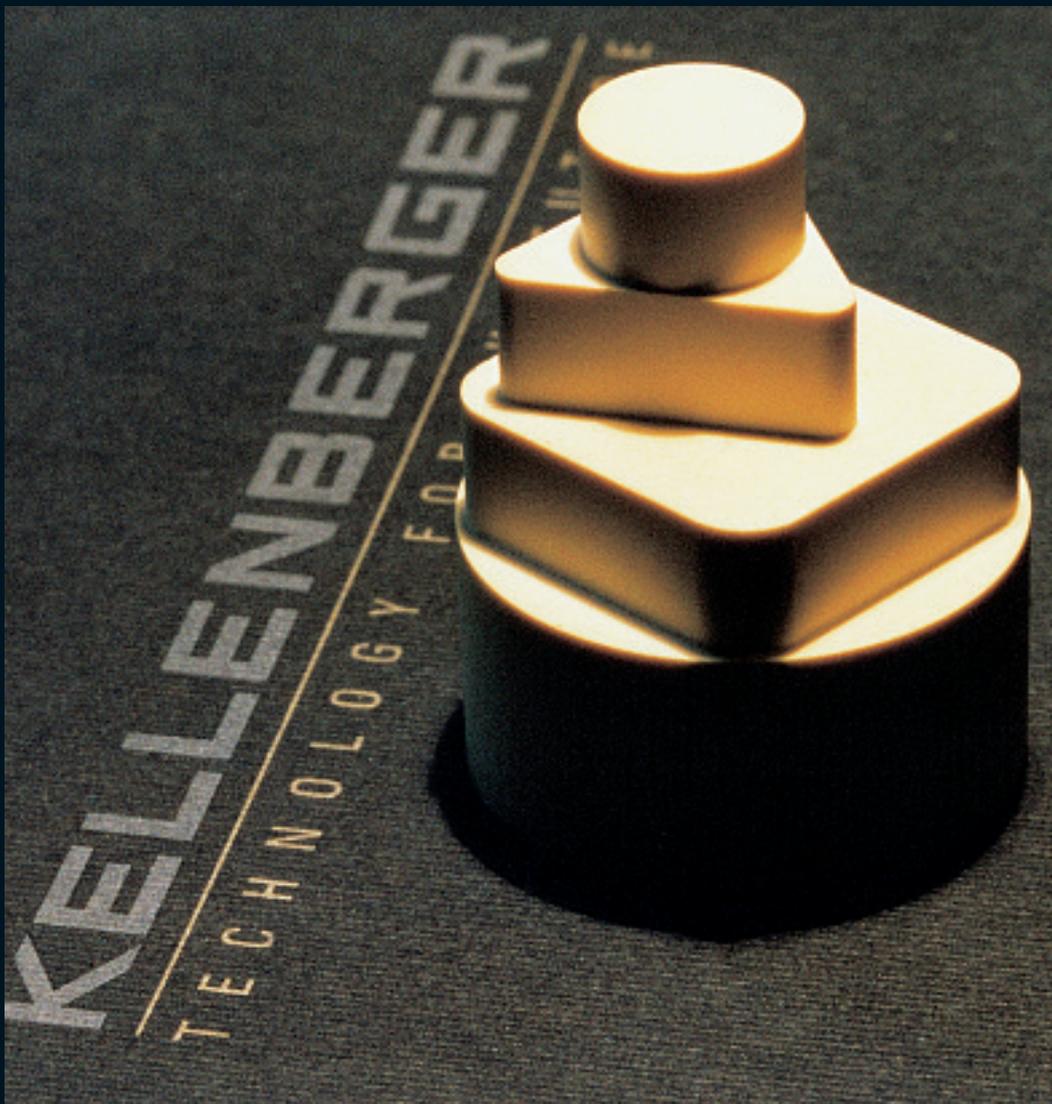


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## Full Upgrade

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**NC**Verlag



## Full Upgrade

It's probably no secret that, for its NC controlled universal cylindrical grinders, L. Kellenberger & Co AG mainly (OK, not exclusively, but nevertheless) adapts NC control systems from the Heidenhain Group – and it is equally clear to insiders why this is the case. Because nobody else demands the same degree of flexible individuality in tool-making as universal cylindrical grinders – and so the manufacturers of machine tools have to satisfy this requirement. And almost no one except Heidenhain is willing to be so flexible with their CNC. So it isn't surprising that, with 'GrindPlusIT', Kellenberger is now adapting one of the latest generation of dual-processor control systems from the Chiemgau company on their top-selling 'Kel-Varia' model (to start with), thereby primarily making form grinding faster (and more accurate). But that's not all: by doing this they are also availing themselves of groundbreaking alternative drive systems and have already introduced some impressive user features.

