



# ATMATIC MF66/FI

## Automatic CCD Registering Screen Printer (Thin Film with Interlay)



(Optional Protective cover for print station and Light barriers)



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## ● APPLICATION :

Specially dedicated to Flexible Printed Circuits (FPC) solder mask, legend and so on high precision screen printing process.

## ● CHARACTERISTIC

New-style design : G7 version four-post screen printer framework, suction cup auto feed-in, CCD visual registering system to implement X-X-Y auto alignment, precise registration, equipped with vacuum motor, sliding table reciprocates right / left transportation, suction cup picks up and places onto roller conveyor to continue IR drying, excellent performance increases production efficiency and yield rate of high precision printing.

### **MECHANICAL FRAMEWORK**

- Robust Framework : adopted high strength H-type steel beam welding + tempering treatment to achieve steady operating.
- High Precision : datum plane is machined precisely for assembly connecting surface to assure guide rail assembly precise parallelism.
- Optimal Rust-proof : metal surface is treated by membrane treatment + electrostatic powder coating, durable and not falling off.

### **Feed-in Structure**

- Positioning Structure : substrate is piled up in position and fed by suction cup sequentially.
- Feed-in Suction Cup : adopted multilayer suction cup (Viton material), 10 sets of suction cup to handle maximum sheet size 650x650 mm.

### **Elevatory Structure**

- Steady Elevation : adopted German gear motor + double chain to transmit four-post synchronously, equipped precise encoder digital control setting position (printing / standby / screen cleaning) to attain accuracy  $\pm 0.05\text{mm}$ .
- Pneumatic Locking Four-post : equipped unique function of pneumatic locking four-post (while printing), assure squeegee printing stroke parallel with table surface to raise printing ink layer accuracy.
- Off-contact Height Setting : screen off-contact height can be preset on HMI from zero off-contact (0~30 mm).

## Sliding Table Structure

- Upgraded Accuracy : registration table is adapted by 3 sets of servo motor control X-X-Y direction, differentiated by visual system to control table displacement amount, sliding table reciprocates right and left traveling to adopt hydraulic buffer + electromagnet positioning, repeatability positioning accuracy attains 5 $\mu$ m.
- High Precision Level : table top is made out of the machined thick Aluminum alloyed plate and anodized hardness treatment, scratching proof, table top flatness accuracy achieved  $\pm 0.05$ mm.
- Various Sections of Vacuum Suction : table top is equipped with strong vacuum to fix substrate position, vacuum power can be adjusted by digitalized infinite setting, assure to fix completely various different thickness of substrate on table while sliding movement.

## Printing Head Carriage

- Servo Motor Direct Drive : free malfunction, solid torque printing, full digital control, full stroke traveling with extreme steady speed.
- Equalized Pressure Control : squeegee / flood coater with digital equalized system control, enable to preset pressure (3~62 kgf) individually onto HMI.
- Delay Printing Function : squeegee with light pressure scraping ink at initiate stroke (0~200 mm digital setting), afterward it is changed to the preset pressure printing, such may avoid printing edge and corner on substrate to prevent mesh torn-off and squeegee damage.
- Dust Proof Cover of Guide Rail : precise linear guide rail for printing stroke is protected by high rigid Aluminum extrusion profile to resist stain and dust.
- Printing Uniform Ink Layer : guide rail cylinder is used for squeegee / flood coater to raise precise motion, precise and smooth leading to make the equalized printing pressure completely to be presented onto substrate, assure printing to deposit consistence and uniform ink layer.

## Frame Holder Structure

- Patented Leveling Adjustment Knob : height adjustment knob is equipped at front / back end of right / left frame holder, provide quick adjustment four corners of screen leveling.
- Screen Frame Micro-adjustment : screen frame X/Y/ $\theta$ micro-adjustment structure is designed in according to precise smooth double frame structure, equipped with position indicator, origin coordinate indication, etc.
- Servo Synchronous Peel-off : automatic calculation is synchronously with printing speed, digital control preset peel-off height and start point, printing resists stick-on mesh.
- Air Locking Screen Frame : quick and easy adjusting and operating, air locking screen, right left frame holder arm, and master frame carrier, equipped with check-valve to last long time fixation.

## Discharge Structure

- Scratching Proof : Viton + Fluoride O-ring is adopted, material PEEK is used for outlet wheel conveyor top prevent scratching substrate efficiently.
- Outlet Vacuum Carrier : multi-layer suction cup (Viton Fluoride rubber) is used, increasing up to 10 sets to maximize suction area 650 x 650 mm.

