



Automatically optimize positioning tool-paths & feed-rates with SmartPACK!



01



SmartPATH®

Optimizes rapid positioning tool-path motions generated by CAD/CAM systems and automatically migrates part programs between differing CNC machines.

02



SmartCUT™

Increases machining productivity by eliminating unnecessary "air-cutting" feed-rate motions.

03



SmartFEED™

Improves overall productivity by extending tool life, improving surface finish quality and optimizing cutting forces and power consumption.



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Generate Safe & Efficient Tool-Paths

01



SmartPATH (patented) generates new optimized and efficient positioning tool-paths while avoiding over-travel and collisions. It also eliminates your time consuming dependency on inefficient and unsafe RAPID or high-feed positioning motions generated by CAM systems.

NC programmers can spend considerable time, using trial and error, to develop and verify positioning paths to achieve desirable safe motions for a specific machine configuration. Should shop conditions later require that the manufacturing program be moved to a different CNC machine, then the non-cutting positioning paths must be redeveloped in your CAM system and the entire trial and error process repeated.

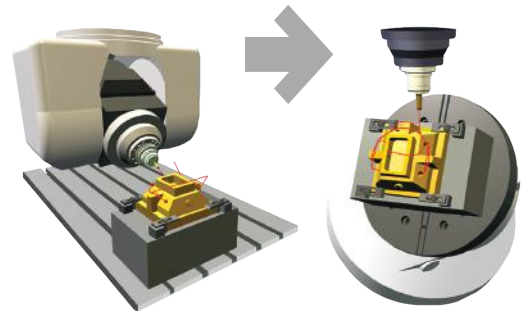
Alternatively, **SmartPATH** automatically finds the optimal path to move the tool quickly and safely from one positioning move to another, respecting the specific machine kinematics, travel limits and physical constraints. This enables NC programmers to move part programs quickly and efficiently by simply re-post-processing the original CAM program.

SmartPATH also ensures the generated multi-axis motions do not cause collisions with dynamically changing in-process stock and all other surroundings such as the fixtures and moving/non-moving components of the machine.

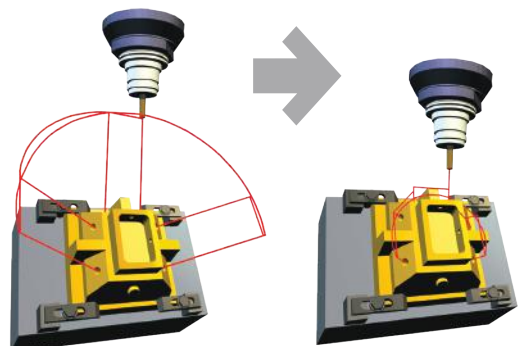
SmartPATH Benefit Highlights

- Automatically migrate your part program from one CNC machine with a specific machine kinematics to another with completely different kinematics. This can be done at the shop floor as scheduling needs and CNC availability dictates.
- Reduce your manufacturing cycle time by eliminating the process of trial and error to adjust and verify multi-axis positioning motions in the CAM environment and minimizing the unproductive time of the positioning operation.
- Ensure optimized and safe multi-axis positioning paths, which are collision-free based on the actual machine tool kinematics, dynamically changing in-process stock, workpiece, fixtures and machining environment.
- Maximize your part accessibility by taking full advantage of the machine's work envelope. As a result, parts having a large size with respect to the machine work envelope can be accommodated, without any over-travel issues, even during multi-axis positioning motions.

Migrate with SmartPATH!



Optimize with SmartPATH!



