

**FCL-T2**

series 系列



**MULTI-AXIS**

**TURNING CENTER**

**多軸車削中心機**



# FCL-T2

series 系列

- Swing over bed 235 mm
- Distance between spindle noses 950 mm
- 12-Position upper and lower turrets
- 5000 r.p.m. spindle speed as standard, 4500 r.p.m. optional
- With Y-axis for upper turret, multi-axis milling operations can be performed (FCL-20T2Y only)
- 45 degree slant bed structure with outstanding rigidity and stability
- Heavy duty roller type linear guideways on all axes
- Fully enclosed splash guard

- 床身上旋徑235 mm
- 兩主軸鼻端間距950 mm
- 上/下刀塔皆為12刀位
- 標準最高主軸轉速 5000 r.p.m. 4500 r.p.m. 為選配
- 上刀塔可配合使用Y軸功能，適合多軸銑削作業 (適用FCL-20T2Y)
- 45°斜床式結構，具有獨特剛性與穩定性
- 所有軸向皆配置耐重負荷之滾柱型線性滑軌
- 全密閉式護罩

**MULTI-AXIS TURNING CENTER**  
DESIGNED TO DRASTICALLY BOOST  
MACHINING EFFICIENCY AND THROUGHPUT

**多軸車削中心機**  
專為大幅提升加工效率與產能而設計

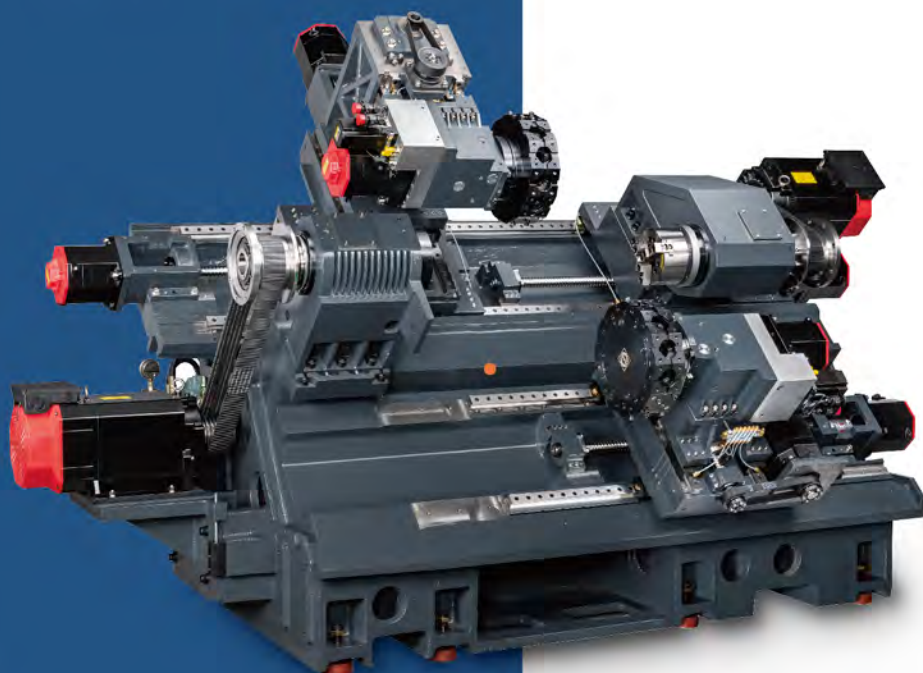


## **Twin Spindles Twin Turrets Creating Double Productivity**

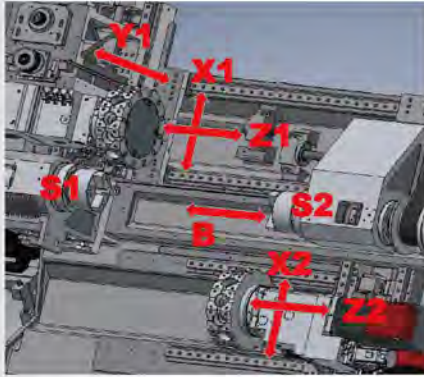
The Force One FCL-T2 series multi-axis turning centers integrate two spindles and two turrets in one machine. With high spindle speed of up to 5000 RPM in combination with two BMT-55 type turrets, many complex shaped parts can be machined in just a single step.

