

MODEL: PISTON A, B, C, S

Specification Models	PISTON TURNER A	PISTON TURNER B	PISTON TURNER C	PISTON TURNER S
Capacity (加工能力)				
Maximum piston diameter (活塞最大直徑)	Ø100mm (3.937")	Ø300mm (11.8")	Ø200mm (7.87")	Ø200mm (7.87")
Maximum piston length (活塞最大長度)	100mm (3.937")	310mm (12.2")	250mm (10")	250mm (10")
Spindle (主軸)				
Spindle nose (主軸鼻端規格)	A2-5	A2-6	A2-6	A2-6
Spindle bearing ID(主軸軸承內徑)	Ø75mm (3")	Ø100mm (3.937")	Ø100mm (3.937")	Ø110mm (4.33")
Spindle motor (主軸馬達)	11kw (14.7hp)	11kw (14.7hp)	11kw (14.7hp)	11kw (14.7hp)
	35.8Nm	114.6Nm	85.9Nm	114.6Nm
Hole through spindle (主軸通孔)	Ø42mm (1.65")	Ø52mm (2")	Ø52mm (2")	Ø65mm (2.56")
Spindle max. speed (主軸最高轉速)	50-5,000rpm	36-3,600rpm	36-3,600rpm	36-1,500rpm
X-axis (X軸)				
Maximum X-axis stroke (X軸行程)	± 80mm (3.15")	200mm + 10mm (8.2")	± 75mm (± 3")	± 75mm (± 3")
Rapid traverse speed (快速速度)	20m/min. (790"/min)	20m/min. (790"/min)	15m/min. (590"/min)	20m/min. (790"/min)
Servo motor (伺服馬達)	1.2kw (1.6hp)	3kw (4hp)	1.4kw. (1.9hp)	1.6kw. (2.1hp)
	7Nm, Max. 15Nm	12Nm, Max. 35Nm	20Nm, Max. 39Nm	8Nm, Max. 29Nm
Motion resolution (運動解析度)	0.001mm (0.0001")	0.001mm (0.0001")	0.001mm (0.0001")	0.001mm (0.0001")
Z-axis (Z軸)				
Maximum Z-axis stroke (Z軸行程)	200mm (7.87")	460mm (17")	370mm (14.5")	370mm (14.5")
Rapid traverse speed (快速速度)	24m/min. (945"/min)	24m/min. (945"/min)	18m/min. (710"/min)	24m/min. (945"/min)
Servo motor (伺服馬達)	1.2kw (1.6hp)	3kw (4hp)	1.4kw (1.9hp)	1.6kw (2.1hp)
	7Nm, Max. 15Nm	12Nm, Max. 35Nm	20Nm, Max. 39Nm	8Nm, Max. 29Nm
Motion resolution (運動解析度)	0.001mm (0.0001")	0.001mm (0.0001")	0.001mm (0.0001")	0.001mm (0.0001")
Y-axis (Oval generator 橢圓產生器)				
Maximum stroke (最大行程)	8mm (0.31")	8mm (0.31")	8mm (0.31")	8mm (0.31")
Actuator (致動元件)	Linear motor	Linear motor	Linear motor	Linear motor
Motion resolution (運動解析度)	0.0001mm	0.0001mm	0.0001mm	0.0001mm
Positioning accuracy (靜態定位精度)	± 0.0005mm	± 0.0005mm	± 0.0005mm	± 0.0005mm
Repetitive accuracy (重現定位精度)	± 0.001mm	± 0.001mm	± 0.001mm	± 0.001mm
Tailstock (支撐尾座)				
Quill diameter (心軸直徑)	Ø60mm (2.36")	Ø90mm (3.54")	Ø80mm (3.15")	Ø80mm (3.15")
Quill stroke (心軸行程)	100mm (3.937")	150mm (5.9")	150mm (5.9")	150mm (5.9")
Turret (刀塔)	X	○	X	X

Machine specifications are subjects to change without notification.
產品規格若有變更，恕不另行通知。

MATECH

CNC MACHINE TOOLS

CNC
PISTON TURNER
(CAMLESS OVAL TURN)

數 控
活 塞 車 床
(非 靠 模 橢 圓 車 床)

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CNC PISTON TURNER

(CAMLESS OVAL TURN)

THIS CNC PISTON TURNER IS DEVELOPED FOR APPLICATIONS OF TURNING ELLIPTICAL AND BARREL PROFILE OF GASOLINE AND DIESEL ENGINE PISTONS.

