

新一代多功能
动柱式加工中心

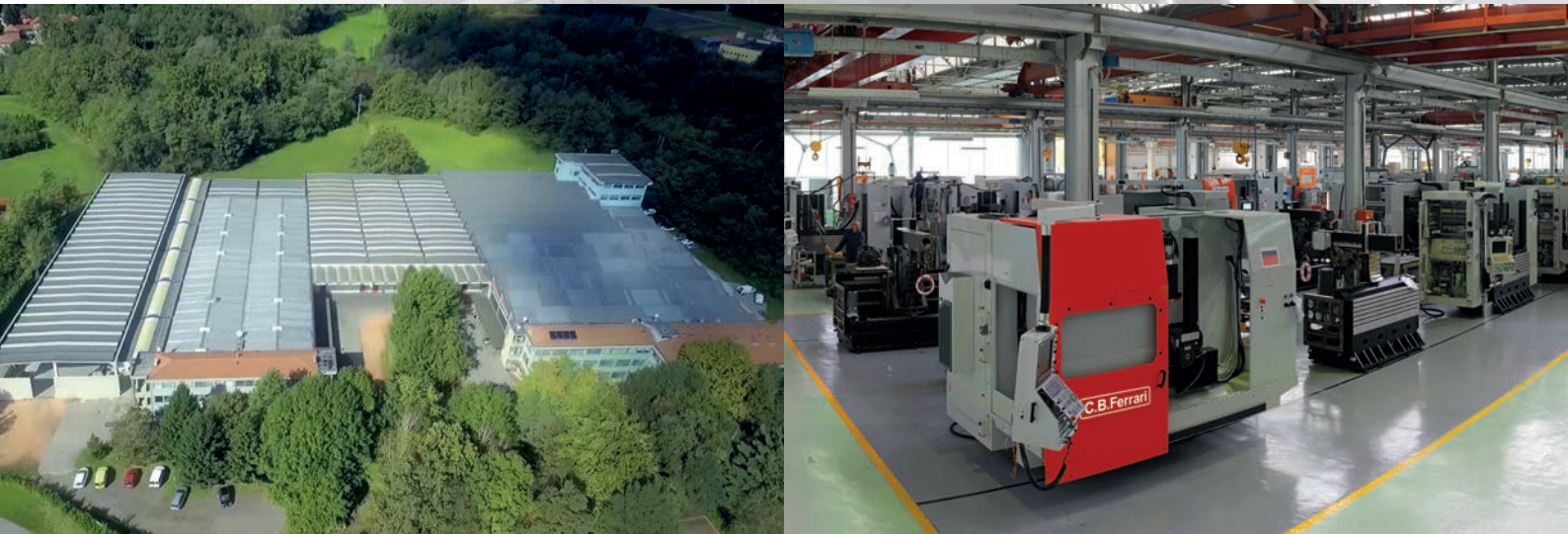
THE NEW GENERATION
OF MOBILE COLUMN
MACHINING CENTER

A236



C.B.Ferrari

ITALIAN EXCELLENCE SINCE 1966



传统与创新

伴随着自1966年起的不断突破、创新以及坚持对性能和精度的不懈追求，C. B. Ferrari在广泛的加工应用领域内皆游刃有余，获得了市场的肯定与信任，这奠定了其在世界上高精度五轴加工中心生产商中的领导地位。

目前C. B. Ferrari在意大利运营两家工厂，共有160余名积极的高技术员工，在生产高精度机床上具备丰富的经验和优秀的传统，同时自主生产包含电主轴和旋转工作台在内的绝大多数机床部件，这一切使得C. B. Ferrari能保证产品优异的质量和可靠性。

C. B. Ferrari在世界范围内安装超过5000台机床，并就近提供及时的销售和售后服务。

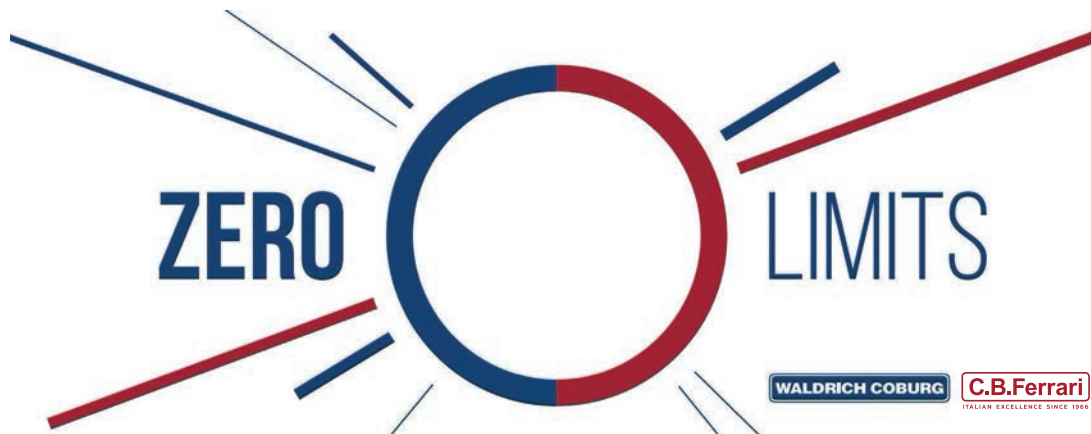
C. B. Ferrari确保客户能够获得极高水平的技术支持，并享受业内顶尖水准的机床性能与精度。

THE COMPANY

Since 1966 the constant innovation, performance- based approach and market recognized and consolidated superior accuracy achieved in a wide variety of manufacturing applications, have led C.B.Ferrari to a world-leading position in high precision 5-Axis machining Center solutions.

