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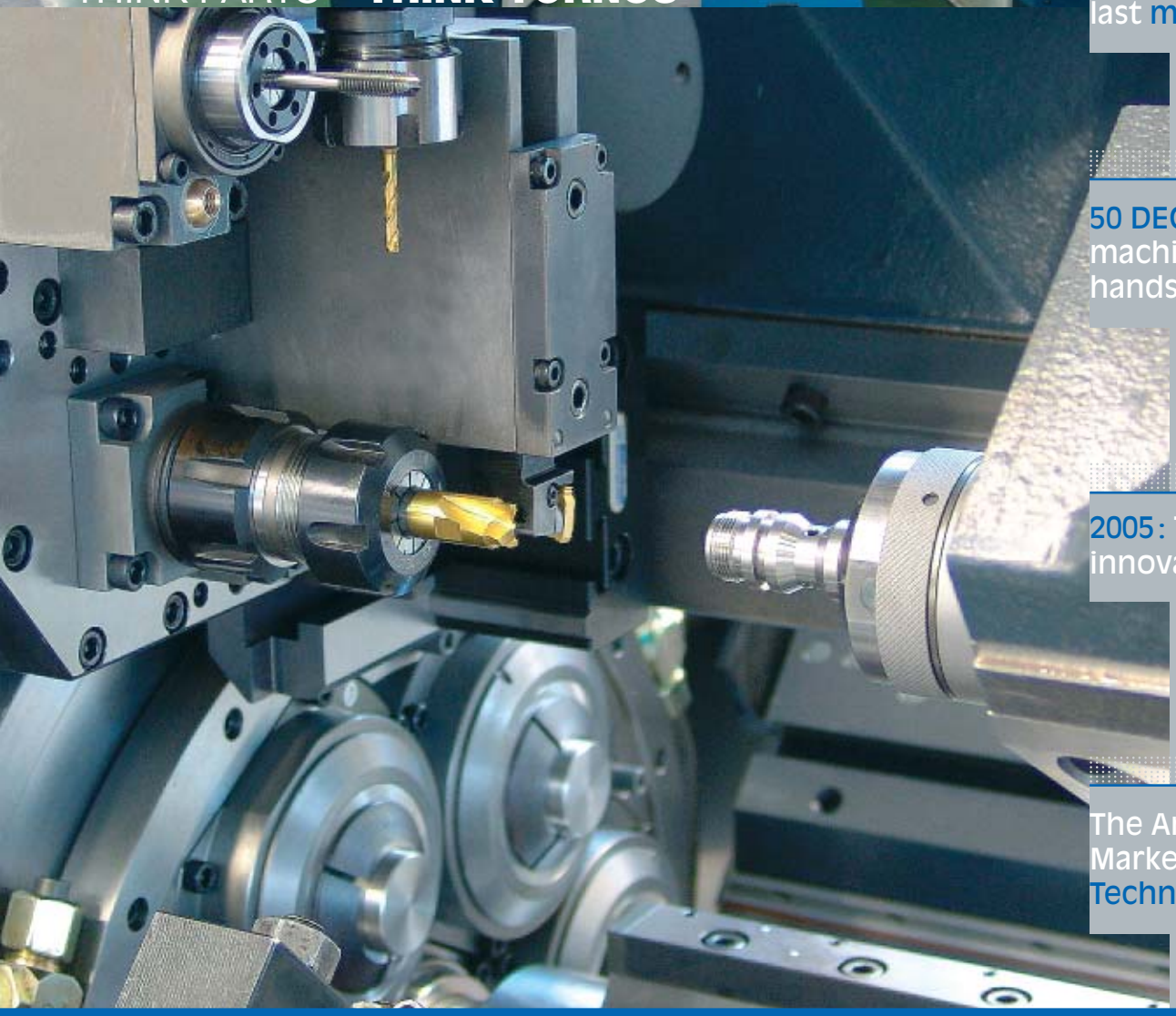
THINK PARTS – **THINK TORNOS**



Searching for the last millennium

50 DECO machines in expert hands...

2005: The year of innovation

The American Market for Medical Technology

MGB 50 DECO

Sommary

Think **parts**
Think **TORNOS**

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INNOVATION

the buzzword for 2005

The Business Units: Engines of innovation

The organisation of our company into business units is now complete. This structure provides increased flexibility at internal operational level and since each business unit fully manages a range of products (single-spindle and multi-spindle), the flexibility is passed on to our clients.

It ensures the organisation is fully focused on the product with the main purpose built around maintaining relationships between the client and TORNOS. The new structure enables TORNOS to continually develop products and services to meet the customers specific requirements.

The business units are to a certain extent the "entrepreneurial" cells of the company. Thanks to direct and personal contact, the clients feel that they are working with a small dynamic company that listens to their requests rather than with a large, impersonal corporation made up of many difficult to access departments.

The "Market → R&D → Market" loop

With the strong back-up of this new structure, TORNOS hit upon the word "innovation" as the buzzword for 2005. The pillars of innovation are essentially based on customer requirements and technological developments.

The business units provide the link between the market and our engineers. This ensures that the circle formed by the defined requirements of knowledge exchange and execution of developments is permanently closed.

No less than six new products will be launched during the next twelve months! Designed on the basis of market studies conducted by the business units, they are the first fruits of the work carried out through continuous dialogue with the Research & Development department.

What are your expectations of TORNOS?

Listening to our customers, the following main requirements were underlined:

- You must be capable of machining parts that are getting ever more complex;
- You are looking for less expensive machines to work fairly complex parts;
- You require increased flexibility (rapid changes) for small series runs.

Meeting your requirements is the first guiding step of TORNOS towards innovation! Thank you for having shared your visions and requirements with us and please continue to do this!

Raymond Stauffer, CEO

Searching for the last millennium

When the operator of a machine tool talks about precision, he means the precision of the manufacturing process. But what is precision with respect to the part itself and how does the machine tool manufacturer meet this requirement ?

As far as the TORNOS machine-tool manufacturers are concerned, the precision of a part is primarily made up of two elements: the dimensional aspect – namely complying with tolerances, which are very tight in the majority of cases and geometric tolerance, i.e. rotundity or even parallelism. An additional requirement relates to surface quality. One must not forget that the means of inspection have developed considerably in recent years and the client is often better equipped to make an appraisal of the parts supplied.

However, a new requirement is now asserting itself: the user is demanding more and more machine capacity (MC) and process capacity (PC).

Machine capacity – MC

Machine capacity (MC) demonstrates that the machine is capable of executing a part from a given material to the geometric dimensions required, under certain conditions. The machine capacity is tested on a number of parts that must comply with the design criteria.

Process capacity – PC

The machine tool must not only be capable of guaranteeing high-performance MC on a series of given parts but also over an extended production period. Specialists talk about repeatability but there's far more to it than that! Nowadays, the client requires a statistical inspection to provide a guarantee that the lathe can manufacture precise parts, not only for an hour or a day, but for a month and more. In other words, the entire series must comply with the same quality criteria.

Strength – first and foremost

In order to comply with all these requirements, the TORNOS engineers incorporated a whole series of elements in the MULTIDECO machines with a view to increasing both MC and PC. In fact, precision can only be obtained by complying with a vast range of factors when designing the machine.

A key element is found in the machine structure. The base of the MULTIDECO is made from mineral cast iron. Because of its mass, this substance absorbs any vibrations and ensures good stability of the lathe. Consequently, the base is directly involved in the precision of the MULTIDECO.

Added to this, the metal structure of the MultiDeco is based on spheroidal cast iron elements, which also absorb vibrations. The choice of material and the special structures of the vibration-absorbing elements mean that vibrations and expansions are avoided.

Thermal stability – one of the keys to success

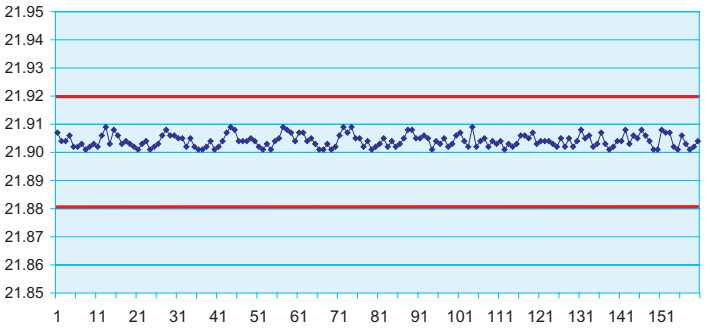
Specialists are only too familiar with thermal effects. A change in machine temperature will lead to variations in the precision of the part being machined – variations that frequently exceed a hundredth of a millimetre. When dimensional accuracy to the nearest half hundredth or less is required, the consequences are quite obvious.

To overcome this phenomenon, the design engineers of the MULTIDECO developed a cutting oil bath in the base of the machine, which contains one thousand litres of oil and more, depending on the model. This oil bath is permanently maintained at a stabilised temperature. Oil, flowing at 300 litres per minute circulates in the machining area and the thermal stability of the oil remains at a controlled temperature of ± 0.2 degrees Centigrade. The oil also passes across the spindles, thereby ensuring the thermal stability of the machine as a whole.

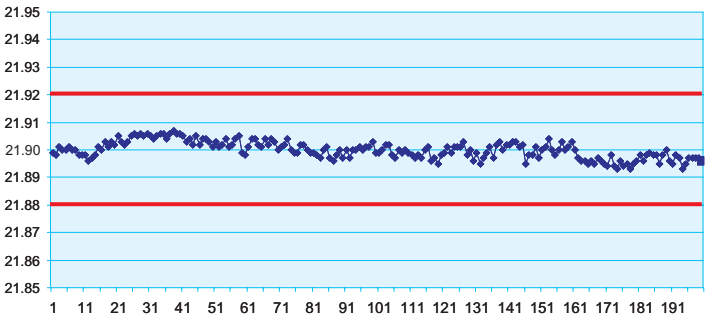
In order to improve the quality of machine temperature control and thereby prevent an accumulation of heat in the machining area, the oil mist is evacuated through a filtered outlet. Eliminating the hot areas in this manner leads to improved machine precision.

The flow of oil at a controlled temperature also offers other benefits. Without this system, the spindle temperature, for example, could quite easily rise to 60°C. It therefore becomes very sensitive to the effects of ambient air. You only need to open the machine for inspection or remove the chips and the spindle temperature will drop, thereby leading to a change in precision.

Thanks to spindle cooling, the temperature of the latter is permanently monitored and thermal fluctuations are avoided. A thermal check of the machine is ensured in all circumstances, thereby leading to stable process capacities, which is something the operator – having to work to the last microns – doubtlessly appreciates.



Test conditions: allow machine to warm up for 1 hour
Test material: stainless steel 303
Cycle time 7.5 parts/min
Conditions for sampling 160 parts on completion
Measurements 21.90 ± 0.02



Test conditions: allow machine to warm up for 4 hours
Test material: stainless steel 303
Cycle time 7.5 parts/min
Sampling conditions during an 8-hour production run: 5 parts every 25 minutes
Measurements 21.90 ± 0.02
Range: 0.014

Coolant spraying to save the tools

In the current models, the cutting oil pumps have a notably high flow rate and sprinkling is incorporated into the body of the tool. Because of this, it is much easier to cool the cutting tools during turning and when drilling or continuously removing chips. The tool can operate under optimum conditions, which equates to increased cutting precision and to an extended useful life of the tool itself.

Thanks to close co-operation between TORNOS and the various tooling and tool holder manufacturers, cutting tool management is constantly improved and the MULTIDECO is adapted to the latest market requirements.

