DP-5000 System

TAIYO
CIRCUIT AUTOMATION

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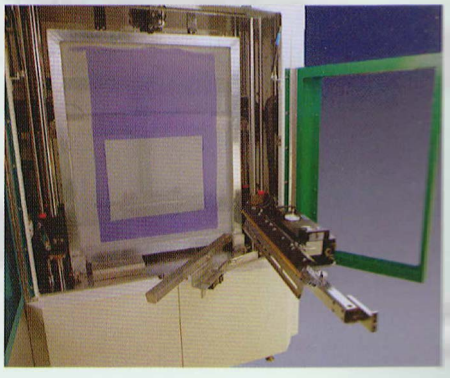
DP-5000 Fully Automatic Coating and Drying System

The Taiyo Circuit Automation DP-5000 System automatically coats and tack-dries printed circuit boards with liquid photoimageable coatings. This system accepts panels continuously from a horizontal feeder, coats both sides simultaneously with photoimageable ink, tack-dries to remove solvents, and unloads panels to a horizontal exit conveyor. The panels are then ready for further processing in an exposure unit, developer, and final cure oven.



The DP-5000 System consists of:

- DP-5000 Automatic Loading Dual-sided LPI Coater
- TC-5000 Conveyorized Oven with Automatic Unloader
- IP-04 Ink Pump

Build up Technologies are requiring more photoimageable coatings to produce the products of the future. Taiyo Circuit Automation s coater apply all types of liquid photoimageable s coating , including soldermask, primary image, dielectic, and legend.

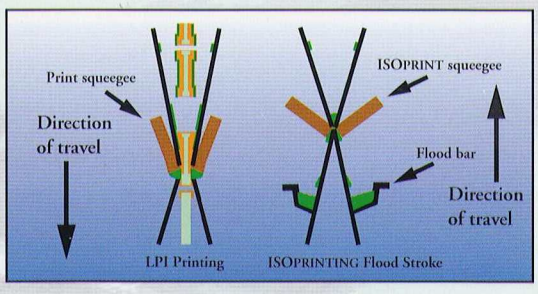
DP-5000s incorporate a rackless handling system to transport the panels. The DP-5000 system accepts panels horizontally and returns them to the horizontal position after processing, making this system ideal for fully automatic factories. Taiyo Circuit Automation continues to produce the DP-4000 system, utilizing a rack based handling system, for customers who prefer the job lot integrity of a rack s cassette based handling system.

DP-5000's are fast: cycle time for loading, coating and unloading a 18" x 24" panel can be as short as 25 seconds. High productivity is maintained even when a variety of different sized jobs are encountered due to the DP-5000's QC (Quick Change) TECHNOLOGY. QC TECHNOLOGY allows complete change over of panel size and ink type in less than 10 minutes. This is accomplished by the unique design of the squeegee and ink reservoir assembly; both can be swung out so that the screen frames can be removed without disturbing the alignment of the squeegee assembly. This provides complete access to the squeegees, flood bars, and the print window on the screen so that they may be exchanged or cleaned readily. These productivity benefits are only found on C Taiyo Circuit Automation equipment.

Advantages of Simultaneous Dual–Sided Coating

- Elimination of side–to–side variation
- Variety of coatings applied on one machine
- Controllable coating thickness
- Elimination of handling defects
- Multiskewable push stroke printing eliminates skips and ensures coverage of traces

The new TC-5000 oven is available in two different lengths; either a 3.0 or a 5.5 meter heated zone. The more economical and compact 3.0 meter length will allow the system to produce 120 panels per hour with 18" x 24" panels and dry times ≤ 45 minutes in Flood/Print/Print mode. The longer 5.5 meter length provides two separate heated zones for added flexibility and versatility. The additional length allows the coater to maximize panel production even with very small panels in the faster Flood/Print mode.



High pressure, low angle printing ensures complete coverage without skips, while the ISOPRINT cycle eliminates residual ink while flooding.

The DP-5000 incorporates several new features as standard equipment to enhance the finished coating quality. ISOPRINT is a system to remove the ink that remains on the back of the screen, for example over holes or slots after printing. ISOPRINTING forces the residual ink back to the front side of the screen mesh, where it is incorporated into the next flood stroke. There are now three different flood choices available to maximize the potential of different soldermasks. The latest process innovation, NO FLOOD, has been proven to dramatically reduce the amount of ink that is coated into component holes. The servo controlled positioning system allows the machine to reposition panels between coating cycles (jog), and even between print strokes (shuffle) .

