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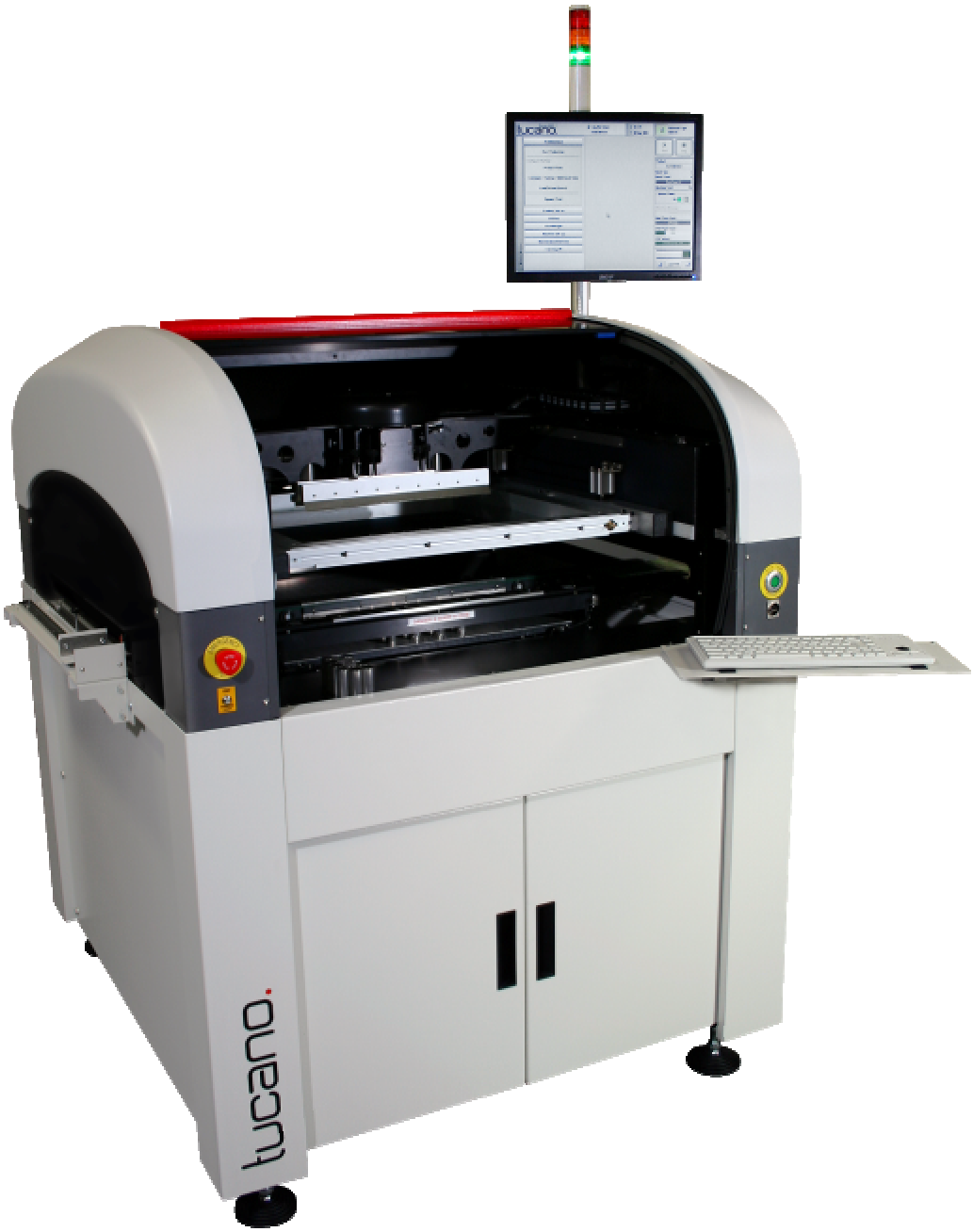
Tucano Stencil Printer

Version 1.01 • December 22nd 2010

System Description



Modification protocol

Version	Date, Vis	Modification
1.00	14.10.2010	Release
1.01	22.12.2010	Dimensions in inches added; New Frame Adapters etc.

1. System Overview

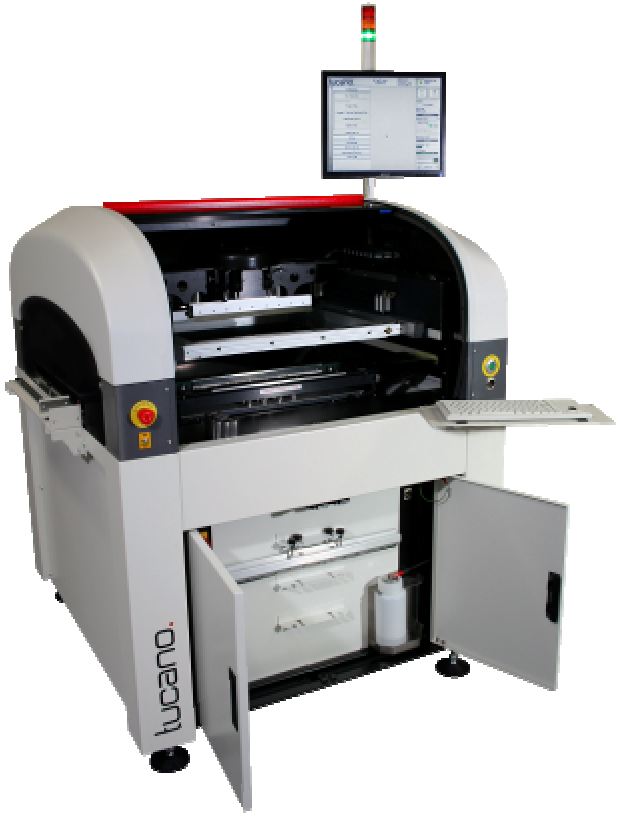
The Tucano is the next development of the already successful SP900. New requirements for the Tucano were:

Higher accuracy and repeatability
Shorter cycle times
Faster product setup and change over times
Small foot print
Reduced maintenance costs

The Tucano was developed to handle a wide range of PCB sizes despite its small footprint of only 1.3m². With its extremely short cycle time of less than10 seconds and high accuracy of 12.5µm @ 6 sigma, this printer takes its place in the middle/ high volume market. The mechanical design is optimised for minimal maintenance costs.

The Tucano is designed to print solder paste, glue and other suitable mediums for stencil and screen printing.

1 Mechanic Overview

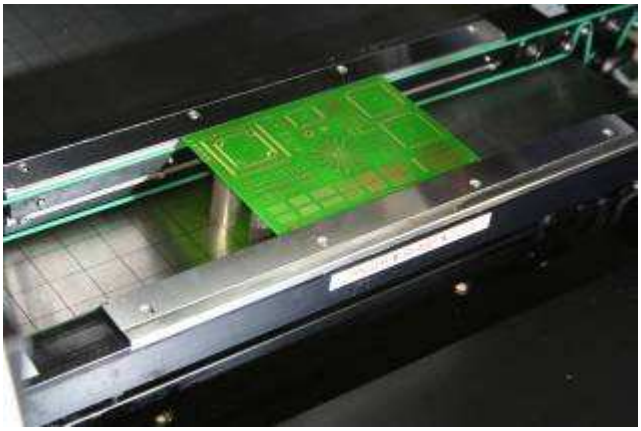


1.1 Structure

The basic stability of the Tucano is based on a welded structure. By using two independent structures to isolate the mechanics from outside influences which is successfully used on our Solar Printer. This gives a strong platform for fast cycle times, high accuracy and repeatability.

