ALZMETALL

we drive productivity

Machining Center **GS 800**

www.alzmetall.com

CONTENT

Explanations/Abbreviations

AF	Air Foil
AGK	ALZMETALL-Gantry-Concept
CDF	Cycle duration factor
FEM	Finite-Elements-Method
FDT	Milling - Turning – Torque-Drive
GS	Gantry Standard
GX	Gantry Special execution
KGT	Ballscrew-Drive
LOB	Laser Surface Machining/Treatment
NPS	Zero Point Clamping System
SDK	NC-Swivel-and-Rotary-Table
T	Torque-Drive
TCO	Total Cost of Ownership
TCP	Tool Center Point
WN	ALZMETALL – Standard Specification

COMPANY INTRODUCTION

ALZMETALL is a company with an international reputation and global activities. For more than seven decades we have been the leader in technology for drilling, milling and casting. Alzmetall products have proven themselves in general machining applications, in the automotive industry, in mould and die business, at the aerospace sector, as well as in many mid-size mechanical engineering enterprises. Our experience is based on over 220.000 machines supplied.

We focus on precision, performance and Quality for all our products. With our own foundry we do not only produce grey cast iron and spheroidal grey cast iron for our own machines, but also are supplier to the machine tool manufacturers and customers worldwide.

Our open company culture encourages innovation and performance by a continuous innovation towards High Tech and customer benefit for added value.

Developing the GS-series, we offer highly dynamic and extremely rigid machining centers according to our pretensions: **„we drive productivity“** .

ALZMETALL is holding its own Sales and Service associated Company in China.

ALZMETALL Machine Tools (Taicang) Co., Ltd.,
Dong Ting Building, Room 1612, No 319,
Middle Zheng He Road, 215400 Taicang, Jiangsu Province.

奥美特机床（太仓）有限公司
地址：江苏省太仓市郑和中路319号兰德东亭大厦德国中心1612室，邮编：215400
sales-support@alzmetall.cn

AT A GLANCE

Machining Center with options: chip conveyor, cooling unit and coolant filter. These options are either to be installed along the right - or left side of the Machining Center.

5-Achs-Machining Center GS 800/5-FDT

Highlights

- ALZMETALL-Gantry-Concept (AGK)
- Grey Cast Iron and Spheroidal Graphite Cast Iron
- Monobloc Travel-System-Carriage with incorporated Box-in-Box-System
- 2-fold Linear Guidance for X-Y-Travel System-Carriage and 4-fold Linear Guidance for Z-Axis with Travel-System-Carriage with integrated Motor-Spindle
- 3-fold Torque-Drives for Swivel-Axis (A-Axis) and Rotary-Axis (C-Axis) at GS 800/5-T and GS 800/5-FDT
- Hybrid-Machining-Applications such as: Drilling/Milling/Turning and Grinding at one Clamping-Set-Up
- Up to 1250 kg workpiece weight including Clamping-Set-Up-Device at GS 800/3
- Up to 500 kg workpiece weight including Clamping-Set-Up-Device at GS 800/5-T und GS 800/5-FDT

Focus on operators needs

- Access to Machine-Table ergonomically configured at working height
- Workpiece loading by front side, top side and sideways access.
- Mist extraction directly at Machine-Table
- Steeply sloping chip tunnel straight below Machine-Table
- Working-Space flushing with coolant [Option]
- Automatic Access-Door feature open/close [Option]
- Access to all maintenance units at working height

User benefits

Streamlined Force-Circuit between workpiece and Cutting-Tool

➲ **Performing**

- Thermal consistency at Tool Center Point (TCP) at X-Y- level without compensation
- Significant reduction of Cutting-Tool costs

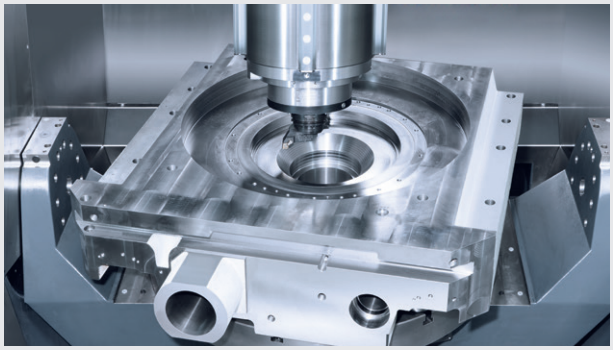
➲ **Optimized**

- Contour consistency at highest path velocity
- Lifetime of Motor-Spindle

➲ **Guaranteed Benefits**

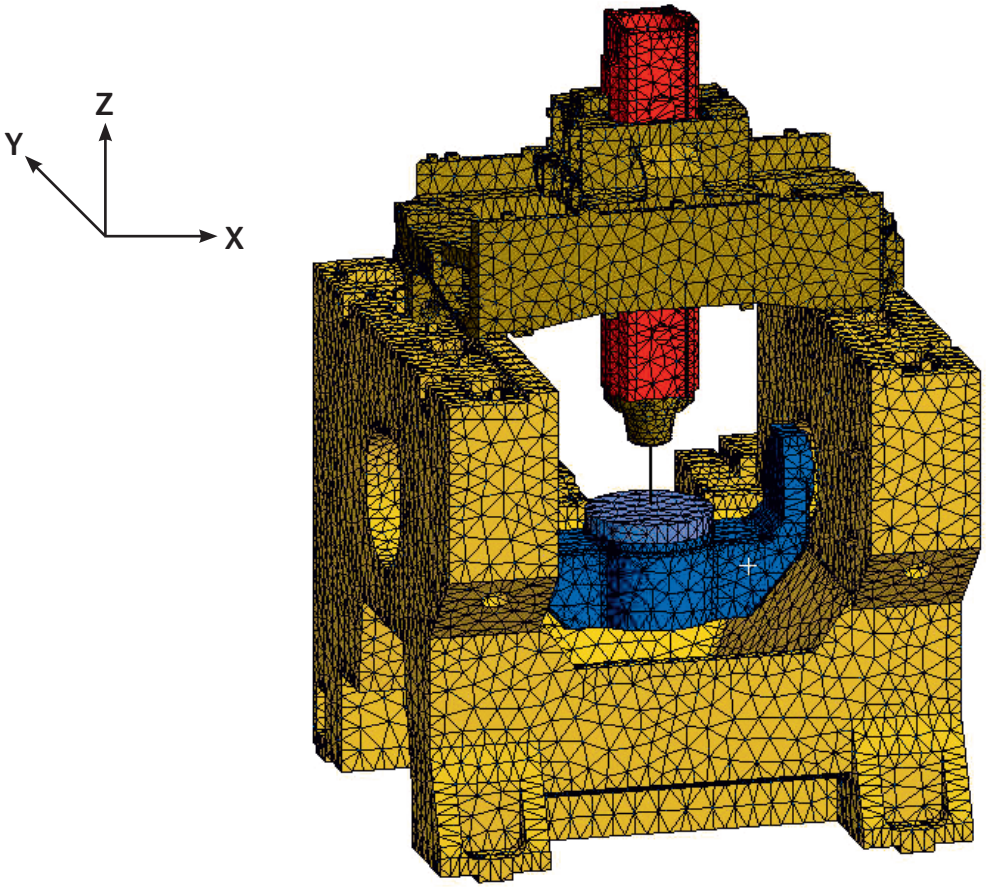
- High-grade Parallel-Path-Precision through two Servo-Drives at Y-Axis
- Considerably reduced Total Cost of Ownership (TCO) over lifetime period of Machining Center

ALZMETALL - THE CONCEPT



RESEARCH AND DEVELOPMENT

Development by using Finite-Elements-Method (FEM)



FEM generated Structural Model - Point of force-input at TCP and simultaneously at Machine-Table

Development

The „Finite-Elements-Method“ was applied to obtain the desired static and dynamic characteristics of each individual part of the machine and to investigate the collective rigidity of the Machining Center.