A large tool holder provides increased stability

Another aspect with respect to structure, is found in the tool holders. The designers left sufficient space on the slides to receive solid and pre-adjusted tool holders. The tool holders have undergone a major development during the past six years. They have become stronger, because they are much wider and now incorporate the sprinkling facility. Gone are the errors of ill-timed clamping when manually setting the tool. The tool holders are repeatedly loaded and unloaded without changing the precision of the lathe. This must also be taken into account when considering lathe precision.

The design of the machine offers something else, in that the slides – hitherto fitted with a certain amount of play – are now fixed in a pre-stressed way to the rolling bodies. The play, which was previously caused by the design of the machine, has now been completely eliminated.

Machine inaccuracy – reviewed and corrected

An element that has always existed with machines is the barrel "fault". In fact, as a result of its machining and assembly, spindles never have a zero tolerance but contain an inherent fault, of say +2 or –2 microns, with the result that the faults start to add up. Working on a diameter will double this fault right from the outset. The operator therefore always has to bear this in mind when setting the machine.

With numeric control, it is sufficient to measure this discrepancy and enter the parameters in the control. As the numeric slides are positioned by the control, the latter takes account of these errors by increasing or decreasing the move-

Searching for the last millennium

ment, thereby cancelling out the difference due to spindle manufacturing and/or assembly. This correction is performed for each spindle, leading to the bonus of assured repeatability. The numeric correction of the barrel also equates to a single line in the machining parameters.

The same facility is found when entering the correction values for the pre-adjusted tools. Once the part is complete, the setter passes it to inspection: if the dimensions differ by three microns, for example, he will correct the control value without having to open the machine.

No more calibrators

In the past, the lathe used for turning small parts often had calibrators for the multi-spindle versions. If the machine was able to maintain five hundredths, for example, the calibrator maintained the hundredth value, meaning that it was the calibrator, which specified machine precision. This tool was also extremely expensive and specific, and depended very much on part shape.

Over many years, the calibrator has become well established in the mind of many operators of conventional multi-spindle machines. Even today, some operators believe that a multi-spindle lathe cannot provide precision unless use is made of a specific tool that is quite tricky to adjust.

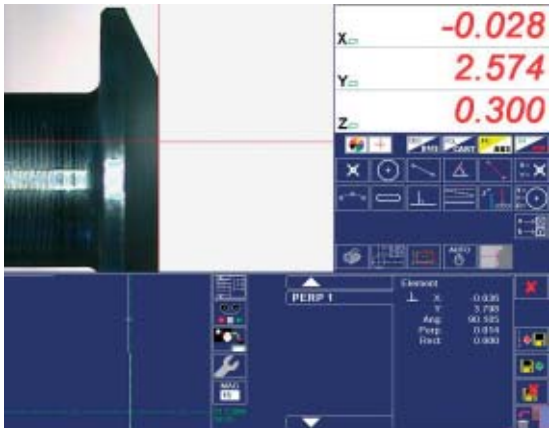
Nowadays, thanks to numeric controls, is no longer the tooling that adopts this role. What is more, the machine no longer needs this tool to achieve the same precision or even a better quality.

Constant intervention

Up to now, the operator used to take samples of parts during manufacture, which then underwent a rigorous inspection. If any discrepancy whatsoever was found, the operator would have to intervene manually, stop the lathe and correct to wrong value. However, this process meant that he rarely obtained results to the nearest micron, given the fact that by clamping the tool with the spanner, a variation in adjustment was always possible. If the dimension were set by the calibrator, he would have to proceed with painstaking, chancy adjustment, so unless this was absolutely essential, he would simply leave the machine to run with its dimensional settings. What is more, some imperfections required some cam modifications and the operator would often hesitate to intervene at this level.

Now, thanks to numeric control, the operator can influence the control at any time by entering a correction value, without having to stop the machine. He even has an inching facility so that he need only partially enter the correction value.

This facility leads to another benefit: previously, the operator had to "program" a machine speed and cam feed rate. These values were fixed and could only be changed with great difficulty. Times have now changed: for a new part or using a new unit, the operator can juggle the feeds and rates numerically, in order to optimise the cutting conditions. No more compromising – with his know-how, the operator can influence all registers because the control allows him to amend a setting at any time. This facility enables the operator to carry out prompt corrections thereby further improving the process.



Measuring the perpendicularity between the large face and small external diameter using the latest generation inspection tool. Result obtained: 0.014 mm (perpendicularity default).

From mechanic to process manager

The old school small parts turner used to operate with his setting tools and intervene directly on the machine. Nowadays, he is more of a process manager than a mechanic. While the work now demands less manual feeling, the requirements concerning his knowledge of numeric control have risen. Instead of working on

Searching for the last millennium

his cam-operated machine to proceed with fine setting work, he will now be asked to modify a computer program. To this end, TORNOS provides the necessary and ongoing training in relation to the product.

The current measuring facilities available considerably reduce operator time, whilst considerably increasing the quality of part inspection. The time invested in measuring parts alone is much shorter and the operator can proceed with any changes far more quickly. For the operator, access to precision has become far more simplified and is far easier to carry out. Suddenly, the improvement in part precision has now placed a higher value on his image as a technician of the art.

Looking to the future

Quality control is currently executed by using the appropriate standard tooling. Likewise, the useful life of a cutting tool is determined by the operator and his experience, know-how and quality procedures. For example, he can enter in the control a useful life of 1000 parts and once these 1000 parts are complete, the control could trigger a warning signal. The operator will then change the insert, for example, without taking account of the actual state of the tool that has been replaced as a preventive measure, until it starts producing parts of inferior quality. If this fails to occur within a pre-determined period, the machine will come to a stop, thereby preventing poor part execution or tool breakage. The trend is towards continuous production. Automated part control with statistical values is something that is growing in demand.

The development engineers at TORNOS are preparing their solution to these demands. They are currently adapting an interface that has already been successfully used on both single-spindle and multi-spindle lathes. With this interface, it is possible to connect a measuring station to the outside of the machine. This station measures certain dimensions and transmits the values to the lathe control, which, by offsetting some parts, will correct the setting of an operation, which has a tendency to deviate.

What is more, the control can also produce statistics and monitor the development of data. This monitoring can also be extended to the status of the cutting tool and warn the operator if any replacement should be carried out. The engineers anticipate, amongst other things, that this system will lead to an extended tool life, therefore leading to a saving in investment whilst retaining quality.

Conclusions

Precision – comprising a multitude of elements, as demonstrated by the above explanations. To achieve precision that is worthy of this name, the designers of machine tools must take account of many things – starting from the base of the machine and finishing with interactive control. The environment as a whole is important and the designers of the MULTIDECO knew how to respond.

The five Ms of precision

The 1st M: the medium

The machine environment has a marked effect on precision – for example, an air-conditioned machine room.

The 2nd M: the methodology

The flexibility of the program and standard tooling mean that the results guaranteed can be achieved using the current measuring facilities.

The 3rd M: manual labour

The skills of the operator are always important.

The 4th M: the material

Each type of material works differently. From one casting to another, from one manufacturer to another – the operator will never obtain the same results. The flexibility offered by the process provides all the benefits of success to the operators.

The 5th M: the machine

A good quality product is one that provides customer satisfaction as a result of its conformity, price, lead time and service.

50 DECO machines in expert hands…

…part of the reason for global success!

On delivery of the 50th DECO machine to MGB in Marnaz, France, DECO Magazine was interested to find out a little more about this company. A meeting was therefore arranged with Mr Jean-Paul Burnier, Chairman and Managing Director. One fine winter's day, our journalist, together with Mr. Alain Tappaz, director of TORNOS France, went to discover the secret of MGB.

DM: Good day Mr. Burnier. 50 DECO machines is quite a large number – can you tell us a little about the use of these machines? What are your markets?

JPB: MGB has been active throughout the world for almost 20 years. Nowadays, 90 % of production is earmarked for electronics, automobile, aeronautic, telecommunications and defence with 70 % of production for export. The DECO machines allow us to manufacture complex and intricate parts that are difficult to execute efficiently.

DM: Aeronautics is very demanding in terms of quality and safety. Is that why you work with DECO machines?

JPB: The main reason is the capacity of the machines. We execute parts on our machines, which cannot be produced on others. We specialise in parts with a high added value… and DECO adds to this value.

DM: The DECO machines provide you with numerous possibilities, but what is it that helps you achieve your strength?

JPB: In fact, our main strength is our sensitive approach to a market that is constantly on the lookout. We are always looking for improved machining solutions on behalf of our clients. The DECO machines are a real benefit, but without the men, they are nothing!

DM: Talking about human resources, do you have a special training policy?

JPB: More than a training policy – we have a company philosophy that governs all our decisions. We simply want the best from all areas of the company. At MGB there is no unskilled staff. Our company consists of experts at all levels. The entire company organisation is based on the optimum deployment of the skills of each employee.

DM: At the start of the century, Taylor proposed a scientific working organisation where everyone only performed the job intended for him. Can one say that MGB makes use of a sort of improved Taylorism?

JPB: The concept of skills and responsibilities in our company is highly developed. In fact, each person executes a specific job, but

50 DECO machines

From left to right: Valérie Burnier, Jean-Paul Burnier and Véronique Roda.

unlike Taylorism, the employees at MGB are all experts who are fully competent in their field and are also able to work the overall concept. Nobody works "without purpose"!

To achieve this result, we have an intensive training policy in place. New employees are coached by a mentor and soon become immersed in the "MGB procedures" and appreciate the global nature of the company and the importance of the individual in the achievement of common objectives.

DM: Is it easy for you to find "experts" in the labour market?

JPB: Absolutely not. It is very difficult to find the best and this is why we are also very keen to allow our colleagues to improve themselves within the company. For example, our technical manager, Mr. Yannick Besson started as a technician and then, as an alternative, completed an engineering course…

DM: So, would this be a major investment for the company?

JPB: Undisputedly! But it's an investment, which enables us to be at the forefront of what's going on in small parts turning throughout the world. This is our strength!

DM: Let's talk about the world. We heard that MGB was going to open a production unit in China. Normally, companies that move to these markets are doing this to produce simple parts at low cost. Does this mean that you are diversifying to fill this gap?

JPB: That's a good question and to answer it, I suggest you talk to my daughter, Mrs. Véronique Roda, who has taken on the general management of the company.

VR: Hello. At the risk of surprising you, I can tell you that MGB will absolutely not be going down the route you mentioned earlier. Our strategy of being experts in producing parts, especially for the connector industry, still holds good throughout the world!

DM: Hello. But if you produce the same parts in China, wouldn't this mean that you were going to relocate part of your French production?

VR: Not at all! Our policy is to provide our clients with "MGB" quality. It transpired that a large number of clients are opening up new assembly units in China, mainly to serve the Asian market. They are seeking out local partners to produce the components required for their sector of activity. We are going to offer this service to our clients!

DM: TORNOS recently opened a commercial and service office in China. How did you regard this event?

VR: For MGB, this is a very positive point. The DECO machines we are going to install over there could benefit from a service quality that we hope is just as good as for the French market.

DM: To come back to "experts", who are deployed in every job in the company, how do you manage globalisation?

JPB: Marnaz is a true centre of skills. Our programmers have amassed considerable know-how, which is centralised in our database. If we want to execute a part in the USA or soon in China, we have recourse to a centre of skills that

in expert hands...

supplies the "standard MGB" service. This means that operators throughout the world have access to a standard and universal procedure.

DM: Does this mean that your setters can change the production site and go to China, for example?

JPB: It's already happened, engineers went to the USA and it is quite possible that exchanges will take place in the future. It is obvious that the Chinese will come to Marnaz for training and that some of our experts will be seconded to Shanghai in a supporting role for short periods.

DM: You are investing in training and really creating high-performance teams. How do you ensure that your colleagues remain with MGB?

