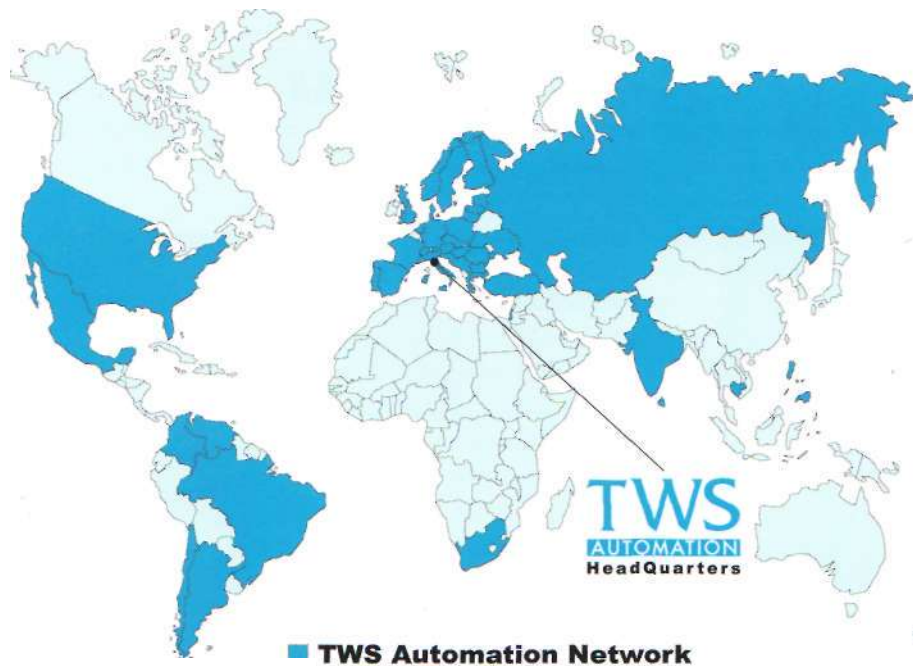


TWS AUTOMATION



SMT SYSTEM 2006



Dear customer,

TWS Automation is a manufacturer based in Italy of low cost assembly lines for SMT PC boards.

Established in 1997, TWS Automation is a member of C-MAP, a multinational group leading in the field of satellite navigation and electronic charting. C-Map head office is located in Marina di Carrara, Tuscany, and coincides with the administrative address of TWS Automation.

TWS Automation's equipment is also used in house by TWS, another company of the Group, to assemble complex electronic cards needed for its production of navigation instruments.

This big production line that use eight Pick&Place, two ovens, screen printers and other auxiliary equipment is the best test bed for TWS Automation products and is used regularly to demonstrate in a live environment the functionality of our SMD assembly lines.

TWS Automation is focused on designing and producing equipment that is simple, hence reliable and easy to maintain. Because of this design philosophy the overall performance of TWS Automation products often outdo that of the more complex and delicate equipment on the market. Our goal is not just to manufacture first class equipment, but to provide our customers with complete and reliable technical support.

TWS Automation has sold more than 700 automated SMT lines throughout Europe, Asia, America and Africa and you will get further information about us visiting our website at: <http://www.tws-automation.com>.



QUADRA *LASER e*



The TWS Automation Quadra is well known for its flexibility, ease of use and low cost of ownership. Now it is available with new encoder motors to improve its performance. Repeatability improvement gives better results, increasing efficiency of this pick and place machine. Over 700 machines sold all over the world testify its success and the Assembly-Industry's appreciation.

The TWS quality/price ratio has revolutionised the concept of surface mount assembly, which was previously considered to be only suitable for large volume manufacturers with large assets.

Unbeatable for small and medium volume manufacturing, the TWS Quadra eliminates the need to sub contract work, thus allowing users to control their quality in-house.

These characteristics have led many customers to expand their production by installing a second and third Quadra rather than looking for a larger machine with higher throughput.

The most important features are:

Cost effective: the machine, having laser centring, has been designed to considerably reduce the capital cost compared to other similar machines currently available. The low cost of the feeders enables users to work with a large feeder inventory to speed up the assembly operation.

High life time: the simple mechanical design uses no delicate mechanisms, and the Laser has been tested to have a long and reliable life span. The new placement head equipped with laser centring ensures high durability, and high speed of placement.

Easy to manage: the machine's software uses very simple menus, enabling the operator to gain a high level of confidence in a short time. The machine comes with a detailed user manual and maintenance guide, and with a practical guide for assembly that includes all stages of production, such as SMD component analysis, solder paste, adhesives, screen printing, soldering, board inspection and verification, repairing and cleaning.

Easy to maintain: all parts of the machine are easy to access and maintain. Maintenance can be carried out by the Operator, who can call our assistance if needed. The machine is driven by a standard PC. Spare parts are low in cost and always available from stock with a fast turnaround. An integrated system provides diagnostics for testing and measuring power absorption of the boards inside the machine. The integral CPU also controls the machine I/O's such as vacuum, electro-magnets, laser centring, axis movement and status of the limit switches.

Quick feeder changeover: the feeders can handle various tapes or stick sizes.

New feeders can be prepared off-line in order to reduce downtime for program changeovers.

High numbers of feeders: The unit can handle all the main types of components and accommodates up to 120 feeders in total, in tape from 8 mm to 44 mm width with 7", 13" or 15" reel diameter.

