



# HEIDENHAIN



## NC Programming

### **Teaching and Learning**

Basic and Advanced Training Offers

December 2015

# Foreword

The solid training of skilled staff is one of the main pillars of the excellent name enjoyed by goods and products made in Germany. It stems essentially from the dual training system with its two-track system: practical professional training on the shop floor and theoretical backup in the vocational school.

However, the best possible training is only when the aspiring professionals are taught and learn in theory and practice at the level that matches the standards demanded in their later workplaces.

HEIDENHAIN offers further training, teaching materials, learning aids and academic equipment to training

companies, vocational schools, universities of applied sciences and universities that provide NC training in the metal sector with the main focus on milling and turning.

With this offer we want to do our part towards ensuring that the desperately needed young skilled professionals in the metal industry are given training under the best possible conditions:

- With the best qualified personnel who can competently answer all questions of theory and practice.
- With the same tools and equipment used in the vocational schools and universities of applied sciences as in the company.

- With modern teaching materials which correspond to today's working environments and fully prepare students for the real tasks ahead.

Get in touch with us directly and benefit from our offer! We will be happy to support you and your training facility.

Best regards,  
DR. JOHANNES HEIDENHAIN GmbH

## The HEIDENHAIN Training Center: over 30 years of competence in basic and advanced training.

Over 1000 students leave the HEIDENHAIN Training Center every year with qualifications in professional skills, in particular in the operating and programming of HEIDENHAIN controls. Add to this the comprehensive training in PLC programming and the commissioning and optimizing of machines.

This wealth of experience is passed on by HEIDENHAIN to apprenticeship workshops, vocational schools, universities of applied sciences and other seats of higher education. Just as students in corporate training programs, you will be able to use the modern equipment of the

training center oriented on real workshop conditions: a machine shop with the latest machines and course rooms with programming stations, exactly as we offer you for your teaching.

### Contact:

We will gladly answer any questions about the HEIDENHAIN Training Center specially designed for professional training facilities.

**HEIDENHAIN**  
**Training Center**  
**Dr.-Johannes-Heidenhain-Straße 5**  
**83301 Traunreut, Germany**

+49 8669 31-1695  
mtt@heidenhain.de



The latest information about training courses is also available here:  
[training.heidenhain.de](http://training.heidenhain.de)



# Our offerings

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# Quality through qualification

## Advanced Training for Practice-oriented Teaching: Special HEIDENHAIN Courses

Specialist qualifications and advanced training are indispensable in today's professional world. For this purpose, HEIDENHAIN offers you a specially optimized basic teacher training course: "iTNC 530 **Klartext** conversational programming."

The basic course gives you practice-oriented, efficient and applied specialist knowledge of the fundamental functions of TNC controls. You get to know the TNC functions from numerous programming examples. Practical exercises reinforce the knowledge gained. This includes testing the functions learned and the programs created directly on modern CNC machines in the machine hall of the HEIDENHAIN Training Center.

All the course documentation that you receive in this basic course is also available from HEIDENHAIN free of charge as a PDF. You can use excerpts or the complete documentation for your classes.



### Basic teacher training course for iTNC 530 Klartext conversational programming

#### Course contents

##### Basic knowledge

- File management
- Tool table
- Data transfer

##### Path functions

- Cartesian coordinates
- Polar coordinates

##### Cycles

- Drilling cycles
- Cycles for milling pockets, studs and slots
- Cycles for machining point patterns
- SL cycles
- Cycles for coordinate transformation

##### Programming techniques

- Program section repeats
- Subprogramming
- Nesting

#### Requirements

- Knowledge of milling according to a drawing
- CNC fundamentals

#### Target group

- Company trainers
- Teachers in vocational schools and colleges

#### Objectives of the course

You can create and test programs from workpiece drawings with HEIDENHAIN **Klartext** conversational programming.

#### Teaching materials

The course participants will receive documentation which they can then use in their own CNC classes.

#### Duration

4½ days,  
Monday 8:00 AM - Friday 12:00 PM



## Not only, but also for training

Naturally it is not only the basic training course in iTNC 530 teaching that is of interest to you. After all, there are also other HEIDENHAIN controls which are relevant for the training program. Or maybe you would like to build on your knowledge from the basic course with an advanced training course or go even further with a special training course.

After consulting HEIDENHAIN you can book the following courses with special conditions for training and teaching staff.