Currently, C.B.Ferrari operates with two manufacturing facilities in Italy, with 160 skilled and highly motivated employees, enjoying the homeland long-standing tradition in precision mechanics, design and manufacture all machines in-house including electro-spindles and rotary tables, ensuring the extraordinary and long-term quality and reliability.

With more than 5000 machines successfully installed worldwide, supported by a complete and prompt sales and service network, C.B.Ferrari ensures its Customers the ultimate manufacturing support, achieving state-of-the-art results in terms of accuracy and performance.



2011年与德国WALDRICH COBURG公司加入同一集团
SINCE 2011 IN THE SAME GROUP OF WALDRICH COBURG - GERMANY

机床的组装过程中时刻通过
严格的几何检测保证优异的装配精度

*MACHINES ASSEMBLED WITH HIGH ACCURACY AND
SPECIFIC GEOMETRIC CONTROLS*

远程协助
预测性维护
REMOTE ASSISTANCE
PREDICTIVE MAINTENANCE



直接畅通的联络方式
IMMEDIATE AND DIRECT CONTACT

完美契合工业 4.0

MACHINES PREPARED FOR INDUSTRY 4.0

全新加工中心 NEW MACHINING CENTER

A236



用于铣削和车削的创新型多功能加工中心：涡轮叶片（航空航天或能源领域）、叶轮、叶盘、刀具刀体、凸轮或医疗产品（医用假肢）和小型模具。

Innovative and multifunctional machining center for milling and turning of: turbine blades (aviation or power technology), impellers, blisks, cutting tool bodies, cams or medical products (prosthesis) and small moulds.

A236在以下方面为工业 4.0 做好了准备：

- 与用户公司的 IT 系统的连接
- 预测性维护
- 数字孪生（使用 Sinumerik ONE）
- 远程服务

车削选项

自动托盘或棒料装载
力矩电机驱动旋转轴

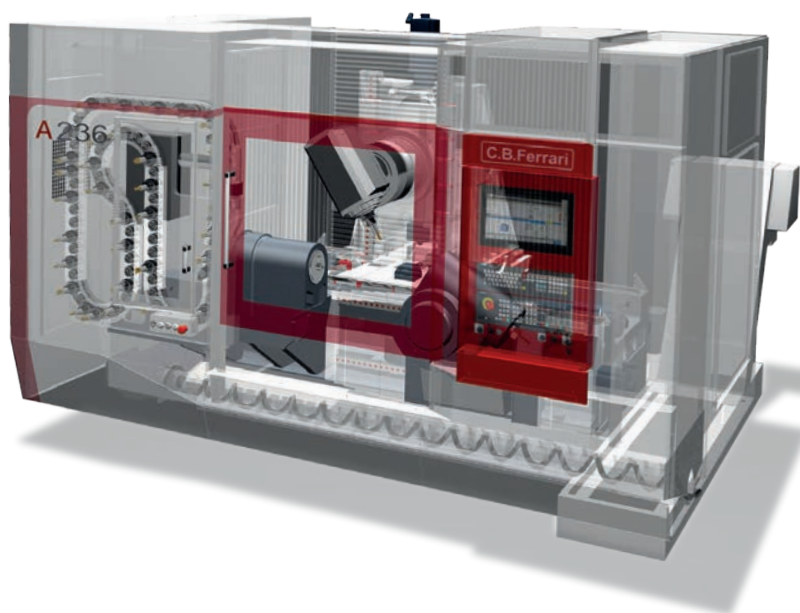
Ready for Industry 4.0 through:

- *Connectivity with the IT systems of the user company*
- *Predictive maintenance*
- *Digital twin (with Sinumerik ONE)*
- *Remote assistance*

