

# Rotary specialist's return

**In 2003, Mikron of Agno, Switzerland, the specialist rotary transfer machine maker was on its uppers. Now at EMO in Hanover, it is launching a revolutionary new machine. Andrew Allcock reports**

**S**ales plummeted to a record low in 2003. Having been put up for sale, Mikron could find few customers willing to place an order while its future was so uncertain. Rescued by a group of three Swiss investors, and with new management in place (see box item), orders returned for existing machines. But a new machine development was needed and needed by EMO 2005 (Hanover, Sept 14 to 21). The company last launched a new type of machine in 1998, the Multifast.

It has met the EMO deadline, compressing its usual three-year development time into not more than a year to realise the revolutionary NRG-50.

The development has been driven by recently installed vice president engineering and development Giordano Gaboardi who hails from an Italian rotary transfer machine maker. Setting a new

benchmark for rotary transfer precision and flexibility, an accuracy of  $\pm 4$  microns and repeatability of  $\pm 2$  microns are claimed for the 1,400 mm diameter table machine.

## CLEAN TECHNOLOGY

With 60 per cent of the company's sales to the automotive market and with almost 30 per cent in fuel and diesel injection, the new machine's accuracy will be particularly relevant to the latest generation of 'EU4' regulation-compliant diesel systems.

Growth in the US market for diesel vehicles will also demand large increases in production and, in turn, the need for production equipment. But any high-precision, complex component with machined features falling within a 50 mm<sup>3</sup> envelope is NRG-50's target, especially where there is constant

technological evolution requiring short time-to-market.

Watch plates and bridges, hydraulic and pneumatic control components, high-tech connectors and medical parts, are all potential areas.

In addition to meeting the demand for high accuracy, the ability to combine operations into a single machine is another strong attraction – one-hit machining comes to the transfer machine market. Larger sizes of NRG machines are expected in the future and these could challenge the Multifast CNC machine.

The NRG-50 is a 12-station machine, can boast up to 140 CNC axes, carry up to 30 NC controlled unit heads, make use of a total of 96 tools and can produce up to 30 parts/minute – but flexibility and scalability are watchwords and the company offers various configuration examples by way of demonstration (see

## The change makers

Mikron, Agno, is now headed up by joint managing directors Franz Wyss and Markus Schnyder. Mr Wyss hails from Mikron's German operation in Rottweil, where Multistep machines are made, and Mr Schnyder was previously managing director of Mikron Tool. How have they changed the company?

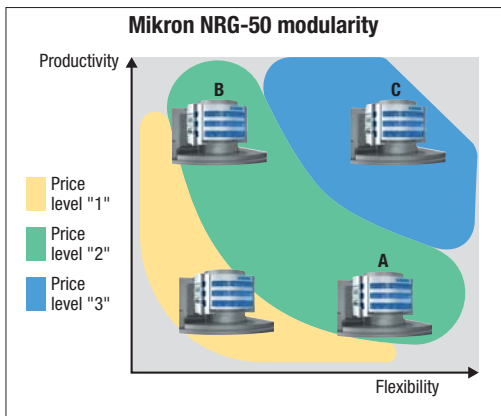
In 2003, the first tasks, says Mr Wyss, was to reassure the workforce who were "disorientated"; second, management had to be united to get them working together for the company as a whole, while management reaction time from decision to action had to be speeded up. Training addressed these issues.

Weaknesses of the previous management boiled down to a few key problems: the managing director did not understand the technology; he could not communicate with the workforce at a technical level, nor, indeed, in their first languages (German, French and Italian are spoken variously in this south-eastern part of Switzerland); he was an analyst and strategist but not a 'doer' or team leader, which meant that the managers around him did not act as a team, but rather as individuals.

In addition, in 2000, as markets turned down, says Mr Wyss: "The company felt that it was the best. And as business fell, management didn't realise that the situation had changed

completely – they waited, thinking that the market couldn't keep going down and down. It's impossible." So a combination of over-confidence, unusual market conditions, and a management group (not team) unable to act or to lead the workforce, saw the company's business crumble.

It took two years to overhaul management practices and develop a team approach. No external consultants were brought in, everything was done in house. A number of individual improvement projects in numerous departments were set up and their progress was measured against associated sets of Key Performance Indicators (KPIs).



diagrams). The NRG-50 is "is a unique proposal that will give us a lead for at least four to five years," says Laurent Vuille, vice president sales.

The essential features delivering precision are symmetry, rigidity, and control of heat-generation. No detail photos or diagrams of the construction are available, as yet.

The machine base is a symmetrical annular casting. Resting on top of this is effectively a circular steel cage around the outside of which are the tool stations – vertical top and bottom plus a horizontal position at each station. All spindle motors etc are located outside the working area and avoid contamination – a problem with previous transfer machines.

