

宝鸡机床集团有限公司
BAOJI MACHINE TOOL GROUP CO.,LTD
宝鸡忠诚机床股份有限公司
BAOJI ZHONGCHENG MACHINE TOOL CO.,LTD



BHR700V

五轴卧式车铣复合加工中心

Machining Center

匠 心 智 造 中 国 好 机 床

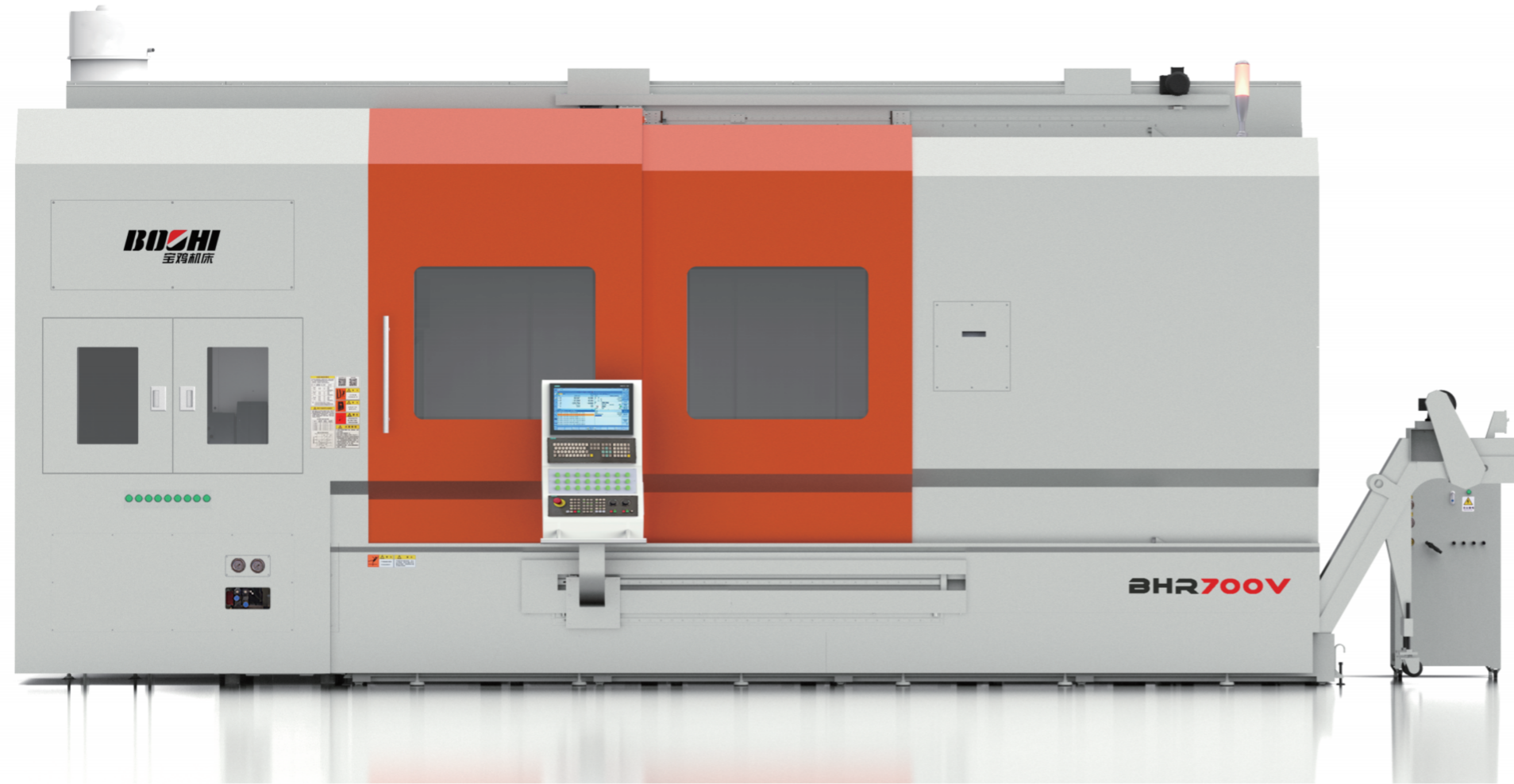
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BHR700V

