

The CNC turner's Christmas tree



Christmas Tree, turned

As a Christmas tree decoration, key ring pedant or as a small Christmas present – the CNC Christmas tree has many uses, and can be easily made with a CNC turning machine and a little skill.

The workpiece is processed from a rod on a CNC turning machine with counterspindle. The outer contour is created in the contour editor and machined using stock removal cycles. A hole through the top can be used to attach a key ring or a hook for use as a Christmas tree decoration.

All of the information required for production, drawings, tool data and workplans are compiled in the following.

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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 Christmas tree.

2. Preliminary remark

The following description is intended for persons acquainted with CNC machines and who have experience with or knowledge of SINUMERIK CNCs. All the technical data listed here corresponds to the machines, tools, materials, machining plans and drawings used to produce the prototype. Because of the widely 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.

The programs were created and tested using a CNC turning machine equipped with SINUMERIK Operate V4.7 SP2. It should be possible to easily adapt the program to other SINUMERIK versions (e.g. different SINUMERIK Operate SW versions). Usually these programs are not downward compatible as new cycles often require additional parameters not yet available in older versions. These must then be added manually. A simulation and necessary changes (e.g. zero points) should always be carried out.

You can download all the CAD drawings, programs and machining descriptions for the workpieces free of charge at www.siemens.com/cnc4you.

The following files and formats are available there:

NC programs ShopTurn, drawings PDF



3. Workpiece blanks

- AlCu4PbMg, round stock Ø 20 mm

4. Turning machine and machining plan

- CNC turning machine DOOSAN, Siemens 828D sl - SINUMERIK Operate V4.7 SP2
- ShopTurn machining plan TTREEE_TURN_TL_3.MPF
 tool list TTREE_TOOLS_TMZ.INI
 The machining plans are available as download for the software versions SINUMERIK Operate V4.5 SP2 and V4.7 SP2.

5. Tools used

Turning, drilling and milling tools for machining both sides of the parts..

Tools for turning machine

Tool name in the machining plan	Designation
SCHRUPP	Turning chisel for outside with one roughing disk, disk radius R0.8, corner angle 80°
SCHL35	Turning chisel for outside with one finishing disk, disk radius R0.4, corner angle 35°
SCJHL35R	Turning chisel for outside with one finishing disk, disk radius R0.4, corner angle 55°, turning direction left to right
SF_D3_2SN	End mill VHM, ø3 mm, 3 cutting edges
CUTTER_D3	Cutoff tool HM, plate width 3mm
SCHL35RGS	Turning chisel for outside with one finishing disk, disk radius R0.4, corner angle 55°, machining counter spindle



6. Turning the Christmas tree

The Christmas tree is made from one piece.

The blank is clamped in the main spindle. As a first step a rough planar and longitudinal cut is performed. Contour turning is used for the top of the Christmas tree. The rest of the contour is turned off from the left to the right to avoid possible contour violations.

ATTENTION

Please note that the workpiece is clamped with enough free length, so that the turning holder does not collide with the main spindle chuck when machining from the left to the right.

The hole for the attachment options is created with an end mill, and then plunge-cutting is used for the trunk and the tree base.

Approximately 110 mm of the material is pulled from the main spindle with the counterspindle, and the material is clamped using the main spindle and the counterspindle. Then, the workpiece is cut off, face turned in the counterspindle and ejected. The pulled-out rod material is pushed back in the main spindle.

And now you can do it all over again.

Work steps at the turning machine

1. Approach the reference point of the machine
2. Read-in the workplan: TTREE_TURN_TL_3.MPF
3. Read-in the tool list or zero offsets TTREE_TOOLS_TMZ.INI
4. Measure tools and enter them in the tool list
5. Insert tools in magazine
6. Clamp the workpiece
7. Set tool zero point, by scraping
8. Program of zero offsets
9. Configure Counterspindle (Pressure, distance)
10. Perform simulation
11. Start production, process workplan

Assembly

The Christmas tree has a hole through the top for attaching a hook or a key ring.



