WSC Tecnomanager

Version 6.1

Operator manual

Tecnologie e Prodotti per l'Automazione

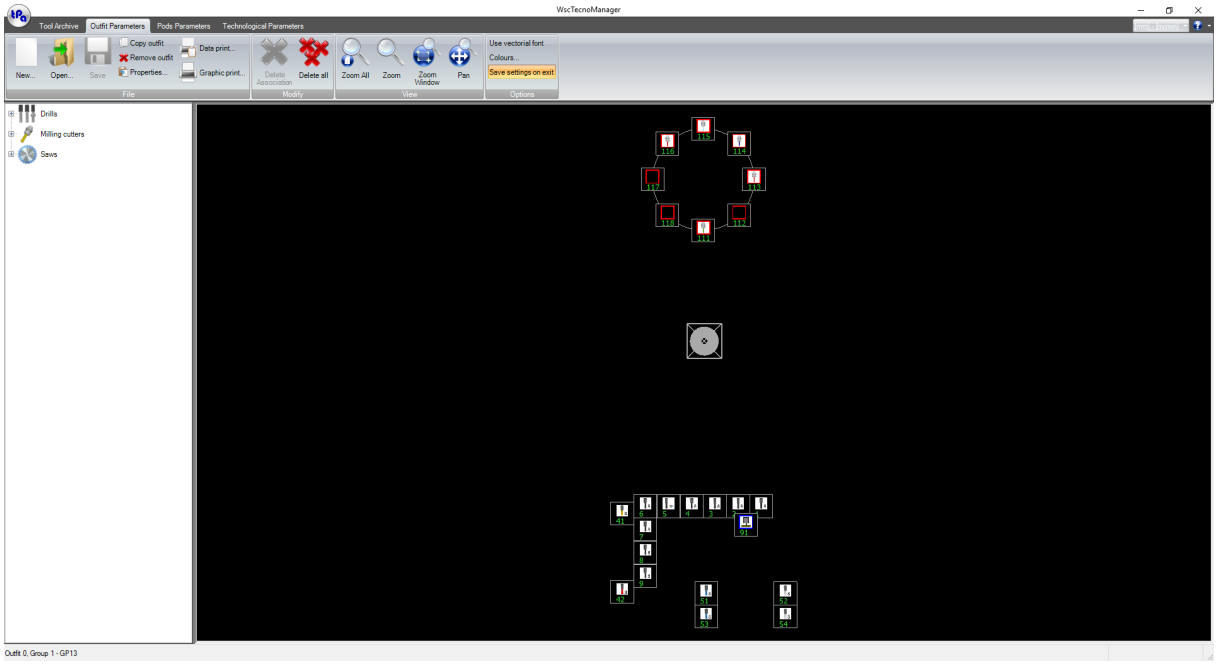
Table of Contents

1 Description

TecnoManager has been conceived to provide a software for the complete machine parameters from tools database to outfit management, from plane configuration to machine correctors.
This application is completely developed in C# by Visual Studio.NET 2008 and requires the installation of.NET RunTime 2.0.
In addition, DevComponents suite was used for a new graphic style designed for a complete integration with Windows 7 design. The application is fully compatible with the 64-bit Operating System.

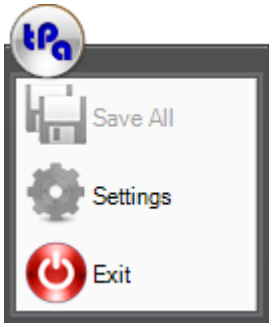
2 Program settings

This program is made by a main tab window, (see the figure below), containing all the functionality of the old parameter programs such as ToolsArc.exe, OutfArc.exe, ParPlain.exe and TechPar.exe.



Main window of the outfit parameters

From the menu, by selecting the "Settings" option you have access to the section that allows to configure the application. This section is available for the "Constructor" level only.



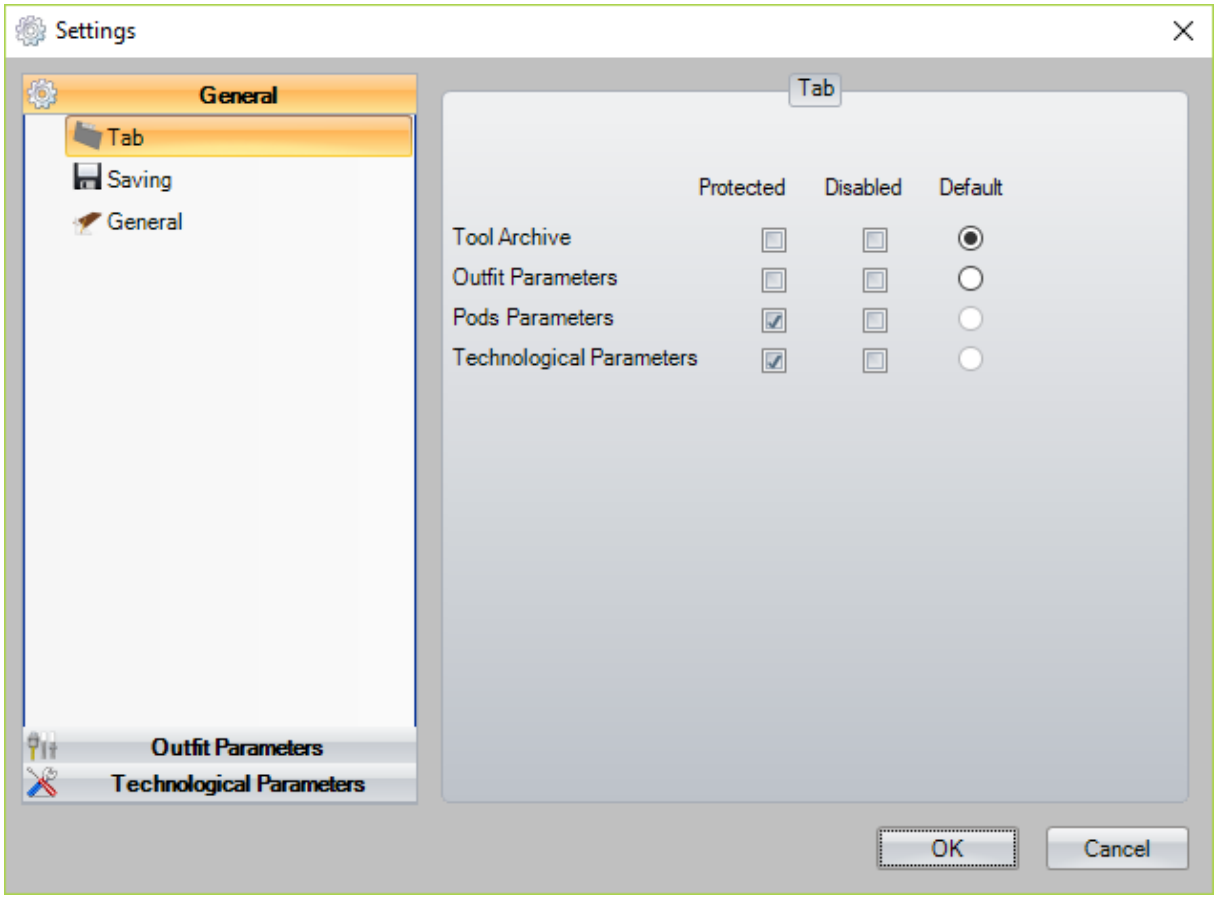
Menu

Setting window is divided in three sections:

- General settings
- Outfit parameter settings
- Technological parameter settings

All the options that are configured through the window of the settings are stored in the file "ConfTecnoManager.xml" which is located in the folder of Technology ("... \System\Techno").

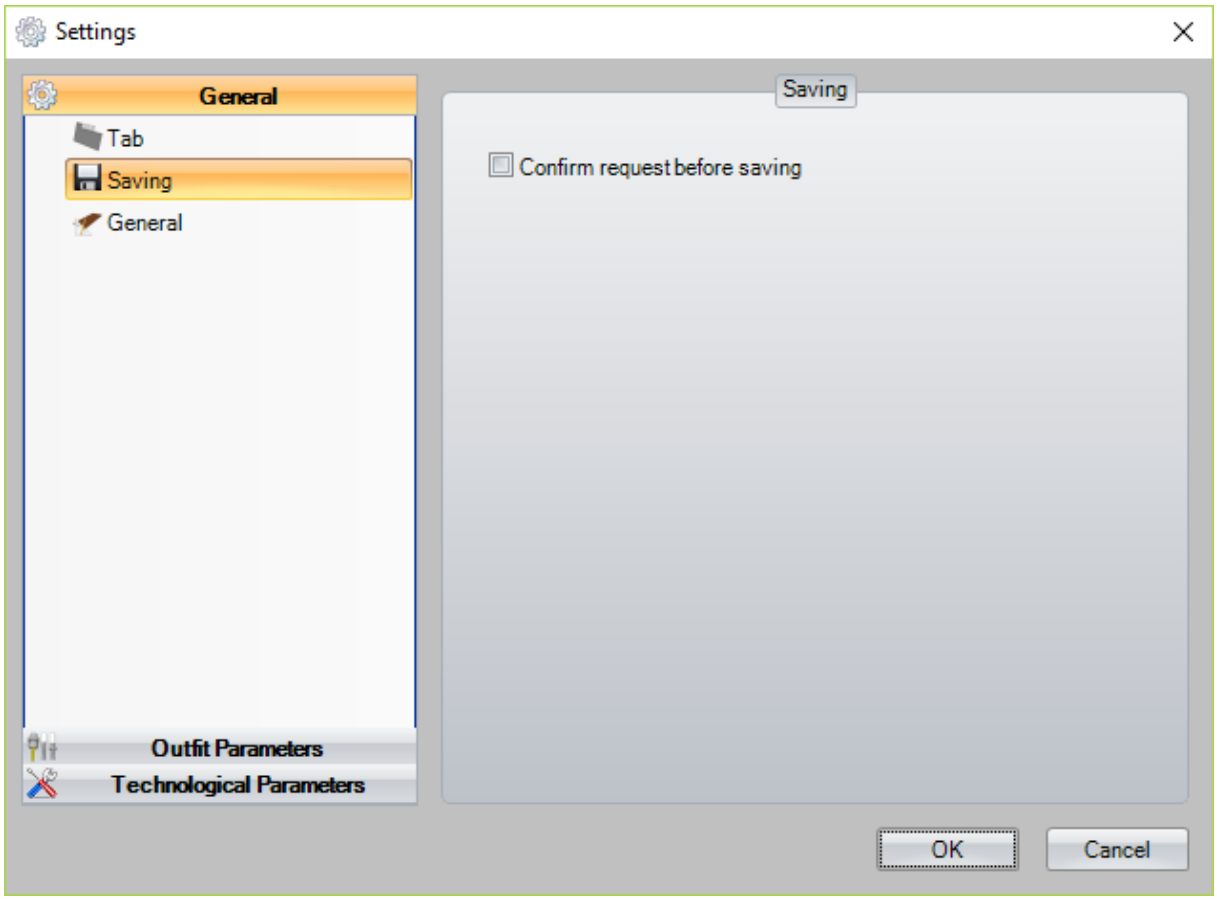
2.1 General settings



Tab Settings

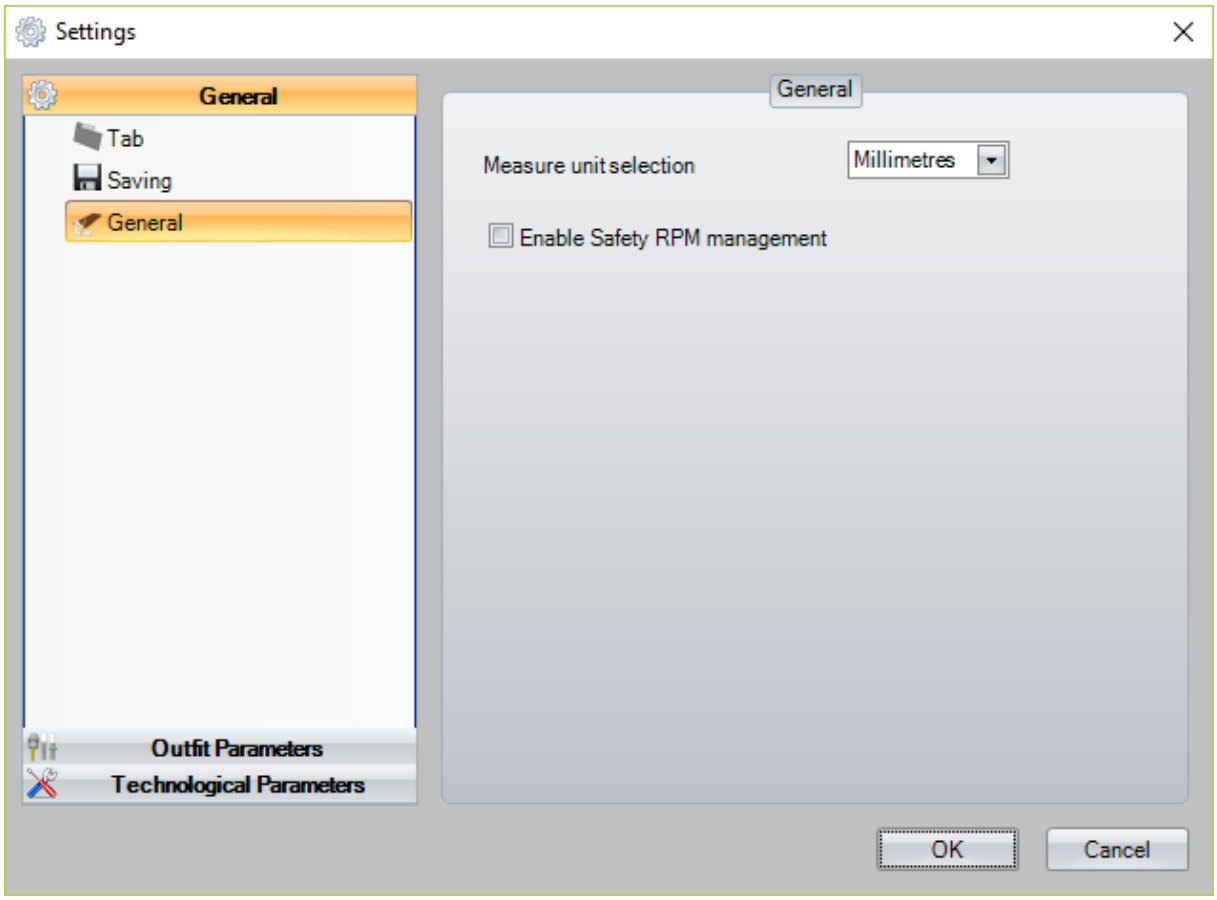
By selecting the "Tab" option, you can set:

- the default tab, shown at the program start
- the protected tabs, available for the Builder password only
- the disabled tabs, that are actually excluded from the application.



Saving settings

By selecting the "Saving" option, you can set "Confirm request before saving".
If enabled, when the tab changes, the user will be asked to confirm the saving changes; if not enabled, an automatic storage occurs.

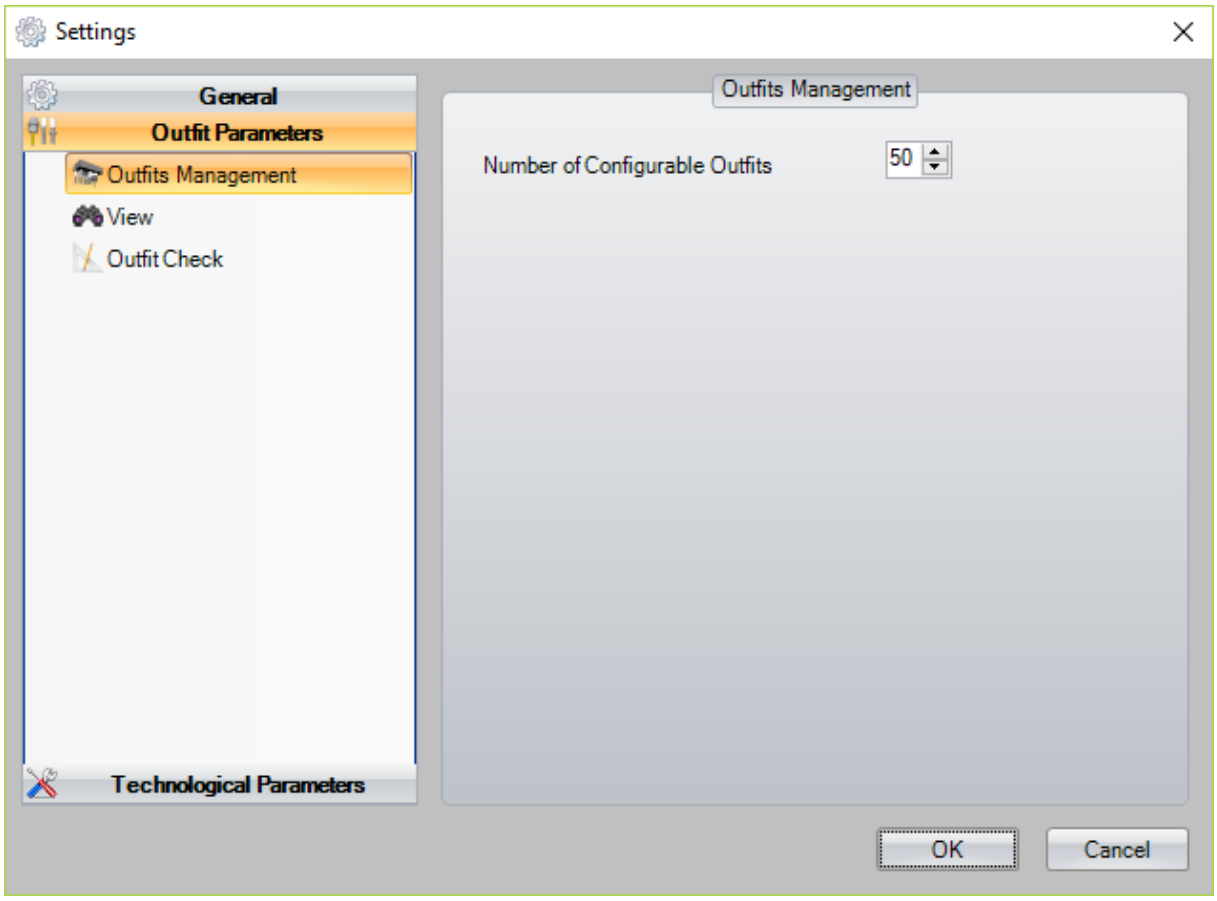


Measure units settings

By selecting the "Measure unit" option, you can set the measure units used in the application:

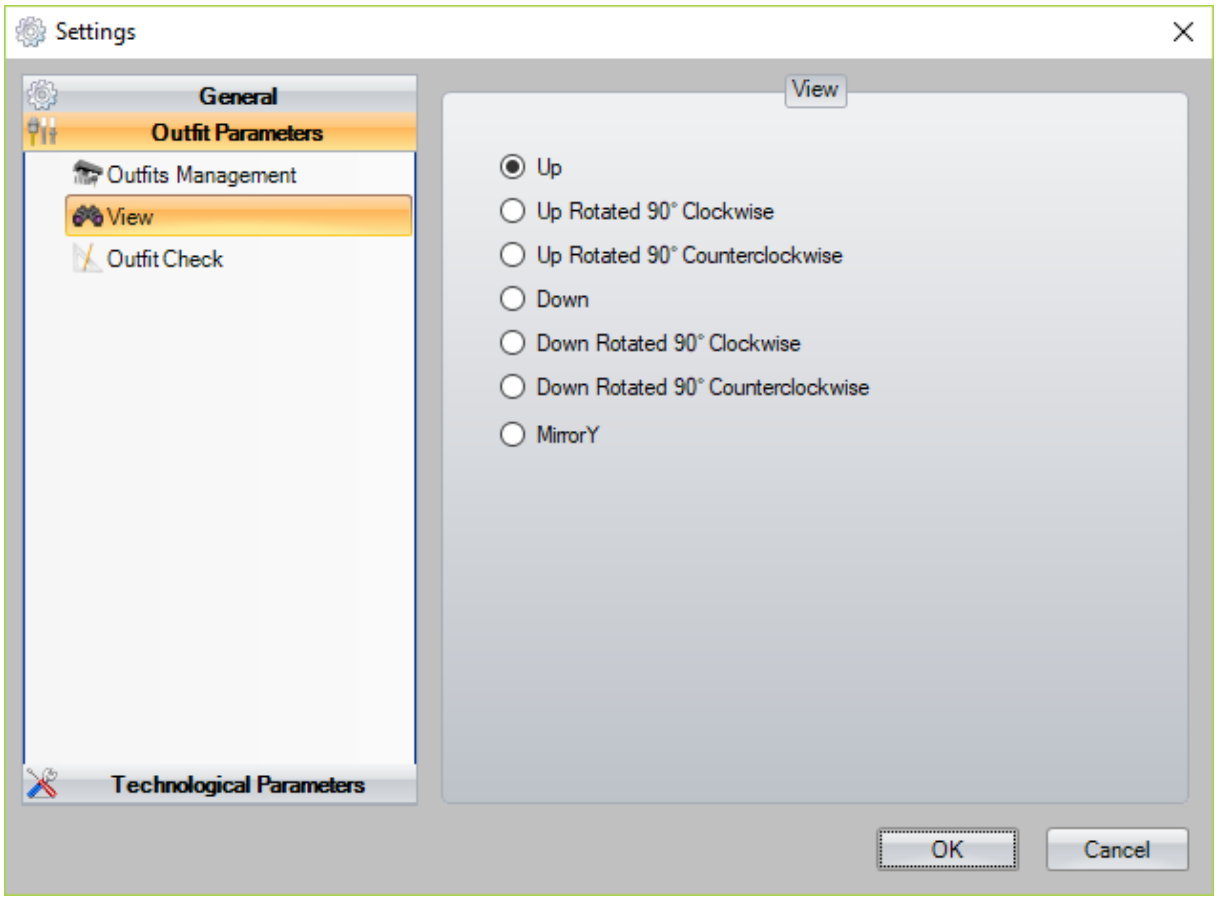
- Millimetres-> positions [mm] – speed [m/Min]
- Inches -> positions [inch] – speed [inch/sec]

2.2 Outfit parameter settings



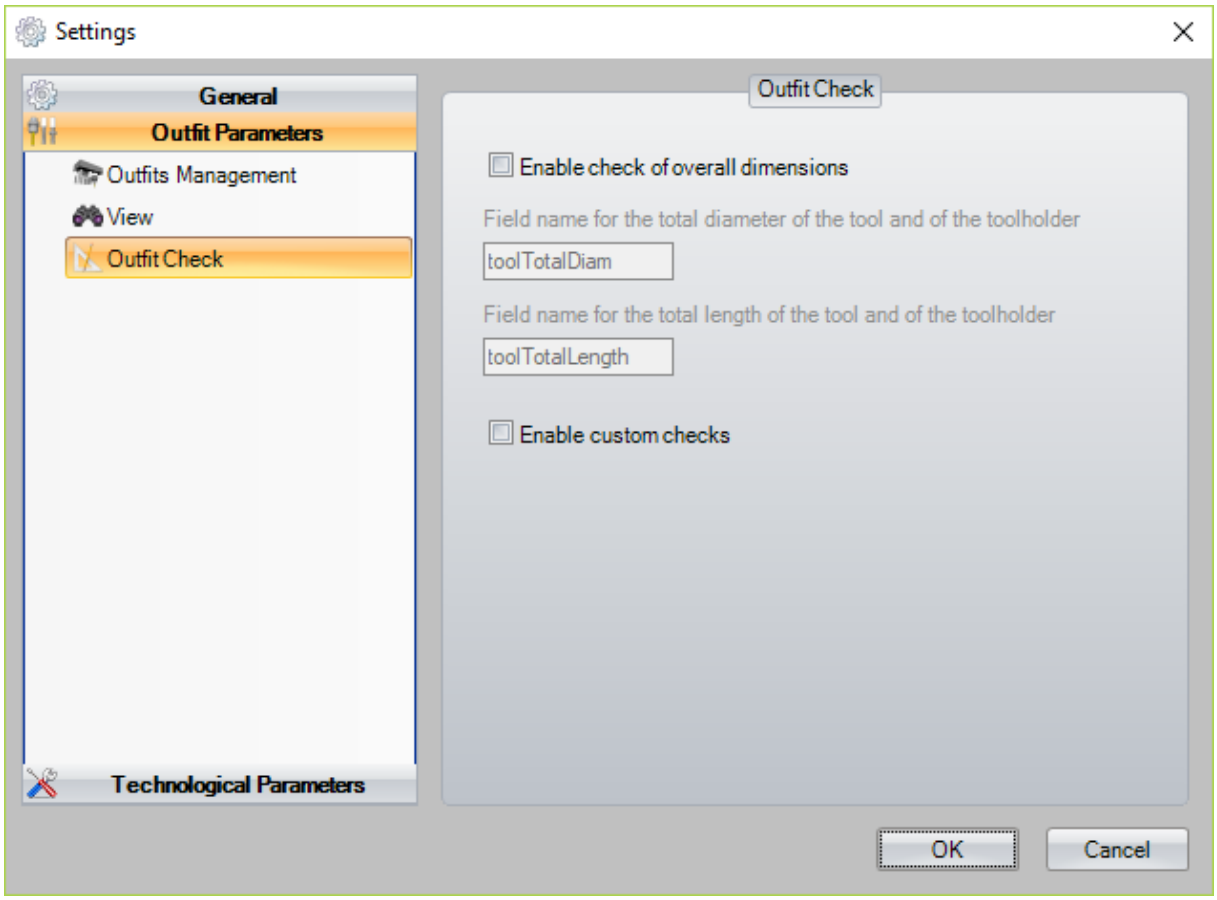
Outfit management settings

By selecting the "Outfit Management" option, you can set the maximum number of outfits that can be managed in the application.