## **雙主軸 雙刀塔 創造雙倍產能**

複上FCL-T2系列多軸車削中心機，將雙主軸及雙刀塔融合在一機。採用高速主軸，轉速高達5000 r.p.m.，配合使用2組BMT-55型刀塔，任何複雜之工件，只需一次裝夾即可加工完成。







### Roller Type Linear Guideways

All machine axes are mounted with roller type linear guideways, featuring heavy duty construction, high rigidity, and low friction coefficient, allowing for extremely high rapid traverse rates.

### 滾柱型線軌

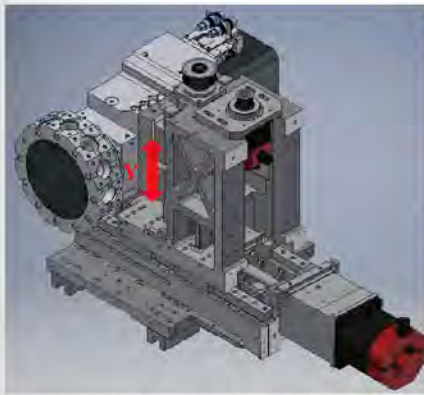
本機所有軸向均配置滾柱型線性滑軌，耐重負荷、高剛性、低磨擦係數。且適合高速位移。

### Rapid Traverse Rate On Each Axis:

- X1, X2-axis: 30 m/min
- Y1 axis: 10 m/min
- Z1, Z2-axis: 40 m/min
- B-axis: 40 m/min

### 各軸快移速率:

- X1, X2軸: 30 米/分
- Y1軸: 10 米/分
- Z1, Z2軸: 40 米/分
- B軸: 40 米/分



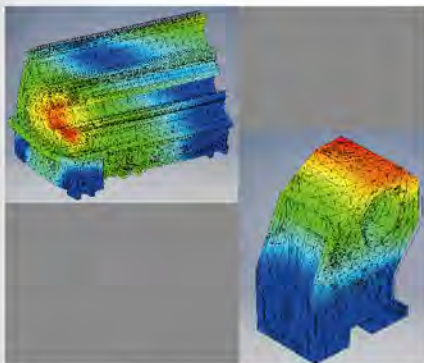
For upper turret only 適用於上刀塔

### Y-axis

- With the use of Y-axis for the upper turret, a wide variety of multi-axis milling operations can be performed.
- Y-axis stroke: 100 (±50) mm
- Extremely rigid structure offers high precision machining equal to or better than a machine center.

### Y軸

- 上刀塔配合使用Y軸功能，可應用於多軸銑削加工。
- Y軸行程: 100 (±50) mm。
- Y軸結構高剛性，加工精度可媲美甚至超越加工中心機。



### Finite Element Analysis

The bed design is subject to Finite Element Analysis to simulate various stress/strain conditions, which in turn ensures optimal structural rigidity, machining stability, and deformation-free performance even after years of operation.

### 有限元素分析

床身設計採用有限元素分析軟體，以模擬各種應力/應變情況，進而確保最佳結構剛性，加工穩定性。且多年使用後，床身不變形。



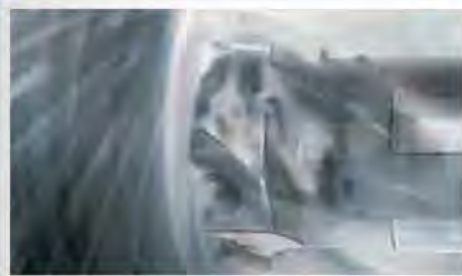
### Long Workpiece Machining Double Productivity

The Force One FCL-T2 series turning centers can hold long workpieces with synchronized control of the right and left spindles and simultaneous cutting by the upper and lower turrets, which dramatically upgrades machining efficiency and results in doubled productivity.

