or single part. ToPs will insert this NC text into the NC program in the course of its generation.

NC cycles you define yourself are called "free cycles" or "customized cycles".

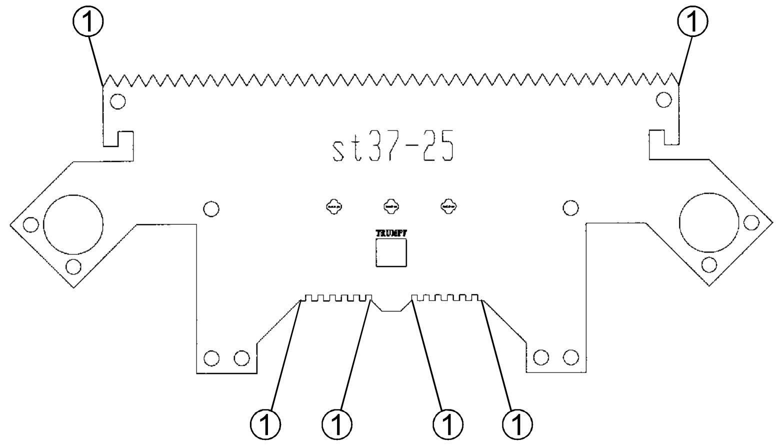
You always create customized cycles for a specific machine.

Overview of all NC functions

You can find an overview of all NC functions in the current programming manual for your machine.

Examples of application for customized cycles:

- Reduce machining speed
- Switch from one contour size to another within a contour (change technology table).



1 Technology table change

Example: Switching from one contour size to another. Fig. 22262

Customized cycles that you use often ...

... can be created in the *Data* module and set in the *Technology* module.

"One-off" cycles ...

... can be set directly in the *Technology* module.

(To set customized cycles see the following description; to create customized cycles see Chapter 6, Data module).

Laser cutting machines with Siemens control systems

For laser cutting machines with Siemens control systems, the following customized cycles are included in the ToPs database as standard:

- Customized cycles with which you can change the contour size.

Defining customized cycles

Prerequisite

- You have loaded a processed sheet or a processed single part (for Loading files, see Section 3, p. 5-13 ff).

1. Select *Processing >Extras >Free cycle >Create*.
   ToPs displays the "Free cycle" mask:

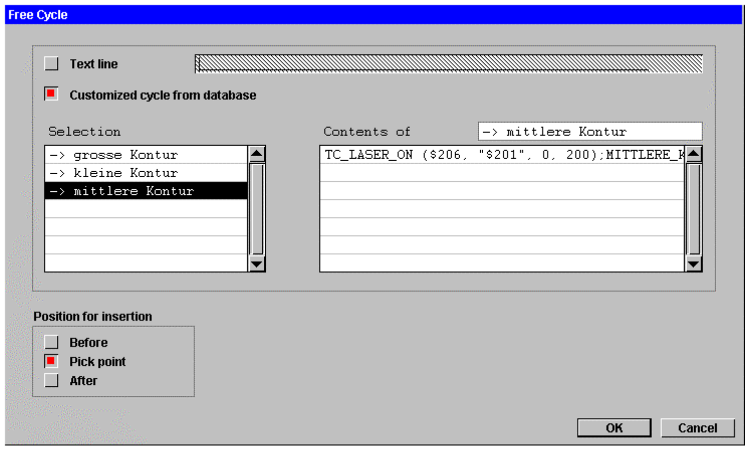


Fig. 22252EN

2. **Either**

   ➢ Select "Text line" if you only want to use the cycle once.

   ➢ Enter the NC text directly. (The text will be retained until you enter a new one.)

   or

   ➢ Select "Customized cycles from database".
   ToPs shows the all customized cycles that you can select from. The selection contains all cycles delivered by TRUMPF with machines with Siemens control systems and all cycles which you have created yourself in the *Data* module for the active machine.

➢ Mark the customized cycle which you want to define.

ToPs displays the content of the customized cycle.

Selecting the insertion position

3. To insert the customer cycle before/after the NC block which defines a contour: select insertion position "Before"/"After".
4. To insert the customer cycle at the pick point: select the insertion position "Pick point".

   ToPs separates the NC block which defines the picked contour into two "halves" and inserts the customized cycle in between.

Inserting the customized cycle

5. Select *OK*.
6. Click on the contour in which you want to insert a customer cycle.

   Note
   For insertion position "Before" or "After":
   Click on the contour in which you want to insert a customer cycle. Click again to insert the name of the customer cycle on the sheet or single part. The position of the name on the sheet is not relevant here.

ToPs sets the customized cycle and displays the name at the selected point.

Deleting customized cycles set in NC texts

Prerequisite

- You have loaded a processed sheet or single part which contains customized cycles (for Loading files, see Section 3, p. 5-13 ff).

1. Select *Processing >Extras >Free cycle >Delete*.

   ToPs displays the "Delete free cycle" mask.
2. To delete an individual customized cycle: select *Object selection*, click on customized cycle.
3. To delete customized cycles on an individual contour in all identical parts: select *Contour*, click on contour (in any of the identical parts).
4. To delete all customized cycles in all identical parts on a sheet: select *Part + copies* and click on one of the identical parts.
5. To delete all customized cycles on the sheet: select *Entire sheet*.

8.2 Microwelds

MicroWelds are welding points. They keep parts which have been cut free in the waste skeleton, and are particularly useful for thick materials where no further microjoints can be placed.

Microwelds are an option for laser cutting machines.

Application:

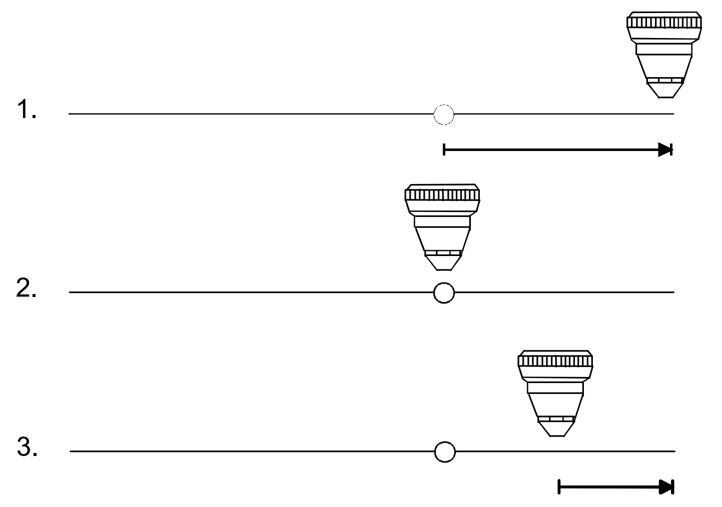
- Fixing small finished parts in the sheet, to enable automatic unloading of the complete sheet (e.g. using the LiftMaster).
- Preventing cut contours from tipping (depending on the size and shape of the parts).
- Fixing long and narrow parts to the sheet which can arch upwards from heat and could lead to collisions.

Operation

- The machining of the contour is halted just after it has passed the position programmed for the welding point (1.).
- The cutting head moves back along the path just machined and places the welding point at the programmed position (2.).
- The cutting head moves forward along the path just machined (3.) and resumes the machining of the contour.

Note
The cutting head cannot move back to a contour which is has already left. For this reason, welding points cannot not be placed at the end of a contour.

At the end of a contour, it is possible instead to work with microjoints (see p. 5-89).



1	Preparatory cut	3	Overlapping cut
2	Placing welding point		

Fig. 29874

Positioning microwelds

Prerequisite

- You have activated the microweld function for your machine (see Chapter 6, Data module).
- You have loaded a processed sheet or a processed single part (for Loading files, see Section 3, p. 5-13 ff).

➢ Select *Processing >Extras >MicroWeld >Create*.
ToPs displays the "MicroWeld" mask:

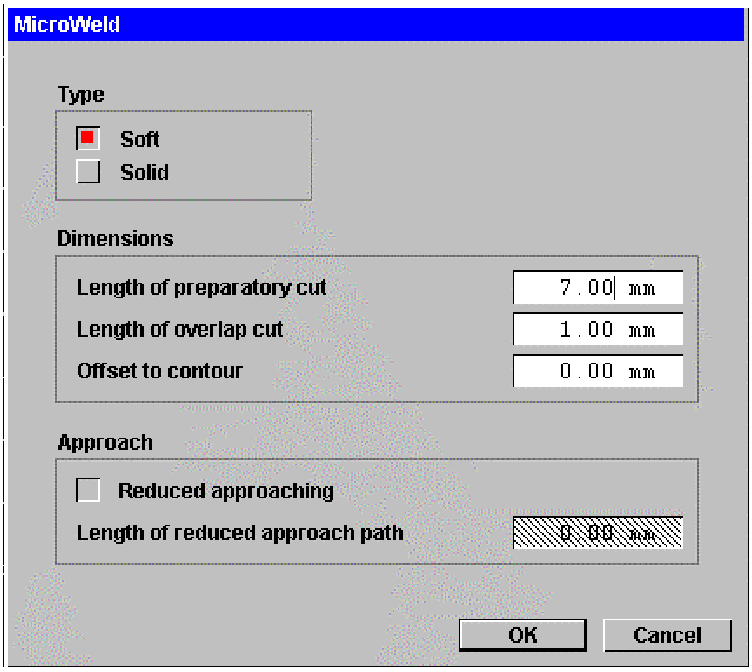


Fig. 29873EN

The mask contains the machining rules for microwelds. They are taken from the process rule and can be temporarily modified here. The changes will be lost as soon as you select a new process rule.

Selecting the "Type" of microwelds

1. To only bind the part lightly to the waste grid: select "Soft".
2. To bind the part solidly to the waste grid: select "Solid".

Entering dimensions

1. Enter "Length of preparatory cut".
   Preparatory cut = path between the position at which machining is stopped and the position at which the welding point is placed (see Fig. 29874, p. 5-85).

2. Enter "Length of overlap cut".

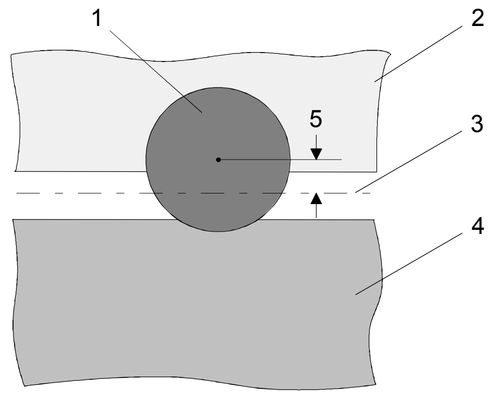
   Length of overlap cut = 0: machining is resumed at the point at which it was stopped.
   Length of overlap cut > 0: machining is resumed prior to the point at which it was stopped.

3. Enter "Offset to contour" (5) (see Fig. 18401, p. 5-87).

   Offset = distance between the center of the kerf (3) and the center of the welding point.

   Advantage of offset:

   – The welding point damages the part as little as possible.
   – An offset increases the weld joint's stability, especially when machining stainless steel.



1	Welding point (microweld)	4	Part
2	Waste grid	5	Offset
3	Kerf center		

Fig. 18401

4. For reduced approach following welding: check "Reduced approaching".

5. If "Length of reduced approach path" = `0`: enter the length. (ToPs reads the length of the reduced approach path from the process rule. If the process rule does not contain a value, ToPs enters the length `0.00 mm`.)

   Note
   The "reduced approach path" begins from the point at which machining was stopped. (For an overview of piercing and approaching for various materials, refer to the current data collection for your machine).

6. Select *OK*.

7. Click on the position(s) of the microweld(s) on the contour.

   Note
   Microwelds can be placed at the beginning and between the beginning and end of a contour.

Microwelds cannot be placed at the end since the cutting head cannot travel back into a contour which it has previously left.

Tip
At the end of the contour, work with microjoints (see p. 5-89).

ToPs marks the welding points with a green or red circle (soft or solid welding points, respectively), the "preparatory cuts" with a blue line, and the "overlap cuts" with a yellow one.

Deleting microwelds

Prerequisite

- You have loaded a processed sheet or single part which contains microwelds (for Loading files, see Section 3, p. 5-13 ff).

2. Select *Processing >Extras >MicroWeld >Delete*.
   ToPs displays the "Object selection" mask.
3. To delete an individual microweld: select *Object selection*, click on microweld.
4. To delete microwelds on an individual contour in all identical parts: select *Contour*, click on contour (in any of the identical parts).
5. To delete all microwelds in all identical parts on a sheet: select *Part + copies* and click on one of the identical parts.
6. To delete all microwelds on the sheet: select *Entire sheet*.

8.3 Microjoints

With microjoints, the contour is not completely cut off:

- With "ToPs microjoints", it remains linked to the sheet via a slat at the end of the contour (see below).
- With "machine microjoints", the contour remains linked to the sheet via several slats within the contour (see p. 5-91 ff).

Microjoints avoid collisions between the cutting head and the cut contour. (Collisions could for example occur if the cut contour tilts and does not fall out.)

After sheet machining has been completed, the contour can be broken out by hand.

"ToPs microjoints" on the end of a contour

For microjoints at the contour end, the beam is switched off before it reaches the end of the contour.

Prerequisite

- You have loaded a processed sheet or a processed single part (for Loading files, see Section 3, p. 5-13 ff).

Note
When you subsequently place a microjoint on contours whose approach or withdrawal flags you have manually altered, the manual modifications of the approach or withdrawal flags are lost.

1. Select *Processing >Modify >Contour >Parameters*.
2 Click on the contour on which you want to create a microjoint.
   ToPs displays the "Set contour parameters" mask:

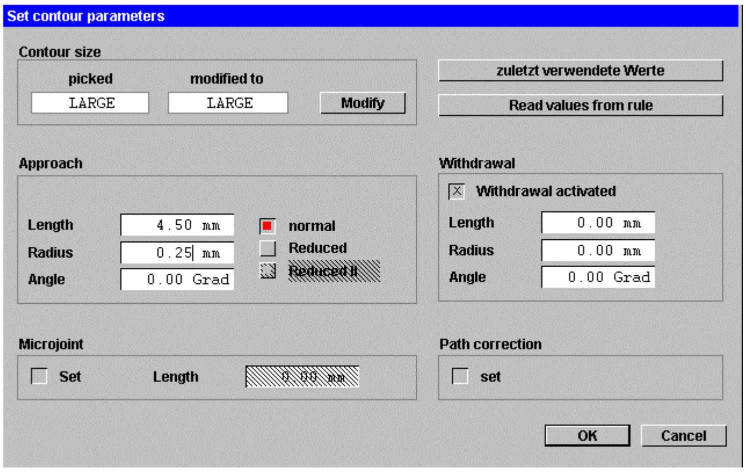


Fig. 29049EN

Read in recommended length of microjoint?

3. Select *Read in values from rule*.

   ToPs reads the length for the microjoint recommended by TRUMPF from the process rule which is being used to process the contour.

   Note
   The length of the microjoint can be temporarily modified here. The change will be lost as soon as you select a new process rule. Parameters can only be permanently changed in the process rule (see Chapter 6, Data module).

4. Select "Microjoint", "Set".
5. Modify length of microjoint if necessary.
6. Select *OK*.
7. Click one after the other on the contours on which the microjoint is to be created.

   Note
   If you place the microjoint on contours of other sizes, these contours are set with the approach and withdrawal data for the "wrong" contour size.

Several "machine microjoints" within one contour

When you program using ToPs "machine microjoints", you only define their position, not their length.

The machine's control system reads the length from a corresponding table.

The operator can activate and deactivate programmed "machine microjoints" in this table.

Creating several "machine microjoints" on one contour

Prerequisite

- You are programming for a machine which can generate several "machine microjoints" on one contour. (As yet, it has only been possible to create several "machine microjoints" on one contour using the TC L 3050.)
- You have loaded a processed sheet or a processed single part (for Loading files, see Section 3, p. 5-13 ff).

Note
ToPs always creates "machine microjoints" within the one contour in all identical parts.

1. Select *Processing >Extras >MicroJoint >Create*.
2. Click one after the other on the positions of the "machine microjoints" on the contour.
   Note
   If you only wish to create **one** "machine microjoint" on the contour end: click on the contour end.

ToPs displays the "machine microjoints" with green diamonds.

Deleting "machine microjoints"

Prerequisite

- You have loaded a processed sheet or single part which contains "machine microjoints" (for Loading files, see Section 3, p. 5-13 ff).

Note
ToPs always deletes "machine microjoints" within the one contour in all identical parts.

1. Select *Processing >Extras >MicroJoint >Delete*.
2. Click on the "machine microjoints" you wish to delete.

Disabling contours against automatic "machine microjoints"

If you wish to cut contours without automatic "machine microjoints" (e.g., because the contour is a scrap piece and is meant to fall out) you can disable these contours against automatic "machine microjoints". The machine operator cannot then activate any further "machine microjoints" there.

The contours are marked as disabled.

Prerequisite

- You have loaded a processed sheet or a processed single part (for Loading files, see Section 3, p. 5-13 ff).

Note
ToPs always disables all identical contours against "machine microjoints".

1. Select *Processing >Extras >MicroJoint >Inhibit*.
2. Click on the contours which you want to disable against automatic "machine microjoints".

ToPs displays the disabling marking with a red diamond.

Enabling contours which had been disabled against automatic "machine microjoints"

Prerequisite

- You have loaded a processed sheet or a processed single part.
- Contours have been disabled against "machine microjoints" (for Loading files, see Section 3, p. 5-13 ff).

Note
ToPs always enables all identical contours in all identical parts.

1. Select *Processing >Extras >MicroJoint >Enable*.
2. Click on blocked contours one after the other.

ToPs releases the contours disabled against automatic "machine microjoints".

8.4 Cutting exact circles

You can optimize the processing of circles in the following ways:

- Cutting circles with path correction.
- Cutting circles with diameter correction.
- Cutting circles with the aid of "approach dimple" without jag.

Cutting circles with path correction

Cut a circle using path correction when you require a high level of precision.

When you cut circles using path correction, ToPs does not output an equidistant in the NC text but rather the contour itself. The operator enters the value for the path correction at the machine.

The path correction corresponds to the kerf. The operator measures the kerf on a cut circle.

For water jet cutting machines, circles are always cut using path correction (ToPs outputs it automatically). For laser cutting machines, you can switch path correction on and off.

Cutting circles with diameter correction

If a small circle is cut at high speed on a machine, it can occur that the control system no longer corrects the lag action of the axes. The circle is then cut with a diameter smaller than the programmed diameter.

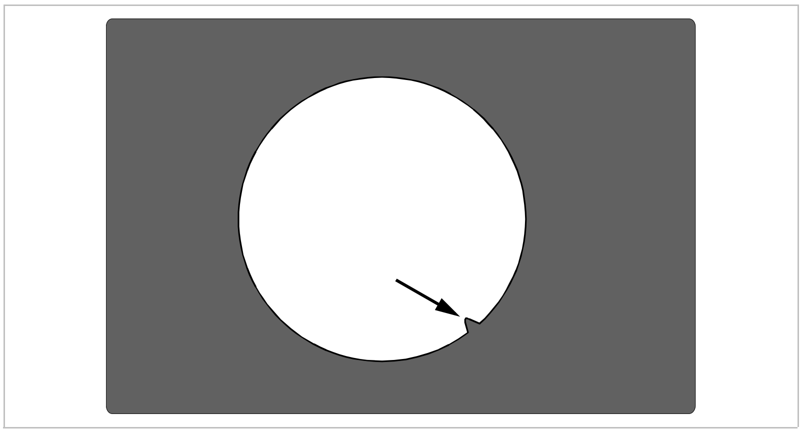
ToPs gives you the option to correct this effect by programming a larger diameter.

The diameter correction affects the NC output, but not the geometry (drawing) of the part.

You can have ToPs calculate the corrective value for the diameter using the machine and cutting parameters (automatic diameter correction) or enter the corrective value manually (manual diameter correction).

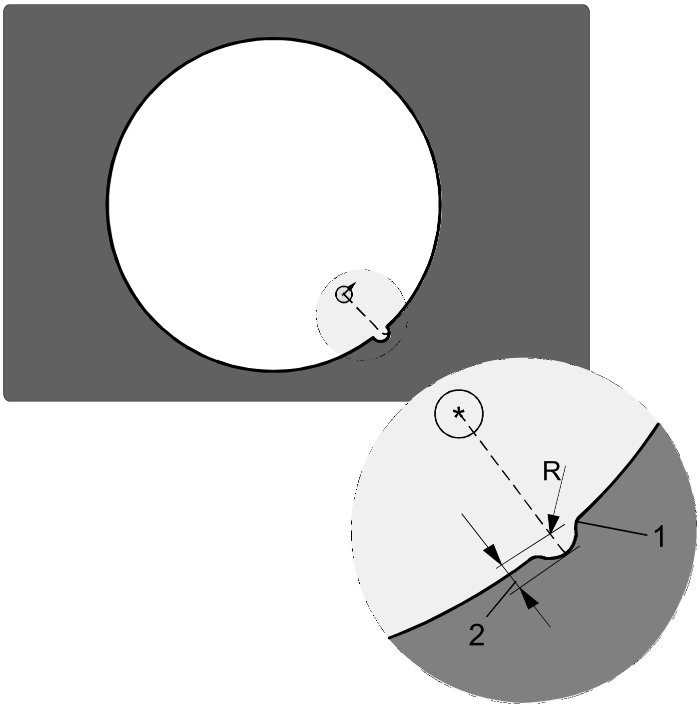
Cutting circles using "approach dimple" without jag

When cutting a circular contour, a so-called jag often remains which juts out into the circle. If, for instance, a tube is to be put through this circle, the jag will need to be removed manually.



Circle with jag Fig. 18346

To cut a circular contour without a jag, it is possible to cut beyond the programmed contour at the approach position. We call the notch which results in the contour the "approach dimple".



1	Transition radius	R	Radius
2	Depth of approach dimple		

Fig. 29875

Combining different circle corrections

Path correction, diameter correction and approach dimples can be combined.

Cutting circles using diameter correction, path correction or approach dimple

Prerequisite

- You have loaded a processed sheet or a processed single part (for Loading files, see Section 3, p. 5-13 ff).

➢ Select *Processing >Extras >Circle correction >Create*.
ToPs displays the "Circle correction" mask.

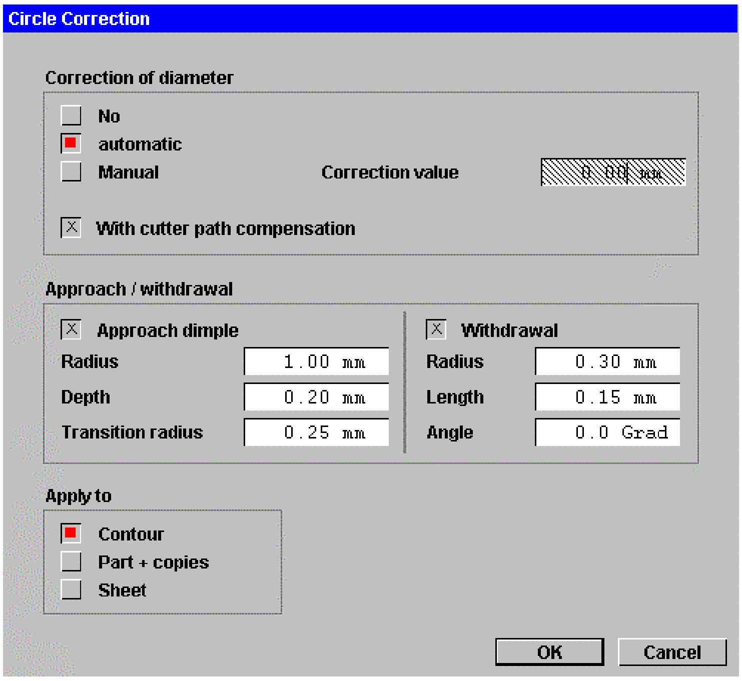


Fig. 29064EN

Cutting with diameter correction?

➢ **Either**

➢ Select "Correction of diameter" "Automatic".

ToPs calculates a corrective value for the diameter with the aid of the machine and cutting parameters.

or

➢ Select "Correction of diameter" "Manual".

➢ Enter the corrective value.

ToPs enlarges the circle diameter by the corrective value entered.

Note
Make sure the machine processes the contour with the speed and acceleration you programmed in ToPs. (Have the values in the technology table been changed at the machine?)

Ensure that the kerf at the machine corresponds to the kerf you programmed.

Cutting with path correction?

➢ Check "With cutter path compensation".

The machine operator can now correct the diameter of the circle cut by entering a different kerf.

Create approach dimple?

1. Check "Approach dimple".
2. Enter Radius (3), Depth (2) and Transition radius (1) (see Fig. 29875, p. 5-94).

   Note
   If you create an approach dimple, you cannot not subsequently modify the processing plan (especially the approach and withdraw flags).

Creating withdrawal flag for machines with Bosch or TASC control systems

For machines with Bosch or TASC control systems, you must program a withdrawal flag in order to dismantle the path correction which the machine has constructed on approaching the contour:

1. Check "Withdrawal".
2. Enter Radius, Length and Angle of withdrawal flag (for Parameters of withdrawal flags, see Section 6.3, p. 5-57).

Selecting the range of application

1. Under "Apply to", enter range of application:
   - *Contour:* cut circle for an individual contour in all identical parts using circle correction.
   - *Part + copies*: cut circles in a part and all copies of it using circle correction.
   - *Sheet*: cut all circles on a sheet using circle correction.
2. Select *OK*.

Only for ranges of application *Contour* or *Part+copies*

3. Click one after the other on all circles which are to be cut using diameter correction, path correction or approach dimple.

8.5 Cutting any given contours with high precision (path correction)

You can cut not only circles using path correction (see p. 5-95), but all other contours too.

Prerequisite

- You have loaded a processed sheet or a processed single part (for Loading files, see Section 3, p. 5-13 ff).

1. Select *Processing >Modify >Contour >Parameters*.
2. Click on the contours which you want to cut using path correction.

   ToPs displays the "Set contour parameters" mask.

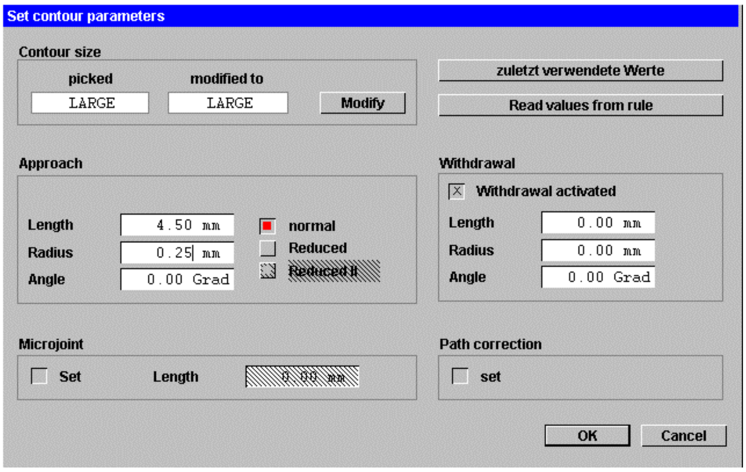


Fig. 29049EN

   In this mask, ToPs displays the contour parameters for the selected contour (e.g. contour size).

3. Select "Set path correction."

Creating withdrawal flag for machines with Bosch or TASC control systems

   For machines with Bosch or TASC control systems, you must program a withdrawal flag in order to dismantle the path correction which the machine has constructed on approaching the contour:

4. Check "Withdrawal".
5. Enter Radius, Length and Angle of withdrawal flag (for Parameters of withdrawal flags, see Section 6.3, p. 5-57).
6. Select *OK*.
7. Click one after the other on all contours which are to be cut using path correction.

Notes
All contours adopt from the "Set contour parameters" mask the contour parameters of the contour first clicked on.

If you also wish to cut contours with **different** contour parameters using path correction: complete action with *End* and open the "Set contour parameters" mask again.

8.6 Pallet workpiece supports

You can:

- Assemble workpiece supports individually and save as selection.
- Call up selection and allocate to a sheet.

Advantages:

- You can remove particular workpiece supports (according to sheet layout), to allow waste parts to fall out cleanly.

ToPs gives a list of workpiece supports in the setup plan which the machine's operator must remove from the pallet.

Compiling workpiece supports individually and saving as selection

Prerequisite

- You have loaded a processed or unprocessed sheet (for Loading files, see Section 3, p. 5-13 ff).

1. Select *Processing >Extras >Workpiece support >Set webs*.

   ToPs displays all workpiece supports which are possible for the active machine. Display: color - red; type of line - dashed.

   Note
   When you select *Set webs* ToPs automatically switches on the web view (for Switching on viewing options, see too Section 13.1, p. 5-113).

2. Click one after the other on all workpiece supports which the machine's operator is to remove.

The color of the removed workpiece supports changes from red to blue.

Saving selection

3. When all desired workpiece supports have been marked: select *Workpiece support, Save*.

   ToPs displays the "Indicate name of web assignment" mask:

4. Enter the assignment name.
5. Select *OK*.

Calling up saved selection and allocating to a sheet

Prerequisite

- You have loaded the sheet which you want to allocate a saved selection to (for Loading files, see Section 3, p. 5-13 ff).

1. Select *Processing >Extras >Workpiece support >Selection*.

   ToPs displays the "Web assignment selection" mask. It contains as standard the option *Alle gesetzt* (*All set*), and all the workpiece support combinations compiled and saved by you.

2. Mark the desired selection.
3. Select *OK*.

ToPs allocates the desired selection to the loaded sheet. ToPs displays set workpiece supports in red, workpiece supports to be removed in blue.

9. Processing with two-head machines

The two cutting heads can machine a sheet either simultaneously or in sequence. They are offset to each other in the X direction in such a way that one cutting head alone cannot cover the entire working range.

Two-head mode

To begin with, ToPs defines the machining for the first cutter head only. Subsequently you state which parts are to be machined with the second cutting head.

Single-head mode with two-head machines

All two-head machines can operate with the first head in single-head mode. The TC HSL 2502, TC HSL 2502 C and the TC HSL 4002 C can also operate with the second cutting head in single-head mode.

9.1 Defining processing with two cutting heads

Prerequisite

- You have laid out "half" of a sheet in the *Nesting* module.
- You have nested the parts so that they are in the working range of the first cutting head (which will later machine the parts).

  Note
  ToPs does not "know" during nesting which parts are to be machined with which cutting head. Therefore ToPs cannot check in the *Nesting* module whether the parts lie inside or outside the working range of the relevant cutting head.
- The same parts are to be cut from the second half of the sheet as from the first half. The second half of the sheet is not laid out.

1. Load unprocessed sheet which is laid out with the parts which are to be cut using the first cutting head (for Loading files, see Section 3, p. 5-13 ff).
2. Select technology table and process rule (see Section 5.1, p. 5-33 ff).

3. Select *Processing >Create >Start*.

   ToPs processes the half laid-out sheet as for machines with one cutting head.

Defining two-head processing

4. Select *Processing >Two-head >Two-head processing >Set*.
5. ToPs displays the "Set cutting head data" mask.
6. Select "Both cutting heads".
7. Enter distance separating the cutting heads.

   Note
   The "Distance between cutting heads" entered in the mask is the minimum distance between the cutting heads (see "Machine data", chapter 6, Data module). You must set it to the actual distance separating the two cutting heads (generally half the sheet size).

8. Select *OK*.

   ToPs displays the working range of the first cutting head with red dashes.

9. Click on or box in parts which are to be machined by the first cutting head.
   (To allocate different "Distances between cutting heads" to different originals and their copies: repeat steps 4 to 9.)

   or

   ➢ To select all parts:
   enter `all` in the command line and press <RETURN> or select the *All* button.

ToPs places copies of parts (with their processing) on the sheet in such a way that the original and the copy can be machined simultaneously. The original is always machined using the first cutting head, the copy using the second.

The parts ToPs processes using the second cutting head are displayed in blue.

9.2 Defining processing with one of the two cutting heads

Note
Only the TC HSL 2502, TC HSL 2502 C and the TC HSL 4002 C can also operate with the second cutting head in single-head mode.

1. Load unprocessed sheet, the parts of which are to be cut using only one cutting head (for Loading files, see Section 3, p. 5-13 ff).
2. Select technology table and process rule (see Section 5.1, p. 5-33 ff).
3. Select *Processing >Create >Start*.

   ToPs processes the sheet as for machines with one cutting head.
4. Select *Processing >Two-head >Two-head processing >Set*.
5. ToPs displays the "Set cutting head data" mask.
6. Select the desired cutting head and then *OK*.