View settings

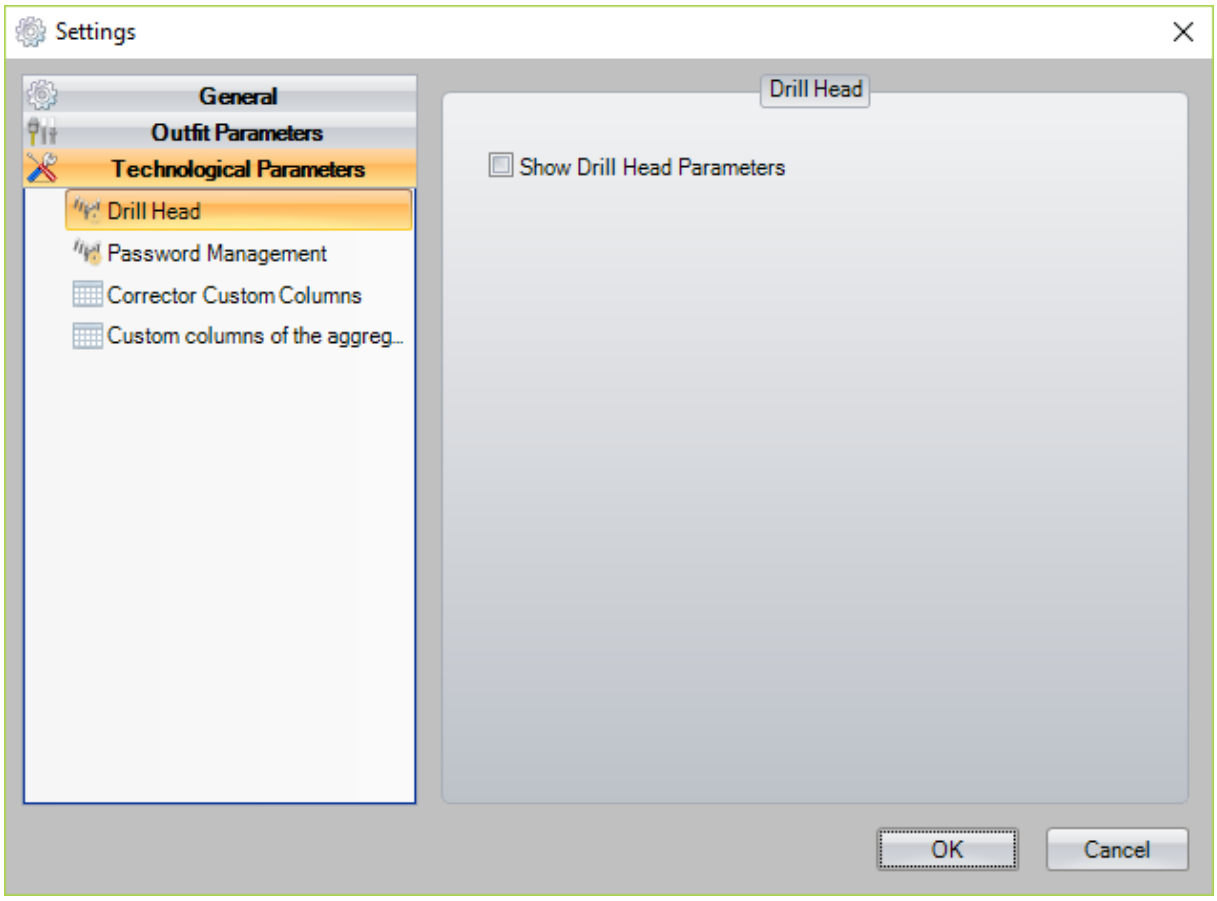
By selecting the "View" option, you can set the outfit display mode. You can also view the arrangement of the tools with different orientations.



Outfit check settings

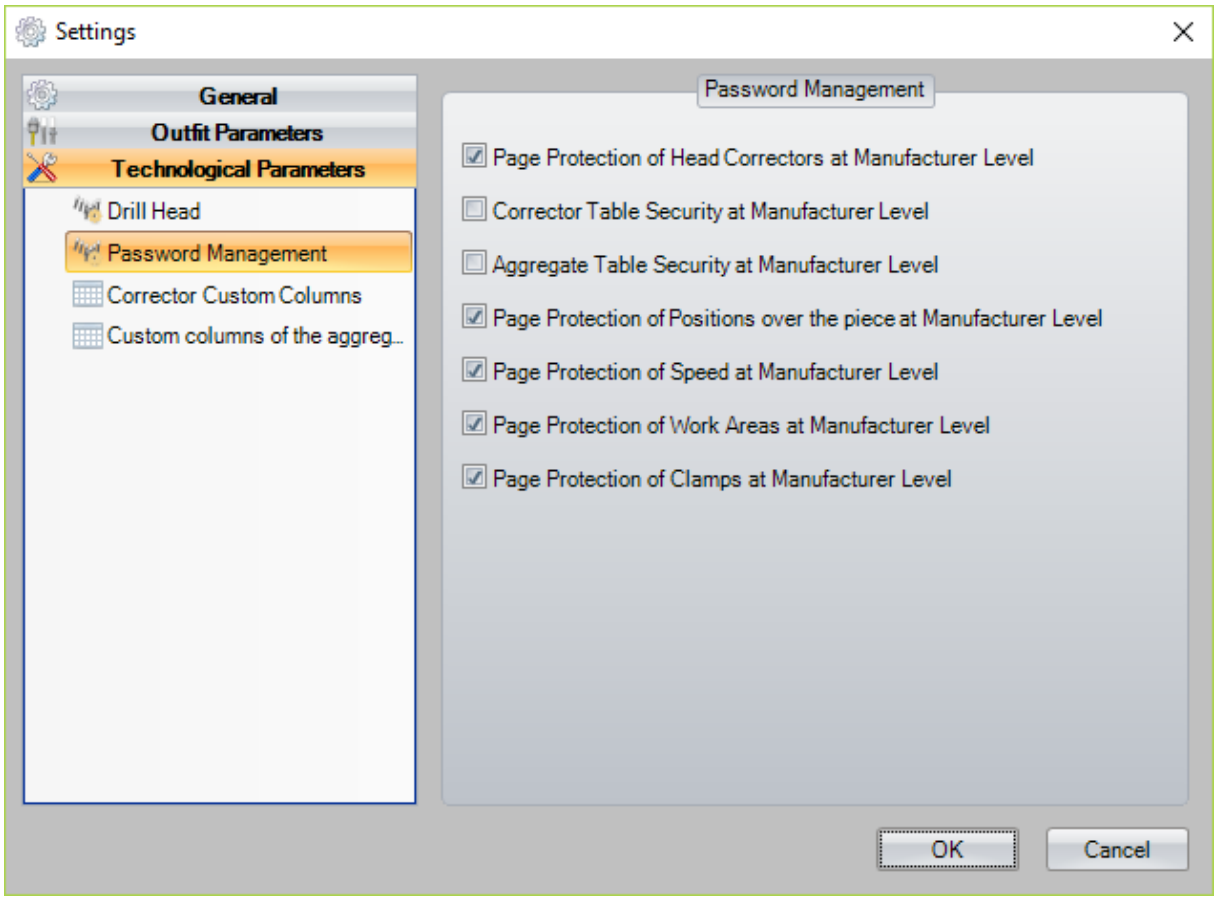
By selecting the "Outfit Check" option, you can activate some additional tests, made during the tool outfit process.
The "Outfit Check" option allows to run a test on the sizes of the tools, after defining in the "TOOLTECNO.XML" file the field that will contain the data needed for the test.
The "Custom check" is a set of optional tests whose logic must be implemented in an additional dll library (CustomTecno.dll).

2.3 Technological parameter settings

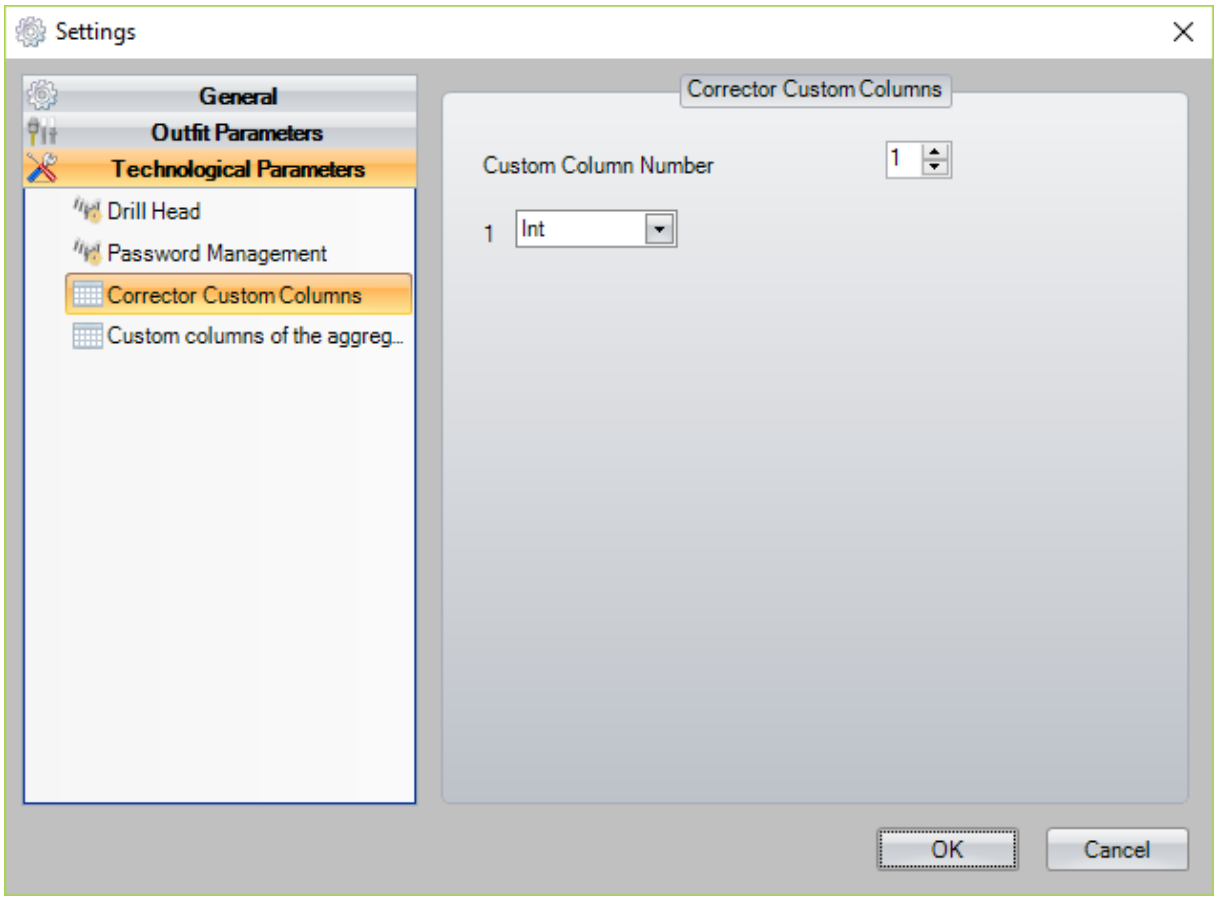


Drill Head settings

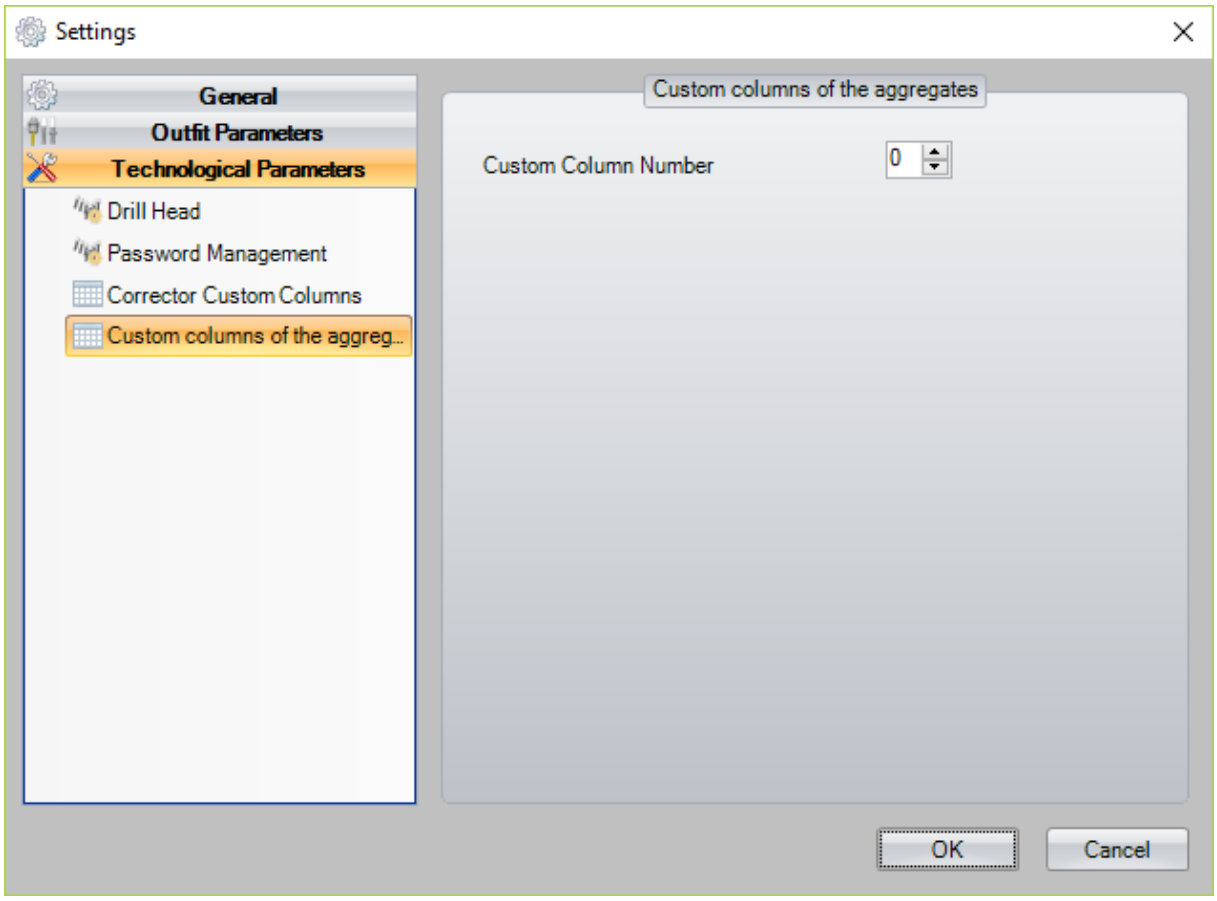
By selecting the "Drill Head" option, you can decide whether to show or hide the parameters of the drill head in the machine parameters.



By selecting the option "Password Management" it is possible to view a window with a series of check-boxes that allow to configure the pages that must be protected during modification and at manufacturer level.



By selecting the option "Corrector Custom Columns" it is shown a window where the number of custom columns to add for the correctors is configurable.
It also allows to specify the type of chosen data.

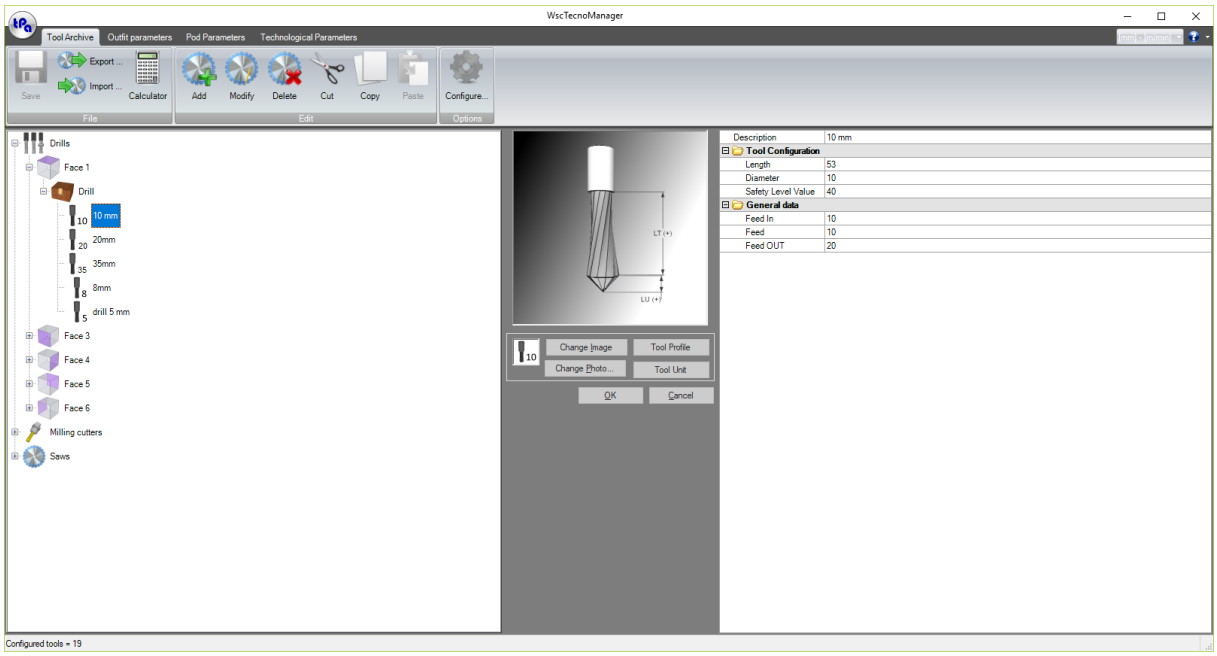


By selecting the option "Custom columns of the aggregates" it is possible to perform the same thing on the page of the aggregates.

3 Tool storage

The first "TecnoManager" tab enables the access to the store of the tools.

Through this item you can create and control a list of tools that will be taken during the Outfit process to configure the machine outfits.
The main functionality allows to enter, delete, view and modify the tools in the list.



Main window of the tools storage

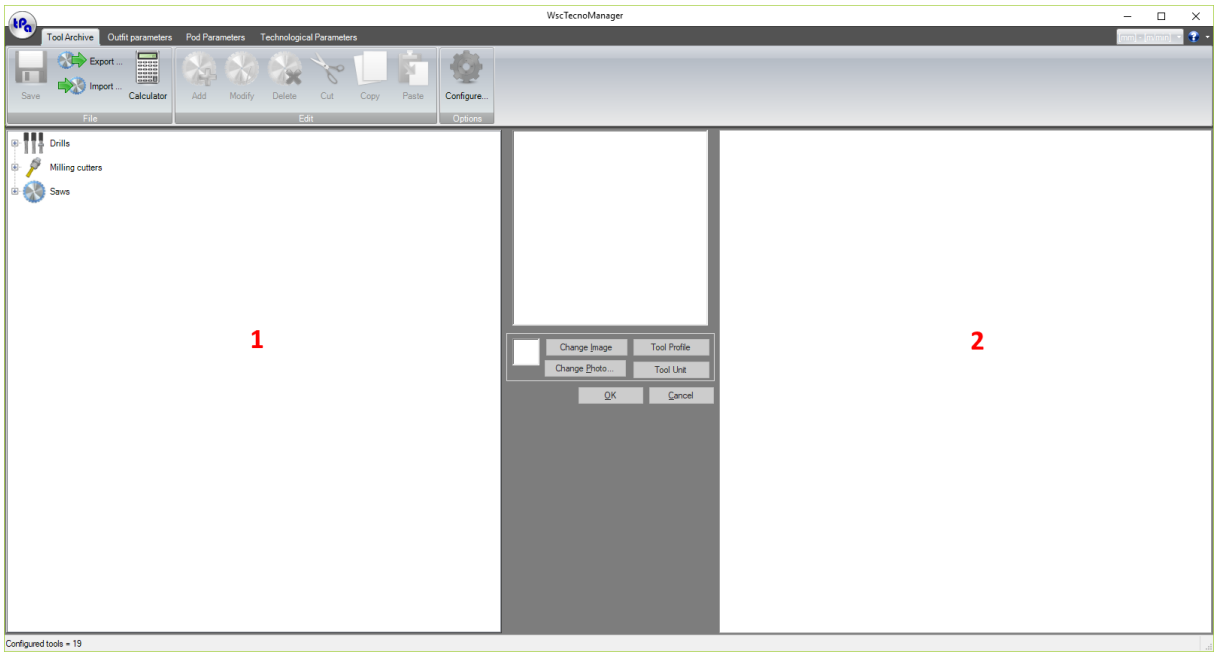
3.1 Toolbar

The Toolbar is made of groups of buttons to use the following commands:
- Save, Export or Import a tool store
- Add, Modify or Delete a tool
- Cut, Copy or Paste data
- Configure the view of the tool store.

Toolbar

3.2 Work windows

The work area is divided in two parts:
1- "Tool list" window
2- "Tool parameter settings" and "Image selection" window.

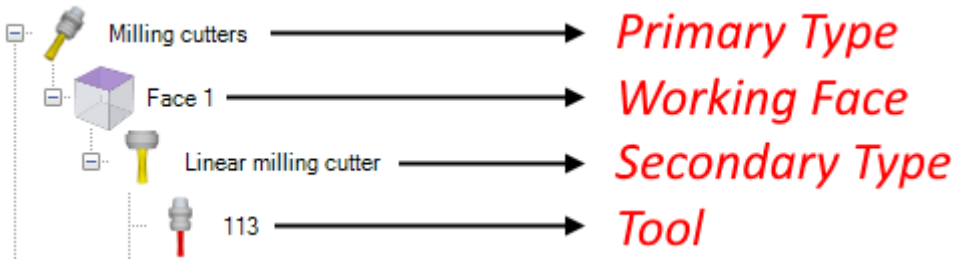


Work window

3.2.1 "Tool list" window

To improve the tool order, we have decided to represent them in a 4-level tree structure.

- **First level** - defines the **primary type** of the tools (Spindles, Milling cutters, Blades, Inserters, Tapping tools, Measurement devices).
- **Second level** - defines the **working face** where the tools are worked.
- **Third level** - defines the **secondary type** of the tools (Blind drilling tool, drilling tool, etc.).
- **Fourth level** - is made by the **tools** represented by the image and by the comment entered in the setting dialogue box.



To view a tool, just select it with the mouse or the arrow keys (in this way a dialogue box of the tool parameters opens in view mode).
To modify a tool, just select it by clicking on it twice with the mouse or use the command "Modify" in the Menu Bar.

