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Klartext

HEIDENHAIN

News from the World of HEIDENHAIN Controls

Milling and turning on one machine

The TNC 640 masters all disciplines

New functions of the TNC controls

Efficient and convenient **from page 10**

New training center

A spacious environment for imparting knowledge **page 22**

Editorial

Dear Klartext Reader,

How well does the new HEIDENHAIN control for multi-operation machining perform in practice? This is exactly what the Klartext staff wanted to find out. We wasted no time before visiting the Groz-Beckert company in the German Swabian town of Albstadt. Here approx. 500 employees develop and manufacture machines and fixtures exclusively for their own use. We were all very excited. After all, this was to be the first user's report on our brand new TNC 640! You can read all about the successful application of the milling/turning control in the field report on **page 6**.

And while we're on the topic, on **page 4** you can read about the valuable new functions that the TNC 640 offers you for calibrating, turning, milling, smoothing and engraving.

The iTNC 530, the TNC 620 and the TNC 320 also feature important innovations. You'll find an overview of them starting on **page 10**.

In our "Do you know this function?" section you'll learn about the advantages that the DXF converter can provide you as the user and how you can make your machining work even more convenient and efficient.

The excitement continues with a user's story on the production of ultra-modern medical operation lamps. At the SIMEON company in Tuttlingen, Germany, attractive and highly heat-dissipating lamp housings are milled. The housings serve to hold numerous LEDs, which in turn provide perfect illumination of surgery rooms. Read how a HEIDENHAIN iTNC 530 masters this difficult milling task in only one setup.

The demand-oriented and optimal application of the TNCs enjoys first priority at HEIDENHAIN. The new HEIDENHAIN training center is a highlight in the transfer of technical knowledge. More space in a building dedicated to the purpose as well as the most modern of media technology provide an optimal environment for effective education. Learn more in our Klartext report on **page 22**.

Read and enjoy, with best wishes from the Klartext staff!

With its new training center, HEIDENHAIN has procured equipment at the cutting edge of modern technology.

Production

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Also, check out our interactive KLARTEXT e-magazine, with even more background information, animations, and expert knowledge. Take a look at:

www.heidenhain.de/klartext

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Software version 2

The TNC 640: thanks to new functions, even more user-friendly and powerful than before

Learn to expect more!

The TNC 640—the high-end control from HEIDENHAIN for multi-operation machining—has added important functions with its new software version. Many new turning and milling cycles together with powerful options like dynamic collision monitoring, adaptive feed control and contour transfer from DXF files help you to become even more productive.

Turning functions

And things will soon "turn" to your advantage

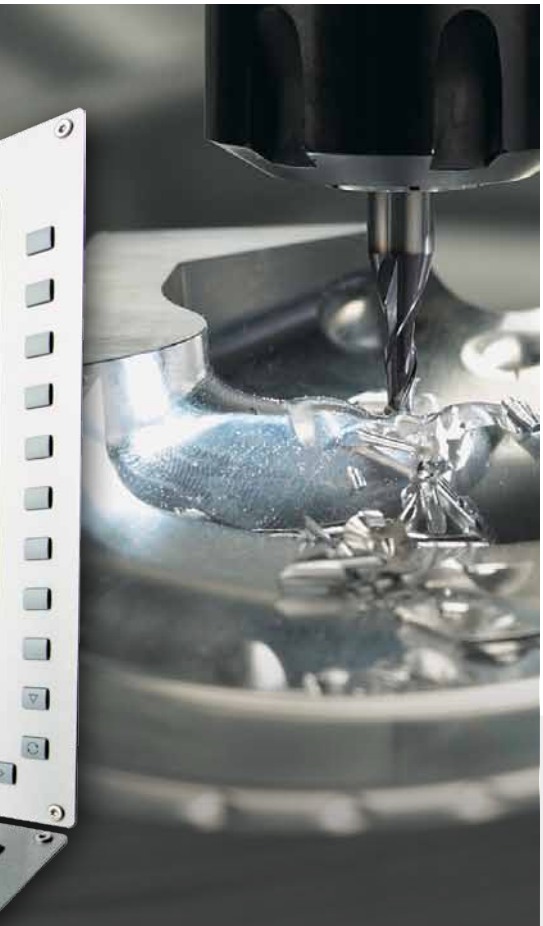
Many new, intelligent turning functions in the TNC 640 not only make the user's work easier—machining now becomes even more effective. Even difficult turning operations can be easily programmed on the machine. For the many functions for mill-turning, the control provides optimal operability—just as you are used to from HEIDENHAIN. Here is a brief summary of the new turning functionality:

New cycles for axial, radial and contour recessing
Thanks to these three new cycles—radial recess turning, axial recess turning and contour recessing—you can realize alternating recessing and roughing movements.

Plunging depth for recessing cycles
The recessing cycles now enable you to define an infeed depth, for example to break chips.

Blank form update during contour cycles
Reduce programming time by using this new function of the TNC 640 to avoid air cuts and optimize approach paths. Here the contour follow-up function updates the originally defined workpiece blank with every machining step. The turning cycles take the current contour of the workpiece blank into account for the calculation of infeed and machining paths.

Type of contour smoothing during turning cycles
Now you can define the type of contour smoothing during turning cycles. You can choose among smoothing with each step, smoothing with the last step or turning without smoothing.



Options

New options for more process reliability and optimal flows

Would you like your machining operations of difficult workpieces to be uncomplicated and effective? The TNC 640 features practical functions that help the operator to manufacture parts safely and conveniently.

Dynamic Collision Monitoring (DCM)
Dynamic collision monitoring (DCM) helps to prevent collisions between the tool and machine-fixed components.

Adaptive Feed Control (AFC)
Adaptive feed rate control (AFC) automatically regulates the feed rate of the TNC, taking into consideration the respective spindle power and other process data.

DXF converter
With the DXF converter you can very easily extract **milling and turning contours** or points from existing DXF files.

Extended tool management
In the new tool management, icons for tool types ensure greater transparency.

You will find detailed information on these special functions on the Web at tnc.heidenhain.de

Tables

Freely definable tables

Freely definable tables are a genuine plus for the user. They enable the TNC 640 to offer numerous possibilities for reading and saving specific data from the NC program. The tables are easily configured through fillable forms.

Milling functions

Milling with more ease

The TNC 640 embodies the high quality that users have come to expect. Machine operators appreciate this in the milling cycles, as well. One important new cycle for milling is the engraving cycle:

Engraving cycle
The engraving cycle 225 enables you to creates texts or serial numbers in a very uncomplicated way. Enter the desired text with a text parameter, and choose whether the text should run along a straight line or an arc.

Touch-probe cycles

Accurate, more accurate, KinematicsOpt & Co

The KinematicsOpt functions ensures the permanent high accuracy of rotary and tilting axes. Recalibration takes only a few minutes and corrects the saved kinematic model. In software version 2, the new Cycle 452 PRESET COMPENSATION makes it easier to work with interchangeable heads. Adjust different interchangeable heads in such a way that the workpiece preset applies for all heads.

Now the user—without any special training—can calibrate a new or exchanged milling head on the machine himself and no longer needs a service technician. He only needs a HEIDENHAIN touch probe and a calibration sphere for the measuring process.

These cycles of the TNC 640 also contribute to more accuracy:

New touch probe cycle for calibrating length and radius on a sphere.
The new calibration cycle 460 automatically calibrates the touch stylus using a fixed KKH calibration sphere from HEIDENHAIN.

New touch probe cycles in Manual mode
You can measure the basic rotation over two holes or studs in Manual mode as well. You can set a datum on the centerline of a slot or a ridge thanks to the new touch probe cycles of the TNC 640.

New calibration cycle for the infrared tool touch probe TT 449
This new cycle supports the wireless TT 449 tool touch probe from HEIDENHAIN for automatic tool measurement.

Users evaluate a combination of milling and turning

The TNC 640 masters all disciplines

At Groz-Beckert in the German Swabian town of Albstadt, the TNC 640 has been given the chance to prove its performance in turning and milling. The new HEIDENHAIN control was to provide more efficiency in the tool and fixture construction department together with the 5-axis machining center from Hermle. What was the users' evaluation in this practical case?