   ToPs displays the working range of the cutting head with red dashes.
7. Click on or box in parts which are to be machined by the selected cutting head.
8. When you have identified all parts: select *End*.

9.3 Deleting processing with two cutting heads

If you completely delete processing with two cutting heads, the machine continues to operate with one cutting head only. It then executes processing for the half laid-out sheet only.

1. Load sheet with two-head processing (for Loading files, see Section 3, p. 5-13 ff).
2. Select *Processing >Two-head >Two-head processing >Delete*.
3. To delete only a part of the two-head processing: click on or box in parts which are to be machined by the first cutting head.

   ToPs deletes the parts copies which were to be machined using the second cutting head.

   or

- To delete all processing with two cutting heads: enter `all` in the command line and press <RETURN> or select the *All* button.

9.4 Displaying processing with two cutting heads

1. Load sheet with two-head processing (for Loading files, see Section 3, p. 5-13 ff).
2. Select *Processing >Two-head >Two-head processing >Show*.

   ToPs displays the "Display cutting head data" mask.

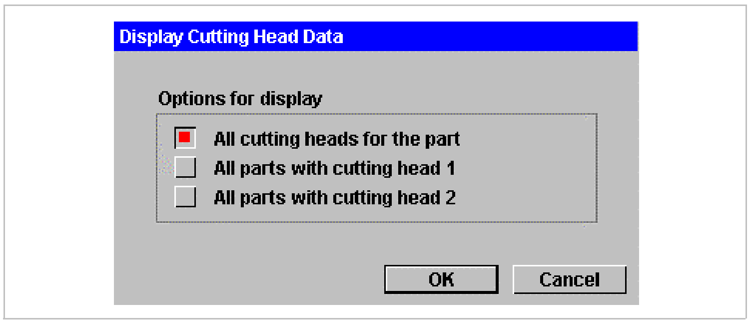


Fig. 29878EN

3. Choose display options:
   - "All cutting heads for the part" = original which is being cut by the first cutting head, and all processing with the second cutting head derived from it.
4. Click on the desired original part.

ToPs displays all parts derived from it in yellow.

10. Creating a simple sheet layout

In the *Technology* module you can arrange processed or unprocessed parts on a sheet without going through the *Nesting* module.

The procedure corresponds to that from ToPs 100 lite:

- The whole sheet is filled with a single part.
- For the layout of the sheet, ToPs uses the circumscribing rectangle of the single part.

Note
Rotating single parts, arranging mini nests on sheets and optimizing sheet layout are not possible here.

1. Select *File >Load ... >Create sheet layout*.
   ToPs displays the "Load file" mask at the tab "File manager".
2. Select desired file format (unprocessed single part: '*.geo', processed single part: '*.gmt').
   The file manager displays all files of the selected format which are located in the current directory.
3. If necessary, change directory (see p. 5-14).

Activate Look-ahead (Preview)?

4. Check "Look-ahead (Preview)".
5. Mark the desired file.
   ToPs enters the name of the file under "File name".
   or
   - Enter the name of the file you want to find under "File name" (to search for file names with the help of wildcards, see p. 5-13).
6. Select *OK*.
   In the case of unprocessed single parts, ToPs displays the "Selection of Technology Tables" mask.

For unprocessed single parts

7. Select technology table and process rule (see Section 5.1, p. 5-33 ff).
   ToPs displays the "Sheet layout" mask:

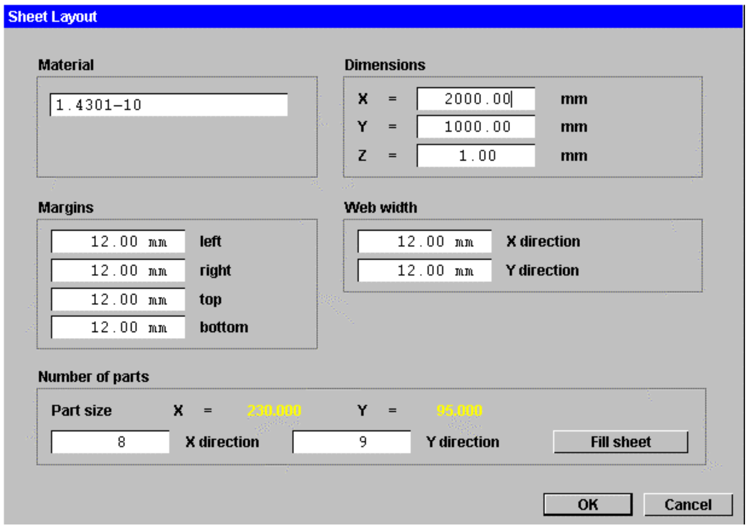


Fig. 22248EN

Under "Number of parts", ToPs displays how many parts fit onto the sheet. (When you display the mask for the first time, ToPs does not take account here of either the edges of the sheet, or the web widths, since at this point these are still zero.)

Create sheet layout

8. Enter dimensions "X" and "Y", edges and web widths.

   Note
   The sheet thickness "z" is preset via the technology data. It cannot be modified.

9. Enter the number of the single parts in the X and in Y directions.

   or

   ➢ Select *Fill sheet*.

   Note
   With *Fill sheet*, ToPs automatically takes into account the edges of the sheet and the web widths which you have entered.

10. Select *OK*.
    ToPs displays the "Sheet layout check" mask.
11. To modify sheet layout further: select *Cancel*.
12. Repeat steps 8 to 10.
13. When the sheet layout is correct: select *OK*.

11. Modifying sheet layout

You can do the following with processed or unprocessed sheets:

- Reposition parts via two points, horizontally, or vertically (see following section).
- Rotate parts around two points or around a center point (see Section 11.2, p. 5-109 ff).
- Create part groups (see Section 12.1, p. 5-111).

If you modify the sheet layout of processed sheets, ToPs "takes along" the processing already present. You do not have to create the processing which is present again. Manual modification and optimizations are retained.

11.1 Repositioning parts

Repositioning parts via two points

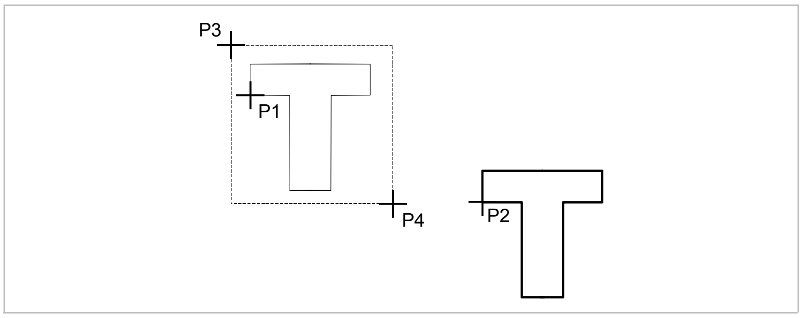


Fig. 27703

Prerequisite

- Technology data have been selected (for Selecting technology table and process rule, see Section 5.1, p. 5-33 ff).

1. Load sheet (for Loading files, see Section 3, p. 5-13 ff).
2. Select *Processing >Layout >Move part >Two points*.
3. Click on a reference point (P1) or enter the coordinates for P1.
4. Click on the target position (P2) or enter the coordinates of P2.

   Note
   (P1) and (P2) define the vector by which the part is to be shifted.

5. Click on any geometry element in the part.

   or

   ➢ Draw a box around the entire part using the mouse (P3, P4).

Undo last repositioning? ➢ Select *Undo*.

Repositioning parts horizontally

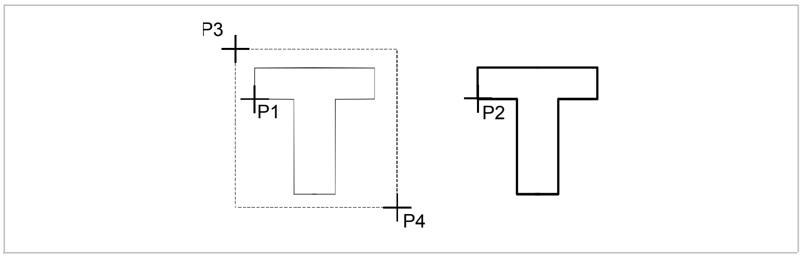


Fig. 27704

Prerequisite

- Technology data have been selected (for Selecting technology table and process rule, see Section 5.1, p. 5-33 ff).

1. Load sheet (for Loading files, see Section 3, p. 5-13 ff).
2. Select *Processing >Layout >Move part >Horizontally*.
3. **Either**

   ➢ Click on a reference point (P1) or enter the coordinates for P1.

   ➢ Click on the target reference point (P2) or enter the coordinates of P2.

   Note
   (P1) and (P2) define the vector by which the part is to be shifted.

   or

   ➢ Enter the distance to move horizontally.

4. Click on any geometry element in the part.

   or

   ➢ Draw a box around the entire part using the mouse (P3, P4).

Undo last repositioning? ➢ Select *Undo*.

Repositioning parts vertically

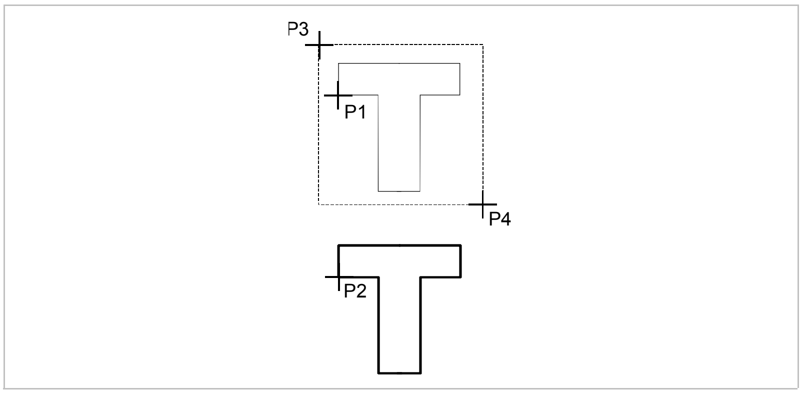


Fig. 28061

Prerequisite

- Technology data have been selected (for Selecting technology table and process rule, see Section 5.1, p. 5-33 ff).

1. Load sheet (for Loading files, see Section 3, p. 5-13 ff).
2. Select *Processing >Layout >Move part >Vertically*.
3. **Either**
   - ➢ Click on a reference point (P1) or enter the coordinates for P1.
   - ➢ Click on the target reference point (P2) or enter the coordinates of P2.

   Note
   (P1) and (P2) define the vector by which the part is to be shifted.

   or

   - ➢ Enter the distance to move vertically.
4. Click on any geometry element in the part.

   or

   - ➢ Draw a box around the entire part using the mouse (P3, P4).

Undo last repositioning?

➢ Select *Undo*.

11.2 Rotating parts

Rotating parts around two points

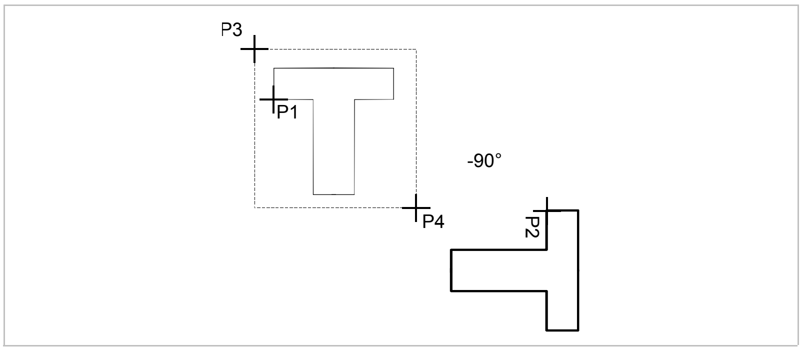


Fig. 28060

Prerequisite

- Technology data have been selected (for Selecting technology table and process rule, see Section 5.1, p. 5-33 ff).

Note
When rotating around two points, the part is also moved along.

1. Load sheet (for Loading files, see Section 3, p. 5-13 ff).
2. Select *Processing >Layout >Rotate part >Two points*.
3. Click on the base point (P1).
4. Click on the target position (P2).

   Note
   (P1) and (P2) define the vector by which the part is to be shifted.

5. **Either**
   - Enter angle of rotation, for example, `-90`.

   or
   - Enter the first point for the angle of rotation.
   - Enter the second point for the angle of rotation.
6. Click on any geometry element in the part.

   or
   - Draw a box around the entire part using the mouse (P3, P4).

Undo last rotation?
- Select *Undo*.

Rotating geometries around a center point

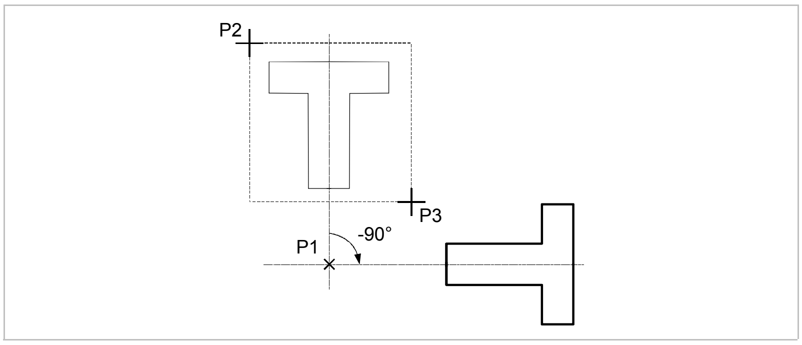


Fig. 28062

Prerequisite

- Technology data have been selected (for Selecting technology table and process rule, see Section 5.1, p. 5-33 ff).

1. Load sheet (for Loading files, see Section 3, p. 5-13 ff).
2. Select *Processing >Layout >Rotate part >Center*.
3. Click on the center of rotation (P2).
4. **Either**
   - ➢ Enter angle of rotation, for example, `-90`.

   or
   - ➢ Enter the first point for the angle of rotation.
   - ➢ Enter the second point for the angle of rotation.
5. Click on any geometry element in the part.

   or
   - ➢ Draw a box around the part using the mouse (P3, P4).

Undo last rotation? ➢ Select *Undo*.

12. Part groups

Identical parts on a sheet can be combined into one or more part group.

Advantage:

- You can process identical parts in different ways.
  Example: only set approach flags on some identical parts. If you do not construct any part groups, ToPs sets approach flags in all identical parts by default.

12.1 Create part groups

Prerequisite

- Technology data have been selected (for Selecting technology table and process rule, see Section 5.1, p. 5-33 ff).
- The sheet contains at least two identical parts.

1. Load unprocessed sheet (for Loading files, see Section 3, p. 5-13 ff).
2. Select *Processing >Layout*.

Only combine selected parts into group?

1. To combine two or more identical parts into a group: Open the list field under "Part groups" using ▾ and select *Interactive*.

   Note
   The parts do not need to have the same angular position.
2. Select *Part groups, Create*.
3. Click on master part (= new original part).
4. Click one after the other on the copies belonging to the part group.

   ToPs shows the master part of the part group in cyan, and the copies belonging to it in yellow.

Join parts with identical angular position to the part group?

1. To combine all identical parts with the same angular position into one part group: Open the list field under "Part groups" using ▾ and select *Same angular pos.*
2. Click on master part (= new original part).

   ToPs shows the master part of the part group and all identical parts with an identical angular position in yellow.

Displaying part groups

Prerequisite

- Technology data have been selected (for Selecting technology table and process rule, see Section 5.1, p. 5-33 ff).
- The sheet contains part groups.

1. Load sheet (for Loading files, see Section 3, p. 5-13 ff).
2. Select *Processing >Layout*.
3. Select *Part groups, Display*.
4. Click on any part from a part group.

ToPs shows all parts belonging to the same part group in yellow.

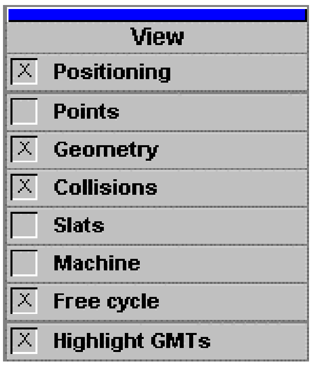
13. Screen display

In ToPs 100 you can switch on and off the following "Viewing options" on the screen. They can be displayed in any combination:

- Positioning paths of the cutting head.
- Geometry and technology points.
- Part geometries on the sheet.
- Collisions in the processing plan.
- Support slats on the pallet (workpiece supports).
- Outlines of the machine in the top view.
- Customized cycles which you have set ("free cycles").
- Processed single parts ('*.gmt').

13.1 Switching on viewing options

ToPs sets the following "standard" viewing options when you open the *Technology* module:



Viewing option default settings　　Fig. 29045EN

1. With unprocessed parts and sheets: select *Processing >View*.
2. With processed parts and sheets: select *Processing >View*.

   or

   ➢ Select *Optimization >View*.

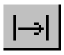
   or

   ➢ Select *NC Program >View*.

Show positioning paths?

3. Check "Positioning".

   or



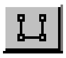
   ➢ Select *Positioning*.

   ToPs shows the positioning paths of the cutting head.

Display geometry and technology points?

4. Check "Points".

   or



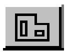
   ➢ Select *Display points*.

   ToPs shows all points which define the geometries and (in the case of processed parts and sheets) the technology.

Display part geometries on the sheet?

5. Check "Geometry".

   or



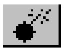
   ➢ Select *Geometry*.

   ToPs shows all part geometries on the sheet.

View collisions?

6. Check "Collisions".

   or



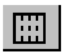
   ➢ Select *Collisions*.

   ToPs shows collisions.

Display support webs on the pallet?

7. Check "Slats"

   or



   ➢ Select *Webs*.

   ToPs shows the support webs on the pallet.

Display machine?

8. Check "Machine".

   ToPs shows the outlines of the machine in the top view.

Show customized cycles?

9. Check "Free cycle".

   ToPs shows all free cycles which you have created and added.

Display processed single parts?

10. Select "Highlight GMTs".

    ToPs shows all processed single parts in cyan.

14. Simulating processing plans on screen

With the aid of simulation, it is possible to check, for instance, the machining (piercing, cutting of contour ...), CSC preparation (preparatory steps, length for overlapping), traversing paths, or the machining sequence.

Prerequisite

- You have loaded a processed sheet or a processed single part (for Loading files, see Section 3, p. 5-13 ff).

1. Select *Processing >Simulation*.

   or

   ➢ Select >*Optimization >Simulation*.

   or

   ➢ Select >*NC Program >Simulation*.

Setting the speed of the simulation

2. Move the controller below "Speed" to the left or the right:
   – Controller to the left: speed is increased.
   – Controller to the right: speed is reduced.

Start simulation

3. Select *Start*.
   ToPs simulates the machining (piercing, contour cutting ...), the traversing paths, and the machining sequence.

Interrupt simulation?

4. Select *Stop*.

   or

   ➢ Press <←>.

Continue interrupted simulation

5. Select *Continue*.

   or

   ➢ Press <Space>.

Simulation in single steps

6. Repeatedly select *Step*.

   or

   ➢ Repeatedly press <→>.
   ToPs plays the simulation step by step.

Cancel simulation

7. Select *Cancel*.

   or

   ➢ Press <Esc>.

15. Using auxiliary tools

The *Technology* module contains the same auxiliary tools that you are already familiar with from the *Drawing* module:

- Drawing construction lines and construction circles.
- Measuring coordinates, lengths, radiuses, diameters, and angles.

Using auxiliary tools with unprocessed sheets

➢ Select *Processing >Aux. tools*.

ToPs displays the mask with all auxiliary tools.

Using auxiliary tools with processed sheets

➢ Select *Processing >Aux. tools*.

or

➢ Select *Optimization >Aux. tools*.

or

➢ Select *NC Program >Aux. tools*.

ToPs displays the mask with all auxiliary tools.

Using auxiliary tools

For description, see Chapter 3.

16. Modifying machining sequence and traversing paths

16.1 Modifying machining sequence manually

The machining sequence between the parts and within the parts can be modified via *Positioning sequence* and via *Rearrange*:

Difference between *Rearrange* and *Positioning sequence*

With *Rearrange*, individual parts can be rearranged and insertion positions can be preset. With *Rearrange* ToPs leaves the current, possibly optimized machining sequence as it is and simply places the selected part/contour at a different point in processing.

With *Positioning sequence*, you can likewise rearrange individual parts. However, ToPs' path optimizer subsequently recalculates the rest of the machining sequence automatically.

In both instances ToPs generates linear traversing paths.

Placing a particular part/contour at beginning of machining plan

Prerequisite

- You have loaded a processed sheet or a processed single part (for Loading files, see Section 3, p. 5-13 ff).

Notes

If you change the machining sequence, you cannot subsequently generate a new processing plan. Otherwise the modifications are lost.

Always process external contours last. Do not cut slitting cuts before the contours behind them.

1. Select *Optimization >Modify*.
2. Open list field under *Apply to ...* using ▾.
3. To place a particular part in the sheet at the beginning of the machining sequence: select *Part*.
4. To place a particular contour in all identical parts at the beginning of the machining sequence: select *Contour*.
5. Select *Rearrange, Define beginn.*

6. Click on part/contour.

ToPs places the selected object at the beginning of the machining process. The remaining (and possibly optimized) machining sequence remains unchanged.

Placing a particular part/contour at end of machining plan

Prerequisite

- You have loaded a processed sheet or a processed single part (for Loading files, see Section 3, p. 5-13 ff).

Notes

If you change the machining sequence, you cannot subsequently generate a new processing plan. Otherwise the modifications are lost.

Always process external contours last. Do not cut slitting cuts before the contours behind them.

1. Select *Optimization >Modify*.
2. Open list field under *Apply to ...* using ▾.
3. To place a particular part in the sheet at the end of the machining sequence: select *Part*.
4. To place a particular contour in all identical parts at the end of the machining sequence: select *Contour*.
5. Select *Rearrange, Define end*.
6. Click on part/contour.

ToPs places the selected object at the end of the machining sequence. The remaining (and possibly optimized) machining sequence remains unchanged.

Modifying machining sequence freely

You can:

- Manually change the machining sequence in any way, and then have the remaining processing automatically recalculated.
- Specifically process one part **prior to** another, and not then have the remaining processing recalculated.
- Specifically process one part **following** another, and likewise not then have the remaining processing recalculated.

Prerequisite

- You have loaded a processed sheet or a processed single part (for Loading files, see Section 3, p. 5-13 ff).

Notes
If you change the machining sequence, you cannot subsequently generate a new processing plan. Otherwise the modifications are lost.

Always process external contours last. Do not cut slitting cuts before the contours behind them.

1. Select *Optimization >Modify*.

Selecting the range of application

2. Open list field under *Apply to ...* using ▼.
3. To modify the machining sequence of the parts on the sheet: select *Part*.
4. To modify the machining sequence of the contours in all identical parts: select *Contour*.

Rearrange freely, recalculate the rest of the machining sequence?

1. Select *Positioning sequence, Manual*.
2. Click on the contour/part starting from which ToPs is to modify the machining sequence.
3. Click on further parts/contours in the order in which you want them to be machined.
4. Select *Positioning sequence, End →*.

ToPs will automatically recalculate the rest of the machining sequence.

Specifically process one part prior to another?

1. Select *Rearrange, Before*.
2. Click on the part/contour before which the other part/contour is to be machined.

3. Click on the part which is to be machined before it.

ToPs leaves the current, possibly optimized machining sequence as it is and simply places the selected part/contour at the desired position in the machining sequence.

Specifically process one part following another?

1. Select *Rearrange, After*.
2. Click on the part/contour after which the other part/contour is to be machined.
3. Click on the part which is to be machined after it.

ToPs leaves the current, possibly optimized machining sequence as it is and simply places the selected part/contour at the desired position in the machining sequence.

16.2 Automatically modifying machining sequence to defined specifications

The machining sequence between parts and inside parts (contours) can be automatically recalculated in accordance with the following specifications:

- Executing direction (horizontal or vertical).
- Calculation strategy.
  The more time taken for calculation, the better (and faster) will the sheet be machined.

The ToPs path optimizer always recalculates the new machining sequence for the entire processed single part and the entire processed sheet. The actual machining plan (piercing type, withdrawal flags etc.) is retained in this process.

Prerequisite

- You have loaded a processed sheet or a processed single part (for Loading files, see Section 3, p. 5-13 ff).

Notes
If you change the machining sequence, you cannot subsequently generate a new processing plan. Otherwise the modifications are lost.

1. Select *Optimization >Modify >Positioning sequence >Automatic*.
   ToPs displays the "Positioning sequence Automatic" mask.

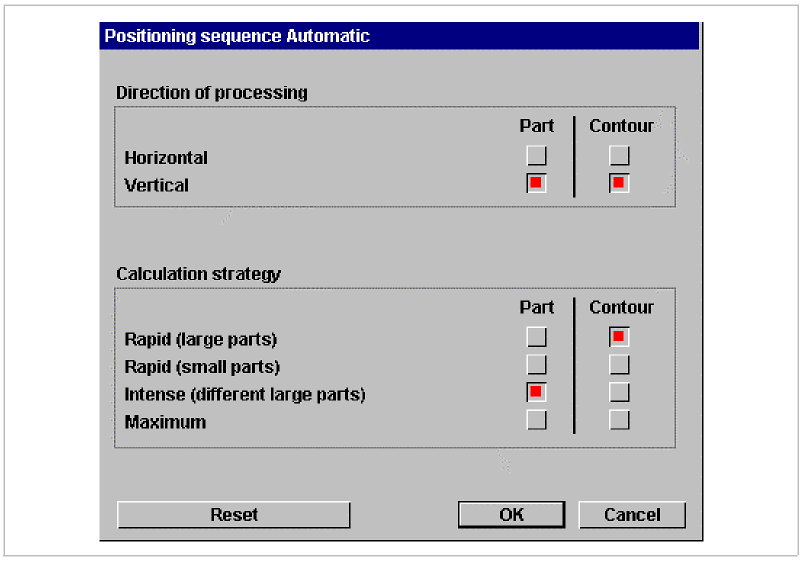


Fig. 22261EN

2. Select the processing direction (executing direction) between the parts and within the contours in a part.
3. Select calculation strategy:
   - "Rapid (large parts)": the calculation required is least. The calculation proceeds fastest.
   - ...
   - "Maximum": the calculation required is greatest. The calculation takes longest.

   Note
   The greater the calculation requirement, the better the result. The effect of the calculation requirement is only noticeable on slower computers.

Reset positioning sequence to default values?

4. Select *Reset*.
   (Default values: calculate parts intensively, calculate contours rapidly).
5. When all values are as desired: select *OK*.

ToPs shows the modified machining sequence on the screen.

16.3 Modifying traversing paths between individual parts

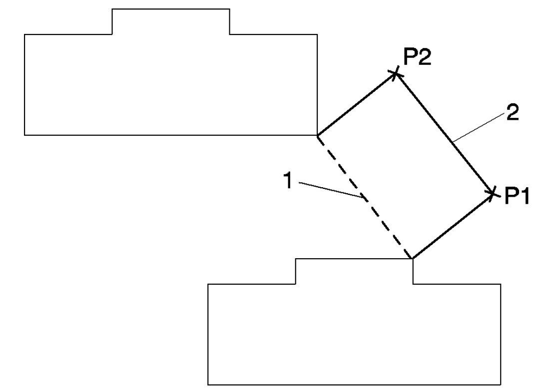
Traversing paths changes the form and direction of the traversing paths but not, however, the order of machining. The position of the piercing point on the contour is not be changed.

With *Traversing paths* polygonal (i.e. non-linear) traversing paths can be generated. (The traversing paths which ToPs automatically generates are always linear.)

Examples of use

- You wish to move around slightly tilting parts on the sheet.
- You are using SprintLas and must move around previously cut contours.

During the automatic definition of the processing plan, ToPs generates linear traversing paths. When you manually modify a traversing path, the linear traversing path becomes a polygonal traversing path, which you can shape as you choose.



1	Automatically generated traversing path	2	Manually generated traversing path

Fig. 4785

All modifications apply to the traversing paths between the parts of the sheet or on the traversing paths within a part.

Manually modifying traversing paths

If you wish to manually modify traversing paths, you must create polygonal traversing paths. Reason: the position of the piercing point on the contours does not change with a different traversing path.

Prerequisite

- You have loaded a processed sheet or a processed single part (for Loading files, see Section 3, p. 5-13 ff).

Note
Modifying the traversing paths manually changes the **form** and **direction** of the traversing paths but not, however, the order of machining.

1. Select *Optimization >Modify >Traversing path >Manual*.
2. Click on the traversing path that you want to modify.
3. Click on calibration points for the new traversing path one after the other.

Delete modified traversing path step-by-step?

4. Click on *Return* until the desired elements of the traversing path are deleted.
   Note
   You can only change the last-generated line of the traversing paths as long as you have not reached the target contour.

Closing traversing path

5. Click on the target contour.

Resetting modified traversing paths

Using this function, you can quickly reject manual modifications to the traversing paths, as ToPs will generate **all** traversing paths again.

The machining sequence remains unchanged.

Prerequisite

- You have loaded a processed sheet or a processed single part (for Loading files, see Section 3, p. 5-13 ff).

➢ Select *Optimization >Modify >Traversing path >Automatic*.

ToPs generates **all** traversing paths again.

17. Increased acceleration

Laser cutting of contours at high acceleration shortens the machining time. However, an acceleration value higher than the acceleration specified by TRUMPF could result in a reduced quality of cut.

17.1 For machines with open control

Defining increased acceleration

With machines with "open control" (SINUMERIK 840D), you can determine which individual contours are to be cut with high acceleration. The value for "high acceleration" is read by the machine's control system from the technology table.

Note
The value for increased acceleration can only be modified in the technology table. (To copy technology tables and create new ones, see Chapter 6, Data module.)

Prerequisite

- You have loaded a processed sheet or a processed single part (for Loading files, see Section 3, p. 5-13 ff).

1. Select *Optimization >Modify >Increased acceleration >Define*.
   ToPs displays the "Set high acceleration" mask.
2. Select the range of application:
   - *Contour*: accelerates machining of a single contour in all identical parts.
   - *Part + copies*: accelerates machining of a part and all copies of it.
   - *Entire sheet*: accelerates machining of the entire sheet.

Ranges of application: "Contour" and "Part + copies"

3. Click one after the other on the contours or parts for which machining is to be accelerated.

ToPs displays the selected parts and contours in yellow until the next time the screen is refreshed. Later you can display the parts and contours with increased acceleration as described in the following section.

Displaying increased acceleration

For purposes of clarity, ToPs only shows contours which are being cut with high acceleration in yellow directly after this machining type is defined.

At a later point in time, you can display whether a contour is being cut with high acceleration or not.

Prerequisite

- You have loaded a processed sheet or a processed single part (for Loading files, see Section 3, p. 5-13 ff).
- The sheet or single part contains parts or contours with increased acceleration.

1. Select *Optimization >Modify >Increased acceleration >Display*.
2. Click on contour.

ToPs reports whether the contour is being cut with increased acceleration or not.

Deleting increased acceleration

Prerequisite

- You have loaded a processed sheet or a processed single part (for Loading files, see Section 3, p. 5-13 ff).
- The sheet or single part contains parts or contours with increased acceleration.

1. Select *Optimization >Modify >Increased acceleration >Delete*.
2. Select the range of application:
   - *Contour:* deletes increased acceleration of an individual contour in all identical parts.
   - *Part + copies:* deletes increased acceleration of a part and all copies of it.
   - *Entire sheet:* deletes increased acceleration for the entire sheet.

Ranges of application: "Contour" and "Part + copies"

3. Click one after the other on the contours or parts for which increased acceleration is to be deleted.

17.2 For machines with different control systems

For machines with other control systems (e.g. BOSCH CC 220S), you can generate a processing plan for a sheet, a single part or individual contours with increased acceleration.

1. Create a self-defined technology table with a higher acceleration value (to copy technology tables and create new ones, see Chapter 6, Data module).
2. Load sheet/part which you wish to machine with increased acceleration.

Entire sheet/part with increased acceleration?

1. Select previously created technology table and process rule (see Section 5.1, p. 5-33 ff).
2. Select *Processing >Create >Start*.

   ToPs processes the entire sheet/part with the new technology table.

Only individual parts/contours with increased acceleration?

1. Process sheet/part with the "normal" technology table.
2. Select self-defined technology table with increased acceleration (see Section 5.1, p. 5-33 ff).
3. Selectively process individual parts/contours (for Selective processing, see p. 5-43).

