



## VERSAPRINT 2

The next generation

GLOBAL. AHEAD. SUSTAINABLE.



## ersa VERSAPRINT® 2 ELITE plus

The sturdy basic version uses an area camera to align the substrate to the stencil and can use this to carry out optional inspection tasks. The stencil support can be adjusted without tools for frame sizes from 450 mm to 740 mm. The ELITE plus can be upgraded or retrofitted with all the options available for the VERSAPRINT 2 series, including 2D- and 3D-camera.



## ersa VERSAPRINT® 2 PRO<sup>2</sup>

With its fast 2D-LIST camera (LIST = Line Scan Technology), this system is particularly suitable for products with a high inspection requirement. It can also be upgraded or retrofitted with all the options of the VERSAPRINT 2 series.



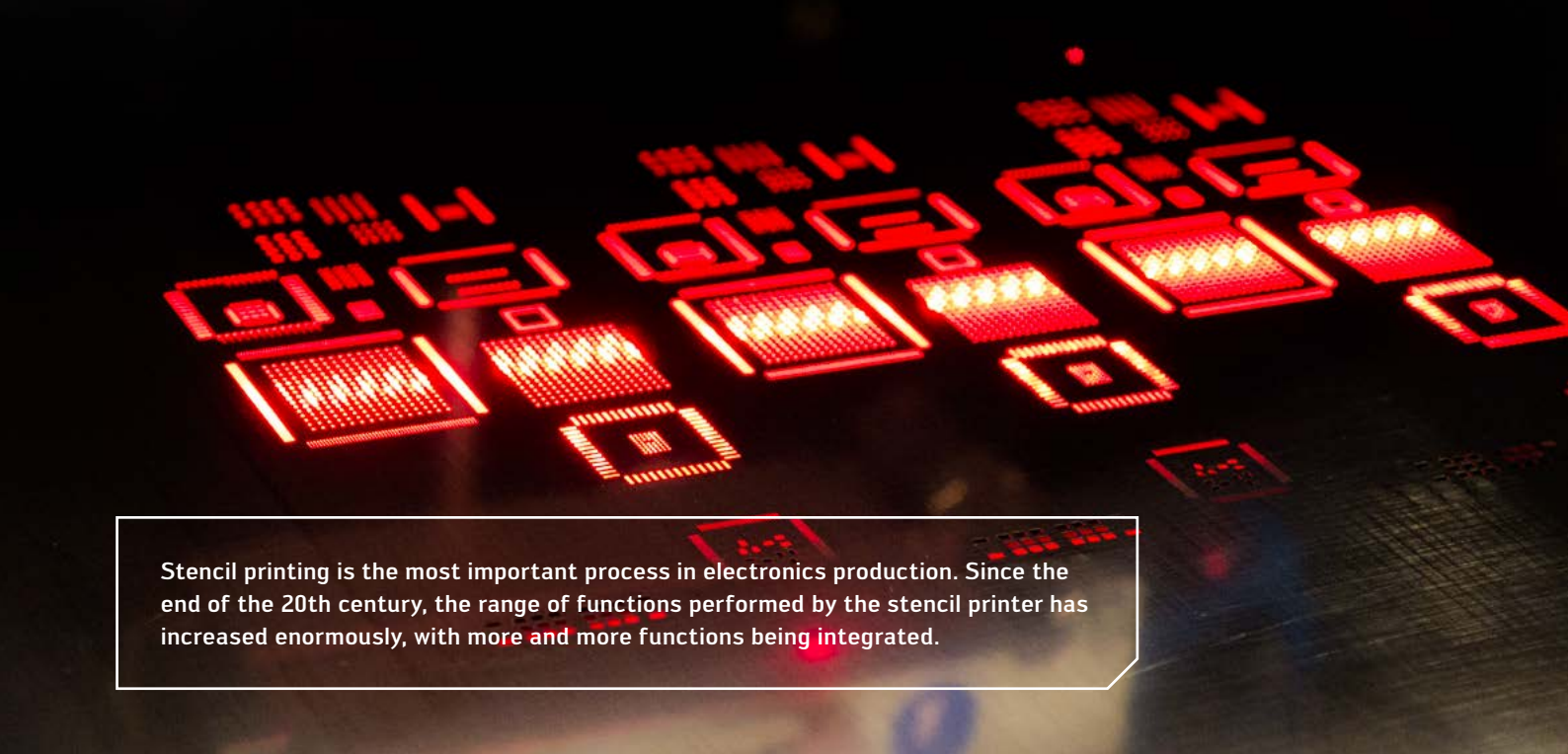
## ersa VERSAPRINT® 2 ULTRA<sup>3</sup>

For operators who pay special attention to the small print. The ULTRA<sup>3</sup> model uses the very latest measuring technology provided by the 3D-LIST camera. The shape of the smallest solder paste depots plays a major role in the printed volume and ultimately for the shape of the solder connection. Is the height of the paste depot consistent or does it drop towards the edges? The ULTRA<sup>3</sup> can answer this question for you. It is both a stencil printer and 3D-SPI (Solder Paste Inspection) in one. It can also be upgraded or retrofitted with all the options of the VERSAPRINT 2 series.



## ersa VERSAPRINT® 2 TIM

VERSAPRINT 2 TIM offers all the advantages of stencil printing together with precise process parameters for optimum processing of thermal pastes. A reproducible application of the paste volume is achieved, which can also be monitored using the printer's integrated inspection system. Combining the VERSAFIT 500 press-fit system and the VERSAPRINT 2 TIM printer, they form a high-performance production unit for power electronics applications.



Stencil printing is the most important process in electronics production. Since the end of the 20th century, the range of functions performed by the stencil printer has increased enormously, with more and more functions being integrated.

