

DECO MAGAZINE

20

1/02

FEBRUARY

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A tip for the
MULTIDECO!

Système
de motorisation
auxiliaire S6

ROBOBAR SBF-532,
eine radikal neue
Konzeption

HSK-C32, i suoi
vantaggi e la sua
tecnica

Och här är
fjärde
generationen...

MOTOREX –
A su servicio



IMPRESSUM DECO-MAGAZINE 20 1/02

Circulation: 12 000 copies

Industrial magazine dedicated
to turned parts:

TORNOS SA
Rue Industrielle 111
CH-2740 Moutier, Switzerland
Internet: www.tornos.ch
E-mail: contact@tornos.ch
Phone +41 (32) 494 44 44
Fax +41 (32) 494 49 07

Editing Manager:
Pierre-Yves Kohler
Communication Manager

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

Printer:
Roos SA, CH-2746 Crémines
Phone +41 (32) 499 99 65

**DECO-MAG is available in
three versions:**

- English / French / German / Italian
- English / French / German / Swedish
- English / French / German / Spanish

E	Mark Saalmuller	3
	A tip for the MULTIDECO!	4
	A tip for the DECO!	6
	HSK-C32, its benefits and technique	8
	Auxiliary motorization system S6	13
	ROBOBAR SBF-532, a radically new design!	15
	Focus on MOTOREX: TITANIUM – a fascinating but extremely demanding material	16
	DECO technical open days	19
	Virtuosity is in your hands...	20
	And here is the fourth generation...	24
	MULTIDECO 20/8b	26

F	Jean-Michel Donnio	27
	Une astuce pour MULTIDECO!	28
	Astuces pour DECO!	30
	HSK-C32, ses avantages et sa technique	32
	Système de motorisation auxiliaire S6	37
	Virtuosity is in your hands...	39
	Denis Perrolaz: la performance avant tout	43
	Journées techniques DECO	47
	ROBOBAR SBF-532, une conception radicalement nouvelle!	48
	Et voici la quatrième génération...	50
	MOTOREX-Focus: le TITANE – une matière première fascinante qui implique de hautes exigences...	52
	MULTIDECO 20/8b	54

D	Michael Czudaj	55
	Ein Trick für die MULTIDECO!	56
	Tricke und Kniffe DECO!	58
	Modernste Werkzeugsysteme von UTILIS AG	60
	Antriebshilf-system S6	65
	ROBOBAR SBF-532, eine radikal neue Konzeption	66
	Virtuosity is in your hands...	69
	MULTIDECO 20/8b	73
	Und nun die vierte Generation...	74
	MOTOREX-Focus: TITAN – Ein faszinierender Werkstoff mit hohen Ansprüchen	76
	DECO Technik Tage	78

I	Carlos Cancer	79
	Un'astuzia per il MULTIDECO!	80
	Astuzia per DECO!	82
	HSK-C32, i suoi vantaggi e la sua tecnica	84
	MULTIDECO 20/8b	88
	ROBOBAR SBF-532, una concezione radicalmente nuova!	89
	MOTOREX-Focus: Il TITANIO – una materia prima affascinante che implica esigenze elevate...	90
	Sistema di motorizzazione ausiliare S6	92
	Virtuosity is in your hands...	93
	Ed ecco la quarta generazione...	96
	Giornate tecniche DECO	98

2002:

Get in "fighting" shape for better times ahead.

DECO MAGAZINE
Editorial
Forum
Interview
News
Presentation
Technical
The present

Editorial

Last January, 2001, the economy pundits were hopeful for a good year. Evidently they didn't have quality crystal balls on their desks. Their predictions were wrong. But, let's go easy on them. After all it's not the first time that hindsight has been clearer than foresight. What we see when we look back on 2001 is a number of businesses down. The connector and electronic sectors were particularly hard hit, which are markets many of our customers serve. The economy in general was unstable as we went into the third quarter, and then crushing a lukewarm economy were the horrendous events of September 11th which shell-shocked all of us. The wrenching grief, the horrendous trauma is still fresh in our collective psyche.

That's the grim picture. Now let's brighten up the scene a bit. While certain industries were knocked down in 2001, others actually thrived and have continued to expand in 2002. Medical manufacturing has remained strong. Demand for bone screws, dental implants and other medical components continues to grow. With all of the rebates and incentives, the automotive companies have sold a tremendous amount of inventory, and now need to replenish. Even the electronic industry, which took a large hit last year, is being cautiously optimistic that 2002 will be better. Their inventories are getting very low, and soon they will need to start producing again.

No one wants or enjoys a slow economy. However, when it does occur, it is the opportune time to prepare for the upswing that will follow and has always followed since experts have tracked the cyclical nature of the American economy. Once again, there are many predictions: "Some sectors will see a turnaround in the second quarter..." "Industry analysts say by the end of the third quarter..." We are hearing as many scenarios as there are hours in a day. The only knowledge you can truly rely on is your own good business sense and use this down period wisely. Here are several suggestions:

Take an operations inventory of your organization and begin instigating any necessary changes that will make your shop or factory more productive, more efficient, or a better place to work. Think inclusion rather than dictating new initiatives from above. Sit down with your staff and review the things that do and don't work, or simply need refinement. Establish goals. Then, brainstorm to generate possible solutions for each goal. Select the one solution that is most feasible and develop an action plan, which identifies the various steps or tasks, who is responsible, and a deadline for completing each task. By breaking down a lofty goal into steps, success is assured.

Slow time is also a great time to perform thorough equipment maintenance to keep your machine tools and other devices functioning at optimum levels. When you are busy, equipment downtime is a harrowing experience. Another way to keep your machines running at their best is to take this slow time to get operators better

trained. Knowing the nuances of a machine tool thoroughly can cut the cost per part significantly.

And lastly, now is also an economical time to purchase capital equipment. Financing costs are low, and machine builders like us want to move equipment. Like you, we want to keep our operations producing. Further, we are following our own advice and taking this opportunity to invest in R & D and make any necessary changes to make our business and our products better for you. Like our military troops, let's all get in "fighting" shape to be ready for the increased work load on the way!



Mark Saalmuller
National Sales & Marketing Manager
Tornos Technologies US Corp.
203 775-4319 ext 216
msaalmuller@tornosusa.com

A tip for the

MULTIDECO!

How to optimise counter-operation cycle time and gain precious seconds?

Basic assumption

The TB-DECO models were designed to operate under the most highly critical conditions. However, in many cases, it is possible to work with all the safety required by adapting the maximum safety factor to actual machining conditions. It is therefore important to adjust certain parameters in relation to the part undergoing machining, in order to achieve maximum productivity.

Necessary safety features

When designing the TB-DECO, the reverse travel of the counter-spindle was parameterized by default to the maximum rear position. In most cases, this safety feature can be modified to optimise production without in any way jeopardising its safety.

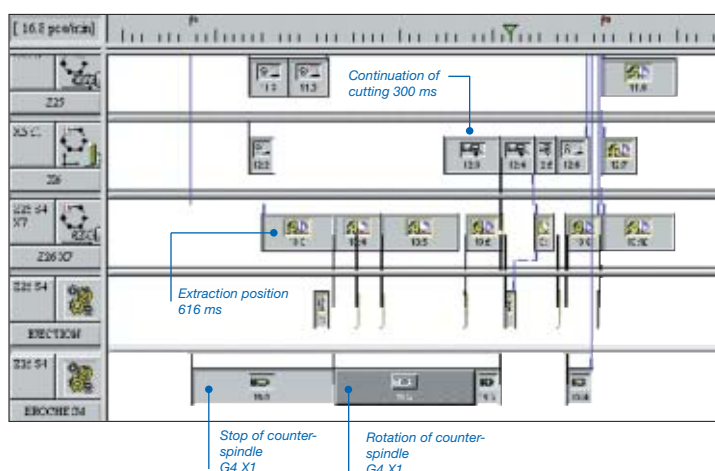
Another feature of the TB-DECO is programming a stop for spindle M405. The time needed for the counter-spindle to come to a stop is not taken into account and the designers therefore added a time delay of 1 second to guarantee the complete stoppage of the counter-spindle. In the majority of cases, a time delay of 0.1 sec. per 1000 spindle revolutions is sufficient.