18. Generating NC program

Note

When you generate an NC program, you can activate or deactivate different functions (e.g. "Anticipate operation", "Apply subroutine technique," "Measure sheet position" ...).

So it is important to ensure that the settings are right for the new program. If necessary, modify the settings (see description on the following pages).

18.1 Determining program settings

Prerequisite

- You have loaded a processed sheet or a processed single part (for Loading files, see Section 3, p. 5-13 ff).
- The processing of the sheet or single part, including all manual modifications, has been completed.

➢ Select *NC program >Generate >Start*.

ToPs displays the "Generate NC program" mask, tab "Settings":

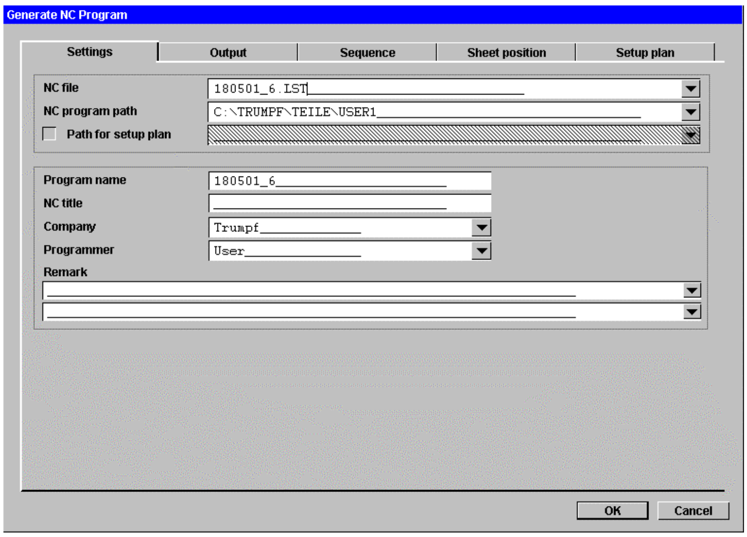


Fig. 29060EN

Connection between name of the "NC file" and "Program name"

Machines with Bosch control systems

For machines with Bosch control systems, ToPs offers as default the last used program name as the program name.

The program name and the name of the NC file can be modified at any time (see following pages).

For machines with Bosch control systems, only numerical program names (digits) can be used.

Machines with Siemens control systems

For machines with Siemens control systems and alphanumeric program names, ToPs offers as default the name of the NC file as program name. (To change alphanumeric program names to numeric, see Chapter 6.)

Note
With alphanumeric program names no distinction is made between lower case and upper case letters.

The program name and the name of the NC file can be modified at any time (see following pages).

1. If "Program name" differs from "NC file": open Explorer.
2. Go to the directory 'Trumpf\ToPs100w'.
3. Double click on the 'ToPs100.ini' file.
4. If necessary select the program (editor), with which the 'ToPs100.ini' file should be opened (e.g. "Notepad").

   The editor opens the 'ToPs100.ini' file.
5. Delete the marking (;;) in front of the following line:

   ";;ST_LAS_NcProgNrLikeFileName = c_yes"

   Tip
   Use the >*Find* menu in your editor to find the variable quickly.

Excerpt from the 'ToPs100.ini' file:

```
"...
;;Bei alphanumerischen Programmnamen die Vorbelegung des
;;Programmnamens mit dem LST-Filenamen abschalten
;;ST_LAS_NcProgNrLikeFileName    { c_no, c_yes }
ST_LAS_NcProgNrLikeFileName = c_yes
..."(Translation:)
;;For alphanumeric program names, switch off the
;;preallocation of the program name with the LST file name
;;ST_LAS_NcProgNrLikeFileName    { c_no, c_yes }
ST_LAS_NcProgNrLikeFileName = c_yes
```

6. Save the modifications in 'ToPs100.ini'.
7. Close 'ToPs100.ini'.
8. Restart ToPs.

The modifications come into effect.

Modifying the maximum length of program names

(See Data module: *Data >Machines >Data >Limit values*.)

Acceptable names for NC files in control systems using Windows 3.11

The NC program name should have a maximum of 8 digits.

If you use longer program names, only the first six characters and the three character suffix ('.lst') are displayed. The missing characters from the file name are replaced by a tilde ("~") and – with file names which occur often – by a digit:

Example: "Zahnra~1.lst"
"Zahnra~2.lst"

Modifying the name of the NC file?

ToPs always suggests the name of the processed sheet as the name of the NC file.

1. Delete the names to be found under "NC file".
2. Enter the new name

Modify NC program path?

ToPs offers as default the NC program path '...\trumpf\teile\user1'. The NC program path can be modified.

1. Open "NC program path" using ▾.

   ToPs displays the "Select directory" mask.
2. To change the directory upwards: click repeatedly on "*" until the desired directory is displayed.
3. To change the directory downwards: mark the directory which is one level deeper. Repeat until the desired directory is displayed.
4. Select *OK*.

ToPs displays the new path under "NC program path".

Defining path for saving setup plan

1. Check "Path for setup plan".

   ToPs offers as default the Path for setup plan '...\trumpf\teile\user1'. The Path for setup plan can be modified.
2. Open "Path for setup plan" using ▾.

   ToPs displays the "Select directory" mask.
3. To change the directory upwards: click repeatedly on "*" until the desired directory is displayed.

4. To change the directory downwards: mark the directory which is one level deeper. Repeat until the desired directory is displayed.
5. Select *OK*.

Under "Path for setup plan", ToPs displays the path set for saving the setup plan.

Modifying program name

1. Delete old program name.
2. Enter new program name.
   Note
   For machines with Bosch control systems, only numerical program names (digits) can be used.

NC title, company, programmer, remarks ...

ToPs writes this information in the setup plan. The remarks for the setup plan are self-holding until they are overwritten by new text.

For machines with Siemens control system, you can also find this information in the master file.

➢ Enter the desired information.

Define further settings?

➢ Go to one of the tabs "Output," "Sequence", "Sheet position" or "Setup plan" (see following descriptions).

When all settings are defined

➢ Select *OK*.

ToPs generates the NC program.

18.2 Defining NC program output

Prerequisite

- You are currently generating an NC program.
- The "Generate NC program" mask is still displayed.

➢ Select "Output".
  ToPs displays the tab "Output":

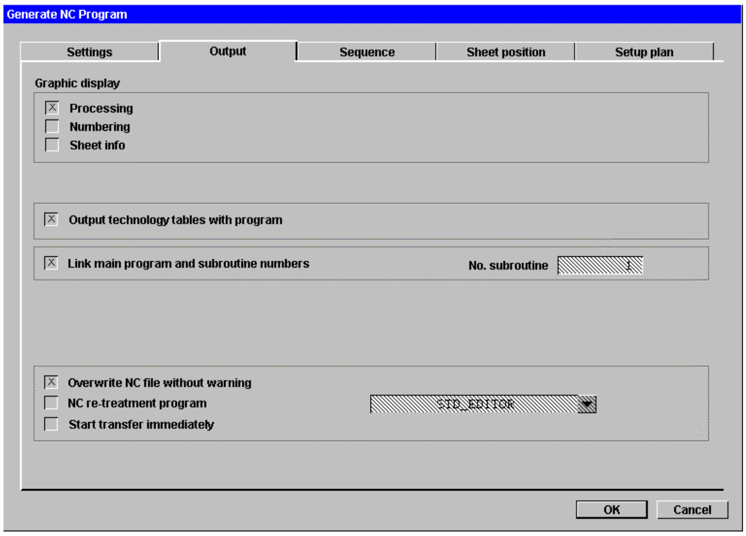


Fig. 29061EN

Select screen display

➢ Mark the desired box:

- "Processing": if you do not mark "Processing", ToPs only displays the parts geometries, not the machining plans.
- "Numbering": the parts are displayed with their part number (corresponds to the part number in the setup plan and in the NC text).
- "Sheet info": The sheet name and the date the sheet was created are displayed.

Output technology tables with program?

➢ Mark "Output technology tables with program".

TRUMPF technology tables are already stored in the database in your machine's control system. It is not necessary to transfer these with the NC program.

Some technology tables not yet present on your machine's control system must be sent to the machine with the NC program. (Alternatively: create the technology table at the machine. This is the more complicated way to do it.)

Note
Technology tables at the machine cannot be overwritten. If you want to replace a technology table in your machine's control system with a technology table from ToPs, you have to delete the machine's technology table beforehand.

Link main program and subroutine numbers?

➢ Mark "Link main program and subroutine numbers".

The numbering of the subroutine then always begins with "1". The "No. subroutine" input field is disabled.

Example: Main program number: "4711".

- Deactivate "Link main program and subroutine numbers".
- Enter 5 under "Subroutine number".

ToPs constitutes the subroutine numbers according to the following table:

Control system	Linked	Non-linked
Siemens	SP14711, SP24711, ...	SP5, SP6, SP7, ...
Bosch	P10004711, P20004711, ...	P5, P6, P7, ...

Table 5-5

➢ To overwrite an NC file with the same name without previous warning: mark "Overwrite NC file without further warning".

Use NC post-processing programs?

Entries for post-processing programs and/or complete post-processing programs are supplied with ToPs. Post-processing programs are started directly after the NC program is generated.

Example: The NC text should be opened and printed with the editor "Notepad" after the NC program is generated:

1. Mark "NC re-treatment program" ("NC post-processing program").
2. Open the input box with ▼.
   ToPs displays the "Select program" mask.
3. Mark "NC re-treatment program" ("NC post-processing program") (here: STD_PRINTER).

ToPs imports the STD_PRINTER in the input box.

Use own post-processing program?

You can create self-defined NC post-processing programs and place these in the selection (see Chapter 6, Data module).

ToPs then offers these post-processing programs here.

Define further settings?

➢ Go to one of the tabs "Settings", "Sequence", "Sheet position" or "Setup plan".

When all settings are defined

➢ Select *OK*.

ToPs generates the NC program.

18.3 Defining sequence of machining operations

Prerequisite

- You are currently generating an NC program.
- The "Generate NC program" mask is still displayed.

1. Select "Sequence."
   ToPs displays the tab "Sequence":

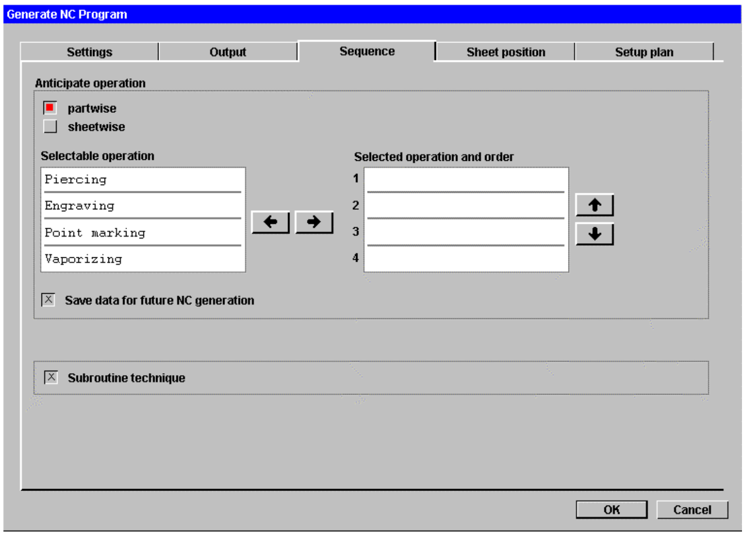


Fig. 22265EN

2. Select "partwise" or "sheetwise".
3. Mark under "Selectable operation" the machining operation which you want to give precedence.
4. Select *right arrow*.
   The operation will be transferred to the "Selected operation & order" input box.
5. To change the order of the machining operations given precedence: mark operation and put it in the desired position using *up arrow* or *down arrow*.
6. To delete machining operations from "Selected operation & order": mark the operation which you want to delete and click on *left arrow*.
   The operation will be taken back into the "Selectable operation" selection field.

7. To save the machining operations' order of precedence for future NC programs: mark "Save data for future NC generation".

Use subroutine technique?

➢ Mark "Subroutine technique".

Define further settings?

➢ Go to one of the tabs "Settings", "Output", "Sheet position" or "Setup plan".

When all settings are defined

➢ Select *OK*.

ToPs generates the NC program.

18.4 Measuring sheet position, defining machine loading

Prerequisite

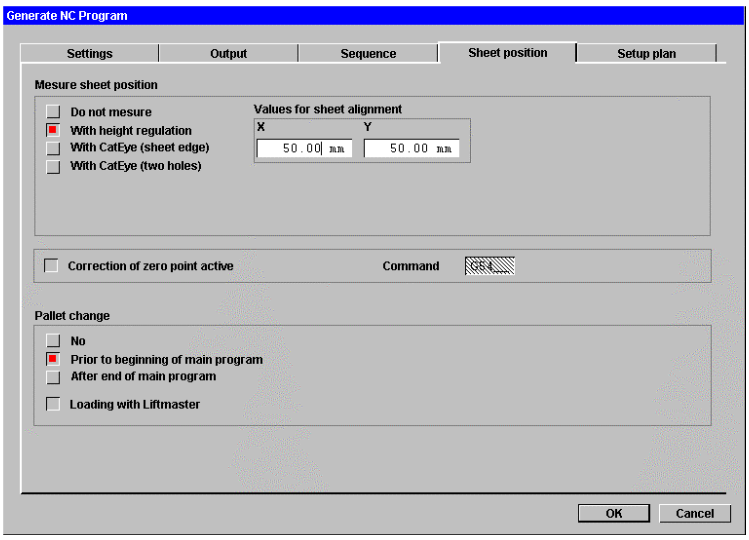
- You are currently generating an NC program.
- The "Generate NC program" mask is still displayed.

Note

The contents of the "Sheet position" tab are dependent on the machine control system and the isolated options.

➢ Select "Sheet position".

ToPs displays the tab "Sheet position":



"Sheet position" for a machine with a Bosch control system — Fig. 22266EN

Measure sheet position?

When machining a sheet, its position must be known with sufficient accuracy. To guarantee this, the sheet must loaded or measured exactly.

- Activate the desired box:
  - "Do not measure": the sheet position is not measured.
  - "With height regulation": the machine measures the position of the sheet edge using the distance control system. (The "Values for sheet alignment" for machines with Bosch control systems are appropriately preallocated.)

    Note
    Sheet alignment using the distance control system can be deactivated indefinitely (see Chapter 6, Data module, basic data of machine).
  - "With CatEye (sheet edge)": CatEye measures the exact position of the sheet edge on a rectangular blank or on a sheet.
  - "With CatEye (two holes)": CatEye measures the exact position of the centers of two round holes.

    Note
    The CatEye (optional) is a photoelectric sensor which exactly measures the position of the workpiece. CatEye must be activated for each machine individually (see Chapter 6, Data module, basic data of machine).

Activate zero point correction (Bosch)?

- Mark "Correction of zero point active" and enter NC command.

  Note
  Zero point correction is only possible on machines with Bosch control systems.

  The "Zero point correction" corresponds to the zero point offset on the machine. With "Correction of zero point active", the machine operator can enter the value of the zero point offset at the control system.

  The NC command is preallocated appropriately. (For NC commands, see the current programming manual for your machine.)

Defining machine loading

1. Select the desired box for the pallet change.
2. For Loading with the LiftMaster: mark "Loading with Liftmaster".

Define further settings?

- Go to one of the tabs "Settings", "Output", "Sequence" or "Sheet position".

When all settings are defined

- Select *OK*.

ToPs generates the NC program.

18.5 Defining setup plan output

Prerequisite

- You are currently generating an NC program.
- The "Generate NC program" mask is still displayed.

➢ Select "Setup plan".

ToPs displays the tab "Setup plan":

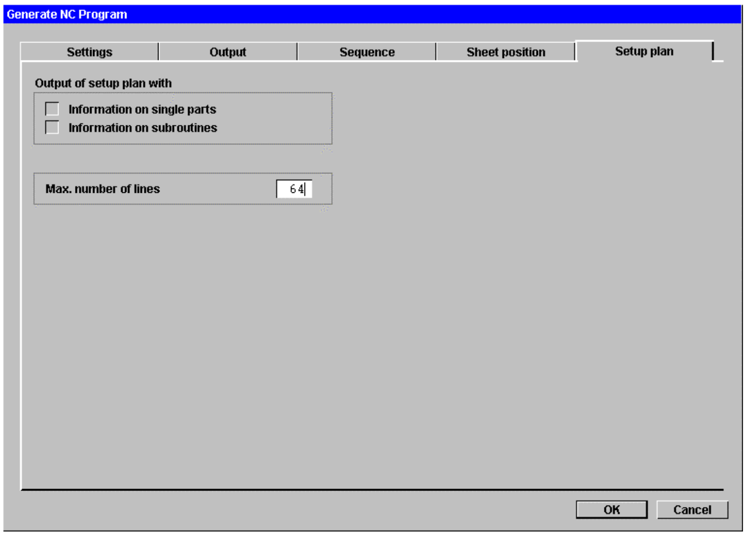


Fig. 22267EN

1. Mark the desired box.
2. If you want to print the setup plan later in '*.ein' format: Enter the maximum number of lines for the setup plan (= maximum number of lines till the printer automatically goes to a new page).

Editing the setup plan

(See Section 19.3, p. 5-146).

Printing the setup plan

(See Section 19.4, p. 5-149; for printing files, see Section 20, p. 5-151).

Define further settings?

➢ Go to one of the tabs "Settings", "Output", "Sequence" or "Sheet position".

When all settings are defined

➢ Select *OK*.

ToPs generates the NC program.

18.6 Editing and printing the NC program

What is editing? Editing = modifying file contents, saving the modified file.

The software you can use to edit the file is called an "editor".

Editing and printing the currently generated NC program

Prerequisite

- You have just generated an NC program.
- The processed sheet or single part is still loaded.

1. Select *NC program >Generate*.
2. Left click on *NC program, Display*.

   ToPs opens the recently generated NC program with an editor (e.g. Notepad).
3. Edit the NC program as needed.

   Tip
   You can find an overview of all NC functions in the current programming manual for your machine.

Saving modifications

4. Select *File >Save* (in the editor; here: Notepad)

Printing NC program

5. Select *File >Print* (in the editor; here: Notepad)

Closing editor

6. Select *File >Exit* (in the editor; here: Notepad)

Editing and printing other NC programs

Prerequisite

- The NC program you want to edit has been generated.
- You have loaded a processed sheet or a processed single part (for Loading files, see Section 3, p. 5-13 ff).

  Note
  You do not have to have loaded the processed sheet or single part whose NC program you wish to edit and/or print.

1. Select *NC program >Generate*.
2. Right click on *NC program, Display*.
   ToPs displays the "Select file" mask. It shows as default all NC files ('*.lst') which are located in the current directory and offers the last generated NC program under "File name".
3. If necessary, change directory (see p. 5-14).
4. Mark the NC program you wish to edit.
   ToPs enters the name of the NC program under "File name".
5. Select *OK*.
   ToPs opens the desired NC program with an editor (e.g. Notepad).
6. Edit the NC program as needed.

   Tip
   You can find an overview of all NC functions in the current programming manual for your machine.

Save modifications?

7. Select *File >Save* (in the editor; here: Notepad)

Printing NC program

8. Select *File >Print* (in the editor; here: Notepad)

Closing editor

9. Select *File >Exit* (in the editor; here: Notepad)

18.7 Sending an NC program to the machine

Directly when generating the NC program ...

- If the "Generate NC program" is still open: select tab "Output".
  - Check "Start transfer immediately".
  - If you have defined all settings for the NC program: select *OK*.

... or later

or

- Select *File >Transfer ...*

ToPs displays the "NC file transfer" mask:

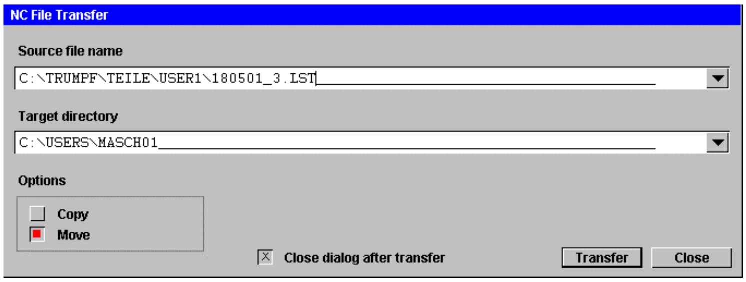


Fig. 27067EN

Selecting the NC program

1. Open "Source file name" using ▼.
   ToPs displays the "Select file" mask.
2. If necessary, change directory (see p. 5-14).
3. Mark the NC program you are looking for ('.lst').
   ToPs enters the name of the NC program under "File name".

   or

   - Under "File name" enter the name of the NC program you are looking for (for entering the required file name with the aid of wildcards, see Chapter 3).
4. Select *OK*.
   ToPs displays the "NC file transfer" mask again. The file name and the path of the NC program are entered under "Source file".

Modifying target directory at the machine

Here ToPs always offers the directory which is entered for the machine in the Data module. The directory '\users\masch01' is preset as standard.

1. To permanently change the target directory: see "Configuring NC program output", chapter 6, "Limit values".

2. To temporarily change the target directory: open "Target directory" using the arrow symbol.

   ToPs displays the "Select directory" mask.

3. **Either**

   ➢ Open "Search in" using ▾.

   ToPs displays the "Previous directories" mask.

   ➢ Mark the desired target directory.

   or

   ➢ Change directory upwards or downwards (see p. 5-14).

   ➢ Mark the desired target directory.

4. Select *OK*.

   ToPs displays the "NC file transfer" mask again. The target directory is entered under "Target directory".

Starting transfer

1. To send a copy of the NC program to the machine: click on the option "Copy".
2. To send the original NC program to the machine: click on the option "Move".
3. To transfer more NC programs following the transfer of the first NC program: deactivate "Close dialogue after transfer".
4. Select *Transfer*.

ToPs starts the transfer of data to the machine.

18.8 Switching time readout on and off after each NC block

The time readout can be switched on and off in the file 'ToPs100.ini'.

Note
When you modify variables in 'ToPs100.ini', you must restart ToPs 100 for the modifications to come into effect.

1. Open Explorer.
2. Go to the directory 'Trumpf\ToPs100w'.
3. Double click on the 'ToPs100.ini' file.
4. If necessary select the program (editor), with which the 'ToPs100.ini' file should be opened (e.g. "Notepad").

   The editor opens the 'ToPs100.ini' file.
5. To switch on the time readout:
   Set the variable ST_LAS_NcZeitausgabe to `1`:

   Tip
   Use the *>Find* menu in your editor to find the variable quickly.

   Excerpt from the 'ToPs100.ini' file:

   ;;NC-Ausgabe mit Zeitangabe
   ST_LAS_NcZeitausgabe = 1
6. To switch off the time readout:
   Set the variable ST_LAS_NcZeitausgabe to `0`.
7. Save the modifications in 'ToPs100.ini'.
8. Close 'ToPs100.ini'.
9. Restart ToPs.

The modifications come into effect.

19. Setup plan

When an NC program is generated, ToPs generates a new, accessible setup plan in '*.html' or '*.pdf" formats. ToPs also saves the setup plan in '*.ein' format.

TRUMPF

SET-UP SCHEDULE
GENERAL DATA

User
14.01.2002

MACHINE:	L3030S (MAX. LASER POWER 4000 WATT)
CONTROL:	Sin 840D
COMPANY:	Trumpf
JOB NAME:	
NC-PROGRAM NAME:	**C:\TRUMPF\TEILE\USER1\HALTER.LST**
PROGRAM NAME:	**HALTER ()**
MATERIAL (SHEET):	
MATERIAL (TT):	**St37-20**
STORAGE ITEM DESIGNATION:	
BLANK:	**2000.00 x 1000.00 x 2.00 mm**
GRAIN:	*
WEIGHT:	32 kg
MACHINING TIME:	**0 : 27 : 17 [h:min:s]**
STORAGE REQUIREMENT:	9734 CHARACTERS
TOTAL CUTTING LENGTH:	52536 mm
NUMBER OF PROGRAMME RUNS:	1
SCRAP:	45.36 %

MACHINING INSTRUCTIONS

SHEET STOP:	1
WEBS REMOVED:	
REMARKS:	

LASER-TECHNOLOGY TABLES

TABLE NUMBER	KERF WIDTH	FOCAL LENGTH	NOZZLE DIAMETER	MAX. LASER POWER	SET DIMENSION	GAS
T2D-5102	0.25	5.000	0.8	4000	0.00	1

Gas type: 1 = O_2, 2 = N_2

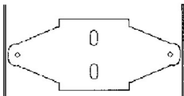
TECHNOLOGY TABLES

NUMBER	PIERCING MODE	CUTTING MODE	TYPE OF CONTOUR
T2D-5102	NORMAL	NORMAL	LARGE

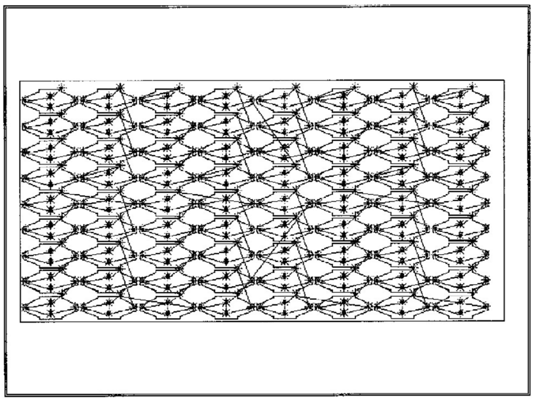
INFORMATION ON SINGLE PART

PART NUMBER:	DRAWING NUMBER:	GEOFILE NAME:	NUMBER:
1		C:\TRUMPF\TEILE\USER1\HALTER.GEO	72

INFORMATION ON SINGLE PART



PART NUMBER:	1
DRAWING NUMBER:	
NAME OF DRAWING:	
CUSTOMER NAME:	
NUMBER:	72
DIMENSIONS:	230.00 x 95.00 mm
SURFACE:	15176.64 mm2
RULE NAME:	T2D-5102-1
SUBROUTINE NUMBER:	1HALTER
MACHINING TIME:	0.37 min
CUTTING LENGTH:	729.667 mm
WEIGHT:	0.240 kg
NUMBER OF PIERCING POINTS:	5
PIERCING TIME	0.5 s
GEOFILE NAME:	C:\TRUMPF\TEILE\USER1 \HALTER.GEO



Setup plan – example

Fig. 29062EN

19.1 Setting the file format of the setup plan

You can set the file format in which the setup plan should be generated in the 'Tops100.ini' file.

In the TRUMPF default setting, ToPs saves in '*.html' and '*.ein' formats.

Note
When you modify variables in 'ToPs100.ini', you must restart ToPs 100 for the modifications to come into effect.

Modifying the standard file format of the setup plans

1. Open Explorer.
2. Go to the directory 'Trumpf\ToPs100w'.
3. Double click on the 'ToPs100.ini' file.
4. If necessary select the program (editor), with which the 'ToPs100.ini' file should be opened (e.g. "Notepad").
   The editor opens the 'ToPs100.ini' file.
5. Modify the variables (see following example).
   The variable at `1` means: setup plan generated in this format.
   The variable at `0` means: setup plan **not** generated in this format.
6. Determine the default editor (see following example).

Example: printing setup plans in html format

Excerpt from the 'ToPs100.ini' file:

;;Einrichteplan als Html-Dokument erzeugen (Grafiken als Link)
ST_EinrichteplanHtml= 1

;;Einrichteplan als Pdf-Dokument erzeugen (Grafiken eingebunden)
ST_EinrichteplanPdf= 0

;;Default Editor festlegen.
;;ST_EinrichteplanDefaultEditor { Moeglicht Eintraege c_ein, c_pdf, c_html }
ST_EinrichteplanDefaultEditor= c_html

Tip
Use the >*Find* menu in your editor to find the variable quickly.

7. Save the modifications in 'ToPs100.ini'.
8. Close 'ToPs100.ini'.
9. Restart ToPs.

The modifications come into effect.

Compressing files in 'html' format

The program 'comprhtm.bat' serves to reduce the required memory on the hard drive.

Files in 'html' format are converted and compressed with all associated graphics into pdf files. After that the larger original files are deleted.

Compressing a directories or files

1. Mark a directory in Explorer which contains html files.

   or

   ➢ Mark one or more html files in a directory.
2. Press the right mouse button.
   The context-sensitive menu opens.
3. Select *Send to >HTM-PDF*.

'comprhtm.bat' is executed. All html files are compressed.

19.2 Adding the company logo to the setup plan

Prerequisite

- Your company logo must be available in 'gif' format.
- The file name of your company logo must be 'SYSTEM_Logo.gif' (note upper and lower case letters).
- The size of the company logo should be 50x50 pixels. This is the ideal size.

Adding the company logo

1. Open Explorer.
2. Go to the directory 'Trumpf\Vorlagen'.
3. Replace the 'SYSTEM_Logo.gif' file with the identical company logo file.

In the new setup plan the TRUMPF logo is replaced by your company logo.

19.3 Editing setup plan

Editing the currently generated setup plan

Prerequisite

- You have just generated an NC program with a setup plan.
- The processed sheet or single part is still loaded.
- '.html' format: to display the setup plan, Microsoft Internet Explorer 4.0 or Netscape Navigator 4.0 must be installed. The display is optimized for Microsoft Internet Explorer 4.0.
- '.pdf' format: to display and print a setup plan, Acrobat Reader must be available. Acrobat Reader is made available automatically with the installation of ToPs.

1. Select *NC program >Generate*.
2. Left click on *Setup plan, Display*.

   ToPs opens the current setup plan with an editor (e.g. Notepad).
3. Edit the setup plan as needed.

Save modifications?

4. Select *File >Save* (in the editor; here: Notepad)

Closing editor

5. Select *File >Exit* (in the editor; here: Notepad)

Editing another setup plan

Prerequisite

- The NC program you wish to edit the setup plan for has been generated.
- You have loaded a processed sheet or a processed single part (for Loading files, see Section 3, p. 5-13 ff).

  Note
  You do not have to have loaded the processed sheet or single part whose setup plan you wish to edit.

1. Select *NC program >Generate*.
2. Right click on *Setup plan, Display*.
   ToPs displays the "Select file" mask. This offers as default all setup plans (suffixes: '*.ein' and '*.html') and always offers under "File name" the most recently generated setup plan.
3. Select the file format for the setup plan (e.g. '*.html').
4. If necessary, change directory (see p. 5-14).
5. Mark the desired setup plan.
6. Select *OK*.
   The editor opens the setup plan.
7. Edit the setup plan.

Save modifications?

8. Select *File >Save* (in the editor; here: Notepad)

Close editor?

9. Select *File >Exit* (in the editor; here: Notepad)

Using Microsoft Word as html editor

The setup plan in '*.html' format can be edited using Microsoft Word if the format of the setup plan is set to '*.html' in the 'ToPs100.ini' file (see Section 19.1, p. 5-144).

1. Start Microsoft Windows.
2. Right click on *My Computer* on the Windows desktop.
3. Select *Find ...*
4. Under "Name" enter `winword.exe`.
5. Select *Start*.
   The search for the 'winword.exe' file begins.
   If the search was successful, the file path ('...\Programme\Microsoft Office\Office') appears in the list field.
6. In the list field, left click on 'winword.exe'.
7. Holding down the mouse button, drag the file to the desktop.
   A shortcut to the file is created.
8. Close the "Find ..." mask.
9. Right click on the shortcut.
10. Click on *Properties*.
    ToPs displays the "Properties of ..." mask.
11. Select "Shortcut" tab.
12. Copy the path stated under "Target" using the key combination <STRG+C> or <CTRL+C>.

Editing 'ToPs100.ini'

1. Open Explorer.
2. Go to the directory 'Trumpf\ToPs100w'.
3. Double click on the 'ToPs100.ini' file.
4. If necessary select the program (editor), with which the 'ToPs100.ini' file should be opened (e.g. "Notepad").
   The editor opens the 'ToPs100.ini' file.
5. Find the following entry in the 'ToPs100.ini' file:
   TC_HTML_EDITOR_PFAD=

   Tip
   Use the >*Find* menu in your editor to find the variable quickly.

6. Insert the previously copied path after the "equals" symbol using the key combination <STRG+V> or <CTRL+V>.
7. Save the modifications in 'ToPs100.ini'.

Word is now available as the html editor.

19.4 Printing setup plan

Printing the currently generated setup plan

Prerequisite

- You have just generated an NC program with a setup plan.
- The processed sheet or single part is still loaded.

1. Select *NC program >Generate*.
2. Left click on *Setup plan, Print*.

ToPs prints the setup plan via Acrobat Reader.