# VERSAPRINT 2

Unique printer platform with fully integrated inspection – partial, 100 % 2D or 100 % 3D

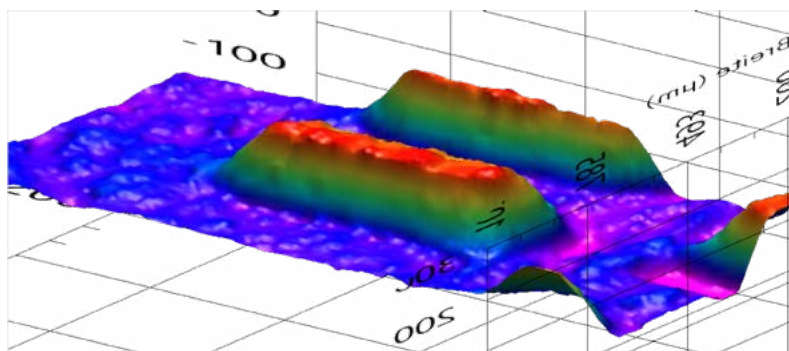
Currently, the VERSAPRINT series not only handles the automatic cleaning of the underside of the stencil and inspection of the printing result, with a choice of 2D or 3D inspection, it also carries out further functions and processes along the production line. The simple printer has long become a multi-functional system. These days, every efficiency-oriented manufacturer inspects the printing result before the assembly is

mounted. The optional three-dimensional inspection of the VERSAPRINT series reliably detects deviations in volume of the solder paste depot.

Dispensing systems in the printer permit additional adhesive or solder paste spots to be set after solder paste printing. This means components can be additionally fixed or solder spots can be provided with additional solder volume.

The set-up check during printer set-up guarantees that the right materials and tools are used for the correct execution of orders.

The data recording functions collect the process data for the solder paste printing, the materials used and document the current manufacturing quality.



3D image of the inspection result



# VERSAPRINT 2 ELITE plus

## Unique advantages

The VERSAPRINT 2 ELITE plus is the ideal printer to enter line production if 100% inspection is not required - for example if an SPI system already exists in the production line. It is the ideal printer for customers expecting a perfect print result in combination with an easy to use printing system.

The printer is equipped with an area camera that uses two separate camera

modules. Different types of illumination make it possible to detect even the most complicated structures on the substrate.

If the VERSAPRINT 2 ELITE plus is combined with an 3D SPI System, the closed-loop function sends feedback to the printer and optimizes the printing process.