3.2.2 "Tool parameter settings" window

As in the previous paragraph, this dialogue box can be opened in two modes:

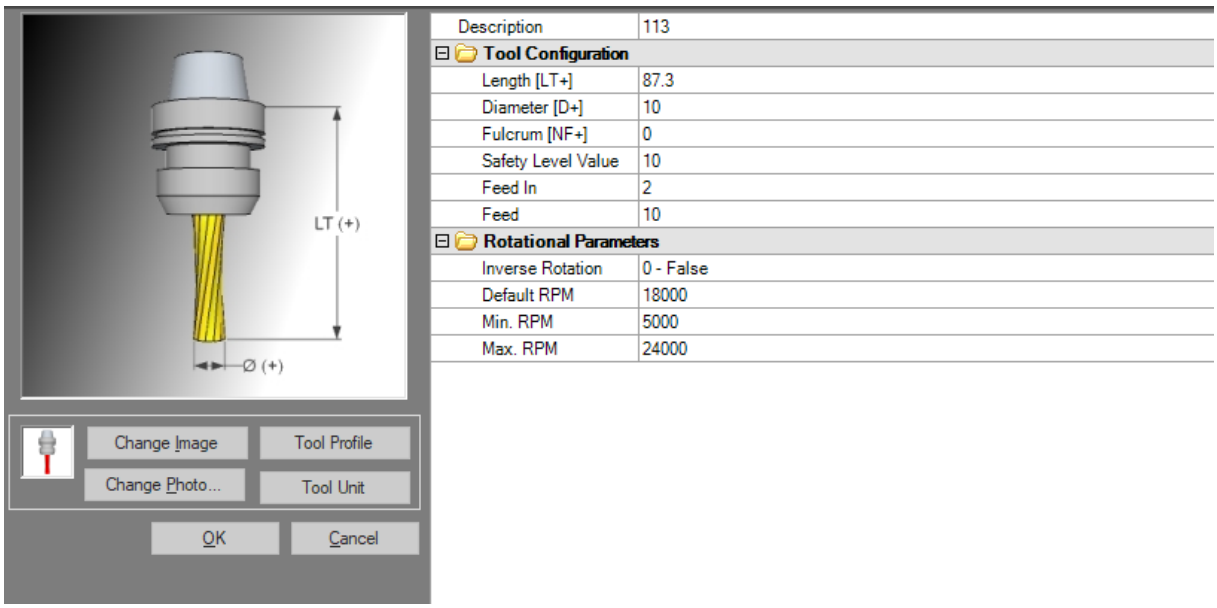
1- View mode (white background)
2- Edit mode (yellow background)

In this window you can see all the information on the selected tool.
The left side is for the display / editing of the tool image.
In the figure above the different physical information on the parameters of the selected tool are shown.
The right side is for the display/editing of the tool features.

Furthermore, there are several buttons, as follows:

[Cancel] to close the window, and leave the changes made

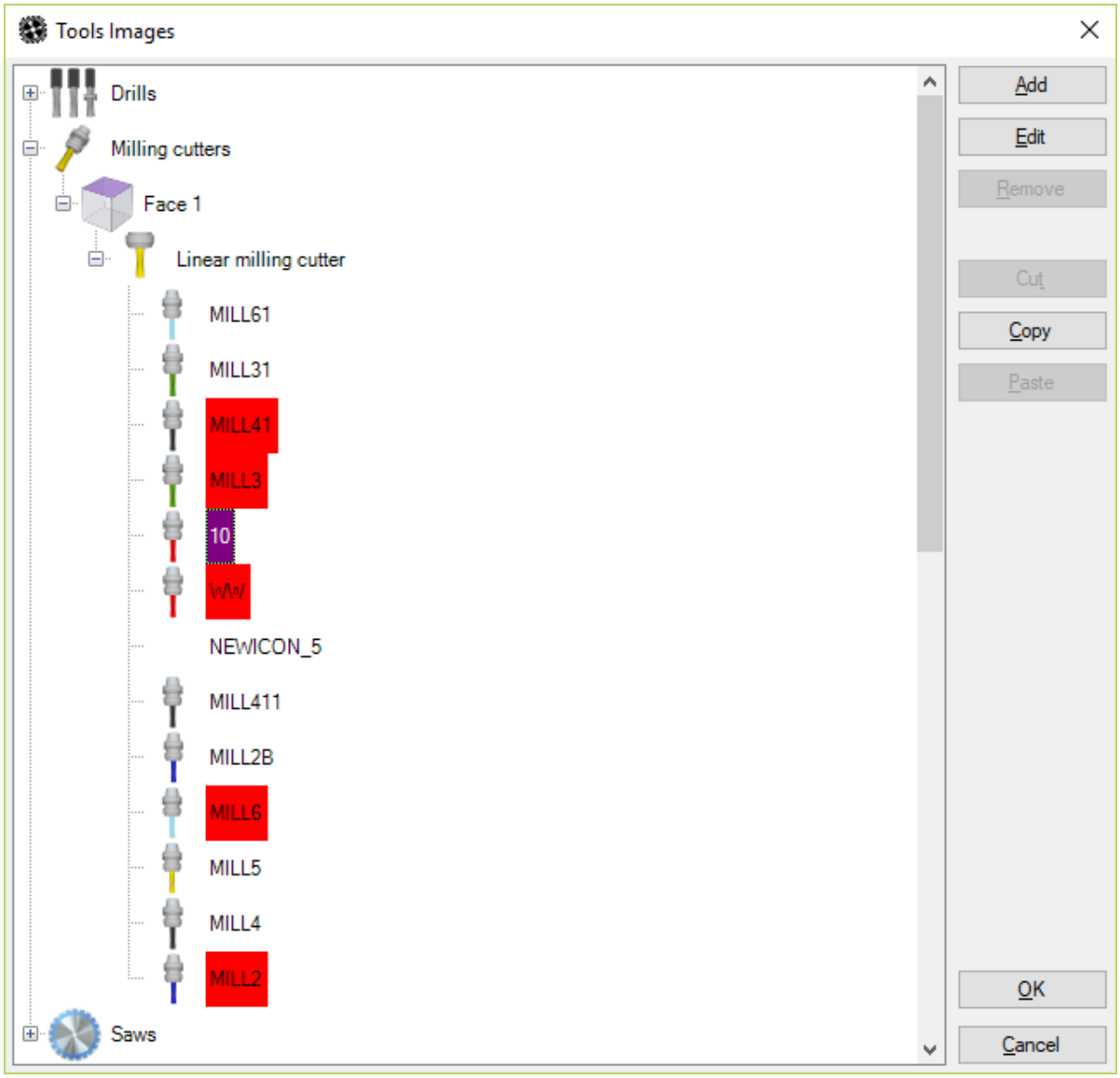
[OK] to close the window, and confirm the changes made
[Change image] to open the window "**Image selection**" that allows to change the tool image by choosing one of those already stored in memory or by creating a new image.
[Change Photo] to open the window that allows to load a representative photograph of the tool to be stored. If the photograph has already been loaded, just click on it to remove it.
[Tool Profile] to represent in the 3D simulator the shaped tool profile.
[Tool Unit] to represent, always in the 3D simulator, the graphic model of the Tool Unit in which the tool is equipped.



Tool management window

3.2.3 "Image selection" window

"Tool images" window:



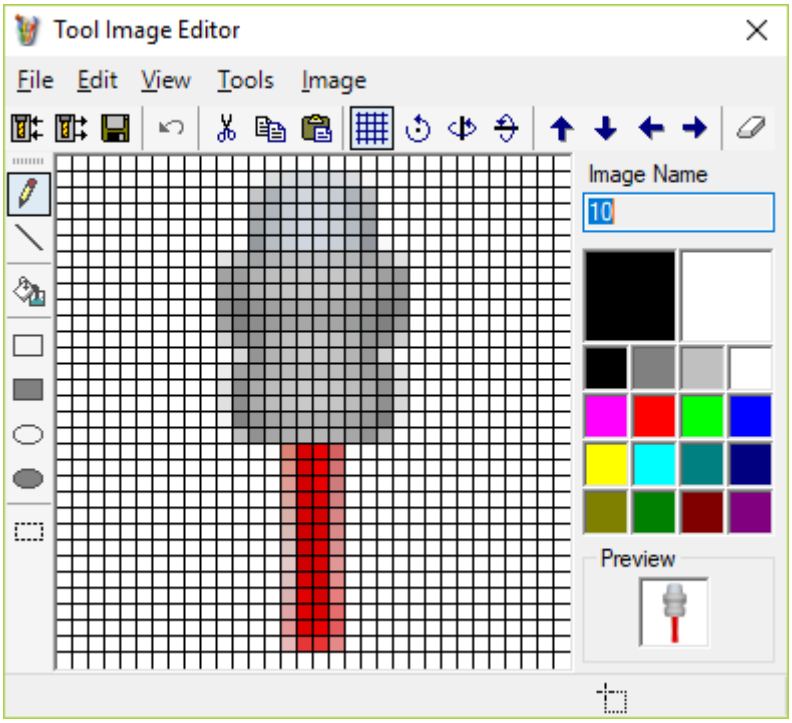
Tool image selection window

This window contains the images of all the tools stored in the list. The selection of the image to associate to the tool is made by directly double-clicking on the image required.

It contains the following buttons:

[Add] it opens the "**Tool Image Editor**" to add a new image
[Edit] it opens the "**Image Editor**" to modify the selected image
[Remove] it removes the selected image
[OK] it closes the window, and confirms the changes made
[Cancel] it closes the window, and quits the changes made

3.2.4 "Image editor" window



Tool image editor window

This window is a simple image editor and allows to import, create or modify the tool images.

To manage the images and the photographs representing the tools, it is important that they are stored in specific directories.
The installation creates the standard images inside the **"...\GRF"** folder.
You can add images and customised images that the customer can use instead the standard ones; all these images must be stored in the **"...\SYSTEM\TECNO\IMG"** folder.

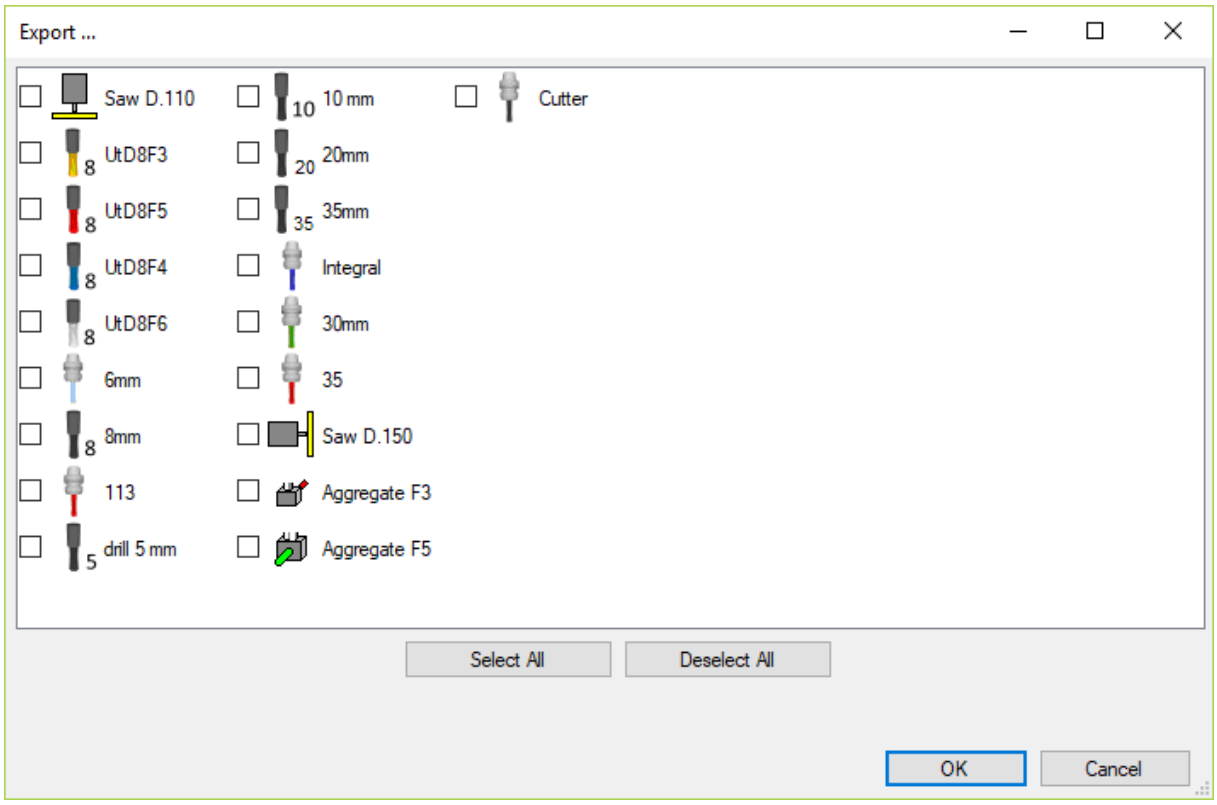
This image management is absolutely essential to avoid the replacement of the customised images with the standard images, in case of a new product installation.

3.3 Import and Export

You can import and export the tools by means of the *Import* and *Export* commands, available in the toolbar shown at the beginning of this chapter.

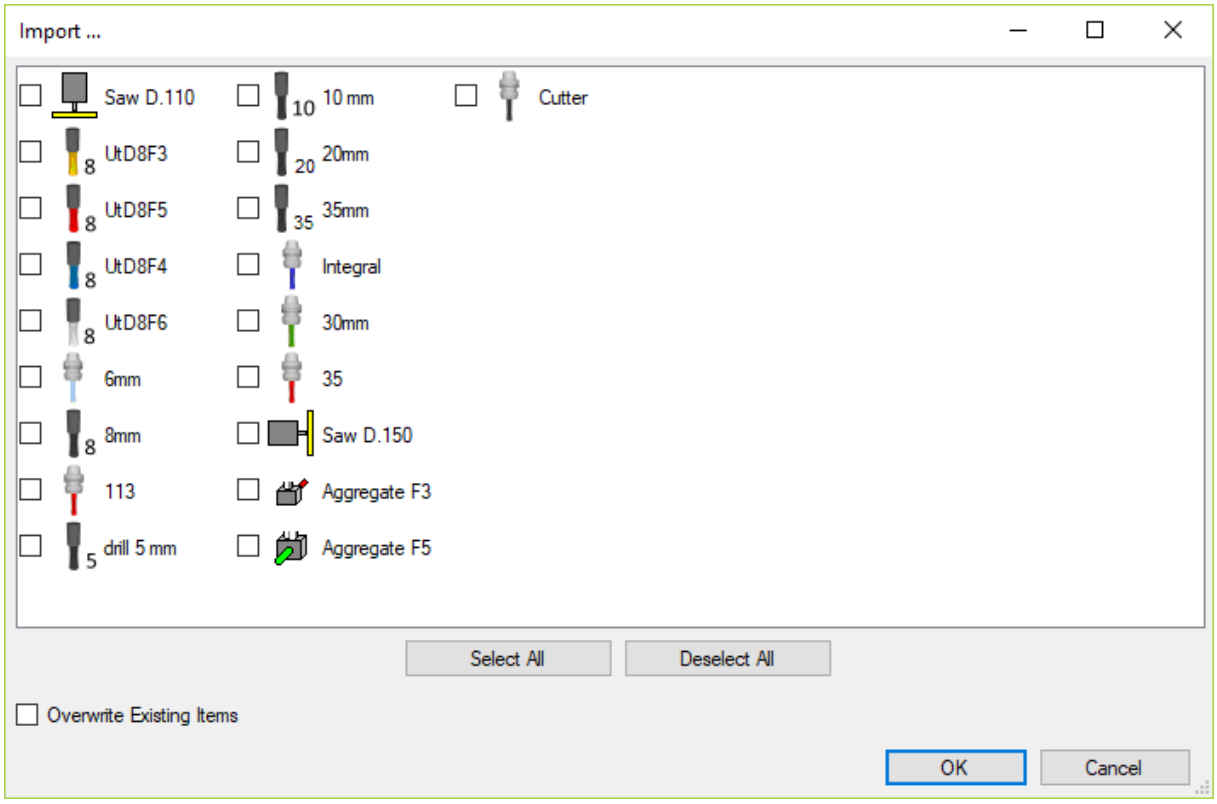
The Export process occurs using an XML file, called "DBTools.xml" by default, containing all the information on the tool including images and photographs; this last will be the input of the import functionality.

The Export command allows by means of the window shown in figure **Export tool selection window,** to select the tools you want to export. Then, you will be asked for the name to assign to the XML export file.



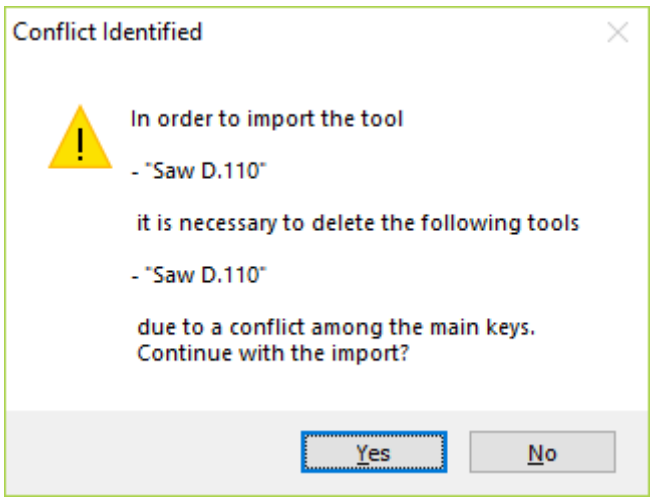
Export tools selection window

The import command loads an export XML file, always called "DBTools.xml" by default and shows all the tools exported before. The user can decide what tools are to be imported. The selected tools will be imported by the program after checking possible primary conflicting keys (Description, ID and image). In case of a conflict, for each tool the user wishes to import, the user will be asked whether they want to import the selected tool, causing the cancellation of those tools already conflicting with this latter.



Import tools selection window

In the Import window, as shown in figure **Import tools selection window**, also a check-box is available to enable the "Overwrite the existing items" functionality that forces the cancellation of the existing tools, if they conflict with those that are to be imported. If this functionality is enabled by the user, the window shown in figure **Conflict Identified** window will never appear; in fact, the tool overwriting confirmation appears only if the above check-box is not enabled.



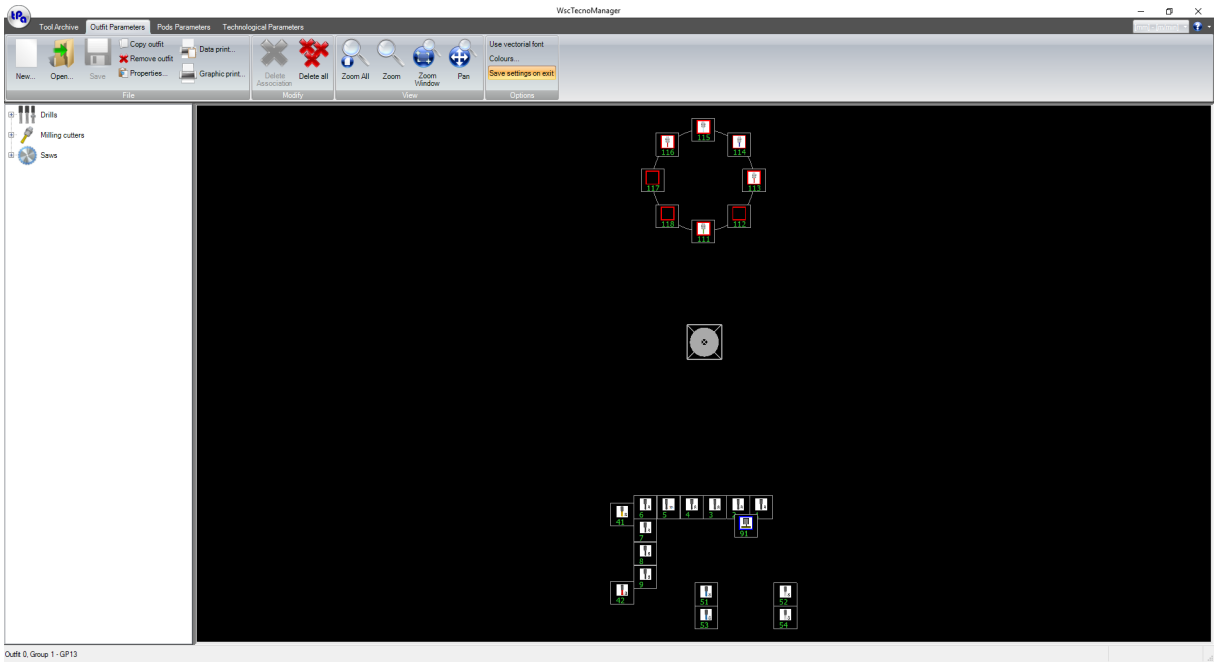
Conflict notification box

4 Outfit parameters

The second tab of TecnoManager program allows to control the machine outfit.

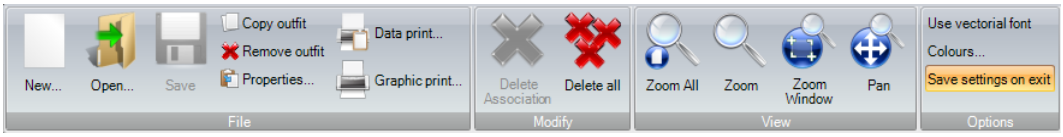
For a better understanding of the next pages, we would like to explain the meaning of some terms used in this manual.
Tools are the bits, the milling cutters, the saws whose features are defined in the tool parameters.
Bushes are the housing (spindles, carousels, chains, etc...) where the tools are mounted. The characteristics of the bushes are defined in the technological parameters.
Outfit is the group of tools to carry out a particular set of workings. This option also shows how these tools are positioned inside the machine. So, each outfit defines a tool list and an association of tools-bushes.

The user can also create no more than 50 different outfits, or a maximum number equal to the limit configured in the "Settings" window.
Each outfit contains the data of one or more groups according to the machine arrangement.



Main window of the outfit parameters

4.1 Toolbar



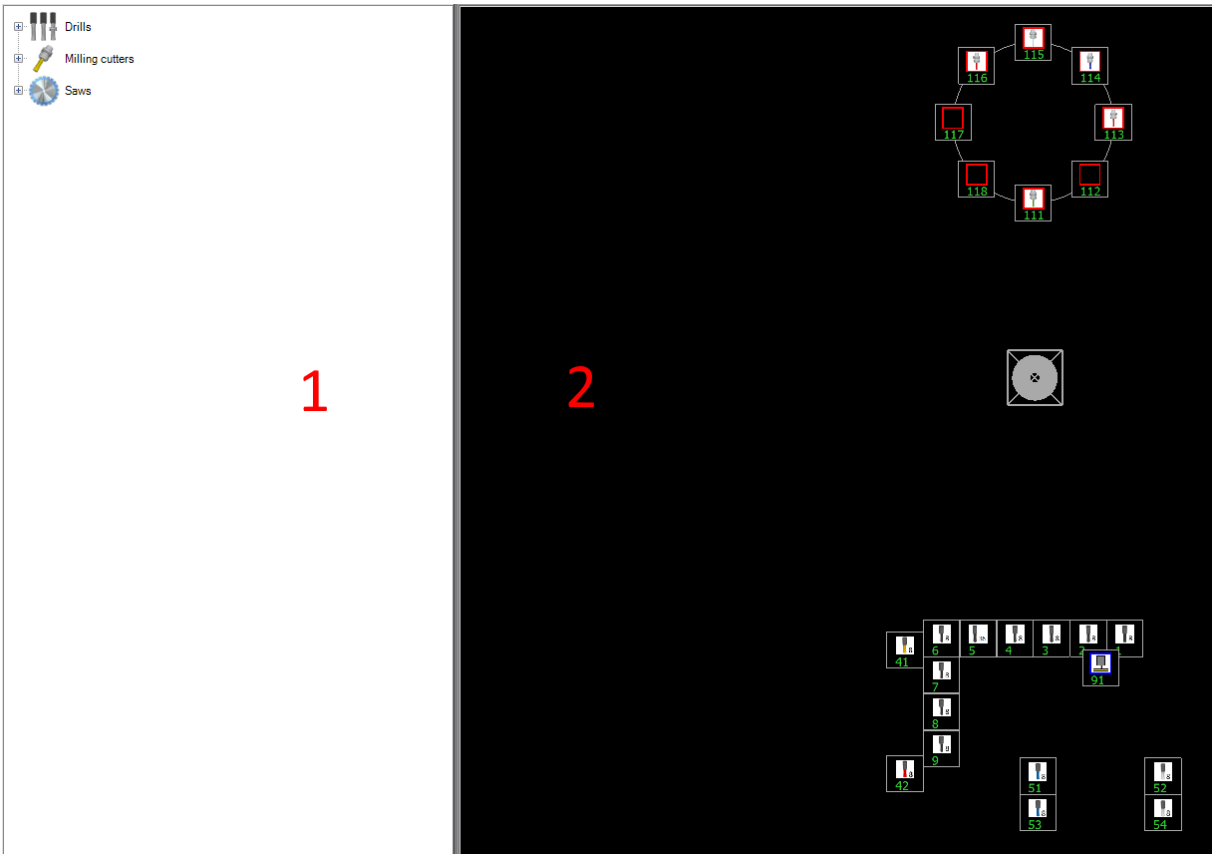
Toolbar

The toolbar allows to use the following commands:

- Create a new outfit.
- Open an existing outfit.
- Save the changes.
- Copy an outfit.
- Remove an outfit.
- View and modify the properties of an outfit.
- Print on paper an outfit.
- Graphic print of an outfit.
- Delete a bush-tool association.
- Commands for Image zoom.
- 3D Outfit management (see paragraph "3D machine model")

- Settings of the graphic interface.

