



TRAINING FOR TOMORROW'S PROFESSIONALS

A CNC Training Initiative by KNUTH Machine Tools and Siemens

In a joint initiative, Siemens and KNUTH Machine Tools developed a complete training system comprising CNC machine tools, training PCs, and real-world learning software. These systems are used to teach users how to program and operate CNC machines and to deepen the knowledge of advanced users. Two systems are offered for different extents of training requirements.

The use of CNC machines is an absolute prerequisite in today's manufacturing environment, which demands high quality and reproducibility with high-volume output in the shortest possible production time. Furthermore, machines must provide a high degree of flexibility to accommodate the continuously growing product variety. This leads to increased pressure on employees, who are responsible for creating the required NC programs. In view of the German government's Industrie 4.0 Project, which stipulates advancing automation in manufacturing, the CNC machine will no longer be just the control component of a modern machine tool, but an important interface for every phase and task of the entire manufacturing process.

The proven concept of dual vocational education and training combines practical experience through hands-on work with classroom training content that is provided by vocational schools. The realization of this concept requires the availability of suitable training systems at these schools. The same applies to continuous education at technical academies. The CNC training systems used in these settings must:

- Allow practical training under real-world conditions
- Be very robust so trainees can perform intensive, high-powered practice tasks
- Have an affordable purchase price and be cost-effective in ongoing operations

The training systems provided under the CNC training joint initiative of Siemens and KNUTH meet all these requirements to the fullest extent. Additionally, these CNC machine tools feature a very compact design so they can be used in areas with restricted space.

Each training system includes an inclined-bed lathe, a vertical machining center, and a module consisting of four training PCs with pre-installed Siemens software. Additionally, each system includes two video cameras to be mounted in the rooms where the machines are set up. In the Basic version, a SINUMERIK 808D is used as machine control, while the more advanced Master version includes a SINUMERIK 828D.

An offline programming tool is installed on each training PC – "808D on PC" for the Basic version, and "SinuTrain" for the Master version. This tool allows each trainee to practice his/her programming results via simulation at the training PC to test the program's function. Subsequently, these NC programs will be transferred to the respective machine tool to try out the real machining process. Training materials and documents provide detailed instructions

describing the required steps for creating an executable NC program according to DIN ISO 66025 as well as the use of individual G commands and machine-specific M commands. These instructions also focus on workshop-oriented programming (cycle control) and optionally will explain the use of PAL codes. Training tasks include turning and milling parts that are especially suited for training purposes. The Learning Software also includes occupational safety instructions for the operation of CNC machine tools and maintenance instructions.

Two video cameras are included to visualize and document the processes during execution of the NC programs in order to give trainees a high degree of feedback and an optimum learning experience. This also is a great motivator, since each trainee can present this video showing the completion of his/her "master piece".

KNUTH also supports training providers during the preparation of training courses. *The scope of one CNC Training System includes an admission certificate for a Trainer Seminar at the Technology and Application Center (TAC) at Siemens in Erlangen, Germany. This certificate gives you access to SINUMERIK training documentation for trainers and keeps trainers continuously up-to-date on the newest developments in CNC technology.*

Of course these training systems can also be used directly by each business for internal training and continuous education of their employees. Both packages use proven production machines that can be used between training courses for individual manufacturing tasks.

KNUTH Machine Tools is a leading supplier of conventional and CNC-controlled machine tools. The great success of our business is based on highest quality standards, technology innovations, 90 years of experience and very competitive pricing. Our network of German and international branches and dealer locations ensures worldwide accessibility for our customers at a local level, market-covering presence, expert consultation and prompt service.

For detailed information and specifications on our complete portfolio of plate machining systems and machining centers, please browse the KNUTH website at **www.knuth.de**.

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