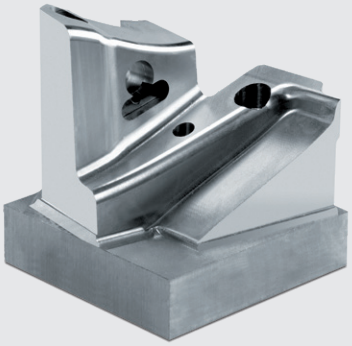
Multi-Elements-Simulation

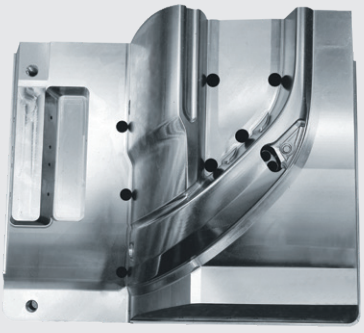
During the development process the Finite-Elements-Method was already applied by building the structure of the machine, patterned from the 3D-Volume–Model born from CAD to simulate vibration characteristics. Thus enabling engineers to determine the optimal dynamic rigidity of the machine under terms and conditions of the daily use at the shop floor.

Modal-Analysis

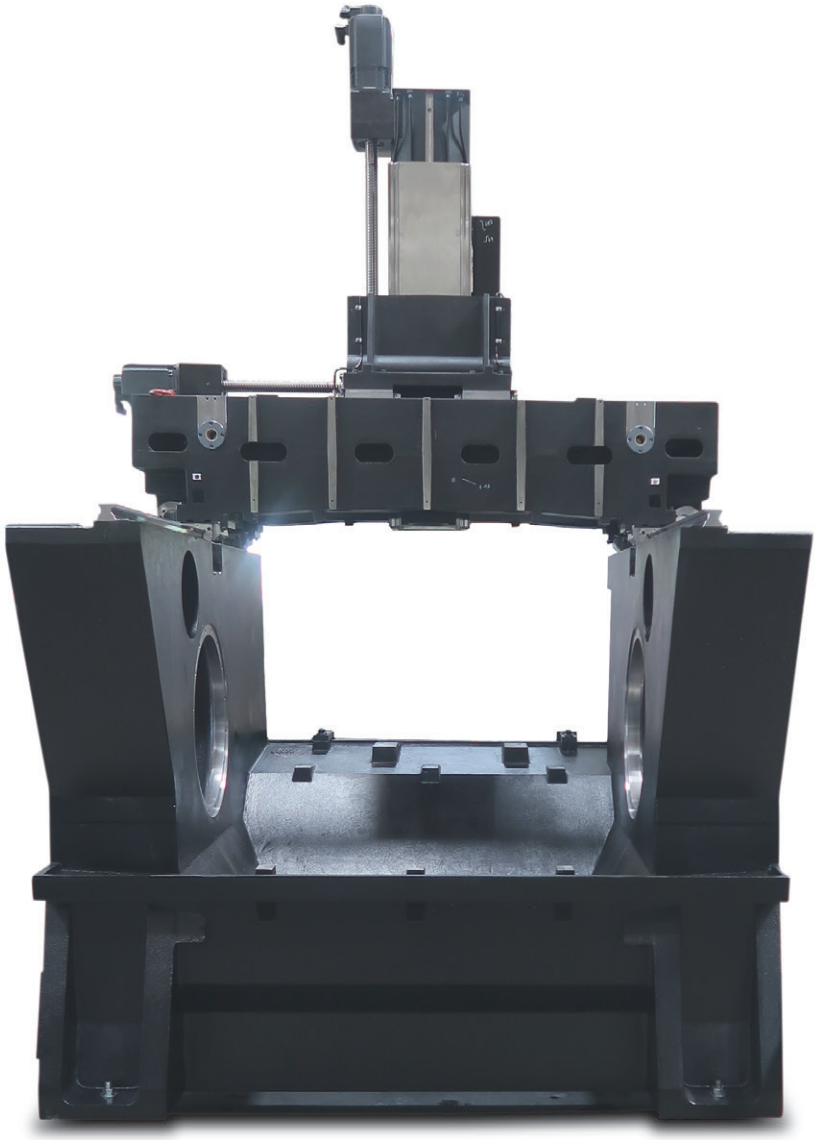
Results gained by the Multi-Elements-Simulation of entire machine structure and design had to be confirmed at the prototype of the GS-Machining Center by using the Modal-Analysis. The experimental Modal-Analysis procedure is being used to realize and demonstrate the quality of the dynamic machine characteristics under production conditions.

The final test of the Modal-Analysis accomplished at ALZMETALL verified the high degree of performance of the dynamic requirements in reality. Thus the ALZMETALL GS-Series offers comparable Best-in-Class conditions for high dynamic machining applications.





BASIC DESIGN

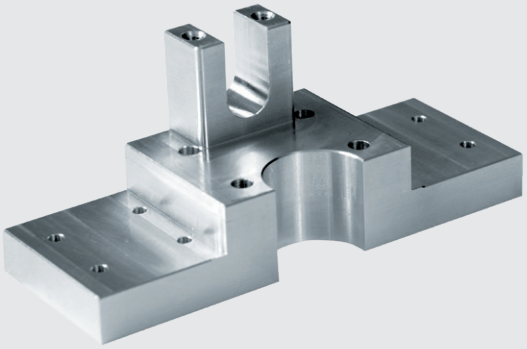


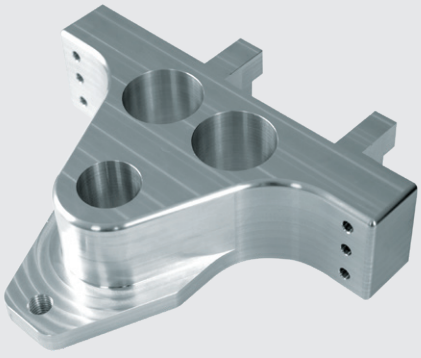
Rigidity, Dynamic and Thermal Symmetry „that's it what counts“

Extreme rigid, Integral-Basic-Body prepared for:

- Monobloc Travel-System-Carriage for X-Y-Z Axes
- NC – Swivel- and Rotary-Table (A- and C- Axis) or Static-Table
- Disc-Tool-Magazine with 40 Tool Positions, alternative twin Disc-Tool-Magazine with [76] Tool-Positions. [Option]
- Rack-Type Tool-Magazine for [224] Tool Positions [Option].

All statically stressed Basic-Machine-Parts made from gray cast iron and all dynamically stressed Basic-Machine-Parts and components made from spheroidal cast iron.

