



# AUI 3000/4000 Series Full-Automatic PCB Separator

May 19, 2019

# Equipment appearance

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[www.aurotek.com.tw](http://www.aurotek.com.tw)

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# Feature Introduction

## 5 Spindle Motor

High-speed spindle motor to reduce mechanical stress during cutting

## 6 Carrier with Nozzles

Moving carrier with smart nozzle design enables automatic material input and production outflow.

## 7 Axial Motor

Uses a high precision/ response AC servo motor and modular actuator.

## 8 In-let Conveyor

Adjustable width to suit varies sizes of PCB panel.

## 9 Controller

PC-based 8-axis motion controller.



## 1 Graphical User Interface

The user interface is based on the Windows GUI operating system and is easy to use. A CCD camera is also used to display a 10X image of the PCB to improve training precision.

## 2 Work Exchanger

This work exchanger provides an alternative in-and-out working space to limit the idle time, which in turn reaches the utmost output value.

## 3 Dust Suction Duct

Design from the Principle of Fluid Dynamics. Collecting dust and fragments effectively in downward direction.

## 4 Waste Bins

Large Volume bins to receive major waste PCB fragments after cutting.

# Specification



MODEL NO.	AUI 3000 / 3000C	AUI 4000 / 4000C
<b>WORKING AREA</b>	<b>X:330 mm Y:350 mm</b>	<b>X:430mm Y:450mm</b>
<b>Working Table</b>	2	
<b>PCB Thickness</b>	0.8 ~ 3.0 mm	
<b>PCB Component Height (Max.)</b>	Upward: 15 mm / Downward: 35 mm	
<b>Motion Control</b>	7 Axes AC Servo Motors	
<b>Moving Speed</b>	Standard : X, Y=1,000 mm/s; Z=750 mm/s; Carrier X=700 mm/s; Carrier Z=750 mm/s Max. : X, Y=1,200 mm/s; Z=750 mm/s; Carrier X=700 mm/s; Carrier Z=750 mm/s	
<b>Cutting Speed</b>	0~100 mm/s	
<b>Cutting Accuracy</b>	±80 μm	
<b>Positioning Repeatability</b>	±10 μm	
<b>Cutting Modes</b>	Linear, Circular, U-Curve, Arc, L-Curve	
<b>Standard Bits</b>	Ø 1.0 mm, Ø 1.2 mm, Ø 1.6 mm, Ø 2.0 mm	
<b>Operating System</b>	Windows 7	
<b>Pneumatic Pressure</b>	0.5/0.6 Mpa (5/6 Bar)	

# Specification

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MODEL NO.	AUI 3000 / 3000C	AUI 4000 / 4000C
<b>WORKING AREA</b>	<b>X:330 mm Y:350 mm</b>	<b>X:430mm Y:450mm</b>
<b>Working Height</b>	890 ~ 940 mm	
<b>Dimensions (W*D*H)</b>	1974*1120*1720 mm + Signal Light 561 mm	2374*1334*1720 mm + Signal Light 561 mm
<b>Net Weight (Approx.)</b>	680 KGS	840 KGS
<b>Vacuum Cleaner</b>	5HP	
<b>Standard Spindle</b>	Standard: 4026, 265W, (Max.) 58,000 rpm, Torque: 4.5 Ncm Option 1: 4025DC-T, 470W, (Max.) 30,000 rpm, Torque: 15 Ncm Option 2: AP 008-ESD, 500W, (Max.) 80,000 rpm, Torque: 8.4 Ncm	
<b>Standard Monitor</b>	15" touch panel	
<b>Power Supply</b>	3 Phase AC220 V $\pm$ 5% 50 Hz/60 Hz, 4.0 kw	

# Product Advantages



## Efficient

- A. High horsepower industrial dust collectors
- B. Small dust-collecting duct design for upward or downward dust extraction systems.
- C. Duct is close to the milling area, removing dust at once while depaneling.

## Accurate

- A. KURODA high precision ball screw
  - B. Panasonic servo motor
  - C. Sycotec spindle
  - D. Advantech IPC
  - E. Aurotek motion control card
  - F. Aurotek vision system
- We guarantee: Cpk >= 1.33**  
**Positioning Repeatability ± 10µm**  
**Cutting Accuracy ± 80 µm**

## Speedy

- A. High-speed axis modules reaches up to (max.) 1200 mm/s
- B. Maximum cutting speed up to 100mm/s
- C. Dual table processing, maximizes production throughput while minimizes idle time.
- D. Customized fixture and tools, production changeover can be done in just a few minutes.

## Yield Increasing

- Easy to use is a must.  
We design machines for:
- A. Manageability
  - B. Usability
  - C. Safety
  - D. Traceability

# Advantageous Genes

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## Aurotek



**KURODA**  
JENATEC



**ADVANTECH**



## Aurotek



**Syco Tec**



**Panasonic**

**Aurotek**

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# Product Overview

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## Strong machine structure & precise motion

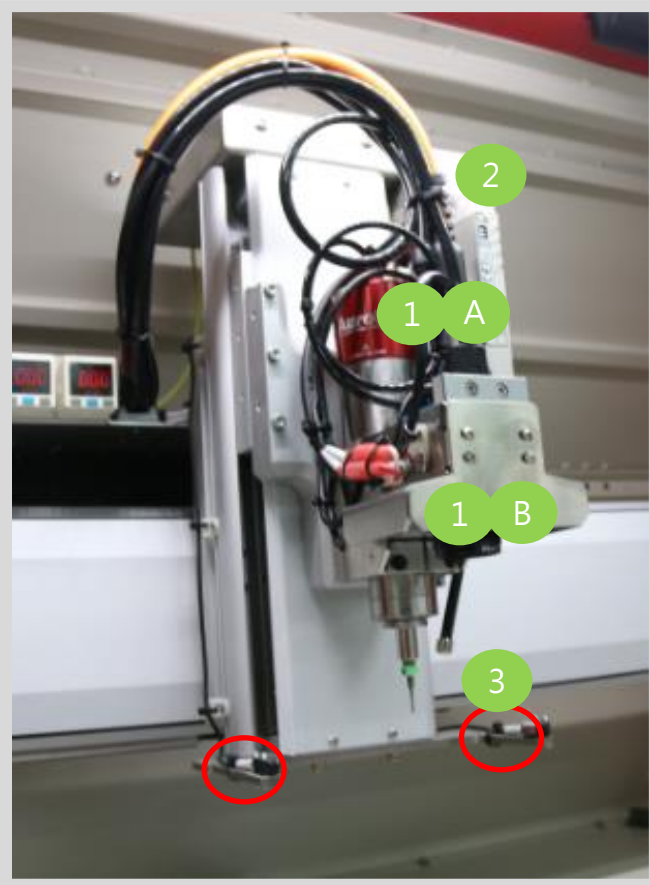
High accurate single-axis motion module designed by Aurotek.

X, YL, YR, Z axes equip with independent Panasonic servo motors ◦





# Product Overview



## 1 CCD camera with LED light

CCD camera (1A) and LED Light (1B)  
Supports coordinate setting. It checks fiducial marks and simulate cutting routes before actual cutting.

## 2 Ionizer

Ionizer focuses on cutting point during cutting process. It reduces electrostatic discharge effectively.

## 3 Bit break check sensor

A standard item in AUI series. Sensor detects bit breakage after every cutting movement.