Machine Features

- * This special machine features linear motor as the non-circular profile generator. The non-contact position feedback system with 0.0001mm resolution ensures quick response, high positioning accuracy, and high rigidity.
- * With high performance real-time control kernel and extremely short sampling time of new controller, fast and accurate cutting path positioning accuracy can be well accomplished.
- * The close loop feedback system of MATECH CNC Piston Turner is digital linear scale with 0.001mm resolution. The direct feedback system provides best positioning accuracy and also eliminates thermo interference.
- * Since there is no more data transmission required, the new integrated oval generating system guarantees no data loss or noise interference.
- * The (READ TO INPUT) concept programming software is one of the friendliest software in the market, and it makes operators become familiar with programs much easier.



Machine Structure (Piston Turner B)

- | | |
|---------------------------|-------------------------|
| A. High Precision Spindle | C. 10 positional Turret |
| B. Oval Generator | D. Revolving Tailstock |

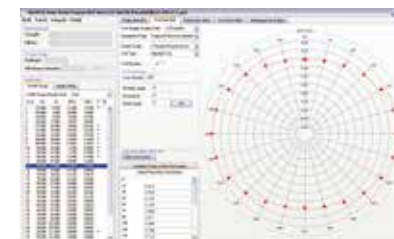


數控活塞車床 (非靠模橢圓車床)

本數控橢圓車床係為解決汽油機與柴油機活塞的中凸變橢圓裙部之加工而設計的。

本機特性

- * 本數控橢圓車床採用線性伺服橢圓產生器，配合非接觸式0.0001mm超高解析度回饋系統，具備高響應頻率、高精密度、高剛性等特點。
- * 由於此設備採用高效能控制核心及極短取樣時間的新一代控制器，可以獲得更快速且精準的切削路徑控制。
- * 本機部份採用全閉環式0.001mm光學尺回饋系統，進一步確保最佳定位精度，並能有效的消除熱干擾。
- * 新一代整合式橢圓控制器，由於不再需要資料傳輸，因此可以避免因為傳輸而導致的雜訊干擾或資料遺失。
- * 編程軟體採用(看圖輸入法)編寫，操作者無須再耗費長時間學習，只要依照活塞圖面標示的尺寸，輸入安加橢圓控制器即可，型線及相關橢圓路徑則全由控制器處理。



Check the Cross section
橢圓截面檢查



Check the Vertical Profile
垂直型線檢查

← Piston Turner B 型之結構

- | | |
|----------|------------|
| A. 高精度主軸 | C. 10工位刀塔 |
| B. 橢圓產生器 | D. 旋轉軸心式尾座 |