Kurt Stäheli, Head of Engineering at Kellenberger, starts off by declaring the benefits of using 'GrindPlusIT': "For form grinding of common profiles – i.e. squares or triangles with radii – we are now definitely twice as fast as before, and for round eccentric grinding it's even three times as fast." He explains: "Thanks to the new control system using two Pentium III processors (running at 800 MHz), we can now also use new servo motors from Heidenhain with higher dynamics and a higher moment of inertia. The main advantage of this package in terms of measurement control is that

we can now operate at doubled acceleration values." He adds: "Our customers will benefit directly from shorter grinding times." In addition, using modern drive and control technology also gives Kellenberger the option of using linear and torque motors with even more dynamics in the future. Stäheli predicts: "If we think it would be useful, we can now implement it at any time."

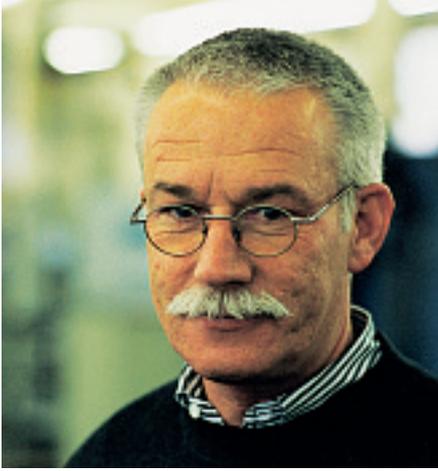
The dual-processor technology has now allowed Kellenberger to be quite confident about installing the Windows 2000 operating system and making full use of its benefits. For example, 99 percent of the demanded grinding jobs are covered

*Kellenberger takes the opportunity of adopting (even) faster CNC on 'KelVaria' (initially) to improve dynamics in form grinding and carry out a general review of the machine tool*

(...jk) A continuous process of improvement is, of course, in theory a good thing – provided it does not reach such extremes that you go off on a new tack each day. In other words, sometimes it is better to do it all in one fell swoop than to keep on introducing innovations – because that simply creates unnecessary disturbance all round. This is why Kellenberger in St Gallen has used the adoption of modern, more high-spec CNC on its top-selling 'KelVaria' model for a general review of this universal cylindrical grinder in terms of productivity and tool construction. Now, it really is attracting attention – above all with its better dynamics, especially in form grinding (and thread grinding), and with greatly enhanced customer benefits in general.

*Kellenberger's best-selling model, the 'KelVaria' universal cylindrical grinder, is now controlled by the 'GrindPlusIT' dual-processor CNC system and is supplied with powerful axis servo drives on the drive side, making it (even) more dynamic than before.*





*Kurt Stäheli, Head of Engineering, Kellenberger & Co AG, CH-St Gallen: "Our customers will benefit directly from shorter grinding times."*

with the graphic programming – by inserting ISO codes, 100 percent can be done. Stäheli says: "That makes correcting programs in particular much easier, quicker and safer." But that's not all: it is now also possible to import workpiece geometry as a DXF file directly into the control by way of CAD data; this speeds up the generation of grinding programs enormously – all that remains is entering a few grinding specific data to define the grinding process to be performed. Stäheli promises: "Our customers should now be a good four-fifths quicker and take only a few seconds instead of minutes." In other words, the NC efficiency concerning production time (for single-piece and small series production) is increased. The newly implemented form and graphics editors will also improve the efficiency – the one provides a program menu for working in lines or tables, and the other allows the extension of graphical programs by ISO command codes. Furthermore, (even) more grinding cycles are now saved to memory and the tool management functions have been upgraded too. Stäheli explains: "In the interests of operator safety and machine protection, we use the first processor exclusively for all real-time processes, and the second is reserved only for user interface operations. And because we now have so much more data processing capacity than before, thanks to 'GrindPlusIT', software that previously had to run on an external PC has now been installed on the control."

Examples of such tools are 'KelAssist' – used to support profile dressing and contour grinding as well as optio-

nal thread-grinding – and also 'Kel-Touch' for gap control (now with increased sensitivity and the option of connecting up to three sensors), and 'KelPoly', which not only programs form contours but also carries out electronic centre line height correction via CNC. As Stäheli explains: "That is really crucial, especially with form grinding, because an incorrect centre line height causes distortion in the shape. Now we can avoid this quite simply and therefore always achieve excellent results." He has special praise for the company from Traunreut: "The really big advantage for us of the Heidenhain control system is that we can control independently from each other the motion of the Z-axis, the infeed and the movement for the form grinding. This allows us not only to grind by hand the respective contours using the handwheel to control the infeed, but means that interim dressing is even possible." He goes on: "This means that complete grinding functionality is retained, and that's a huge advantage, especially for single-component and small series production."

However, Kellenberger didn't stop at adapting a new CNC system on the 'KelVaria' in the form of 'GrindPlusIT' and making it more dynamic with the requisite drive technology and putting the additional data processing capacity to good use for the operator interface. They also took an in-depth look at the cylindrical grinding machine itself. Stäheli: "We said to ourselves that if we were installing a more powerful control system and more dynamic axis servo drives, we really ought to update the whole cylindrical grinder, which meant looking to see where else we could improve it." Naturally, that process started with the control cabinet. The compact converter, and just one controller unit for four axes and one spindle, and now an integrated digital drive control system, resulted in considerable space savings (at the same time, some of the relays were no longer needed and the wiring became immeasurably easier thanks to – in-house designed – connection and function printed circuit boards). Stäheli takes up the story: "Despite having many extra functions, our control cabinet is now really tidy and its installation time has been halved."