JPB: We are looking at the whole. In the first place, our colleagues are experts and not unqualified employees. We therefore offer a salary that is adapted to the development potential within the company. Also, our working philosophy is to provide optimum working conditions in terms of noise, pollution and so on. We provide workshops where every machine is fitted with filters. The rooms are air-conditioned and the environment is pleasant. Our workshops are nothing like the old small-parts turning shops.

DM: Will you adopt the same policy in China?

JPB: Absolutely!

DM: You often refer to "MGB philosophy". Visiting your workshops, we noted that this was present throughout, since all your machines are similar and benefit from the same environment. How did you set all this up?

JPB: I have managed this company for 30 years with my brother, Pierre Burnier. Pierre was the specialist in applying this philosophy to the workshops and he was responsible for standardising our entire fleet. And even though he is now retired, every now and then he suggests other improvements. Without him, MGB would not be at this level of excellence. Now, together with my daughters, the company is managed by the fourth generation!

DM: After four generations, are there any future challenges left for you?

JPB: The company is now managed by my daughters. Véronique is the general director and Valérie is the financial director. My contemporary, Yves Roda is technical director. The management team is completed by Yannick Besson, who is in charge of the small parts turning centre in Marnaz. As chairman of MGB, I support the management in its strategic development and nowadays, I am very closely involved in the China project and I'll be going back there on Monday! For us, the challenges are to provide an improved service for our clients.

DM: In this context, you are technological experts and use high-tech products. What else can you do to stand out from the competition?

JPB: It is really our intention to provide our clients with a complete solution by incorporating machi-

50 DECO

machines in expert hands…

ning and associated services in a fully integrated production facility. But this alone is not sufficient. In my opinion, the most important thing is to excel further. For example, we've gone a long way with the TB-DECO in that we've created dozens of macros so that we can always do that bit more and always provide our clients with added value.

DM: Your machines, dedicated processes and your company philosophy are very important assets but are they recognised in the market?

JPB: We are acknowledged as the leader in the connector market. Our experience enables us to offer perfect parts that match the requirements of all sectors. Our company is certified to ISO 9000 and in 2005 we shall be ISO 14000 certified. We are also certified to ISO TS 16949 in the automotive sector. We work with Airbus and its A380, which is revolutionising air transport. These certifications represent the "official stamp" of our processes, but they go even further with regard to the quality management of the company's products.

DM: With your programming centre that operates for the world as a whole, does this not contradict the concept of the experts? If the setters did not develop the programmes...

JPB: Exactly, they are the experts and develop their experience. The programmers take account of this experience and offer very high-quality services. What is more, the setters can go from one machine to another, since everything is standardised. This guarantees the same quality and a "universal" philosophy in all the companies forming part of the MGB group.

DM: What about the tooling? Do you also wish to ensure universality?

JPB: Mr. Besson will be in a better position to answer this…

YB: Everything is standard at MGB – the programmes and tooling. The idea is to provide the setters with a "process" that is really as efficient as possible and allows them to go from one machine to another without problem. The programs are transferred to the machines via the memory card to the DECO 13a and 20a, and for the DECO 7/10a machines, we go via RS 232 using mobile PC stations.

DM: What about the software developments at TORNOS, were you able to benefit from these?

YB: Our series runs are quite varied – from 100 to 100,000 parts. But in all events, we carry out several dozen start-ups and program changes per month. The most interesting for us in the short-term is the "one key function" for transferring programs – this is a great simplification.

DM: Thank you Mr. Besson. Unfortunately, Mr. Burnier has just given me a sign that we have come to the end of this meeting.

Mr. Burnier, it would appear that MGB is constantly on the move

Mr. Jean-Paul Burnier and Mr. Yannick Besson.

Mr. Yannick Besson "talking chips" with Mr. M. Didier Perreard, setter.

and your on-going objective of offering more to your clients means that you have developed in several directions – both in terms of industrial methods and geography. Could you perhaps divulge some other ideas for the benefit of our readers?

JPB: In terms of communication with our clients, there is still a lot that has to be done. We shall set up an information system in real time on the web, for the benefit of our clients. All the information regarding offers, order monitoring and delivery tracking are now permanently available.

DM: I can see that MGB is always rich in ideas and that this provides strength to the company. Regarding your machines, could you spare us a few words before we finish?

JPB: After 9 years of experience with the DECO machines, I can tell you that we have achieved our goals. We can really offer efficient solutions for complex parts with high added value. We are constantly on the lookout for new products to execute simple parts …

DM: We shall pass on this message... I would like to thank you for this meeting and wish you every success for the future. We may write an article on China in a few years time – what do you think?

JPB: The future will tell…

MGB

Production	*France* *USA* *China from 2005 onwards*
Scope of activity	*90 % connectors* *10 % medical*
Number of DECO machines	*50*
Number of employees	*85 people*
Total number of machines	*130*
Export	*70 %*
Comment	*100 % of small parts turning is carried out on TORNOS machines. The company also uses other types of machines, but purely for connectors.*

The story behind the logo …

When questioned about the meaning of his logo, Mr. Burnier explained…

"The hands represent the connection, the main sphere of activity of our company, but also the partnership with all our clients. The "small squares" represent the spare parts we machine, which then make up the units for our clients. The world is underneath because our ambition is to have a global presence to service all our clients!"

The logo was created 10 years ago and the message is as pertinent as ever. If only one word should be applied to MGB and Mr. Burnier, it could be "visionary"…

Precision cleaning «swash»

The winning system

The solvent A3 (Isoparaffin) removes oil perfectly. The water based detergent dissolves salts and other polar soils. This is the solution to your cleaning problems.

Ionbond uses the Amsonic swash technology for surface preparation prior to PVD – CVD coatings.

Degreasing and precision cleaning

Ionbond of Olten, Switzerland is one of the world's leaders for PVD and CVD coatings. In connection with the surface preparation of tools or decorative parts it is important to ensure the adhesion of the layers. The cleaning system used up until 1991 consisted of degreasing with water detergent and drying using R113. After R113 had been banned, the system was modified and used the following sequence of cleaning in line:

- Water based degreasing.
- Rinsing.
- Final rinsing with isopropanol.
- Hot air drying.

The compact equipment ***swash L+H*** increases the capacity of the currently used system by ensuring high performance cleaning and drying that provides better results than the previous equipment.

The Amsonic EgaClean concept is based on hydrocarbons applied at a high temperature. In use since 1997, it is the first of its kind on the market. It has proven its superiority over chlorinated solvents by using immerse cleaning at a high temperature followed by a vapour phase and finally vacuum drying. The continuous distillation maintains a constant solvent quality. The fluid does not have to be changed as the distillation perfectly purifies the solvent without time limitations. This is an advantage compared to chlorinated solvents and modified alcohols.

Non polar soils are perfectly removed. Salts develop during the drying of the parts after a cleaning process with water based emulsions (incl. 95 % of tap water). Parts are generally covered with anti-corrosion oil that protects them. These salts are not soluble in Isoparaffin, modified alcohols or chlorinated solvents. The only usable solvent is a water detergent. This is the ***swash*** concept; it contains a cleaning phase using Isoparaffin that dissolves all non polar soils. The solvent remains efficient due to the continuous distillation. This is not the case with

Precision cleaning «swash»

The winning system

	Isoparaffin cleaning	Combined cleaning ***swash***
Pollution in mg C	0.032	0.01
Pollution in mg C/m²	10.8	3.0
Hydrocarbon in mm	0.0138	–

water detergents that are polluted by oils. The preceding equipment used acetone in a pre-degreasing step.

Remaining salts can then be dissolved in a second cleaning phase, using a low concentration of water based detergent and then followed by a rinsing phase. A vapour phase with deionised water can also be introduced. The cleaning process ends with a vacuum drying phase.

The water detergent is a product of Borer Chemie. It uses a low alkaline salt free combination of tenside solutions. Its low concentration and the optimisation of the tenside solutions allow an easy rinsing.

The ***swash*** concept makes it possible to perfectly degrease and clean any type of parts. The name ***swash L + H*** stands for lipophilic (oil soluble) and hydrophilic (water soluble). This means, basically any type of soil can be dissolved.

The cleaning cycle can also include a final vapour phase using Isoparaffin, should the metal have to be protected against corrosion. A very thin layer of this patented solvent will protect the parts for approximately four weeks.

The flexible programming of the machine allows the operator to select either the Isoparaffin or the water cleaning phase.

The remaining carbon residues have been measured in a laboratory and show that the remaining pollution leads to variable concentrations. This makes it possible to use the cleaning system ***swash*** for bio-medical applications.

Programmable quality

The requested cleaning quality covers a broad range of parts and soils. Drills with thin cooling channels and an overall length of 200 mm as well as recess holes need to be cleaned and dried perfectly.

Some steel parts are cleaned using Isoparaffin only. The cleanliness measured in surface tension shows values of over 52mN/m after cleaning and drying. A quality like this is perfectly adapted to PVD or CVD coatings. A supplementary control uses a clean white paper with isopropanol that is rubbed onto the surface of the parts and inside the recess holes. The cleaning is accepted if no marks are visible under the microscope with a twenty fold enlargement factor.

Parts of complex geometry with multiple recess holes show traces of grease after water based cleaning with acetone, water detergent rinsing and isopropanol drying. Swash removes these soils efficiently.

Hard metal parts often show cobalt leaching when cleaned with water based systems. This is avoided with the swash equipment using A3 solvents. An important part of this technology lies within the various sequences of cleaning (freely programmable by the operator) and the distillation parameters of the solvent.

Finally, rinsing with deionised water and an aqueous vapour phase achieves drying qualities equal to HFE and HFC drying systems. The drying control method uses a visual check under the microscope with a twenty fold enlargement factor. Some polished parts with an electroless nickel layer can be dried in an equivalent quality using this method, unlike the drying with isopropanol.

Productivity, economics and ecology

The ***swash*** process has low operational costs and best environmental values. The following table shows the systems significant cost and performance data:

Parameters	Swash L + H	Water based line
1. Investment	index 100	index 250
2. Cleaning costs in CHF/kg	0.09	approx. 0.5
3. Productivity Basket dimensions	approx. 200 - 300 kg/h 670 x 480 x 320 mm 100 litres	approx. 50 - 80 kg/h 300 x 300 x 200 mm 18 litres
4. Environment data 4.1 Emissions VOC or DOC/year	A3 solvent approx. 200 l VOC emissions = 0 kg approx. 30 kg detergent or 2 kg DOC	Acetone: 5000 l VOC emissions = 2000 kg 1250 kg detergent or 87 kg DOC
4.2.Energy in kWh/year	approx. 35'000	approx. 40'000
4.3.Water consumption in m^3/year	approx. 150	approx. 550
4.4 Ecological balance sheet (a low value is best)	850 eco points	2150 eco points

A new generation of cleaning equipment

Cleaning problems are related to various soils. Polar or non polar pollutions represent the overall range of pollutions met within metallurgical productions.

Polar soils like salts can be eliminated from the parts surface using water based detergents or polar solvents. Non polar soils like oil and grease are better dissolved by hydrocarbon solvents than by water detergents. This is due to the fact that tenside solutions are consumed by the oil particles. Hydrocarbon solvent can be distilled continuously and therefore will always keep its solving capabilities. The advantage of cleaning in two steps is that the degreasing phase leaves only salts or polar soils on the parts. These can be eliminated by a water detergent with low concentration (below 1%). In some cases rinsing with deionised water may be sufficient to eliminate salt soilings (Ca and Mg) left by water emulsions.

The cleaning quality is also related to the geometry of the parts. Vacuum allows a better penetration inside recess holes. The high temperature of the AIII solvent is also a guarantee for a better dissolving of oils and greases. The progressive elimination of chlorine additives in cutting oils and their replacement by other additives not compatible with chlorinated solvents, speaks for the efficiency of A3 cleaning compared to processes with tri or perchloroethylene.

Swash is the result of applied research using non chlorinated solvents since 1993 and is part of the growing importance of efficient and environmentally friendly cleaning and drying technologies.

