



XG MULTI-TECHNOLOGY MACHINING CENTER



Maximum Technology Flexibility



XG 692 – Widely Applicable by Covering a Wide Range of Parts

MAG is one of the leading suppliers when looking not only for a machine, but a complete manufacturing and technology solution in the field of engine and powertrain components.

The XG 692 multi-technology machining center enables complete milling, turning or grinding of constant velocity joint parts such as housings, hubs and cages. The perfected machine concept is designed for large quantities at the highest processing quality.



Constant velocity joint parts: housings, hubs and cages



Type AC/RF/UF housing, soft milled



Type VL/CG housing, soft milled



Type VL/CG housing, hard milled



Type VL/CG housing, soft milled



VL/CG housing ring, soft milled



Cage with fly-milled windows



Cage with milled windows



Type AC/RF/UF cage and hub, soft milled

XG 692 – Highly Flexible by Milling, Turning and Grinding Joint Parts

For the complete machining of a ball joint cage the XG machine plays out its advantages both in milling and in turning.

The linear drives help the XG 692 to the highest dynamic response with absolute contour accuracy for milling and turning, and thus make it a highly flexible CNC machining center.



Internal turning of a hardened joint cage in the first setup



Fly-mill cutting/hobbing – joint cage windows



External turning of a hardened joint cage in the second setup



Milling joint housings



Milling a window on hardened joint cage in the second setup



Grinding hardened joint housings

XG 692 – Compact and Stable for Highest Precision and Productivity

We meet and exceed the increasing demands on precision and productivity of machine tools with our XG 692 multi-technology machining center. The dual-spindle machine is convincing with its vertical machine concept for overhead processing, high technology flexibility and the highly dynamic drive concept with linear motors.

The machine is equipped with linear motors for a highly dynamic performance, reduce cycle and idle times. Thanks to the patented X slides in triangle design, parallel processing with double production, or a fully independent processing by both spindles is possible. In addition, the triangle design contributes to a very compact design.



The innovative machine concept with exemplary stability and rigidity means highly productive manufacturing with perfect precision. Providing the options of double production through parallel processing of two identical workpieces, or maximum flexibility through machining two different workpieces, this machine allows for complete machining of constant velocity joint parts through turning, milling or grinding. The almost wear-free linear motors on the main axis (X) provide for less follow-up costs. Combined with the torque motors in both rotary axes, the result is a very high overall dynamic response and thus remarkable speed.

The highly dynamic response is supplemented by a rapid workpiece feed in pick-up process and a flexible connection of the automation, which is possible from 3 sides.

Axis configuration

- X = Linear motors with highly dynamic response
- Z = linear infeed axis
- B = pivot axis with torque motors
- C = rotary spindles with synchronous motors
- Y = linear axis (optional)

X slides in triangular design

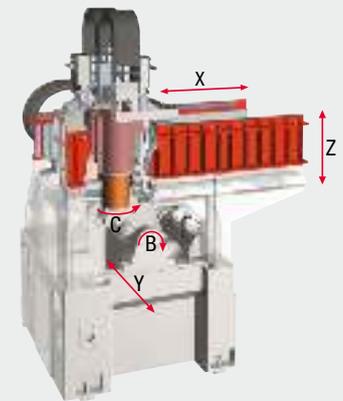
Rigid and compact machine design through the patented X-slides in triangular design enables the simultaneous processing of different workpieces and guarantees optimum accessibility for servicing.

3-axis module

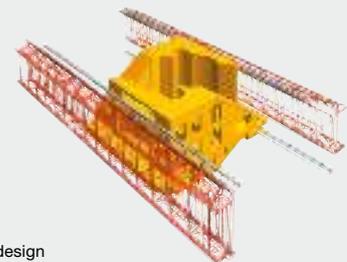
- ▶ X-slides with Z-axis and integrated C-axis turning spindle
- ▶ Compact and highly dynamic 3-axis module

Loading concept

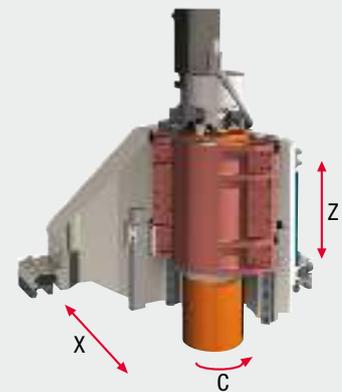
- ▶ The connection of automation is very flexible (3 variants)
 - Loading from the machine front, unloading at the rear
 - Loading from machine rear side, unloading front
 - Loading and unloading at the machine front



XG axis configuration



X slides in triangular design



3-axis module



Loading concept

XG 692 – Highlights

Speaking for this Machine

Outstanding flexibility

- ▶ Flexible configuration through high modularity in the periphery
- ▶ Multi-technology machine structure for various processing technologies, such as turning and milling or grinding
- ▶ Workpiece loading configurable in 3 variants
- ▶ Dry and wet machining possible
- ▶ Flexible chip removal, choice of 3 sides

