Production of a nutcracker

Nutcracker

"Crack the hard nuts with SINUMERIK" – this is no problem in the future with the Christmas nutcracker and SINUMERIK knowledge.

The nutcracker consists of two turned parts, the base plate in the form of a bell and the handhold. The contours were created with the geometry processor directly in ShopTurn and then machined with the stock removal cycles.

All the information, tool data, drawings and ShopTurn machining plans required for a reproduction are contained in the following.

www.siemens.com/cnc4you

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1. Safety note

Working with machines is always associated with numerous hazards. It is therefore imperative that the legal and company safety regulations are also observed during the production of the nutcracker.

2. Preliminary remark

The following description is intended for persons acquainted with CNC lathes and who have experience with or knowledge of SINUMERIK CNCs with ShopTurn. All the technical data listed here corresponds to the machines, tools, materials, machining plans and drawings used to produce the prototype. Because of the very varying conditions in other workshops, this data is only of exemplary character for a reproduction. Nevertheless, a problem-free reproduction should be possible in most cases.

ShopTurn enables the base plate and the handhold each to be turned in two clamping operations. The programs have been created for a lathe with counterspindle and Y axis. With minor changes, the programs can be adapted for other lathe configurations or the milling work performed on a milling machine.

The base plate is turned in two clampings. First the contour is turned and then the circular pockets milled by means of the Y axis and the thread tapped. The part is then cut off and taken over by the counterspindle. The base is then turned. Programs for the engraving of a candle and "Merry Christmas" are included separately for experts. These are calculated in the CAM system for the counterspindle. If you use the programs on the main spindle, you must adapt the SETMS program sections and mirror the machining on the X axis. Before machining, please check whether further adaptations have to be made to your machine. The hole on the peripheral surface must be deburred manually as the sidewalls have sharp edges.

The handhold is also turned in two clampings with counterspindle. First the contour is turned and the thread cut. The workpiece is then clamped on the tread in the counterspindle, cut off and the round end turned on the rear side.

A collet adapter is recommended for the clamping of the workpieces as clamping is performed on the finished surfaces and the thread. For greater safety, we recommend that the machining plans be simulated before starting the actual machining. In this way, any program errors can be detected and avoided.

You can download all the CAD drawings, programs and machining descriptions for the workpieces free of charge in the registered Internet area "My SINUMERIK" at **www.siemens.de/cnc4you**. The following files and formats are available there:
DXF, STP, IGS and Inventor files / Jobshop files / Drawings as PDF

3. Workpiece blanks

- Base plate
  One piece of round stock, AlCuMgPb material, material no. 3.1645;
  diameter 80 mm, cut length approximately 100 mm
- Handhold
  One piece of round stock, AlCuMgPb material, material no. 3.1645;
  diameter 40 mm, cut length approximately 150 mm

4. Lathe and machining plans

- SPINNER TC-600 lathe equipped with SINUMERIK 840D sl and ShopTurn
- ShopTurn Version 6.4 turning program (minimum requirement)
- Machining plan GRIFF_GLOCKE.MPF for turning the handhold
- Machining plan GRUNDKOERPER_GLOCKE.MPF for turning the base plate
- Machining plan for engraving the candle and the lettering
  GRAV_1.MPF
  GRAV_2.MPF
  GRAV_3.MPF


5. Tools used to turn the nutcracker

Designation	Tool name in the machining plan
Tool tip holder with turnplate for roughing (main spindle)	SCHRUPPER_80_HS
Tool tip holder with turnplate for finishing (main spindle)	SCHLICHTER_35_HS
Milling cutter ∅ 16 mm (two or three cutting edges), cutting edge length at least 36 mm	FRAESER_16
Drill ∅ 12 mm for tap hole drilling (main spindle)	BOHRER_12
Boring bar for the boring for tap hole drilling (main spindle)	BS_80_INNEN
Tap M16 (main spindle)	GEWINDEBOHRER_M16
Parting tool with 3 mm tip width (main spindle)	ABSTECHER
Tool tip holder with turnplate for roughing (counterspindle)	SCHRUPPER_80_GS
Face plunge cutter with 3 mm tip width for boring the bell base (counterspindle)	PLANSTECHER_GS
Threading tool with thread pitch 2	GEWINDESTAHL_P2
Ball mill ∅ 3 mm, for engraving of text and candle	FRAESER_kugel_3

6. Turning of the base plate

The sawn blank is securely clamped (collet recommended).

