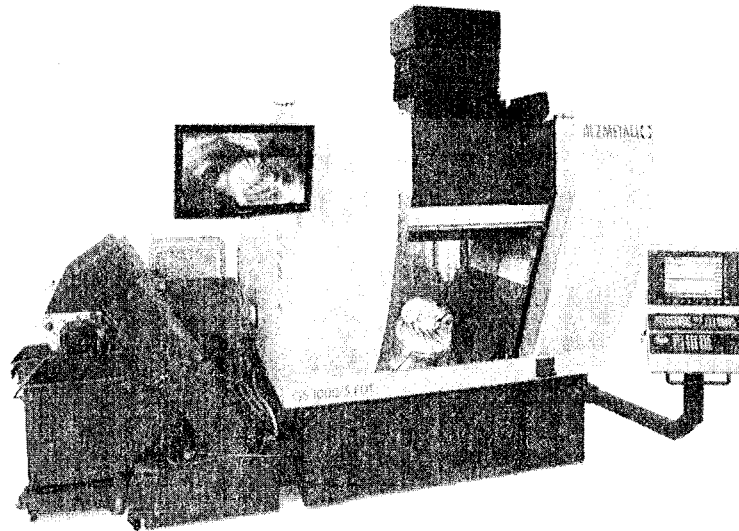


## GS1000/5-T 技术描述 GS1000/5-T Technical Description

### 1) 机床基本情况 General information



以上机型为GS1000/5-FDT照片，GS1000/5-T与FDT相同（以上照片部分选项，本方案中未提供）

- VERTICAL MACHINING CENTER GS1000/5-T  
GS1000/5-T立式加工中心
- 5-axes simultaneously (A- and C-axis with 3 Torque-motors)  
5 轴联动 (A轴-2个和C轴1个共带三个扭矩电机)
- Vertical design 立式设计
- Box in box design 箱中箱设计
- the developed Gantry concept of the GS 1000 is predestined for the requirements of technological top class applications as:  
机床采用加强型龙门结构设计，能够满足最具难度的加工要求：
  - \* high speed cutting 高速切削
  - \* hard milling 硬切削
  - \* dry milling 干切削and is above all significant through:  
以下机床性能保证了以上各种高难度加工的实现：
  - \* high dynamic characteristics 高动态特性
  - \* extreme stiffness 极致刚性
  - \* application related machine concept 针对应用领域的机床设计

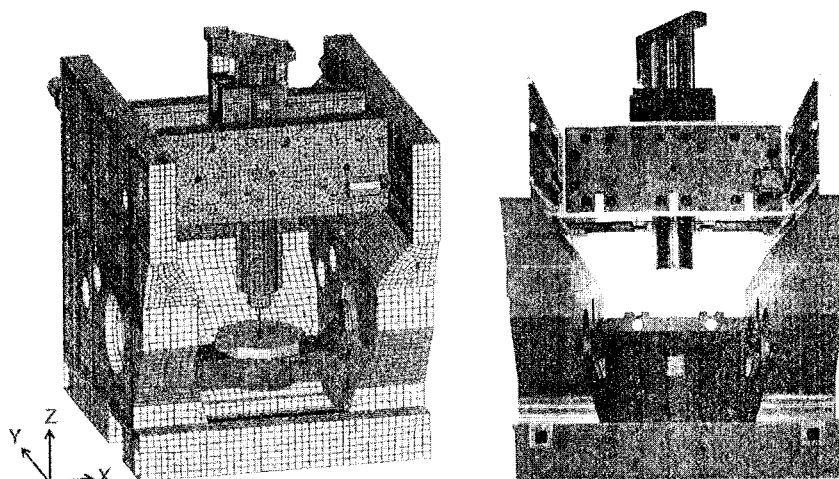
requirements for profitability and best machining quality are performed in equal measure.