A catalogue is available for stick components. IC lanes for components not listed in the catalogue may be prepared in a short time.

Programming modalities: There are four ways of programming:

Teaching through camera, data loading via CAD file, data entry via keyboard and prepared by an off-line programming digitiser.

Automatic fiducial recognition: At the beginning of every assembly cycle, the camera automatically moves to the memorised reference points, searches for their exact position and adjusts the placement positions, for better precision.

Dispensing of adhesives and solder paste: The optional dispenser enables easy and rapid dispensing of adhesive and solder paste.

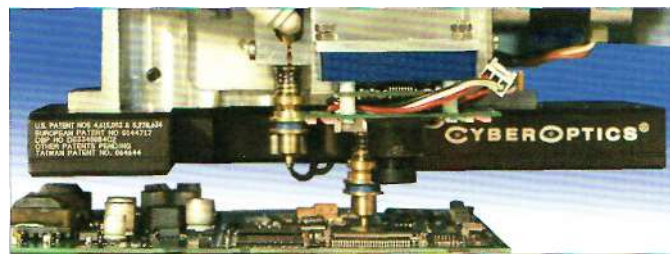
The dispenser is simple to set up and achieves over 4000 dots per hour. An additional volumetric dispenser, not supplied by TWS Automation, could be mounted on the machine.

Smart feeders: With its feeder database the Quadra Laser provides fast set-up. There is no need to re-enter the feeder data, since a new electronic system detect automatically feeders mounted on the machine, loading data of the components already present in that feeder. It doesn't matter if you change position of the feeder: machine will recognize it. Each time a component is picked-up, its quantity is decremented.

After the feeder data has been recorded for the first time, every subsequent time a group of feeder banks is changed, you can run the function that automatically detects the feeders and their positions on the machine.

Network connection: Connecting a Quadra to a local network (LAN) allows the user to easily and automatically make a back-up copy of the mounting program onto an external PC. The program and configuration files can be transferred from one machine to another without using external devices such as floppy disks. Use of the LAN network, also allows the feeder database to be used in conjunction with smart feeders and the information can be shared by all the machines, reducing set-up time. The feeder database is updated with every change made to the feeder configuration.

Centering by vision system: An additional external camera equip machine to accurately center components. The camera is located at a fixed position on the work area and provides more accurate centring of BGAs, very fine-pitch ICs, large components and similar.



TECHNICAL SPECIFICATIONS

- **Components size and type:** The machine can mount chip components from 0402, Melf, Mini-melf, cylindrical components, transistors, SOT diodes, integrated circuits 0.5 mm pitch (20 mil), PLCC and LCCC integrated circuits up to 35 mm, trimmers, inductors, connectors, aluminium electrolytic capacitors up to 10.5 mm high.
- **Placement Area:** The placement area and the maximum printed circuit board dimensions are 440 x 360 mm. For larger boards, the placement area can be extended by removing feeder magazines on one or two sides of the machine, making the maximum board size 550 x 420 mm. The machine needs at least 2 square meters area (including the unit itself) to operate correctly.
- **Productivity:** 4000 components per hour. The average productivity is 3500 components per hour.
- **Placement Head:** The machine is supplied with a dual-spindle laser centring head where the centring is obtained by means of the laser system. The placement head moves along the X and Y axes. Each head is equipped with a laser and vacuum sensor to detect component pick-up failure and to command a new pick-up cycle. Some components may be centred off-line by a special mechanism.
- **Axes Movement:** The New encoder motors allow higher performance, granting better repeatability and higher life time.
- **Resolution:** 0.02 mm on X and Y axes 0.08° on the Theta axis rotation for head 1, 0.16° for head 2,
- **Repeatability:** ± 0.04 mm on X and Y axes ±0.16° on Theta axis
- **Accuracy:** ±0.10mm on X and Y axes 0.16° on Theta axis rotation
- **Noise:** The noise coming from the unit is 65 dBA (average value) and 90 dBA (instantaneous peak value), measured at 1 meter from the unit and 1.6 meter from the ground.
- **Power Supply:** The unit works with AC 230Volt ± 10%, 50/60Hz. Consumption is lower than 1 kW. One 8-10 bar air compressed source is required and consumption is about 60 L / air each minute.
- **Dimensions:** 850x1000x1800 mm (Depth x Width x Height)
- **Weight:** 215 kg
- **Packaging:** 960x1200x1650 mm (Depth x Width x Height)
- **Gross weight:** 300 kg

QUADRA *BASIC*



The TWS Automation Quadra is suitable for prototype and/or for small to medium sized manufacturing batches, representing a lower cost option in the TWS Automation Pick & Place range.

The Quadra Pick & Place machine is supplied with a dual spindle mechanical centring head where the centring is carried out by means of 4 lightweight jaws and if requested, can be equipped with a dispenser for adhesives and solder paste.

The machine accommodates up to 120 feeders in total, in tapes from 8 mm to 44 mm width, 7", 13" or 15" reel diameter and any kind of stick and tray. The most important features are:

Cost effective: the machine, having mechanical centring, has been designed to considerably reduce the capital equipment cost compared to other similar machines currently available. The low cost of the feeders enables users to work with a large feeder inventory to speed up the assembly operation.

High durability: the simple mechanical design uses no delicate mechanisms, and the Quadra has been tested to have a long and reliable life span.

Easy to manage: the machine's software uses very simple menus, enabling the operator to gain a high level of confidence in a short time.