High Precision CNC Vertical Oval Turing Machine

高精密CNC立式橢圓車削加工機

MVP Series Machine Features

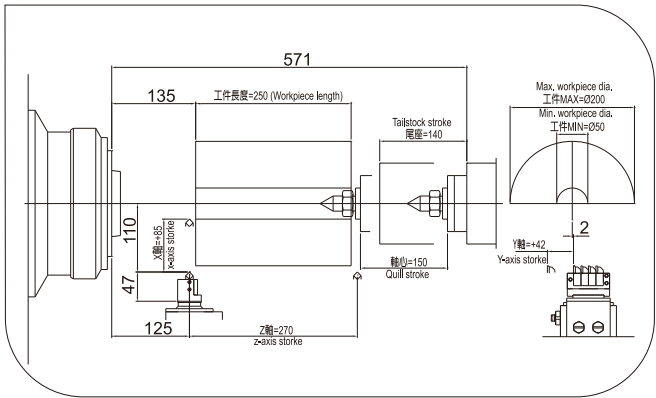
- * The high precision CNC vertical piston turner is specially designed for automated production line application. The machine takes advantage of its unique design and can surely be great space saving solution.
- * Vertical turning center offers reduced deflection error.
- * The multi cutting tool post design is convenient to select suitable tools for different work pieces in order to extend tool lifetime and machining efficiency.

高精密CNC立式橢圓車削加工中心特性

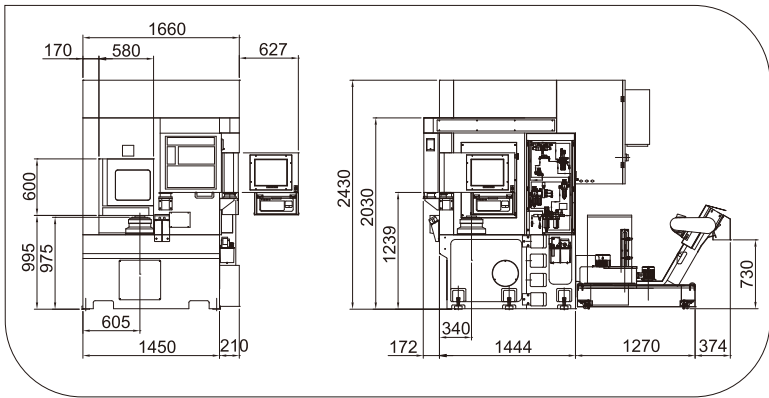
- * 此立式活塞加工中心的獨特設計，能夠減少設備的使用空間，特別是在自動加工線的佈置上，更能發揮其特性。
- * 由於活塞採用立式裝夾，使得工件的重心向下，亦可降低加工時所產生的偏擺誤差。
- * 本機的橢圓產生器換刀設計，可依工件本身材質的不同而選用不同的刀具，以提高刀具之壽命及加工效率。



Working area diagram



External View



Specification Models	MVP-200	MVP-200T
Capacity (加工能力)		
Maximum piston diameter (活塞最大直徑)	Ø50-200mm	Ø50-180mm
Maximum piston length (活塞最大長度)	250mm	200mm
Spindle (主軸)		
Spindle nose (主軸鼻端規格)	A2-6 ISO	
Spindle bearing ID (主軸軸承內徑)	Ø90mm	
Spindle Motor (主軸馬達)	7.5kw (112S)	
Spindle max. speed (主軸最高轉速)	3600rpm	
X-axis (X軸)		
Maximum X-axis stroke (X軸行程)	85mm	±75mm
Rapid traverse speed (快速速度)	15m/min	
Servo motor (伺服馬達)	1.6kw (α8i)	
Y-axis (Y軸)		
Maximum Y-axis stroke (Y軸行程)	42mm	
Rapid traverse speed (快速速度)	15m/min	
Servo motor (伺服馬達)	1.4kw (α4i)	
Z-axis (Z軸)		
Maximum Z-axis stroke (Z軸行程)	270mm	220mm
Rapid traverse speed (快速速度)	15m/min	
Servo motor (伺服馬達)	4kw (α22i)	

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Specification Models	MVP-200	MVP-200T
Tailstock (支撐尾座)		
Quill diameter (心軸直徑)	Ø75mm	
Quill taper (心軸錐度)	4 MT	
Quill stroke (心軸行程)	150mm	
Tools (刀具)		
Tool number (刀具數量)	4	
Tool size (刀柄尺寸)	□ 12 x 12mm	
Grooving tools (車溝刀)		
Tool number (刀具數量)	NO	4
Hydraulic oil tank capacity (液壓油容量)	25L	
Lubrication oil tank capacity (潤滑油容量)	2L	
Coolant tank capacity (冷卻系統)	400L	
Power requirement (動力需求)	220V	
	40KVA	
Air requirement (氣壓需求)		
Pneumatic pressure (壓力)	0.5Mpa	
Velocity (流量)	26L/min	
Dimension (設備尺寸)		
Machine length (寬度)	1800mm	
Machine width (深度)	3000mm	