Machining steps on the lathe

1. Home the machine
2. Load the GRUNDKOERPER_GLOCKE.MPF machining plan
3. Enter the measured tools in the tool list
4. Insert the tools in the magazine
5. Set tool zero by scratching
6. Perform simulation
7. Start production, execute machining plan

7. Turning of the handhold

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8. Information on the Internet

Construction of the parts, creation of the drawings, development of the plans for the machining

Siemens AG, SINUMERIK TAC
Frauenauracher Strasse 80
D-91056 Erlangen, Germany
On the Internet: http://www.siemens.com/cnc4you

Specifications of the machine tool used

SPINNER Werkzeugmaschinenfabrik
Rudolf-Diesel-Ring 24
D-82054 Sauerlach, Germany
On the Internet: http://www.spinner-wzm.de

Manuals and information from the Siemens AG

Manuals and detailed information about our products can be found at www.siemens.de/sinumerik -> Index or search: DOConWEB -> SINUMERIK

- "Simple Turning with ShopTurn" Training Documents
  -> Info/Training -> "Simple Turning with ShopTurn" Training Documents
- ShopTurn Product Brief
  -> 840D/840Di/810D Users -> ShopTurn Product Brief 840D/810D
- ShopTurn Operation/Programming
  840D/840Di/810D Users -> ShopTurn Operation and Programming

Tips when searching in DOConWEB

DOConWEB enables individual pages to be called up quickly from documents without having to load the entire file.

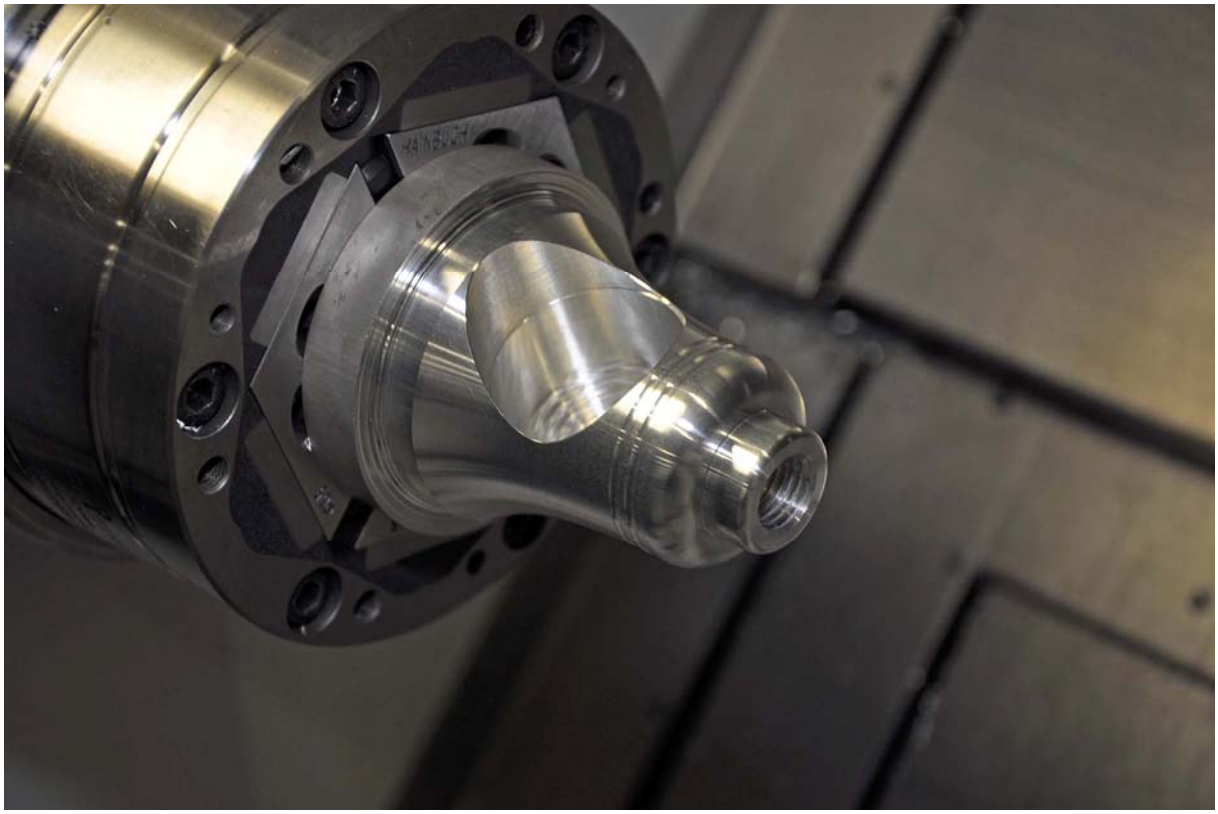
- You can restrict the search by clicking "A-Z"
  (-> a search is now only performed below this point in the index)
- Or click the zoom
  (-> a full text search is now performed below this point)

