

直线电机驱动
摇篮式五轴加工中心
LINEAR MOTORS
MACHINING CENTERS

ML45



C.B. Ferrari

ITALIAN EXCELLENCE SINCE 1966

公司历史 OUR HISTORY

- 1966** 1966年9月1日 C.B.Ferrari公司在位于意大利米兰北部50公里处的瓦雷泽省莫尔纳戈成立。三位创始人分别是负责技术的Renato Bianchi先生和Giuseppe Ferrari先生，以及负责财务的Augusto Caravati先生。成立之初的目标方向是生产适用于加工冲头、模具和复杂零件的小型铣床。
C.B.Ferrari was founded on September 1st in the northern Italian town of Mornago (VA), 50 km north from Milan, by Mr. Renato Bianchi and Mr. Giuseppe Ferrari as technical members and Mr. Augusto Caravati as the financing partner starting the production of small milling machines suited to build punches, moulds and complex workpieces.
- 1967** C.B.Ferrari 公司研发了自己的直流电机和驱动系统，并生产了第一台直流电机驱动的三轴机床。
C.B.Ferrari develops its own DC motors and drives, builds the first 3-Axis machine operated by DC motors.
- 1973** C.B.Ferrari 为生产的绝大多数机床配备了数控系统并且采用了绝对测量系统。
C.B.Ferrari equips the majority of its machines with CNC and adopts absolute measuring systems.
- 1974** C.B.Ferrari 发布了机床热补偿软件。
C.B.Ferrari releases the machines thermal compensation software.
- 1978** C.B.Ferrari 制造了自己的第一个双摆转台和第一台五轴加工中心。
C.B.Ferrari builds its own first 2-Axis rotary table and builds its first 5-Axis machine.
- 1984** C.B.Ferrari 创立了软件技术部以开发自己的CAM软件。
C.B.Ferrari founds Tecnosoft, its software division.
- 1985** 软件技术部发布了第一版3D CAM软件。
C.B.Ferrari 和意大利领先的Elexa公司共同研发了第一套基于PC的数控系统。
*Tecnosoft releases its first 3D CAM software.
C.B.Ferrari develops the first PC-based CNC in Europe, in cooperation with the Italian CNC leading company Elexa.*
- 1987** C.B.Ferrari 在意大利摩德纳建立了新工厂。
C.B.Ferrari opens a new plant in Modena (Italy).
- 1992** C.B.Ferrari 自主研发并生产了第一根电主轴。
C.B.Ferrari builds its own first electro-spindle.
- 1993** 软件技术部发布了专门应用于透平叶片制造的CAM软件。
Tecnosoft releases the CAM software for turbine blades machining.
- 1994** C.B.Ferrari 售出了第一台用于发电机叶片加工的机床。
C.B.Ferrari sells the first machine for power-generation blades manufacturing.
- 1998** 软件技术部发布了用于模拟加工过程的数字仿真软件。
C.B.Ferrari 售出了第一台用于航空发动机叶片加工的机床。
*Tecnosoft releases the software for machining's graphical simulation.
C.B.Ferrari sells the first machine for aero-engine blades manufacturing.*
- 2003** C.B.Ferrari 生产了第一台配置直线电机和力矩电机的立式五轴加工中心。
C.B.Ferrari builds its first vertical 5-Axis Machine equipped with linear and torque motors.
- 2009** C.B.Ferrari 成立了激光技术部。
C.B.Ferrari establish its own Laser Division.
- 2010** 软件技术部改进了CAM软件，使其能够适用于整体叶盘和叶轮的加工。
Tecnosoft develops the CAM software for IBR's (blisks) and Impellers machining.
- 2012** C.B.Ferrari 生产了第一台配有直线电机和力矩电机的卧式五轴加工中心。
C.B.Ferrari 和瑞士Rofin Lasag 公司在激光技术应用领域签署独家协议。
*C.B.Ferrari builds its first horizontal 5-Axis Machine equipped with linear and torque motors.
C.B.Ferrari and Rofin Lasag sign an exclusive agreement for laser application development.*
- 2013** C.B.Ferrari 开发了适用于分度凸轮加工的机床与配套软件。
C.B.Ferrari develops machine and software for the cam machining.
- 2015** C.B.Ferrari 发布了专为中型叶片加工而设计的N316机床。
C.B.Ferrari present the new N316 model for the medium size blades machining.
- 2016** C.B.Ferrari 发布了专为超大型叶片加工而设计的N530机床，同年售出6台。
C.B.Ferrari presents and supply 6 machines of the new model N530, for the machining of the biggest blades in the world.