The machine comes with a detailed user manual and maintenance guide, and with a practical guide for assembly that includes all stages of production, such as SMD component analysis, solder paste, adhesives, screen printing, soldering, board inspection and verification, repairing and cleaning.

Easy to maintain: all parts of the machine are easy to access and maintain. Maintenance can be carried out by the Operator, who can, if required, call upon our assistance if needed.

The machine is driven by an industry standard PC. Spare parts are low in cost and always available from stock with a fast turnaround.

An integrated system provides diagnostics for testing and measuring power absorption of the boards inside the machine.

The integral CPU also controls the machine I/O's such as vacuum, electro-magnets, laser centring, axis movement and status of the limit switches.

Quick feeder changeover: the feeders can handle various tapes or stick sizes.

New feeders can be prepared off-line in order to reduce downtime for program changeovers.

High numbers of feeders: The unit can handle all the main types of components and accommodates up to 120 feeders in total, in tape from 8 mm to 44 mm width with 7", 13" or 15" reel diameter.

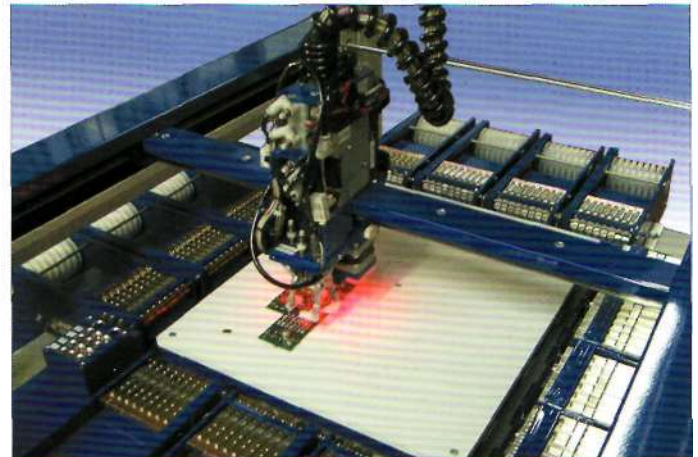
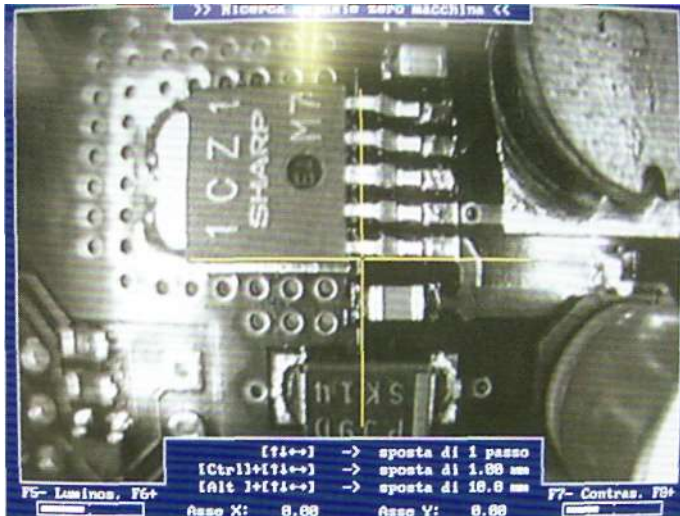
A catalogue is available for stick components. IC lanes for components not listed in the catalogue may be prepared in a short time.

Programming modalities: There are four ways of programming:

Teaching through camera, data loading via CAD file, data entry via keyboard and prepared by an off-line programming digitiser.

Automatic fiducial recognition: At the beginning of every assembly cycle, the camera automatically moves to the memorised reference points, searches for their exact position and adjusts the placement positions, for better precision.

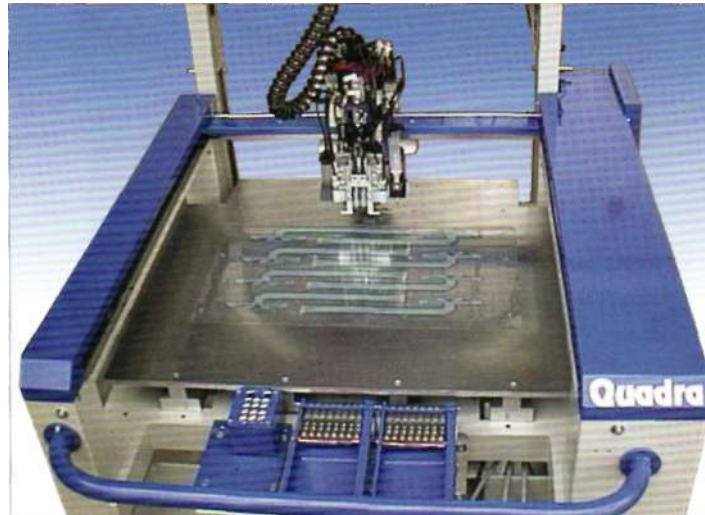
Dispensing of adhesives and solder paste: The optional dispenser enables easy and rapid dispensing of adhesive and solder paste. The dispenser is simple to set up and achieves over 4000 dots per hour. An additional volumetric dispenser, not supplied by TWS Automation, could be mounted on the machine.