### 長工件加工 雙倍產能

複上FCL-T2系列車削中心機，可以夾持長工件，經由左/右主軸同動控制以及上/下刀塔同步切削，大幅提升加工效率及雙倍產能。

## MACHINE FEATURES 機械特性

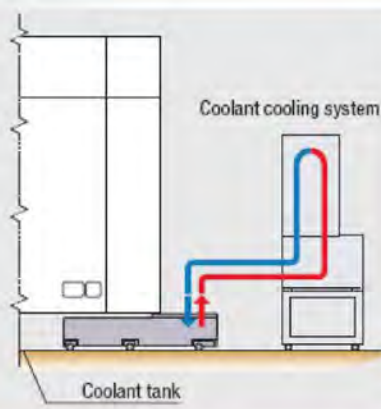


### 20 Bar High Pressure Coolant System

The 20 bar high pressure coolant system is recommended for high production machining.

### 20 Bar高壓冷卻液系統

20 bar高壓冷卻液系統適用於高產能加工之場合。



### Coolant Chiller

The coolant chiller is used to control the temperature of coolant, helping to ensure consistent machining accuracy. The chiller is essential equipment when high pressure coolant is used.

### 冷卻液冷卻系統

冷卻液冷卻系統適用於冷卻液的溫度控制，以確保加工精度之穩定性。當使用高壓冷卻液時，建議同時使用此種冷卻系統。

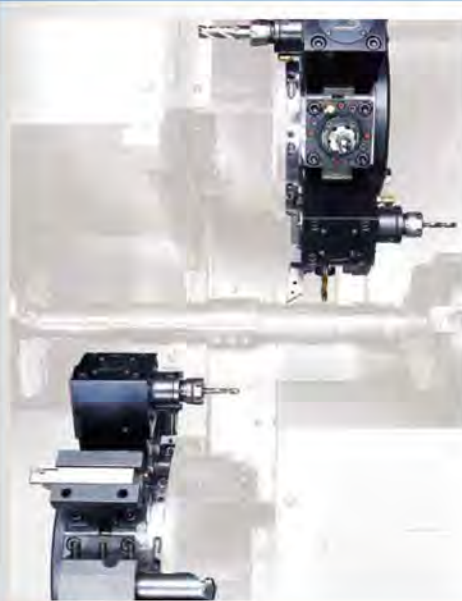


### Parts Unloader And Conveyor for Sub-spindle

Once the workpiece is machined by the right spindle, it will be delivered to the parts unloader by the part ejector. Then the workpiece is discharged to the parts conveyor.