公司简介 THE COMPANY

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与精度的不懈追求，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。

意大利是欧洲第二大机床生产国，也是世界第五大机床生产国。目前C.B.Ferrari在意大利运营两家工厂，共有170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与优秀的传统，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4500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。

TRADITION AND INNOVATION

Since 1966 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 CNC machining centers solutions.

Currently C.B.Ferrari operates with two manufacturing facilities in Italy, the second major machine manufacturing country in Europe and the fifth in the World. 170 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 extraordinary quality and reliability over the time.

With more than 4500 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 performances.

全面服务 *SERVICES*



服务内容 SERVICES



C.B.Ferrari 提供广泛的技术服务，包括：

- 全球范围的销售和服务网络
- 专有主轴、分度头的制造与维修
- 顶尖的专有CAM软件和仿真模拟软件
- 交钥匙解决方案
- 机床操作示范及加工效率优化
- 精度和重复定位精度测试
- 定制自动化解决方案
- 机床大修
- 全面的技术培训



C.B.Ferrari offers comprehensive consulting, including:

- *Worldwide Sales and Service Network*
- *Proprietary Spindles and Dividing Heads Manufacturing and Repair*
- ***Proprietary CAM and Simulation Software products***
- *Turnkey Projects*
- *Machine Demonstration and Time Studies*
- *Accuracy and Repeatability Tests*
- *Customized Automation Solutions*
- *Used machines Overhauls*
- *Training programs*



ML45

6 新型摇篮式五轴加工中心ML 45配置直线电机，经过精心设计与开发，不仅带来卓越的性能，同时缩短了加工时间。

ML 45全面满足了现代化生产所需的高速、高定位精度及高重复定位精度、更长的使用寿命和更短的维护时间等要求，其独特的设计为高速加工技术树立了新的基准，完美展现了C.B.Ferrari在提供卓越的动态特性的同时对高精度的把控能力。

直线电机和电主轴的温度控制系统，确保了热稳定性的始终如一。

由力矩电机驱动的双摆转台使ML 45实现了出色的运动平稳性和极高的表面光洁度。

ML 45可配备西门子 840D-sl 或海德汉 TNC 640 数控系统，借助友好易用的操作界面为用户提供稳定、安全和可靠的性能表现。

得益于C.B.Ferrari最新一代校准系统，ML 45与其他同类产品相比能够在复杂造型的零件、型腔、型芯和电极的加工处理上大大加快循环时间。

The new 5-axis vertical machining center with linear motors ML 45, is designed and developed to provide high accuracy with short machining time.

The modern production cycles require high speed, high acceleration, maximum positioning accuracy, high reliability and reduced maintenance time.

The ML45 unique design sets new benchmarks in high-speed machining technology, achieving superior dynamic accuracy in a 5-axis configuration. Temperature-controlled linear, torque and spindle motors all guarantee complete thermal stability.

The integration of the rotary and tilting table, thanks to its two continuous torque motors, contributes to achieving excellent motion smoothness and extremely high surface finishing. The ML 45 can be either equipped with Siemens 840D-sl or Heidenhain TNC 640, providing a stable, secure and reliable performance with a user-friendly graphical interface. Thanks to the latest generation of the proprietary calibration system, C.B.Ferrari is able to obtain cycle times considerably faster on complex shaped parts, dies, cavities, cores and electrodes compared to other solutions.