我们的设计兼顾最佳的机床质量和性能价格比。

- A streamlined force-circuit between workpiece and tool is granted through the basic set-up of the machine so that negative influences of force and especially temperature at the workpiece effecting significantly lower compared with open machine frames.  
特别的机床结构使刀具和工件形成了力封闭效应，能够最大程度地消除由于切削力导致的各种负面影响，同时工作区的温度稳定性也比开放式结构机床好。

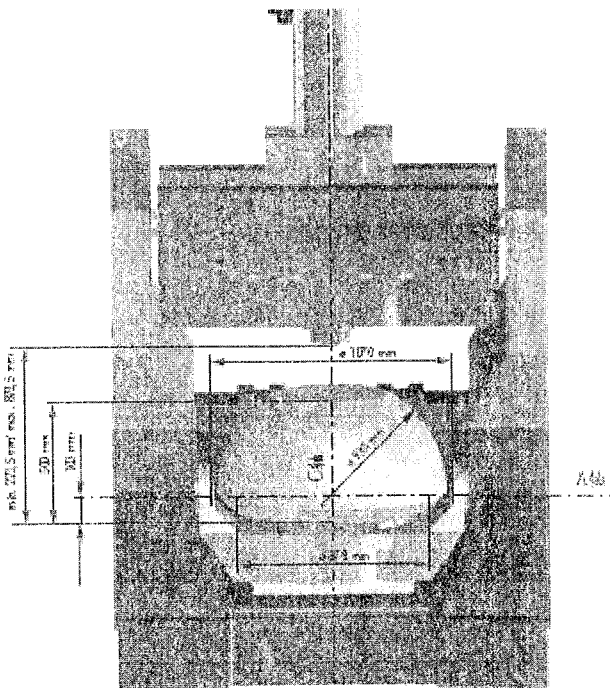
- all dynamic stressed frame parts are made of high-grade spheroidal graphit cast iron EN-GJS 500 (GGG50).

全部承受动应力的零部件都选用高强度的球墨铸铁EN-GJS500制造



- WORKING RANGE: 工作范围

travel x-axis X轴行程	800	mm
travel y-axis Y轴行程	800	mm
travel z-axis Z轴行程	600	mm



- Precision levelling shoes 精密水平垫铁  
for machine bearing 针对机器轴承  
acc. to installation drawing (1 set = 4 pc.) 符合安装图  
incl. anchor bolts 包括地脚螺栓

For machine dynamic reasons it is necessary to use the ALZMETALL recommended levelling elements as well as their bolting with the foundation. Otherwise ALZMETALL cannot grant warranty for dynamic deficiencies.

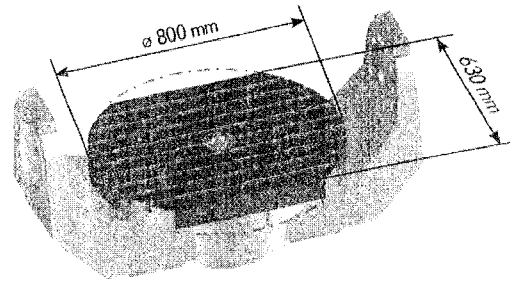
鉴于机床动态因素，必须使用ALZMETALL推荐的水准测量元素并用螺栓连接地基。否则ALZMETALL无法保证动

力不足。

## 2) **NC-Swivelling-Rotary table** ( integrated 4<sup>th</sup> and 5<sup>th</sup> NC-axis)

### **NC-摆动-旋转工作台**

- with 3 rotative direct drives (Torque motors) in the swivelling- and rotary axis.  
在摆动轴和旋转轴上有三套直接驱动装置
- torque drive technic realises highest dynamic control requirements and guaranties with it extreme acceleration and speed.  
扭矩驱动技术实现了最高动态控制的需求, 并保证极快的加速度和速度。
- no mechanical drive elements, through this no parts worn out based on friction and no backlash – **maintenancefree.**  
没有机械驱动元件, 所以也就没有零件因为摩擦或无间隙而损耗-免维护
- A-axis (swivelling range)( 2 Torque motors)  $\pm 140^\circ$   
A轴摆动范围 (2个扭矩电机)
- C-axis (rotary range) (1 Torque motor)  $360^\circ$  (endless)  
C轴旋转范围 连续 (1个扭矩电机)
- rotary table 旋转台直径  $\varnothing 800$  mm
- 8 T-slots acc. to DIN 650/  
radial arrangement  $8 \times 45^\circ$   $4 \times 14$  H12 /  $4 \times 14$  H7  
旋转工作台台面结构: 8个T形槽呈  $8 \times 45^\circ$  径向分布, T形槽规格:  $4 \times 14$  H12 +  $4 \times 14$  H7
- swivel range on middle of A-axis 1070 mm  
绕A轴中心的摆动范围
- swivel range within middle of x-axis 930 mm  
绕X轴中心的摆动范围
- rotary table below middle A-axis 100 mm  
工作台在A轴中心线以下