### 副主軸工件放料及輸送帶

工件採用右主軸加工完成後，將經由頂料器送料到放料器，再將工件放置在輸送帶上。



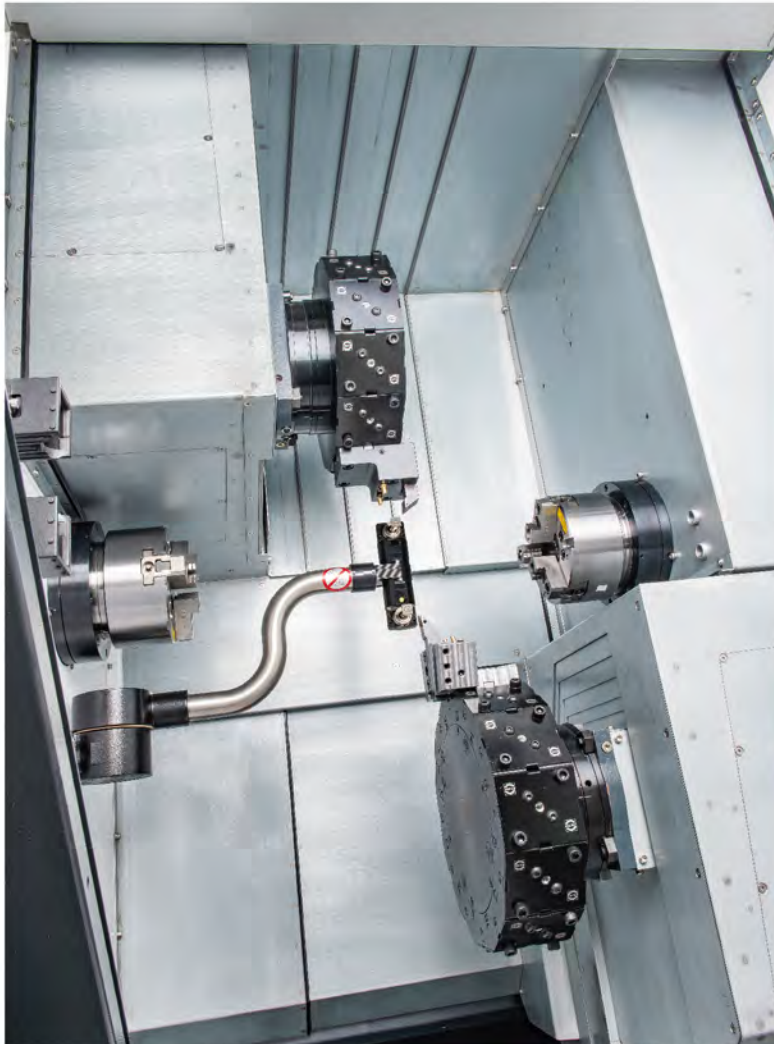
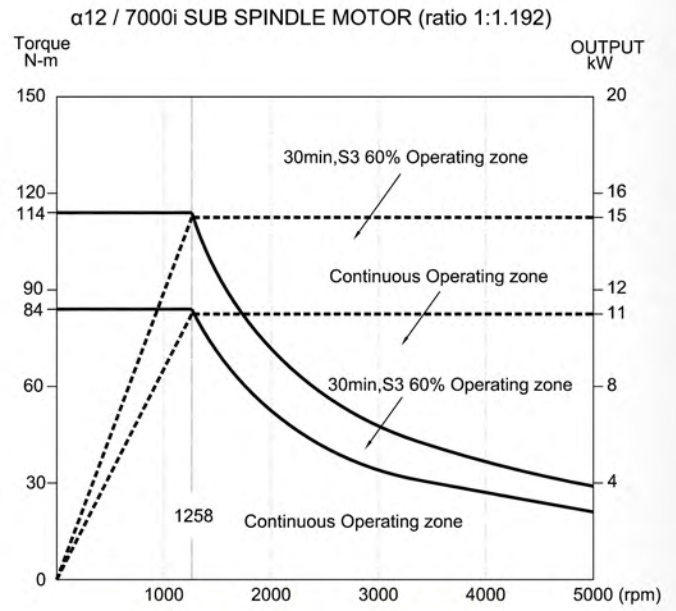
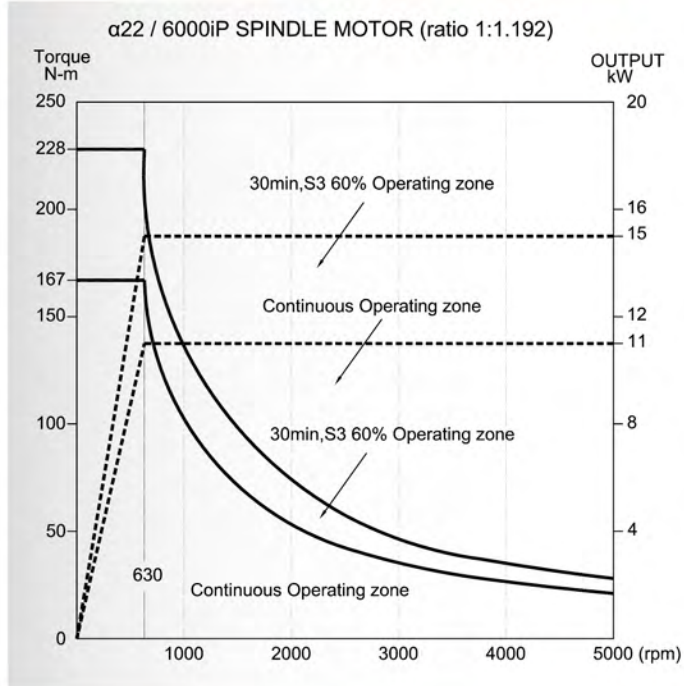
### TURRET

The upper and lower turrets double machine productivity by allowing Independent , simultaneous operation.

