



FORTWORTH



昌鑫機械工業股份有限公司
CHUNG SING MACHINERY CO., LTD.

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CNC HORIZONTAL BORING & MILLING MACHINE
CNC 臥式 搪 銑 床



OUR GROWTH



Factory in 1988



New Headquarter and factory in 2014

About **F/RTW/RTH**

Founded in Taiwan in 1988, Fortworth, also known as Chung Sing Machinery Co., Ltd., is a leading manufacturer of high-precision boring and milling machines, and CNC horizontal boring machines.

Fortworth focuses on developing state-of-the-art mechanical engineering by continuously innovating our own unique products to fulfill the ever-changing needs of our customers.

We use advanced technology to offer our customers the optimum efficiency and cost-effective performance metalworking shops require.

All of our machines are designed and manufactured with the finest craftsmanship for consistent accuracy and quality.

All details of our customers' needs are considered during every step of manufacturing. Our standards exceed the expectations of our customers.

Our company's unsurpassed after-sales support is known throughout the industry for its expertise and efficiency.

We believe in providing superior service after each customer order, not just during the ordering and purchasing process.

We integrate honesty and integrity into all aspects of our business operation.

We thank all of our valued customers for promoting our products.

Thousands of Fortworth machines have been purchased by companies in more than 20 countries worldwide.

Like a fortress, Fortworth is the brand you can rely on.

Awarded Certificates

- 2013 Certificate approved ISO9001: 2008 by AMTRI VERITAS, England
- 2011 Certificate approved ISO9001: 2008 by AMTRI VERITAS, England
- 2007 Certificate approved ISO9001: 2000 by AMTRI VERITAS, England
- 2004 Certificate approved ISO9001: 2000 by AMTRI VERITAS, England
- 2000 Certificate approved ISO 9002 by AMTRI VERITAS, England
- 1999 Certificate approved EEC by TUV Rhineland, Germany



Quality Assurance

We always focus on the quality and accuracy of our products. Customers are kindly welcomed to witness the final inspection.

High acceptance rate proves that our customers appreciate FORTWORTH products. FORTWORTH always welcomes independent inspectors and quality checks.



FORTWORTH CNC Horizontal Boring and Milling Machines Features of HB Series

Fortworth has been building precision milling and boring machines for over 25 years.

Fortworth Horizontal Boring Mills are designed utilizing the latest advancements in machine building technology.

The machines are specifically designed & built with roughing and finishing in mind to meet customers' needs.

Meehanite castings ensure a stable machine foundation.

To further ensure stability a T frame design is used for the base with extra leveling screws and jacks to accommodate for heavy roughing and finishing machining.

The controls and drives are from the most advanced suppliers.



The electrics and hydraulics come from world-class manufactures, making part replacement as easy as a trip to your local supply store.

All moving axes are encoded with Heidenhain glass scales and angle encoders using a closed loop system to ensure high accuracies. (HB-110-20T)

The machine has an added feature option to have coolant thru spindle for the ease of drilling deep holes. In order to minimize thermal growth there is a choice of spindle for either heavy duty machining or high speed machining.

For countries with strict safety lines guide, Fortworth offers a fully guarded machine with safety interlocks to allow 100% safe machine tool operations. (option)

Fortworth can help you with your concerns or machining problems and come up with cutting solutions.

HB-110B



工作台 WORKING TABLE



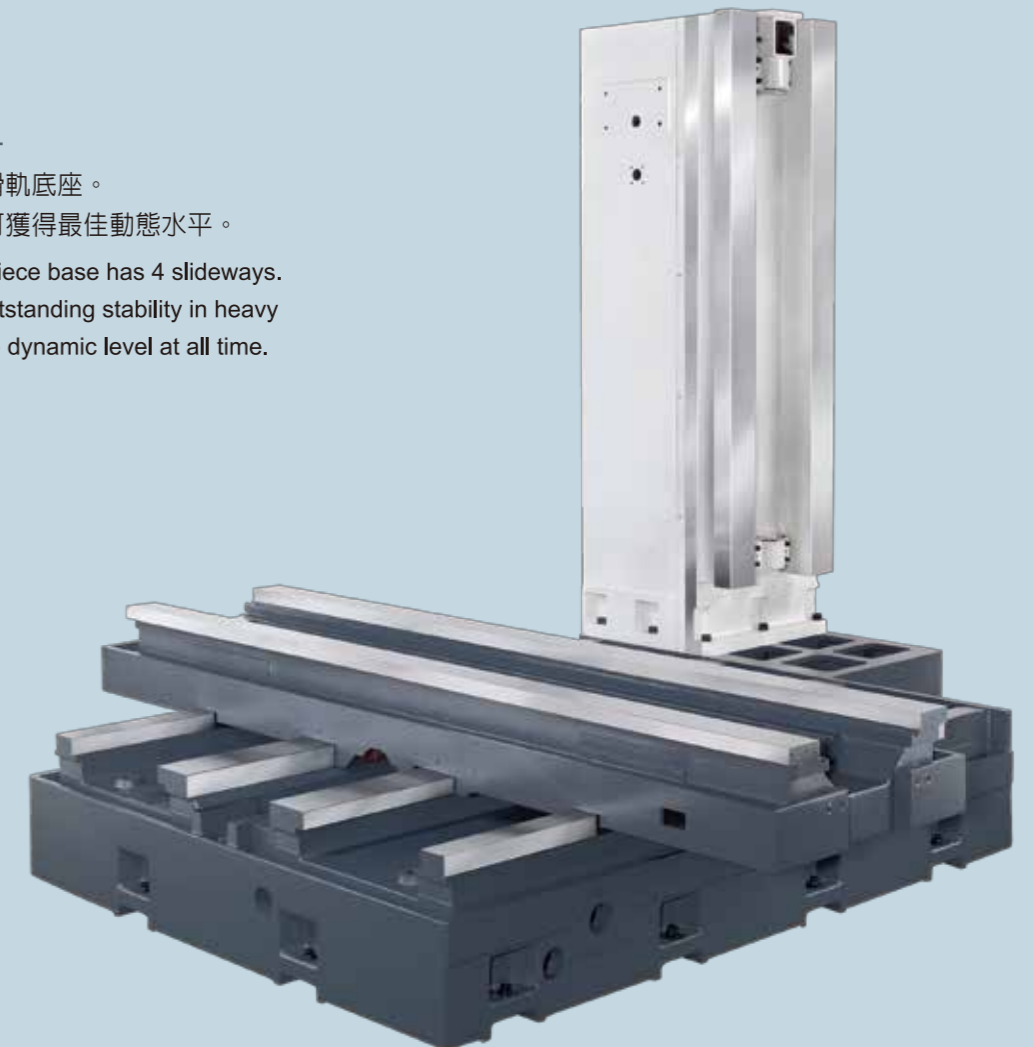
NC伺服驅動高精度分度工作台，最小分割角度1度。可承載3000kg的工作件及做精確角度分割。搪孔、銑削、鉗孔、攻牙配合分度工作操作業一次完成，可大幅節省工件安裝、調整及搬運等待的時間。