TECHNICAL SPECIFICATIONS

- **Components size and type:** The unit can mount chip components from 0603, Melf Mini-melf, cylindrical components, Sot transistors, diodes, integrated circuits with 0.8 mm pitch (31.5 mil) up to 35 mm, PLCC and LQCC integrated circuits up to 35 mm, trimmers, inductors, connectors, aluminium electrolytic capacitors up to 10.5 mm high.
- **Placement Area:** The placement area and the maximum printed circuit board dimensions are 440 x 360 mm. For larger boards, the placement area can be extended by removing feeder magazines on one or two sides of the unit, making the maximum board size 550 x 420 mm.
- **Productivity:** 3600 components per hour. The average productivity is 3000 components per hour.
- **Placement Head:** The unit is supplied with a dual-spindle mechanical centring head where the centering is by means of 4 jaws. The placement head moves along the X and Y axes. Each head is equipped with a vacuum sensor to detect component pick-up failure and to command a new pick-up cycle. Components bigger than 15 mm are centred off-line by a special mechanism.
- **Axes Movement:** Stepper motors driven by a controlled gradient, allowing the head motion to accelerate and slow down at the starting and stopping points.
- **Resolution:** 0,02 mm on X and Y axes 0.45° on the Theta axis rotation
- **Repeatability:** ± 0.12 mm on X and Y axes ± 0.45° on Theta axis
- **Accuracy:** ± 0.20 mm on X and Y axes 0.90° on Theta axis rotation
- **Noise:** The noise coming from the unit is 65 dBA (average value) and 90 dBA (instantaneous peak value), measured at 1 meter from the unit and 1.6 meters from the ground.
- **Power Supply:** The unit works with an AC 220Volt. + 10%, 50/60Hz. Consumption is lower than 1 kW. One 8 - 10 bar air compressed source is required and consumption is about 60 L / air each minute.
- Dimensions: 850x1000x1800 mm (Depth x Width x Height)
- **Weight:** 215 kg
- **Packaging:** 960x1200x1650 mm (Depth x Width x Height)
- **Gross weight:** 300 kg

QUADRA *MEMBRANE*



This Pick & Place Quadra for Membrane Keyboards has been designed for placing SMD components and metal domes on membrane keyboards. There are two versions: one with conveyor and one with fixed vacuum plate. This machine can also be used for dispensing glue and paste using two syringes. The new features of this special application are:

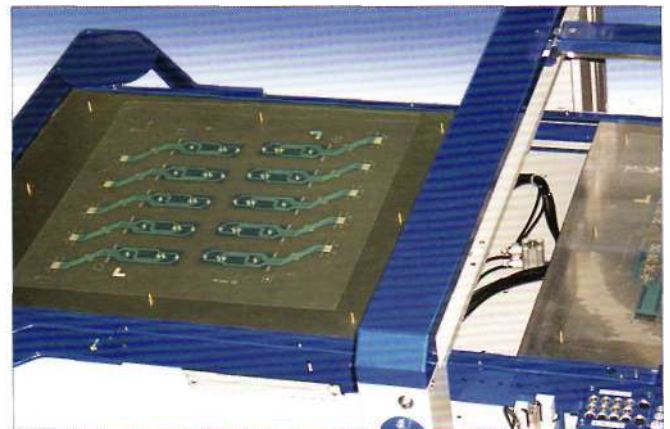
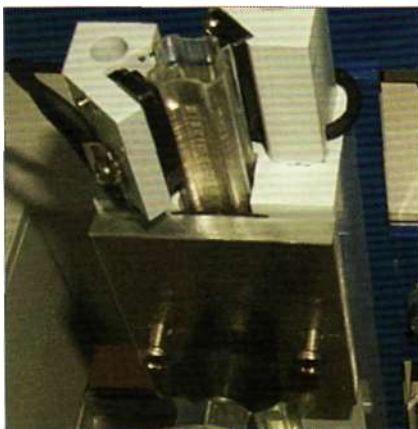
CONVEYOR AND PALLET SYSTEM: With the Quadra equipped with conveyor, the flexible keyboards are assembled on a rigid support (pallet) that are handled by a conveyor.

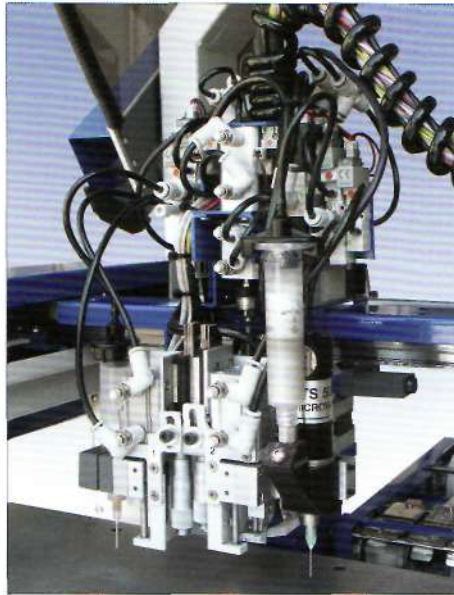
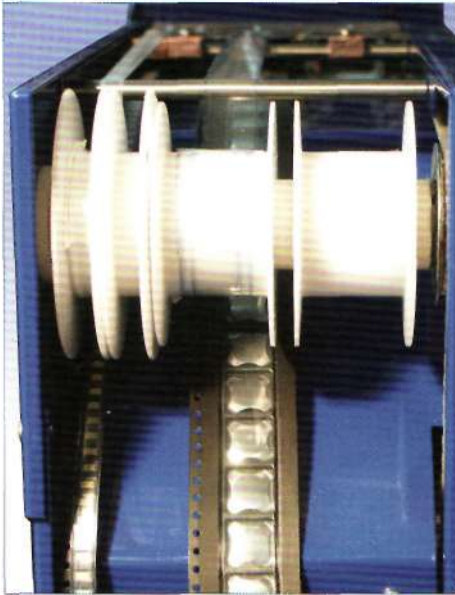
FIXED VACUUM WORKING PLATE: In this version, flexible keyboards are placed on a fixed vacuum plate.