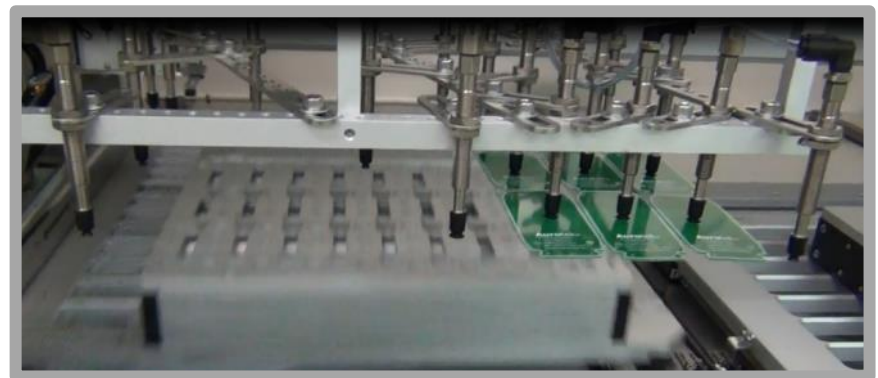
# Product Overview



Carrier Axis / pick& place Z axis

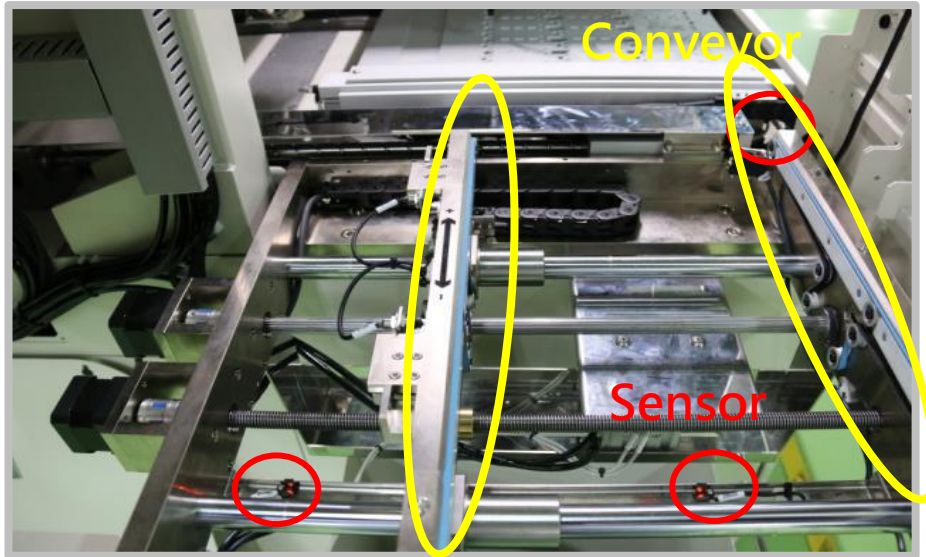
## Carrier Axis / pick& place Z axis

The intergraded Carrier axis can move the PCB from inlet conveyor to the dedicated jig to implement cutting, after the cutting finished, Carrier axis will drop the disused board, and move the finished PCB to the outlet space to connect the work of next station, the Whole processing is complete automatic, reduces labor cost.



Nozzle/Nozzle Pad

# Product Overview



## Manual adjustable inlet conveyor width and sensor.

Manual adjustable conveyor width, suitable to various PCB dimension

Width: AUI 3000 Max. 350mm/ Min. 100mm

AUI 4000 Max. 450mm / Min. 100mm

Loading weight: Max. 2kg

Process direction :

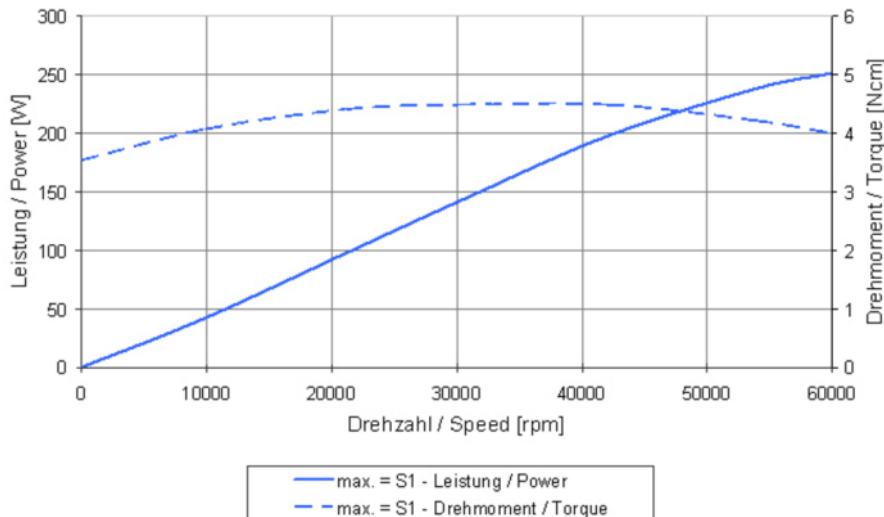
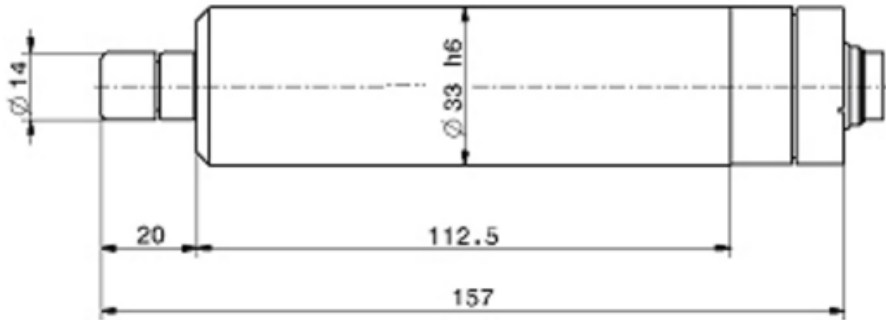
AUI 3000L/AUI 4000L : Left-in/ Right-out

AUI 3000R/AUI 4000R :Right-in/ Left-out



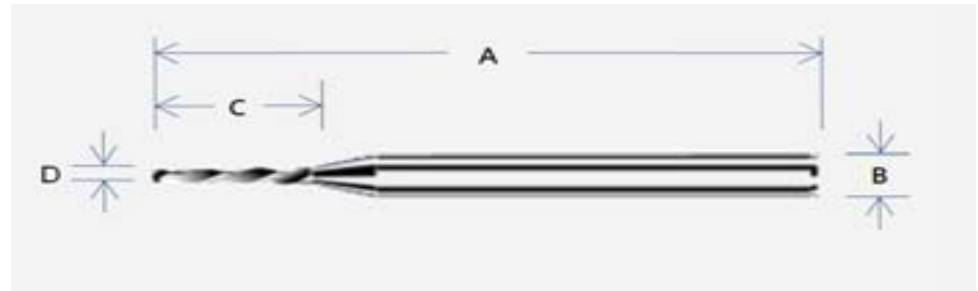
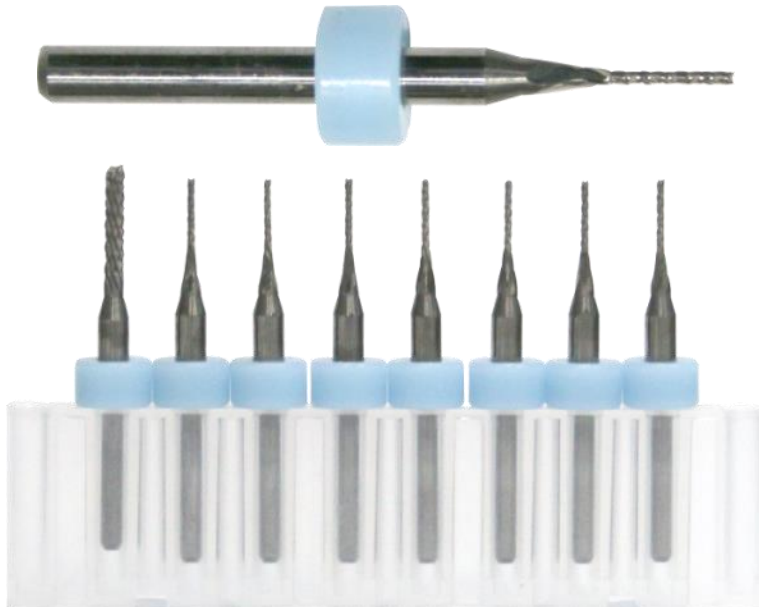
# Spindle & Motor

## SycoTec 4026 Spindle



Motor system : 3 phase asynchronous motor  
Speed range : 5,000~60,000 rpm  
Voltage : 30V  
Current : max. 8A  
Torque : 4.5 Ncm  
Frequency : 83~1,000 Hz  
Power : 265W  
Weight : 700g  
Bearing system : 2x Hybrid, 1 x Steel, lifetime lubricant  
Protection category : IP 20  
Working position : ←  
Load direction: axial ↕ radial  
Run-out (taper):  $\leq 1.5 \mu\text{m}$   
Cooling system : Self-ventilation fan  
Cooling via clamping bracket  
Housing material : Stainless steel

# Router bits



**Bit diameter**  
Ø 1 ~ Ø2 mm

LEFT HAND CUTTER

RIGHT HAND CUTTER

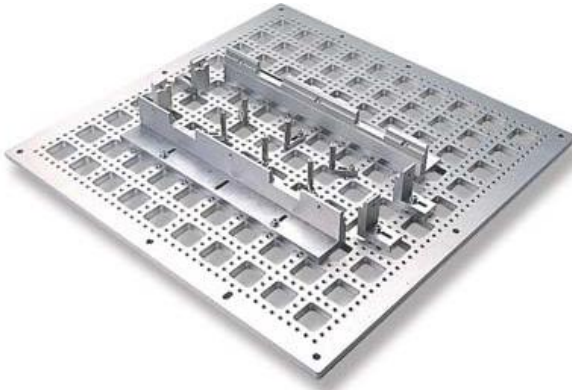


LEFT HAND SPIRAL

RIGHT HAND SPIRAL

Left-hand bit;  
Downward cutting;  
Carbide end mills  
Overall Length (A): 38.2 ±0.30 mm  
Shank Diameter(B): 3.175 mm  
Cutting Length(C): 6 ±0.50 mm  
Cutting Diameter(D): 1.00 1.20 1.50 1.60 2.00 mm

# Dedicated jigs



## Universal Jig

Suitable for various PCB sizes and shapes.