车铣复合
高精度
高速度
多配置



01 产品概况 Product Overview

BHR700V卧式车铣复合加工中心是宝鸡机床集团有限公司采用先进研发手段开发的新产品，机床采用卧式对列双主轴布局，上刀塔为回转B轴，下刀塔为卧式动力刀塔型结构，机床采用高速车、铣电主轴，滚柱线轨导轨副，车铣链式刀库，机床具有5轴联动、车铣复合、高速高精度等特点。

设备用于对复杂轴类等零件的精密车、铣复合加工，广泛应用于航空航天、船舶、汽车、模具等制造业，特别适合航空、能源、油气、挤出机螺杆、塑料机械、曲轴及通用加工领域，为用户提供客户化的加工方案。

BHR700V horizontal turning and milling composite machining center is a new product developed by Baoji Machine Tool Group Co., Ltd. using advanced research and development methods. The machine tool adopts a horizontal dual spindle layout, with the upper turret being a rotating B-axis and the lower turret being a horizontal power turret structure. It adopts high-speed turning and milling motor spindles, roller linear guideway, turning and milling shared chain type tool magazine, with features such as synchronized 5 axes, turning and milling composite, high speed and precision.

BHR700V is used for precision turning and milling composite processing of complex shafts and other parts, widely used in manufacturing industries such as aerospace, shipbuilding, automobiles, molds, etc. It is particularly suitable for aviation, energy, oil and gas, extruder screws, plastic machinery, crankshafts, and general processing fields, can provide customized processing solutions for customers.

02 性能优势 Performance advantages

● XYZBC五轴联动，车铣复合结构，左右主轴及上下刀塔组合，可实现同步、复合加工，一次装夹精密切削复杂零件，最大化提高生产率；

● 平床身、立柱结构，通过结构优化设计，保证整机高刚性；

● 采用正交设计结构，最大化Y轴加工范围；

● B轴采用滚子凸轮+伺服电机驱动，刚性高、精度保持性好；

● 铣主轴采用内置电机驱动结构，最高转速12000r/min；

● 高精度主轴轴承，最高转速达4000r/min，高精度C轴驱动、制动结构，可以高速、高精车削；

● 直线轴采用高刚性滚柱重负荷精密级直线导轨，高精度预拉伸滚珠丝杠传动，回转轴采用转台轴承，五轴全闭环检测系统，精度保持性高。保证加工运动的高速、高精度、高刚性和高稳定性；

● 内置链式排屑器，带铁屑箱；铣主轴冷却液中心出水；

● 车铣共用40刀位链式刀库，结合12工位BMT65下刀架，提供充足的刀具安装能力；

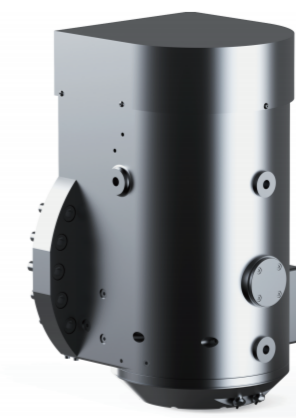
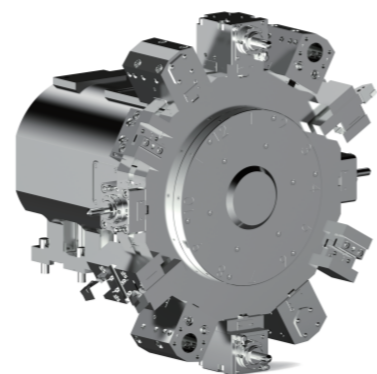
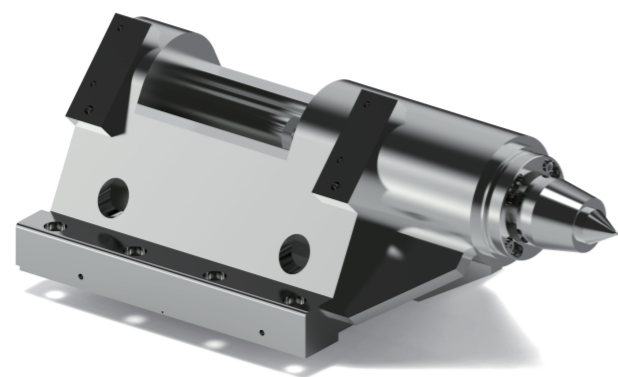
● 铣主轴、车主轴内置电机、滚珠丝杠采用强制冷却系统；