4.2 Work window



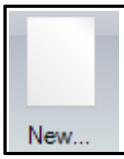
Work window of the outfit parameters.

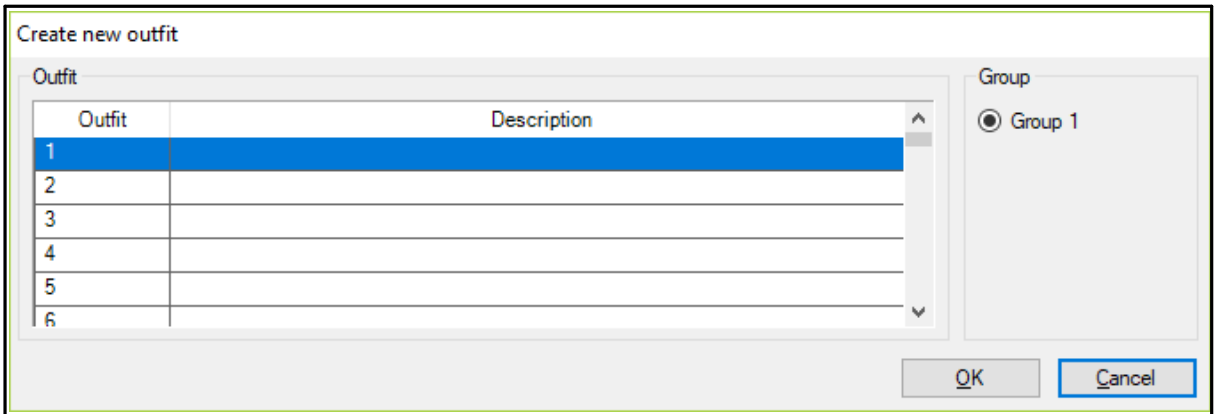
1) The **tool list** is the same list as it appears in the tool parameters. It represents the whole tool collector of the machine, defined in the "Tool parameters".

2) The **machine configuration** shows the scheme of the bushes, defined in the "Technological parameters".

4.3 File management

Create a new outfit

	To create a new outfit, use the button in figure.

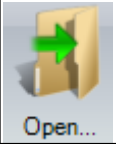


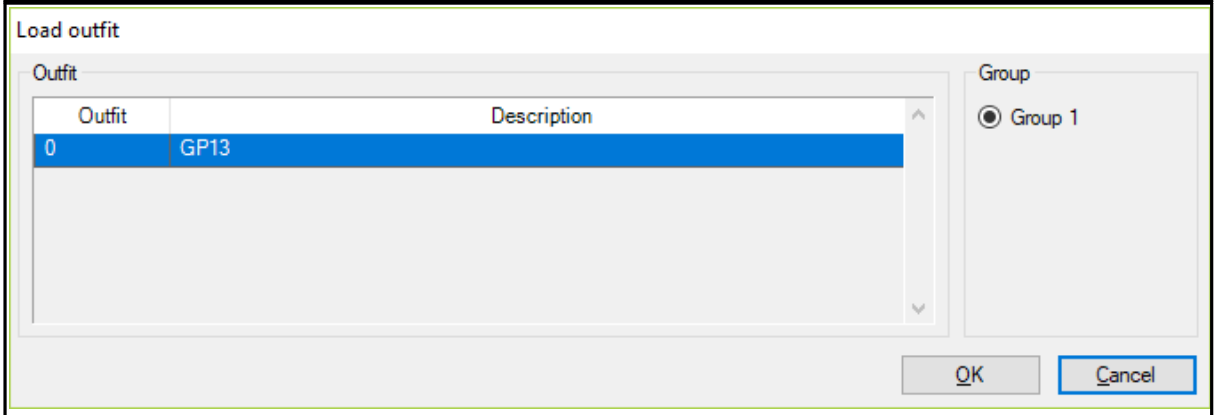
Window to create a new outfit

The window that appears shows the outfits that are not used yet, and allows the user to set the information needed to load the Group/outfit required.

4.3.1 Loading an existing outfit

Loading an existing outfit

	To load an existing outfit, use the button in figure.

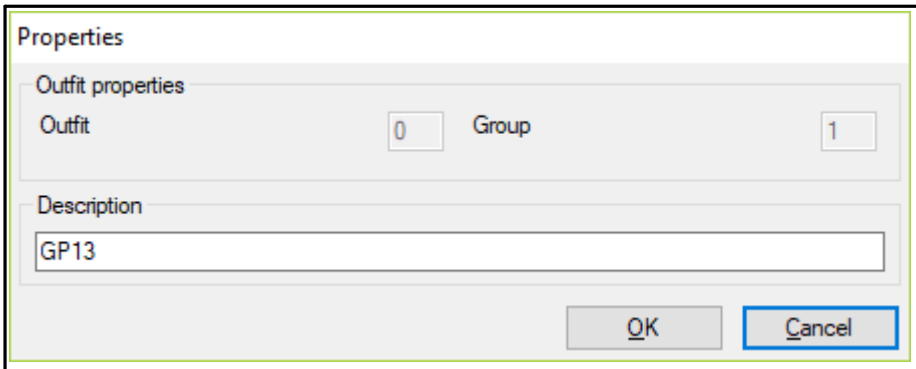


Loading window of an existing outfit

This window shows the outfits already used, and allows to set the information needed to load the Group/outfit required.

4.3.2 Outfit description setting

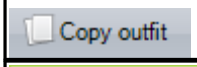
	To modify the outfit properties, use the button in figure.

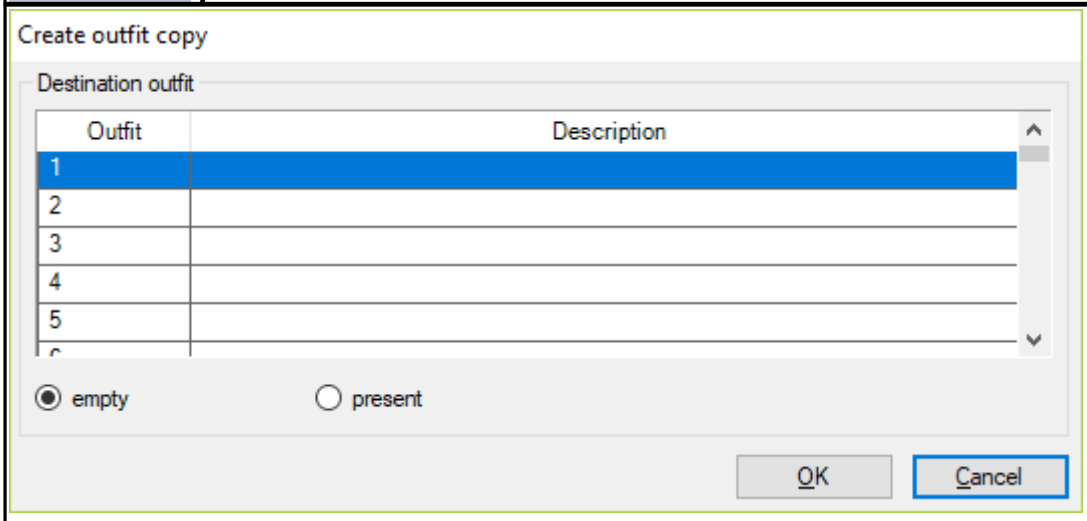


Window of outfit properties

This window allows the user to modify the outfit description.

4.3.3 Copying an outfit

	To copy an outfit, use the button in figure.



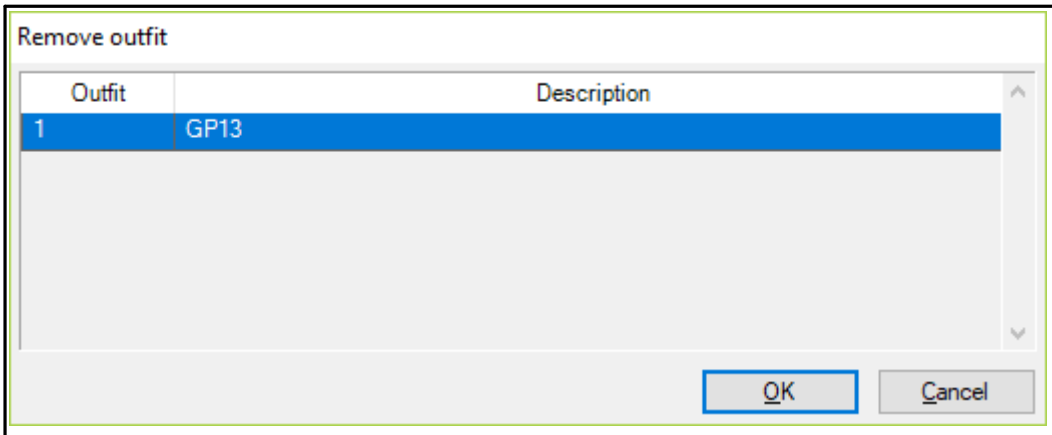
Outfit copy window

This window allows the selection and the copy of the destination outfit.

4.3.4 Removing an outfit

Removing an outfit

	To delete an outfit, use the button in figure.



Outfit remove window

This window shows the outfits used and allows the selection of the outfit to be deleted.

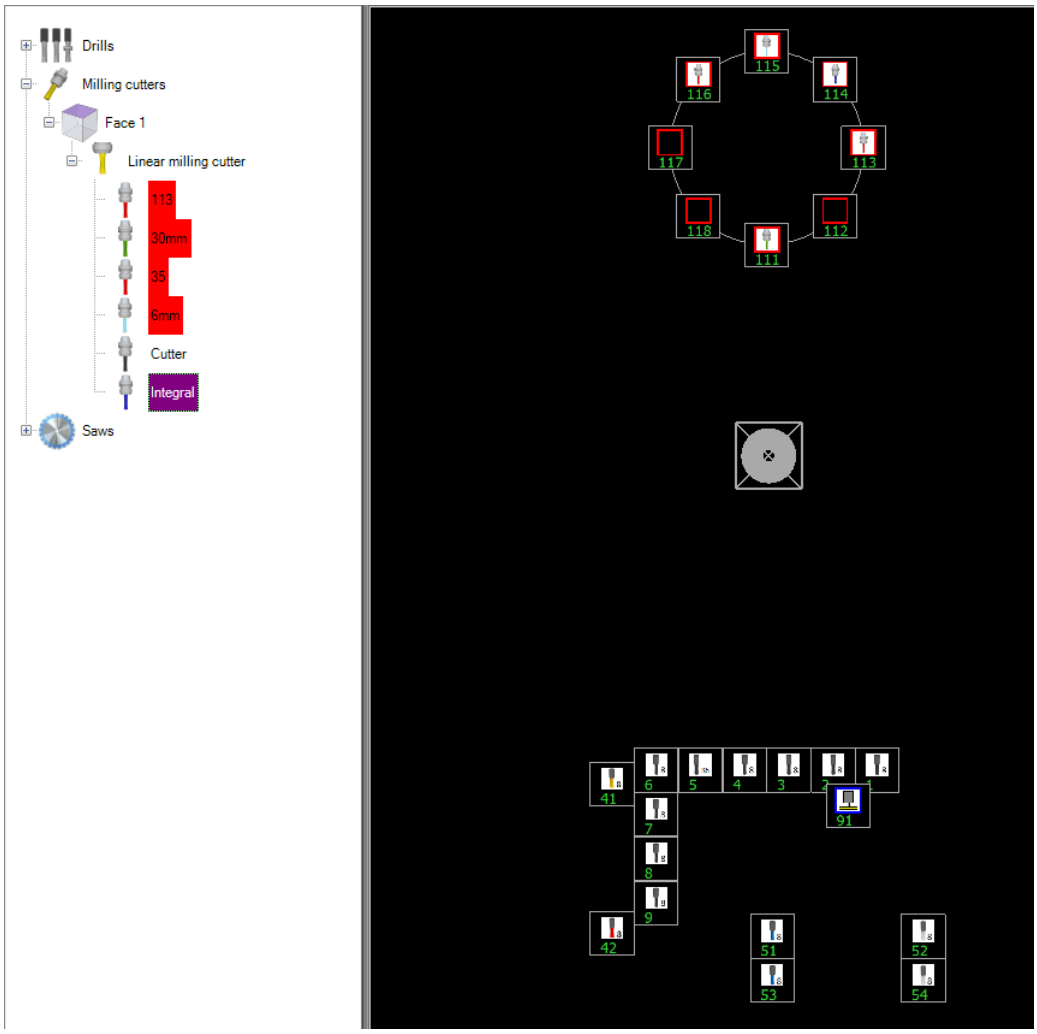
4.3.5 Saving an outfit

 Save	To save the changes to be made, use the button in figure.

After the program has exited, if one of the outfits has been changed, you will be asked to save. If you exit without saving, you will lose all of your changes.

4.4 Equipment construction

4.4.1 Assigning tools/bushes



Work window of the outfit parameters.

The choice of the tools and the assigning of their positioning in the machine is made by selecting the tool with the mouse. Hold the mouse left button and drag it over the bush of destination.

After releasing the mouse button and if the general outfit check has given a positive result, the tool is assigned to the bush; if not, the status bar will show some reports indicating the reason of the missing assignment.

The successful assignment is highlighted by the fact that the image of the bush is replaced by the one of the tool.

In case of drill bits, the tool is seen as a model of a particular category (for example a drill bit 8 mm). You can drag it more times to equip more bushes.

In the milling cutters and the saws instead, features of uniqueness are recognized and for this reason you can only assign the tool to one bush.

Once a milling cutter or a saw has been assigned, it is marked by a red strip showing that it is not available for any further assignments.

4.4.2 Deleting tool/bush assignment

The assignment of a tool/bush can be deleted in two ways:

1) By selecting the tool from the tool list and using the button of the tool bar "Delete association".

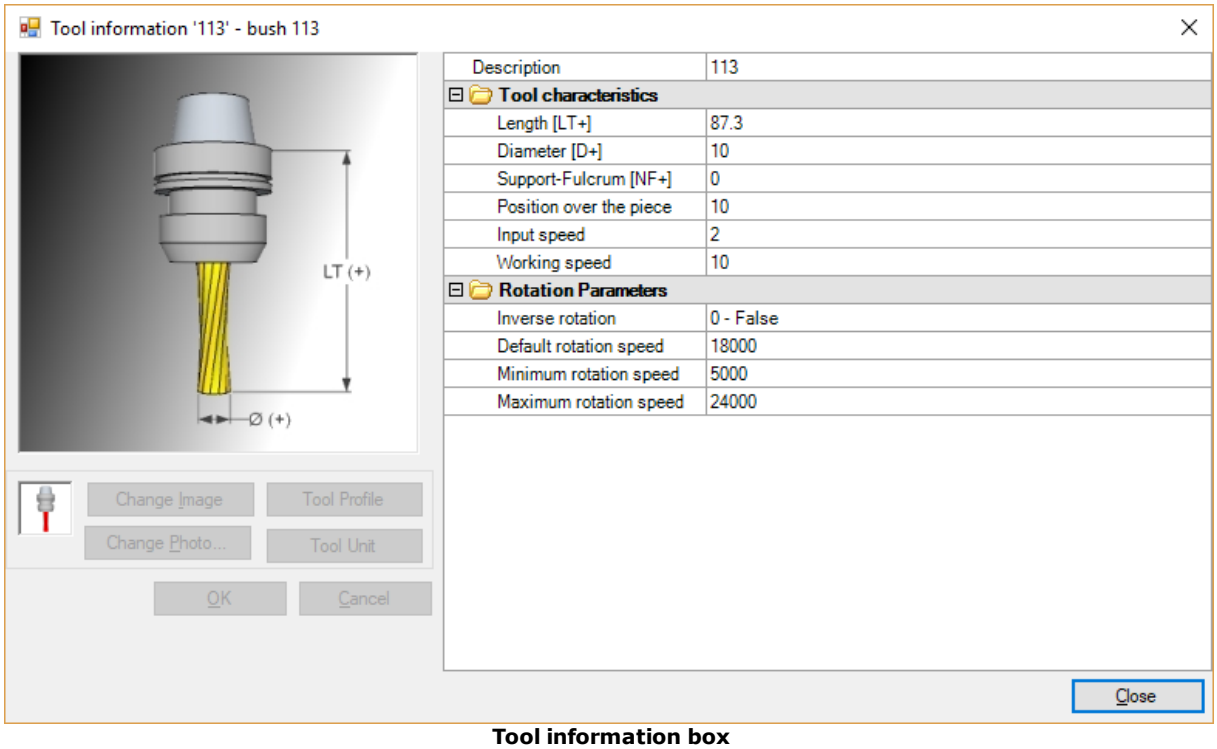
2) By selecting the bush and pressing the mouse right button; from the displayed window, select the "Delete tool" option.

4.4.3 Showing tool specifications

There are two ways to see the specifications of a tool.

First one: place the mouse on the tool of the list and *click twice*.

Second one: place the mouse on the bush and press the right button; in the dialogue box that appears select the option "Display tool".



Tool information box

4.5 Print

4.5.1 Graphic print

By clicking the button "Graphic print" in the toolbar you get a graphic print of the current outfit.

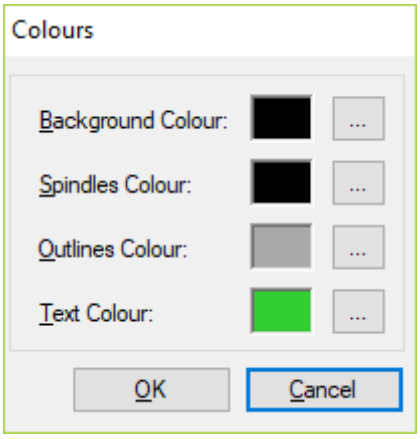
4.5.2 Data print

By selecting the option "Data print" you get a print in a table form of the current outfit.

4.6 Options

In the **Options** groups there are the options to customise the work environment.

4.6.1 Colour settings



Colour setting window

4.7 3D machine model

3D machine model

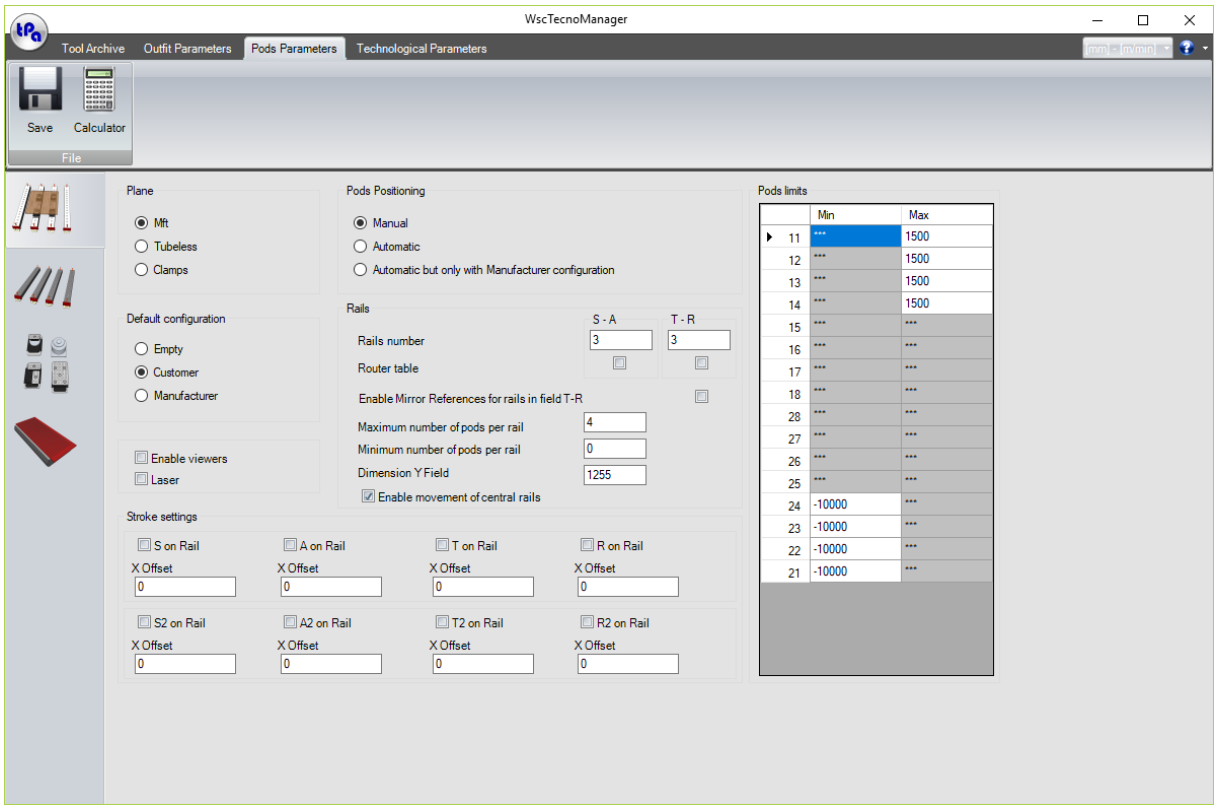
During the outfit stage you can view the three-dimensional model of the "equipped" machine. This functionality is available after the installation of the Wood System Control suite with 3D simulator and license in Sentinel key.
The three-dimensional model is interactive: you can change the view, rotate and zoom it on the machine.

5 Plane parameters

The third tab of TecnoManager program allows to control the plane parameters. By selecting this tab, you access another control, made of four tabs for the configuration of plane, rails, pods and grid plane.