9. Figures

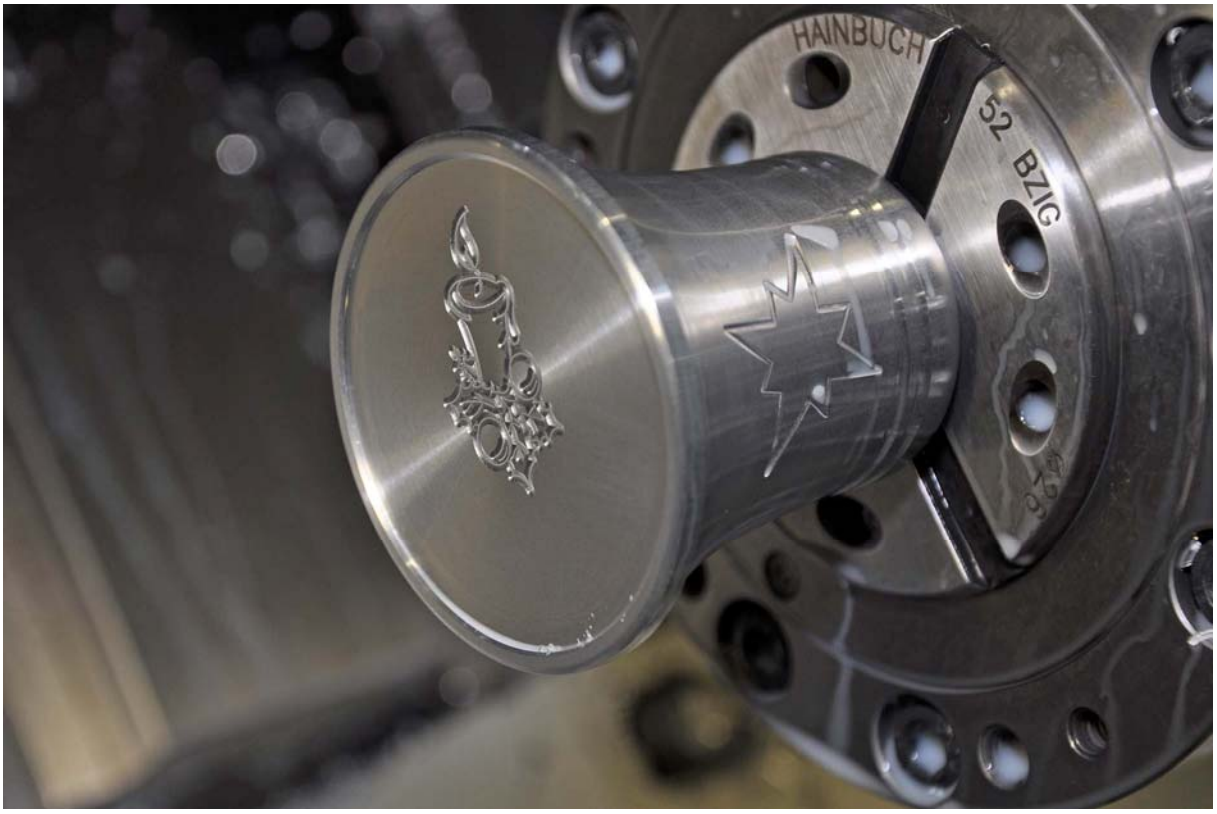
Nutcracker

Nutcracker Christmassy

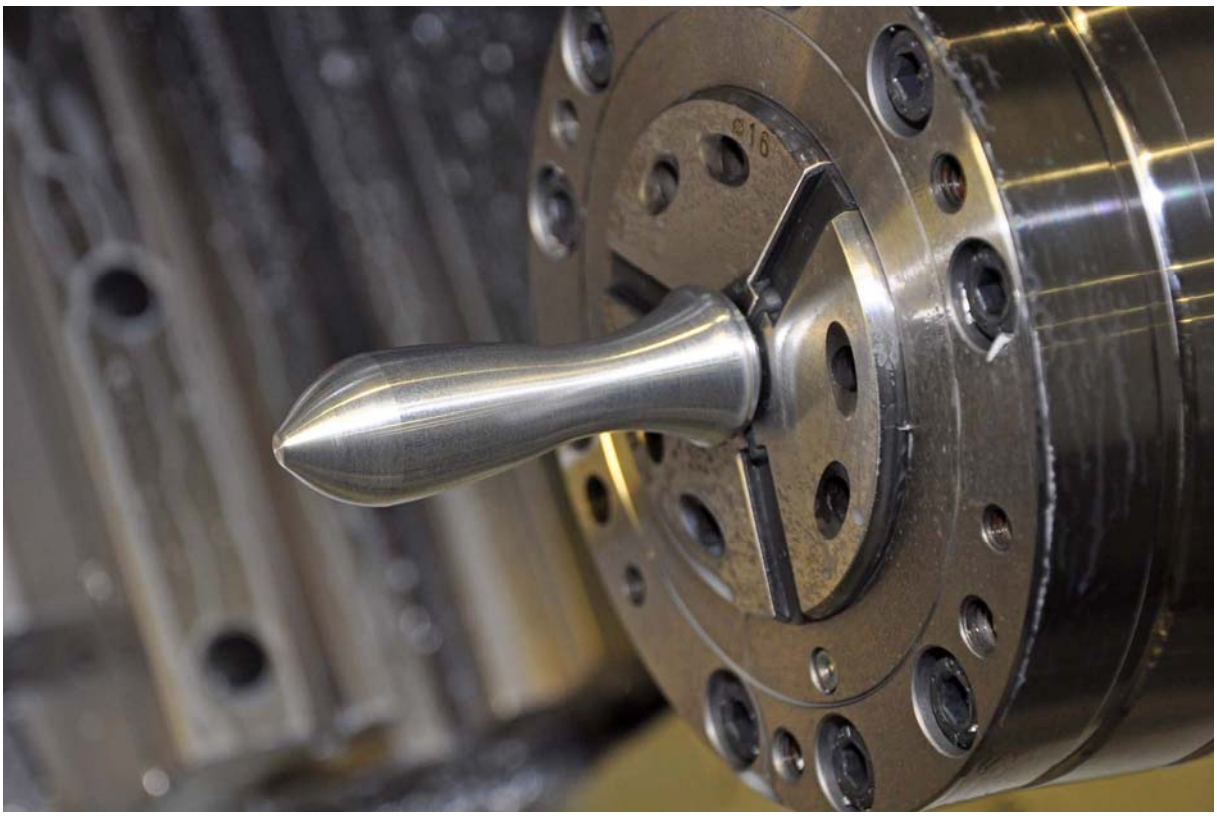
Base plate in master spindle



Base plate with engraving

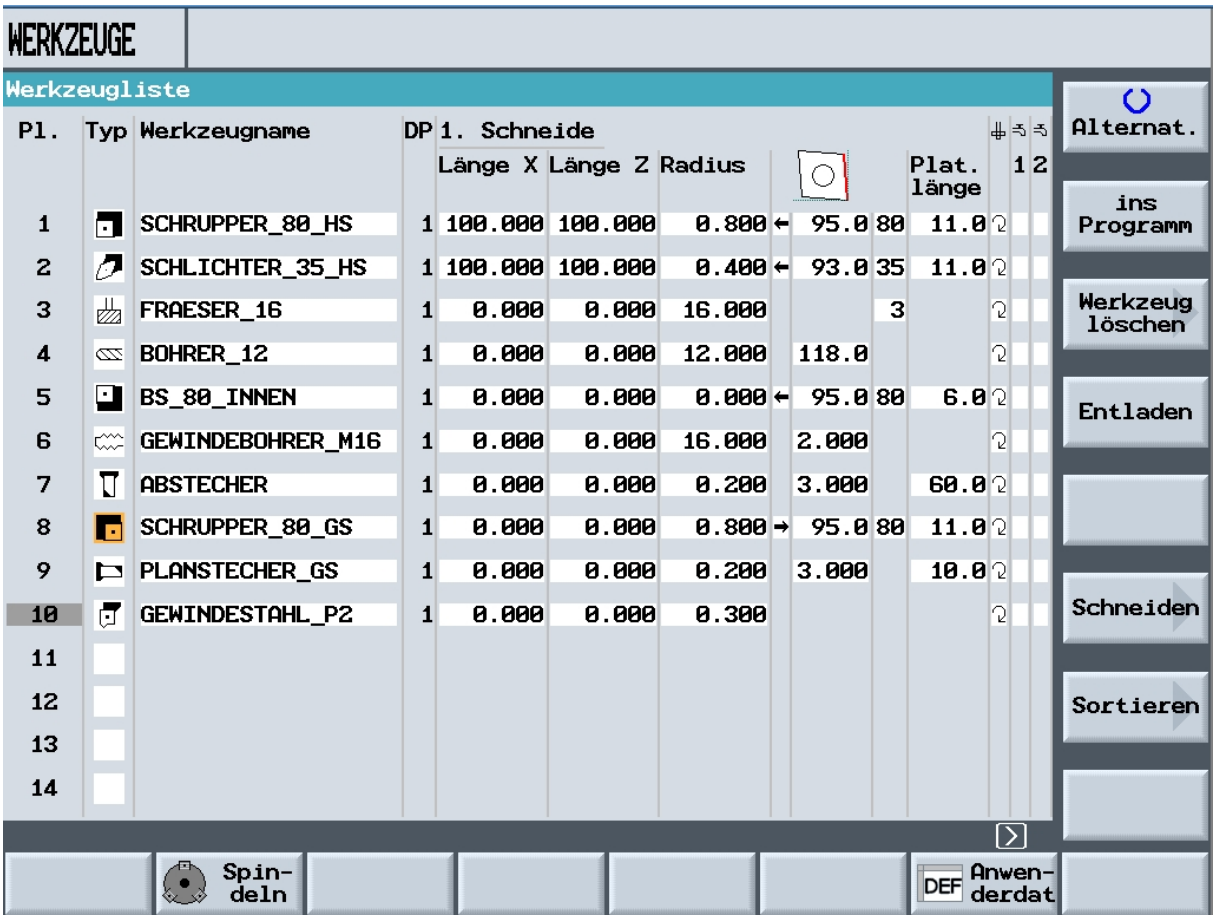


Handhold

