



## Hybrid Placement & Insertion System

# MAI Series

### Machine Definition

- MAI Series, which was launched in 2016, brought radical innovation to the manufacturing industry by automating insertion of PTH components, which previously had to be inserted manually by hand.
- Mirae offers optimized solution for automated insertion of various PTH, odd-shape components through precision head up to 12 axis, vision camera, ZHMD, and laser vision.

### Advantages

- Component inspection with Vision Camera
- Component height inspection with Z Height Measurement Device (ZHMD) after placement
- Up to 12 axis precision head optimized for inserting various odd-shape components
- Detects and compensates position of PCB mark through head camera
- Laser vision allows to precise inspection of the leads on PTH, odd-shape components



## Option II

### Auto Clinching Conveyor



### Auto Clinching Conveyor

- After component insertion, lead bending function applies to radial and axial components
- Fast motion speed through 5-axis application
- Integrated conveyor structure

### LV (Laser Vision)



### Rear Vision (FOV36mm 2H Camera)

- Laser Vision enables precise inspection of leads that are difficult to distinguish by the camera
- Recognizing shapes of components by applying laser integrated with optical triangulation method
- Cradle type and embedded type are available
- Applies two different inspection angles in order to improve lead inspection accuracy
- Inspection time: 25 (ms) [2P DIODE]

## Applicable Components

### Connectors



### Relays



### ICs



### Transformer Coils



### Odd-shape Components



## Feeder Types

Tape Feeder (8mm ~ 88mm)		
Tape Feeder (8mm ~ 88mm)	1 level ~ 3 levels	4 levels ~ 5 levels
Tray Feeder		
MTF	TF5, SLTF	DLTF
Radial, Axial, Label, and Stick Feeders		
Radial & Axial Feeders	Label Feeder	Stick Feeder

## Feeder Quantities

Base	Reel			Stick	Tray				Bowl	
	SMT Tape(8mm)	Axial	Radial	Multi stick	MTF	TF5	SLTF	DLTF	1 Lv.-3Lv.	4 Lv.-5 Lv.
Front	60	8	8	8	2	-	-	-	2	2
Rear	60	8	8	8	2	1	1	1	2	2

## Nozzle Types

### A. Connector Nozzles

QP C-S0A-1	QP C-S0A-2	QP C-S0A-3	QP C-S0B-1	QP C-S0B-2	QP C-S0B-3	QP C-S0B-4	QP C-S0B-5

### B. Gripper Nozzles

QP G2	QP G3	QP G4	QP G5	QP G7	QP G8	QP G9	QP GA

### C. Pad Nozzles

QP P2-1	QP P2-1-S01	QP P2-1-S01-1	QP P2-1-S02	QP P2-1-S03	QP P2-1-S04

\* In addition to the above samples, Mirae has varied nozzles for odd-shaped components

## Option I



### ZHMD (Z Height Measuring Device)

- Improves quality and eliminates placement defects by measuring component height
- Automatic measurement of component pick-up height
- Auto height compensation by measuring PCB warpage
- Placement defect prevented by measuring height of component after the insertion



### Rear Vision (FOV36mm 2H Camera)

- Optimal component placement based on identifying different shape of each component
- Increasing productivity by supporting camera in the rear feeder area in case that feeders are installed on the rear side

# MAI Series



## MAI Series Specifications

Item		MAI-H4T/H4T2	MAI-H4ST	MAI-H6T
Performance Optimal Condition	Module	17,000 CPH(0.21sec/chip) 11,500 CPH(0.31sec/chip)	17,000 CPH(0.21sec/chip)	17,000 CPH(0.21sec/chip)
	QFP	9,000 CPH(0.40sec/chip)	9,000 CPH(0.40sec/chip)	11,500 CPH(0.31sec/chip)
Performance IPC-9850 Standard	Module	12,500 CPH(0.29sec/chip) 10,500 CPH(0.34sec/chip)	15,000 CPH(0.24sec/chip)	13,500 CPH(0.27sec/chip)
	QFP	7,500 CPH(0.48sec/chip)	7,500 CPH(0.48sec/chip)	9,000 CPH(0.4sec/chip)
Placement Accuracy	Module (3σ)	±0.050mm		
	QFP (3σ)	±0.035mm		
Number of Precision Head		4 Precision Head (H4T2 100W Z-Axis Motor)	4 Precision Head	6 Precision Head
Component Size		0603 ~ 50 × 50mm, 90 × 30mm		
PCB Size (L x W x T)	Standard	700 x 510 x 5.0mm 640 x 510 x 5.0mm	700 x 330 x 5.0mm	600 x 510 x 5.0mm
	Minimum	75 x 50 x 0.4mm 50 x 50 x 0.4mm (Option)		
Maximum Number of Tape Feeders (8mm)		60EA 120 EA (60x2) Option		
Feeder	Tray	TF5(20 pallets) SLTF(10 pallets) DLTF(35 pallets)	TF5(20 pallets) SLTF(10 pallets)	TF5(20 pallets) SLTF(10 pallets) DLTF(35 pallets)
Component Height		55mm		
Power Requirement		3 phase 200 / 208 / 220 / 230 / 240 / 380 / 400 / 415 / 430 [V], 50/60Hz		
Air Pressure		0.55Mpa		
Machine Size (W x D x H)		1,580 x 2,090 x 1,560mm	1,580 x 1,700 x 1,560mm	1,580 x 2,090 x 1,560mm
Machine Weight		Approx. 2,000Kg	Approx. 1,800Kg	Approx. 2,000Kg

	MAI-H6ST	MAI-H8T	MAI-H12T
	17,000 CPH(0.21sec/chip)	30,000 CPH(0.12sec/chip)	33,000 CPH(0.11sec/chip)
	11,500 CPH(0.31sec/chip)	21,000 CPH(0.17sec/chip)	23,000 CPH(0.15sec/chip)
	13,500 CPH(0.27sec/chip)	17,000 CPH(0.21sec/chip)	18,500 CPH(0.19sec/chip)
	9,000 CPH(0.4sec/chip)	11,000 CPH(0.33sec/chip)	12,000 CPH(0.30sec/chip)
	±0.050mm		
	±0.035mm		
	6 Precision Head	8 Precision Head	12 Precision Head
	0603 ~ 50 × 50mm, 90 × 30mm		
	600 x 330 x 5.0mm	700 x 510 x 5.0mm	600 x 510 x 5.0mm
	75 x 50 x 0.4mm 50 x 50 x 0.4mm (Option)		
	60EA 120 EA (60x2) Option		
	TF5(20 pallets) SLTF(10 pallets)	TF5(20 pallets) SLTF(10 pallets) DLTF(35 pallets)	TF5(20 pallets) SLTF(10 pallets) DLTF(35 pallets)
	55mm		
	3 phase 200 / 208 / 220 / 230 / 240 / 380 / 400 / 415 / 430 [V], 50/60Hz		
	0.55Mpa		
	1,580 x 1,700 x 1,560mm	1,580 x 2,090 x 1,560mm	1,580 x 2,090 x 1,560mm
	Approx. 1,800Kg	Approx. 2,100Kg	Approx. 2,100Kg

\*1. TF5 : Automatic Tray Feeder (20 slots, 330 x 220mm) \*2. SLTF : Single Large Tray Feeder (20 slots, 420 x 290mm)

\*Above Specifications are subject to change without notice

\*3. DLTF : Dual Large Tray Feeder (70 slots, 420 x 290mm) \*4. MAI-H4T2 can be used as Fuse Insertion Machine by changing conveyor