Production of a Coordinate Cube



Coordinate Cube

"Know exactly what is required." Finally, extensive considerations for determining the coordinate axes and the sign for the direction of rotation are no longer necessary.

The coordinate cube consists of a single piece of material. The coordinate axes can either be labeled separately or be engraved directly in the milling machine. The cube is an informative example for the simple use of the CYCLE800 swivel cycle.

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

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Table of contents

1. Safety note	2
2. Preliminary remark	2
3. Workpiece blanks	3
4. miller and machining plans	3
5 Used Tools	4
7. Milling the Coordinate Cube	6
8. Information at the Internet	7
9. Figures	9

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 coordinate cube.

2. Preliminary remark

The following description is intended for persons acquainted with CNC machines and who have experience with or knowledge of SINUMERIK CNCs with ShopMill. 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.



The coordinate cube can be milled in a single clamping, provided the prerequisites for cutting are good and a suitable clamping device for swiveled machining is available. If this is NOT the case, you can first manufacture your own clamping device. This means two clampings are required for the manufacturing process.

The program has been programmed and tested on ShopMill 6.4. Normally, the program can be easily adapted to other SINUMERIK user interfaces, such as SINUMERIK Operate. SINUMERIK Operate also allows a complete simulation with swiveled planes.

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.com/cnc4you**. The following files and formats are available there:

Jobshop files / Tool list / Drawing as PDF

3. Workpiece blanks

- Coordinate Cube
 1 piece square stock, AlCuMgPb material, material number 3.1645
 square edge 50x50 71, cut-off length approx. 71 mm.
- 4. miller and machining plans
- Milling machine HERMLE C20U equipped with SINUMERIK 840D / ShopMill 6.4 Comment: The part has already been manufactured on a DMG DMU50 with SINUMERIK 840D / ShopMill 6.4. The swivel data block must be adapted to the associated machine.
- Machining plan KOORDWUERFEL.MPF for milling the socket in one clamping



5.. Used Tools

Milling tools

Designation	Tool name in the machining plan
Boring groove milling tool, 12 mm diameter	VHM_FRAESER_12
Machining: Mill coordinate finger and base cube surfaces	
Multimilling-tool, 10 mm diameter, 90°	FASER_WP
Machining: 3x chamfer coordinate fingers	
Multimilling-tool, 6 mm diameter, 90°	Multifr_D6_G90
Machining: Chamfer base cube and engraving	
WARNING Observe unclamping length of 30 mm! Maximum diameter 6 mm, otherwise danger of collision!	





Slotting cutter 125 mm diameter x 4 mm thickness Machining: Separation of the coordinate cube from the blank	Trennfr_D125_ovm
WARNING Measure from the above!	

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7. Milling the Coordinate Cube

The sawn blank is securely clamped. The swivel data block has been adapted to the associated machine.

Machining steps on the milling machine

- 1. Home the machine.
- 2. Load the KOORDWUERFEL.MPF machining plane.
- 3. Enter the measured tools in the tool list.
- 4. Insert the tools in the magazine
- Set the workpiece zero-point by scratching or contacting. The workpiece zero-point is located at the left-hand front workpiece edge X-12 Y-12 Z on the blank surface Z+37.5.
- 6. Perform simulation.
- 7. Start production, execute machining plan.





8. Information at the Internet

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

Hans-Peter Moser Moser CNC-Training, Strasser Weg 4 in 89233 Neu-Ulm, E-Mail: info@moser-cnc-training.de

Details of the tool machine to be used

Maschinenfabrik Berthold Hermle AG Industriestraße 8-12, 78559 Gosheim, Internet: <u>www.hermle.de</u>

Gildemeister Aktiengesellschaft, Gildemeisterstraße 60, 33689 Bielefeld, Internet: www.gildemeister.com

Details of the tools to be used

Paul Dümmel Werkzeugfabrik GmbH, Lerchenstr. 15, 72584 Hülben, Internet: www.duemmel.de

High-performance arbor-mounted slotting cutter Type 591



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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

Coordinate Cube, back and front



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Simulation SinuTrain SINUMERIK Operate 4.4









Coordinate Cube before cutting



Production of a Coordinate Cube







Milling the fingers



Production of a Coordinate Cube







Cutting the Coordinate Cube



Production of a Coordinate Cube







Trainees BiA Karlsruhe after milling the Coordinate Cube



Production of a Coordinate Cube







Trainees KHWS Biberach after milling the Coordinate Cube



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