- Turret indexing time (1 face)  
**0.15s**
- No. of tool station  
(the same for the upper and lower turrets)  
**12 station**
- No. of index positions  
(the same for the upper and lower turrets)  
**24 index position**



## SPINDLE POWER – TORQUE DIAGRAM



**Auto Type Tool Presetter**  
自動刀具量測儀



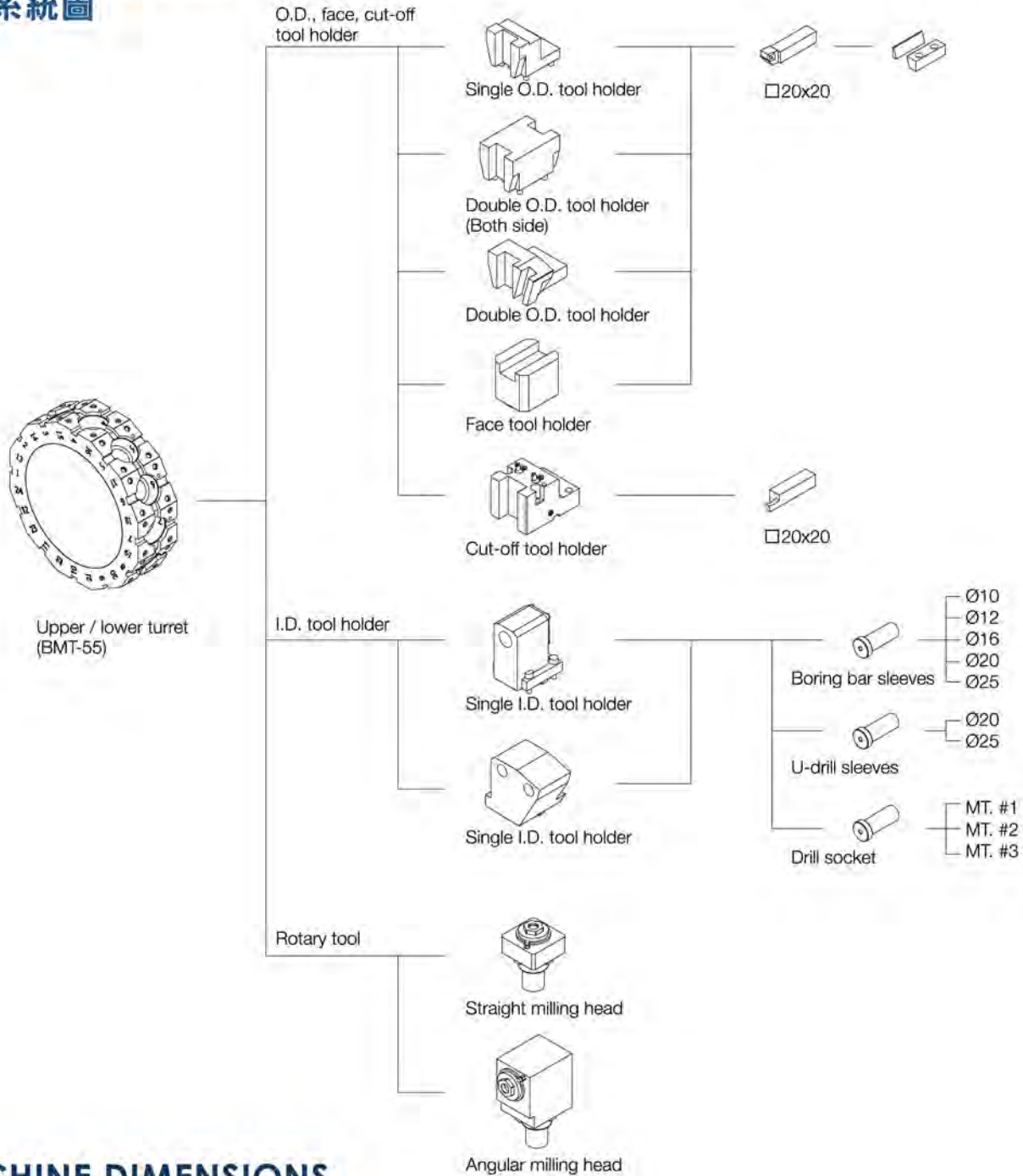
**Oil Mist Collector**  
油霧回收機





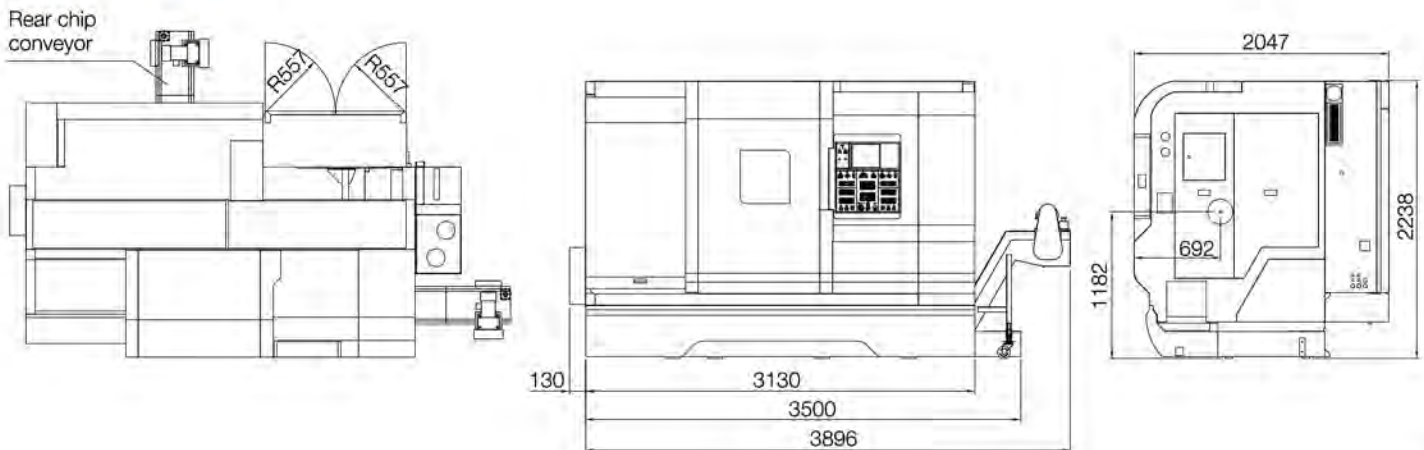
# TOOLING SYSTEM

## 刀具系統圖



# MACHINE DIMENSIONS

## 機械尺寸圖



# SPECIFICATIONS 機械規格表

MODEL 機型		UNIT 單位	FCL-20T2	FCL-20T2Y	
<b>Capacity</b> 加工能力	Swing over bed	床身上旋徑	mm	235	
	Swing over cross slide	滑座上旋徑	mm	235	
	Max. distance between spindle noses	兩主軸鼻端最大距離	mm	950	
	Max. turning diameter	最大車削直徑	mm	230	
	Max. turning length	最大車削長度	mm	690	
	Bar work capacity	棒材孔徑	mm	52 / 65 (opt. 選配)	
<b>Travel</b> 行程	X-axis travel	X軸行程	mm	X1: 180, X2: 185	
	Y-axis travel	Y軸行程	mm	-	Y: 100 (±50)
	Z-axis travel	Z軸行程	mm	Z1, Z2: 630	
	E-axis travel (spindle 2)	E軸行程 (第2主軸)	mm	700	
<b>Spindle 1/2</b> 第1/第2主軸	Max. spindle speed	主軸最高轉速	mm <sup>-1</sup>	5000 / 4500 (opt. 選配)	
	Spindle nose	主軸鼻端型式		JIS A2-5 / A2-6 (opt. 選配)	
	Chuck size	夾頭尺寸	inch	6 / 8 (opt. 選配)	
	Through-spindle hole diameter	主軸孔徑	mm	61 / 73 (opt. 選配)	