Example

To illustrate the enormous benefits of these two tips, we proceeded with a real test under the following conditions:

Machine:	MULTIDECO 20/6
Spindle speed:	4000 rpm
Material:	brass.
Part length:	20 mm.
Diameter:	12 mm.

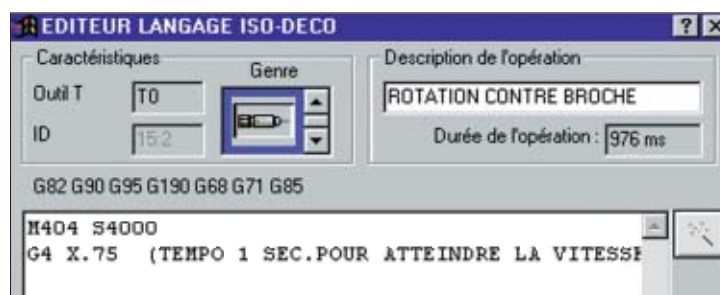
1. Program before optimisation



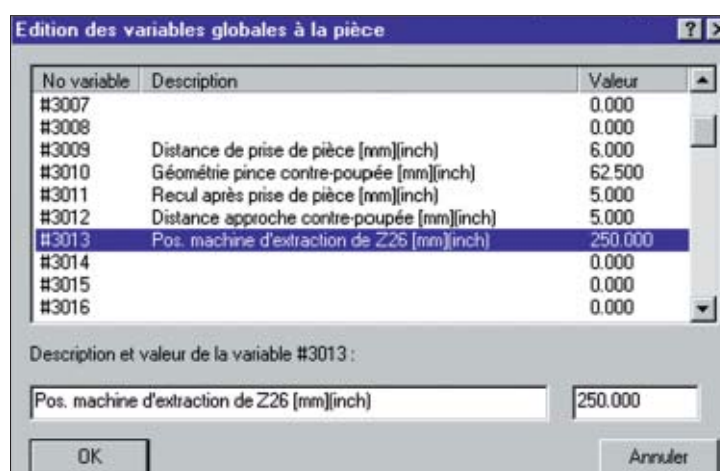
2. Modification in operation 15 : 1 of time G4 X1 to G4 X.2, which will produce a total stopping time of 424 ms for the counter-spindle to come to a stop at the time of part ejection (0.1 sec. per 1000 spindle revolutions is allowed in the majority of cases).



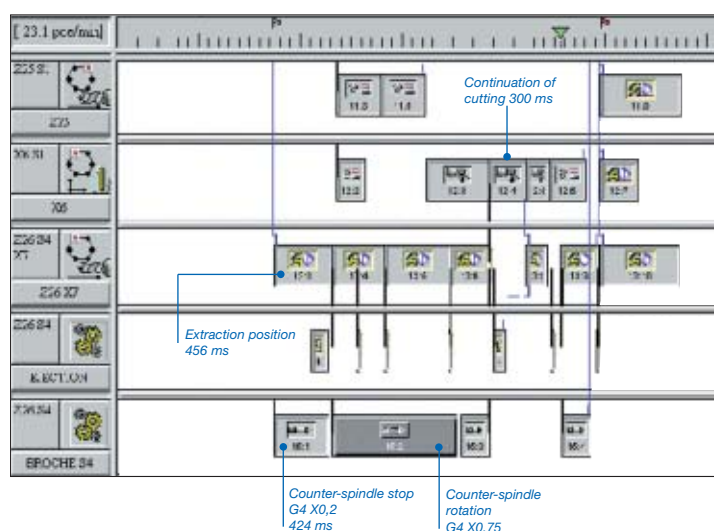
3. Modification in operation 15 : 2 of time G4 X1 to G4 X.75, which will produce a total stopping time of 976 ms for the counter-spindle to start rotating again. In this case, this can be adapted to each part because this is largely hidden time.



4. Modification of variable #3013 - extraction position from 300 to 250. This must be adapted to the length of the part and the part grip used.



5. Results following optimisation



Production before optimisation: 16.8 parts/min

Production after optimisation: 23.1 parts/min

An increase of 6.3 parts/min i.e. 37.5 %

To conclude: in this example where the counter-spindle is decisive for production time, adjusting these 2 parameters will increase productivity by 6.3 parts per minute, i.e. a 37.5% increase in productivity!

A tip for the

DECO!

1st tip G920:

The G920 macro used in the INIT program has an interesting feature: an optional P1 parameter can be added to it.

Operation:

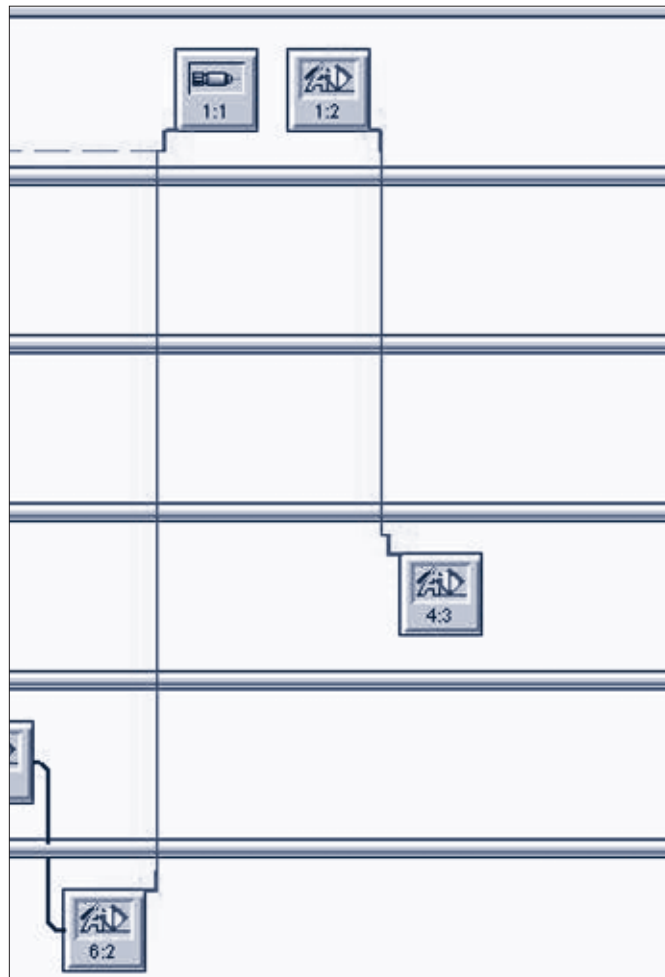
If an ejector is used to extract the part from the counter-spindle (variable #3017=1), the part positioned in the counter-spindle is ejected each time the machine is RESET. The ejector is activated in the INIT program following a START CYCLE and the incomplected part is therefore lost following each RESET. When setting up a highly worked part and a long cycle time, this feature can slow down optimum machining parameters. To overcome this, an additional parameter is provided.

Tip:

A value of 1 entered into this parameter prevents part ejection during the INIT program (operation 4:3) following a RESET.

Programming syntax: **G920 P1=1**

This tip is valid for the DECO 13a, 13b 20a and 26a machines.



WARNING:

It is essential that the part is manually removed from the counter-spindle when proceeding with a modification to the variables #3003 (part length) and #3009 (part pick-up distance). There is a risk of collision when machining in counter-operation, because the part is no longer clamped in the counter spindle at the same spot.

2nd tip G922, DECO 10:

Configuration

- ◆ Use of an ejector incorporated in the counter-spindle clamp instead of deploying a fixed ejector.
- ◆ Machining a long part with part pick-up distance (#3009) > 30mm.
- ◆ Tools mounted in T41-T44 in a Z-shape (for example, circular miller on unit 4700).