## Option: Specific Jig (Customized Jig)

Greatly improve the cutting stability and provide a precise cutting environment.

# Vacuum Cleaner



## YSF Series Dust Collector

YSF vacuum cleaner is designed for PCB Separator Series to collect the dust & scrap generated by router cutting. High horse power motor & high efficiency fan ensure the suction with excellent efficiency.

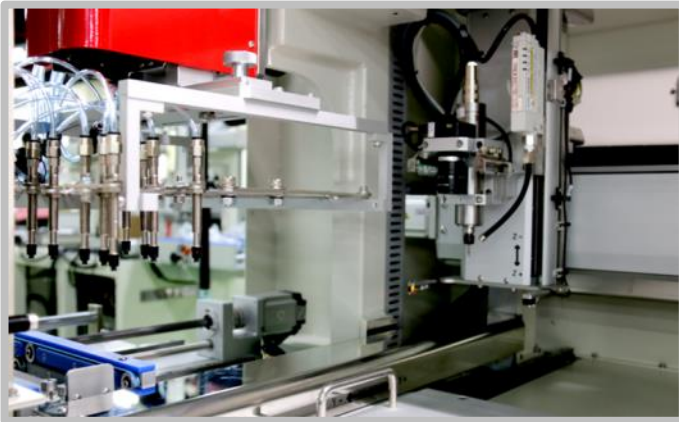
Type	YSF-V605
Dimensions (WxDxH)	780x665x1900mm
Weight	230 KGS
Power Supply	3 phase 50 Hz / 60 Hz 220 V
Motor Power	3.7 kw
Inlet Wind Speed	5HP
Inlet Wind Capacity	28 m/sec
Inlet Wind Pressure	40 m <sup>3</sup> /min
Inlet Diameter	300 mm-Ag
Outlet Diameter	150 mm
	203 mm

# Superb Product Features



## 1. Fully Automated Solutions

Not only is AUI series able to provide peak standard performance as fully Automated Solutions, but is also able to adjust according to our customer' s production line. We always take customer' s needs as our top priority and ensure every motion operated successfully.



## 2. Loading/Unloading System

During the up/unloading action, we provide either nozzles with various vacuum systems or customized nozzles and gripper to ensure every PCB transport in precision and safety.



# Superb Product Features



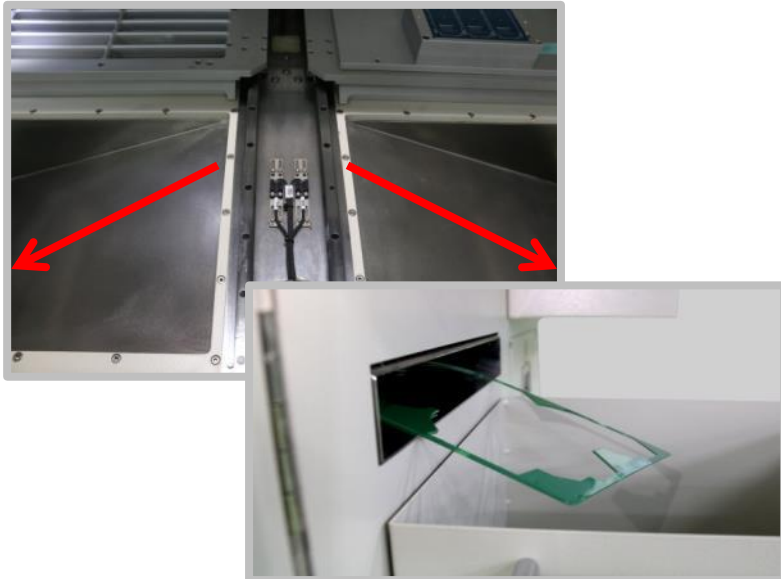
## 3. Dual Working Stations

The dual table design contains left & right working areas to take turns to implement cutting, picking, discharging, placing tasks, greatly increases production capacity.

Working area: 330\*350\*60mm \* 2 tables

## 4. Waste Ramp & Bins

After separated the PCB and disused board, the nozzle or gripper will drop the disused board to the waste sliding passage under the worktables, and the waste board will slide down to the waste bin on both sides.



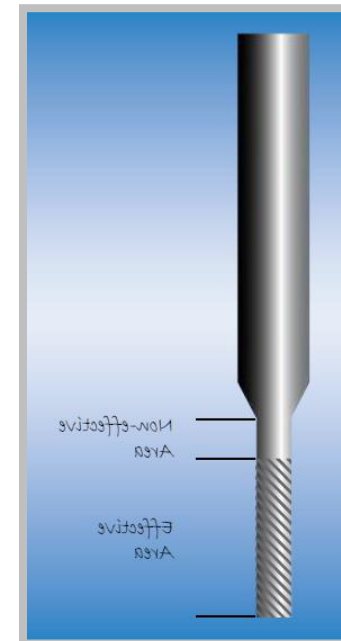
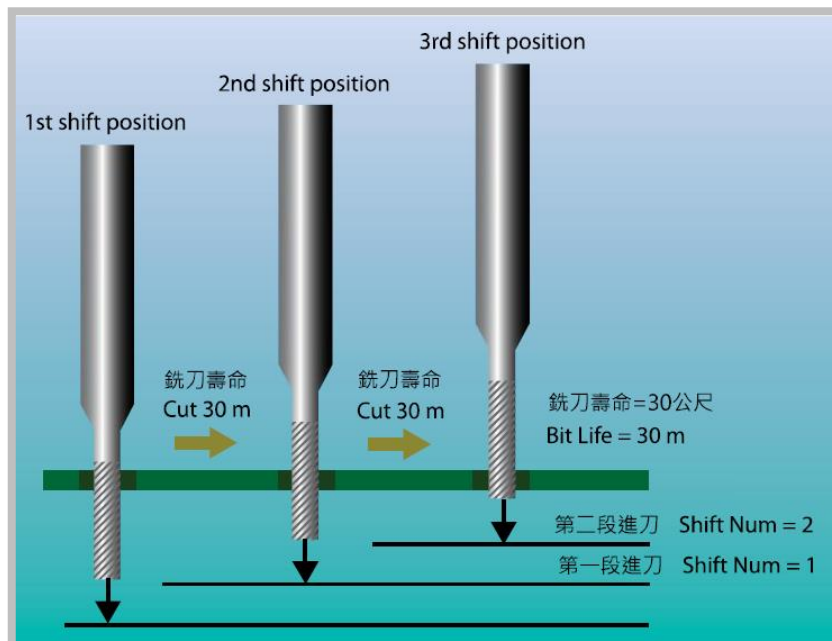
# Superb Product Features



