# decomagazine

THINK PARTS THINK TORNOS 42 03/07 ENGLISH


**UGITECH –** Stainless Steel Solutions Provider for the Medical Sector.

**Not the least** bit crazy.

**Accessories…** which are anything but accessory!

**Feeding** a multispindle turning machine with blanks is possible!

9 21 37 69


Tornos is on the move to exhibit without any machine; is it non-sense or the future?

We want to be solution providers and to ensure that these solutions are perfectly suited to our customers' needs, we are sharing our expertise with our partners.

The automotive industry is a large consumer of turned parts of the highest quality.

S.a.r.l. Kugel:
Full concentration on high-tech.

## IMPRESSUM

Circulation: 14'000 copies
Eurotech 12'000 copies

Available in: English / French / German / Italian / Swedish / Spanish

TORNOS S.A.
Rue Industrielle 111
CH-2740 Moutier
www.tornos.ch
Phone ++41 (0)32 494 44 44
Fax ++41 (0)32 494 49 07

Editing Manager:
Pierre-Yves Kohler
Phone ++41 (0)32 494 44 34

Graphic & Desktop Publishing:
Georges Rapin
CH-2603 Péry
Phone ++41 (0)32 485 14 27

Printer: AVD GOLDACH
CH-9403 Goldach
Phone ++41 (0)71 844 94 44

Contact:
redaction@decomag.ch
www.decomag.ch

## SUMMARY

# TORNOS: DEVELOPING A WINNING ENERGY

**I've been with Tornos for a few months and it is exciting to see how the company has managed to combine the tradition of hundred year old manufacturing company with the solution providing capability of a modern international company.**

Within the past few months I have discovered a company full of qualified people working hard and "in love with precision and quality" with the customer needs in mind. It is fair to say we still have potential to move forward, but there is a real "positive hype" in the company. Everybody knows that Tornos is moving forward and that delivering innovations and exemplary service to our customers is priority.

Benefiting from a favourable point, the company can only grow with and for its customers.

### Techno-center

The European Grand Opening of Tornos Techno-centers in France and Germany took place at the end of June and it is a clear indication that Tornos is moving even closer toward its customers needs. These grand openings celebrated the first step of a more visible and accessible customer based organisation.

In these centres, machines and skilled engineers are at the service of the customers, offering various capabilities such as machining test parts, providing training for customers, processing of time studies and more. The Techno-centre in France has been active for some months now and we can say that some customers told us the difference is visible.

Encouraged by this fact we will develop further services not only in Europe but in Asia and the Americas as well. We are currently making progress in preparing the opening of the same Techno-centers in Chicago and Shanghai.

### New building in Moutier

With customer services in mind we are also building an new 5000 $m^2$ facility in Moutier. In this we will have the state of the art training and Techno-center as well as sufficient space to set up machines for customers who purchased the machine with a set up or turn key application.

Application engineers in Moutier will focus mainly on cutting edge technology. To ensure knowledge transfer with the Techno Hubs in the region, all application engineers have access to the database where machine parameters and tooling experience is available.

The customers can have an even quicker and efficient answer if the information needed was once worked on in any tech-center worldwide.

### New products at EMO

There are a lot of exciting activities happening in the company, but as a "sales and marketing oriented" person, I, like our customers, eagerly await EMO in September. Tornos will release several world premieres closely linked to major trends we've been analysing in our business. In addition, we will show our know-how with the help of virtual reality. We will be honoured to welcome you to our booth to discover these!

### Conclusion

These are only a few examples of the dynamism of the company and I hope you're also witnessing that "things are positively happening" for our customers.

That's the carburant that makes us move…

I am looking forward to seeing you in Hannover on the Tornos booth (Hall 17 – Booth C18)

*Urs Hirsiger*
*VP – Sales and Marketing Tornos*

# THE BIGGEST…
# …MACHINE TOOL FAIR IS COMING SOON!

**Every two years, the machine tool world enjoys a major celebration – EMO.
There are more than 160,000 visitors and they all have their own agenda! They know that in the space of a few days they can discover "state-of-the-art" of machine tools. All the main suppliers will be there, they can compare the different ranges on offer and discuss and make new contacts. In a lot of cases, it's a compulsory trip for company directors who wish to keep abreast of the latest developments and "be there when it happens".**


Make sure you don't miss the Tornos stand in Hall 17, Stand C18.

EMO Hannover 17-22·9·2007

This fair is on an international scale and every manufacturer wants to be there with their latest products. It is an "unmissable" event for the sector and this year, more than 2000 exhibitors over 142,000 square metres will be presenting their expertise during the week. Indeed, this year EMO will take place from Monday to Saturday and not from Wednesday to Wednesday as was the case in the past.

The electricity required for the event is the equivalent of the needs of a medium-sized town…

Is it not too big? Why should you take part? With what kind of equipment?

To answer these few questions and to get a glimpse of the latest Tornos products, decomagazine met up with the company's marketing team.

**decomagazine: You will be attending EMO on a stand that measures nearly 400 square metres, isn't that "too big"?**

**Team marketing:** Yes, it is a large area, but it enables us to show our expertise to our advantage… we need the space with 4 single spindle machines,

3 multispindle machines and the TB-DECO and Virtual DECO. In fact, we will probably be short of space.

**dm: What is the average size of stands at Hannover?**

**TM:** I don't have the details, but looking at the plans, there are some very large stands (up to 900 square metres and more) and some much smaller ones. I think that with 380 square metres, Tornos has an average-sized stand for a manufacturer of "large machines".

**dm: In this edition, we have an article on "Virtual DECO", highlighting your "no machine" exhibition solution. How does this fit in with the notion of exhibiting a range of machines at EMO?**

**TM:** At the EMO trade fair, we will be premiering the Micro 7, physically and virtually! Each method enabling the visitor to perceive different aspects of this product. We are therefore providing complementary methods of discovering its true capabilities. Moreover, by offering two solutions, we are doubling our ability to present this machine to the public.

**dm: You will be presenting 7 machines…**

**TM:** Yes, we will have 3 new machines, Micro 7 as I mentioned, Sigma 32 and MultiAlpha Chucker. The other products will allow us to present the whole line and highlight our specialisations in the different activity sectors.

We have decided to present "a maximum" this year. Considering the size of the event and the international side to it, it's in our own interest to have a variety of resources and "centers of activity and attractivity" on the stand. We will be able to welcome and work with over 20 customers at once on our stand.

**dm: What will these centers be?**

**TM:** The machines, the plasma displays, our "core competence center", TB-DECO, Virtual DECO…

**dm: Coming back to the products you will be exhibiting, what are the highlights of the other new developments?**

**TM:** For Micro 7, it is without doubt its high level of precision and its cost effectiveness. It's a machine which complements Micro 8 perfectly but is designed for longer parts. In the watchmaking, electronics or medical sectors for example.

## EMO Hannover from 17 to 23 September 2007

**Opening times: open daily from 09:00 to 17:00**

**Location: exhibition hall, public transport including in the ticket price www.emo-hannover.de**

**Tornos: Hall 17 - Stand C18**

Sigma 32 is another machine from the Sigma line designed for the production of parts of medium complexity up to 32 mm in diameter. This machine has the same successful build used for the DECO Sigma 20 and offers increased capacity.

The MultiAlpha Chucker is a new machine that allows the production of complex parts on multispindles from billets instead of bars. The presented solution will work from rough sketches. It should be noted that this is a production part from our customer Microdeco who is working with us to optimise the solution.

The other products exhibited will be the Micro 8 (see page 61), DECO 13a, MultiAlpha 6x32 and MULTIDECO 20/6! We will be demonstrating our expertise in all types of parts and diameters.

**dm: You mentioned sectors of activity. Can you elaborate on this?**

**TM:** Tornos is a solutions provider in different sectors and during EMO, the machines will be producing parts for different sectors, including the electronic, automotive and medical. This will allow us to demonstrate a far-reaching scope of highly specialised expertise. At the same time, it would be wrong to say that the machine presented for the medical sector for instance is only limited to this sector.

**dm: You mentioned "core competence center". What is that?**

**TM:** Our stand will comprise a section set aside for presenting our solutions and our own specific attributes. Here, our visitors will be able to discover what partnerships mean to us. They will also be able to discover specific equipment and areas of expertise. And they will also be able to get close to virtual reality for machining parts.

**dm: How many people from Tornos will be there?**

**TM:** I think the real question is this: how many customers will we be able to give a quality welcome to… And this should allow us to deploy the appropriate number of people from our sales and service teams at Hannover.

**dm: And how many customers are you going to get on your stand?**

**TM:** Everything will be put in place so that we can welcome 600 to 800 customers during the week.

| Machines |  Electronics |  Automotive |  Medical |  Micromechanics | Core competencies |
|---|---|---|---|---|---|
| **Micro 7** | ✓ | | | | |
| Micro 8 | | | ✓ | | |
| **Sigma 32** | | ✓ | | | |
| DECO 13a | | | ✓ | | |
| **MultiAlpha 8x20 chucker** | | ✓ | | | |
| MultiAlpha 6x32 | | ✓ | | | |
| MULTIDECO 20/6 | ✓ | | | | |
| TB-DECO | ✓ | ✓ | ✓ | ✓ | ✓ |
| Virtual DECO | ✓ | ✓ | ✓ | ✓ | ✓ |

**World premiere**

✓ = Tornos solutions on display

TORNOS PRESENTS

# SIGMA 20


# VIRTUAL DECO

*Go beyond reality...*
*...you won't come back unchanged!*

**www.tornos.com**

# VIRTUAL DECO – REAL SUCCESS?

**Tornos is on the move to exhibit without any machine; is it non-sense or the future? To discuss this important topic, decomagazine met Scott Kowalski, Head of Tornos USA.**

To start the article, let's write down some assumptions and questions that are common.

- High precision turning is a very conservative world…
- We produce machine tools; and customers produce parts. Nothing changes and nothing ever will change…
- Customers coming to a show absolutely need to see machines.
- Are screw machine shop floors really full of people willing to work on machines from 100 years ago?
- Is a machine tool builder condemned to do the same things forever because of fear?
- Isn't customer satisfaction a point that must be thought about to allow them to win, not only today – but tomorrow?

To try to "bring water to the mill", Scott Kowalski and Tornos USA decided to be part of an important machine tool show without even exhibiting a single machine! **deco**magazine was there!

Through the aisles of the Westec show in LA at the end of March, there was a kind of buzz about the Tornos booth. It wasn't the deep thrill of a space shuttle launch or of a game won by the Lakers, but definitely there was something in the air… something special was happening: Tornos was presenting a virtual DECO Sigma 20.

Our journalist met Scott Kowalski the last day of the show, then long enough to see the outcome of the gambit.

**decomagazine: Hi Scott, you choose Los Angeles to unveil a virtual machine. Doing so in the world city of movie and special effects seems well adapted. The question is: movies are dreams, machines are reality. How can a movie work to demonstrate machines?**

**Scott Kowalski:** In fact, the Virtual DECO works even better than reality.

**dm: Better?**

**SK:** Yes, in our field, it's quite difficult to see what's happening in the machines – because of the oil,

Westec 2007, an exhibition right next door to Hollywood, a perfect location to unveil "virtual DECO".

chips and a lot of projection… Machining brass slowly is maybe good to help customers to see what's happening, but that's not the reality and could even be unproductive, making customers think "they can only machine brass slowly".

**dm: To come back to the Virtual DECO, what is it exactly?**

**SK:** The Virtual DECO consists of a large screen, theatre chairs, and headphones. People interested in discovering the Sigma 20 come into our booth, sit down and learn not only about the machine but also the Swiss turning process in a 3 minute presentation.

**dm: Why did you decide to do this concept?**

**SK:** To be different, to be ahead of others and to offer our customers a brand new experience in discovering the work we all love. Moreover, the solution is more informative and efficient.

**DM: More efficient than a real machine? How?**

**SK:** Tradeshows traditionally take up a lot of time and man power. With the Virtual show I don't have to take my people out of the field for two weeks to set up the show. And applications isn't out of the office for a week during the show. Everybody in my organization is allowed to do their respective jobs – sales can sell, service does service, and applications can focus on applications. This year we're exhibiting at sixteen shows. By eliminating the machines in the booth, we get back 2200 man hours which can spent on what our customers need instead of on moving equipment here and there.

**dm: What about the feedback of your customers and visitors?**

**SK:** All in all, it's a great success! We had a lot of leads coming to our booth and the feedback was very positive. We had representatives from all the trade magazines attracted to our booth to see the show and many plan to do articles on the Virtual. Nineteen people told us they hadn't seen anything like the Virtual DECO for this industry…that is was truly innovative… and that we were far ahead of the curve.



**dm: Nobody complained about the fact you weren't showing a machine or that the presentation was "too light"?**

**SK:** Some of our customers who are, of course, already familiar with Tornos and what we offer came with a specific question about a part; so they were not really interested in the concept; all they wanted was the professional presence of our technicians and sales people – which they got. But visitors who were new to Tornos said they liked seeing the machining processes, the «virtual» machine assembly, and enjoyed the movie-like qualities of the presentation.

**dm: What about your dealers and partners?**

**SK:** The virtual DECO is a tool to help them to be more present on the market, but the most important thing is the message it sends: that Tornos is back in the US. Back with a strong drive to move and to help customers… The virtual DECO is very motivating for our network.

**dm: You surveyed your booth visitors after the presentations…**

**SK:** Yes, we wanted feedback based on figures. We discovered with this survey that our customers and everybody who "took the tour" (like dealers, press people and even our competition) found the presentation impressive and on target.

**dm: Finally it's a way to make something different… but does it bring something more to your customers?**

**SK:** Good question, thanks for asking. In fact, it allows customers to discover several points that would be impossible in any other way in a booth. First it shows many of the possible ways one can machine parts – enlightening our customers and prospects to the range of operations and new ways to work. It shows this better and faster than a machine could. Second, it allows our visitors to see the machine "behind the scenes". What better way to «experience» the rigidity, for instance, than seeing the core of the machine? Finally, the Virtual DECO show ensures that we don't forget to communicate an important benefit that the machine can offer. The level of information achievable is unbeatable in so little time and it's also entertaining!

**dm: Do you have some new ideas for future versions (if any)?**

**SK:** Oh yes obviously… We discovered that seeing how the parts are actually machined (via thread whirling for instance) is something our customers would find helpful.

**dm: You will follow that idea?**

**SK:** Yes… the next time we show the virtual DECO, this will be done; and we have a lot of others ideas to stay ahead.

**dm: Do you think that this concept could give some ideas to other manufacturers?**

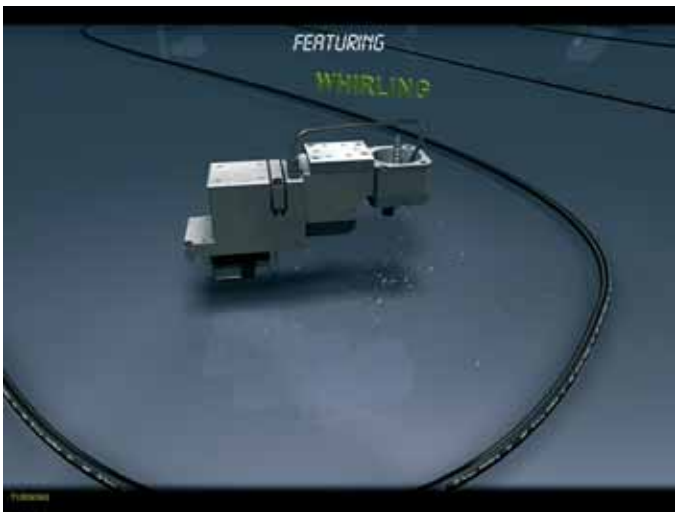
**SK:** When they realize that with the Virtual concept I can show more than with a machine, explain more – and I need less space, less money for shipping – and that my people can concentrate on added value and customer service instead of moving machines to shows. Then yes, I think that the Virtual concept will be interesting for a lot of companies.

**dm: Then you will be all the same again?**

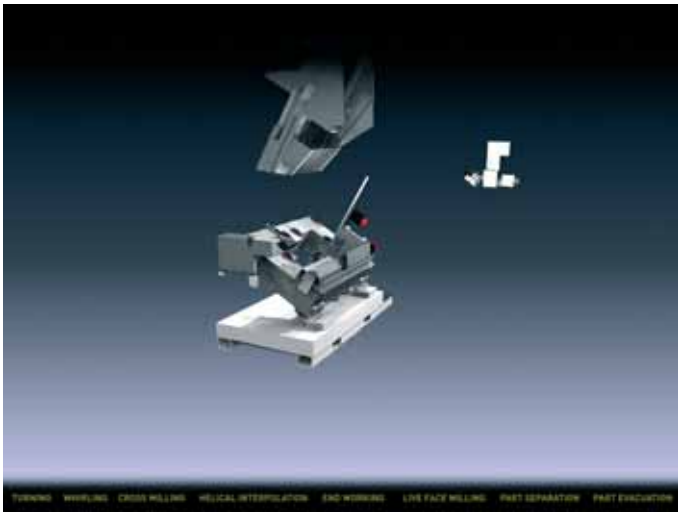
**SK:** Not really the same, there are a lot of good ideas to implement everywhere. And we won't stand still of course.

**dm: This "test" seems very positive, as you said you will use it again in an improved way. Do you think it could be used worldwide?**

**SK:** We are very confident that it can, yes. Americans use tradeshows as a «point of contact» to introduce themselves to the technology and equipment. And they expect a follow up visit at their facility to have the builder elaborate on the product that is best suited to their specific environment. Therefore, visitors to the booth stay for only 10 or 15 minutes. This is much less than for European shows. I cannot answer why it's this way. However, we have to play the hand we're dealt. So to be successful at a show in the US, one must be different and come up with innovative ways to bring customers to their booth and create an opportunity for follow up. And you only have a short time to succeed with this. The Virtual DECO fits these requirements. That said, we met the Tornos dealer from eastern Europe based in Zurich and they asked to use the Virtual DECO at some exhibitions in Europe…







**dm: Can you give a little more information about the European venue of the "Hollywood Star" Virtual DECO?**

**SK:** I don't know exactly yet. I've heard that Tornos is thinking about using it at EMO…

**dm: Thank you Scott, we'll have to check in with Moutier. To close this article, what do you think about the quotes at the start of this article?**

**SK:** I think customers must be served in whatever way helps them. But that doesn't mean one has to stand still… Tornos is back in the USA and we're doing all we can to help the market discovering the real "swiss type" machining.