Problem

Once the end of the part is activated, the counter-spindle positions itself at a specific distance in Z4 so as to prevent the part from colliding with the fixed ejector. This position is calculated in G920 and executed in G922. Because of the large part pick-up distance, this Z4 position would be close to tools T41-T44. It is therefore likely that the part protruding from the counter-spindle will collide with these tools. (see picture)

Tip

1. As there is no fixed ejector, it is possible to go back as far as the maximum rear position (Z4=100) whilst keeping the part clamped in the counter-spindle. To do this, delete the macro G922 found in operation 4:8 of the TB-001 model and reprogram the following 2 lines instead:

Standard ISO code of operation 4:8:

```
G52
T0
M405
(PUSH Z4,X4 M110 OR M111 BACK INTO MACRO G920 FOLLOWING THE TEST)
G922
```

New code ISO:

```
G52
T0
M405
G1 Z4=#24 X4=#19 G100
G1 X4=#25 G100
```

2. Operation 2:1 in the INIT program:

Delete code M111 (opening counter-spindle clamp)

3. Regenerate the program:

The following information appears during interpretation:

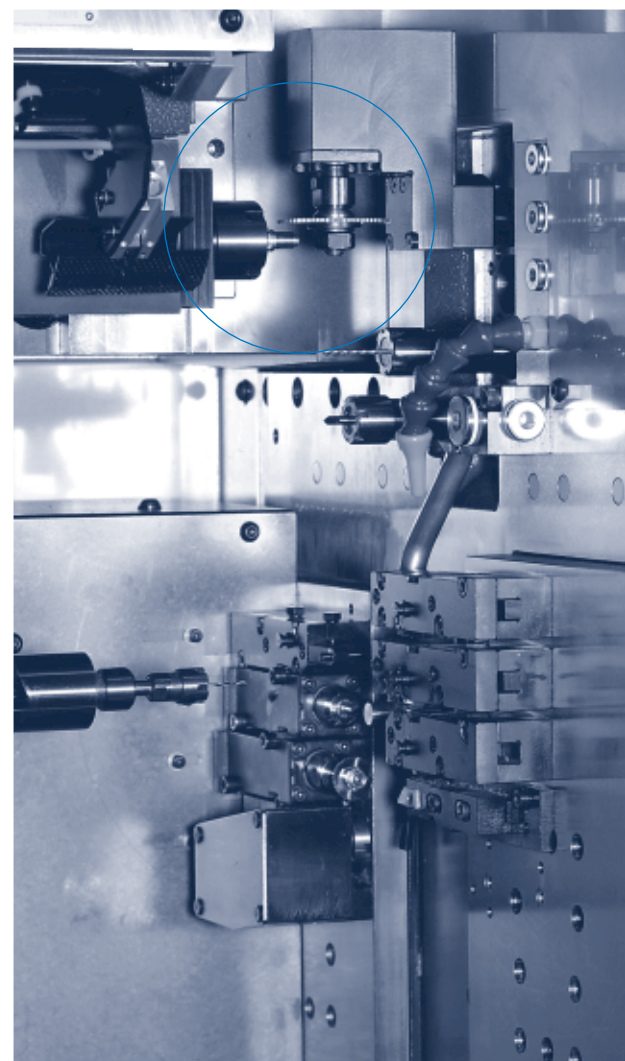
FC1018: Part pick-up distance > 30.0000 mm! The max. Z4 <MC> position without colliding with the ejector would be Z4=63.0000

Followed by the following question:

FC1020: Do you want to keep the part in the back-center? YES/NO

Enter NO against this question.

The part will now remain in the counter-spindle and the axis Z4 will go back to the maximum position and avoid any collisions.



In our next edition:
Tips for
simultaneous
rough-working/finish
machining.

HSK-C32,

its benefits and technique

For readers of DECO Magazine, Utilis – one of the associates of the company with respect to the tooling for the DECO 42f – is now reviewing this standard.



The TORNOS company in Moutier, decided to fit its latest 42f machine with this system for its cutting tools. By adopting the HSK-C32

Since time immemorial, the method of fixing tools to machines has been very simple, involving the use of bolts or a conical surface, to ensure their hold. It is now time for a fundamental technical development to modernise this system.

From the existing forms of attachment, the HSK system not only provides more freedom and diversity in its execution, but also ensures great stability mainly because of the cone/face technique adopted.

This absolute rigidity means that it is now possible to manufacture tools of an overall length, equivalent to three times the diameter (3xD), right from the supporting surface of the system.

What remains to be defined is which type of HSK, forming part of the standard, will meet the following demands: technical performance and a financial benefit with

respect to its manufacture and use as a fixed cutting device – in other words, as a non-rotating tool.

On this subject, the standard suggests a range of different types! For example, the version for gripping the tool during automatic change (A), or the compensated tool (E) suitable for HSC - UGV machining, etc... As a fixed cutting tool designed for manual change, it would be expedient to opt for a form of execution devoid of all superfluous properties that impede the proper operation and assembly of the cutting device on the clamping head. Based on current market trends, the choice has fallen on the C-type for the manufacture of cutting devices.

It is always tricky and restricting for a machine producer to offer options that depart from the standard of his machines, all the more so when the specific nature of the request is a one-off!

as the standard cutting device, the TORNOS machines now offer the following advantages:

- ◆ The connection between the cutting unit and clamping head is ensured by way of "cone / face" technology. Its exceptional strength provides the unit with the necessary stability to withstand the radial cutting forces encountered during asymmetric turning operations.
- ◆ The surface of the system absorbs the axial cutting forces, which mainly occur during drilling operations. It thereby relieves the cone of any superfluous operating stresses.
- ◆ The angular cutting forces are fully encased by the notches at the rear of the attachment.
- ◆ Taking up the angular play is guaranteed by an internal mechanism on the clamping head.
- ◆ System repeatability is less than 0.005 (mm) (5 µm), thanks to the

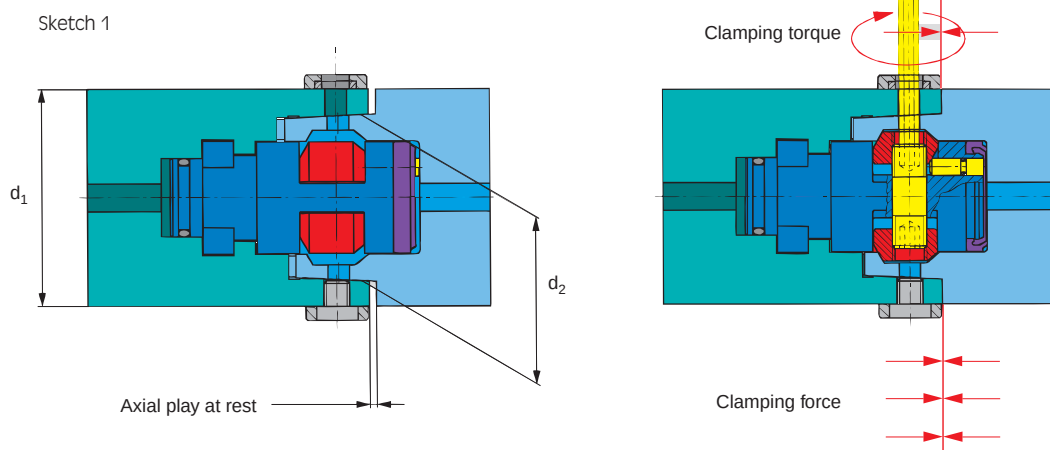
cone in particular. Repeatability is essential between the pre-setting bench and clamping head (average of thirty tests at 2.65 μm over 80.00 [mm] PAF).

- ◆ Type C is completely smooth, thereby eliminating the risk of chippings adhering to the rear section of the cutting unit.
- ◆ Quick assembly and clamping of the tool.
- ◆ Central lubrication incorporated in the tool.