2005: The year of innovation

So that we can provide you with a more detailed explanation as to what the "year of innovation" means to TORNOS and its clients, the editorial team of DECO Magazine met Messrs. C. Cancer and W. Nef - managers of the single-spindle and multi-spindle business units.

DM: Good day, gentlemen! We have seen that TORNOS is launching a major offensive on innovation this year. We've heard things about 6 brand new products for 2005, never before seen at TORNOS...

CC: Indeed. This year we will be launching 3 new single-spindle and 3 new multi-spindle products. This will be a real challenge, which will nicely round off the TORNOS range.

DM: When you talk about "rounding off the range", does this mean that these products are an addition to existing products?

WN: Absolutely! In real terms, we are talking about an extension of our range to respond to market sectors with very targeted requirements.

DM: Would this mean that the current DECO & MULTIDECO products, which many clients have invested in, will become obsolete in the short term?

WN: The current products provide solutions that are perfectly adapted to sectors with specific requirements. The new products reinforce the company's position, thereby allowing it to cover other markets.

The ranges, including the DECO and MULTIDECO machines have seen an increase in their performance and reliability over the years and sales have proved that our products are very competitive and meet market requirements. There is no need whatsoever to replace these!

CC: These extensions of the ranges simply mean that we can provide the exact solutions to pertinent sector requirements, in areas we have hitherto not covered!

DM: You are presenting new products, but how did you decide upon their characteristics?

WN: Our thinking is in tune with current customer and market requirements and not the product itself. Our main areas of innovation include the reinforcement of current products and ranges and also the development of new solutions covering other requirement categories.

DM: What are these requirements?

CC: With regard to the single-spindle, we have been working on the development of a brand new product line, the [S-line] perfectly adapted to the realization of fairly complex parts to excellent price-to-performance ratios!

[S-line]

WN: For the multi-spindles, we have been extending the range in both directions so that we are better able to execute complex parts as well as very simple parts at very attractive price-to-performance ratios.

2005: The year of innovation

DM: You just mentioned new ranges, but what are they in detail?

CC: Our first two new products will be presented at Moutier during an exhibition which will take place from **19–23th April 2005**. We shall be presenting for the first time, the DECO 8sp and MULTIDECO 32/6c. We shall also be exhibiting our current range, in addition to these innovative products.

DM: The new single-spindle machine is a DECO 8sp. The "s" indicates the range [S-line] but what does "p" mean?

CC: It is in fact a new range of machines, which is different from the current range of DECO. It is complementary to the well-known DECO. This first machine is intended mainly for the electronics industry of point (disk drive). It works without gun. The "p" means "extreme precision", but the "sp" can also mean "special" because it is a machine which is specifically adapted to the realization of extremely precise parts with tolerances from more or less than one micron!

The programming is carried out in traditional ISO and is on several levels a revolutionary machine. The base of realization of this new product is very clearly the market demand. The aimed market in first is the electronics of point (disk drive) and there is a very strong potential in Asia for this type of part.

DM: So does this mean that the machine is destined exclusively for the Asian market?

CC: Not at all! The characteristics of the parts we are executing with this new machine (to remind you: very small and very precise parts of average complexity to maximum productivity runs at highly competitive prices), also correspond to the requirements expressed over 5 continents and in other industrial sectors like electronics, medical and automotive sectors.

DM: Aren't there just a little too many innovations? Are you not scared of "losing" your clients en route?

CC: On the contrary, it is our clients who are encouraging us to innovate so that we can keep offering better performing and more targeted solutions, thereby helping them become even more competitive.

DM: Before we go on to the multi-spindles, Mr. Cancer, can you tell us something more about the other two new features concerning the single-spindles?

CC: This year we will present a complete new range with the [S-Line]. The machines presented in 2005 correspond to this vision of realization of fairly complex and precise parts, at high rate of productivity and at optimised price-to-performance ratios.

DM: Mr. Nef – are there any other fascinating announcements for the multi-spindle machines?

WN: Yes of course! The products we shall be exhibiting will be of capital importance for many operators!

With the MULTIDECO 32/6c we are offering a rational solution to machining highly complex parts in operations and back operations, since we can carry out 5 back-operations simultaneously with operation work!

But that's not all. This new machine will allow us to palletise the machined parts. A recovery device will allow us to "remove" all the parts without causing damage and to pack them for an industrial flow.

DM: So would this be a 32 (34) mm machine with 6 spindles operating with TB-DECO like the 32/6i?

WN: Yes. Put simply, the new ma-

chine provides different results for other markets. We are referring to the highly complex parts that can be machined on both sides and provide additional handling facilities. The the new MULTIDECO 32/6c caters for many of the requirements of the MULTIDECO 32/6i whilst having capabilitites suitable for completely different parts.

DM: We shall present further details of the characteristics of these two new products in the box below. Can you provide us with some information on other innovations?

WN: Our other two innovations for 2005 will be presented at EMO, just like the MULTIDECO 32/6c. These are more simple machines, yet they are more complete. I can't really say more at the moment. We are actively working on upholding the quality produced by these machines. We don't want to divulge any characteristics that may subsequently have to undergo modification.

DM: So there will be a lot of innovations in 2005 at TORNOS. If you had to summarise the salient features of these new products in a few words, what would you say?

WN: We supply new solutions that on the one hand, execute complete parts and on the other produce very simple parts by way of dedicated industrial solutions at the best possible price.

CC: A high rate of productivity of fairly complex parts at the best price-to-performance ratio!

DM: Thank you gentlemen. We shall publish below the rating plates of these new products. Messrs. Cancer and Nef will be very pleased to welcome all interested parties to Moutier for their world first exhibition from 19 – 24th April 2005.

We shall keep you posted of any developments with respect to the innovations at TORNOS.

2005: The year of innovation

DECO 8sp

Main characteristics

Sector	: electronics, automotive and medical
Max. bar diameter	: 8,5 mm
Operates without guide bush	: yes, exclusively
Number of tools	: 21
Number of tools for back operation	: 4
Precision	: ± 1µ
Part length	: 17.5 mm
Max. speed	: 15,000 rpm.
Strong points	: - extreme precision - rigidity - ergonomics and floor plan - high rate of productivity - price-performance ratio

MULTIDECO 32/6c

Main characteristics

Sector	: automotive
Max. bar diameter	: 32 (34) mm
Number of tools in operation	: 11
Number of tools for back operation	: 5 (3 rotating)
Part length	: 100 (120) mm
Strong points	: - precision - possibilities and high machining capacities - complete solutions - controlled part outlet (palletization possibility, control, etc.)

Tips and new functions of the TB-DECO ADV

To help you gain the maximum benefit of the latest facilities of the TB-DECO ADV, we shall be publishing a series of articles under the heading, "Tips and new functions of the TB-DECO ADV", which will help you get a better understanding of the new generation TB-DECO.

New global variables for single-spindle machines:

Two additional global variables are available for programming excess facing thicknesses of the part. These are #3020 and #3021.

Description: **#3020:** Excess facing thickness of the part in OP mode [mm](inch)

#3021: Excess facing thickness of the part in COP mode [mm](inch)

Use: The excess thickness value required that is programmed in operation (OP) mode can be entered in variable #3020. At the time of bar feeding (G912) the distance is added to the part length in order to have the material required for facing. To execute facing as such, it is sufficient to program a turning tool to Z=0 in order to remove this excess thickness. This operation can be carried out at any time during the part cycle. The same applies to counter-operation (COP) using variable #3021.

Feature: The part length (#3003) must be entered, without taking account of excess facing thicknesses. It is sufficient to indicate the actual length of the completed part.

Comments: **a)** This function is available for the TB-DECO ADV 2004 version onwards. For all programs executed in versions 5.xx or 6.xx, the variables #3020 and #3021 can be used once these have been converted to the ADV version. The old programs, where the facing function in OP or COP was programmed using code G54 Z1=…and G54 Z4=… (see DECO MAG No. 28), can be adapted as follows:

1° Modify #3003. The length must be that of the finished part

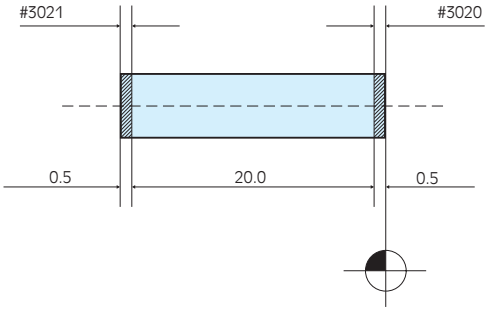
2° Delete `G54 Z1=-…` or `G54 Z4=-…` that have been programmed for managing excess facing thicknesses

3° Enter the excess thickness values previously programmed by G54 in variables #3020 or #3021.

b) Variant B models (facing the front) no longer feature in the model databases in ADV versions.

Depicting variables #3020, #3021:

Example: A part, 20 mm long that requires 0.5 mm facing on 2 sides.



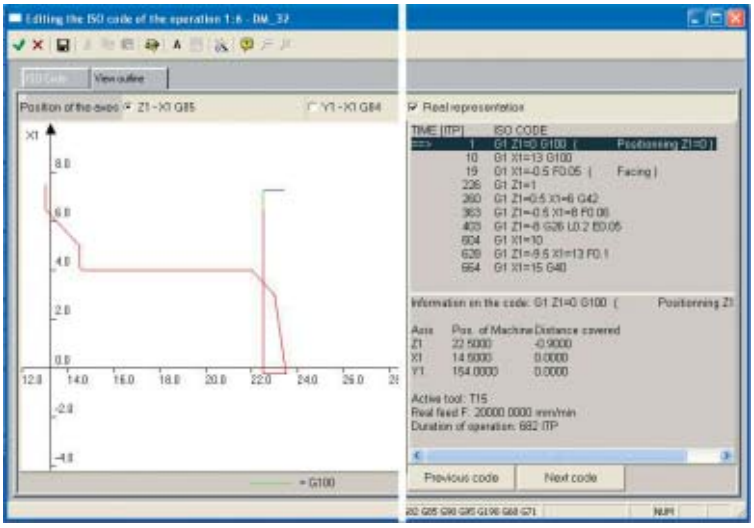
Values to be programmed in the global variables:

#3003: 20

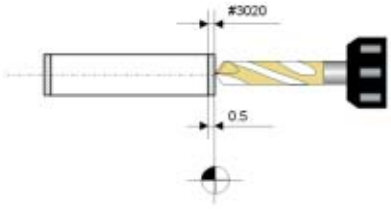
#3020: 0.5

#3021: 0.5

ISO code of the facing operation during operation mode, showing the contour:



Note: If the excess thickness has not been removed by turning (facing), this must be considered during the approach of the end tools (e.g. centring-drilling). In operation and/or counter-operation mode, an approach exceeding the value of the variables #3020 or #3021 must be programmed (see below). This caution does not apply where the excess thickness was removed during the first operation of the cycle.