The high precision indexing work table driven by a servo motor provides high accurate indexing. The working table can be indexed at least 1 degree, available for maximum table loading up to 3000kg. The CNC boring and milling machine provides multiple faces machining at one time, boring, milling, drilling and tapping can be done just in one set-up.

底座 MACHINE BASE

穩重，特寬一體成型的四滑軌底座。在重切削時，絕對平穩，可獲得最佳動態水平。

The extra heavy, wide one-piece base has 4 slideways. Box type column features outstanding stability in heavy duty machining and accurate dynamic level at all time.



HB-110-20T



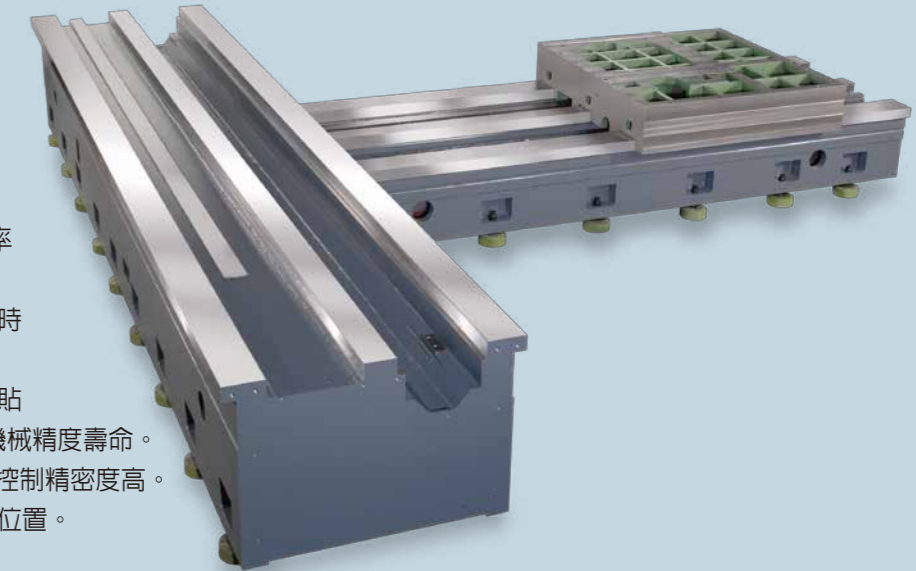
工作台 WORKING TABLE

- NC伺服馬達驅動高精度分度工作台，最小輸入單位0.001度。
- 工作台B軸裝角度型光學尺，密閉式迴路控制精密度高。
- 工作台最大荷重達5000kg。
- 0-90-180-270度位置有機械插銷定位。
- 工作台有油壓鎖緊裝置。
- Build-in index table 1500x1200mm driven by a servo motor.
- With high precision absolute angle encoder for closed feedback.
- Minimum input 0.001 degree, full B-axis 360 degree.
- 0-90-180-270 degree with mechanical locating pin.
- Table load capacity maximum 5000kg.
- Hydraulic clamping system.



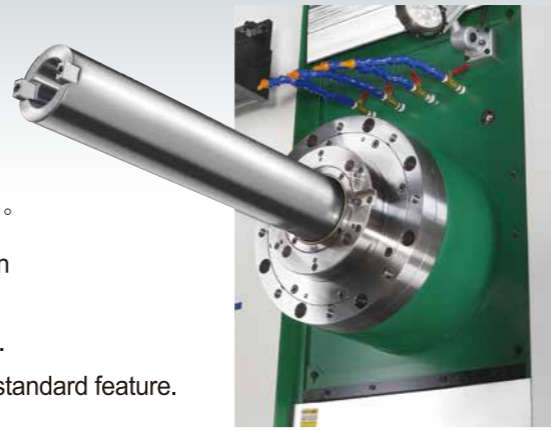
機械結構 MACHINE STRUCTURE

- 動柱式設計配合T型機械結構提昇加工效率及機械壽命。
- 箱型結構設計的機體剛性佳，提供重切削時最佳穩定度。
- 三軸滑軌皆經硬化處理，精密研磨，滑道貼TURRCIT-B耐磨片減少摩擦阻力，增長機械精度壽命。
- XYZ及W軸裝絕對式光學尺，密閉式迴路控制精密度高。絕對式座標系統不必做原點復歸即可檢出位置。
- 有效縮短非加工時間及磨耗。
- X及Z軸滑軌面裝設有防屑伸縮鈹金，確保精密滑道壽命。
- 中央自動潤滑系統配用定點定量分配器及自動檢出控制。
- Column moving design with T-structure, offers high efficiency machining process.
- Rigid box-type column features outstanding stability in heavy duty machining.
- Hardened and precision grounded box way construction for X,Y and Z-axis.
- The X,Y,Z and W-axis installed with high precision linear scale and B-axis with angle encoder feedback for high accuracy.
- Absolute coordinate system no needs to return the axis to home position.
- Telescopic covers for the cross and longitudinal traverses.
- Quantitative automatic lubrication system features forced lubrication to all slideways, and self-detection function ensures long slideway life



