ALZMETALL - COMPANY INTRODUCTION

ALZMETALL is a company with an international reputation and global activities. For more than six 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 aircraft industry, as well as in many mid-size mechanical engineering enterprises. Our experience is based on over 200,000 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“.

How to find us
AT A GLANCE

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

Highlights
- Alzmetall Specific Gantry Concept (ASGK)
- Grey Cast Iron and Spheroidal Graphite Cast Iron Machine Body and Frame components
- Travel-System-Carriage with incorporated Box-in-Box-System with Z-Axis Monobloc - patented
- 4-fold Linear Guidance for Travel-System-Carriage and Z-Axis with integrated Motor-Spindle
- 3-fold Torque-Drives for Swivel-Axis (A-Axis) and Rotary-Axis (C-Axis)
- Hybrid-Machining-Applications such as: Drilling/Milling/Turning and Grinding at one Clamping-Set-Up
- Up to 2500 kg workpiece weight including Clamping-Set-Up-Device

Focus on operators needs
- Access to Machine-Table on Operator level
- Working-Space access from top, loading by crane possible
- Mist extraction directly at Machine-Table
- 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 in addition to geometrical and symmetrical configuration of the Carriage-Travel-System.

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

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

➡ Guaranteed
- Extremely high Parallel-Path-Precision through two Servo-Drives at each X-, Y-, and Z-Axis
- Considerably reduced Total Cost of Ownership (TCO) over lifetime period of Machining Center
FEM generated Structural Model - Point of force-input at TCP and simultaneously at Machine-Table.
Development by using Finite-Elements-Method (FEM)

**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.
"The Heavyweight" when Milling and Turning

Extreme rigid, Integral-Basic-Body prepared to be fitted with:

- Frame Side Walls as carrier for both Y-Axes (Y- and V-Axis)
- NC – Swivel- and Rotary-Table (A- and C- Axis)
- Tool-Magazines (ATC)

All statically stressed Basic-Machine-Parts made from EN-GJL 300 (GG 30) and all dynamically stressed Basic-Machine-Parts and components made from EN-GJS 500 (GGG 50).
ALZMETALL-Specific-Gantry-Concept (ASGK)

In comparison to conventional and modified Gantry-Designs:

- Deviation (Deflection) reduced by factor 2.3 delivers
- Rigidity increased by factor 2.3 versus “On-Top-mounted” Linear Guidance Systems
- Less Position Deviation at TCP at the same level of Acceleration
- Significant increase of Cutting-Tool lifetime

Conventional and modified Gantry-Designs

- 2 On-Top-mounted Linear Guidance Systems
- Deviation (Deflection) of Frame Side Walls increased by factor 2.3
Design Characteristics

Box-in-Box-System:

- Y- and V-Axis Frame Side Walls as static basic structure. Therein embedded two X-Axes-Carrier with integrated Z-Axis Monobloc
- Dynamically stressed Basic-Machine-Parts and components made from EN-GJS 500 (GGG 50)
- All 3 Linear-Axes (X/Y/Z) are each 8-fold and in 2 levels linear guided

- All 3 Linear-Axes (X/Y/Z) are each driven by 2 Ballscrews and 2 Servo-Drives
  ➤ Excellent Axes dynamics
  ➤ Cutting edge Parallel-Path-Precision
  ➤ Thermal stability due to geometrical symmetry with Thermo-Symmetric Motor-Spindle
Direct Rotary Drives (Torque-Motors) for high dynamic and oscillating Machining – maintenance free –
2 internal Torque-Motors 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
- 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
Machining Space

- Maximum utilization of Machining Space
- C-Axis DIA. 1220 mm
- A-Axis DIA. 1240 mm
- Spherical sector DIA. 1200 mm up to 700 mm height
- Swivel range ± 140 degrees
- Table Load max. up to 2500 kg
### OPTIONS

**NC-Swivel (A-Axis) and Rotary-Table (C-Axis)**

<table>
<thead>
<tr>
<th>Clamping surface mm</th>
<th>Option</th>
</tr>
</thead>
<tbody>
<tr>
<td>ø 900 mm</td>
<td></td>
</tr>
<tr>
<td>T-slots acc. DIN 650</td>
<td>4 x 18 H7 and 4 x 18 H12</td>
</tr>
<tr>
<td>Configuration</td>
<td>8 x 45°</td>
</tr>
<tr>
<td>RPM max.</td>
<td>100 ¹</td>
</tr>
<tr>
<td>Table Load max. kg</td>
<td>2500</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Clamping surface mm</th>
<th>Option</th>
</tr>
</thead>
<tbody>
<tr>
<td>ø 1000 mm</td>
<td></td>
</tr>
<tr>
<td>T-slots acc. DIN 650</td>
<td>4 x 18 H7 and 4 x 18 H12</td>
</tr>
<tr>
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</tr>
<tr>
<td>Table Load max. kg</td>
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<table>
<thead>
<tr>
<th>Clamping surface mm</th>
<th>Option</th>
</tr>
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<tbody>
<tr>
<td>ø 1200 x 1000 mm</td>
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<tr>
<td>T-slots acc. DIN 650</td>
<td>8 x 18 H12 and 1 x 18 H7</td>
</tr>
<tr>
<td>Configuration</td>
<td>parallel</td>
</tr>
<tr>
<td>RPM max.</td>
<td>100 ¹</td>
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<tr>
<td>Table Load max. kg</td>
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</table>

