

## A Change Without Alternative



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# From CAM to CNC: A Change Without Alternative

## Burgmaier opts for the Index CNC multi-spindle automatic for mass-produced complex turned parts

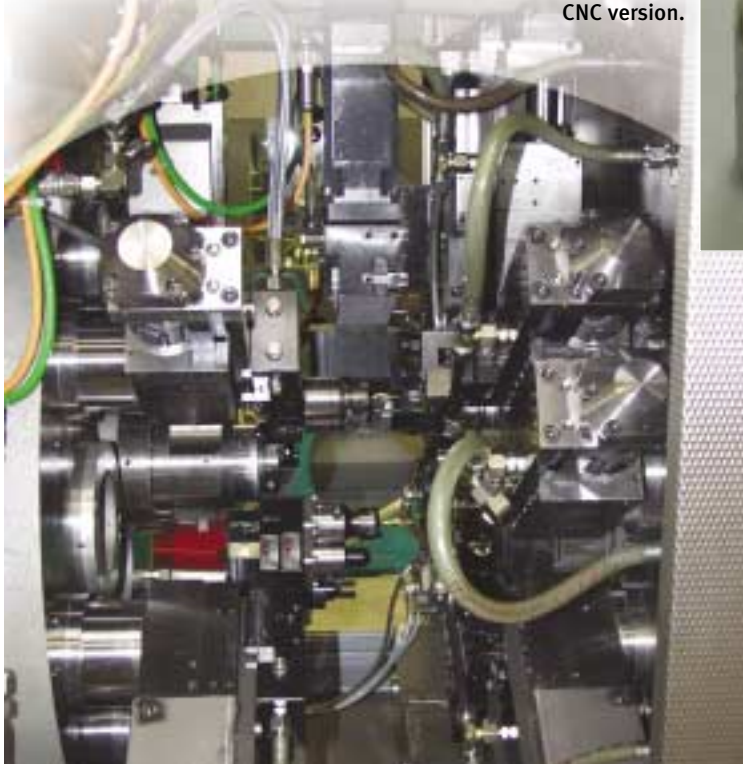
The Burgmaier Metalltechnik GmbH in Allmendingen, Germany is considered an important figure among the manufacturers of turned parts. This company has become a coveted partner of the automotive industry and their OEM suppliers precisely because early on it specialized in the production of complex and difficult-to-machine parts. The machine tool basis for these parts is the use of the Index CNC multi-spindle automatics.



Not all mass-produced turned parts are the same. There is a good reason for the two-class society in this area: Here cheap products, often produced in low-wage countries; there a highly complex, often safety-relevant part for high-tech products, production site: Germany. Here the cam-controlled multi-spindle automatic with its almost incredible sturdiness; there the CNC multi-spindle automatic as a technological all-round talent of surprising flexi-

lity. Those who smile at this way of looking at things as being too graphic should have a look at the statistics from the House of Burgmaier Metalltechnik, Allmendingen -

**Stumbling block Control bushing:** The cam-controlled multi-spindle automatic was not able to machine it, and the machining solution only became possible with the changeover to the CNC version.



which at a yearly output of about 100 million parts and a turnover of 50 million Euros is one of the big companies in the area of mass-produced turned parts. If in the past easy-cutting steel provided around 70 percent of all multi-spindle machining, nowadays the majority are the difficult-to-machine ball-bearing steels or high-alloy steels.

This is reflected in the machinery. 66 of the 118 metal-cutting machines are multi-spindle automatics. Of those, 31 machines in turn are already CNC-based. This trend becomes more apparent when you look at the investments made over the last few years. Karl-Hugo Schick, Managing Partner of the Burgmaier GmbH, gives a few figures: "Every year we invest between three and five million

Euros in multi-spindle automatics. And for the last few years almost exclusively in CNC-controlled machines."

Hans Bernhard, Burgmaier's Technical Managing Director thinks that this is mainly due to the flexibility and high productivity of the machines: "What has convinced us is the overall concept. Each spindle is driven by its own motor and its speed is infinitely variable up to 6,300 rpm; additionally, you have right- and left-hand rotation, spindle stop and C axis. This allows us to machine even difficult materials with optimum cutting performance. Moreover, a total of up to 24 tools can be used. No other manufacturer can offer this."

**An all-round talent but no panacea:** The flexible and highly productive CNC multi-spindles have paved the way for Burgmaier into the high-tech era.



The six individually driven spindles along with the large number of possible tool carriers is the feature that makes the MS series stand out and produce such a high output. Pictures: by courtesy of Index/fertigung



**Keyword**

**The CNC multi-spindles from the MS series**

The MS series from Index, Esslingen, designed as six-spindle automatics and grouped together in the MultiLine product group, is available as a modular system in different versions.

- MS 32 Compact: a machine for short turned parts and simple complete machining in the small-to-medium lot size range, equipped with 12 tool carriers which can be fitted with up to 18 tools.
- Quill versions MS 32 P, MS 42 P

and MS 52 P: designed for short turned parts and shaft parts requiring high machining effort and backworking with C and Y axes; 17 tool carriers can accommodate up to 24 tools.

- Counter spindle versions MS 32 G and MS 52 G: Six full counter spindles and Y axes on several tool carriers allow high-complexity parts with complex backworking requirement to be machined.

Index in Esslingen will be pleased to hear this. After all, they pride themselves on having invented the CNC multi-spindle automatic and introduced it for the first time on the market in mid-1980. In the meantime, a wide range of machines is available based on a modular design.