● 导轨、滚珠丝杠副采用集中自动稀油润滑，各个节点配有定量式分油器，定时定量向各润滑部位注油。铣主轴采用油气润滑。润滑系统可靠，提高了各运动副的使用寿命；

● 机床采用全封闭防护设计；可拖动旋转式操作面板、手持盒MPG使操作更加方便；

● 采用高档数控系统，机床具有坐标转换功能（数控系统功能），使编程更加简单；

● 关键零件和出厂精度均由美国布朗·夏普BROWN & SHARPE三坐标测量和英国雷尼绍RENISHAW双频激光干涉仪严格检测，对其进行全面检验，确保机床几何精度和工作精度。



● XYZBC synchronized 5 axes, turn-milling composite structure, combination of left and right spindles, upper and lower turrets, can achieve synchronous and composite processing, precision cutting of complex parts in one time clamping, maximizing productivity;

● The flat bed and column structure are optimized through structural design to ensure high rigidity of the entire machine;

● Adopting an orthogonal design structure to maximize the Y-axis machining travel;

● The B-axis is driven by a roller cam and servo motor, with high rigidity and good accuracy retention;

● The milling spindle is driven by built-in motor with a maximum speed of 12000 r/min;

● High precision spindle bearing with a maximum speed of 4000r/min, high-precision C-axis drive and braking structure, capable of high-speed and high-precision turning;

● The linear axis adopts high rigidity roller heavy load precision linear guideways, high-precision pre-stretched ball screw transmission, and the rotary axis adopts rotary table bearings. The five axes with full closed-loop detection system has high accuracy retention. Ensure high-speed, high-precision, high rigidity, and high stability of machining motion.

● Built in chain type chip conveyor with chip cart; coolant center outlet system in milling spindle;

● Turning and milling shared 40 position chain type tool magazine, plus a lower 12 position BMT65 turret, providing sufficient tool installation capacity;

● The milling spindle and turning spindle are equipped with built-in motors and ball screws using a forced cooling system;

● Guideways and ball screws adopt centralized automatic thin oil lubrication, and each node is equipped with a quantitative oil separator, which regularly and quantitatively injects oil to each lubrication part. The milling spindle is lubricated with oil and air. The lubrication system is reliable, which improves the service life of moving parts.

● The machine tool with fully enclosed protection ; rotary operation panel and portable MPG make operation more convenient;

● Adopting a high-end CNC system, the machine tool has coordinate conversion function (CNC system function), making programming easier;

● The key parts and factory inspection accuracy are strictly tested by the BROWN&SHARPE coordinate measurement and theRenishaw dual frequency laser interferometer, and comprehensively inspected to ensure the geometric and working accuracy of the machine tool.

