

Snowman with engraving



Snowman

The "Snowman" CNC4you workpiece is an aluminum turned part with a personal engraving. You can achieve the best results by anodizing or inking the workpiece by other means before engraving it. This results in a 4-phase machining process:

- 1) Turning the blank
- 2) Anodizing or inking
- 3) Turning the device for clamping during engraving
- 4) Engraving

All information required for production, including the drawing set, tool data, workplan and NC programs, is compiled below.

Decorating the snowman with a ribbon and hat is optional.

www.siemens.com/cnc4you

Table of contents

1. Safety note	2
2. Preliminary remarks	2
3. Workpiece blanks/parts list	3
4. Turning machine and NC programs	3
5. Tools used	4
6. Turning the blank and subsequently engraving it	5
7. Information on the Internet	14

1. Safety note

The use of machinery always entails numerous hazards. It is therefore essential that you observe the standard and statutory safety regulations when manufacturing the snowman, too.

2. Preliminary remarks

The following description is intended for operators of CNC machines who have experience with or knowledge of the SINUMERIK CNC. All technology data listed here correspond to the machines, tools, materials, workplans, and drawings used in the manufacture of the sample. For remanufacturing purposes, they only serve as a model, on account of the diverse conditions prevailing in other workshops. Trouble-free remanufacturing should nevertheless be possible in most cases.

The program was created and tested on a Doosan Puma 2600SY CNC turning machine with a 2 x 24-position tool turret (24 for the main spindle, 24 for the counterspindle). The machine was equipped with a SINUMERIK 828D and a SINUMERIK Operate V4.7, SP3 HF1 user interface.

Note:

As a rule, the program can be easily adapted to other SINUMERIK versions, such as other SINUMERIK Operate software versions. Simulations and necessary changes, such as zero point adjustments, should always be carried out.

All CAD drawings, programs, and manufacturing descriptions for the workpieces can be downloaded free of charge at www.siemens.com/cnc4you. Normally we offer you the following files and formats: NC programs, PDF drawings and 3D data. For the Snowman with engraving you only need NC programs, so no drawings and 3D data are not provided in this case.

Snowman with engraving

www.siemens.de/cnc4you



3. Workpiece blanks/parts list

- Aluminum, round stock \varnothing 32 mm, length approx. 340 mm (120 mm protruding length of blank, 115 mm for clamping device, plus approx. 100 mm clamping length)



4. Turning machine and NC programs

- DOOSAN PUMA 2600SY CNC turning machine with counterspindle SINUMERIK 828D with SINUMERIK Operate V4.7, SP3, HF1



Part programs:

- SCHNEEMANN.MPF (production of the blank)
- SCHNEEMANN_GRAV_SPANN.MPF (device for clamping during engraving)
- SCHNEEMANN_GRAVUR.MPF (engraving of the blank)

NC/UKS/SCHNEEMANN/SCHNEEMANN	
P	Program header G58 Cylinder
Stock removal	T=SCHRUPP F=0.2/rev U=280m Face X0=32
Contour	C
Stock removal	T=SCHRUPP F=0.25/rev U=280m Longitudinal
Residual cutting	T=SCHL35 F=0.25/rev U=285m Longitudinal
Stock removal	T=SCHL35 F=0.075/rev U=250m Longitudinal
Stock removal	T=SCHL35 F=0.075/rev U=250m Face X0=32
Deep hole drill.1	T=SPIBO-5.0 F=0.035/rev U=115m Z1=-20
Centering	T=FASE-12 F=0.02/rev U=115m \varnothing 6.5
001: Positions	Z0=0 X0=0 Y0=0
Center tapping	T=GEU_M16 M16 S=500rev Z1=-12
Counterspindle	Complete S1-S3 G59
Cutoff	T=CUTTER_3 F=0.075/rev S=1500rev X0=32
Contour	C_G5
Stock removal	T=SCHRUPP_GG F=0.15/rev U=320m
Stock removal	T=SCHR_GG F=0.075/rev U=250m Longitudinal
END	End of program

Snowman with engraving

www.siemens.de/cnc4you



5. Tools used

Turning and drilling tools for machining the blank up to the anodization stage, ball end mill for engraving with the C axis, and thread cutter for the clamping device:

Tools for turning machine:

Tool/short name	Description
SCHRUPP	Roughing tool
SPIBO-5.0	Twist drill, 5.0 mm
GEW_M6	Metric tap, 6.0 mm
FASE-12	Chamfer, 12 mm
SCHL35	Finishing tool
SCHR_GG	Finishing tool, opposite direction
CUTTER_3	Cutting tool, 3 mm
SCHRUPP_GG	Roughing tool, opposite direction
GEW-GG-P1	Thread cutter, counterspindle (clamping device)
KUGEL-R1	Ball end mill for C axis

Snowman with engraving

www.siemens.de/cnc4you



6. Turning the blank and subsequently engraving it

The turned part is machined using the part programs listed below in accordance with the following machining phases:

- 1) Production of the blank at the turning machine
- 2) Anodization/coloration
- 3) Production of the clamping device for engraving
- 4) Engraving of the blank in the turning machine

If no turning machine with a counterspindle is available, the part program can be adapted for manual reclamping; the standard tools from the first half of the program should then be used instead of those for opposite-side machining.

The anodized/colored blank is not clamped directly for engraving, but with the aid of a device with a screw-on thread. The snowman blank is screwed tightly onto this device by hand using the threaded hole in the base of the snowman intended. This is the only way engraving the lower part of the snowman is possible.



Work steps at the turning machine

1. Approach the reference point of the machine.
2. Read in the tool list or zero offsets SCHNEEMANN_GRAVUR_TMZ.INI.
3. Measure the tools and enter them in the tool list.
4. Insert the tools in the magazine.
5. Read in the SCHNEEMANN.MPF part program for the snowman blank.
6. Clamp the workpiece, protruding length 120 mm.
7. Start the part program; the blank is programmed to be automatically accepted into the counterspindle.
8. Once the program is complete, remove and clean the workpiece, and anodize or color it by other means.
9. Load the SCHNEEMANN_GRAV_SPANN.MPF part program, clamp the raw material with a protruding length of approx. 115 mm in the counterspindle and produce the clamping device.
10. Check the protruding length of the device and set it to 115 mm. Screw the anodized/colored workpiece onto the device in the counterspindle.
11. Load the SCHNEEMANN_GRAVUR.MPF part program and modify the text to be engraved in the part program editor as required.



12. Start the part program.
13. Once the program is complete: Remove, clean and decorate the finished workpiece.

Surface quality and liquid cooling

We recommend performing the first phase of machining (until the anodization/coloration stage) with liquid cooling to achieve the envisaged surface quality. Depending on the type of coloration (anodization, etching, coating, etc.), the engraving can and should be performed without liquid cooling if this will adversely affect the color application.

Snowman with engraving

www.siemens.de/cnc4you



Machining sequence

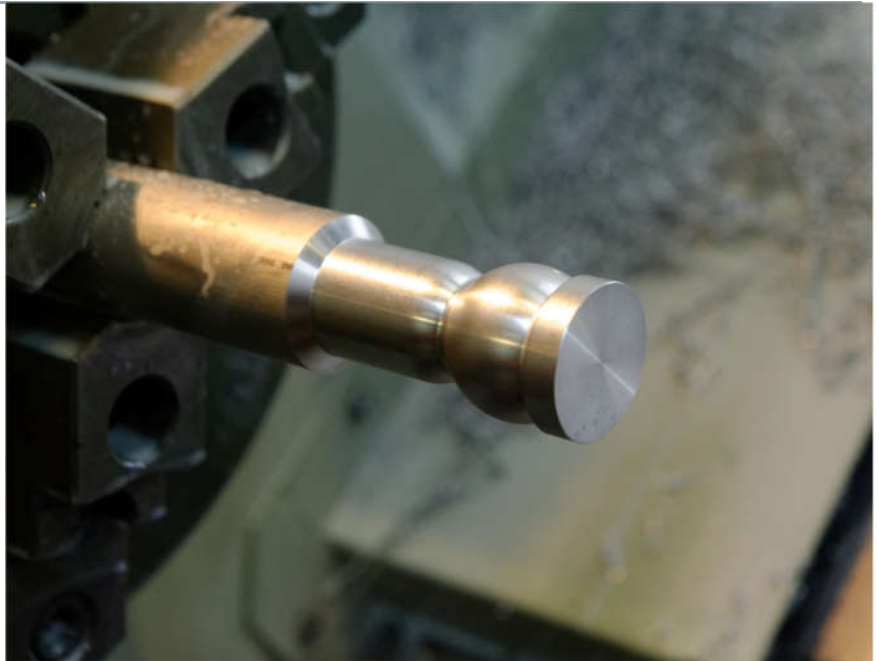
Work step	Figure
<p>Read in SCHNEEMANN part program. Clamp the raw material with a protruding length of 120 mm, start the first-side machining part program.</p>	
<p>Intermediate view during program stop after face turning and initial roughing.</p>	

Snowman with engraving

www.siemens.de/cnc4you



Intermediate view during program stop after reading in contour C, stock removal, residual stock removal, and initial finishing.