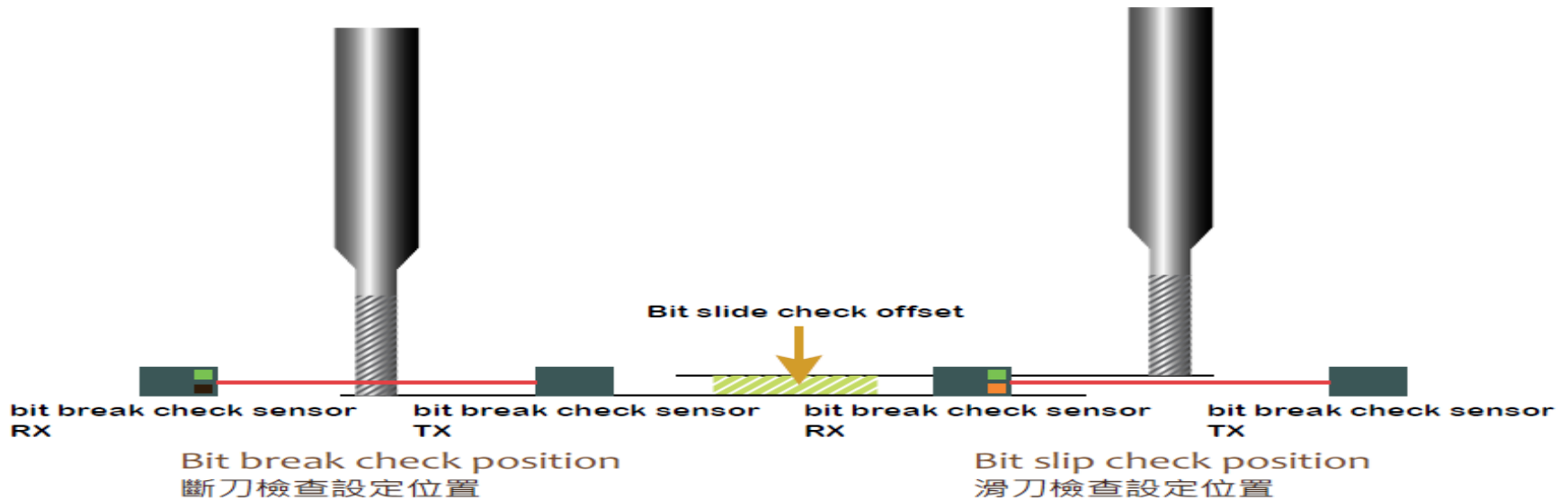
## 5. Maximum 9 Routing Bit Sectioning

The user can set the milling length of each cutting segment according to the PCB thickness, when the cumulative milling distance has been ran out, the Z axis will automatically drop to next cutting segment. °

Note: The viable number of section depends on PCB thickness and bit length.



# Superb Product Features



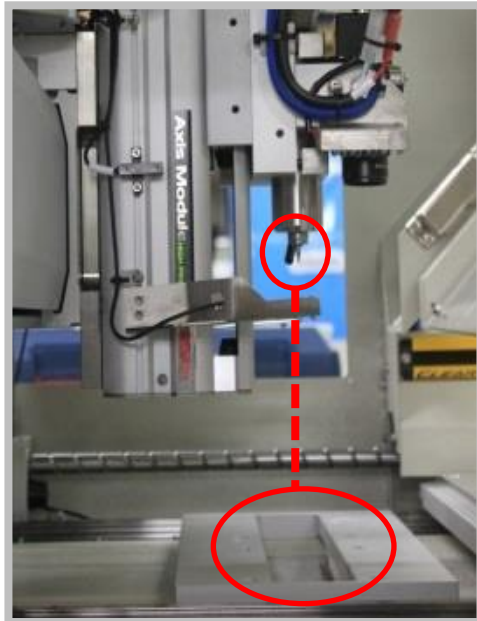
## 6. Bit break detection Sensor

During every routing task, the system detects any variable change of bit, and notices the user with alarm system.

## 7. Bit Slip Detection Sensor

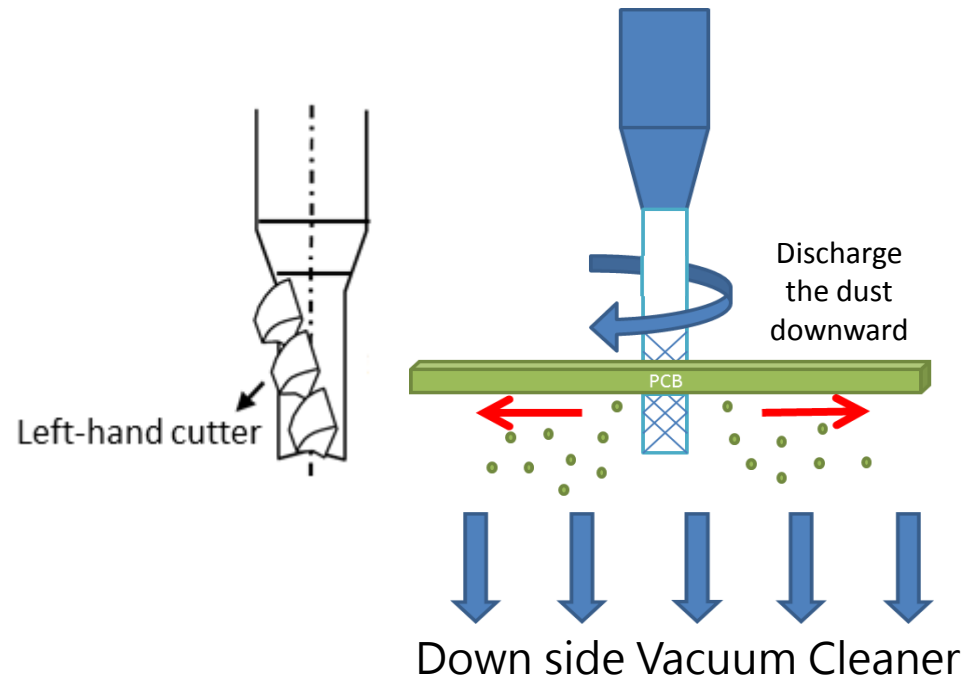
All of Aurotek machine equip with bit slip check in order to make sure the router bit is firmly held in place.

# Superb Product Features



## 8. Small Dust Orifice

The vacuum suction is just under bit cutting position, which focuses on the actual cutting area. Together with the use of ionizer that remove ESD during bit cutting, these enhance dust collection efficiency significantly.



# Superb Product Features



## 9. Graphical User Interface

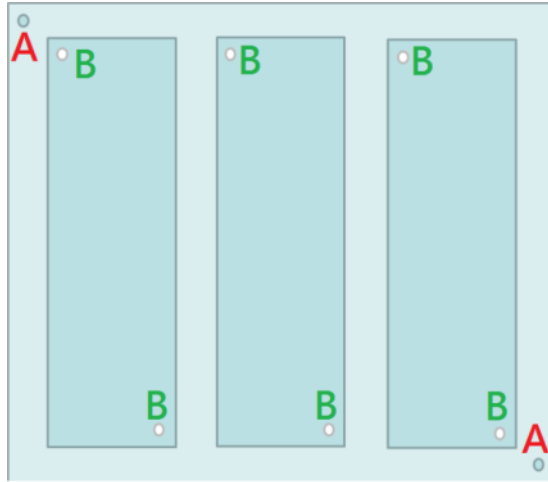
The user interface is Windows system, the CCD camera image helps the operator to edit the cutting program easier, accurate positioning and shortens the program editing time.



## 10. CCD image cutting path simulation

The CCD image can be used to confirm and simulate the cutting path, when doing cutting program editing, CCD image help to reduce error.

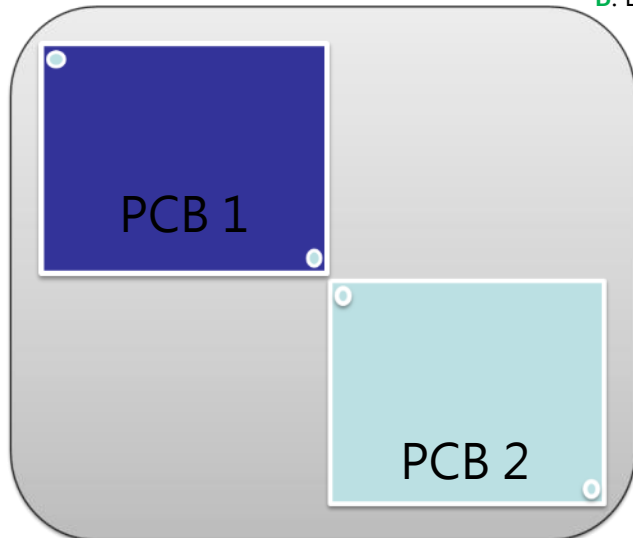
# Superb Product Features



PCB panel  
A: Main Fiducial Mark  
B: Local Fiducial Mark

## 11. Multiple Fiducial Mark Alignment

Fiducial marks are automatically checked before every cutting process. Should misalignment happen caused by any reason, cutting process will be stopped immediately with a machine alarm



## 12. Cutting Path Translation

By aligning the fiducial marks, our program enables cutting path translation to other identical PCBs. Saves time when setting up cutting path.

# Superb Product Features

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The screenshot displays two side-by-side control panels for 'Left Tool' (左治具) and 'Right Tool' (右治具). Each panel includes fields for 'Part Name' (工件名稱), 'Production Quantity' (生產件數), 'Cycle Time' (循環時間), and 'Cutting Segment Skip' (切割段跳躍). Below these are 'Position Offset' (位置差) fields for X1, Y1, X2, and Y2, and a 'Manual' (手動) section with a 'Retreat' (後退) button. The 'Processing Status' (加工狀態) is shown with four buttons: 'Standby' (待機), 'Processing' (加工中), 'Waiting for Processing' (待加工), and 'Attention' (注意).