<table>
<thead>
<tr>
<th>Clamping surface mm</th>
<th>Option</th>
</tr>
</thead>
<tbody>
<tr>
<td>780 x 780 mm at NPS</td>
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<tr>
<td>T-slots acc. DIN 650</td>
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<tr>
<td>Configuration</td>
<td>4 x 90°</td>
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<tr>
<td>RPM max.</td>
<td>100 ¹</td>
</tr>
<tr>
<td>Table Load max. kg</td>
<td>2500</td>
</tr>
</tbody>
</table>

Further executions on demand

1) GS 1200/5-T
2) GS 1200/5-FDT
3) NPS = Zero Point Tooling System

[Image of machining equipment]
OPTIONS

CNC-Controls
Heidenhain iTNC 530
Heidenhain TNC 640

KINEMATIK Gauging
Accuracy check and compensation
- KinematicOpt., Heidenhain
- C 996, Siemens

3D-Touch Probes
Infrared transmission
- TS 460/640/740, Heidenhain
- IRP 25,41, m&h Inprocess
- OMP 40/60/40, Renishaw
- TC 50/52, Blum

Electrical Handwheels
- HR 410, Heidenhain
- HR 520, Heidenhain
- Mini-Handwheel, Siemens

Multiple-Media-Coupling
for Rotary-Table
4-fold on selection air and/or fluids

CNC-Controls
Siemens SINUMERIK 840 D sl
**Tool Setting System**
Laser System for Tool Setting and Breakage Detection on selection including mechanical Touch Trigger Probes
LTS 35.65, m&h, (without mech. Touch Trigger Probes)
LC NT, Blum, (without mech. Touch Trigger Probes)
TC 76, Blum, (with mech. Touch Trigger Probes)

**Tool-Magazines**
Single Chain Magazine, up to 75 Tool Positions
Double Chain Magazine, up to 186 Tool Positions

**Production Package**
On selection A, B, C with Scratch-Type-Conveyor,
Hinge-Type-Conveyor, Magnetic-Conveyor

**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**
Rack-Type Magazines with 250 Tool Positions

**Production Package**
With Coolant Cleaning Unit with Metal-Edge-Filter or Compact-Paper-Filter
Machining Center Acceptance
Workpiece according to ALZMETALL-Standard, on selection
Customer-Workpiece (option)

Services
Machining Center Installation, Set-Up, Production Assistance
and Maintenance

Remote Diagnosis, Remote Maintenance
and for NC-Programming-Support

Options
- Rotary-Table (C-Axis) various configurations
- Multiple-Media-Coupling for Rotary-Table (C-Axis)
- Motor-Spindles RPM-Range 14,000/24,000 min⁻¹
- Tool-Magazines up to 186 Tool Positions
- Rack-Type Magazines with 250 Tool positions
- Cutting-Tool Interface HSK-100/SK 40/SK 50
- Chip Conveyor: Scratch-Type-, Hinge-Type-, Magnetic-Conveyor ¹
- High pressure Coolant Units up to 150 bar ²
- Electrical Handwheels
- 3D-Touch Probes
- Automatic Workpiece-Changing-System
- Cutting-Tool Setting and Detection
- Mist Extraction Units ³
- Workpiece-Pallet-Changing-System
- Robot-Systems, up to 1000 kg
- Equipment for Graphite Machining
- Custom-Made Solutions
- Services

¹ Optional placement along the right- or left side of the Machining Center
² ² Optional placement along the right- or left side of the Machining Center
## TECHNICAL DATA