1.2 Table Mechanism

The table mechanism is designed for fast and accurate alignment. This is enabled by using stepper motors with a high resolution. Additional is the whole table mechanism extremely strong designed for excellent repeatability.

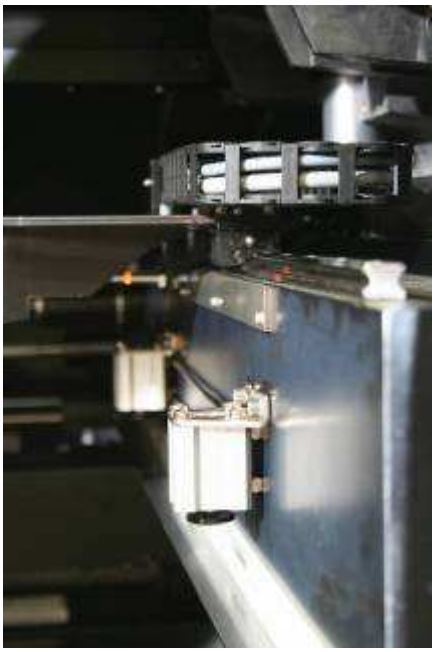


1.3 Fully Programmable Transport System

The new developed Transport System is designed for fast transport speed and a big range of products.
For quick changeover and set-up, the transport width of the conveyor is automatically set, but can also be adjusted manually. The transport system can be fully programmed for each product. Also is the transport direction, loading and unloading position free adjustable for all kinds of product lines.

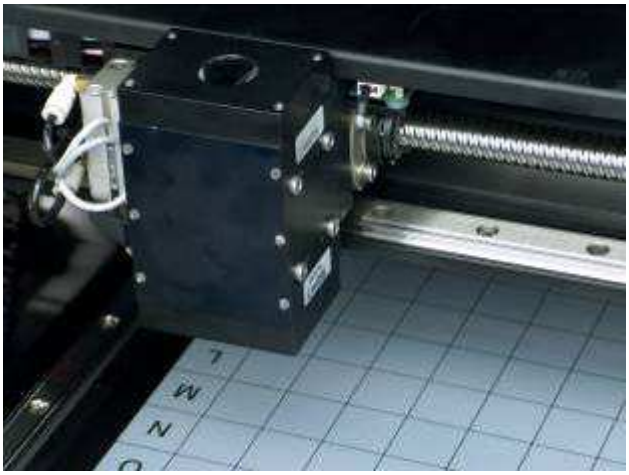
The board-stencil alignment is done by moving the complete table in both horizontal axes and rotation. With the vertical motion, the snap-off distance and speed are controlled accurately and reliably.

The board stopper is fully programmable as it is integrated in the camera. Therefore, the board loading position is programmable too.



1.4 Stencil clamping system

For quick changeover, the automatic stencil clamping system is very helpful. Once the product is set up in the machine, next time the stencil will be loaded automatically.



1.5 Double Camera Vision System

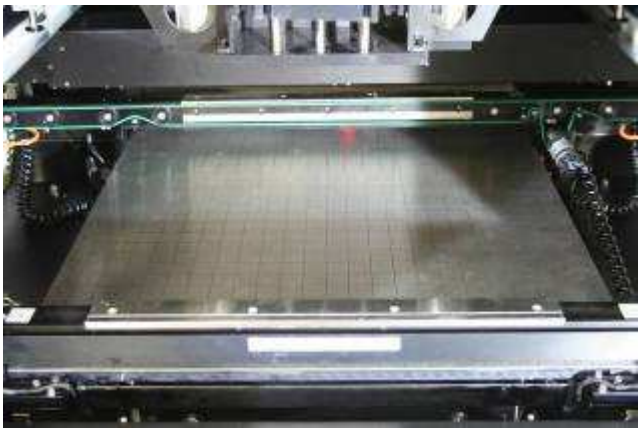
The unique dual camera vision system uses a combination of stored and live images to align the board with the stencil. It can recognise standard board features or dedicated fiducials to provide perfect alignment each time.

The system is fast and flexible and features multipoint alignment to compensate for stencil stretch and board manufacturing variations. Alignment calibration and vision system training are fully automatic to minimise operator intervention.

With the fully programmable RGB-LED illumination the vision can use more than 16 Million different colours for illumination. Therefore, for every PCB or stencil the colour with maximum contrast can be selected. Therefore, for every PCB or stencil the colour with maximum contrast can be selected.

1.6 Camera Drive :

The Camera Drive is made out of a combination of Belt driven for the y movement and ball screw driven for the x movement. All axes are controlled by powerful motors with high resolution Linear Encoders.



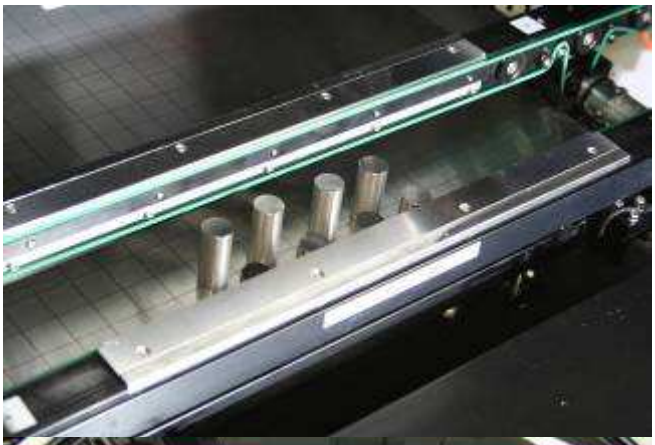
1.7 Print Table:

The rigid Table is fitted with an extreme resistant surface provides a flat screen surface. Additional the grid supports the operator during placement of the Tooling Pins. (see software)

1.8 Double Squeegee Print Head

The fully programmable print head features

- Programmable print pressure using a an accurate motion control in combination with calibrated springs
- Full programmable print speed in both directions
- Belt driven Print head for easy maintenance



1.9 Manual Tooling Grid

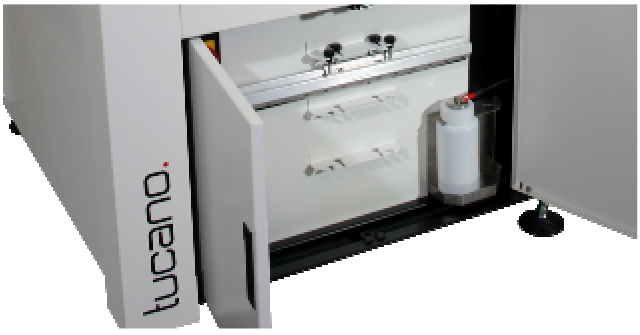
For manual tooling, the Tucano is equipped with a magnetic tooling grid. PCB Support Tooling can be placed accurately on the grid.