Maximum productivity

- ▶ Vertical machine concept with overhead workpiece, optimal chip fall due to overhead machining
- ▶ Highest dynamic response through linear drive in the X-axis
- ▶ Dual-spindle machine for doubled production
- ▶ Compact machine design due to patented arrangement of the X-slide

Highest precision

- ▶ Very rigid machine structure
- ▶ High physical and thermal stability
- ▶ High continuous accuracy through linear motors
- ▶ Reduction of wear parts through linear drive

Energy efficiency

As part of environment and energy management, with the XG 692 MAG offers a non-hydraulic machine. Instead of the hydraulic/pneumatic units, actuators are used.



The machine's workspace



Pneumatic workpiece clamping and handling

High modularity for excellent component flexibility

In highly productive mass production with state-of-the-art machine tools, a high degree of flexibility via optimal machine configuration is required.

Thanks to our innovative machine design we always strive to meet these requirements, also with the XG 692. Due to the large number of technology modules, this machine can be adapted to your advantage without any problems to the workpieces to be machined. Even during the design of the XG 692, the use of multi-technology stood in the foreground.

Various machine configurations

Standard configuration turning-milling

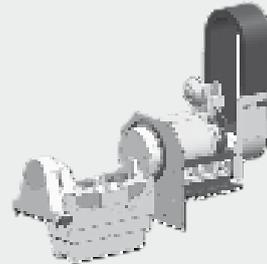
- ▶ Milling spindles on a pivoting axis
- ▶ Turning tools on a console

Extension turning-milling

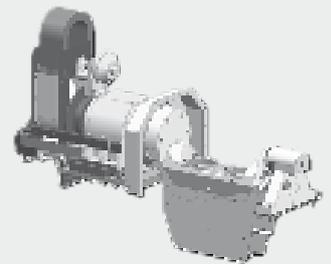
- ▶ Solid milling spindles
- ▶ Turning tools on a console
- ▶ Milling spindles on a pivoting axis

Grinding configuration

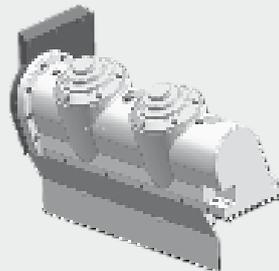
- ▶ Solid grinding spindles
- ▶ Grinding spindles on a pivoting axis
- ▶ Dressers on C axis



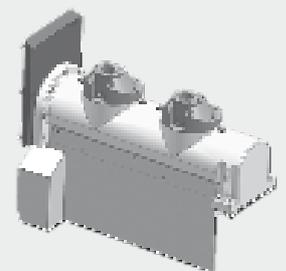
Version with B-axis



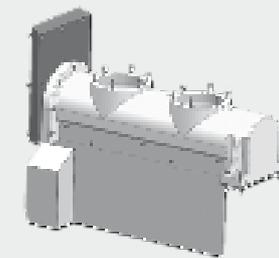
Version with B- and Y-axis



Console for roughing



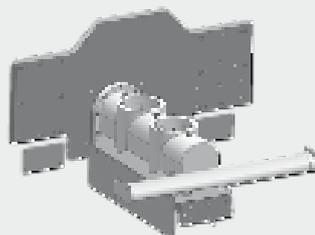
Console for turning



Console for grinding



Rotary turret



Console for fly-milling/hobbing

XG 692 – Automation with Maximum Flexibility in the Configuration

Automation for loading and unloading constant velocity joint parts

Highlights

- ▶ Workpiece loading configurable in 3 variants
- ▶ Contactless start and end orientation of the parts
- ▶ Loading belt as a driven plate chain belt
- ▶ Chain belt adjustable in width on both sides
- ▶ Defined positioning of the parts to fixed stop
- ▶ Radial alignment by means of a mounted gripper and contactless slot detection on a handling system

Implementing the automation

The installation of automation is very flexibly designed and can be performed in three different versions.

A loading and unloading from the back or front of the machine ensures a compact design of the system.

If your system configuration requires a separate loading/unloading from the front and back sides, this is also possible.

Function of the automation

The workpieces are fed by a driven loading conveyor (plate chain belt), which is adjustable in width on both sides, and positioned according to a defined fixed stop.

A rotatable gripper mounted on the handling system picks up the workpieces, aligns them radially through contactless slot detection, to then place them in the loading nests on a turntable in the transfer station.

The turntable swings the workpieces into the loading area of the machine, where they are pressed directly by the vertical axis in the chuck.

When unloading, the workpiece spindles place the finished parts directly on the unloading nests on the turntable.

The turntable swings to a transferer which places the parts on the unloading belt.

