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Structure of a NC-program according to DIN 66025 / ISO 6983/1 - 1982

Even though modern CAM-systems and workshop orientated programming systems automatically generate NC-programs, so that hardly anybody still programs directly using machine code, it is an advantage to have some basic knowledge of the structure of a NC-program.

NC-programs consist of a series of instructions in address format, which the CNC-machine works one by one in order to process a workpiece. The following instructions can be distinguished:

- geometric instructions, that control the relative movements between workpiece and tool through space coordinates,
- technological instructions, that define tools, revolutions per minute and feed,
- motion instructions, that define the type of movement (direction, entry move, etc...),
- switchboard instructions, like spindle on/running direction right, change tools, or clamp workpiece,
- corrective calls, like compensation of the contour cutter line or the cutter radius, or shifting of the workpiece origin, and
- calling up subprograms and cycles for work processes that are always repetitive.



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The structure of a NC-program is determined by the syntax - rules of a programming language according to DIN 66025, page 1 - and the semantic - meaning of the individual words according to DIN 66025, page 2. The content of the program consists of a multitude of so-called blocks, which are serially numbered, and which each consists of one or several words. Numerical values that determine the position to be reached are entered in decimal notation.

Beginning of the NC-program
of the digital wood joint G_003

Even though the structure of NC-programs is standardized by DIN 66025, the various NC-programs can not directly be run on CNC-machining centers of different manufacturers. This is due to the fact, that only one part of the available instructions is standardized, while the manufacturer can freely define others.

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ROHTEIL      X+0000.00 Y+0000.00 Z+0000.00
              U+0050.00 V-0190.00 W-0032.00
REFERENZ      X+0245.72 Y+0099.56 Z+0056.00
WERKZEUG      T01 E+0008.00 S+0008.00 L+0035.00
              H+0045.00
% (START)
N0010 F800 (EINSCHALTZUSTAND)
N0020 M03 (SPINDEL EIN)
N0030 G90 (ABSOLUTE KOORDINATEN)
N0040 G00 Z+0004.00 (Z-ACHSE SICHERN)
N0050 (B1 BOHRZYKLUS)
N0060 G00 X+0053.00 Y-0169.05
N0070 G01 X+0053.00 Y-0169.05 Z-0032.50
N0080 G00 Z+0004.00
N0090 G00 X+0052.00 Y-0169.05
N0100 G01 X+0052.00 Y-0169.05 Z-0032.50
N0110 G00 Z+0004.00
N0120 G00 X+0051.00 Y-0169.05
N0130 G01 X+0051.00 Y-0169.05 Z-0032.50
N0140 G00 Z+0004.00
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