5.1 General parameters

The general settings of the machine plane are available in the first tab of the pod/plane parameters. From left to right and from top to bottom all the settings available in the tab are shown in the figure below:



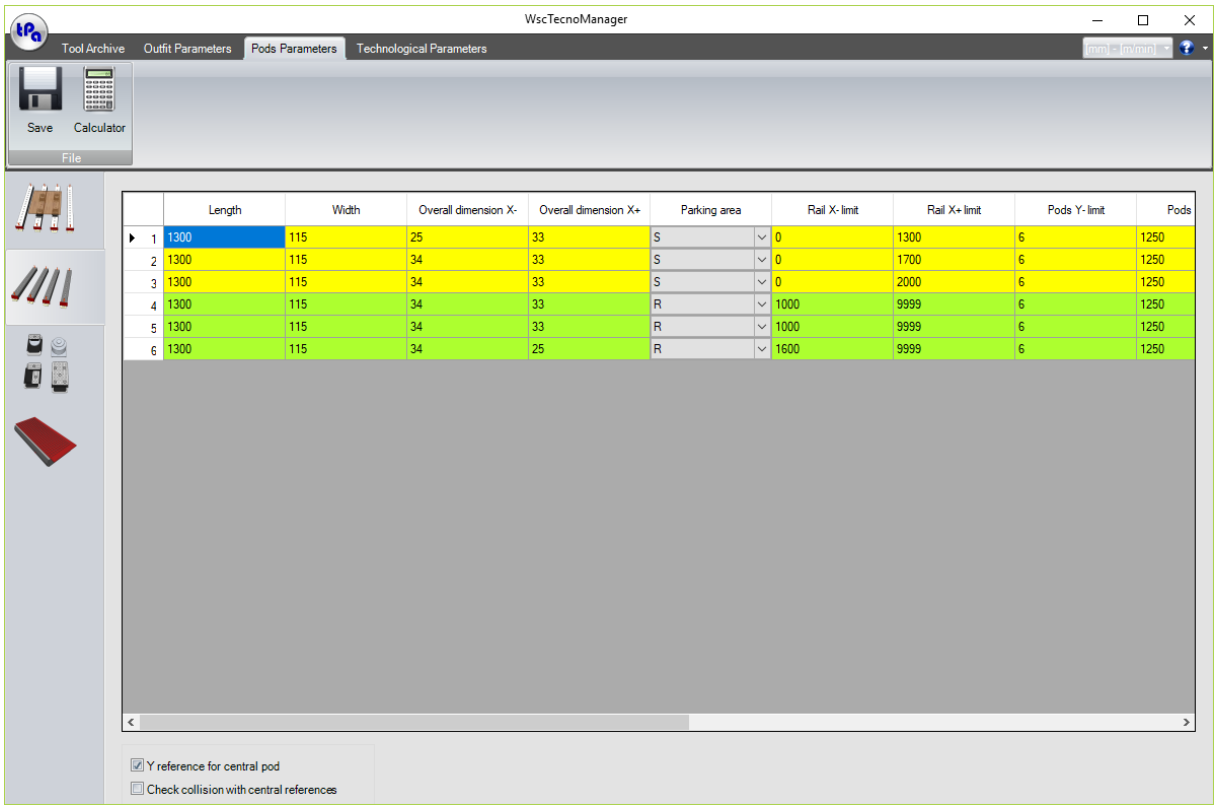
Plane parameters window

- Plane
  - Mft -> MFT typology plane, so with non-removable pods and with limits due to the air pipes.
  - Tubeless -> Malta typology plane. The pods can be removed and added without space limits.
- Default configuration
  - This option allows to select the default configuration among the configurations of the WSC pods. After opening the WSC, the plane will always show the selected configuration.
- Rails
  - In this group of parameters there are the settings to configure the number of the rails for each half-area in X and, if necessary, the flag enabling the RT plane on each of them. For each rail you can also configure the maximum and the minimum number of pods. The minimum number is considered only in the following cases:
    Mft plane and plane dimension in Y, if the central rails can move over their half-plane or not.
    Furthermore, you can activate the Mirror of the X-positions on the T-R plane.
- Display and Laser
  - This option enables to control the position display on the rails and on the pods.
  - It enables to control the HPGL laser, the laser typologies are LaserTec and ZLaser. Before the installation you always have to check the congruence between the laser and the HPGL format created by the WSC. For this functionality a licence on TPA hardware key is required.
- Strokes settings
  - Parameters of the Y entry movements on the rails. In some cases, these movements are on the rails or only on some of them and can have an offset in X.
- Pod limits

- Available only in case of MFT plane. Two groups of pods that can be grouped upwards (Position from 11 to 18) or downwards (Position from 21 to 28): due to the connection with the air pipes, the two different groups have some limits in their movements, highlighted by the following parameters:
- Maximum limit (downwards), for each pod of the 11-18 group.
- Minimum limit (upwards), for each pod of the 21-28 group.

5.2 Rail parameters

In the second tab of the plane/pod parameters there are the settings for the machine rails; these settings are grouped in a single table (see figure **Rail parameter table**). All the possible parameters associated to the rails are listed in the table below.



	Length	Width	Overall dimension X-	Overall dimension X+	Parking area	Rail X- limit	Rail X+ limit	Pods Y- limit	Pods
1	1300	115	25	33	S	0	1300	6	1250
2	1300	115	34	33	S	0	1700	6	1250
3	1300	115	34	33	S	0	2000	6	1250
4	1300	115	34	33	R	1000	9999	6	1250
5	1300	115	34	33	R	1000	9999	6	1250
6	1300	115	34	25	R	1600	9999	6	1250

Rail parameter table

- **Length:**
Base dimension towards Y.
- **Width**
Base dimension towards X.
- **Overall dimension X-**
Extra overall dimension (over the basic width) towards X-.
- **Overall dimension X+**
Extra overall dimension (over the basic width) towards X+.
- **Parking area**
Differentiated in accordance with the group to which they belong.
- **Rail limits**
These values are set by the manufacturer to limit the stroke of the rails in accordance with the air pipes.
- **Pod limits**
It shows the limit position of the first (Y-) and of the last (Y+) pod.
- **Stroke position**
It shows the side where possible strokes can be applied, in accordance with the rails, for the second reference in Y.
- **Y first vacuum dispenser**
It shows the (Y) coordinate for the first dispenser of the vacuum (tubeless plane).
- **Step between vacuum dispensers**
It shows the (Y) step for the first dispenser of the vacuum (tubeless plane).
- **Diameter Vacuum Dispensers**
It shows the diameter of the vacuum dispenser. It is provided, like the other data concerning the distributors, for the graphic representation of the same (tubeless plane).

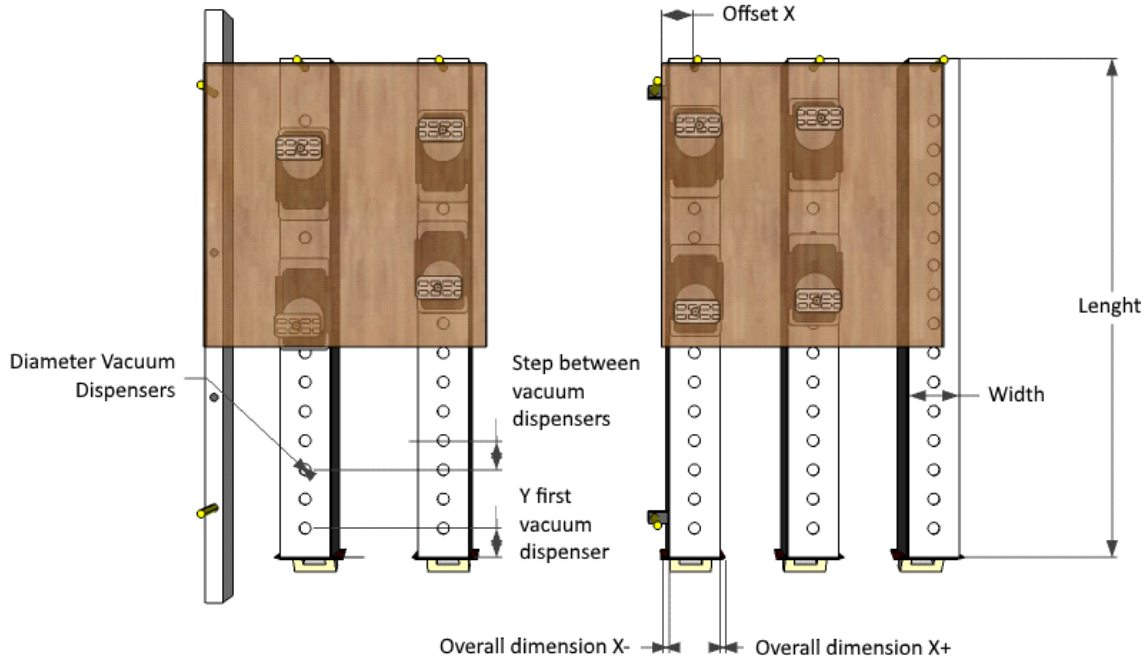
- **Step first dispenser front area**

For machines with double stroke in Y. The step between the last dispenser of the front area and the first one of the back areas may be changed to leave space to the current tool rising. This value is shown from by this parameter.

- **Display X Offset**

Offset of the positions for the view of these last inside the WSC.

Finally, at the bottom of the page two possible options can be enabled: the first allows to consider its centre in Y as pod reference; the second enables the collision control of the central rails and the references of the central areas, if available.



Representation of the geometric parameters.

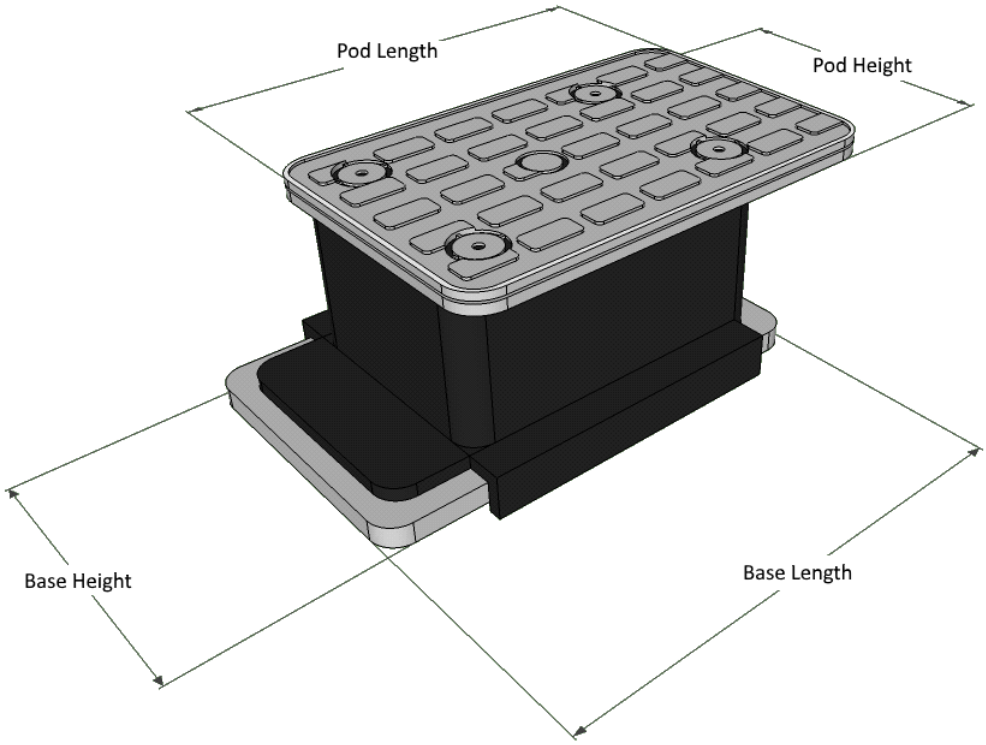
In the case on the left, the S stroke **is not** connected with the first Rail and so it has a permanent reference. In the case of the right, the S stroke **is** connected with the Rail, whose base structure has a distance from the X offset shown.

5.3 Pod parameters

5.3.1 Default parameters

The default parameters of a pod are essentially 4 (see Figure **Default parameters**) and are:

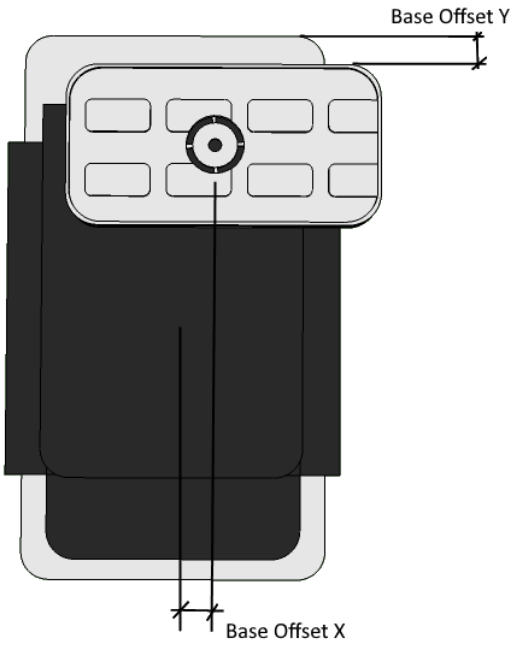
- Pod Length -> Dimension in X of the pod
- Pod Height -> Dimension in Y of the pod
- Base Length -> Dimension in X of the base
- Base Height -> Dimension in Y of the base



Default parameters

Successively, you can set two offsets in X and Y (see Figure **Offset Parameters**), between the base and the pod, as follows:

- Base Y Offset -> Offset between the top edge of the pod in Y and that of the base; if positive, it brings the pod over the base in Y (in Figure **Offset Parameters** see the opposite situation with negative offset)
- Base X Offset -> Offset between the medial axis in X of the pod and that of the base. If positive, it brings the pods to greater X with respect to the centre of the base (see Figure **Offset Parameters**)

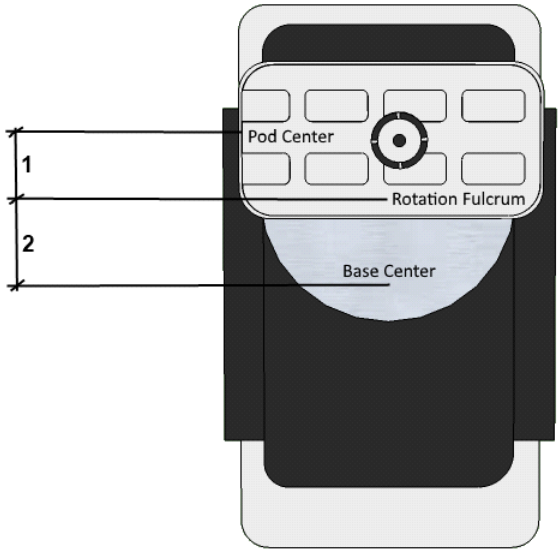


Offset Parameters

5.3.2 Rotation

As for the rotation, the pods can be
1. Pods without rotation
   - they cannot be rotated.
2. 0-90-180-270 rotation of the pods
   - they can be rotated in 90° steps only.
3. 0-180 rotation of the pods
   - they can be rotated in 180° steps only.
4. From 180 to -180 rotation of the pods
   - their rotation value can only be defined up to the tenth of a degree.

As for the parameters of the rotation type from 180 to -180, there are some additional data, as follows:
- Y Offset pod fulcrum -> Y Offset between the centre of the pod and its rotation fulcrum (see parameter 1 in figure **Parameters of the rotating pod**).
- Y Offset Base Fulcrum -> Y Offset between the centre of the pod and the rotation fulcrum (see parameter 2 in figure **Parameters of the rotating pod**).
- Rotation step ->Delta in degrees for the pod rotation that in the plane is applied to the pressure of the arrows in the "Rotation in degrees..." form. (no filter, if the rotation value is entered)



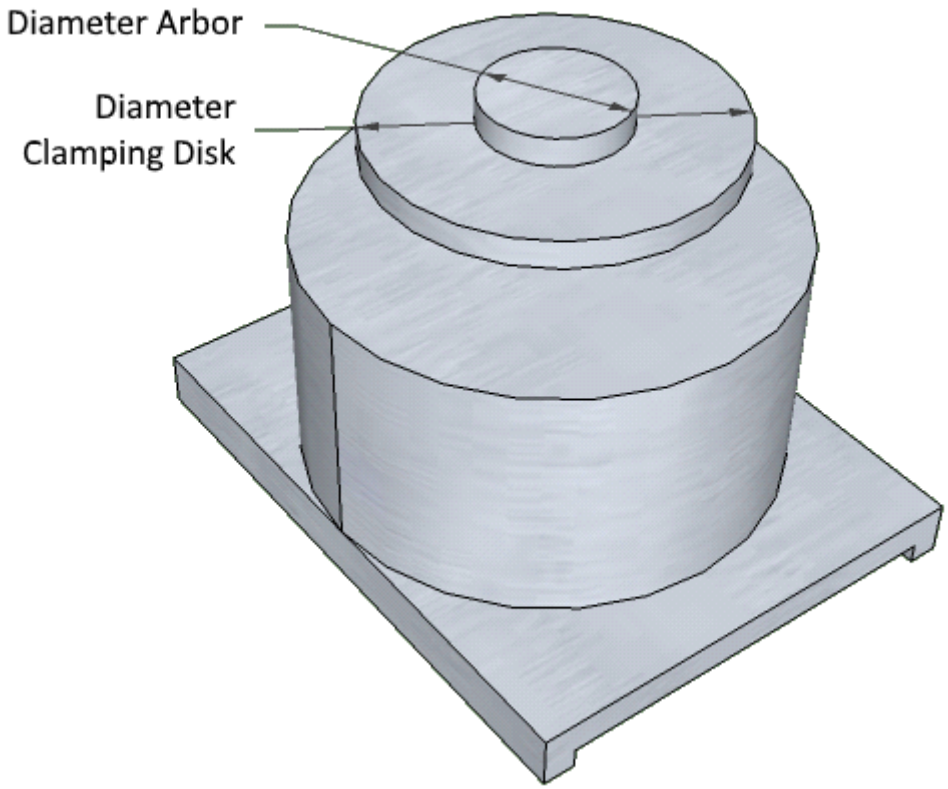
Parameters of the rotating pod

WARNING !!!: Once these parameters have been defined, you must always calculate the base Y offset in the column provided.

5.3.3 Turnbuckles

This type of pods, after defining the default parameters in such a way that base, pod and possible Y and/or Y offset dimensions coincide, defines the following parameters (see figure **Parameters of the clamping device**):

- Enable turnbuckles -> This option identifies a turnbuckle pod
- Diameter Clamping Disk -> Diameter of the clamping disk
- Diameter Arbor -> Diameter of the clamping arbor (top the clamping device)



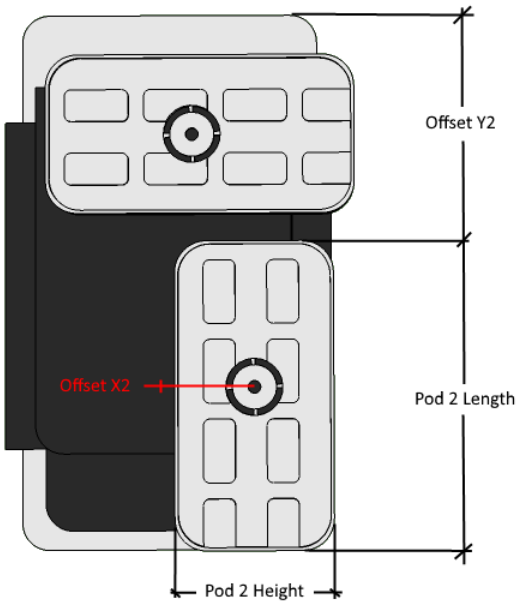
Parameters of the clamping device

WARNING !!! – No type of rotation can be applied to clamping pods.

5.3.4 Double vacuum pod

This type of pod differs from the normal type because there is a second vacuum area of empty parametrised in a manner similar to the first; so, the parameters must be set as follows (Figure **Parameters of double vacuum pod**):

- Pod 2: Length -> Dimension in X of the pod
- Pod 2: Height -> Dimension in Y of the pod
- Base Y2 Offset -> Offset between the top edge of the pod in Y and that of the base. If positive, it brings the pod over the base in Y.
- Base X2 Offset -> Offset between the medial axis in X of the pod and that of the base. If positive, it brings the pod to greater X with respect to the centre of the base.

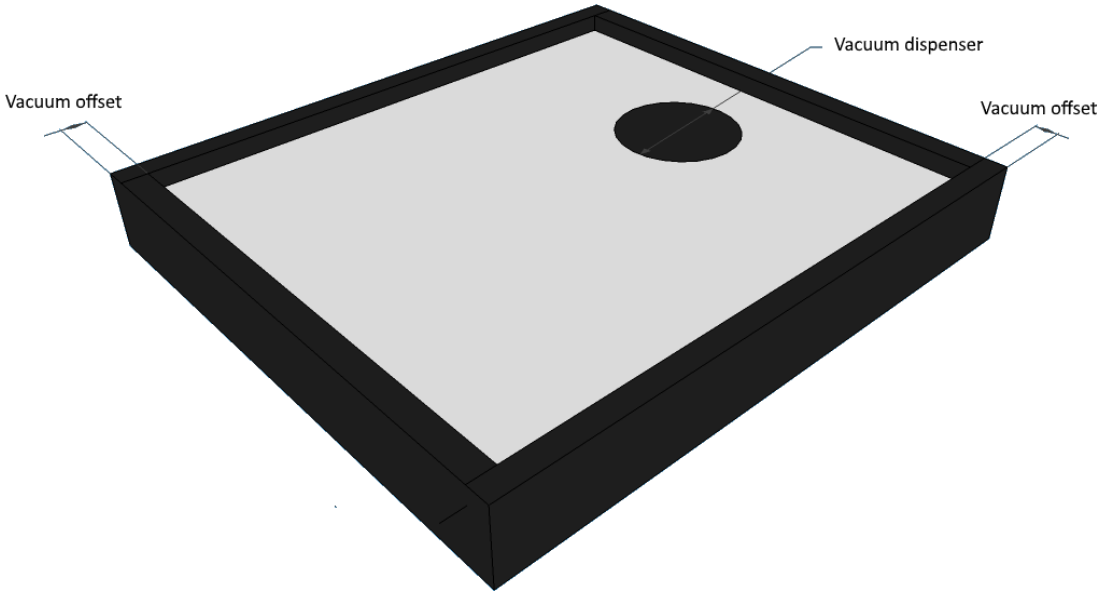


Parameters of double vacuum pod

5.3.5 RT plane pod

As for the pods characterizing the RT planes, there is an additional parameter to be added, that is (see OFFVacuum in figure **Pod parameters for RT plane**):

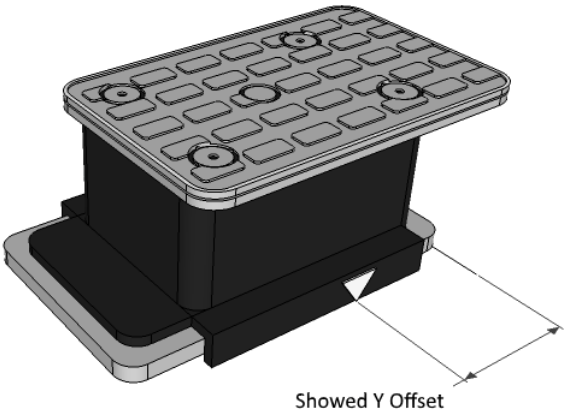
- Vacuum offset -> is the distance between the pod outer limit and the centre of the seal locking in the router type table.



Pod parameters for RT plane

5.3.6 Offset viewers

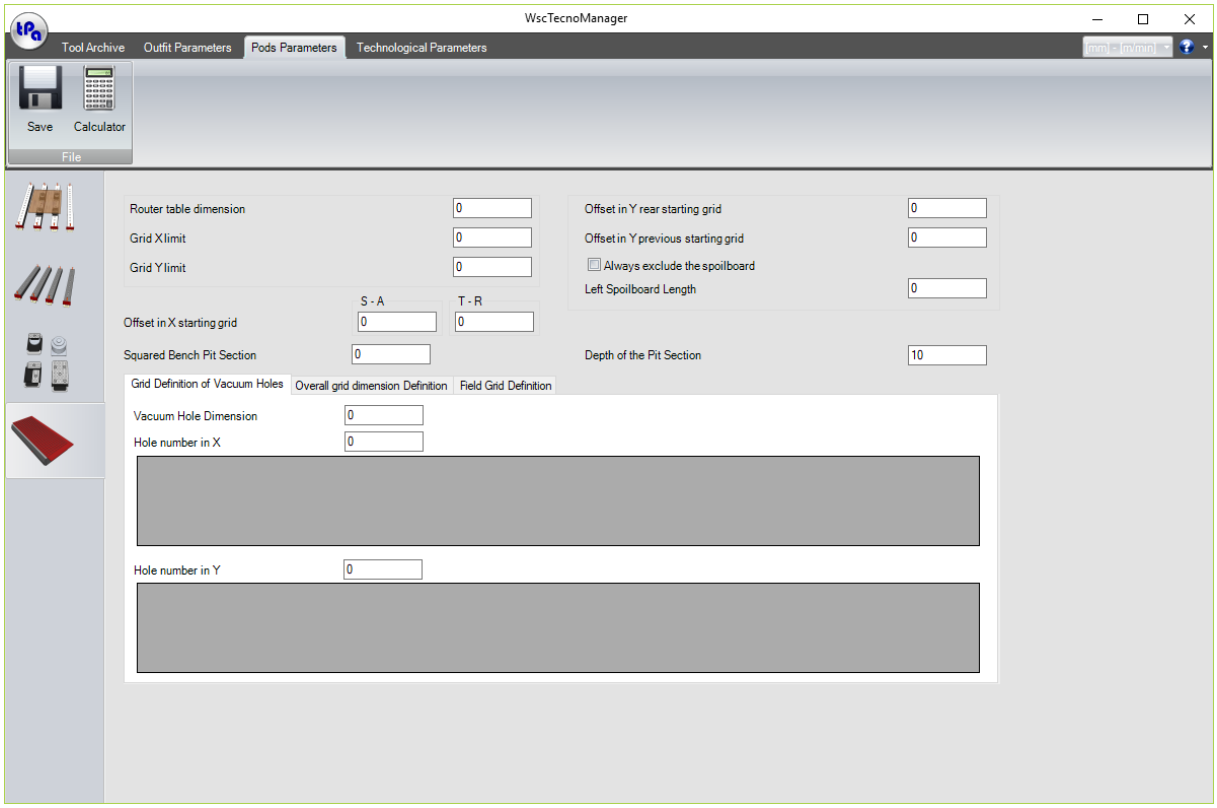
The last parameter we have left to analyse is the Offset Viewer. This parameter does not affect the graphics of the pod; it is a simple offset in Y for the pod position, because sometimes the pod reference does not coincide with the top limit of the pod itself, but there is an arrow on the side pointing to the ruler in Y from which you can take the reference. Its parameter is just the offset in Y of this reference (arrow).