03 机床数据 Machine Specification

机床规格参数表
Machine Tool Specification Parameter Table

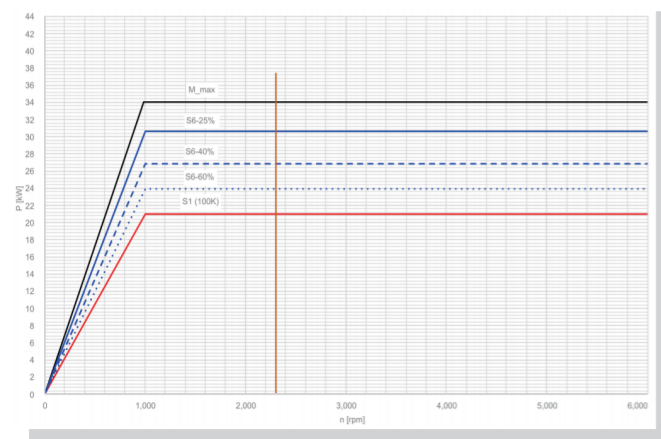
项目 (Item)		单位 (Unit)	标准规格 (尾座及中心架) (Standard specification (with tailstock and steady rest))	副主轴规格 (带下刀架) (sub-spindle specification (with lower turret))
加工 Capacity	床身上的回转直径 (Diameter swing over bed)	mm	Φ700	Φ700
	托板上的回转直径 (Diameter swing over slide)	mm	Φ500	Φ500
	最大加工直径 (上刀塔/下刀塔) (Max. machining diameter (upper/lower turret))	mm	Φ700/-	Φ700/Φ490
	最大加工长度 (Max. machining length)	mm	2594/1594	2594/1594
	主轴过棒料能力 (Max. bar diameter of through spindle)	mm	Φ67	Φ67
行程 Travel	X1轴 (X1 axis)	mm	845	845
	X2轴 (X2 axis)	mm	-	270
	Z1轴 (Z1 axis)	mm	2680/1680	2680/1680
	Z2轴 (Z2 axis)	mm	-	2600/1600
	W轴 (第2主轴或尾座) (W axis (sub-spindle or tailstock))	mm	2400/1400	2400/1570
	Y轴 (上刀塔) (Y axis (upper turret))	mm	430 (±215)	430 (±215)
	B轴 (B axis)	deg	±120	±120
	C轴 (C axis)	deg	旋转轴 Rotary axis	旋转轴 Rotary axis
进给 Feeding	快移速度 X1轴/X2轴 (Rapid travel speed X1/X2)	m/min	36/-	36/36
	Z1轴/Z2轴 (Z1/Z2)	m/min	36/-	36/36
	Y轴 (上刀塔) (Y axis (upper turret))	m/min	36	36
	W轴 W axis	m/min	8	30
	B轴 B axis	r/min	40	40
	C轴 C axis	r/min	200	20
	导轨方式 X/Y/Z/W轴 Guideway X/Y/Z/W		滚柱线性导轨 Roller linear guideway	
第1主轴 (主轴) Mail spindle	卡盘尺寸 Chuck size	inch	10"	
	转速 Speed	r/min	max4000	
	电机功率 (S6-4%/Cont) Motor power (S6-4%/Cont)	kW	27/21	
	额定/最大扭矩 Rated/maximum torque	Nm	200/330	
	分度角度 (C轴) C1 Indexing angle (C axis) C1	deg	0.0001	

项目 (Item)		单位 (Unit)	标准规格 (尾座及中心架) (Standard specification (with tailstock and steady rest))	副主轴规格 (带下刀架) (sub-spindle specification (with lower turret))
第1主轴 (主轴) Mail spindle	主轴鼻端 Spindle nose	-	A2-8	
	主轴通孔直径 Spindle bore	mm	Φ82	
第2主轴 (副主 轴) Sub- spindle	卡盘尺寸 Chuck size	inch	-	10"
	转速 Speed	r/min	-	max4000
	电机功率 (30min/Cont) Motor power (30min/Cont)	kW	-	27/21
	额定/最大扭矩 Rated/maximum torque	Nm	-	200/300
	分度角度 (C轴) C2 Indexing angle (C axis) C2	deg	-	0.0001
	主轴鼻端 Spindle nose	-	-	A2-8
	主轴通孔直径 Spindle bore	mm	-	Φ82
上刀塔 Upper turret (B axis)	刀具形式 Tool model		HSK-A63	
	B轴锁紧分度角度 End-tooth gear indexing angle of B axis	deg	5/0.001	
	B轴分度方式 B axis indexing method		伺服电机+滚柱蜗轮减速 Servo motor & roller worm gear reduction	
	B轴分度时间 B axis indexing time	s	1/90°	
	刀具安装位置 Position of loading tool	把	1	
	车削刀具尺寸 外径 / 内径 Turning tool size turning/boring	mm	□ 25/40	
	铣主轴转速 Milling spindle speed	r/min	max12000	
铣主轴 (S6-4%/Cont) Milling spindle power (S6-4%/Cont)	kW	26/26		
铣主轴额定 / 最大扭矩 Rated/max. torque of milling spindle	Nm	75/120		
中心出水压力 Pressure of coolant through spindle	Mpa	Max7		
下刀塔 Lower turret	刀塔形式 (车削 / 旋转刀具) Turret model (turning/living tool)		-	Turret (BMT-65)
	刀具把数 Tool number	把	-	12
	车削刀具尺寸 外径 / 内径 Turning tool size turning/boring	mm	-	□ 25/40
	旋转刀具主轴速度 Living tool speed	r/min	-	max5000
	旋转刀具输出功率 Living tool output power	kW	-	3.7