Already a Star...




## Virtual DECO at EMO? Question to R. Stauffer CEO

**dm: M. Stauffer, Scott Kowalski told us that the virtual deco could be used at EMO, can you confirm?**

**RS:** We are currently working on the concept of EMO. We're going to show new machines and solutions… and yes, the virtual DECO will be part of the booth.

**dm: We can then invite everybody to come and see this evolution?**

**RS:** Yes, we invite everybody to come and discover this virtual machine, one of the stars of the Tornos booth.

## EMO 2007

Three world premieres

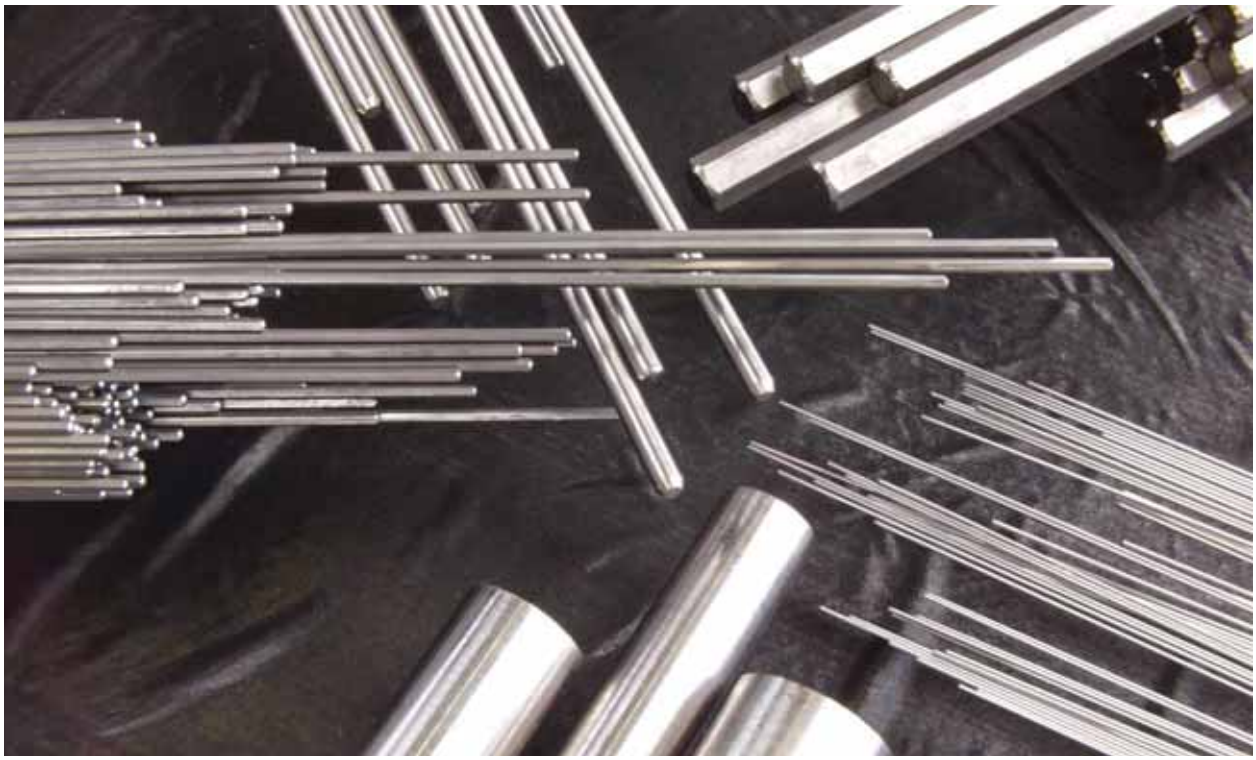
- Micro 7
- Sigma 32
- MultiAlpha chucker for billed parts

Virtual DECO

and many more (see article page 6)

# UGITECH – STAINLESS STEEL SOLUTIONS PROVIDER FOR THE MEDICAL SECTOR

**Ugitech, a leading manufacturer of stainless and alloy steels is investing in a new re-melting furnace in order to widen the company's product range and expand their activities in certain highly specialised and demanding markets such as the medical, aerospace, energy (gas turbines) and automotive industries.**



## Introduction to Ugitech

The stainless long steel sector of the Schmolz and Bickenbach group, which Ugitech became part of in July 2006, is currently the world leader in this field with over 300,000 tons delivered in 2006. Founded in 1908, Ugitech, then known as "Forges et Aciéries Electriques Paul Girod", built up its expertise and competence over the last century.

The time spent with Pechiney Ugine Kuhlmann, Usinor Sacilor, then Arcelor and finally Schmolz & Bickenbach, has enabled the company to become specialists in the manufacture of billets, bars, wire rod and drawn wires in stainless and alloy steels.

Based in Ugine, France, Ugitech has locations around the world with products used to manufacture a very diverse range of parts: valves, pumps, connectors, screws and fixture components, axes, turbine and reactor components, superstructure components, welding rods, cutlery, surgical equipment, injectors, springs, steel mesh, fibers, filter screens and many more. These parts can be found in a diverse range of industries including the energy, agricultural foodstuffs, transport (aerospace, shipbuilding, automotive), housing and construction, water treatment and medical to name just a few.

Ugitech is a highly-skilled company that focuses on servicing its customers, providing innovation and technical assistance to the marketplace by delivering partnerships based on quality.

## Innovation

Ugitech's policy of product and service innovation forms an integral part of their development strategy. In order to do this, Ugitech can rely on its research

centre based in Ugine (Savoy, France), where 60 people, including approximately ten engineers are employed. Created forty years ago, the research centre has three principal missions:

- To be tuned in to customer needs and understand what they do. In order to promote the use of stainless steels and recommend the grade best suited to the customer. This is why the research centre is equipped with a forging machine for the screws and bolts market and several machining units (automatic turning machines, bar turning machine). Ugitech also develops corrosion tests that are adapted to the specifications of each customer in order to recommend the suitable grades. Let's take two examples: for the electro-injection market, research engineers have perfected a synthetic grade of petrol; for the construction industry, the research centre uses synthetic alkaline and carbon solutions for stainless steel frames in reinforced concrete, which accurately mirror the chemical reactions that occur in concrete over an extended period of time. This has also led Ugitech to recognise the value of developing technical partnerships with their customers.
- Developing new products. This is at the heart of the role of Ugitech researchers. To reach this objective, competencies need to be multi-disciplinary and researchers are brought together within project teams: materials and metallurgy, hot and cold shaping, resistance of materials, chemicals and electro chemicals. A considerable amount of equipment is available for research in the area of optical and electronic microscopics (Electronic Scanning and Transmission Microscopy). The service also includes technical documentation including patent research and participation in standardising work groups. If its research centre does not have the necessary technical expertise, Ugitech approaches the universities on an as-needed basis, e.g. for surface analysis work or within the framework of Cifre dissertation projects.
- Perfecting innovative production processes compatible with a sustainable development policy. Research centre teams are organised into multi-skilled projects and assigned to assist production workshops (steelworks – continuous flow – hot rolling – pickling – drawing and wire drawing) to improve the end quality of the products.

**Technical Assistance**

Supporting the sales force, Ugitech offers customers the services of their technical advisors. The aim here is to:

- Help customers receive maximum benefit from their product quality. For example, the Ugima product line (stainless steels with enhanced machinability) can increase productivity considerably with Ugitech specialists' expertise in stainless steels and their machining characteristics. The latest genera-

tion of Ugima 2 has enabled those customers who chose it to make further advances in productivity (an extra 10 to 20 %) and at the same time in tool durability (multiplied by 2 to 5 times depending on the case in question).

- Recommend stainless steel solutions suited to the actual needs of the customer.
- Be tuned in to any new requirements coming from the market.
- Offer solutions to technical problems that customers may have on a daily basis.
- Partner the development of new Ugitech products with the customers.

**ESR Furnace Investment**

In 2006, Ugitech's development strategy was outlined by the decision to invest in the construction of a new ESR furnace to increase production capacity and supply to the aeronautics, medical, energy (gas turbines) and automotive markets.

Electro-slag re-melting (ESR = RSLE in French) involves re-melting a lingot or bloom arranged vertically and referred to as an electrode, by passing a very strong electric current through liquid slag, which is itself an electro conductor at high temperature (1500 °C). The drops of liquid metal that fall from the lower surface of the electrode, pass through the slag and collect in a lingot mould, the sides of which are water-cooled to solidify and form the re-melted metal bloom. This is a relatively slow process (approx. 500Kg/hour) but very stable. It guarantees a high quality re-melted product.

Ugitech opted for the new ESRR® slag re-melting technology from Inteco, an Austrian company and leader in this field. The system enables continuous flow blooms to be re-melted under electro-conductive slag and a protective atmosphere, a process which provides greatly enhanced analytical continuity than lingots. This also provides the option of re-melting only part of the blooms of the original line, leaving the others to be used in the standard way, providing the overall process with greater flexibility and higher speed. In this way, the minimum re-melting production quantity is approximately 1 ton and production time similar to standard production times.

ESR re-melting provides both a high level of metal cleanliness (purification of metal droplets as they pass through the slag bath) and an enhanced solidification structure. This greatly reduces the amount of radial segregations, improved dispersion of carbide and other precipitants. The cleanliness levels obtained meet the highest quality standards such as ISO 5832 for medical implants and AMS in the aeronautical sector or standards in turbine construction.

Virtually all stainless steel grades can be re-melted using ESR as this type of re-melting only modifies the analytical composition of the original metal very slightly. In fact, it is the only re-melting process suitable for grades containing high nitrogen levels such as those used for medical implants which comply with ISO 5832-9.

**Products for the medical sector**

The internal investment has enabled Ugitech to increase its presence in the medical market. Indeed, up to this point, Ugitech had a restricted range of stainless implantable products. However, the investment in this ESR furnace will allow Ugitech, as of September 2007 to add a new range of vacuum arc re-melted stainless steels, Ugipure, available in billets, bars, machine and drawn wire to the SM Phynox range of cobalt-based alloys (conforming to ISO 5832-7 and ASTM F1058).

The UGIPURE range will include:

- UGIPURE 4441 (ISO 5832-1, ASTM F138)
- UGIPURE 4472 (ISO 5832-9, ASTM F1586)
- UGIPURE XM19 (ASTM F1314)

Initial trial orders will be available from September 2007.

This new re-melted stainless steel range will complete Ugitech's already very wide range of stainless steels designed for the manufacture of ancillaries and instruments. This range comprises, among others:

- austenitic grades (UGI 4404 or 316L)
- martensitic grades (UGI4028 or 420B, UGI 4034 or 420D, UGI 4122, UGI 4118 or 420F)
- structural hardening grades (UGI 4542 or 630).

These grades offer an excellent compromise between corrosion resistance and mechanical resistance. In addition, for some of grades (UGI4404, UGI4028, UGI4542), Ugitech has developed enhanced machinability versions (the UGIMA range), enabling the customer to benefit from productivity increases of 10 to 20 %.

It should be noted that in order to improve the way Ugitech approach and serve the medical market, since early 2007 we have set up a partnership with Tornos and their collaborators. This collaboration based on a complimentary relationship (materials, machine, tools, oil) was set up to offer our customers an improved service, allow them to increase their productivity and offer global solutions more suited to the needs of the end user.

Please contact Ugitech for any additional information.

UGITECH

Providing stainless steel solutions

All questions should be addressed to
Delphine AUBRY, Head of medical sector,
on +33 (0)4 79 89 30 30
or by e-mail: info@ugitech.com

# A LOT MORE THAN JUST A CLICHÉ: A REALITY!

**Recently, I witnessed an interesting experiment. About thirty sales people from a large company were taking part in a seminar. The facilitator handed round a questionnaire on American cinema. Each participant completed the test and handed it in. Later in the day, the same test was done by the same people, but in groups of three.**

If you don't have a skilled and motivated team, you cannot hope to reach your objective.

It goes without saying which exercise generated the better results. And that was only general knowledge!

This demonstrates that there is real potential if we're dealing with specific professional competencies.

Under the name **"Partners for Medtech"**, several companies have come together to maximise this type of synergy in the medical sector.

swiss medtech

*«We want to be solution providers and to ensure that these solutions are perfectly suited to our customers' needs, we are sharing our expertise with our partners»* said Mr Raymond Stauffer, CEO at Tornos, when summing up the willing shown by the participating pool of companies.

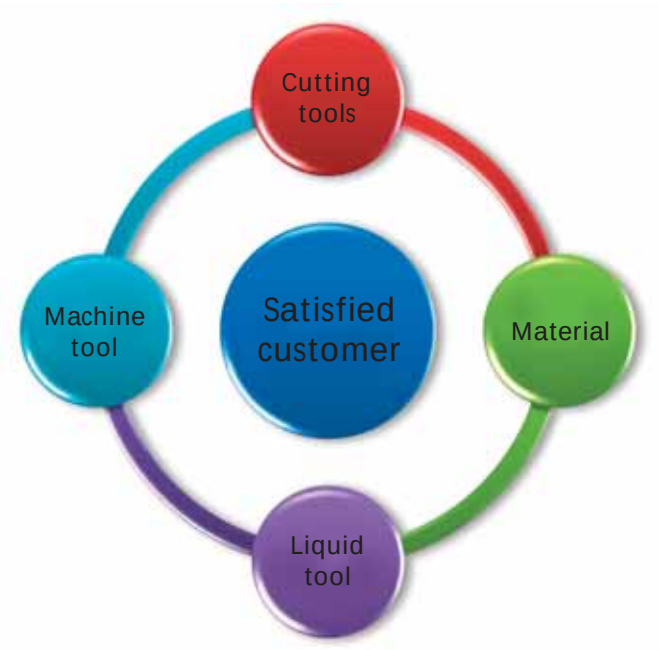
Made up of complementary products, the exhibition included:

Ugine and PX Précimet for materials, Blaser for cutting fluid solutions and Sandvik and PX Tools for cutting tools. Tornos was present for "machine tool solutions".

To find out more, decomagazine spoke to Pierre-Yves Kohler of Tornos, the man in charge of communication on this project.

**decomagazine: Is it not a little idealistic to want to bring such diverse companies into the same project?**

**Pierre-Yves Kohler:** These companies are different but after all they all have the same objective. Providing all round solution performances really depends on all participants.




**dm: How far have you actually got with this project? We attended the conference at Medisiams (see separate article), do you have any more details?**

**PYK:** We have designated a machine and an operator to this project. This means that at Tornos, one person allocates his time to attempting to "go further" with the solutions that have been proposed. This person is working closely with our partners and we can say that everything is being analysed with genuine scientific discipline.

**dm: If I understand correctly, you are running medical tests...**

**PYK:** Absolutely, we are testing tools, materials and machining operations to optimise all component

## "Partners for Medtech" evening.

During Medisiams, the "Partners for Medtech" brought together over a hundred people for a presentation on the medical sector and possible solutions. A highlight of the evening was the presentation on market trends by Mr. Martin Von Walterskirchen who had flown in for the event from Chicago. At the event, we found out that there is a very good potential for bar turning in this sector but also that tailor-made solutions are increasingly specialised and require a high level of expertise.

The report on the developments within the medical market by Swiss Business Hub is available free of charge from the following address: Martin von Walterskirchen, Director Swiss Business Hub USA, 737 N. Michigan Avenue, Suite 2301, Chicago, IL 60611, martin@swissbusinesshub.org, www.swissbusinesshub.org

operations. At the moment we are working on thread whirling for example.

**dm: Scientific tests take a lot of time. What sort of schedule are you envisaging and more precisely, how do you see your "discoveries" being used in delivering customer solutions?**

**PYK:** We have a schedule that stipulates that we must have results available for our customers in time for the EMO exhibition in Hanover in September. However, each "discovery" is immediately evaluated in integrated into our other projects with customers.

**dm: You are working with partners so you will be sharing and creating expertise. Do we need to buy a Tornos machine to benefit from this?**

**PYK:** I would say that you can only really derive maximum benefit from some of the expertise acquired if our customer is using the "same range of partners". We now know that our partners are also going to use these tests as a basis for making modifications to their products and from this point on, everyone who purchases products from our team will benefit from the knock on effect of these tests.

**dm: You are working on this project with several partners, why these companies in particular?**

**PYK:** Our work is project-based for the most part, which allows us greater reactivity and a genuine entrepreneurial vision of things. This project is made up of skilled partners who want to go forward together with us. For other projects, we also have other partners. The objective is really to work together for the customer.

**dm: But what about the other Tornos partners, those who aren't in the spotlight at the moment, isn't there a risk here? Aren't you concerned that customers might get confused by the messages underlying your communication about this project?**

**PYK:** Are you saying, for example, that Tornos will now only be working exclusively with X or Y?

**dm: Exactly!**

**PYK:** I hadn't looked at it that way, but you know, tools, materials and oils will still be sold to all of our customers, whatever type of machine they are using. While on this subject, I can advise that we will be continuing to work with several partners.

**dm: Do you think working this way is what the future holds?**

**PYK:** Tornos has always set out to be a supplier of added value and a solution provider, and working with such partners is an obvious example. We don't do it just for fun (even if it is very pleasing and motivating), but because this enables our customers to scale new heights with our solutions.