主軸 MAIN SPINDLE (ISO50)

- 主軸配用NN系列雙滾柱精密軸承，剛性佳適合重切削。
- 全齒式強力型齒輪二段變速傳動，配合油冷式控制溫度及潤滑，避免熱變位問題，確保加工精度。
- 主軸外徑110mm，行程(W軸)550mm。
- 主軸有空氣簾幕設計，防止切削液及鐵屑滲入，延長主軸壽命。
- Working spindle diameter 110mm is mounted on high precision NN type dual roller bearing.
- With 2-steps gear box for automatic change the spindle speed.
- Oil cooler for the lubrication circuit and temperature control as a standard feature.
- Working spindle stroke (W-axis travel) is 550mm.
- Air curtain for the spindle effectively prevents fluid or chip into the spindle.



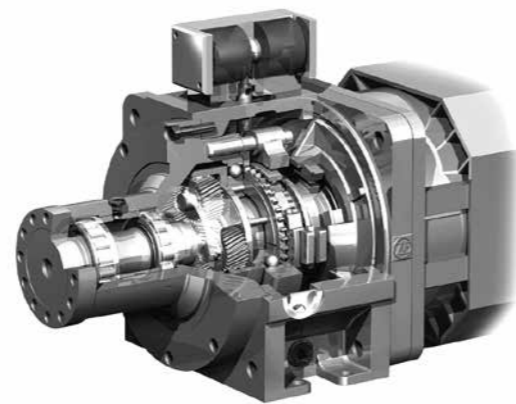
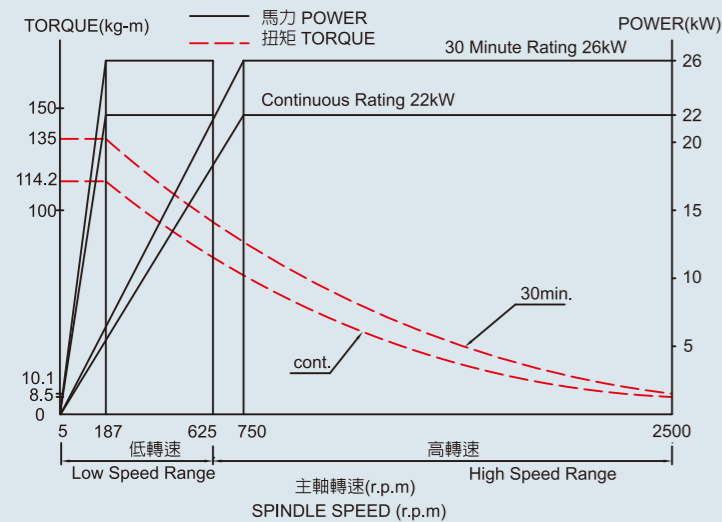
自動換刀裝置 AUTOMATIC TOOL CHANGE SYSTEM

- 標準60刀庫，絕對式鏈條型刀庫，安全穩定易操作，提升加工彈性及效率，適合各類型工件加工需求，雙向最短路徑選刀減少非加工等待時間。
- Standard chain type with 60 tools magazine ATC, provide safety and stable tool exchange. This enhances machining flexibility and efficiency.
- Loading and unloading tools at the rear side of the ATC magazine is available.



扭力圖 TORQUE CHART

- 強力型主軸馬達22/26 kW二段變速傳動最高轉速2500rpm，輸出最大扭力135kg-m 加工適用範圍廣。
- Powerful spindle motor: 22/26 kW.
- 2-steps variable speed at maximum 2500rpm.
- Torque output maximum 135kg-m.

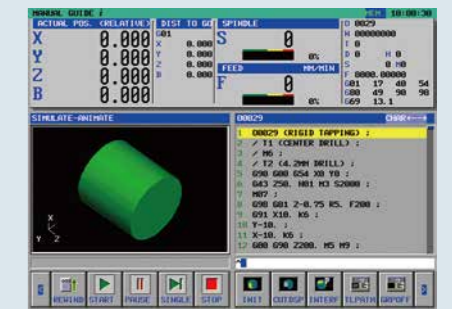


主軸二段變速齒輪箱
TWO-SPEED GEARBOX
FOR SPINDLE SPEED CHANGE



控制器 CONTROL SYSTEM

- 懸吊式，可旋轉控制箱，配有可移式電子手輪，方便全方位操控。
- CNC控制器配用高性能及高性賴度的Fanuc FS-Oi-MF控制器。
- The suspended control box can be rotated during operation and the portable MPG handwheel easily in set-up workpiece.
- With high reliable and high performance control Fanuc FS-Oi-MF.



