



A29

Semiautomatic machine for printing of solder paste and adhesives in SMT assembly

Currently growing demand on high integration and new device packages requires - even in prototyping – to use stable and highly accurate printing machines. New printing system A29 which was developed on the base of experiences with design and manufacturing of small format printers is capable to fulfill all these requirements. It is a first from the new family of machines with stencil format 29"x29", which bring excellent price / performance ratio.



Printer A29 is determined for small and middle scope production as low-cost machine with necessary process level and eliminating of subjective operator's factor. Using A29 printing system can be also convenient for big manufacturers for producing very small series of products to avoid long break of big automatic line due to re-adjusting of in-line automatic machine.

Advantage of printer A29

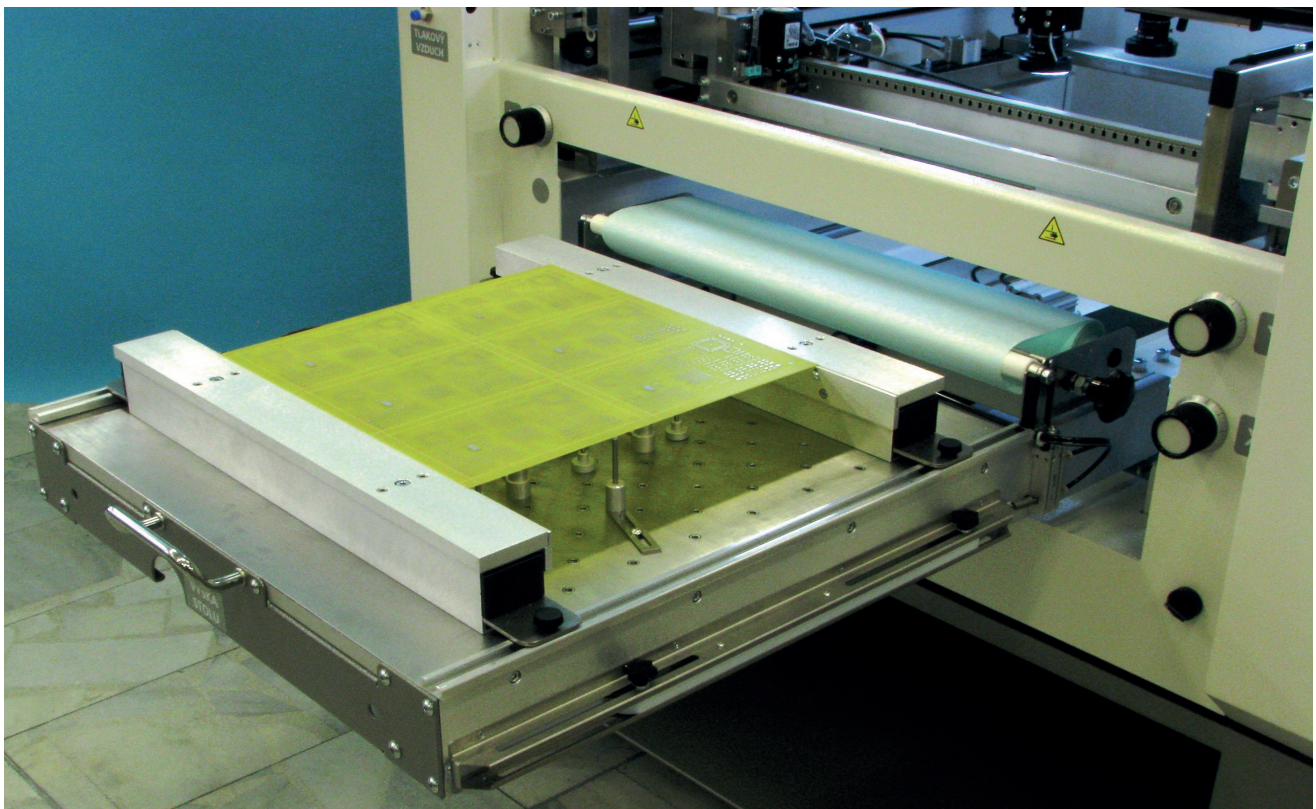
- Extraordinary stable steel sheet – frame of machine.
- Compact concept with print table movable like a drawer from the front side of the machine, to save working space.
- Unique substrate/stencil camera alignment system.
- View through stencil to PCB directly in print position without any movement before printing eliminates possible alignment unaccuracy even at long-term hard-process use.
- Applied system of alignment eliminates any usage of test print to transparent foil commonly needed at other off- line semi-automatic printers.
- After alignment, there is no need of further movement of stencil against substrate before print. This increases overall accuracy of the printing process substantially.
- The alignment system saves time of re-adjusting printer for new job. It is ideal for very flexible production.
- Direct checking of stencil by cameras in the area with fiducial marks enable more over checking of:
 - proper contact stencil with substrate
 - cleanliness of stencil after print
 - completeness of print
 - cleanliness of stencil apertures
- There is not necessary to use special fiducial marks for alignment but only proper soldering pads on PCB and relevant apertures on stencil.
- Digital image processing enables to use filters for local surface irregularities and texture of solder pads and eliminates influence of leads belonging to soldering pads, used for alignment.
- Control SW does not allow to start print procedure without a proper alignment.
- Control system enables to program all process parameters and to save values necessary for adjustment of printer for repeated production of the same job.
- Icone - based SW communication is easy for operator and training.
- Unique system of double squeegee with very compact design where distance between squeegees edge only 60mm saves space on the stencil.
- Print pressure is applied by means of membrane cylinders with high accuracy, that is important for printing the fine pitch structures.
- Pneumo-hydraulic vertical drive of print table ensures an extremely smooth separation with very low speed, important for printing HI-density structures.