## 3) **CONTROL: 控制器**

- 控制器布置在机床右侧  
Location at the right side of the machine
- Heidenhain iTNC 530 HSCI with Smart  
海德汉数控系统 iTNC 530 HSCI with Smart  
包括常用的数字驱动控制, 操作面板可通过旋转和摆动调整角度  
Contouring control Heidenhain iTNC 530 HSCI, with digital drive regulation, with rotatable and swivelling operation panel
- 19吋TFT彩色平面显示器, 带触摸板  
19 TFT-colour-flat screen, operating and machine control panel with Touch-Pad
- 硬盘: 144G Hard disc 144GB
- 内存: 1GB RAM memory 1GB
- 直线及圆弧差补  
Linear- and circular-interpolation
- 螺旋和三维插补  
Helical- and 3D-interpolation
- 刚性攻丝  
Tapping without compensating chuck
- 前瞻--几何参数预先计算  
Look Ahead - geometry pre-calculation
- 标准钻孔及铣圆  
Standard drilling- and milling cycles
- 接触式探头测量子程序  
Cycles for touch probe system
- 平行操作 (在加工同时编程)  
Parallel running (machining and programming)
- 文件管理  
File management
- 编程输入以海德汉清晰文本或根据DIN/ISO带smarT.NC

- Program input with Heidenhain-clear text or acc. to DIN/ISO or with smarT.NC
- 自由轮廓编程带海德汉清晰文本及图形支持  
Free contour programming with Heidenhain-clear text and graphical support
- 归零表  
zero point tables
- 数据接口V.24/RS-232-C和V.11/RS-422最大115 kbit/s  
Data interface V.24/RS-232-C and V.11/RS-422 max. 115 kbit/s
- TCP/IP以太网接口（无需添加软件与网络系统进行数据交换）  
Ethernet-interface 100 BaseT (Twisted Pair Ethernet) protocol(no add. software for data exchange with network system necessary)
- 圆工作台及倾斜工作台:  
Round table working and tilting of working plane:  
\* 圆柱差补Cylinder-material-interpolation  
\*速度以mm/min表达Speed in mm/min  
\*工作面倾斜Tilting of working plane  
\*在倾斜工作面上进行三轴圆弧差补circle-interpolation in 3 axes at tilted working plane
- 五轴工作5-axis working  
\*光滑动作控制  
Smooth motion control  
\*刀具校正，通过表面正常3D矢量  
3 D-tool correction via surface normal vector 3D  
\*刀具中心点管理（定位倾斜轴时保持刀尖位置）  
TCPM - Tool Center Point Management  
\*法向矢量（加工轮廓加工刀具垂直功能）  
Tool vertical on the contour  
\*刀具半径向补偿  
Tool radius correction  
\*样条差补：工作样条（多项式：3 度）  
Spline-interpolation: work-off splines (polynome 3. degrees)  
\*0.5毫秒记录程序运行时间  
0,5 ms record processing time
- 3.01.41 电子手轮 HR 410  
**Electronic handwheel** HR 410  
便携式portable
- 3.03.62 **3D-探针及红外传输**  
**3D-touch probe with infrared transmission**  
品牌：雷尼绍brand: Renishaw  
型号 OMP 60Type OMP 60  
在自动模式内，对准工件及测量  
alignment of workpiece and measuring within automatic mode  
能实现全自动化工件测量，数控系统中提供测量循环软件包，可以满足外圆与内孔孔径、方肩高度、长度、孔心坐标、角向等各项测量功能
- 3.03.80 **Tool measuring via laser**  
激光刀具测量  
brand: Blum LaserControl NT  
品牌：Blum 激光控制NT  
suitable as tool breakage control and for tool settings  
适用于刀具破损控制和刀具设置  
consisting of :  
• receiver unit incl. dirt screen with lock up piston  
接受单元包括污垢屏及闭锁活塞  
• pneumatic unit with extra-fine filter  
气动单元及超精滤器  
• **measuring width 160 mm**  
calibration mandrel Ø 8/12 mm

