



ATMAOE PC66 / PC68

Fully Automatic CCD Registering PCB Screen Printer




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Bringing Print to Life

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⊕ APPLICATION :

Specialized for printing Legend or PSR (photo-imageable solder resist ink) on rigid printed circuits board.

⊕ FEATURES :

Consisted of Inlet, CCD registering, Printing and Outlet section. Substrate is flowed from Left to Right side by central shuttle table to attain fully automatic connection.

FRAMEWORK STRUCTURE

- ◆ **Robust Framework** : adopted high strength H-type steel structure welded + tempering treatment, equalized stress to minimize strain.
- ◆ **High Precision** : Datum plane for assembly bonding is refined by machining, assure guide rails to get mounted in parallel precision.
- ◆ **Optimal Rustproof** : Metal surface is treated by skin film treatment + static powder coating, durable not falling off.

Inlet Section Structure

- ◆ **Inlet Conveyor Belt** : Equipped with leveling conveyor belt to deliver the incoming material to registration platform.

Pre-registration Structure

- ◆ **Flattening Structure** : Six registration pins for edge alignment and push PCB into center, then flattening PCB to facilitate CCD to detect registration mark accuracy.
- ◆ **Substrate Flattening** : Three sets of flattening rod can be adjusted in according to substrate size, right left adjustment to move position, spring is added to attain equalizing flattening.

CCD Registering Structure

- ◆ **Image Registering** : Two sets of CCD camera to detect fiducial mark or hole image on substrate, and calculated deviation volume for control system, X/Y servo driven system transmit table (with substrate on top) to precise position.
- ◆ **Laser Pointer** : Pneumatic control locking / unlocking CCD camera, quick move positioning and manual fine adjustment front back / right left position to coordinate with Laser pointer to attain fast and precise position.

Registration Platform Structure

- ◆ **Refined Table Top** : Registration table is made of thick Aluminum alloyed plate with machining and hardness anodized treatment, excellent scratching proof effect and extreme flatness leveling to achieve printing uniform layer.

- ◆ **Upgraded Accuracy** : Registration platform adopts three sets of servo motor to control X-X-Y direction, using image system identifies to control table displacement volume. High precise transmission structure to assure registering repeatability accuracy.

Center Sliding Table Structure

- ◆ **Reciprocation Transfer** : Shuttle table is transmitted by servo moto + tooth belt to transfer fast and stable.
- ◆ **Servo Motor** : Servo motor possesses self-position control and torque control, assure shuttle table reciprocation precise positioning.
- ◆ **Vacuum function** : Equipped vacuum function to hold down substrate during transportation to prevent substrate displacement while transportation.

UP DOWN STRUCTURE

- ◆ **Stable Up Down** : Adopts German Gear Reducer to coordinate with servo motor + double chain to transmit four-post synchronously (printing level / stand-by level / screen cleaning level), position accuracy attains $\pm 0.05\text{mm}$.
- ◆ **Four-post Air Locking** : Equipped with unique four-post air locking function (while printing), assure printing stroke parallel with table to increase printing accuracy.

Printing Carriage Structure

- ◆ **Servo Motor Straightforward Transmission** : Error free, solid printing torque, digital control, full stroke stable speed motion.
- ◆ **Equalizing Pressure Control** : Squeegee (3_98 kgf) / flood coater (3-62 kgf) digital equalizing pressure system control, enable to set pressure individually on touch-screen.
- ◆ **Delay Printing** : Initial printing stroke (0~200 mm digital setting), squeegee presses with light pressure, then shifts to the preset pressure printing, enable to avoid concerns and prevents to damage mesh and squeegee.
- ◆ **Guide Rail Mounted Inside Dust-proof** : Precise linear guide rail is protected by high rigid Aluminum extrusion profile against dust and contamination.
- ◆ **Printing Uniform Layer** : Squeegee / flood coater adopts guide rail cylinder to increase accurate linear motion, leading precision and smoothness to make equalizing air pressure to present completely printing on substrate, assure consistency of printing uniform layer.