Printing another setup plan

Prerequisite

- The setup plan you wish to print has been generated.
- You have loaded a processed sheet or a processed single part (for Loading files, see Section 3, p. 5-13 ff).

  Note
  You do not have to have loaded the processed sheet or single part whose setup plan you wish to edit.

1. Select *NC program >Generate*.
2. Right click on *Setup plan, Print*.

   ToPs displays the "Select file" mask. The name of the most recently generated setup plan is entered under "File name". ToPs offers the setup plan in the formats which you have set in the 'ToPs100.ini' file (see Section 19.1, p. 5-144).
3. Select setup plan file format.

4. If necessary, change directory (see p. 5-14).
5. Mark the desired setup plan.
6. Select *OK*.
   ToPs prints the setup plan.

With setup plans in '*.ein' format

➢ If the preset font results in an unclear printout: modify your printer's standard font (see following section).

Modifying your printer's standard font

If the preset font results in an unclear printout in the case of setup plans in '*.ein' format, you can modify the printer's standard font.

1. Open Explorer.
2. Go to the directory 'Trumpf\Gritw'.
3. Copy 'Topsprn.ini' and (in Windows NT) insert it into the directory 'C:\Winnt'. With other operating systems, take corresponding steps.
4. Double click on the 'Topsprn.ini' file.
5. If nec. select the program (editor), with which the file should be opened (e.g. "Notepad").
   The editor opens the 'Topsprn.ini' file.
6. Change the variable "ChooseFont=NoChoose" to "ChooseFont=Choose."
   If you now want to print the setup plan, you will be automatically offered a selection of fonts upon selecting the printer.
7. Select a non-proportional font (e.g. "Courier_New", point size 8).

20. Production plan

Using NcLink, you can create production plans directly in ToPs and send them to the machine.

NcLink combines several NC programs from a nesting job into a production plan. Data which is important for automation (for example, storage item designation) is added to the individual NC programs. The production plan is sent to the machine's transfer directory.

20.1 Creating production plan "afterwards"

When you load and process a nesting job, you can have the production plan automatically created directly there (see Section 3.5, p. 5-25).

Naturally the production plan can also be "created afterwards":

Prerequisite

- You have created nesting jobs and nested sheets in the *Nesting* module.
- The NC programs for all the various sheets have been created (to create NC programs for nesting jobs, see Section 3.5, p. 5-25 ff).

Note
If your machine is linked to CELL SERVER or TC CELL: change *NcLinkLiteModus* variable in the Data module under *Rules >Customer machine* from `1` to `0`.

If data is missing in your production plans: change *NcLinkProduktionsPlanTyp* variable (for both see Chapter 6, Data module, Machine-dependent process rule).

➢ Select *File >Nesting job ... >Create production plan*.
ToPs displays the mask "Selection of jobs".

Search for nesting job?

1. Check "Job name".
2. Enter job name. (For entering job names with the help of the wildcards when searching for nesting jobs, see Chapter 4.)
3. Select *Find ...*

Loading desired nesting job

4. Mark nesting job.
5. Select *OK*.

ToPs opens the production plan for the selected nesting job with Microsoft Internet Explorer.

20.2 Viewing production plan

Prerequisite

- You have created and saved production plans.

1. Select *File >Nesting job ... >View production plan*.

   ToPs displays the "Select file" mask. It displays as standard all production plans ('*.xml') located in the current directory.
2. If necessary, change directory (see p. 5-14).
3. Mark desired production plan.

   ToPs enters the name of the file under "File name".

   or

   ➢ Enter the name of the production plan under "File name" (to search for file names with the help of wildcards, see p. 5-13).
4. Select *OK*.

   ToPs opens the production plan for the selected nesting job with Microsoft Internet Explorer.

Printing production plan

➢ Print the production plan from Internet Explorer (via *File >Print*).

21. Printing

21.1 Printing the text content of a file

You can print the text content of the following file types:

- Drawings ('*.geo').
- Setup plans (e.g. '*.html', '*.ein'). (To set the file format of the setup plan, see Section 19.1, p. 5-144.)
- NC programs ('*.lst').
- Nesting jobs ('*.dat').

Furthermore, you can print the following files from other ToPs products:

- Mini nests ('*.mtl').
- Nested sheets ('*.taf').
- Processed geometry ('*.gmt').
- Processed sheets ('*.tmt').

Note
Production plans ('*.xml') can only be printed from Internet Explorer while they are being displayed (see Section 20.2, s. 5-152).

1. Select *File >Print >File ....*
   ToPs displays the "Print file" mask:

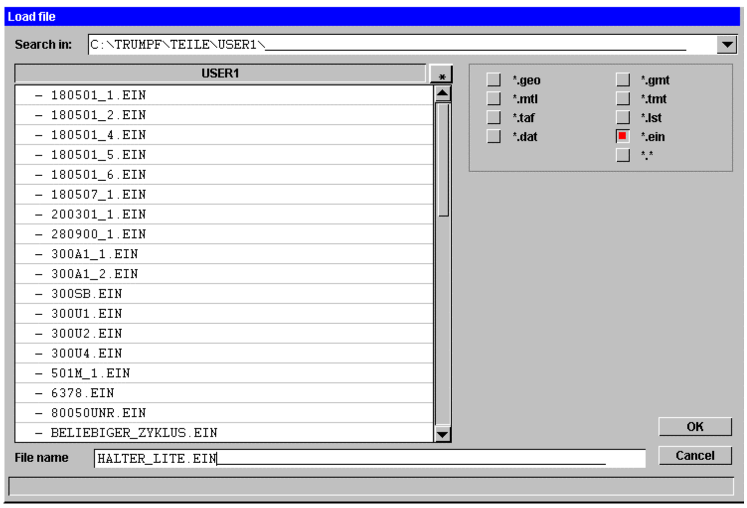


Fig. 27167EN

2. Select the file format (e.g.: '*.ein').
   ToPs displays all files of the selected format which are located in the current directory.

3. If necessary, change directory (see p. 5-14).
4. Mark the desired file.
   ToPs enters the name of the file under "File name".

   or

   ➢ Enter the name of the file you want to find under "File name" (to search for file names with the help of wildcards, see p. 5-13).
5. Select *OK*.
   ToPs displays the contents of the file.
6. Select *Print*.
   ToPs prints the contents of the file.
7. Select *OK*.
   The contents of the file disappear.

21.2 Printing screen shots

You can print that which is currently displayed on the screen.

1. Load the file which contains screen shots you wish to print (for Loading files, see Section 3, p. 5-13 ff).
2. Select *File >Print >Screen ...*
   The standard printer mask is displayed.
3. Change the settings as required.
4. Select *OK*.

ToPs prints the contents of the screen.

21.3 Printing geos as HPGL

ToPs prints '.geo' files as '.hpgl' (= graphic output of plotters).

1. Load the desired file in '*.geo' format (for Loading files, see Section 3, p. 5-13 ff).
2. Select *File >Print >HGPL ...*
   ToPs displays the "Plotting" mask.
3. Configure the settings as required.
4. Select *OK*.

ToPs prints the geo file in '.hpgl' format.

TRUMPF

Chapter 6

Data module

1. The database as an information resource

With the Data module, TRUMPF gives you access in the form of a database to its whole range of expertise in the field of laser and water jet machining of sheets.

The database contains all data to which ToPs refers in the various phases of programming.

- Machine data
- Material data
- Technology tables
- Process rules
- Customized cycles

Current application parameters

The technology tables and process rules contain the current application parameters released by the TRUMPF process development department. At regular intervals TRUMPF issues data collection updates which contain the latest application parameters.

Information resource

The database serves as an information resource to which you can add. This is where you enter new processing technology findings. ToPs will refer to this data when setting up the next NC program.

Working with a database

When working with the database, you can:

- Create data records (completely new or copies).
- Change data records (modify entries).
- Delete available data records.

Maintaining the database

1. Add data about the materials you use.
2. Check the values stored in the database.

2. Support functions

All functions which are reserved for the exclusive use of TRUMPF software support are protected by a password. You can only access this data with guidance from TRUMPF Software Support.

3. The Data module

3.1 Opening and closing Data module

Opening Data module

1. Open ToPs (see chapter 2).

   The ToPs initial screen is displayed.

2. Select *Data*.

   If you only selected one machine when installing ToPs, ToPs opens the Data module for this machine.

3. If you selected more than one machine when installing ToPs, ToPs displays the "Machine selection" mask (see selecting machine, Section 4.1, p. 6-8).

Closing Data module

➢ *Return*.

ToPs returns to initial screen.

4. Machine data

The machine data constitute the general framework for the creation of NC programs. ToPs can be configured for different machines with an NC interface.

The technical data for the machine, the laser or water jet cutting head and the control system are stored in the database. ToPs refers to this data when creating the NC program.

You can configure some of your machine's functions in the machine data:

- Two-head mode for the TC WS 2502.
- Machines with Bosch control and SprintLas.

Caution

Incorrect values in the machine data can lead to inoperable NC programs!

- ➢ Ensure that your entries and modifications are correct.
- ➢ Consult TRUMPF Software Support in case of doubt.

All the necessary data for your machine can be found in the machine's current operating and programming manuals.

4.1 Selecting machine

Note
The selection of a machine in the Data module is not self-holding.

If you only selected one machine when installing ToPs, ToPs opens the Data module for this machine automatically.

The machine cannot be changed within the Data module. If you wish to modify several machines' machine data, you must first exit the Data module and then restart.

Prerequisite

- The initial screen for ToPs is displayed.

1. Select *Data*.

   If you only selected one machine when installing ToPs, ToPS opens the Data module for this machine.

   If you selected more than one machine when installing ToPs, ToPs displays the "Machine selection" mask. Here ToPs always offers the machine which you most recently had active in the Technology module.

2. To confirm the suggested machine: *Yes*.

   ToPs opens the Data module for the suggested machine.

3. To select a different machine: Select *No*.

   ToPs displays the "Machine selection" mask. It shows all the machines stored in the database and their corresponding control systems:

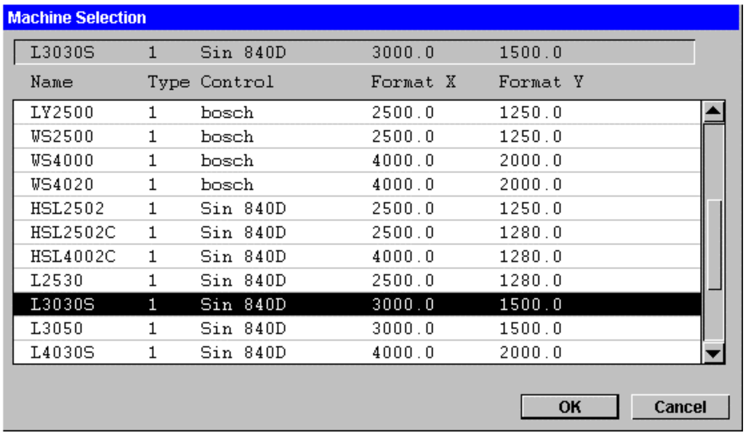


Fig. 25790EN

4. Mark machine.
5. Select *OK*.

4.2 Configuring machine

"Basic data" of machine

The following data is included in the "basic data". It can be viewed and/or modified here. ToPs shows the largest and the smallest value possible in each case:

"Base data 1"

- Working range.
- Travel limits.
- Maximum sheet size.

"Base data 2"

- Positioning speed of the cutting head in the X, Y and Z directions.
- Consider Z axis when performing time calculation Yes/No?
- Acceleration in the X, Y and Z directions.
- Jerk limitation Yes/No?
  With "jerk limitation", the machine approaches full acceleration of the axes via a gradient. Jerk limitation affects the time calculation and is preset for all machines with Siemens control systems:
  - If gradient ≥ `0 m/s3`:
    New time calculation taking jerk limitation into account.
  - If gradient = `0 m/s3`:
    New time calculation without taking jerk limitation into account.

"Base data 3"

- Machining direction in the X or Y direction?
- Sheet alignment with height regulation Yes/No?
- Sheet alignment with CatEye Yes/No?
- Reduced approaching II Yes/No?
- Gas flushing Yes/No?
- Microweld Yes/No?
- Start and loading corners.
  (The terms "upper left", "upper right", "lower left" and "lower right" relate to the screen display. The machine zero point is in the lower left of this display.)

1. Select *Machines >Data >Base data 1, 2* or *3*.
   ToPs displays the corresponding "Base data ..." mask.

Modifying basic data

2. Modify data.
3. Select *Modify*.

ToPs saves the changes.

Leaving "Base data ..."

- Go to another mask or another menu.

Configuring "Laser data"

The following data is included in the "laser data". It can be viewed and/or modified here. ToPs shows the largest and the smallest value possible in each case:

"Laser data 1"

- Focal length lens.
- Material thickness.
- Laser power in [%], laser type in [W].
- Pulse frequency.
- Feedrate.
- Delay time.

"Laser data 2"

- Cutting gas pressure.
- Kerf width.
- Ramp cycle number from ... to ....
- Ramp cycle time.
- Piercing height.
- Blow out time.
- Piercing gas pressure.

"Laser data 3"

- Rounding (contour control mode):
  In contour control mode the control system processes the following NC blocks in advance. When the tangent direction is altered, it rounds the transition points.
- Path slope (acceleration-braking ramps):
  Activating path slope generates a constant speed over the block transition points, enabling the laser to machine the workpiece contour at a constant speed (see also current programming manual for machines with path slope).
- Height control on/off?

  Note
  Do not change this setting!
- Work with high pressure?
- Feed forward.
- SprintLas Yes/No?
- Activate/deactivate measuring cycles 0, 1, 2 or 3 for defining the sheet thickness when piercing.

Modify laser data?

1. Select *Machines >Data >Laser data ...*.
   ToPs displays the "Laser data" mask.
2. Modify data.
3. Select *Modify*.

ToPs saves the changes.

Leaving "Laser data"

➢ Go to another mask or another menu.

Configuring NC program output ("Limit values")

NC program output can be configured as follows:

- Maximum number of digits in the main program name and the subroutine number.

  Note
  The digits are counted together.
- Maximum values for the X, Y, I and J coordinates.
  (I and J coordinates: arc radius and end point.)
- Block number:
  Maximum number of digits for line numbering in NC text.
- Machine name.
- Name transfer path:
  Which directory should the NC programs be copied into for data transfer? The path '...\users\masch01' is preset as standard.
- Maximum number of digits for program names.
- Laser table format.
- Output program names with leading zeros?
- Subroutine technique with programmable single part rotation?

With Siemens control systems

- Accept alphanumeric program names?

Configuring NC program output

1. Select *Machines >Data >Limit values*.
   ToPs displays the "Limit values" mask.
2. Modify the data as required.
3. Activate the desired parameters.
4. Select *Modify*.

ToPs saves the changes.

Leaving "Limit values"

➢ Go to another mask or another menu.

"Two-head" machines

Two-head machines have the following additional machine data:

- Two-head operation Yes/No?
- Offset in X Yes /No? If Yes: minimum distance to cutting head in X (= minimum distance between the two cutting heads in the X direction).
- Offset in Y Yes/No? If Yes: minimum distance to cutting head in Y (= minimum distance between the two cutting heads in the Y direction).
- Single-head operation possible with cutting head 2?

  Note
  Only the TC HSL 2502, TC HSL 2502 C and the TC HSL 4002 C can also operate in single-head mode with the second cutting head.
- Time calculation for head adjustment Yes/No? (The time taken to bring the two cutting heads to the desired distance from each other can be included in time calculation.)
- Head adjustment speed.

Only with water jet cutting machines

- Park position possible Yes/No?
  On all water jet cutting machines, the second cutting head can be moved to parking position when the machine is in single-head mode. This way, the second cutting head is "out of the way" and does not restrict the working range of the first cutting head.

  Note
  If you are working with only one cutting head and do not bring the other cutting head into parking position, the working range of the first cutting head will be restricted.

Modifying data for two-head mode?

1. Select *Machines >Data >Two-head*.
   ToPs displays the "Two-head" mask.
2. Modify data.
3. Select *Modify*.

ToPs saves the changes.

Leaving "Two-head"

➢ Go to another mask or another menu.

4.3 Deleting machine

Note
If you want to delete a machine which you selected when installing ToPs, it does not matter what machine is currently activated in the Data module.

1. Select *Machines >Administration*.
   ToPs displays all the machines you selected during installation.

Sort selection list?

2. Click on the button for the desired sorting criteria
   Possible sorting criteria:
   – Machine
   – Machine (Type)
   – Control
3. Mark the machine you wish to delete.
4. Select *Delete*.
   ToPs displays the "Delete machine data" mask.
5. Select *Delete* again.

ToPs deletes the machine marked above.

Note
In the "Delete machine data" mask there is no sign that the machine has in fact been deleted. However ToPs no longer offers the deleted machine in the "Machine selection" mask (see Fig. 25790, p. 6-8).

5. Material data

Material data is independent from the machine.

When you modify or add to material data it is **not** overwritten when ToPs is updated.

5.1 Adding to material specifications, material designations, blanks, stock items

ToPs 100 makes a distinction between "materials" and "blanks":

"Material specification"
- The material specification (e.g. glass) entails physical properties.

"Material designation"
- Material with a defined sheet thickness.

"Blank"
- Material with stock item designation.
  The storage item designation information allows the warehouse management to unequivocally determine the storage area of a blank and prepare it for processing. The storage item designation is given in the NC program and in other TRUMPF file formats (examples: *.taf, *.pdf, *.gmt, *.tmt...).

1. Select Material.
2. ToPs displays the "Material management" mask. This contains all materials and blanks which are already contained in the database.
3. To add a material specification (e.g. foam): select "Mat. spec".
4. To add material specification, material designation and stock item designation to a blank: select "Blank".
5. Mark one of the material specifications/blanks in the list field.

   ToPs will enter the data into the mask header.

   Tip
   Mark a material specification/blank which is similar to the new one.
6. Enter/modify data.
7. Select Create.

ToPs adds the material to the list field.

5.2 Modifying material data

1. Select *Material*.
2. ToPs displays the "Material management" mask. This contains all materials contained in the database.
3. Select Mat. spec. or Blank.
4. In the list field mark the material for which you want to modify data.

   ToPs enters the material data in the mask header.
5. Modify the desired data.
6. When modifying the data of a blank: if needed, open "Material specification" using ▼.
7. Mark material specification.
8. Select *Modify*.

Deleting materials

1. Select *Material*.

   ToPs displays the "Material management" mask. This contains all materials contained in the database.
2. Select Mat. spec. or Blank.
3. In the list field mark the material you want to delete.

   ToPs enters the material data in the mask header.
4. Select *Delete*.
5. Confirm the query from ToPs with *Delete*.

ToPs deletes the material in the list field and also in the database.

8

6. Technology tables

Why technology tables?

In order to be able to run an NC program on a machine, the technology data (e.g. piercing time, gating frequency, kerf width ...) for laser and water jet cutting must be accessible.

The technology data depend on the machine, the material and the material thickness. These are all to be found in technology tables.

The technology data only appear in the NC program if the technology table is sent to the machine control system together with the NC program. If the NC program is sent without the technology table, the NC program will only contain the names of the technology tables.

Machines of the same type and the same group use the same technology tables.

The technology data is determined and released by TRUMPF process development for the corresponding machines.

How does the machine control system access the technology data?

The original TRUMPF tables have already been stored in the control system of the machine. The control system reads in the technology data from the technology tables.

Technology tables you have produced yourself must be transferred to the control system together with the NC program (to send an NC program to the machine, see chapter 5).

If you are creating your own technology tables ...

... allocate additionally one or more process rules to each technology table (see p. 6-54).

The original TRUMPF tables have already been assigned one or more process rules.

Information on process rules

(See p. 6-55 ff).

Creating your own technology tables

(See Section 6.4, p. 6-24).

6.1 Technology table names

The names of numeric technology tables are 4-digit and consecutive.

The names of alphanumeric technology tables (only for open control systems) are 7-digit and consecutive.

Examples

Numeric	Alphanumeric
3527	T2D-5100
3528	T2D-5101
3529	T2D-5102
...	...

Table 6-1

Note
The technology tables created by TRUMPF are automatically overwritten with each ToPs update. If you modify the original technology tables supplied with ToPs, your modifications are lost in every ToPs update.

To modify an original TRUMPF table

If you wish to modify the data in a technology table permanently, you must first copy the technology tables supplied by TRUMPF and save them under another name (see Section 6.4, p. 6-24).

Valid names for technology tables

	Names	
Numeric:	1000 to 4999	Names for original TRUMPF tables
	5000 to 9999	Names that you can allocate.
Alphanumeric (only open control systems):	T...	Names for original TRUMPF tables
	K...	Recommended for your tables.

Table 6-2

Data collection

In the data collection supplied with your machine, the technology tables are stored under the same numbers as in the ToPs database.

Updating the data collection

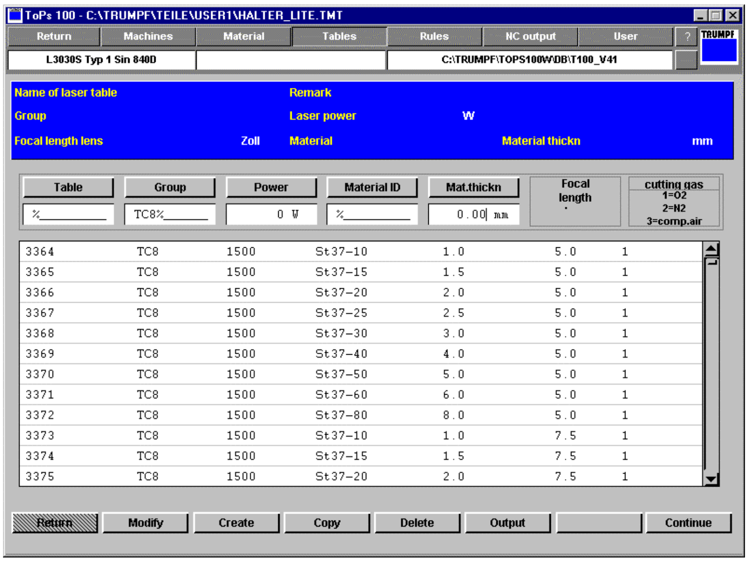
The data collections are updated by us at regular intervals. The data collection contains an overview of the table names in which data have been changed, and information on the improvements expected from the changes made. This gives you the opportunity to decide whether you want to follow our recommendations and modify and expand your former data resource.

You will find more information on the technology tables in your machine's current data collection.

6.2 Finding technology tables

1. Select *Tables*.

   ToPs displays the selection of all technology tables for the active machine group:



Selection of technology tables for the active machine group

Fig. 27620EN

2. **Either**

   ➢ Look for the technology table using the scroll bar.

   ➢ Mark the technology table.

   or

   ➢ Search for the technology table using search criteria (see following description).

Searching for the technology table using search criteria

You can search for technology tables according to the following criteria:

- Table number ("Table").
- Machine group ("Group"). ToPs offers the technology tables for the active machine group as default.
- For laser cutting machines: Laser power ("Power").
- Type of material ("Material ID").
- Material thickness ("Mat. thickn").

Entering search criteria

1. Click in the input box under the button for the desired search criteria.
2. Enter the search value.

Tip
If using the ToPs key functions, you can delete the content of the input box using <Esc>. (for a description of the ToPs key functions see Chapter 2, to set key functions see Section 10, p. 6-110).

3. Click on the button for the criterion ToPs is to use to sort the selection.

Tip
To filter laser power and material thickness for larger than/equal to: left click on the search criterion button.

To filter laser power for the exact value: right click on the search criterion button.

4. If necessary enter further search values and then click on the button for the additional search criterion.

   ToPs further narrows the selection.

5. When you have found the technology table: mark the technology table.

ToPs enters the name of the technology table in the mask header.

6.3 Modifying header data in the technology tables

The following data are included in the header data:

- Name of the laser table.
- Remark.
- Machine group which the technology table belongs to.
- Laser power.
- Focal length lens.
- Material thickness.
- Material type.

Note
The technology tables created by TRUMPF are automatically overwritten with each ToPs update.

To modify an original TRUMPF table: copy it and save it under a new name (see Section 6.4, p. 6-24).

(To modify technology data in technology tables, see Section 6.4, p. 6-24).

1. Search for technology table you wish to modify (see Section 6.2, p. 6-20).
2. When you have found the technology table, mark it.
   ToPs enters the name of the technology table in the mask header.
3. Select *Modify*.
   ToPs displays the "Modify laser table" mask.
4. Select *Read*.
   ToPs fills the mask with the technology table header data.
5. Modify header data as desired.
6. Select *Modify*.

ToPs modifies the technology table header data.

Modify further tables?

1. Under "Table selection", click on one of the two *arrows* until ToPs displays the desired technology table.
2. Click directly in the input box.
   ToPs enters the name of the technology table under "Laser table".

3. Select *Read*.
   ToPs fills the mask with the technology table header data.
4. Modify the header data as desired.
5. Select *Modify*.

Closing "Modify laser table" mask

➢ Select *Return*.

ToPs displays the technology tables to select from again.

6.4 Copying technology tables and creating new ones

Note
Always create technology tables on the basis of an existing table.

1. Select *Tables*.

   ToPs displays the selection of all technology tables for the active machine group.

2. Search for the technology table you wish to copy (see Section 6.2, p. 6-20).

   Tip
   Find a technology table which has data is similar to that of the technology table to be created.

3. When you have found the technology table:
   Mark it.

   ToPs enters the name of the technology table in the mask header.

4. Select *Copy*.

   ToPs displays the "Copy laser table" mask.

5. Select *Read*.

   ToPs fills the mask with the technology table header data.

6. Change at least the name of the technology table.

7. Select *Copy*.

   ToPs creates a copy of the technology table under the new name.

8. Select *Return*.

   ToPs displays the selection of all technology tables for the active machine group again.

9. Mark the copied technology table.

10. Select *Continue*.

11. Modify the desired technology data in the individual tabs (see Section 6.7, p. 6-27 ff).

ToPs adds the new technology table to the database and also to the selection list.

6.5 Deleting technology table

1. Select *Tables*.

   ToPs displays the selection of all technology tables for the active machine group.
2. Search for the technology table you wish to delete (see Section 6.2, p. 6-20).
3. When you have found the technology table: mark it.

   ToPs enters the name of the technology table in the mask header.
4. Select *Delete*.

   ToPs displays the "Delete laser table" mask.
5. Select *Read*.

   ToPs fills the mask with the technology table header data.
6. Select *Delete*.

ToPs deletes the technology table from the database and also from the selection list.

Delete further tables?

1. Under "Table selection", click on one of the two *arrows* until ToPs displays the desired technology table.
2. Click directly in the input box.

   ToPs enters the laser table number under "Laser table".
3. Select *Delete*.

ToPs deletes the technology table from the database and also from the selection list.

Closing the "Delete laser table" mask

➢ Select *Return*.

ToPs displays the selection of technology tables again.

6.6 Viewing and printing technology tables

1. Select *Tables*.

   ToPs displays the selection of all technology tables for the active machine group.
2. Search for the technology table you wish to display or print (see Section 6.2, p. 6-20).
3. When you have found the technology table: Mark the technology table.

   ToPs enters the name of the technology table in the mask header.
4. Select *Output*.

   ToPs displays the "Print/File output" mask. ToPs displays the selected table under "Table No".

View technology table?

5. Under "Output", select *Display*.

   A viewer displays the content of the technology table.
6. Close the viewer again using the *cross* button.

Print technology table?

7. Under "Output", select *Printer*.

The technology table will be printed on your default printer in the format in which it is displayed in the viewer.

Closing "Print/File output"

Select *OK*.

6.7 Laser cutting machine technology data in detail

1. Select *Tables*.

   ToPs displays the selection of all technology tables for the active machine group.

2. Search for the technology table you wish to see the details of (see Section 6.2, p. 6-20).

3. When you have found the technology table: mark it.

   ToPs enters the name of the technology table in the mask header.

4. Select *Continue*.

   ToPs displays an overview of the individual tabs for the technology table.

Example: TRO-5102 Fig. 27694EN

"Piercing"

Prerequisite

- The overview of the individual tabs for the technology table has been displayed (see Section 6.7, p. 6-27).

➢ Select *Piercing*.
ToPs displays the tab "Piercing":

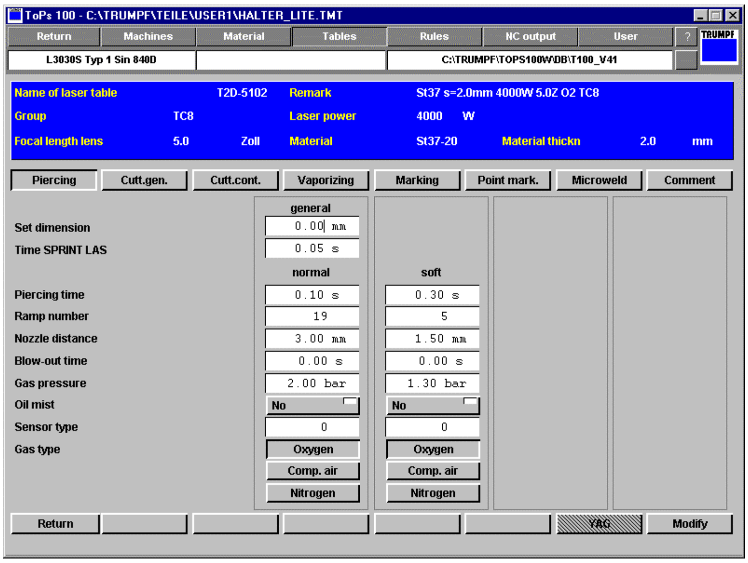


Fig. 22532EN

The tab "Piercing" contains the following data:

- Set dimension of the cutting head when piercing.
- Piercing time for normal and soft piercing.
- Ramp number (normal/soft).
- Blow-out time for normal and soft piercing.
- Gas pressure for normal and soft piercing.
- Gas type for piercing.

Additionally for machines with Siemens control systems

- Time Sprint Las.
- Nozzle distance at the cutting head for normal or soft piercing.
- Oil mist Yes/No.

Additionally for machines with Bosch control systems

- Relative piercing hight for normal and reduced approaching and Reduced appro-aching II.

Modifying technology data

Note
The TRUMPF technology tables supplied with ToPs are automatically overwritten with each ToPs update. To modify an original TRUMPF table, copy it and save it under a new name (see Section 6.4, p. 6-24).

(For valid names for the technology table, see Section 6.1, p. 6-19)

1. Modify the data as required.
2. Select *Modify*.

"Approaching" (Bosch)

Prerequisite

- The overview of the individual tabs for the technology table has been displayed (see Section 6.7, p. 6-27).

➢ Select *Approaching*.

ToPs displays the tab "Approaching":

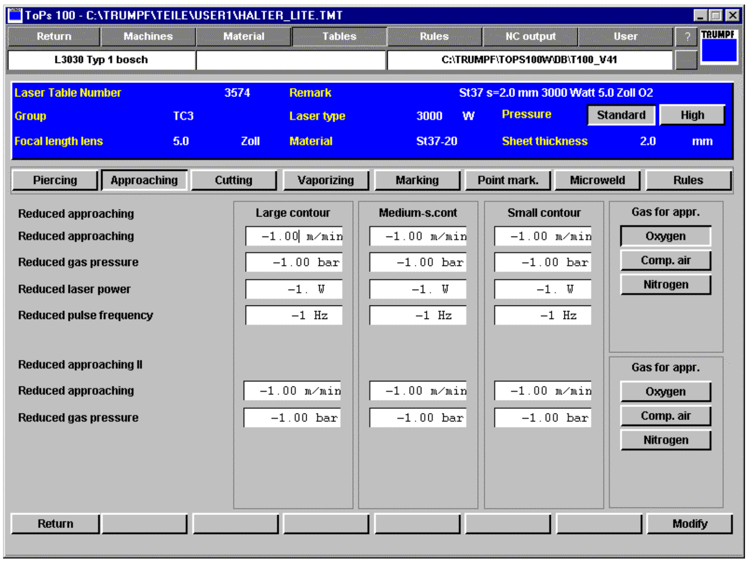


Fig. 22680EN

The tab "Approaching" contains the following data.

A distinction is made each time between "Reduced approaching" (= normal approaching with full laser power) and "Reduced approaching II" (= reduced approaching with reduced laser power):

- (Reduced) cutting speed when approaching.
- (Reduced) gas pressure.
- (Reduced) laser power.
- (Reduced) pulse frequency.