In order to have a clearer understanding of how the HSK attachment system operates, we shall now briefly refer to the technique deployed.

ping forces produced by the clamping torque of 6 [Nm] for the HSK-C32, can get as high as 11 [kN], i.e. a pressure of approximately 32 [N/mm²] on the front bearing surface.

As already indicated above, such clamping forces and stresses mean that overhanging tools can be used, especially for cutting off operations, which, for short parts, allow the counter-spindle to approach the main spindle as closely as possible, thereby allowing the manufacture of a tool with good transverse travel.



Connection principle

Sketch 1 clearly shows the male/female connection at rest (left) and in action (right).

In the left sketch, it is quite easy to imagine the axial play limited by manufacturing tolerances when cone grinding (see table below). The suitability of these tolerances guarantees perfect centering of the connection at rest but also, and above all, when the clamping force is activated. Take-up of this axial play is ensured by the elastic deformation of the shaft, thereby providing a support at the face contact point.

The right section of the sketch shows the mechanism of the clamping principle providing a perfect connection of the unit. Because of the compact design of the clamping cartridge, the clam-

The vibrations and cutting forces normally generated by large-capacity tools are completely absorbed by the extreme stability of the connection – a fact which considerably extends the useful life of the cutting edges and enhances machining quality and hence productivity.

Nominal diameter d_1	HSK	32	40	50	63
Cone diameter	mm	24.00	30.00	38.00	48.00
d_2 male tolerance	μm	+7	+7	+9	+11
		+5	+5	+6	+7
d_2 female tolerance	μm	+3	+3	+3	+3
		0	0	-1	-1
Axial play at rest – d_1 and d_2 making contact	μm	+70	+70	+100	+120
		+20	+20	+30	+40
Radial gripping forces	kN	0.1 - 1.4	0.2 - 1.6	0.3 - 1.9	0.6 - 3.1
Clamping force (Mapal KS)	kN	11	14	21	30
Clamping force DIN 69893	kN	4.5	6.8	11	18
Clamping moment	Nm	6	7	15	20

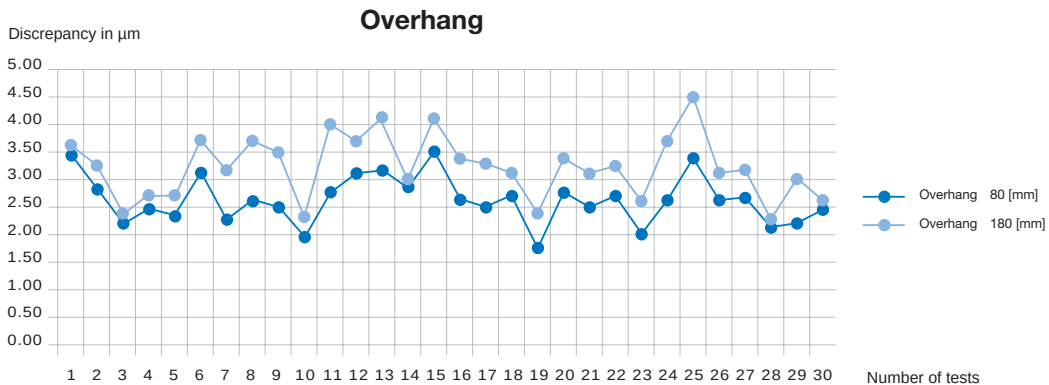
The following table provides more details on this subject and it is interesting to note that a clamping moment of 6 [Nm] corresponds to a force of 11 [kN] for the KS Mapal cartridge and of 4.5 [kN] with respect to standard DIN 69893.

HSK-C32,

its benefits and technique

Repeatability and concentricity

The repeatability and concentricity precision of the HSK attachment is one of the major properties of the system.



Graph 1

The perfectly distributed clamping forces (ratio 1 : 4) guarantee an axial repeatability in the order of ≤ 1.5 (μm) and a radial repeatability of ≤ 3 (μm) for the cone/face unit. This synergy of precision guarantees a max. concentricity of ≤ 5 (μm), even for tools with considerable overhang, such as drills and boring bars.

As already touched upon previously, pre-setting also benefits from this high precision, especially when the tool is transferred to its working station.

If we look at graph 1 here above, it is interesting to compare the overhang concentricity values of 80.00 [mm] and 180.00 [mm].

The graph alongside represents, more practically, the discrepancies checked with an overhang of 80 [mm] in dark blue and 180 [mm] in light blue. It is interesting to note that the maximum value recorded during the thirty concentricity tests does not exceed 4.5 (μm) for an overhang of 180 [mm], i.e. a mean concentricity of 3.23 (μm) and a mean concentricity of 2.65 (μm) for a PAF of 80 [mm].

This graph confirms the quality of repeatability and concentricity of ≤ 5 (μm) with the HSK attachment.

This new situation now makes it possible for each user of the pre-setting bench to achieve his objectives in concrete terms – in other words, fitting the tool to his work

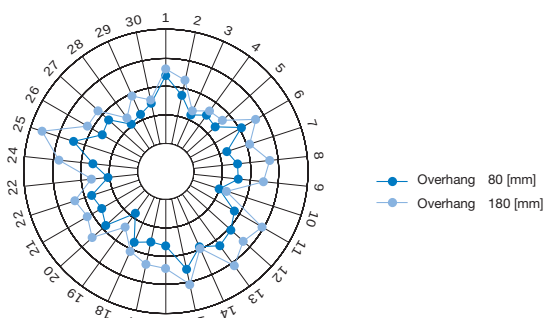
station whilst guaranteeing the conformity of the first part after changing the cutting edge.

Radial and transmissible torques

The HSK-type attachments are subject to considerable force and form torques. The cone deformations that set in when it is stressed by the clamping forces, produce friction forces on the cone and above all, on the front supporting face of the system.

With respect to an HSK that is designed to machine at high speed (type E), the cutting power is guaranteed and retransmitted to the cutting edge of the tool, but only by the forces and moments of friction. In other words, because the cutting forces on the sharp edge of the tool are less than the forces and moments of friction produced by the clamping force of the system, the tool hold in the spindle is ensured by the latter.

Regarding the case of interest to us, the cutting forces are directly associated with the chip section and in the case of rough working, are clearly greater than the cutting forces absorbed by the E-type HSK.



Graph 2

34 CrMo4 steel, (Ks 2'190 [N/mm²]), a chip height of 5.00 [mm], a feed rate of 0.30 [mm] per lathe (small parts turning feed), a cutting speed of 150 [m/min] and a machine output [P] of 0.9 absorbs a power of 9.3 [kW].

The cutting force F represents approx. 3285 [N] for a surface area of 1.5 [mm²]. If one takes account of this value and, in the case of the HSK-C32, the applied torsional moment is equal to $F [N] \cdot r [m]$, i.e. a moment M of 72 [Nm].

If we take the values of r [m] 16.00 [mm] and a surface of A 1.00 [mm²] and if we consider a coefficient of friction μ of 0.35 (steel-steel, running dry), the minimum friction torsional moment prior to small parts turning the coupling, will be 40 [Nm].

We can now see that the moment

Tool ergonomy

Apart from the technical properties indicated above, the turning tools developed by Utilis have been specially designed to meet very exacting ergonomic standards.

The profile of the turning tools in particular, has been designed to prevent any incidents during handling. The absence of millers, grooves or other joined parts produces the following benefits:

- ◆ The operator cannot injure himself when handling the tool.
- ◆ The fact that there are no milled geometries on the tool body makes it virtually impossible for long chips to become adhered to the tool.

We are offering a range of tools which have been completely blackened. It was our intention for the tool to be fully executed prior to blackening, so as to provide the

In fact, when positioned on the working plane, the tool remains in a stable position, thereby making it possible to change the insert without having to use the "boys tool", because of the flat part located beneath the tool. When held in a static position, the user can proceed with a perfect visual check of the tool geometry.

Conclusion

Apart from the technical aspects mentioned above, the advantages of the HSK-C can be checked, particularly when in use, on the parts machined and also when working on the cutting tools.