	Spindle bearing inner diameter	主軸軸承內徑	mm	100 / 120 (opt. 選配)	
	Min. spindle indexing increment	主軸最小分割精度		0.001°	
<b>Turret</b> 刀塔	Turret type	刀塔型式		BMT-55	
	Number of tool stations	刀位數	tool	12 x 2 = 24	
	Shank height for square tool	方形刀具刀柄高度	mm	20	
	Height of boring bar shank part	搪孔刀刀柄高度	mm	32	
	Turret indexing time (1 station)	刀塔定位時間 (1刀位)	sec.	0.2	
	Max. rotary tool spindle speed	旋轉刀具最高主軸轉速	mm <sup>-1</sup>	4000	
<b>Feedrate</b> 進給速率	Rapid traverse rate	快速位移	m/min	X1, X2: 30 / Y1: 10 Z1, Z2: 40 / E: 40	
<b>Motors</b> 馬達	Spindle 1 drive motor (30 min./cont.)	第1主軸馬達 (30分/連續)	kW	15.0 / 11.0	
	Spindle 2 drive motor (30 min./cont.)	第2主軸馬達 (30分/連續)	kW	15.0 / 11.0	
	Rotary tool spindle drive motor (30 min./cont.)	旋轉刀具馬達	kW	3	
	Feed motor	進給馬達	kW	X1, X2: 3.0 / Y1: 1.6 Z1, Z2, E: 3.0	
<b>Machine size</b> 機器尺寸	Machine height (from floor)	機器高度 (從地面)	mm	2238	
	Floor space (width x depth)	占地面積	mm	3260 x 2047	
	Mass of machine	機器重量	kg	8000	8500

● All specification, design, and characteristics shown on this catalogue are subject to change without prior notice.

● 本規格表如有變更，不另行通知，以契約之規格為準。

## STANDARD ACCESSORIES

- 4 bar coolant pump(MTH4-30/3)
- Automatic lubrication system
- Tool and tool box
- Work light
- Three color alarm light