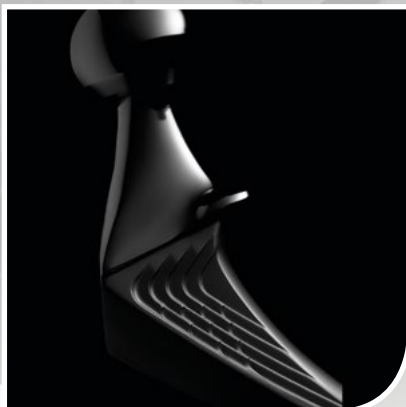
应用一览

APPLICATION SECTOR



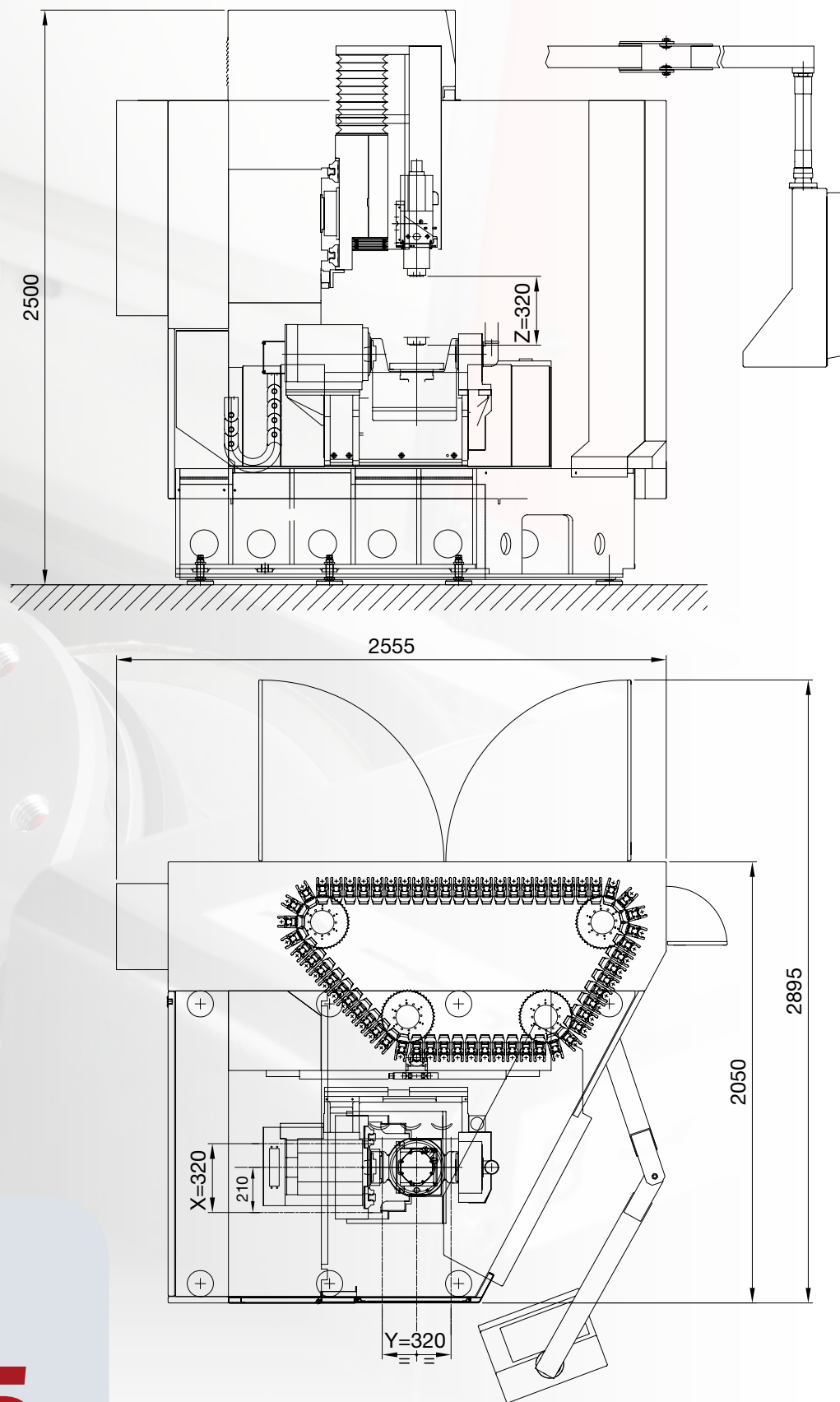
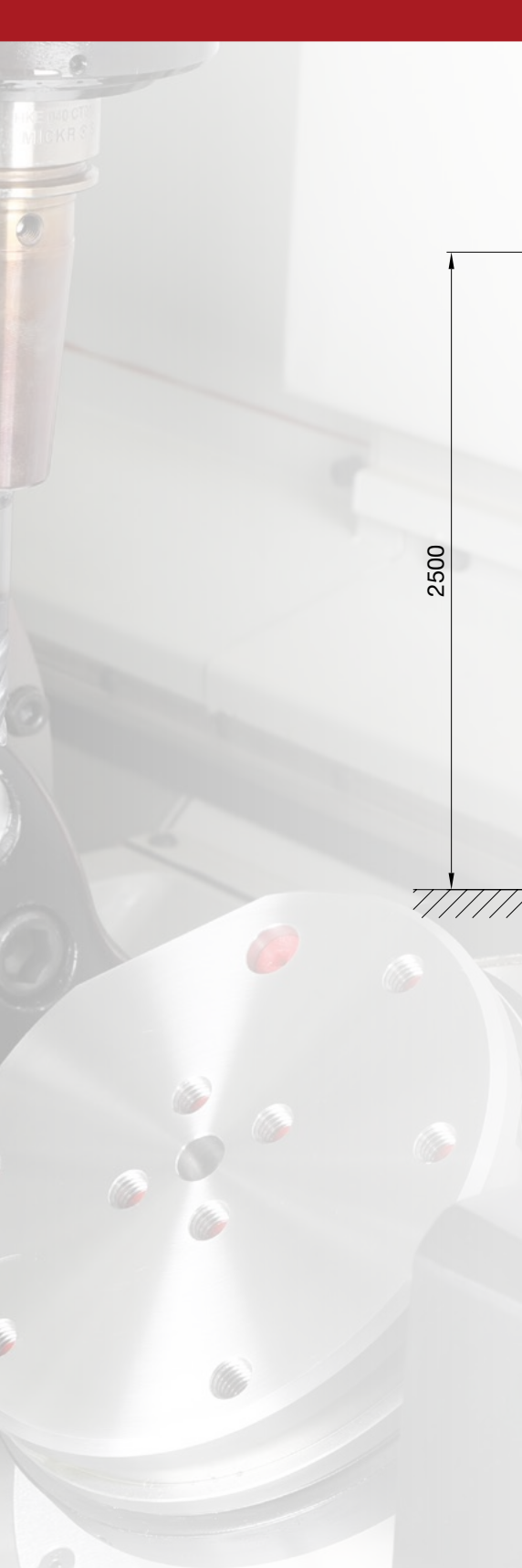
电极
小型模具
精密零件
叶轮
整体叶盘
医用医疗