Nominal diameter d ₁	HSK	32	40	50	63
Clamping force	kN	11	15	21	30
Torsional friction moment	Nm	40	100	180	325
Max. torsional moment	Nm	140	300	700	1300

M of 72 [Nm] calculated above, is greater than the minimum friction torsional moment of M 40 [Nm] of the above table.

With such values, the total forces and moments of friction produced by the clamping force, are no longer sufficient to guarantee the perfect connection of the system. This is the essential reason why the HSK attachment (apart from type E) has notches at the rear, on the small diameter crown of the cone, thereby ensuring the angular anchorage of the male/female coupling. In addition, a mechanism which adjusts the internal angular play at the female support, eliminates any play, whilst positioning the cutting edge with absolute precision.

user with the opportunity of proceeding with a quick and reliable check of the male/female connection of the attachment.

Blackening does not modify the dimensional and mechanical properties of a tool, given the fact that the process is carried out at a temperature of between 142 and 148 [°C] in a nitrate, nitrite and water bath. What is more, the tool is better able to withstand corrosion, thereby making it possible to store the tools without having to be unduly preoccupied by the packaging.

However, the tool advantages do not stop here ! Each tool with its detachable insert has a property associated with our own feeling of perfection.

This technical adaptation means that the operator can proceed with his work more calmly. Once this system has been tried and tested in the small parts turning sector, it will inevitably pave the way for general standardisation.



Juillerat Denis

Sources: Utilis SA CH-8555 Müllheim / Mapal Deutschland review HSK-FF-010-0899-SDZ

Units used: 1 [daN] = 0.981 [kg]
1 [µm] = 0.001 [mm]

Auxiliary

motorization system S6

The present

Application

This option will enable you to increase the number of motorized tools available at the guide bush by installing two on platen 1. This new S6 motorization complements the S2 motorization already installed on platen 2.

Comment

Increasing the turning working positions at the guide bush is achieved by using the existing turning units (1600 and 1690) on the other machine tool systems. Modularity is thereby guaranteed. This facility replaces the need to add high-frequency, low- power turning units.

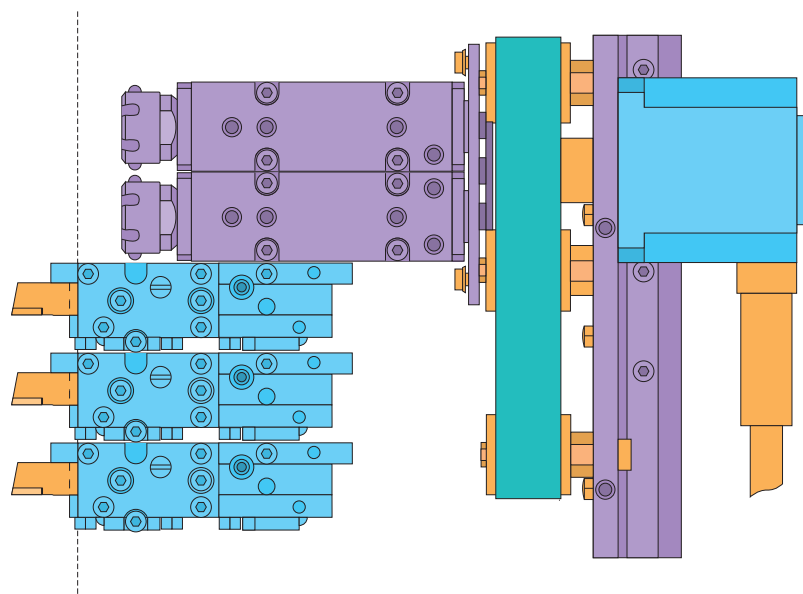
Considerable increases in production are thus achieved during the simultaneous cross-drilling operations using the rear platen x2/y2.

This new option will not allow left rotation (no tapping) or synchronization with the other motorizations.

Compatibility

This option is available ex-works. TORNOS engineers will perform a retrofit on the DECO 20a and 26a. Once installed, it will not be possible to dismantle the motorization.

Located on the tool-holder plate of the front screw die, the motorization causes no stress to the platen tool positions – i.e. the 5 positions. However, the NSK high-frequency spindles (options 2000 and 2100) can no longer be mounted on the screw die X1/Y1.



Technical characteristics

Max. number of motorized positions	: 2
Allemby positions	: T11 and T12
(Positions T13, T14, T15 are free for the turning tools if this motorization is not used. Positions T11 to T25 can receive the turning tool holders).	
Adaptable turning units (cross-drills)	: option 1600
	: option 1690
Type of clamp	: ESX25
Facility to re-turn units with a geometry in Z of 25 and 45 mm.	
The other turning units that can be mounted on the X2/Y2 will not be adaptable to screw die X1/Y1.	
Drive S6:	
Axis motor, type	: INFRANOR
Reference	: HDD b 09N
Maximum motor speed	: 5000 rpm
Motor-to-tool speed ratio	: 1:1
Max. tool speed	: 5000 rpm
Programmable speed	: 0-5000 rpm
On/Off via	: function M
Max. drive power	: 1,25 kW
Tightness index	: IP 65
Available torque	: 4Nm

ROBOBAR SBF-532

a radically new design!

News



TORNOS unveils its new
ROBOBAR SBF-532 bar feeder to the world at
Simodec in La Roche-sur-Foron.

This new bar feeder, which has been one hundred percent designed, developed and manufactured on the TORNOS premises at Moutier, guarantees that loading solutions correspond exactly to the lathe capacities for which it was developed. Its characteristics, especially the incorporation of a multiple guide channel and the choice of a pusher that can be simply interchanged by a latching mechanism, are aimed at reducing superfluous handling operations to a minimum and increasing the rate of capacity change at the time of start-up and so on.... in other words, increasing the productivity of those operators who decide on this option.

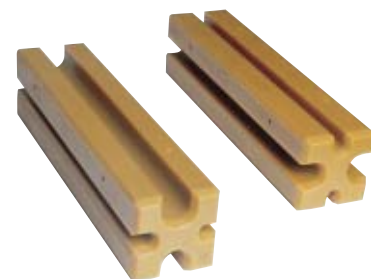
Controlling the functions of the bar feeder is by way of the machine PNC-DECO control, which considerably simplifies the interface between machine and bar feeder and eliminates any risks of incompatibility.

This latest option, which can be handled by one operator alone, does not require the further addition of numerous costly options, since the guide channels and pusher set that correspond to the ca-



pacities of the relevant machines (DECO 20a or DECO 26a) are supplied as standard.

With this new version, TORNOS provides "optimum customer convenience" coupled with a very good quality-to-price ratio.



The new Robobar SBF 532 will be available from March 2002.

For further information, please do not hesitate to request the relevant information from your usual agent or directly from TORNOS at the address published on page two of the magazine. Since March, you will also be able to download the brochure from our Internet site on:

http://www.tornos.ch/eng/products/prodFrame_catalogues.html

Technical characteristics: ROBOBAR SBF-532

Bar passage:	min. Ø 5 mm max. Ø 32 mm
4 bar-guide capacities:	5-8 (25,4) mm 8- 13 (16) mm 13-22,5 (26) mm 22,5-29 (32) mm
Capacity change-over:	15 min
Compatibility:	DECO 20a et DECO 26a

Focus on MOTOREX:

TITANIUM – a fascinating but extremely demanding material

Whenever titanium is used, we immediately think of something very special. This is hardly surprising since the most important users of this metal range from the aerospace industry thru medical engineering to the clock and watch making industry. Whilst titanium has outstanding properties, it makes very exacting demands on machining and on the capability of the cutting fluid.



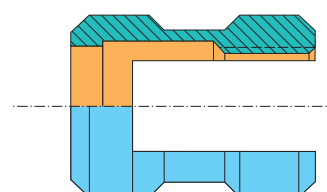
Fascinating properties

What stands out immediately about titanium is its excellent corrosion resistance and low-specific weight of 4.5 g/cm³. And it is approximately 40% lighter than steel! Added to this, is the phenomenal strength of titanium alloys, which can be as great as 1000 N/mm². Because of this favorable combina-

tion of properties, titanium is ideal for use in the manufacture of components in structures that need to be very strong but also of light weight, as for example, in motor racing.