Peel-off Structure

- ◆ **Patented Leveling Adjustment Knob** : Front and back end of right / left holder are equipped height adjustment knob for quick calibrating screen leveling at four corners.

- ◆ **Screen Frame Micro Adjustment** : Screen X/Y/θ three point micro-adjustment structure is designed in according to precise smooth double frame and coordinate with position indicator, original coordination indication, etc.
- ◆ **Servo Synchronism Peel-off** : Automatic calculating synchronism with printing speed, digital setting peel-off height and start point, printing is not sticky mesh, enables to compensate screen precision.
- ◆ **Frame Air Locking** : Frame adjustment operating easy and fast, screen frame, right left holder, frame carrier adopts air locking, equipped with check-valve to sustain locking long time.

Outlet Structure

- ◆ **Outlet Conveyor Belt** : Equipped with outlet conveyor belt to put the incoming material to Dryer.

Control System

- ◆ **Digitalized Control** : Adopted 10.1 inch colored touch-screen to set versatile operational function and parameters, enables to save and retrieve quickly to attain digitalized control printing quality.
- ◆ **Module Expansion** : Adopted the advanced controller with high compatible to facilitate expansion and simply maintain the program.
- ◆ **Standardized Management** : 100 groups memory module can be named and numbered individually, quick save and retrieve to facilitate standardized management each different production processing.
- ◆ **Error Display** : When control system error is occurred, error message will be displayed on touch-screen for quick trouble shooting.

All transmission system are considered digitalization, allocated top class to reduce setting time and easy operation to raise productivity, also error proof and dummy proof to last long run operation, attains the highest requirement for digitalized processing, standardization and security, every transmission system are :

- ❖ **Seven Sets Servo Motor** : Shuttle table right left movement (1 set), peel-off up down (1 set), printing head forth/backward (1 set), X/X/Y axis CCD movement (3 sets), Printing up down (1 set).
- ❖ **1 set Digital Control Equalizing Air Pressure** : Squeegee / flood coater pressure uses one set commonly, professional loop design, automatic switch.
- ❖ **Advanced PLC** : Chain locking every digital control transmission / control system mentioned above, several groups of input / output point are reserved to integrate connecting with up / downstream work station.
- ❖ **Operational Interface Adopts Colored Touch-screen HMI** : Provides convenience for instant operation and setting diverse parameters, display delicate control. Setting 100 groups of operational mode memory, only press several switches easily to save and retrieve the setting mode. This is another advantage to reduce setting time.

Safety Protection

- ◆ **Automatic Air Pressure Detection Switch** : Air source pressure insufficiency stops machine warning, assure all printing to be done under sufficient air pressure to raise printing yield rate.
- ◆ **Safety Raster** : When screen descends, if foreign object invasion into printing area is detected, screen rises to protect operator safety.
- ◆ **Three Color Warning Lamp** : Correctly indicates machine operating status to facilitate operator handling.
- ◆ **Emergency Stop Switch** : Whole machine is enclosed 3 sets E-stop switch, encountered emergency status to press E-stop switch, immediately activates safety loop to stop machine, internal power is shut off and need to re-start, attains intensive safety protection.
- ◆ **Safety Loop** : Error or malfunction is occurred upon setting or operating, error message will be displayed onto touch-screen and stop machine immediately, attached with safety restoration button.

Visual System :

CCD visual registering system is adopted IPC + Windows advanced program to drive three axis servo registering system, fast and precise registration. Operation interface adopts color LCD display.

1. Purpose : Use CCD optical magnifying the registration mark, analysis and comparison to attain high resolution, image resolution capacity attains 0.4 μ m, coordinate with X/Y servo motor, automatic precise registering to achieve accuracy 5 μ m, table movement fast and precise.

2. Characteristic : (1) Provides proper visual light source (white ultra illuminant LED)

(2) Field of View : FOV 13 X 10 view depth 0~6mm ◦

(3) Shape of registration mark is not restricted, enable to track trace.

(4) Enable to select edge alignment, not use CCD registering.

(5) Regular target can be registered completely within 1 second

(6) Use professional screen, tempered glass, acid-base resistance, temperature resistance, anti-interfere, long life time, certain contrast.