Parameter	Left Tool (mark_L)	Right Tool (MARK_R)
工件名稱	mark_L	MARK_R
生產件數	6898 pics	6078 pics
循環時間	15.53 sec	7.38 sec
切割段跳躍	0	0
加工狀態	待機 加工中 待加工 注意	待機 加工中 待加工 注意

## 13. Production Information

Showing product name, produced quantity, cycle time, and etc.

The screenshot shows a control panel for 'Bit & Spindle Lifespan Management'. It features four main parameters, each with a numerical value, a unit, and a 'Reset' (歸零) button: 'Cumulative Cut Distance' (累積切割距離) at 0.49 m, 'Allowable Cut Distance' (容許切割距離) at 99.00 m, 'Automatic Tool Change Count' (自動進刀次數) at 0, and 'Spindle Rotation Time' (主軸轉動時間) at 28 h.

累積切割距離	0.49 m	歸零
容許切割距離	99.00 m	
自動進刀次數	0	歸零
主軸轉動時間	28 h	

## 14. Bit & Spindle Lifespan Management

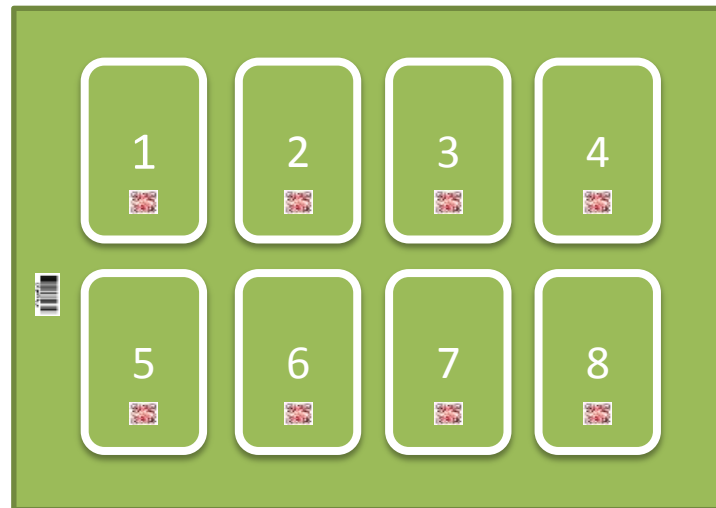
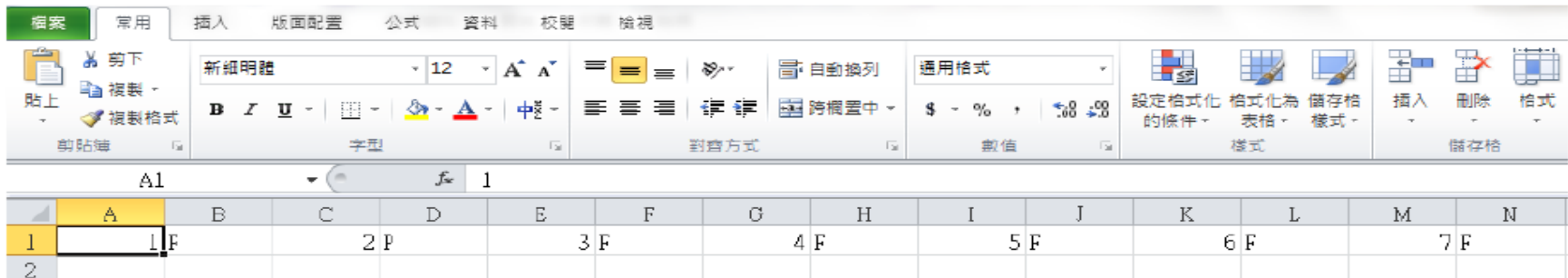
When cumulated cut distance reaches pre-set bit life, the program will give alert for bit change notification.

# Superb Product Features



## 15. Cutting section grouping (Group)

Each cutting segment can be grouped( as in the below, 1~8 blocks) and cut the selected blocks according to CSV file.



Remark: Will launch in Q3 2019.

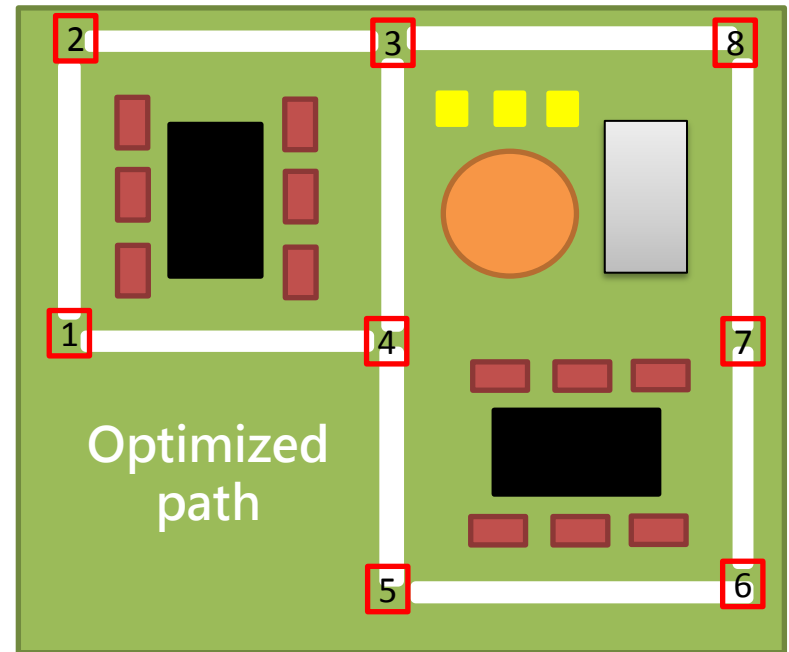
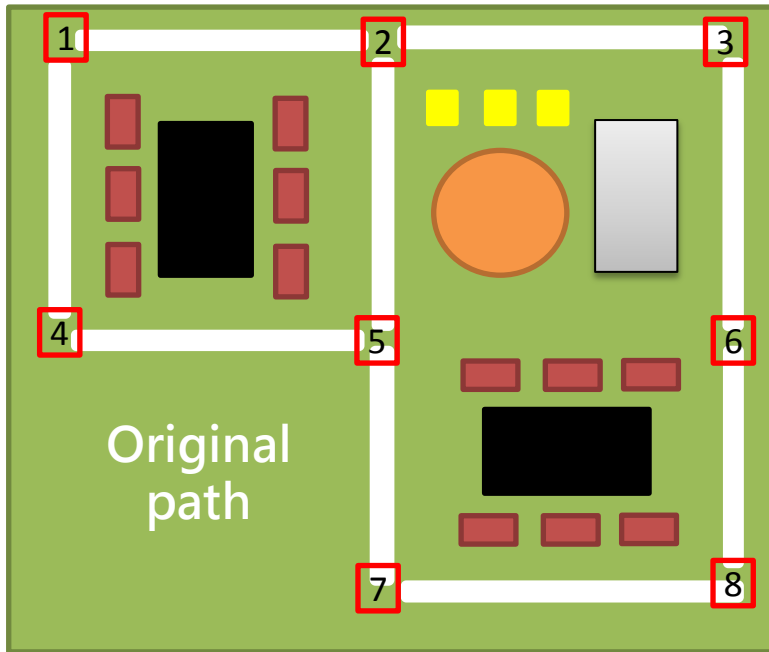


# Superb Product Features



## 16. Cutting path Optimization

Rearrange the cutting path to minimize the moving distance and effectively shorten the cycle time.



Remark: Will launch in Q3 2019.