## The medical market in figures and notions

| | |
|---|---|
| Orthopaedics market in 2006 | approx. USD16 billion |
| Of which reconstruction | USD5.5 billion (hip, knee, etc.) |
| Spinal products | USD5 billion (screws, inserts, etc.) |

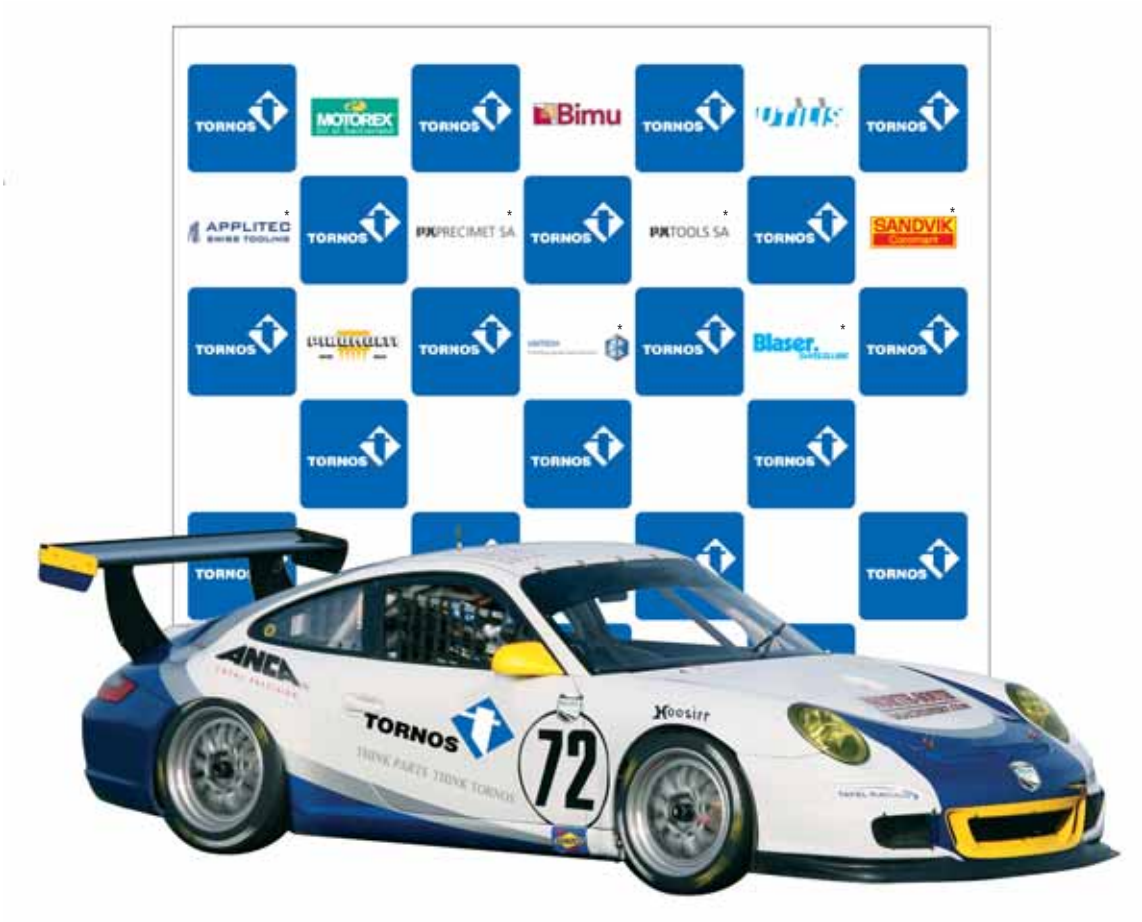
The market has seen two figure growth over last few years.
Forecast for 2008-2011 ≈ of 10 % / year.

The medical market is on the up and has not been subject to a cycle like other markets.

What are the trends for machining?

- Sub-contracting
- Finish all parts in one fixture setting
- Increase productivity
- Zero defects
- Ever increasing part complexity

## Tornos partners offering solutions to customers




*partners for Medtech

# NOT THE LEAST BIT CRAZY: FLUID-OPTIMIZED PRECISION MILLING

**They're still out there, those suppliers to the "crazy" watchmaking and medical technology sectors – two areas of business where, in design terms nothing appears to be impossible, provided it can be machined on a machine tool. This is precisely the line of business for Horst Fichter of Precision Turned Parts, based in St. Georgen in the Black Forest, Germany. This company specializes in the production of ultra-precise medical technology components and to achieve this, Fichter relies on Swiss technology and precision.**

In many cases, these companies are small to medium-sized owner-managed businesses employing hourly-paid staff that has built up specialist expertise over the decades as well as a loyal customer base. These companies succeed by using their knowledge that is continually updated through close collaboration with specialists from the fields of raw materials, tools, machine tools and machining fluids.

**Cone shape as a safety feature**

A good example of the "tough nuts to crack" when manufacturing for prosthetic applications can be noted in a long turned component that is produced from stainless steel 1.4112 and has a diameter of just 1,2 mm with a slight tapered hexagon at one end. Due to the cone shape between tool and bone screw, the screw cannot get lost once plugged into

the tool. This property is essential for the successful positioning and introduction of these screws.

### Milling the outer hex

All operations for this process can be performed on a Tornos DECO 13a. Dimensional integrity is a particularly challenging requirement in the bar-turning sector. When precision milling with a high-quality solid milling tool with a diameter of 2.2 mm, unusually high levels of distortion can affect cone shape readings at the end of all machining stages. This in turn means that the screws whose hex cap head also had a precisely defined tolerance did not always locate firmly enough on the taper of the medical tool. Scrap levels associated with turning operations were as high as 30 to 46 %!

### Change to MOTOREX ORTHO

All machining parameters were checked – without any result. The only parameter that could still be modified was the machining fluid. As a consequence, the tool, bar stock, cutting data and programming were left in their existing form and adopted in this condition. When selecting new cutting oil, various trade specialists recommended the high-performance cutting oil Ortho NF-X from MOTOREX.

## Stainless steel 1.4112

This rust and acid-resistant material (X90CrMoV18) comprises:

| | |
|---|---|
| 0.85-0.95% C | (carbon) |
| 1% Si | (silicon) |
| 1% Mn | (manganese) |
| 0.04% P | (phosphorus) |
| 0.015% S | (sulphur) |
| 17-19% Cr | (chrome) |
| 0.9-1.3% Mo | (molybdenum) |
| 0.07-0.12% V | (vanadium) |

It can be described as a "tough" material.

With the naked eye, this hexagon is virtually undetectable – so imagine the great pleasure when optimum results were obtained at the first attempt using Motorex Ortho NF-X. Without the slightest need for rework.

The solid hard metal milling tool rotates at approximately 6000 rpm and removes material for the tapered external hexagon in a single pass on the medical technology machine tool.

Precision to the nearest hundredth is now seldom sufficient. Through a process of regular measuring checks with all results recorded in a definitive measuring log during volume production, the machine operator always knows exactly how things stand at any point in time.

Success factor Ortho NF-X – the complex fluid technology has required several decades of development to achieve its current status. It is now reality for production to be faster, more precise and more cost-effective than ever before.

**Improved Tool Life…**

In the first machine filled with MOTOREX Ortho NF-X ISO 15, it was possible to achieve substantial improvements in tool service life within just the first eight hours of a turning operation, as well as during the deep hole boring on another component. With great interest, Fichter examined the precision measurement results from the external hexagon of the medical technology tool after the first series of components was manufactured using Ortho NF-X.

**…with greatly enhanced dimensional precision**

The measurement results from the milled hex head demonstrated a high precision and extremely satisfactory finish. All measuring values were recorded down to the last tiny detail and at the end of the series production run, the scrap rate was found to be just 5.8 %! How was this possible? Following a metallurgical and technical lubricant analysis in the MOTOREX laboratory and also on the machine, it was established that a specific formula contained in


Smiling faces on Mr. H. and Mrs. S. Fichter: «Thanks to the superb willingness of our suppliers to co-operate with us, and to our cutting edge technology, we are now able to achieve standards of quality previously not thought possible."


The Horst Fichter turning shop is home to several generations of Tornos machine, all arranged neatly in rows across the building. There is even a Tornos Model A dating from 1948, still delivering a bravura performance after all these years.

Ortho NF-X specifically makes use of the heat generated during milling operations to increase high-pressure stability, something which has a very favourable impact on the machining operation. Simply expressed, it enables a layer of material to be removed from the workpiece more "gently", thereby improving standards of finish.

If you take a look at the surface properties of stainless steel grade 1.4112 under a scanning electron microscope, you will see clearly that the surface has an irregular structure. The hard placement of the milling tool during stock removal from a workpiece is effectively cushioned by the lubricant film, thereby protecting the material structure. The result: improved finish and enhanced dimensional integrity.

**A perfectly familiarized team**

Horst Fichter employs several generations of Tornos machines and his machine shop presents a clean and well-ordered range of machine tools, neatly arranged in rows across the building. The oldest longitudinal turning machine, a Tornos Model A built back in 1948, performs its relatively simple tasks with the same consummate ease as the latest DECO generation bring to bear on their ultra-complex machining processes. Since January 2006, the Fichter turning shop business has been using MOTOREX Ortho NF-X lubricant, and employs its versatile and positive properties to great advantage.

Whenever the company proprietor starts to speak about the quality and ingenious capabilities of Tornos and MOTOREX, you can quickly tell why he is so willing to trust his business to the perfectly familiarized team from these two Swiss suppliers.

We would be delighted to provide you with information about the new generation of ORTHO cutting oils and the scope for optimisation within your area of application:

MOTOREX AG LANGENTHAL
Customer Service
Postfach
CH-4901 Langenthal
Tel. +41 (0)62 919 74 74
Fax +41 (0)62 919 76 96
www.motorex.com

# ACCESSORIES... WHICH ARE ANYTHING BUT ACCESSORY!

**Occasionally, the world of machine tools has a surprise in store. For example, while on an accessory discovery, we found something that suddenly transformed what is meant by accessory and principal equipment. During a visit to Pibomulti in Locle in Switzerland, our journalist experienced this phenomenon.**

Multi-spindle heads, rotational speeds of up to 40'000 rpm.

Turret heads, 9 types / 24 models.

Speed multipliers up to 30 kW and 50'000 rpm.

Angled heads, adjustable from 0° to 120° / pivoting through 360°.

A visit to a manufacturer of accessories was transformed into a fascinating discovery of expertise and extraordinary products.

Based in Locle in the Neuchâtel region, Pibomulti is at the heart of the Swiss watchmaking industry. You pass several prestigious names along the road to the company. During our discussion with Mr. Boschi (Company Director), Mr. Bueno and Mr. Schiavi (technical sales team), we also understand that these prestigious brand names are also clients of the company and share the same values of precision and quality.


Nestled in the mountains of the Neuchâtel region, the modern Pibomulti buildings hold their own against the watchmakers located not far away.

**decomagazine: Pibomulti manufacture and sell a wide range of products, what do you do exactly?**

**M. Boschi:** Pibomulti is a specialist in the production of accessories and equipment aimed at improving our customers' productivity.

**dm: You mean tools?**

**M. Bueno:** No, Pibomulti makes everything a machine needs to bring the right tool to the right place for machining, whatever challenge that may involve. We develop and supply accurate and tailor-made solutions. Only very occasionally do we make tools.

**dm: So you supply equipment and accessories. In 2007 is it possible to offer added value in this area?**

**M. Boschi:** You don't seem convinced! In actual fact, several customers see us as THE added value of their machine fleet… to such an extent that in some cases, the machine that bears our equipment is the accessory. Pibomulti was originally created to allow machines that were already on the market to achieve "impossible" performances. It remains our profession's vision today.

**dm: Are you saying that a machine, DECO for example, is only a support, there only to allow your equipment to be used?**

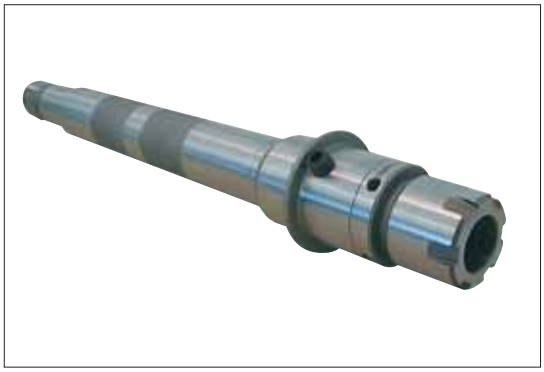
**M. Schiavi:** Absolutely not, this phenomenon doesn't actually exist in the bar turning sector…

**M. Boschi:** We offer solutions to improve the productivity of our customers' machines … and in this area, bar turning is in a much better state than standard machining centres for example. As far as DECO machines are concerned, we work hand in hand with the department of research and development at Tornos to offer the best possible solution.

**M. Bueno:** We have noticed that in bar turning, customers are under continuous pressure both in terms of time and price. The part's added value is important. We are in a situation that enables us to highlight the value of our products and of the machines on which they are fitted. A thread whirling unit is a very impressive piece of kit in its own right, but when fitted to a DECO or MultiAlpha turning machine, it really shows what it can do.

**dm: You said that your "philosophy" is to enable your customers to be more productive, how do you do that?**

**M. Bueno:** We work on all aspects of productivity. This involves optimising operations during machining work and management of presettings during down-time periods. We make the impossible possible.



Modular quick-change spindle (BMRC).

BMRC tool carrier.

Multi-spindle head with modular BMRC spindles.

**dm: Isn't it a dangerous position to be in, always firefighting on behalf of your customers? If you are forever developing new solutions, doesn't this prevent you from ever reaping the benefits of your investments?**

**M. Boschi:** It's one of the strengths of the company. All our developments are based on our experience and existing parts. For example, we always keep a full range of our spindles in stock so no matter which one we might need for a new development, one is always available. In principle, it is always available! So, we make something very specialised from existing products. It's one of the reasons for success at Pibomulti.

**dm: In stock? Does that mean you handle high stock levels?**

**M. Schiavi:** Absolutely! It's really high level in terms of the number of references. We have thousands of items ready to be fitted.

**M. Bueno:** This allows us to swiftly come up with new solutions for our customers.

**dm: If you only sell "specials", do you have regular customers?**

**M. Bueno:** Absolutely. These days, in industry, production needs to be increasingly optimised and you have to run "extraordinary" operations. This is what we believe in at Pibomulti.

**dm: For bar turning, what type of equipment do you sell?**

**M. Boschi:** Several different types. We began with multispindle heads to increase the number of tooling positions, but there are also tools for angled operations, thread whirling units and milling units. Rapid changeover heads, for example, are essential accessories these days. You can make considerable gains in productivity on a DECO machine because there are more tool positions and everything can be 100 % pre-set.


3D measuring system.

CNC turning & conventional CNC turning shop.

**dm: You mention pre-setting, do you need special equipment?**

**M. Schiavi:** If you don't have any kind of system, you will need to purchase one, that's for sure. But, if you have Tornos equipment, for example, one straightforward modification will suffice.

**dm: You said that your areas of specialisation are adapting and innovating… if we take the thread-whirling process for example, hasn't it all been done before?**

**M. Schiavi:** Oh no. We are continuously striving to "push back" the limits, at the request of our customers. For example, a medical customer requests a sharper angle… we were able to satisfy this request and it's now possible on Tornos machines.

**M. Bueno:** And for example, thread whirling heads are now adapted on multispindle turning machines… there are always new challenges to be faced.

**dm: What about the competition?**

**M. Boschi:** There are several competitors on certain products, but no-one covers the full range of our production. It really is a considerable competitive edge because more important than benefiting from substantial synergies, we also enjoy combined expertise. It is one of the strengths at Pibomulti.

**dm: What are your product lines?**

**M. Boschi:** We produce 4 main lines: multispindle heads, accelerators, revolving heads and angular heads.

**dm: You said that a machine is sometimes only an accessory…**

**M. Boschi:** Yes, that's one of the reasons why a partner company supplies machines. When the core of the solution consists of accessories, we can supply a complete package.

CNC turning.


CNC and conventional machining & milling shop.

**dm: You develop equipment for DECO for example, what sort of collaboration is it?**

**M. Bueno:** It's a genuine partnership. We work hand in hand with the manufacturer of the machines and the final customer, enabling three partners to share experiences and go "the extra yard". It really is a very close relationship.

**dm: In terms of production, how do you ensure the quality and the "relevance" of your products?**

**M. Schiavi:** Our production is based on a modular or "island" principle where our colleagues are responsible for meeting quality standards and deadlines. This is a guarantee that our production is optimum and under control.

**dm: You mentioned collaborators... in the bar turning sector it's very difficult to find skilled personnel, what about Pibomulti?**

**M. Boschi:** Unfortunately, our apprenticeship system, which remains a model of efficiency, is a little overlooked by certain school teachers who don't encourage young people to choose mechanics, but that's another story. As with all other companies in the mechanics sector, we have to put the brake on growth for the time it takes to find the right people.

**dm: Coming back to your activity... if I'm a Tornos customer and having problems with a workpiece, can you help me?**

**M. Boschi:** Absolutely… within physical restrictions…

**dm: Do you have an example of a request?**

**M. Boschi:** Recently, we received a request from a manufacturer in the aerospace sector. They were having trouble machining certain parts. We looked into the problem and found the solution. We pro-

| | |
|---|---|
| Founded: | 1979, 1 employee |
| Workforce 2007: | 135 employees |
| International customer base, domestic market 15 % | |
| Address: | Rue Jambe-Ducommun 18 – CH-2400 Le Locle |
| Internet: | www.pibomulti.com |

duced specific products which enabled our customer to reach their objectives.

**dm: How do you see the future for Swiss industry and your own customized solutions?**

**M. Boschi:** Switzerland definitely holds a strong hand. We are leaders in micromechanics and the precision industry. Look at watchmaking for example. We are particularly strong in niche markets where special skills are required. For Pibomulti, it's a "success story" that has been going on for 25 years!

We rounded off the visit by a tour of the workshops. Everything from minuscule parts to huge pieces of equipment are in stages of production (for machining processes of a few millimetres in small workpieces up to ship engines, larger than the reception hall we had just left).

Air-conditioned workshops to guarantee high precision, modular production stations "islands" responsible for quality and deadlines, open plan offices facilitating communication… routes which have contributed to this company's success!