测量宽度 **160 mm**, 校准心轴直径8/12 mm

- measuring cycles 测量周期
  - \*calibration program 校准程序
  - \*tool breakage control 刀具破损控制
  - \*cut-in control 切入控制
- with Heidenhain-Software带海德汉软件

3.03.110 **Signal column** mounted on the machine信号灯 安装在机床上  
in front upper right (left) 在前方右上(左边)  
green: machine in automatic mode (NC is running) 绿: 机床自动模式 (数控运行中)  
orange: machining job has finished橙: 加工任务已完成  
red: error (automatic mode interrupted) 红: 运行失败 (自动模式中断)

#### 4) **MAIN SPINDLE DRIVE** 主轴驱动

- water cooled high frequency motor spindle with hybride-spindle bearings and [oil-air lubrication] permanent grease lubrication  
水冷高频电机主轴带混合轴承及(油-气润滑)永久性的油脂润滑
- air sealing at tool side of spindle bearings. 在主轴轴承刀具侧带气密装置
- compressed air through the spindle center. 压缩气体通过主轴中心
- main spindle cooling system with external heat exchanger/ refrigerating circuit.  
主轴冷却系统带外部热量 交换/冷却电路。
- compensation of thermal expansion. 热膨胀补偿
- spindle-Ø at front bearing 主轴前轴承直径 70mm

#### 4.03.338 **Fequency-motor spindle**

高频-电机主轴

main spindle speed max. 18.000 rpm

主轴速度最大18.000 rpm

hybride-spindle bearing with oil-air lubrication

driving capacity max. 40 kW 25% ED

主轴轴承带油气润滑, 驱动能力最大40 kW 25% ED

torque max. 136 Nm 25% ED 最大扭矩136 Nm 25% ED

with HSK A-63 adaption DIN 69893

HSK A-63适应DIN 69893

with security-compound window 有安全复合窗

#### 5) **AXES DRIVES** 轴驱动装置

- Through double drives and stiff ball bearing drive-nut systems in X- and Y-axis (Gantry-axis) the machine obtains a extreme high parallel path precision.  
通过Y轴双丝杠(龙门式轴), 驱动系统机床获得极高的平行精度
- Central grease lubrication of ball bearing drive-spindle bearings and nut systems.  
滚珠丝杠驱动装置集中脂润滑
- feed drives executed as digital AC-Synchro-motors, (controllable/ maintenancefree).  
进给驱动用数字交流同步电机(可控制免维修)
- feed force in X-, Y- and Z-axis, 40% ED max. 10kN  
XYZ进给力(40% ED)
- rapid travel X-, Y- and Z-axis on the TCP max. 60 m/min  
在TCP上X-, Y- 和 Z-轴快速移动最大 60 m/min

#### 5.03.362 **DynEx-version DynEx** 版

rapid travel X-, Y- and Z-axis on the TCP max. 100 m/min

在TCP上X-, Y- 和 Z-轴快速移动最大 100 m/min

#### 6) **GUIDANCE SYSTEMS** 导轨系统

- the inside arranged 4-fold linear-antifriction-guide way systems in X- and Y-axis of the coordinate drive system are realising more than the double stiff-

ness compared with other drive systems with guide ways located on top of sidewalls. This plus in stiffness increases tool life times and guarantees lower positional misalignment with the same acceleration resp. achieves higher acceleration with the same precision.

