Machines for PC-Board Assembly
Equipment Manufacturing
Process consulting

FA23

Automatic Off-line Printing Machine for SMT Assembly

The new automatic screen & stencil printer FA23 is designed to meet highest demands on accuracy and flexibility for small and middle-size PCB assembly shops.

It is equipped with an automatic alignment system and with under-side stencil cleaning. Ease of operation set up and robust machine design enables to achieve highly reproducible quality even with low skilled operators.

The machine is a next development of a field- proven semi-automatic print system A23 with the same concept.

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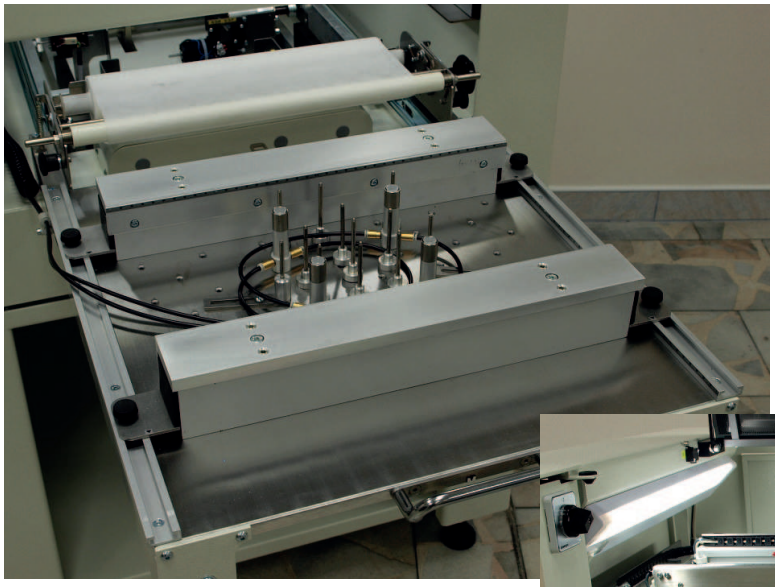
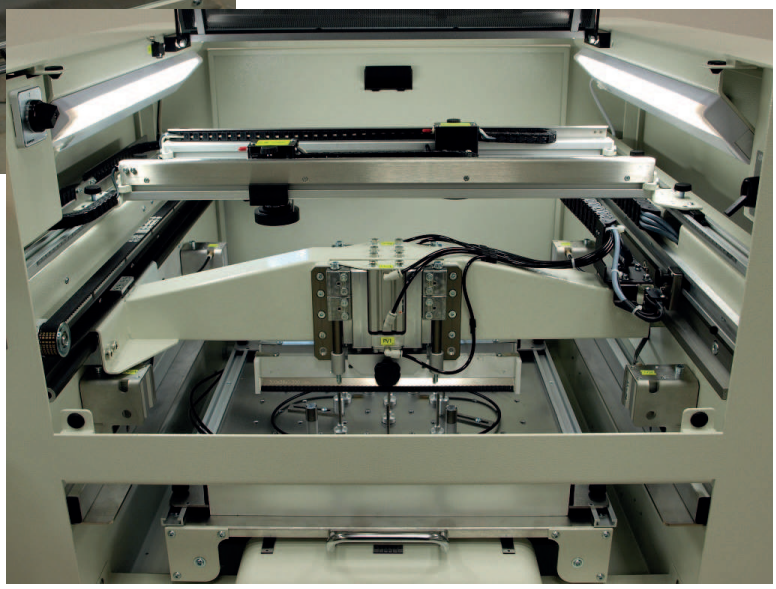
Some of unique features