DISPENSER: On request two dispensing systems can be employed together: one time-pressure dispenser and one volumetric dispenser. A separate hose for compressed air now supplies each syringe. This hose has been added to the head wires harness and is connected to a separate air pressure regulator, with a pressure gauge.

FEEDERS: The machine may accommodate two special feeders for metal domes in stick and two feeder magazine for SMD components (stick or tape).

In the special feeder for metal domes in stick, the stack of domes is pushed upward by a screw driven by a motor, and an optoelectronic sensor stops the motor when it detects the presence of the stack of domes.





TECHNICAL SPECIFICATIONS

- **Components size and type:** The unit can mount chip components from 0603, Melt, Mini-melf, cylindrical components, transistors, Sot diodes, integrated circuits 0.8 mm pitch (31.5 mil) up to 35 mm, PLOC and LCCC integrated circuits up to 35 mm, trimmers, inductors, connectors, aluminium electrolytic capacitors up to 10.5 mm high and metal domes.
- **Placement Area:** According to the configuration of the machine (type of conveyor, number of dispensers, quantity and location of the feeder magazines).
- **Productivity:** 3600 components/hour. The average productivity is 3000 components per hour.
- **Placement Head:** The machine is supplied with a dual-spindle mechanical centring head where the centering is obtained by means of 4 lightweight jaws. The placement head moves along the X and Y axes. Each head is equipped with a vacuum sensor to detect component pick-up failure and to command a new pick-up cycle. Components bigger than 15 mm are centred off-line by a special mechanism.
- **Axes Movement:** Stepper motor driven in a controlled gradient, allowing the head motion to accelerate and slowdown at the starting and stopping points.
- **Resolution:** 0.02 mm on X and Y axes 0.45° on the Theta axis rotation
- **Repeatability:** ± 0.12 mm on X and Y axes $\pm 0.45^\circ$ on Theta axis
- **Accuracy:** ± 0.20 mm on X and Y axes 0.90° on Theta axis rotation
- **Noise:** The noise coming from the unit is 65 dBA (average value) and 90 dBA (instantaneous peak value), measured at 1 meter from the unit and 1.6 meter from the ground.
- **Power Supply:** The unit works with an AC 220Volt $\pm 10\%$, 50/60Hz. Consumption is lower than 1 kW. One 8-10 bar air compressed source is required and consumption is about 60 L / air each minute.
- **Dimensions:** 850x1000x1800 mm (Depth x Width x Height)
- **Weight:** 215 kg
- **Packaging:** 960x1200x1650 mm (Depth x Width x Height)
- **Gross weight:** 300 kg
- **Packaging for conveyor:** 820x2150x250 mm (Depth x Width x Height)
- **Gross weight:** 75 kg

608 - 808



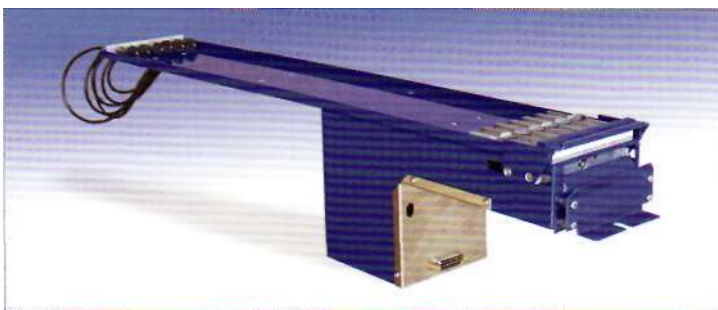
The new smart feeder banks increase their performance: new motor, new belt to improve their reliability, new recognition system through a new electronic control. The feeders are organised in banks which can accommodate up to eight tape reels. This dramatically reduces both costs and set-up time.

The feeder banks are configurable. The operator may decide at any time to change the combination of tape sizes. For instance, three 8mm tapes can be replaced with two 12mm tapes or one 16mm plus one 8mm tape. The feeder banks can be thus configured to suit individual requirements. Feeder sets are available for virtually every kind of tape on the market.

The work principle is very simple and reliable, tested on thousands of feeder banks already sold. No maintenance is needed.

Stick feeders are also organised in similar feeder banks able to accommodate up to six tubes, retaining the advantages of low cost and fast set-up speed. Stick feeder sets for virtually any kind of component and any kind of tube are held in stock. Sets that are not in our catalogue can be custom made in a short time.

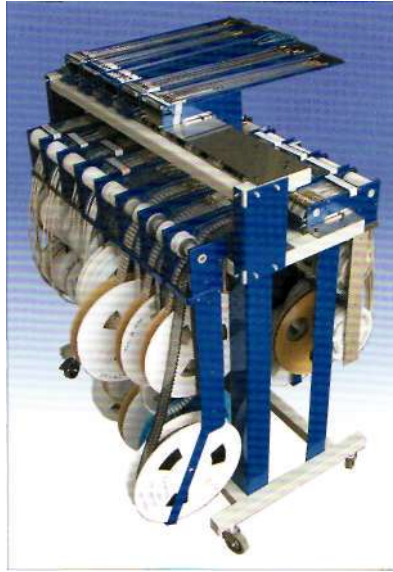
The stick feeders work by using a gentle pulse of compressed air which moves the components along the tube to the pick-up position. This is more reliable than using vibration feeders. The low cost of the magazines allows the user to keep a high number in stock, dedicating their use to a specific board or to different customer's boards.