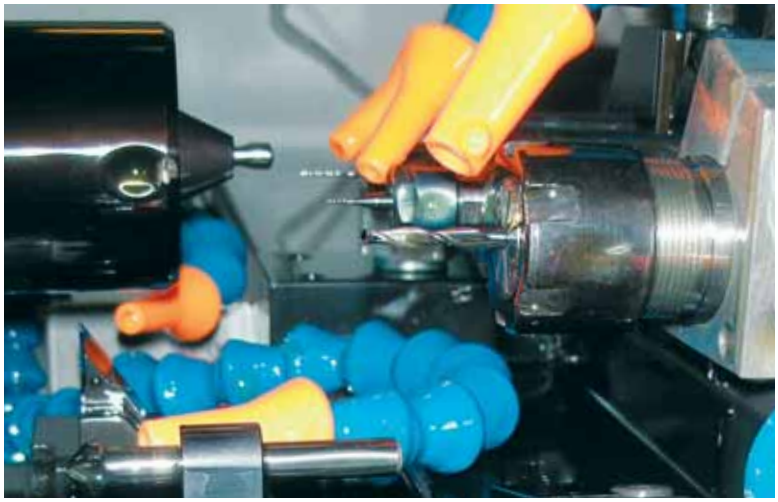
A really wonderful find.

CNC milling.

Would you like further information on Pibomulti adapted solutions? Please contact M. Schiavi at info@pibomulti.com

# HSC 80’000

**High speed cutting (HSC) is a relatively little-used technology in bar turning and it is almost a mystery within the manufacturing sector. decomagazine turned to Tornos and the “client applications“ division of the Tornos single spindle Business Unit to find out more.**



Counter-operation machining of Torx.

In order to increase the range of options available to its machines, TORNOS took the decision to install high speed spindles, also known as electric spindles or high frequency spindles. These spindles are particularly well suited to small machining operations that require a high level of precision at high output rates. For very small tool diameters (drill bits, milling cutters) that do not require large amounts of drive power, high frequency spindles can be fitted. There are several suppliers on the market and Tornos is working closely together with a number of them.

These suppliers propose different lines of electric spindles depending on the work required, for example drilling or milling with micro-tools. This principle can be applied to all Tornos machines.

### Strengths

The compact dimensions of these spindles mean they can be installed on different tool systems, either in bar-turning operations or in counter operations. A very uncluttered work area and the variety of available tool positions (up to 21) make these spindles much easier to install without in any way impeding their ability to accommodate more traditional tool positions. The benefits are:

- Allows the use of much higher speeds than traditional spindles.
- Perfect for end operations, for example milling a Torx profile.
- Productivity gains.
- Very low level of burring.
- Long tool life.

### Technical specifications

- Min. tool diameter: Miller 0.15 mm.
- Max. tool diameter: Miller 8 mm.
- Max. programmable rotational speed: from 10,000 to 80,000 rpm.
- Control: Via M functions of the machine/ TB-DECO.
- Drive system: Synchronous drive system and independent power supply.

### Compatibility

DECO, Sigma, Micro, MULTIDECO and MultiAlpha.

### Availability

Now.

These electric spindles are not part of the standard Tornos options, but they are often proposed in order to optimise machining procedures. If interested, your usual Tornos contact will be able to advise on the optimum solution for you. Depending on the type of operation, in particular for micro milling and to use a well-known slogan, once you’ve tried HSC, you won’t go back!

# THE AUTOMOTIVE INDUSTRY – A DEMANDING SECTOR

**The automotive industry is a large consumer of turned parts of the highest quality. Bar turners are privileged suppliers and are therefore faced with considerable demands. With their MultiAlpha turning machine, Tornos offers a suitable production tool to meet demands.**

*Robert Meier, independent specialist journalist, Rupperswil (Switzerland)*

If there is one industry that is largely subjected to harsh conditions it must be the automotive industry. Car security is never questioned but their fuel consumption, pollution levels and of course price are regular topics of conversation. In order to face up to all of these demands, the client has become particularly innovative in terms of the design of their parts and highly demanding in terms of their quality.

### Reducing the number of parts

When reducing consumption means reducing the number of parts; automotive engineers become ingenious. Why not combine different functions into the same part? Of course that will complicate matters when it comes to size, materials and other things, but problems requiring solutions are forwarded to the producers of these parts – the bar turners. Fortunately they have a competent partner who can supply them with a production tool capable of producing these parts cost-effectively: Tornos and their MultiAlpha turning machine.

This automatic bar-turning machine is available with six or eight spindles depending on the model, each with its own drive system. In addition, the machine is equipped with a new highly-rigid 4-axis CNC counter operation concept which, thanks to its 5 tools can produce complex counter operations that are impossible to carry out without secondary operations employing traditional techniques. On this new machine, parts are can be finished and do not require additional machining, which is always costly and causes quality concerns.

Benefits in terms of quality, costs and time needed to finish the part are well-established and meet the ever-higher expectations of the automotive sector.

**Long production runs but small batches**

Unique to the automotive industry are the long production runs that can amount to millions of parts. This client is today perhaps one of the rare examples that require so many of the same type of part. However, these runs are increasingly fragmented although the part remains the same. The customer still requires the supplier to remain reactive to changes in the market and be able to make swift production run changes.

Therefore, bar tuners need to be able to keep abreast of their customer. The MultiAlpha turning machine provides users with a means of production that enables them to produce high volumes and – to the delight of the automotive industry – to finish each part so that no further machining operation is required. This reduces the costs of over-specific transfer systems and the labour required for these different interventions while raising quality levels of the end product.

The MultiAlpha meets another requirement in Europe: Reducing human intervention on parts. In order to meet this requirement, machines are increasingly automated, highly autonomous and equipped with an ever-increasing choice of tools.

**Faultless quality**

It is no longer conceivable that cars should break down. The consumer demands impeccable levels of quality and a level of vehicle safety that could well be described as an absolute standard. The automotive industry now requests a level of quality of 5 ppm or below, or five defective parts per million at the most. To ensure this kind of quality level, Tornos has formed partnerships with specialists in controlling and measuring procedures. Tornos has developed an interface that is able to communicate with different types of measuring systems. Data from this interface are made available to suppliers of these systems who then adapt them. This partnership guarantees total compatibility between the machine and the measuring system for the operator, one less major issue.

This interface is an option which is available on

single as well as multispindle machines and allows corrective data to be transmitted. If the measuring system detects a gradual drift from input data – due to tool wearing, for example – a corrective measure will automatically be triggered by the turning machine's control unit. In this way, the bar turner can monitor both tool wear parameters and a sudden shift from an input dimension resulting from tool failure, because in this case the system automatically actuates an alarm and can stop the machine.

Finishing a part on a single machine is a benefit much appreciated by the automotive industry. In the case of any problems, locating the cause is much simplified and with this procedure, the quality of the parts increases because machining conditions remain unchanged for the whole batch.

### Homologation testing – no longer the headache it used to be

To reply to an invitation to bid, the supplier must submit a small run of parts for approval. This sample is usually done on a single spindle turning machine. The problem with this way of operating is that the automotive industry now demands the approved part be machined on the production unit where it will later be produced in series. With the MultiAlpha, it is easy to make prototypes and therefore gain early approval at the sampling stage.

### Workpieces provided at an appropriate rate

The MultiAlpha automatic turning machine is a production tool well-suited to continuous production. However, the ability to machine 24 hours per day is not only down to the machine itself but also to an entire system that includes the machine and its periphery equipment.

The standard turning machine for producing parts for the automotive industry is a multispindle turning machine able to machine bars up to 32 mm in diameter. For larger diameters or for the machining of

Handling and palletization system.

forged, molded or stamped parts, the turning machine can be fitted with a "chucker" system (see article on page 43 in this magazine). In either case, the turning machine housing remains the same. This means that, apart from some minor changes to provide an opening for an automated chucker part feed, no other modification is necessary. This way, the bar turner's choice of system adapted to a certain family of parts does not rule out another variant. The bar turner's investment will not be compromised by the arrival of another family of parts. In fact the opposite will be true.

### Additional handling – handling parts using an integrated robot

Parts machined on an automatic turning machine are often extracted by free fall. Trends – especially within the automotive industry – are heading towards monitored parts and palletisation of parts. Here, parts are gripped by a collet that transfers them to a pallet system. In the case of continuous production, the capacity of such a system merely depends on the type of installation. One variant is the use of a robot to load stamped workpieces and unload machined parts. This kind of automated model does not complicate things for the bar turner, even the programming can be carried out in standard mode.

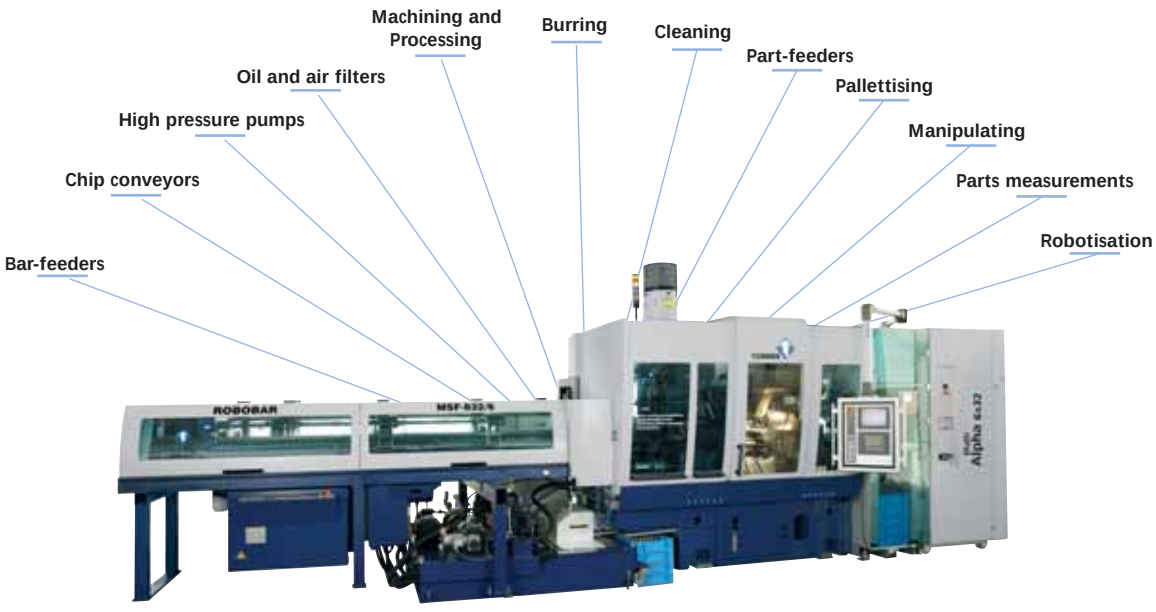
### What swarf?

Depending on the volume and the material to be machined, swarf extraction is a process that can cause the most problems, especially if the operator requires automated production that includes minimum monitoring. To overcome this, the MultiAlpha removes swarf using its high pressure pumps (35 and 80 bar). Additional assistance is available for the operator here in the form of a universal swarf conveyor that handles several types of swarf from brass and aluminium to stainless steel. As far as cutting fluid is concerned, this is constantly filtered. If a filter is blocked, it is automatically cleaned without interrupting the machining process. On the peripherals and equipment side of things, Tornos is building partnerships on the basis of its extensive experience.

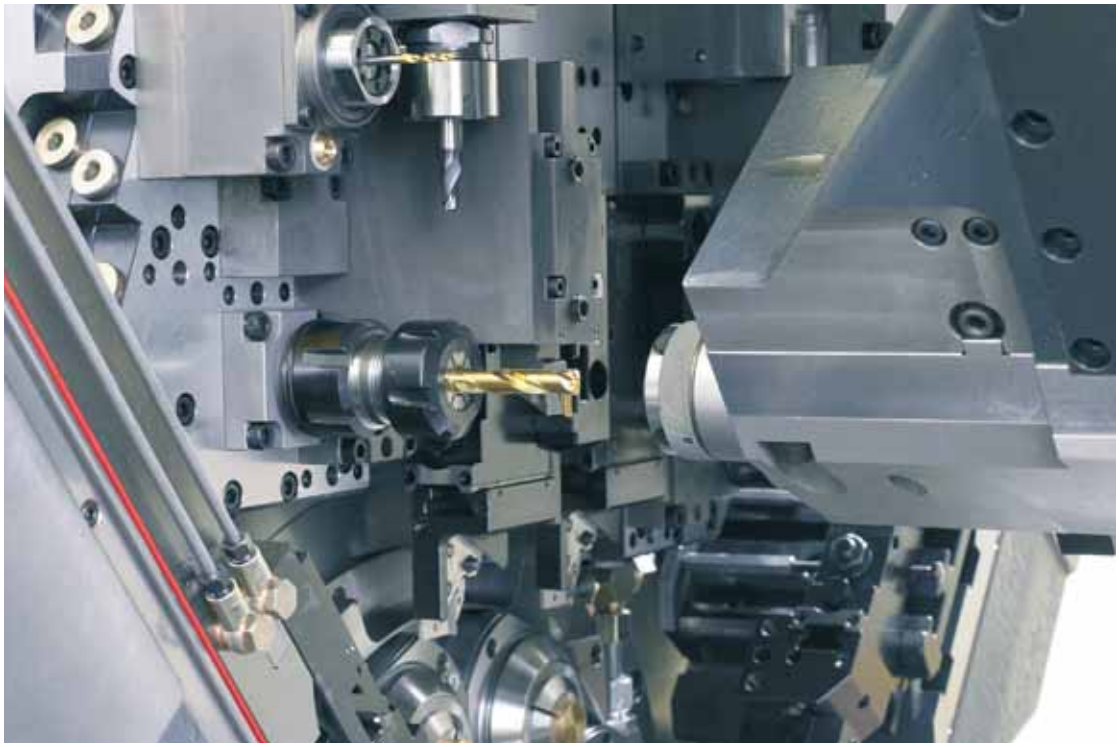
### Painless programming

The MultiAlpha is a turning machine with every work position equipped with its own spindle. Does the programming start to become highly complex? A turning machine equipped with more machining options logically requires programming to match the machine's capacities. As each of the MultiAlpha's work stations is equipped with its own drive system, its programming is done by station. This facilitates the programming of the turning machine and becomes as straightforward to program as a 3-axis single spindle machine.

First of all, you could be forgiven for thinking that programming machines of more than 30 axes must be complicated. However, thanks to the TB-DECO concept and to Tornos' multispindle kinematics, the user only programs 6 or 8 times 3-axes, which is a lot more straightforward.




Powerful integrated machining solution.



With 5 counter-operation tools, MultiAlpha can also perform complex counter-operations.

The fact that each work station is equipped with its own powered spindle means optimum machining process can be carried out at this station without worrying about the others. Managing the turning machine is therefore simplified. Bar turners enjoy increased flexibility in the programming of their parts. Thanks to independent speeds, they can select a wider range of tools and can also select the perfect speed. The bar turner's expertise will be very useful and in workshops equipped with both single and multispindle turning machines, operators will always be within the same programming family.

**Counter spindles in action**

The MultiAlpha is equipped as standard with a counter spindle that can hold five tools. This provides this machine with a considerable machining capacity in counter operation. The increased extent of counter-operation machining operations can have an adverse effect on machine cycle times. To prevent this from happening Tornos provides a version of the machine with two counter spindles to reduce the cycle time in counter-operation mode by half. If the customer selects the double counter operations version, it can, if necessary produce a highly machined part both in operation and in counter operation in an unrivalled cycle time.

However, if a more straightforward part is to be produced, the customer can work in double cycle which means one workpiece on stations 1, 3 and 5 with counter operation on 7 with five tools and on stations 2, 4, 6 with the counter operation on 8. In this version, it's actually comparable to working with 2 machines with 4 spindles each equipped with a system of complex counter operations.

**Integrated production system**

Automotive sector clients are not looking for a machine, but a flexible production system that is highly productive and whose efficiency guarantees they will "stay in the game" The Tornos MultiAlpha multispindle turning machines belong in this category of solutions.

Do you require further information on multispindle solutions from Tornos? Please contact Mr. Willy Nef, director of the Multispindle Business Unit nef.w@tornos.com

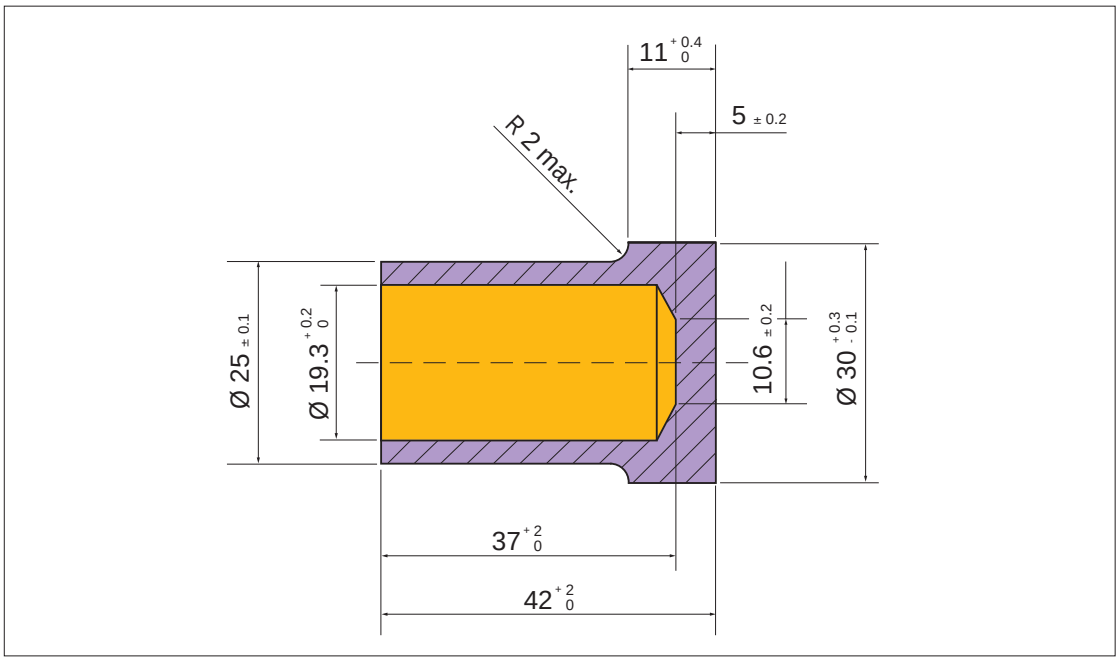
Are you interested in the automotive sector and multispindle solutions? You can download the automotive brochure at the following address or contact your usual correspondent at Tornos.

http://www.tornos.com/dnld-app-e.html

# FEEDING A MULTISPINDLE TURNING MACHINE WITH BLANKS IS POSSIBLE!

**Automatic bar-turning machines are designed for machining workpieces from bars. A new trend is heading towards rough-machining workpieces on these turning machines. Working with these parts requires what is known as "chucker" machining. The Tornos multi-spindle turning machines are perfectly suited to this.**

*Robert Meier, independent specialist journalist, Rupperswil*




Workpieces being loaded on the 'chucker' system at EMO 2007.