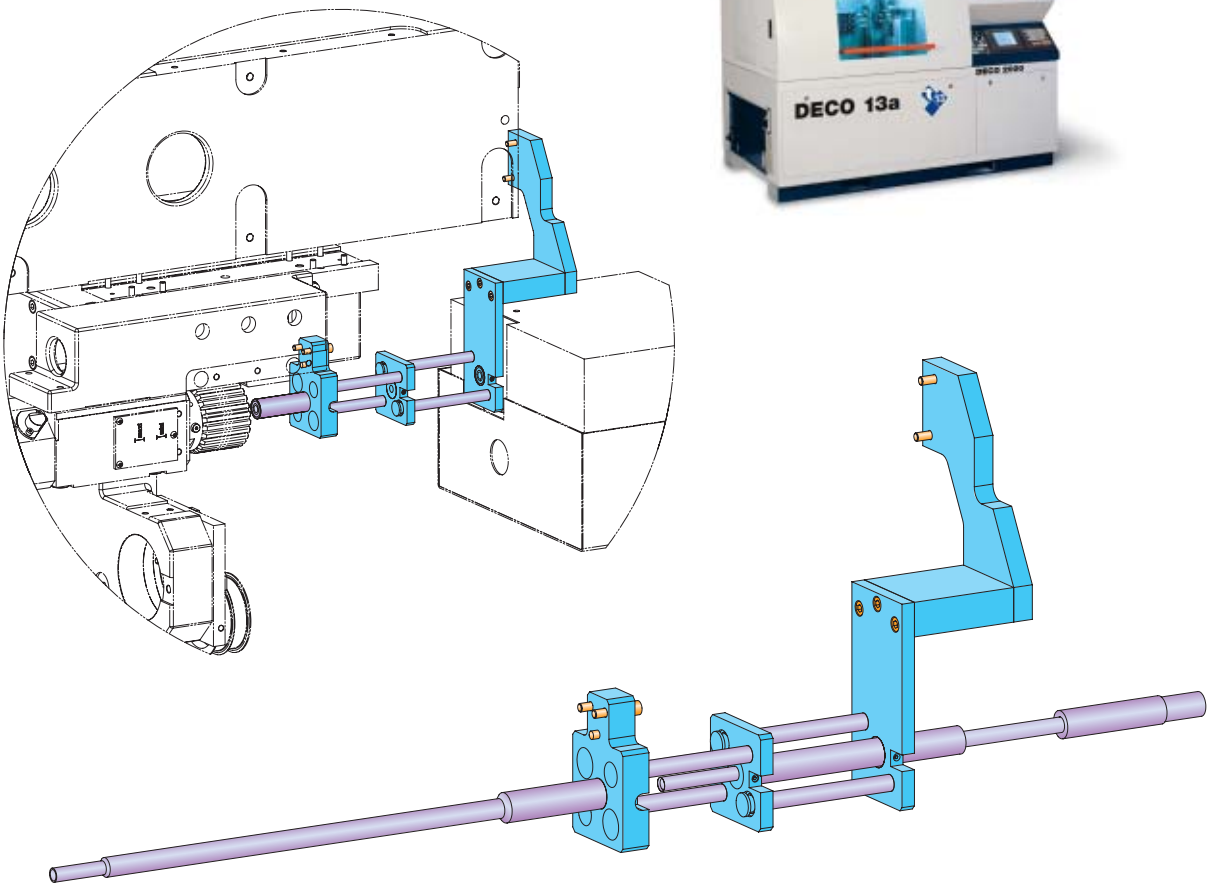


Advantages: Compared with the previous TB-DECO versions, the macros G915 and G916 take account of these excess thicknesses. It is no longer necessary to program an additional offset as described in DECO-MAG No. 28.

Telescopic guide bar for the DECO 13a

Option: Telescopic guide bar

This new device does not have an option number as yet.



Application

The wide flexibility of the DECO machines means that many operations can be carried out on machines that are not specifically adapted. This versatility may lead to a use that requires certain adjustments. The option presented allows DECO 13a operators to use bars of very small diameter – in the order of 1mm – without any risk of buckling.

Strong points

The device is easy to assemble and can be adapted to all types of bar feeder available for the DECO 13a. It eliminates the effects of recoil caused by buckling with the small diameter bars and increases precision and tolerance compliance.

Technical characteristics

Guide material identical to that used for the bar feeder.

Can be used with the spindle rotating at maximum speed of 10,000 rpm.

Constraints

This device cannot be fitted if the machine has a spindle lock.

Use the set of adapted dowels for bars with a diameter of less than 2 mm.

Availability

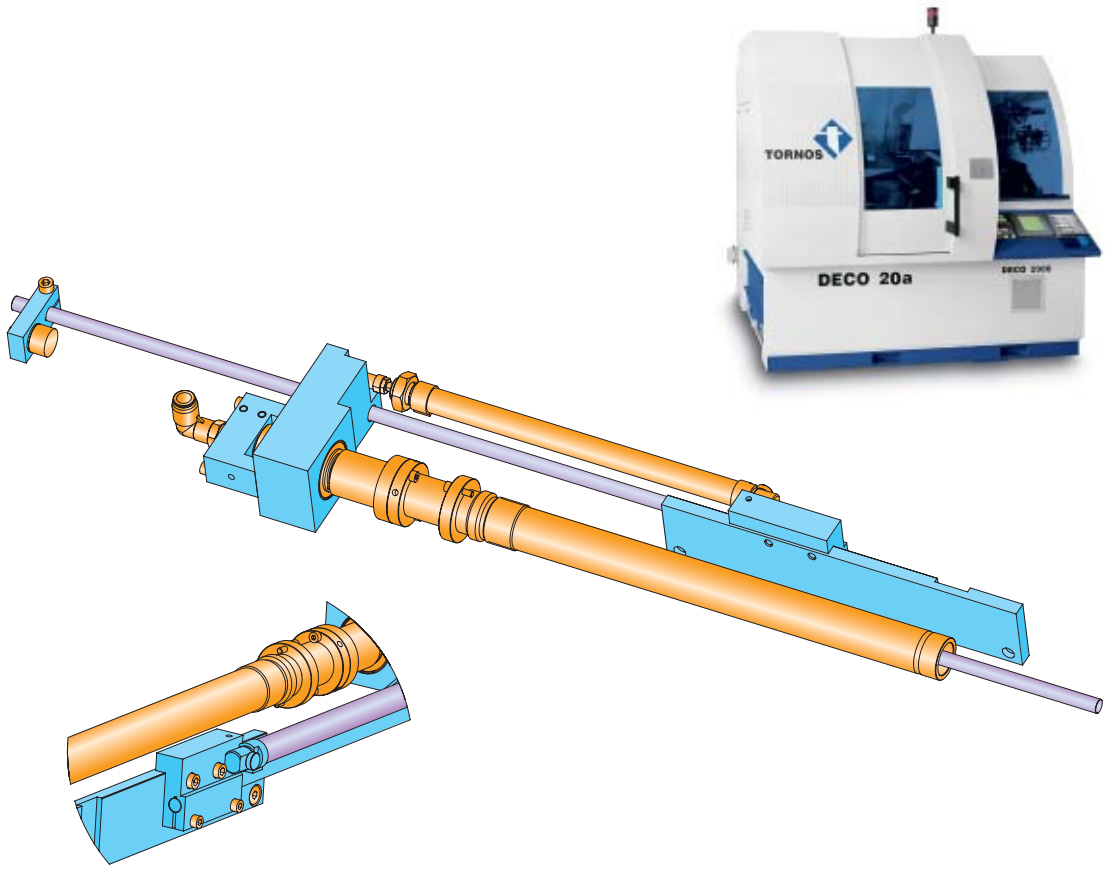
Ex-works and ready for immediate retrofitting.

DECO 20a

Optimized extraction up to 200 mm

Option: Adjustable pneumatic part extractor

This new device does not have an option number as yet.



Application

The execution of long parts exceeding 150 mm on the DECO 20a required the use of a spring-actuated mechanical extractor. The new option advantageously replaces this device with a PNC machine-controlled system.

Advantages

- an extractor for all parts executed in a clamp
- complete solution including oil cleaning of the tailstock
- adjustment of travel in relation to part length.

Comment

This technology uses solutions that have been tried and tested on the DECO 13a and replacesoption 4102.

Comptability

- available ex-works and can be retrofitted to all DECO 20a machines
- can be retrofitted to all DECO 20 machines.

Characteristics

- travel: 200 mm
- control: via M function.

Availability

Available! If you are interested, please contact your local TORNOS partner.

DECO MAGAZINE

23 years of exemplary

TORNOS & Teximp

PUB DIXI

partnership:

Teximp SA of Zollikon, Switzerland and TORNOS SA, Moutier have been successfully co-operating for more than 23 years. In that time, many machines have been sold with approximately 80 machines sold in the last three years alone.

So, how did this partnership that has lasted so long through thick and thin begin ?

It actually started like this: In the 1970s the life of a BECHLER salesman was anything but simple. «No thank you, we have TORNOS machines» was the usual reply to offers of BECHLER machines.

This was the origin of the motivation of said frustrated BECHLER salesman and he focussed his attention on waiting until the agency for TORNOS products became available in an eastern European country.

In 1982, when Teximp was established, TORNOS was looking for a representative in Bulgaria (in the meantime BECHLER had been taken over by TORNOS). The former BECHLER salesman was on hand and so began an eventful and very successful business relationship

Success for the former BECHLER salesman was not long in coming. Just one year later and 20 TORNOS machines had been sold.

TEXIMP recorded positive development and grew steadily until it had more than 50 highly qualified engineers, technologists, service engineers, administrative staff and other valuable and loyal Teximp team players. To a large extent, this development was supported by the co-operation with TORNOS.

Vlado Vukoja, owner of Teximp SA

The common path, which was also sometimes thorny, as is usual in the industry, was constantly smoothed and tended on the basis of trust and mutual partnership respect. This path also led us to our present-day major customers, such as ARMATURKA, TESLA, KATRING, HYTOS, etc.

The direction we took proved to be the correct one in the past and right up to the present day and we will continue to stick to this way of doing business. We are convinced that it will continue to lead us to such customers and this is the only thing that counts in selling. Any machine, wherever it is built, must first be sold. TORNOS and TEXIMP were usually in agreement about this important basic way of thinking and have shared this outlook.

Whilst we respect all the possible methods of various CRMs and other modern devices of selling, any collaboration that results in sales success, does not have to be reinvented but maintained and continued by all means available. It is impossible to overemphasize the fact that the seller, with his closeness and attention to the customer, plays the central part in the chain of success.

The TORNOS – Teximp co-operation is based on a model, which has brought success to both partners right up to the present day. We aim to continue to pursue this strategy

23 years of exemplary partnership:

TORNOS & Teximp

Teximp Headquarters

Teximp 360° CNC Solutions

Teximp TTC Ljubliana

and to consolidate the strong foundation of these valued business relationships without making major changes to guarantee future success. Not least because it identifies with the TORNOS product but it also continues the exemplary co-operation, which is vitally important to Teximp.

Some countries, such as Romania, Bulgaria and Serbia, which have up to now not been large customers to TORNOS, are gradually becoming active. We are endeavouring to achieve market dominance in these countries as has been done in the Czech Republic. We are convinced that to get there can only be done through more intensive and closer co-operation between Teximp and TORNOS, thereby helping all those involved to be successful.

Kind regards from your former, aforementioned BECHLER salesman, Vlado Vukoja.

The headquarters of Teximp SA are located in

Seestrasse 25
CH-8702 Zollikon
Tel. 0041 1 914 40 00
Fax 0041 1 914 40 04
www.teximp.sa
info@teximp.sa

Teximp International

Zurich, Prague, Brno, Belusa, Ljubljana, Zagreb Belgrade, Bucharest, Sofia.

Teximp maintains branches in the following countries, thereby guaranteeing efficient working of the local markets:

- Prague & Brno (Czech Republic)
- Belusa (Slovakia)
- Ljubljana (Slovenia)
- Zagreb (Croatia)
- Belgrade (Serbia)
- Bucharest (Romania)
- Sofia (Bulgaria)

The seven Teximp branches offer a decentralised sales and service network. Short distances and rapid responses are made available to the customer.

Modern technology and service centres (TTC) provide the customer with the facility to test the functional efficiency of the machine prior to making the investment. Trained, personnel are available at all times to welcome individual visitors. Machine demonstrations, machining of parts, training courses and instruction from customer care staff are therefore guaranteed on site and are available at all times.