The VERSAPRINT 2 ELITE plus can be equipped with the optionally available 2D

inspection which allows to verify coverage, shorts and offset in glue or solder paste printing. On the stencil the apertures and under stencil smearing will be inspected.

VERSAPRINT 2 ELITE plus can also be retrofitted with the 2D or 3D-SP LIST camera, in case inspection requirements change over time.



# VERSAPRINT 2 PRO<sup>2</sup>

The first stencil printer worldwide  
with fully integrated 100% SPI



Almost 70% of all process errors in the SMT line can be traced back to the stencil print. Furthermore, most of the errors in solder paste printing can be eliminated at low cost provided they are detected in good time. For this reason, the printing result is inspected in most electronic products before the components are placed on the PCB.

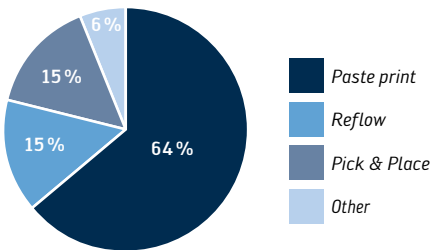
The revolutionary camera using Line Scan Technology (LIST) is at the heart of the integrated inspection feature. It can inspect the printing result at a speed of 210 mm/s over the whole scanning width.

With the VERSAPRINT 2 PRO<sup>2</sup>, inspection takes place directly following the printing process.

The familiar 2D inspection method of SPI is ideal for most applications and stands out on account of its simple programming and parameter finding. The percentage specification of minimum cover by the print makes it easier to specify process limits. Adequate default values cover the usual process limits.

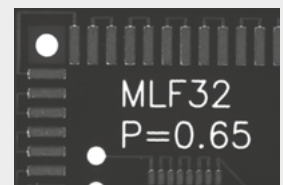
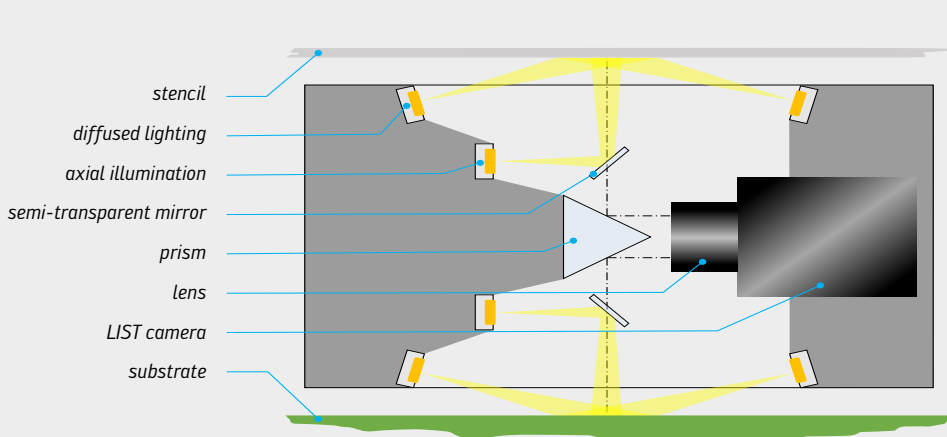
- True parallel process for print and inspection
- LIST camera for 100% inspection at line speed
- Little floor space required for print and inspection
- Closed-loop process control for print and SPI
- Easy programming and handling
- Printer and SPI in one

Ersa is the only manufacturer in the market able to achieve a 100% printing check at line speed thanks to 2D inspection integrated in the printer.

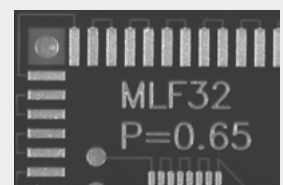


Error distribution in the SMD process – C. H. Mangin

## Schematic of the LIST camera



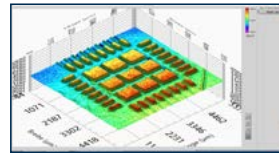
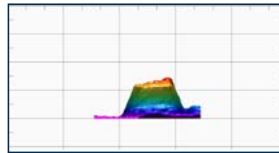
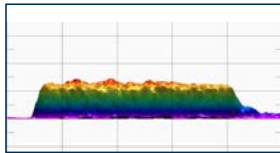
- ▲ Direct light source
- ▼ Diffuse light source