- All print parameters are programmable. Editing of programs is protected by password.
- Three levels of operational software with password protected access (Operator, Supervisor, Service).
- Programmable print pressure setting and control.
- Dual, friction-free air cylinders enable very precise pressure setting of print pressure.
- Separation of stencil from PCB is driven by pneumatical-hydraulic system which assures very smooth acceleration of printable separation speed, important for printing of small chips and high-density PCB´s
- Stencil-to-PCB automatic alignment system utilises unique through-stencil view technology. Two fixed cameras can be positioned over any suitable position of the print area. System can use fiducials, which will be printed with paste (fiducials must not be covered with solder mask) or any suitable solder pad in the PCB layout.
- The exact position of PCB under stencil can be achieved even for stencils with reduced apertures. This is possible thanks to scanning procedure, picture analysis and a sofisticated processing of this signal from both cameras.
- The first alignment for a new job does not require to make any calibration print to define the stencil position, often necessary at systems with stationary cameras. All to do with the new product is to find the proper apertures for alignment, to show them to the system and start print process.
- After finishing alignment, the PCB–to–stencil position remains without any movement. This assures highest long terms stability of print accuracy, without any possible influence of parts wearing and temperature fluctuation.
- Controlling and programming of the printer is done via notebook under WINDOWS 7® operation system.
- 32 bit True Colour alignment cameras with 10 um resolution and 27 times display magnification, provides an extremely good contrast resolution for pad- to stencil surface differentiation.
- Digital filtration of non uniform reflection of solder pad surface (HASL surface compensation).
- Digital filtration of leads belonging to the solder pads, which are choosen for alignment.
- Alignment in just a few seconds thanks to fast and reliable table servo-positioning with MAXON® drives.
- Cleaning system of bottom side of stencil is integrated on telescopic print table.
- Possibility of logging all process parameters (suitable for research and university studies).
- Very fast setup for new and repeated products due to:
  - Pneumatic stencil frame clamping.
  - Camera positions, PCB position and layout can be memorized in product program file.
  - No need of calibration print before starting new job.



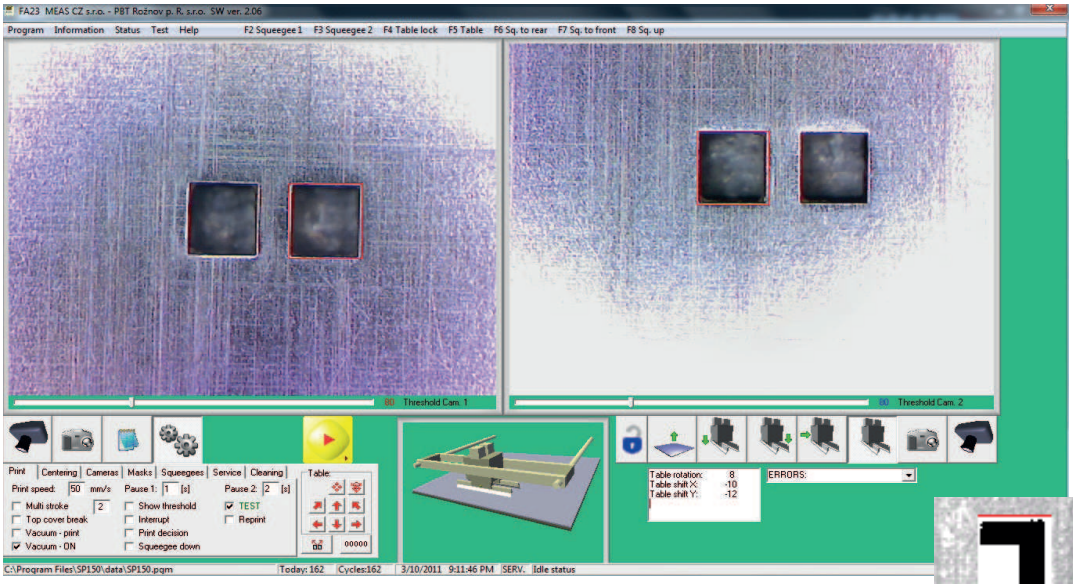


Controlling system

Controlling software - access is allowed by three levels:

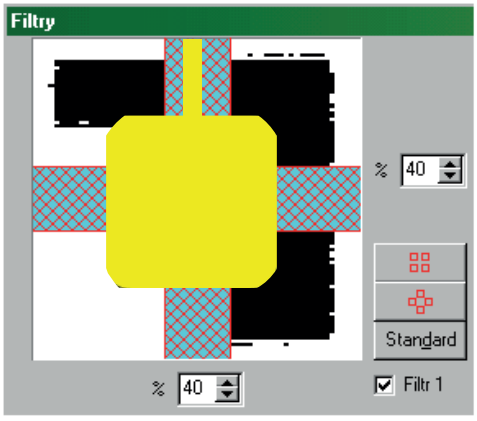
- Operator - for selection of program number and start printing process (this access is without password)
- Technologist - for editing, programs creating and machine setting (technologist password needed)
- Service - for maintenance and calibration of machine (service password needed)

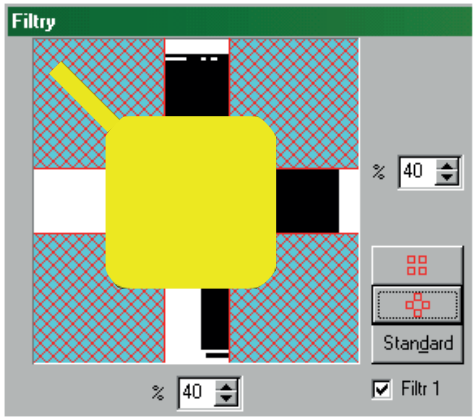
Adjustment display synoptically merges informations from both cameras. Digital image processing allows to eliminate surface defects of reference pads and excludes an impact of lead of pads on distortion of centring.