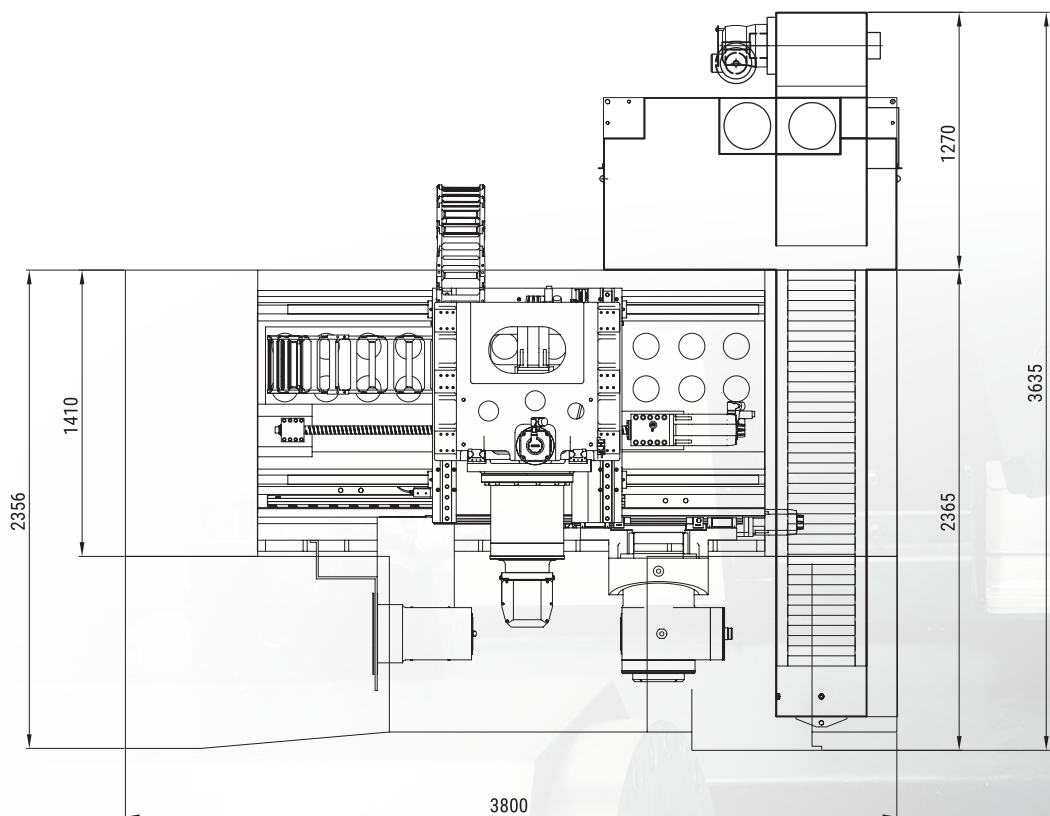
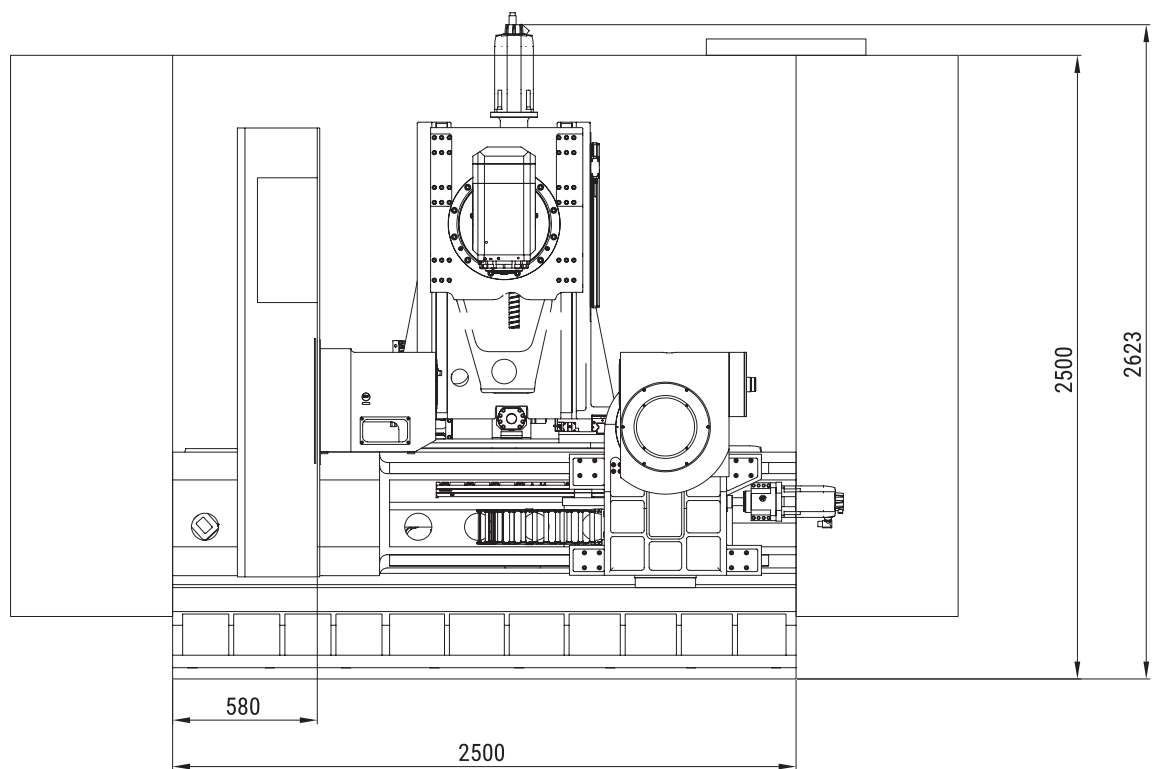
TURNING OPTION

AUTOMATIC LOADING OF BARS OR PALLETS

TORQUE ROTARY AXES



机床平面图
MACHINE LAYOUT



运输尺寸 Transport dimensions	3800 x 2365 x 2635 H mm
标准颜色 Standard colors	机床主体 - Gray RAL 7035 门 - Red RAL 3003