# VERSAPRINT 2 ULTRA<sup>3</sup>

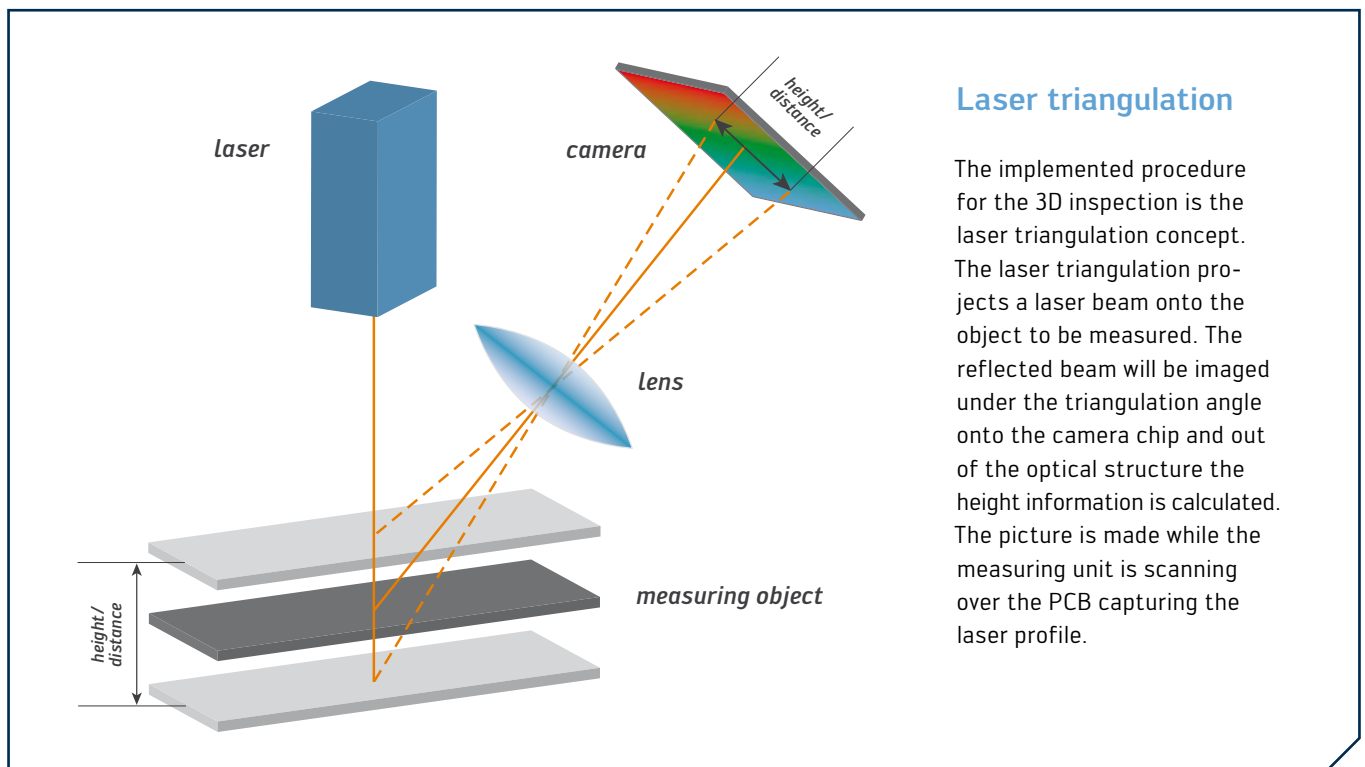
The first stencil printer worldwide  
with fully integrated 100% 3D SPI



Left to right:  
Profile of the inspection  
result incl. height indication.  
Profile rotated by 90°. In-  
spection result

## Advantages vs. 3D SPI stand-alone systems:

- 3D-SPI for the inspection of complex PCBs direct after the printing process
- VERSAPRINT stencil inspection detects errors before they appear
- Zero reference measurement of the unprinted PCB can be done before every print
- Integrated closed-loop function for print offset compensation
- One software platform for print and inspection – one consistent operator concept
- Maintenance and service for only one machine
- One contact for both processes
- Less space required on the shop floor



## Inspection: Requirements

The following properties of the solder paste print are evaluated during 3D inspection:

- Volume
- Area
- Height
- Shorts
- Offset

If the system determines deviations in the solder paste printing to the specifications for the above-mentioned properties, a 2D image of the area affected is recorded for better representation and analysis through the operator. In addition, the operator can turn and zoom in on the 3D image of the error detected as required in order to carry out reliable analysis efficiently. The height profiles are shown color-coded. Limit areas are highlighted in yellow and red.