## Trend

In some cases, using the "chucker" solution is obligatory. The following changes in working conditions can explain this development: The sharp increase in the price of materials means that ways to reduce scrap to a minimum are always sought after. The race for profitability is sensitive to the reduction in floor space and the increase in productivity (less roughing work). In terms of capacity, there is great scope for making parts from special profiles.

As the term "chucker" indicates, this new way of working originates from English-speaking countries. As a general rule, forged, moulded or stamped workpieces require subsequent machining before they take on their definitive shape. However, the objective here is also is cost-effective solutions while still aiming for precision and quality. Tornos, the manufacturer of automatic turning machines provide solutions that go even further.

## Exceeding the limits

In looking for ever more cost-effective solutions whilst maintaining the reliability level of the part, the industry is forever seeking different production methods. Technologies such as sintering, casting and forging often allow for the production of component shapes that would otherwise prove difficult to make or result in lower production costs. However, these workpieces would normally need to be machined again to obtain the required look and quality level.

In addition, bars with a diameter of more than 35 mm can very rarely be fed into standard automat-

ic turning machines. Besides, the larger the diameter the heavier the bar becomes and this rotating weight needs to be controlled in order to obtain the required precision. There is also the issue of the weight that the operator is required to lift every time. One solution often applied is pre-cutting the bars to the dimensions of the workpiece.

In either case, the specialist turns to the chucker. The workpieces are introduced into the turning machine and clamped in place in the collets. The collets are adapted to the shape of the workpiece and can even clamp diameters in excess of 40 to 50 mm. The restriction due to the passing of the bar through the spindle is in this case no longer an issue.

### High capacity already available

With its declared objective being to machine workpieces with ever-higher levels of precision and quality while at the same time reducing unit costs, Tornos has succeeded with the MULTIDECO and MultiAlpha turning machines. These are machines capable of meeting current demands. This has been done within the framework of their continuous development of automatic turning machines. First and foremost, these automatic turning machines were designed to machine workpieces from bars and their productivity track record is uncontested. Transferring these available capacities onto the machining of chuckers was only a question of adapting the turning machines. Mission accomplished.

### Automated loading

Blanks often arrive in bulk and are directed onto the rails by a vibrating hopper, loaded onto the machine from above and put in position using the force of gravity. Another alternative is to use a manipulator or robot to position the workpieces in the turning machine's collet. Tornos has taken the initiative of preparing the MULTIDECO and MultiAlpha before they leave the factory in view of possibly installing this kind of complementary equipment. This machine tool manufacturer has assured the collaboration of specialist partners who have profound knowledge of all the issues involved in loading workpiece by workpiece automatically. This way, they are able to provide solutions suited to customer requirements and in perfect harmony with Tornos turning machines. If a robot is used, it can even take on the role of feeding the turning machine with semi-finished workpieces, removing finished parts and palletising once machining has finished. More and more clients are requesting this solution for the parts they order.

The benefit of palletising is that this operation reduces the number of different handling procedures for each workpiece, whether it is for cleaning and dispatching or even for other types of operations such as thermal treatments, for example.

This reduction in human intervention cuts down on the transit time as well as the risk of damaging the workpieces and added costs that this incurs. For the bar turner, machine start up remains straightforward. Even when a robot is used, programming is still simple.

### Nothing but benefits

It is rare to find solutions that only offer advantages. Indeed, a turning machine designed for the machining of blanks loses none of its initial capacity especially in the event of a change of process when following up with bar work. The machine's kinematics remain identical, both on the chucker and the bar feeder versions. It is therefore totally feasible to add on a bar feeder without the need to make any

Chucker system to complement the productivity of MultiAlpha.

significant modifications to the turning machine. This way, bar turners lose none of their initial investment in the turning machine. The opposite is in fact true: they actually win.

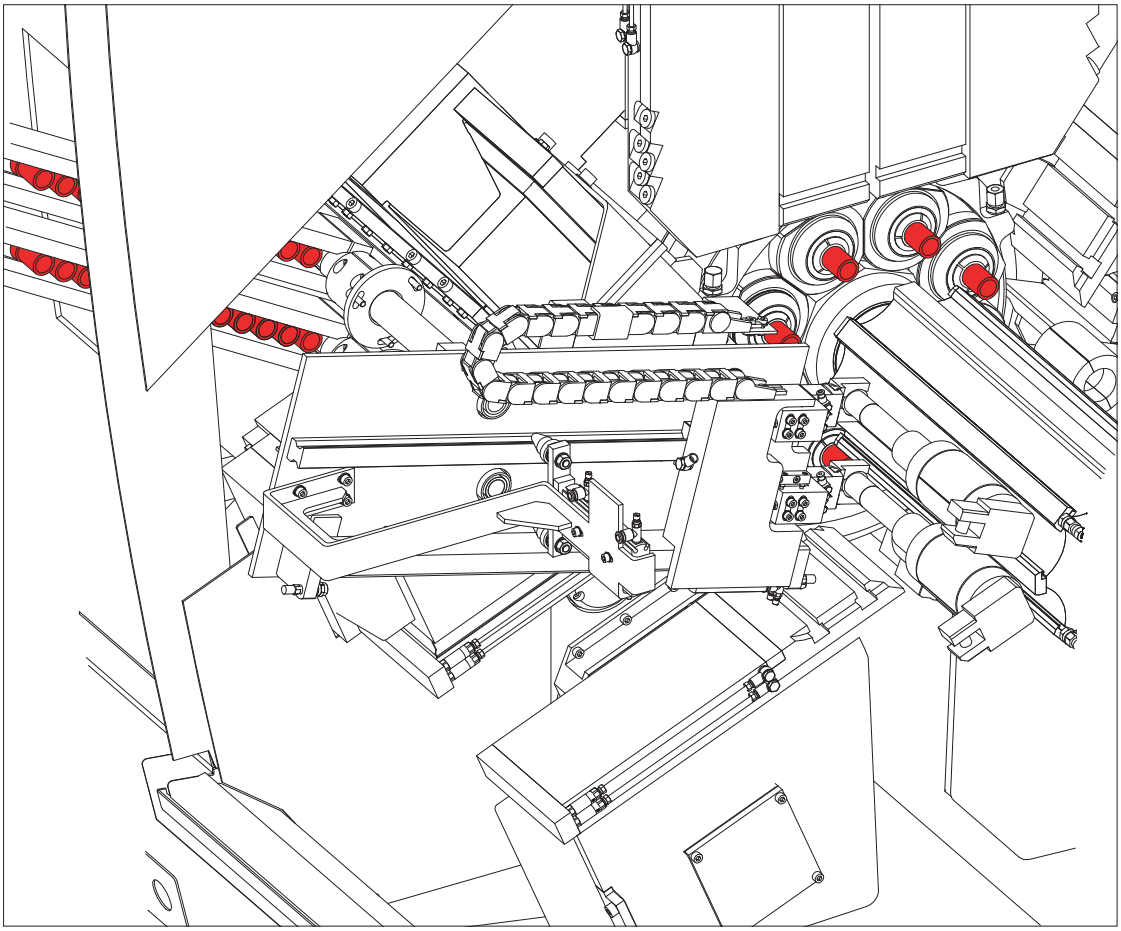
In chucker mode, they will actually be able to machine tubes as well as larger diameters because they will have the option of an internal fixture placement, an option not available in the bar feeding operation. A further benefit – and a considerable one at that will be that they will be able to machine workpieces in materials or primary shapes that are unavailable in bars.

In addition, a turning machine with chucker is a relatively short machine because the bar feeder is no longer required. Floor space is therefore reduced. Bar turners also benefit from enhanced swarf handling because machining volumes have been reduced due to the fact that workpieces are pre-shaped. As a result, less equipment is required for handling swarf and other processes.

**Gaining productivity**

As far as stamped workpieces are concerned, manufacturers are already able to produce a good level of quality, ideal for machine turning. Machining volumes are therefore reduced, which means that the required number of work stations on the machine is reduced.

On the Tornos MultiAlpha automatic turning machine, every machining work station has an independent spindle speed and position thanks to its integrated motor (motorspindle). This way, it can run operations at the perfect speed for each spindle and stop the workpiece at each position to run operations such as guided milling and drilling including interpolations with rotary C axes. Because of this, on this model of turning machine the workpiece can be loaded when the spindle is at a standstill, which makes loading the blank in the grippers of the turning machine considerably more straightforward.



Workpieces shown in red. Workpieces shown arriving on the left-hand section.

An additional benefit of the motorspindle turning machine comes from the possible need to work with different cutting speeds because the diameter of the workpieces has increased. This is easily manageable with the MultiAlpha. Its independent speeds help bar turners to achieve more effective and optimised production processes.

Company directors are always on the look out for the most cost-effective solution. So, on a turning machine with six spindles, for example, one machining station would be assigned to the loading of the workpiece, another to its removal and four stations would remain available for machining operations.

No down time is actually necessary for loading and unloading workpieces. Standard turning machine bar loading times are not applicable and as a result the overall efficiency of the turning machine is enhanced. On a turning machine with eight spindles and for relatively straightforward workpieces, half of the spindles are sufficient to produce the part. All operations have been doubled and the cycle time has thus been halved. Furthermore, chucker autonomy is only limited by the stock of workpieces available. In fact, this solution also enables continuous production to be run. And all this on turning machines with a proven track record in production.

## What is a “chucker“?

The term “chucker“ is an English word. A “chuck“ is a gripper for a turning machine, for example. “Chuck lathe“ is the term for a turning machine with spindle, the “chuck jaws“ are the clamping grippers; “chucking“ is used to describe the clamping of a workpiece in the turning machine’s grippers.

# SIGMA 20 MAKES IT POSSIBLE!

**Set up around the Tornos DECO Sigma 20 CNC sliding head turning centre, A-BAX Precision Engineering Ltd of Kettering UK is a successful company formed by a businessman seeing an opportunity arising from a fading CAM Auto machine shop.**


Company director Alan Baxendale next to his new machine that makes all possible.

In 2006 the opportunity arose for, A-BAX Managing Director, Alan Baxendale, to take ownership of a machine shop with 6 CAM Auto lathes supplying components to a global company. Mr Baxendale had already purchased a sheet metal business and as sole operative, was looking for a solution to eliminate the labour intensive CAM Autos and allow him to continue with the metal work. Although he had no CNC experience, he realised that the way forward was to replace all the CAM Autos with a CNC turning centre in order to meet demand.

Despite his lack of experience Mr Baxendale knew exactly what he was looking for. He contacted sliding head lathe manufacturers with the brief that "the machine must be capable of machining at least 6 sequential batches within each component group without any requirement from the operator to load changeover programs or tooling between batches." He required variations in engraving details, drill sizes, countersink depth and quantities between each batch for the respective component. An electrical signal was required to interface with an automatic

finished parts catcher to allow for bin change to occur between each sequential batch.

Mr Baxendale states: "Whilst some suppliers said their machines could deliver what I wanted, none of them appeared to do it. However, Tornos were the most confident about delivering what I wanted and it was this confidence and the power of the machine that drew me to Tornos." The result was a Tornos Sigma 20 supplied in December 2006 fully tooled with programs.

What Mr Baxendale wanted was a machine that, in conjunction with an automatic finished parts bin changer, would run with minimal operator input and that is effectively what Tornos has delivered.

The company at present primarily produces motorcycle components in batches varying from 150 to 2,500. With 5 types of brass components and up to 80 different sizes, each of the 5 types has between 29 and 72 size variations – something that undoubtedly causes a headache for any manufacturer.

As Mr Baxendale continues: "The (Fanuc) Macro B option on the Tornos means that I can load 6 sizes and associated quantities and the program calculates all the other parameters associated with each variation. The overall tooling in the Sigma 20 remains the same for each group. Technomation Ltd integrated a Doser 600 automatic rotating bin changer, using the signal provided by Tornos, which is controlled by an M code within the parts program. The machine automatically signals the bin to rotate to avoid mixing batches. I can leave the machine overnight and come in the following day to find 6 batches completed and collected in separate bins, allowing me to operate the turnkey package I originally envisaged."

The simplicity now built into the business has been conducted with significant productivity gains. "The previous annual production of approximately 250,000 parts will be achieved in the first six months with the potential to triple production by the end of the first year. The old company was sinking in its workload. With the new Sigma 20 I have not only retrieved the situation but turned it around. I am already looking at new orders and potentially a second machine by the middle of next year," continues Mr Baxendale.

The total number of each part produced per annum is large. However, as Mr Baxendale continues: "Nobody ever wants all their parts in one run. Despite making large quantities overall we must have the capability to run small batches to deliver to customer needs. These needs can be catered for with simplicity, thanks to the Sigma 20."

A-BAX tailored the Tornos parts collection system to meet its changing needs and will develop the system further in conjunction with Tornos and Technomation Ltd to sub-divide large batches and to retrieve the final component made by each batch for inspection in order to achieve ISO:9002.

The automation capability of the Sigma 20 allows A-BAX to run 24/7 without having to employ a night shift and incur additional labour costs and unnecessary set-ups. "I cannot understand why more companies are not working this way. It may be a leap of faith and maybe my naivety and a fresh approach has enabled me to do this. I see companies running a night shift with operators there just to change bins and load programs. Even during the day, machines can sit idle waiting for the operator to set up the next batch for a similar component. This does not seem to be a cost effective way of working," concludes Mr Baxendale.

John McBride
Tornos Technologies UK
Tornos House – Garden Road
Whitwick Business Park
Coalville – Leicestershire
Tel: 01530 513100
E-mail: sales@tornos.co.uk
Site web: www.tornos.ch

# IS A STRONG BRAND NECESSARY?

**In the retail sector the brand has a definite impact on consumer choice. But what about in the machine tool market?**

**Isn't talk about brands and identities a waste of time? Isn't reading this article a waste of time too?**



The Tornos brand, now into its 2nd century, and still just as innovative as ever.

### Brands and technology

Tornos is working on a "Branding project". Is it important for an investment item such as a machine tool? What are the benefits of a strong brand? Isn't it just following a trend?

A lot has been written on the benefits of having a strong identity, what do to strengthen it and what it can do for you? But what about the customer? What does it matter to them if their machine has got a "label"? Without going into detail of the "me too" products found everywhere in the retail sector, it is often said that a brand represents a certain level of quality or certain values that the consumer is looking for. Something they can identify with.

It's these values that the Swiss manufacturer has been working on.

## MR RAYMOND STAUFFER, TORNOS CEO TELLS US MORE...

**dm: Mr. Stauffer, why did you launch this Branding project at Tornos?**

**RS:** Our strategy was drawn up in 2003 and "brand revaluation" has always been planned for 2006-2008. We are therefore on schedule with our business plan. Our main aim was first to make a name for ourselves and create our flagship products then to consolidate our brand's good name.

**dm: You mentioned a brand but everyone knows Tornos don't they? Everyone knows what you do?**

**RS:** It's true, that with a track record that goes back a hundred years, Tornos is well known. But what does this mean? Do our clients have the same vision as ourselves? Are the values that we promote shared by people outside the company as well as inside? These are the questions we have been tackling.

**dm: And what are these values?**

**RS:** We have defined four foundation stones which are: **user-friendliness, finished parts, value for money and technology.**

- **User-friendliness** can be found at all levels: From customer training programmes to maintenance via ergonomics and design, the user-friendly interface between man and machine, programming and machine start-up etc. We need to make people want to work on a Tornos machine!
- As for the notion of **finished parts**, this meets a customer demand that cannot be ignored. Our equipment and processes must enable parts to be finished to avoid any reworking operations – if at all possible from the moment the workpiece is loaded to its palettization.
- **Value for money** encompasses all the economic factors from the purchase price to running, maintenance and auxiliary costs, to the machine's residual value after a certain number of years. The reliability, productivity, longevity and maintenance – versus the cost ratio must all be optimised all the way down the line.
- As far as the **technology** value is concerned, this involves everything to do with innovation, keeping an eye on technological developments and our ambition to provide our customers with cutting edge solutions all with proven reliability. Only equipment that has passed our rigourous tests and whose reliability is unquestioned will be proposed and integrated into our products.

**dm: What is the choice of these values based on?**

**RS:** These values haven't been defined arbitrarily. On the one hand, they are the foundation of our company philosophy and on the other hand they mirror the expectations of our customers all over the world as to how they perceive Tornos. It was important to

actually define them so as to have a clear vision at all levels. But this is only the beginnings of the work ahead.

**dm: The beginnings?**

**RS:** Indeed, because these values have to be reinforced both internally and externally, so that our customers really recognise them. They are our driving force and we need to pull together so that customer experience at Tornos is a positive one, everywhere in the world, every time.

**dm: It is a long term programme then?**

**RS:** It's above all an ongoing effort, the leitmotif of every employee, whatever level you are at. Whether employees are in product design or after-sales service, development, manufacturing or sales - everyone must share the same values that in some way represent the ideology at Tornos.

**Conclusion**

This interview answers the question at the beginning of the article very clearly. According to Tornos, yes, a strong brand is necessary. It gets its strengths from shared values. But that isn't everything. These values need to be set in stone by company culture. At Tornos, this culture is made up of four foundation stones. First, **customer focus**, then **teamwork**, using **clear indicators** based on facts and **innovation**. These elements need to be internally reinforced every day.