After aluminum, iron and magnesium, titanium is the next most commonly found metal in the earth's crust. Titanium can be

found in approx. 140 different titaniferous iron ores. The best known and the one with the highest titanium content is rutile (93 – 98%). Ilmenite, which contains 45 to 65% titanium, is also of interest for industrial production.



Machining titanium

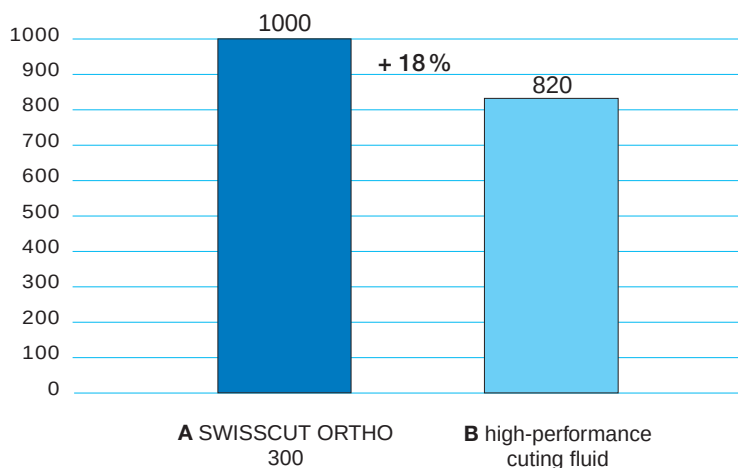
Basically, titanium can be machined in the same way as steel: it can be turned, milled, drilled, threaded, sawn, ground, etc. However, certain conditions, resulting from the properties of titanium, have to be respected. A high-quality cutting fluid, such as SWISSCUT ORTHO 300, is ideal for successfully machining titanium. Please contact the appropriate departments with respect to tooling requirements and machining sequences.

SWISSCUT ORTHO

MOTOREX SWISSCUT ORTHO cutting fluids are based on an innovative formulation that includes solvent-refined base oils that are low in aromatics, a large number of special additives and completely synthetic components. They are characterized by outstanding cooling, flushing and lubricating capacities with enormous wear reserves within a very wide temperature range. The result is optimum surface quality and low tool stress. ORTHO-cutting fluids are light in color, slow to evaporate, have a gentle smell, are well tolerated by the skin and do not tend to foam.

It is precisely with titanium that increasing output is difficult to achieve, because machining speeds have to be kept low. A test using the work piece illustrated and a conventional high-performance cutting fluid has shown that with MOTOREX SWISSCUT ORTHO 300 the machining sequence can be speeded up by approx. 18%, thereby noticeably improving the productivity of the machinery.

Target: 1000 workpieces in x-minutes



Would you like to question the experts from MOTOREX about machining titanium using MOTOREX SWISSCUT ORTHO? Please contact:

**MOTOREX AG, Kundendienst,
Stichwort „TITAN“,
ICustomer Service,
code word „TITAN“
Postfach,
CH-4901 Langenthal
or send an e-mail to:
motorex@motorex.com**

DECO technical open days

The best way of discovering the DECO

The TORNOS Group recently started organizing one-day sessions under its "DECO technical open days", so as to allow all those interested in – or simply curious about – the DECO machines, to come and discover, at first hand, the programming system and modes of operation of both the DECO and MultiDECO machines.

To date, single-spindle sliding headstock and multi-spindle sessions have been organized in Germany, France and Switzerland. In addition to the sessions notified at the end of this article open days dedicated to the DECO f "fixed-headstock" will be organised later.

It must be seen to be believed!

This is a challenging heading that clearly summarizes the decision-making bases for holding these open days. The company shares the opinion that discussion, whether of publicity or commercial nature, remains the first port of call and that the actual possibility of discovering a system is through a demonstration coupled with participant involvement. A working group, comprising technical and training specialists, was formed in order to create an interesting "module of discovery in a day".

According to the adage, humans retain 10 % of what they read, 20 % of what they hear, 30 % of what they see and almost 80 % of what they see, hear and actually handle!

This is why these open-days are geared towards the practical side, thereby enabling those present to actually machine a part on the DECO or MultiDECO respectively at the end of the day!

During such events, the participants have the opportunity of actually programming and machining a test piece and thereby discovering the simplicity and transparency of the concept, irrespective of the type of machine envisaged. The technical and training specialists will be available to help those interested parties for the day, so why not make use of this opportunity?

A well attended program

More than 10 participants attended the initial sessions organized in Switzerland, and more than 100 in Germany, where the scheme was

launched almost three years ago. Almost 20 participants attended the initial sessions in France!

If you only know the DECO from hearsay, then these open days are for you!

They are, of course, completely free of charge.

The next sessions will soon take place near you, so register now

The DECO has already changed the performance of more than 1000 companies around the world why not come along and find out how?

Yes. I am interested in the discovery open days and would like to register for the next session:

The next sessions	DECO a and b	MultiDECO
Switzerland (in French)	☐ 03.04.2002 ☐ 07.05.2002 ☐ 14.06.2002	☐ 05.04.2002 ☐ 07.05.2002 ☐ 11.06.2002
Switzerland (in German)	☐ 02.04.2002 ☐ 06.05.2002 ☐ 13.06.2002	☐ 08.05.2002 ☐ 10.06.2002
Germany	☐ 07.05.2002 ☐ 18.06.2002 ☐ 24.09.2002	☐ 14.05.2002 ☐ 26.09.2002
France	DECO and MultiDECO ☐ 21.03.2002 ☐ 25.03.2002 ☐ 28.03.2002 ☐ 08.04.2002 ☐ 18.04.2002 ☐ 25.04.2002	
	☐ 16.05.2002 ☐ 27.05.2002 ☐ 03.06.2002 ☐ 10.06.2002 ☐ 20.06.2002 ☐ 24.06.2002	☐ 04.07.2002 ☐ 08.07.2002 ☐ 18.07.2002 ☐ 22.07.2002

For other countries, please contact us open day needed in _____ Country, please fill

Summary of the open-day program:

Presentation of the DECO and TORNOS
The Business Units
The DECO a & b or MultiDECO or DECO f family (depending on session)
TB-DECO, programming principle
Practical example, program, transfer, machining
Applications, part types and solutions

Reply coupon:

to be copied and faxed to the following numbers.

Switzerland: 032 494 49 07
France: 04 50 03 89 07
Germany: 07231 / 910 750



Country	Date
Name	First name
Company	Telephone
Date	Signature

Virtuosity

is in your hands...

...but what can virtuosity do without good instruments ?

This is the slogan used by the Maillefer company in Ballaigues (CH) to promote its dentistry product range. Using the instruments and equipment produced by this specialist company means that dentists can now offer new options in terms of convenience and operating times, thereby considerably improving the patient's conditions whilst he is in the dentist's chair.

A strategy centered mainly on developing ultimate technological products and excellent specialist training, coupled with a strong image, enabled Maillefer to grow at a steady rate for more than 100 years.

In order to find out more about this success story, the editorial staff of DECO Magazine were given the opportunity to meet M. Pierre-Luc Maillefer – CEO of the company. We now have an exclusive on the routes taken by Maillefer.

A consistent and finely targeted range

Maillefer mainly produces dentistry instruments. These are finished products, which the company markets directly to the final users (dentists). This explains the company's "widescale" and highly professional approach to communication and image.

The products manufactured are largely small instruments for the dental trade and include, in particular, hand-held instruments, burs, probes and broaches for example. They are the concrete answer to specific pathological conditions. Approximately 12 % of turnover is accounted for by small instruments for other sectors of activity, such as medical instruments or tooling for the jewelry and luxury watch industries. Approximately 500,000 instruments leave the company every day!