7. Information on the Internet

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

MOSER CNC-Training

www.moser-cnc-training.de/

and

TAC Technology and Application Center

Frauenauracher Str. 80

91056 Erlangen

Details of the tool machine and tools to be used

DOOSAN turning center

Internet: www.doosan.com/

Manuals and information from the Siemens AG

Manuals and detailed information about our products, please visit the following websites:

- DOConWEB (www.automation.siemens.com/doconweb)
- Service&Support Portal (www.support.automation.siemens.com)
- SINUMERIK website (www.siemens.com/sinumerik)

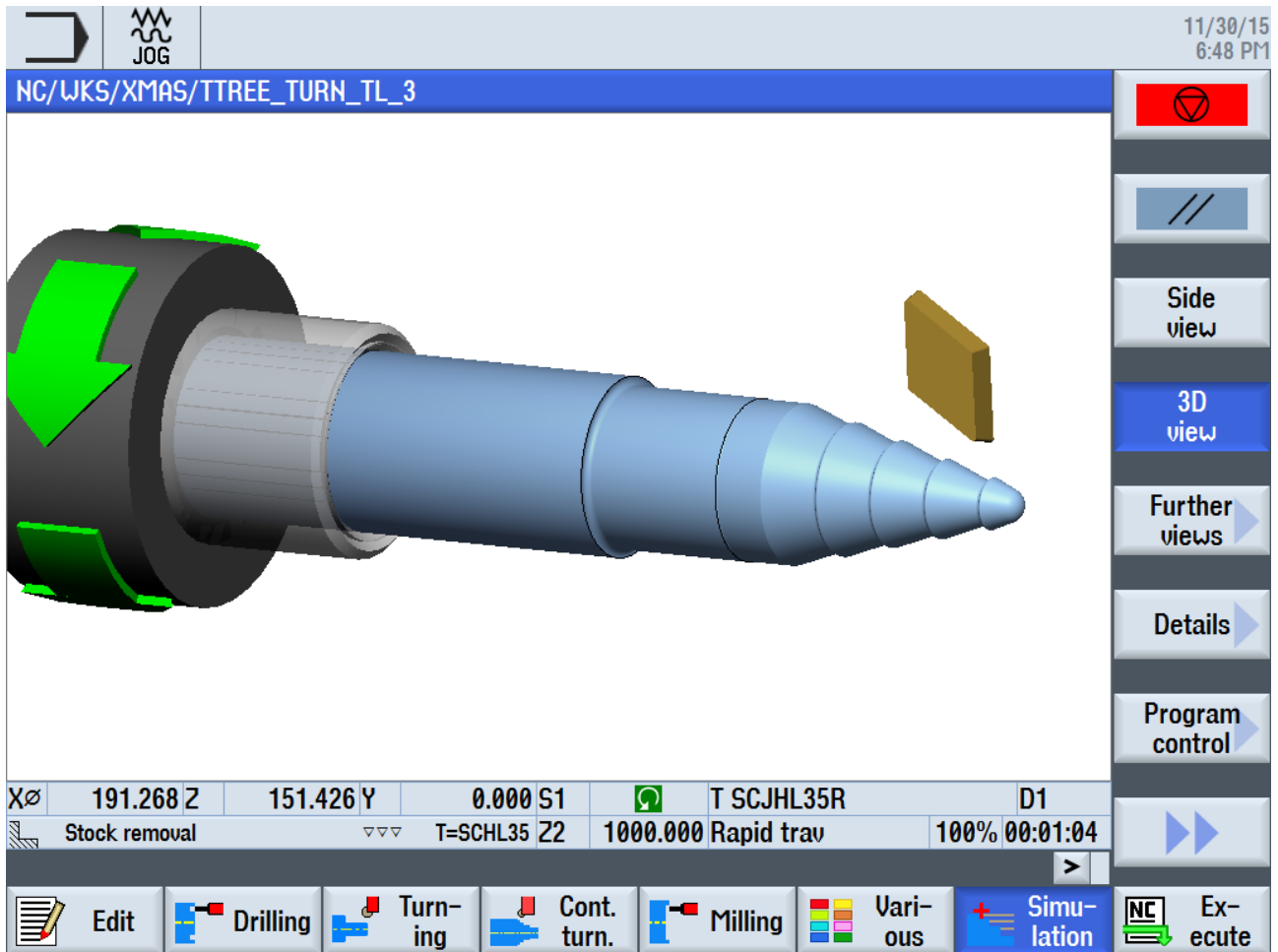
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8. Figures

