

ESPRIT Multi-Axis 3+2 Probing

With its Modeless Programming™, ESPRIT offers a powerful suite of multi-axis probing cycles for any combination of CNC machine, control and touch probe manufacturer. ESPRIT Multi-Axis 3+2 Probing cycles may be added at any point during the part program and combined with other ESPRIT cycles into one complete part program to support all machining and on-machine inspection needs.

Using the ESPRIT Digital Machine, probing cycles are automatically chosen based upon the part geometry selected for inspection. Simulation is performed prior to machining to verify the probing in combination with all other machining processes. Finally, edit-free G-code is generated to activate the corresponding probing cycles embedded in the physical machine's control.

Probing

Workpiece Location

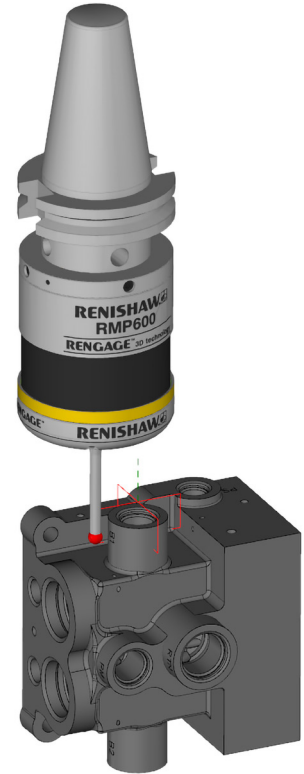
ESPRIT's multi-axis probing cycles may be used on the stock or workpiece to dynamically update work offsets, which then provide an accurate datum to be used for subsequent machining operations. In this scenario, when material is loaded, new datum points are established for the stock's exact location accounting for variances in the workholding and part loading. For parts with varying stock, such as castings and forgings, ESPRIT's probing cycles are used to establish accurate datum points and alignment to ensure the subsequent machining processes are adapted to variations in stock conditions.

- Probe the workpiece and establish the datum points
- Dynamically update the work offsets

Miss-Load Detection

An unexpected set up or a miss-load of the CNC machine introduces the risk of damage to the workpiece or worse yet a collision on the machine. ESPRIT's probing cycles may be used to detect inaccuracies in material loading, fixture installation, and fixture component positioning. Using these probing cycles the workpiece setup may be verified prior to machining assuring that the program is run in the expected environment.

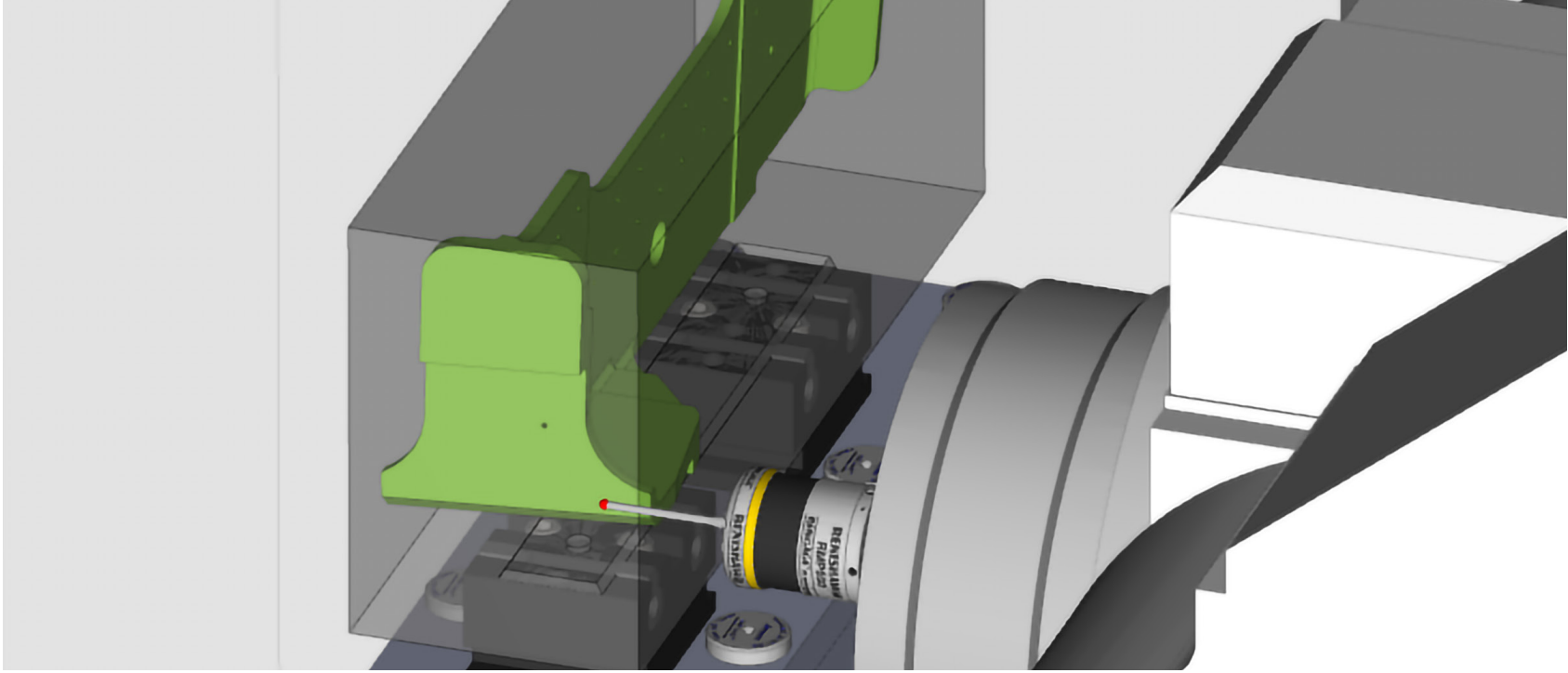
- Confirm part loading and verify workholding