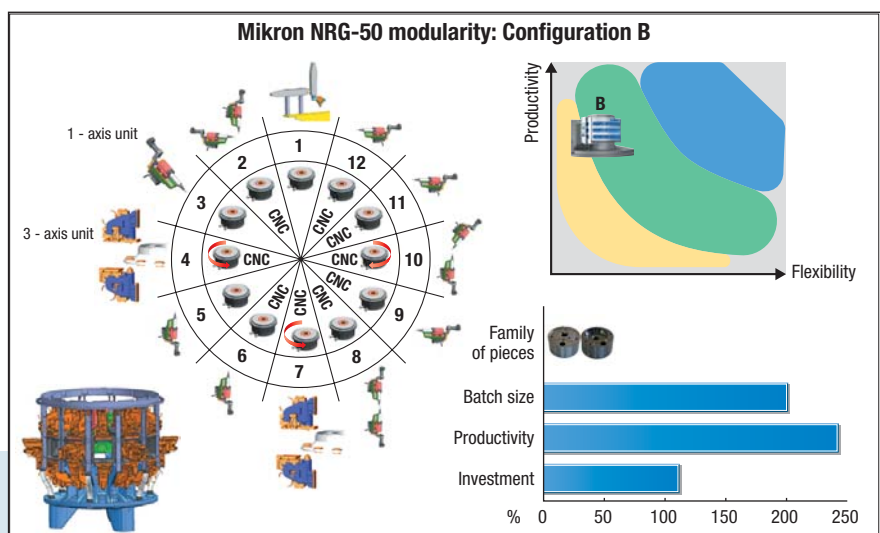
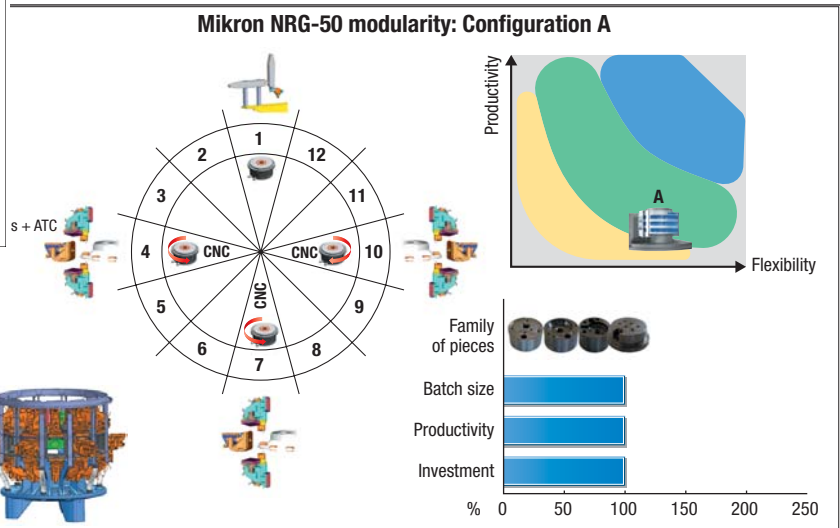
Through the centre of the steel cage, and located in it, runs the torque motor spindle which drives the indexing table which is suspended over the hollow centre of the annular base casting such that swarf falls to the bottom of the machine, out of

Illustrations: Phil Holmes

"Once we started measuring, we began to see the problems – for example, in the service department it might take two months for a quote to be supplied and so customers complained."

Progress against KPIs is ongoing: "We are perhaps 80-90 per cent where we want to be," says Mr Wyss.

The idea for the new machine came out of one of the management team meetings – each manager pitched in with the concerns and demands he was hearing. The base requirements were born. At the end of 2003, two development teams were put together – one with a linear machine bias and another with the rotary design bias – and they were tasked to look at new