*When the microphone was switched off, Mr. Stauffer told me that the project was underway and that it is definitely not a magic wand to reinforce values or culture, but he has full confidence in all Tornos employees.*

*He also made it clear that readers can send any problems, questions or ideas to:*

*brandvalues@tornos.com.*

*This will provide the brand work group with an insight into market reaction.*

# MANAGE THE MODIFICATION RIGHTS TO COMPONENT PROGRAMS!

**The TB-DECO ADV 2007 software includes a new function that enables you to manage modification rights to programming software. This provides your company with the guarantee of improved control over modifications to your component programs.**

Set as standard, this new function is deactivated and each user has, like before, the right to modify any element of the component program. To activate this function, ownership of the TB-DECO ADV (option 750-0005 + 750-0710) software is required, along with administrator rights on your computer.

### How does it work?

Modification rights and management of component programs is based on the management of Microsoft Windows privileges. Ownership of Windows accounts for each user of the TB-DECO software is a prior requisite.

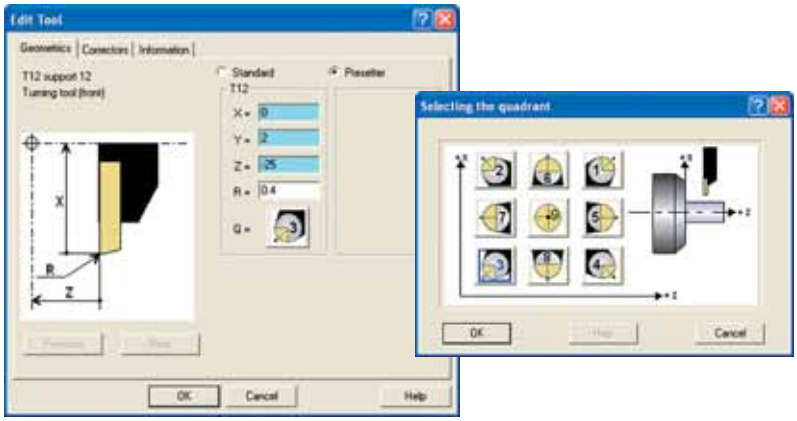
### TB-DECO user groups

Three level of privileges are available to TB-DECO software users:

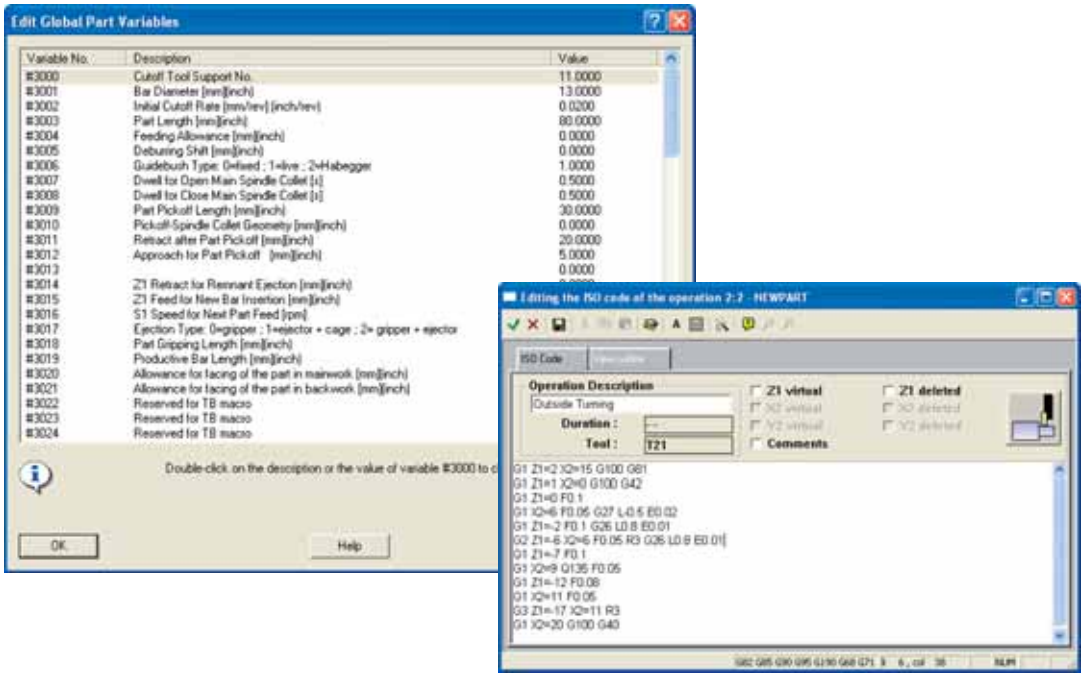
Level 1: Operators
Level 2: Operational supervisors
Level 3: Process engineering department and IT network administrators

| Elements of TB-DECO software | Levels | | |
|---|---|---|---|
| | 1 | 2 | 3 |
| Edit tools (geometries, correctors etc) | ✓ | ✓ | ✓ |
| Change machine for component program | | ✓ | ✓ |
| Modify global variables | | ✓ | ✓ |
| Use a shared tool catalogue | | ✓ | ✓ |
| Modify the ISO code | | ✓ | ✓ |
| Modify initial speeds and configuration of spindles | | ✓ | ✓ |
| Correct fixture settings (extent of offset and speed) | | ✓ | ✓ |
| Part information (general component data) | | | ✓ |
| Rename main program | | | ✓ |
| Add, delete or copy a tool | | | ✓ |
| Program an operations line | | | ✓ |
| Add, delete or copy an operation | | | ✓ |
| Program synchronisations and constraints | | | ✓ |
| Modify succession of programs | | | ✓ |
| Modify TB-DECO configurations (options menu) | | | ✓ |
| Machines management: add and delete machines | | | ✓ |
| Modify machine database | | | ✓ |

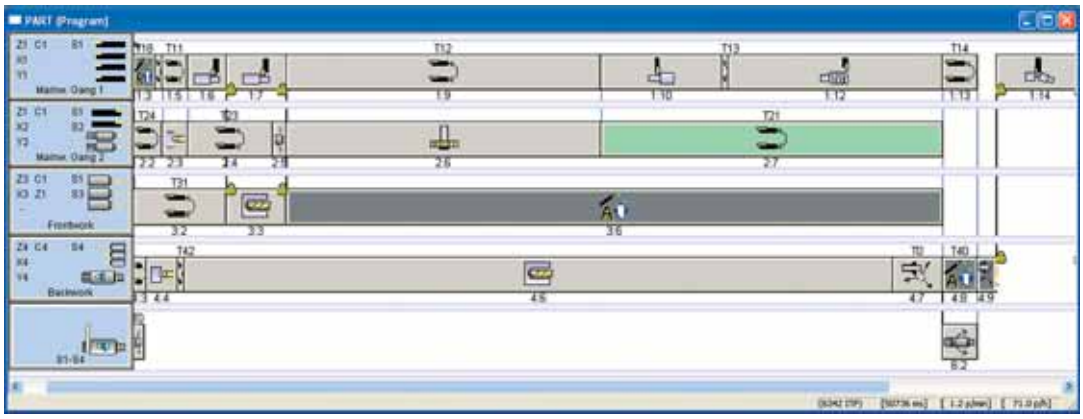
Depending on organisation of your company, you may only require two privilege levels. On request, Tornos can change the proposal to have different access rights to different elements of the TB-DECO software.




Editing tools: Levels 1, 2 and 3

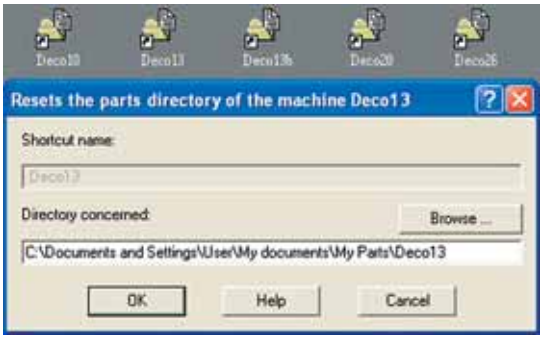



Editing global variables and ISO code: Levels 2 and 3

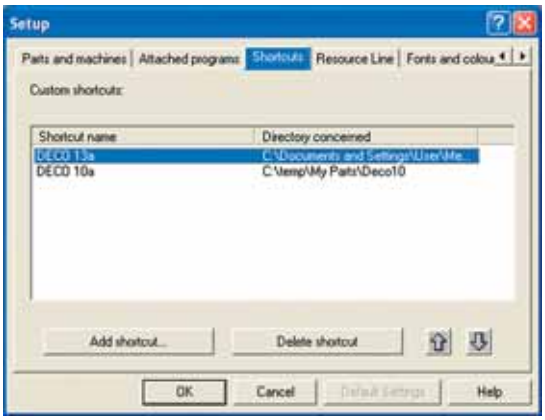



Editing structure of program: Level 3

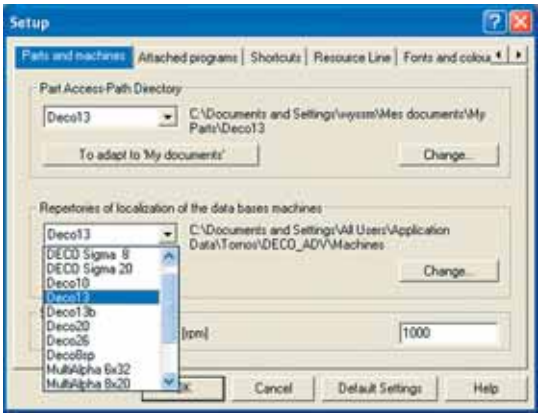
**Configure location of your machine directories and component programs**




The TB-DECO ADV 2007 software not only offers the option of modifying the location of a directory of component programs, but also the machine directory of databases. This enables the component programs to be centralized, for example the machine data bases can be stored on the company network.




The location of the machine databases can be modified from the configuration window (Option > Configuration…).




By “right-clicking“ twice you can modify the short cut of each directory of component programs. Modifying these short cuts can also be done from the configuration window (Option > Configuration…).

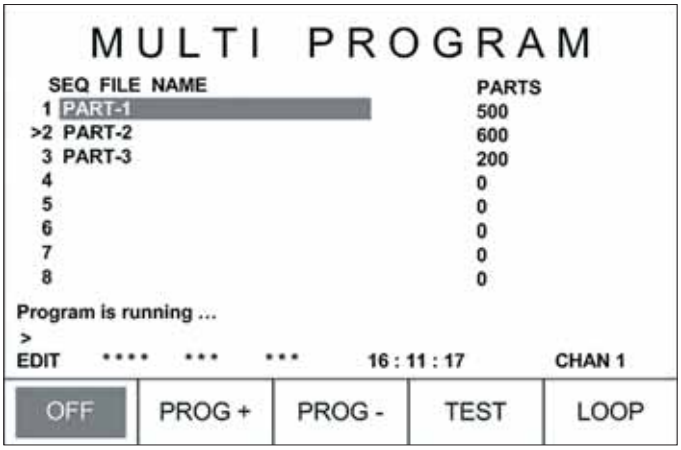

For component programs, new short cuts can be added to open other directories of component programs. The additional short cuts are displayed in blue.

# MULTI PROGRAMS

**A production changeover in one minute? Now you can!**

A new CNC option on DECO [a-line] machines enables you to define up to 8 component programs to be launched automatically in succession. The benefit: considerable time saving during the program transition from one workpiece to another. The machine no longer goes into standby mode until an operator transfers a new program and puts the machine into production mode.

The Multi Programs function also enables the production of different parts during the night, unsupervised. In this way, it is an excellent way of boosting your productivity.




**Applications**

This function meets the ever-increasing demand for small part runs. It is however limited to one family of parts that do not require a change of tooling (tools, grippers…) or material.

**Availability**

The "Multi Programs" option sold is available on all DECO [a-line] units with the exception of the first generation of DECO 7 and DECO 10. These machines can be identified by the fact they have no memory card reader on the CNC program transfer by RS232 only.

**The "Multi Programs" function (option 7056) requires:**

- An Ethernet connection. The component programs must be installed on the company network. The Ethernet connection is present on all DECO machines manufactured since 2004. Update option 521629 is available for DECOs without the Ethernet connection.
- The shared tool catalogue function is only available on TB-DECO ADV (option 750-0005 + 750-0710). Versions prior to 2007 are not compatible with the Multi Program function.

# ENVIRONMENTALLY FRIENDLY CLEANING

## WATER OR A3 SOLVENT BASED CLEANING AFTER LAPPING PROCESSES?

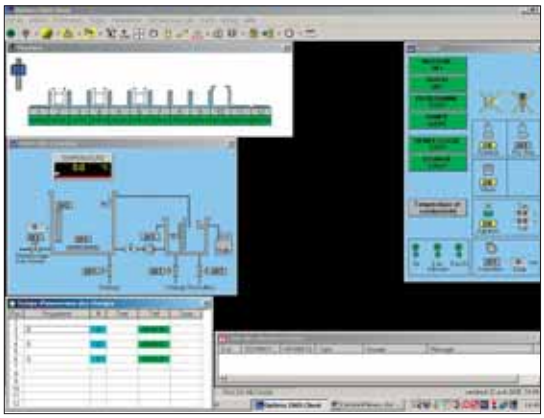
**Cleaning after lapping presents various problems. Polar as well as nonpolar soilings need to be removed. For this, a technology is applied that combines high cleaning quality with environmental protection.**

The cleaning of surfaces has become an important part of the manufacturing process. Generally, non-chlorinated, organic solvents are used to remove nonpolar soilings (e.g. mineral oils) whilst water-based detergents are suitable for removing polar soilings (e.g. salts). For this purpose, Amsonic offers two technologies: the automated cleaning systems CleanLine and EgaClean.


### The cleaning of steel parts after lapping processes

Polar soilings, e.g. salts, are preferably removed with water-based detergents. These salts are residues from water-based cooling emulsions that are used during the mechanical processing. As the proportion of oil remaining on the parts after the lapping process is minimal the utilised water-based detergent is not soiled too heavily. A large proportion of oil would influence the cleaning process and require the application of e.g. oil separators.

Particle soiling is a critical factor in connection with new generation diesel injection nozzles as they feature very small boreholes. It is crucial to completely remove these particles. The cleaning concept applied for this purpose includes an ultrasonic immersion

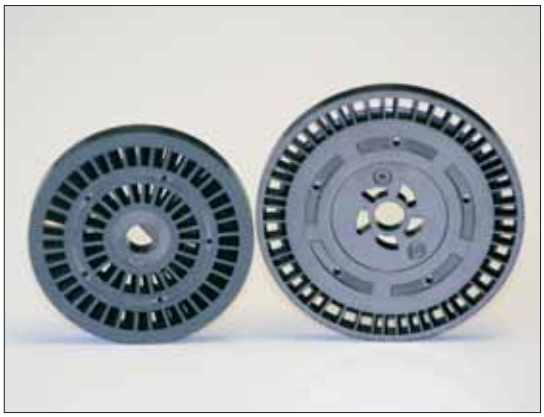


cleaning process using a water-based detergent that is especially adapted to the respective material and soiling.

**The cleaning procedure consists of the following process steps:**

| | |
|---|---|
| • Ultrasonic cleaning | 3 min. |
| • Ultrasonic cleaning | 3 min. |
| • Rinsing | 3 min. |
| • Rinsing with DI water | 3 min. |
| • Passivation | 3 min. |
| • Hot air drying | 5 min. |
| • Vacuum drying | 3 min. |

The fully automated cleaning system is controlled via PC.

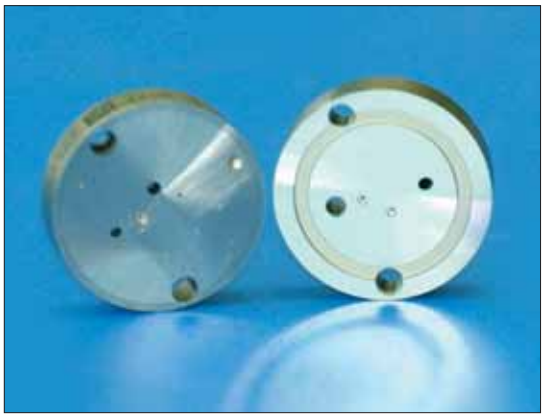


Parts made of thermosetting plastic (polymer).

**Amsonic cleaning system CleanLine**

The machine processes 12 cleaning baskets per hour. This particular application uses Amsonic's WetEx vacuum drying process which was developed in collaboration with the Fraunhofer Institute in Brunswick (Germany). It guarantees a perfect, stainless drying even in tapped blind holes. For each charge, the control software automatically produces a data sheet to confirm the adherence to the cleaning process and parameters, thus allowing information on process steps, functions (e.g. ultrasonics, basket rotation etc.) and the DI water quality to be saved and printed.

We will be publishing detailed information in the next edition of decomagazine, so be sure not to miss it!



Diesel injection nozzle elements (steel).

