New features in NUMROTO 4.3.0 and 5.0.0

- End mills
- Drills / Step drills
- Form cutters
- 3D-Simulation
- NR Draw
- Other topics
- Other general innovations
- Planned innovations
Cutting edge and chisel edge exactly on radius

- S-shaped or straight chisel edge which follows the ball nose radius precisely
- Gashout-X and relief are precisely on the ball nose radius cutting edge
- Only for tools with 2 cutting edges to center & side distance > 0
Straight chisel edge (on radius) grinding

(Special grinding functions, 4.3.0)
Extension chisel edge

- Chisel edge extension - transverse correction.
- For S-shaped and straight chisel edge.
Increment ball relief chisel edge

- Separate increments for ball relief chisel edge.
Grind cutting edge along radius past center

- Cutting edge always precisely on radius

(Special grinding functions, 4.3.0)
Cup wheel Typ '11V5'

- The type ‘11V5’ can now be used to define a cup wheel.
- The grinding wheel type can so far only be used for end mills.
- The point of grinding is on the inner wheel rim.
- By using the wheel rim on the face of the wheel the tool is pre-grinded automatically.
Flute-X: Show calculated cutting angle

- The smallest (Min) and largest (Max) calculated cutting angle of all flutes is always displayed as the top value. If you open the drop-down box, the values according to helix 1 up to helix n are displayed.
Up & Down Cutters

- New Cutter type ‘Up & Down’
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Up & Down Cutter

- With customized, simple geometry dialogue
New operation 'Radius at end of cutting length ' for end mill

- At the end of the cutting length, a radius can be ground.
Other innovations end mill

- Separate feedrate on engage / disengage slant (5.0.0)
- Cutting and displacement angle for certain relief surface can be selected for each tooth group
- Grinding position selectable (4.2.0)
- Grinding position 'Perpendicular to surface' (4.2.0)
- Side distance is calculated more accurately on ball nose when using gash out-X (4.3.0)
Separate feedrate for engage and disengagement slant

- A separate feed rate can now be programmed for the engage and disengagement slant.
Cutting and displacement angle

- In relief operations with several groups of teeth, it is sometimes difficult to sufficiently relieve the teeth in the center and at the same time not to grind any neighboring teeth. Until now, relief operations could only be modified by the distance from the center. More flexibility is provided by the possibility of individually programming of the displacement and cutting angle for each group of teeth.

- This can be used for the following relief operations:
  - ball nose end mills.
  - corner radius end mills.
  - End mills with flat face or corner chamfer.
Grinding position can be selected

- For reliefs the grinding position can now be selected.
Grinding position: 'Perpendicular to surface'

- With cup wheel, peripheral wheel or point wheel.
- Peel-grinding with peripheral wheel.
  → less wheel wear, better looking relief wash-out.
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Clearance relief with disengage chamfer

At the end of the clearance relief operation, it is now possible to program a disengage chamfer.
Chamfer relief - grinding wheel position inside - outside

- When using a peripheral wheel, the inside-outside grinding wheel position can now be selected.

**Diameter 1/Chamfer relief 1 V2**
- Geometry
- Division/Disengagement
- Wheel
- Feedrates
- Cycles/Infeed
- AC
- General
- Modifications
- Change positions
- Grinding position
- Cooling Valves
- Division/Helix
- ISO disengagement program
- ISO program

**Wheel position inside (Pos-1)**

**Wheel position outside (Pos-1)**

**Wheel position inside (Pos-2)**

**Wheel position outside (Pos-2)**
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Show relief profiles

- Show relief profile based on the programmed relief angels and land width.

![Relief angle definition - Relief angle A](image)
Form reliefs: Range relative to profile points

- As reference for the range of a form relief, profile points can now be selected.
- The selected range will now no longer be changed even if some profile elements are modified.
Multiple form compensation

• The calculated compensation profile only shifts the point of contact.
• The grinding wheel is always oriented according to the original target profile.

NUMROTO Path Calculation without or with previous Compensation Profile

Compensation Profile recalculate and with this Calculate new path

Grinding with form compensation

Grinding

Target profile

Measuring Tool
Other innovations form cutter

- Form Compensation - Automate Alignment Measuring Profile (5.0.0)
- Shortening form cutter with shear angle (5.0.0)
- Form relief - grinding in helix direction, the grinding point offset direction is now selectable (5.0.0)
- Measure in process for form relief and multi-axis oscillation (5.0.0)
Automate Alignment Measurement Profile

- When importing a DXF measurement profile, the start - end point can be swapped and the profile automatically aligned based on the settings.
Shorting form cutter with shear angle

- If a form cutter with pre machined flutes and shear angle is shortened, the position and side distance will be changed. In order for the software to track this, the checkbox below must be activated.
The grinding point off-set can be new selected in the direction of the relief angle or wheel rim.
Measure in process for form relief

- For the form relief operation, the measurement in process can be used with the probe task 'Diameter'. The probed diameter difference can now be compensated not only in the diameter direction ('new calculation'), but also as an stock amount (recalculation using 'stock amount'). The result is so far the same as with the compensation 'wheel compensation'. The advantage is that multi-axis oscillation can also be applied at the same time.

