



THINK PARTS THINK TORNOS



When it comes to the automotive industry, there is a Tornos solution, either multispindle or single-spindle

# The automotive 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 its MultiAlpha and MultiSigma turning machines, Tornos can offer suppliers of automotive turned parts the ideal production tool, for huge batches. For shorter batches, the machine tool manufacturer offers single-spindle technology with DECO, Sigma and Delta machines.

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 price are regular topics of conversation. In order to face up to all

these demands, this company has become particularly innovative in terms of the design of its parts and highly demanding in terms of its 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? That will complicate matters when it comes to size, materials and other factors, but problems requiring solutions are forwarded to the producers of these parts – the bar turners.



Samples of parts produced on multispindle

# – a demanding client



Simple parts produced on multispindle

Fortunately, bar turners have a competent partner that can supply them with a production tool capable of producing these parts cost-effectively: Tornos and its multispindle and single spindle turning machines. The multispindles bar-turning machines are equipped with six or eight spindles, depending on the model. Each spindle has its own drive system and the machine is equipped with a new highly-rigid 4-axis CNC counter operation concept which, thanks to its five tools, can produce complex counter operations that are impossible to carry out without secondary operations employing traditional techniques.

On these machines, parts are finished and do not require costly secondary machining processes. Benefits in terms of quality, cost and production time are significantly enhanced to meet the ever-increasing expectations of the automotive sector.

The single spindles can produce even more complicated parts, still without any secondary operations.

The recently launched Delta product range on the contrary allows users to produce simple parts on small batches with an incomparable return on investment.

## Long production runs, but small batches

Unique to the automotive industry are long production runs that can amount to millions of parts. This sector is today perhaps one of the rare examples of a customer that requires so many parts of the same type. 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 ahead of their customers.

The MultiAlpha turning machine provides customers 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 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, are highly autonomous and are equipped with an ever-expanding 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 safety that could well be described as an absolute standard.

The automotive industry now requests a level of quality of 5ppm (five defective parts per million) at the most. A lot of parts are even reaching 0ppm.

To ensure this kind of quality level, Tornos has formed partnerships with specialists in controlling and measuring procedures.

Tornos has developed an interface 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 to worry about.

This interface is an option 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 because of tool wearing, a corrective measure will automatically be triggered by the control unit of the turning machine. In this way, the bar turner can monitor both tool wear parameters and

a sudden shift from an input dimension resulting from tool failure. This is an added advantage – automatically actuating an alarm that can stop the machine.

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

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

To reply to an invitation to tender for a project, 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 that the approved part be machined on the production unit where it will later be produced in series. With the MultiAlpha and MultiSigma, it is also easy to make prototypes and therefore gain early approval at the sampling stage.

Being the only producer of both machines, Tornos has a unique position to transfer know-how from one to the other kind of machines.



**For a price as low as €45,000 (depending on the country), the Tornos quality and know-how offer great opportunities**

### **Workpieces provided at an appropriate rate**

The multispindle automatic turning machines are a production tool that are 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 peripheral equipment. The standard turning machine for producing parts for the automotive industry is a multispindle turning machine able to machine bars up to 34mm in diameter.

For larger diameters or for the machining of forged, moulded or stamped parts, the turning machine can be fitted with a 'chucker' system. In either case, the turning machine housing remains the same.

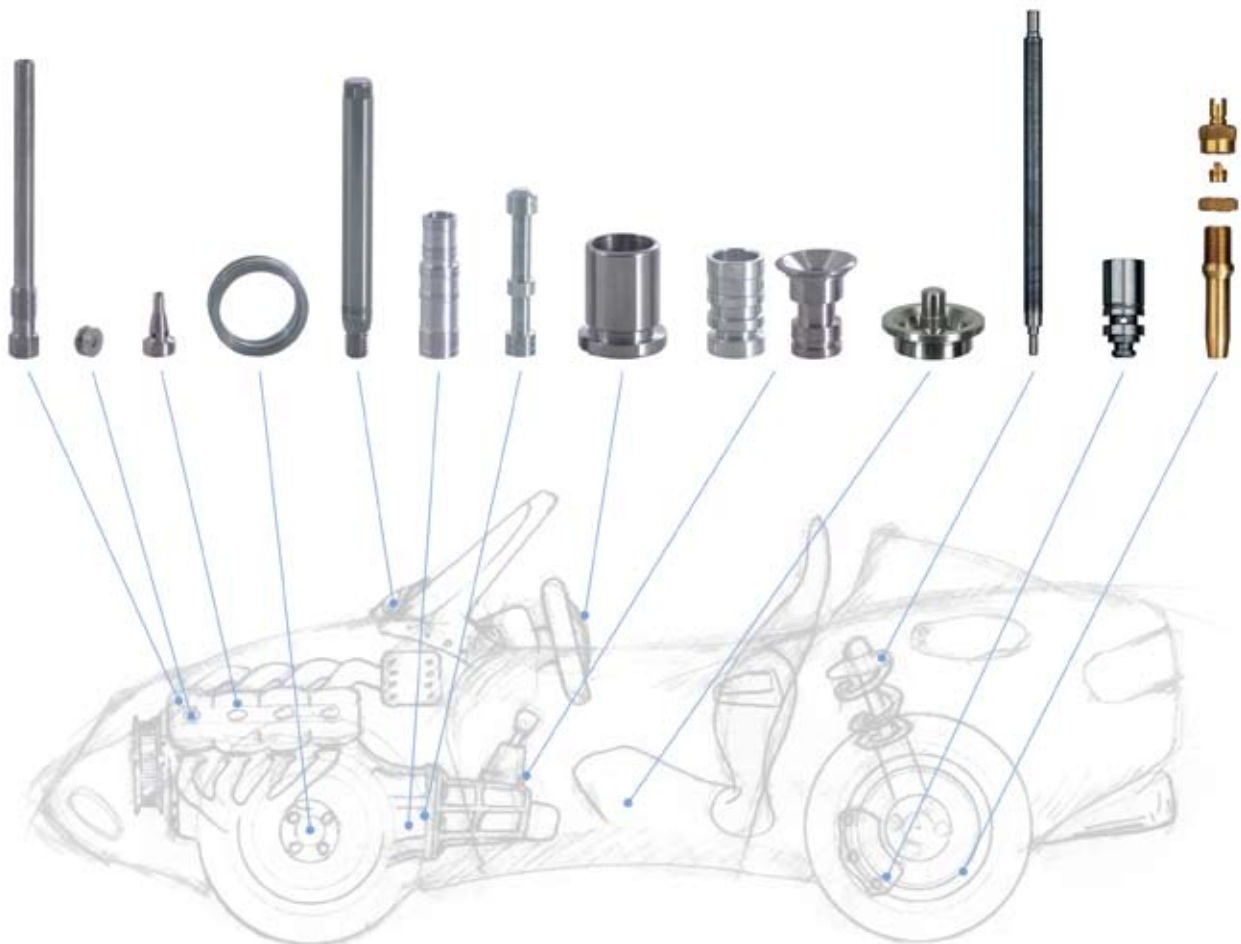
This means that, apart from some minor changes to provide an opening for an automated chucker part feed, no other modification is necessary. This way, the bar turner's choice of system adapted to a certain family of parts by no means rules out another variant.