MANUAL GUIDE I
Whole operations on an all-in-one screen for daily machining

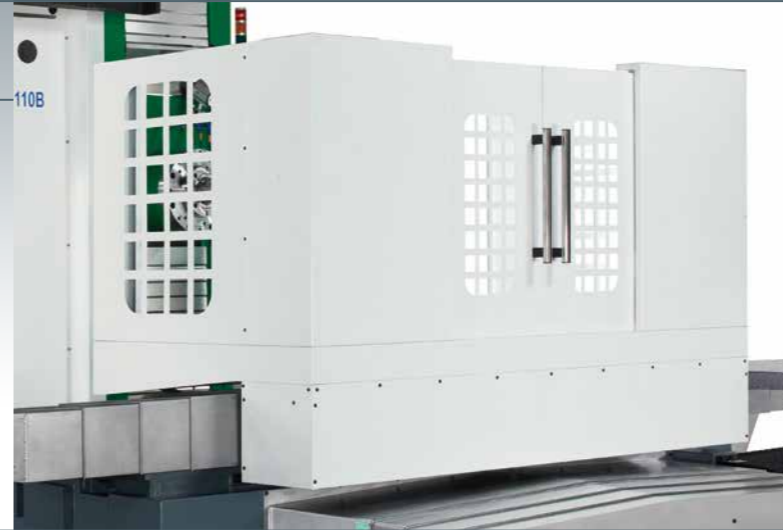
ACCESSORIES



螺旋排屑裝置
Chip auger for table



軌道潤滑機
Slideway lubrication pump



工作台防濺護罩(選配)
Table splash guard(opt.)



安規快速接頭
Safety quick connectors

- 電氣箱配置安規快速接頭，可安全快速的連結各項電控設施。
- The electrical box is equipped with safety connectors, safety and easy to connecting with electric parts.

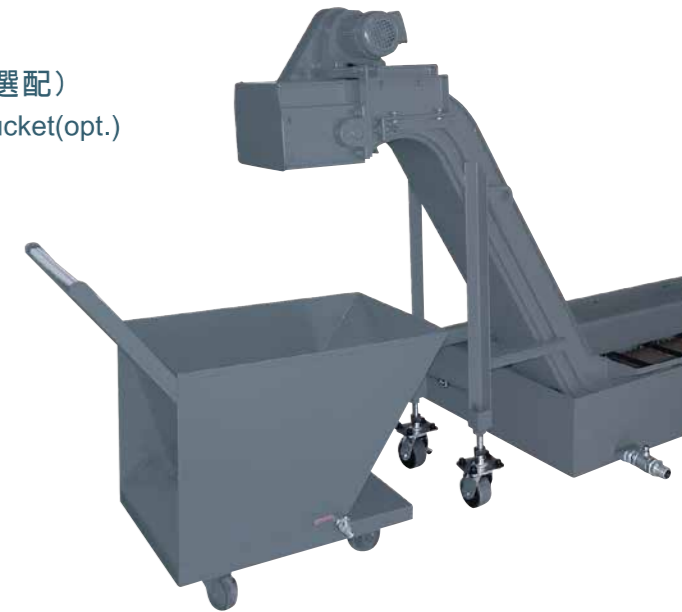


主軸油冷卻裝置
Spindle oil cooler



直角基座(選配)
Angle plate(opt.)

鍊板式排屑機(選配)
Chip conveyor with bucket(opt.)



電氣箱空調冷氣機
(選配)
Air conditioner
(for HB-110-20T only)



油水分離機(選配)
Oil skimmer(opt.)



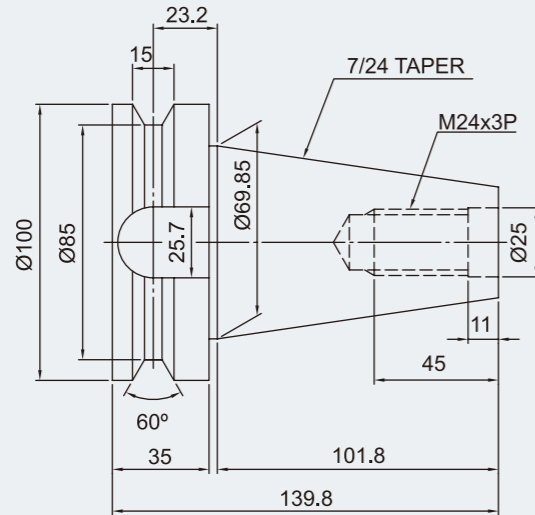
90度銑床頭(選配)
Right angle milling attachment(opt.)



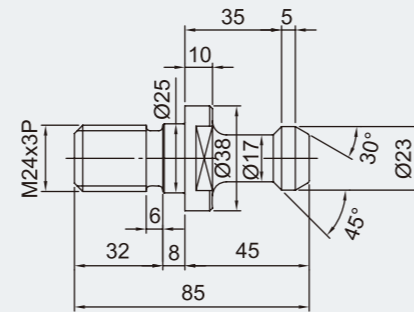
主軸延伸襯套(選配)
Spindle support(opt.)

TOOL SHANK & PULL STUD BOLT

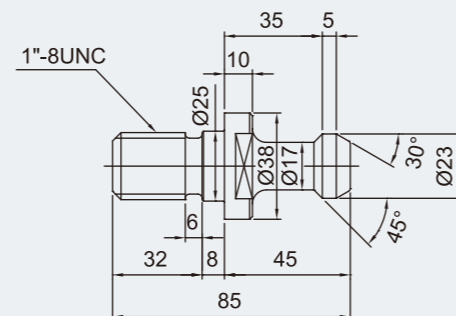
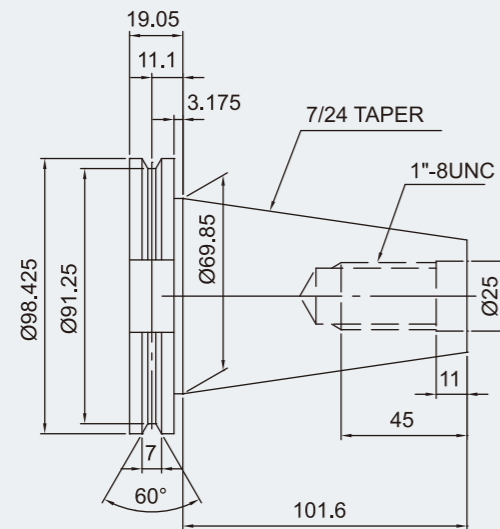
BT-50