### Basic courses

- TNC 320/TNC 620/TNC 640  
**Klartext** conversational programming
- iTNC 530  
**Klartext** conversational programming
- MANUALplus 620
- CNC PILOT 640

### Advanced courses

- TNC **Klartext** conversational programming

If you are interested in a course from our program beyond this—for example, a special course or user workshop—then please get in touch with us. All the contact details are given below in the infobox.

On agreement we also offer training courses on-site or at a teaching facility in your neighborhood. Information is likewise available via the telephone hotline indicated below or by e-mail.



## Information sources

An up-to-date overview of the HEIDENHAIN training program and detailed information about training course contents and dates are always available on the Internet by going to:



[http://training.heidenhain.de/de\\_EN/training-program/](http://training.heidenhain.de/de_EN/training-program/)

Here you can also apply directly for a training course. When applying, please enter *FöPS* in the "Message" field.

We will gladly answer any questions you have about all the training courses directly:

+49 8669 31-1695  
[mtt@heidenhain.de](mailto:mtt@heidenhain.de)

# Quality through qualification

HEIDENHAIN Services help ensure that your classes run smoothly

## Advice and assistance from experts: The HEIDENHAIN helplines

Problems with the HEIDENHAIN controls and programming stations you are using in your classes or training courses? In-depth questions about programming HEIDENHAIN controls which you cannot answer? Questions about measuring systems? No problem! Just call the HEIDENHAIN helplines!

Competent experts will be ready to field all your technical questions about HEIDENHAIN products. The control specialists are sitting directly at the programming stations with operating panel. In this way they can reproduce your problems directly, precisely follow your operations and clearly explain the appropriate solutions.



## On-site service for installation

We offer an on-site service to ensure that your HEIDENHAIN programming stations and machine tools with HEIDENHAIN controls work perfectly and are optimally adjusted to your requirements for teaching

and training. The service supports you when installing your equipment and provides tips and tricks for the competent and easily comprehensible teaching of your trainees.

## Information sources

### HEIDENHAIN technical helplines

#### NC programming

- For all questions about programming and operating our TNC controls:  
☎ +49 8669 31-3103  
service.nc-pgm@heidenhain.de

#### NC support

- For all questions about the hardware of our TNC controls:  
☎ +49 8669 31-3101  
service.nc-pgm@heidenhain.de

#### PLC programming for TNC

- For all questions about adapting control functions to individual machine parameters:  
☎ +49 8669 31-3102  
service.plc@heidenhain.de

#### Measuring systems/machine calibration

- For all questions about using our measuring systems and machine calibration:  
☎ +49 8669 31-3104  
service.ms-support@heidenhain.de

### HEIDENHAIN commercial helpline

- For all questions about repairs, spare parts, replacement systems and complaints:  
☎ +49 8669 31-3121  
service.order@heidenhain.de

# Quality through qualification

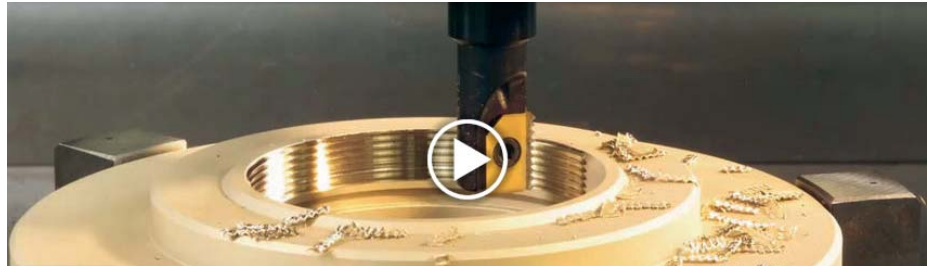
Keep on the ball with online offers from HEIDENHAIN

## Webinars for learning and teaching

Our webinars provide you as teachers the capability to learn about new functions and deepen your knowledge of specific topics.

The dates of the next **Live Webinars** are published on the Industry Arena home page [de.industryarena.com](http://de.industryarena.com) under > Media > Webinars.

**Recorded webinars** are available in the HEIDENHAIN **Klartext** portal, on HEIDENHAIN TV on YouTube or in the Industry Arena. Naturally you can also use the recorded webinars in your classes.



## Data collections for class preparation

On the Internet there are two absolutely essential data collections which will help you prepare your classes:

- The **NC Database** is a collection of solutions to regularly occurring problems. Here you can download NC programs and use them on your machine or programming station. The NC database also contains a special category for training workpieces.
- Our **FAQ Collection** contains answers to questions which have often been asked on our helplines. This makes the FAQ Collection an interesting tool in two ways: it keeps you up to date and you can also use it as a source of questions and tasks for your trainees.