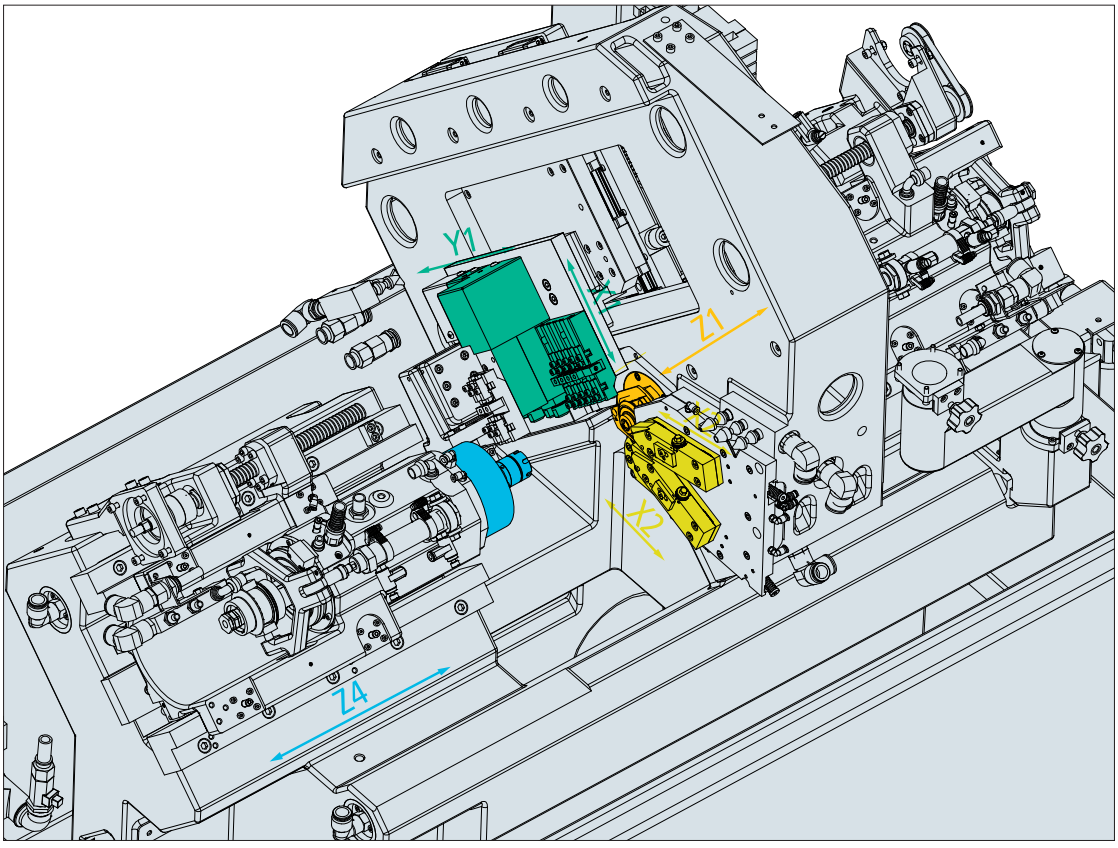
# 6 SIGMAS, SIGMA 8, MICRO 7 AND MICRO 8...

**The figures...**

In statistical terms, 6 Sigma is the abbreviation for 6 standard deviations mathematically related to approximately 2 defective parts per million produced.

In machine tool terms, the Sigma 8 is a sliding headstock automatic turning machine presented by Tornos at EMO 2005 and operating without a guide bush – a machine and brand synonymous with ultra-high precision! Indeed, one of the characteristics of this turning machine is its ability to reach micron levels of geometric and dimensional precision.

**During EMO 2007, The Swiss manufacturer is unveiling Micro 7; another small machine designed for high precision and gives a new name to the Sigma 8: Micro 8.**




Micro 7 kinematics, based on the success story of Sigma 8.



To find out more, decomagazine met Serge Villard, product manager for this turning machine and also the man responsible for the Micro 8 turning machine.

**decomagazine: Mr. Villard, you have changed the name of Sigma 8 to create a new range with the Micro name, why?**

**Serge Villard:** The Tornos Sigma range is designed for the manufacture of parts of medium-complexity in terms of machining operations. This new machine belongs to this category by virtue of certain characteristics: Its straightforward design, its 2 tooling systems for working at the bar and at the rear of workpieces with a counter spindle with 5 linear axes. However, this new machine, as was already the case with Micro 8, offers many more benefits, which puts the Tornos range in a different class.

**dm: Is it also a fixed headstock turning machine?**

**SV:** Neither Micro 7 nor Micro 8 (ex-Sigma 8) is fixed headstock turning machines even if Micro 8 resembles a fixed headstock turning machine. Again, the Micro 8 is a sliding headstock turning machine that operates without a guide bush. As for the Micro 7, this is the standard sliding headstock turning machine operating with guide bush.

Our customers look for flexibility, but also efficiency and performance. Performance levels would be affected if either a fixed headstock turning machine or a sliding headstock turning machine without a guide bush was used to turn a lengthy bar. It's for this reason that the principle of the sliding headstock was invented and is applied on the Micro 7. A Micro 8 type turning machine, if part morphology allows, offers alternate benefits. The main benefits are the very high levels of precision and the option of using bars of inferior quality material, which is a considerable advantage in many cases. It is, however, designed for machining short parts. Bar turners have realised this and I am confident that many of our customers will have these two types of turning machines in production side by side in their workshop.

**dm: You mentioned Micro 8. Does the new machine have anything in common with it?**

**SV:** Yes. The kinematics are the same successful design as on the Micro 8 with a tooling system fitted on an X1/Y1 cross table with 2 precision tools controlled by an independent digital axis (X2). The big

difference is the work done by the guide bush and by the right-hand bar feeding system, akin to our DECO machines.

**dm: Can you run simultaneous operations with these kinematics?**

**SV:** Yes, we can run parallel machining in operation and counter operation mode and we can also carry out simultaneous "rough-finish" turning operations thanks to the two independent tool systems.

**dm: I believe that another strength of the Micro 8 is the flexibility of the tool modules. This turning machine provides the option of fitting several tool holders for diverse tooling requirements. What about Micro 7?**

**SV:** This modular design is also featured on the Micro 7. That's right. This modular design principle, which is a feature of Tornos machines, is a real benefit for our customers and we are going to keep it that way.

**dm: If I own a Micro 8 machine, am I a potential user of a Micro 7 or are you aiming at a new market?**

**SV:** Micro 8 is currently enjoying a lot of success, mainly in the watchmaking industry, but also in the electronics sector and this is growing in the medical sector. As far as Micro 7 is concerned, we have concentrated our market research on two industries which are not only well established in our region but also internationally. And these are the watchmaking industry with its requirements for parts of a very high degree of finishing and the electronics sector, mainly for connector parts. For the latter, requirements generally concern rapid start-up and the productivity of the turning machine. These two areas of activity both require flexible, efficient and cost-effective solutions and we believe the Sigma turning machine meets these criteria.

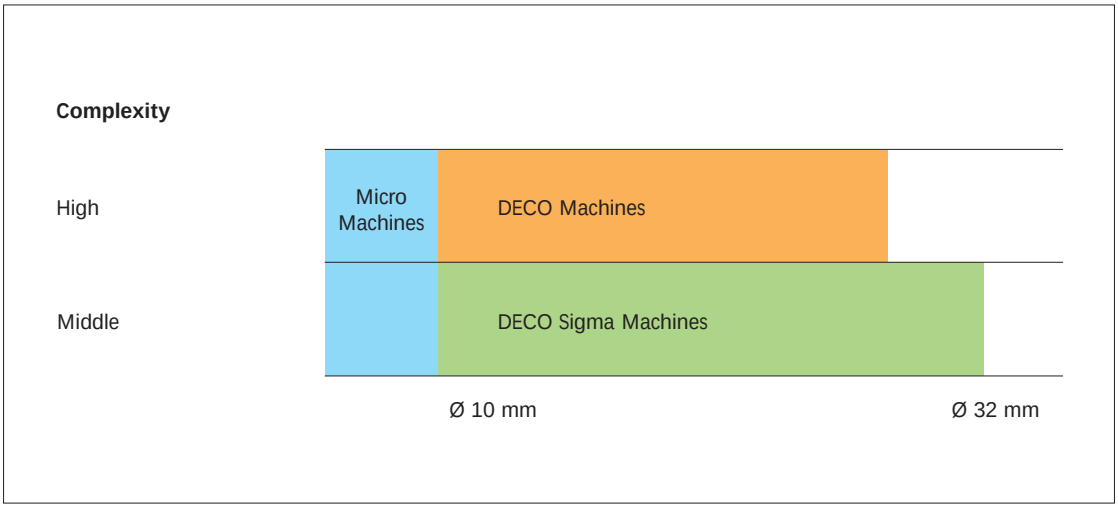
**dm: Can you tell us more about the programming?**

**SV:** Once again, this is a very easy-to-use turning machine. This way, the ISO programming will suit the majority of users. For those used to using the TB-DECO software, I think they will prefer using this software.

**dm: In your opinion, what are the advantages of this turning machine that "give it the edge" over the other machines on the market?**

**SV:** Tornos is leader in building turning machines for the manufacture of parts of small diameters and has been for over 100 years. Inevitably, we have an unrivalled level of expertise and the Micro 7 is a result of this. To employ a few key words, I would say: precision, machining stability, productivity, user friendliness, modular design and reduced floor space.

We are light years away from the cam-operated turning machine with this new technology. Did you know that many of our customers have begun to replace their cam-operated turning machines with the Micro 8. This trend will only increase with the arrival of the Micro 7.




Rationalized product range.


With its Micro range, Tornos is according the MS-7 a richly deserved retirement, joining the pantheon of great human inventions.
Its legacy is in safe hands!

**dm: Can you tell us more?**

**SV:** These are turning machines that are user-friendly and easy to set, that have unrivalled machining stability even at very high spindle speeds and this does not require onerous investment. By virtue of the reduced dimensions it can be perfectly integrated into our customers' workshops. Why would anyone want to invest in repairing a cam-operated turning machine if modern technology gives you all these benefits? What about the young professionals who want to exercise this fine trade with modern tools?

**dm: When will the first machines be available for delivery?**

**SV:** We are presenting a concept machine at EMO. This machine will already be at an advanced stage and will be very similar to the series-produced machines. The cowling, for example, will not be the final version but visitors will be able to see a turning machine manufacture parts and that is the key attraction. We plan to have the first machines available for the 2nd quarter of 2008. The official launch will take place during the first quarter of next year.

**dm: Can you tell us more about the price?**

**SV:** It is too early to be talking about the price of the machine. We will announce it later in the year but we do know that our sales network is really looking forward to taking the first orders. All I can say is that it will match the performance of the turning machine, in other words, competitive.

**Conclusion**

With this new turning machine Tornos is adding to its small diameter line, making its position on the traditional markets even stronger and offering its customers even more competitive solutions to meet the challenges they are facing.

**More statistics...**

**6 Sigmas**

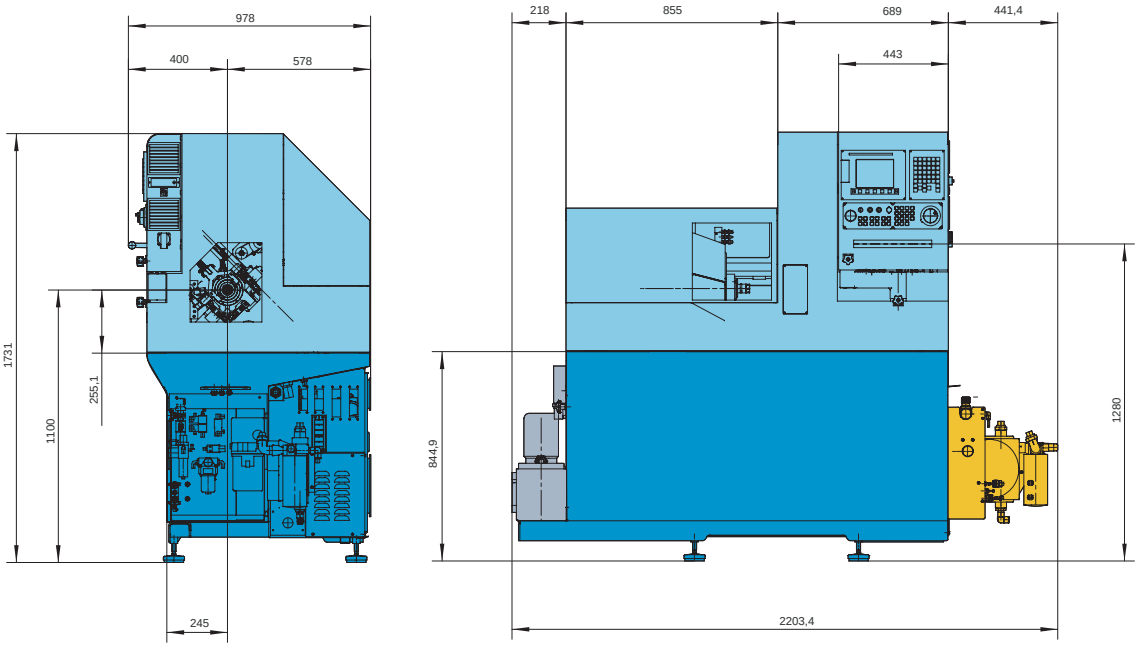
The performance of a process can be summed up by its ability to reach an objective and to do it regularly.

**Sigma 8, Micro 8**

It is exactly the same principle for a machine. This is then converted into sales statistics and customer satisfaction. The Micro 8 is demonstrating strong growth in the market and many customers now have extensive machines installations (over 42 machines).

**Micro 7**

With Micro 7, the statistics are as yet unknown; the future will tell us how the market reacts. Mr. Villard is confident and is sure the Tornos engineers will provide a solution that suits market requirements perfectly. You can be sure decomagazine will be covering it early next year.




# μicro 7

| Main Characteristics |
|---|
| Max bar capacity: 7 mm |
| Max length of workpiece: 60 mm |
| Max spindle speed: 20,000 rpm |
| Max no. of tools: 20 |
| Max no. of powered tools: 3 transv or 2 transv + 1 axial |
| CNC Fanuc series 32i – ISO / TB DECO programming |
| Powered spindle technology for spindle and counter spindle |
| Thermal stabilization |

| Main selling points |
|---|
| High level of machining stability (+/- 2 microns) |
| High productivity |
| Modular design |
| Ease of use |
| Excellent price-performance ratio |
| Reduced dimensions |

# SIGMA 32 – A WORLD PREMIÈRE AT EMO

**How to utilise high power and rigidity for workpieces up to 32 mm in diameter!**


Despite its close family resemblance to Sigma 20, Sigma 32 is still innovating in several areas.

**Great, a new machine…**

At EMO in Hanover, Tornos will be displaying the Sigma 32 sliding headstock single spindle turning machine designed for machining bars up to 32 mm in diameter.

This turning machine uses the successful kinematics of the DECO Sigma 20 and offers all the benefits for larger diameter ranges. The kinematics are made up of two totally independent and identical tool systems that therefore enable the production of workpieces of the same complexity in operation and counter operation. Several tool holders and accessories are available and are interchangeable both in operation and counter operation. In total, Sigma 32 benefits from 22 tool positions. This in no way makes setting up any more complex, the pre-adjustable tool systems feature rapid changeover, the widely accessible machining zone renders this operation very user-friendly.

As far as programming is concerned, the Swiss manufacturer offers the customer total freedom. Either programming is done in standard ISO code, or in TB-DECO for TB-DECO fans!

**But what can it do?**

Sigma 32 has been designed with "rigidity" in mind. In particular, the generously proportioned FEM-verified cast iron housing, ensures an immovable base and perfect support for spindles of a respectable dimension. Sigma 32 has clearly been designed for demanding operations, including difficult materials. The machining zone and its lubrication system allows for optimum swarf removal, even when removing large amounts of material generates large quantities of swarf.

Sigma 32 will be available for delivery by the end of 2007.

**Technical specifications**

- Bar capacity: 32 mm.
- Spindle and counter spindle max speed: 8000 rpm.
- Spindle and counter-spindle power: 3.7/5.5 kW.
- Tool position: 22.
- Tool cross-section: 16 x 16.
- Max rotating tools: 16.
- Number of linear axes: 6.

# WORKING WITHOUT A GUIDE BUSH
## THE GUIDE BUSH: A NECESSARY EVIL?

*Kurt Schnider*

**I grew up surrounded by cam-operated turning machines and for several generations of professionals of which I am one, the guide bush is an essential part that contributes to the precision of a bar-turning machine. But with Micro 8 (Sigma 8), Tornos is claiming an "incredible" level of precision of +/-1micron which has never been seen before in bar turning… and all without the use of a guide bush. So is the guide bush set to be a thing of the past? With 87 Micro 8 (Sigma 8) machines installed or sold or in the process of being installed, the Swiss market seems to be telling us that it is really a myth. To find out more, decomagazine talked to Mr. Kurt Schnider, head of sales in Switzerland at Tornos.**

**dm: Mr. Schnider, you are a fervent supporter of Micro 8, but you, like others with a similar experience, have for a long time believed that the guide bush was a key element of precision. Could you tell us why?**

**KS:** I know cam-type machines very well and I have seen our trade change, right up to the most recent developments in the field of digital control. To begin with, I would not say that the guide bush is a non-essential accessory, it is actually essential depending on the type of workpieces to be turned. For long workpieces, it's a must. But for short workpieces, it's another story. And here, we have to go back in time a little. Sometimes you have to go back to the origins of legend to grasp the ins and outs of the question.

**dm: Are you saying that the "essential guide bush" is a legend?**

**KS:** Let me finish… as is often the case, there is no smoke without fire. If we look at cam-type machine technology at the time, we must not forget that machines required "operational float" – i.e. clearances – whether on the slides or the spindles, there were "free hundredths of a mm" and the fixed guide bush compensated for this by guiding the bar as near as possible to the machining point.