内有4通道的XYZ轴线性减摩导轨系统，与其他位于侧墙顶部的驱动系统相比，更加稳定坚固。从而延长了刀具寿命并在相同加速度或更快加速度是确保降低定位误差。

- grease central lubrication of all carrier units. 所有滑台采用集中油脂润滑

## 7) **MEASURING EQUIPMENT** 测量装置

- Y-axis equipped with each two direct linear-path measuring systems.  
Y轴配置两套直接线性测量系统
- X- and Z-axis with one direct linear-path measuring system.  
X和Z轴配置一套直接线性测量系统
- positioning tolerance  $T_p$  acc. to DIN ISO 230-2 (VDI/DGQ 3441) 0,006 mm.  
Re-positioning tolerance: 0,004 mm  
定位精度符合 DIN ISO 230-2 (VDI/DGQ 3441) 0,006 mm  
重复定位精度: 0,004 mm
- A- and C-axis equipped with one direct absolute angle measuring system.  
A和C轴配置一套直接绝对角度测量系统
- A-axis and C-axis accuracy acc. to ISO-230-2: 8 angle second  
A轴和C轴精度: 8角秒

### 7.03.75 **High precision package HPP** 高精度包HPP

Position tolerance  $T_p \leq 0,005$  mm for X-Y-Z-axis  
XYZ轴定位精度  $T_p \leq 0,005$   
Position tolerance  $T_p \leq 4''$  mm for C-axis  
C轴定位精度  $T_p \leq 4''$   
Position tolerance  $T_p \leq 6''$  mm for A-axis  
A轴定位精度  $T_p \leq 6''$   
acc. to DIN ISO 230-2 (VDI/DGQ 3441)  
根据 DIN ISO 230-2 (VDI/DGQ 3441) 标准  
Increasing of the position accuracy in the separate linear axes and both round.  
针对不同线性轴及两个旋转轴而增加的定位精度

## 8) **TOOL CHANGING SYSTEM** 刀具交换系统

- 提取式刀具交换系统  
Tool change arranged by pick-up system
- 刀库TOOL MAGAZINE:
- 刀库形式（右侧） 链式  
Magazine type (mounted at right side)
- 刀库容量 33  
Magazine places
- tool diameter with fully loaded magazine max. 95 mm  
最大刀具直径（有临刀）
- with free neighbouring positions max. 110/150 mm  
无临刀时 tool length at 刀具长度 max. 350/225 mm
- tool weight 刀具重量 max. 10 kg
- max. perm. weight of all tools each chain max. 160 kg  
每链所有刀具重量最大
- tool changetime 换刀时间 approx. 2s
- chip-to-chip time 切削到切削时间 approx. 6 s

## 9) **LUBRICATION** 润滑

- grease-central lubrication for all axes-, guideway- and drive systems  
by progressive-distribution system.  
通过渐进式分配系统,全部轴、导轨和驱动装置采用集中脂润滑
- oil-air lubrication of the high frequency motor spindle.  
高频电机主轴油-气润滑
- fill level monitoring of tanks. 油箱液面监测装置
- lubrication intervals controlled by PLC. 由 PLC 控制间歇性润滑