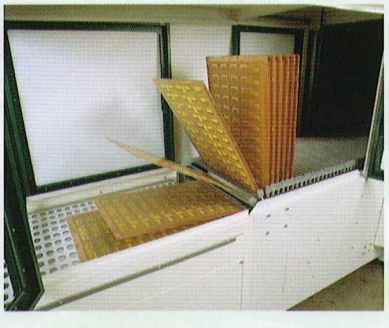
Quality and reproducibility of the coating are enhanced by the unique screen printing technique utilized by the DP-5000. Printing occurs at high squeegee pressure and fast print speeds with high off-contact but with a shallow squeegee angle on tight screen mesh. This technique ensures uniform coverage over and between traces. Leading edge printing forces the ink between and over traces. Two and three mil lines and spaces can be encapsulated without skips or bubbles. Even eight mil high traces are coated reliably. The DP-5000 will consistently and reproducibly produce boards to meet changing parameters in coating requirements.

DP-5000 Automatic Coating and Drying System

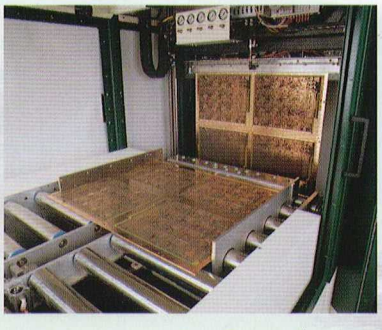
The DP-5000 is simple to operate, clean, and maintain. A new user friendly touch screen operator interface directs the machine. Set up time and system verification time has been greatly reduced by the new controller package. The machine now has the capability to verify panel size to improve automation and prevent misfeeds. The coating chamber is isolated from the operator and a comprehensive safety interlock system is provided. The machines are constructed to meet the requirements of the European Committee for Standardization and carry the CE mark.

DP-5000s are designed to meet the specifications and expectations of high production manufacturing. Critical components have been up sized to provide vibration-free operation and long functional life with a minimum of downtime. Maintenance personnel will appreciate the simplicity and elegance of the design, making routine maintenance fast and straightforward.

Integration of LPISM coating and tack-drying leads to higher yields with less dependence on operator efficiency. Handling defects are reduced as both sides are coated and dried simultaneously. Because both sides are coated simultaneously, the DP-5000 is much more compact than curtain coaters or spray coaters which coat each side of the panel independently. Experience has shown that simultaneously coating both sides produces superior results.

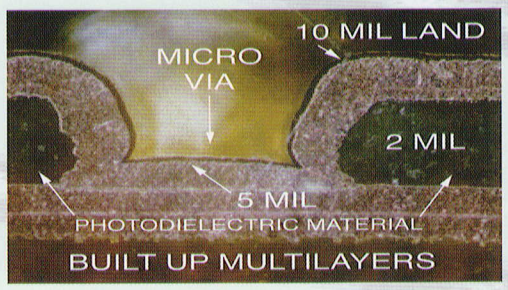


Automatic Unloader



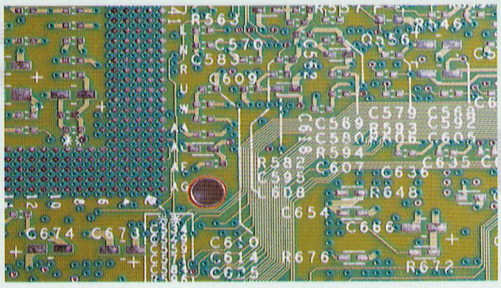
Automatic Loader

Versatile • Productive • Efficient



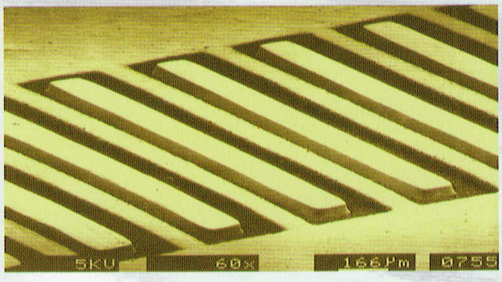
Versatility of the Machine

Photoimageable dielectric material, BGA panels, and liquid photoimageable resist material can be coated.



Photoimageable Legend Ink

Dual-sided coating of photoimageable legend and marking inks will improve yields and reduce cycle time in this critical process.

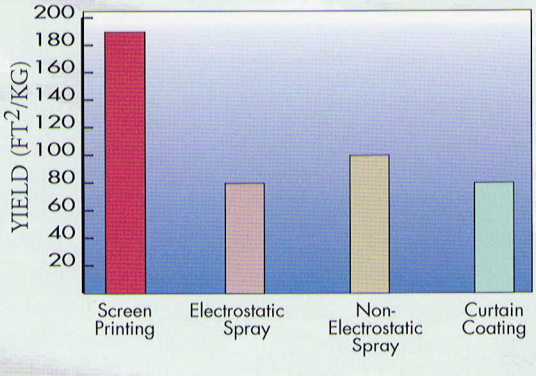


Fine Line and Feature Capability

The uniform and controllable thickness of screen printed LPISM allows the imaging of very fine features. Soldermask can be coated lower than the feature height.