Pod with Offset Viewer

5.3.7 RT plane parameters

The fourth tab of the plane parameters contains the settings of the grid plane, that can cover the whole plane or a half-area only in X. As for the bottom there are two fields to define the grids of the vacuum holes and of the overall dimensions on the plane. In the first case you have to define the vacuum hole diameter, how many holes in X and in Y are in the grid and their position; as for the overall dimensions, that is the areas of the plane on which you cannot place a pod. These overall dimensions are defined as rectangles whose dimensions are equal, and can be defined in the tab provided.



Window parameter of the RT plane

The settings of the top of the command area are as follows:

- **Router table dimension**

✓ Side of each quadrant to which the grid belongs. The measure DOES NOT include the vacuum areas (see figure **Grid dimensions**).

- **Squared Bench Pit Section**

✓ Thickness of the vacuum area creating the grid (see figure **Grid dimensions**).

- **Offset in Y rear starting grid**

✓ Offset between the back side of the plane and the centre of the first vacuum area (moving towards the inner part of the plane).

- **Offset in Y previous starting grid**

✓ Offset between the front side of the plane and the centre of the first vacuum area (moving towards the inner part of the plane).

- **Offset in X starting grid S-A**

✓ Offset between the left side of the plane and the centre of the first vacuum area (moving towards the inner part of the plane).

- **Offset in X starting grid T-R**

✓ Offset between the right side of the plane and the centre of the first vacuum area (moving towards the inner part of the plane).

- **Grid X limit**

✓ If you consider the grids starting from the external limits of the plane towards the inner area, this is a limit you can place between two horizontal grids, creating a real discontinuity in the grid. If placed at 0, it means that the grid is only one and continuous.

- **Grid Y limit**

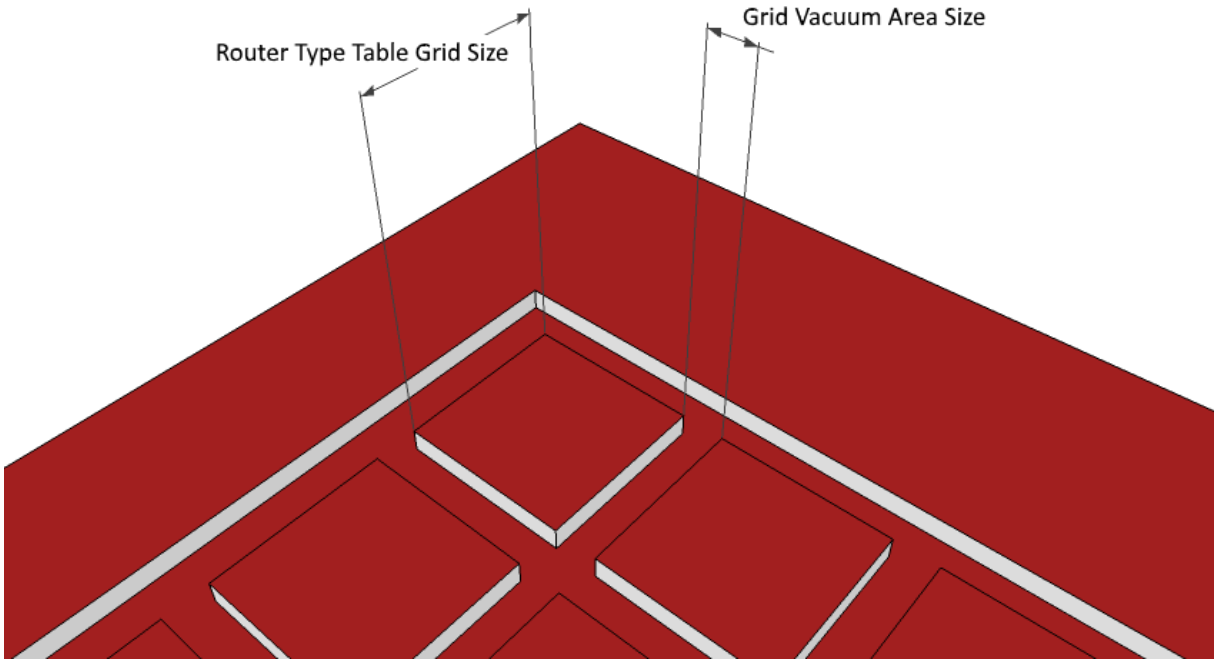
✓ If you consider the grids starting from the back and front limits of the plane towards the inner area, this is a limit you can place between two vertical grids, creating a real discontinuity in the grid. If placed at 0, it means that the grid is only one and continuous.

- **Always exclude the spoilboard**

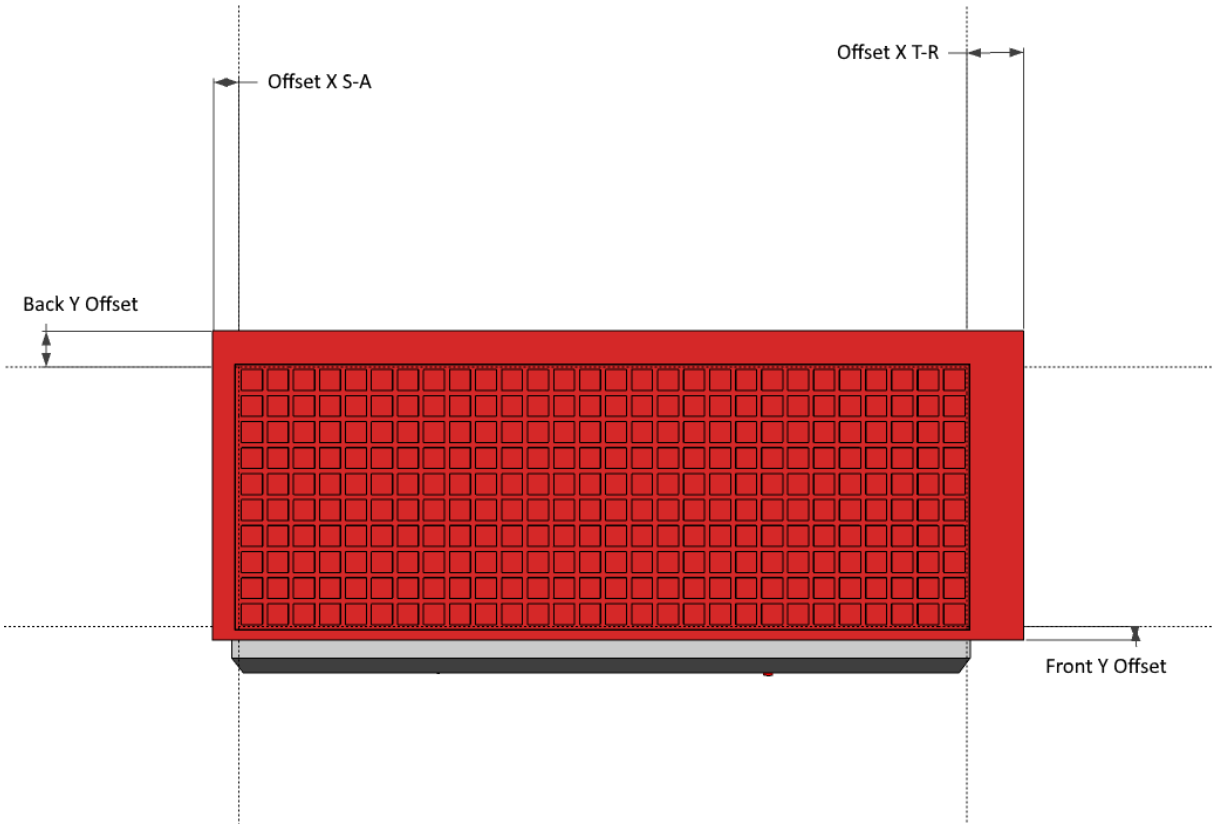
✓ To be selected if no spoilboard is available on the grid plane.

- **Left Spoilboard Length**

✓ If only two spoilboards are available on the plane, this is the maximum limit of the left spoilboard.



Grid dimensions



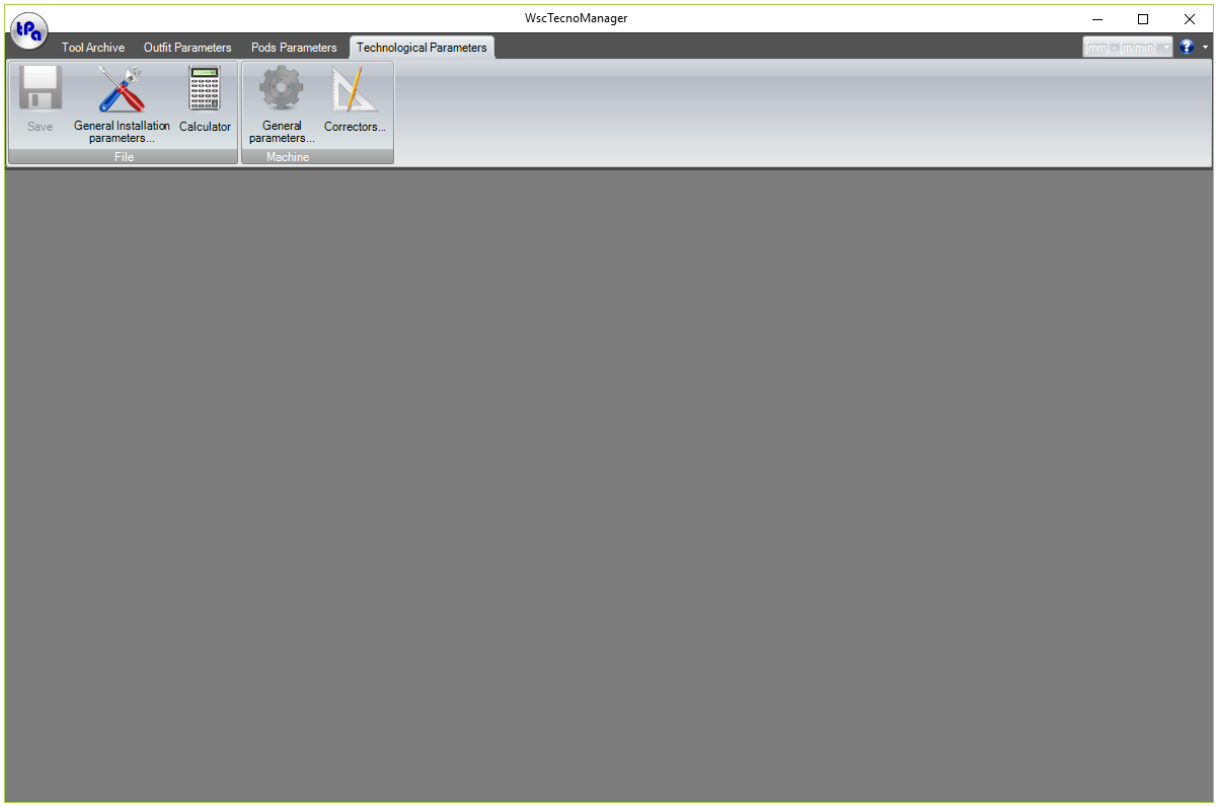
Offset RT plane

6 Technological parameters

6.1 Technological parameter access

In the fourth tab of TecnoManager the technological parameters are available and allow to set and modify the work and machine technological parameters (for example, area offsets, correctors, positions over the piece (positions over the piece, etc....). In the WSC these data are used by the plane to draw the references and are available for the custom optimizers.

The main work window is as follows:



Technological Parameter Window

6.1.1 Toolbar and Status bar

The *Toolbar* is made by some button groups that allow the quick access to some most frequently used commands of the menu.

The names of the buttons are listed and briefly described as follows:

Menu	**Description**
Save	to save and exit the process.
General machine parameters	to select the machine parameters.
Calculator	to open the window calculator.
General Parameters	to set the positions over the piece (positions over the piece), the work speed rates and the field strokes.
Correctors	to set the spindle correctors and the group offset of the two groups.

6.1.2 Parameter setting window

Each dialogue box allows to set or to modify the parameters. It generally contains some images that visualise the idea of the parameter you are setting; furthermore, they always contain the following two buttons:

[Cancel] it closes the window, and leaves the changes made

[OK] it closes the window, and confirms the changes made

6.2 Saving the technological parameters

Save the technological parameters

- Select from the menu **File** the option **Save**.

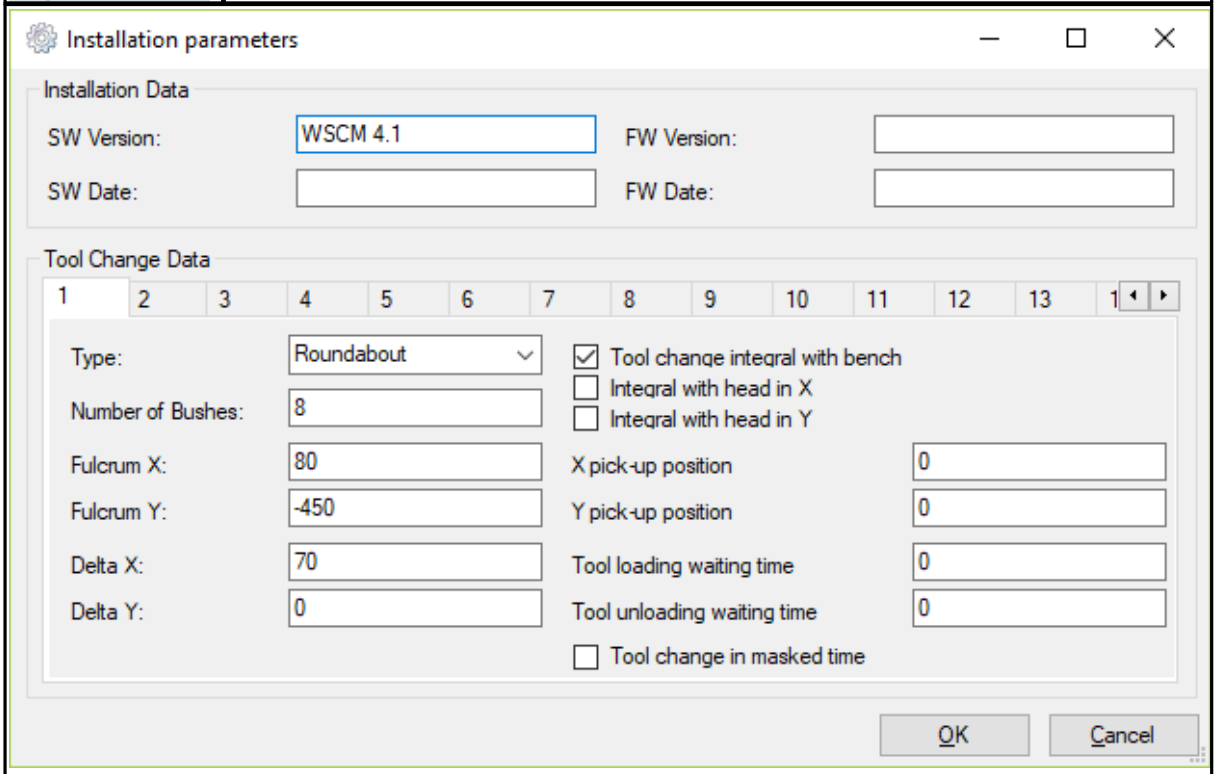
All the parameters set or modified are saved in a disk and permanently stored according to the situation of the data at the time of the selection of this button: no window is opened, but the data are saved directly, without any further confirmation.

6.3 General plant parameter settings

6.3.1 General installation parameters

Setting the General Installation parameters

- Select from the menu **Machine Parameters** the option **Installation Parameters**.



Base window of the machine parameters

This window contains some information and allows to set some parameters. It is divided into the following areas:

1) **Installation Data** area: to view the following information:

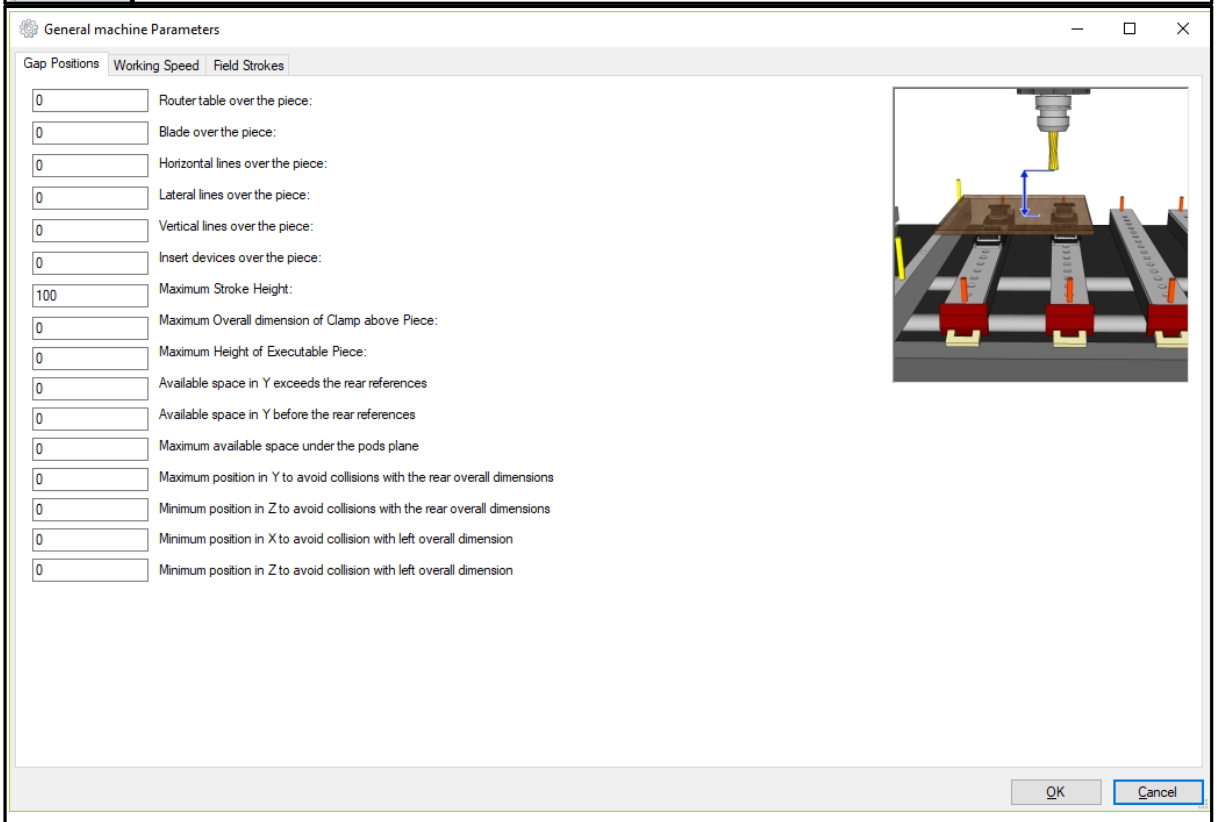
SW version	it shows the version of the application Software installed in the system
SW Date	it shows the date of release of the above SW version
FW version	it shows the version of the Firmware installed on the numeric control boards
SW Date	it shows the date of release of the above FW version

2) **Tool Change Data** area: to set the Tool Change Parameters:
Type: Select from the list-box the different typologies (Carousel, Array, etc.)
Number of Bushes: Number of useful positions
X/Y Fulcrum: Positions of the rotation centre
Delta X/Y: Significant positions
All the parameters of the tool change placed on the right side of the window are used to calculate the execution time by the Simulation program.
This window describes the version of the software and the characteristics of the tool sets. The parameter setting is disabled at user and maintenance password.

6.4 General machine parameter settings

6.4.1 Positions over the piece

Setting the Positions over the piece
- Select from the menu **Machine Parameters** the option **General machine Parameters** and select the page **Gap Positions**.



Air Coordinate setting window

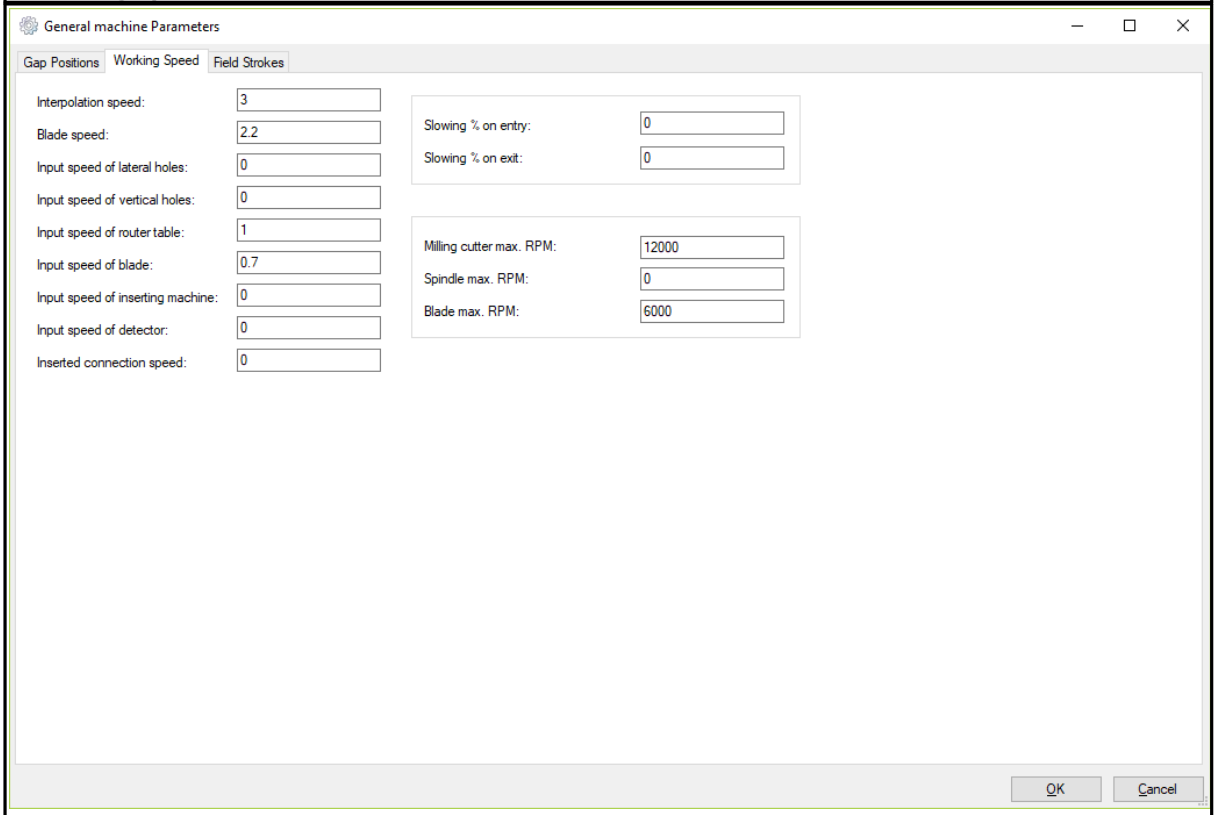
The "gap position" is the distance from the surface of the piece to which the working tool is brought in case of consecutive movements over the piece for workings on the same face. The programming axis can change according to the work face, because it is identified with the tool axis penetrating into the piece.
You can assign coordinates over the piece for the following kind of workings:
Router table over the piece: distance between the point of the tool and the piece to be worked.
Blade over the piece: distance between the lowest part of the blade and the piece to be worked.
Horizontal lines over the piece: distance between the point of the tool and the piece to be worked.
Lateral lines over the piece: distance between the point of the tool and the piece to be worked.
Vertical lines over the piece: distance between the point of the tool and the piece to be worked.
Insert devices over the piece: distance between the point of the inserter and the piece to be worked.