- Interesting also for CBN material.
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Display wheel body

- The size of the wheel body can now be defined. This will also be considered by the 3D collision check and it will be animated in the 3D simulation.
Monitor wheel body

- In the 3D simulation the wheel body will be monitored for collision (only if QW’-calculation is active)
Reduce the blank to a cuboid

- Possibility to reduce the blank to a defined cuboid to get a highly accurate simulation of small details.

(4.3.0)
Other innovations 3D simulation

- DXF blank (2D profile), (4.2.0a)
- Simulate shortening (4.2.0a)
- Up to 15% faster simulation when using a CPU with 6 or more cores (4.3.0)
- Custom background (planned in 5.0.1)
DXF blank

The blank for the 3D simulation can now also be defined by a 2D profile.
Simulate shortening (Production and re-grinding)

- Instead of the „end stock amount“ a shortening amount can be set for the 3D-simulation. This shortening amount can be linked with the shortening amount from the page „Manufacturing“ or „Resharpening“. This allows to recognize collisions with the collet more accurately and also has other advantages. For example for the collision check the same shortening amount will now be used as for the actual grinding.

- For the 3D simulation the effect of the shortening amount is now the same as when the tool is actually shortened on the grinding machine. Thus the shortening of pre-fluted blanks or the resharpening of cross-toothed or conical tools can be simulated exactly. When this new function has been activated, the circular orientation can only be set to „According adjustment length“.
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User defined drawing headers
Other innovations NR-Draw

- Additional tables per tool range
- Simplified alignment of drawing elements
- New dimensioning type for relief on outside diameter
- Optimized dialog for printing
- New element 'Circles' available
- Move elements
Additional tables per tool range

- Any number of tables can be added as defaults for each tool range (end mills, drills, form cutters and burrs).
Simplified alignment of drawing elements

- Drawing elements can now be easily aligned with other drawing elements.
- When approaching, the snap function boxes of the individual drawing elements, snap into each other.
- After snapping in place, the element can be moved in horizontal or vertical direction using the arrow keyboard keys.
Simplified alignment of drawing elements

- The snap function is activated either via the 'Edit mode' key.

Or by 2x clicking the move and crop border box.

Displacement box  →  Crop Box  →  Snap function box
New dimensioning type for relief on outside diameter

- Relief on outside diameter can now be easily dimensioned.
- The dimensions can be displayed or moved individually.
Optimized dialog for printing

- Print quickly and easily with the new buttons and selections.
New element 'Circles' available

- Simplified way to draw a circle.
Move elements

- Move elements with keyboard arrow keys.
- Step size adjustable in the settings.
New features in NUMROTO 4.3.0 and 5.0.0

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Profileditor-X

- Quick editing of the profile with mouse
- Easy-to-read table with all elements
- Multiple Layers
- Conversion Spline → Polyline
- Consistent application of attachment and tangency
Profile Editor-X: Quick editing of the profile with mouse

- This function can be used to draw a contour of lines and radii.
- By positioning the mouse (crosshairs) on the drawing, the left mouse button is used to select the starting point of the first line or radius.
- Clicking the left mouse button once activates the function for creating a line. By holding the left mouse button longer, a radius is created.
- Then, by moving the mouse horizontally, vertically or diagonally, the direction and length of the line or the direction and size of the radius is determined. By clicking the left mouse button again once, the end point is selected and a line automatically follows as a further element. If you hold the left mouse button longer, the end point is selected and a radius automatically follows as the next element.
- The upper steps can be repeated as often as required until the final contour is achieved.
- Finally, the exact size must be determined manually for each element.
Profile editor-X: easy-to-read table with all elements

- In the upper right corner the tables of individual elements and type are displayed.
- When you click on an element, the size of the element is displayed in the lower right corner.
Profile Editor-X: Multiple Layers

- During DXF import, all existing layers are displayed in a preview.
Profile Editor-X: Conversion Spline – Polyline

- Splines can now also be read in and segmented into lines with a maximum tolerance.
Multiuser-Server: Sybase 17 and new user management

- More rights can be defined in the user administration.
- As of Windows Server 2019, Sybase 17 is required.
Cylindrical grinding perpendicular to the radius or profile

- End mills: new operation ‘Radius grinding’ (Cylindrical grinding perpendicular to ball nose radius)
- Form cutters: new operation ‘Form grinding’ (Cylindrical grinding perpendicular to profile)
Dialogue with corrections

- The same corrections can now be used for practically every operation. The list of possible corrections has been greatly expanded. (Related to operation, work piece or wheel).