Machine-Aware Probing

Using a combination of ESPRIT's Multi-Axis 3+2 Probing and CNC machines outfitted with touch probes, shops will benefit with increased throughput on existing equipment while reducing operator intervention. This benefit comes along with increases in part consistency and quality. Starting with the ESPRIT Digital Twin and an accurate digital representation of the touch probe, ESPRIT provides a natural workflow for workpiece location, miss-load detection, dynamic tool offsets and on-machine inspection.

Within ESPRIT, a probing cycle is created and treated like all other machining cycles including the use of the workplane to determine probe orientation, automatic cycle selection based on selected geometry, and previews of the probing patterns. The link generator provides all the moves necessary to position the probe for the probing cycle. Both the link positioning moves and the probing routines take into consideration the remaining stock, so all moves are collision-free and optimized for cycle time. The simulation shows exactly what will happen at the machine before a single chip is ever cut including the movement of the probing routines and the additive and subtractive processes providing a preview of the entire machining process. ESPRIT's universal approach to probing eliminates the needs to understand the details of the machines' probing cycles and their parameters by delivering edit-free G-Code for any CNC machine, control, and touch probe manufacturer.



Dynamic Tool Offsets

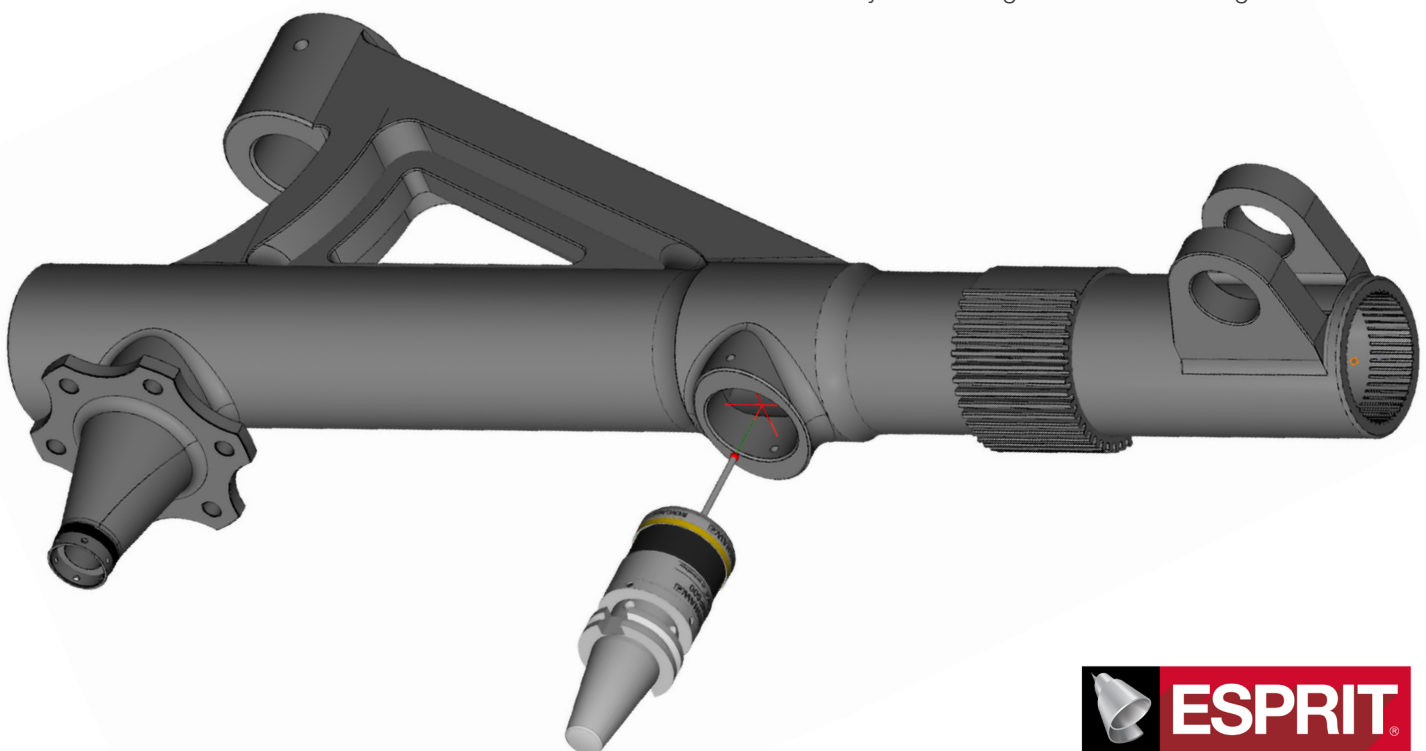
For part features with tight tolerances, ESPRIT's probing cycles are used to dynamically update the tool offsets prior to final machining based upon the remaining stock as measured in real time by the probing cycle. This enables the program to automatically adapt to any potential tool wear allowing critical part features to be machined to exact tolerances.