Maximum Stroke Height: distance between the support of the piece and the highest stroke. This parameter is associated with the Z axis with support on xy.

6.4.2 Working Speed

Setting the working feed

- Select from the menu **Machine Parameters** the option **General machine Parameters** and select the tab **Working Speed**.



Speed setting window

The window to enter the working feed parameter appears, to be taken as the maximum values to be set (namely, those programmable also in Editor) or prefixed (namely, those for which there is no programmable function in Editor).
On the values in Mt/Min unit, the minimum programmable value is 0.01. All the values must be positive. The speed parameters are:

Interpolation speed: this is the maximum movement speed (in Mt/Min.), during a milling process. This parameter shows the tangential speed on the trajectory required, that results associated to all the interpolating axes.
Blade speed: is the maximum displacement speed (in Mt/Min) of the blades executing a groove in the piece. The speed is associated to the axes:

- X or Y, respectively on x or y blade.
- to the diagonal trajectory in XY, on inclined blade.

Input speed of horizontal/lateral holes: is the maximum entry speed in the piece (in Mt/Min.), during a drilling process on one of the side faces. The speed is associated to the X axes (on holes in face 3 or 4) or Y (on holes in face 1 or 2).
Input speed of vertical holes: is the entry speed in the piece (in Mt/Min.), during a drilling process on one face 5 (vertical drilling). The speed rates are associated to the Z axis.

Input speed of router table: is the entry speed in the piece (in Mt/Min.), during a milling process. The speed rates are associated to the Z axis (in milling processes on face 5), X (on face 3 or 4), Y (on face 1 or 2).
Input speed of blade: is the entry speed in the piece (in Mt/Min.), during the working process with a saw blade tool. The workings are associated to the Z axis (workings on face 5 only).

The window to enter the working speed parameters appears, to be taken as the maximum values to be set (namely, those programmable also in Editor) or prefixed (namely, those for which there is no programmable value in Editor).

For the values in Mt/Min unit, the minimum programmable value is 0.01. All the values must be positive. The speed parameters are:

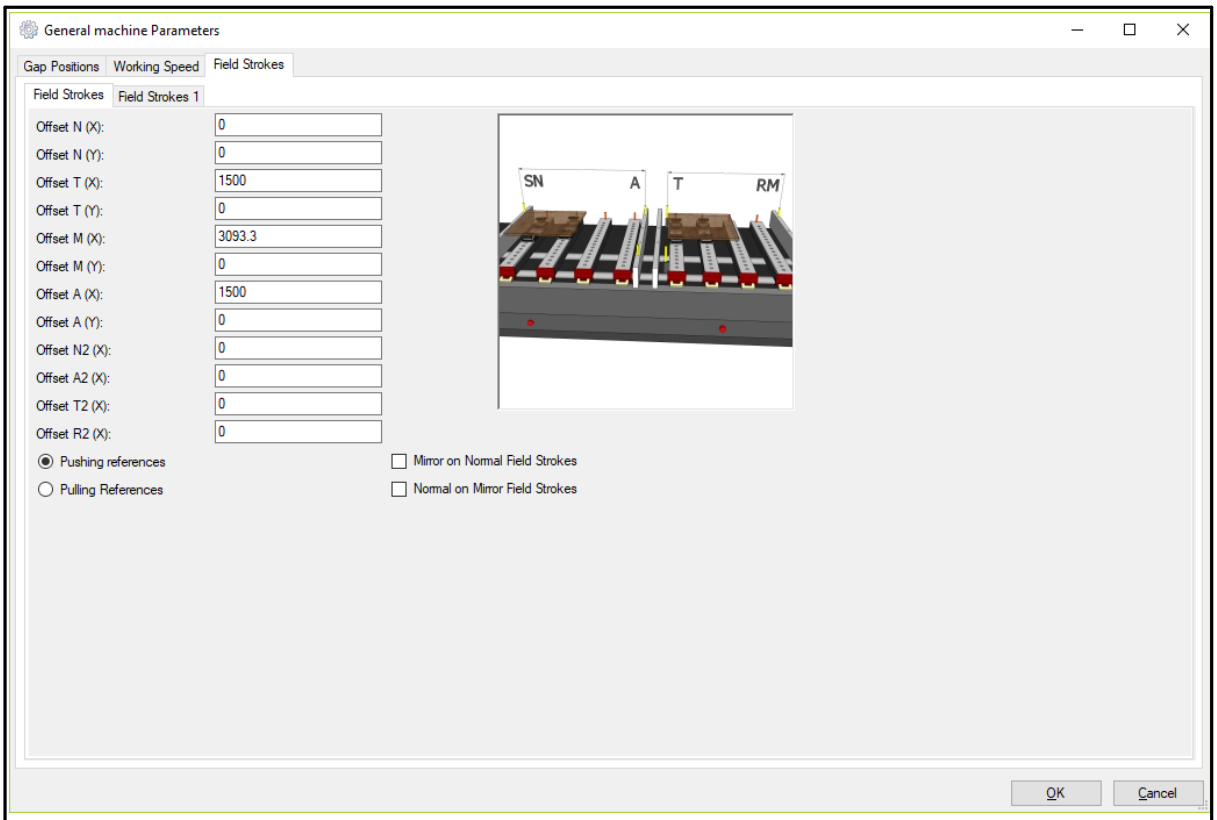
Interpolation speed: this is the maximum movement speed (in Mt/Min.), during a milling process.
This parameter shows the tangential speed rate on the trajectory required, that therefore results associated to all the interpolating axes.
Blade speed: is the maximum movement speed (in Mt/Min) of the blades executing a groove in the piece.
The speed is associated to the axes:
- X or Y, respectively on x or y blade.
- to the diagonal trajectory in XY, on inclined blade.

Input speed of horizontal/lateral holes: is the maximum entry speed rate in the piece (in Mt/Min.), during a drilling process on one of the side faces. The speed is associated to the X axes (on holes in face 3 or 4) or Y (on holes in face 1 or 2).
Input speed of vertical holes: is the entry speed rate in the piece (in Mt/Min.), during a drilling process on one face 5 (vertical drilling). The speed rates are associated to the Z axis.
Input speed of router table: is the entry speed in the piece (in Mt/Min.), during a milling process. The speed rates are associated to the Z axis (in milling processes on face 5), X (on face 3 or 4), Y (on face 1 or 2).
Input speed of blade: is the entry speed rate in the piece (in Mt/Min.), during the working process with a saw blade tool. The workings are associated to the Z axis (workings on face 5 only).
Input speed of inserting machine: is the entry speed rate in the piece (in Mt/Min.), during insertion working. The axes to which the speed rates are associated is defined according to the working face.
Input speed of detector: is the entry speed rate in the piece (in Mt/Min.), during the working process with a probe tool. The axes to which the speed rates are associated is defined according to the working face.
Inserted connection speed: is the reference interpolation speed rate in Mt/Min. to define the speed on the inserted fillets compensating the tool radius.
It is the speed rate on the 100 mm interpolation radius.

Slowing % on entry, Slowing % on exit: are the percentage values to be applied to the working speed, slowing in entry or in exit, in case of missing direct programming. They are non-dimensional values. Do not set any values higher than 100.
Milling cutter maximum RPM's: is the spindle rotation speed rate, that corresponds to the +10 Volt maximum output on the analogue-digital converter (in rpm).
Set an integer value not greater than 32000.
Spindle maximum RPM's: is the spindle rotation speed rate, that corresponds to the -10 Volt maximum output on the analogue-digital converter (in rpm).
Set an integer value not greater than 32000.
Blade maximum RPM's: is the spindle rotation speed rate for the blade.

6.4.3 Field Strokes

Setting locators fields
- Select from the menu **Machine Parameters** the option **General machine Parameters** and select the tab **Field Strokes**.



Locators setting window

You can assign the position for the locators of the pieces in the X and Y coordinates for a machine reference (usually coinciding with the N locator). The measure units taken are that selected in Machine Parameters.
The **Field strokes1** (back checks) are called: S/N, T, R/M and A, like the execution areas in the work programs.
The **Field strokes2** (front checks) are called: S1, T1, A1, R1.
You can also check the direction toward which the panels lay in the front areas (pulling/pushing references) and in cases of particular machine usage the execution type (Mirror on Normal Field References or Normal on Mirror Field References).

6.5 Corrector settings

6.5.1 Head Offset - Group 1

Setting Head Offset - Group 1

- Select from the menu **Machine Parameters** the option **Machine correctors** and select the tab **Group 1**, then the secondary tab **Head offset**. In case of mono-group machine, the selection tab of the groups does not appear.

Offset Setting Window

A window appears and allows the setting of three Offset parameters in mm or inches according to what has been set in the Machine Parameters.

Offset X Head is the distance along x (X Offset) of the group reference point with respect to the N stroke, head in setpoint (axis in 0 position).

Offset Y Head is the distance along y (Y Offset) of the group reference point with respect to the N stroke, with the head in setpoint (condition of axis in the 0 position).

Offset Z Head is the distance (towards Z) of the hook point of the reference tool (to a selected spindle) from the panel support (not managed at the moment).

Minimum head height is the minimum distance between the lowest head point and the work plane

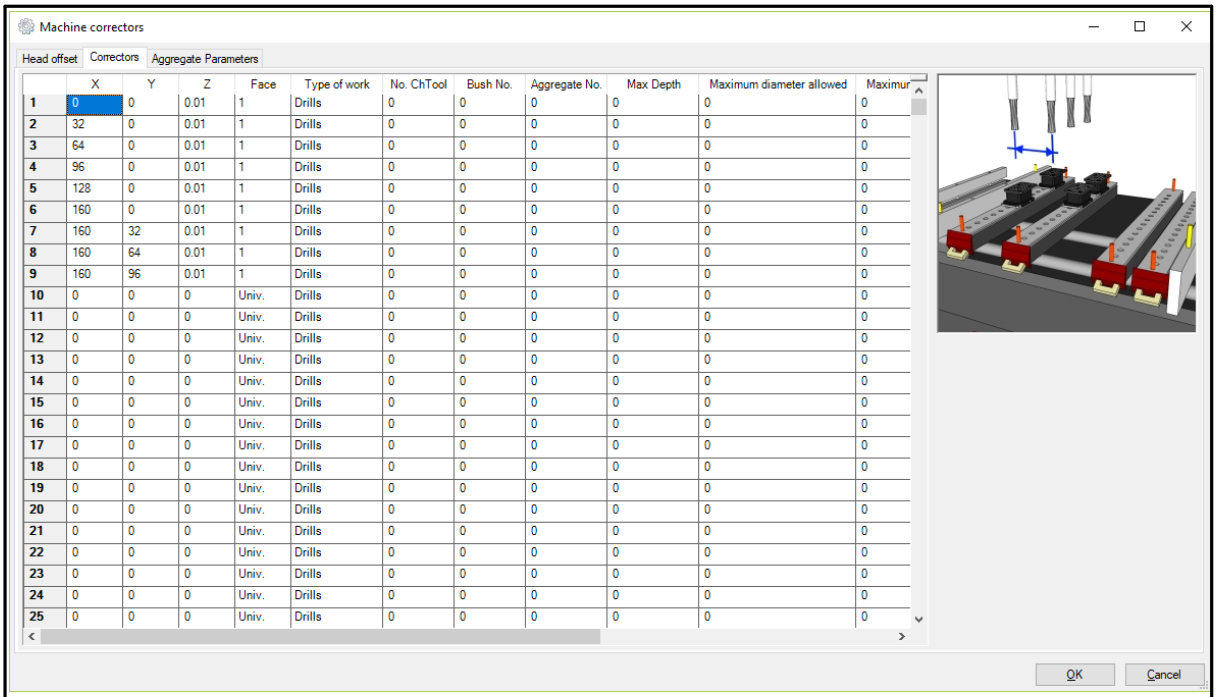
Minimum height of the drilling head is the minimum distance between the lowest drilling head point and the work plane.

ID tool range of the drilling head is the range of the numerical Ids for the tools available in the drilling head.

6.5.2 Spindle corrector - Group 1

Setting Spindle corrector - Group 1

- Select from the menu **Machine Parameters** the option **Machine correctors**, and select the tab **Group 1**, then the secondary tab **Correctors**. In case of mono-group machine the selection tab of the groups does not appear.



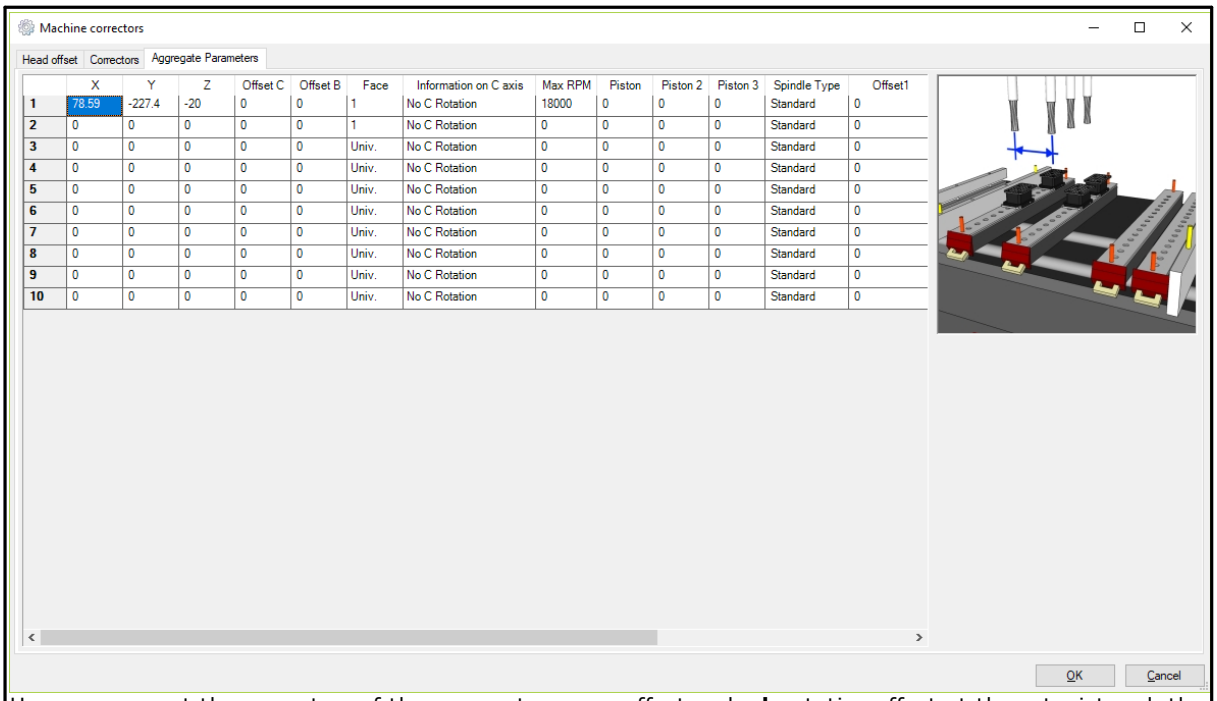
	X	Y	Z	Face	Type of work	No. ChTool	Bush No.	Aggregate No.	Max Depth	Maximum diameter allowed	Maximur
1	0	0	0.01	1	Drills	0	0	0	0	0	0
2	32	0	0.01	1	Drills	0	0	0	0	0	0
3	64	0	0.01	1	Drills	0	0	0	0	0	0
4	96	0	0.01	1	Drills	0	0	0	0	0	0
5	128	0	0.01	1	Drills	0	0	0	0	0	0
6	160	0	0.01	1	Drills	0	0	0	0	0	0
7	160	32	0.01	1	Drills	0	0	0	0	0	0
8	160	64	0.01	1	Drills	0	0	0	0	0	0
9	160	96	0.01	1	Drills	0	0	0	0	0	0
10	0	0	0	Univ.	Drills	0	0	0	0	0	0
11	0	0	0	Univ.	Drills	0	0	0	0	0	0
12	0	0	0	Univ.	Drills	0	0	0	0	0	0
13	0	0	0	Univ.	Drills	0	0	0	0	0	0
14	0	0	0	Univ.	Drills	0	0	0	0	0	0
15	0	0	0	Univ.	Drills	0	0	0	0	0	0
16	0	0	0	Univ.	Drills	0	0	0	0	0	0
17	0	0	0	Univ.	Drills	0	0	0	0	0	0
18	0	0	0	Univ.	Drills	0	0	0	0	0	0
19	0	0	0	Univ.	Drills	0	0	0	0	0	0
20	0	0	0	Univ.	Drills	0	0	0	0	0	0
21	0	0	0	Univ.	Drills	0	0	0	0	0	0
22	0	0	0	Univ.	Drills	0	0	0	0	0	0
23	0	0	0	Univ.	Drills	0	0	0	0	0	0
24	0	0	0	Univ.	Drills	0	0	0	0	0	0
25	0	0	0	Univ.	Drills	0	0	0	0	0	0

X is the distance along the X direction from the reference spindle of the Group.
Y is the distance, along the Y direction, from the reference spindle of the Group.
Z is the distance, along the Z direction, of the hook point from the panel support to the operating spindle and Z axis to setpoint.

Note: when the Z corrector has 0 value, this spindle is considered a non-existing tool.
To calculate the actual work positions on a piece, the correctors are treated in operations of algebraic calculations, so you have to assign a significant sign to the values set.
For each spindle you can impose the following options:

- one or more *Faces*;
- the Type of Working allowed;
- the number of the Chtool Number (tool change)
- the related Bush Number*;*
- the Aggregate on which it is mounted.

If you select the Aggregate Parameters secondary tab, you will see the following table:



	X	Y	Z	Offset C	Offset B	Face	Information on C axis	Max RPM	Piston	Piston 2	Piston 3	Spindle Type	Offset1
1	78.59	-227.4	-20	0	0	1	No C Rotation	18000	0	0	0	Standard	0
2	0	0	0	0	0	1	No C Rotation	0	0	0	0	Standard	0
3	0	0	0	0	0	Univ.	No C Rotation	0	0	0	0	Standard	0
4	0	0	0	0	0	Univ.	No C Rotation	0	0	0	0	Standard	0
5	0	0	0	0	0	Univ.	No C Rotation	0	0	0	0	Standard	0
6	0	0	0	0	0	Univ.	No C Rotation	0	0	0	0	Standard	0
7	0	0	0	0	0	Univ.	No C Rotation	0	0	0	0	Standard	0
8	0	0	0	0	0	Univ.	No C Rotation	0	0	0	0	Standard	0
9	0	0	0	0	0	Univ.	No C Rotation	0	0	0	0	Standard	0
10	0	0	0	0	0	Univ.	No C Rotation	0	0	0	0	Standard	0

Here you can set the correctors of the aggregates **x,y,z** offset and **c,b** rotation offset at the setpoint end, the working faces, the type of the associated rotating axes, the maximum rotation speed rates and the stroke of the pre-selection pistons.

6.5.3 Head Offset - Group 2

In case of a machine with a Double Head of Tools:

Setting Head Offset - Group 2
- Select from the menu **Machine Parameters** the option **Correctors**, and select the tab **Group 2**, then the secondary tab **Head Offset**.

The Parameter window structure is identical to the case of the Group 1 just as the programming rules.

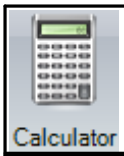
6.5.4 Spindle corrector - Group 2

In case of a machine with a Double Head of Tools:

Setting Spindle corrector - Group 2
* Select from the menu **Machine Parameters** the option **Correctors**, and select the tab **Group 2**, then the secondary tab **Correctors**.

The Parameter window structure is identical to the case of the Group 1 just as the programming rules.

6.6 Use of the calculator



Use of the calculator

It opens Windows calculator.

6.7 Command About...

About

It shows the information on the operation.

6.8 Information on measure units

[mm] - [m/min]	**Information on measure units**
It displays the measure units currently in use. This field is for information purposes only. To modify the measure units, please refer to the application settings.	

7 Technology component

7.1 Description

The *TpaSpa.Tecno.dll* dll contains a set of classes and controls to manage the tools, the load/storage process on database files of the tools, the tree configuration of the tools and the modification of the fields and of the images. All the files used now are in the directory "[…]/mod.0/config. They are:

TOOLDATA.PAR	contains the database of the tools
IMGLIST.BIN	contains the images associated with the tools
ToolTecno.xml	definition and configuration of the tools
ToolTree.xml	definition and configuration of the tool tree.

Moreover, the images within the "grf/ute" and "grf/ute/tree" directories are used underneath the Albatros directory. The first one contains the images used by the visualization element of the tools, the second one those used by the element to manage the tool tree.

7.2 Classes and controls

7.2.1 DBTools

This class represents a tool database and allows to load and save the tools available in the TOOLDATA.PAR. file.

Methods:

void **Load**()	loads the database of the predefined file
void **Save**()	loads the database in the predefined file
Tool **NewTool**()	returns a new Tool (needed for different versions of the Tool field definition)

Properties:

ToolList **Tools**	returns a reference to the tool list

7.2.2 Tool and ToolField

The Tool class represents a single tool and contains a set of ToolField representing the fields with associated value:

Tool
Methods:

void **Read**(BinaryReader)	reads the tool from the BinaryReader
void **Write**(BinaryWriter)	writes the tool on the BinaryWriter
Tool **Clone**()	returns a new tool with equal values of the fields
bool **ContainsField**(string)	returns true, if the Tool contains a field of the given name

Properties:

ToolField **this**[string]	returns the ToolField with the name given in string

ToolField
Properties:

string **Name**	returns the ToolField name
Type **Type**	returns the ToolField type
object **Value**	returns ToolField value

7.2.3 ToolImage and ToolImageCollection

ToolImage represents an image that can be associated with a Tool. ToolImageCollection is a ToolImage collection.