TECHNICAL SPECIFICATION

- **608 feeder dimensions:** 280x610x100 mm (Depth x Width x Height)
- **Net weight:** 4 Kg
- **808 feeder dimensions:** 150x650x105 mm (Depth x Width x Height)
- **Net weight:** 2,5 Kg
- **Packaging:** 360x770x150 mm (Depth x Width x Height)
- **608 gross weight:** 5 Kg
- **808 gross weight:** 3,5 Kg

TROLLEYS



Lack of space in the work place is a problem all firms have to face. TWS AUTOMATION has created simple and cost-effective trolleys for Quadra feeders, which can save space and improve the order of the workplace.

The 608 model is capable of lodging up to 16 tape feeder banks, and the 608-808 model can lodge 16 tape feeder banks, plus 8 stick feeder banks. These trolleys are not just very useful but also extremely easy to move, practical and most of all space saving. They are supplied dismantled, to reduce shipping costs, and may be quickly mounted in your facility.

For customers who operate just one Quadra pick-and-place and do not need a trolley, TWS AUTOMATION can also offer some practical and reliable shelves that can lodge up to 8 feeder banks.



TECHNICAL SPECIFICATIONS

- **Dimensions 608:** 1060x400x1100 mm (Depth x Width x Height)
- **Weight:** 21 Kg
- **Packaging:** 630x1120x235 mm (Depth x Width x Height)
- **Gross weight:** 23 kg
- **Dimensions 608-808:** 1060x400x1300 mm (Depth x Width x Height)
- **Weight:** 26 Kg
- **Packaging:** 630x1120x235 mm (Depth x Width x Height)
- **Gross weight:** 28 kg
- **Dimensions shelf:** 1050x210x250 mm (Depth x Width x Height)
- **Weight:** 5 Kg
- **Packaging:** 1060x225x100 mm (Depth x Width x Height)
- **Gross weight:** 6 kg

TWS 1400



The TWS 1400 is a 10 zone, full convection reflow oven with an outstanding quality-price ratio.

It is 4 metres long, with a tunnel length of 3 metres. This length provides excellent performance, a controlled soldering profile, high productivity and low power consumption. It is also extremely easy to use.

The TWS 1400 is divided into five upper heating zones and five lower heating zones. Eight zones are for preheating and two for reflow.

The convection is achieved by means of a turbulent flow of hot air generated by carefully placed lateral fans.

The air temperature is controlled by a fast digital PID loop with high stability K thermocouples placed in each zone. The 10 zones are controlled by ten set-point values which can be individually set by the user.

To monitor the soldering performance, the oven is equipped with a temperature recorder. The soldering graph can be monitored through the oven LCD or by connecting the oven to an external PC. In this case the graph can be saved and printed out.

The ten heating zones and the digital adjustment of the conveyor speed provide great flexibility. Up to 14 programs can be saved and quickly downloaded.

The heating elements are controlled by a PID regulator utilizing Burst Firing commutation, making the oven fully compliant with the EMI standards.

The oven's main parameters are constantly monitored by the LCD display of the computer, showing:

- Temperature set-point, for each heating zone
- Actual temperature, for each heating zone



- Conveyor speed set-point
- Actual speed of the conveyor

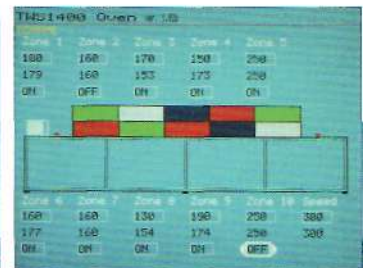
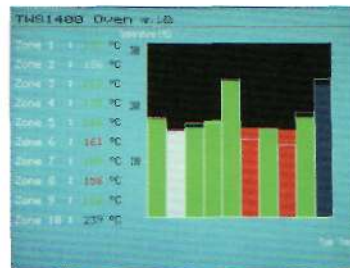
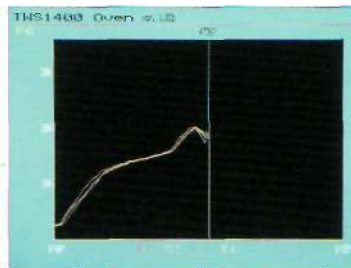
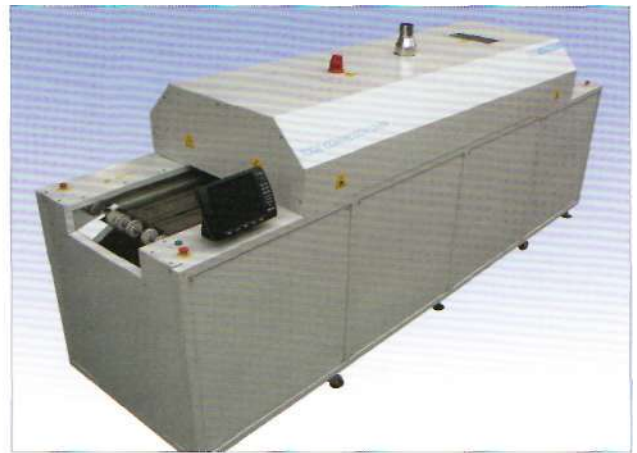
The TWS 1400 is equipped with a new built-in 10" LCD colour display with the new following functions:

- "PID" algorithm to ensure a faster temperature adjustment in the four zones.
- Staggered insertion of the zones in order to reduce power consumption during start-up
- Possibility to graphically monitor the temperature ranges in all the zones. Once the operator has set the temperatures, the oven starts to heat up and the colours showed on the screen represent the temperature deviation from the set point.