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 which transfers them to a palletisation 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 usually be carried out in standard mode.



### **Swarf is removed using high-pressure pumps**

Depending on the volume and the material to be machined, swarf extraction is the process that can cause the most problems, especially if the operator requires automated production which therefore includes minimum monitoring. To overcome this, the MultiAlpha removes swarf using its high-pressure pumps (30 and 80 bars). Additional assistance is available for the operator 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 liquid 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.

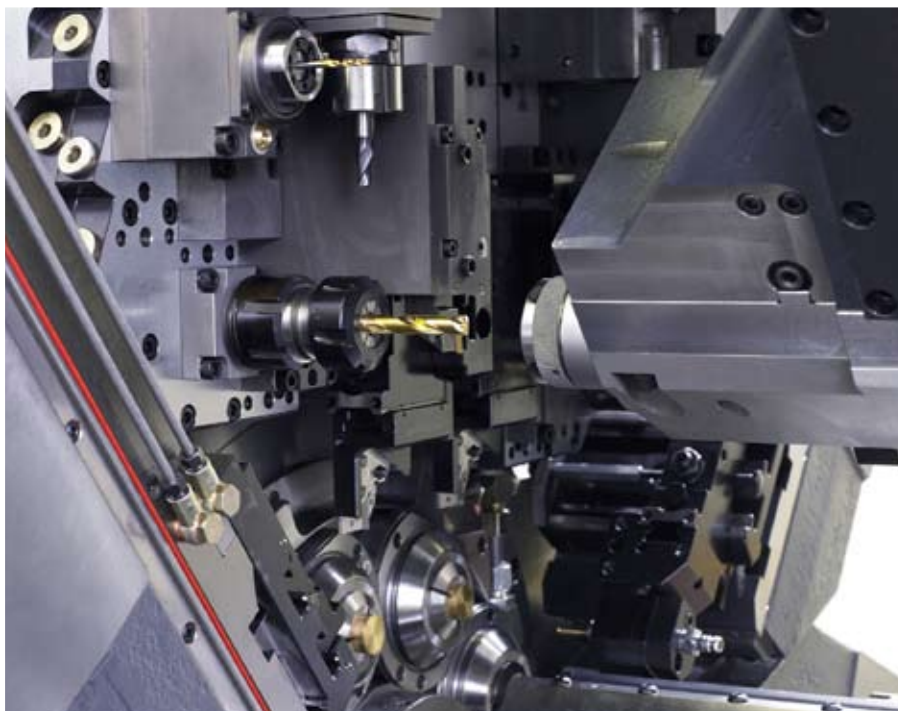
### **Painless programming**

The MultiAlpha, for instance, is a turning machine with every work position equipped with its own motorspindle. 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. Because each of the MultiAlpha's workstations 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 3 axes six or eight times, which is a lot more straightforward.

The fact that each work station is equipped with its own powered spindle means an optimum machining process can be carried out at this station without worrying about the others. Managing the turning machine is therefore also 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 multi-spindle turning machines, operators will always be within the same programming family.



**With 2 times 5 tools in counter-operation, the MultiAlpha opens a new range of possibilities to users**

### Counter spindles in action

The MultiAlpha is equipped as standard with a counter spindle which can hold five tools. This provides this machine with a considerable machining capacity in counter operation.

The increased capability of counter-operation machining operations can, in certain situations, have an adverse effect on machine cycle times. To prevent this from happening, regardless of the type of part the customer might wish to produce, 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, 5 with counter operation on seven, with five tools and on stations 2,

4, 6 with the counter operation on eight. In this version, it's actually comparable to working with two machines with four 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 which is highly productive and whose efficiency guarantees they will 'stay in the game.' The Tornos MultiAlpha and MultiSigma multispindle turning machines are in this category of solutions.

Do you require further information on multispindle solutions from Tornos? Please contact the Director of the MultiSpindle Business Unit. Mr Ivan Von Rotz (vonrotz.i@tornos.com)

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

<http://www.tornos.com/dnld/app/tornos-ap-auto-uk.pdf>



With its integrated PC, MultiSigma creates a new level of user-friendliness



Maximum quality  
Finished parts  
Outstanding productivity  
Painless programming



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