Inspection Report (Example)

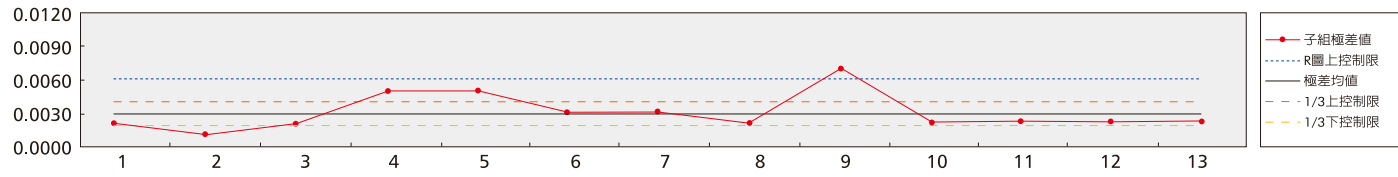
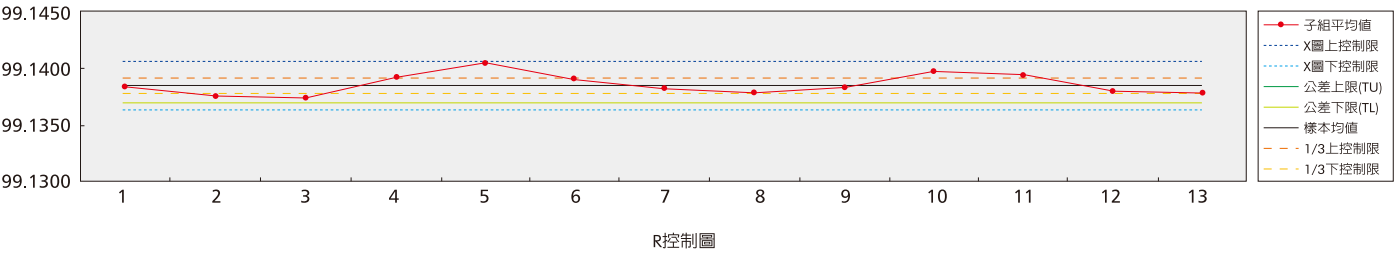
檢驗報告 (範例)

範例 A

機器能力分析報告

參數區				計算結果			
生產線	302線	檢查項目 (規範)	外圓直徑(DM=99.145±0.015)	公差中心	99.1450	R圖上控制限	0.0062
工序名稱	精車外圓	公差上限 (TU)	99.1530	樣本均值	99.1385	1/3R圖上控制限	0.0040
產品名稱	CYQD32II	公差下線 (TL)	99.1370	極差均值	0.0029	Cm值	1.69
產品圖號		樣本容量	5	標準偏差	0.0016		
設備名稱/編號	Piston A	取樣頻率	連續	X圖上控制限	99.1406	1/3X圖上控制限	99.1392
檢驗員	崔海軍	子組數量	25	X圖下控制限	99.1364	1/3X圖上控制限	99.1378