1.10 Under Stencil Cleaning System

The fully programmable under stencil cleaning system enables dry and wet cleaning cycles with or without vacuum (vacuum is available on Tucano-USC-V only).

Paper exchange can be easily done from front or back.

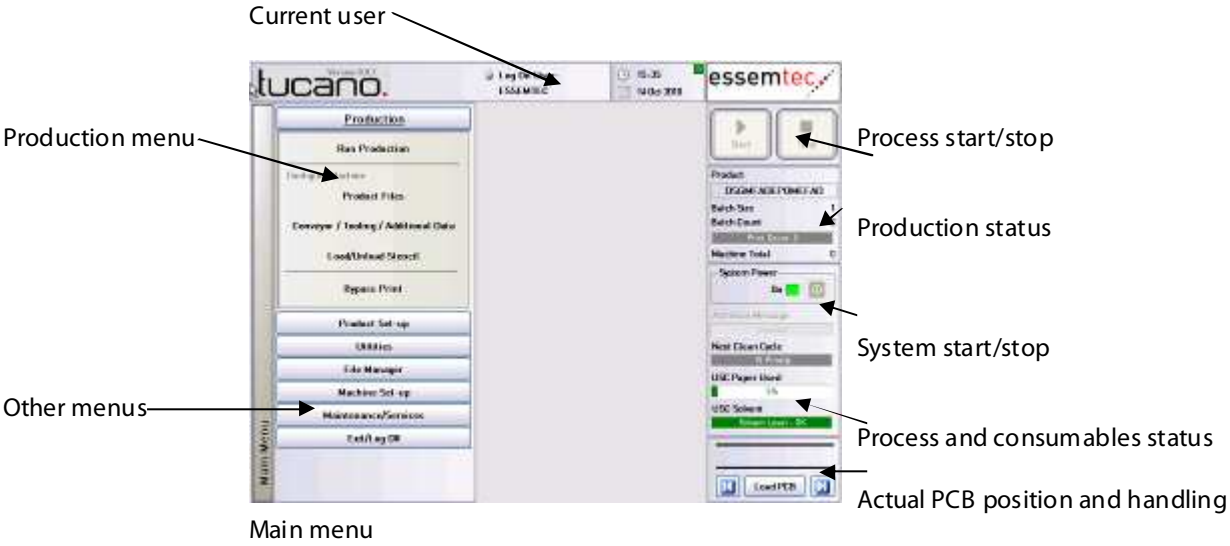
Solvent exchange can be done by replacing the solvent bottle at the front of the machine.



2 Software

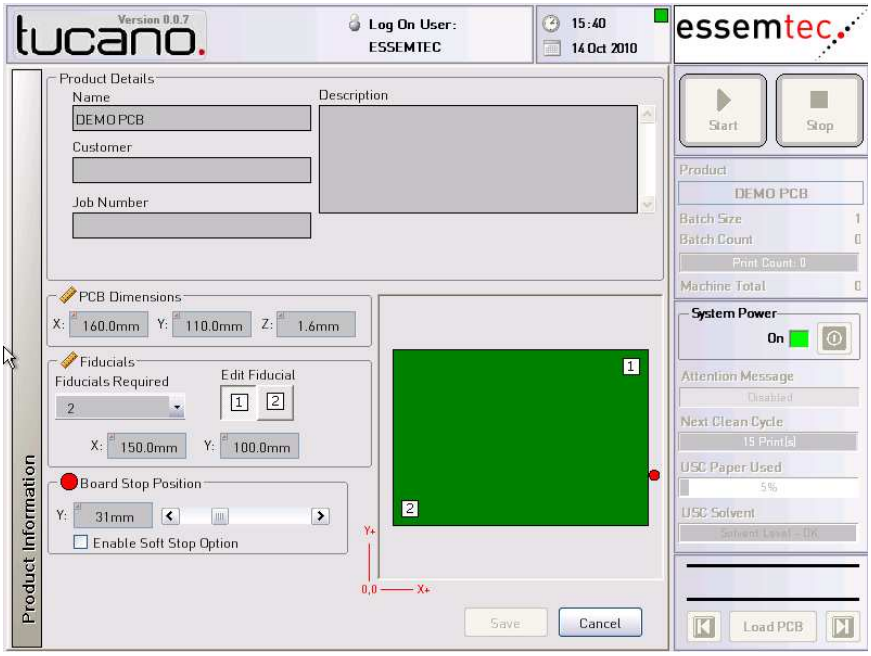
The Tucano software is designed for easy to use and fast product setup and change over.

Easy and Intuitive User Interface Software



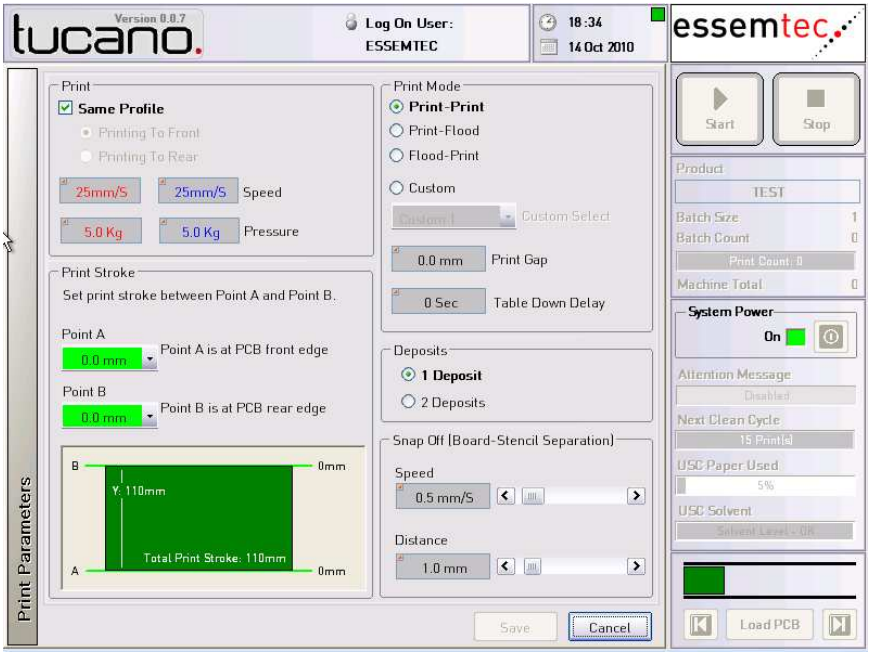
2.1 Guided Product setup:

The guided Product setup leads the operator through all the required product setup stages. This simplyfies setup,saves time and significantly reduces user errors.