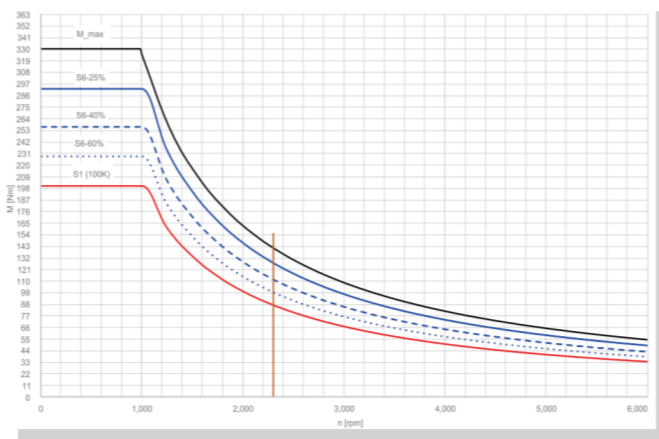
项目 (Item)		单位 (Unit)	标准规格 (尾座及中心架) (Standard specification (with tailstock and steady rest))	副主轴规格 (带下刀架) (sub-spindle specification (with lower turret))
尾座 Tailstock	锥孔的形式 Tailstock taper		MT-5	-
	尾座轴的移动量 Travel of tailstock	mm	2400	-
ATC	刀柄形式 Tool shank		HSK-A63	
	刀具收纳把数 Capacity of tool magazine	把	40 (80、120)	
	刀具最大直径 Max. tool diameter	mm	φ90/φ125 (无相邻接刀具) φ90/φ125 (no adjacent tools)	
	最大刀具长度 Max. tool length	mm	500	
NC装置 CNC controller	SIEMENS		840D	

项目 Item	型号规格 Model&Specification	BHR700V
控制系统 CNC controller	西门子840D系统 SIEMENS 840D	○
	华中848DM数控系统 HNC 848DM	●
副主轴 Sub-spindle	4000r/min电主轴 4000r/min motor spindle	○
	尾座 tailstock	●
下刀架 Lower turret	BMT-65, 12工位 BMT-65, 12 position	○
刀具主轴 B axis	12000r/min电主轴HKA63 12000r/min motor spindle HSKA63	●
B、C轴 B, C axes	B轴减速机构、C直驱 B-axis reduction mechanism, C-axis direct drive	●
光栅尺 linear encoder	五轴光栅尺 (X1/X2/Y/Z1/Z2) 5 axes (X1/X2/Y/Z1/Z2)	●
防护型式 Protection guard	全防护 Full closed protection	●
排屑方式 Chip conveyor	链式排屑器 Chain type chip conveyor	●
链式刀库 Chain type ATC	HSKA63 X40	●
	HSKA63 X80	○
	HSKA63 X120	○
主轴冷却单元 Main shaft cooling unit	国产 domestic	●

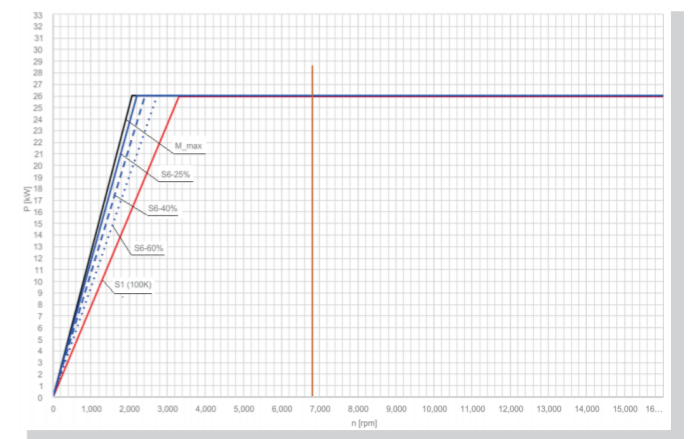
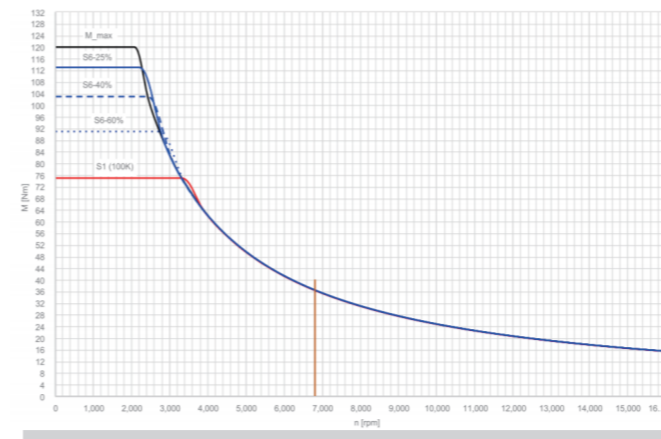
04 扭矩图 Torque diagram