Teximp SA maintains technology and service centres (TTC) in the following countries:

- TTC Prague: High-tech centre with more than 300 m² showroom space.
- TTC Belusa: High-tech centre with more than 100 m² showroom space.
- TTC Ljubljana: High-tech centre with more than 200 m² showroom space.
- Training centre and showroom, Zagreb.

The Teximp package

Teximp 360° CNC solutions:

- Advice and sales
- Competitive financing packages
- Complete and all-embracing production technology
- Commissioning and training by skilled staff
- Service & After Sales
- Large selection of accessories

Teximp success story at a Glance

1982

The public limited company, Teximp SA, is founded in Morges near Lausanne.

1987

Vlado Vukoja takes over 100 % of the shares of Teximp SA.

New sales markets such as Czechoslovakia and Yugoslavia are developed.

1997

Teximp opens its first technology and service centre (TTC) in Prague – this represents the initial foundation of future successes.

2000

For the first time in Teximp's history, more than 100 machines are sold.

2004

- Teximp SA employs more than 50 people.
- Teximp sells more than 180 CNC machines.
- Teximp achieves consolidated sales in excess of 30 million CHF.
- Opening of the second Teximp technology centre (TTC) in Ljubljana/Slovenia.
- Opening of the third Teximp technology centre (TTC) in Prague/Czech Republic.
- Opening of the fourth Teximp technology centre (TTC) in Belusa/Slovakia.
- Opening of the Teximp training centre and show room in Zagreb/Croatia.

Teximp SA in the Czech Republic and Slovakia

1992 Teximp establishes its branch in Prague. This is followed in 1996 by Teximp Brno and in 2000 by Teximp Belusa.

1997 Teximp opens the first technology & service centre (TTC) in Prague – an important basis for further success.

2004 Teximp opens the second high tech TTC centre with more than 300 m² of showroom space in Prague and also in Belusa / Slovakia.

Teximp now employs 16 people in the Czech Republic and 4 in Slovakia.

Czech market

All the sales markets of Teximp SA are in a state of constant economic growth.

The Czech and Slovac markets in particular, offer great potential.

TTC Prague

With the integration of these two countries into the European Economic Community, numerous barriers to the movement of people and goods have been removed. In future, standard, legally enforceable EU standards will apply in these countries. This makes expansion in these two countries attractive to many investors. Added to this is the positive element of a cheap production site with well-trained staff.

The Czech Republic has a modern, transformed economic system. In the wake of the wave of privatisation that took place during the 90s, state-ownership has passed to private ownership. Now approx. 80 % of the private sector is involved in contributing to GDP. Amongst the strongest industries are mechanical engineering and vehicle construction, chemicals and food processing.

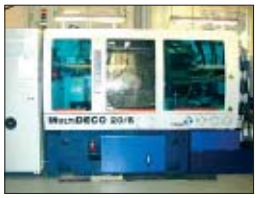
In 2003, Swiss exports to the Czech Republic exceeded 1,000 million CHF for the first time, of which 30 % was destined for the engineering industry.

Teximp customers in the Czech Republic

TESLA Jihlava, a.s.

is the largest manufacturer of electro-mechanical components for the electronics and automotive electronics industries in the Czech Republic. TESLA is authorised to use the UL-registration for connectors to DIN 41612 and also the KEMA registration mark for mains switches.

The company conducts its precision manufacturing using TORNOS machines:



Applications examples:

TESLA Jihlava, a.s.
Havlickova 30
CZ-586 26 Jihlava
Tel: +420-567 113 111
Fax: +420-567 113 757
E-mail: market@teslaji.cz
Homepage: www.teslaji.cz

ARMATURKA VRANOVA LHOTA, a.s.

Armaturka is 100 % privately owned and employs approximately 200 people. It uses extremely modern CNC manufacturing for top quality fittings and components for internal connection systems and also manufactures on five TORNOS MULTIDECO machines amongst others.

TORNOS machines at Armaturka:

Applications examples:

ARMATURKA VRANOVA LHOTA, a.s.
Vranova Lhota
CZ-571 01 Moravska Trebova 1
Tel: + 420 461 362 611
Fax: + 420 461 362 654
Homepage: www.avl.cz

Katring GmbH

The core business of Katring GmbH is metal working. Components for various branches of the engineering industry are produced with the help of TORNOS multispindle lathes. A significant part of the production includes automotive parts with the largest customers being Volkswagen and Škoda Auto.

The subsidiary company, Katring Plus GmbH, was set up in the year 2000. It operates the heat treatment technology of metals based on carbonitro oxidation under the name ARCOR and is the only one in the Czech Republic involved in this. This technology guarantees hardness and good rust resistance of steel components.

Here are some TORNOS lathes and parts produced by them:

Katring GmbH
Přátelství 1084/5
Praha 10 - Uhříněves
Czech Republic
Tel: +420 274 877 325, 272 701 215
Fax: +420 272 704 328
Homepage: www.katring.cz

Klein & Blažek spol. s r.o.

Klein & Blažek s.r.o. has been supplying metal components for more than 30 years for the series production of vehicles. It is based in Northern Moravia, close to the Polish border in the small town of Štíty. The company employs approximately 400 people in an area of 23.241m^2.

Klein & Blažek offers its partners highly qualified co-operation in the development, planning, quality assurance and production of metal parts as well as a finishing service.

Klein & Blažek spol. s r.o.
Nádražní 100, 789 91 Štíty
Czech Republic
Tel: + 420 583 482 111
Fax: + 420 583 482 269
Homepage: www.kleibl.cz

Loading programs

Since the beginning of 2004, TORNOS has specified the use of the CNC 16i-TB by FANUC on all DECO and MULTIDECO machines (except for the DECO 13b/13bi). This numeric control contains various improvements compared with its predecessors, including an integral Ethernet card.

This fast and reliable technology opens up new innovative possibilities. Several studies are currently underway to develop the new software products based on networking the DECO and MULTIDECO machines.

New 16i-TB control

In July 2004, TORNOS launched:

- A new CNC 16I-TB software program to download programs via the Ethernet (FTP).
- TB-DECO ADV 2004 with integral FTP server.
- A TB-DECO update patch (version 5 or 6) that can be downloaded from the TORNOS site: http://www.tornos.ch/tech-tips-e.html

Downloading via the Ethernet is without compromise. It combines both the speed of transferring memory cards (SRAM) and RS232 network security. It allows those companies putting their machines onto the network, to connect directly to the DECO and MULTIDECO machines without having to go through an RS232 – Ethernet adapter.

16i-TA control

In order to benefit from the advantages of the latest generation of machines, TORNOS has been offering an update of the CNC 16I-TA since November 2004.

This includes an Ethernet card, a connector to be fitted to the machine cowling, cables and a new CNC function,

by Ethernet

A fast and reliable solution

namely a modification to the spindle phases (see below).

This option also includes the FTP software for the CNC and the program download function using only one key:

1. Deletion of all the programs in the CNC memory (0-9999).
2. Loading the new program.
3. Converting the program to tables (convert 1).
4. Restoring the tool wear values (restore).

16-TB control

This control is easy to identify. Program transfer via the memory card (SRAM) is not available here. This first generation of CNCs cannot be fitted with the Ethernet update, limiting program transfer to the RS232. Only the DECO 7 and 10 machines are fitted with this control.

However, there is a facility to put these DECO 7/10 machines on the Ethernet network. All that is required is an RS232 – Ethernet adapter. The speed of program transfer is, however, identical to an RS232 transfer. This equipment is available from companies specialising in networking machine tools (DNC network).

New CN functions

Managing the useful life of tools

A MULTIDECO option is now available on the DECO machines fitted with a 16i-TA or 16i-TB control. This new option on the DECO means that the useful life of a maximum of 8 tools can be managed using part counters. Once the number of parts has been reached, the machine stops automatically.

If option 5130 «configurable 3-colour light marker (yellow, red, green)» was ordered at the time of purchasing the DECO, it is now possible to configure a number of parts before the machine comes to a stop, during which time a light signal will be actuated.

Modification of spindle phase on the DECO machine

A new function is available on all the DECO machines with 16i-TB control. This enables:

- adjustment of the polygon tool in relation to the part, without recourse to the TB-DECO;
- modification of the part angle when using the positioned stop of axis C, without recourse to the TB-DECO. This function is very useful for back-operations when machining profiled bars.

The American Market for Medical Technology

Switzerland's industry is widely recognized as a world leader in medical device innovation. The United States' market for medical technology is of strategic importance being the largest and most sophisticated in the world. Total sales in the U.S. for 2002 amounted to $71.3 billion. This is about twice the volume of the respective European market.

swiss medtech

The Swiss Business Hub USA, the Swiss Government's export promotion arm in America, and Osec, the Swiss export promotion agency, have launched a full scale support program in 2004, designated to connect the innovation generated by the Swiss medical device industry with the sophisticated American market place. A comprehensive report on opportunities and challenges has been prepared by a panel of experts1. Promotional support tools are implemented for active partnering activities till 2008.

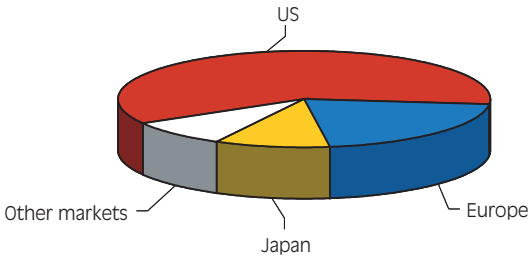
In 2004 Swiss Exports to the United States have grown almost 3 percent – in spite of the unfavorable dollar exchange rates. Medical instruments and appliances account for 6.2 % of total exports to the US and are up 2 % compared to the previous year. Swiss machine tools, an essential part in the production of high quality medical technology in the US, are up 35.4 % compared to 2003.

The US market for medical technology is expected to grow at a compound annual rate of 8 % over the next three years. The most important reasons for further growth are:

The U.S. population is aging and demand for medical technology is on the rise. Today the group of people aged 65 and over stands at 35 Million. These numbers are relevant, as the average yearly per capita spending for healthcare increases with age: a male age 30-34 will spend an average of $1,528, whereas a male age 50-54 will spend nearly three times as much ($4,454). In 2020 there will be 55

The American Market for Medical Technology[1]

World wide market of the "Stents" coronary
3.3 billion US dollar (2003)



Source: Standard & Poor's

million Americans age 65 and over and extrapolations support expectations that this segment of the population will increase by an additional 25 % between now and 2075. Demographic trends are not only important for projections, but also because older people are on average wealthier than younger people. According to the Wall Street Journal the 78 Million Americans that are 50 years old or older today control 67 % of the country's wealth.

The American economy currently shows a growth rate of 3.1 percent. Although debt, both governmental and private, has risen to historic levels, it is most likely that the U.S. economy will continue to grow over the next few years. Nothing seems to indicate that the U.S. will lose its economic strength or its predominant role in political issues. Most analysts expect GDP growth to continue at a rate of between 3 % and 3.5 %.

According to an analysis of the healthcare components of the S & P, medical device companies enjoyed an above average net margin of 14 % in 2003. This is a decrease from 2002 where margins averaged 14.5 %. It does, however, remain above the healthcare industry average of 8 %. It is estimated that margins in 2004 hit 15 % due to new technologies and benefits from off-shore manufacturing in Puerto Rico, Ireland, and Costa Rica.

Pressure on margins will most likely continue. The sharp increase of costs in the health care sector and a growing demand caused by an aging population exercises great pressure from insurers to health care providers. Health care providers will have to reduce costs – among other avenues – by increasing productivity. The desire of buyers for more effective and efficient medical devices represents an important opportunity for the innovation driven Swiss industry. Technological advancements that combine improved therapeutic effects (such as better clinical outcome) with lower overall costs (such as shorter hospital stay) will represent great opportunities in the market.