Simulation

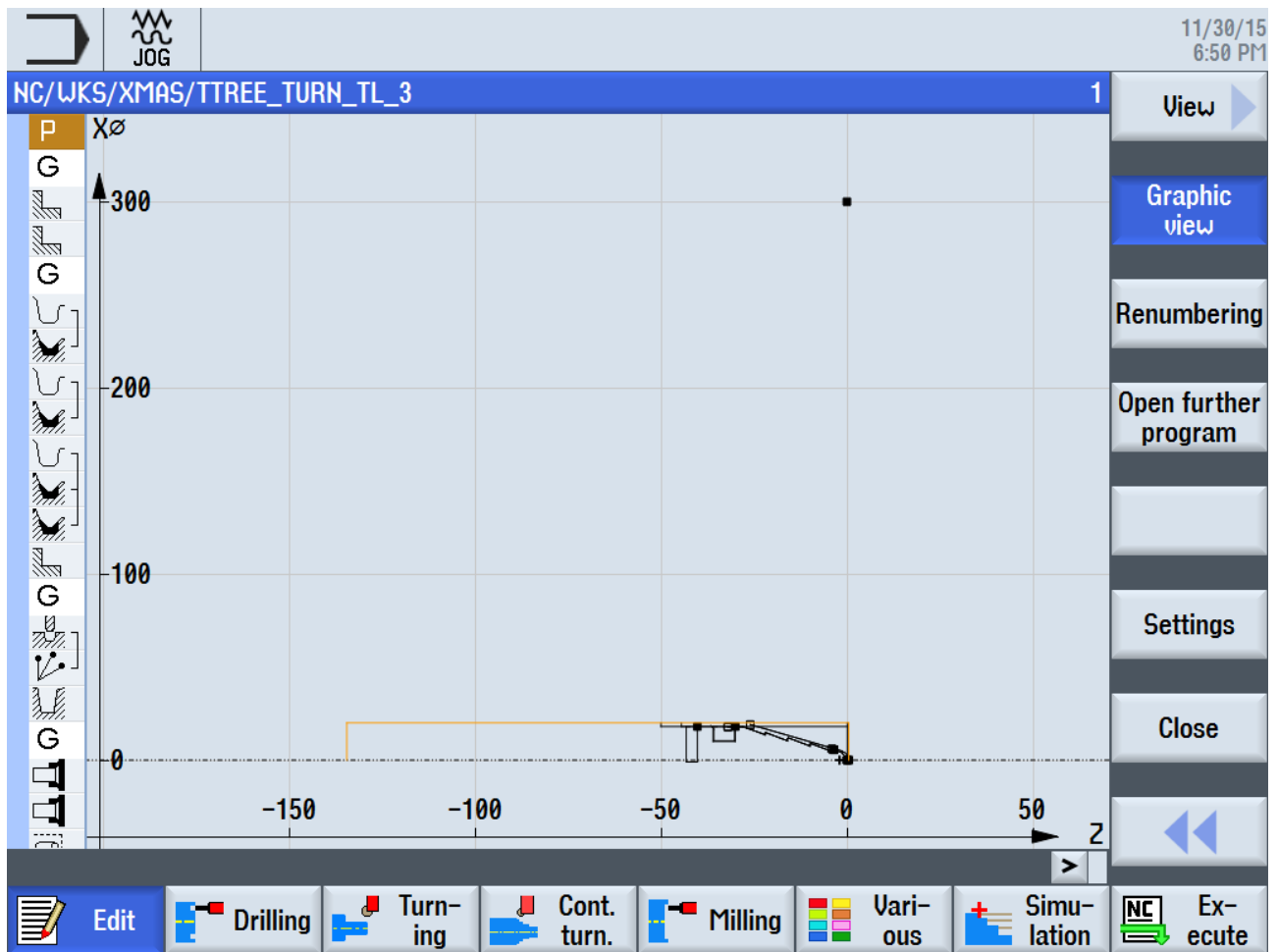


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Graphical view



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ShopTurn program

11/30/15
6:50 PM

NC/WKS/XMAS/TTREE_TURN_TL_3 1

P	Program header	G54 Cylinder
G	;GOTOF _NEXT	
	Stock removal	T=SCHRUPP F=0.125/rev V=220m Face X0=20
	Stock removal	T=SCHRUPP F=0.15/rev V=220m Longitudinal X0=20
G	;Preturning outer contour	
	Contour	AK1
	Stock removal	T=SCHRUPP F=0.125/rev V=220m Longitudinal
	Contour	SPITZE
	Stock removal	T=SCHL35 F=0.085/rev V=220m Longitudinal
	Contour	AK2
	Stock removal	T=SCJHL35R F=0.085/rev V=220m Longitudinal
	Stock removal	T=SCJHL35R F=0.085/rev V=220m Longitudinal
	Stock removal	T=SCHL35 F=0.085/rev V=220m Longitudinal X0=20
G	;Hole for key ring	
	Drilling	T=SF_D3_2SN F=0.025/rev S=5000rev X1=3inc
	Ø01: Positions	X0=5 C0=90 Z0=-2.5 C1=270
	Groove	T=CUTTER_D3 F=0.05/rev V=150m X0=18 Z0=-30
G	F_HOME	
	Counterspindle	Grip with S2
	Counterspindle	Pull from S1 G54 Z1=110
	Settings	TCP

Bottom toolbar: Edit, Drilling, Turning, Cont. turn., Milling, Various, Simulation, Execute

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Picture



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