Modifying technology data

Note
The TRUMPF technology tables supplied with ToPs are automatically overwritten with each ToPs update. To modify an original TRUMPF table, copy it and save it under a new name (see Section 6.4, p. 6-24).

(For valid names for the technology table, see Section 6.1, p. 6-19)

1. Modify the data as required.
2. Select *Modify*.

"Cutting, general" (Siemens)

Prerequisite

- The overview of the individual tabs for the technology table has been displayed (see Section 6.7, p. 6-27).

➢ Select *Cutt. gen.*
  ToPs displays the tab "Cutt. gen.":

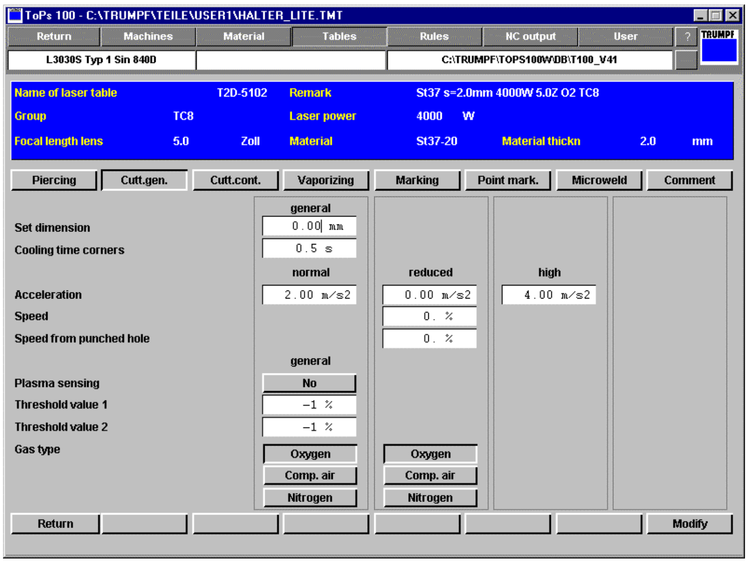


Fig. 22533EN

The tab "Cutt. gen". contains the following data:

- Set dimension of the cutting head.
- Cooling time corners.
- Acceleration and cutting speed.
- Speed from punched hole[1]
- Plasma sensing on/off.
- Threshold values 1 and 2 of the plasma sensor system.
- Gas type for cutting.

Modifying technology data

Note
The TRUMPF technology tables supplied with ToPs are automatically overwritten with each ToPs update. To modify an original TRUMPF table copy it and save it under a new name (see Section 6.4, p. 6-24).

1. Modify the data as required.
2. Select *Modify*.

"Cutting, contour" (Siemens)

Prerequisite

- The overview of the individual tabs for the technology table has been displayed (see Section 6.7, p. 6-27).

➢ Select *Cutt.cont.*
ToPs displays the tab "Cutt.cont.":

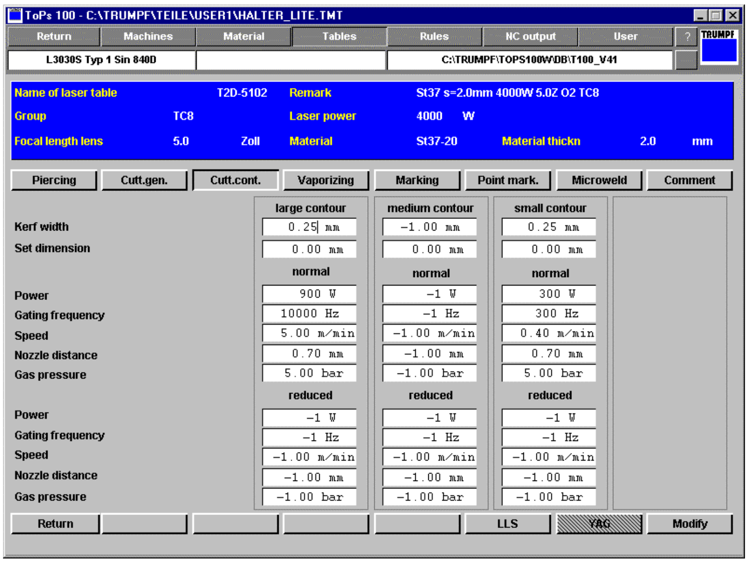


Fig. 22534EN

Note
Do not change anything on the tab for laser power control (reached via the *LLS (LPC)* button)!

The tab "Cutting, contour" contains the following data. A distinction is made in each case between small, medium and large contours and between normal and reduced cutting:

- Kerf width.
- Set dimension.
- Laser power.
- Laser beam gating frequency.
- Cutting speed.
- Cutting head nozzle standoff.
- Gas pressure.

Machines with YAG laser

- Pulse power and pause power.
- Pulse time and pause time.

➢ Select YAG.

Modifying technology data

Note
The TRUMPF technology tables supplied with ToPs are automatically overwritten with each ToPs update. To modify an original TRUMPF table, copy it and save it under a new name (see Section 6.4, p. 6-24 and Section 6.1, p. 6-19.)

1. Modify the data as required.
2. Select *Modify*.

"Vaporizing"

Prerequisite

- The overview of the individual tabs for the technology table has been displayed (see Section 6.7, p. 6-27).

➢ Select *Vaporizing*.
ToPs displays the tab "Vaporizing":

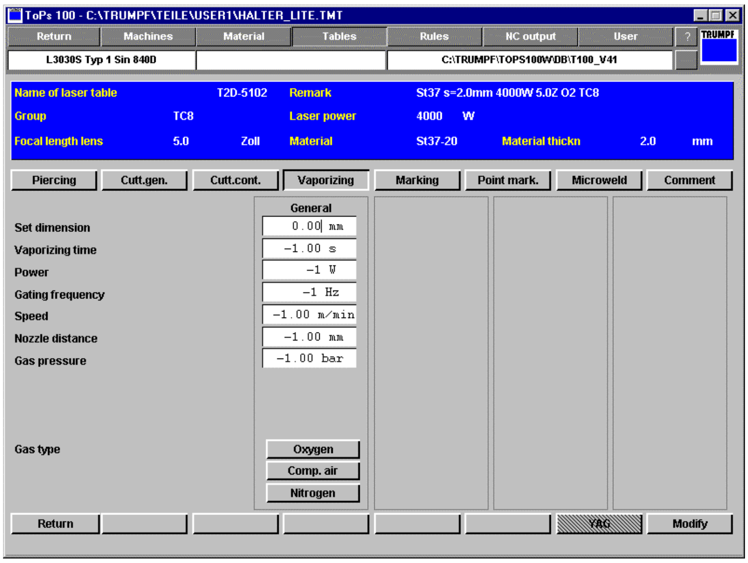


Fig. 22535EN

The "Vaporizing" tab includes the following data:

- Laser power during vaporizing.
- Gating frequency.
- Speed.

Additionally for machines with Siemens control systems

- Vaporizing time.

Additionally for machines with Bosch control systems

- Kerf width.
- Delay time.
- Gas change time.

Machines with YAG laser

- Power pulse and power pause.
- Time pulse and time pause.

➢ Select *YAG*.

Modifying technology data

Note
The TRUMPF technology tables supplied with ToPs are automatically overwritten with each ToPs update. To modify an original TRUMPF table, copy it and save it under a new name (see Section 6.4, p. 6-24).

(For valid names for the technology table, see Section 6.1, p. 6-19.)

1. Modify the data as required.
2. Select *Modify*.

"Marking"

Prerequisite

- The overview of the individual tabs for the technology table has been displayed (see Section 6.7, p. 6-27).

➢ Select *Marking*.
ToPs displays the tab "Marking":

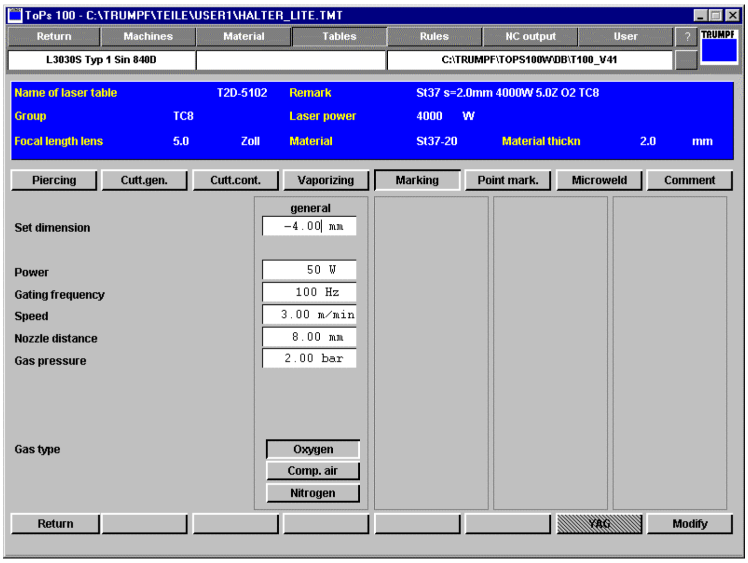


Fig. 22536EN

The tab "Marking" contains the following data:

- Laser power.
- Gating frequency.
- Cutting speed.
- Nozzle distance.
- Gas pressure.
- Gas type.

Additionally for machines with Siemens control systems

- Set dimension.

Additionally for machines with Bosch control systems

- Delay time.
- Kerf width.
- Gas change time.
- Height of the cutting head when marking.

Machines with YAG laser

- Pulse power and pause power.
- Pulse time and pause time.

➢ Select *YAG*.

Modifying technology data

Note
The TRUMPF technology tables supplied with ToPs are automatically overwritten with each ToPs update. To modify an original TRUMPF table, copy it and save it under a new name (see Section 6.4, p. 6-24).

(For valid names for the technology table, see Section 6.1, p. 6-19.)

1. Modify the data as required.
2. Select *Modify*.

"Point marking"

Prerequisite

- The overview of the individual tabs for the technology table has been displayed (see Section 6.7, p. 6-27).

➢ Select *Point mark.*
ToPs displays the tab "Point marking":

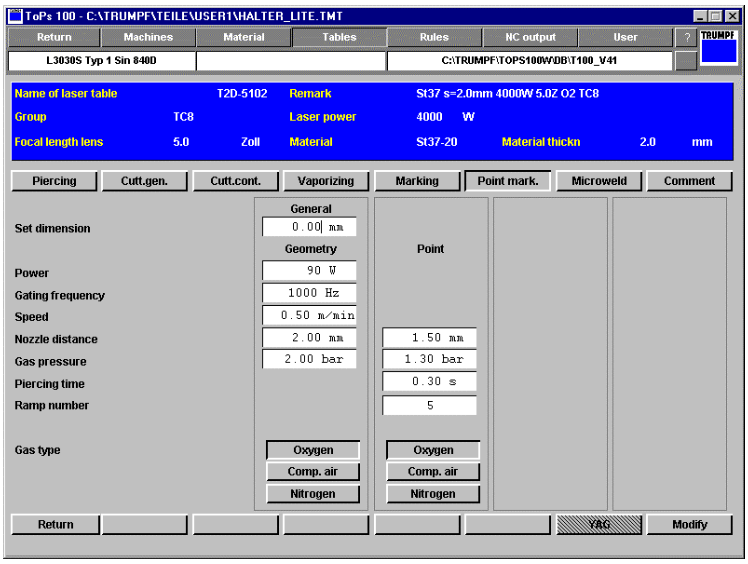


Fig. 22531EN

The tab "Point marking" contains the following data:

- Laser power
- Gating frequency
- Cutting speed
- Nozzle distance
- Gas pressure
- Piercing time
- Ramp number
- Gas type

Additionally with Siemens control systems

- Set dimension

Additionally with Bosch control systems

- Kerf width.
- Delay time.
- Gas change time.
- Piercing height.
- Blow-off time.

Machines with YAG laser

- Pulse power and pause power.
- Pulse time and pause time.

➢ Select *YAG*.

Modifying technology data

Note
The TRUMPF technology tables supplied with ToPs are automatically overwritten with each ToPs update. To modify an original TRUMPF table, copy it and save it under a new name (see Section 6.4, p. 6-24).

(For valid names for the technology table, see Section 6.1, p. 6-19.)

1. Modify the data as required.
2. Select *Modify*.

"Microweld"

Prerequisite

- The overview of the individual tabs for the technology table has been displayed (see Section 6.7, p. 6-27).

➢ Select *Microweld*.
ToPs displays the tab "Microweld":

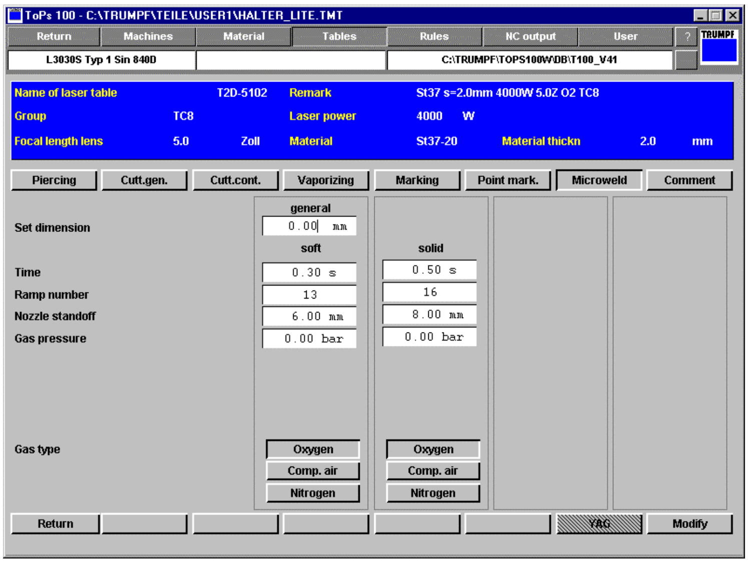


Fig. 22530

The tab "Microweld" contains the following data:

- Time for positioning welding point.
- Ramp number.
- Nozzle distance.
- Gas pressure.
- Gas type.

Additionally for machines with Siemens control systems

- Set dimension.

Machines with YAG laser

- Pulse power and pause power.
- Pulse time and pause time.

➢ Select *YAG*.

Modifying technology data

Note
The TRUMPF technology tables supplied with ToPs are automatically overwritten with each ToPs update. To modify an original TRUMPF table, copy it and save it under a new name (see Section 6.4, p. 6-24).

(For valid names for the technology table, see Section 6.1, p. 6-19.)

1. Modify the data as required.
2. Select *Modify*.

"Comment" (Siemens)

Prerequisite

- The overview of the individual tabs for the technology table has been displayed (see Section 6.7, p. 6-27).

➢ Select *Comment*.
ToPs displays the tab "Comment":

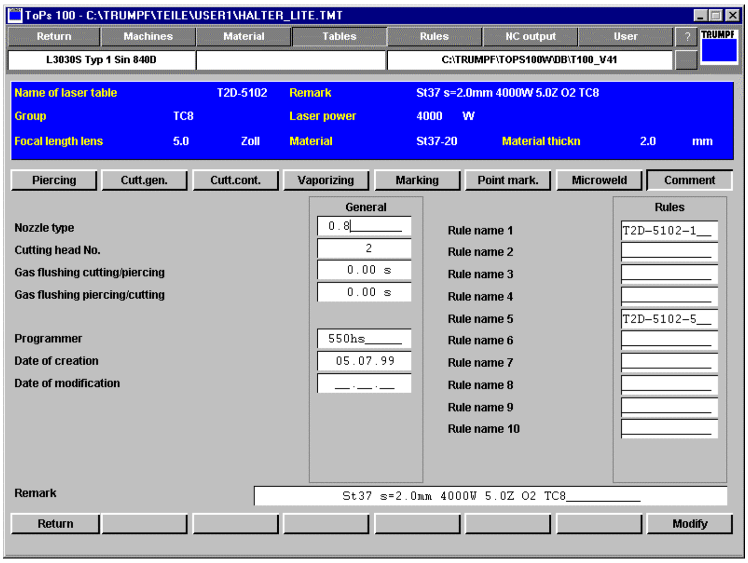


Fig. 27628EN

The tab "Comment" contains the following data:

- Nozzle type.
- Cutting head No. with AutoLas *Plus* characteristic curve.
- Gas flushing when changing between cutting and piercing?
  ➢ To activate gas flushing: enter time > `0`.
- Technology table programmer.
- Technology table creation and modification dates.
- Process rules allocated to the technology table.
- Remarks on the technology table.

Apart from the above you can also allocate process rules to a technology table here:

Allocating process rules

1. Under "Rule name ..." enter the names of the process rules which you want to allocate to the technology table.
2. Select *Modify*.

Modifying technology data

Note
The TRUMPF technology tables supplied with ToPs are automatically overwritten with each ToPs update. To modify an original TRUMPF table copy it and save it under a new name (see Section 6.4, p. 6-24).

(For valid names for the technology table, see Section 6.1, p. 6-19.)

1. Modify the data as required.
2. Select *Modify*.

"Rules" (Bosch)

Prerequisite

- The overview of the individual tabs for the technology table has been displayed (see Section 6.7, p. 6-27).

➢ Select *Rules*.
ToPs displays the tab "Rules":

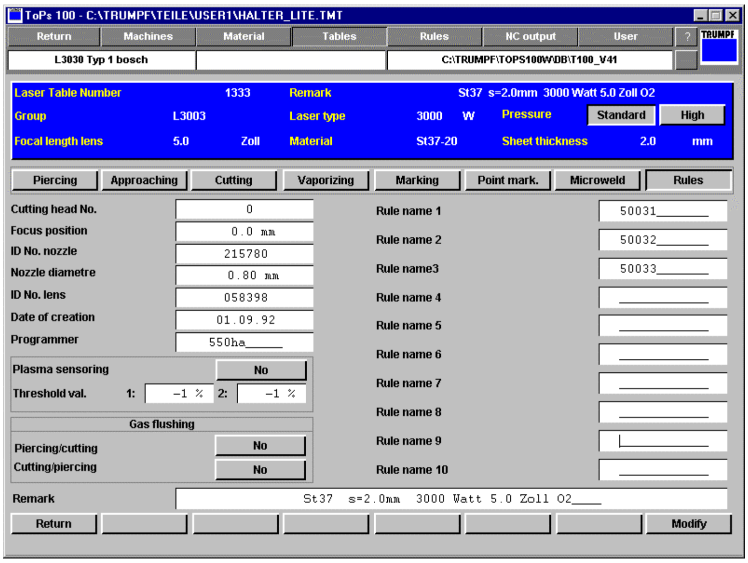


Fig. 27630EN

The tab "Rules" contains the following data:

- Cutting head number.
- Focus position.
- Nozzle ID number and diameter.
- Lens ID number.
- Technology table creation date.
- Technology table programmer.
- Plasma sensing on/off:
- Threshold values 1 and 2 of the plasma sensor system
- Gas flushing Yes/No when...
  - ... changing from cutting to piercing.
  - ... changing from piercing to cutting.
- Process rules allocated to the technology table.
- Remarks on the technology table.

Allocating process rules

1. Under "Rule name ..." enter the names of the process rules which you want to allocate to the technology table.
2. Select *Modify*.

Modifying technology data

Note
The TRUMPF technology tables supplied with ToPs are automatically overwritten with each ToPs update. To modify an original TRUMPF table, copy it and save it under a new name (see Section 6.4, p. 6-24).

(For valid names for the technology table, see Section 6.1, p. 6-19.)

1. Modify the data as required.
2. Select *Modify*.

6.8 Water jet cutting machine technology data in detail

1. Select *Tables*.

   ToPs displays the selection of all technology tables for the active machine group.

2. Search for the technology table you wish to see the details of (see Section 6.2, p. 6-20).

3. When you have found the technology table, mark it.

   ToPs enters the name of the technology table in the mask header.

4. Select *Continue*.

   ToPs displays an overview of the individual tabs for the technology tables:

Example: 1000 Fig. 29869EN

"Parameters"

Prerequisite

- The overview of the individual tabs for the technology table is displayed (see Section 6.8, p. 6-43).

➢ Select *Parameters*.
ToPs shows the "Parameters" tab:

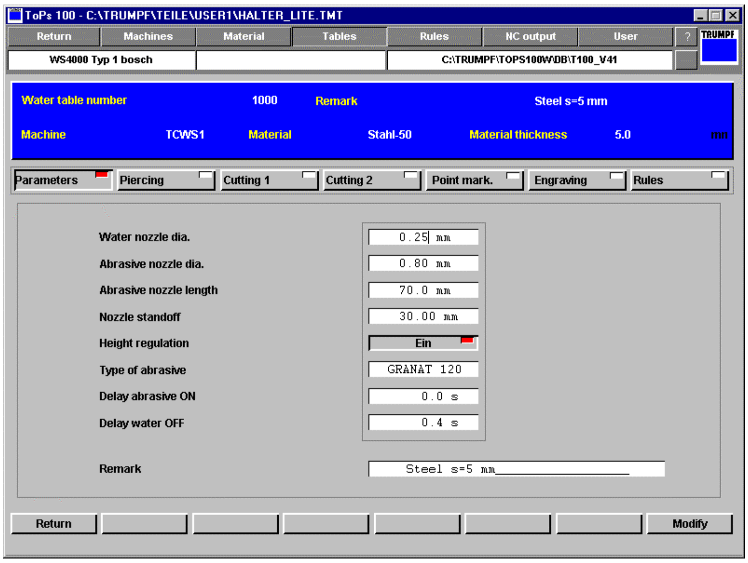


Fig. 22672EN

The tab "Parameters" contains the following data:

- Water nozzle diameter.
- Abrasive nozzle diameter.
- Abrasive nozzle length.
- Nozzle standoff.
- Height regulation (distance control system).
- Type of abrasive:
  - 1 = garnet 80.
  - 2 = garnet 120.
  - 3 = olivine 60.
  - 4 = olivine 90.
- Delay abrasive ON:
  How long is the water on before the abrasive is switched on?
- Delay water OFF:
  How long does the water stay on after the abrasive has been switched off?
- Remarks on the technology table.

Modifying technology data

Note

The TRUMPF technology tables supplied with ToPs are automatically overwritten with each ToPs update. To modify an original TRUMPF table, copy it and save it under a new name (see Section 6.4, p. 6-24).

(For valid names for the technology table, see Section 6.1, p. 6-19.)

1. Modify the data as required.
2. Select *Modify*.

"Piercing"

Prerequisite

- The overview of the individual tabs for the technology table is displayed (see Section 6.8, p. 6-43).

➢ Select *Piercing*.
ToPs displays the tab "Piercing":

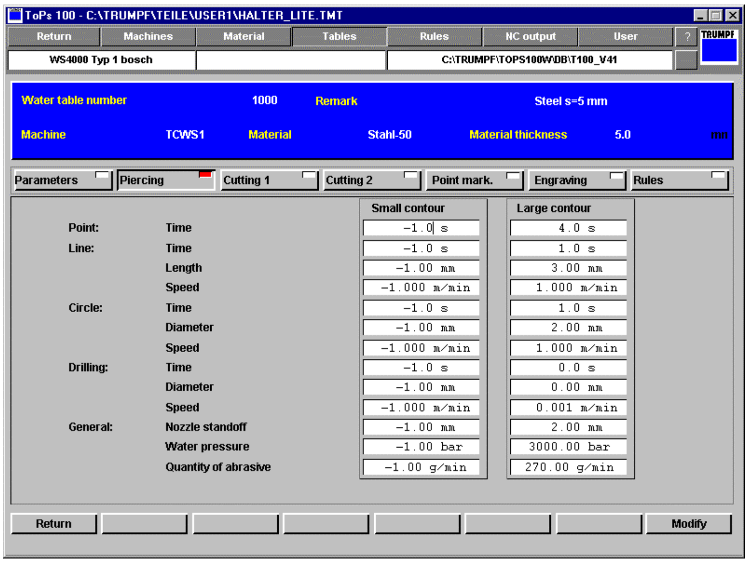


Fig. 22673EN

Note

At present, it is not necessary to differentiate between contour sizes for water jet cutting machines. It has no effect on the cutting result.

As has previously been the case, ToPs does not evaluate the values in "Small contour".

The tab "Piercing" contains the following data:

- "Point":
  For what length of time is the cutting head to remain "stationary" while piercing?
- "Line":
  For what length of time (in seconds) is the cutting head to go back and forth? What length is the piercing path to be? How quickly, i.e. at what speed should the cutting head move back and forth?
- "Circle":
  What size is the diameter of the piercing circle to be? (ToPs automatically takes the kerf into consideration). How quickly, i.e. at what speed is the cutting head to "circle"?
- "Drilling":
  For what length of time is drilling to last? What is the drill diameter? At what feedrate (speed) is drilling to take place?
- Nozzle standoff.
- Water pressure.
- Quantity of abrasive.

Modifying technology data

Note
The TRUMPF technology tables supplied with ToPs are automatically overwritten with each ToPs update. To modify an original TRUMPF table, copy it and save it under a new name (see Section 6.4, p. 6-24).

(For valid names for the technology table, see Section 6.1, p. 6-19.)

1. Modify the data as required.
2. Select *Modify*.

"Cutting 1"

In "Cutting 1", you specify some of the parameters with which your water jet cutting machine is to cut different qualities of cut (slitting cut, quality cut, precision cut).

Prerequisite

- The overview of the individual tabs for the technology table is displayed (see Section 6.8, p. 6-43).

➢ Select *Cutting 1*.
ToPs displays the tab "Cutting 1":

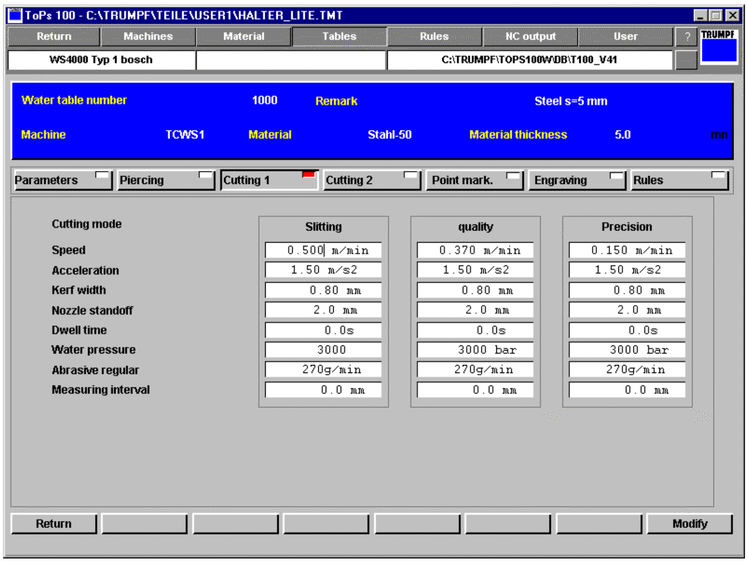


Fig. 22674EN

The tab "Cutting 1" contains the following data:

- Cutting speed.
- Acceleration.
- Kerf width.
- Nozzle standoff.
- Dwell time.
- Water pressure.
- Abrasive regular:
  Amount of abrasive added; 0 = cutting with pure water.
- Measuring interval: distance between two measuring points of the distance control system.

Modifying technology data

Note
The TRUMPF technology tables supplied with ToPs are automatically overwritten with each ToPs update. To modify an original TRUMPF table, copy it and save it under a new name (see Section 6.4, p. 6-24).

(For valid names for the technology table, see Section 6.1, p. 6-19.)

1. Modify the data as required.
2. Select *Modify*.

"Cutting 2"

In "Cutting 2", you specify the remaining parameters with which your water jet cutting machine is to cut different qualities of cut (slitting cut, quality cut, precision cut).

Prerequisite

- The overview of the individual tabs for the technology table is displayed (see Section 6.8, p. 6-43).

➢ Select *Cutting 2*.
  ToPs displays the tab "Cutting 2":

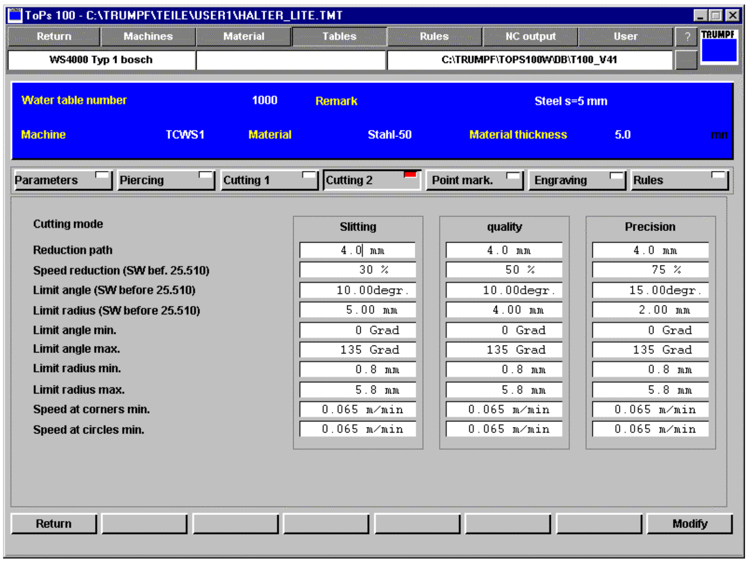


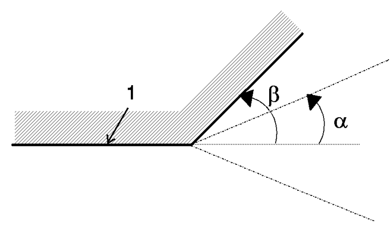
Fig. 22675EN

The software version before 25.510 utilizes "Reduction path" and the parameters marked with (SW before 25.510).

The software version after 25.510 utilizes "Reduction path" and the parameters not marked with (SW before 25.510).

Explanation of the data

- "Reduction path" = the length of the path along which the speed is to be reduced.
- "Speed reduction (SW before 25.510)" = reduction of speed in %, when the cutting head is at a distance equal to the "Reduction path" in front of the corner.
- "Limit angle (SW before 25.510)" = angle from which the machine should move with reduced speed around the corner.

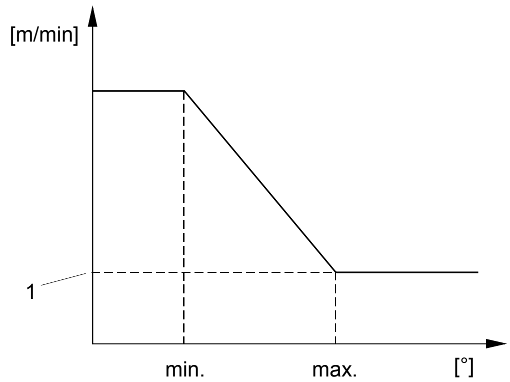


1	Contour	α	Limit angle
		β	Contour angle

Fig. 6673

- "Limit radius (SW before 25.510)" = from which radius should rounded corners be approached with reduced speed?
- "Limit angle max". of a corner:
  If a corner has the maximum limit angle (or more), the machine cuts the corner with minimum speed (= "Speed at corners min".).

  "Limit angle min." of a corner:
  If a corner has the minimum limit angle (or less), the machine cuts the corner with the maximum cutting speed from the technology table. Between these two angles, the speed is reduced or increased in linear proportion.



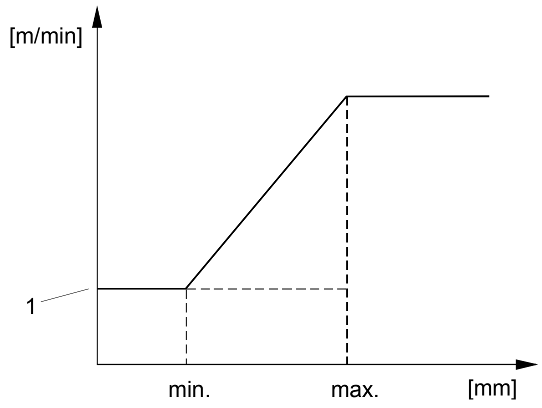
1 Minimum cutting speed

Cutting speed [m/min.] dependent on corner angle [°]

Fig. 22741

- "Limit radius min." of a contour:
  If a contour has the minimum limit radius (or less), the machine cuts the contour with minimum speed for circles (= "Speed at circles min".).

  "Limit radius max". of a contour:
  If a corner has the maximum limit radius (or more), the machine cuts the contour with the maximum cutting speed from the technology table.



1 Minimum cutting speed

Cutting speed [m/min.] dependent on circle radius [mm] Fig. 22742

Modifying technology data

Note
The TRUMPF technology tables supplied with ToPs are automatically overwritten with each ToPs update. To modify an original TRUMPF table, copy it and save it under a new name (see Section 6.4, p. 6-24).