Martin von Walterskirchen[2]

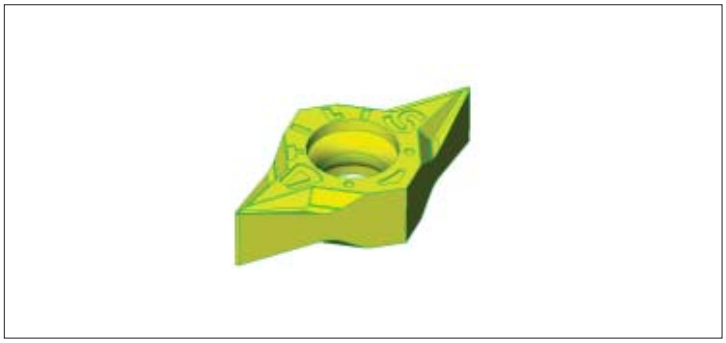
swiss medtech

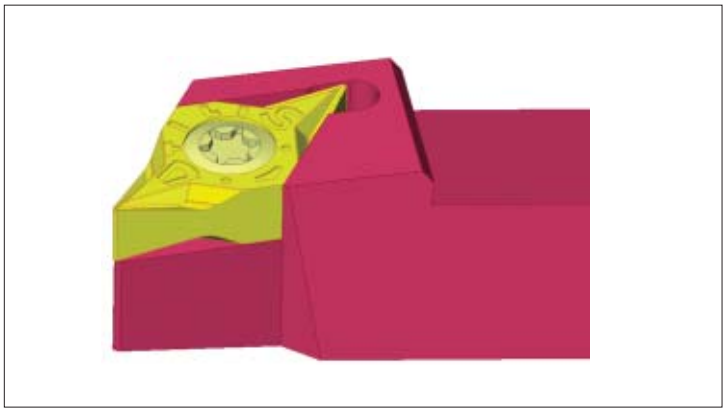
[1] *„The American Market for Medical Technology – Opportunities and Challenges for Swiss companies" available at www.swissbusinesshub.org*

[2] *Martin von Walterskirchen, Director of Swiss Business Hub USA, previously councilor of the Swiss embassy in Moscow, Swiss chief negotiator for services (GATS) during the Uruguay Round of the GATT, general secretary of the Swiss federal office for foreign economic affaires, personal advisor to the Swiss minister of justice and police and to the Swiss President. The Swiss government conferred him on September 21, 2001 the title of Minister. MA economics (honors) of the University of St. Gallen, Switzerland.*
Contact: martin@swissbusinesshub.org

DNGU, finally negative-positive for small parts turning

For many years now, design, development and innovation formed the basis of the philosophy of Utilis SA.





Whilst presenting its new range of CUT 3000 precision turning tools in September 2002, Utilis SA demonstrated its aim of reinforcing its presence in the small parts turning sector. This year, Utilis SA brought out a new feature with an insert that is generally used in the mechanical sector. Having been specially designed and developed for automatic lathes, this new insert has a positive geometry, despite its negative position in the insert holder.

What is the benefit of offering an insert with a negative position, but with a positive geometry in the small parts turning market, specially for the tailstock, whilst the negative tools generate greater cutting forces than the so-called positive inserts? This has been the response to market requirements.

Market requirements

Initially, we thought that the interest in this insert would essentially lie in its price. In fact, an insert, which is sharpened and has four cutting edges, selling at the price of an insert with two cutting edges, is of particular interest to the user.

Knowing the requirements of the industry in question, the insert specifications are quite clear. The protocol requirements were as follows:

- Super micro-grain substrate, specific to stainless steel and Ti.
- Sharp cutting edges, sharpened insert circumference.
- Perfect chip management and control.
- Non-typical tip radii.
- Fitted in insert holder in alignment with the body and acc. to ISO standard.

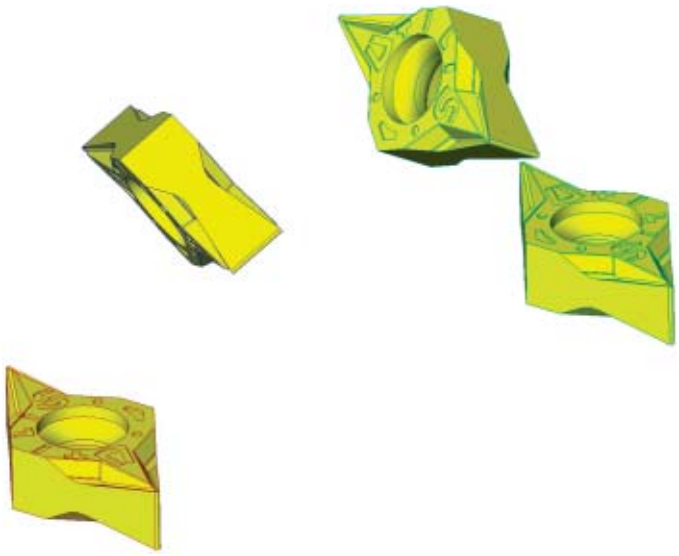
Substrate and coating

When precision turning parts of small diameter, the cutting speed is rarely properly adjusted. For small bar diameters, the speed of the spindle is too high if we were to apply the specified cutting speeds. This is why the type of substrate chosen was based on a durable grade of super micro-grains with an average grain size of 0.5 – 0.8 [µ], that corresponds best to its use.

The choice of this grade was based on the various materials. It is intended to machine materials such as stainless steels, titanium alloys,

DNGU,

finally negative-



Hastelloy and Inconel, as well as materials with a cobalt (Co) base. All these materials have one thing in common: when turning, they are abrasive and produce long chips that are not managed.

To provide our substrate with greater mechanical properties, we use a surface coating of the TiAlN Nano type, produced by the PDV process.

Although the coating has a slide coefficient that is less than that for carbide, the deformation of the chip and its friction along the cutting slope generates heat. The coating provides protection for the cutting edge, thereby considerably increasing the useful life of the cutting material.

This grade also offers a considerable advantage for machining during interrupted cutting, especially for hexagon or square bars and also if any instability should be spotted.

Sharp cutting edges and chip management

The negative inserts, as designed, are intended for mechanical applications with considerable deep passes and feeds. With these cutting properties, problems caused by chips are rare, if not non-existent. With this insert configuration, the cutting forces are quite considerable and accentuate the mechanical forces in the kinematics of the machine. When such inserts are machined on a tailstock, you will soon be confronted by problems of instability, like maintaining the correct dimensions, as well as compromised turning surface quality.

positive for small parts turning

The new DNGU insert retains the economic aspect of the negative insert but its inclined position in the insert holder and the geometrical relief of the chip break are very different from the standard negative insert. These provide the insert with the benefits of a so-called positive insert. In an area where progress is often very slow, and in order to machine materials like the ones described above, it is essential to have a sharp cutting edge, to optimise machining conditions.

Non-typical tip radii

Compliance with commitments and ISO certification, mean that the use of inserts with a radius that is equivalent to the value defined on the part drawing is no longer permitted. The important risk of non-conformity is predominant and especially costly, given our current economic climate.

Up to now, when a user was confronted with this situation, his only option was to use an insert with a radius of R=0.10 [mm], which inevitably led to reduced feed, followed by a drop in productivity and an inevitable reduction in the useful life of the tool.

Utilis SA has been innovative and is now offering an insert with non-typical radii of either 0.15 [mm] or 0.35 [mm]. A new choice of intermediate radii is now available to the user.

Assembly on the ISO type standard insert holder

This special insert for small parts turning can be fitted not only to the standard ISO insert holder but also to an insert holder that relates to the small parts turning machine.

This offers the advantage of positioning the insert along the tool bodyline, whilst upholding the properties of the standard tool at 93°, the angle formed between the turning axis and the straight line given by the main cutting edge. It therefore enables turning, facing and pricking along the turned diameter.

Another feature that merits discussion is that the insert is fixed to the insert holder by a screw. Although the so-called negative inserts are fixed by an internal lever system to the insert holder, we preferred to fix the insert by way of a Torx screw to prevent any chips from penetrating the hollow space of the insert.

Insert holders are available in right or left versions in the following sizes (HxW): 10x12 – 12x12 – 16x16 – 20x20 [mm].

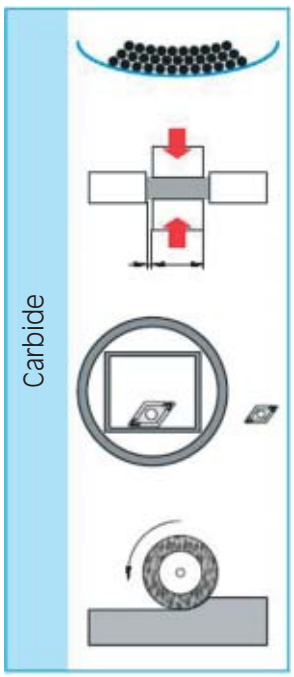
Conclusion

Without doubt, Utilis SA has now produced a tool that has long been waited for in the world of small parts turning. The benefits provided by this new tool are:

- Economic insert with four cutting edges.
- Complete chip management.
- Tip radii of 0.15 and 0.35 [mm].
- Holders available from size 10x12 [mm] for aligning the body.

This new tool is now available from your authorised Utilis agent

Denis Juillerat



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Order successfully completed:

7 good reasons for ORTHO NF-X

"On which machining centre should the brass component ordered at short notice be manufactured? No problem, but is the available machine filled with the correct cutting oil?" You will certainly be familiar with such questions in production planning. A short-term order arrives and a suitable and available machining centre must be found in the factory…

…**u**p to now consideration also had to be given to the machining fluid, with which the machine was filled, or it even had to be changed. You know the reason: up to now, not every type of cutting oil was suitable for machining different materials. Since the market launch of MOTOREX ORTHO NF-X, this problem has become a thing of the past! Whether the materials are high-alloy steel, non-ferrous metals, aluminium or even castings – ORTHO NF-X is suitable for all materials – without compromise!

Dramatically improved flexibility

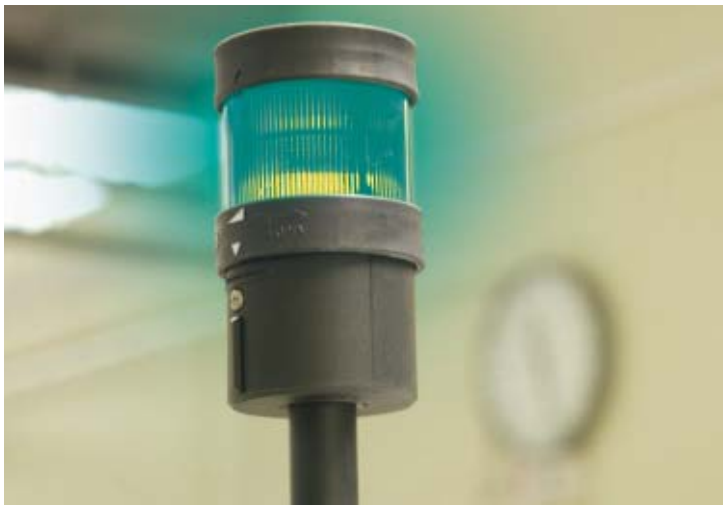
Anyone that frequently manufactures parts made from different materials is aware of the advantage of making best use of the machinery available. We all know that today, customers' deadlines are fixed and they have a decisive effect on the successful completion of the order. The days when we had to keep a bewildering range of machining fluids are finally gone! MOTOREX took the first step in the right direction with the universal cutting oil, SWISSCUT ORTHO NF-X of the 'max-generation.