ToolImage
Methods:

int **GetPixelsSize**()	returns the dimensions in bytes of the image to save the pixels
int **GetPixelsSize**()	returns the dimensions in bytes of the image to save it on file
bool **OkBitmap**(string)	verifies that the bitmap in the given file represents a tool
bool **OkKey**(string)	verifies that the given string represents a key for the image
void **Read**(BinaryReader)	reads ToolImage object from the BinaryReader
void **Write**(BinaryWriter)	writes ToolImage object on BinaryWriter

Properties:

Bitmap **Icon**	sets/reads the Bitmap of the image

Bitmap **Key**	sets/reads key of the image

ToolImageCollection
Methods:

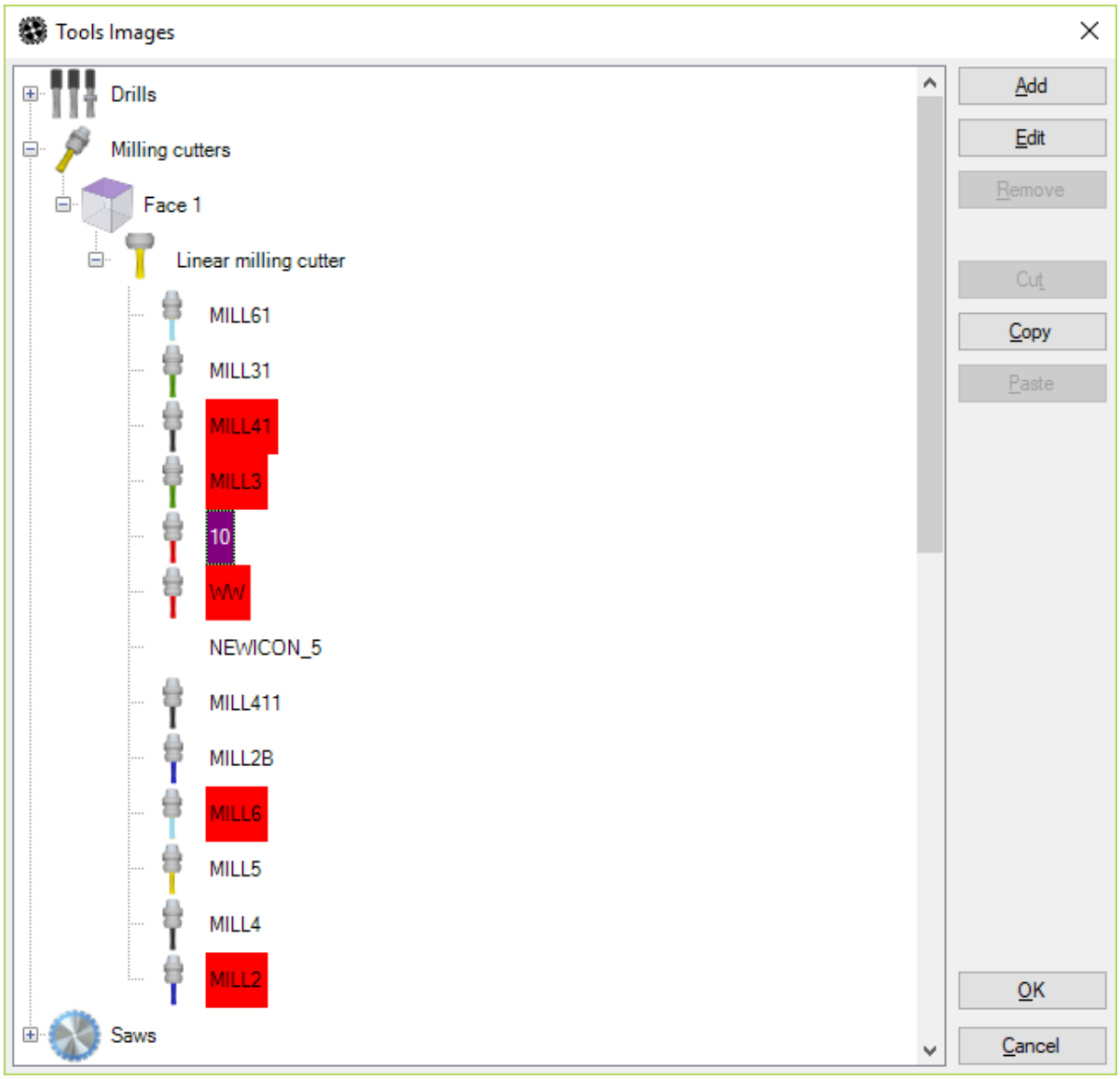
void **Add**(ToolImage)	adds the image to the collection
bool **Contains**(string)	returns true if the collection contains an image with a given key
bool **CreateFromDir**(string)	creates a collection of images using the images in the given directory. It returns true, if everything is ok
bool **LoadFile**()	loads the collection of images from the default file. It returns true, if everything is ok
void **Remove**(string)	clears the image of the given key
bool **WriteFile**()	writes the collection on the default file

Properties:

ICollection **Keys**	returns the collection of keys
ToolImage **this**[string]	returns the ToolImage object of the given key
Icollection **Values**	returns the collection of values

7.2.4 ToolImageCollEdit

This is a control to modify the collection of images, as the figure below:



Tool image window.

All the strings displayed can be configured by means of a language file.
This window contains the following buttons:

[Add]	opens the "**Tool Image Editor**" to add a new image
[Edit]	opens the "**Image Editor**" to modify the selected image
[Remove]	clears the selected image
[Cut]	cuts the entered data
[Paste]	pastes the entered data
[OK]	closes the window and confirms the changes made
[Cancel]	closes the window and quits the change made

Properties:

bool **CollectionChanged**	flag showing the collection modified
TpaSpa.TpaLanguage **Language**	assigns the language for the localisation
string **SelectedToolImageKey**	sets/reads the key of the selected image
ToolImageCollection **ToolImages**	sets the collection of images
DBTools **Tools**	assigns the database of the tools (needed to control the clearance of the images associated with the tool)

Events:

ClickCancel	you clicked on the "Remove" button
ClickOk	you clicked on the "OK" button

7.2.5 ToolImageEdit

This class is an editor of images to be associated with the tools. The window of the editor looks like this:

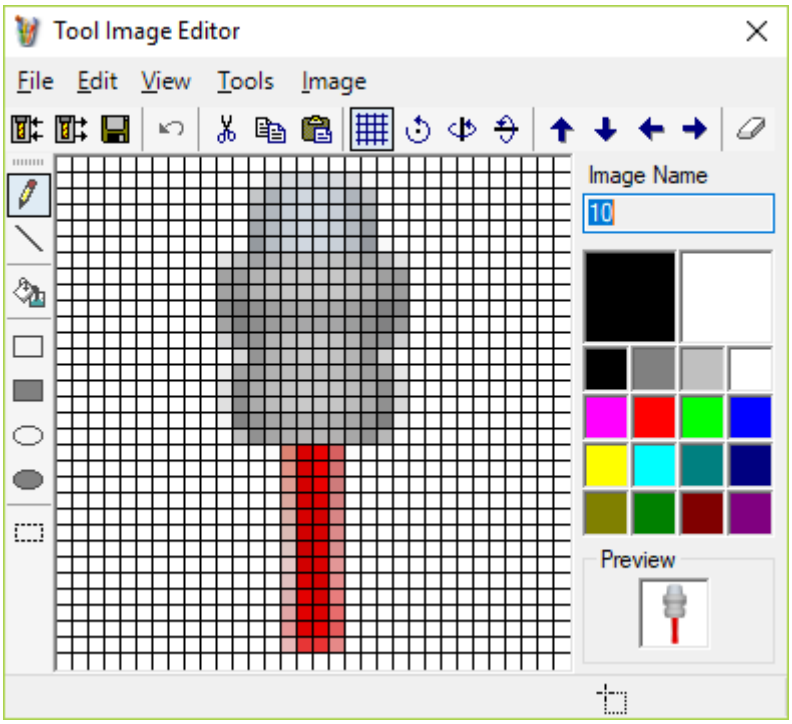


Image editor window for a tool

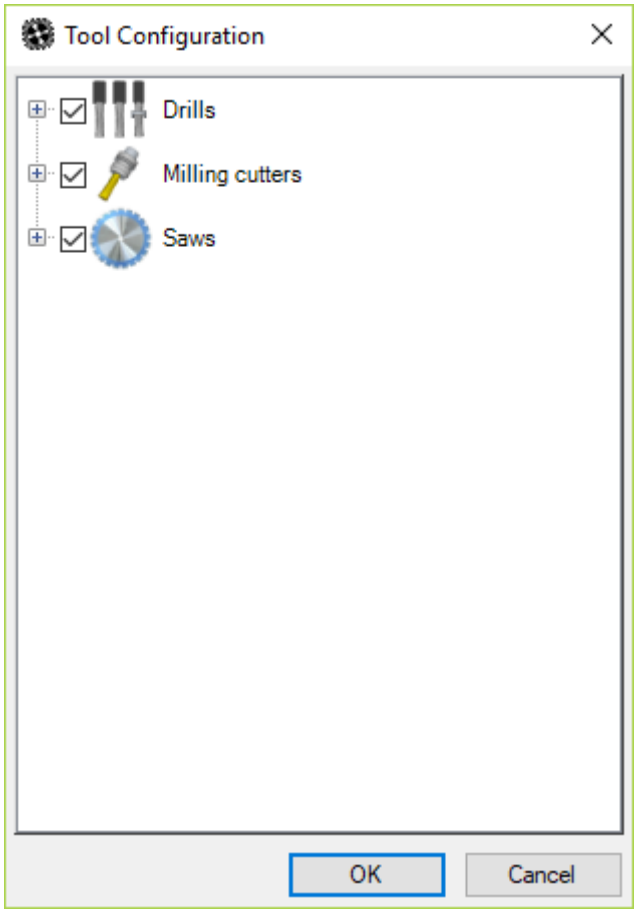
This window is a simple image editor and allows to import, create or modify the images of the tools. It works in a full similar way as the normal drawing programs.

Properties:

bool **AllowEditName**	sets/reads the flag allowing the edit of the key
Bitmap **IconImage**	sets/reads the image
string **IconName**	sets/reads the image key
ToolImageCollection **ImageCollection**	sets the image collection (needed to control the key uniqueness)
TpaSpa.TpaLanguage **Language**	sets the language for the localization

7.2.6 ToolTree

This component is used to represent and configure the tool tree.



"Tool Tree" configuration window

The tool tree is read and written on the ToolTree.xml file.

Methods:

Tool **AddTool**() adds a tool in the current position, if possible. You can add a tool only if the selected node does not have any child nodes or if it has some tools as child elements or if the selected node is a tool. An additional tool is returned whose fields, defined in the tree, are posted.

void **Cut**()

void **Copy**()

Tool **Paste**() operations that can be performed on the tools by means of the internal clipboard

void **EnsureToolVisible**(Tool) shows the tool

void **Init**() initializes the element; the data needed are loaded by the default files, if they are not assigned

void **RemoveCurrentNode**() removes the current node

void **UpdateCurrentNode**() updates the current node

void **UpdateToolsImages**() updates the tool images

Properties:

bool **CanAdd** returns true if a tool can be added

bool **CanCopy** returns true, if the "Copy" command can be performed

bool **CanCut** returns true, if the "Cut" command can be performed

bool **CanDelete** returns true, if the deletion is possible

bool **CanModify** returns true, if the modification is possible

bool **CanPaste** returns true, if the "Paste" command can be performed

bool **ConfigurationChanged** reads/sets the flag of the tree configuration that has been changed

bool **Configuring** sets the configuration mode

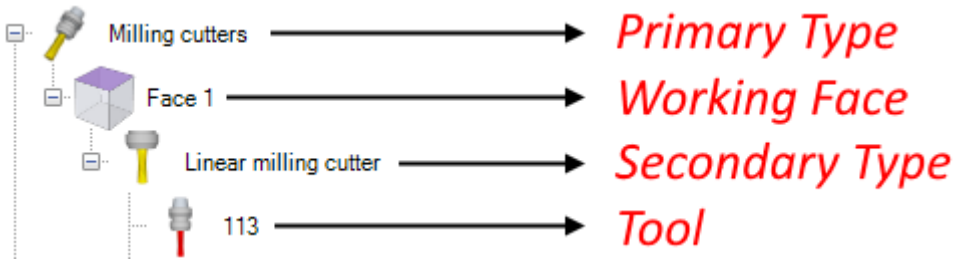
TpaSpa.TpaLanguage **Language** sets the language for the localization

ToolImageCollection **ToolsImages** assigns the collection of the tool images
DBTools **Tools** assigns the database of the tools
XmlDocument **XmlTecno** sets/reads the xml document of the tool configuration
XmlDocument **XmlTree** sets/reads the xml document of the tree configuration

Events:
ToolDoubleClick double click on the tool
ToolSelect tool selection

7.2.7 ToolView

This control is used to view and modify the data of a tool.



Tool parameter view window

All the displayed strings can be localized with the language file.
Methods:
void **GetToolData**(Tool) copies the displayed data in the tool
void **Init**() initializes the control
bool **ShowTool**(Tool) shows the tool

Properties:
bool **Enabled** enables the edit mode
string **IconName** reads/sets the image key
TpaSpa.TpaLanguage **Language** sets the language for the localization
ToolImageCollection **ToolsImages** assigns the collection of the tool images
DBTools **Tools** assigns the database of the tools
XmlDocument **XmlTecno** sets/reads the xml document of the tool configuration

Events:
ClickCancel you clicked on the “Remove” button
ClickChangeImage you clicked on the “Change image" button
ClickOk you clicked on the “OK” button

8 Technology files

The TecnoManager functioning is based on the some available files that are stored in the "…/SYSTEM/TECNO" folder. They contain all the data required to parametrize the tools, the machine and the work plane.

The files are as follows:

✓ **OUTFDATA.XML**
This is the outfit database of the machine.

✓ **TECDATA.XML**
It contains the technological configuration of the machine.

✓ **TOOLDATA.XML**
This is the database of the tools that can be equipped in the machine.

✓ **TOOLICON.XML**
This is the database of the images that can be associated with the tools in "ToolTree".

✓ **TOOLTECNO.XML**
It contains the configuration for the functioning of the technology component.
With it the following language files are also associated:
TOOLTECNO.XMLNG
TOOLTECNO.XMLNA

✓ **TOOLTREE.XML**
It contains the configuration of the "ToolTree" itself.

✓ **BUSHCFG.XML**
It contains the configuration for the groups of face and type of bushes to perform a filtering operation during the outfit process.

8.1 "TOOLTECNO.XML" file

This file is in the *config* data directory in the TPA.INI file (default "mod.0\config" under the Albatros directory) and contains the definitions of the tools.

It is divided in three main sections:
- MsgDef
- ToolDef
- ToolView

8.1.1 Msgdef

This section contains the definition of the messages used in the rest of the file. Each item is an association of a string and a numerical value corresponding to a message in the "ToolTecno.xmlng" language file. This section is not obligatory, because you can always directly specify a message number rather than the corresponding string.

Each item must have this structure:

```
<msgdef>
        [...]
        <message name="MSG_SIDE3" id="509" />
        [...]
</msgdef>
```

Each node message contains the "name" and "id" attributes, where:
"name" identifies the string associated with the message;
"id" is the corresponding numerical value.

8.1.2 ToolDef

This section contains the definitions for the structure of each tool. The fields define the binary structure of the tools stored in the TOOLDATA.PAR file, by defining the order and the type of the fields. You can specify different versions of the tool structures. You can also define a group of predefined values, associated with strings.

```
<tooldef>
```

```
<tool version="1">
        <field id="0" name="nRecord" type="Int16" comment="Numero del record" />
        <field id="1" name="nTools" type="Int16" comment="Numero..." />
        <field id="2" name="nWithRotationC" type="Byte" comment="&lt;&gt; 0..."/>
        [...]
        <field id="12" name="diameter" type="Double[]" mean="Length" length="6"
comment="Campo Diametro" />
        <field id="7" name="codBmp" type="String" length="8" comment="Nome..." />
        <field id="8" name="description" type="String" length="30" comment="Co..." />
        <field id="9" name="toolID" type="Int32" comment="Campo..." />
        <field id="10" name="angleC" type="Double[]" length="6" comment="..." />
        <field id="11" name="angleB" type="Double[]" length="6" comment="..." />
        [...]
</tool>
<tool version="2">
        […]
</tool>
<fielddef field="codWork" key="1">
<subs value="1" name="foro" messageId="MSG_FORATORI" imageName="tree_2.bmp" />
        <subs value="2" name="fresa" messageId="MSG_FRESE" imageName="tree_3.bmp" />
        <subs value="3" name="lama" messageId="MSG_LAME" imageName="tree_4.bmp" />
        <subs value="4" name="inserimento" messageId="MSG_INSERITORI"
imageName="tree_5.bmp" />
        [...]
</fielddef>
</tooldef>
```

Each "tool" node contains the "version" attribute, that shows the tool version. It is mandatory and available in the file header called TOOLDATA.PAR. When this file is read, a tool node with the number of corresponding version is searched in the xml;

The "field" node, inside "tool", is distinguished by the following attributes:
"id" is an ID number of the field;
"name" is the field in string format of the field;
"type" defines the type of field. It corresponds to a value type as defined inside.NET. If it is followed by "[]", it shows a vector;
"length" shows the field length. It is mandatory for strings. It established the number of characters. It also mandatory for strings, for which a number of elements is established. In other cases, it is ignored.
"mean" shows the meaning of the date. It is mandatory to guarantee the functioning of the measure units control.
"Length" considers the value for the conversion of positions/dimensions
"Speed" considers the value for the speed conversion.
"comment" field explanatory comment. It is not used, and it is optional.

The "fielddef" node is made of the following attributes:
"field" shows the reference field name
"key" flag. If set on "1", it shows that the fields are used to search to tool

The "subs" node, inside "fielddef", is made of the following attributes:
"value" the value that the field can assume
"name" the string associated with the field value
"messageId" message number associated with the field or message name defined in the "msgdef" section
"imageName" image name associated with the field value. The images are stored in the "ute\tree" directory under the *GRF* directory of Albatros

8.1.3 ToolView

In these sections there are the parameters to display the tool. The tools are divided through the selection of the values in the specified keys. More specifically, as below, the attributes called "codWork", "codSide", "codSubWork" in the tool node correspond to the fields marked by the 'key="1"' flag inside the "tooldef" section. The search keys can be any (at the moment the arrays are not implemented) and in any number.

A tool display definition appears in this way:

```
<tool codWork="fresa" codSide="side1" codSubWork="FRESATOROIDALE">
<key field="toolID" messageId="MSG_TOOLID" />
        <key field="description" messageId="MSG_DESCRIPTION" />
        <key field="codBmp" messageId="MSG_BITMAP" />
        <display field="toolID" prefix="[" suffix="]" />
        <display field="description" />
        <assign field="nTools" value="1" />
```

```
        <assign field="nWithRotationB" value="0" />
        <assign field="nWithRotationC" value="0" />
        <item field="toolID" messageId="MSG_TOOLID" min="1000" max="9999" />
        <item field="description" messageId="MSG_DESCRIPTION" />
        <group messageId="MSG_TOOLDATA">
<item field="toolLength[0]" prefix="[LT]" messageId="MSG_TOOLLENGTH" defValue="100" readPswLevel="0"
writePswLevel="2" />
<item field="diameter[0]" messageId="MSG_TOOLDIAMETER" defValue="10" readPswLevel="0"
writePswLevel="2" />
<item field="diameter[0]" messageId="MSG_TOOLDIAMETER" />
        </group>
        <group messageId="MSG_TOOLRPM">
                <item field="minRPM" messageId="MSG_RPM_MIN" min="0" max="18000" />
                <item field="maxRPM" messageId="MSG_RPM_MAX" min="0" max="18000" />
                <item field="defaultRPM" messageId="MSG_RPM_DEF" min="0" max="18000" />
                <item field="rotDirection" messageId="MSG_ROTAZIONE"
        values="MSG_ROT_0%MSG_ROT_1%MSG_ROT_2" />
        </group>
        <group messageId="MSG_TOOLFEED">
                <item field="defaultWorkFeed" messageId="MSG_WORK_FEED" />
                <item field="defaultPenetrationFeed" messageId="MSG_PENETRATION_FEED" />
</group>
        <group messageId="MSG_OTHER">
                <item field="accTime" messageId="MSG_TOOLACC" />
                <item field="decTime" messageId="MSG_TOOLDEC" />
                <item field="
Tool" messageId="MSG_QZARIATOOL" />
        </group>
</tool>
```

Where, on the "tool" node, the names of the fields, specified as keys, appear with values that correspond to selection values. Inside the "tool" node there are other nodes.

“key” node shows a field where the uniqueness control is needed, when you edit a tool.
Attributes: “field” field name
“messageId” associated message

“display” node defines what fields must be displayed, when you need a tool description (for example "In the tree of the tools"). It is important the order in which the "display" nodes appear.
Attributes: “field” field name to display
“prefix” string to display before the field value
“suffix” string to display after the field value

“assign” node defines the default value for the specified field
Attributes: “field” field name to which assign the value
“value” value to assign to the field

“item” node specified a field that must be displayed when the tool appears. The order of the nodes corresponds to the order in which they are displayed.
Attributes: “field” name of the field to display. If the field is an array, you need to specify the index in square brackets; the index of the first element is 0.
“prefix” string to display before che message
“messageId” associated message
“min” field minimum value. Valid only if the field is numerical. You need it to check the input of the user (it does not check values already available in the tool:
“max” maximum value of the field, as above
“defValue” default value assigned during the creation of a new tool
“readPswLevel” Password level to access in read-only.
“writePswLevel” Password level to access in read-write.

“group” node is a category inside which other items to display are entered.
Attributes: “messageId” message to display as a category name

8.2 "TOOLTREE.XML" file

This file is the *config* data directory in the TPA.INI file (default mod.0\config” under the directory of Albatros). It contains the definitions of the tool representation tree.

Structure:

```
<?xml version="1.0" encoding="UTF-8"?>
<tooltree>
        <node name="codWork" value="foro" enabled="1">
                <node name="codSide" value="side1" enabled="1">
                        <node name="codSubWork" value="FOROCIECO" enabled="1" />
                        <node name="codSubWork" value="FOROPASSANTE" enabled="1" />
                        <node name="codSubWork" value="FOROLAMATA" enabled="1" />
                        [...]
                </node>
        </node>
</tooltree>
```

The *"tooltree"* root node contains some *"node"* element, in any number and nested to any level. The *"node"* defines a single node of the tool representation tree. The attributes on the node show the field and the value used to select the tools.
In the above-mentioned example, the first tool groups all the drilling tools, the second the drilling tools of face 1, the third all the blind drilling tools and so on.

Attributes: "name" tool field name to be considered; the field must be defined in the *fielddef* file section "ToolTecno.xml", so that a message and an image can be associated
"value" field value corresponding with a one of the values specified in the *fielddef* section of the "ToolTecno.xml"field
"enabled" if ="1", the node appears, otherwise it does not appear.

8.3 "BUSHCFG.XML" file

The "BushCfg.xml" file allows to define the groups of face and type for each bush configured in the machine; if not available, it will be automatically created by the TecnoManager application (with default values) to keep its compatibility with old custom versions.

For example:

```
<?xml version="1.0" encoding="utf-8"?>
<BushCfg>
 <ToolTypes>
        <ElemStart messageId="554" Color="Color [Yellow]">
          <SubElem codWork="2" />
          <SubElem codWork="3" />
        </ElemStart>
        <ElemStart messageId="500" Color="Color [Black]">
         <SubElem codWork="1" />
        </ElemStart>
        <ElemStart messageId="501" Color="Color [Red]">
         <SubElem codWork="2" />
        </ElemStart>
        <ElemStart messageId="502" Color="Color [Blue]">
         <SubElem codWork="3" />
         <SubElem codWork="1" codSubWork="4" />
         <SubElem codWork="1" codSubWork="5" />
        </ElemStart>
 </ToolTypes>
 <SideTypes>
        <SubElem value="0" name="Univ." messageId="554" />
        <SubElem value="1" name="1" messageId="507" />
        <SubElem value="2" name="2" messageId="508" />
        <SubElem value="3" name="1-2" messageId="551" />
        <SubElem value="4" name="3" messageId="509" />
        <SubElem value="8" name="4" messageId="510" />
        <SubElem value="16" name="5" messageId="511" />
        <SubElem value="32" name="6" messageId="512" />
        <SubElem value="20" name="3-5" messageId="513" />
        <SubElem value="40" name="4-6" messageId="514" />
        <SubElem value="60" name="3÷6" messageId="515" />
        <SubElem value="61" name="1-3÷6" messageId="516" />
        <SubElem value="63" name="1÷6" messageId="517" />
 </SideTypes>
</BushCfg>
```

The file is divided into two main parts, "ToolTypes" and "SideTypes".

In the first unit, each "ElemStart" tag represents an option that can be selected inside the table of the correctors, in the "WorkType", in the technological parameter tab. This option will be described by the message defined in the “ToolTecno.xmlng” file where "id" will be equal to the value assigned to the "idMessage" attribute. In the 2D model representing the machine outfit, each bush will be coloured according to the colour defined in the "Colour" attribute.

Each "ElemStart" element must contain one of more “SubElem” child tags, by means of which you define type and sub-type of the working, by setting “codWork” and “codSubWork” attributes.
The values given to the above-mentioned attributes are defined in the “ToolTecno.xml” file.

In the “SideTypes” unit, the "SubElem" tags must be defined. Each one represents an option that can be selected inside the corrector table, in the "Face" column in the technological parameter tab.
Each "SubElem" tag must contain these 2 attributes: “value” represents the value of integer type, identifying the bitmask of the face; "name" identifies the message defined in the “ToolTecno.xmlng”file, where “id” is equal to the value given to the “idMessage” attribute that will be shown as description of the selectable item.

Thanks to the use of this file, while equipping the tools by means of "Drag & Drop", a test will be carried out. It will be successful only if the selected tool can work on the face and if it belongs to the typology and the sub-typology of the working that identify the bush on which you need to prepare this tool.

This functionality, related to the “BushCfg.xml” file, is managed from the 1.1.0.0 version of the "TecnoManager" application.

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