(For valid names for the technology table, see Section 6.1, p. 6-19.)

1. Modify the data as required.
2. Select *Modify*.

"Point marking"

Prerequisite

- The overview of the individual tabs for the technology table is displayed (see Section 6.8, p. 6-43).

➢ Select *Point mark.*
ToPs displays the tab "Point marking":

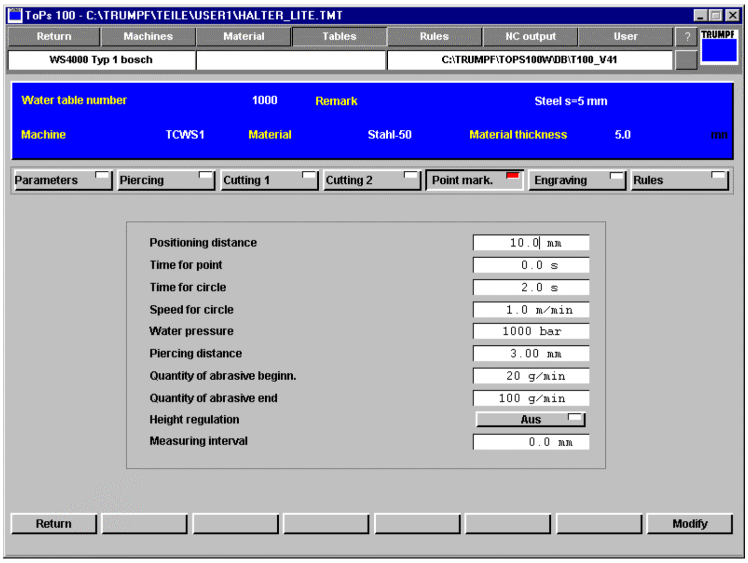


Fig. 22676EN

The tab "Point marking" contains the following data:

- Positioning distance.
- Period of time for point marking of a point ("Time for point").
- Period of time and speed for point marking of a circle ("Time for circle", "Speed for circle").
- Water pressure.
- Piercing distance.
- Quantity of abrasive at the beginning and end of point marking.
- Measuring interval (for determining the position of the surface).

Modifying technology data

Note
The TRUMPF technology tables supplied with ToPs are automatically overwritten with each ToPs update. To modify an original TRUMPF table, copy it and save it under a new name (see Section 6.4, p. 6-24).

(For valid names for the technology table, see Section 6.1, p. 6-19.)

1. Modify the data as required.
2. Select *Modify*.

"Engraving"

Prerequisite

- The overview of the individual tabs for the technology table is displayed (see Section 6.8, p. 6-43).

➢ Select *Engraving*.

ToPs displays the tab "Engraving":

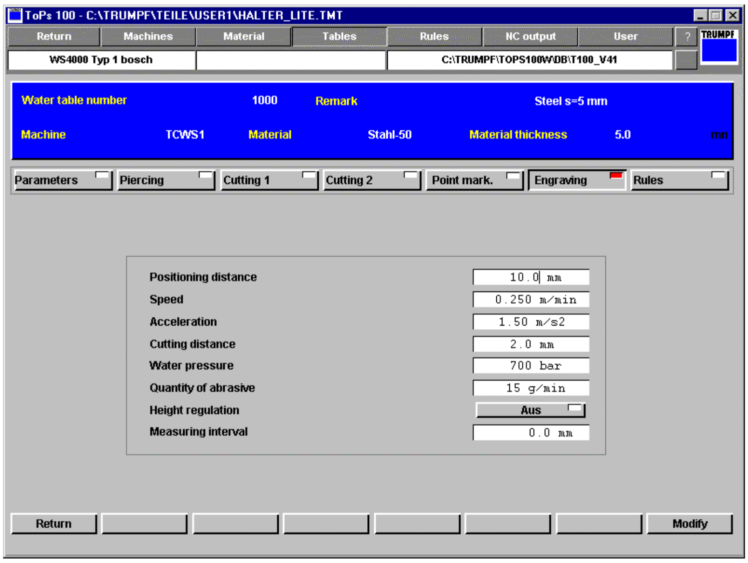


Fig. 22677EN

The tab "Engraving" contains the following data:

- Positioning distance.
- Speed.
- Acceleration.
- Cutting distance.
- Water pressure.
- Quantity of abrasive.
- Height regulation (distance control system) (on or off?).
- Measuring interval (for determining the position of the surface).

Modifying technology data

Note

The TRUMPF technology tables supplied with ToPs are automatically overwritten with each ToPs update. To modify an original TRUMPF table, copy it and save it under a new name (see Section 6.4, p. 6-24).

(For valid names for the technology table, see Section 6.1, p. 6-19.)

1. Modify the data as required.
2. Select *Modify*.

"Rules"

In this tab, you can allocate process rules to a technology table.

Prerequisite

- The overview of the individual tabs for the technology table is displayed (see Section 6.8, p. 6-43).

1. Select *Rules*.
   ToPs displays the tab "Rules":

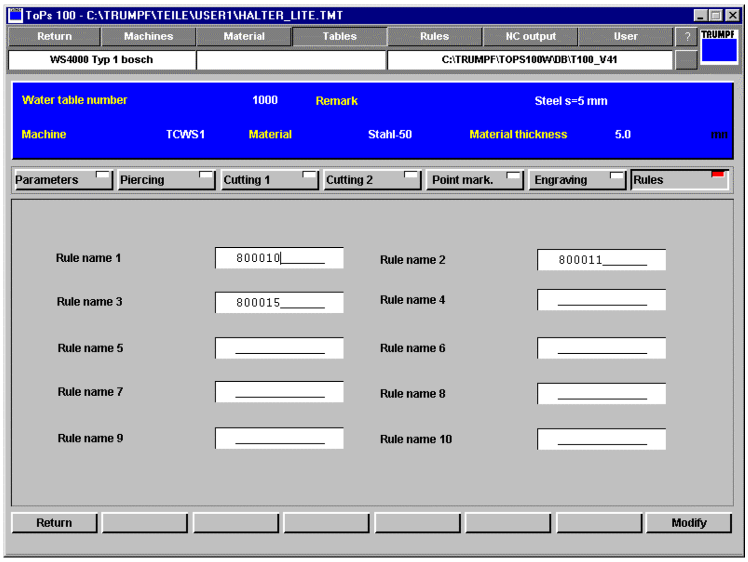


Fig. 22678EN

2. Further see Section 6.9, p. 6-54.

6.9 Allocating process rules to technology tables

Prerequisite

- When opening the Data module you chose a machine appropriate to the technology table (see Section 4.1, p. 6-8).

Note
The TRUMPF technology tables supplied with ToPs are automatically overwritten with each ToPs update. To modify an original TRUMPF table, copy it and save it under a new name (see Section 6.4, p. 6-24).

(For valid names for the technology table, see Section 6.1, p. 6-19.)

1. Select *Tables*.
2. Search for the technology table you wish to allocate process rules to (see Section 6.2, p. 6-20).
3. Mark the technology table.
4. Select *Continue*.
5. For laser cutting machines with Siemens control systems: select tab "Comment".
6. For machines with Bosch control systems: select tab "Rules".
7. Under "Rule name ..." enter the names of the process rules you wish to allocate to the technology table. (For valid names for the technology table, see Section 7.1, p. 6-55.)
8. Select *Modify*.

7. Process rules

7.1 Process rule names

The name of the process rule can consist of various characters: letters, numerals or a combination of both. Maximum name length: 14 characters.

TRUMPF process rules

The process rules which we have already stored in the database are characterized by the fact that their first character **is not** "K".

Examples

"Old" laser process rules:	"New" laser process rules:
50001	T2D-3832-5
50002	...
50003	T2D-4304-6
...	...
50101	T2D-4307-4
...	...

Table 6-3

Note
The process rules created by TRUMPF are automatically overwritten with each ToPs update.

Modify original TRUMPF process rules?

Original TRUMPF process rules cannot themselves be modified:

1. Copy process rule and save under a valid name (to copy process rule, see Section 7.3, p. 6-58, for valid names, see below).
2. Modify desired values (for technology data of process rules, see Section 7.6, p. 6-61).

Your process rule names

The first character in the name of your process rule must be a "K". (The process rules which we have already stored in the database are characterized by the fact that their first character **is not** "K".)

Examples

K4711
KPR1
K0001

Original TRUMPF process rule code numbers

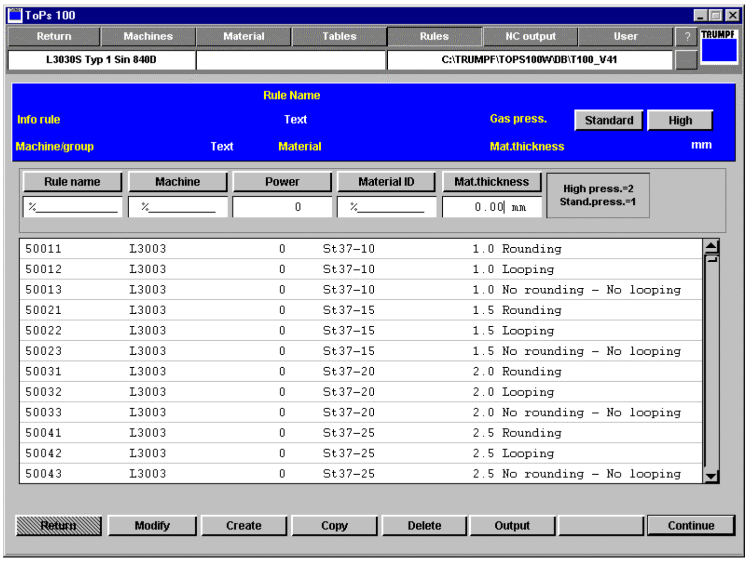
The names of our process rules all contain a code number. The code number shows the general framework of the process rule:

1 Corner rounding; without SprintLas
2 Looping (sharp corners)
3 Corner cutting (no rounding or looping)
4 Vaporizing, corners are rounded
5 Corner rounding, SprintLas
6 Corner rounding; ContourLas

7.2 Finding process rule

1. Select *Rules >Data*.

   ToPs displays the selection of all process rules for the active machine group:



Selection of process rules for the active machine group — Fig. 27631EN

2. **Either**

   ➢ Look for the process rule using the scroll bar.

   ➢ Mark the process rule.

   or

   ➢ Search for the process rule using search criteria (see following description).

Searching for the process rule using search criteria

You can search for process rules by the following criteria:

- Process rule name ("Rule name").
- Machine group ("Machine") ToPs offers the process rules for the active machine group as default.
- For laser cutting machines: Laser power ("Power").
- Type of material ("Material ID").
- Material thickness ("Mat. thickness").

Entering search criteria

1. Click in the input box under the button for the desired search criterion.
2. Enter the search value.

Tip
If using the ToPs key functions, you can delete the content of the input box with <Esc> (for the ToPs key functions see Chapter 2, to set key functions see Section 10, p. 6-110).

3. Click on the button for the criterion which ToPs is to use to sort the selection.

Tip
To filter laser power and material thickness for larger than/equal to: left click on the search criterion button.

To filter laser power for the exact value: right click on the search criterion button.

4. If necessary enter further search values and then click on the button for the additional search criterion.

   ToPs further narrows the selection.

5. When you have found the right process rule: mark it.

ToPs enters the name of the process rule in the mask header.

7.3 Copying process rules and creating new ones

Note
TRUMPF process rules cannot be modified, but only copied and saved under a new name (for valid names see Section 7.1, p. 6-55).

If you create your own process rules, you must allocate them to at least one technology table (see Section 6.4, p. 6-24).

1. Select *Rules >Data*.

   ToPs displays the selection of all process rules for the active machine group.

2. Look for the process rule you wish to copy (see Section 7.2, p. 6-56).

   Tip
   Look for a process rule in which the data resembles that in the new process rule.

3. When you have found the right process rule:
   Mark the process rule.

   ToPs enters the name of the process rule in the mask header.

4. Select *Copy*.

   ToPs displays the "Copy Rules" mask.

5. Select *Read*.

   ToPs fills the mask with the process rule header data.

6. Change at least the name of the process rule.

7. Select *Copy*.

   ToPs creates a copy of the process rule under the new name.

8. Select *Return*.

   ToPs displays again the selection list of all process rules for the active machine group.

9. Mark the copied process rule.

10. Select *Continue*.

11. Modify the desired data in the individual tabs of the copied process rule (see Section 7.6, p. 6-61).

7.4 Deleting process rules

Note
Original TRUMPF process rules cannot themselves be deleted. You can only delete process rules you have created yourself (to create a process rule, see Section 7.3, p. 6-58).

1. Select *Rules >Data*.
   ToPs displays the selection of all process rules for the active machine group.
2. Look for the process rule you wish to delete (see Section 7.2, p. 6-56).
3. When you have found the right process rule: mark it.
   ToPs enters the name of the process rule in the mask header.
4. Select *Delete*.
   ToPs displays the "Delete Rules" mask.
5. Select *Read*.
   ToPs fills the mask with the process rule header data.
6. Select *Delete*.

ToPs deletes the process rule from the database and also from the selection list.

Delete further process rules?

1. Under "Rule name" "Selection" click on one of the two *arrows* until ToPs displays the desired process rule.
2. Click directly in the input box.
   ToPs enters the name of the process rule under "Rule name".
3. Select *Read*.
   ToPs fills the mask with the process rule header data.
4. Select *Delete*.

ToPs deletes the process rule from the database and also from the selection list.

Closing the "Delete Rules" mask

➢ Select *Return*.

ToPs displays the selection of process rules again.

7.5 Viewing and printing process rules

1. Select *Rules >Data*.

   ToPs displays the selection of all process rules for the active machine group.
2. Find the process rule you wish to issue as a file or print (see Section 7.2, p. 6-56).
3. When you have found the right process rule: mark it.

   ToPs enters the name of the process rule in the mask header.
4. Select *Output*.

   ToPs displays the "Print / File output" mask. ToPs displays the selected process rule under "Table No".

View process rule?

5. Under "Output", select *Display*.

   A viewer displays the content of the process rule.
6. Close the viewer again using the *cross* button.

Print process rule?

7. Under "Output", select *Printer*.

The process rule will be printed on your default printer in the format in which it is displayed in the viewer.

Closing "Print/File output"

➢ Select *OK*.

7.6 Laser cutting machine process rules in detail

1. Select *Rules >Data*.

   ToPs displays the selection of all process rules for the active machine group.

2. Find the process rule whose data you wish to view (see Section 7.2, p. 6-56).

3. When you have found the right process rule: mark it.

   ToPs enters the name of the process rule in the mask header.

4. Select *Continue*.

   ToPs informs you that TRUMPF process rules cannot be modified.

5. Select *OK*.

   ToPs displays an overview of the individual tabs for the process rule:

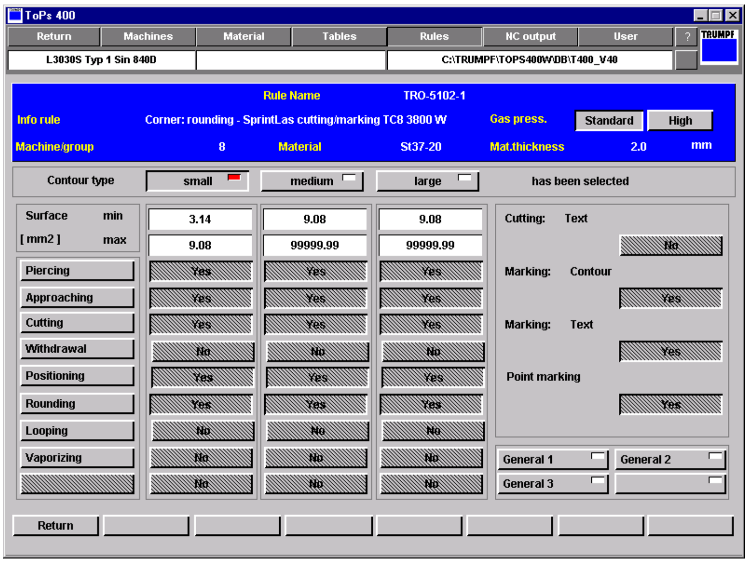


Fig. 27632EN

"General 1"

Prerequisite

- The overview of the individual process rule tabs for the laser cutting machine is displayed (see Section 7.6, p. 6-61).

Note

Original TRUMPF process rules cannot themselves be modified. You can only modify process rules you have created yourself (to create a process rule, see Section 7.3, p. 6-58).

➢ Select *General 1*.

ToPs displays the tab "General 1":

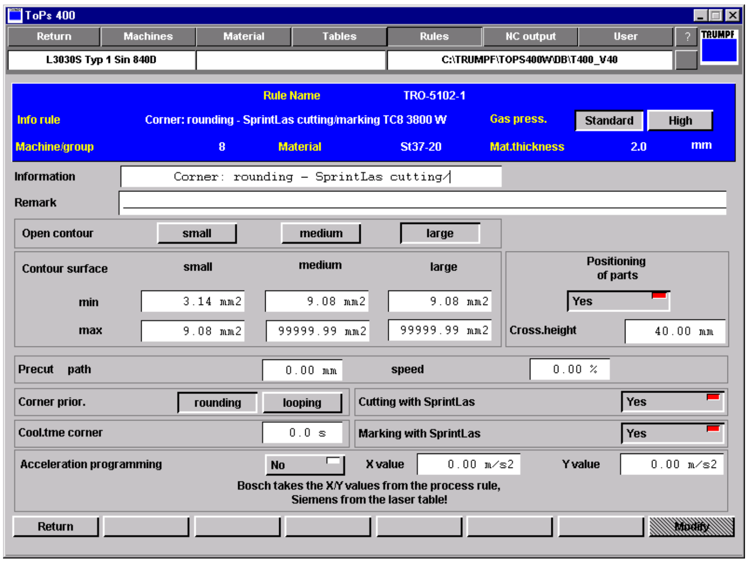


Fig. 27633EN

Data in the tab "General 1"

- Information and remark on the process rule:
  ToPs will display the text you enter here in the selection list of process rules in the Technology module. The "Information" text is pre-entered in all original TRUMPF process rules.

- Contour size of open contours.

- Classification of contours into "small", "medium" and "large" according to their surface.

- Positioning of parts
  Note
  "Positioning of parts" must always be set to *Yes*.

- Cross. height (= height that the cutting head adopts when positioning between contours).

- Precut path for approaching thick plate?
  On the approach flag a part is "precut" on minimized feed rate, then the beam goes back to the piercing point and cutting continues on full feed rate.

  Note
  Precut for approaching thick plate is an approach strategy for thick plates. Precut for approaching is supported by all Siemens control systems and by Bosch control systems from version number 4.0.

  Precut for approaching thick plate only makes sense in conjunction with the equidistant method, but not with the path correction method.

- Precut speed?
  Note
  The precutting speed is only read in by Bosch control systems. Siemens control systems take the precut speed from the technology table. Activate precut with Bosch control systems as follows:

  1. Select *Return >Approaching*.
  2. Enter "Precut path" and "Speed".
  3. Select *Modify*.

  ToPs saves the modifications in "Approaching".

- Priority corner treatment "Rounding" or "Looping"?

- Corner cooling time.

- Cutting with SprintLas?
  SprintLas means: fast positioning of the laser head during cutting and marking with deactivated height regulation.

- Marking with SprintLas?

- Acceleration programming (i. e. reduced acceleration)?
  Note
  Acceleration programming is not evaluated on machines with open control, – not even if the button is on *Yes*. On machines with open control systems, the machine control system reads the value for "Reduced acceleration" from the technology table:

  ➢ To activate acceleration programming: Enter the X and Y values.

  Acceleration programming is mostly used for aluminum (4-6 mm) and stainless steel (4-10 mm):

- Effect: reduction of acceleration (m/s^2). Although the reduction applies to the whole contour, it particularly affects corners and approaching.
- No further special corner treatment using rounding or looping is necessary. The reduction causes the corners to be cut sharply.
- Contours which would have to be approached in an arc without acceleration programming can be approached linearly.
- Acceleration programming is generated automatically and independently of the contour size, and it affects all contours.

If only individual contours are to be processed using accelerat-ion programming, you must allocate a process rule without acti-vated acceleration programming to these contours and generate the processing of these contours selectively (for changing and selectively processing process rules see chapter 4).

Changing the data in the process rule

1. Modify the data as required.
2. Select *Modify*.

"General 2"

Prerequisite

- The overview of the individual process rule tabs for the laser cutting machine is displayed (see Section 7.6, p. 6-61).

Note

Original TRUMPF process rules cannot themselves be modified. You can only modify process rules you have created yourself (to create a process rule, see Section 7.3, p. 6-58).

➢ Select *General 2*.

ToPs displays the tab "General 2":

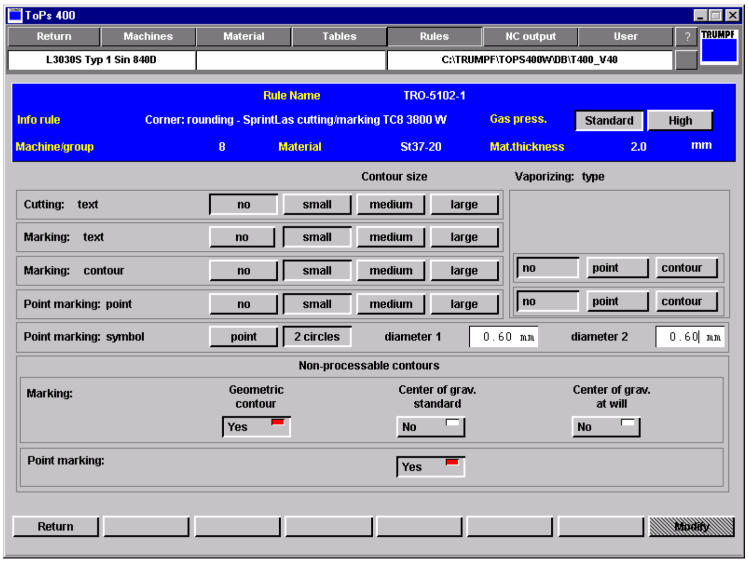


Fig. 27634EN

Data in the tab "General 2"

- Cutting texts?
  If Yes: Determine the contour size of the texts that you want to cut.

  Notes

  Texts to be cut must have the line color "white" (for line colors see Chapter 3).

  When cutting the texts ToPs does not generate approach or withdrawal flags. The beam pierces directly on the contour.

  Processing cannot be rearranged. This could result in uncontrolled scrap (depending on the font).

- Marking texts?
  If Yes: Determine the contour size of the marked texts.

Note
Texts to be marked must have the line color "yellow" (for line colors see Chapter 3).

- Marking contours?
  If Yes: determine contour size of marked contours.

- Previously vaporize marked contours?

- Point mark dots?
  If yes: Determine the contour size of the point marked dots.

  Notes
  Dots to be point-marked must have the line color "cyan" (for line colors see Chapter 3).

  If you are programing dot-shaped point marking (which corresponds to "soft piercing") for a machine with a Bosch control system, the following values must be modified in the technology table:
  - Piercing distance
  - Piercing gas pressure
  - Gas type

  (For values, see the current data collection for your machine).

- Prior vaporization of point-marked dots?

- Point-mark symbols as a *dot* or as *2 circles*?
  For *2 circles*: enter the diameter of the 2 circles.

- Handling unprocessable contours: simple marking or point marking?

  ToPs automatically determines which contours cannot be processed during machining definition. You can have these parts marked as follows:
  - "Marking", "Geometric contour": ToPs marks all the contours that cannot be processed.
  - "Marking", "Center of gravity standard": ToPs marks standard contours (rectangle, circle, oblong hole) in their center of gravity.
  - "Marking", "Center of gravity, at will": ToPs marks chosen contours in their center of gravity.
  - "Point marking": ToPs point-marks contours in their center of gravity.

  Note
  If both point marking in the center of gravity and marking in the center of gravity are activated, point marking in the center of gravity has priority.

Changing data in the process rule

1. Modify the data as required.
2. Select *Modify*.

"General 3"

Prerequisite

- The overview of the individual process rule tabs for the laser cutting machine is displayed (see Section 7.6, p. 6-61).

Note

Original TRUMPF process rules cannot themselves be modified. You can only modify process rules you have created yourself (to create a process rule, see Section 7.3, p. 6-58).

➢ Select *General 3*.

ToPs displays the tab "General 3":

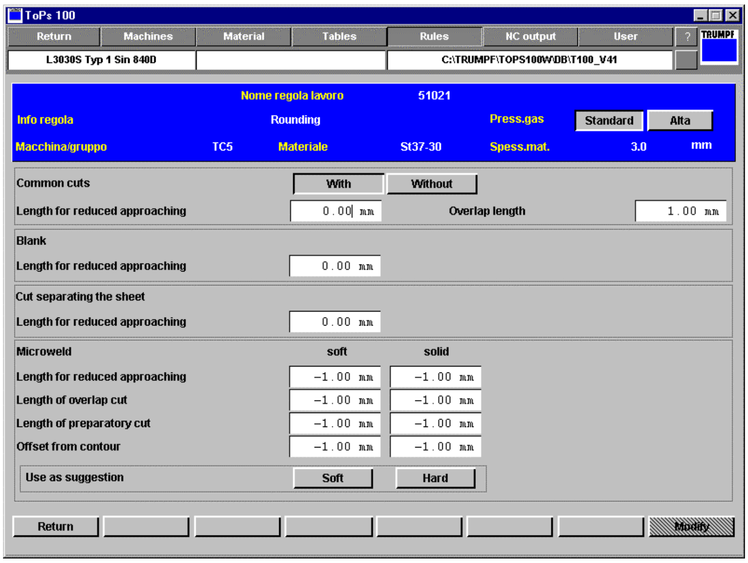


Fig. 22497EN

Data in the tab "General 3"

- Common cuts? (For a description of the parameters see chapter 5, Technology module).
- Length for reduced approaching in the case of blanks and sheet parting cuts (for an overview of piercing and approaching for various materials, refer to the current data collection).
- Microwelds? (For a description of the parameters of micro-welds, see chapter 5, Technology module)
- "Use as suggestion"?: ToPs offers the form of welding point you choose here as a suggestion during processing in the Technology module.

Changing the data in the process rule

1. Modify the data as required.
2. Select *Modify*.

"Piercing"

Prerequisite

- The overview of the individual process rule tabs for the laser cutting machine is displayed (see Section 7.6, p. 6-61).

Note

Original TRUMPF process rules cannot themselves be modified. You can only modify process rules you have created yourself (to create a process rule, see Section 7.3, p. 6-58).

➢ Select *Piercing*.

ToPs displays the tab "Piercing":

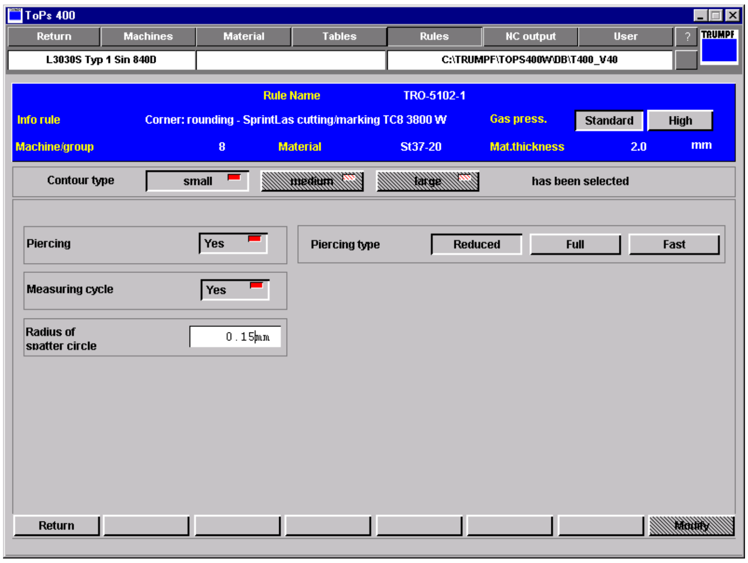


Fig. 27636EN

Data in the tab "Piercing"

- Selected contour type:
- Piercing Yes/No.
  If Yes: "Piercing type" reduced, full or fast?
  Note
  Fast piercing is only available on machines without open control systems (see your machine's current programming manual).
  - Reduced piercing: the beam pierces in ramp mode with reduced laser power.
  - Full piercing: the beam pierces in ramp mode with full laser power.
- Determine the sheet thickness with a measuring cycle?

- Radius of spatter circle.
  The spatter circle radius is a safety range, within which contours may not be positioned which could possibly be damaged. ToPs takes account of this safety range in its collision check.

Changing the data in the process rule

1. Modify the data as required.
2. Select *Modify*.

"Approaching"

Prerequisite

- The overview of the individual process rule tabs for the laser cutting machine is displayed (see Section 7.6, p. 6-61).

Note

Original TRUMPF process rules cannot themselves be modified. You can only modify process rules you have created yourself (to create a process rule, see Section 7.3, p. 6-58).

➢ Select *Approaching*.
  ToPs displays the tab "Approaching":

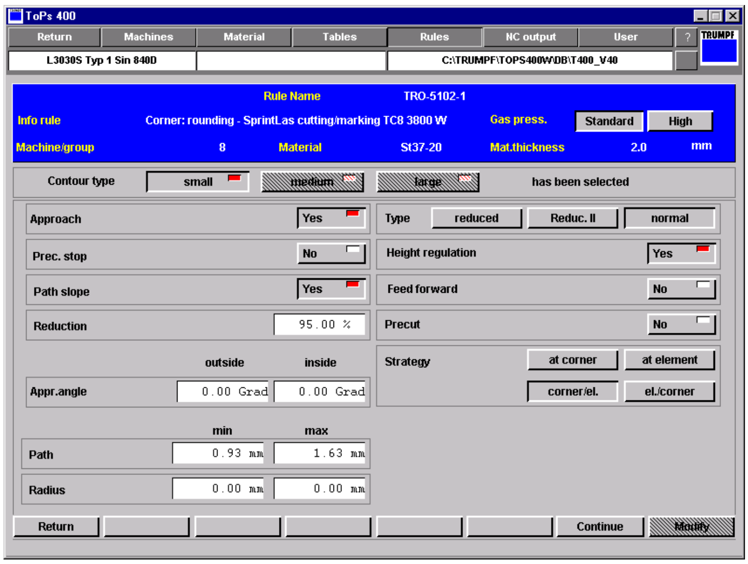


Fig. 27637EN

Data in the tab "Approaching"

- Selected contour type:

- Approaching Yes/No?
  If Yes: select the type of approaching (reduced, reduced II, full).

  Note
  Reduced approaching II is only available for machines with Bosch control systems from software update 7.0.

  "Reduced approaching II" makes reduced approaching for high-pressure cutting of aluminum and special steel faster than it has been hitherto, because the control system no longer needs to switch to a different technology table.

  Activate reduced approaching II for machines with Bosch control systems as follows:

  1. Select *Machines >Data >Base data 3*.
  2. Activate Reduced approaching II.
  3. Select *Modify*.
     ToPs saves the modifications in the basic data.

- Precision stop.

- Height regulation Yes/No?

  Note
  Height regulation (the distance control system) must be either activated or deactivated in all the tabs in the process rule. Further tabs with "Height regulation": "Approaching", "Cutting", "Withdrawal"

- Path slope.

- Feed forward.

- Reduction: what reduction (in percent) should the straight part of the approach path be cut with?

- Precut for approaching thick plate?
  Determining the path and the speed of the precut:

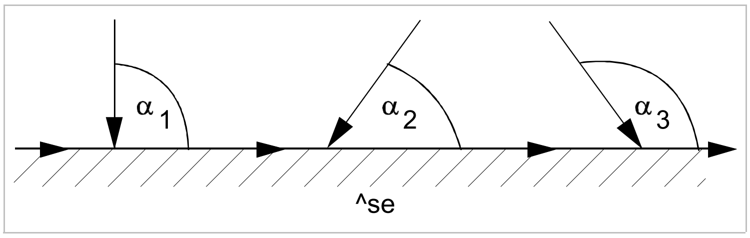
  1. Select *Return >General 1*.
  2. Enter "Precut path" and "speed".
  3. Select *Modify*.

- Inside and outside approach angles.

  0°: ToPs generates an approach flag in the angle $\alpha 1$ of 90° (90°-0°).

  -20°: ToPs generates an approach flag in the angle $\alpha 2$ of 70° (90°-20°).

  +20°: ToPs generates an approach flag in the angle $\alpha 3$ of 110°(90°+20°).