Stencil inspection is retained as a feature of 2D inspection. It triggers automatic stencil cleaning if solder paste soiling on the underside or blockage of a stencil opening should have exceeded the set limit.



The inspection parameters specify the permissible process limits.

A further advantage of the integrated inspection is the closed-loop function for print offset correction. It is able



Inspection result – graphic visualization of measurements with set and actual values.

to detect offsets and correct them automatically in line with the direction of printing.

## Inspection: Determination of zero point

The critical point for height measurement is the definition of the zero point. When the measurement is carried out, the pad area which represents the zero position is covered with solder paste. For this reason, current SPI systems usually measure a limited number of non-printed circuit boards before production as a reference for determining the zero point.

With this method, the height of the non-printed pads is set in relation to its environment (stop mask, via-filling, placement pressure etc.), on which the zero height has to be determined during production. These values are then used to form average values which are used for measurement during production.

This usually has to be repeated in the case of batch or supplier change. This is the major advantage of integrated inspection in the printer: every printed circuit board can be measured before printing. In the event of very demanding requirements in terms of precision of the result or where there are reserves in terms of cycle time, the system can always carry out a preliminary inspection.

## SPC data analysis

Statistic Process Control, or SPC for short, is an important tool for the continual improvement of the production process. The SPC integrated in VERSAPRINT 2 collects all the process data relevant for you including the inspection results, delivers a compact summary of the data and also indicates trends.

The data make it possible to compare several batches or production shifts, and thus enable the detailed qualification of processes or individual components such as the stencil or the paste. Inspection results can be saved as a fault pattern together with the data: equally fault-free printed circuit boards can be completely documented. This means later qualifica-

tion and analysis of the results is always possible. The SPC data analysis can be used at the machine for immediate optimization of the current process, at the end of the line as comparison with the AOI system (Automatic Optical Inspection) or as a control tool for production management.



VERSAPRINT 2 TIM in combination with press-fit system VERSAFIT

# ERSA VERSAPRINT 2 TIM

## Efficient and reproducible print technology for heat dissipation (Thermal Interface Material – TIM)

For the efficient use of power semiconductors such as IGBTs (insulated gate bipolar transistors), it is vital to create the optimum electrical connection to the PCB and a high-quality thermal connection to the heat sink (housing or dissipator).

The ideal combination for a high-quality PCB assembly process is the VERSAFIT 500 press-fit system to create the electrical connection and the **VERSAPRINT 2 TIM (Thermal Interface Material)** stencil printer to provide the thermal connection for heat dissipation.

After the press-fit process, the assembly is automatically conveyed into the printer, where thermal paste is printed onto the IGBTs. The direct linking of the press-fit and printing processes saves handling steps and increases the production line's throughput.



## Highlights

- Bottom-side component clearance up to 100 mm
- Repeatability +/- 12.5 µm @6s
- Print force control with Closed-Loop
- Recording of the paste roll diameter
- Paste feeding from large containers
- Heavy load conveyor up to 15 kg
- Integrated 3D inspection
- Flat belt conveyor
- Options can be retrofitted in the field