<table>
<thead>
<tr>
<th>Machine-Type</th>
<th>GS 1200/3</th>
<th>GS 1200/5-T</th>
<th>GS 1200/5-FDT</th>
</tr>
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<tbody>
<tr>
<td><strong>Working Range</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Traverse Path</td>
<td>1000/1200/800 mm</td>
<td></td>
<td></td>
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<tr>
<td>Distance Spindle - Table min/max.</td>
<td>150/950 mm</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Static Table</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clamping Surface ((w \times d))</td>
<td>1100 x 1200 mm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11 T-Slots acc. DIN 650 at X-Direction</td>
<td>18H12 x 100 mm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alignment-Slot at Table Center Line</td>
<td>18H7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Machine-Table Load</td>
<td>3000 kg</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>NC-Swivel-and Rotary-Table</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Torque-Drives at Swivel- and Rotary-Axis</td>
<td>direct</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Swivel Range of A-Axis</td>
<td>± 140 °</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Swivel Speed at A-Axis</td>
<td>30 rpm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C-Axis Rotation</td>
<td>360 ° unlimited</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C-Axis RPM max.</td>
<td>100 rpm</td>
<td>560 rpm</td>
<td></td>
</tr>
<tr>
<td>Diameter Machine-Table C-Axis</td>
<td>Ø 800, [Ø 900], [Ø 1000], [Ø 1200 x 1000] mm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8 T-Slots acc. DIN 650</td>
<td>18 H12</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Star-Shaped Configuration</td>
<td>8 x 45 ° [9 x parallel]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Machine-Table Center Bore</td>
<td>Ø 50 H7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Table Load max.</td>
<td>2500 kg</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C-Axis Rotary-Diameter at A-Axis Center</td>
<td>Ø 1220 mm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A-Axis Swivel Diameter (Swing) at X-Axis Center</td>
<td>Ø 1240 mm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Distance A-Axis-Center to Rotary-Table</td>
<td>100 mm</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Feed-Drive-System X-, Y- und Z-Axis</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Digital AC-Servo-Motors, maintenance free</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max. Rapid Travel X, Y, Z-Axis at TCP</td>
<td>60 [100] m/min</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Feeding Force X, Y, Z-Axis at CDF 40%</td>
<td>12 kN</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Motor-Spindle-Drive</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High Frequency Motor-Spindle</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cutting-Tool Interface</td>
<td>HSK-A63 [SK40] [SK50] [HSK-A100]</td>
<td>HSK-T63 [HSK-T100]</td>
<td></td>
</tr>
<tr>
<td>Motor-Spindle-Power at CDF 25 [20] %</td>
<td>29,4 [82] [40] [30] kW</td>
<td>29,4 [82] kW</td>
<td></td>
</tr>
<tr>
<td>Variable Speed Range max.</td>
<td>12,000 [14,000] [18,000][24,000] rpm</td>
<td>[12,000] [14,000] rpm</td>
<td></td>
</tr>
<tr>
<td>Motor-Spindle Torque at CDF 25 [20] %</td>
<td>187 [500] [136] [96] Nm</td>
<td>187 [500] Nm</td>
<td></td>
</tr>
<tr>
<td><strong>Tool-Magazines</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tool Positions, Type</td>
<td>45 1 Chain [33] [66] [90] [126] [150] [186] 2 Chains [250] Rack-Type</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max. Tool Diameter, fully loaded</td>
<td>95 [125] mm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max. Tool Diameter, neighbour positions unloaded</td>
<td>150 [250] mm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max. Tool Length</td>
<td>425 [500] (at DIA. 80) mm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max. Tool Weight</td>
<td>10 [30] kg</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tool-Change-Cycle approx.</td>
<td>4 s</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chip-to-Chip Cycle approx.</td>
<td>7 s</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Linear Encoders X-, Y-, Z-Axis</strong></td>
<td>absolute, direct</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Positioning Scatter acc. VDI/DGQ 3441</td>
<td>0,007 [0,005] mm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Angle Encoder System A, and C-Axis</td>
<td>direct</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Machine Weight excl. Options approx.</td>
<td>20 metric tons</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CNC-Controls</td>
<td>TNC 640 Heidenhain [iTNC 530 Heidenhain] [840 D sl Siemens]</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
GS 1200/3, GS 1200/5-T, GS 1200/5-FDT
RPM-POWER-TABLE RPM max. = 12,000
(with and without Hirth-Gear-Indexing for turning operation) HSK-A63, HSK-T63, SK40

GS 1200/3, GS 1200/5-T
[RPM-POWER-TABLE RPM max. = 18,000, HSK-A63]
Machining Center (Single Unit)

- Transportation Dimensions

- Width approx. 2.905 mm
- Depth approx. 5.500 mm
- Height approx. 3.083 mm

Options

A) Chip Conveyor
B) Chip Trolley
C) Mist Extraction Unit
D) High Pressure Coolant Unit
E) Tool Magazin 126 / 150

Please observe: Options A, B, C, D and E are either to be installed along the right- or left side of the Machining Center!
Automation Solution with flexible Robot-Loading System

Automation with Robot-Loading Rack-Type System
The GS-Series – Focus on operators needs and user benefits

5-Axis-Machining Center GS 1200/5-T – Productivity gains by milling and turning at one set-up
Machining Centers
• GS 600/3
• GS 600E/5
• GS 600/5-T
• GS 600/5-FDT

Machining Centers
• GS 800/3
• GS 800/5-T
• GS 800/5-FDT
• GX 800/5-AF

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

Also please ask for further Machining Centers of CS-Series, Drilling Machines-Series and Custom made Cast-Iron-Products.