- Right side chip conveyor and bucket
- Hydraulic unit(3HP/2.2KW)
- Heat exchanger for electric cabinet

## 標準配備

- 4 bar coolant pump(MTH4-30/3)
- Automatic lubrication system
- Tool and tool box
- Work light
- Three color alarm light
- Right side chip conveyor and bucket
- Hydraulic unit(3HP/2.2KW)
- Heat exchanger for electric cabinet

## OPTIONAL ACCESSORIES

- 20 bar coolant pump
- Oil skimmer
- Coolant chiller
- Chuck coolant(L/R)
- Coolant gun
- Rear side chip conveyor and bucket
- Air blower(L/R)
- Mist collector
- Tool setter (Manual/Auto)
- Parts catcher for main spindle
- Parts unloader and conveyor for sub-spindle
- Part ejector
- Auto door
- Robot interface
- Bar feeder interface
- Linear scale (X1,X2,Z1,Z2)
- Air gun
- Air conditioner for electric cabinet
- Auto power off

## 選購配備

- 20 bar高壓冷卻液系統
- 油水分離器
- 冷卻液冷卻系統
- Chuck coolant(L/R)
- Coolant gun
- Rear side chip conveyor and bucket
- Air blower(L/R)
- Mist collector
- Tool setter (Manual/Auto)
- Parts catcher for main spindle
- 副主軸工件收料及工件輸送帶
- 推料器
- Auto door
- Robot interface
- Bar feeder interface
- Linear scale (X1,X2,Z1,Z2)
- Air gun
- Air conditioner for electric cabinet
- Auto power off



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