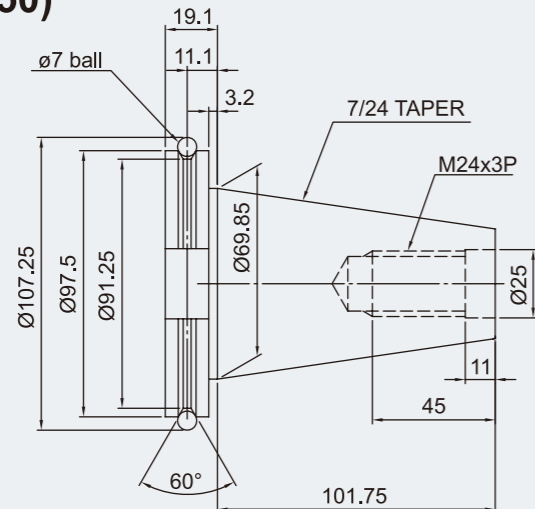
MAS403 P50T-1



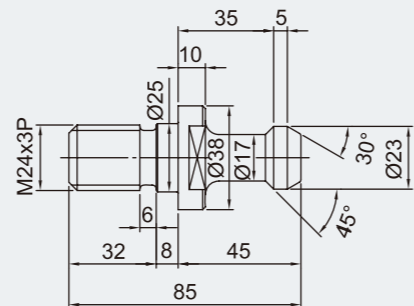
CAT-50 (opt.)



DIN 69871-A(#50) (opt.)