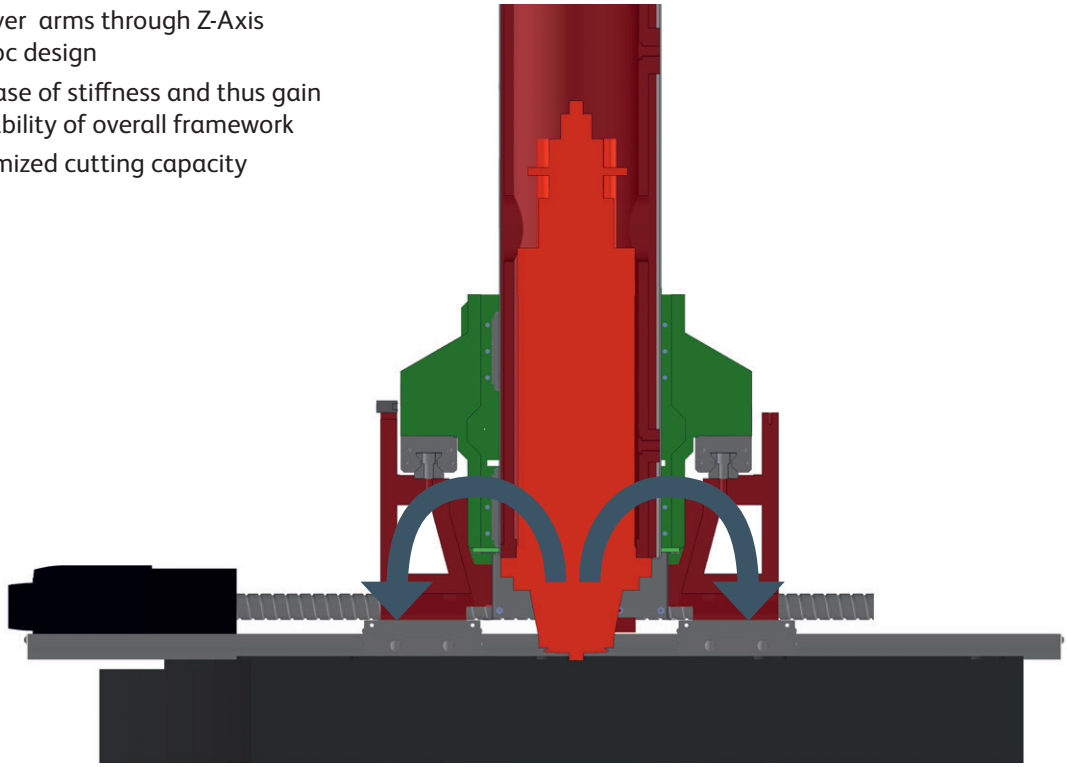




TRAVEL - SYSTEM - CARRIAGE

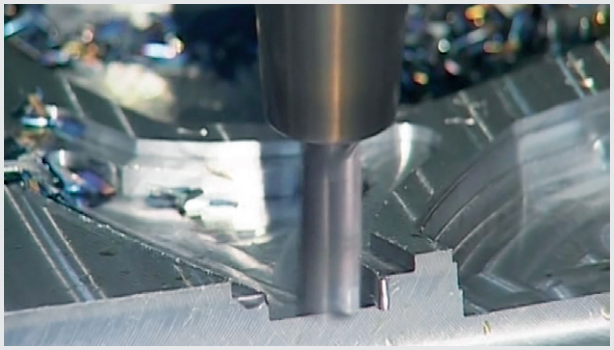
Force Transmission - Symmetry

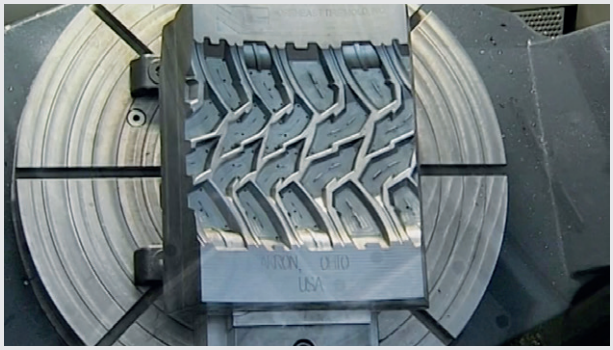
- Small lever arms through Z-Axis Monobloc design
  - ➲ Increase of stiffness and thus gain of Stability of overall framework
  - ➲ Maximized cutting capacity



- Thermo-Symmetric
- Narrow and direct Force-Circuit

- ➲ Thermal stability
- ➲ High grade stability and stiffness with coexistent weight-optimized Axes-Elements



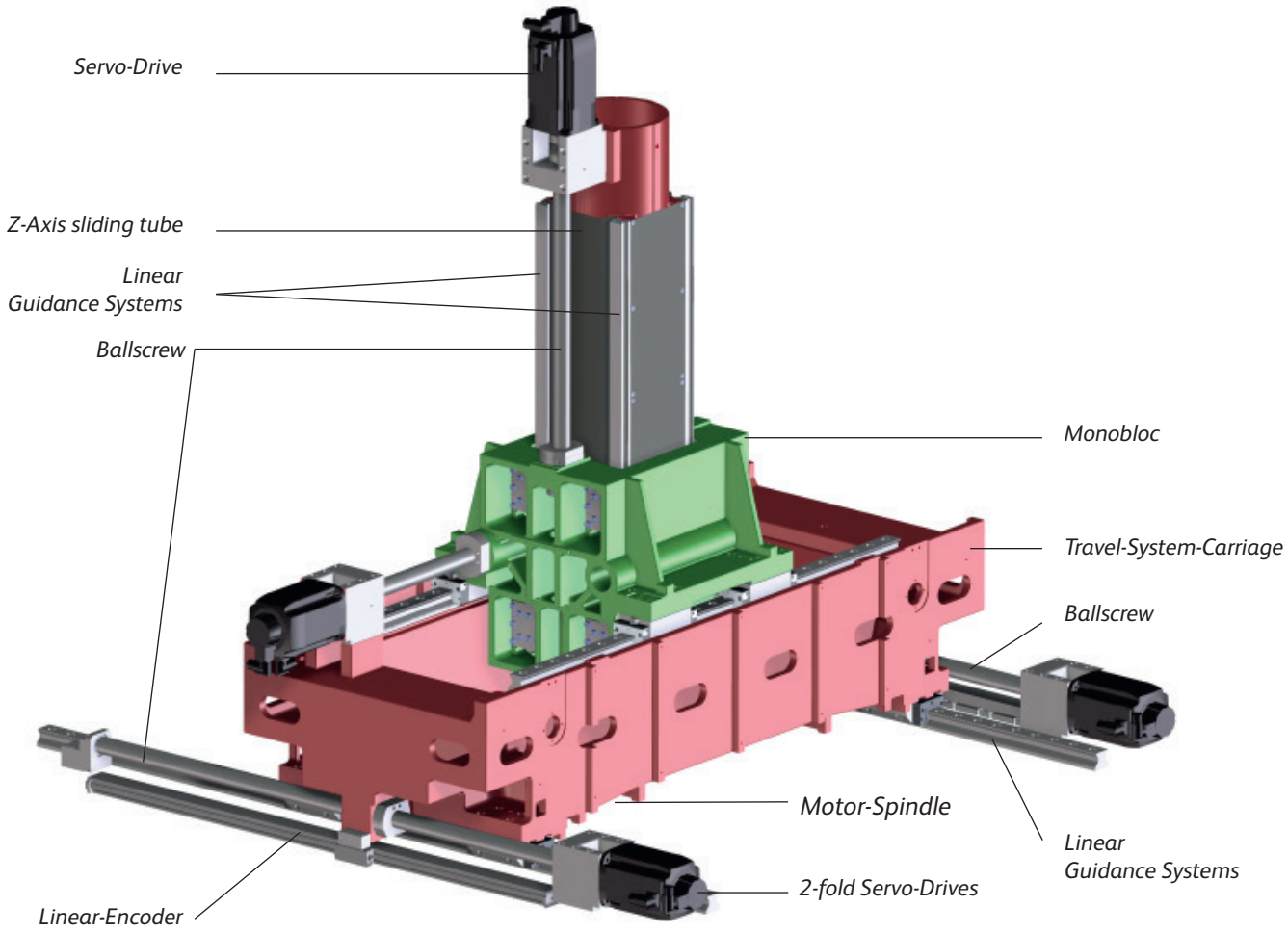


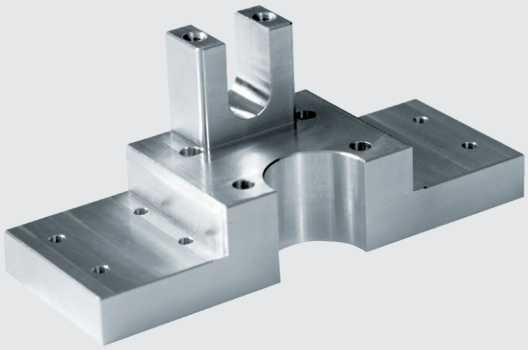
TRAVEL - SYSTEM - CARRIAGE

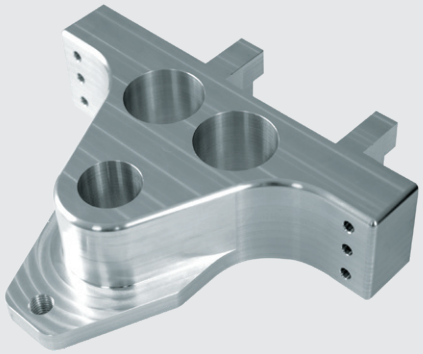
Design Characteristics

Box-in-Box-System:

- Frame Side Walls as static basic structure Y-axis. On top mounted Travel-System-Carriage with integrated Z-Axis Monobloc.
- Dynamically stressed Basic-Machine-Parts and components made from EN-GJS 600 (GGG60).
- Both Linear-Axis X and Y 2-fold guided, with 4 guiding elements each, Z-Axis 4-fold guided with 8 guiding elements.
- Linear-Axis Y driven by two Ballscrews and two Servo-Drives. X- and Z-Axis each driven by one Ballscrew and one Servo-Drive.
  - ➲ Excellent Axis dynamics
  - ➲ Cutting edge Parallel-Path-Precision
  - ➲ Thermal stability due to geometrical symmetry with Thermo-Symmetric Machine construction





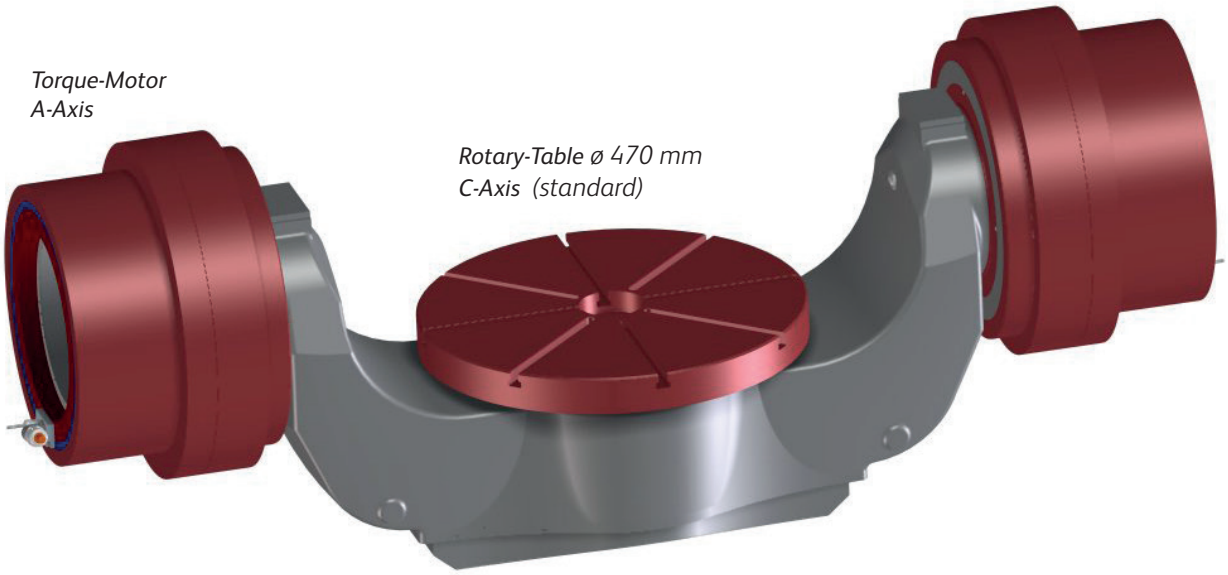


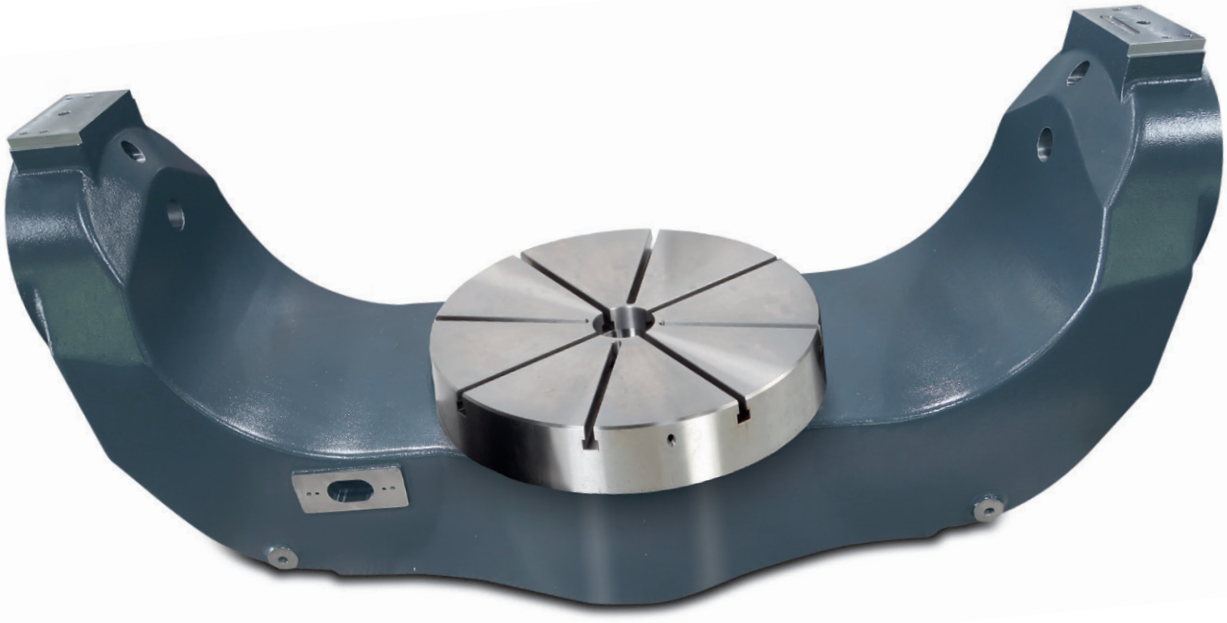
NC - SWIVEL - AND - ROTARY - TABLE (SDK)

GS 800/5-T AND GS 800/5-FDT

- Direct Rotary Drives (Torque-Motors) for high dynamic and oscillating machining – maintenance free –
- Internal Torque-Motor at each frame side wall as NC-Swivel-Axis (A-Axis) – patented –
- NC-Rotary-Table (C-Axis) equipped with Torque-Motor

- ➲ Highest swivel and rotational speed with outstanding control quality
- ➲ Higher accuracies – no mechanical backlash
- ➲ Elimination of friction at Drive-Components
- ➲ Wear – and maintenance free delivers reduced Total Cost of Ownership (TCO) over lifetime period of Machining Center