Also manufactured in Nitrogen version, TWS 1400 oven is able to solder in a controlled atmosphere. Working with nitrogen gives superior performance, improving solder joints wetting, reducing solder balls, making shinier joints, preventing bridging, easing the removal of soldering residues during washing of the boards.

TWS 1400 will be available in two different models: one with traditional conveyor belt and one with conveyor chain.

Also soldering lead-free



TECHNICAL SPECIFICATIONS

- **Conveyor belt width:** 400 mm
- **Conveyor chain width:** 116mm minimum, 400mm maximum (complies with SMEMA standard)
- **Conveyor belt height:** adjustable from 37" to 38" (complies with SMEMA standard)
- **Maximum belt speed:** 700 mm/minute
- **Maximum on-board component height:** 35 mm
- **Maximum temperature differential between adjacent zones:** 110°
- **Max Temperature settings:** 300°C
- **Maximum power consumption:** 20 kW
- **Average power consumption:** 5 kW
- **Heating zones:** 10
- **Cooling zone:** 1
- **Power supply:** 230 Volt or 400 Volt
- **Dimensions:** 1135x4065x1365 mm (Depth x Width x Height)
- **Net weight:** 680 Kg
- **Packaging (wood):** 1230x4160x1460 mm (Depth x Width x Height)
- **Gross weight:** 880 Kg

Energy saving is one of our leading goals. All our ovens are designed to minimize the power requirements.

TWS 1380



The TWS 1380 is an innovative medium-size convection oven, equipped with a support bench (included), which has an outstanding quality-price ratio. The TWS 1380 is 3 metres long (with a 2 metres tunnel) which produces a very good soldering profile, together with high productivity with low power consumption. It is also very easy to use.

The TWS 1380 is divided into four heating zones, three for preheating and one for reflow.

The air convection is directed horizontally by fans that blow the air from the centre of the zone to the surroundings.

The window in the hood of the machine enables the user to observe the reflow process in real time, giving useful indications and allowing for thermal profile fine-tuning without using the recorder. The upper part of the soldering tunnel has a flip-opening system that enables an immediate inspection and cleaning.

The air temperature is controlled by a microprocessor through K-type thermocouples placed in each zone, that keeps the temperature between tight limits.

To obtain the best soldering performance, the oven is equipped with a temperature recorder which can be connected to a PC to display the temperature profiles during the soldering process.

A great variety of thermal profiles can be obtained (to fulfil even the most complex demands) due to its four heating zones and the digital adjustment of the conveyor speed. Up to 14 programs can be stored and quickly downloaded. The heating elements are controlled by a PID



TWS 1250



The TWS 1250 is an innovative medium-size convection oven which has an outstanding quality-price ratio. The TWS 1250 is 2.5 metres long (with a 1.5 metres tunnel) which produces a very good soldering profile, together with high productivity with low power consumption. It is also very easy to use.

It can be equipped with a support bench sold as optional.

The TWS 1250 is divided into three heating zones, two for preheating and one for reflow.

The air convection is directed horizontally by fans that blow the air from the centre of the zone to the surroundings.

The window in the hood of the machine enables the user to observe the reflow process in real time, giving useful indications and allowing for thermal profile fine-tuning without using the recorder. The upper part of the soldering tunnel has a flip-opening system that enables an immediate inspection and cleaning.



The air temperature is controlled by a microprocessor through K-type thermocouples placed in each zone, that keeps the temperature between tight limits.

A great variety of thermal profiles can be obtained (to fulfil even the most complex demands) due to its three heating zones and the digital adjustment of the conveyor speed. Up to 14 programs can be stored and quickly downloaded. The heating elements are controlled by a PID regulator using Burst Firing commutation, complying to EMI standards.

The oven's main parameters, which are constantly monitored by a microprocessor connected to the PC LCD display, shows:

- Temperature set point, for each heating zone
- Actual temperature, for each heating zone
- Conveyor speed set point
- Actual speed of the conveyor

The TWS 1250 is equipped with a new built-in LCD monochrome display with the new following functions:

- "PID" algorithm to ensure a faster temperature adjustment in the four zones.
- Delayed connection of the zone in order to reduce power consumption during the zone heating.

Also soldering lead-free



TECHNICAL SPECIFICATIONS

- **Conveyor belt width:** 400 mm
- **Conveyor belt height:** complies with SMEMA standards with optional table (adjustable from 37" to 38")
- **Maximum belt speed:** 500mm/minute
- **Maximum on-board component height:** 35 mm
- **Maximum temperature differential between adjacent zones:** 110° C
- **Max Temperature settings:** 300°C (zone 1 and zone 2), 350°C (zone 3)
- **Maximum power consumption:** 9 kW
- **Average power consumption:** 3.5 kW
- **Heating zones:** 3
- **Cooling zone:** 1
- **Power supply:** 230 Volt or 400 Volt
- **Dimensions:** 800x2500x600 mm (Depth x Width x Height)
- **Net weight:** 160 Kg
- **Packaging (wood):** 880x2620x900 mm (Depth x Width x Height)
- **Gross weight:** 250 Kg

Energy saving is one of our leading goals. All our ovens are designed to minimize the power requirements.