MAS403 P50T-1

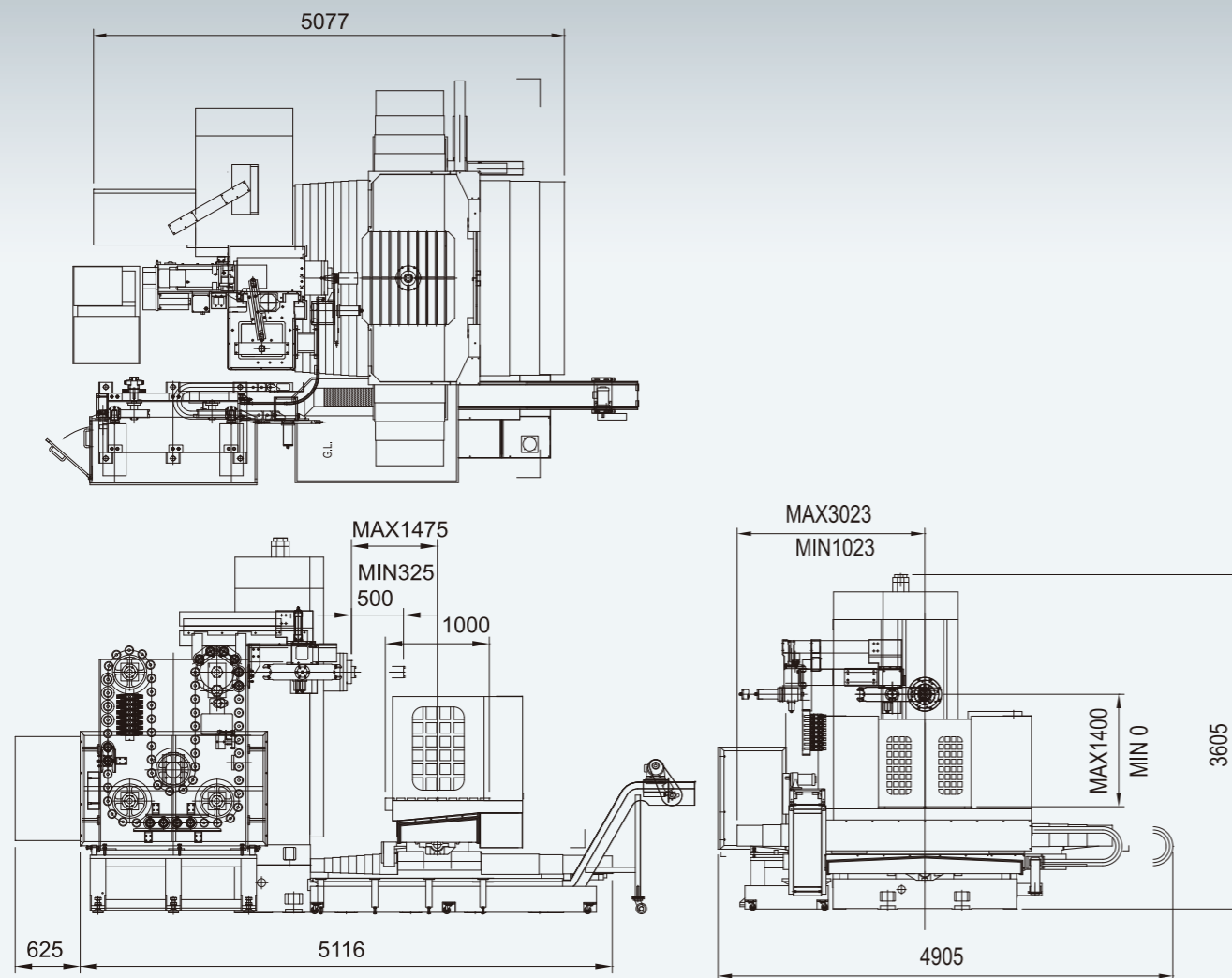


數控標準功能 CNC SPECIFICATIONS

Description		Description	
1	Controlled axes 5 Axes	64	Custom macro B
2	Simultaneous controllable axes 3 Axes	65	Canned cycles G73/G74/G76, G80-89, G98/G99
3	Least input increment 0.001mm/0.0001in	66	Circular interpolation by R programming
4	G20 Inch/ G21 metric conversion	67	Program stop/ Program end M00/M01/M02/M30
5	Interlock	68	Reset
6	Machine lock	69	Spindle speed function
7	Emergency stop	70	Spindle speed override
8	Stored stroke check	71	Spindle orientation
9	Backlash compensation	72	S code function S5 digit
10	Stored pitch error compensation	73	M code function M8 digit
11	Follow-up	74	T code T8 digit
12	Automatic operation (memory)	75	Tool function
13	MDI operation	76	Tool offset memory C
14	DNC operation	77	Tool length offset G43-44,
15	DNC operation with memory card	78	Cutter compensation (G41/G42 G40)
16	Program number search	79	Part program storage length 512Kbyte (1280meters)
17	Sequence number search	80	Registered programs 400
18	Buffer register	81	Part program editing
19	Dry run	82	Background editing
20	Single block	83	Program protect
21	JOG feed	84	Status display
22	Manual reference position return	85	Clock function
23	Manual handle feed	86	Current position display
24	Manual handle feed rate x1, x10, x100	87	Program display (Program name 31 characters)
25	Z axis neglect	88	Parameter setting and display
26	G00 Positioning	89	Self-diagnosis function
27	G61 Exact stop mode	90	Alarm display
28	G09 Exact stop	91	Alarm history display
29	G01 Linear interpolation	92	Operation history display
30	G02, G03 Circular interpolation	93	Help function
31	Helical interpolation	94	Run hour and parts count display
32	Dwell G04	95	Actual cutting feedrate display
33	G31 Skip function	96	Display of spindle speed and T code
34	G28 Reference position return	97	Servo setting screen
35	G27 Reference position return check	98	Spindle setting screen
36	2nd reference position return	99	Data protection key
37	Index table indexing	100	Erase CRT screen display
38	Rapid traverse rate	101	Setting and display unit 10.4" color LCD/MDI (standard size)
39	Rapid traverse override F0, F25, F50, F100%	102	Chinese/English display
40	Feed per minute G94	103	RS232-C interface
41	Tangential speed constant control	104	Memory card interface
42	Feed rate clamp	105	USB interface
43	Automatic acceleration/deceleration	106	Manual guide i
44	Rapid traverse Bell-Shaped Acc./Deceleration	107	Input power supply
45	Cutting feed rate override	108	Mirror image
46	Feed stop	109	Program restart
47	Jog override	110	Manual handle interruption
48	EIA/ISO Automatic recognition	111	Programmable data input G10
49	Label skip	112	Playback
50	Parity check	113	Polar Coordinate Command G16
51	Optional block skip	114	Optional Chamfering / Corner R
52	Program number O4-digit	115	Automatic Corner Override G62
53	Sequence number N5-digit	116	Automatic corner deceleration
54	G90 Absolute/G91 incremental programming	117	Coordinate System Rotation
55	Decimal point input	118	Scaling G51
56	Plane selection G17,G18,G19	119	Tool Length measurement
57	Coordinate system setting G92	120	Additional of Tool Offset Pairs 400
58	Rotary axis designation	121	Additional of workpiece coordinate system 48 pair
59	Automatic coordinate system setting	122	Additional custom macro common variables #100~199, #500~999
60	Workpiece coordinate system G52/G53/G54-G59	123	Single direction positioning G60
61	Manual absolute on/off	124	AICC-II (Look ahead 200 blocks)
62	Rigid tapping	125	*Data server (for HB-110-20T only)
63	Sub program call (10 folds nested)	126	

HB-110B

DIMENSIONS



TABLE

Item	內容	Description	unit	
工作台 Table	工作台尺寸	Table size	mm	1000×1000
	T 型槽	T slot (wide x no . x pitch)	mm	22×9×100
	最大負荷	Max. load capacity	kg	3000
	最小分割角度	Min. indexing unit	deg	1
	工作台快速旋轉	B-axis rapid feed	rpm	4
行程 Travel	X 軸行程	X-axis travel	mm	2000
	Y 軸行程	Y-axis travel	mm	1400
	Z 軸行程	Z-axis travel	mm	1150
	W 軸行程	W-axis travel	mm	500
	主軸鼻端至工作台中心距離	Spindle nose to table center	mm	-175~1475
	主軸中心至工作台面距離	Spindle center to table top	mm	0~1400
主軸 Spindle	主軸錐孔	Spindle nose	mm	BT50
	主軸外徑	Spindle diameter	mm	110
	最大扭力輸出	Output max.	kg-m	135
	主軸轉速 (自動二段轉換)	Spindle speed (2 ranges)	Lo-speed Hi-speed rpm	5~625 626 ~ 2500
進給 Feeds	X/ Y/ Z軸快速移位速率	Rapid X, Y, Z, W-axis	m/min	15/ 12/ 15/ 6
	X/ Y/ Z 軸切削進給速率	Feed rate of X, Y, Z-axis	mm/min	1 ~ 6000
	W軸切削進給速率	Feed rate of W-axis	mm/min	1 ~ 4000
	X/ Y/ Z軸滾珠螺桿(外徑/螺距)	X,Y,Z ballcrew (Dia./ Pitch)	mm	50/10
	W軸滾珠螺桿(外徑/螺距)	W ballscrew (Dia./ Pitch)	mm	40/10
自動換刀 裝置 A.T.C.	刀庫容量	Magazine capacity	pcs	60
	拉刀栓規格	Pull stud	-	MAS-P50-1
	最大刀具長度	Max. tool length	mm	400
	最大刀具重量	Max. tool weight	kg	25
	最大刀具徑	Max. tool diameter	mm	ø125/ ø250(w/o adjacent tool)
	刀具選擇方式	Tool selection	-	Sequence by shortest path
馬達 Motors	換刀時間刀對刀(約)	Tool change time (approx.)	sec	15
	主軸馬達	Spindle motor	kW	22/ 26
	X/Y/Z/B 軸馬達	Servo motor for X/Y/Z/B/W	kW	7/6/7/4/7
	油壓單元	Hydraulic pump	kW	3.7
	主軸油冷裝置	Spindle oil cooler pump	kW	1.18
機器一般規格 General information	氣壓需求	Pneumatic required	kg/cm ²	6
	切削液箱容量	Coolant tank	L	250
	機械尺寸	Machine dimension	mm	4905×5116×3605
	機械重量	Machine weight	kg	21000
	CNC控制器	CNC Controller		FS-0i-MF