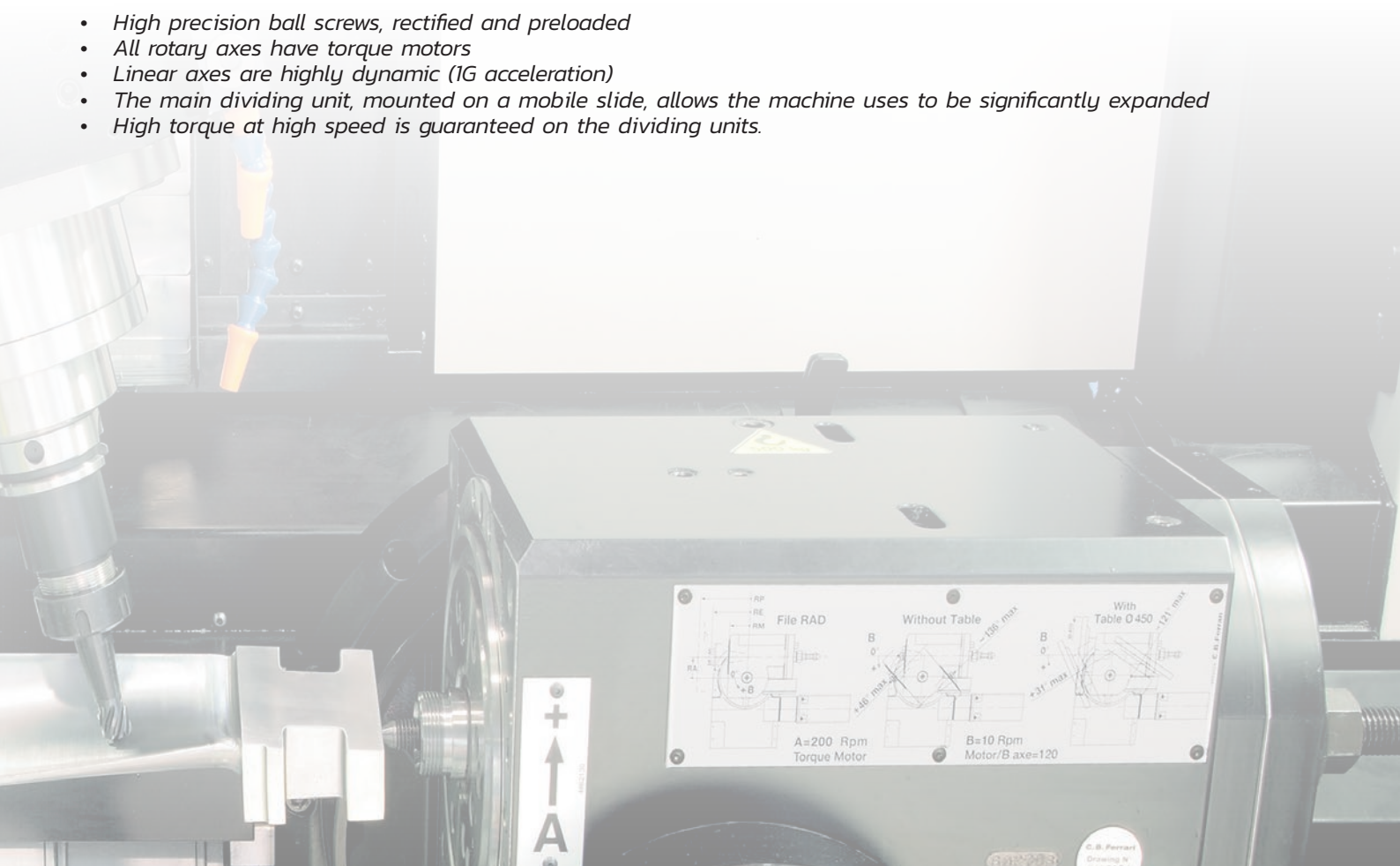
技术参数 TECHNICAL FEATURES

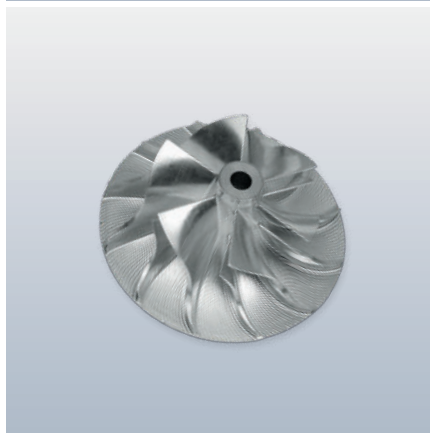
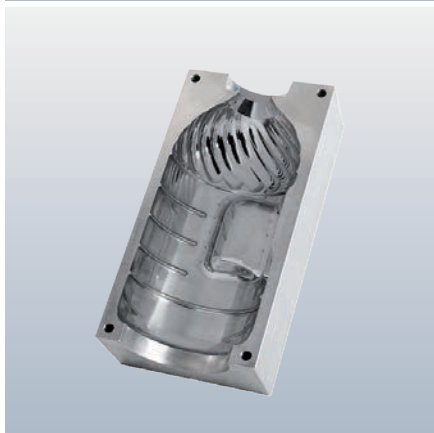
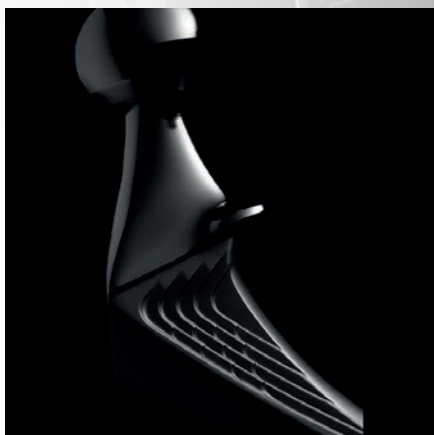
	行程 <i>Travels</i>	速度 <i>Rapid</i>	推力/扭矩 <i>Thrust/Torque</i>	锁紧力/扭矩 <i>Clamping thrust/torque</i>
X - 横向 - Longitudinal	1220 mm	50 m/min	3000/11000 N	-
Y - 纵向 - Cross	310 mm	50 m/min	3000/11000 N	-
Z - 竖向 - Vertical	465 mm	50 m/min	3000/11000 N	-
U - 滑轨 - Sleigh	500 mm	15 m/min	3400 N	6600 N
A1/A2 - 分度头 - Dividing unit	n360°	500 RPM	310/530 Nm	820 Nm
B1 - 分度头 - Dividing unit	-15° ÷ 90°	60 RPM	510/870 Nm	3400 Nm

分度头间最小 ÷ 最大间距 Min ÷ max distance between the two dividing units	230 ÷ 730 mm
机床总重量 Total mass of the machine	13000 kg