Approach angle α Fig. 27686

- Strategy:

  Determine where the approach should be positioned:

  – *at corner*: The cutting head only approaches corners. If ToPs cannot find a corner, the contour is not processed.
  – *at element*: The cutting head only approaches elements (= lines or arcs). If ToPs cannot find an element, the contour is not processed.
  – *corner / el.:* The cutting head gives priority to corners. If ToPs cannot find any corners, the cutting head approaches a suitable element.
  – *el. / corner:* The cutting head gives priority to elements. If ToPs cannot find any elements, the cutting head approaches a suitable corner.

  For approaching an element: for form and length, see second "Approaching" tab (open with *Continue*).

  For approaching a corner: for form, angle and length of the elements before or after a corner, see second "Approaching" tab (open with *Continue*).

- Path (approach path) and radius.
  Note
  The approach path and the radius must be smaller than web width.

Changing the data in the process rule

1. Modify the data as required.
2. Select *Modify*.

"Cutting"

Prerequisite

- The overview of the individual process rule tabs for the laser cutting machine is displayed (see Section 7.6, p. 6-61).

Note

Original TRUMPF process rules cannot themselves be modified. You can only modify process rules you have created yourself (to create a process rule, see Section 7.3, p. 6-58).

➢ Select *Cutting*.

ToPs displays the tab "Cutting":

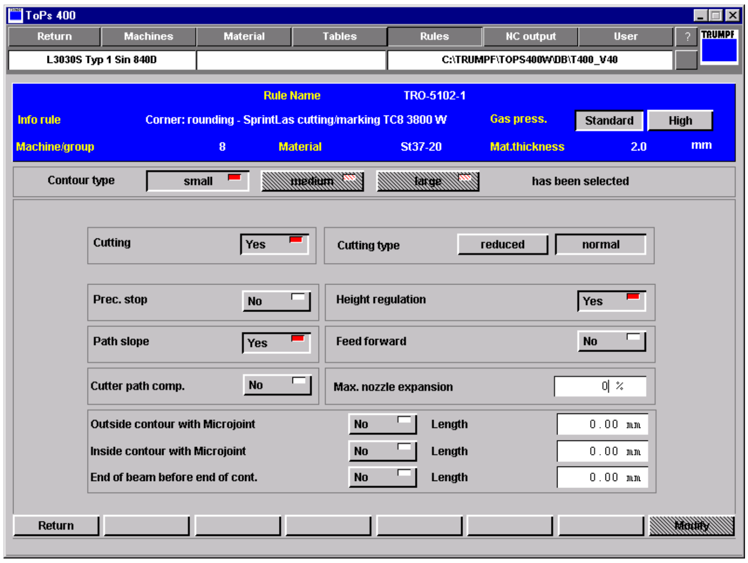


Fig. 27638EN

Data in the tab "Cutting"

- Selected contour type.
- Cutting type.
- Precision stop.
- Height regulation Yes/No?

  Note

  Height regulation (the distance control system) must be either activated or deactivated in all the tabs in the process rule.

  Further tabs with "Height regulation":
  - "Approaching" (see p. 6-69).
  - "Withdrawal" (see p. 6-74).

- Path slope.
- Feed forward.
- Cutter path comp.
- Max. nozzle expansion
- Automatically generate microjoints on outside or inside contours during processing?

  Specify the following:
  - Contours where microjoints are to be created.
  - Length of the microjoint.

  (For a description of microjoints see Chapter 4).
- End of beam before end of contour Yes/No?
  If *Y*es: Enter the length.

  With "End of beam before end of contour" the laser beam is switched off shortly before the end of the contour. The laser beam still completely cuts the contour.

  When you activate "End of beam before end of contour", no notch is made at the end of the contour when processing aluminum and stainless steel.

Changing the data in the process rule

1. Modify the data as required.
2. Select *Modify*.

"Withdrawal"

Prerequisite

- The overview of the individual process rule tabs for the laser cutting machine is displayed (see Section 7.6, p. 6-61).

Note

Original TRUMPF process rules cannot themselves be modified. You can only modify process rules you have created yourself (to create a process rule, see Section 7.3, p. 6-58).

➢ Select *Withdrawal*.
ToPs displays the tab "Withdrawal":

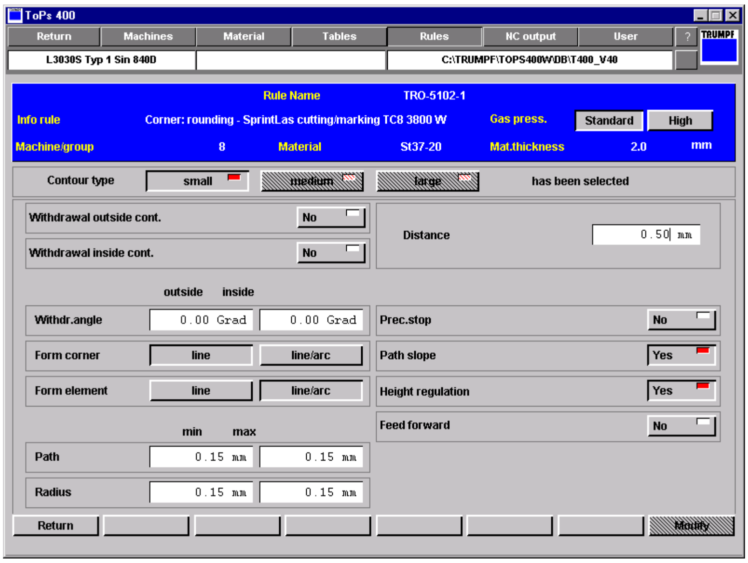


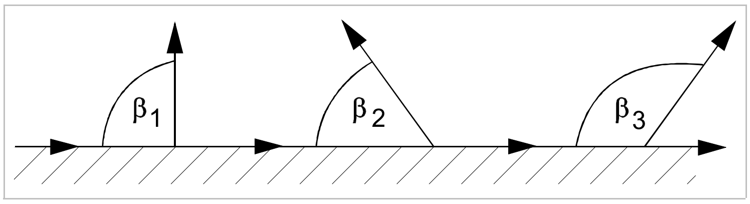
Fig. 27639EN

Data in the tab "Withdrawal"

- Selected contour type.
- Withdrawal on outside and/or inside contours?
  If yes: Enter "distance" (see following list item).
- "Distance": safety distance from contours that must not be damaged. ToPs takes account of this safety range in its collision check.

- Inside and outside withdrawal angles.

0°:	ToPs generates a withdrawal flag in the angle $\beta 1$ of 90° (90°-0°).
-20°:	ToPs generates a withdrawal flag in the angle $\beta 2$ of 70° (90°-20°).
+20°:	ToPs generates a withdrawal flag in the angle $\beta 3$ of 110° (90°+20°).



Withdrawal angle β Fig. 27687

- Form corner / Form element?

  Defines the form of the withdrawal flags at corners and on elements:
  - *Line*: the withdrawal flag consists only of a straight line.
  - *Line / arc*: the withdrawal flag is composed of a straight path and an arc.

- Path (withdrawal path) and radius.

  Note
  The withdrawal path and the radius must be smaller than web width.

- Precision stop.

- Path slope.

- Height regulation Yes/No?

  Note
  Height regulation (the distance control system) must be either activated or deactivated in all the tabs in the process rule.

  Further tabs with "Height regulation":
  - "Approaching" (see p. 6-69).
  - "Cutting" (see p. 6-72).
  - "Withdrawal" (see p. 6-74).

- Feed forward.

Changing the data in the process rule

1. Modify the data as required.
2. Select *Modify*.

"Positioning"

Prerequisite

- The overview of the individual process rule tabs for the laser cutting machine is displayed (see Section 7.6, p. 6-61).

Note

Original TRUMPF process rules cannot themselves be modified. You can only modify process rules you have created yourself (to create a process rule, see Section 7.3, p. 6-58).

➢ Select *Positioning*.

ToPs displays the tab "Positioning":

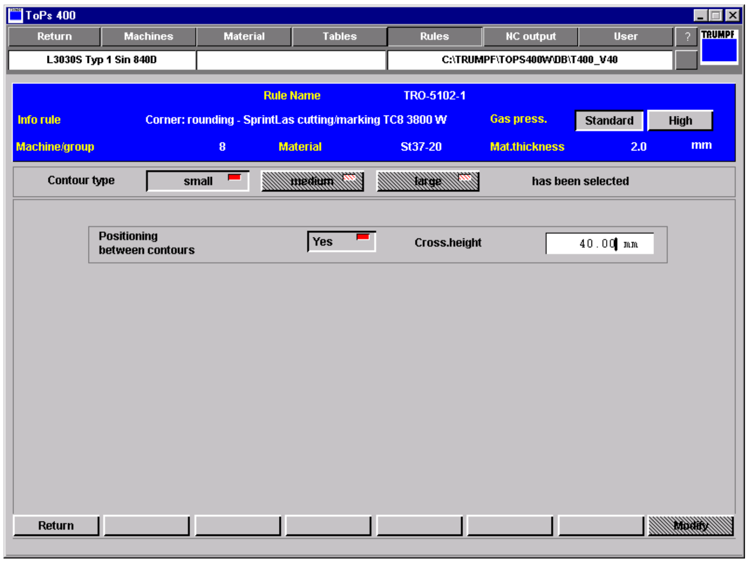


Fig. 27640EN

Data in the tab "Positioning"

- Selected contour type.
- Positioning between contours.
  Note
  "Positioning between contours" must always be set to *Yes*.
- Cross. height (= height that the cutting head adopts when positioning between contours).

Changing the data in the process rule

1. Modify the data as required.
2. Select *Modify*.

"Rounding"

Prerequisite

- The overview of the individual process rule tabs for the laser cutting machine is displayed (see Section 7.6, p. 6-61).

Note

Original TRUMPF process rules cannot themselves be modified. You can only modify process rules you have created yourself (to create a process rule, see Section 7.3, p. 6-58).

➢ Select *Rounding*.
ToPs displays the tab "Rounding":

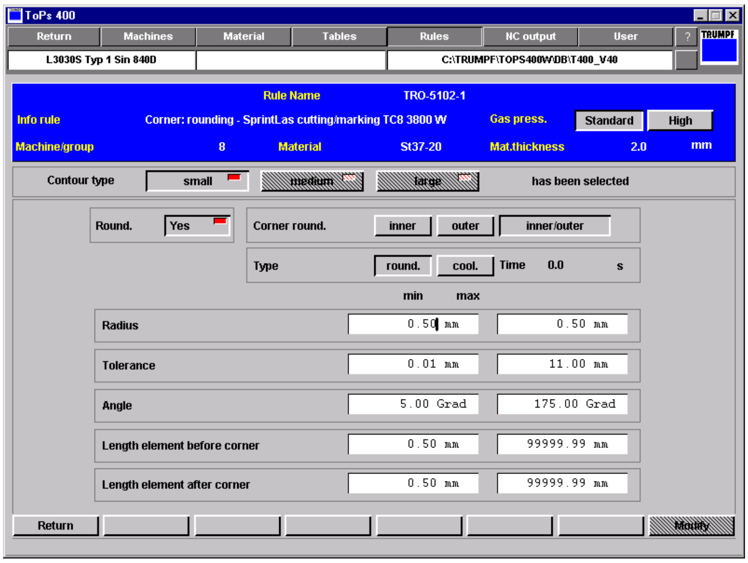


Fig. 27641EN

Data in the tab "Rounding"

- Selected contour type.
- Round or cool corners?
  If Yes: select the corners to be rounded / cooled.
- Mode of corner treatment.
- Rounding radius.
  Note
  If ToPs is to observe the rounding radius exactly, the minimum radius must correspond to the maximum radius.
- "Tolerance".
  These values produce the tolerance range within which the rounding is to be found.

- Angle range within which the corner is to be rounded. When you enter a value, ToPs only rounds those corners which are within the entered angles.
- Length of elements before or after a corner:

  "Minimum ...": this prevents the corner treatment from damaging elements which are too close to the contour. If the "free path" before or after the corner is too short, the corner will not be treated.

  "Maximum ...": if the path before or after the corner is longer than the entered value, the corner will not be treated.

(For further information on corner treatment, see Chapter 4).

Changing the data in the process rule

1. Modify the data as required.
2. Select *Modify*.

"Looping"

Prerequisite

- The overview of the individual process rule tabs for the laser cutting machine is displayed (see Section 7.6, p. 6-61).

Note

Original TRUMPF process rules cannot themselves be modified. You can only modify process rules you have created yourself (to create a process rule, see Section 7.3, p. 6-58).

➢ Select *Looping*.

ToPs shows the "Looping" tab:

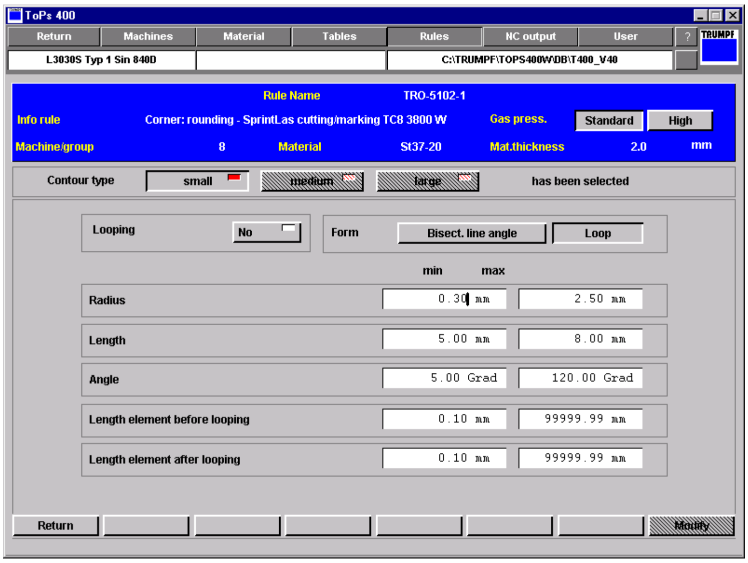


Fig. 27642EN

Data in the tab "Looping"

- Selected contour type.

- Loop corners?
  If Yes: select form of looping:
  - *Bisecting line angles*: The cutting head moves out of the first half of the corner with the head tilted up, turns around, and moves into the second half of the corner.
  - *Loops*: The cutting head moves in a straight line away from a corner, makes a loop, and moves into the second half of the corner in a straight line.

- Radius.
  Note
  The radius is only relevant when *Loop* is the form of looping.

  If ToPs is to observe the loop radius exactly, the minimum radius must correspond to the maximum radius.

- Length.

  Note
  The length is only relevant when *Bisecting line angle* is the form of looping.

- Angle area within which ToPs is to form loopings on corners. When you enter a value, ToPs only forms loopings on those corners which are within the entered angles.

  Note
  The angle is only relevant when *Bisecting line angle* is the form of looping.

- Length of elements before or after looping:

  "Minimum ...": this prevents the corner treatment from damaging elements of the contour which are too close. If the "free path" before or after the corner is too short, the corner will not be treated.

  "Maximum ...": if the path before or after the corner is longer than the entered value, the corner will not be treated.

(For further information on corner treatment, see Chapter 4).

Changing the data in the process rule

1. Modify the data as required.
2. Select *Modify*.

"Vaporizing"

Prerequisite

- The overview of the individual process rule tabs for the laser cutting machine is displayed (see Section 7.6, p. 6-61).

Note
Original TRUMPF process rules cannot themselves be modified. You can only modify process rules you have created yourself (to create a process rule, see Section 7.3, p. 6-58).

➢ Select *Vaporizing*.

  ToPs displays the tab "Vaporizing":

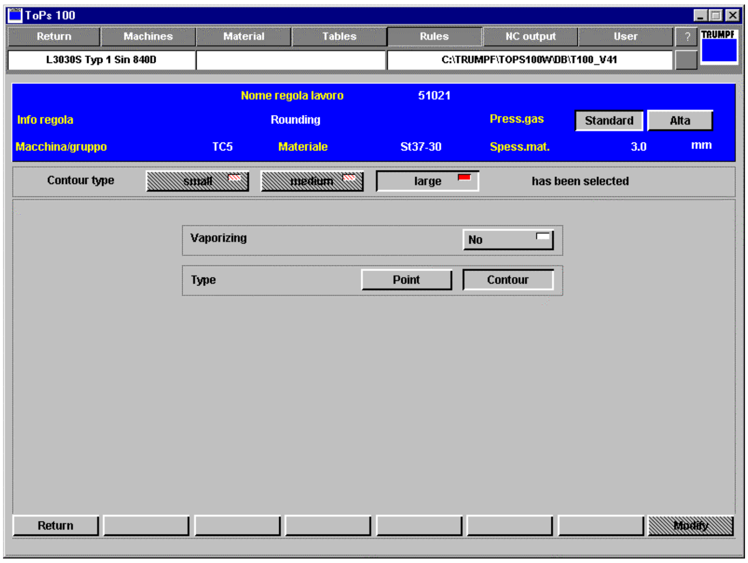


Fig. 22529EN

Data in the tab "Vaporizing"

- Vaporizing Yes/No?
- Type of vaporizing:
  - *Point*: only vaporize piercing point?
  - *Contour*: vaporize entire contour?

Changing the data in the process rule

1. Modify the data as required.
2. Select *Modify*.

7.7 Water jet cutting machine process rules in detail

1. Select *Rules >Data*.

   ToPs displays the selection of all process rules for the active machine group.

2. Find the process rule whose data you wish to view (see Section 7.2, p. 6-56).

3. When you have found the right process rule: mark it.

   ToPs enters the name of the process rule in the mask header.

4. Select *Continue*.

   ToPs informs you that TRUMPF process rules cannot be modified.

5. Select *OK*.

   ToPs displays an overview of the individual tabs for the process rule:

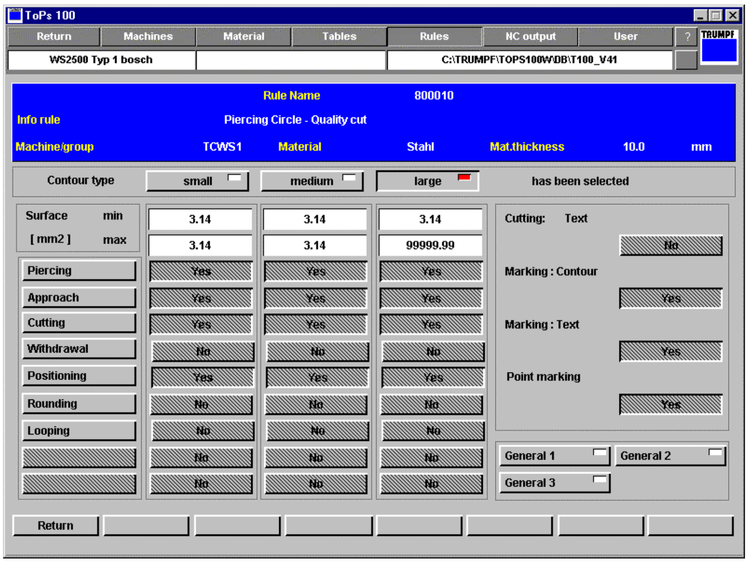


Fig. 29870EN

"General 1"

Prerequisite

- The overview of the individual process rule tabs for the water jet cutting machine is displayed (see Section 7.7, p. 6-82).

Note

Original TRUMPF process rules cannot themselves be modified. You can only modify process rules you have created yourself (to create a process rule, see Section 7.3, p. 6-58).

➢ Select *General 1*.

ToPs displays the tab "General 1":

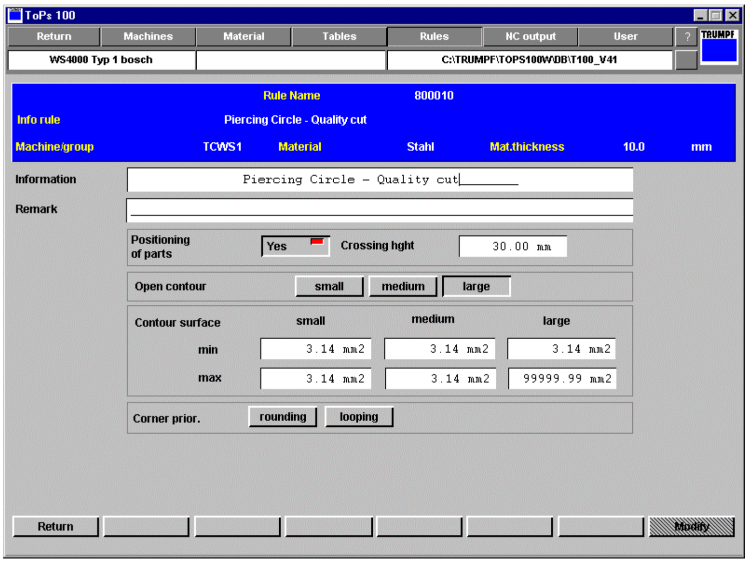


Fig. 22687EN

Data in the tab "General 1"

- Information and remark on the process rule:
  ToPs will display the text you enter here in the selection list of process rules in the Technology module. The "Information" text is pre-entered in all original TRUMPF process rules.

- Positioning of parts.
  Note
  "Positioning of parts" must always be set to *Yes*.

- Crossing hght (= height that the cutting head adopts when positioning between contours).

- Contour size of open contours.

- Classification of contours into "small", "medium" and "large" according to their surface.
- Priority corner treatment "Rounding" or "Looping"?

Changing the data in the process rule

1. Modify the data as required.
2. Select *Modify*.

"General 2"

Prerequisite

- The overview of the individual process rule tabs for the water jet cutting machine is displayed (see Section 7.7, p. 6-82).

Note

Original TRUMPF process rules cannot themselves be modified. You can only modify process rules you have created yourself (to create a process rule, see Section 7.3, p. 6-58).

➢ Select *General 2*.
ToPs displays the tab "General 2":

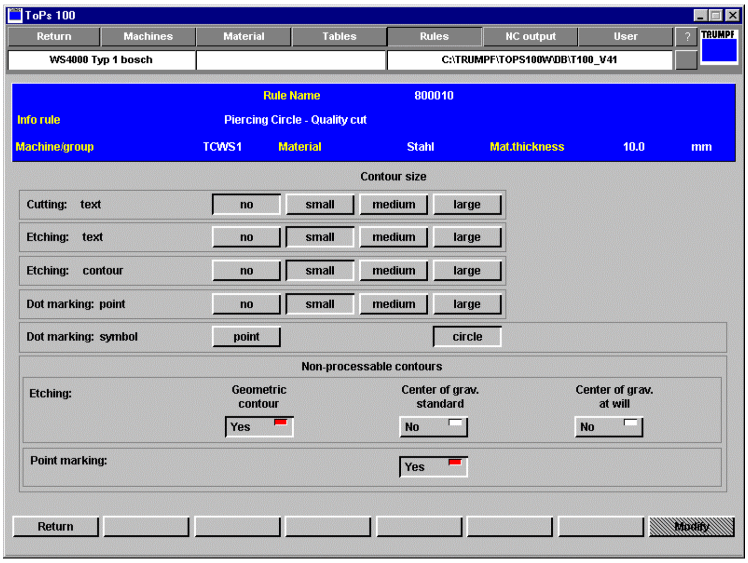


Fig. 22688EN

Data in the tab "General 2"

- Cutting texts?
  If yes: Determine the contour size of the texts you wish to cut.
  Notes
  Texts to be cut must have the line color "white" (for line colors see Chapter 3).

  When cutting the texts ToPs does not generate approach or withdrawal flags. The beam pierces directly on the contour.

  Processing cannot be rearranged. This could result in uncontrolled scrap (depending on the font).

- Etching texts?
  Note
  Texts to be etched must have the line color "yellow" (for line colors see Chapter 3).

- Etching contours?

- Point mark dots?
  Notes
  Dots to be point-marked must have the line color "cyan" (for line colors see Chapter 3).

  If you are programing dot-shaped point marking (which corresponds to "soft piercing") for a machine with a Bosch control system, the following values must be modified in the technology table:
  - Piercing distance
  - Piercing gas pressure
  - Gas type

  (for values see the current data collection for your machine).

- Point-mark symbols as a *dot* or as *2 circles*?
  For *2 circles*: enter the diameter of the 2 circles.

- Handling unprocessable contours: etching or point marking?

  ToPs automatically determines which contours cannot be processed during machining definition. You can have these parts marked as follows:
  - "Etching", "Geometric contour": ToPs marks all contours that cannot be processed.
  - "Etching", "Center of grav. standard": ToPs marks standard contours (rectangle, circle, oblong hole) in their center of gravity.
  - "Etching", "Center of gravity, at will": ToPs marks chosen contours in their center of gravity.
  - "Point marking": ToPs point marks contours in their center of gravity.

Note
If both point marking in the center of gravity and etching in the center of gravity are activated, point marking in the center of gravity has priority.

Changing the data in the process rule

1. Modify the data as required.
2. Select *Modify*.

"General 3"

Prerequisite

- The overview of the individual process rule tabs for the water jet cutting machine is displayed (see Section 7.7, p. 6-82).

Note
Original TRUMPF process rules cannot themselves be modified. You can only modify process rules you have created yourself (to create a process rule, see Section 7.3, p. 6-58).

➢ Select *General 3*.
ToPs displays the tab "General 3":

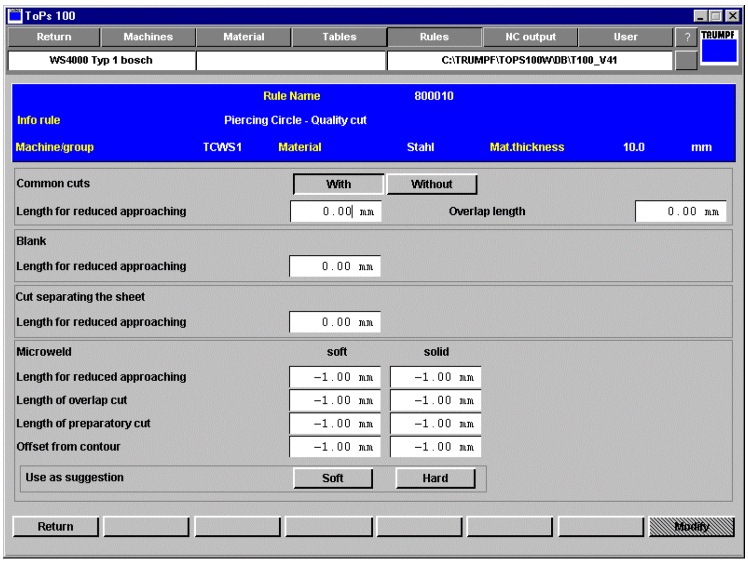


Fig. 22689EN

(For description of data, refer to tab "General 3", laser cutting machines, p. 6-67.)

Changing the data in the process rule

1. Modify the data as required.
2. Select *Modify*.

"Piercing"

Prerequisite

- The overview of the individual process rule tabs for the water jet cutting machine is displayed (see Section 7.7, p. 6-82).

Note

Original TRUMPF process rules cannot themselves be modified. You can only modify process rules you have created yourself (to create a process rule, see Section 7.3, p. 6-58).

➢ Select *Piercing*.
ToPs displays the tab "Piercing":

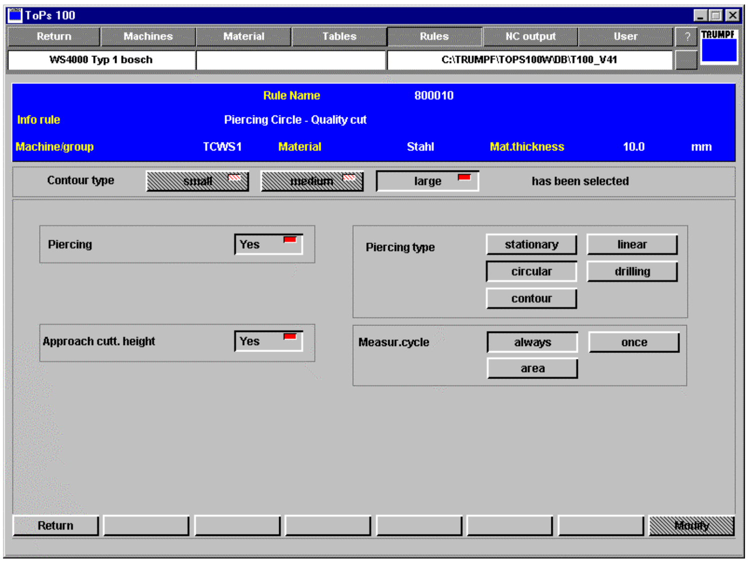


Fig. 22690EN

Data in the tab "Piercing"

- Contour size for piercing.
  Note
  The contour type cannot be changed.
- Piercing Yes/No. If Yes: "Piercing type"?
- Approach cutting height directly after piercing without switching off beam? (*Yes* = default setting.)
- Determine material position when piercing using measuring cycle?
  - *always*: The material position will be measured on each piercing.
  - *once*: The material position will be measured once.
  - *area*: The material position will be measured by sections.

Changing the data in the process rule

1. Modify the data as required.
2. Select *Modify*.

"Approach"

Prerequisite

- The overview of the individual process rule tabs for the water jet cutting machine is displayed (see Section 7.7, p. 6-82).

Note

Original TRUMPF process rules cannot themselves be modified. You can only modify process rules you have created yourself (to create a process rule, see Section 7.3, p. 6-58).

➢ Select *Approach*.
ToPs displays the first "Approach" tab:

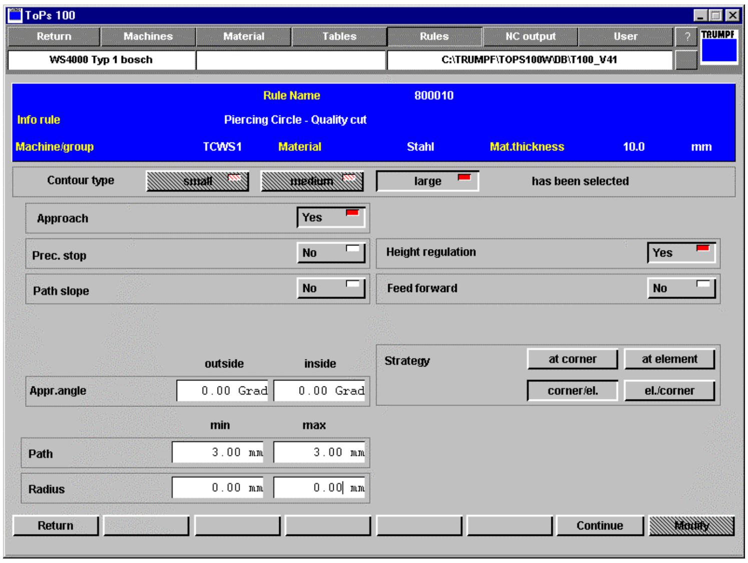


Fig. 22736EN

Data in the first "Approach" tab

- Contour size for approaching.
  Note
  The contour type cannot be changed.
- Approaching Yes/No?
- Precision stop?

- Height regulation Yes/No?

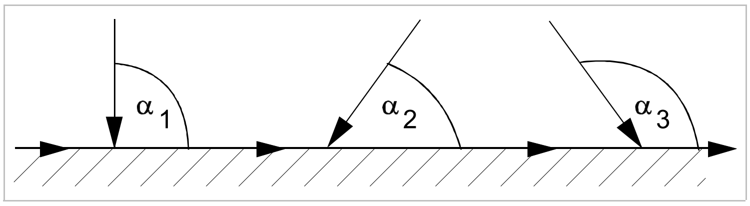
  Note
  Height regulation (the distance control system) must be either activated or deactivated in all the tabs in the process rule. Further tabs with "Height regulation": "Approaching", "Cutting", "Withdrawal"

- Path slope.

- Feed forward.

- Inside and outside approach angles.

0°:	ToPs generates an approach flag in the angle α1 of 90° (90°-0°).
-20°:	ToPs generates an approach flag in the angle α2 of 70° (90°-20°).
+20°:	ToPs generates an approach flag in the angle α3 of 110° (90°+20°).



Approach angle α Fig. 27686

- Strategy:

  Determine where the approach should be positioned:

  – *at corner*: The cutting head only approaches corners. If ToPs cannot find a corner, the contour is not processed.
  – *at element*: The cutting head only approaches elements (= lines or arcs). If ToPs cannot find an element, the contour is not processed.
  – *corner / el.:* The cutting head gives priority to corners. If ToPs cannot find any corners, the cutting head approaches a suitable element.
  – *el. / corner:* The cutting head gives priority to elements. If ToPs cannot find any elements, the cutting head approaches a suitable corner.