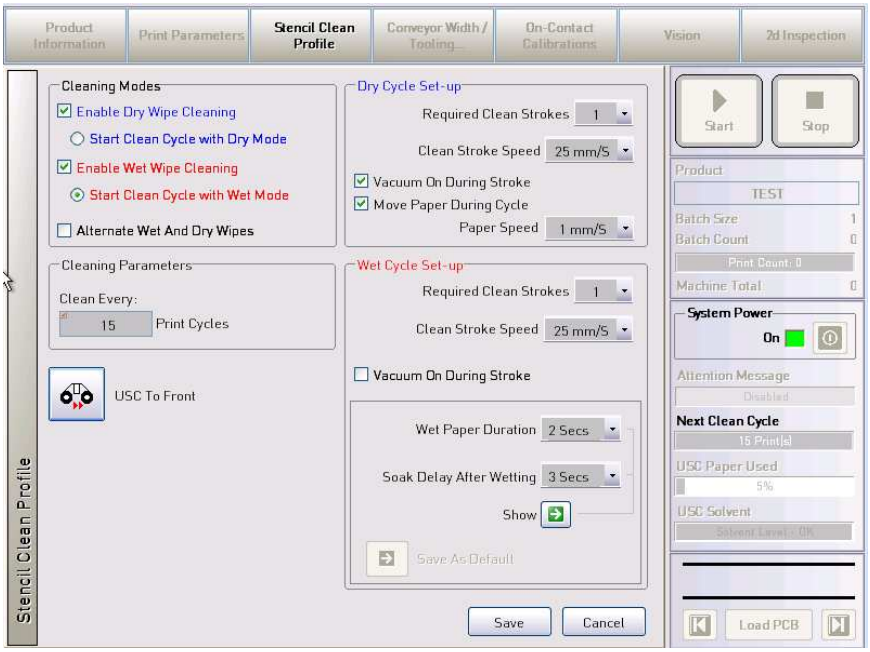
2.2 Product Details:

Just add the main Product informations. For example; Name, Customer, Jobnumber, Dimensions, and so on.



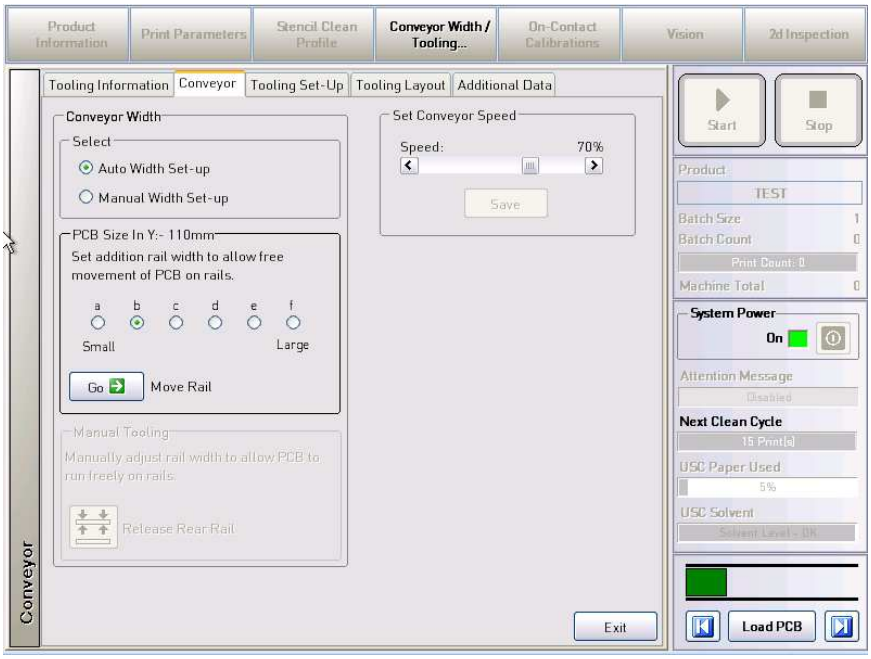
2.3 Print Parameter Set up:

Enter required print parameter. These parameter are also avaible in the production mode.



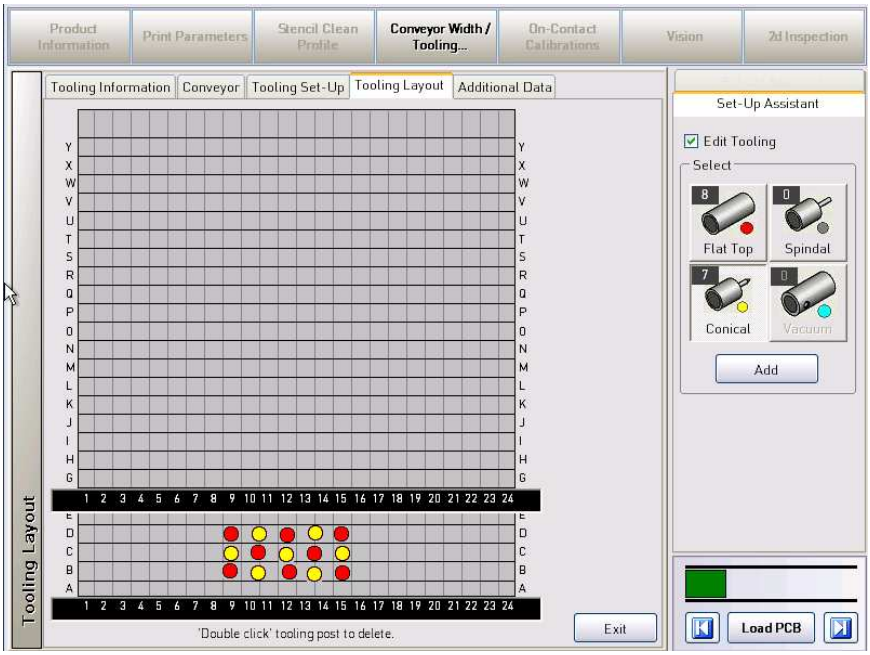
2.4 USC Parameter:

Just adapt the USC cleaning profile to your product requirements.



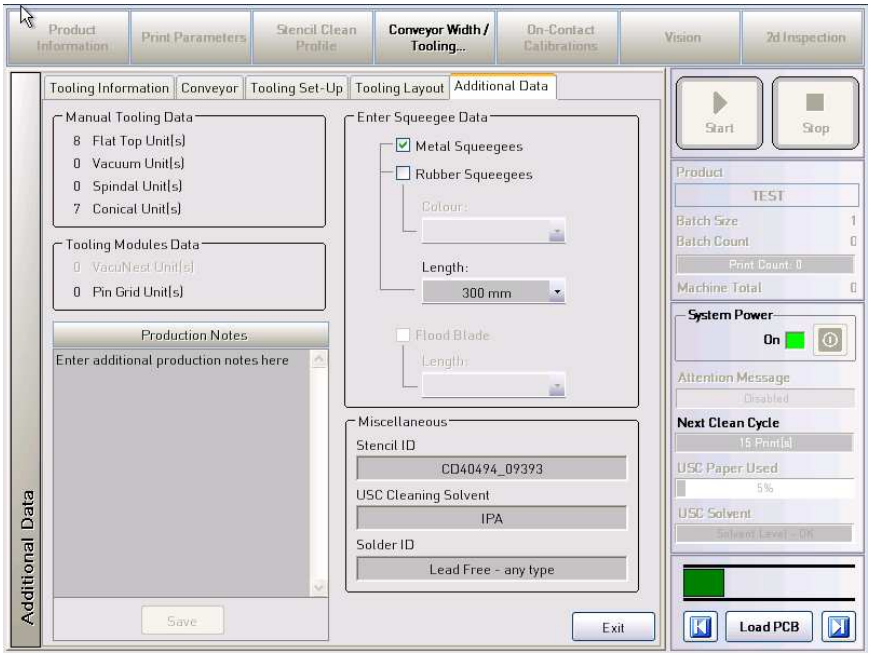
2.5 Conveyer parameter:

Enter the conveyor width either manually or let the machine do it automatically. The speed at which the product moves within the machine is also set here.