**dm: But at that time, you could also work without guide bush, couldn't you?**

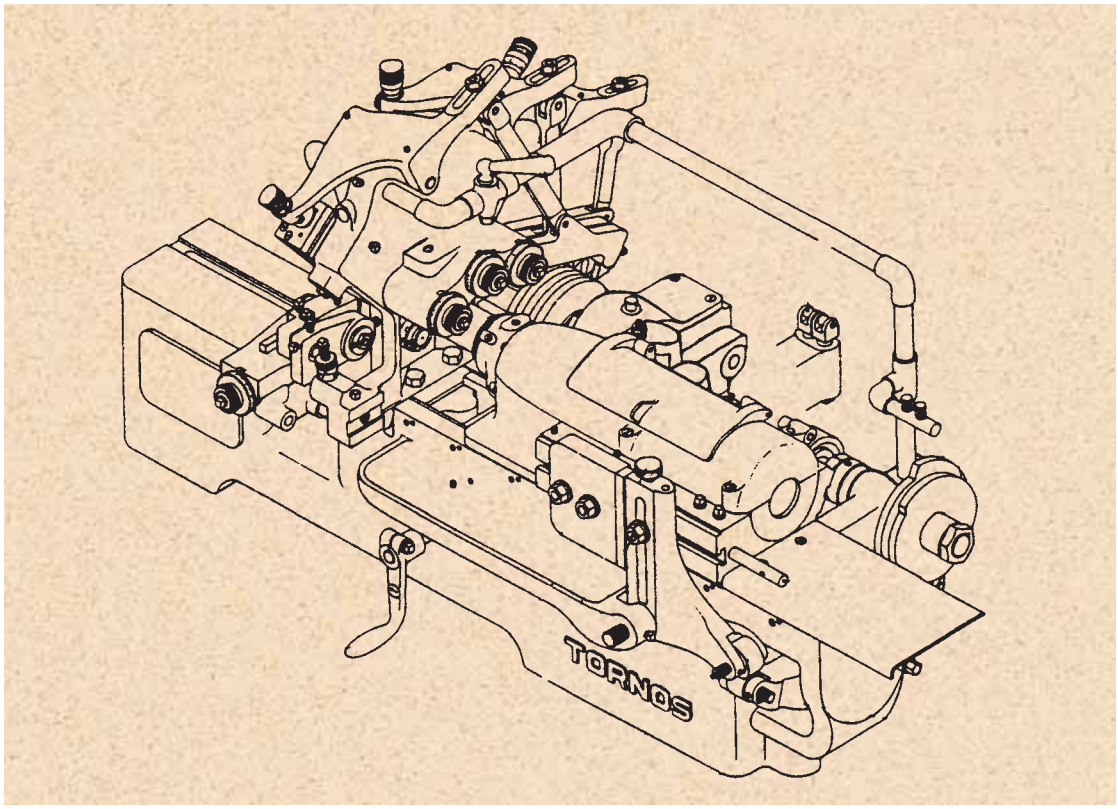
**KS:** Absolutely. At that time, if we needed to work on profiled material for example, we preferred working without a guide bush and there was no rotating guide bush rigid enough, and working with a collet inevitably meant working with a special collet. Whatever the solution, it compromised quality levels and the finish achieved on workpieces.

**dm: So people that remember working without a guide bush with a sliding headstock would judge it as synonymous with poor quality… and now you are trying to break the myth…**

**KS:** With Micro 8, we're in a totally different context, you can't compare today's technology with what we used to do then. Everything is now designed without float/clearance, has very generous dimensions and is temperature-stabilized. The cast iron base and monobloc housing deliver very high rigidity and strength. The parameters are very different. For the spindle, we use powered spindles that don't have belts like on the old machines and which used to cause vibrations… it's really a whole new world.

**dm: Does this also affect the tool life?**

**KS:** Absolutely, everything is different on this machine, there is excellent control over bar guidance which clearly improves tool life that also means increased operation time between two sharpenings. Not only do we assure +/- 1 micron in production, but for longer too! Naturally this has an influence on the SPC of the machined parts but also enhances user comfort. The operators are delighted to work on such modern production equipment.




Machining zone of the MS-7, overloaded with the operational clearances deemed indispensable in its day.

**dm: Does this machine lend itself to any markets in particular?**

**KS:** No! In fact the machine works wonders anywhere where there are short workpieces… of course a lot of customers are from the watchmaking industry, but the machine produces parts from the medical, electronic and automotive sectors… the machine is not restricted to any area of activity!

**dm: I'm not easily convinced, I "know" that for the last 20 years, working without guide bush is a "spare wheel" for emergencies. How are you going to persuade me that I'm going to win a Grand Prix with this wheel?**

**KS:** I will show you the test results, the geometric protocols and prove that precision is not all talk but a genuine reality.

**dm: If I am to purchase such a machine, I'm going to have to change my whole way of thinking… but do I also have to learn a lot of "specialities"?**

**KS:** You're on familiar ground with the Micro 8, 8x8 tool sections (12x12 is also possible), ISO programming as standard or TB-DECO on option. Maybe the hardest part will be to convince those with a great deal of experience that this experience can pave the way to a new direction for them and that working without guide bush is not any kind of punishment.

**dm: What about ergonomics and working conditions?**

**KS:** We're on familiar ground, the same tools are used and are pre-adjustable, much of the equipment is interchangeable and this kind of flexibility has never been seen before on a cam-operated machine. Micro 8 also offers the option of producing more complex parts that required special machines, for example for milling threads or producing "rectification quality" finishes.

**dm: I've heard that we can also come and see the machine as it is being assembled…**

**KS:** Yes, you can… and you will have the opportunity to see that precision also comes from rigidity and the "internal" design concept of the machine.

**dm: Is this visit available for everyone?**

**KS:** I can't speak for the other sales managers, but the possibility is there and I am sure that it is not just reserved for Swiss customers.

**dm: You seem convinced by this technology, but Tornos also and primarily manufactures turning machines using guide bushes.**

**KS:** Absolutely! The "without guide bush" technology is ideal for making relatively short parts up to approx. 3 x the diameter. For longer workpieces, the constraints imposed on the bar material call for the guide bush that enables the workpiece to be machined ever closer to the guide bush in order to avoid any buckling problems for example.

We will be presenting the Micro 7 machine at the EMO (editor's note: see article on page 60). This is a standard sliding headstock machine and features a guide bush. In fact, it creates a good fit with Micro 8 because depending on the type of workpiece, the customer will have the option of producing it on "the best alternative". Many manufacturers are calling for solutions tailored to suit short workpieces (Micro 8). For their longer workpieces, they are waiting for the Micro 7 machine.

**dm: And what about the DECO machines?**

**KS:** You're right, in this diameter category our customer also has the option of choosing a DECO 10a machine. Once again, its the geometry and required machining processes that will influence the decision. We are very pleased to be able to provide three complementary products that help us strengthen our position as the market leader in bar turning workpieces with small diameters.

**The essential guide bush, "myth or reality"?**

It really is a non-starter, according to Mr. Schnider, the type of workpiece has an influence on the choice of technology, but is clear to see that working without guide bush is an ideal solution depending on the parts to be manufactured… and that the precision levels are guaranteed! As far as I am concerned, at least I haven't been deliberately lied to all these years, but… I've had to question my own beliefs!

## μicro 8

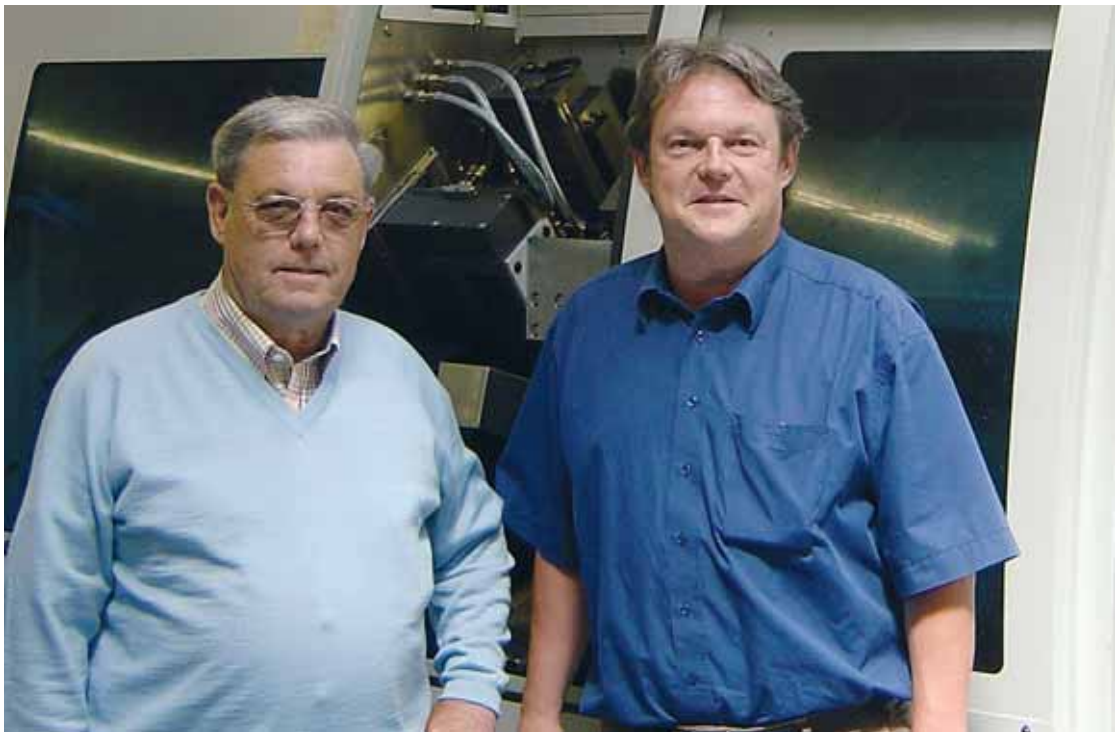
| Technical characteristics | |
|---|---|
| Main areas application | Electronics, watch industry, automotive, medical |
| Max. bar diameter | 8 mm (10 with bar preparation) |
| Part length | 17,5 mm |
| Work without guide bush | Yes |
| Number of axes (+c) | 5 (+2) |
| Number of tools | 19 (21) |
| Number of back-operation tools | Up to 6 |
| Number of tools working simultaneously | 3 max. |
| Max. speed | 15,000 rpm |
| Power of spindle/counter-spindle | 2,2 (3,7) kW |
| Turning tools | Up to 4 |

On the manufacturer's website customers have access to information on the Micro 8, in particular on precision.

www.tornos.com/download

# FULL CONCENTRATION ON HIGH-TECH

**While the birthplace of Kugel Präzisions-Drehteile GmbH, the company founded in Wiernsheim, Germany by Richard Kugel may have been in his parent's house, it has over the years grown into one of the most modern businesses of its kind in Europe and now sets the standards the international competition has to fol-low. The success story of this company is closely associated with Tornos, the Swiss turning machine manufacturer. On the basis of partnership and collabora-tion, production strategies are developed to enable Kugel to supply all the lead-ing automotive suppliers throughout the world.**



Among the most loyal of Tornos customers: Richard (left) and Jochen Kugel from Kugel Drehteile GmbH, Wiernsheim.

"A turned component manufacturer can only survive in Germany if he commits firmly to high-tech and highly complex parts in an almost entirely automated manner", states Chief Executive Jochen Kugel, accurately capturing the philosophy of this company. This is an area where he and his father, company founder Richard Kugel, are in total agreement. Back in 1962, then working as a salaried employee in a watchmaking factory, earning DM 150 a week, his father founded the company in his parent's home. He borrowed DM 40,000 with which he purchased two turning machines. He used these to supply a turning shop with parts for the watchmaking industry. The early days are always tough, as Richard Kugel found out for himself, but with hard work, ability and good fortune, his initial successes did not take long to arrive. He was always on the lookout for new machines and improvements in the production process. The only real headache in the early years was over the issue of obtaining sufficient financial backing. A few of the large and established manufacturers proved very resistant, reticent and relatively risk-averse. This was not true of Tornos-Bechler, who believed in the capability and entrepreneurial flair of Richard Kugel and sold him his first machines with extended, favourable credit terms. This laid the foun-


Kugel Drehteile GmbH is now one of the most modern turning shops in Europe and it supplies virtually all the major automotive OEMs and their suppliers.

dations of a genuine partnership which can now look back over a 40-year relationship. Richard Kugel invested in leading-edge technology right from the outset. At the 1974 Industriemesse in Basle, he saw the first Tornos automatic turning machines with loading magazine, and purchased ten of these before leaving the trade fair. In one fell swoop, this investment doubled his production capacity and competitiveness, and also enabled him to set his course to further growth.

### Swapping blue overalls for a suit and tie

In 1984, when his son and now the current chief executive, Jochen Kugel joined the company, the business entered a new era. Prior to this, Jochen worked in the applications technology sector with Traub, the turning machine manufacturer, where he gained experience in the organization of a larger company and where he became familiar with all the production processes. With the consent of his father, he brought this all to bear on his parent's company and remained consistently true to the motto of "investment in the future".

Today, the company has more than 70 machines, including 25 CNC units, of which six are CNC multi-spindle machines. Almost all of these units are Tornos machines because Jochen Kugel is a great believer in the need for precision, performance, cost-effectiveness and availability. Richard and Jochen even have nothing but praise for the service support from Tornos, something that has often attracted criticism from other parties in the past. "We are more than satisfied with the support provided from the Pforzheim site: whenever a service event occurs, we invariably receive immediate attention. Given our massive volumes and tight delivery lead times, it is of course absolutely indispensable for us to receive such swift support".

Kugel has now built up a customer base almost exclusively within the automotive sector and its suppliers, an industry where very demanding quality standards are the name of the game. On the one hand, components are becoming ever more complex because a growing number of functions need to be integrated in ever smaller parts. At the same time, machining costs are required to reduce, with suppli-

ers also being required to show ever greater flexibility in terms of component modifications. This intricate balancing act is one, which a dwindling number of turned parts manufacturers is able to accomplish. Jochen Kugel is therefore less concerned about the physical size of his company, placing greater emphasis on its inherent expertise, innovation and efficiency. This is the basis underpinning purchasing decisions about which machines to use.

**Progress and further development through the use of ultramodern machines**

Considering a current project involving the automotive industry, the company recently invested in four MULTIDECO CNC multispindle automatic turning machines. These include an integrated robot cell capable of machining complete transmission components in a single fixture setting. This dispensed with the need for subsequent machining on a single-spindle machine, thereby eliminating the losses in time and precision and the attendant risk of damage during the changeover.

Through the use of CNC multispindle automatic turning machines from the MULTIDECO range, it has been possible to achieve significant reductions in production times. The machines are equipped with motorspindles to deliver optimum cutting speeds in every working position. It also enables spindles to be oriented and stopped in a very precise manner. Tornos employed this technology for the first time on a MULTIDECO 20/8d. The motorspindle on the MULTIDECO 20/8d delivers levels of performance superior to those of conventional motors. The integrated drive concept makes this machine substantially faster and more flexible. This also enables maximum use to be made of all market-standard tools.

The increasingly stringent requirements for turned parts frequently have an impact on machining of the reverse side of a component. With this in mind, Kugel works with two counter-spindles as standard

Richard Kugel (right) greatly appreciates the skill and committed support he receives from Sven Martin, Product Manager for multispindle automatic turning machines at Tornos Technologies Deutschland GmbH, Pforzheim.


Jochen Kugel, Chief Executive of Kugel Drehteile GmbH is committed to un-compromising standards of quality. For this reason, the company is certified and compliant with all applicable current standards and has also passed the Environment Audit defined in DIN EN ISO 14001.

on the MULTIDECO 20/8b 2x4, each mounted on a separate axis. These grip the components as they leave the previous process and then machine their reverse sides. For turning, drilling, milling and similar operations, each unit has a separate 2-part set of tools that can be used on either the X and/or the Z axis. This twin-track solution has yet another benefit, as Jochen Kugel explains: On less complex workpieces, ones for which four stations are sufficient, the two gripper spindles can enable two workpieces to be machined simultaneously, thus doubling production output (2x4 machining).

Another special feature of these machines is the integrated robot cell manufactured by Handling Tech and employing robots from Fanuc. The complex geometry of these transmission components makes them very prone to surface damage, but customers demand totally undamaged parts. This is why Jochen Kugel pursues a zero-defect strategy in his production operations. This approach not only requires reliable, precise machines but also calls for corresponding standards of component handling and stringent quality inspections. A small Fanuc robot takes finished parts from the spindle on Tornos CNC multi-spindle units with integrated robot cell and places each one in a shaped receptacle. This then proceeds automatically to the washing machine. The measuring machine takes charge of the parts. Here, an internal check is performed using compressed air, accompanied by a visual check of the bore. The length and other relevant dimensions are also checked before another robot packs verified "good" parts in customer-specific containers.

### Easy to program and extremely reliable

Despite the complex capabilities of the MultiAlpha (and MULTIDECO), programming remains the familiar, easy process. This task is performed using the TB-DECO programming system with its graphic user interface. For Jochen Kugel, the DECO system is an important plus point: We manage superbly with this programming system, employed externally on just one PC. It even enables us to program complex operations very rapidly. All of the time-consuming computation work is performed on the PC, relieving the workload for the CNC unit and delivering very positive benefits in terms of machining speeds. Another advantage is the transparency of control units and the programming system. For programming purposes, you have a single, uniform system with a dialogue-based user interface which also permits DIN ISO-compliant programming. For Jochen Kugel, this is ideal: No matter whether we are working with

In the clean and generously proportioned factory building, Tornos CNC multi-spindle and CNC single-spindle units stand in series and operate reliably round the clock.

Tornos CNC multi-spindle automatic turning machine with integrated robot cell manufactured by Handling Tech.

single spindle or multi-spindle units, we do not need to make any changes when programming. In recounting the benefits, Jochen mentioned reliability as well as ease of programming, both of which characterize the Tornos machines. "Our machines run round the clock, producing components with diameters of between 2 and 32 mm, with unit volumes into the millions. In the process, we are able to achieve dimensional integrity accurate to ± 1/100 millimetres, and to maintain that standard of precision throughout an entire series. Another key factor for our company is that malfunctions are an exceptionally rare occurrence".

Richard and Jochen Kugel both view the expertise and commitment of their employees as another key ingredient in the success of their business. This is something they really are prepared to invest in. Year on year, young people are trained at Kugel and groomed for their future careers. Most employees have been with the company for several years and, in contrast to other companies, the level of staff turnover is very low. Something about which Richard Kugel is proud: "From personal experience, I know just how important it is to receive a good education". The company has successfully raised itself above the pack by virtue of its expertise, even with highly complex components, and has made itself a name for high-quality products. Kugel has risen to the challenge of meeting market requirements and is always prepared to meet new challenges. Quality and environmental protection are always at the heart of everything the company does and delivers. Accordingly, Kugel has obtained certification of its quality management system in accordance with DIN ISO 9001:2000 and TS 16949 and, every since 2005, has operated an integrated environmental management system acc. to DIN EN 14001:2005.

Kugel Präzisions-Drehteile GmbH
Daimlerstrasse 3
75446 Wiernsheim
Tel.: +49 7044/92 50 0
Fax: +49 7044 92 50 30
e-mail j.kugel@kugel-gmbh.de
www.kugel-gmbh.de

Tornos Technologies Deutschland GmbH
Karlsruher Strasse 38
75179 Pforzheim
Tel.: +49 7231/91 07 - 0)
Fax: (07231/91 07 – 50)
e-mail: mail@tornos.de
www. tornos.ch