Intermediate view during program stop after face turning of the face end, drilling, and chamfering/centering.

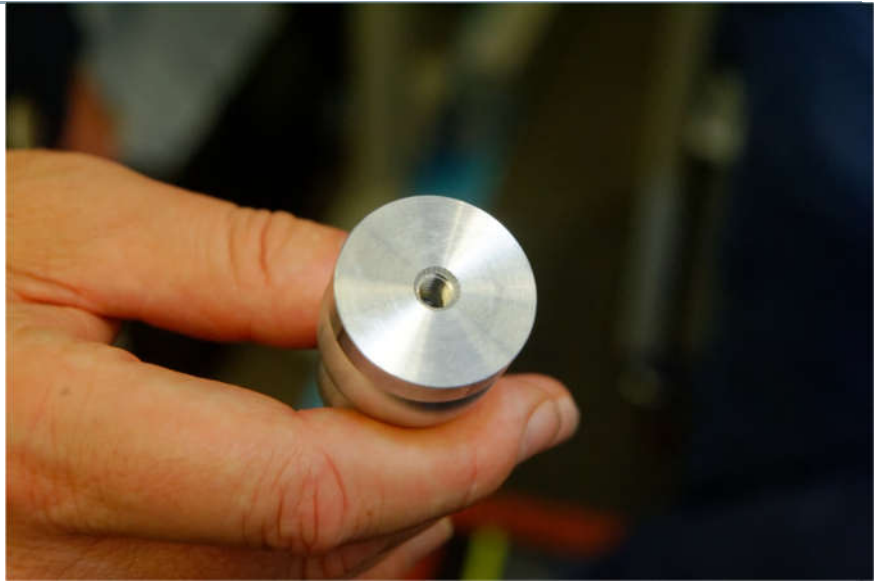


Snowman with engraving

www.siemens.de/cnc4you



Intermediate result after tapping.
This intermediate step is normally not visible at the machine, because the workpiece is automatically clamped and parted in the counterspindle following tapping.



Workpiece following parting in the counterspindle.



Snowman with engraving

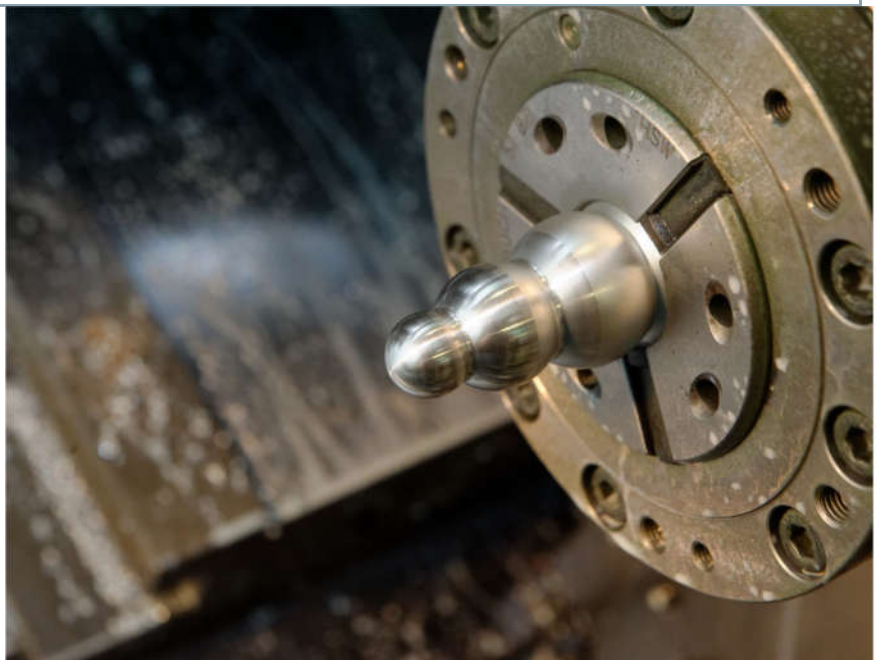
www.siemens.de/cnc4you



Intermediate view during program stop after reading in contour C_GS (from the counterspindle perspective) and roughing.