*ELECTRODES
SMALL MOULDS
PRECISION MECHANICS
IMPELLER
BLISK
MEDICAL*



产品参数 FEATURES

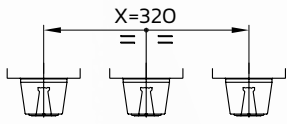
ML45	
行程 · SLIDE TRAVELS	
X轴 Longitudinal (mm)	320
Y轴 Cross (mm)	320
Z轴 Vertical (mm)	320
测量系统 · MEASURING SYSTEM	
绝对光栅尺 Absolute optical linear scales	Heidenhain
轴 · AXES	
XYZ 进给速度 Feed rates XYZ (m/min)	60
推力 Thrust (N)	15000
加速度 · ACCELERATION	
线性加速度 Linear (m/s ²)	10
操作系统 · CNC-CONTROL	
海德汉 Heidenhain	TNC 640
西门子 Siemens	840D sl
刀库 · TOOLS MAGAZINE	
配有机械手的链条式刀库 Chain type with exchanging arm	
刀位数量 Positions	60
换刀时间 Changing time chips/chips (s)	5
刀具最大长度 Max. tool length (mm)	125
刀具最大直径 Max. Tool diameter (mm)	16
刀具最大重量 Max tool weight (kg)	2
双摆转台 · 2-AXIS TILTING ROTARY TABLE	
装夹范围 Clamping area (mm)	∅ 250
旋转与摆动角度 Rotary and tilting	C 360° B +/- 100°
转速 Feed rates (RPM)	C B 200
轴扭矩 Axis Torque (Nm)	C 115 B 470
主轴鼻端至台面距离 Distance spindle nose-table (mm)	40-360
最大载荷 Max. table load (kg)	20
尺寸与重量 · WEIGHT AND DIMENSIONS	
尺寸 Dimensions (mm)	2050 x 2555 x 2520 H
重量 Weight (kg)	5000
功率 Rating power (kW)	35