- 精细打磨和预加载的高精度滚珠丝杠
- 所有旋转轴均配备力矩电机
- 所有直线轴均具有很高的动力（加速度 1G）
- 安装在滑轨上的主分度头显著扩展了机床的用途
- 双分度头在保证高转速的同时提供极高的扭矩。

- *High precision ball screws, rectified and preloaded*
- *All rotary axes have torque motors*
- *Linear axes are highly dynamic (1G acceleration)*
- *The main dividing unit, mounted on a mobile slide, allows the machine uses to be significantly expanded*
- *High torque at high speed is guaranteed on the dividing units.*





航空航天
模具及工装
医疗器械
涡轮叶片
汽车制造
刀具加工
精密机械
能源发电

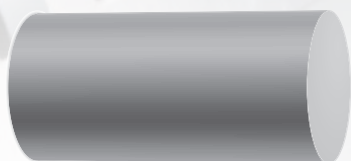
APPLICATION SECTORS

AEROSPACE
MOULDS & DIES
MEDICAL
TURBINE BLADES
AUTOMOTIVE
CUTTING TOOLS
PRECISION MACHINERY
POWER GENERATION

加工区间 WORKLOAD

在 A236 机床上，左侧配备固定的单轴分度头，右侧配备可移动的两轴分度头（ $B1 = 0^\circ$ ），可以加工以下体积的工件：

On the A236 machine, equipped with a fixed one-axis dividing unit on the left side and a mobile two-axis dividing unit on the right side ($B1 = 0^\circ$), it is possible to machine pieces with the following volumes:



最大长度 Max. length	500 mm
最大直径 Max. diameter	450 mm

当工件固定在两个分度头上时，其最大重量为 300 kg。

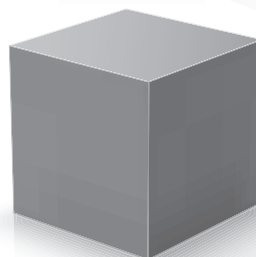
With the piece fixed between the two dividing units, the piece weight must not exceed 300 kg.

A236 机床单独配备右侧两轴可动分度头且当 $B1 = 90^\circ$ 时，可加工以下体积的工件：

The A236 machine, equipped with the mobile two-axis dividing unit on the right side with $B1 = 90^\circ$, can machine pieces with the following volumes:



最大高度 Max. height	300 mm
最大直径 Max. diameter	450 mm



最大尺寸 Max dimensions	300x300 mm
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工件最大重量为 300 kg.

The piece weight must not exceed 300 kg

电主轴 ELECTROSPINDLES



连续摆头技术参数

A236 机器配备了一个带有力矩电机的连续摆头，摆动范围达到 $\pm 120^\circ$ 。

头部由带气动开关的机械制动器锁紧。

摆头的技术参数是：

- 摆动范围: $\pm 120^\circ$
- 摆动速度: 60 RPM
- 锁紧扭矩: 3400 Nm
- 极大地减少了主轴鼻端至旋转中心的距离，以保证极高的精度和重复定位精度。

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CONTINUOUS TILTING HEAD AND ELECTROSPINDLES FEATURES

The A236 machine is equipped with a torque motor tilting head that can perform a $\pm 120^\circ$ rotation of the spindle axis.

The head is locked with a mechanical brake with pneumatic release.

The head features are:

- angle of rotation: $\pm 120^\circ$
- rapid rotation speed: 60 RPM
- clamping torque: 3400 Nm
- extremely reduced distance from the spindle nose to the rotation center to guarantee a high degree of accuracy and positioning.

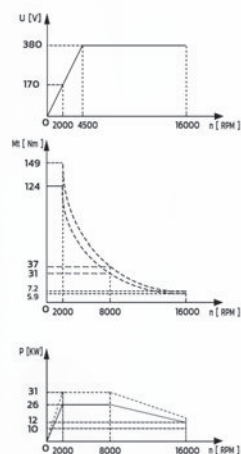
摆头可以配备以下的盒式电主轴:

The head can support the following cartridge electro-spindles:

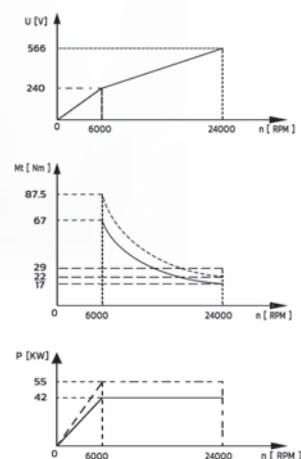
16.000 RPM	HSK A63	26/31 kW	124/149 Nm	铣削 - Milling
16.000 RPM	HSK A63	50/67,5 kW	90/120 Nm	
24.000 RPM	HSK A63	42/55 kW	67/87,5 Nm	
20.000 RPM	HSK T63	42/55 kW	67/87,5 Nm	铣削/车削 - Milling/Turning

铣削 - MILLING

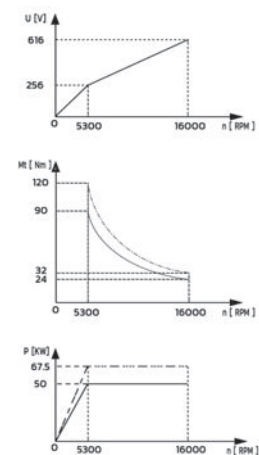
主轴接口 Spindle taper	HSK A63
主轴转速 Spindle speed	16.000 RPM
功率 - Power	26/31 kW
扭矩 - Torque	124/149 Nm
润滑 Lubrication	油脂 - Grease
电机类型 Motor type	异步 Asynchronous