Finished snowman blank before unclamping.



Snowman with engraving

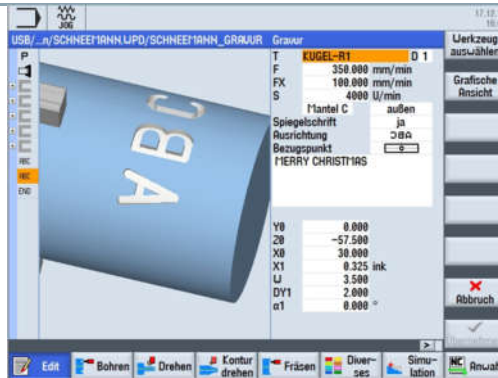


www.siemens.de/cnc4you

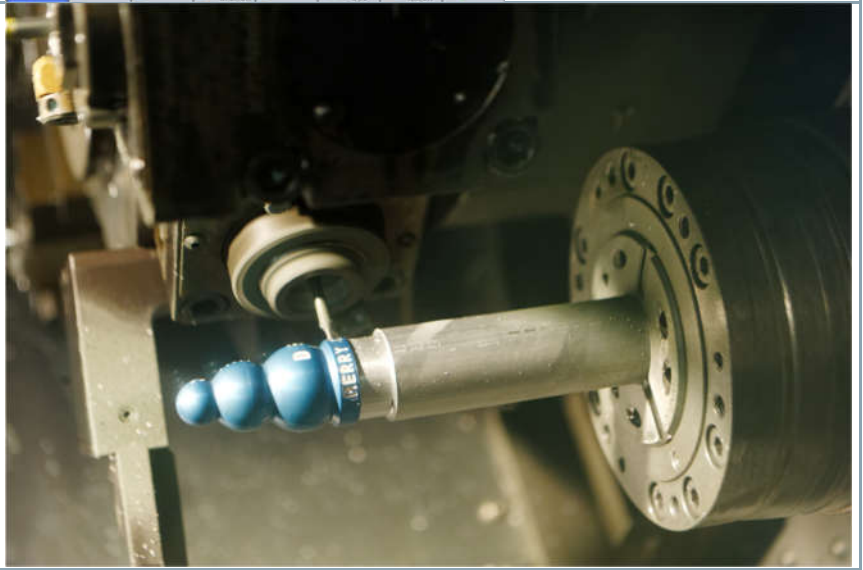
<p>Unclamp and clean the blank, and anodize or ink it by other means.</p>	
<p>Clamp the raw material in the counterspindle, load and execute the SCHNEEMANN_GRAV_SPANN part program. The photo shows the finished device with the threaded end onto which the snowman blank is screwed.</p>	
<p>Ensure that the device is clamped in the counterspindle with a protruding length of 115 mm. Screw the snowman blank on tightly by hand.</p>	



Load the
SCHNEEMANN_GRAVUR part
program, modify the text to be
engraved in the engraving cycle
...



... and execute the part program.



Snowman with engraving

www.siemens.de/cnc4you



Remove the finished workpiece,
blow the part out again well, let it
dry, and then decorate it!



Snowman with engraving

www.siemens.de/cnc4you



7. Information on the Internet

Design of parts, creation of drawings,
development of work plans for machining:

Digital Experience and Application Center
(DEX) Erlangen
Frauenauracher Strasse 80
91096 Erlangen

Published by:

Digital Experience and Application Center
(DEX)
Frauenauracher Strasse 80
91056 Erlangen

Details on the Doosan Puma 2400ST machine tool
used on the Internet:

<http://www.doosanmachinetools.com/>



Manuals and information issued by Siemens AG

Manuals and detailed information about our products can be found on the following websites:

- DOConWEB (<https://support.industry.siemens.com/cs/ww/en/view/109476679>)
- Service & Support portal (<https://support.industry.siemens.com>)
- SINUMERIK website (www.siemens.com/sinumerik)

Snowman with engraving

www.siemens.de/cnc4you