  For approaching an element: for form and length, see second "Approaching" tab (open with *Continue*).

  For approaching a corner: for form, angle and length of the elements before or after a corner, see second "Approaching" tab (open with *Continue*).

- Path (approach path) and radius.

  Note

  The approach path and the radius must be smaller than web width.

Changing the data in the process rule

1. Modify the data as required.
2. Select *Modify*.

"Cutting"

Prerequisite

- The overview of the individual process rule tabs for the water jet cutting machine is displayed (see Section 7.7, p. 6-82).

Note

Original TRUMPF process rules cannot themselves be modified. You can only modify process rules you have created yourself (to create a process rule, see Section 7.3, p. 6-58).

➢ Select *Cutting*.

ToPs displays the tab "Cutting":

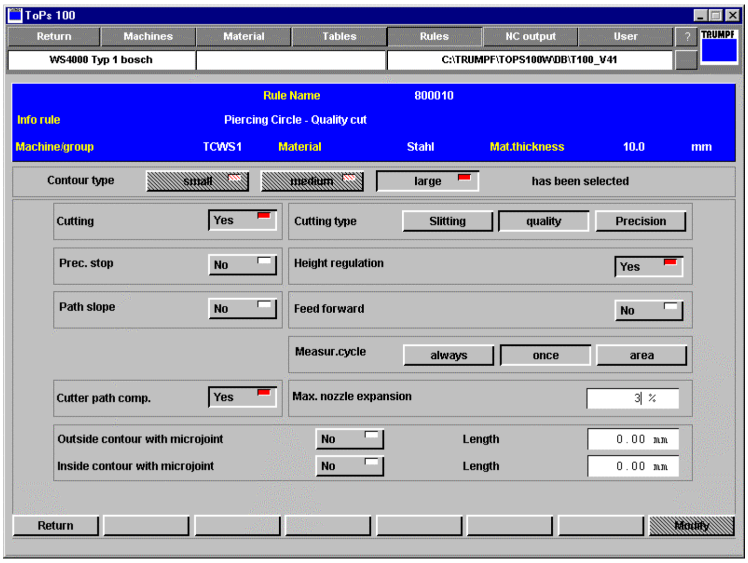


Fig. 22737EN

Data in the tab "Cutting"

- Contour size for cutting.
- Cutting type.
- Precision stop.
- Height regulation Yes/No?
  Note
  Do not change this setting!
- Path slope.
- Feed forward.
- Determine material position when cutting using measuring cycle?
  - *always*: The material position will be measured on each piercing.
  - *once*: The material position will be measured once.
  - *area*: The material position will be measured by sections.
- Cutter path comp.
- Max. nozzle expansion.
- Automatically generate microjoints on outside or inside contours during processing?

  Specify the following:
  - Contours where microjoints are to be created.
  - Length of the microjoint.

  (For a description of microjoints, see chapter 5, Technology module.)

Changing the data in the process rule

1. Modify the data as required.
2. Select *Modify*.

"Withdrawal"

Prerequisite

- The overview of the individual process rule tabs for the water jet cutting machine is displayed (see Section 7.7, p. 6-82).

Note

Original TRUMPF process rules cannot themselves be modified. You can only modify process rules you have created yourself (to create a process rule, see Section 7.3, p. 6-58).

➢ Select *Withdrawal*.

ToPs displays the tab "Withdrawal":

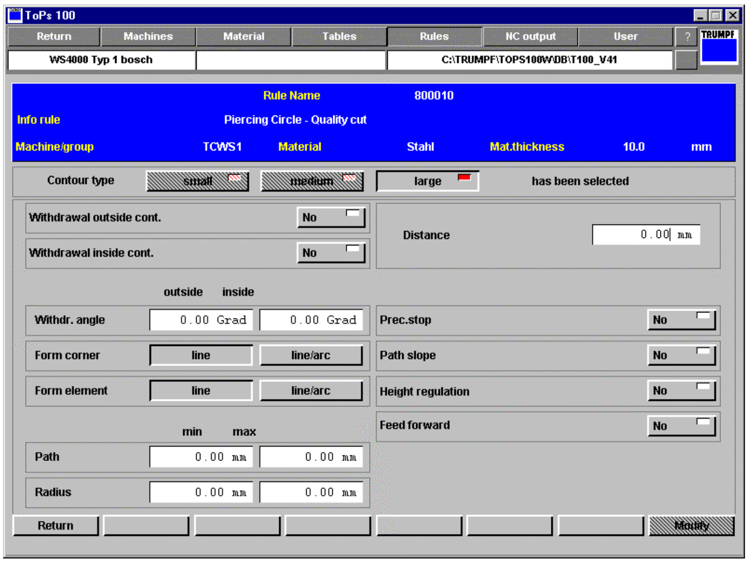


Fig. 22738EN

Data in the tab "Withdrawal"

- Contour size for withdrawal.

  Note

  The contour type cannot be changed.

(For further description, see p. 6-74).

Changing the data in the process rule

1. Modify the data as required.
2. Select *Modify*.

"Positioning"

Prerequisite

- The overview of the individual process rule tabs for the water jet cutting machine is displayed (see Section 7.7, p. 6-82).

Note
Original TRUMPF process rules cannot themselves be modified. You can only modify process rules you have created yourself (to create a process rule, see Section 7.3, p. 6-58).

➢ Select *Positioning*.
ToPs displays the tab "Positioning":

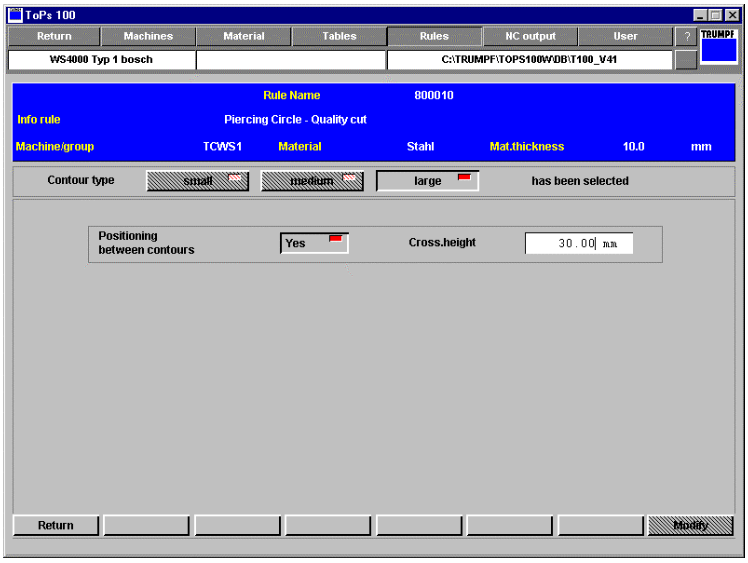


Fig. 22739EN

Data in the tab "Positioning"

- Contour size for withdrawal.
  Note
  The contour type cannot be changed.
- Positioning between contours:
  Note
  "Positioning between contours" must always be set to *Yes*.
- Cross. height (= height that the cutting head adopts when positioning between contours).

Changing the data in the process rule

1. Modify the data as required.
2. Select *Modify*.

"Rounding"

Prerequisite

- The overview of the individual process rule tabs for the water jet cutting machine is displayed (see Section 7.7, p. 6-82).

Note

Original TRUMPF process rules cannot themselves be modified. You can only modify process rules you have created yourself (to create a process rule, see Section 7.3, p. 6-58).

➢ Select *Rounding*.

ToPs displays the tab "Rounding":

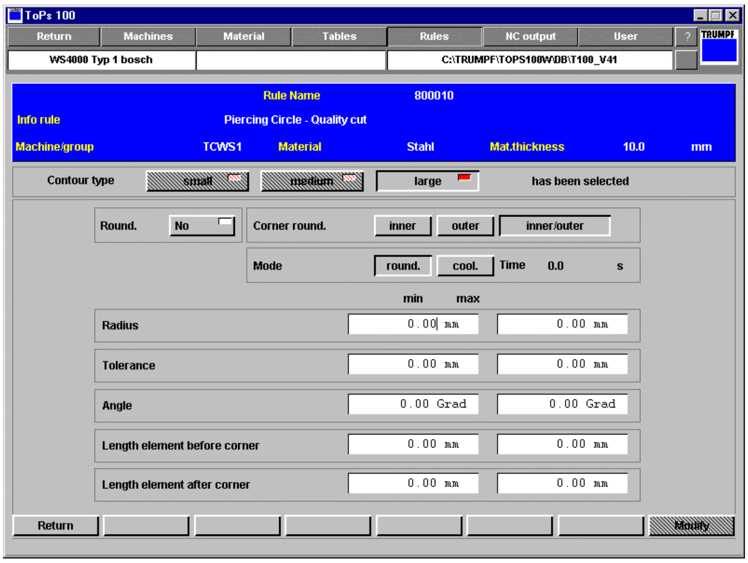


Fig. 22740EN

Data in the tab "Rounding"

- Contour size for rounding corners.

  Note

  The contour type cannot be changed.

(For further description, see p. 6-77.)

Changing the data in the process rule

1. Modify the data as required.
2. Select *Modify*.

"Looping"

Prerequisite

- The overview of the individual process rule tabs for the water jet cutting machine is displayed (see Section 7.7, p. 6-82).

Note
Original TRUMPF process rules cannot themselves be modified. You can only modify process rules you have created yourself (to create a process rule, see Section 7.3, p. 6-58).

➢ Select *Looping*.
ToPs shows the "Looping" tab:

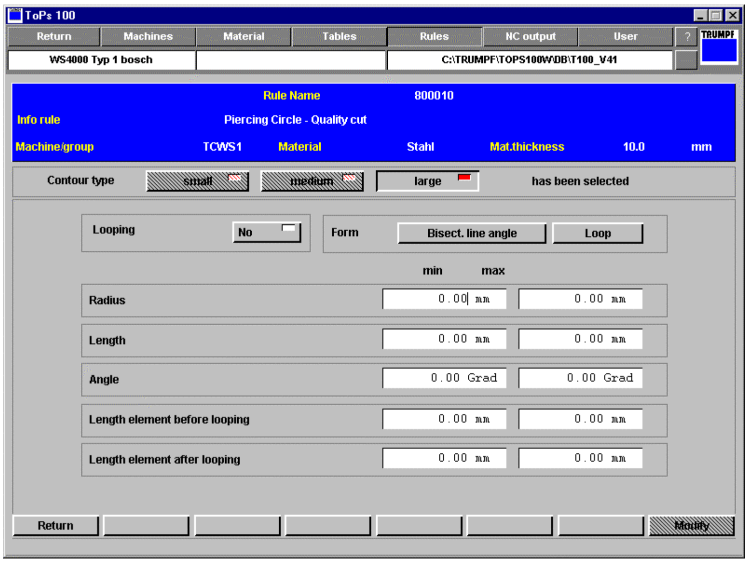


Fig. 22743EN

Data in the tab "Looping"

- Contour size for looping.

  Note
  The contour type cannot be changed.

(For further description, see p. 6-79.)

Changing the data in the process rule

1. Modify the data as required.
2. Select *Modify*.

7.8 Allocating process rules to individual technology tables

(See Section 6.9, p. 6-54.)

8. Machine-dependent process rule

In addition to the internal password-protected process rule *(Rules >Machine)*, there is an open access machine-dependent customized process rule *(Rules >Customer machine)* for describing machine-specific and customer-specific system data.

In the machine-dependent process rule, changes can be made without daily passwords. Variables which are enabled for the machine-dependent process rule are displayed in a list field.

Note
Which variables are displayed depends on the machine selected.

Variables for all machines which are supported in ToPs are listed in the following table.

No.	Variable	Comment text
1	T2MSrNcL_HPKennung	Zum Erstellen muessen alle Informationen angegeben werden. (All information must be provided for creating.)
2	T2MSrNcL_ProgRegExprHP	Max Laenge= Maximale Anz.Stellen HP. (Max length= Maximum no. of chars main progr.) PruefExpr.=RegExpr fuer HP. (Check expr.=Reg. expr. for main progr.)
3	T2MSrNcL_ProgRegExprUP	Max Laenge= Maximale Anz.Stellen UP. (Max length= Maximum no. of chars subroutine.) PruefExpr.=RegExpr fuer UP. (Check expr.=Reg. expr. for subroutine.)
4	EinrichteplanFormular	Name for default set-up plan form
5	EpZeitAusgabeFormat	Ausgabeformat der Maschinenzeit im Einrichteplan. (Output format for machine time in setup plan). 1=Dezimal, 2=h:m:s, 3=beides. (1=decimal, 2=h : m : s, 3=both.)
6	MaschinenMicrojoint	Microjoints an Maschine möglich ? (1 = ja, 0= nein). (Microjoints possible on this machine ? (1 = yes, 0 = no).)
7	NcLinkLiteModus	Fehlertolerante Ausgabe des Produktionsplans. (Fault-tolerant output of production plan.)
8	NcLinkProduktionsPlanTyp	Konfiguration der Maschine. (Machine configuration.)
9	T2MSrNc_Opt_Abs_X	Measure sheet position in X
10	T2MSrNc_Opt_Abs_Y	Measure sheet position in Y

Table 6-4

Comment text
The comment text for selected variables contains information on how the actual value is structured.

Actual value
The actual value corresponds to the coding of a variable. After ToPs is installed the default actual values are displayed. To make your individual settings effective, you must modify the actual value. Refer to the following list to see how the actual values are composed and what happens when they are modified.

8.1 Adapting machine-dependent process rule

Modifying the actual value of a variable

Caution

Deleted or incorrect variables can lead to inoperable NC programs!

- Do not delete variables.
- When you modify variables: Check the entries and modifications.
- Consult TRUMPF Software Support in case of doubt

1. Select *Rules >Customer machine*.
2. Mark a variable in the list field.
   ToPs imports the actual value into the input box.
3. Modify the "Actual value" (for description, see p. 6-99 ff).
   Note
   Never modify "Min. value", "Max. value" and "Check expr".
4. Select *Modify*.

ToPs saves the changes.

Copying variables for the selected machine

1. Select *Rules >Customer machine*.
2. Next to "Variable" click on ▼.
   ToPs displays the "Selection" mask. This contains variables that are already stored in the database for other machines but are not yet defined for the active machine.
3. Select variable.
4. Enter "Actual value" (for description, see p. 6-99 ff).
5. Select *Create*.

Delete the variable you created?

1. In the list field mark the variable that you created and want to delete.
   Note
   Only ever delete variables that you created yourself!
   ToPs imports the actual value into the input box.
2. Select *Delete*.

Description of variables

No. 1 T2MSrNcL_HPKennung

The actual value entered here serves as identification for the main program names in the NC program. The identification is placed in front of the alphanumeric program number. The maximum length of the actual value is limited to 25 characters for alphanumeric program number output.

No. 2 T2MSrNcL_ProgRegExprHP

The variables entered here determine the format of the main program name.

No. 3 T2MSrNcL_ProgRegExprUP

The variables entered here determine the format of the subroutine name.

No. 4 EinrichteplanFormular

File name of the default setup plan in '*.html' format for:

Laser machines = 'ReportLaser.html'
Punching machines = 'ReportPunch.html' [1]
Combi machines = 'ReportCombi.html' [1]

The files are located in the directory '...\Trumpf\Vorlagen'.

No. 5 EpZeitAusgabeFormat

The variables entered here determine how the machine time will appear on the setup plan:

Configuring machine time

Actual value = 1: Machine time issued as decimal.
Actual value = 2: Machine time issued in hours, minutes and seconds.
Actual value = 3: Machine time issued as decimal and in hours, minutes and seconds.

[1] Does not apply for ToPs 100

No. 6 MaschinenMicrojoint

Actual value = 0	Creating microjoints is not possible at machine.
Actual value = 1:	Creating microjoints is possible at machine.

Note
Machine microjoints can as yet only be created using the TC L 3050.

No. 7 NcLinkLiteModus

If you wish to create production plans in ToPs and your machine(s) are linked to CELL SERVER or TC CELL, ToPs must output the parts information (= allocation of nesting customer – part) in the production plan. (The default is that ToPs does not output the parts information.)

Output part job information in production plan?

➢ Modify actual value for the variable *NcLinkLiteModus* from `1` to `0` (to modify a variable's actual value, see p. 6-98).

Actual value = 0	Strict output of part job information: the allocation of nesting customer – part / nesting customer - drawing number is retained (drawing numbers in drawing data are absolutely necessary).
Actual value = 1:	Simplified output of part job information. The allocation of nesting info – part / nesting info - drawing number is lost (standard setting; drawing numbers in drawing data are not necessary).

No. 8 NcLinkProduktionsPlanTyp

The production plan type in ToPs is set as default to the "Actual value" `17`.

If data is missing from your production plans: read off your machine's production plan type at its control system and enter it into ToPs:

Entering your machine's production plan type into ToPs

1. At your machine's user interface:
   Select *Activity >Maintenance/Start-Up >MMC Applications*.
2. Enter password (available from TRUMPF Software Support).
3. Open "Group" using ▾.
4. Mark *Production plan*.

5. Read off the first production plan type entered there and enter it as the actual value for the *NcLinkProduktionsPlanTyp* variable. (To modify the actual value of a variable, see p. 6-98).

No. 9 T2MSrNc_Opt_Abs_X

Dimension traveled by the cutting head in the X direction from zero point in order to measure sheet position.

No. 10 T2MSrNc_Opt_Abs_Y

Dimension traveled by the cutting head in the Y direction from zero point in order to measure sheet position.

9. NC output

You can insert NC texts that you have written yourself into the processing of a sheet. ToPs will then insert this NC text into the NC program in the course of its generation.

Enter an NC text either directly in the Technology module or call up an NC cycle you have created in the Data module and stored in the database.

NC cycles you define yourself are called "customized cycles".

9.1 Customized cycles

Creating customized cycles

Note
ToPs always creates a customized cycle for the machine currently active.

1. Select the machine for which you want to create a customized cycle (see Section 4.1, p. 6-8).
2. Select *NC output >Customer cycles*.
   ToPs displays the Customer cycles mask:

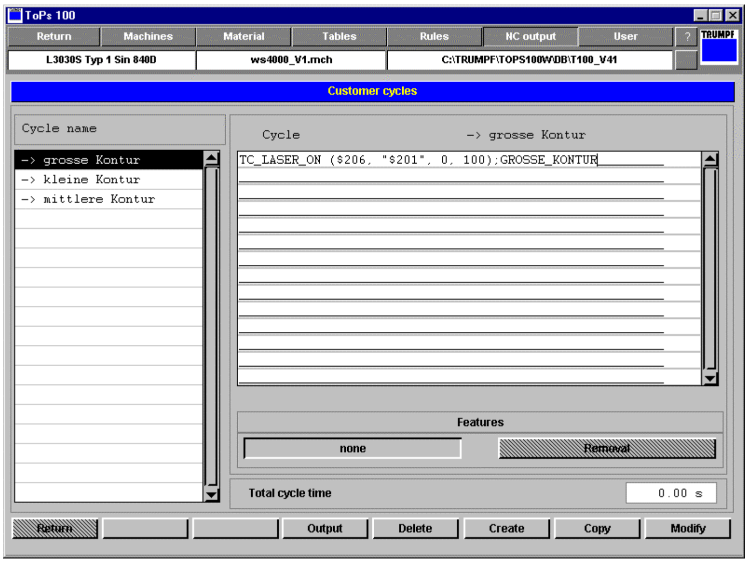


Fig. 22681EN

Allocating the name of the customized cycle

1. Select *Create*.

   ToPs displays the "Create cycle" mask.

2. Under "Cycle name" enter the name of the customized cycle you wish to create.

   Note
   The name must not contain any special characters, umlauts or accents. These characters are not displayed in the drawings in the Technology module.

3. Select *Create*.

   ToPs reports that the desired cycle has been created.

4. Select *OK*.

5. Select *Return*.

ToPs displays the "Customer cycles" mask again.

Entering NC text for customized cycle

1. Mark the name of the new customized cycle in the "Customer cycles" mask.

2. Enter the NC text of the customized cycle under "Cycle".

   ToPs interprets all entries when generating the NC program. For example, ToPs automatically converts the so-called "$-variables" (= wildcards) into values.

   ToPs does not check the syntax of your NC text.

3. Enter the approximate duration of the NC cycle under "Total cycle time".

   Note
   "Features" are not required by ToPs 100.

4. Select *Modify*.

ToPs makes the new customized cycle available for selection in the Technology module.

Printing customized cycles

Note
Customized cycles cannot be printed individually, but rather all together only.

1. Select *NC output >Customer cycles*.
   ToPs displays the "Customer cycles" mask.
3. Select *Output*.
   ToPs displays the content of all customized cycles using an editor (here the editor is Notepad)
4. Select *Print*.
   The customized cycles are printed.

Close editor

5. Select *OK*.

Modifying customized cycles

1. Select *NC output >Customer cycles*.
   ToPs displays the "Customer cycles" mask.
2. Enter the name of the customized cycle that you want to modify.
   ToPs displays the text of the customized cycle under "Cycle".
3. Modify the text of the customized cycle.
4. Select *Modify*.

ToPs saves the modifications in the customized cycle.

Copying customized cycles

Application:

- Creating similar customized cycles.
- Using the same customized cycle on other machines.

1. Select *NC output >Customer cycles*.
   ToPs displays the "Customer cycles" mask.
2. Mark the customized cycle you wish to copy.
3. Select *Copy*.
   ToPs displays the "Copy cycle" mask. Here ToPs displays the "Source" and "Destination" of the customized cycle you wish to copy.

   "Source" = the machine to which the customized cycle is currently allocated and the name of the customized cycle which you want to allocate to the other machine.

   "Destination" = the machine to which the copied customized cycle will be allocated.

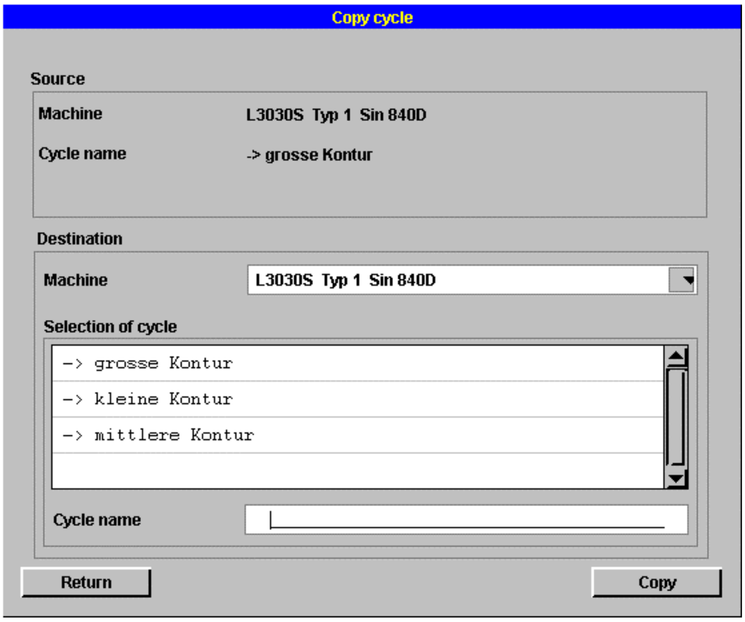


Fig. 22682EN

Selecting the destination machine

4. Open "Machine" using ▼.
   ToPs displays the "Select machine" mask.
5. Mark machine.
6. Select *Continue*.
7. Mark the name in "Selection of cycle".
   ToPs enters the name under "Cycle name". You can modify it there.

Note
Under "Selection of cycle", ToPs offers **all** cycle names available – irrespective of the source machine.

The names of all cycles are displayed **without** their contents.

8. Modify the cycle name if necessary.
9. Select *Copy*.

ToPs allocates the copied customized cycle to the destination machine.

Removing a created customized cycle from the selection

When you want to delete a customized cycle which you have created, so that it is no longer displayed for selection for the active machine (to delete customized cycles set in NC text, see Chapter 4).

1. Select *NC output >Customer cycles*.
   ToPs displays the "Customer cycles" mask.
2. Mark the customized cycle that you want to delete.
3. Select *Delete*.
   ToPs displays the "Delete cycle" mask. This shows the machine for which the customized cycle was created and the name of the customized cycle.
4. Select *Delete*.

ToPs deletes the cycle.

9.2 NC post-processing program

Creating NC post-processing programs

1. Select *User >Programs*.
   ToPs displays the "External program settings" mask.

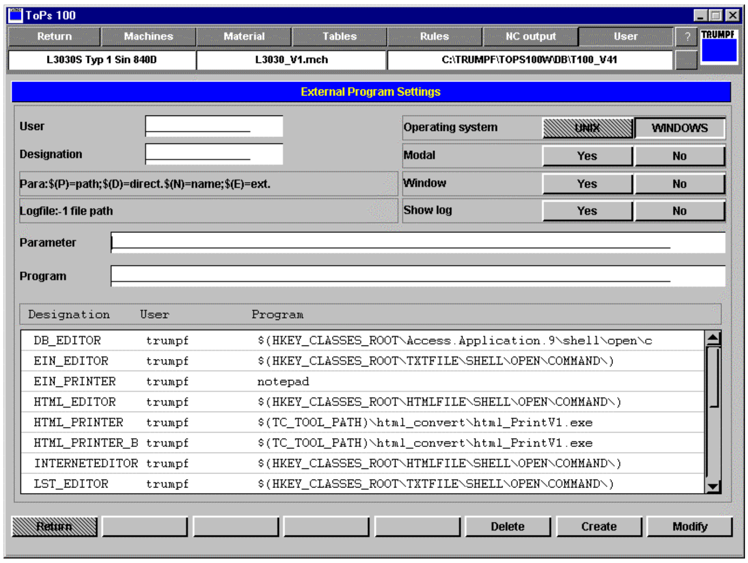


Fig. 27683EN

2. Select operating system.
3 Enter the following data:
   – "User" (usually "trumpf").
   – "Designation" of the post-processing program.
   – "Parameter".
     The parameters define how the program for post-processing the NC texts should search for an NC program (examples in the following table).

Para-meter	Example	Explanation
$(P)	C:\Trumpf\teile\user1\test.lst	Complete path. The program searches for the NC file 'test.lst' exactly. (Default setting)
$(D)	C:\Trumpf\teile\user1	Path without file name.
$(N)	test	File without suffix.
$(E)	lst	Suffix.
$(D)\$(N)	C:\Trumpf\teile\user1\test	Program searches for the file "test" without suffix.

$(D)\$(N) .suffix	.html	If the program is to be used to for post-processing of files other than "lst" files, a file suffix must be entered as the "suffix".

Table 6-5

– Under "Program": path and program name.
  Example:
  'C:\Trumpf\Nachbearbeitungsprogramme\MyProg.exe'

4. Select *Create*.

ToPs inserts the NC post-processing program into the selection window.

Activate NC post-processing program?

(See Chapter 4, under Creating NC program, setting parameters.)

Modifying NC post-processing programs

1. Select *User >Programs*.

   ToPs displays the "External program settings" mask.
2. Mark the NC post-processing program you wish to modify.

   ToPs enters the post-processing program data in the mask header.
3. Modify parameters.
4. Select *Modify*.

Deleting post-processing programs

Note
NC post-processing programs supplied with ToPs must not be deleted.

1. Select *User >Programs*.

   ToPs displays the "External program settings" mask.

2. Mark the post-processing program you have created which you want to delete.

   ToPs enters the post-processing program data in the mask header.

3. Select *Delete*.

ToPs deletes the NC post-processing program in the selection window.

10. Key functions

The ToPs key functions have been adapted to the Windows key functions. This means that ToPs can be operated faster with the keyboard.

Note
The Windows key functions are automatically set at initial installation and when ToPs is updated. The key functions can be configured.

(For a description of the ToPs and Windows key functions, see chapter 2, Operating ToPs 100).

10.1 Setting key functions

1. Select *User >Configuration*.
   ToPs displays the"Configuration" mask.
2. Select "Settings ToPs key functions".
   or
   - Select "Settings Windows key functions".

Select *Modify*.

ToPs sets the desired key functions.

10.2 Focusing the mouse pointer automatically on *OK* in masks

1. Select *User >Configuration*.
   ToPs displays the"Configuration" mask
2. Select "Focus pointer on OK button".

ToPs automatically focuses the pointer in all masks on the *OK* button.

Chapter 7

Information module

1. Displaying information

The software update as well as the version details for all of the program's individual components are displayed. So that your questions can be properly answered when consulting TRUMPF software support, it is important to quote this data exactly.

Note
Loading the data can take a few seconds as the program searches through the ToPs directories for the current versions.

- Select *Information >Version*.

or

- Select *Information >Files*.

Tip
Under "Files" you can edit a file (e.g. 'tops100.ini') directly by right clicking on the displayed path.

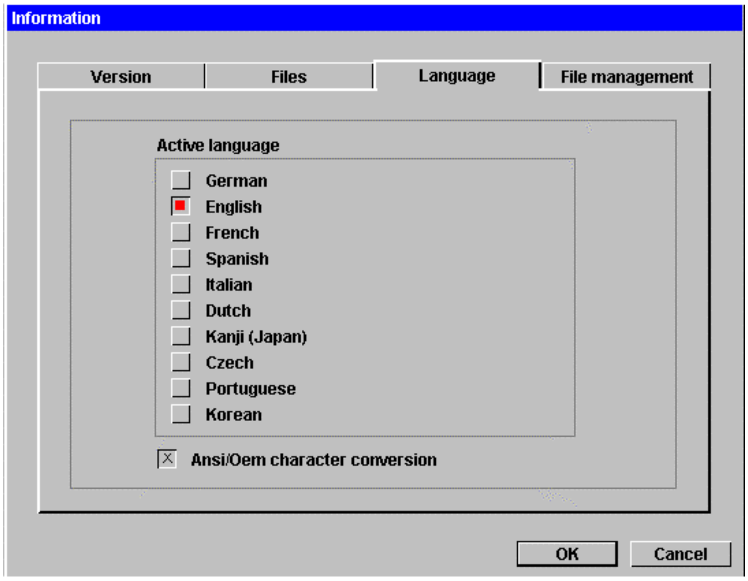
Caution

Incorrect modifications to the edited files can lead to serious program and machine malfunctions!

- Ensure that your modifications are correct.
- Consult TRUMPF Software Support in case of doubt.

2. Changing language

1. Select "Language".
   ToPs shows the Language tab:



Languages available in ToPs 100 Fig. 19562EN

2. Click on the desired language.

For kanji

3. To be able to start ToPs in kanji on computers which do not have an operating system configured for kanji: check "Ansi/ OEM character conversion". (This is activated as default.)
4. Select *OK*.

ToPs changes the language.

3. File management: deleting files

Files saved on the hard drive can be deleted via the tab "File management":

1. Select *Information >File management*.
   ToPs shows the File management tab:

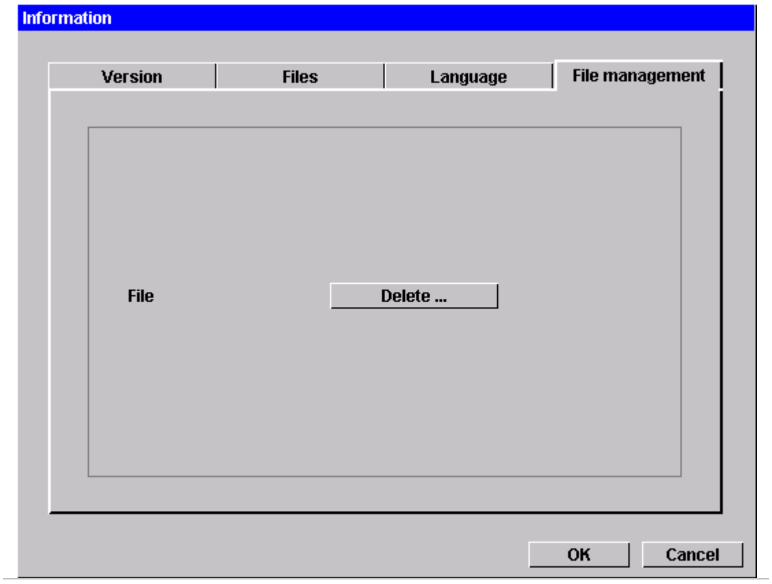


Fig. 19563EN

2. Select *Delete ...*
   ToPs displays the "Select file" mask. Normally all files are shown here ('*.*' is active).

Restrict file selection?

3. Click on the file type to be listed.
4. Highlight the file you wish to delete.
   The file name will be entered into the "File name" display panel.
5. Select *OK*.
6. Select *Yes*.

The file is deleted from the directory.