Fixing of PCB

PCB are fixed between magnetic supporting bars with settable height due to PCB thickness. Substrate face is than in the same level like face of supporting bars. This increases stencil lifetime. Printed substrate can be fixed by supporting pins in holes of the substrate and by vacuum supporting cups. This flexible solution enables easy to find optimal support even for very unusual shape of PCB's. Such clamping system enables to print just from edge of PCB without problems with bad contact of stencil, typical for top clamping „knives“

Cleaning bottom side of stencil:

System for cleaning of bottom side stencil is integrated on slide-in table. It is moved pneumatically onto upper position according to preadjusted cleaning length and position. Cleaning of stencil is performed during movement of print table with PCB. Frequency command to clean can be programmed on the machine.



Control system

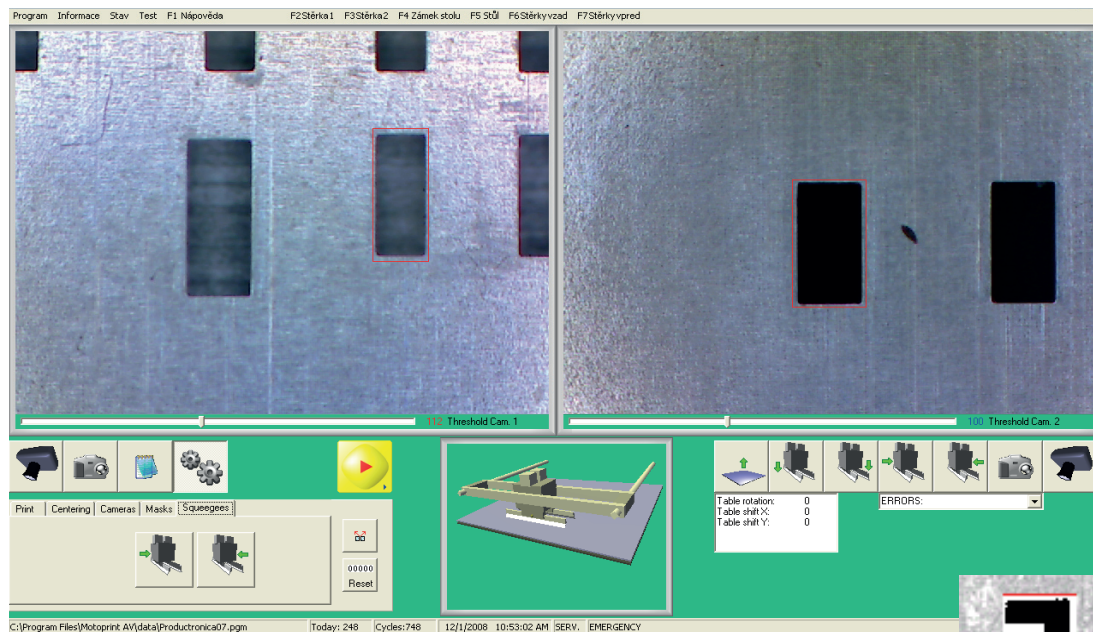
Machine is controlled by PC under W-XP operating system.

Control SW has three access levels:

- Operator (can choose number of program, start print process)
- Engineer (setting of parameters and setting of machine)
- Service (access to maintenance and calibration)

Both higher levels are protected by passwords.