# Superb Product Features



## 17. User Access Management

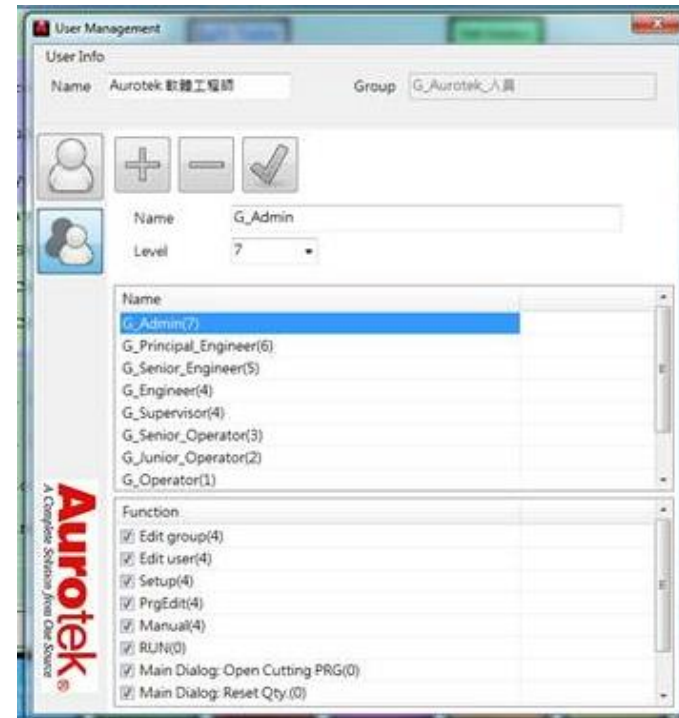
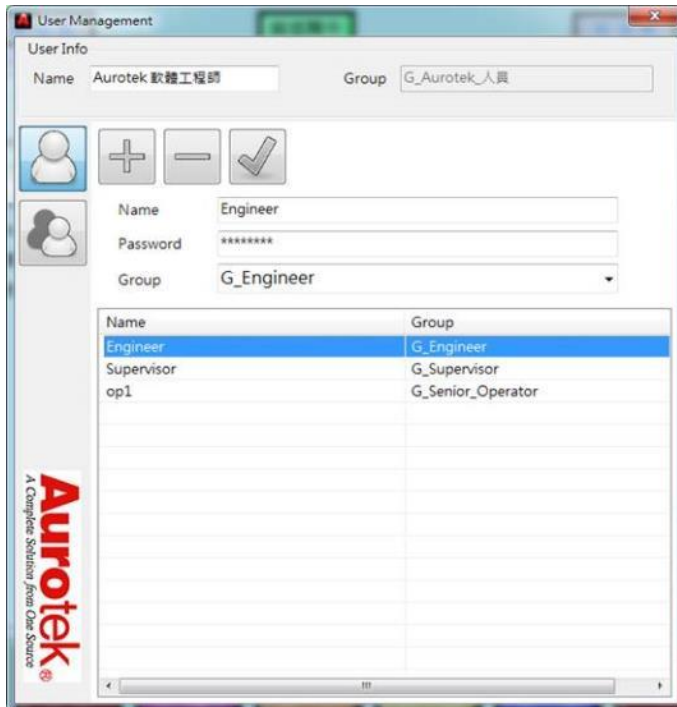
### A. Create users:

It's able to create user name & password, total 7 access levels.

the function can be set under the condition - level7 can set function for level 1~6

### B. Access level:

Total 7 access levels.



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Access level	User name	password	Access level description
Level 8	Aurotek	<del>XXXXXXXXXX</del>	Only available to Aurotek engineers
Level 7	Aurotek Customer Service	<del>XXXXXXXXXX</del>	The maximum permissions to edit all features
Level 5	Senior Supervisor	senaopz	Customer's highest permission, all functions and system setting are available.
Level 4	Supervisor	362951847	All functions are available EXCEPT system setting screen.
Level 1	op1	0000	Only allows to implement CCD RUN & Cutting task.

S330L Twin Slide Separator Ver 1.0.7.99 (Debug mode) (PRG 4 - 沢慈) (Current User: Senior Supervisor) Beta

左治具
路徑顯示
右治具
MAINTEN.

工件名稱 **test\_L** 開啟

生產件數 **7281** pics 歸零

循環時間 **19.63** sec

位置差 0.0

切割段跳躍 **0**

加工狀態: 待機 加工中 待加工 注意

手動 後退

工件名稱 **0925** 開啟

生產件數 **7007** pics 歸零

循環時間 **11.62** sec

位置差

切割段跳躍 **0**

加工狀態: 待機 加工中 待加工 注意

手動 後退

累積切割距離 **0.00** m 歸零

容許切割距離 **20.00** m 歸零

自動進刀次數 **0**

主軸轉動時間 **45** h

條碼

X 0.00 mm 歸零

YL 0.00 mm 歸零

YR 0.00 mm 歸零

Z 0.00 mm 歸零

緊急停止

空壓不足

門開啟

左區域感測器

右區域感測器

**Aurotek**  
A Complete Solution from One Source

測試

錯誤訊息

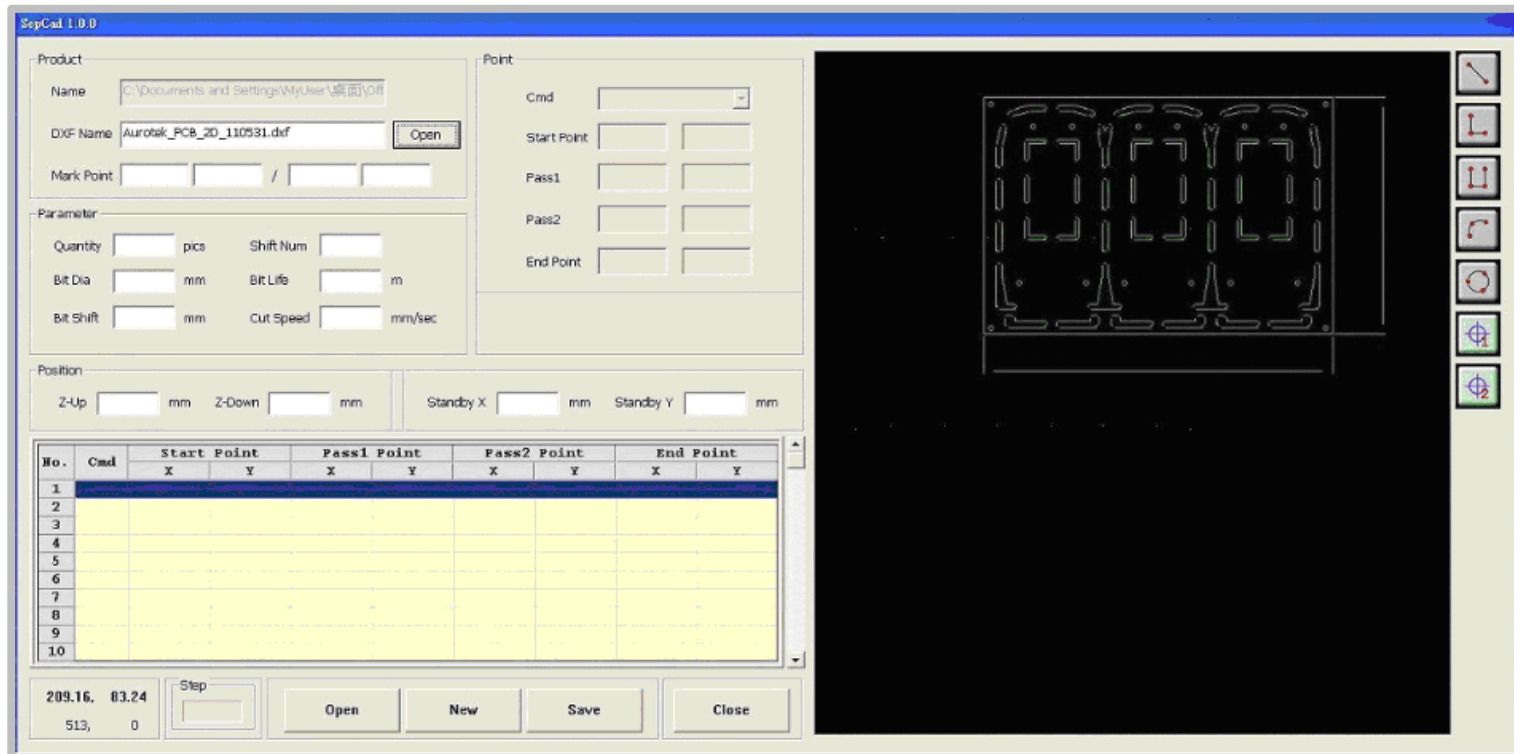
原點復歸
路徑模擬
單步模式
單步執行
程式編輯
換刀
設定
開機

# Superb Product Features



## 18. Off-line Editing Program

In response to Industry 4.0 era, users only need to upload AUTO CAD DXF to OFF-LINE EDITING PROGRAM, and use mouse to simply create cutting program. Then use USB storage device to save the edited program and upload to machine USB port. It is simple and efficient.