標準配件 Standard Features & Accessories

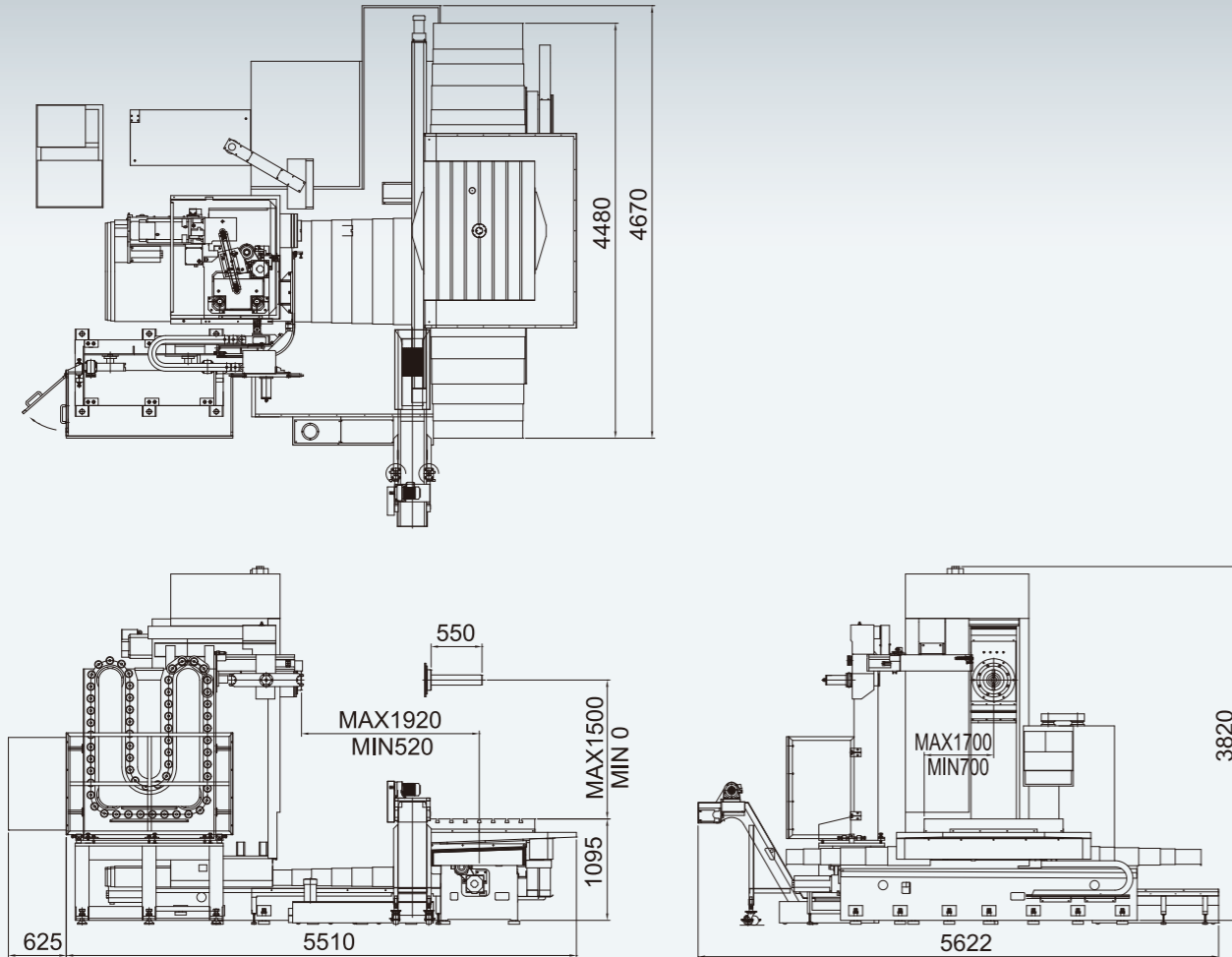
1. 主軸頭油冷卻裝置
2. 軌道自動潤滑裝置
3. 切削液冷卻液裝置
4. 切削吹氣控制
5. 電氣箱裝熱交換器
6. 石英工作燈
7. 螺旋排屑裝置
8. M30 自動斷電裝置
9. 可移動式電子手輪
10. 動作警示燈
11. RS232 界面接口
12. 工具箱及調整用工具
13. 水平調整螺栓及墊塊