Virtuosity
is in your hands

The instruments produced generally go through three successive stages of production, machining by turning (small parts turning), heat or chemical treatment and, to conclude, any rework for the finishing operations (machining cutting profiles for example).

Since production is 100% internal the company must be capable of mastering a large number of different jobs to achieve the high level of quality it is striving towards.

the universities and practitioners. This close relationship allows them to determine any trends and future requirements, which the company must respond to by developing new products, which correspond to these requirements exactly.

Once a new product design has been chosen and agreed, the "industrialization" department, comprising roughly 50 persons, comes into play. Everything must be considered to find the most efficient integral production solution at the best possible quality-to-price ratio.

The following stage consists in producing and testing prototypes. These tests take place in two phases. First of all, operations are car-

Once this new product has passed all these stages, Maillefer can now contemplate offering this product to the dental practitioners on a mass scale.

In order to sell such solutions where new technologies demand new methods of use, Maillefer organizes discovery and training seminars so that the dentists can experience these products first hand. Once a month, many dentists spend two days in Ballaigues in a fully equipped room (which includes X-ray machines) so as to understand fully the benefits of these products and acquire the necessary "handling skills".



Mastering a complex chain of operations

To illustrate the complexity of the overall process, we shall take, as an example, a new product. New products have to comply with numerous standard and physiological requirements and numerous specialists are involved at all stages of the process, from the basis of the design, to production thru industrialization. There are roughly 10 research and development specialists, who work hand in hand with

ried out on "dummy" teeth, followed by an examination of the conformity of treatment by X-ray or by sectioning the teeth treated.

Once this test proves conclusive, a second validation phase consists in carrying out "live" tests on patients. To do this, partnerships are established with university hospitals. The treatments are then monitored over a period of time, with this phase lasting up to 6 months.

In addition, once a year Maillefer organizes seminars for the leading opinion-makers in Europe, Asia and the USA.

The company, which was founded in 1880 by M. Maillefer, a watch-maker turned dentist, now achieves a turnover of CHF 125 million. It exports to 110 countries and has more than 450 employees. The machine shop currently stands at 650 machines and the small-parts turning section represents 10% (in numbers of machines).

As we have seen above, machining parts by small-parts turning is very often the first stage of a very complete process involving heat and chemical treatment, reworking and finishing work. A specific category of parts is, however, fully completed on the DECO lathes and does not require further treatment or reworking. This category represents around 7 % of turnover.

Virtuosity is in your hands



Small-parts turning – a strategic operation

More than 50 % of parts produced by Maillefer undergo small parts turning. Depending on the parts in question, the added value of this operation represents between 15 % and 60 % (excluding those parts which are completely executed by small parts turning). Optimizing the performance of this operation, whilst "only" making use of 10 % of the machine fleet, hence represents a strategic importance with regard to the profitability of the finished product.

The operators of this section of the company play a major role in overall product value.

A catastrophe occurred on 25th January 2001 – the small parts turning shop was destroyed by fire! The company was in danger of finding itself totally paralyzed. To overcome this situation, the management immediately adopted the following measures:

They used their in-house small parts turning specialists to strip, clean and repair what could be salvaged. As a result of this, twenty MS-7 machines were saved.

Work was sub-contracted to satisfy immediate demand. The company selected partners who had machines that were only used on a small-scale basis and provided the men and technology to produce the necessary parts.

An investment program in new machines was implemented, especially the purchase of twelve DECO machines.

The management is most keen to underline the enormous effort put in by the staff in the small parts turning shop (re-location, work not precisely corresponding to specifications, etc) and would like to extend its thanks.

Following the installation of the machines in new premises (initially earmarked as a warehouse and logistics center), the small parts turning shop has been operating 7 days a week with three shifts, throughout the year 2001.

Machines providing even greater performance

One of the major trends facing the company is the need to execute parts that are more and more precise and complex. With respect to those parts not requiring machining following heat or chemical treatment, a lathe for finishing all operations not entailing rework, would be ideal. Productivity is also very important with regard to the quantities undergoing machining (millions of parts). Maillefer therefore decided on twelve DECO machines in order to benefit from the numerous facilities offered by the large number of axes available and from the special equipment and tooling offered (e.g. thread whirling). To maximize on its use, the company provided all members of staff with in-depth training. It therefore applied the same logic it used to market its products: to provide complete training so as to achieve virtuosity.

According to Pierre-Luc Maillefer – CEO, "the man-machine interface nowadays plays a very powerful role and the solution proposed to the small parts turner is always more democratized. However, it is the key skills of men which always make the difference". Hence, in terms of small parts turning, even if Maillefer found a partner in TORNOS, which provided a solution to its requirements, it is still continuing to improve its machining facilities so as to maximize its advantages over the competition. The outcome of this logic will be the protection of machining processes on existing machines.

A market that is constantly growing.

The company has recorded average growth over the last 10 years of more than 10% and exports its products worldwide. The turnover achieved in Switzerland represents approx. 5% of total turnover. As an illustration, the targeted clientele in Switzerland is made up of all dentists – i.e. 4000 dental surgeons. However, there are about 6200 dental surgeons in the American city of New York alone!

The company exports to more than 100 countries and either markets its products directly or via the

Virtuosity is in your hands



Virtuosity

is in your hands...

Presentation

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Virtuosity
is in your hands



Densply Group, which it has belonged to since 1996. This group provides a complete solution for the practitioner – ranging from equipment to chemical products, thru implants and false teeth. This association provided an excellent synergy and approach, aimed at providing dental practitioners with a complete service.

The most frequent problems encountered by dentists are caries (which attacks and weakens the enamel) and canal infections (which require root treatment). Maillefer tools are designed to treat both cases. Both these problems are strongly associated with the standard of living and age of the population – two aspects that are constantly changing in the direction of improved dental care. In geographical terms, a large number of markets are only at the starting point of these processes.

At world level, the market potential is estimated at approximately three billion dollars with ten or so manufacturers having a share of the cake.

Maillefer is well known for its latest technological solutions, especially its nickel-titanium alloy broaches, which are both extremely flexible and tough and successfully in-

crease the size of the canals whilst perfectly complying with their shape. The accuracy required is absolute – ten progressive sizes must allow for canal cleaning and enlargement, without this leading to any deformation.

New ideas ...at all levels

Always on the watch, Maillefer is very creative in terms of design, production and marketing. To quote an example of this latter, the company has recently adopted a "pull" strategy (this method, which is aimed at encouraging the distributor to provide a product reference since this is what consumers want, is frequently used for large-scale distribution). Following a recent seminar of opinion leaders in Paris, numerous communication campaigns aimed at the public at large were launched. During the following months in this region, a certain number of patients asked their dental practitioners to treat them with Maillefer instruments! The combination of the most advanced industrial processes and marketing to the public at large paved the way to reflection...

Let us bet that Maillefer will continue with its innovations and offer solutions that will make our stay at the dentist as brief and pleasant (or at least as unpleasant) as possible ...

The editorial staff of DECO Magazine would like to thank Maillefer and extends its best wishes for a successful future...

Virtuosity
is in your hands



Creativity in the art of dentistry



Maillefer Instruments
CH-1338 Ballaigues
Switzerland
www.maillefer.ch

Maillefer – a few figures

Turnover 2001:	CHF 125 million
Export:	More than 110 countries 95% of turnover
Location :	Ballaigues, 50 minutes away from Geneva airport, 10 kilometers from the French border
Employees:	450, of which half are from neighboring France. More than 10 nationalities are represented.

And here

is the fourth generation...

In April 2002, the TORNOS Internet site will undergo a complete change. The designers wanted to create greater transparency, make the discovery of information more instantaneous and provide a content of increased added value.

However, all these plus points in no way compromise the design, which remains first class and high-tech.

The navigation concept is by way of context menus. A click on the button will bring up all those elements available at this level. The "navigation" and "search" buttons are always present. These two buttons will allow you to find a specific item very quickly at any time.