主轴接口 Spindle taper	HSK A63
主轴转速 Spindle speed	24.000 RPM
功率 - Power	42/55 kW
扭矩 - Torque	67/87,5 Nm
润滑 Lubrication	油气 - Air/oil
电机类型 Motor type	同步 Synchronous

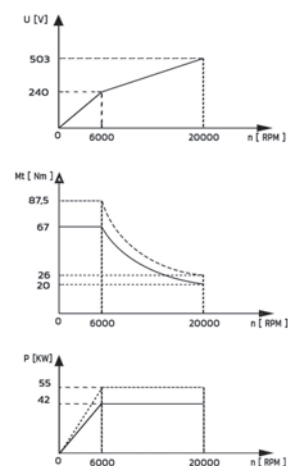


主轴接口 Spindle taper	HSK A63
主轴转速 Spindle speed	16.000 RPM
功率 - Power	50/67,5 kW
扭矩 - Torque	90/120 Nm
润滑 Lubrication	油气 - Air/oil
电机类型 Motor type	同步 Synchronous



铣车复合 - MILLING/TURNING

主轴接口 Spindle taper	HSK T63
主轴转速 Spindle speed	20.000 RPM
功率 - Power	42/55 kW
扭矩 - Torque	67/87,5 Nm
润滑 Lubrication	油气 - Air/oil
电机类型 Motor type	同步 Synchronous

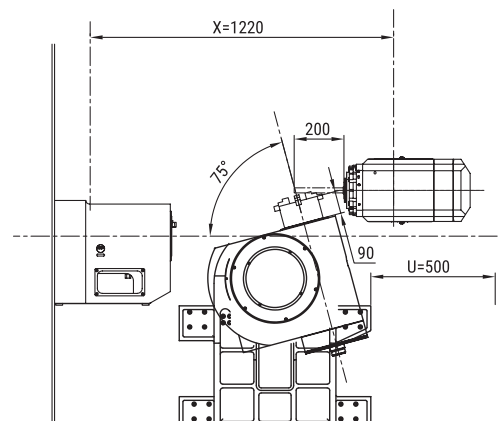
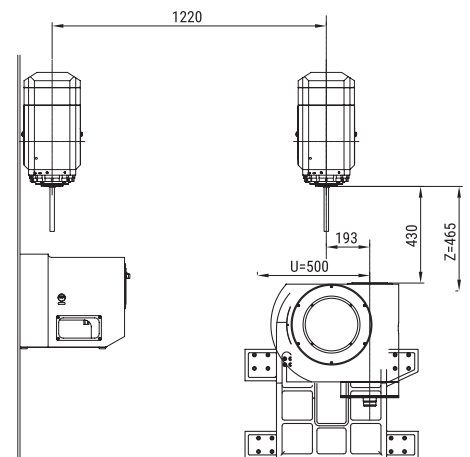
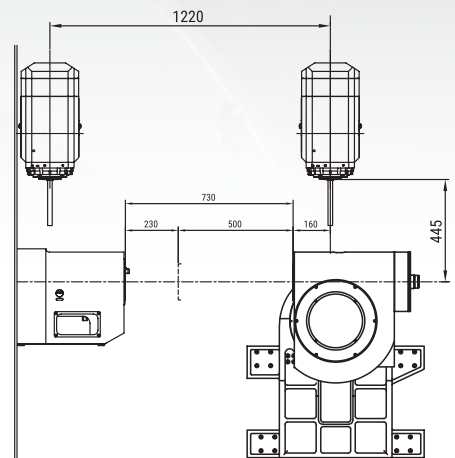


分度头 DIVIDING UNITS



In its basic configuration the A236 has on the right side, the two-axis mobile dividing unit (A1, B1), mounted on a slide with $U = 500 \text{ mm}$. (U axis: Speed 15 m/min - Clamping force 660 Nm). Having a mobile two-axis dividing unit with 500 mm travel means to significantly increase the machine potential: the B1 axis can rotate from -15° to $+90^\circ$ thus allowing vertical rotation of the piece and its longitudinal translation. The drawings below show the operating conditions in the two cases of axis $B1 = 0^\circ$ and axis $B1 = +90^\circ$.

在 A236 的基本配置中，右侧配置有两轴（A1、B1）可动分度头，安装在行程 $U = 500 \text{ mm}$ 的滑轨上。（U轴：速度 15 m/min - 锁紧力 660 Nm ）。具有一个行程为 500 mm 的两轴移动式分度头意味着显著增加机床的潜力：B1 轴可以从 -15° 旋转到 $+90^\circ$ ，允许工件在垂直平面内旋转及其纵向平移。下图表示轴 $B1 = 0^\circ$ 和轴 $B1 = +90^\circ$ 两种情况下的加工范围。



左侧分度头 LEFT DIVIDING UNIT



A236 在左侧配有一个固定的单轴分度头 (A2)，可以加装自动棒料装载系统。A2轴为工作轴；可联动 X、Y、Z 轴连续进行加工，与右侧两轴移动分度头A1轴同步。

The A236 has on the left side a fixed one-axis dividing unit (A2) with the possibility of bar passage. The A2 axis is a work axis; can perform continuous machining with the X, Y and Z axes and in synchronism with the A1 axis of the two-axis mobile dividing unit placed on the right side.