3. Function :

(1) Attains purpose of precision and quick registration, low failure rate.

(2) Production management requires records, internet linkage to remote long distance save and retrieve.

SPECIFICATION :

	ITEM	SPECIFICATION	ATMAOE PC66	ATMAOE PC68
Substrate	1	Substrate thickness	0.3~3.5mm	0.3~3.5mm
	2	Substrate weight	<2.5kg	<2.5kg
	3	Max. printing size	640*640mm	760*760mm
	4	Min. printing size	300*260mm	350*350mm
General Specification	5	Machine size	3350(L)*1700(W)*1800(H)mm	3860(L)*1900(W)*1800(H)mm
	6	Machine weight	2,250 kgs	2,920 kgs
	7	Workflow direction	Standard Left-in & Right-out	Standard Left-in & Right-out
	8	Productivity (non-stop full speed full stroke)	540 P/H	450 P/H
	9	Air pressure source	5~7 kg/cm ²	5~7 kg/cm ²
	10	Air exhaustion	90 L/min.	70 L/min.
	11	Power source	3-phase, 220/380V, 50/60Hz	3-phase, 220/380V, 50/60Hz
	12	Power consumption	5KW(10.2A)	5KW(10.2A)
Screen & frame holder Structure	13	Max frame O/D size	1100*1100mm	1300*1300mm
	14	Min frame O/D size	900*900mm	900x900mm
	15	Frame height	24~42mm	24~42mm
	16	Micro adjustment X-axis	±10mm	±10mm
	17	Micro adjustment Y-axis	±10mm	±10mm
	18	Micro adjustment Z-axis	±2mm	±2mm
	19	Frame locking	by cylinders and screw bolts	by cylinders and screw bolts
	20	Peel-off driving	by servo motor	by servo motor
	21	Peel-off height	25 mm	25 mm

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Screen up down Structure	22	Screen up & down	driven by servo motor + reducer + chain	driven by servo motor + reducer + chain
	23	Screen at cleaning height	350 mm	350 mm
	24	Screen at stand-by height	60 mm	60 mm
	25	Delay off-contact	0~9.9 sec	0~9.9 sec
	26	Repeatability accuracy of screen down at printing level	±0.05 mm	±0.05 mm
	27	Space between Screen & table (adjustable)	0~30 mm	0~30 mm
Printing Transmission Structure	28	Printing direction	from Back to Front	from Back to Front
	29	Printing head transmission	Servo motor + gear reducer + timing belt	servo motor +gear reducer + timing belt
	30	Printing speed	20~625 mm/s	20~625 mm/s
	31	Flood coater speed	20~625 mm/s	20~625 mm/s
	32	Printing stroke	0~750 mm	0~960 mm
	33	Offset printing	0~200 mm	0~200 mm
	34	Printing stroke while using maximum swivel angle at 5°	0~580 mm	0~830 mm
	35	Gear reduce ratio	1:20	1:20
Printing Head Structure	36	Squeegee holder type	H-type with 9mm slot	H-type with 9mm slot
	37	Flood coater type	M-type	M-type
	38	Printing head swivel angle	±5°	±5°
	39	Flood coater skew angle	20±10°	20±10°
	40	Squeegee skew angle	45±5°	45±5°
	41	Adjustable printing depth	0~12 mm	0~12 mm
	42	Squeegee cylinder type	Guided rail cylinder	Guided rail cylinder
	43	Squeegee printing pressure	3~98 kgs	3~98 kgs
	44	Flood coater cylinder spec.	Guided rail cylinder	Guided rail cylinder
	45	Flood coater printing pressure	3~62 kgs	3~62 kgs