[www.klartext-portal.com](http://www.klartext-portal.com)  
under > Media library > Webinars



[www.youtube.com/heidenhaintv](http://www.youtube.com/heidenhaintv)



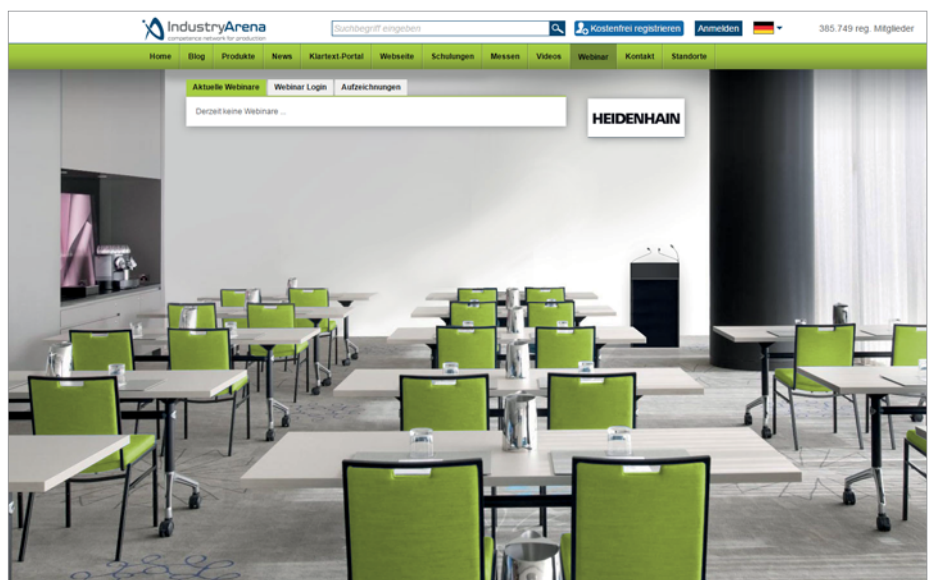
[de.industryarena.com/webinar](http://de.industryarena.com/webinar)



[www.klartext-portal.de/nc-solutions](http://www.klartext-portal.de/nc-solutions)



[nfaq.heidenhain.de](http://nfaq.heidenhain.de)



# Quality through qualification

Learning for a successful future: well prepared for the job

The Oskar-von-Miller vocational school in Schwandorf emphasizes a type of vocational education that provides students with an optimal career start from modern equipment and motivated teachers. Over 3,500 students are educated here every academic year in various, predominantly technical occupations.

In metal technology the school uses HEIDENHAIN equipment and for its implementation in teaching, the teachers and faculty advisors have been specially trained in the HEIDENHAIN Training Center. The enthusiasm is great on all sides: with teachers, trainees and the training companies.

There is only very little time for NC programming; a time which the vocational school aspires to put to optimum, practice-oriented use. "This is why I have given my full backing to using HEIDENHAIN solutions in classes," explains Alois Meyer, Head of the Metal Technology Department at the Oskar-von-Miller vocational school. "I got to know about what HEIDENHAIN has to offer at an advanced teacher training course and was immediately impressed.



HEIDENHAIN provides vocational schools, apprenticeship workshops and universities of applied sciences with a truly comprehensive package from qualification of teachers to practical tools like the programming station and the HIT learning software through to support in installing hardware and software in the school."

Today, the trainees at the Oskar-von-Miller vocational school have a classroom with HEIDENHAIN programming stations that are fully integrated into the school network. This permits programs created on these programming stations to be called directly at the machine tool in the apprenticeship workshop and tested under realistic





conditions. Johann Klein, the teacher and faculty advisor for the metal workshops, emphasizes that “without the programming stations, many students would not have the opportunity to gain practical NC experience from the very beginning.”

The trainees join in the enthusiasm. “In the vocational school I now have the equipment equivalent to that in my training company,” says a happy student in the precision mechanics class. “My trainers told me that previously they learned programming on paper!” said a bemused fellow student.

Johann Klein can only laugh here: “Of course, writing programs on paper is inconceivable and quite ridiculous for trainees in the age of smartphones and tablets. And they are quite right in this opinion. That is why we are very happy to have the programming stations at our disposal.” Just how practice-oriented the trainees are today is reflected in their preferred choice of final examination. Examinations on the NC machine are

nowadays clearly more common than the conventional written final papers.