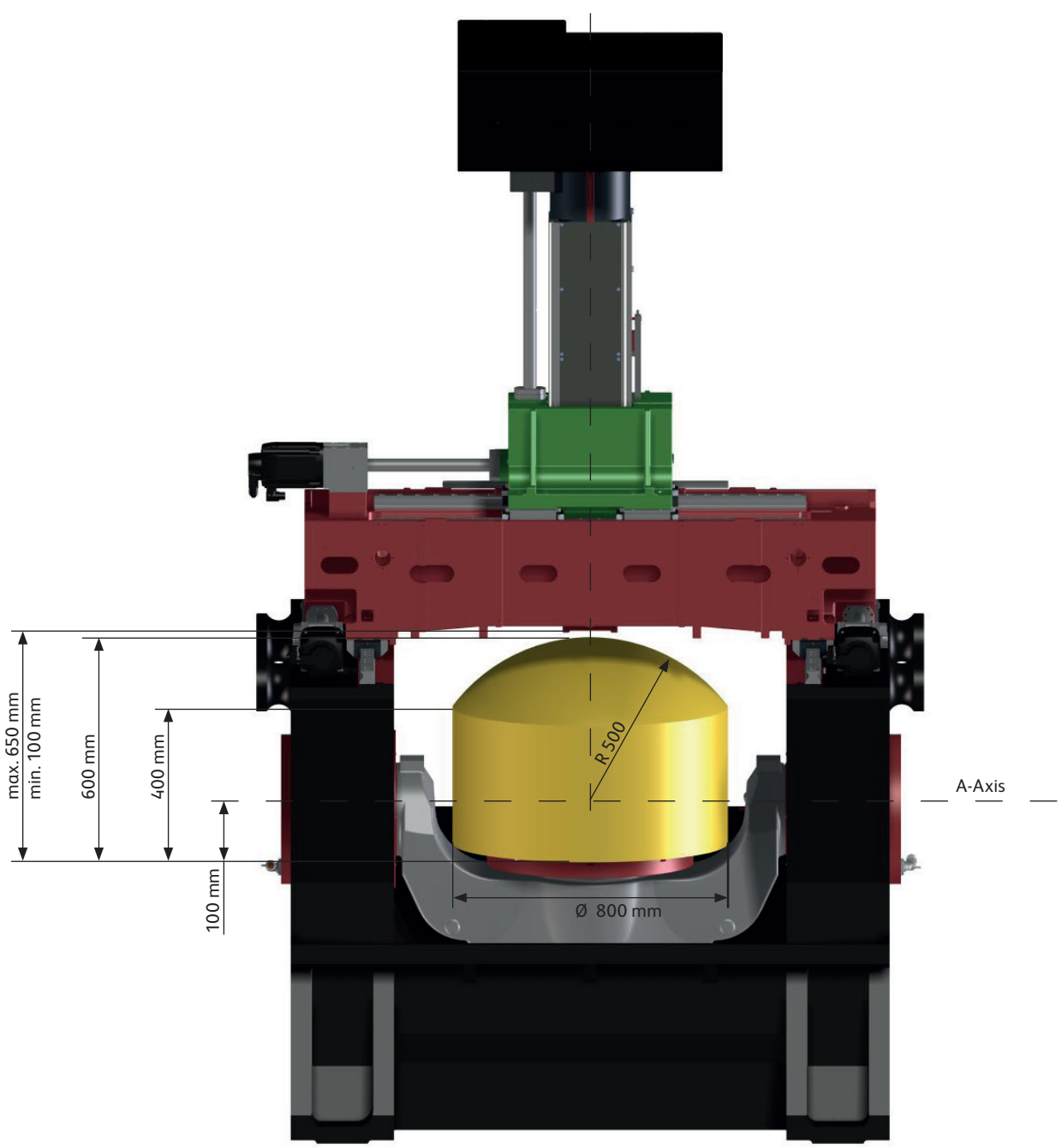


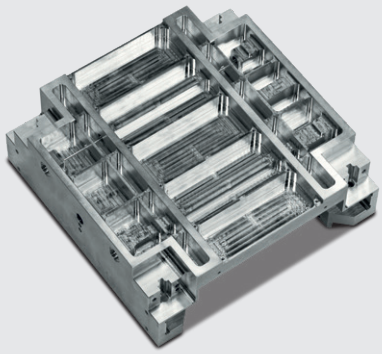


WORKPIECE DIMENSIONS - MACHINING SPACE

Machining Space

- Maximum utilization of Machining Space
- C-Axis DIA. 800 mm
- A-Axis DIA. 1000 mm
- Max workpiece dimensions: Spherical sector with Radius 500 mm up to 600 mm height
- Swivel range ± 140°
- Table Load max. 500 kg
- Stainless steel inside covering [Option]



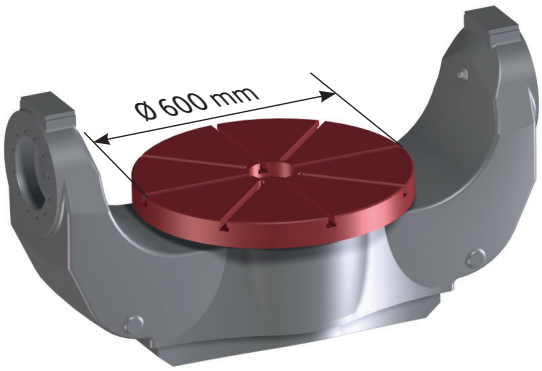


OPTIONS

NC - Swivel - (A-Axis) and Rotary-Tables (C-Axis)

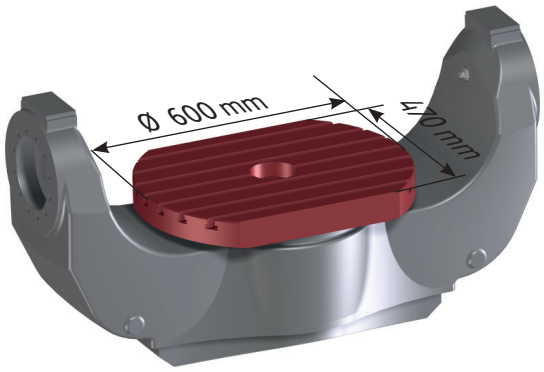
Rotary-Table C-Axis [1) 2)]

Clamping surface mm	ø 600	
T-slots acc. DIN 650	4 x 14 H7 and 4 x 14 H12	
Configuration	8x45°	
C-Axis RPM max. min^{-1}	55 [1)]	1200 [2)]
Table Load max.	500 kg	



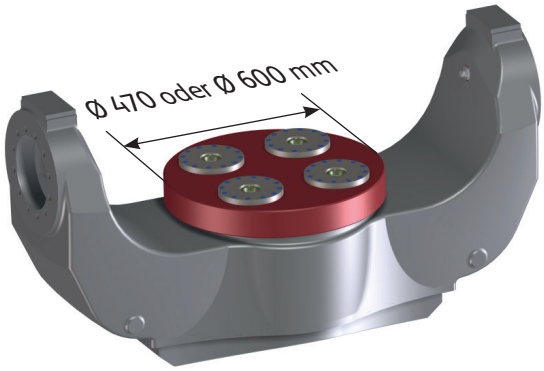
Rotary-Table C-Axis [1) 2)]

Clamping surface mm	ø 600 x 470	
T-slots acc. DIN 650	1x14H7 and 6x14H12	
Configuration	parallel	
C-Axis RPM max. min^{-1}	55 [1)]	1200 [2)]
Table Load max.	500 kg	
Distance T-slots mm	63 mm	



Rotary-Table C-Axis with NPS [1) 2) 3)]

Clamping surface mm	ø 470 or ø 600	
T-slots acc. DIN 650	without	
Configuration NPS	4 x 90 °	
C-Axis RPM max. min^{-1}	55 [1)]	1200 [2)]
Table Load max.	500 kg	



[1)] GS 800/5-T
[2)] GS 800/5-FDT
[3)] NPS = Zero point clamping system

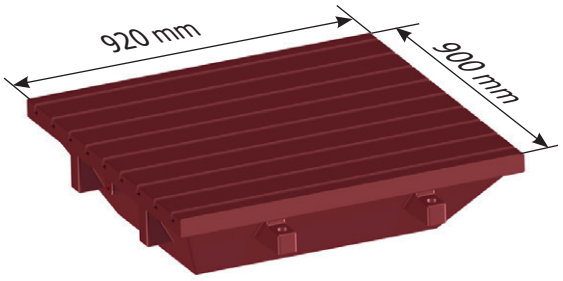
Further designs on demand

GS 800/3

3-Axis-Machine with rigid fixed base table

Rigid fixed base table

Clamping surface mm	920 x 900
T-slots acc. DIN 650	8x14 H12/1x14 H7
Configuration	parallel in X-direction
Distance T-slots	100 mm
Table Load max.	1250 kg