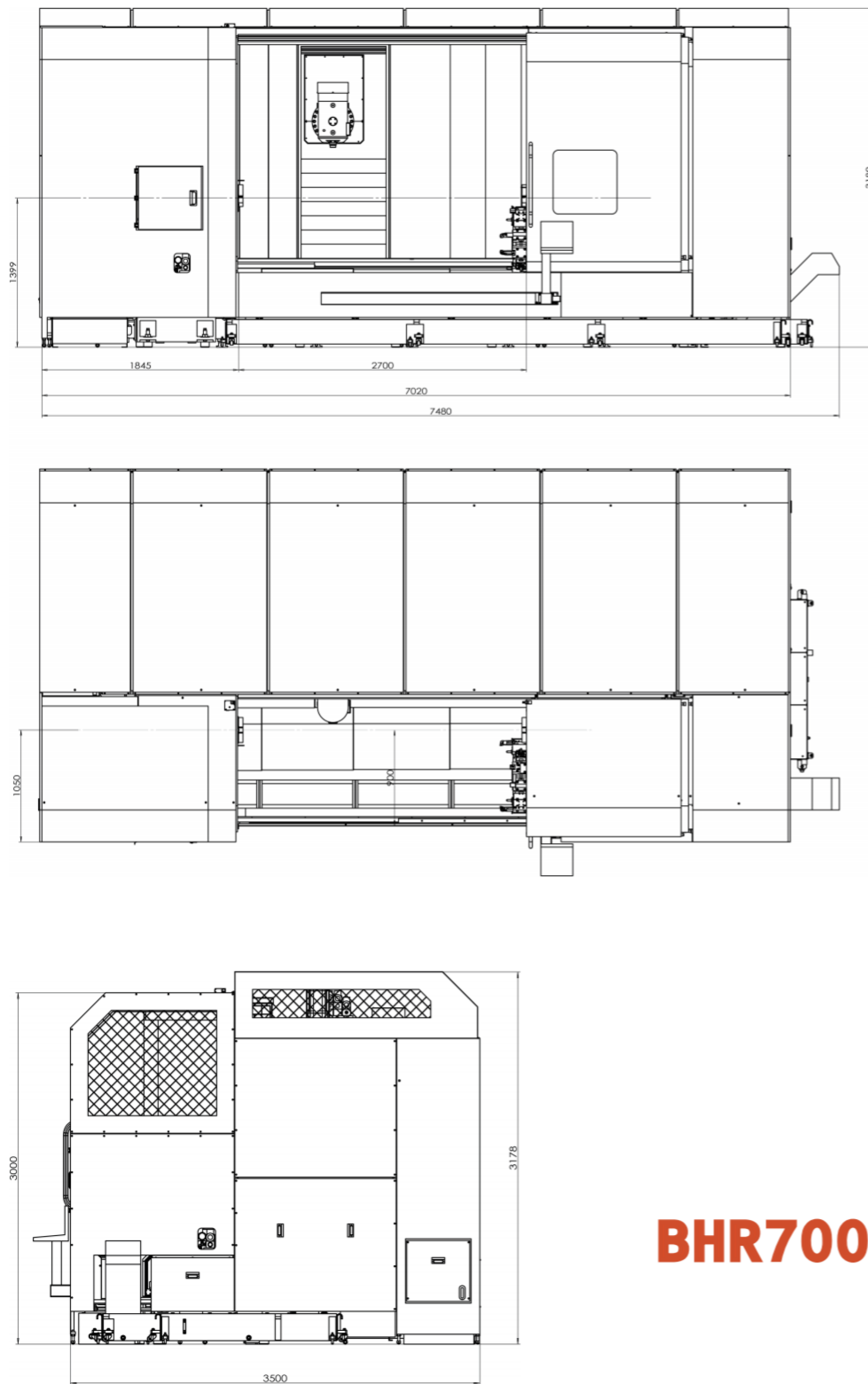
工件主轴特性曲线
Workpiece spindle characteristic curve