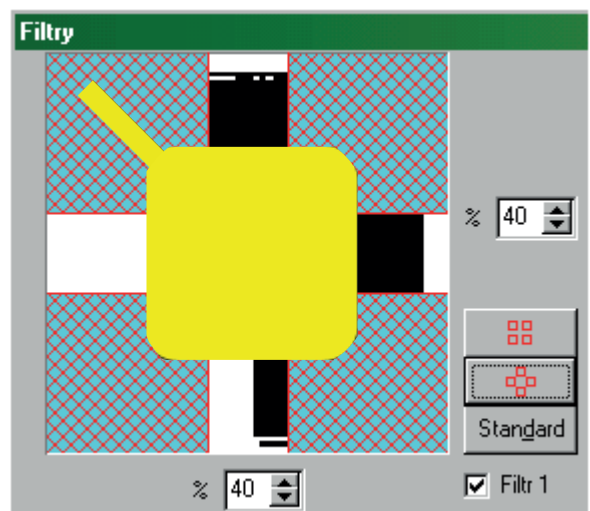
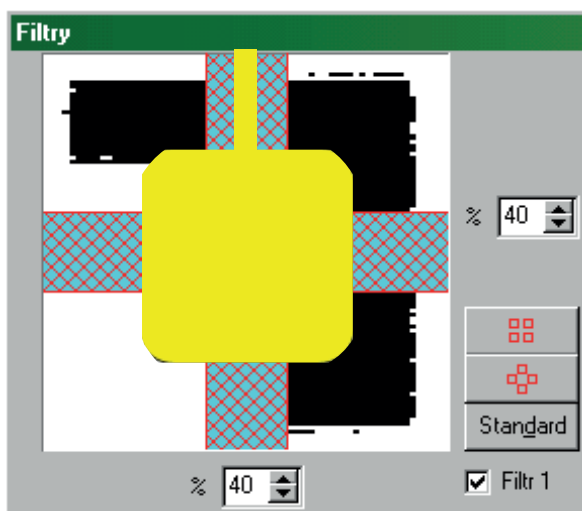
LCD display is well organized and includes information from digital recognition from both cameras. All process-relevant parameters are easy to find on the screen.



Filter for surface non-homogeneity eliminates reflexions and other surface irregularities. It helps to digitize the pad border and increases the accuracy of alignment.



Masking leads part of the camera view range can be electronically excluded from the calculations for alignment. This enables to choose virtually all available pads on the PCB layout for the alignment.



Instruction display helps operator to train quickly the optimal way of alignment stencil with substrate.

Technical data

Printing data

Print frame size	W x L x H	508 -737 x 890 x 20 - 40 mm
Max. PCB size	W x L	510 x 660 mm
Min. PCB size	W x L	55 x 55 mm
PCB thickness		min. 0,8 mm; max. 4 mm
Max. print format	W x L	500 x 650 mm
Printing Modes		Print/Print, Print/Flood, Flood/Print, 1 or 2 deposits. Others available on request.
Stencil Location		Manual, Pneumatically clamped.
Max. print height (max. underside clearance)		63.5 mm
Typical printing accuracy		+/- 20 micron 3 Sigma

PCB Registration

	Positioning pins: 3 mm dia., edge pin height 1 mm - as standard
Tooling support	10 x 19 mm diameter - magnetic, 4 x 19 mm diameter - vacuum
Squeegee types	Metal std. 60°
Squeegee lengths	210, 290, 370, 450, 530 mm (other on request)
Typical cycle time	30 s, with single print stroke

Programmable parameters

Number of programs

unlimited

Print pressure range	W x L x H	0 – 0.5 MPa (4 - 240 N)
Print squeegee pressure setting		30 – 99 % with step of 1 %
Print speed range		10 – 99 mm/sec with step of 1 mm/s
Separation speed control		0,1 - 5 mm/sec
Print gap size		2,5 – 9 mm
Print sequence programming		1 to 50 prints, with vacuum / without vacuum

Alignment condition

Method of scanning / screen evaluation	view through stencil / colored
Alignment solder pad (mark) shape	square or rectangle with max. rate 2:1
Min. distance between marks	50 mm; 25 % max. PCB dimension
Min. dimension of mark	0.5 x 0.8 mm
Max. correction deflection of stencil and PCB position	30 % stencil aperture dimension
Min. contrast of mark and substrate	2:1 (mark has to be lighter)
Min. free area in surroundings of mark	50 % dimension of mark
Range of table movement	X +/- 8mm; Y +/- 15 mm; theta +/- 2°

Camera system parameters

Cameras number / type	2 / colour
Screen magnification	18 times
Displayed screen resolution	640 x 480 pixels
Output	USB
Lighting	2 fluorescent lamps PHILLIPS TL13W/35T

Installation data

Dimension (W x L x H)	1240(+460 notebook) x 1160 x 1460 mm
Gross Weight	400 kg
Mains	230 V/50 Hz, circuit breaker B10A or B16A , other on request
Power consumption	150 VA
Internal power supply	24 V DC
Compressed air input	0.6 – 0.80 MPa (oil-free air, filtered 2 micron)
Interface Control	Keyboard or mouse

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