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Inlet first positioning structure	46	Initial positioning	by 6 pins for edge registration	by 6 pins for edge registration
	47	Initial positioning pin adjustment range	300x260 ~ 610x610 mm	350x350 ~ 760x760 mm
	48	Initial positioning pin adjustment way	by hand wheel + screw rod+ transducer for position feedback	
	49	Initial positioning pin	driven by Guided rail cylinder (X/X/Y)	driven by Guided rail cylinder (X/X/Y)
	50	Central flatten	Guided rail cylinder	Guided rail cylinder
	51	Central flatten width adjustment range	250 ~ 440 mm	310 ~ 560 mm
Inlet/outlet conveyor structure	52	Inlet/outlet belt height	972+30 mm	972+30 mm
	53	Conveyor mode	Flat conveyor belt	Flat conveyor belt
	54	Inlet/outlet conveyor belt lifting height	972+30 mm / 942+30 mm	972+30 mm / 942+30 mm
	55	Conveyor belt speed adjustment range	50 ~ 1000 mm/sec	50 ~ 1000 mm/sec
	56	Conveyor belt max. load weight	4.0 kgs	4.0 kgs
Printing table structure	57	Inlet/outlet printing table vacuum area	640*120 mm	740*200 mm
	58	Vacuum hole diameter	Ø2.0 mm	Ø2.0 mm
	59	Inlet/outlet printing table lifting position	932 / 972 mm	932 / 972 mm
	60	Inlet printing table lifting	driven by stepping motor + screw rod + connecting rod	driven by Stepping motor + screw rod + connecting rod
	61	Substrate clamp	driven by stepping + screw rod + cylinder	driven by stepping + screw rod + cylinder
	62	Clamping axis & quantity	dual cylinder at X&Y / 4pcs	dual cylinder at X&Y / 4pcs
	63	Clamping thickness	0 ~ 4.0 mm	0 ~ 4.0 mm
	64	Clamping moving stroke	300 ~ 610mm	350 ~ 760mm
	65	Clamping resolution	0.015 mm	0.015 mm

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Shuttle table transmission Structure	66	Shuttle table back & forth distance	1160 mm	1350 mm
	67	Shuttle table	driven by servo motor + timing belt	driven by servo motor + timing belt
	68	Shuttle table back & forth registration	servo torque control	servo torque control
	69	Shuttle table back & forth registration accuracy	0.005 mm	0.005 mm
	70	Shuttle table back & forth time	0.8 sec	1.5 sec
Printing table structure	71	Printing table size	800*850 mm	950*1050 mm
	72	Printing table vacuum area	620*620 mm	740*740 mm
	73	Pressing plate pressed depth	5 mm	5 mm
	74	Pressing plate adjustable stroke	250~610 mm	350~760 mm

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CCD image positioning system	75	CCD FOV (H*V)	13*10 mm	13*10 mm
	76	Image registering accuracy	0.005 mm	0.005 mm
	77	Integrated accuracy	±0.02 mm	±0.02 mm
	78	Camera working distance	150 mm	150 mm
	79	Camera spec. / Extension ring length	50mm f1.8 / 15mm	50mm f1.8 / 15mm
	80	Recognition type	Cross target 、 round target 、 square target..etc, and other shapes are also workable	
	81	Standard light source	LED (white light)	LED (white light)
	82	CCD camera movement	manually with pneumatic lock	manually with pneumatic lock
	83	CCD capture range	X= ±130~±305 mm Y= ±0~±305 mm,	X= ±175~±380 mm Y= ±0~±380 mm
Operation system	84	Printing control system	PLC control Colorful HMI panel (w/ Chinese & English interface)	
	85	Imaging control system	Touch screen(15" TFT LCD) + Mouse control	
	86	HMI parameter memory module	100 groups	100 groups
	87	HMI digital control parameter	Parameter setting function: printing stroke 、 printing speed 、 off-contact height 、 screen off-contact delay time 、 Offset printing 、 production statistics 、 pre-production 、 printing delay time 、 flood coating delay time 、 inlet & outlet conveyor speed 、 clamping adjustment 、 printing/flood coating pressure setting 、 counting check 、 item number editing	
	88	Printing number setting	1-5 times	1-5 times
	89	Connection I/O	Inlet section : provide 2 INPUT ; 1 OUTPUT Outlet section : provide 1 INPUT ; 2 OUTPUT	
	90	Safety device	Emergency stop button	Emergency stop button
	91	Warning light device	LED (three color light)	LED (three color light)
	92	Automatic error detection & error exclusion display	HMI display error message	HMI display error message