A2 轴 - A2 AXIS

旋转范围 - Angle Rotation	360°
最大转速 - Max. rotation speed	500 RPM (2000 RPM 车削 - Turning)
扭矩: 额定/最大 Torque: Working/Maximum	310/530 Nm

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A1 轴 - A1 AXIS

旋转范围 - Angle Rotation	360°
最大转速 - Max. rotation speed	500 RPM (2000 RPM 车削 - Turning)
扭矩: 额定/最大 Torque: Working/Maximum	310/530 Nm

B1 轴 - B1 AXIS

旋转范围 - Angle Rotation	15° +90°
最大转速 - Max. rotation speed	60 RPM
扭矩: 额定/最大 Torque: Working/Maximum	510/870 Nm

刀库 TOOL MAGAZINES

A236的机床左侧配有**40、60或80**刀位的刀库，刀库具有水平的刀具轴。刀库的设计使自动棒料装载得以实现。刀库采用链条式**环形**设计，刀具位置通过由伺服电机驱动的齿轮盘控制移动。当刀具位于换刀位置时，特制的交换器将向内移动，在此情况下，交换器会旋转机械臂并利用快速释放钳进行换刀。摆头旋转+ 90°（主轴轴线水平）时进行换刀。换刀过程由放置在刀具交换器附近的**激光探头**控制。

The A236 is equipped with a tool magazine with **40, 60 or 80 positions**, which has a horizontal tool axis, located on the left side of the machine; the tool magazine is designed to allow the passage of the automatic bar loading. The tool magazine is of the **ring type** where the tool-holding bushings slide by pushing through toothed wheels run by a servomotor. When the tool-holding bushing is at the tool change position, a special tipper moves it towards the inside where an exchanger rotates an arm with quick-release pliers. The tool change occurs with the head rotated by +90° (spindle axis horizontal). The tool is controlled by a **laser meter** placed near the tool exchanger.



刀柄：HSK-A63 或 HSK-T63
刀位数量：**40** 044446, **60** 044445, **80** 044444
最大刀具重量：5 kg（刀具总重不超过
200/300/400kg的情况下可达到10kg）
满刀位时：

- 最大刀具直径：93 mm
- 最大刀具长度：250 mm

相邻无刀时：

- 最大刀具直径：150 mm
- 最大刀具长度：250 mm

换刀时间：2.2 s

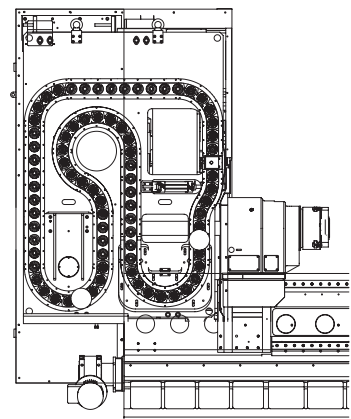
Tool taper: HSK-A63 or HSK-T63
Tool positions: **40** 044446 **60** 044445 **80** 044444
Tool weight: 5 kg (max 10 kg with a total tools weight equal to 200/300/400 kg)
With full positions:

- max. Ø tool: 93 mm
- max. tool length: 250 mm

With alternate positions:

- max. Ø tool: 150 mm
- max. tool length: 250 mm

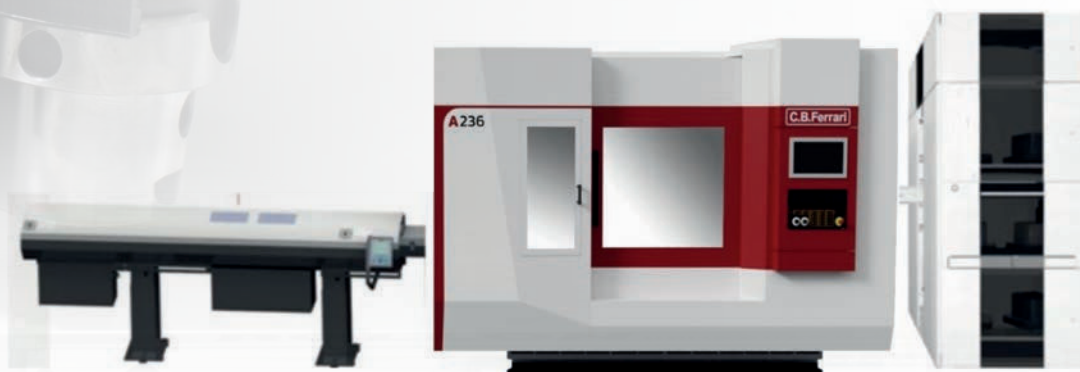
Tool change time: 2,2 s



自动化解决方案 AUTOMATION SOLUTIONS

机床左侧分度头直连的自动棒料库

AUTOMATIC BAR LOADING IN THE LEFT DIVIDER



托盘自动装卸系统

AUTOMATIC PALLET LOADING AND UNLOADING SYSTEM

A236 设计用于托管能够从机器上装载和卸载零件的自动化系统。

所提供的系统可用于托盘更换或用于各种几何形状（圆形、方形、矩形、六边形）棒材的自动装载机。

自动棒料装载机特点如下：

- 输送直径为8至76 mm，长度最大为2300 mm的棒料；
- 正面有一个棒料仓库；
- 可以并卸载回收余料至特殊容器；
- 可以轴向移动装载机，以便接触前衬套以管理维护。

自动系统始终位于机床的侧面，操作人员可在机床正面自由操作。

The A236 is designed to accommodate automation systems capable of parts loading and unloading from the machine. The systems provided can be with a pallet change or for an automatic bar loader of various geometries (round, square, rectangular, hexagonal).

The automatic bar loader can include:

- *loading of bars with $\varnothing$ from 8 to 76 mm and lengths up to 3000 mm;*
- *a bar magazine placed on the front side;*
- *the possibility of recovering the bar section and unloading it in a special container;*
- *the possibility of axially moving the loader in order to access the front bushing to manage maintenance.*

The automatic systems are always positioned on the sides of the machine, leaving the operator front part free.