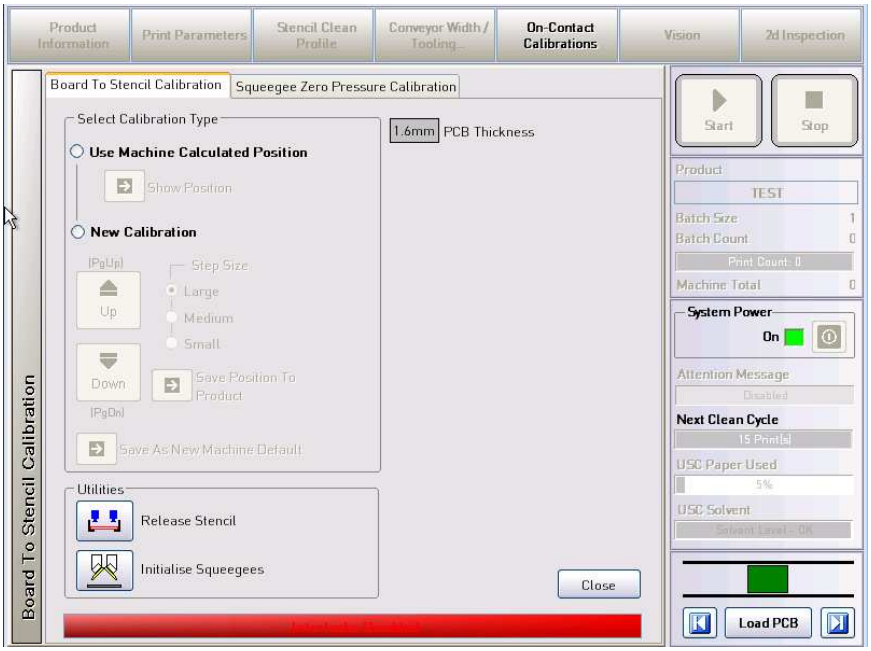
2.6 Tooling Layout:

Record the actual tooling layout to help simplify product change over.



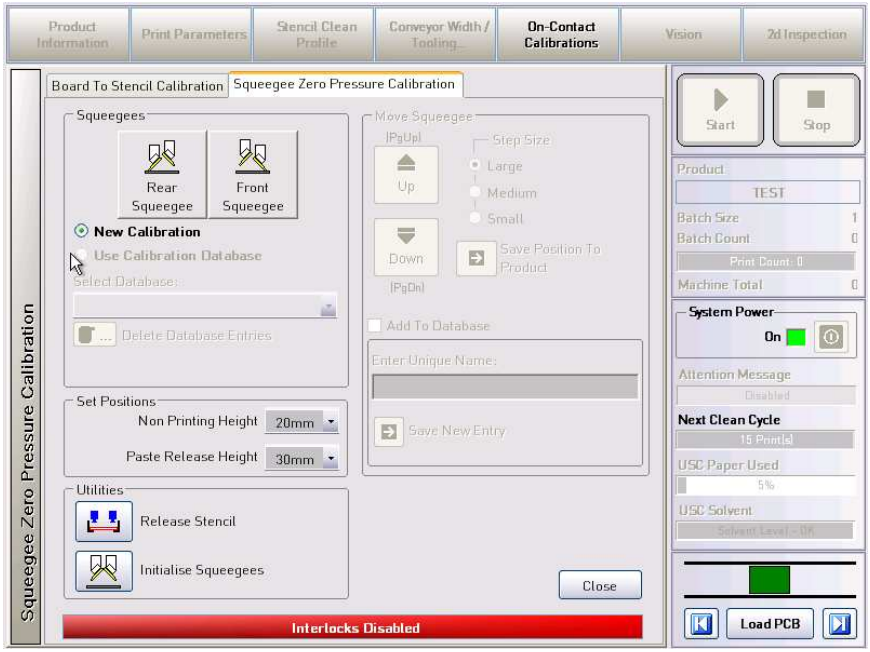
2.7 Additional Data:

Save additional product information used for each product. This includes: squeegee length, stencil ID, solder paste type and production notes.



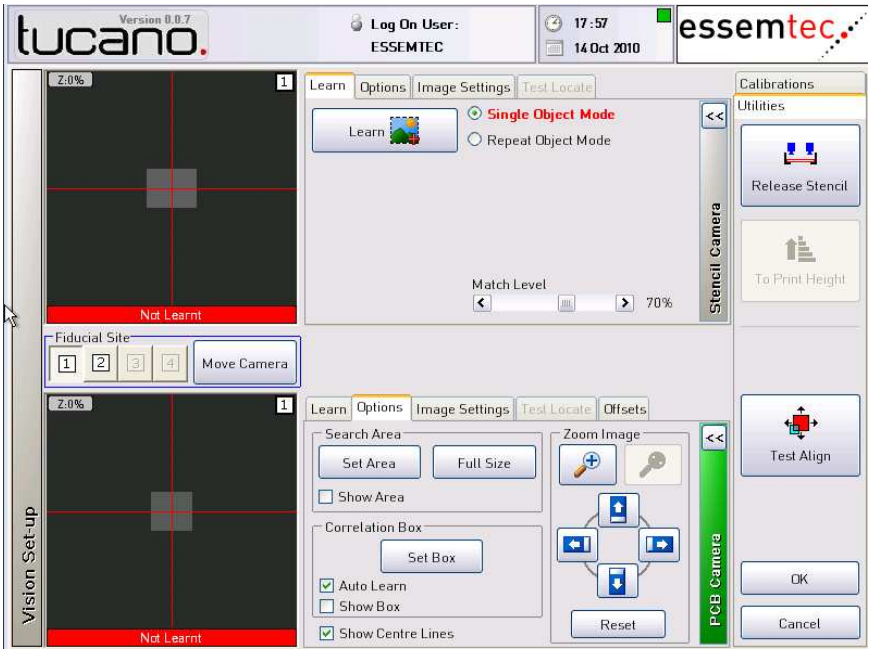
2.8 Board to stencil calibration:

Two methods can be used to set this calibration point. Either manually set the on-contact point or let the printer determine the position.