In Schwandorf, the trainees and teachers alike are also full of enthusiasm about **HIT, the HEIDENHAIN Interactive Training** program. This interactive learning software combines theoretical learning with practical exercises and illustrative videos. This is the method in which HIT demonstrates important procedures and processes on a CNC machine and amply fills the gap in teaching inevitably left by the tight schedule for CNC programming. Johann Klein: “Students can learn on their own and as teacher I can use that time to devote myself to individual questions and problems.”

The trainees greatly appreciate this: “With HIT I can manage almost completely on my own” and “the animations are very practice-oriented” are just some of the comments from the class. One student was full of praise: “HIT is the perfect solution for independent learning. The application is designed in straightforward

and comprehensible learning steps. The cycles, for example, are described very vividly. HIT shows you step by step what has to be done.” Another student added: “if we do get to a point where we can’t go on, Mr. Klein can answer our questions directly in class. In this way we learn very efficiently and also take practical knowledge with us from the vocational school to the company.”



# Equipped for training

## Practice meets theory: the HEIDENHAIN programming station

HEIDENHAIN provides programming stations for classrooms so that for NC programming classes you can rely on the same equipment used in practice on milling, mill-turn, and turning machines.

### What is a programming station?

At the heart of the HEIDENHAIN programming station is the programming station software. It runs on Windows PCs and is the PC-based counterpart of a HEIDENHAIN control. In this way the programming station software perfectly simulates the real machine workplace and permits you to create CNC programs as on the machine but in peace and quiet away from the shop floor. Many companies use the HEIDENHAIN programming stations also as an extension to or instead of CAD/CAM systems in their design and development departments for this reason.

### Which programming stations are available?

You can choose between programming stations for creating Klartext conversational programming and DIN/ISO programs for the milling and mill-turn controls:

- TNC 640
- TNC 620 and TNC 320
- iTNC 530

and programming stations for creating smart.Turn and DIN PLUS programs for the turning controls:

- CNC PILOT 640
- MANUALplus 620

### What is in the programming station software package?

The programming station software delivers all the functionalities of the HEIDENHAIN controls. These include functions and software options as well as cycles.

### Practical addition: the TNC operating panel

Naturally you can also operate the programming station software with a conventional PC keyboard. The interesting and practical point is that you can equip your classroom with the original TNC operating panel.

This then truly unites workshop conditions with theory. In the class you can implement the original operating panel with all the keypads like the axis selection keys and function keys.



You can download the free demo versions of the HEIDENHAIN programming stations and TNCremo from our home page: [www.heidenhain.de](http://www.heidenhain.de) > Documentation / Information > Software > Downloads

### How do you implement the programming station?

You can choose between the free demo versions with a restricted storage capacity for NC programs of a maximum of 100 blocks and the full versions which HEIDENHAIN offers at very attractive prices for training purposes. You can also order the full versions as single-station licenses or network licenses for 14 or 20 workstations.

### How does my NC program get from the programming station to the machine?

You can use the free TNCremo PC software to transfer NC programs as well as tool and pallet tables between the programming station and the TNC control. Furthermore, you can also make data backups.

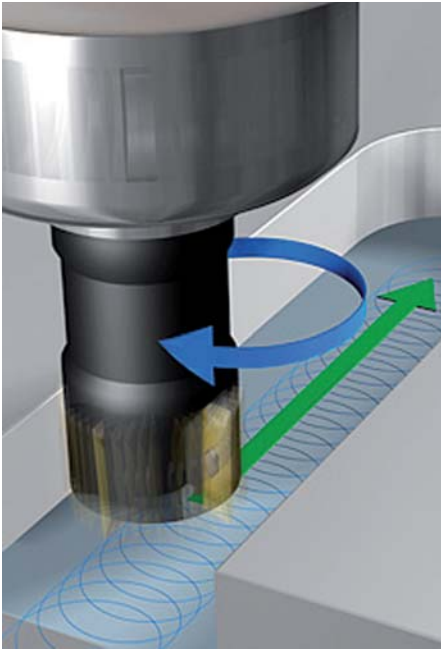
The paid version, TNCremoPlus, provides you with advanced functions like the live-screen function. This permits you to transfer screen contents to the PC and to always see what is happening on the control screen.

	Single-station license with TNC operating panel	Single-station license with virtual keyboard	Network license for 14 stations with virtual keyboard	Network license for 20 stations with virtual keyboard
Milling TNC 640	1113967-01	1113924-01	1113926-01	1113928-01
Milling TNC 620 and TNC 320	1113967-01	1113924-01	1113926-01	1113928-01
Milling iTNC 530	1113967-01	1113924-01	1113926-01	1113928-01
Turning MANUALplus and CNC PILOT 640		737157-xx	737158-xx	737159-xx

# Equipped for training

A film says more than a thousand words: videos, animations and webinars

Many processes and the necessary operations are difficult to explain in words. How would you explain 'trochoidal milling' for example?



In texts we describe trochoidal milling like this:

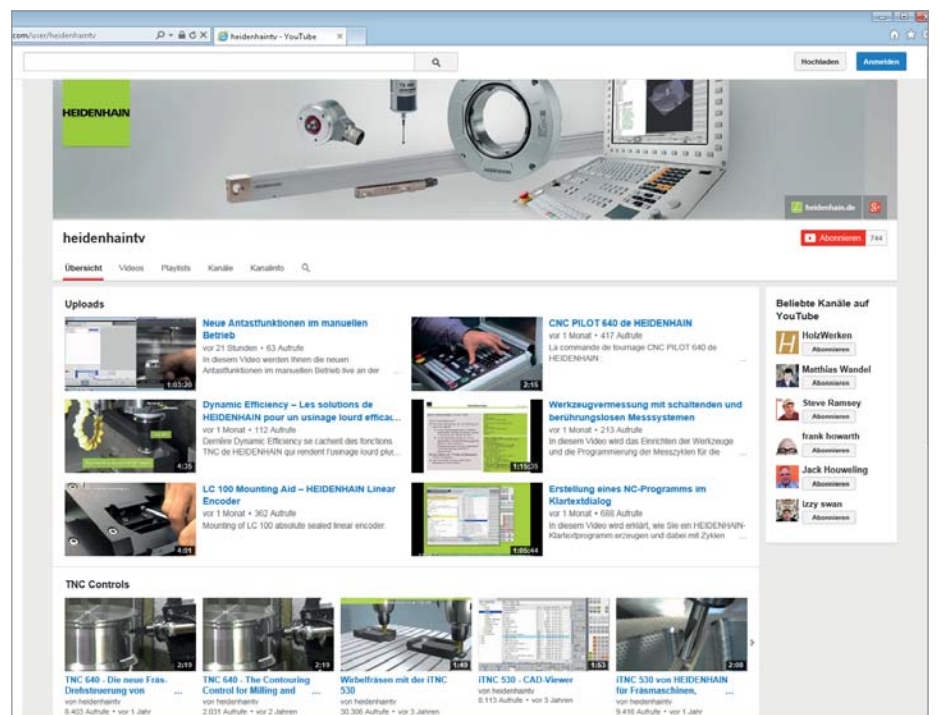
“With trochoidal milling the roughing process is performed with circular movements overlaid with a linear forward feed.” There is also a diagram. The reader needs a great deal of technical understanding and imagination to get an idea of what trochoidal milling is about. It takes animated images to really demonstrate the complex movements and above all the enormous dynamics of trochoidal milling.

## HEIDENHAIN TV on YouTube

That is the reason for HEIDENHAIN TV on YouTube. This provides **videos from the shop floor and animated sequences** which you can use in your classes and for training. They clearly show the processes above all of complex machining operations and functions.

HEIDENHAIN TV also includes recordings of webinars held by our trainers from the HEIDENHAIN Training Center, which you are invited to use in whole or in excerpts in the classroom.

[www.youtube.com/heidenhaintv](http://www.youtube.com/heidenhaintv)



# Equipped for training

## Getting content across: HIT supports teaching

As a learning method for HEIDENHAIN controls, the HIT program (HEIDENHAIN Interactive Training) ideally combines theoretical learning with practical exercises into an autodidactic educational strategy.

The HEIDENHAIN learning method can be used for qualified basic and advanced training. It consists of three modules:

- HEIDENHAIN programming station
- HIT Workbook
- HIT Software

These three modules combine the academic with the practical and thus deliver firm and solid knowledge as a gateway to programming HEIDENHAIN controls.

### The HIT Workbook: Programming tasks

The HIT workbook is the guide to the HIT learning method. It includes work assignments, tasks and numerous programming examples. The HIT workbook leads trainees step by step through the programming of a workpiece—either using the HIT software or on a HEIDENHAIN programming station.