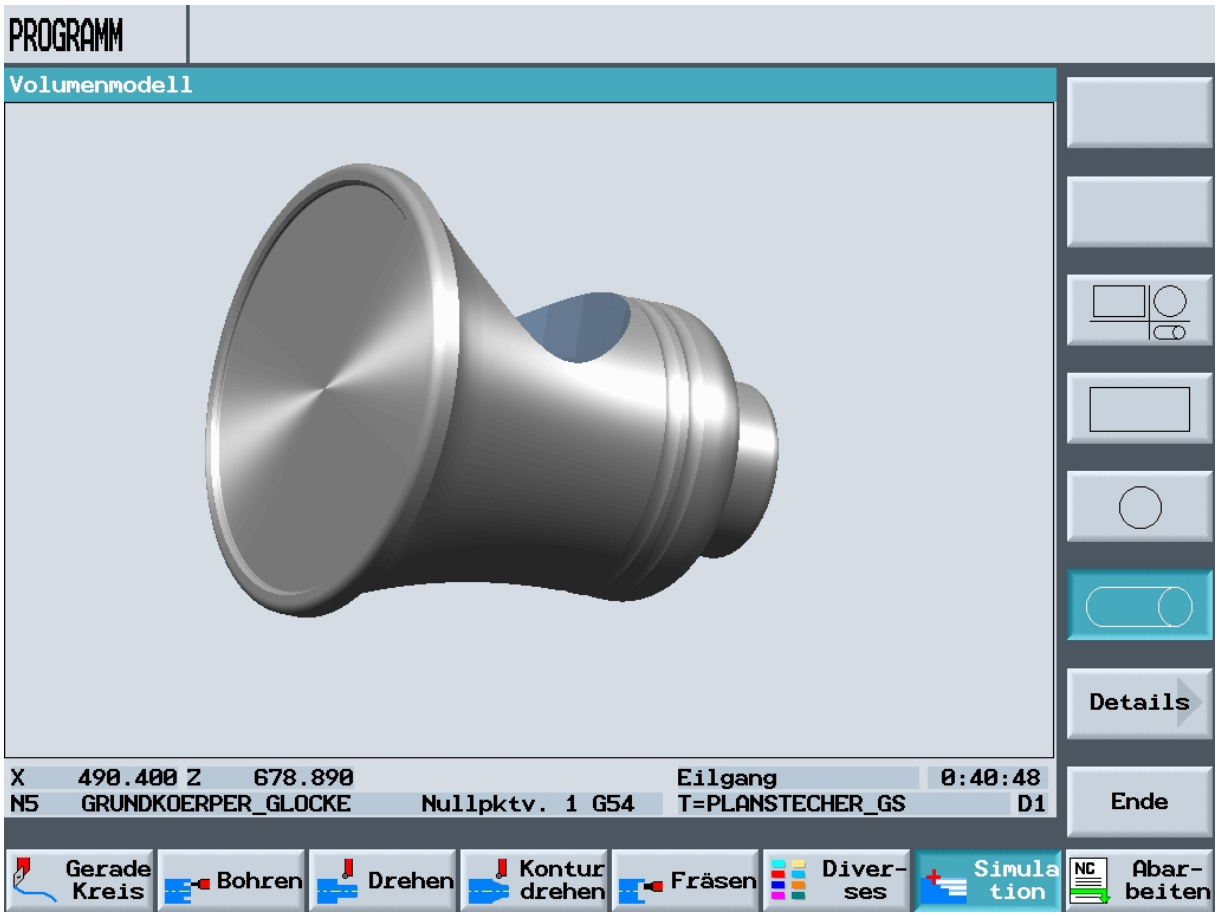


Bottom side with engraving "candle"

Tool list


WERKZEUGE
Werkzeugliste
Pl. Typ Werkzeugname DP 1. Schneide
Länge X Länge Z Radius Plat. länge 1 2
1 SCHRUPPER_80_HS 1 100.000 100.000 0.800 95.0 80 11.0
2 SCHLICHTER_35_HS 1 100.000 100.000 0.400 93.0 35 11.0
3 FRAESER_16 1 0.000 0.000 16.000 3
4 BOHRER_12 1 0.000 0.000 12.000 118.0
5 BS_80_INNEN 1 0.000 0.000 0.000 95.0 80 6.0
6 GEWINDEBOHRER_M16 1 0.000 0.000 16.000 2.000
7 ABSTECHER 1 0.000 0.000 0.200 3.000 60.0
8 SCHRUPPER_80_GS 1 0.000 0.000 0.800 95.0 80 11.0
9 PLANSTECHER_GS 1 0.000 0.000 0.200 3.000 10.0
10 GEWINDESTAHL_P2 1 0.000 0.000 0.300
11
12
13
14
Alternat.
ins Programm
Werkzeug löschen
Entladen
Schneiden
Sortieren
Spin-deln
DEF Anwen-derdat

3D simulation base plate



3D simulation handhold