The gripper of the handling system unloads the workpieces to the discharge position, a pneumatically actuated pusher pushes the workpieces to an unloading belt.



XG 692 – Multifaceted Variants

Through a Wide Range of Machining Options

Machining of kingpins, joint cages and ball hubs

Soft

- ▶ Pre-milling with two fixed milling spindles
- ▶ Finish milling with two spindles on the B-axis
- ▶ Turning with two turning tools on the console

Hard (dry)

- ▶ Hard milling with two milling spindles on the B-axis
- ▶ Hard turning with two turning tools on the console

Hard (wet)

- ▶ Grinding the cage track with two fixed grinding spindles
- ▶ Grinding raceways with two grinding spindles on the B-axis
- ▶ Dressing of grinding tools with two dressers on the C-axis

The XG 692 multi-technology machining center has a very compact footprint of less than 10 m².

A key factor for this is the patented, close together laying array of technology modules in the machine's workspace. As a result, the travel paths are very short and thus the idle times are shorter.

A further point in the optimisation of travel paths is the linear motor technology that, in addition to the high dynamics in the axis movement (increased rapid traverse and high acceleration) also brings improved accuracy and reduced wear.



Milling machine with rotary jig and hard milling spindles



Milling machine with roughing and finishing spindles and rotary turret



Grinder for raceways and outside diameter



Grinder with workpiece chuck inner piece and dressing wheel

Technical Data

Machine type			XG 692
Work area	X-axes	mm	750
	Z-axes	mm	250
	optional Y-axis	mm	70
Pivoting spindle optional	with console	deg	-95/+35
Workpiece spindle*	C-axes: speed range	rpm	0 – 3000
	Power	kW	30
	Positioning accuracy	arc s	±6
	No. of spindles		2
Axis speeds and accelerations	X-axes	m/min.	120 (1 g)
	Z-axes	m/min.	30 (0.3 g)
	optional B-axis	m/min.	15 (0.3 g)
	optional Y-axis	m/min.	30 (0.3 g)
Direct measurement system (absolute) (in all axes)			
Milling spindles*	Power (40% duty cycle)	kW	22
	Speed	rpm	6000
	Tool mounting		HSK 63
Grinding spindles*	Power (40% duty cycle)	kW	20 / 12
	Speed	1/min	30 000 / 60 000
	Tool mounting		Special mounting
Dimensions	Width incl. autom. loading / unloading	mm	3150
	Length with switch cabinet	mm	4650
	Height (machine/machine with cable carrier)	mm	2840 / 3460

* Default: Customers can have machines equipped with spindles with other characteristics

Technical alterations reserved.

Service and Support

The **services team at MAG** is your single source for maintenance and productivity solutions designed to optimize plant operations. Through comprehensive support and factory-direct expertise, manufacturers achieve maximum equipment availability and utilization reducing their cost per piece. By providing a proven and innovative service and support program, our customers maintain the lowest possible total cost of ownership of capital equipment throughout the machine's life cycle.

After Sales Service



- ▶ Hotline / tele service
- ▶ Repair
- ▶ Maintenance
- ▶ Service
- ▶ Overhauling / Retrofit
- ▶ Second-hand machines
- ▶ Relocations
- ▶ Service contracts

Spindle Service / Online Shop



- ▶ Repair / overhauling
- ▶ Loop concepts / reconditioned spindles

Spare Solutions



- ▶ Availability 24 / 7
- ▶ Individual spare logistics
- ▶ Central warehouse

Technology Solutions



- ▶ Energy Management
- ▶ Relocations
- ▶ Technical optimization
- ▶ OEE optimization
- ▶ Overhauling and retrofit
- ▶ Control upgrades
- ▶ Maintenance management
- ▶ General contractor

Software Solutions



- ▶ Capture machine data
- ▶ Machine diagnosis
- ▶ Condition monitoring
- ▶ Energy management
- ▶ Virtual machine

Training



- ▶ Operator training
- ▶ Fluid training
- ▶ Maintenance training
- ▶ Interactive training
- ▶ NC program training



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About FFG Europe & Americas

The FFG entities in Europe and the Americas unite major players from the German, Italian, Swiss and American machine tool industry with a broad range of milling, turning, grinding, and gear manufacturing technology, and the knowhow of the renowned machine tool brands VDF Boehringer, Hessapp, IMAS, Jobs, MAG, Meccanodora, Modul, Morara, Pffnner, Rambaudi, Sachman, Sigma, SMS, Tacchella and Witzig & Frank. Since 1798, these brands have substantially contributed to the progress in industrial manufacturing and are well known as reliable and innovative equipment and systems solutions suppliers for the automotive and truck, aerospace, machine building, general machining, railway industry, energy and heavy engineering industries. While being an independent group, these entities benefit from the strengths and opportunities of the global Fair Friend Group. They stand for premium technology within FFG.



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