Automatically Eliminate “Air-Cuts”

02



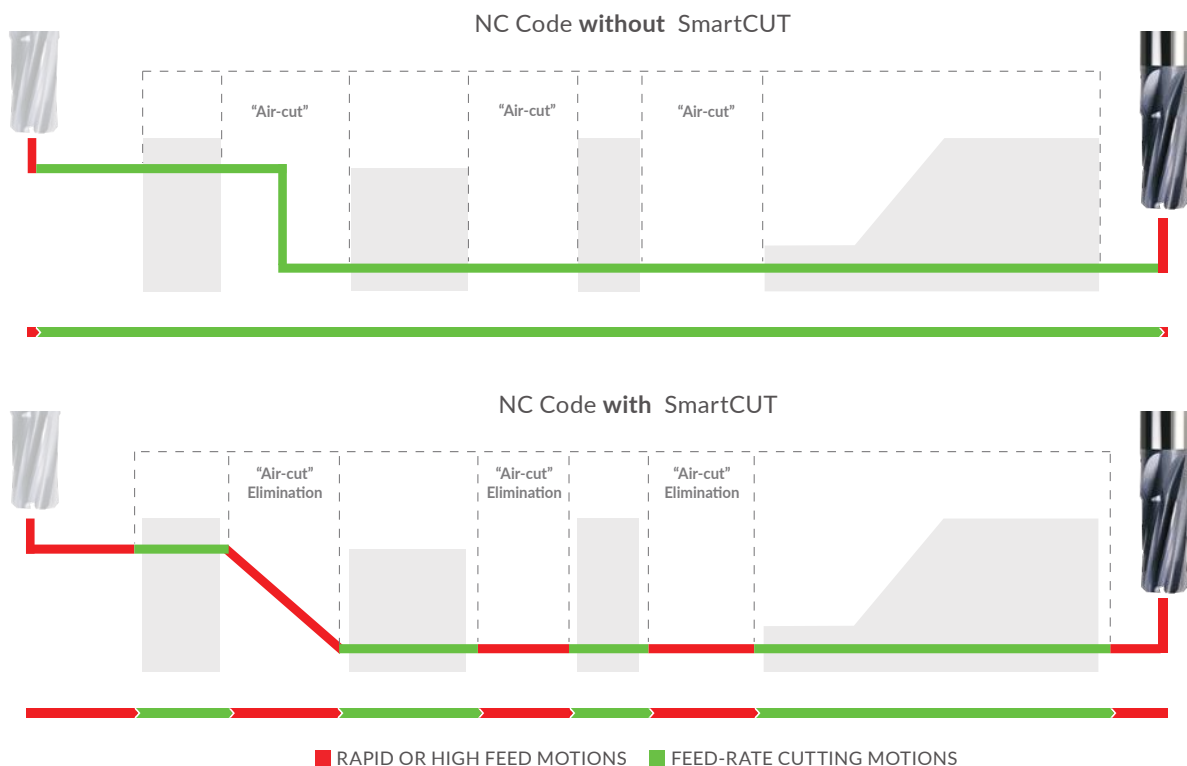
SmartCUT eliminates time wasting “air-cuts” by using material removal simulation to detect when the tool is not engaged with the material and moving at a cutting feed. Where feasible, SmartCUT will change these air-cut motions to RAPID or high-feed; thereby, significantly reducing machining cycle time.

SmartCUT detects positioning (i.e. RAPID) or high-feed motions that cut into the in-process stock and in addition to warning the NC programmer, will automatically reduce the feed-rate to the upcoming programmed feed to avoid tool breakage. Similarly, when leaving the material, SmartCUT will detect RAPID motions that cut the stock when leaving the part and will automatically slow down these cutting motions to the last programmed feed.

SmartCUT provides other settings that can: ignore air-cutting paths less than a specified length; enforce a minimum safe distance on air-cut positioning motions; and define minimum safe positioning approach and exit feed distances.

SmartCUT and SmartPATH when used together can significantly improve NC programs containing time wasting air-cuts. SmartCUT will detect the start point and subsequent end points of air-cut segments as normal, but instead of increasing the velocity along the programmed path, it will use SmartPATH to compute the fastest path to the start of the next cut.

SmartPATH takes into account the current state of the in-process stock as well as part, fixtures and machine components, when computing the shortest path to the start of the cut.