## **10) COOLANT DEVICE, EXTRACTION- AND CHIP DISCHARGE SYSTEM**

冷却液装置、收集器和排屑器

10.03.20 清洗切屑用水枪

### **Chip rinsing with flush pistol**

包括独立泵incl. separate pump

0.1bar with 108 l/min

压力0.1bar, 流量108l/min

10.03.300c **Production package A**

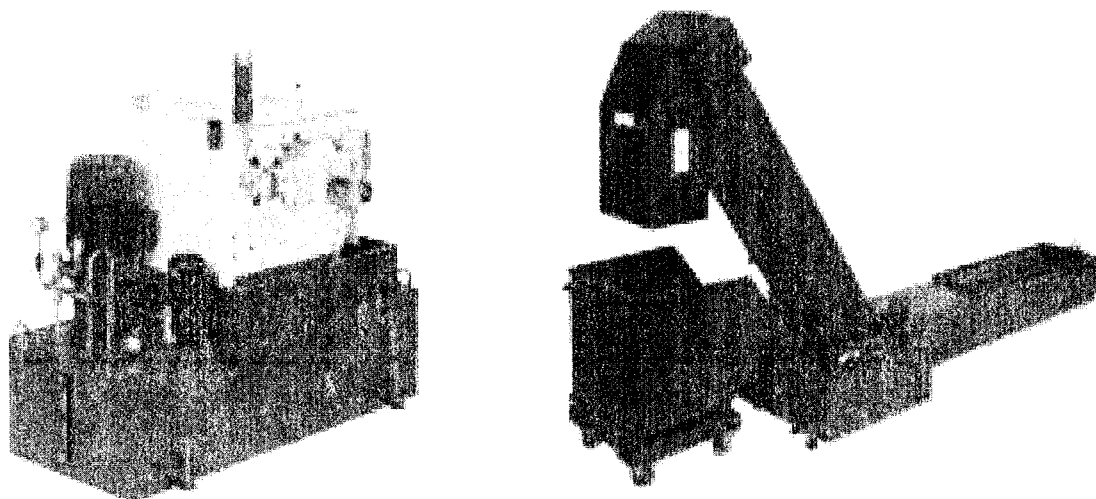
产品包A

**compact band filter 500** altern. to edge filter

排屑和冷却装置位置在机器的左[右]侧

Chip removal and location of the coolant device at the left [right] side of the machine  
含consisting of:

- chip conveyor, scratch type construction  
without [chip trolley]  
for short metal chips, suitable for max. chip length of 80 mm  
排屑器, 刮板式结构无切屑车, 用于短金属切屑, 适合最大切屑长度80mm
- height of drain/emptying outlet 1.145 mm above floor  
排屑口高度距离地面1.145mm
- coolant tank / dirt water – filtered water  
冷却液箱/污水-过滤水
- coolant super cleaning by coolant micro filter  
冷却液微过滤器清洁冷却液
- coolant pump, pressure 7 bar, capacity 80 l/min  
coolant inlet nozzles around the main spindle  
(external coolant supply)  
冷却液泵压力7bar 流量80l/min  
主轴周围冷却液进口喷嘴(外部冷却液供给)
- coolant high pressure pump, pressure 50 bar, 35 l/min  
(coolant high pressure, supply through the main spindle)  
主轴中心出水高压泵, 压力50bar, 流量35 l/min
- air sealing for linear-path measuring systems  
线性测量系统的气密装置  
(suitable for plastic, alu, steel and iron chips!)  
(适用于塑料, 铝, 钢和铁碎屑)



#### 10.03.340 **Frequency control**

频率控制 流量压力无级调节

每个冷却液供给带高压泵最大功率 5,5 kW

For every coolant with high pressure pump max. 5,5 kW

压强将由手动测量和存储并在工件获取时激活

Pressure will be measuring and storing manual and activated at workpiece-taking

可连续调节压强

Pressure is adjustable stepless

压力调节: 20bar~50bar pressure: 20bar~50bar

流量调节: 35 l/min ~50 l/min flow: 35 l/min ~50 l/min

#### 11) **MACHINE HOUSING** 机床外罩

--- 机床外防护罩为钢板

Out around protection housing made of steel metal sheets

--- 加工区域完全封闭, 不仅保证没有铁屑、冷却液外溅, 而且噪声也被控制在被允许的范围内  
The machining area is closed up all around, so that not only chips and coolant lubricants might be retained, but also the noise level stays below the permissible limitation

--- 机床允许用起重机吊装**11.03.212**

Standardly the machine is loadable by crane. 11.03.212

--- 机床内侧采用不锈钢板护罩**11.03.349**

The inside machining area is fitted with plane INOX sheets. 11.03.349

--- 工作区域照明装置

Lighting of the working area

--- 水平推拉门, 带机械锁和电气保护, 门的开度约为750mm

Horizontal protection sliding door at the operators side, electrically protected with mechanical locking, opening width approx. 750 mm