**HEIDENHAIN**

HIT HEIDENHAIN Interactive Training

**Inhalte**

1. Die CNC-Fräsmaschine
2. CNC-Grundlagen
3. Technologische Grundlagen
4. Lineare Bewegungen
5. Kontur-Programmierung
6. FK-Programmierung
7. Zyklen
  - CYCL DEF / CYCL CALL
  - Planfräsen
  - Rechtecktasche
  - Kreistasche
  - Nutenfräsen
  - Bohren
  - Gewindebohren
  - Universal-Bohren
  - Zusammenfassung
  - Arbeitshelf / Programmierplatz
8. LBL-Anwendungen

**Abschlusstest**

**Planfräsen**

Mit Zyklen wird eine Vielzahl von Einzelbewegungen in einem NC-Satz zusammengefasst. Zyklen machen das NC-Programm übersichtlich.

6. CYCL DEF 232 PLANFRAESEN

- Q389=+2
- Q225=+0
- Q226=+0
- Q227=+0
- Q386=+0
- Q218=+60
- Q219=+20
- Q202=+5
- Q369=+0
- Q370=+1
- Q207=+500
- Q385=+500
- Q253=+750
- Q200=+2
- Q367=+2
- Q204=+50

:STRATEGIE  
:STARTPUNKT 1. AXHSE  
:STARTPUNKT 2. AXHSE  
:STARTPUNKT 3. AXHSE  
:ENDPUNKT 3. AXHSE  
:1. SEITENLAENGE  
:2. SEITENLAENGE  
:MAX. ZUSTELLTIEFE  
:AUFMAG TIEFE  
:MAX. UEBERLAPPUNG  
:VORSCHUB FRAESEN  
:VORSCHUB SCHLICHTEN  
:VORSCHUB VORPOS.  
:SICHERHEITS-ABST.  
:SI-ABSTAND SEITE  
:2. SICHERHEITS-ABST.

**Programmieren Sie die Zyklus-Definition**  
Bestätigen Sie Ihre Eingaben mit <ENTER>.

Mäanderförmige Bearbeitung (Zustellung außerhalb des Werkstücks).  
Der Messerkopf soll 2 mm planfräsen, so dass danach die Oberfläche bei Z0 liegt. Es soll in einem Schnitt plangefräst werden.  
Es soll mit einer Überlappung 1,41 x Werkzeug-Radius gefräst werden.  
VORSCHUB FRAESEN = 750 mm/min

Installations-Hilfe 1 2 Lösung i < >

The HIT learning method gives you a vast number of applications for the classroom and the shop floor. You can seamlessly integrate films and animations into your teaching, plus practice-oriented tasks.

However, the interactive operation and autodidactic learning method also enables you to set the trainees tasks for which they have to work out the solutions by themselves.

### The HIT Software: learning NC programming on the PC

Modern and interactive—the HIT software teaches, trains and tests basic and advanced knowledge of HEIDENHAIN controls. Animations clearly illustrate control functions; tasks and exercises reinforce what has been learned and assess the trainees' learning status.



## The HIT learning packages

There are various HIT learning packages available to suit your teaching needs:

### HIT Klartext conversational and HIT DIN/ISO

These two learning packages—tailored to the programming language in each case—are for:

- CNC milling machines
- CNC fundamentals
- Technological fundamentals
- Linear motions
- Contour programming
- Free contour programming
- Cycles
- LBL applications

### HIT Tilting 3+2

The HIT Tilting 3+2 learning package builds on the HIT Klartext conversational package and imparts the specific knowledge required for tilted operations with a HEIDENHAIN TNC control:

- Fundamentals of tilting
- Tilting with one spatial angle
- Zero point shift
- Program structure
- Tilting program optimization
- Tilting with multiple spatial angles

### HIT Turning

The HIT Turning learning package illustrates and explains the function and programming of turning machines:

- CNC turning machines
- Technological fundamentals
- CNC fundamentals
- Contour programming with G codes
- Cycle programming with smart.Turn
- C-axis machining
- Y-axis machining

All four HIT learning packages are available in the following versions:

#### ■ Free demo version

You can use selected sections from the complete package as a single-station license as part of a cloud application\* with unlimited duration.

#### ■ Single-station license—cloud application\*

This single-station license gives you full access to all the contents of the selected HIT learning package for 12 months.

#### ■ Single-station license—download version

This single-station license gives you full access to all the contents of the selected HIT learning package for 12 months.

#### ■ Network license—download version

The network license gives you full access on 20 PC workstations to all the contents of the selected HIT learning package for an unlimited duration.

\* To use the cloud applications you need a permanent Internet access.