- Important: These corrections should only be used with small values. With larger values, geometry deviations may occur and collisions cannot be ruled out.
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New features in NUMROTO 4.3.0 and 5.0.0

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- Other topics
  - Other general innovations
- Planned innovations
Other general innovations (1)

- Plunging between end of cutting edge and shank
- Copy wheel packages
- Limit wheel selection
- Grinding wheel - show list of tools
- Categories for collets
- K-land probing with coolant hole needle, additional probing method selectable
- Tab page 'Blank' available on F10-Resharpening
- Form cutter – determine tooth center position
- Multi-helix end mill - Multiple helix probing
Plunging between end of cutting edge and shank

- With the operation ‘Cylindrical grinding – Plunge infeed’ it is now possible to grind automatically between end of cutting edge and shank.
Copy wheel packages

- Existing wheel packages can now be copied. The package and the wheels are automatically duplicated during this process. The names for the new package and the copied wheels can be selected individually.
Limit wheel selection

- The wheel selection can now be individually limited per operation based on various criteria. This is helpful if other wheels are to be assigned to the tool on another machine. This information is retained even if the target assignment has been deleted.
Grinding wheel - show list of tools

On the info page of a grinding wheel, a list of all tools in which the corresponding wheel is used can be displayed.
Categories for collets

- The collets can now be assigned to a category.
K-land probing

- K-land probing with coolant hole needle, additional probing method selectable

Coolant hole needle vertical (new)  
Coolant hole needle transverse
Tab page 'Blank'

- The 'Blank' dialog is now available on the F10 Resharpening page. This makes it again possible to define the length of the blank.
Form cutter – determine tooth center position

As in the drill program, it is now also possible in the form cutter program to determine the tooth center position with the measuring probe.
Probing page: Multiple helix probing

- Now it is possible to select in the probing dialog which helix must be probed (multi-helix end mill)
Other general innovations (2)

- Thermal growth compensation
- Numbering teeth
- Separate parking position for program end within NR-Control
- NUMROTO E-Mail Client
- NR-Control: display message for PC Restart
- New, additional Clamping system transformations can be added manually
- Automatically use last used machine
- Inch / mm value converted in context menu
- Intermediate stop / Park position - Flag and Strategy
- Direct import of default collets
Thermal growth compensation, new option

- Automatic thermal growth compensation using the work piece or wheel probe
- This function must be adapted once for each machine kinematic
CNC Power Engineering - Always on the move

Pitch: Numbering of teeth

- Teeth are new numbered
Separte parking position for NR-Control

- For NR-Control at the end of the programm a separate parking position can be defined.
Numroto E-Mail Client

- It is no longer necessary to install an e-mail program to send notifications with NR-Control - an integrated e-mail client for sending e-mails is now available.
NR-Control: display message for PC Restart

- Display a message if the system has not been restarted for a long time.

![Image of NR-Control settings screen]

- Check if the system has not been restarted for a long time.
- The message will appear after a certain period, which can be configured.
- Options for additional system settings are available on the left side of the screen.
Adding manual inputs to the clamping system transformation

- For profile insert tools, the orientation of the insert is defined in the profile insert clamping system, and for indexable insert tools, it is defined within the page 'Orientation'. Based on this definition, the insert position is automatically selected correctly in the clamping system transformation.

- New, additional transformations can be added manually.
Automatically use last used machine

- It is now possible to automatically activate the last machine used, according to the workpiece info, when opening a tool.
Inch / mm value converted in context menu

- The input value can be displayed in the context menu in the other measure system.
Intermediate stop / Park position - Flag and Strategy

- Intermediate stop / Park position - Display flag and strategy for machining steps and 3D simulation separately.

- In operation-4, 'Switch to this operation step via intermediate stop' was activated manually. If now for the 3D simulation the operation-3 is deactivated, the operation-4 has to change via the parking position.
Direct import of default collets

- When installing version 5.0.0, the collet types Schaublin W15, W20, W25, B32, B32-45 are supplied in the 'DEF_COLLETS' folder. These can be imported as required.
New features in NUMROTO 4.3.0 and 5.0.0

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- Other topics
- Other general innovations
- Planned innovations
Planned innovations as of 5.0.1

- Parabolic helix on ball nose
- Consider form wheel profile for flute X
- Complete parameter input with simple calculator
- Wheel type 11V5 also suitable for radial clearance (end mill and form cutters)
- Duplicate selected shape/clearance angle, etc.
- Display Start/end points (profile element) in tables
- Widening Preview 'Tip gash out X' and 'X Flat'
- Assign several collets to other machines
- Dialog F10 Resharpen - Automatically add tool to job list
- and much more!
Reduce helix at ball center

- For end mill with ball nose, the helix course on radius 'helix angle linear increasing' has proven itself technologically very well. With a new reduction factor, the helix course in the center of the ball can be made more straight. At 0%, everything remains as before. At 100%, the helix angle at the center of the ball is more straight. Intermediate values are also possible. In all cases, the cutting edge is always continuous.

Reduction factor 100%  
Reduction factor 0% (same as before)
Parameter input

- Complete parameter input with simple calculator.
Further information:

Release Notes in the NUMROTO customer area:
www.numroto.com
Thank you for your interest!