11.03.211 **Security-compound window**安全窗

instead of polycarbonat-window代替聚碳酸酯窗

11.03.212 **Roll-shutter roof protection**

卷帘式机床顶部防护罩

Automatic opening and closing with coordinate drive system

带坐标驱动装置自动开、关

11.03.349 **Inside covering of the machine**

机床内部防护



With INOX metal sheet covers  
采用不锈钢金属板覆盖

## 12) ELECTRICAL, PNEUMATICAL, HYDRAULICAL EQUIPMENT

### 电、气、液设备

Max. permissible ambient temperature: + 10° C - + 40° C  
允许室温范围 + 10°C - + 40°C

- wiring cabinets with electronic equipment mounted behind the machine at the left and the right side. Cabinet on the left side with refrigerator, on the right side without.  
电子设备的电器柜在机床的左后侧，电器柜左侧有制冷器。
- CONNECTION CAPACITIES : 相关性能
- network connection 电源 400/50 volt/ cycles
- power input 输入功率 40 KVA
- fusing 熔断电流 63 AgR
- installed drives generally require a TN-NET system ! 安装驱动通常需要有 TN-NET 系统
- the machine complies with the EMV-norm EN 50370-2 (interference immunity) and EN 50370-1 (emitted interference) for industrial networks!  
机床符合EMV-norm EN 50370-2（抗干扰）和EN 50370-1（抗辐射）工业电网标准
- air pressure supply 压缩空气源最小 min. 6 bar
- hydraulic 液压源 最大 max. 6,8/140 l/ bar
- specific electrical supply networks may require a transformer that is not included !  
特殊电源供应网络可能需要变压器（不包含）
- detached, external heat-exchanger unit for operation of 3 torque motors  
带三个扭矩马达的独立外部热交换装置

备注: 如果用户处电压不稳定, 推荐客户自备IGBT快速电子反应式稳压器以适应高速机床性能。

## 13) PAINTING 油漆色

- DD-structured paint,  
light-grey RAL 7035, anthrazite RAL 7016, white-aluminium RAL 9006, black,  
(colouring similar to leaflet).  
浅灰色RAL7035 烟褐色RAL7016 铝白色RAL9006 黑色（颜色与产品样本接近）  
[special painting 特殊颜色]

## 14) TRANSPORT DIMENSIONS (without options) 运输尺寸（不含选项）

- width 宽度 approx. 2.250 mm
- depth 深度 approx. 4.000[5.300][5.900]mm
- height 高度 approx. 2.810mm

## 15) WEIGHT OF MACHINE 机器重量

- machine as transport unit 机器重约  
approx. 15.500 kg

16) 交货期Delivery: 首付款后4个月发运。

17) 商务条款, 详见商务偏离表

18) 服务 Service:

18.05.15 Installation/Commissioning at  
end user's site  
最终用户处安装及调试

## 配置清单

NO	编号 Code	描述 Description	价格 Price
1.		GS1000/5-T 机床主机GS1000/5-T	EUR577,720
2.	2.03.71	旋转工作台直径 $\Phi$ 800mm Rotary table C-axis $\Phi$ 800mm	EUR5,150
3.	3.01.41	电子手轮 HR 410 Electronic handwheel HR 410	EUR2,600
4.	3.03.62	3D-探针及红外传输 OMP60 3D-touch probe with infrared transmission Renishow OMP60	EUR7,540
5.	3.03.80	激光刀具测量品牌: Blum 激光控制NT Tool measuring via laserbrand: Blum LaserControl NT	EUR11,040
6.	3.03.110	信号灯 Signal column	EUR900
7.	4.03.338	高频-电机主轴 180,000 rpm Frequency-motor spindle 180,000 rpm	EUR9,640
8.	5.03.362	轴驱动装置实现在TCP上X-, Y- 和 Z-轴快速移动最大100 m/min AXES DRIVES rapid travel X-, Y- and Z-axis on the TCP max. 100 m/min	EUR9,110
9.	7.03.75	高精度包HPP High precision package HPP	EUR8,320
10.	10.03.20	清洗切屑用水枪 Chip rinsing with flush pistol	EUR1,100
11.	10.03.300c	冷却液装置及收集器产品包A (中心出水50Bar) Coolant device, extraction Production package A(coolant 50Bar)	EUR33,930
12.	10.03.340	频率控制 流量压力无级调节 Frequency control	EUR5,060
13.	11.03.211	安全窗 Security-compound window	EUR3,390
14.	11.03.212	卷帘式机床顶部防护罩 Roll-shutter roof protection	EUR3,470
15.	11.03.349	机床内部防护 Inside covering of the machine	EUR2,640
16.	18.05.15	Installation/Commissioning at end user's site 最终用户处安装及调试	已含在主机报价中
<b>TOTAL:</b>			<b>EUR681,610</b>

以上报价不含任何技术服务费用、工件试切及运输费用。

The Seller 卖方:

**FINDTON INTERNATIONAL LIMITED**

惠东国际有限公司

Signature of authorized representative:

授权代表签字:

