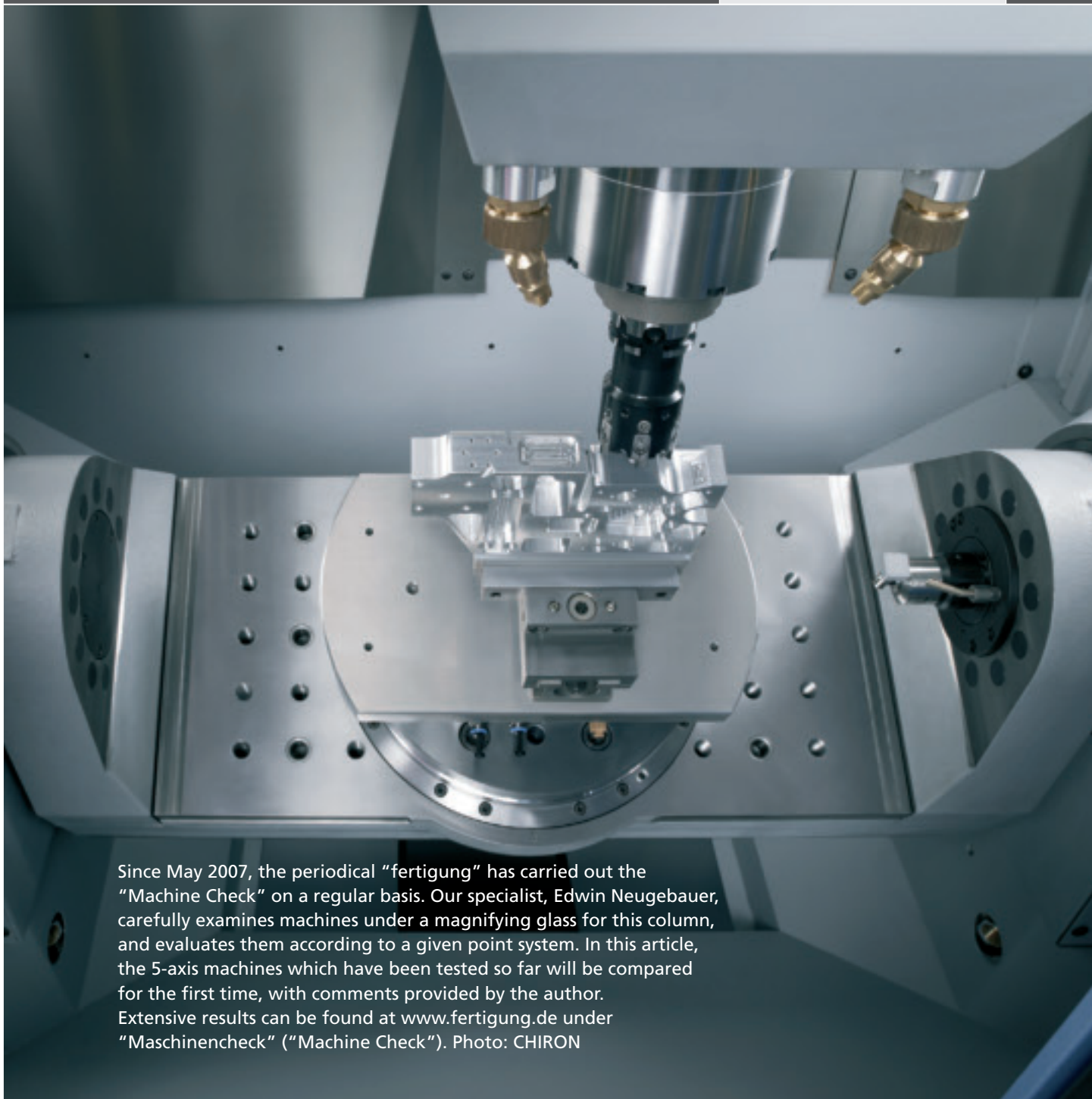


# PRESSEfocus

Special printing

Machine check  
Main focus: 5-axis machining

fertigung



Since May 2007, the periodical "fertigung" has carried out the "Machine Check" on a regular basis. Our specialist, Edwin Neugebauer, carefully examines machines under a magnifying glass for this column, and evaluates them according to a given point system. In this article, the 5-axis machines which have been tested so far will be compared for the first time, with comments provided by the author. Extensive results can be found at [www.fertigung.de](http://www.fertigung.de) under "Maschinencheck" ("Machine Check"). Photo: CHIRON

**GS 1000/5-T from Alzmetall**



The GS 1000/5-T is a versatile machine with a compact design. The cast iron frame, portal and guide design give it rigidity. In workpiece handling – whether with a pallet or workpieces only – and in the clamping technology, there are plenty of variation options.