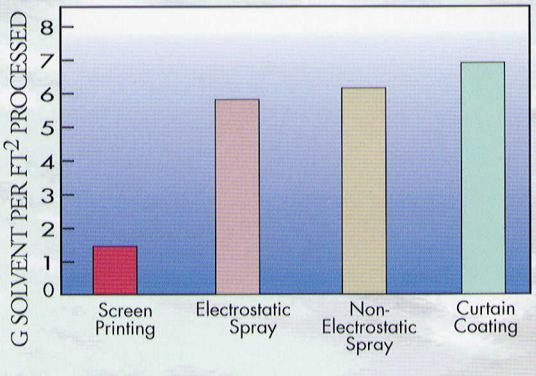
Flat and Thick Coverage

BGA panels require a thick, consistent and flat surface and can be coated with one pass to the desired thickness of soldermask.



Efficiency

Screen printing is much more efficient than curtain coating or spray coating for applying mask. In typical use, screen printing can be expected to coat nearly twice as much surface area as other processes, and cost half as much.



Lower Solvent Emissions

The lower solvent content of the ink actually applied reduces solvent emissions by two to five times over other processes. This reduces, and may eliminate, additional air pollution control costs.

DP-5000 SYSTEMS

Panel Dimensions

Minimum size	12" x 12"	305 x 305 mm
Maximum size	24" x 30"	610 x 762 mm
Minimum thickness	0.031"	0.8 mm
Maximum thickness	0.130"	3.2 mm

Custom oven slots are available.

Coating Features

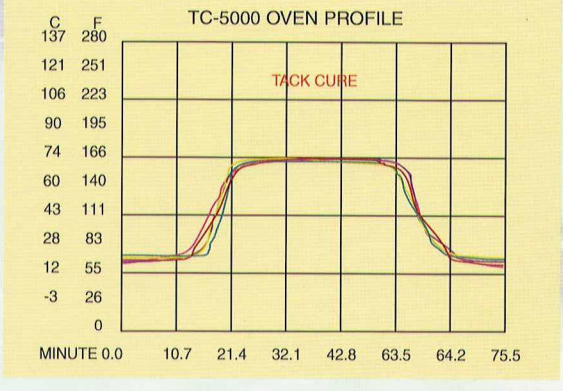
Coating Modes	Flood and print Flood, print, print Flood, print, flood, print, print Flood only Fully manual No Flood Printing Reverse home position flooding
Print Speed	1.0 to 10 in/sec 2.5 - 25 cm/sec
Flood Speed	1.0 to 10 in/sec 2.5 - 25 cm/sec
Skew	Squeegee may be skewed or straight Skew is reversible on alternate strokes
Frame Type	Aluminum; stretch and glue or self-tensioning frames
Frame Size	37" x 46.6" 940 x 1184 mm
Servo Positioning	Provides for precise panel positioning Allows jogging of panels between cycles Permits shuffle of panel between print strokes

Productivity

Panel size	Flood/Print	Flood/Print/Print
18"	23 sec	28 sec
24"	26 sec	29 sec
30"	29 sec	33 sec

Cycle time is between identical points in the machine cycle for consecutive panels. "Panel Size" is the dimension in the direction of screening. "Flood/Print/Print" are the coating modes most commonly used.

Sizing of the oven requires matching the average panel size, tack-dry time, coating mode, and coating thickness to the required panels per hour for the throughput desired. Consult your Circuit Automation professional for additional information.