選配附件 Optional Accessories

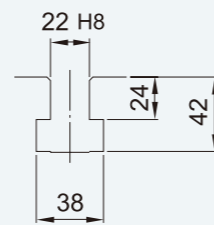
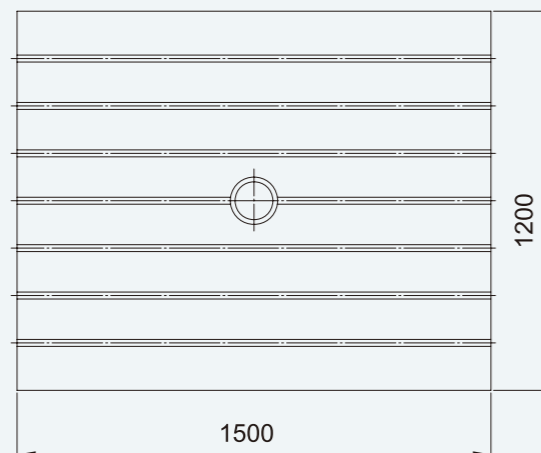
1. 主軸中心出水 20bar
2. 鍊板式排屑機
3. 主軸延伸襯套
4. 工作台防濺護板
5. 變壓器
6. 90 度銑床頭
7. 直角工作台
8. 油水分離機
1. Coolant thru spindle with pressure 20 bar
2. Chip conveyor with bucket
3. Spindle support
4. Table splash guard
5. Transformer for other than 220V
6. Right angle milling head
7. Angle plate
8. Oil skimmer

HB-110-20T

DIMENSIONS



TABLE



Item	内容	Description	unit	
工作台 Table	工作台尺寸	Table size	mm	1500x1200
	T 型槽	T slot (wide x no. x pitch)	mm	22H8 x 7 x 150
	最大負荷	Max. load capacity	kg	5000
	最小分割角度	Min. indexing unit	deg	0.001(Every 90 deg with locating pin)
	工作台快速旋轉	B-axis rapid feed	rpm	2
行程 Travel	X 軸行程	X-axis travel	mm	2000(3000 opt.)
	Y 軸行程	Y-axis travel	mm	1500
	Z 軸行程	Z-axis travel	mm	1400
	W 軸行程	W-axis travel	mm	550
	主軸鼻端至工作台中心距離	Spindle nose to table center	mm	-30 ~ 1920
	主軸中心至工作台面距離	Spindle center to table top	mm	0 ~ 1500
主軸 Spindle	主軸錐孔	Spindle nose	mm	BT50
	主軸外徑	Spindle diameter	mm	110
	最大扭力輸出	Output max.	kg-m	135
	主軸轉速 (自動二段轉換)	Spindle speed (2 ranges)	Lo-speed Hi-speed rpm	5 ~ 625 626 ~ 2500
進給 Feeds	X/ Y/ Z/W軸快速移位速率	Rapid X, Y, Z, W-axis	m/min	10/ 10/ 10/ 6
	X/ Y/ Z 軸切削進給速率	Feed rate of X, Y, Z-axis	mm/min	1 ~ 6000
	W軸切削進給速率	Feed rate of W-axis	mm/min	1 ~ 4000
	X/ Y/ Z軸滾珠螺桿(外徑/螺距)	X,Y,Z ballcrew (Dia./ Pitch)	mm	63/10
	W軸滾珠螺桿(外徑/螺距)	W ballscrew (Dia./ Pitch)	mm	40/10
自動換刀 裝置 A.T.C.	刀庫容量	Magazine capacity	pcs	60
	拉刀栓規格	Pull stud	-	MAS-P50T-1
	最大刀具長度	Max. tool length	mm	400
	最大刀具重量	Max. tool weight	kg	25
	最大刀具徑	Max. tool diameter	mm	ø125/ ø250 (w/o adjacent tool)
	刀具選擇方式	Tool selection	-	Sequence by shortest path
馬達 Motors	換刀時間刀對刀(約)	Tool change time (approx.)	sec	15
	主軸馬達	Spindle motor	kW	22/ 26
	X/Y/Z/B 軸馬達	Servo motor for X/Y/Z/B/W	kW	6/6/6/7/7
	油壓單元	Hydraulic pump	kW	3.7
	主軸油冷裝置	Spindle oil cooler pump	kW	1.18
機器一般規格 General information	氣壓需求	Pneumatic required	kg/cm ²	6
	切削液箱容量	Coolant tank	L	250
	機械尺寸	Machine dimension	mm	4480x5510x3820
	機械重量	Machine weight	kg	24500
	CNC控制器	CNC Controller		FS-0i-MF

標準配件 Standard Features & Accessories

1. X,Y,Z,W 軸裝 Heidenhain 絕對式光學尺
2. B 軸裝 Heidenhain 絕對式角度光學尺
3. 主軸頭油冷卻裝置
4. 軌道自動潤滑裝置
5. 切削冷卻液裝置
6. 切削吹氣控制
7. 電氣箱裝空調冷氣機
8. 石英工作燈
9. 螺旋排屑裝置
- 10.M30 自動斷電裝置
- 11.可移動式電子手輪
- 12.動作警示燈
- 13.RS232 界面接口
- 14.工具箱及調整用工具
- 15.水平調整螺栓及墊塊

選配附件 Optional Accessories

1. 主軸中心出水 20bar
2. 鍊板式排屑機
3. 主軸延伸襯套
4. 工作台防濺護板
5. 變壓器
6. 90 度銑床頭
7. 直角工作台
8. 油水分離機
1. Coolant thru spindle with pressure 20 bar
2. Chip conveyor with bucket
3. Spindle support
4. Table splash guard cover
5. Transformer for other than 220V
6. Right angle milling head
7. Angle plate
8. Oil skimmer