The tension is high as the KLARTEXT team arrives at Groz-Beckert in Albstadt: they are about to hear the first user report on the brand new TNC 640! How well does the new HEIDENHAIN control for multi-operation machining perform in practice? This is exactly what the tool and fixture construction people at Groz-Beckert wanted to know. Here approx. 500 employees develop and manufacture machines and fixtures exclusively for their own use. This section of the company owns extensive machinery for this purpose. Today extremely high demands are placed on the quality and durability of needles for textile machines, Groz-Beckert's core product, not least because there are thousands of them in each individual weft or warp knitting machine. There are no machine tools available on the market that manufacture needles of such high quality, which is why Groz-Beckert builds the machines for its production itself.

Because the topic of multi-operation machining has become increasingly important for the Swabian needle manufacturer, it started a project in which both the control and the machine were to combine milling and turning operations for the first time. The tool and fixtures department often had to machine workpieces on lathes and milling machines one after the other, which required several setups. The result was a serious loss of time because the parts had to be stored for some time while waiting for the next machining step. This also tied up employee capacity. In addition, each new setup invites problems with accuracy. Now was finally the time to put a stop to it!

Application of the new TNC 640 control for milling/turning

```
TNC:\nc_prog\DEMO\TURN\Beispiel1_en.h
→Machining operation (0/1/2/3)?
3  * - Preset in center
4  CYCL DEF 247 DATUM SETTING
    Q339=+1     ;DATUM NUMBER
5  * - Turning
6  CALL LBL "TURN"
7  TOOL CALL "T_SCHR_AUSSEN"
8  FUNCTION TURNDATA SPIN VCONST:ON VC:110
9  L  A+0 R0 FMAX M303
10 CYCL DEF 800 ADJUST XZ SYSTEM
    Q497=+0     ;PRECESSION ANGLE
    Q498=+0     ;REVERSE TOOL
11 CYCL DEF 815 CONTOUR-PAR. TURNING
    Q215=1      MACHINING OPERATION
    Q460=+2     ;SAFETY CLEARANCE
    Q485=+0     ;ALLOWANCE ON BLANK
    Q486=+0     ;CUT LINES
    Q499=+0     ;REVERSE CONTOUR
    Q463=+3     ;MAX. CUTTING DEPTH
    Q478=+0.3   ;ROUGHING FEED RATE
    Q483=+0.4   ;OVERSIZE FOR DIAMETER
    Q484=+0.2   ;OVERSIZE IN Z
    Q505=+0.2   ;FINISHING FEED RATE
12 CYCL DEF 821 SHOULDER, FACE
```

The TNC 640 makes it very easy to switch between turning and milling

A genuine trial by fire from day one

For the Groz-Beckert team, the project would only make sense if the new control and new machine tool could prove themselves together in productive application. This is why the young combination was integrated into the manufacturing process from day one. The project manager and CAM programming group manager Dennis Hagg concludes, "The control and machine were productive from the very beginning." Of course, as is to be expected in a pilot project, several discussions and corrections were necessary with the new duo. The people at Groz-Beckert are happy with the fast reactions and effective support by all the companies involved. And they can be proud of the results. According to Mr. Hagg, they were able to reduce the door-to-door times for milling/drilling operations by fully half. Now many workpieces can be machined in one setup where before, transportation, waiting, and setup times reduced efficiency.

Looking back, Dennis Hagg, the Project Group Manager for CAM Programming sums up: "For Groz-Beckert's tool and fixture construction, dimensional accuracy, contour fidelity, but also surface definition are very important. In all disciplines, the new TNC 640 did a really good job, just as we have come to expect from the other HEIDENHAIN controls here at Groz-Beckert."

A new look on a machine tool

In visible terms, however, there are noticeable differences. The newly designed user interface on the 19-inch monitor finds a positive echo: the arrangement of dialogs, the screen layout and the color highlighting provide a good overview. "The large monitor is a must if you want to keep informed. It provides more important information all at the same time. And it is much better in terms of convenience," confirms Alexander Löffler, milling machinist at Groz-Beckert. Innovations such as SmartSelect make it easier and faster to access functions, and they also provide a valuable functional description. The machine operators praise the well organized layout. Values and parameters specific to milling or turning are easily recognized as such. The workers are very happy with it. "The control feels good to operate," summarizes Löffler.

Recipe for a successful pilot project

But let's go back to the project launch: Groz-Beckert didn't want to leave anything to chance and prepared itself optimally for the application of the new machine. One experienced professional for milling and another for turning were to take on the jobs with the new machine. Both employees have experience with HEIDENHAIN controls and were quickly able to orient themselves. They didn't even need special courses—the two complemented each other well with the knowledge they already had and were able to solve all their problems quickly. Of course, the easily understandable manuals for the HEIDENHAIN controls also provided the right answers when needed.

Gradually the machinists got acquainted both with the new machine and the new control. Functions were tested, machining strategies were tried out. Many different parts with greatly varying materials had to be machined. Errors and suggestions for improvements were documented in monthly collective records. Sometimes they received quick help by e-mail in the form of change files that they transferred to the control.

The milling-turning team bets on the strengths of its TNC 640

Many components are manufactured in very small batches because the production equipment is only used by the company itself. At the same time, the machining operations are very complex. Groz-Beckert's jig and fixture manufacture has committed itself to a special form of teamwork for which a HEIDENHAIN control is especially well suited: One employee writes the essential part of the NC program right at the machine in HEIDENHAIN conversational format. This also applies for simple 5-axis operations. A colleague on the CAD/CAM system contributes the more complex machining steps. The automatically generated program sections are then integrated into the manually generated part program. The simultaneous use of both programming methods ensures an especially fast creation of the complete part programs. The combination of both employees' experiences quickly leads to reliable and very valuable results. For the HEIDENHAIN control, the source of the program sections makes no difference. The familiar advantages, such as surface definition and contour fidelity are ensured at any rate.

Convenient combination of turning and milling

Lately the machinists have gained the confidence to take on complicated and difficult tasks. With its fast block processing, the TNC 640 runs programs for unattended shifts quickly and safely. They can even run subprograms with several hundred thousand blocks. The control supports the user in complicated turning operations with a tilted table, for example with the PLANE function. Thanks to the selective definition of the tilted working plane he keeps a good overview of the coordinate system. Also, the TNC 640 compensates and appropriately converts the datum from the preset table.

There are also new challenges for the machining strategies, which are different from the familiar procedures with several machine tools. On the one hand, it's important to reduce the number of setups as far as possible, and on the other hand you can change as desired now between turning and milling operations. To ease the change in thinking, the TNC 640 supports this new flexibility in machining with an especially convenient new feature: the user can give standardized plain-language commands in the part program to switch as desired between turning and milling. There are almost no restrictions, since the switchover is independent of the momentary axis configuration.

The people at Groz-Beckert are quick to assure us: "Switching between turning and milling goes completely without problems. The new TNC 640 has everything that makes working with the control easier."

Focus on productivity

The primary aspect of the project with the TNC 640 was increasing productivity through multi-operation machining of turned and milled parts. At Groz-Beckert they're very satisfied with the current results: After an intensive startup phase where small problems were quickly solved, they found the combination of the new control and new machine tool to be remarkably well-suited for the job.

The TNC 640 simplifies complex tasks—tilted table operations can be programmed right at the machine

"The time savings and the working results fulfill our expectations of multi-operation machining," says the project manager Mr. Hagg. "We were especially nervous about turning—but here, too, we're completely satisfied."

Long operations lasting 8 to 10 hours are run unattended—which further improves productivity and at the same time is a sign of confidence in the new combination.

In the interview, Dennis Hagg and Alexander Löffler both agreed: "The new turning-milling combination has become an important part of our tool and fixture construction, and today it's simply indispensable." When the KLARTEXT staff asked them for their general opinion of the control, the answer was concise: "Very good in practical application." And with that, we're satisfied.

"The easy switching between milling and turning has impressed us."