日期	分組	X1	X2	X3	X4	X5	子組平均值	最大值	最小值	極差
2009.11.04	第1組	99.1390	99.1390	99.1380	99.1370	99.1390	99.1384	99.1390	99.1370	0.0020
	第2組	99.1380	99.1380	99.1370	99.1380	99.1370	99.1376	99.1380	99.1370	0.0010
2009.11.04	第3組	99.1360	99.1370	99.1380	99.1380	99.1380	99.1374	99.1380	99.1360	0.0020
	第4組	99.1380	99.1420	99.1390	99.1400	99.1370	99.1392	99.1420	99.1370	0.0050
2009.11.04	第5組	99.1400	99.1410	99.1400	99.1430	99.1380	99.1404	99.1430	99.1380	0.0050
	第6組	99.1380	99.1410	99.1380	99.1400	99.1380	99.1390	99.1410	99.1380	0.0030
2009.11.04	第7組	99.1400	99.1370	99.1370	99.1400	99.1370	99.1382	99.1400	99.1370	0.0030
	第8組	99.1380	99.1370	99.1390	99.1370	99.1380	99.1378	99.1390	99.1370	0.0020
2009.11.04	第9組	99.1390	99.1390	99.1340	99.1380	99.1410	99.1382	99.1410	99.1340	0.0070
	第10組	99.1390	99.1400	99.1410	99.1390	99.1390	99.1396	99.1410	99.1390	0.0020
2009.11.04	第11組	99.1400	99.1400	99.1380	99.1400	99.1380	99.1392	99.1400	99.1380	0.0020
	第12組	99.1370	99.1380	99.1380	99.1390	99.1370	99.1378	99.1390	99.1370	0.0020
2009.11.04	第13組	99.1370	99.1360	99.1370	99.1370	99.1410	99.1376	99.1390	99.1370	0.0020

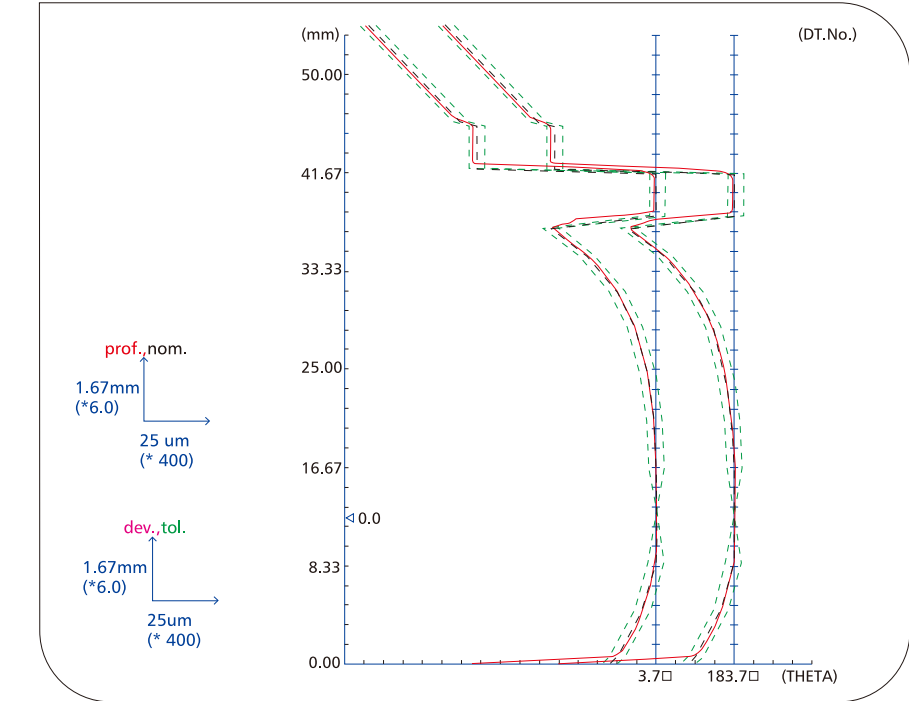


範例 B

Date: 2008/04/19
Ope:
Measuring Mag: 200

Wkn:
Num:

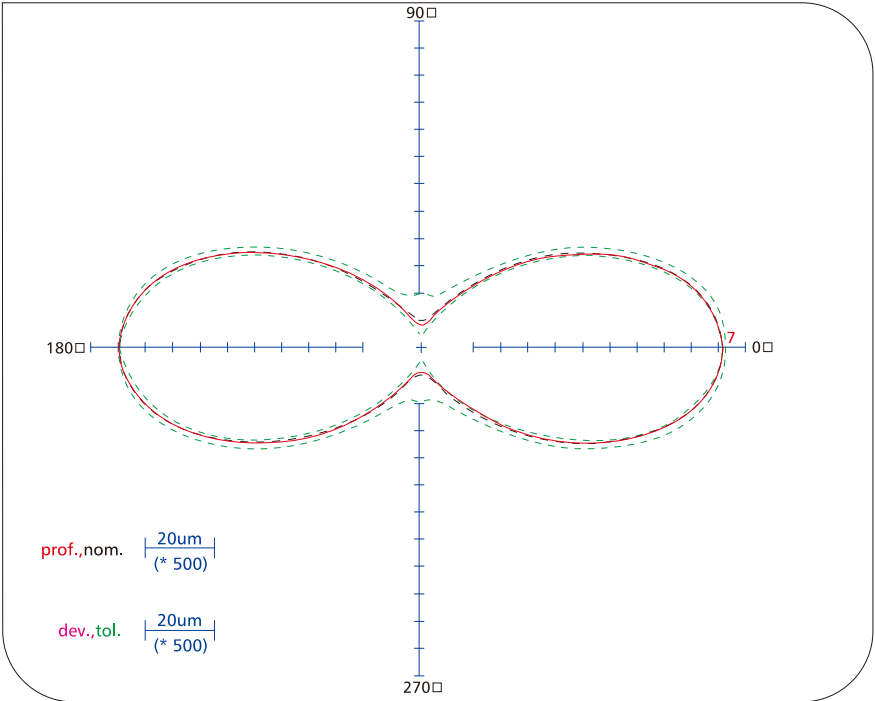
Date	Method	Filter	Mes. Len.	Z	R	P-P	P	V	TILT. CORR.
NO.	(mm)	(mm)	(mm)	(mm)	(um)	(um)	(um)	(um)	:lul data
5	LSC	0.6250D	58.0	0.00	80.510	497.7	183.2	-314.4	
6	LSC	0.6250D	58.0	0.00	80.510	507.8	183.2	-324.6	



Date: 2008/04/19
Ope:
Measuring Mag: 200

Wkn:
Num:

Date	Method	Filter	Z	R	P-P	P	V
NO.	(U/R)	(mm)	(mm)	(um)	(um)	(um)	(um)
7	LSC	50D	14.02	80.510	204.4	122.8	-81.5



OVAL COLL.

OVALITY (um): 405.1

MAX DEVIATION (um): 1.1

MIN DEVIATION (um): -5.6

ANG(DEG): 323.5

ANG(DEG): 173.0

PHASE DEVIATION(DEG): 6.8

ANG	ACT	NOM	ERR	U-TOL	L-TOL	OVER
(DEG)	(um)	(um)	(um)	(um)	(um)	(um)
0.0	0.0	0.0	0.0	0.0	0.0	0.0
10.0	-10.9	-11.0	0.1	4.0	-2.0	
20.0	-40.9	-40.0	-0.9	6.0	-3.0	
30.0	-81.7	-80.0	-1.7	8.0	-4.0	
40.0	-124.7	-121.0	-3.7	10.0	-5.0	
50.0	-158.8	-156.0	-2.8	12.0	-6.0	
60.0	-183.9	-180.0	-3.9	14.0	-7.0	
70.0	-196.3	-193.0	-3.3	16.0	-8.0	
80.0	-202.7	-199.0	-3.7	18.0	-9.0	
90.0	-203.1	-200.0	-3.1	20.0	-10.0	
100.0	-201.1	-199.0	-2.1	18.0	-9.0	
110.0	-195.0	-193.0	-2.0	16.0	-8.0	
120.0	-182.0	-180.0	-2.0	14.0	-7.0	
130.0	-156.7	-156.0	-0.7	12.0	-6.0	
140.0	-122.5	-121.0	-1.5	10.0	-5.0	
150.0	-79.9	-80.0	0.1	8.0	-4.0	
160.0	-39.9	-40.0	0.1	6.0	-3.0	
170.0	-10.6	-11.0	0.4	4.0	-2.0	