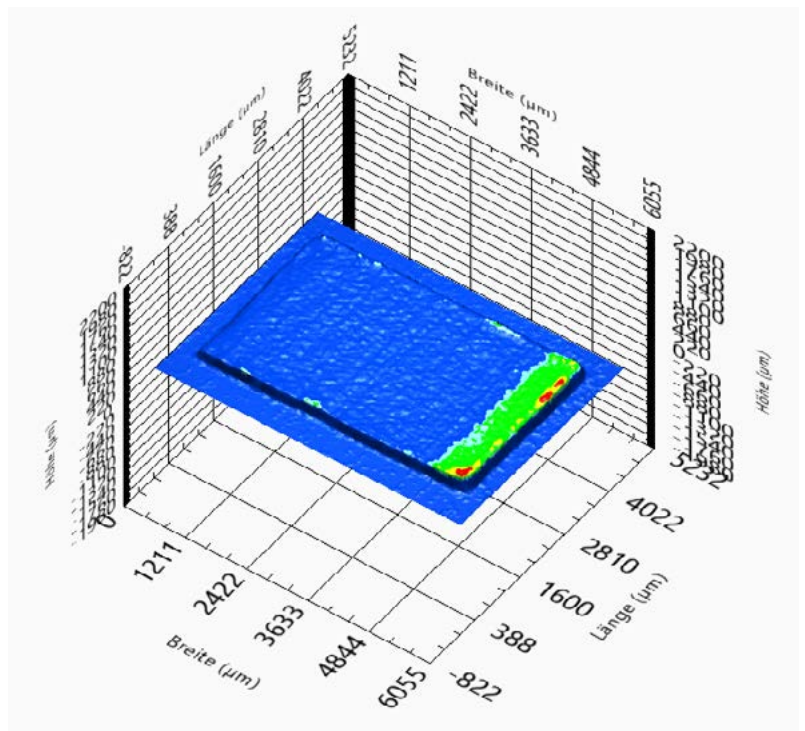


VERSAPRINT 2 TIM offers all the advantages of stencil printing together with precise process parameters for optimum processing of thermal pastes. A reproducible application of the paste volume is achieved, which can also be monitored using the printer's integrated inspection system.

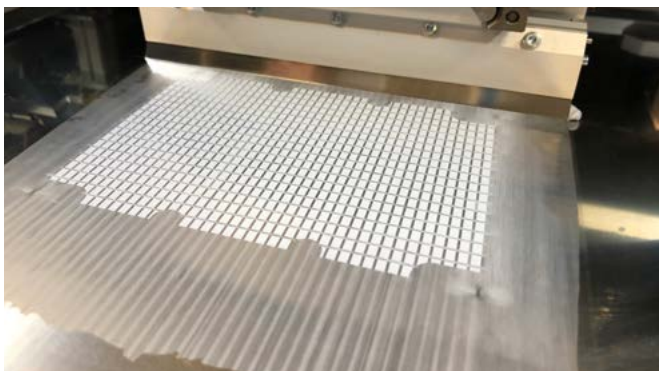
Combining VERSAFIT 500 and VERSAPRINT 2 TIM, they form a high-performance production unit for power electronics applications.

## Basic configuration Ersa VERSAPRINT 2 TIM

- Program-controlled width adjustment
- Automatic fiducial recognition
- Automatic bottom-side stencil cleaning
- Efficient programming
- Touch operation
- High maintenance friendliness



Available as an option: 3D inspection of the printed thermal paste depot



Thermal paste in a rectangular grid



Honeycomb structure for thermal paste printing



## Print head and squeegee

- Closed pressure system for repeatable print result
- Optional weight compensation of squeegee and print head also enables very low squeegee pressures
- Easy mounting and pneumatic clamping of the squeegee
- All common squeegees types can be used
- Squeegee angle is mechanically fixed to minimize operator influence
- Screen print head available as an option

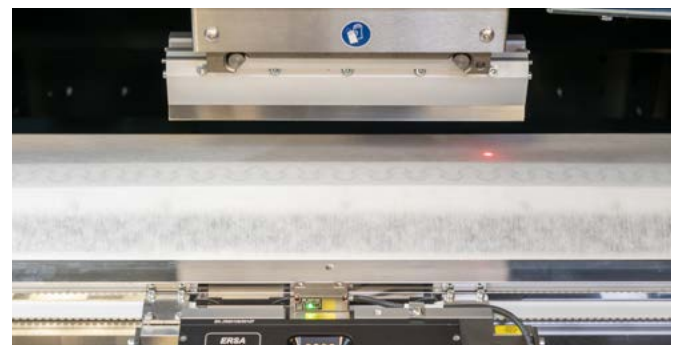
# Standard Features

## for VERSAPRINT 2 PRO<sup>2</sup>, ELITE plus, ULTRA<sup>3</sup> & TIM



## Substrate handling and parallel process

- Substrate is clamped between over top clamping and transport belt
- Thin substrates are clamped without warping
- Minimum snap off and overlap of the substrate edge
- Precise pressure adjustment for side clamping using the track width motor prevents warping of even very thin boards