Alzmetall produces the machine 80% themselves; in other words, the customer can also be quickly helped with regard to after-sales problems. The

The A and C axes are equipped with direct drives, which ensure high accelerations and rotary speeds. A cutting path of 500 mm in the Y direction results when the A axis is positioned at 90°.

Photo: Alzmetall

TCO topics are still in their beginnings; only sparse feedback is coming from the application fields. A new project will counteract this.

**Facts + figures: Machine data**

Work area (X/Y/Z axis)	800 x 800 x 600 mm
Rapid feed (X/Y/Z axis)	60 m/min
Maximum table load capacity	1000 kg
Main spindle	
Speed	12 000 (18 000) rpm
Torque/power	121 (70) Nm, 35 (22) kW
Control	Heidenhain iTNC530; Siemens 840D
Set-up area	10.7 m <sup>2</sup>
Price (standard machine)	420 000 Euro

**FZ 12K S five axis from CHIRON**



CHIRON has developed an ideal supplement to the FZ series with the FZ 12K S five axis. The machine captivates with its consistent design for accommodating growth in productivity, reinforced by high accelerations in the axis drives, short chip-to-chip times and the intelligent 2-axis tilt rotary table. Precision machining is a priority at CHIRON. The data collection and evaluation by the Service Department is exemplary. TCO data specified in the contract is not considered to be positive

**Compact design for high productivity per unit area: it has a spatial requirement of 4.4 m<sup>2</sup>, weighs 6.5 t and has free space for clamping technology, with an interference diameter of 695 mm.** Photo: CHIRON

all-around, but all necessary data is there for substantiated conclusions. Only with the process-oriented support by practical software on the control is there still room for improvement.

**Facts + figures: Machine data**

Work area (X/Y/Z axis)	550 x 400 x 360 mm
Rapid feed (X/Y/Z axis)	75 m/min
Maximum table load capacity	320 kg
Main spindle (motor spindle)	
Speed	15 000 (24 000) rpm
Torque/power	29 (29) Nm, 24 (24) kW
Control	Heidenhain iTNC530; Siemens 840D
Set-up area	4.4 m <sup>2</sup>
Price (standard machine)	from 185 000 Euro

**VF-6TR from Haas Inc.**



With corresponding system modules, one can plan a solution tailor-made to one's needs thanks to the extensive machine selection. The standard version (vertical BAZ VM-6 was tested here) is well-suited for conventional milling machining, thanks to the solid frame structure and the spindles (gear spindles, inline spindles). For 5-axis simultaneous HSC milling, the offered solutions were below the market requirements. The Haas' own control is easy to operate. The price of the machines speaks for itself and can't be undersold when

**Milling with an optimum investment: The machine is mainly used in die construction; what's missing are European standards, such as HSK take-ups.** Photo: Haas

the customer's requirements are met. For service calls, the professional is quickly on-site with the replacement part. TCO criteria are not realized.

**Facts + figures: Machine data**

Work area (X/Y/Z axis)	1626 x 813 x 762 mm
Rapid feed (X/Y/Z axis)	13,7/15,2/15,2 m/min
Maximum table load capacity	227 kg
Main spindle (inline)	
Speed	12 000 rpm
Torque	102 Nm
Control	Haas
Set-up area	16.6 m <sup>2</sup>
Price (standard machine)	160 790 Euro

## MyTrunnion-1 from Kitamura



The vertical 5-axis machine series "MyTrunnion" from Kitamura includes machines which supplement each other in their application areas. With regard to precision machining, components are put together which are practical and match. What's surprising is the realization of the linear-axis dynamics on the massive sliding guides. The effort put in for machine thermostability is among the top in the sector. It's obvious that Kitamura attaches great importance to demonstrating the individual machines specifically and optimally. There are limitations on the clamping technology

The C axis of the two-axis table can turn at up to 1000 rpm; the manufacturer provides special tools for turning and grinding operations. The machine can machine workpieces weighing up to 20 kg. Photo: Kitamura

and application range of the working spindle. So far, it is not yet known what the TCO is. Knowledge concerning the TCO will certainly improve as more of these machines permeate the market.