All HIT learn packages are available online at:  
[hit.heidenhain.de/800/purl-eng](http://hit.heidenhain.de/800/purl-eng)



The printed HIT workbooks can be ordered via the CNC-Verlag online shop:  
[www.cnc-verlag.de](http://www.cnc-verlag.de)

# Equipped for training

Classroom classics: training kit, coordinate cross and other tools

## Training kit: measuring systems made clear

Without high-precision measuring systems modern machine tools as well as machines used in the electronics industry, automation and medical technology would never be able to achieve the degrees of precision possible today in the micrometer and even nanometer range. But how do rotary encoders, angle encoders and linear encoders work?

The HEIDENHAIN training kit contains models and instruments as well as DVDs which you can use to clearly illustrate positioning:

- A 140-mm long glass scale on which you can demonstrate the measuring standard—a grating scale on glass.
- A cutaway model of a sealed linear encoder as found typically on machine tools. The cutaway model allows you to demonstrate and explain the components and their functions.
- A take-apart absolute rotary encoder as commonly used in electric drive controls. You can also use the take-apart model to give a clear explanation of the components and their functions.
- The probe systems DVD: How do you measure workpieces and tools and why is this so important for precision manufacturing?
- The linear encoders for machine tools DVD: Why is precise length measurement important for positioning?



## Coordinate cross: all axes at a glance

There are many rules of thumb and mnemonics to help remember the designations of a machine tool's axes. But nothing is as simple as the HEIDENHAIN coordinate cross. It shows the X, Y and Z axes as well as the rotary axes A, B and C.

This illustrates very clearly and quickly the motion of the axes in the machine space. At the latest when tilting is on the curriculum the coordinate cross becomes an essential tool for explaining and understanding these movements.



## User's Manuals

In order to have hard and fast documentation on the HEIDENHAIN controls for your classes you can procure the **User's Manuals** for all the current milling, mill-turn and turning controls as PDF files or printed documents.

PDF available at [www.heidenhain.de](http://www.heidenhain.de) under >Documentation / Information > Manuals > TNCguide



Printed version via [www.cnc-verlag.de](http://www.cnc-verlag.de) under > HEIDENHAIN User's Manuals



In the Operating Manuals Archive (O.M.A.) on the HEIDENHAIN home page you can also find the operating manuals for older controls:

[www.heidenhain.de](http://www.heidenhain.de) under > Documentation / Information > Manuals > O.M.A. Controls



## Rollups, posters

We also supply rollups and posters to assist you with teaching in classes and training in the apprenticeship workshop.

More information about the motifs and content are available by sending an e-mail to:

[foeps@heidenhain.de](mailto:foeps@heidenhain.de)

# Equipped for training

## Customized for you: training packages from HEIDENHAIN

To keep you from worrying about getting the right teaching materials, we have put together different packages based on our experience in training and in close cooperation with vocational schools and universities of applied sciences. If you find that the packages and their contents do not meet your requirements, please just get in touch with us. We will gladly customize the materials and the mix to meet your special needs.

### Package 1: Complete equipment

With this package we provide everything you need to equip a classroom.

- 14 TNC operating panels
- 1 TNC programming station dongle
- 1 TNCremoPLUS dongle
- 15 coordinate crosses
- 1 user's manual for **Klartext** conversational programming
- 1 user's manual for cycle programming
- 1 training kit
- 1 network version of HIT **Klartext** Conversational or DIN/ISO
- 14 HIT **Klartext** Conversational or DIN/ISO workbooks
- 1 HIT **Klartext** Conversational or DIN/ISO solutions workbook
- 1 network version of HIT Tilting 3+2
- 14 HIT Tilting 3+2 workbooks
- 1 HIT Tilting 3+2 solutions workbook
- 1 network version of HIT Turning
- 14 HIT Turning workbooks
- 1 HIT Turning solutions workbook
- 15 programming station DVDs
- 15 TNC training DVDs
- 1 set of posters FöPS (1 set = 6 items)
- 2 rollups
- 1 week basic training course for 2 persons in Traunreut
- 3-day practical workshop on site including commissioning of the HEIDENHAIN hardware and software; adjustment of the tool table to your machine; training on the machine





### Package 2: Basic equipment

The basic equipment includes the essential components of our training materials and equipment:

- 14 TNC operating panels
- 1 TNC programming station dongle
- 15 programming station DVDs
- 1 TNCremoPLUS dongle
- 15 coordinate crosses
- 1 user's manual for **Klartext** conversational programming
- 1 user's manual for cycle programming
- 1 training kit