## Stencil mount and fitting

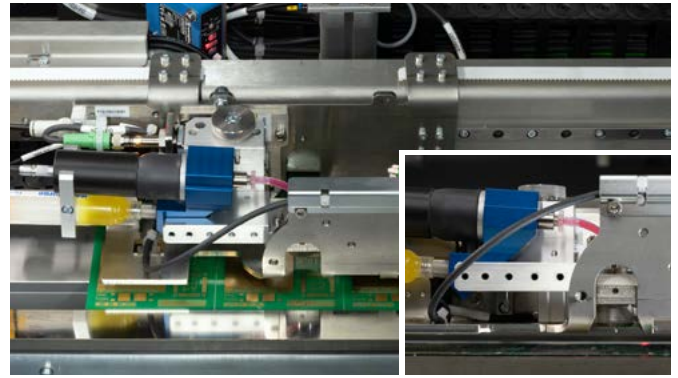
- Common stencil formats and quick-action clamping systems can be used directly
- The stencil mount is fixed, alignment is carried out via the printing table – important for 3D stencil applications with extreme steps
- Flexible mount for different stencil formats
- Programmable mechanical stop at the squeegee head for simple stencil mounting

## Stencil cleaner

- Cleaning system with wet, dry and vacuum cleaning mode
- Speed-controlled paper feed for repeatable cleaning cycles and adjusted material consumption
- Dispenser for exact and precise amount of cleaning solvent
- Intelligent stencil cleaner – a cleaning cycle will be automatically performed after a bad stencil inspection
- An easy concept of the cleaning unit enables a fast exchange of the cleaning paper without the need of extra tools

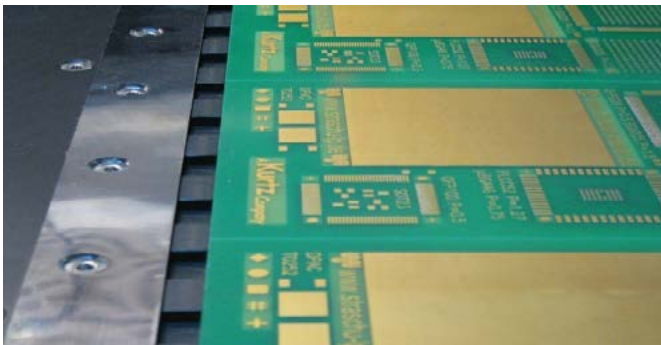
## Dispenser – auger screw or jet

- Screw dispenser for SMD glue or solder paste
- Dispensing of additional paste, e.g. for components with a higher demand of paste
- Glue dispensing to fix heavy or position critical components
- Jet dispenser for more flexibility and speed
- Optional heating unit available for temperature critical material
- Inspection of dispensed dots if 2D or 3D inspection is available



# Options

## for VERSAPRINT 2 PRO<sup>2</sup>, ELITE plus, ULTRA<sup>3</sup> & TIM

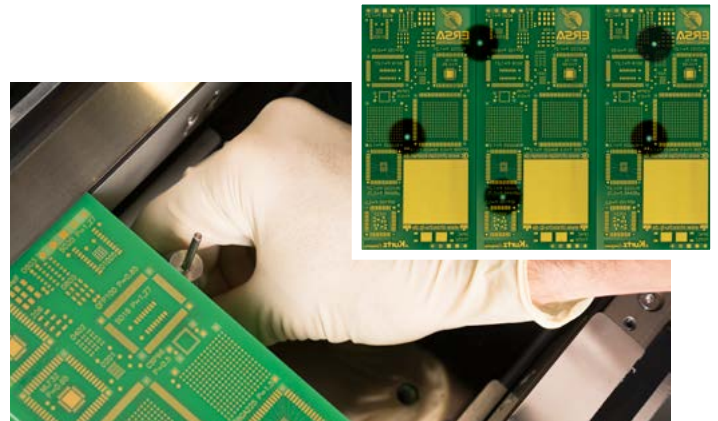


## Retractable over-top clamping

- Perfect solution to print to the edge of the board
- No snap off between stencil and board
- Precise pressure adjustment for side clamping using the track width motor prevents warping of very thin boards
- Height fixation of the side clamping guarantees stencil support outside the print area