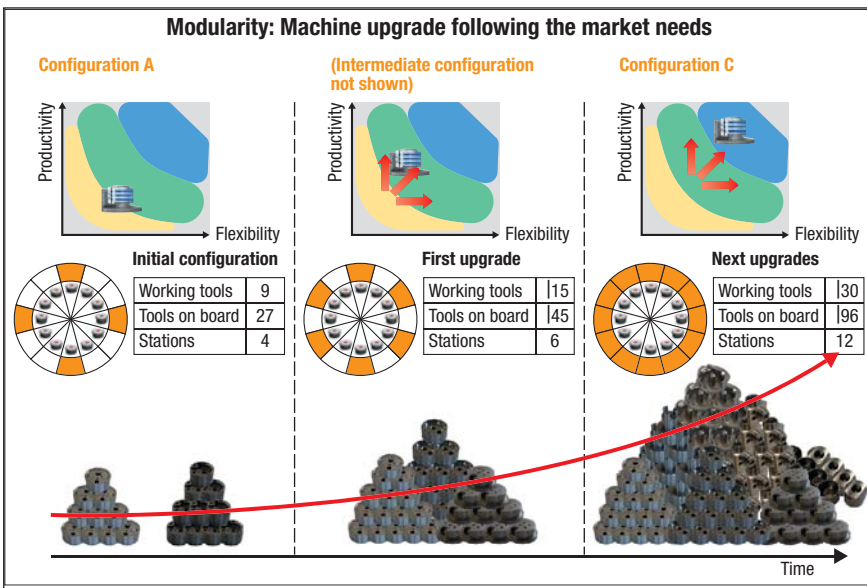
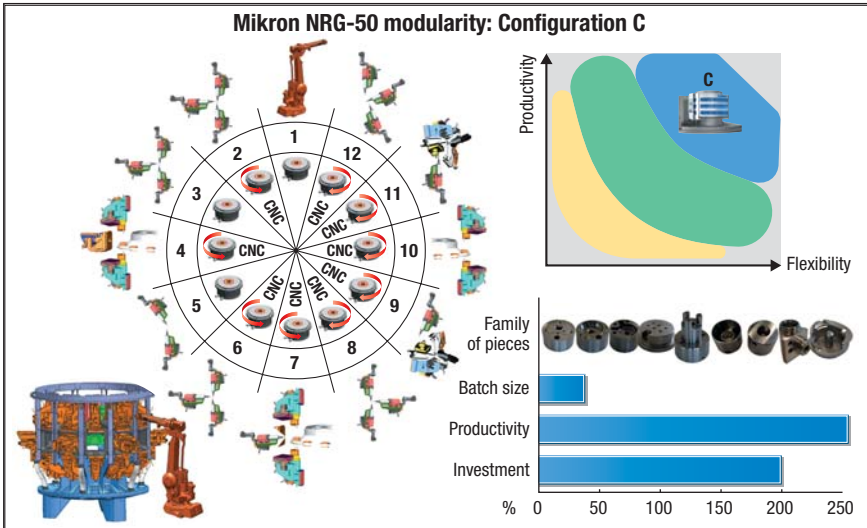
concepts. By May 2004, it was clear that a rotary concept should be pursued, but the company hints at "good ideas in the drawer" for the future. In that month, Dr Giordini Gaboardi joined the company, bringing some design concepts he had had in his mind for some time, but had been unable to realise.

Regular review meetings made sure that pace was maintained and problems flagged. Apart from the Bosch control, there are no new technological elements that deliver the machine's overall capability. It is the concept and manufacture/assembly of the different

elements that are the key, together with novel in-house developments like the toolchanging spindles.

Having assembled a good development team, the new management is alive to the fact that technical people need to be kept interested with projects and is making sure that they are – this did not happen before and Mikron lost key people, their experience, with continuity, was lost.

As for compressed development times, these will be the norm from now on: 12-18 months, like the NRG-50 – "or even faster".



the working area, and along with it the heat contained in it.

**THREE HIRTH GEARS**

The indexing table does not drop/rise to index. Instead, six hydraulic plunger units in the cage engage/disengage a Hirth gear that mates both with a Hirth gear on the rotary table and a static Hirth gear in the cage. Table transfer takes 1 sec.

The rotary table can have either vertical or horizontal locations, with part rotation supported up to 6,000 rpm. Unusually, a 2-axis unit featuring rotation

and swivel is also a possibility for horizontal tables and effectively gives a unique vertical configuration, it is claimed.

In the tool station locations, a number of units may be installed, these include: single-axis CNC units; 3-axis CNC units; 3-axis toolchanging units (another unique design). All units are identical, regardless of their orientation in the machine and all can feature one of many spindles, including a deep-hole unit. Push-button, single-handed exchange of tooling is another feature of the spindle units.

The 3-axis units can also locate in a

**Mikron range**

The company's existing range includes the 25-year-old concept Multifactor; the cam-driven Multistar, launched in 1991 – a more flexible and more productive version of the earlier machine; the CNC linear transfer Multistep – unveiled in the mid-90s; and the CNC Multifast launched in 1998.

Each product sits in a different position in terms of productivity versus flexibility, with Multistar offering the highest productivity and Multi-step offering the highest flexibility. The NRG-50 challenges existing barriers, however. Mikron has delivered over 7,000 machines and claims 1,000 customers.

slider frame which gives another controlled CNC axis – a vertical-to-horizontal translation. Combined with a rotary axis in the table fixture, this means that 5-axis machining is possible – another capability claimed to be unique. The close proximity of the tool spindles to the table and limited spindle overhang from the unit body makes for a very rigid set-up.

Along with the vertical despatch of swarf away from the machine's frame, other features counteract thermal effects. Coolant controlled to  $\pm 0.5^\circ \text{C}$  is pumped inside and around the machine frame and spindle units, while the machining area is totally air conditioned.

Mikron is also the only rotary transfer maker to boast its own tool manufacturing company (next door) – crucial in delivering a complete machine/tooling package. Indeed, the company is supplying special tools to a competitor to help it get its machines performing. And the NRG-50 with its capabilities is expected to drive tooling development further. □

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