### Facts + figures: Machine data

Work area (X/Y/Z axis)	325 x 510 x 460 mm
Rapid feed (X/Y axis)	50 m/min; Z axis: 36 m/min
Maximum table load capacity	20 kg
Main spindle	
Speed	15 000 rpm
Torque/power	71 Nm, 7.5 kW
Control	Kitamura-Fanuc 300iM-A
Set-up area	7 m <sup>2</sup>
Price (standard machine)	295 000 Euro

## VG 5000 from OKK (Sales: Teamtec)



OKK's VG 5000 is a powerful machine, the advantages of which are used when cutting high-strength materials. Vibration-rigid machine construction, a powerful spindle and a massive rotary-tilt table allow the machine to run smoothly, even at high tooth feeds. The strengths are geared toward sophisticated heavy cutting tasks; also because the spindle supplies a maximum torque even at low speeds, which allows it to run at the tool performance limits during roughing. When finishing with small tools, there are speed-related limitations. The separation of the front-sided

The rotary swivel table with the working spindle is the heart of the machine. A lot of importance is put on the thermostability. Photo: OKK

operation and rear-sided loading is advantageous. "The Japanese suppliers must be made aware of how important the life cycle costs are.

### Facts + figures: Machine data

Work area (X/Y/Z axis)	760 x 900 x 610 mm
Rapid feed (X/Y/Z axis)	24 m/min
Maximum table load capacity	600 kg
Main spindle	
Speed	12 000 rpm
Torque/power	600 Nm, 25 kW
Control	Fanuc F310i-A5
Set-up area 1	5.2 m <sup>2</sup>
Price (standard machine)	450 000 Euro

## Variaxis 630 5X-II from Yamazaki Mazak



The Variaxis 630 5X-II is a very compact machine with a fast, convenience-equipped control. The control's performance effectively supports the optimum organization of the production process. Machining task flexibility, roughing/finishing and any number of extendable pallet and tool changes are available with a full range. The machine achieves peak values for the sector in workpiece and tool handling. Service availability is also top class. There are a wide variety of options; only for the control is delivery limited to the Mazatrol

The machine will especially convince you with its control, as well as with its very dynamic behaviour when handling workpieces and tools.

matrix. The determination of TCO data is possible according to Mazak, but up till now, no such contracts have been made.

### Facts + figures: Machine data

Work area (X/Y/Z axis)	630 x 765 x 510 mm
Rapid feed (X/Y/Z axis)	52 m/min
Maximum table load capacity	500 kg
Main spindle	
Speed	12 000 (25 000) rpm
Torque	172/252 (29) Nm
Control Mazatrol Matrix	
Set-up area	12.9 m <sup>2</sup>
Price (standard machine)	254 000 Euro

## MACHINE CHECK

### Machine Check results

	GS1000/5T Alzmetall	FZ 12K five axis CHIRON	VF-6TR Haas Inc.	MyTrunnion-1 Kitamura	VG 5000 OKK	Variaxis 630 5X-II Yamazaki Mazak
Machine commissioning (maximum number of points: 25)	24	23.50	17	17	23.25	18.5
Maintenance-friendliness (maximum number of points: 100)	72.50	87.50	77	71.50	88.50	61
Automation (maximum number of points: 100)	80	100	88	72	94	94
Control (maximum number of points: 50)	33	33	42	39	36	50
Easy setup (maximum number of points: 50)	47	50	32.25	24	50	38.75
Service (maximum number of points: 75)	60	65.25	58.50	58.50	53.25	64.50
TCO (maximum number of points: 85)	51	85	30.60	27.20	40.80	64.60
Contract (maximum number of points: 15)	10.50	10	11.50	10	12	12
<b>Total</b> (maximum number of points: 500)	<b>378</b>	<b>454.25</b>	<b>356.85</b>	<b>319.20</b>	<b>395.80</b>	<b>403.35</b>

The values in the table are based on the extensive evaluations which the respective machine check is based on.

Extensive results can be found at [www.fertigung.de](http://www.fertigung.de) under "Maschinencheck" ("Machine Check").

CHIRON-WERKE GmbH & Co. KG  
Kreuzstraße 75  
D-78532 Tuttlingen  
Tel. +49 (0) 74 61-940 0  
Fax +49 (0) 74 61-940 8000