CNC Power Engineering - Always on the move

Total solution for tool grinding
New features in NUMROTO 4.2.1 and 4.3.0

- End mills
- Drills / Step drills
- Form cutters
- 3D-Simulation
- NR Draw
- Probing
- NR-Control/NCl
- Other changes
- Additional small improvements
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
Grind cutting edge along radius past center

- Cutting edge always precisely on radius
Cup wheel type ‘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 calculated cutting angle at the front and rear is now being displayed.
Up & Down Cutters

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

- With customized, simple geometry dialogue
Selectable grinding position

- For reliefs the grinding position is now selectable.
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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New Kennametal HP-points 02

- The three new drill points SE-111 SGL, SE-112 HPX und SE-113 HPR can now be re-grinded with NUMROTO true to original.
- An official license from Kennametal is needed. The new HP points are not included in the previous HP point.
- NUMROTO order number CH50052491
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Show relief profiles

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

- In form cutters a multi-helix feature has been added. An operation can now follow several helices. This allows to reduce the number of operations for such a tool.
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

Measuring Tool

Grinding with form compensation
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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)
Limit blank length / show rear part transparent

- The blank can now also be shortened directly in NUMROTO-3D. Also the opacity for the in-active blank part can be set.
- The minimal opacity for the rear part for a blank with a limited length can now also be set to 0%, so that the rear part is completely invisible (like in earlier versions).
Reduce the blank to a cuboid

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

(4.2.0a)
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User defined drawing headers and tool parameters

Drawing header company

Drawing header adapted in NR-Draw
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Probing: Helix hand detection

- When using the function 'Helix hand detection' the search angle can now be defined separately.
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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.
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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.
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)
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.
ISO-Program: Machine independent movements

- Instead of an ISO disengagement program the movements can now also be defined in a machine independent table.
- Like this the user-defined disengagement moves create exactly the same results on all machines, independent from the axis names.
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
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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Adjusting the walk angle for multi-helix-cutter

- With multi-helix-cutters, the pitch angle on the tip is often unequal. During gash out, this leads to the walk angles no longer fitting optimally during widening. This can now be adjusted automatically.
Numroto-3D: Monitor QW

- Numroto-3D can now monitor the QW' maximum during collision detection. For the QW' maximum to be calculated accurately, a higher model resolution is required (at least 200).
Numroto-3D: Shorten blank length for collision check

- The blank length is now automatically shortened for the collision check. The length always corresponds to the part that sticks out from the collet. This achieves better accuracy for the material removal rate and QW' calculation.
Numroto-3D: Hide wheel / transparent wheel

- There are two new keyboard shortcuts to change the transparency of the wheel or to hide it. So far these functions could only be accessed by using the tool bar. These shortcuts work in both directions.
Numroto-3D: Show path error only when > 0

- The path error is now only displayed if it is > 0. This makes it clear in which operations the path error could be significant at all.
Other optimizations in 3D simulation

- Up to 15% faster simulation when using a CPU with 6 or more cores (4.3.0)
- Avoiding the overlapping of the measurement results display (4.2.1)
- STL blanks can now also be limited in length (4.2.1)
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.
Scaling: Several improvements

- Scaling of end-mills and drills has been improved in many ways, so that after changing the diameter of an existing tool no many manual adjustments will be needed.
- In the settings it is now also possible to define how the constant lead should be changed if a tool is being scaled based on a diameter change.
Tool- and grinding wheel filter

- The filter which was selected previously will now be opened directly by using the button.

![Filter selection interface](image)
Manufacturing – only shorten in axial direction

- When manufacturing a tool a selection has been added which allows to use the shortening amount only in axial direction. The tool is then no longer rotated according to the shortening amount and the helix information.

- This shortening procedure is specially recommended for cross-cut tools (up-down end-mills, side milling cutters). Like this deviations can be avoided if bigger shortening amounts are used. When this function is active, only the clamping length can be probed.
Auto switch for wheel rotation speed

- Auto switch for automatic wheel rotation speeds for new operations
Inch / mm value converted in context menu

- The input value can be displayed in the context menu in the other measure system.
Event logging

- The event log, which can currently be opened via the status bar, is now stored in the database. This means that all events are documented and available in a central location, even in a multi-user environment. The list of all events can also be exported as an Excel file.
NR-Control: Configuration

- Now the configuration can be opened directly from NR-Control
Other innovations in 4.2.1 and 4.3.0

- Side distance is calculated more accurately on ball nose when using gash out-X (4.3.0)
- End mill: 5 tooth groups with 6 teeth (4.2.1)
- The calculation time for creating the CNC file was optimized (4.3.0)
- Step face cam: 2nd machining length without infeed added (4.2.1)
- NR-Control: The display of the collision check process is no longer shown in a separate window (4.2.1).
- DXF form step (drill): Concave radii accurate even for small diameters (4.2.1)
- Shaper cutter - longitudinal offset during clamping length probing - or reduction shortening amount (4.2.1)
- K-land probing with coolant hole needle possible in direction of rake angle surface (4.3.0)
- Tooth center position probing now also possible with form cutter (4.3.0)
- Time optimization, avoidance of idle times in NR Control (4.2.1)
- 2D collet collision monitoring more accurate (4.2.1)
Further information:

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