## Camera-guided pin positioning

- Camera-guided positioning of the PCB support pins
- Ideal for assemblies where support is not possible on the components
- Prevents the pins being placed under the opening with “pin-in-paste” applications
- The positions of the pins can simply be marked on the printed circuit board at the monitor and serve the set-up technician as a positioning aid – whether the pins have been placed completely and correctly can be seen at a glance



## Additional options

- Paste height control: controls the amount of solder paste on the stencil
- Dispenser for print media: adds solder paste automatically
- Closed loop to SPI: uses the offset values determined by the SPI
- Climate control inside the printer: maintains a constant temperature inside the printer
- Temperature and humidity sensor
- Setup control and DMC (Data Matrix Code recognition): verifies the equipment and materials used before production start
- Flexible substrate support systems: quickly applicable support systems for minimal setup time

# Technical data VERSAPRINT 2

VERSAPRINT 2	ELITE plus	PRO <sup>2</sup>	ULTRA <sup>3</sup>	TIM
<b>Substrate handling</b>				
Maximum substrate size	550 mm x 500 mm			
Maximum printing size	680 mm x 500 mm with workholder possible			
Minimum substrate size	50 mm x 50 mm			
Substrate thickness	0.5 ... 6 mm; 0.8 ... 6 mm with retractable clamping			
Maximum substrate weight	1 kg			1 kg (option: up to 15 kg)
Component clearance	34 mm			30 mm (option: up to 100 mm)
Transport clearance	3 mm			3 mm; 5 mm if 15 kg
Transport height	820 ... 975 mm 870 ... 975 mm (with manual loading or by robotic loading)			
<b>Print parameters</b>				
Print speed	5 ... 200 mm/s			
Print force	0 ... 260 N			
Separation speed	0.1 ... 50 mm/s			
Print mode	alternating, multiple print, flood/print			
Paste knead	programmable			
<b>Stencil mounting</b>				
Maximum stencil size	737 mm x 737 mm x 40 mm			
Minimum stencil size	450 mm x 450 mm x 25 mm			
Adjustable without tools	yes			
<b>Performance</b>				
Repeatability	± 12.5 µm @ 6 Sigma (CPR > 2)			
Print accuracy	± 25 µm @ 6 Sigma (CPR > 2)			
Cycle time	10 s + print	12 s + print		10 s + print
<b>Vision</b>				
Fiducial size	0.5 ... 3 mm			
Fiducial types	all synthetic fiducials or any unique shape within the camera's field of view			
Camera	area camera	2D LIST camera	3D LIST camera	area camera
Field of view	10.4 mm x 8.3 mm	34 mm x 0.018 mm	34 mm x 0.017 mm	10.4 mm x 8.3 mm
Inspection speed	1 picture/s	210 mm/s	130 mm/s	1 picture/s
Resolution	8 µm/pixel	18 µm/pixel	18 µm/pixel; Z: 1 µm	8 µm/pixel
<b>Dimensions</b>				
Width x depth x height	1,225 mm x 1,855 mm x 1,617 mm			
Weight max.	860 kg			
<b>Electrical data/compressed air</b>				
Power supply	5-wire system, 3 x 400 V, N, PE 50/60 Hz, 16 A			
Air supply	6 ... 10 bar, 5 l/min; in vacuum cleaning mode 5.5 l/s			

## Worldwide presence:

**America:**  
usa@kurtzera.com

**Asia:**  
asia@kurtzera.com

**Vietnam:**  
info-kev@kurtzera.com

**France:**  
kefrance@kurtzera.com

**Mexico:**  
info-kmx@kurtzera.com

**China:**  
info-esh@kurtzera.com

**India:**  
india@kurtzera.com