The MS series, generally designed as six-spindle automatic and grouped together at Index in the so-called MultiLine, begins with the MS 32 Compact as the basic version. The next option is the quill version, while the counterspindle version with six driven counterspindles is top of the line. At the present time, three different spindle capacity diameters are available: 32 mm, 42 mm and 52 mm.

Index, too, regards separately driven spindle motors as standing out against the competition. According to Helmut Pleyer, Technical Sales Director of multi-spindle automatics in Esslingen, this allows the customer to generate an enormous competitive edge. "There are some materials which have a very narrow machining range. This means that beyond a certain cutting speed the surface finish and accuracy achieved are unsatisfactory, the tool life leaves much to be desired, and the chips coming out of the machine are long and tangled. This makes it absolutely necessary, especially if greatly varying diameters must be machined from one spindle position to the next, to be able to rely on adjusted spindle speeds." Analogously, the machining accuracy is also improved, especially if difficult materials are used. "If the process-safe tur-

ning accuracy of the cam-controlled multi-spindle automatic," continues Helmut Pleyer, "is 0.06 mm, 0.03 mm are no problem for the multi-spindle automatic." Under optimum technological conditions, it is quite possible to achieve an accuracy under 0.02 mm.

The machining accuracy also depends on the bar guides. For almost all models, Index offers bar storage in an oil bath, thus preventing a vibration of the bars during machining. The only exception so far: For

**The breakthrough came with the new machine.**

the MS 42 C, this magazine does not yet exist for automatic loading. Here there is still work to be done on the part of the Esslingen firm, says Hans Bernhard.

Apart from that, he can only confirm Index' s statements, most conspicuously on a concrete example from the early days of the CNC multi-spindle era at Burgmaier: The machining of a high-quality steel bushing on a conventional multi-spindle automatic didn't get going, because the part could simply not be cut off economically. The breakthrough did not come until an M 42 was used, with the possibility of travelling at a constant cutting speed. Result: The Allmendingen firm got the order and furthered their reputation as a specialist for difficult cases. ➔



**INFO-SERVICE**

**The CNC Multi-Spindle Automatic As A Must**

The trend at Burgmaier GmbH, Allmendingen, the manufacturer for mass-produced turned parts, goes clearly towards high-strength steels, complex contours and reduced lot sizes. That's why the changeover from the cam-controlled to the CNC multi-spindle automatic, which was done about six years ago, was the only way to go. For the flexible use, in conjunction with highly productive machining, not only significantly reduces the machining times, in some cases they make it

possible that certain parts can be machined at all. The first choice at Burgmaier are the multi-spindles by Index, Esslingen.

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Helmut Pleyer, Index, (on the left, next to him Anja Meister from Index), Hans Bernhard (center) and Karl-Hugo Schick, Burgmaier, agree: "The CNC multi-spindle automatic is an ideal medium for the production of high-complexity and difficult-to-machine mass-produced turned parts."

Meanwhile there are a host of such cases which, according to Hans Bernhard, all have one thing in common: "Without the Index CNC multi-spindle automatic, an economical machining wouldn't be possible at all." Economical also because the quick changeover capability of the machines has shifted the profitability of the lot sizes clearly toward the lower end: If at Burgmaier the economic running time of the conven-

workpiece, this number can go up to 17 with the multi-spindle automatic. Thus, machining takes place at a much higher rate."

At the latest at this point, it's worth having a look at the investment costs which, for a comparable CNC multi-spindle automatic, are about four times those of the single-spindle automatic. Also in comparison with the conventional multi-spindle automatic, these costs are about twice as high for the CNC variants. The same also applies to the service costs.

That's why the CNC multi-spindle automatic, according to Burgmaier Managing Director Bernhard, isn't a panacea either. "We still have quite a few applications for which the use of

conventional multi-spindle automatics is the best choice." Especially with smaller diameters under 16 mm, where a relatively small chip removal takes place, the CNC multi-spindle automatic is uneconomical. The same is true of simple parts made of easy-cutting steel."

However, it is a fact that at Burgmaier the machining focus is on quite a different parts range. That's why, according to Karl-Hugo Schick, the CNC multi-spindle automatic is an absolute must. "If we want to be a competent partner for our customers, we must have visions. We have therefore decided to specialize in high-strength materials. And for those, we just need suitable machinery."

### Even smaller lot sizes are now profitable.

tional multi-spindle automatic is calculated at at least 40,000 units, this limit is around 10,000 units for the CNC multi-spindle automatic. But that isn't all: "During pre-series production", notes Karl-Hugo Schick, "we have the machine run for as many as 5,000 parts." Mind you, of course only if backed by a fairly large order. This flexibility combined with the high productivity moves the CNC multi-spindle automatic in the counterspindle version close to the single-spindle automatic, says Index Sales Director Helmut Pleyer. "If one thinks of the spindle positions and the associated tools as analogous to the turrets of a single-spindle automatic, one quickly realizes the productivity potential offered by using the multi-spindle automatic. If, in the single-spindle automatic, a maximum of two tools are used per

### User rating

#### User:

Burgmaier Metalltechnik GmbH, Allmendingen

#### Machine:

The CNC multi-spindles from the MS series by Index, Esslingen

#### Rating:

use of up to 24 tools, allowing also milling and 6-side machining

- the six driven spindles can be adapted individually to the particular machining task

### Advantages

- economical machining of high-strength materials such as ball bearing steel
- flexible changeover, resulting in economical machining even of medium lot sizes
- high accuracy
- high productivity through the

### Disadvantages

- high purchase price of the machine
- high service costs (as with the purchase price)
- there is no automatic barloader equipped with oil-bath storage (precision) available for the MS 42 C
- for smaller diameters (< 15 mm), machining is uneconomical