Automatically Optimize Cutting Feed-Rates

03

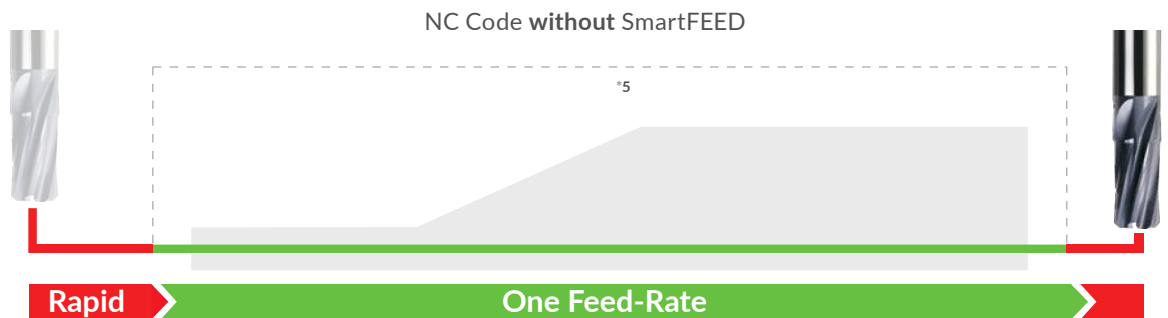


SmartFEED optimizes cutting feed-rates by using material removal simulation to automatically recalculate the best machining feed-rate based on the machine tool capabilities, tool reference cuts and the real-time engagement of the cutting tool in the in-process stock material.

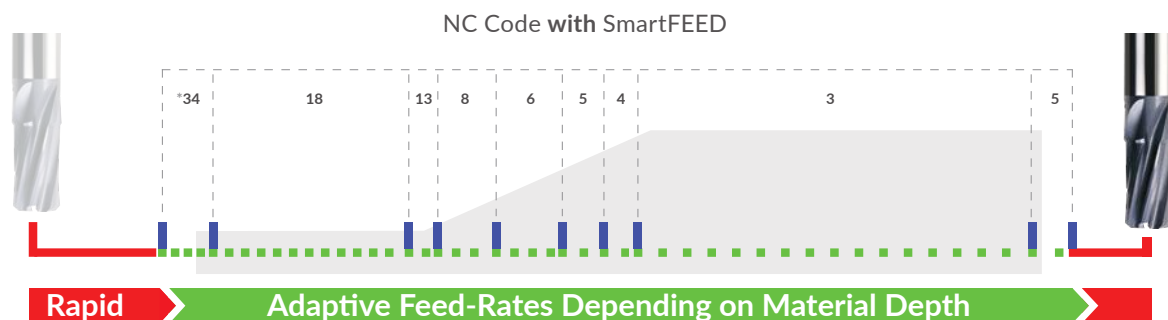
SmartFEED allows for the full control over feed-rate parameters to automatically optimize feed-rates in your part programs. SmartFEED is easy to use and can be entirely controlled from post-processor commands. It also includes post-processor run-time dialogs for programmers who prefer a more interactive approach.

SmartFEED relies on reference cut information to perform material removal rate (MRR) based feed optimization. A reference cut defines, among other things, the depth, width, feed and speed of a successful cut, which the software then uses to determine the feed and optional speeds to use for the feed motions present in the NC program.

SmartFEED allows NC programmers to place limitations on the spindle speed, feed-rate and spindle power and provides settings to define what constitutes a significant change in feed-rate, to define the material removal sampling rate, and more. These are designed to assist the NC programmer in achieving an optimal balance between overall processing time, CNC program size and smoothly changing feed-rates.



*Feed-Rate in Inch per Minute (IPM), Total Machine Time - 60 seconds.



*Feed-Rate in Inch per Minute (IPM), Total Machine Time - 43 seconds - 28% Reduction in Machining Time!

■ VECTOR SHOWING END OF BLOCS ■ RAPID MOTIONS ■ FEED-RATE CUTTING MOTIONS