ANG	ACT	NOM	ERR	U-TOL	L-TOL	OVER
(DEG)	(um)	(um)	(um)	(um)	(um)	(um)
180.0	0.0	0.0	0.0	0.0	0.0	0.0
190.0	-11.2	-11.0	-0.2	4.0	-2.0	
200.0	-40.5	-40.0	-0.5	6.0	-3.0	
210.0	-80.6	-80.0	-0.6	8.0	-4.0	
220.0	-121.8	-121.0	-0.8	10.0	-5.0	
230.0	-157.1	-156.0	-1.1	12.0	-6.0	
240.0	-182.0	-180.0	-2.0	14.0	-7.0	
250.0	-194.8	-193.0	-1.8	16.0	-8.0	
260.0	-201.0	-199.0	-2.1	18.0	-9.0	
270.0	-202.1	-200.0	-2.1	20.0	-10.0	
280.0	-200.9	-199.0	-1.9	18.0	-9.0	
290.0	-195.9	-193.0	-2.9	16.0	-8.0	
300.0	-183.9	-180.0	-3.9	14.0	-7.0	
310.0	-159.7	-156.0	-3.7	12.0	-6.0	
320.0	-125.7	-121.0	-4.7	10.0	-5.0	
330.0	-83.1	-80.0	-3.1	8.0	-4.0	
340.0	-41.5	-40.0	-1.5	6.0	-3.0	
350.0	-12.2	-11.0	-1.2	4.0	-2.0	

Fully Automated Piston Production Line

全自動活塞生產線

隨著人工成本的增加，精度要求的提升及市場激烈的競爭下，降低成本，提高效率及良率，投入自動化生產設備是必然的趨勢。

With increase in labor costs, higher accuracy requirement and serious market competition, investment in automated production equipments is an inevitable trend that helps to lower production costs and upgrades efficiency and yield rate.

本系統特點：

- * 全線自動化選料及上下料，以減少大部分的人力需求。
- * 搭配在線量測並立即自動補正加工尺寸，提升加工良率。
- * 獨創雙工位設計，可以在加工的同時更換料件，進而節省換料時間。
- * 刀具、治具採快速更換設計，減少換線時間。

Features of MATECH Production System:

- * Automated material sorting and material loading/unloading on the entire production line result in dramatic reduction of labor requirement.
- * With online inspection and instant automatic compensation of machining dimensions, higher machining yield rate can be achieved.
- * Exclusive twin machining position design allows simultaneous material loading/unloading on one position during machining on the other side. Material loading/unloading time can be saved.
- * Quick tool and fixture change system design reduces time of shifting one model to a completely different one.



卡簧槽加工
Circlip Grooving



銷孔量測
Pin Hole Measurement



拉槽
Broaching



滾輪拋光
Roller Burnishing



異型搪孔
Non-Cylindrical Pin
Hole Boring



精車環槽
Finish Grooving



錐型銷孔拋光
Trumpet Pin Hole
Burnishing



橢圓半精車
Semi Oval Turning



半精車、
粗車環槽及倒角
Semi-Finish Turning, Rough
Grooving & Chamfering



粗搪孔
Rough Boring



鑽油孔
Oil Hole Drilling



車止口及鑽中心孔
Register Turning & Center
Hole Drilling



外徑粗車
Rough O.D. Turning



活塞鑄件送料系統
(最多200個)
Piston casting feeding
system (Max. 200pcs)



清洗
Washing Machine



外觀檢驗
Appearance Inspection



去除澆冒口
Riser Removing & Deburring



外徑量測
Dn Measurement &
Compensation



刻印
Engraving