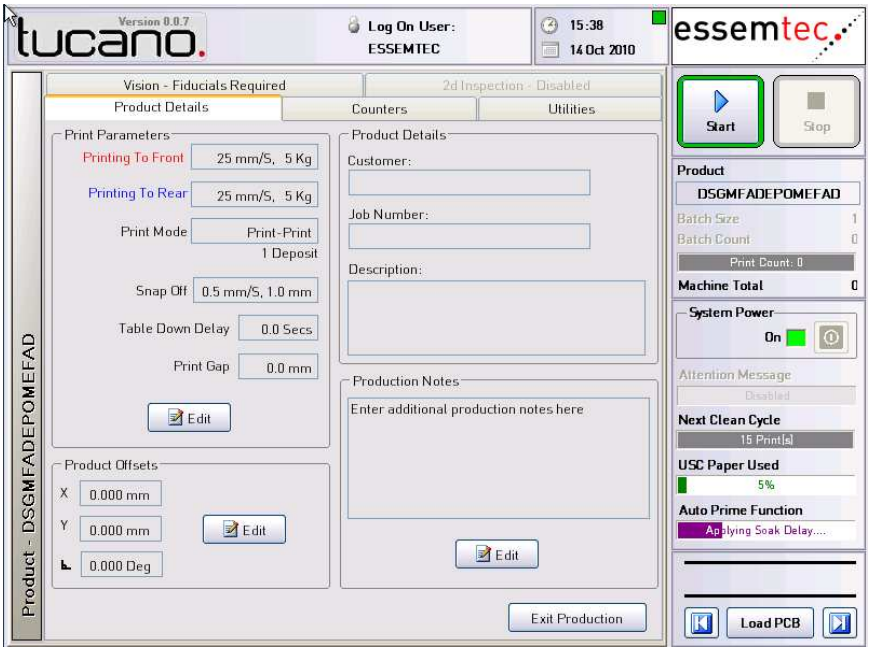
2.9 Squeegee Zero Pressure Calibration:

Squeegee Zero Pressure values can be set manually or retrieved from a database of known settings.



2.10 Vision:

Fiducial settings are achieved by simply 'point and click'. Other PCB features such as pads can alternatively be used in the absence of fiducials.



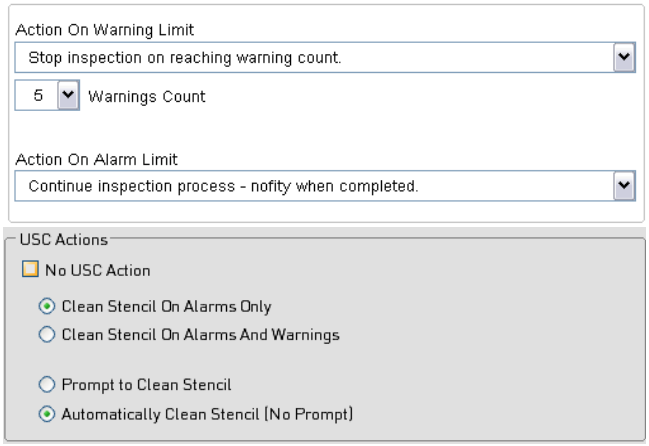
2.11 Production Mode:

The most important parameters like printing speed and pressure, offsets and printer utilities are accessible in the Production Mode.

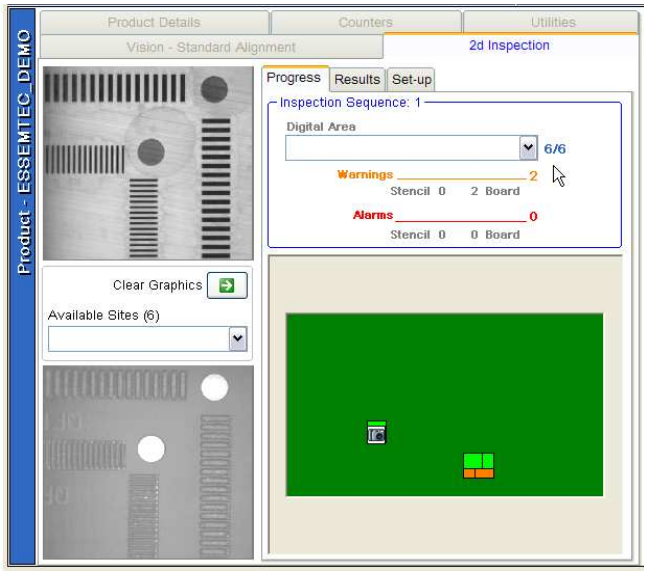
3 Options

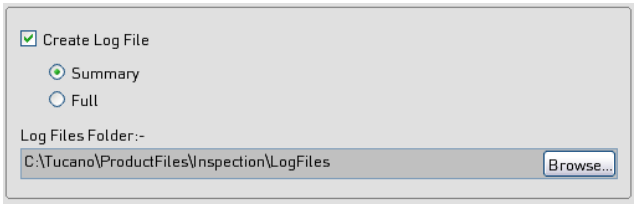
3.1 Post Print 2D Inspection of Board and Stencil

Post print inspection is a desirable function for integrated, fully automatic production. The software can detect paste and printing errors for both the stencil and PCB. Automatic cleaning of the stencil is also possible using the inspection function.



Warning and alarm handling Tuca-IS1.

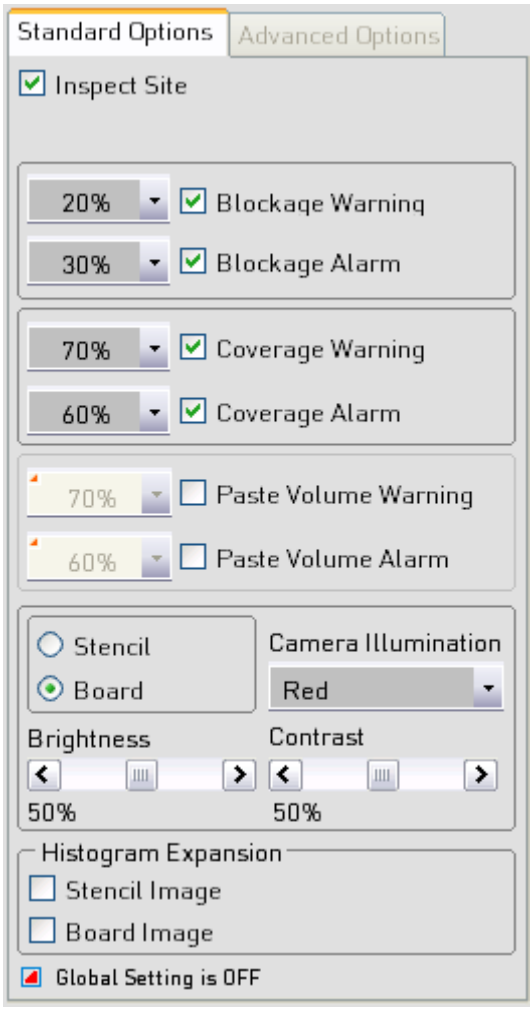




All inspection results can be stored to a log file.

Tuca-IS1 Standard 2D post print inspection
Standard version features:

- Detect stencil blockage
- Analyse paste coverage on pads
- Predict paste volume from stencil blockage and paste coverage data.
- Programmable Inspection Rate – e.g All sites every cycle, selected sites every cycle, inspect sites every x prints
- Inspection sites can be divided into inspection regions allowing any combination of regions to be inspected at different frequencies.
- Actions on Alarms and/or warnings. Can now set action on programmable amount of warnings detected.
- Programmable cleaner action on alarm and/or warnings detection.



Post print inspection settings.

3.2 Tucano Definition Options

The standard delivery includes

- 516 mm (20.27") cleaning paper roll and vacuum (only on Tucano-USC-V). This width should be sufficient for the majority of applications a 29x29" stencil tension frame.
- English keyboard and operation software

The following options define your specific requirements regarding paper/vacuum width, power and language.