机床布局

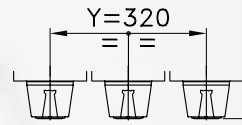
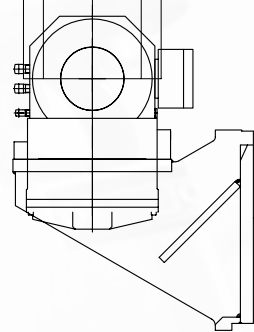
ML45

MACHINE
LAYOUT

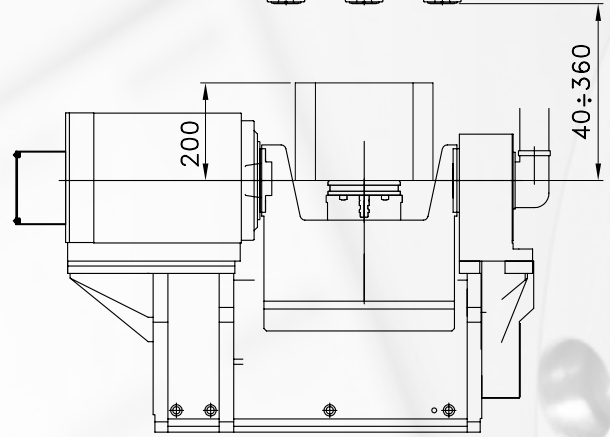


$X=320$

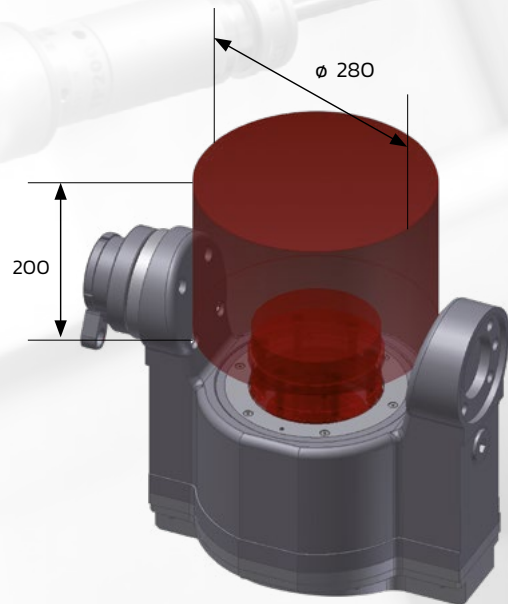
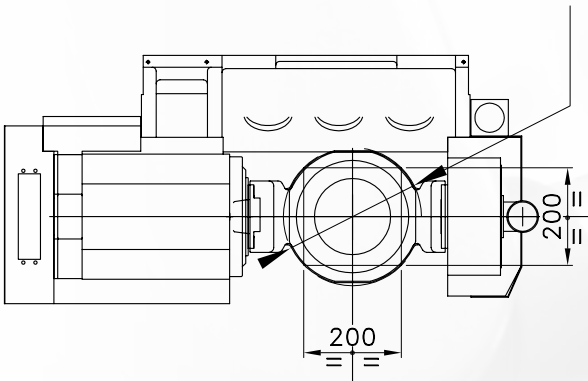
$+100^\circ$ 0° -100°



$Y=320$



$\varnothing 282$ 最大旋转直径
max. in rotation



双摆转台 • 2-AXIS TILTING ROTARY TABLE

装夹范围 Clamping area (mm)	$\varnothing 250$
旋转与摆动角度 Rotary and tilting	C 360° B $\pm 100^\circ$
转速 Feed rates (RPM)	C B 200
轴推力 Axis thrust (N)	C 115 B 470
主轴鼻端至台面距离 Distance spindle nose-table (mm)	40-360
最大载荷 Max. table load (kg)	20

电主轴 *ELECTROSPINDLES*

C.B.Ferrari 所有机床配备自主设计并制造的电主轴，
可以为其用户提供以下卓越的优势：

- 库存有充足的备用电主轴
- 响应时间短且主轴易于更换
- 低廉的维修费用
- 减少机床停机时间

同时包含：

- 陶瓷球轴承
- 集成同步电机
- 温度控制功能
- 液体冷却系统
- 刀具轴向热变形自动补偿

C.B.Ferrari design and manufactures in house all the electrospindles its machines are equipped with, offering remarkable advantages to its customers:

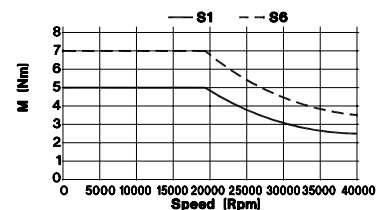
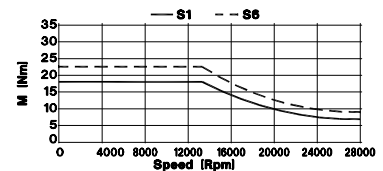
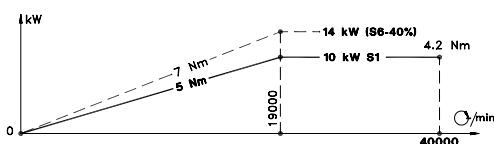
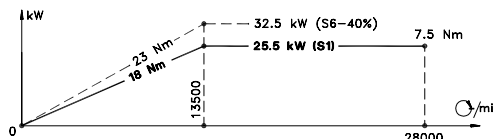
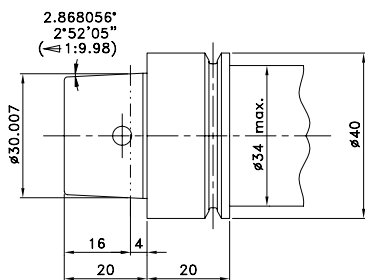
- *Spare spindles always available*
- *Easy of replacement with minimum intervention time*
- *Low repair cost*
- *Reduced machine downtime*

Also include:

- *Ceramic ball bearings*
- *Integrated synchronous motor*
- *Temperature controlled operation*
- *Liquid cooling system*
- *Automatic compensation of thermal expansion along the tool axis*

40.000 RPM	HSK E40	10/14 Kw	5/7 Nm	Type 051555
28.000 RPM	HSK E40	25,5/32,5 Kw	18/23 Nm	Type 051553

HSK-E40 (ISO12164-1/DIN69893)



配件一览 ACCESSORIES

机床可安装以下标准配件：

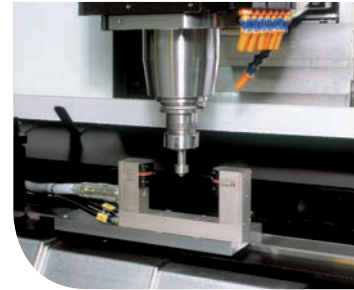
- 适用于钢件加工的排屑器
- 用于铝合金钛合金加工的排屑器
- 废气过滤器
- 75bar主轴中心出水
- 刀具气冷系统
- 刀具油气冷却系统
- 2D或3D接触式测头
- 接触式对刀仪
- 激光对刀仪
- 旋转视窗
- 根据要求可安装其他配件

The machine can be equipped with the following STANDARD accessories:

- Chips conveyor for Steel
- Chips conveyor for Aluminium/Titanium
- Exhaust filter
- Through spindle coolant system 75 bar
- Tool blower air system (standard)
- Tool blower air/oil system
- 2D or 3D Touch probe
- Touch tool setting device
- Laser tool setting device
- Spin window on door (rotoclear)
- Other options available on request