Dennis Hagg, project manager at Groz-Beckert

Groz-Beckert

Groz-Beckert is best known for its needles, which are used in industrial weft and warp knitting machines. For over 155 years, the company from the German Swabian town of Albstadt has produced tools for textile manufacturing. The processes in question are weft knitting, warp knitting, weaving, needling, tufting or sewing. Today, Groz-Beckert develops entire systems in collaboration with manufacturers of textile machines.

www.groz-beckert.com

Alexander Löffler praises the application-oriented and convenient operation of the TNC 640

Controls

Software version 60642x-03

The iTNC 530 with new functions for efficient machining

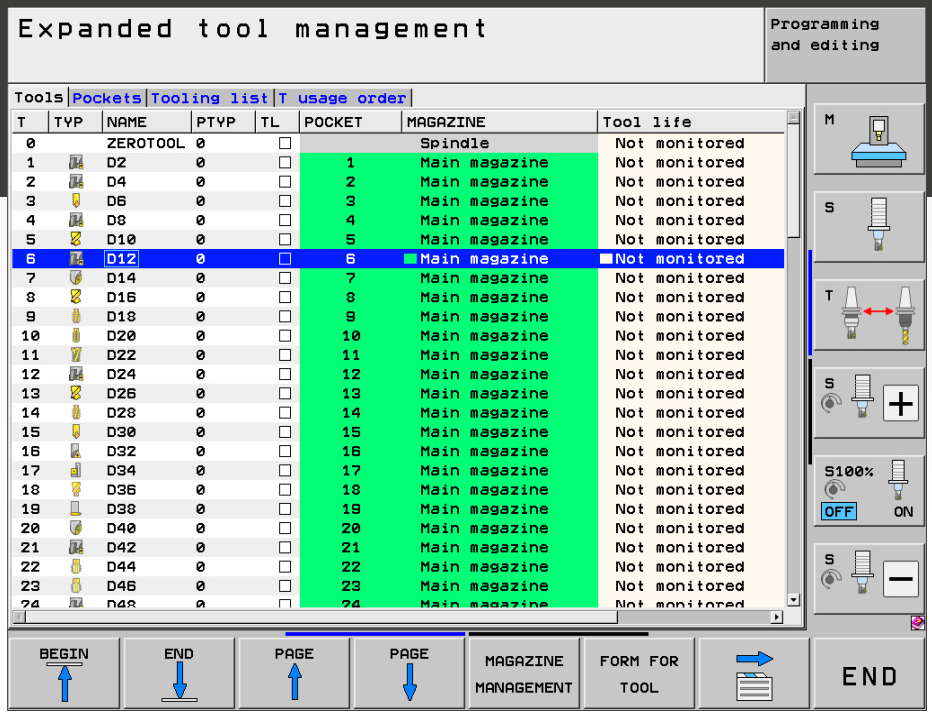
New functions for alert milling machinists

Numerous conversations with customers and new requirements in practice are constantly giving birth to new ideas that make working with the iTNC 530 control simpler and more convenient. The HEIDENHAIN software developers use them to make practical new functions. Here are some of the most important new functions.

New functions of the iTNC 530

Extended tool management (option)

In the new tool management, icons make it easier to differentiate between differing tool types in the overview table. The various tool types are graphically differentiated in the tool data form.



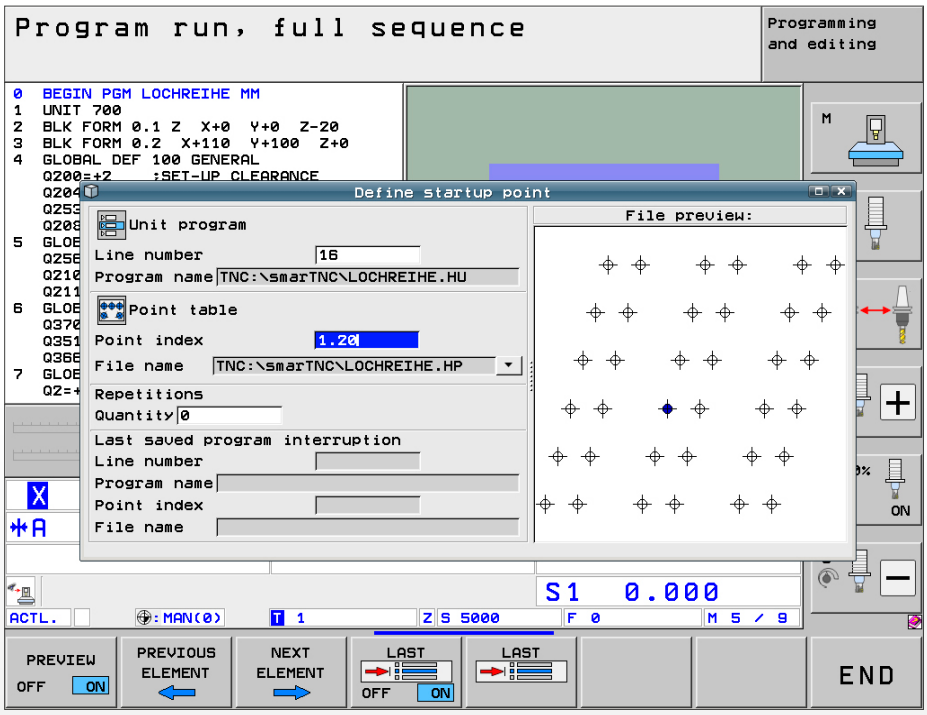
Enhanced tool management: now with visible icons

Graphically supported mid-program startup

Mid-program startup has become easier with point pattern files: selection of the entry point is now graphically supported. You simply use a soft key to mark the desired location in a graphic window.

Graphically supported file selection

Find the right program more quickly: when you select programs from within different functions (e.g. during PGM CALL) the TNC shows a graphic in a pop-up window—in addition to the directory tree. In the graphic, the TNC shows the content of the selected file in the form of a line graphic (graphic representation of the contour).



Graphically supported mid-program startup of point pattern files

Storing and discarding

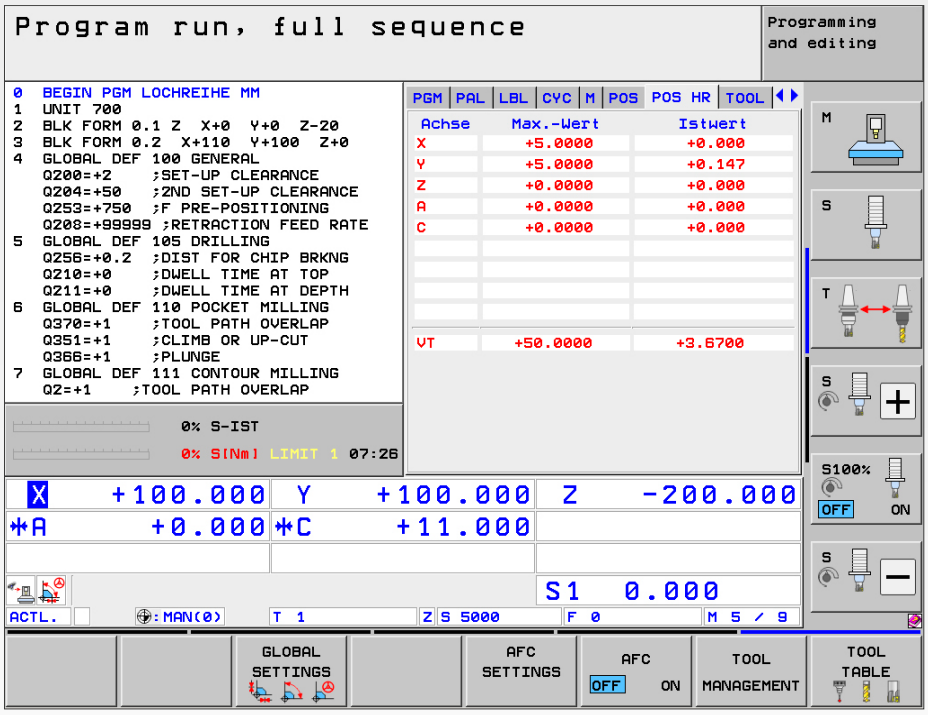
With the SAVE and DISCARD functions, the user can specifically decide at which time any changes made should be saved or discarded. Saving to a new file is possible with the new SAVE AS function.

Additional status display

A new tab in the status displays keeps you constantly informed. It shows which handwheel superimposition values are allowed and which can actually be realized.

Optimization in the DXF converter (option)

You can use the DXF converter to open CAD data directly on the TNC in order to extract contours. The most important innovations in this function are described in our Klartext article "Do You Know This Function?"



New status display for handwheel superimposition values

New features of the TNC 620 and TNC 320 offer the user numerous capabilities in machining

Small, but what performance!

The compact TNC controls, too, will feature powerful new functions with the next software update. New cycles and practical options—like the DXF converter—will help you to work more easily and productively.

	TNC 620	TNC 320
For the DXF converter (option), see the Klartext article "Do you know this function?"	+	–
New touch probe cycle for calibrating length and radius using a sphere.	+	+
New touch probe cycles in Manual mode	+	+
Engraving cycle	+	+
New calibration cycle for the infrared tool touch probe TT 449	+	+
Freely definable tables	+	+
Support of the new HEIDENHAIN HR 5xx display handwheels	+	+
New HEROS 5 operating system available, see the Klartext article "New operating system HEROS 5"	+	–

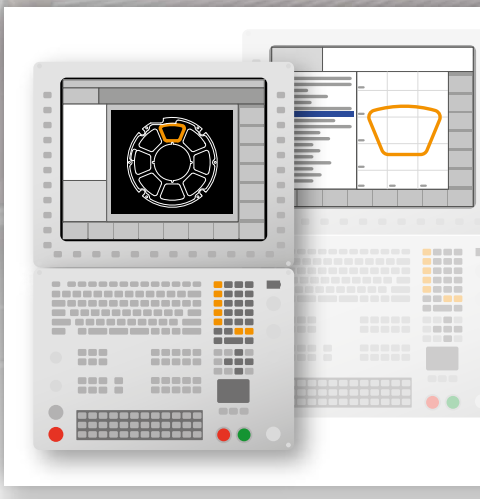
Special functions—clearly explained

Do you know this function?

With the DXF converter you can very easily import milling and turning contours and machining positions from existing DXF files.

DXF converter (option)

CAD/CAM system



DXF converter: select the contour and create the part program

What are my advantages as a user of the DXF converter?

You can use the DXF converter to open CAD data directly on the TNC in order to extract contours. This greatly simplifies the creation of a part program because the direct data transfer eliminates input errors and accelerates the programming process many times over. This way you can be sure that the finished contour is exactly according to the designer's specifications. A further plus point: you can also use the DXF converter to create part programs for old TNC controls as well.

How can you select contour elements?
Contour selection is particularly convenient: you select any element by mouse click. As soon as you select a second element, the control detects your desired direction of machining, and starts automatic detection of the entire contour.

How can you transfer machining positions?
Use the mouse to mark an area and the TNC shows you, for example, all the hole diameters lying within this area. The advantage: you can quickly isolate your selection of machining positions and have no extraneous information on your screen. Then you can simply save the selected data, especially to use drilling positions or starting points for pocket machining. The TNC even finds the shortest distances and moves through the machining positions on the most efficient path of traverse.

Which locations can I define as a datum?
The datum of the DXF file is not always located where you can use it directly as the workpiece preset, especially when the drawing contains multiple views or cuts. However, you can also simply move the datum by clicking an element at an appropriate location. You define the position at the beginning, middle or end of a distance as the datum.

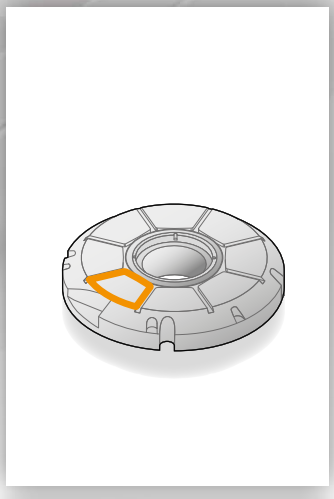
What other settings can I make with the DXF converter?
A powerful zoom function and useful setting options complement the functionality of the DXF converter. For example, you can define the resolution of the contour program to be transferred for when you want to use it on older TNC controls. Or you can set a transition tolerance if occasionally the elements do not quite adjoin.

Does the new version of the DXF converter support polylines, too?
Polylines are used in CAD drawings when the desired contour cannot be created with circles or lines alone. In addition to the *LINE*, *CIRCLE* and *ARC* elements, the new version now also supports the *POLYLINE* element.

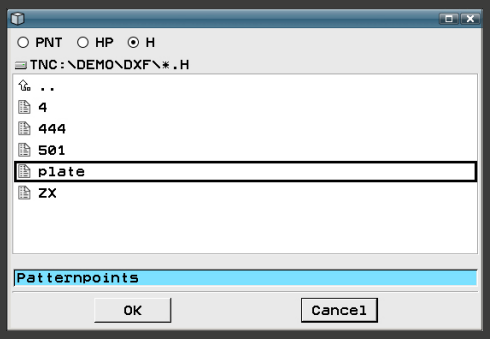
The DXF converter is for the following TNC controls	
TNC 640 HSCI	As of NC SW 34059x-02
TNC 620 HSCI	As of NC SW 34056x-04/73498x-02
TNC 320	As of NC SW 34055x-06
iTNC 530 HSCI	As of NC SW 60642x-01
iTNC 530	As of NC SW 34049x-02

New features of the DXF converter: more efficiency and convenience in operation

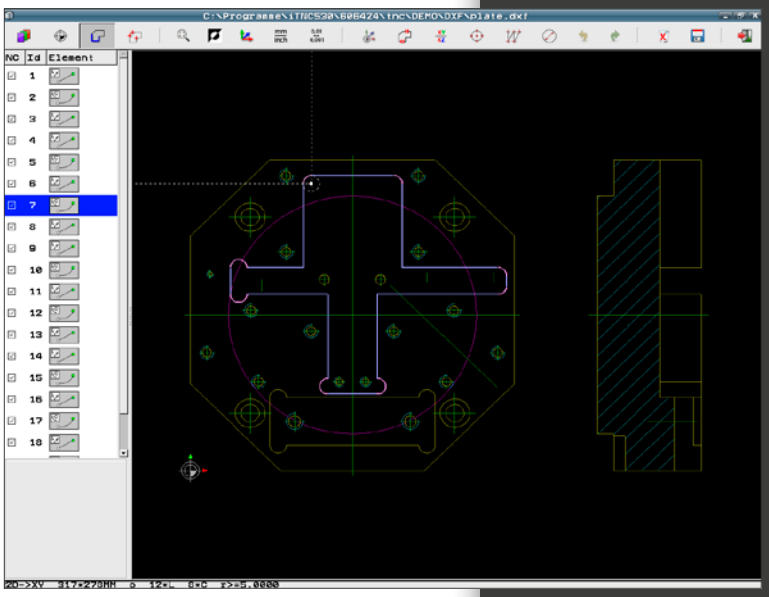
- Now you can copy contours and points automatically to the buffer memory and copy it directly into the NC program by using the function after exiting the DXF converter.
- In the option box, select whether the positions should be saved as a point file or PNT file. You can also save the positions as plain-language blocks (L X.. Y.. FMAX M99) in order to use them in programs on older TNC controls that do not support point tables.
- You can select directly in the options box whether to save the contour as an .H program or as a contour program with the file extension .HC.
- The DXF converter now runs as a parallel application on the TNC's 3rd desktop. This enables you to transfer data quickly to various positions in an NC program. Operation of this application is now possible with only the mouse. Soft keys have been removed in order to provide more space for the graphics.
- You simply use the mouse and icons to select the desired functions. The TNC automatically shows all available functions for the current mode without your having to switch through soft-key rows.



Machine the workpiece or subcontour.



In the option box you have your own choice: you can save positions as point files, as PNT files or a plain-language dialog blocks.



DXF converter in a new look: easy operability thanks to self-explanatory buttons.

Further operating highlights:

- Zoom setting of the last selected DXF file is saved.
- Datum that was set for the DXF file last used is saved.
- Circle center points can now be loaded directly.
- The info box, which shows all data of the selected element, is particularly helpful. For machining positions you see the X/Y coordinates, for contour elements the start and end points, and for the circles, the center point and direction of rotation are shown as well

Manufacturing operating-room lamps with the iTNC 530

Precision in the spotlight

Light and color play an important role in a hospital operating room. The doctor has to see clearly and must not get tired, not even in long operations. The primary benefit of this goes to the patient. The illumination of the operation field provides an important contribution. The SIMEON Medical GmbH & Co KG in Tuttlingen, Germany, has specialized on exactly that. HEIDENHAIN controls do precision work in the manufacture of operating-room lamps and help to ensure high production quality.

The exact alignment of the holders for the LED blocks is an important contribution to a homogenous light field

Optimal light with modern design

SIMEON is a young company that specializes in the manufacture of modern medical operation lamps. These innovative products use LEDs as the light source. For many years, LEDs have been used as indicators or for background lighting. However, LEDs for white light with a high light output, an appropriate color temperature, and a long service life have only been available in recent years.

Modern LEDs provide dramatic benefits for the new generation of medical operation lamps:

Instead of a relatively large halogen lamp, they use many small light sources that produce a perfect light field through numerous reflectors. This opens entirely new possibilities for operating-room lamps: large clunky lamps with a one-eyed reflector are becoming a thing of the past in operating rooms. Today, they are being replaced—as in the case of SIMEON—with attractively designed, flat lamps.

Sophisticated manufacture of the lamp housing

The concisely formed housing is supplied as an aluminum casting. Its special form already presents a challenge during its casting. It is then machined with a Hermle C 30 U that is controlled by a HEIDENHAIN iTNC 530. The 5-axis machine tool completes its work on the casting in only one setup.

In detail: after the workpiece has been set up, the iTNC 530 uses a 3-D touch probe to measure defined positions on the lamp housing. This exactly ascertains the position of the casting in space. Then the program generated with a CAD/CAM system can do its work precisely.

In the area where the housing is connected to handles, there are pockets and holes that have extremely thin walls on the inside. Small inaccuracies at this connecting point can quickly turn the relatively large component into scrap. For this reason, the combination of machine tool and NC control has to ensure high machining accuracy.

KinematicsOpt makes an important contribution to an optimal light field

The exact alignment of the holders for the LED blocks on the inside of the housing is particularly critical: the angular position of the round surfaces is calculated so that the light cones of the LED blocks that are to be fastened to them join up to provide a homogeneously illuminated light field. Any deviations would result in disturbing light and dark spots in the light field. The 5-axis machining of the holder must therefore be very precise. Here the accuracy of the tilting axes is crucial. With KinematicsOpt, the cycle for fast calibration, the

Assembly aids programmed right on the control

Thin-walled structures require high accuracy in machining

deviations of the centers of rotation are checked regularly and the compensation values are transferred to the kinematic model. Recalibration takes only a very short time and can be performed by the machine user without help. This ensures high and lasting accuracy in tilting operations.

The casting is machined in only one setup.

High machining accuracy is essential in medical technology

High machining accuracy and high surface definition are often of primary importance in the manufacture of medical technology products. HEIDENHAIN controls are known for their high accuracy in motion control. One of the many functions that make high accuracy possible is the optimal execution of NC programs that have been generated in a CAD/CAM system. This is also the case with the lamp housings from SIMEON. Such programs usually consist of very many straight-line blocks whose contour transitions are each affected by a chord error. The HEIDENHAIN TNC automatically smoothes the contour between any contour elements very effectively and with a definable tolerance. This is the only way to attain high surface definition with the required accuracy.

Reliability in series and single-part production with DCM

SIMEON has committed itself to DCM, the iTNC's dynamic collision monitoring function. In 5-axis simultaneous machining it is particularly useful for effective collision protection: the more axes a machine moves simultaneously, the more difficult it is for the NC programmer and the machine operator to visualize their movements. For this reason the actual danger of collision is hardly predictable during programming and setup.

DCM is not only effective for workpiece machining operations generated by CAD/CAM. The function can also prevent collision damage during setup, manual intervention, or the execution of programs that were written directly at the machine.

Fast and safe manufacture of single parts

Apart from the series part for the lamps, SIMEON also occasionally programs single parts, such as assembly tools, right at the machine. For cases like this, the machine operator learns to appreciate the convenience in operation of HEIDENHAIN controls. The easily understandable plain-language programming makes it very easy to create machining programs for complex parts. The people at SIMEON are quite familiar with this: As a result, they seldom have to refer to the well-structured control documentation, as the workers on the machine assure us.

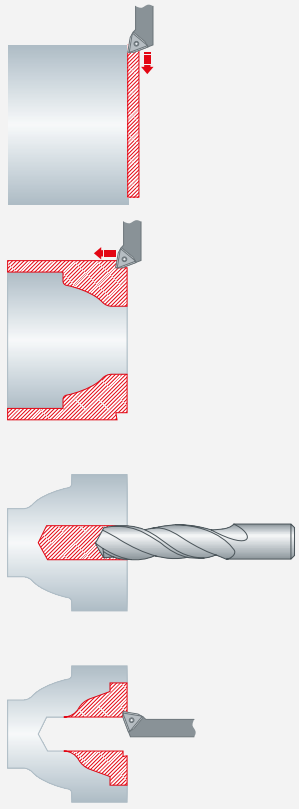
Conclusion

SIMEON makes use of new LED technology for the manufacture of innovative medical operation lamps that combine a modern, compact mechanical design with optimal illumination. The new design, however, is possible only with precise and powerful manufacturing technology that can fulfill the high quality requirements of today's medical technology. The milling machines at SIMEON are therefore uniformly equipped with HEIDENHAIN TNC controls.

New functions of the CNC PILOT 620 simplify programming

NC program at the push of a button with TURN PLUS

The CNC PILOT 620 lathe control is used in many workshops. It distinguishes itself particularly by convenience in program creation. Now it boasts another feature: TURN PLUS, a powerful function with which you can write part programs very quickly.



TURN PLUS automatically selects all cycles, tools and cutting data for the entire machining operation.

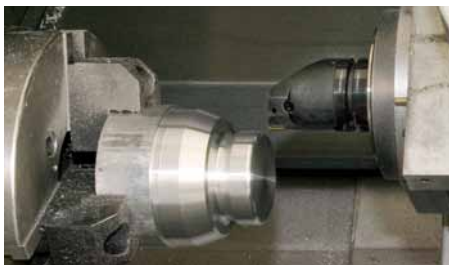
The powerful TURN PLUS function of the CNC PILOT 620 guarantees fast and easy operation: Once you have entered the workpiece geometry you only need to select the material and chucking devices. TURN PLUS handles everything else automatically, such as:

- Creating a working plan
- Selecting the machining strategy
- Selecting tools and cutting data
- Generating NC blocks

Result: A thoroughly commented DIN PLUS program

TURN PLUS makes it easy to automatically create a part program for falling contours. Often, the angle the contour falls off at is steeper than the tool tip angle. In that case, the CNC PILOT 620 automatically chooses another tool and machines the contour in the opposite direction or as a recess. As a result, your part program is ready to run sooner.

The automatically generated part program can later be altered or optimized in TURN PLUS. You simply watch all the machining steps and stop at the program point you would like to optimize (using interactive graphics). You choose the sector for machining and the appropriate fixed



Facing and ...

... longitudinal turning with the same tool.

cycle, and TURN PLUS proposes the tool and cutting data. Following that, the control automatically generates the new machining step. You can also use TURN PLUS for milling, drilling and boring operations with the C or Y axis on face and cylindrical surfaces. The same goes for machines with opposing spindles for rear surfaces.

Working in a tilted plane with the B axis

Here HEIDENHAIN has also taken another step toward simple programming: for operations in a tilted plane you simply tilt the coordinate system to the required position and program the machining operations as usual in the working plane. The machine will then execute machining in the tilted plane, without any additional conversions.

You can also profit from the B axis during turning: with just one tool you can reach positions that enable longitudinal and transverse machining with the main and opposing spindles. This way you need fewer tools and can change them less often.

With the new TURN PLUS function (software option) you can create NC programs in a very short time.

New operating system HEROS 5

The new real-time era

HEROS 5 (the new HEIDENHAIN Real-time Operating System) readies our family of controls for future developments. It integrates new and powerful functions into the control software.

For example, a new connection to the Internet is possible: the control's integrated browser grants you direct access to the Web.

The new PDF viewer enables you to open PDF files directly on the control. New editors also make it possible to open work instructions, drawings and other information in additional file formats.

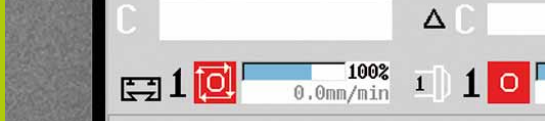
The following additional formats are supported:

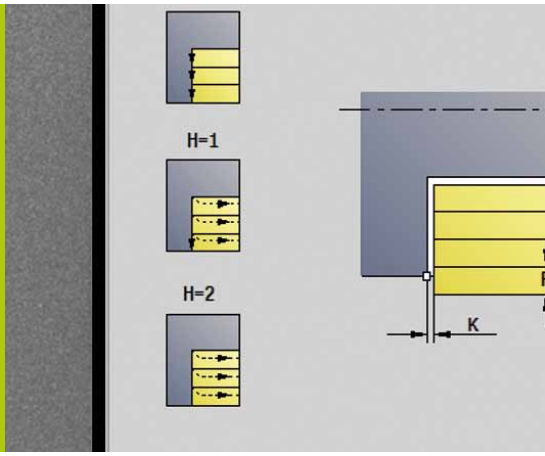
- Text files ending with .txt or .ini
- Graphic files ending with .gif, .bmp, .jpg, or .png
- Table files ending with .xls or .csv
- HTML files

The HEROS 5 operating system makes it easier to interconnect HEIDENHAIN controls in your network. The settings dialogs have been standardized, and now look the same on all controls.

The new HEROS 5 operating system currently runs on the TNC 640, TNC 620, iTNC 530 and CNC PILOT 620 controls.

Opening PDF files directly on the control: the PDF viewer makes it possible.





Retrofit with the MANUALplus 620

New future for a time-proven vertical boring and turning mill

A retrofit builds on the tried and tested. The reconditioning is intended not only to restore the original condition of a machine, but also to prepare it for the demands of today and tomorrow. A new control frequently opens up entirely new machining opportunities. This has been proven by a MANUALplus 620 in Varel way up in northern Germany at the Haar Mechanical Machining GmbH & Co. KG. Here the new HEIDENHAIN lathe control combines the new with the past in a special way.

The workpieces at Haar are impressive in their size and weight. The company in the North Sea town of Varel is part of the Sande Stahlguss GmbH casting group, from which some of their steel and stainless steel cast workpiece blanks come. These are components for power plant construction such as complicated turbine and valve housings. The machine workpieces have an individual total weight up to 100 metric tons and sport a maximum turning diameter of 7,100 mm. The company performs both the mechanical machining and—in a special machine hall—the preparation of the workpieces for assembly.

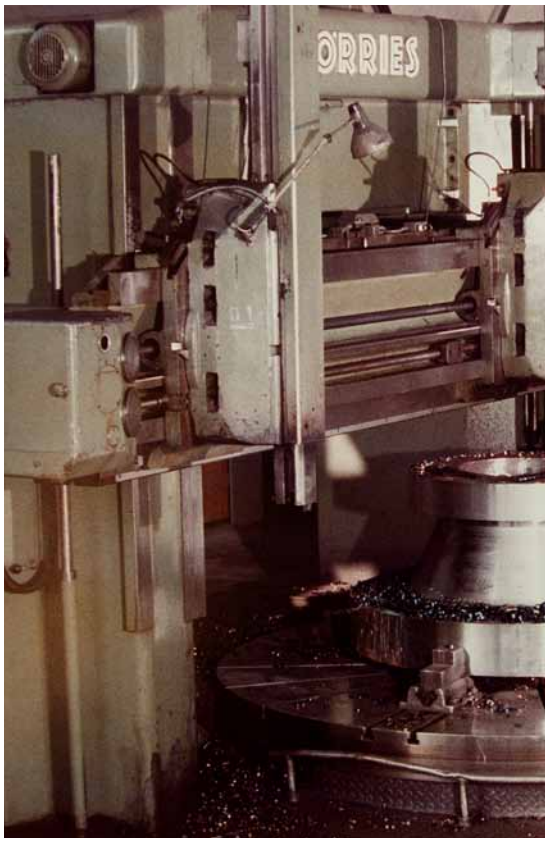
For decades, the Dörries vertical boring and turning mill in Haar has been doing very heavy work in the area of mechanical preparatory machining. The sturdy machine from the 60s has "unusually solid substance." So they decided to have it reconditioned by equipping the time-proven conventional machine with new technology and substantially expanded capabilities.

The company performed the mechanical renovation itself. The changes in the control, encoders and electrical parts were commissioned to a qualified company that has specialized in machine modernization with HEIDENHAIN controls. After the project planning—a detailed plan of all measures—the two companies tackled the retrofit in close coordination. The measures proceeded without a hitch and were completed after a few weeks.

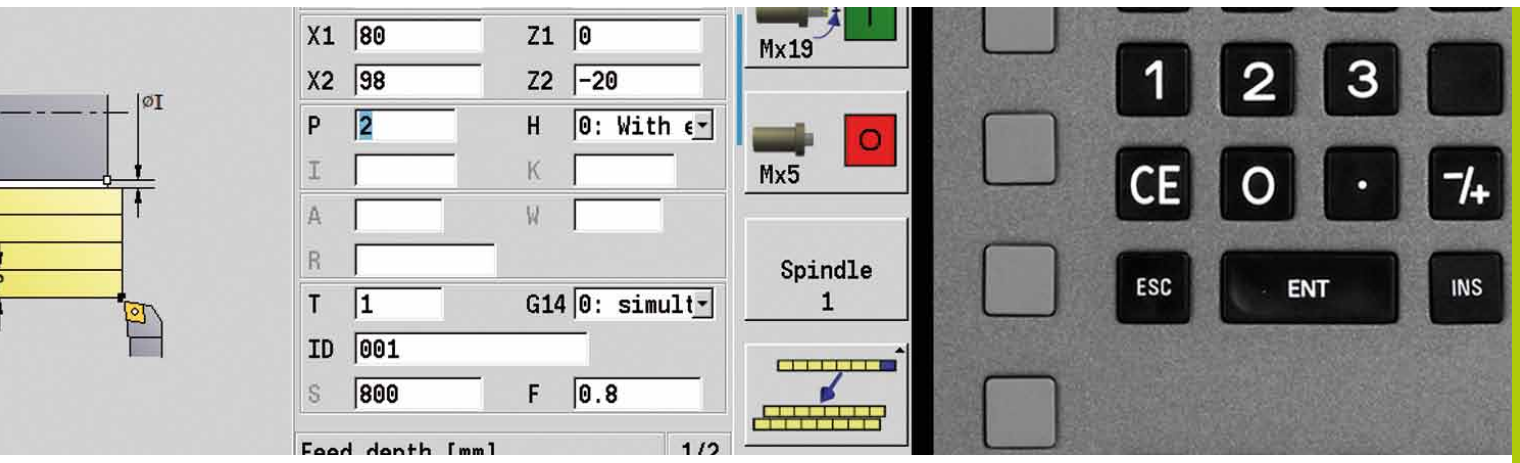
Decision for optimum operability

The competition for selection of the control was won hands down by the new MANUALplus 620 from HEIDENHAIN. What decided it was most of all the superior operability of the lathe control. Haar had enjoyed good results with HEIDENHAIN controls on other large machines in the company: their boring machines, for example, are equipped with the iTNC 530. Now the 45 year old Dörries machine was to profit from these typical qualities. In functional and technical terms, too, the HEIDENHAIN control fit well with the requirements of the project. Because the MANUALPlus 620 is also available as an NC control for analog drive control. That resulted in a significantly lower time and cost expenditure in its integration to the machine.

Machining the large castings has become more and more complex. Today it is hardly possible to machine parts precisely and efficiently without the use of a powerful control. At Haar in Varel the part programs for preparatory machining are frequently written in the conversational method. A clear advantage of the MANUALplus 620.



Every workpiece differs from another—machining in series is almost nonexistent at Haar. For this reason, the part programs are created or modified individually for each workpiece. The details of what has to be done often do not become apparent until after delivery of the massive components. Then it's an important advantage to be able to create reliable part programs quickly and flexibly. Once again, a significant plus for the HEIDENHAIN control.



Counts since the 1960s as indispensable—the Dörries vertical boring and turning mill

Now the machine provides dramatically increased performance with the MANUALplus 620

The retrofit with the MANUALplus 620 increased efficiency by about 30 %.

Dipl. Wirtsch.-Ing. Jens J. Haar, Manager

Programming stations—fast program creation without hurry

To allow programmers to work in a quiet, nondistracting atmosphere and not only right at the huge machines, Haar keeps a separate office with HEIDENHAIN programming stations. This HEIDENHAIN PC software features all the functions of a real control and also permits workpiece simulation. It can be installed and used in any normal PC workplace to provide all the convenience of HEIDENHAIN conversational programming for the office as well.

Programming stations and controls are networked throughout the entire company. In this way the part programs are easily transferred from the office to the machine.

More convenience and safety for manual interventions

Machining workpieces that can weigh tons is extraordinarily time consuming and typically claims all of three to five weeks. To manage it, they work in three shifts. Unattended, overnight machining? No way! Here the machine operator needs to keep a very close eye on the entire machining process. When problems such as tool breakage occur, he has to be able to react quickly and effectively. This places a huge responsibility on each and every machine operator! The new MANUALplus 620 makes manual intervention as easy and safe as possible. Even interventions directly in the machining process are not unusual: with feed-rate superimpositioning, for example, you can optimize protracted operations. And in many cases it can be helpful that the control can take a contour oversize into account.

Manual operations are typical in the mechanical preparation department. The machining steps are very different from workpiece to workpiece. Because the workpiece blank contours are frequently not defined exactly and no more than one axis is needed, it often is not worth writing a complete part program. Instead, this company places its trust in the year-long experience of its employees and the particularly simple and safe operation of the controls.

New NC technology fosters qualification

However, it is also important to give young employees a chance. "NC-controlled machine tools are also needed so that apprentices or new workers can have an attractive environment," assures us the manager Jens J. Haar. The HEIDENHAIN lathe controls in particular make it easy to make a start in complex NC-controlled turning operations, and in that way they improve the workers' qualifications. (See the article "Basel" in KLARTEXT edition 55.)

The Haar company not only wants to keep valuable machines and stay capable of future jobs. It also values the year-long experience of its team and has to remain attractive for the future. In both cases, the HEIDENHAIN control bridges the gap!

Retrofitting with a profit—a plus for economy and convenience

The general trend in technology toward ever more complex manufacturing also affects the machining of extremely large and heavy workpieces. New components are designed with powerful CAD systems. Here designers are confident that there have to be solutions in workpiece machining even for difficult contours. At the same time, they want to machine the complex parts with as few setups as possible and finish the job within a justifiable time frame. This is exactly the challenge that the Haar company decided to meet. The result: "We can work substantially more economically now with the Dörries machine. Reconditioning the machine has increased efficiency in machining by about 30%. And the MANUALplus 620 made a very decisive contribution here," the manager confirmed.

To ensure optimal use of the proven machine new potential, several employees of the Haar company traveled from the North Sea over to the Upper Bavarian foothills. Here they were trained by the manufacturer to handle the new control. HEIDENHAIN offers a broad program of coursework in a dedicated new training center. The training is aimed specifically at specialists who have to prove themselves daily in the work at their machines.

Regardless of how complex the large workpieces are, the conventional vertical boring and turning mill from Dörries can take on entirely new tasks now thanks to the retrofit with a HEIDENHAIN lathe control. The great convenience in creating the part programs also saves time. The simple operation of the machine is a genuine plus for machining safety.

HEIDENHAIN recommends having a machine tool reconditioned with a new control by qualified service providers. We would be glad to advise you. Please send your inquiries by e-mail to:

hd@heidenhain.de.

Mr. Jürgens was responsible for retrofitting the HEIDENHAIN control

Johannes Jürgens and Jens Haar are very satisfied with the new capabilities of the large machine

Professional service available for the world of NC controls

HEIDENHAIN—your reliable service partner

The most important thing to a machine operator is that everything runs smoothly. As such, downtimes must be kept to a minimum. In case there is a disturbance, the service department at HEIDENHAIN provides rapid and appropriate solutions.

Demanding technology requires qualified services. That is why HEIDENHAIN offers reliable service of the highest standard. After the products have been delivered and set up, qualified technicians are available for competent consultation and rapid service—in nearly all industrialized countries of the world. Rapid on-site assistance ensures that your machinery remains available for production.

HEIDENHAIN repair and exchange service

The quick repair and exchange service helps you to minimize interruption times. We will immediately bring or send you the required device, so that production can resume if the machine has come to a standstill. Once the defective device has been returned, we will only charge you for the repair costs incurred.

HEIDENHAIN Helpline

An important piece of advice: Use the Helpline. Regardless of whether you require rapid on-site assistance, or need to exchange a defective device, or your machine needs to be inspected and calibrated, a personal contact partner will take care of your request and coordinate the appropriate support.

Do you have any technical questions? Our specialists from the HEIDENHAIN Helpline can advise you competently about solutions for encoders, controls, NC and PLC programming, and other topics.

When a machine is down, every minute counts. In this case, the on-call service helps you immediately. The benefit: telephone support and replacement shipments even outside the usual office hours.

Helpline hours:
Monday to Thursday: 7:00 a.m. to 4:30 p.m.
Friday: 7:00 a.m. to 3:00 p.m.

On-call service for machine standstill:
Monday to Thursday: 4:30 p.m. to 8:00 p.m.
Friday: 3:00 p.m. to 8:00 p.m.
Saturday: 8:00 a.m to 6:00 p.m.

The HEIDENHAIN Service Department also provides online support at www.heidenhain.de/service.

Your direct line to the HEIDENHAIN service department

	Telephone	E-mail
NC support	+49 (8669) 31-3101	service.nc-support@heidenhain.de
PLC programming	+49 (8669) 31-3102	service.plc@heidenhain.de
NC programming	+49 (8669) 31-3103	service.nc-pgm@heidenhain.de
Encoders / machine calibration	+49 (8669) 31-3104	service.ms-support@heidenhain.de
Lathe controls	+49 (8669) 31-3105	service.lathe-support@heidenhain.de
Repairs, spare parts, exchange units	+49 (8669) 31-3121	service.order@heidenhain.de

New training center

A spacious environment for transferring knowledge

HEIDENHAIN has built an impressive and very modern training center at its headquarters in Traunreut.

All rooms are optimally equipped: powerful beamers, large projection screens, and PC boards with touchscreen functionality are provided for the course participants. In addition, the entire range of control hardware is available for the technical courses.

The demand-oriented and optimal application of the TNCs enjoy first priority at HEIDENHAIN, since we want our users to be able to take full advantage of our products, and use our controls' entire potential for efficient and productive machining. Keeping this in mind, we have been holding TNC programming courses regularly since 1982.

HEIDENHAIN also considers high-quality imparting of knowledge to be a service to the customer. Hannes Wechselberger, Manager of Technical Training, puts it in a nutshell: "Customers and users shouldn't decide in favor of HEIDENHAIN just because of the capabilities of our high-quality products, but also because we are an excellent service provider, thereby providing added value. This definitely includes our professional training courses."

The numbers prove that this training program is well received: in 2011, more than 1,300 students participated in about 200 NC programming courses in Traunreut, and the numbers are rising. The generally good economic situation, as well as the good reputation of the HEIDENHAIN courses, resulted in a serious capacity problem in the previous classrooms. HEIDENHAIN saw the need for more space in sufficient time to do what was necessary.

High-tech meets unpretentious elegance

The result is something to be proud of: more than 1,700 square meters are spread out over four floors (920 square meters of course rooms, reception, cafeteria and offices, and 360 square meters of shop floor). The eight course rooms (one of which can also be used for larger events, with room for up to 60 people) offer more than enough space and facilities for imparting all sorts of knowledge about HEIDENHAIN products.

The reception area of the new training center is captivating, with its simple elegance and modern furnishings. The new course rooms are very aesthetic, and make learning even more fun.

State-of-the-art equipment for optimal training

Wechselberger emphasizes that our own demands on the courses are quite high: "Our products are always at the cutting edge of technology; the same should apply to our training center."

In order for the trainers to teach the necessary expertise as effectively possible, HEIDENHAIN equipped all rooms with the best media technology available.

Powerful beamers, large projection screens, PC boards with touchscreen functionality, and comfortable workplaces await the course participants in all rooms. Courses on specific products naturally

"Our professional training program is a true added value for the users."

Hannes Wechselberger, Manager of Technical Training

also provide access to the compatible encoders in addition to all the control hardware. The use of such modern educational media permits the interactive and practical transfer of knowledge about the entire world of TNCs.

This makes it easy for course participants to run a simulation on the programming station, and then put the program into practice on a real CNC machine in the new workshop.

"If it had only been like this back in school," one young participant raves about the new training center in Traunreut. The well-thought out approach has already proven itself: "It's really fun to learn with this modern media equipment," another participant in an NC course adds.

The new training center enables HEIDENHAIN to significantly improve the practical relevance of the courses, since an increasing number of customers want courses on specific topics: "They want to learn exactly what they need to know for the individual tasks in their respective companies. Gaining this same knowledge through regular courses would require much more time—and we all know how little there is of that. And that's why we simply needed more rooms," Wechselberger explains.

The sleek and modern building offers much space and many capabilities for technical courses.

Compared with the earlier situation, the new machine hall offers ten times as much space, and five powerful machines for practical exercises.

Training for participants from around the world

After an initial "trial run," courses have been held officially in the new training center since July 1, 2012. The machine operators are the most important target group, but close behind are the "knowledge multipliers," including the trainers in HEIDENHAIN's network of training partners. Furthermore, HEIDENHAIN trains its machine manufacturers in PLC programming, kinematics, commissioning, and machine optimization. Numerous service courses covering all HEIDENHAIN products are available to expert maintenance and service technicians from machine manufacturers and dealers, retrofitters, and service providers. More details can be found on the HEIDENHAIN training portal. In total, about 60 percent of the courses deal with NC programming, and the other 40 percent emphasize OEM and service topics.

HEIDENHAIN is an internationally active company, so courses are regularly held in Traunreut both in German as well as English. Courses in other languages, such as Polish, can also be held in Traunreut by native speakers. Upon request, courses in further languages such as Chinese are possible through an interpreter.

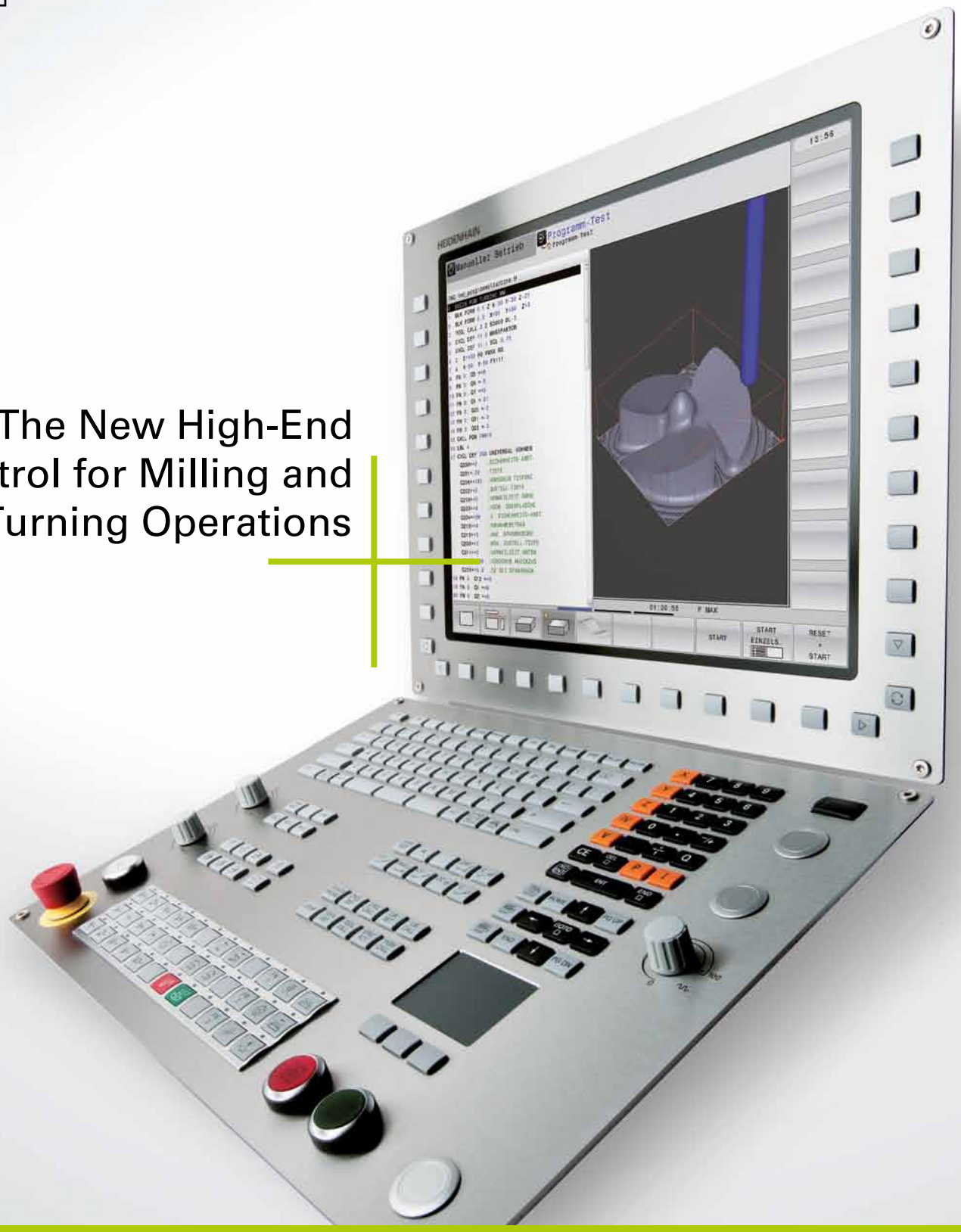
New machine hall: very well equipped for the future

The new machine hall also counts among the additional possibilities for learning: it is a large and well-lit room, equipped with the most modern machine technology, and welcomes the participants to apply their theoretical knowledge to the real world.

Compared with the earlier situation, the new machine hall in Traunreut offers tenfold more space, and is ideally equipped: four powerful milling machines (including two milling/turning machines) with TNC 640 and iTNC 530 controls and a lathe with a CNC PILOT 620 cover the entire spectrum of machine-tool control functions.

HEIDENHAIN

The New High-End Control for Milling and Turning Operations



The new TNC 640: for the first time, milling and turning are combined in one TNC. Now users can switch as desired between milling and turning—within one and the same NC program. Switchover is independent of the machine kinematics. It automatically takes the respective operating mode into account and requires no additional action. This new simplicity is complemented by dialog-guided plain language programming, the optimized user interface, powerful programming aids as well as comprehensive cycle packets taken from widely field-proven HEIDENHAIN controls into the new TNC 640. **This is technological edge built-in**. DR. JOHANNES HEIDENHAIN GmbH, www.heidenhain.de

Angle Encoders + Linear Encoders + Contouring Controls + Position Displays + Length Gauges + Rotary Encoders