### Package 3: Advertising material

The advertising material not only peeps up your classroom or apprenticeship workshop, but also provides additional important information:

- 15 programming station DVDs
- 15 TNC training DVDs
- 1 set of posters (6 items)
- 2 rollups

### Package 4: E-learning

The e-learning package includes all the available learning packages for turning and milling with HEIDENHAIN controls:

- 1 network version of HIT **Klartext** Conversational or DIN/ISO
- 14 HIT **Klartext** Conversational or DIN/ISO workbooks
- 1 HIT **Klartext** Conversational or DIN/ISO solutions workbook
- 1 network version of HIT Tilting 3+2
- 14 HIT Tilting 3+2 workbooks
- 1 HIT Tilting 3+2 solutions workbook
- 1 network version of HIT Turning
- 14 HIT Turning workbooks
- 1 HIT Turning solutions workbook

### Package 5: Training/Commissioning

The package is designed for all those who have recently chosen HEIDENHAIN hardware and software for their work. The package comprises the following:

- 1 week basic training course on **Klartext** conversational programming for 2 persons in Traunreut
- 3-day practical workshop on site including commissioning of the HEIDENHAIN hardware and software; adjustment of the tool table to your machine; training on the machine



# Equipped for training

## FöPS—the sponsorship program for professional training from HEIDENHAIN

Today's trainees are the skilled professionals of tomorrow who will shape our future. Why shouldn't we introduce these trainees to modern and future-oriented technology now?

Imparting specialist knowledge and reinforcing it in practice can only come about when companies and professional training centers work together.

Essentially this means that trainees should be provided with the same tools in the company as in the vocational school.

This is why HEIDENHAIN has initiated the **FöPS** sponsorship program. The FöPS sponsorship program enables training companies that offer NC training in the metal sector with the main focus on milling and turning to provide the same conditions

for students doing NC training as in vocational training institutions.



All the offers in this catalog for further training, teaching materials, learning aids and academic equipment are provided by HEIDENHAIN in the scope of its FöPS sponsorship program for vocational schools.

With FöPS you also receive regular news bulletins about the latest offers in the program.

Your central address for FöPS activities:

**HEIDENHAIN**  
**Re: FöPS**  
**Dr.-Johannes-Heidenhain-Straße 5**  
**83301 Traunreut, Germany**

+49 8669 31-3132  
[foeps@heidenhain.de](mailto:foeps@heidenhain.de)

# Fax query about "Equipped for Training"

## Your address:

_____ School / University	_____ Contact person
_____ _____	_____ E-mail address
_____ Street	_____ Telephone number
_____ Zip code	_____ City

By fax  
**+49 8669 32-3132**

By e-mail  
**foeps@heidenhain.de**

Please send me an offer for the following equipment:

	<b>Single-station license with TNC operating panel</b>	<b>Single-station license with virtual keyboard</b>	<b>Network license for 14 stations with virtual keyboard</b>	<b>Network license for 20 stations with virtual keyboard</b>
Programming station for milling TNC 640	<input type="checkbox"/> 1113967-01	<input type="checkbox"/> 1113924-01	<input type="checkbox"/> 1113926-01	<input type="checkbox"/> 1113928-01
Programming station for milling TNC 620 and TNC 320	<input type="checkbox"/> 1113967-01	<input type="checkbox"/> 1113924-01	<input type="checkbox"/> 1113926-01	<input type="checkbox"/> 1113928-01
Programming station for milling iTNC 530	<input type="checkbox"/> 1113967-01	<input type="checkbox"/> 1113924-01	<input type="checkbox"/> 1113926-01	<input type="checkbox"/> 1113928-01
Programming station for turning MANUALplus and CNC Pilot 640		<input type="checkbox"/> 737157-xx	<input type="checkbox"/> 737158-xx	<input type="checkbox"/> 737159-xx
<input type="checkbox"/> Training package 1: Complete equipment			PC software TNCremoPlus	<input type="checkbox"/> 340447-xx
<input type="checkbox"/> Training package 2: Basic equipment			Measuring system training kit	<input type="checkbox"/> 620709-02
<input type="checkbox"/> Training package 3: Advertising material			Coordinate cross	<input type="checkbox"/> 352436-01
<input type="checkbox"/> Training package 4: E-learning				
<input type="checkbox"/> Training package 5: Training/Commissioning				

Please contact me for a personal interview.

\_\_\_\_\_  
Date, signature



# HEIDENHAIN

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