OPTIONS

CNC-Controls

Heidenhain TNC 640 (standard)

CNC-Controls

Siemens SINUMERIK ONE

KINEMATIK Gauging

Accuracy check and compensation
- KinematicsOpt., Heidenhain
- C 996, Siemens

Electrical Handwheels

- HR 510, Heidenhain
- HR 520, Heidenhain
- Mini-Handwheel, Siemens

3D - Touch Probes
Infrared transmission

- Heidenhain
- m&h Inprocess
- Renishaw
- Blum

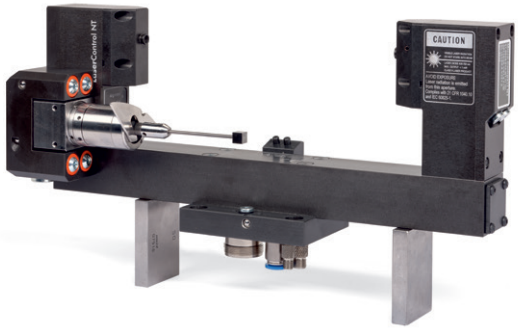
Multiple-Media-Coupling

Rotary Joint at C-Axis-Table, 4 channels,
air and/or fluids on selection

OPTIONS

Tool Setting System

Brand:
m&h (without mech. Touch Trigger Probes)
Blum (with or without mech. Touch Trigger Probes)

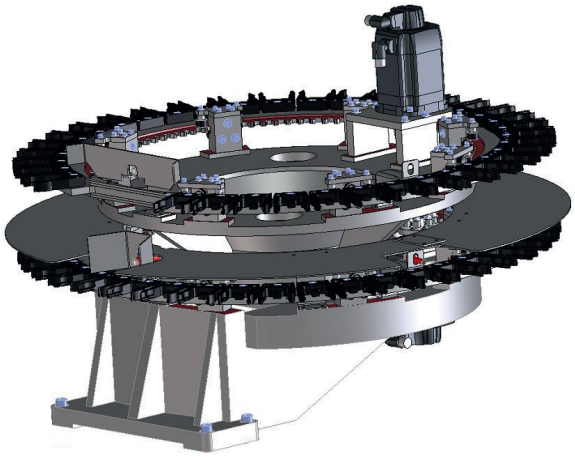


Camera and Screen

Camera mounted at Machining Space with transmission to external flat screen or Video-Server for process-set-ups and process-controls

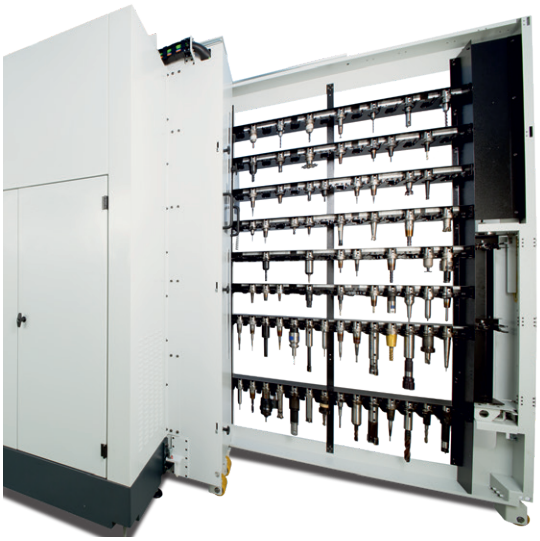
Tool-Magazines

Twin-Disc-Tool Magazine with 76 Tool Positions



Tool-Magazines

Rack-Type Magazines designed for 224 Tool Positions



Operating Supply Unit Set‘s

Bundle set‘s A, B, C cooling and cleaning circuit system up to 80 bar high pressure, on selection Scratch-Type or Hinge-Type-Conveyor

Operating Supply Unit Set‘s

Coolant Cleaning Unit with Compact-Paper-Filter

OPTIONS

Mist Extraction Unit

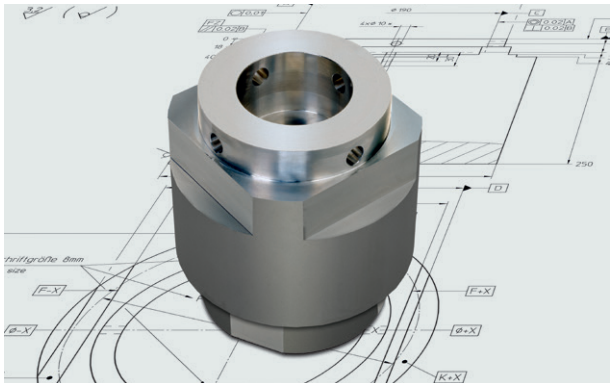
Attached to Machine-Basic-Body

Remote Diagnosis and Maintenance

and for NC-Programming-Support

Machining Center Acceptance

Workpiece according to ALZMETALL-Standard, on selection Customer-Workpiece (option)



Services

NC-Program-Training, Operator-Training for Heidenhain and Siemens

- Machining Center Installation and Commissioning
- Process development
- Production Assistance
- Service and Maintenance

More Services

- Cutting-Tool Setting and Detection
- Mist Extraction Units [1)]
- Equipment for Graphite Machining
- Custom-Made Solutions