Easy to follow: The Seven good reasons

The desire for improved productivity, longer tool life and optimum machining results was at the heart of the development of ORTHO NF-X. And the product benefit should be easy for the user to understand. Hence, MOTOREX ORTHO NF-X is the ideal choice for the following seven reasons:

1. Can be used for all materials.
2. Optimum cutting data and therefore shorter workpiece times thanks to vmax-technology.
3. Reduced costs through measurably longer tool life.
4. Low odour and low mist – contains no heavy metals or chlorine.
5. Work pieces can be rapidly and thoroughly cleaned without effort.
6. Thanks to new additive technology – paints, varnishes, sealing materials and non-ferrous metals are not affected.
7. Complies with the negative lists of BOSCH, DaimlerChrysler and VDE- guidelines. Ideal for manufacturing processes in medical engineering.

The plumbing industry frequently likes to use red bronze parts. Red bronze is a particularly ductile copper zinc alloy (80 % copper). Here too, ORTHO-NF-X convinces with top quality results.



Machining units filled with MOTOREX ORTHO NF-X are more flexible in use and can therefore be more easily used to full capacity. As a result, productivity and profit are always in the "green zone".

Technology in liquid form

For more than 30 years, MOTOREX has been investing in the research and development of innovative cutting oils. MOTOREX vmax-technology (improved cutting data) succeeded in setting a milestone. This technology uses the heat produced in a targeted way and positively influences the machining process at the crucial moment - at maximum production speed. The result is the desired chemical synergy that increases productivity. A balanced package of additives in ORTHO NF-X is responsible for this. More than a dozen active ingredients enable measurably optimised cutting values and perfect surfaces to be obtained.

We will be pleased to give you further information about the new generation of ORTHO NF-X cutting oils and recommend that you conduct a practical test in your factory in the presence of an industry specialist from MOTOREX:

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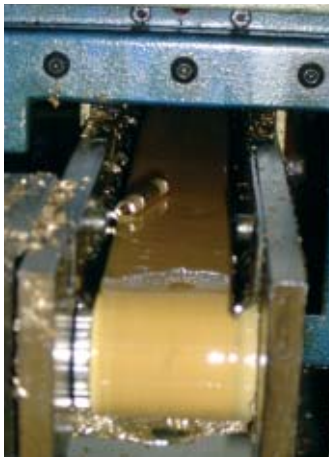
"Nothing works here without a magnifying glass"

An innovative, medium-sized turned parts manufacturer consistently backs micro-machining and is thriving on considerable growth rates, in spite of declining economic activity. The success story of Laufer GmbH in Hardt is closely associated with the Swiss lathe manufacturer, TORNOS. Working together in partnership, manufacturing strategies are developed, which now enable Laufer to supply turned parts even to the Czech Republic and the Far East.

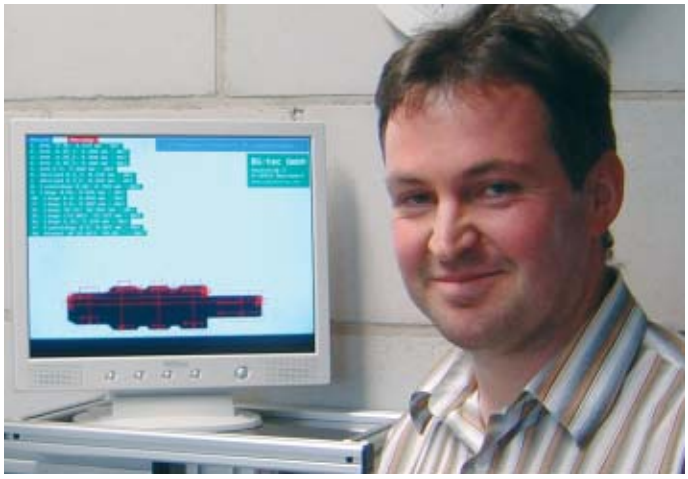
"Sometimes a week's production fits on a Euro pallet". At first glance, this statement does not necessarily indicate anything of great interest but when you see the pride and conviction with which Thomas Laufer, the youngest in the family, makes it, then it is worthwhile listening a bit more closely. During the course of the conversation, the initial appeal of the "Laufers" gives way to genuine admiration.



The father and founder of the company, Gerhard Laufer, was a foreman in the automatic turning shop of the company, Junghans. When things in the watch industry started to go downhill and Junghans was looking for possibilities of cutting costs, he seized the opportunity. At that time nobody talked about outsourcing, but Gerhard Laufer put it into practice. Together with his wife, he took over ten TORNOS automatic longitudinal lathes and continued to make watch components for Junghans on his own. Soon afterwards, new customers arrived and in 1988 the move to the company's present building in Hardt took place. In the same year, the first new machine was purchased, a TORNOS MS 7 with bar feeder. In1991 and 1994 his two sons, Andreas and Thomas, joined the company and soon convinced their father that he should go over completely to new technologies.

A pioneer of NC technology

The company already had twenty cam-operated automatic lathes when it risked the leap into NC technology in 1994. It was a TORNOS ENC 74, which was bought as the demonstration machine. This was followed one year later by the second machine of the same type, because the two sons had completely got to grips with the NC technology, which was still in its early days, and opened up for the company a range of parts, which up to that time had not been possible. Antenna components and micro-turned parts with complicated back-machining were added to the programme of watch components. At the time, the "Laufers" were told confidentially by TORNOS about the new DECO-concept and because the co-operation had worked so well up to that point, they decided to go for it. In July 1996 the first prototype found its way to Hardt. It was the first DECO-



machine in Germany and Gerhard Laufer has never regretted his decision. "I was convinced of the concept right from the start; the quality was right and the support from Moutier was exemplary." In 1997 production was doubled not least because of this machine, the production area was increased from 500 to 1300 m² and in 1998 the second DECO was purchased. The third machine, a DECO 13, which was bought in 2000, with a diameter range up to 16 mm, was used mainly for prototype production and supplying samples.

The courage to take risks

Every flight must come to an end sometime and the downturn in the mobile phone market at the start of this century hit the Laufers very hard. 2002 was then the worst year in the company's history, but instead of resigning themselves to the situation, the "Laufers" recalled the family virtues and decided to really relaunch themselves. Together it was decided to get into CNC multi-spindle technology with immediate effect. In February 2002, Gerhard, Andreas and Thomas Laufer were in Moutier for the first turning tests. The part in question was one for a turbocharger, of which 9 million were to be produced. The requirements of this part shattered all previous limits and, together with the TORNOS technologies, the process was refined until the developers could go no further. The material, a high-temperature resistant stainless steel, material number 1.4845, is in any case, extremely difficult to machine and the very complex part geometry and the diameter-to-length ratio (Ø 4.5 / 22mm) did

"Nothing works here without a magnifying glass"

not simplify manufacture on a MULTIDECO 20/6 in any way. After a nine-month trial phase, "Laufers" had control of the manufacturing process and their company was on course once again. Whilst the life of the tools was initially about 500 parts, approx. 5000 parts can now be manufactured with one set of tools. And that pays in anyone's language. "We have super machines, a super oil and super tools but we've still not finished yet", says Andreas Laufer – perfectionism runs in the family.

Advancing to new dimensions

During the same year, changes occurred in rapid succession. In January an additional DECO 10 was delivered and in March the first MULTIDECO 20/6b, again a TORNOS machine, which was the first to be delivered to Germany. "We have not lost our willingness to take risks but to be fair it must be said that we have never yet been disappointed by TORNOS", said Gerhard Laufer. "However, it must also be understood that we are now moving in quite different dimensions. Whilst before we were happy with quantities of 100,000, we are now manufacturing series running into millions. And this is in a diameter range where others dare not go. Our strengths are within the range from 1 to 16 mm, with 90 percent of our parts being less than 6 mm". M1 screws, M1 set screws with slot and point or buttons of 1.3 mm diameter – Laufer even delivers parts like these to the Czech Republic and China. Customers from the electronics and car industries have realised that they cannot produce such parts of the same quality and at the same price locally and therefore they come to Hardt. For this reason the 25 employees and approximately 30 TORNOS machines run at capacity around the clock. The order books are full until the end of 2005 and the next plans for expansion are already on the table.

Looking forward to new products from TORNOS

This year TORNOS will be bringing some new machines onto the market and "Laufers" are already waiting in the wings. After all, they want to be the first again to try out one of the new CNC longitudinal lathes or multi-spindle lathes from TORNOS in practice. Ultimately, they owe part of their success to these machines. With an availability of 95 percent, a rate of complaint in the thousandth range and a productivity, which has no equal, TORNOS machines are a reliable investment for Laufers. In 2003, they produced approximately 25 million parts in 15 to 17 shifts per week; from January to October 2004, 33 million exacting turned parts had already left the two production halls of Laufer GmbH precision-turned parts. Sometimes, there was just one Euro-pallet per week, but, as we have said, it is sometimes worthwhile looking a little closer.

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TORNOS SA Moutier,
from 19 to 23 April
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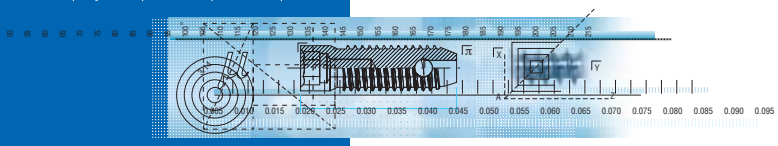
TORNOS

Invitation



Let us all be innovators !

Dear clients,

Exceptional profitability, coupled with reduced costs by way of rationalisation, are the key elements needed to develop your business!

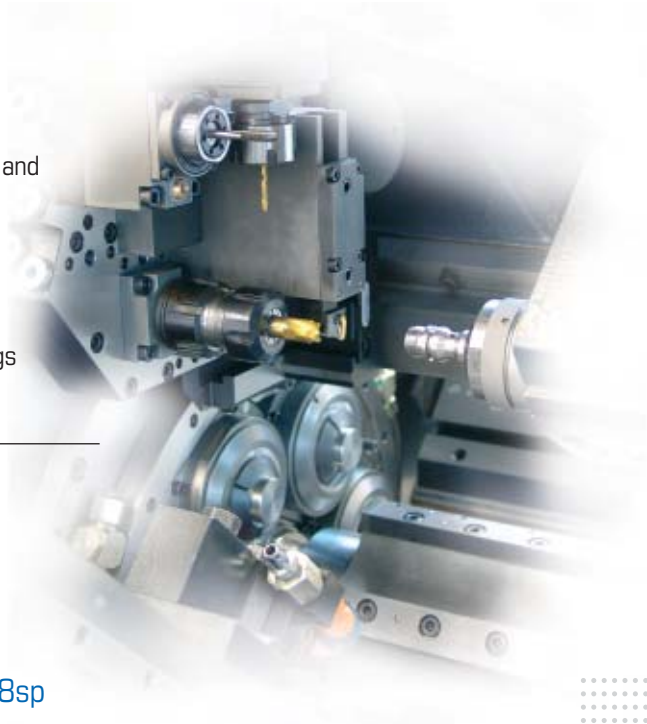
It is against this background that over the past few years and based on discussions with many customers, we carried out a number of developments to our very successful DECO and MULTIDECO ranges.

But that isn't all! In order to offer you higher added value through unrivalled performance, our campaign for 2005 is geared towards the creation of 6 new additional products. Here are 6 good reasons to transform your dreams into reality!

Our entire team will now be delighted to present you with the first two innovations when we open our doors in Moutier Switzerland from **the 19th to 23rd April 2005**, where our specialists will be at your disposal!

MULTIDECO 32/6c

- machine fitted for multiple back-operations and palletization
- 19 numeric axes
- 5 back-operation tool holders
- 32 mm capacity
- main sectors : Automotive, Fluid & Gas fittings



[S-line]

DECO 8sp

- first machine of a new range that complements the existing DECO Range
- specially developed for simple to reasonably complex parts
- 5 numeric axes
- ISO programming
- 8 mm capacity
- main sectors: Electronics, Plastics, Subcontracting

THINK PARTS **THINK TORNOS**

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