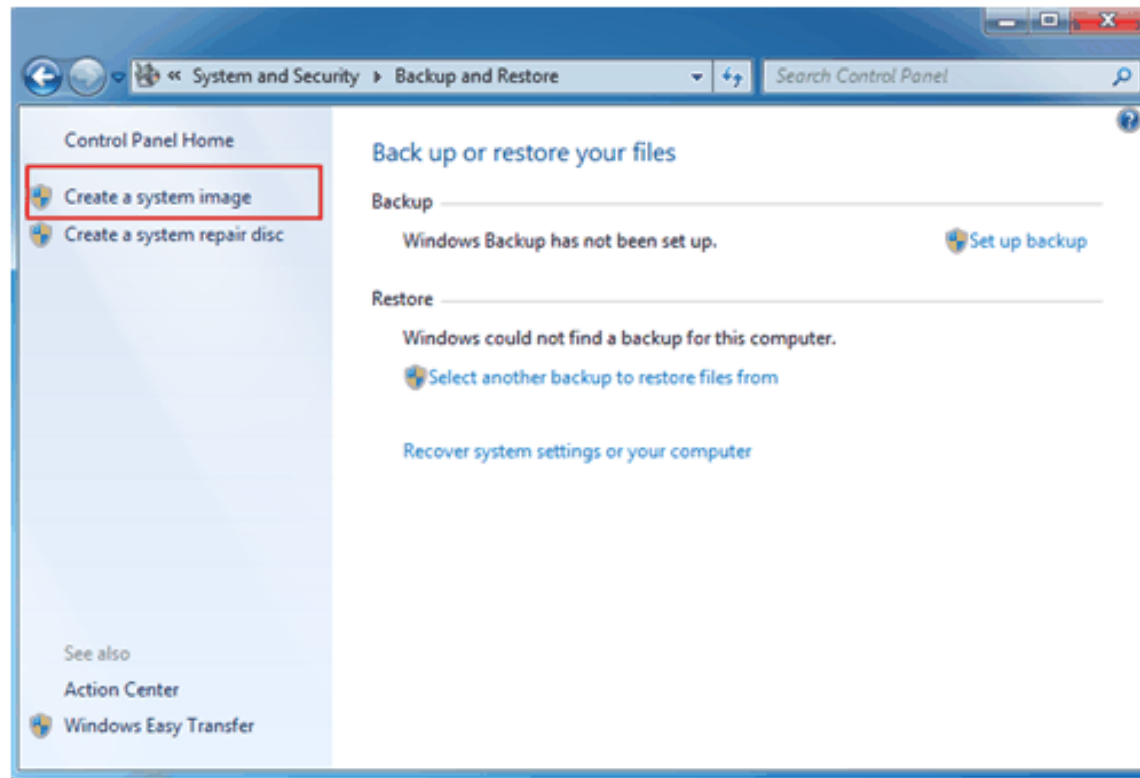


# Superb Product Features



## 19. System Backup Software

When the IPC is abnormal, the operating system and application can be reinstated to the backup system as factory mode.



# Option & Customized Solutions

## A. Aluminum Board Cutting

For cutting aluminum PCB panels, Aurotek suggests using higher power, lower rpm, and higher torque spindles.

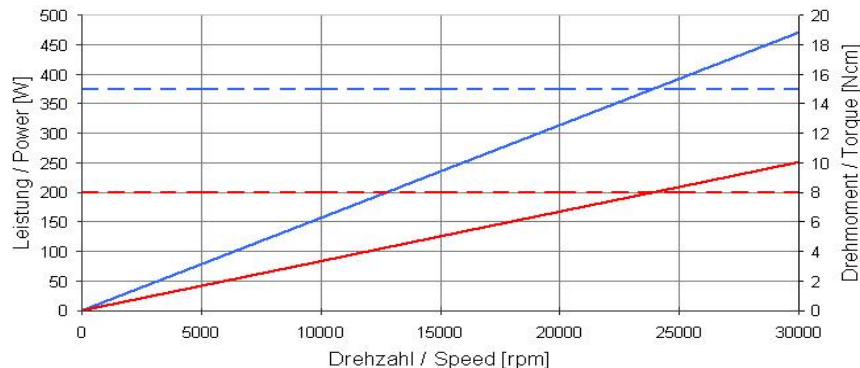


Spindle for Aluminum Board Cut System:  
**SycoTec 4025DC-T** 470W Max. 30,000rpm  
(Torque Max.15Ncm)



Routing Bit & Cast Alloys:

The Aluminum Association (AA) has adopted a nomenclature standard to wrought alloys. Please inform Aurotek aluminum alloy codes of MCPCB panel in order to get best cutting performance.



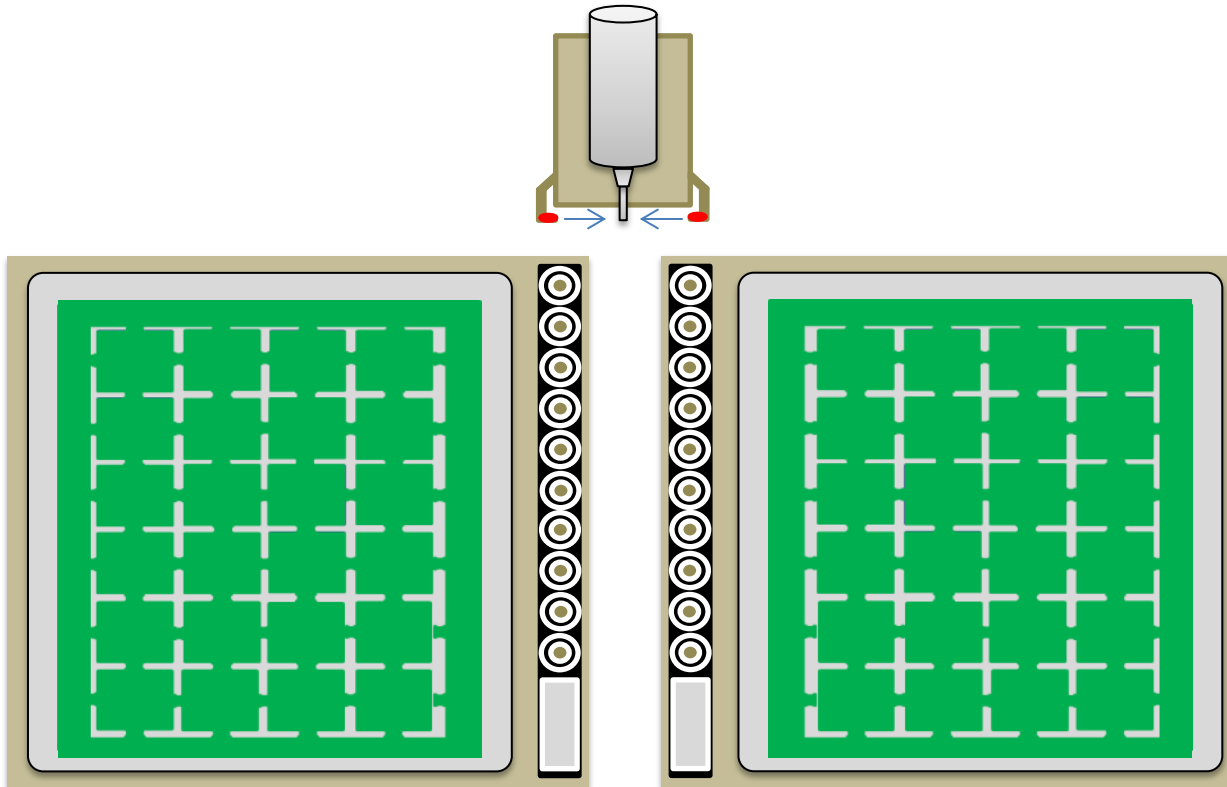
— max. - Leistung / Power  
— max. - Drehmoment / Torque  
— S1 - Leistung / Power  
— S1 - Drehmoment / Torque