[1)] Optional placement along the right- or left side of the Machining Center

TECHNICAL DATA

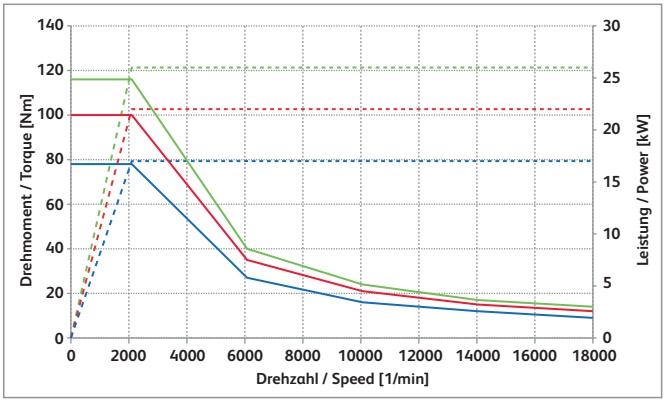
Machine-Type	GS 800/3	GS 800/5-T	GS 800/5-FDT
Working Range			
Traverse Path	660 / 800 / 550 mm		
Rigid fixed base table			
Distance Spindle - Table min./max.	100/650 mm		
Clamping Surface (w x d)	920 x 900 mm		
9 T-Slots acc. DIN 650 at X-Direction	8x14H12/1x14H7 Distance 100 mm		
Table Load max.	1250 kg		
NC-Swivel-and Rotary-Table			
Distance Spindle - Rotary Table min/max.		100/650 mm	
Torque-Drives at Swivel- and Rotary-Axis		Torque direct	
Swivel Range of A-Axis		± 140 °	
Swivel Speed at A-Axis		50 min^{-1}	
C-Axis Rotation		360 ° unlimited	
C-Axis RPM max.		100 min^{-1}	1200 min^{-1}
Diameter Machine-Table C-Axis		Ø 470, [Ø 600], [Ø 600 x 470] mm	
8 T-Slots acc. DIN 650		4 x 14H 7 und 4 x 14H12 [6 x 14 H12 / 1 x 14 H7]	
Star-Shaped Configuration		8 x 45 ° [7 x parallell]	
Machine-Table Center Bore		Ø 50 H7 mm	
Table Load max.		500 kg	
C-Axis Rotary-Diameter at A-Axis Center		Ø 800 mm	
A-Axis Swivel Diameter (Swing) at X-Axis Center		Ø 1000 mm	
Distance A-Axis-Center to Rotary-Table		100 mm	
Feed-Drive-System X-, Y-, Z-Axis			
Digital AC-Servo-Motors, maintenance free			
Max. Rapid Travel X-, Y-, Z-Axis at TCP	75 m/min		
Feeding Force X-, Y-, Z-Axis at CDF 40%	9 - 9 - 9 kN		
Motor-Spindle-Drive			
High Frequency Motor-Spindle			
Cutting-Tool Interface	HSK-A63 [HSK-E50]		HSK-T63
Motor-Spindle-Power at CDF 25%	26 [44] [17] kW		24 kW
Variable Speed Range max.	18.000 [30.000] [38.000] min^{-1}		18.000 min^{-1}
Motor-Spindle Torque at CDF 25%	116 [40] [11] Nm		92 Nm
Tool-Magazine			
Tool positions, Type	40 Disc, [76 Twin-Disc], [224 Rack-Type]		
Max. Tool Diameter, Chain fully loaded	80 mm		
Max. Tool Diameter, Chain neighbour positions unloaded	150 mm, [80 mm Rack-Type]		
Max. Tool Length (Details: Drawing on request)	300 mm [150 mm Twin-Disc/350 mm and 175 mm Rack-Type]		
Max. Tool Weight	10 kg		
Tool-Change-Cycle (approx.)	6 s		
Chip-to-Chip Cycle (approx.)	7 s		
Linear Encoders X-, Y-, Z-Axis	absolut, direct		
Positional Tolerance TP acc. VDI/DGQ 3441	≤ 0,007 mm [≤ 0,005 mm]		
Angle Encoder System 4./5. Axis			
Machine Weight excl. Options	10.200 kg	11.200 kg	
CNC-Controls	Heidenhain TNC 640, [Heidenhain TNC7], [Siemens SINUMERIK ONE]		

[Option]