Option	Description	Application
SP900-DEF-VUS	Supply voltage 110V/60Hz, US power cable	USA and Canada
SP900-DEF-VEU	Supply voltage 230V/50Hz, European cable	EU
SP900-DEF-VCH	Supply voltage 230V/50Hz, Swiss power cable	Switzerland

3.3 Tucano Manual Tooling Options

All manual tooling pins are magnetic. They can be freely repositioned without the use of tools.

SP900-MTS-KIT
Flat top manual magnetic tooling support kit (20 Pcs), diameter 20 mm (0.79"), height 44 mm (1.73")

SP900-MTS-001
Flat top manual magnetic tooling support, diameter 20 mm (0.79"), height 44 mm (1.73")

SP900-MTS-002
Flat top manual magnetic tooling supports, diameter 4 mm (0.16"), height 44 mm (1.73")

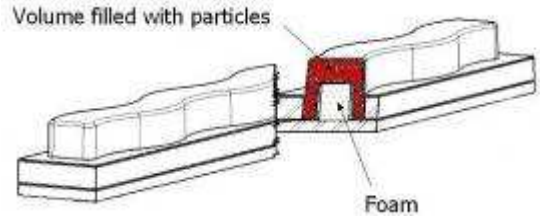
SP900-MTS-003
Conical manual magnetic tooling supports, diameter 4 mm (o.16"), height 44 mm (1.73")

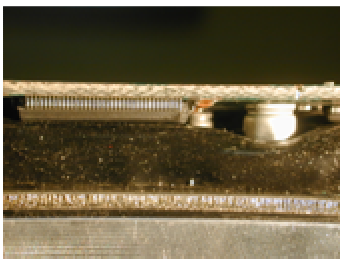
3.4 Tucano Vacuum Tooling Options

SP900-VTS-KIT
Vacuum magnetic tooling support kit (8 Pcs), diameter 20 mm (0.79"), height 44 mm (1.73")

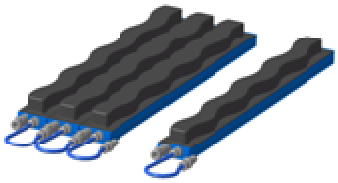
3.5 Tucano Vacunest Tooling

- ✓ Automatic shape recognition
- ✓ Quick setup and universal application
- ✓ Homogeneous support pressure distribution





Homogeneous support pressure distribution



Modular expandable

Perfect supporting of any shape

Order Number	Description
SP900-VNS-1	Vacunest Module 366x40x44mm (14.41x1.57x1.73")
SP900-VNS-2	Vacunest set up plate
SP900-VGS-COMP	Vacunest/Gridlok Control Unit complete incl. 3 x VNS-1.
SP900-VGS	Vacunest/Gridlok Control Unit (to be ordered with initial printer)

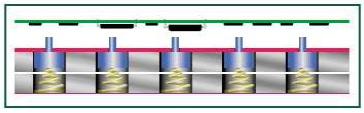
3.6 Tucano RE-Board Support Manual

Benefits:

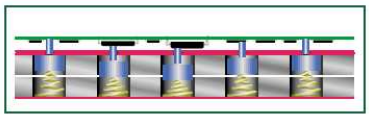
- Maximum support of both single- and double-sided boards
- Magnetic modules allow quick changeover
- Add modules as needed to both length and width
- Larger substrate capacity at half the price of competitors' models

Features:

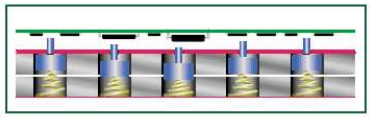
- Reduces stencil coining on screen printers
- Close spacing of pins for maximum support
- Independently spring-loaded, non-abrasive support pins
- Pins lock in place to fit board's contour and for repeat usage



Support pins are individually spring loaded



Pins will take the shape of the underside of the populated board



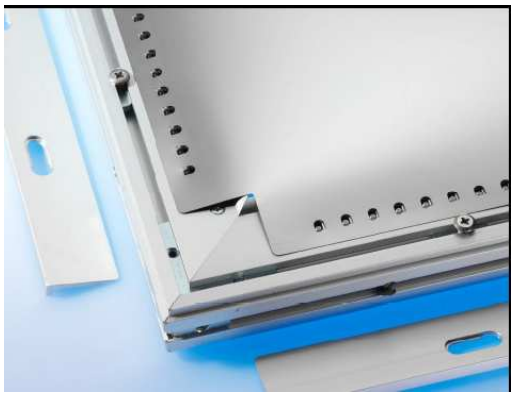
Pins are locked in place.

Order Number	Description
SP900-RE-6	RE-Board Support 152.4mm (6") x 33.5mm (1.32") manual; 12.7mm (0.5") Pin Height
SP900-RE-16	RE-Board Support 406.4mm (16") x 33.5mm (1.32") manual; 12.7mm (0.5") Pin Height
SP900-RE-18	RE-Board Support 457.2mm (18") x 33.5mm (1.32") manual;12.7mm (0.5") Pin Height.
SP900-RE-24	RE-Board Support 609.6mm (24") x 33.5mm (1.32") manual; 12.7mm (0.5") Pin Height.
SP900-RE-PP	RE Board Support Press Plate (for easy setup)
SP900-RE-AW	RE-Board Support T Handle Allen Wrench (Setup Tool)

3.7 Tucano Stencil Frames

4-sided pneumatic stencil tension frame for equal tension all over the stencil surface. The pneumatic tension allows a quick changeover of stencils. The frame is filled with air for tensioning. The air connection can then be released, the frame will keep it's tension. For stencil release, the air pressure inside the frame is released.

Frame complete with mounted stencil and air tube.



Stencil fixation detail. Layout Gerber data are available from ESSEMTEC.

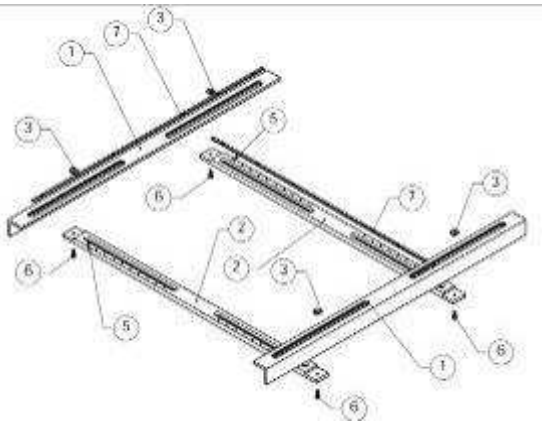
Specification	SP900-SF29 (recommended)	SP900-SF29-438	SP900-SF29-616
Outer dimensions	29x29" (737x737mm)	29x29" (737x737mm)	29x29" (737x737mm)
Stencil outer dimensions	598x598 mm (21.1x21.1")	520x520 mm (20.5x205")	698x698 mm (27.5x275")
Printing area	516x516 mm (20.3x203")	438x438 mm (17.25x17.25")	616x616 mm (24 ¼ x 24 ¼")
Clamping adapter height	40 mm (1.5")		33 mm (1.3")
Air tube	included, tube outer diameter 6 mm, quick connection to frame		
Air pressure	Max. 6 bar (87 psi) for stencils >150 µm (>6 mil) Max. 4 bar (58 psi) for stencils 100-150 µm (4-6 mil)		