铣主轴特性曲线
Milling spindle characteristic curve

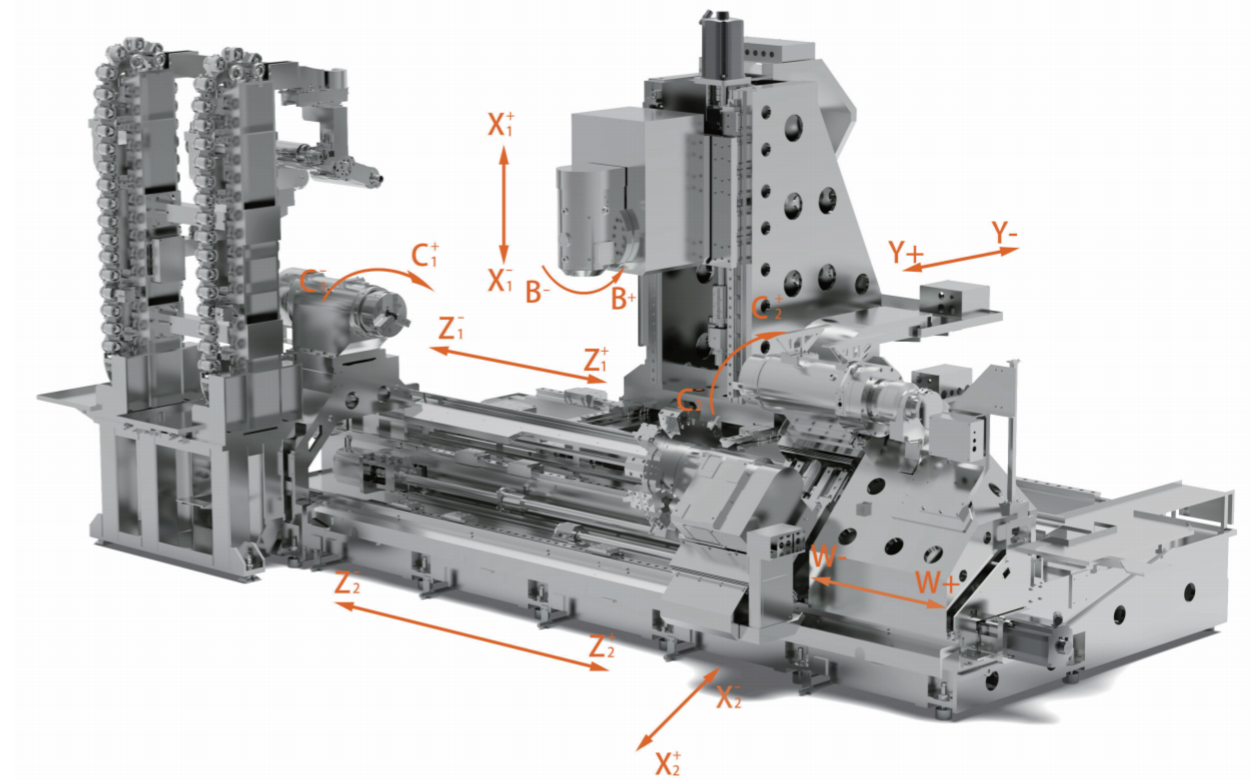


05 机床外形图 Machine outline drawing



BHR700V

06 典型零件 Typical parts



- 航空航天领域：发动机燃烧室、叶盘等；
Aerospace field: engine combustion chamber, blade disc, etc;
- 能源领域：汽轮机转子轴、水轮机传动轴、发电机传动轴、风电齿轮箱传动轴等；
Energy field: steam turbine rotor shaft, water turbine transmission shaft, generator transmission shaft, wind power gearbox transmission shaft, etc;
- 大型船用柴油机领域：凸轮轴、曲轴、连杆等；
Large marine diesel engine field: camshaft, crankshaft, connecting rod, etc;
- 其他领域：空气压缩机公转子和母转子、石油天然气行业的深孔钻头。等。
Other fields: air compressor male and female rotors, deep hole drill bits in the oil and gas industry, etc.