MOTOR - SPINDLES

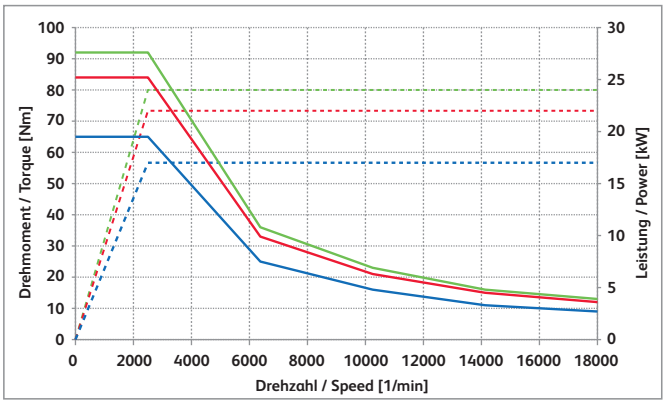
RPM / Power / Torque Track Record

RPM$_{max.}$ = 18.000



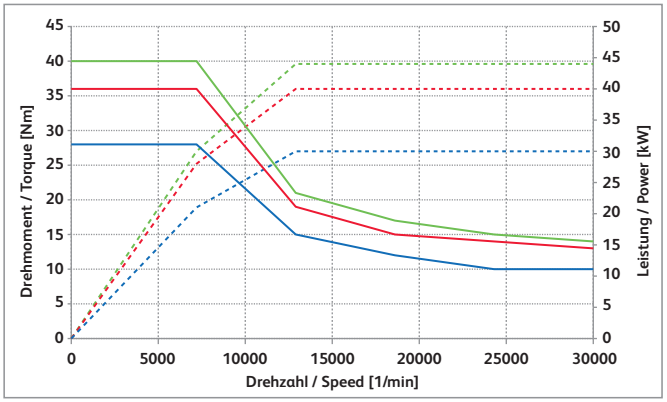
GS 800/3, GS 800/5-T

[RPM$_{max.}$ = 18.000 with Hirth Gear Indexing] Option



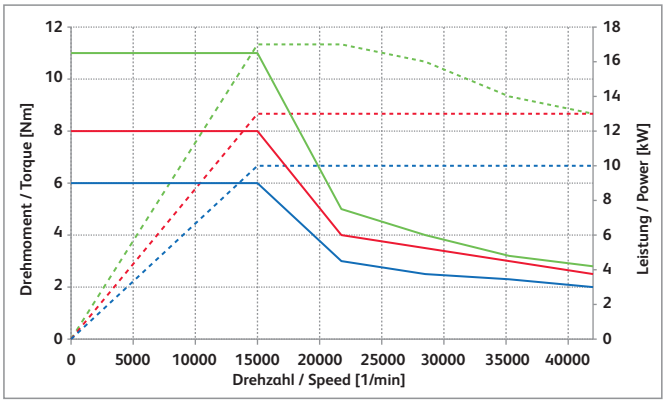
GS 800/5-FDT

[RPM $_{max.}$ = 30.000] Option



GS 800/3, GS 800/5-T

[RPM $_{max.}$ = 38.000] Option

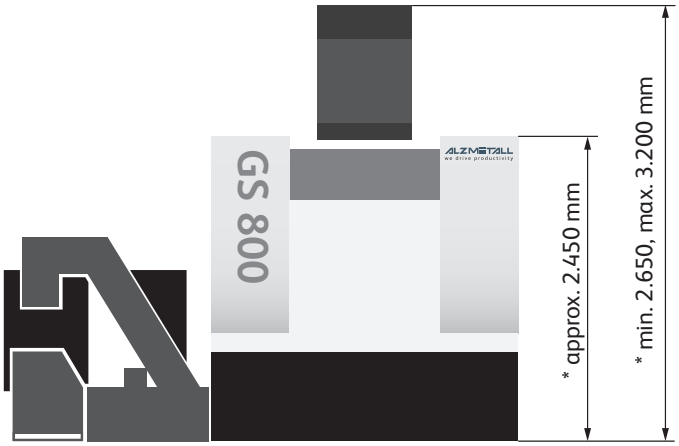


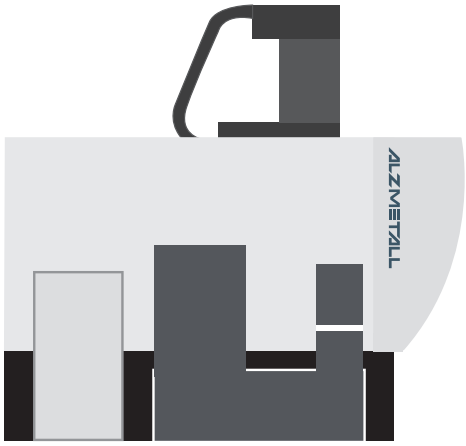
GS 800/3, GS 800/5-T

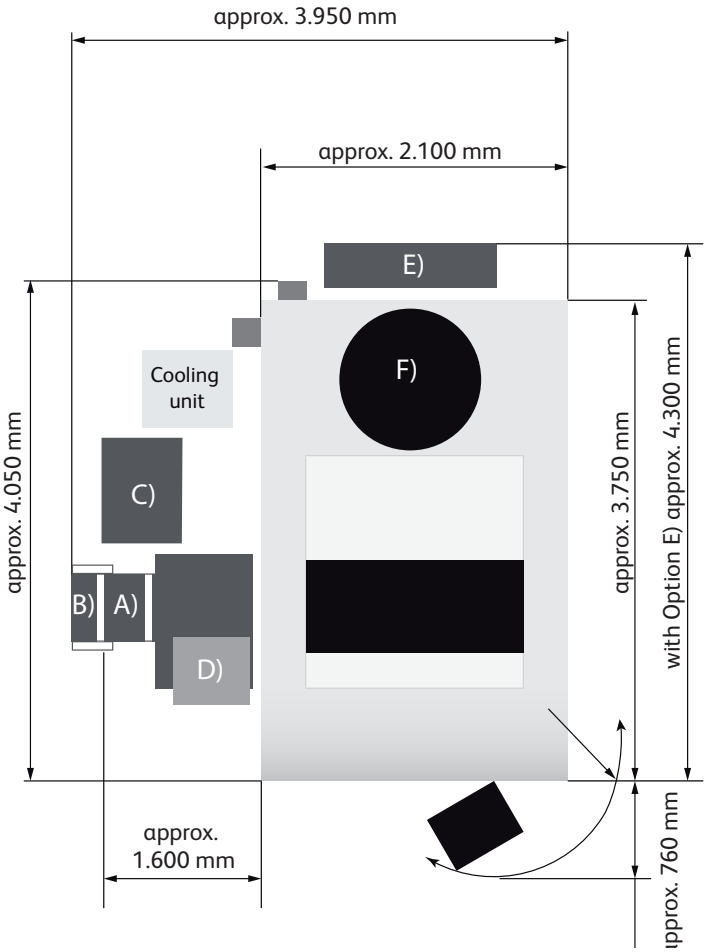
Legend

- Torque S1 [Nm]
- Torque S6 40% [Nm]
- Torque S6 25% [Nm]
- Power S1 [kW]
- Power S6 40% [kW]
- Power S6 25% [kW]

MACHINING CENTER DIMENSIONS







Options

A) Chip Conveyor
B) Chip Trolley
C) High pressure Coolant Unit
D) Mist Extraction Unit
E) Tool-Magazine 224 tool positions (Rack-Type)
F) Tool-Magazine 76 tool positions (Disc)

Please note: Options A, B, C, D
are either to be installed along the right- or left side of the Machining Center.

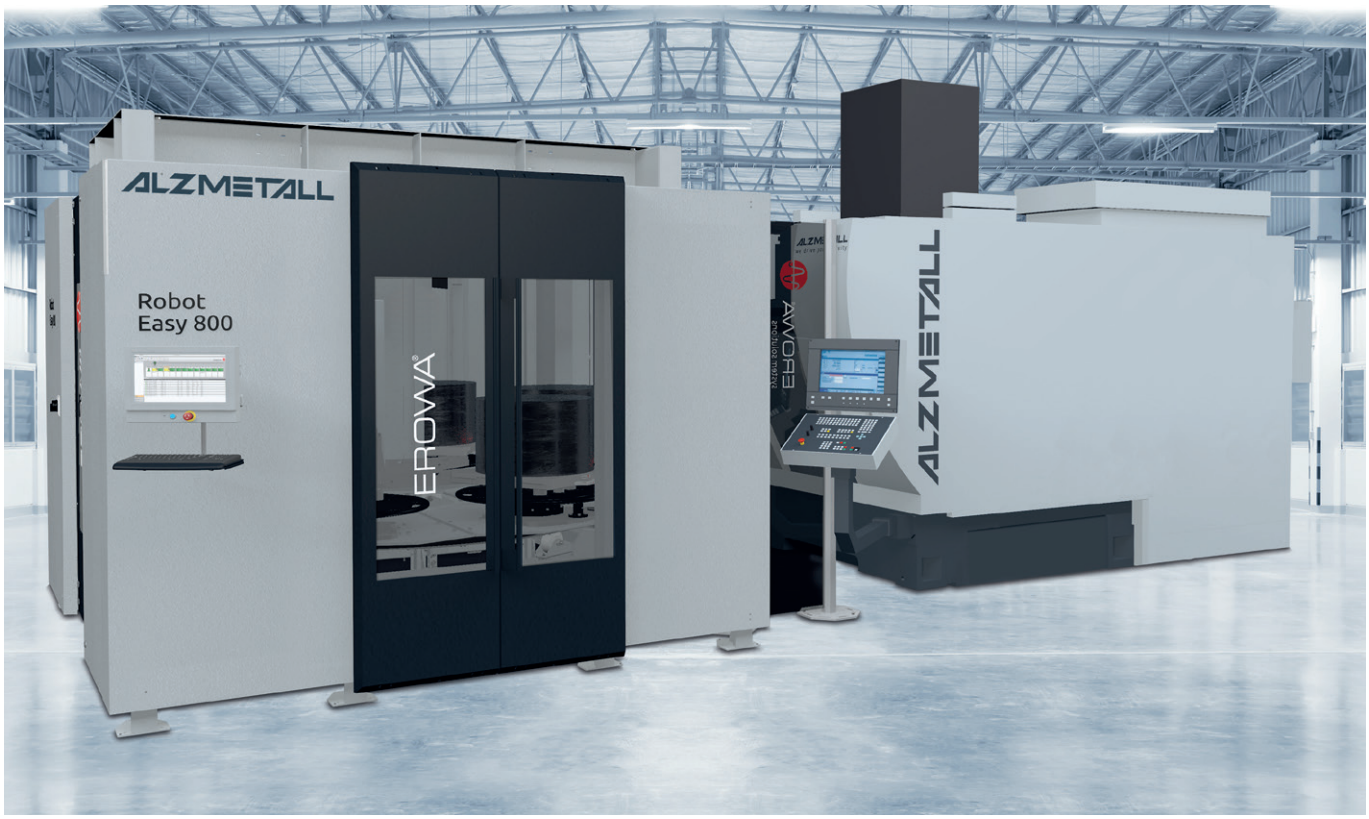
The coolant unit can be placed variable.

Please see machine layout for
detailled information.

* incl. Precision levelling elements

AUTOMATION SOLUTION

ALZMETALL GS 600/5-T and WU-robot cell RZ-3/20 implementation for specific part handling. Transfer weight of 20 kg dependent on inserted gripper.



Automation solution ALZMETALL GS 1000 and EROWA ERE800 implemented for workpiece dimension ø 850 x 1000 mm. Transfer weight max. 800 kg, 6-12 Magazine-Positions, 6,4 metric tons Magazine capacity.

AUTOMATION SOLUTION

ALZMETALL GS 1000 and INDUMATIK Ultralight 300 implementation. Transfer weight of max. 300 kg, 3-12 pallet positions for pallets 320 x 320 mm up to 630 x 630 mm. Transfer carrier drive for operator access.

Flexible manufacturing cell with ALZMETALL GS 1000 and GS 800. Transfer weight of max. 400 kg, 28 work piece pallets for two pallet dimensions 470 x 470 mm and 700 x 700 mm.

PRODUCT RANGE - PLEASE CONTACT US

Machining Centers

- GS 600E/3
- GS 600E/5
- GS 600/5-T
- GS 600/5-FDT

Machining Centers

- GS 1000/3
- GS 1000/5
- GS 1000/5-T
- GS 1000/5-FDT
- GX 1000/5-AF
- GX 1000/5-LOB

Machining Centers

- GS 1200/3
- GS 1200/5-T
- GS 1200/5-FDT

Machining Centers

- GS 1400/3
- GS 1400/5-T
- GS 1400/5-FDT
- GX 1400/5-AF

We gladly inform you also about ALZMETALL Column Drilling machines and Foundry engineering.

ALZMETALL GmbH & Co. KG

Postfach/P.O. Box 1169
D-83350 Altenmarkt/Alz · Germany

Harald-Friedrich-Straße 2-8
D-83352 Altenmarkt/Alz · Germany

Tel./Phone +49 86 21 88-0
Fax +49 86 21 88-213
E-Mail: info@alzmetall.com
www.alzmetall.com

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