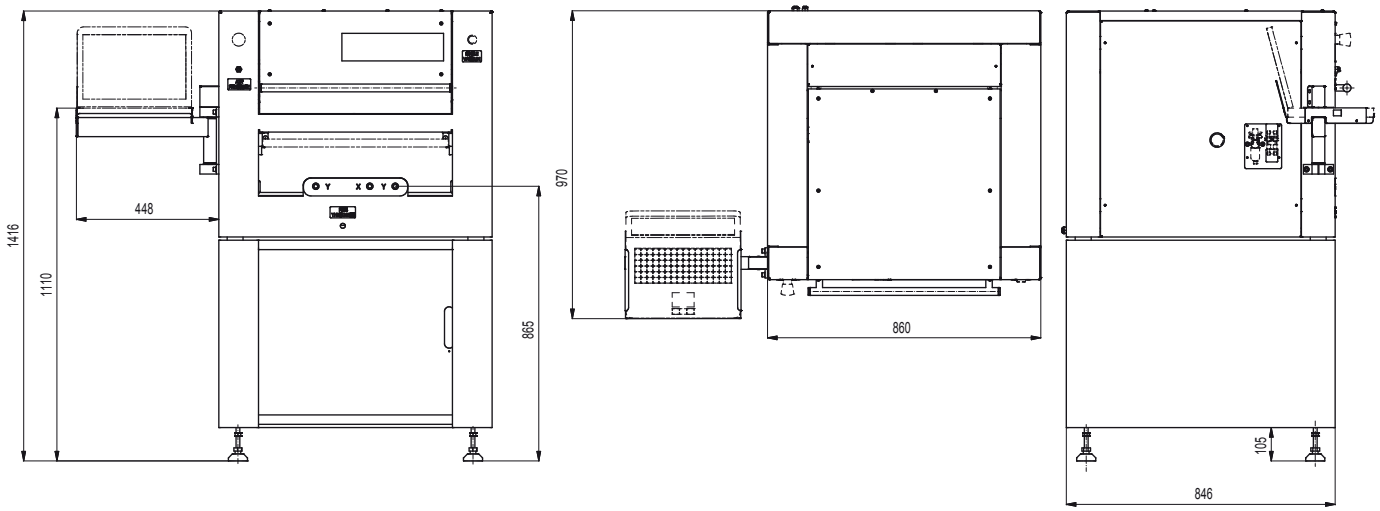


Non-uniformity filter of surface makes a digital image and gets more accurate interface between pads and surroudin lad masking. Some area of picture can be excluded from the numerical evaluation during alignment. This allows to mask leads coming to the pad, which is chosen for alignment. This tool enables to use almost any pad for centring even on high dense PCB´s. gs.

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.







Technical data

Printing data	
Max. print frame size (W x L x H)	584 x 680 x 25-40 mm
Max. PCB size (W x L)	410 x 410 mm (on request 460 x 410 mm)
Min. PCB size (W x L)	50 x 60 mm
PCB thickness	min. 0,5 mm; max. 7 mm
Max. print format (W x L)	390 x 390 mm, 450 x 390 on request
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 (on request 66 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 or Polyurethane std. 60°
Squeegee lenghts	130, 180, 220, 260, 300, 400, 430 (on request 450) mm
Typical cycle time	15 - 30 s, with single print stroke
Programmable parameters	
Number of programs	unlimited
Print pressure range	4 – 140 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	0,1-3,5 mm/sec
Print gap size	2,5 – 9 mm
Print sequence programming	1 or 2 strokes, with/without vaccum PCB clamping
Installation data	
Dimension	860 (+ 448 notebook) x 846 x 1416 mm
Gross Weight	220 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
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 surroudings of mark	50 % dimension of mark
Range of table movement	X, Y, (theta): +/- 6 mm (+/- 3°)
Camera system parameters	
Cameras number / type	2 / colour
Screen magnification	27 times
Displayed screen resolution	640 x 480 pixels
Output	USB
Lighting	2 fluorescent lamps PHILLIPS TL13W/35T

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