## Control System

- Digitalized Control : 7 inch colored display is equipped, exquisite setting versatile operational function and parameters, enable to save and retrieve rapidly to attain digitalized control printing quality.
- Convenient Module Extension : the advanced controller is adopted, high compatibility to facilitate module extension, easily maintain program.
- Standardized Management : 100 groups of memory can be named individually, quick save and retrieve to facilitate the standardized management of each different production.
- Error Indication : when control system failure is occurred, error message will be displayed on HMI for quick trouble shooting.

Digitalization is considered for all transmission system, equipped with top class to reduce installation time, convenient operation to raise productivity, also resist error and dummy, durable long working hour to attain top requirement for digitalization, standardization, and safety operation. All transmission system as listed below :

- ❖ 9 Sets of Servo Motor : sliding table reciprocates right and left traveling ( 1 set), peel-off (1 set), printing head forth and backward (1 set), CCD with X/X/Y axis displacement (total 3 sets), vacuum carrier in / outlet (each per 1 set), printing section up down (1 set).
- ❖ 1 set of Digital equalized Pressure : one set is used jointly for squeegee / flood coater pressure, professional loop design, automatic switch.
- ❖ Utilizing the Advanced Programmable Controller (PLC) : interlock all digitalized control transmission / control system mentioned above, reserve several sets of I/O point to facilitate connecting with up / down equipment to make integrated synchronously.
- ❖ Colored HMI for Operational Interface : provide instant operation convenience and setting various parameters, display exquisite control. Configured with 100 groups of operational mode memory IP, just touch several icons to save or to retrieve the preset mode, this is efficient tool to save time for setting.

## **Safety Protection**

Equipped with other safety protection : error diagnosis, failure indication, mono key auto restoration, light barrier, E-stop, warning lamp and so on comprehensive safety protection.

### **Visual Surveillance System :**

CCD visual registering system is used Industrial Computer + advanced Window program to drive three axis servo registration system, quick and precise registration. Colored LCD display is adopted as operation interface.

1. Purpose : utilize CCD optical magnification to enlarge image of registration mark, analysis, comparison to attain high resolution, image resolution capability attains 0.4 $\mu$ m in coordinate with X/X/Y servo driving, automatic precise registration purpose. Registration accuracy achieves 5 $\mu$ m, quick and precise table displacement.
  
2. Characteristic :
  - (1) Provided proper visual light source (white light ultra brightness LED).
  - (2) Field of View : FOV 12 x 9 mm, view depth 0~6mm ◦
  - (3) Shape of registration mark is NOT restricted, enable to track trace.
  - (4) Enable to add up to 4 CCD cameras to increase accuracy, increasing precision of average of registration deviation.
  - (5) Enable to select alternative edge alignment without CCD camera to detect registration.
  - (6) CCD registering can be done within one seconds with normal registration mark.
  - (7) Equipped with professional monitor, tempered glass, acid base resistance, temperature resistance, weather resistance, noise resistance, long life time, clear contrast.
  
3. Functionality :
  - (1) Achieved purpose for precision, fast registration, low defective rate.
  - (2) Record for production management, internet linkage, long distance remote save and retrieve.
  - (3) Vision System memorizes printed fiducial position from screen by training process and compares with substrate fiducials in each cycle so that the servo motors move the print table to match the coordinates between the two positions for precise final alignment. Total system accuracy +/- 10  $\mu$ m / +/- 0.4 mil / +/- 0.004in.

☛ Specifications :

	Item	Specifications	ATMATIC MF66/FI
<b>Substrate</b>	1	Substrate thickness	0.03~3.2mm
	2	Substrate size	MAX:610*610mm(24"*24") MIN: 250*250mm(10"*10")
<b>Equipment Specification</b>	3	Dimensions (W x D x H)	4358*1580*1719mm
	4	Net weight	2050kg
	5	Workflow direction	Standard spec: from left to rightward
	6	Capacity (non-stop full speed full stroke)	240 Cycles/hour
	7	Air pressure	6~7kg/cm <sup>2</sup>
	8	Air exhaustion	12L/cycle.
	9	Power	3 φ ,220/380V,50/60Hz
	10	Power consumption	5kw
<b>Inlet Conveyor Structure</b>	11	Transmission methodology	Inlet stacked setting
	12	Substrate transfer	Vacuum suction, Charge conveying arm
	13	Vacuum suction	8 pcs (Separate on/off)
	14	Vacuum suction loading	1.5kgw
	15	Initial registration	2pcs registration pin