# Option & Customized Solutions

## B. Automatic Bit Changer System

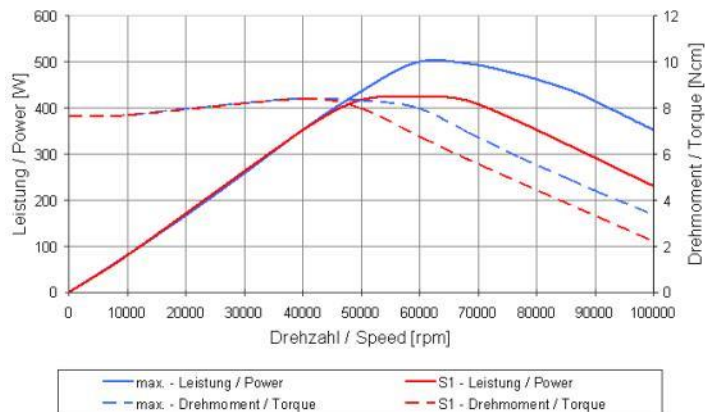
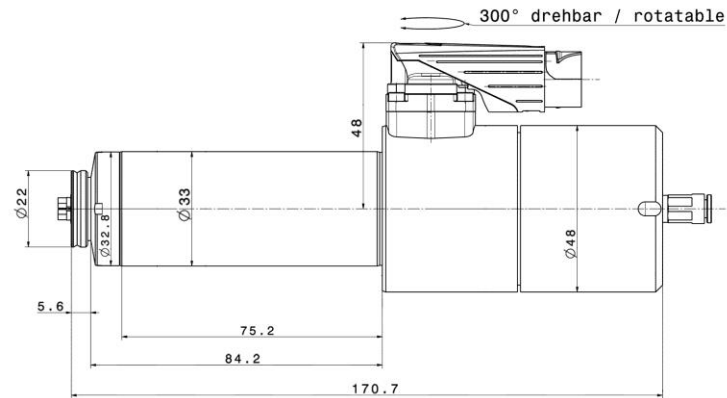
Automatic Bit Change System equips with SycoTec AP 008 ESD pneumatic spindle, when the router bit almost reaches its life time, the system will drop the bit which is implementing cutting task and automatically replace a new bit and continue the cutting process, this function reduces labor cost in the production line.



# Option & Customized Solutions

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## SycoTec AP 008 ESD Spindle



Motor system : 3 phase asynchronous motor  
 Speed range : 6,000~80,000 rpm  
 Voltage : 60V

Current : max. 8A

Torque : max. 8.4 Ncm

Frequency : 100~1333 Hz

Power : 500W

Weight : 1kg

Bearing system : 3x Hybrid, lifetime lubricant

Protection category : IP 55/57

Working position :

Load direction: axial  $\updownarrow$  radial

Run-out (taper) :  $\leq 1\mu\text{m}$

Cooling system : Cooling via clamping bracket

Housing material : Stainless steel

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# Option & Customized Solutions

## C. Linking Barcode Module & CIM / MES Function

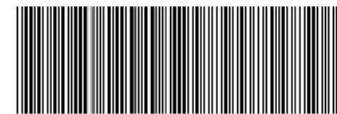
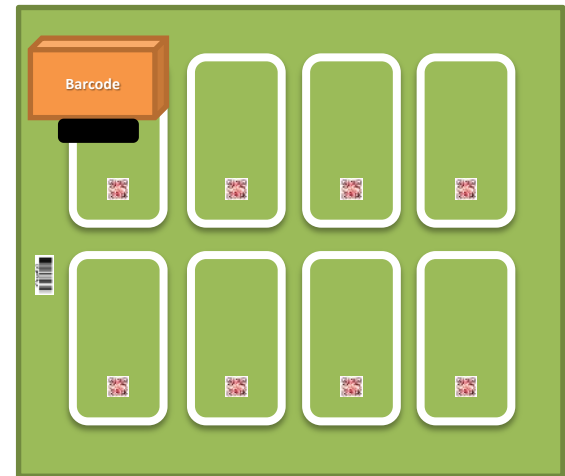
We provide software customized service to meet various production information needs in the market, instantly obtains the actual production status through the central monitoring system in order to provide the most appropriate schedule and production configuration accordingly.



Automatic :  
Cognex DM150Q



Manual :  
DENSO AT21Q-HM



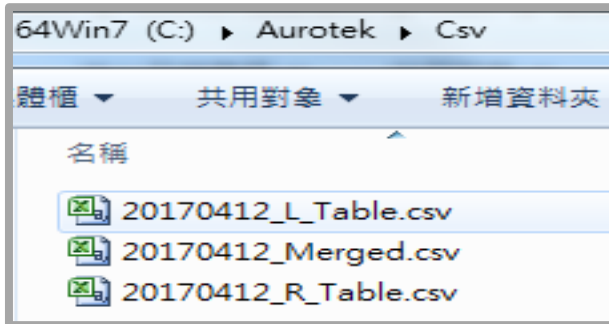
12345678avc



# Option & Customized Solutions

Production data can be automatically recorded and stored in the IPC.

Information such as Date, Time, Product Serial Number, Product Name, Production Quantity, Production Cycle time & Operator ID will be kept for future tracking by equip with Barcode reader & Software customization.



	A	B	C	D	E	F	G	H	I	J	K	L
	Date	Time	L PCB Board serial Number	L Product Name	L Qty.	L Cycle Time(sec)	Opeartor ID Number	R PCB Board serial Number	R Product Name	R Qty.	R Cycle Time(sec)	Opeartor ID Number
1												
2	2017/4/12	17:15:58	1	DEMOL1	29	18.13	9527	1	DEMOR1	1	9.98	9527
3	2017/4/12	17:16:17	1	DEMOL1	29	18.13	9453	1	DEMOR1	2	13.36	9453

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## D. Central-Monitoring System

To integrate the production information and build up a central controlling system which can realize resource sharing, mutual transmission and mutual monitoring.

The screenshot displays the Advantech ViewDAQ 001 software interface. The main dashboard features a row of status indicators for different equipment units: 'Line' (pink), '正常運行' (Normal Operation, green), '故障' (Fault, red), and '未連線' (Not Connected, grey). Below these, a row of equipment units is shown with status icons: 'iii' (grey), 'AP02' (grey), 'Aurotek' (green), 'AP04' (grey), 'AP05' (grey), 'AP06' (grey), 'AP07' (grey), 'AP08' (grey), 'AP09' (grey), and 'AP10' (grey). A table titled '設備報警訊息顯示' (Equipment Alarm Message Display) is visible, showing a list of alarm messages with columns for '日期' (Date), '時間' (Time), '設備編號' (Equipment ID), and '警報信息' (Alarm Message). The table shows that the 'Aurotek' unit (Aurotek03) is currently in a 'no' (normal) state, while all other units show an asterisk (\*) indicating an alarm or error. The interface also includes a menu bar, a toolbar, and a status bar at the bottom showing 'main.bgr' and the time '17:58:10'.

日期	時間	設備編號	警報信息(當正常運行時將顯示no並亮綠燈，反之則紅燈列錯誤訊息)
2018-01-16	17:58:11	iii	*
2018-01-16	17:58:11	AP02	*
2018-01-16	17:58:11	Aurotek03	no
2018-01-16	17:58:11	AP04	*
2018-01-16	17:58:11	AP05	*
2018-01-16	17:58:11	AP06	*
2018-01-16	17:58:11	AP07	*
2018-01-16	17:58:11	AP08	*
2018-01-16	17:58:11	AP09	*
2018-01-16	17:58:11	AP10	*

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F. UPS System for IPC

G. Spindle Rpm Digital Adjustment

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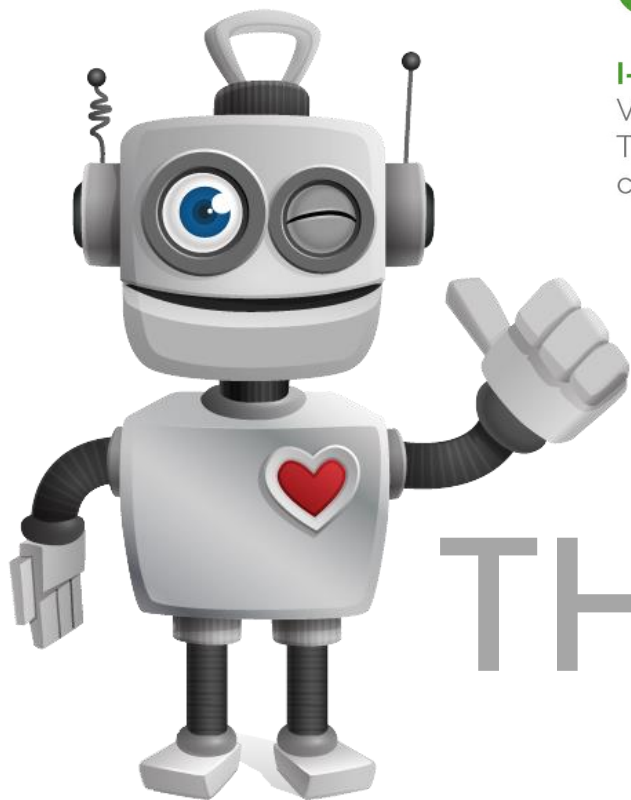
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