- Programs that automatically adapt for tool wear
- Machining critical part feature to exact tolerances

On-Machine Inspection

On-machine, in-process inspection of parts after machining will provide consistent and accurate measurements by eliminating manual measuring errors. All the commonly needed inspection routines are readily available within ESPRIT for use on any class of CNC machine tool. By selecting the part geometry to measure, ESPRIT will automatically identify the probing routine and its required parameters. With 4- or 5-axis machining, ESPRIT's 3+2 Probing cycles will orient the part using the rotary axes prior to activating the machine's probing cycle for accurate measure of multi-axis workpieces.

- Consistent and accurate measurements
- By eliminating manual measuring errors



Probing

- 3+2 Probing Cycles for any class of CNC machine tool
- Available at any point in the program
- Probing on the stock or part
- Use of the workplane to determine probe orientation
- Automatic cycle selection based on selected geometry
- Probing pattern preview
- Supported probing cycles include
 - Single Point
 - Web/Pocket
 - 3 Point Bore/Boss
 - 4 Point Bore/Boss
 - Internal Corner
 - External Corner

ESPRIT CAM, LTD

by DP Technology Corp.

+44 (0)1516323415

+44 (0)7378309046

espritcam.eu - esprit@dptechnology.com

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João Paulo Simões
jp.simoies@vsc.pt
93 924 8221



High-Performance CNC Programming

Using the ESPRIT Digital Machine - Machine skin models, controller emulators, machine parameters and universal post processors - ESPRIT delivers powerful programming, accurate simulation and machine-optimized G-code. The ESPRIT solution is backed by world-class technical support to get started quickly and keep running at top efficiency.