3.8 Tucano Frame Adapter

3.8.1 SP900-ADPT

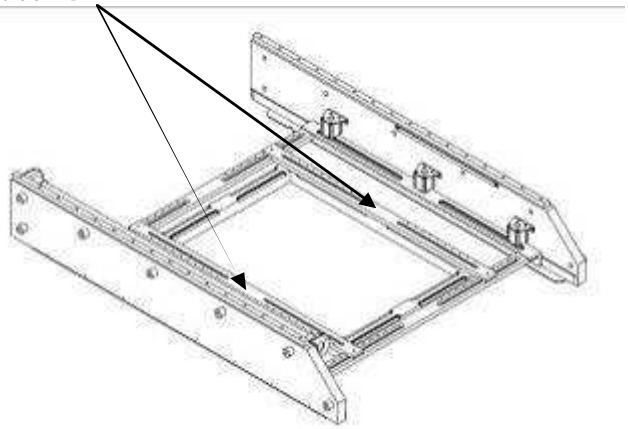
The first is to use our Multi-Purpose Frame adaptor – SP900-ADPT. The frame would need 6mm or 1/4" threaded holes in the top corners of the frame to connect to the adaptor.

SP900-ADPT



Adapter for stencil frames smaller than 29x29". The frames are fixed on the X bars (2). The Y bars (1) fit into the standard frame clamping system of the SP900 printer.

SP900-ADPT-1



Additional Y cross bars for SP900-ADPT for frames more than 25mm thick. The additional Y cross bars are fitted on the X bars (2, see left picture).

Specification	Value
Maximum frame height without SP900-ADPT-1	25 mm
Maximum frame height with SP900-ADPT-1	32 mm

3.8.2 LTC Adapters

Part. No.	Description
Tuca-ADPT-LTC-540/760	Frame Adapter to LTC QFP-2 540x760x30mm (21.25x29.92x1.18" / 736 x 760x40mm (29x29.92x1.57")
Tuca-ADPT-LTC-584/720	Frame Adapter to LTC QFP-2 584x720x30mm / 736 x 736 x 40mm ((23x28.35x1.18")

3.8.3 SPGEN-Adapters

Part. No.	Description
Tuca-ADPT-14L	Frame Adapter to SPGEN-14L 584mm to 736mm (23" to 29")
Tuca-ADPT-13	Frame Adapter to SPGEN-13L 508mm to 736mm (20" to 29")

*other Adapters on request

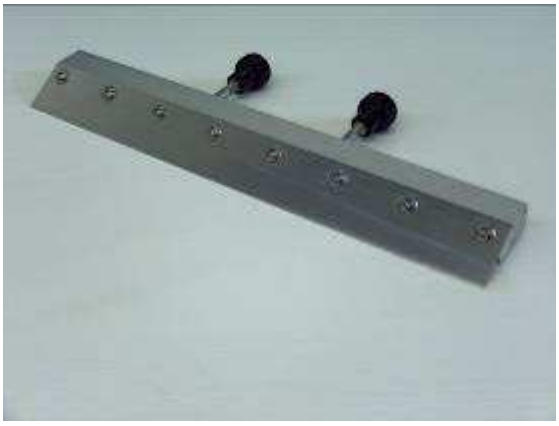
3.9 Tucano Squeegees

3.9.1 Tucano Metal Squeegee Assemblies (SP900-AxxxM)

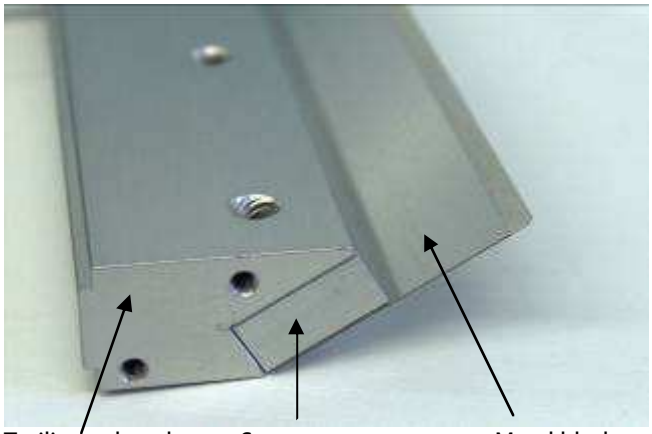
The metal squeegee assemblies provide a highly accurate stencil printing. They are available in different width from 150 to 608 mm (5.9-23.94″). A metal squeegee assembly consists of

- Metal squeegee blade
- Squeegee spacer
- Trailing edge clamp plate

One printer requires 2 squeegee assemblies, one for the print stroke from front to back, the other one for the print stroke back to front.



Metal squeegee assembly



Standard squeegee length:	150mm (5.9″), 220mm (8.7″), 300mm (11.8″), 360mm (14.2″), 420mm (16.5″),
Squeegee angle:	60°

3.9.2 Tucano Polyurethane Squeegee Assemblies (SP900-SHxxx-45)

PU (Polyurethane) squeegee assemblies are available in different width from 150 to 608mm (5.9-23.94”). The PU can be of different hardness of 60 to 90 shore. A PU squeegee assembly consists of

- PU squeegee blade
- Trailing edge clamp plate

One printer requires 2 squeegee assemblies, one for the print stroke from front to back, the other one for the print stroke back to front.

PU squeegee assembly

PU blades of different hardness

Standard squeegee length:	450mm (20.1”), 460mm (18.1”), 520mm (20.5”) and 608mm (23.9”)
Standard squeegee hardness:	60 shore (colour: light blue) 70 shore (colour: yellow) 80 shore (colour: red) 90 shore (colour: white)
Squeegee angle:	60°

3.9.3 Tucano Flood Squeegee Assemblies (SP900-AxxxF)

Flood squeegee assemblies are available in different length from 150 to 608mm (5.9-23.94").
One printer requires 2 squeegee assemblies, one for the print stroke from front to back, the other one for the print stroke back to front.

3.9.4 Tucano 45 Special Squeegee Holder 45° (SP900-SHxxx-45)

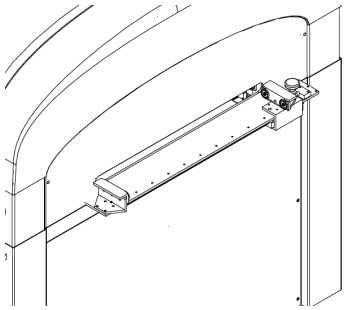
Some applications require a flat squeegee angle of 45°. Such squeegee holders are available in two lengths (300mm (11.8") and 360mm (14.2").
Note: This option requires additional squeegee blades for full function:

- PU squeegee blade (spare part)
- Metal squeegee blade and spacer (spare parts=

One printer requires 2 squeegee assemblies, one for the print stroke from front to back, the other one for the print stroke back to front.

3.10 Tucano Inlet

Conveyer extensions helpful if the Tucano is used as stand alone or in combination with a loading module.



Part. No.	Description
Tuca-Einl100-left	Inlet left 100mm (3.94"), necessary for use together with some loading module
Tuca-Einl100-right	Inlet right 100mm (3.94")

*other Dimensions on request

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4 Dimensions