2D-3D 工件测量系统
2D-3D control piece group



激光对刀仪
Laser tools setting device



接触式对刀仪
Contact tools setting device

12



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
500 lts tank - Drum filter

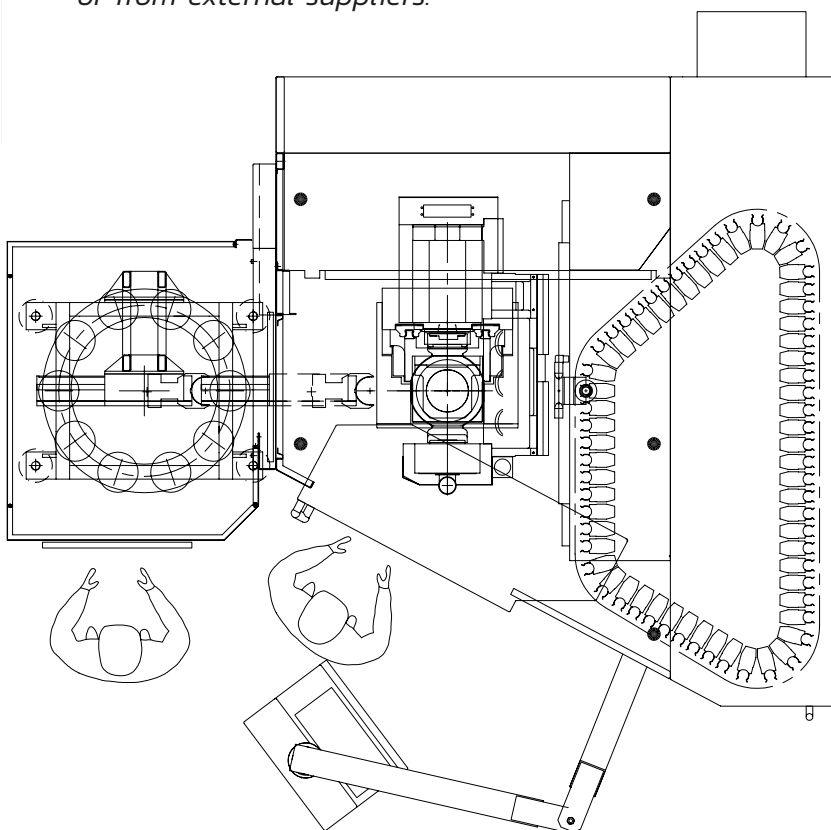
自动化解决方案 AUTOMATION SOLUTIONS

自动上下料的机械化系统

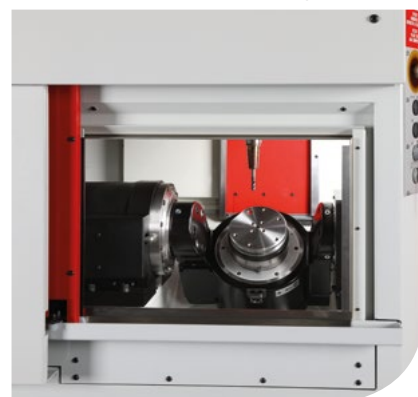
机床可配置由C.B.Ferrari或其他供应商提供的自动化装载机械手。

ROBOTIZED SYSTEM FOR THE AUTOMATIC PIECES CHANGE

On the machining is possible to apply automatic loader, which can be produced by C.B.Ferrari or from external suppliers.



上下料自动门
Automatic door for pallet



13

机床升级 MACHINES UPDATE



可对旧机床的工作台、分度头以及电主轴进行升级。

Possibility to update C.B.Ferrari used machines, with new tables, dividing heads and electrospindles.

数控系统选项 AVAILABLE CONTROLS



西门子 840D SL



海德汉 TNC 640

14

绝对测量系统 ABSOLUTE MEASURING SYSTEM



所有回转轴标配海德汉绝对编码器
分辨率达到0.0001°

*All rotary axes are equipped with Heidenhain
absolute encoders. Resolution 0,0001°*



所有机床标配海德汉绝对光栅尺

*All machines are equipped with Heidenhain
absolute linear scales.*

配置直线电机铣削加工中心 5-AXIS LINEAR MACHINING CENTERS

GM 85

五轴机床 • 5 AXIS VERSION

行程 Travels XYZ	850-600-520 mm
进给速度 Feed rates XYZ	40 m/min.
主轴转速 Spindle speed	9000-16000-20000 24000 32000-40000 RPM
装夹范围 Clamping area	Ø 550 mm
双摆转台 Tilting and rotary table	C 360° A +125° -35°

仅转台为力矩电机驱动 Only the table is torque



MCL85 立式 • VERTICAL

五轴机床 • 5 AXIS VERSION

行程 Travels XYZ	600-850-520 mm
进给速度 Feed rates XYZ	60 m/min.
主轴转速 Spindle speed	9000-16000-20000- 24000 32000-40000 RPM
双摆转台 Tilting and rotary table	C 360° B +35° -125°

15

MCO85 卧式 • HORIZONTAL

五轴机床 • 5 AXIS VERSION

行程 Travels XYZ	800-650-780 mm
进给速度 Feed rates XYZ	60 m/min.
主轴转速 Spindle speed	9000-16000-20000- 24000 32000-40000 RPM
双摆转台 Tilting and rotary table	C 360° A +125° -35°



另有其他机型可选
OTHER TYPE AVAILABLE

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

地址：北京市顺义区顺西南路10号
电话：+86 010 60496244
传真：+86 010 60496243
电子邮箱：cbferrari@cbferrari.com.cn

www.cbFerrari.com