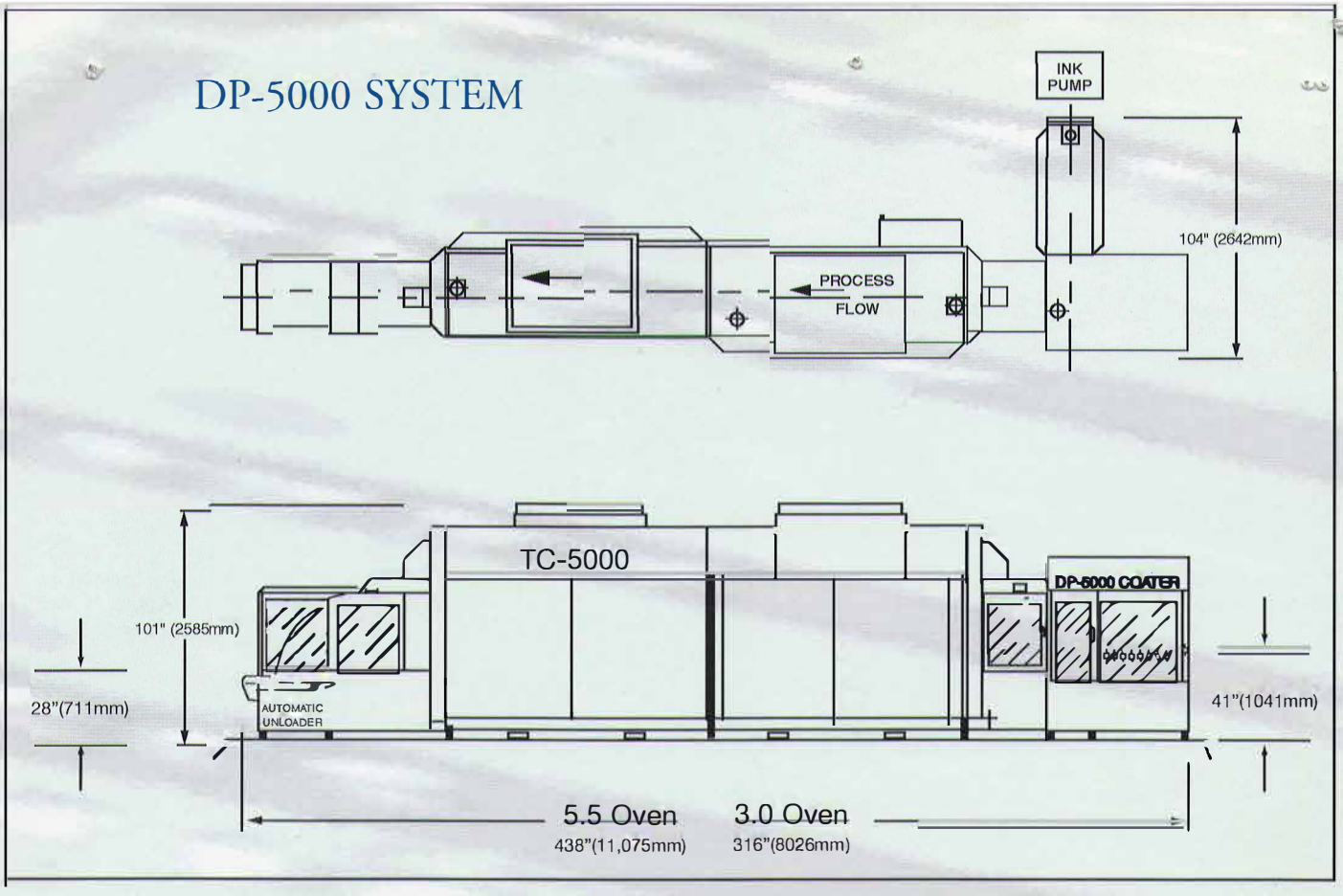
Coverage of High Traces

Screen printing provides precise metering of the ink deposit over circuitry, and screen printing inks have the highest viscosity and lowest solvent content providing uniform coverage on even the highest traces. The unique printing process utilized by the DP-5000 forces the ink between spaces and creates skip-free printing.

Coating and Thickness and Fill

Thickness of ink deposited will vary with the type of ink, circuit height and the screen mesh used. Typical thickness over 3.0 mil is 0.6 mil using 110 tpi mesh, 1.0 mil using 86 tpi mesh, and 1.5 mil using 74 mesh. 2.0 mil lines and spaces may be coated without skips or air encapsulation. 2 mil dams are producible because of the precise metering of ink.

DP-5000 SYSTEM



Utility Requirements

Electrical

Coater with 3.0 meter oven:

480 V 3ϕ, 80 A 60Hz	415 V 3ϕ, 90 A 50Hz 380 V 3ϕ, 100 A 50Hz

Coater with 5.0 meter oven:

480 V 3ϕ, 150 A 60Hz	415 V 3ϕ, 170 A 50Hz 380 V 3ϕ, 190 A 50Hz

Pneumatic

8 cfm @ 100 psig	14 m^3/hr @ 7 bar

Exhaust

Coater

250 cfm *Blower not supplied*	425 m^3/hr

3.0 meter oven

900 cfm *Blowers supplied*	1525 m^3/hr

5.5 meter oven

1400 cfm *Blowers supplied*	2400m^3/hr

Shipping

DP-5000/TC-5000 3.0

Net weight	8500 lbs	3875 kilos
Gross weight	10000 lbs	4550 kilos

Crated Dimensions 20' high cube container

DP-5000/TC-5000 5.5

Net weight	15000 lbs	6800 kilos
Gross weight	19000 lbs	8650kilos

Crated Dimensions 40' high cube container

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