工业 4.0

INDUSTRY 4.0

A236 机器是根据工业 4.0 和智能制造的原则设计的，即用于自动化和互连的工业环境，由先进的数控系统和机器人管理生产过程和数据。

A236实际上具有以下特点：

- 它完全由基于数字控制的数控系统控制，能够在加工过程中管理机床的所有轴以管控加工过程；
- 与车间 IT 系统互连，执行远程加载指令和/或零件加工程序；
- 它与工厂的物流系统、供应网络和/或属于其他环节的机床集成，设置为自动装载棒料和/或工件支撑托盘以及自动卸载工件/托盘；
- 具有简单直观的人机界面；
- 配备先进的远程维护/或远程诊断和/或远程控制系统；
- 允许在生产过程的开发中对操作进行建模和/或模拟。



The A236 machine has been designed according to the principles of Industry 4.0 and Smart Manufacturing, i.e. for an automated and interconnected industrial environment where advanced numerical controls and robots manage production processes and data. The A236 has in fact the following characteristics:

- it is completely controlled by a digital system based on a numerical control capable of managing all the axes of the machine during processing in order to create the piece;
- interconnects to factory IT systems with remote loading of instructions and/or part programs;
- it integrates with the logistic system of the factory, with the supply network and/or with other machines of the production cycle, being predisposed for an automatic loading of the bar and/or of the piece-holder pallet and for an automatic unloading of the piece/pallet;
- has a simple and intuitive man-machine interface;
- is equipped with advanced remote maintenance/or remote diagnosis and/or remote control systems
- allows the modeling and/or simulation of one's own behavior in the development of the production process.

车削选项 TURNING OPTION



A236 设计初衷为多功能机床（多任务处理）：除了经典的铣削和钻孔操作外，它还提供车削功能，使您可以在同一台机床上完成一个工件的不同步骤，避免将其移动到其他机床，从而优化加工时间。车削功能需要工件以高速进行旋转，以便在保持刀具固定的同时去除材料。

车削选项提供：

- 带有拉杆锁定系统的电主轴，以保持刀具固定；
 - 左侧的固定分度头，最大转速为 2000 RPM，可设计中空以进行棒料的装卸；
 - 右侧可动两轴分度头，最大转速为 2400 RPM，可设计中空以进行棒料的装卸；
- 分度头配备力矩电机，能够提供远高于车削过程所需的工作扭矩的数值。

The A236 has been designed as a multifunctional machine (multi-tasking): in addition to the classic milling and drilling operations, it also includes turning which, allows you to finish a piece on a single machine without moving it. on other machines and thus optimizing execution times. The turning option requires high rotation speed of the piece in order to remove material while keeping the tool fixed. The turning option provides:

- *an electrospindle with a shaft locking system in order to keep the tool fixed;*
- *a fixed dividing unit on the left side with a maximum rotation speed of 2000 RPM with or without the possibility of bar passage;*
- *a mobile dividing unit with two axes on the right side with a maximum rotation speed of 2400 RPM with or without the possibility of bar passage;*

The dividing units are equipped with torque motors capable of delivering a torque much higher than the cutting torque required by the turning process.

数控系统 AVAILABLE CNC CONTROLS



西门子 SINUMERIK 840D SL
西门子 SINUMERIK ONE



海德汉 TNC 640

绝对测量系统 ABSOLUTE MEASURING SYSTEM



所有旋转轴均配备海德汉绝对编码器。精度等级达到 $\pm 2''$ 。
All rotary axes are equipped with Heidenhain absolute encoders. Accuracy class $\pm 2''$.



所有机床均标配海德汉绝对光栅尺
All machines are equipped with Heidenhain absolute linear scales

机床配件

机床可安装以下标准配件：

- 用于铝合金或钛合金加工的排屑器
- 废气过滤器
- 25/75 bar主轴中心水冷或气冷
- 3D 工件测量系统
- 激光对刀仪或接触式对刀仪
- 操作门圆形视窗
- 其他按需选配

ACCESSORIES

The machine can be equipped with the following accessories:

- Chips conveyor for steel or Aluminum/Titanium
- Exhaust filter
- Through spindle coolant 25/75 bar or by air
- 3D touch probe
- Tool setting device Laser or contact
- Spin window on door (rotoclear)
- Other options available on request



3D工件测量系统
3D touch probe



激光对刀仪
Tool setting device Laser



接触式对刀仪
Tool setting device contact



中心出水冷却单元 - 75 BAR 500升水箱 - 鼓式过滤器
THROUGH SPINDLE COOLANT GROUP - 75 BAR - 460 LITERS TANK - DRUM FILTER



可对旧机床的工作台、分度头以及电主轴进行升级。
Possibility to update the used machines with new CNC, electrosindles, dividing units, etc.

C.B.Ferrari

C.B. FERRARI S.r.l. a socio unico
*Società soggetta a direzione
e coordinamento di*
Jingcheng Holding Europe GmbH
Coburg, Germany

SEDE DI MORNAGO
Via Stazione, 116
21020 **Mornago** (VA) - Italy
Tel. +39 0331 903524
Fax +39 0331 903642
cbferrari@cbferrari.com

SEDE DI MODENA
Strada Curtatona, 21
41126 **Modena** - Italy
Tel. +39 059 281460
Fax +39 059 280113
cbferrarimodena@cbferrari.com

C.B.FERRARI CHINA
北京市顺义区
顺西南路10号
Tel. +86 010 60496244
Fax +86 01062496243
cbferrari@cbferrari.com.cn

www.cberrari.com