If the company from St Gallen is smart, it will not only be its own bottom line that benefits, but their customers too. Stäheli confirms: "Of cour-

se both sides will gain from this." Conveniently, the 'tidying-up' work in the control cabinet had another useful effect: the cabinet now complies with both EU and US standards, so there is just one version now. Of course, the upgrading process didn't stop there – it continued step-by-step throughout the entire cylindrical grinder. Stäheli says: "We literally went through everything, questioned everything and looked to see if there was a better solution, and if so, what it was – it turned into a huge project." For example, following the same 'both/and' principle employed for the control cabinet, all the relevant wiring, cables and seals were designed to be equally resistant to both coolant and oil (it doesn't take long to work out the benefits of these two steps alone: for buying and selling, storage, distribution, assembly, servicing etc...).

Then all the hydraulic, pneumatic and electronic components were put on the test bench, with the simple aim of

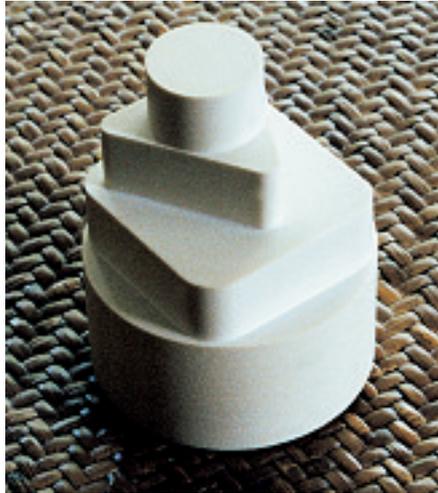
*The 'GrindPlusIT' on the 'KelVaria' offers the Heidenhain full-sized keyboard with touch pad, Kellenberger function keyboard, Softkey bar and 15" LCD colour screen. While one processor controls and regulates only real-time processes, the other runs the Windows operating system for the operator interface as well as Kellenberger's bespoke grinding software programs.*



## Schleifmaschinen



Top: As an optional feature, a swivel-angle display for the W spindle can be incorporated into the control panel.



Right: Thanks to the 'GrindPlusIT' system that has now been adapted for the 'Kel-Varia' and the powerful, highly dynamic drive technology, polygons can now be processed twice as fast, and round eccentric shapes even three times faster than before.

finding ones that were better in every way – with the criteria including not only compelling technical superiority but also, of course, price. The results? Thanks to continuous further development, there are now modern, third-party components that are smaller, more reliable and yet cost less than their predecessors. Take, as just one example, the electric door drive offered as an option for the 'Kel-Varia' where the manufacturer, Landert AG, has progressed considerably. Stäheli comments: "From time to time you just have to take stock generally and draw the necessary conclusions."

Just two more examples, both relating to the KelVaria's thermal management, which is so important in achieving indexing accuracy (and has nothing to do with the adoption of the new control system): whereas until now there were cooling options for various important assemblies, (which sometimes resulted in more than one cooling unit having to be installed), now, virtually everything that generates unwanted heat is connected to the cooling circuit as standard: both the control cabinet and the entire hydrostatic system as well as the grinding head (28 different ones are in the catalogue and can be supplied

– or none) and the (optional) HF spindle. This results in a high degree of accuracy and, again, simplifies more than just the installation. The second example is the decision (also as standard) to subject the entire machine base to continual rinsing and to wash continuously the upper table, so as to reliably remove both grinding particles and the heat that is generated.

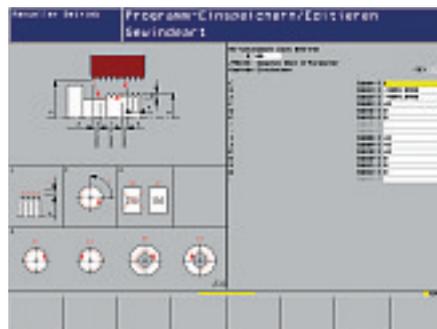
So, were there problems before? "No...", says Stäheli, "...while we were introducing the new control system we just looked everywhere for really useful possible improvements that would increase both accuracy and productivity – and we not only found plenty, we have also implemented them."

So there you have it, a full upgrade, for a universal cylindrical grinding machine which will certainly still be with us tomorrow...

[www.kellenberger.net](http://www.kellenberger.net)



The form editor included in 'GrindPlusIT' makes set up and programming significantly easier for both grinding and dressing operations.



Below: Much easier: CAD drawings of workpieces needing to be ground can be easily (and instantly) imported as DXF files into 'GrindPlusIT' – making graphical programming using the graphics editor much quicker and easier.