	Item	Specifications	ATMATIC MF66/FI
<b>Screen Frame Holder Structure</b>	16	Max Frame O/D Size	1100*1100mm
	17	Min Frame O/D size	900*900mm
	18	Frame Height Range	25~40mm
	19	Screen Micro-adjustment X	±10mm
	20	Screen Micro-adjustment Y	±10mm
	21	Screen Micro-adjustment Z	±2mm
	22	Frame Fixation Methodology	Pneumatic locking+ screw lock
	23	Peel-off Driving	Servo motor
	24	Peel-off Height	0~25mm
	25	Registration Platform Drive	Servo motor + screw rod
	26	Registration Platform Movement range X	±5mm
	27	Registration Platform Movement range $\theta$	±1.6°
	28	XY $\theta$ Registering Repeatability Accuracy	0.005 mm
29	XY $\theta$ Registration Platform Movement time	200 $\mu$ S	
<b>Sliding Table Transmission Structure</b>	30	Sliding Table Movement Direction	Left Right Movement
	31	Sliding Table Reciprocating Drive	servo motor + timing belt
	32	Reciprocation Positioning Accuracy	±0.005mm
	33	Reciprocation time	1.2 sec
	34	Table Positioning Methodology	1200mm
	35	Sliding Table Reciprocating Drive	Electro Magnetic Positioning

	Item	Specifications	ATMATIC MF66/FI
<b>Printing Transmission Structure</b>	36	Printing Direction	From back to front
	37	Print Head Transmission	Servo motor + reducer + timing belt
	38	Max Printing Stroke	0~740mm
	39	Effective Printing Stroke	0~680mm
	40	Printing Speed	20~600mm/sec
	41	Off-set Printing	0~200mm
	42	Delay Peel-off	0~300mm
	43	Squeegee Skew Angle	20±15°
	44	Flood Coater Skew Angle	45±15°
	45	Adjustable Pressing Depth	0~12mm
	46	Cylinder for Squeegee Pressure	2 sets of Rail guide cylinder
	47	Cylinder for Flood Coater Pressure	2 sets of Rail guide cylinder
	48	Squeegee Pressure	3~62 kg
49	Flood Coater Pressure	3~62 kg	
<b>Screen Up Down Structure</b>	50	Screen Up Down	Gear + Chain
	51	Screen Stand-by Level	0~20mm
	52	Screen Cleaning Level	350mm
	53	Repeatability Printing Accuracy	±0.05 mm
	54	Screen up down brakes device	Equipped
	55	Delay Off-contact	0~9.9 sec



	Item	Specifications	ATMATIC MF66/FI
<b>Outlet Conveyor Structure</b>	56	Transmission methodology	UPE transmission roller
	57	Outlet Transmission Speed Range	20~130mm/sec
	58	Outlet Speed setting	Touch-screen display setting
	59	Substrate transfer	Vacuum suction, Charge conveying arm
	60	Adjustable vacuum suction area	610*610mm(MAX)
	61	Vacuum suction	8 pcs (Separate on/off)
	62	Vacuum suction loading	1.5kgw
<b>Operation Control System</b>	63	Touch-screen Display	Colorful Chinese/English display
	64	Parameter Memory	100 groups
	65	Printing Times	1~5 TIMES
	66	Connection control	Inlet : 2sets INPUT;1set OUTPUT
			Outlet : 1set INPUT;2sets OUTPUT
	67	Safety Device	Equipped
68	Error Diagnosis and Trouble Shooting	Equipped	



**Tools and Accessories**

Part number	Item	Specifications	Quantity
57CM001	M type Squeegee holder	400mm	1 pc
57CM002	M type Squeegee holder	500mm	1 pc
57CM003	M type Squeegee holder	600mm	1 pc
57CM301	M type Flooder coater	400mm	1 pc
57CM302	M type Flooder coater	500mm	1 pc
56N7M253	M type Flooder coater	600mm	1 pc
*F412(T70)	RKS solvent resistance flat printing squeegee	70°x1500mm	1 pc
YH50116	Spherical allen key	2.5/3/4/5/6/8mm	1 set
YH50117	Allen key	5mm*160L	1 pc
YH50075	Black handle Allen key	8mm	1 pc
YH50055	Spanner wrench	12"	1 pc
YH50352	Cross screw driver	4"	1 pc
YH50376	Parallel screw driver	2"	1 pc
YH50028	Wrench	08/10mm	1 pc
YH50037	Wrench	21/23mm	1 pc
57CEY001	H-type clamp		4 pcs
57CM103	Clearance gauge		1 pc
YD60001	Tool box (red)		1 pc
YD40340	Key	C-408-H1	2 pcs
TPC60-S1-1	User manual	ATMATIC MF66/F	1