Via the menu, we would like to draw your attention to some new features.

Reference list and customer presentation.

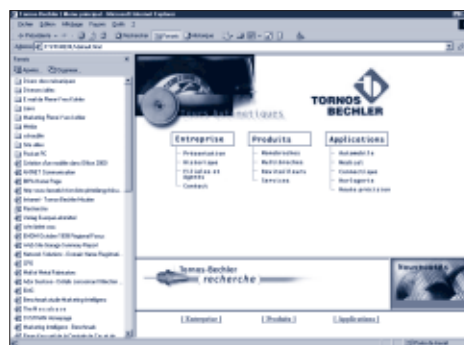
We have already touched upon this section in DECO Magazine. The aim is to enable you to find your way around a site, which always has a very high hit list. By logging on, a customer who wants to place an order

and who is searching for a sub-contractor working with DECO machines, will have the best chance of finding him. This can be considered as a service to existing clients.

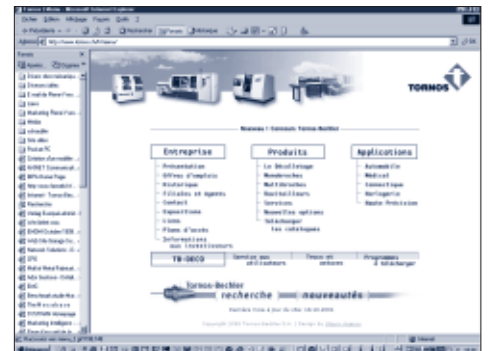
This section is open to all our clients using the DECO and MULTIDECO. If you are interested, please send us an e-mail (decomag@tornos.ch) showing the following information: name of the company, contact details, 2 lines of information about your company and the address you would like to establish a link with. Unfortunately, some companies have already sent information to be displayed but a computer problem has prevented us from inputting it. Please resend this information.



1996



1997



2000

For those requiring a TORNOS solution, a multicriterion search section is available to determine what product best suits customer requirements. Thanks to this intelligent search engine and by answering a few simple questions, the requesting party will receive direct access to the product that is most adapted to his needs. The product-relevant items can be downloaded immediately in print format.

Editorial
Forum
Interview
News
Presentation
Technical
The present

The present

The items for downloading (program examples) in the TB-DECO section are regularly updated. Do not hesitate to register the address (http://www.tornos.ch/fr/TB-DECO/default.taf?page=http://db-tornos.utopix.ch/fr/TB-DECO/app_list.taf) in your list of favorites, so that you can benefit from all the TORNOS experience available to you.

The documentary center, a real library for downloading, collates all the information published by the company together with a true li-

brary of pictures unencumbered by copyright, catalogues, the DECO Magazine and information – all of which are available to you. A search system will also enable you to discover everything that has been executed on a particular type of machine, for example, or what has been created for publicity purposes for a given occasion...

In all, the site has not undergone a fundamental change in

structure – all the information relating to the company, products and concerning investors etc., is grouped together here. It is the organisation for finding this information and its formatting which have been improved.

You will also have the opportunity of subscribing to a **newsletter**, which automatically notifies you of any site updates. Please use the basic form to subscribe. You will then

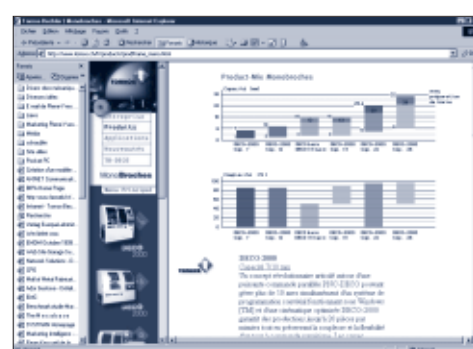
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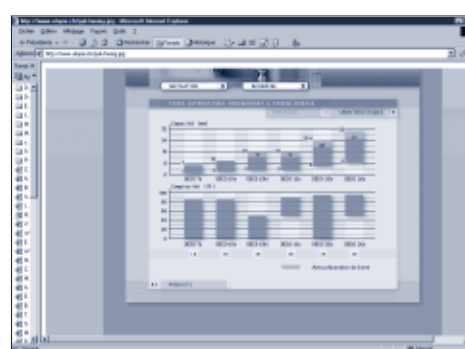
1996



2002



2000



2002

Some information on the site

- Number of pages per language: more than 180
- Number of languages, 3 (F, G and GB)
- Number of visitors for the year 2001: 113,308
- Number of MB's downloaded for the year 2001: 6270

be the first to receive all the information by e-mail, whether press releases, the launch of a new catalogue or site news.

Do not hesitate to visit the site, subscribe to the newsletter and above all, let us know your first impressions (and any subsequent impressions you may have) on the use of this tool we have created for you!

See you soon on our site
www.tornos.ch
New version launch: April 2002

MULTIDECO 20/8b

The latest on multispindle [2x4] machines !



Some important bases

The strong points of a machine with 8 workstations are, undisputedly, the vast number of operations, which can be carried out simultaneously, coupled with the high level of quality and precision that is achieved, in particular by the excellent distribution of rough machining and finishing work, both for external and end operations. Another strength of the system lies in the vast number of operations that can be performed and hence the complexity of parts being executed. Eight spindles equates to greater complexity, more possibilities, better finish and hence, overall, greater productivity (by dispensing with reworking operations, in particular).

In the multispindle world, productivity is always a very important aspect and, coupled with the versatility of the DECO concept, the MULTIDECO machines are, accordingly, perfectly tailored to meet your requirements in the production of medium to highly complex parts. With respect to maximum output of simple parts, an alternative has now come to light in the form of the MULTIDECO 20/8b [2 x 4 version].

MULTIDECO 20/8b [2x4 version]

This solution, which has already been briefly touched upon in DECO Magazine 17 is, in [2 x 4 version], an integral type MULTIDECO of the same family as the MULTIDECO 32/6i. The supreme forces of integration are, above all, the guarantee of the

perfect match between machine and bar-feeder and the other peripherals ... (universal Mayfran chip conveyor, cutting oil cooler, 2 high pressure pumps operating at 30 and 80 bar).

All operations, including bar feeding, are divided on this machine. As a simplification one can say that the machine comprises two machines fitted with four spindles. The first position includes bar feeding with a hobbing and end slide. The second and third positions have the cross slide. The fourth position has a counter-spindle and two independent slides, namely the cutting and counter-operation slides. The end units are independent. The simultaneously driven counter-spindles can be synchronised with the main spindles.

The machine has, in effect, a dual loading system

The bar feeder is fitted and the peripherals incorporated during the machine development phase, so as to guarantee the perfect interaction between the various elements. Experience has shown that our clients prefer to have fully equipped systems so that they can perform the majority of machining operations and hence clearly benefit from the machine's potential.

The best of two worlds

With the MULTIDECO 20/8b [2x4] it is also possible to work in the same way as with a conventional multispindle machine, but with very little restriction. This is very simply due to the power and versatility of the DECO concept. By way of simple parameterization during programming, one can switch from a [2x4] machine to a powerful multispindle machine fitted with four cross slides, thereby making it possible to execute highly complex parts at a high output, using standard tools.

Double bar feeder and double operation – is this a real benefit for simple parts?

Tests have shown that increases in productivity can attain more than 90% compared with a conventional machine. Both the overall space requirements and the price of the machine on the other hand, bear no relation to "two machines".

The execution of fairly straight-forward, short parts (such as ball races, fittings, gas nozzles) is considerably improved thanks to the MULTIDECO 20/8b [2 x 4] solution. The versatility of the TB-DECO, the use of standard tools and cross slides provide considerable flexibility. As for the tool pre-settings, it is now possible to change the settings very quickly, even when changing over from [2x4] machining to conventional machining.

Technical properties

Max. production	: 50 parts/minute. (2 x 25)
Power	: 15 Kw
Capacity Ø	: 22 (24 mm. including bar preparation)
Number of axes	: 23 axes