TWS 1150



The TWS 1150 is a full forced air convection oven with 2 zones capable of soldering boards up to 400 mm in width.

Unlike infrared systems, the hot air soldering is not influenced by the colour of the component and only slightly by the thermal mass of the components. With the oven operating at just 50 deg above the reflow temperature, this allows the boards to remain in the oven longer without causing thermal shock. For this reason the process window is increased making profiling far easier and a wider variety of boards to be soldered with little adjustment to the profile. The oven's main parameters are constantly monitored by a microprocessor connected to a LCD display of the computer, showing:

-Temperature set-point, for each heating zone -Actual temperature, for each heating zone -Conveyor speed set-point -Actual speed of the conveyor

TWS 1150 is equipped with a built-in LCD display with new functions as the following:

-"PID" algorithm to ensure a faster temperatures adjustment of the two zones.

-Connection of the two zones delayed in order to reduce power consumption during the zones heating.

In case of powercut, a pad-battery ensures the transport of the boards out of the heating tunnel.

A storage support for the oven is also available

Also soldering lead-free



TECHNICAL SPECIFICATIONS

- Conveyor belt width: 400 mm
- Conveyor belt height: complies with SMEMA standards (adjustable from 37" to 38")
- Maximum belt speed: 500mm/minute
- Maximum on-board component height: 35 mm
- Maximum temperature differential between adjacent zones: 110°
- Max Temperature settings: 300°C (zone 1), 350°C (zone 2)
- Maximum power consumption: 7 kW
- Average power consumption: 3 kW
- Heating zones: 2
- Cooling zone: 1
- Power supply: 230 Volt or 400 Volt
- Dimensions: 800x2000x600 mm (Depth x Width x Height)
- Net weight: 140 Kg
- Packaging (wood): 880x2050x900 mm (Depth x Width x Height)
- Gross weight: 200 Kg

Energy saving is one of our leading goals. All our ovens are designed to minimize the power requirements.

TWS1150 AND TWS1250 OPEN TABLE

TWS Automation has designed tables and storage cabinets that can offer strong support for all of the reflow ovens. The storage compartments and shelves are ideal for storing PCBs, tools, accessories and similar, close to the working environment.

The TWS Automation SMT furniture follow the official standards for the interface and operation of the equipment promoted by the SMEMA International Association.



TECHNICAL SPECIFICATIONS

- **Dimensions:** 603x1580x640 mm (Depth x Width x Height)
- **Weight:** Kg 21
- **Packaging:** 180x1620x330 mm (Depth x Width x Height)
- **Gross weight:** Kg 35

TWS 850



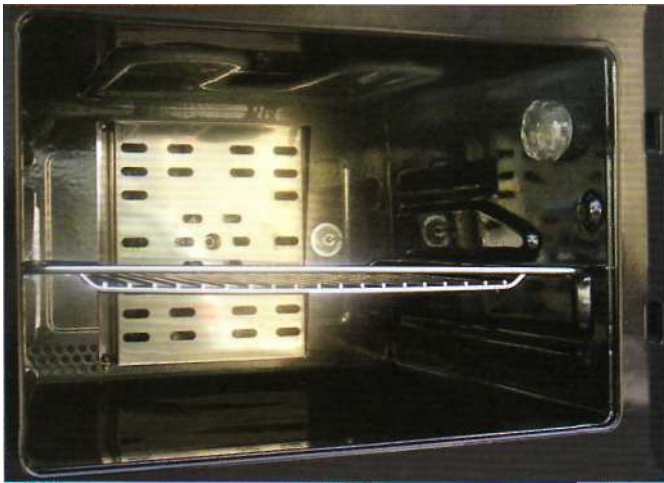
TWS 850 is a batch convection reflow oven, designed to solder prototypes and small batches, for curing of adhesives and baking of components. Small, compact and with low power consumption, the TWS 850 warms up in only a few minutes after switch on. Heat diffusion is very efficient across the whole surface of the PCB, giving precise thermal profile.

One of its functions is the "hot bake", used to dehumidify large integrated circuits or similar components before the soldering process.

It is equipped with a rear smoke exhaust system, with an electronic display to set temperature values for any solder profile and with an electronic indicator of the actual temperature inside the oven. A buzzer warns the operator once the soldering process is complete. The user may easily operate the oven, by looking at the instructions displayed on the LCD display.

The soldering parameters are stored in memory, ready to be displayed again every time the oven is switched on.

Also soldering lead-free



TECHNICAL SPECIFICATIONS

- **PCB max dimensions (mm):** 250x200 (Depth x Width)
- **Max Temperature settings:** 265°C (Ref. temperature)
- **Maximum power consumption:** 1.5 kW
- **Heating zones:** 1
- **Power supply:** 230 Volt
- **Dimensions:** 420x540x640 mm (Depth x Width x Height)
- **Net weight:** 20 Kg
- **Packaging:** 430x550x650 mm (Depth x Width x Height)
- **Gross weight:** 25 Kg

Energy saving is one of our leading goals. All our ovens are designed to minimize the power requirements.

RT-03

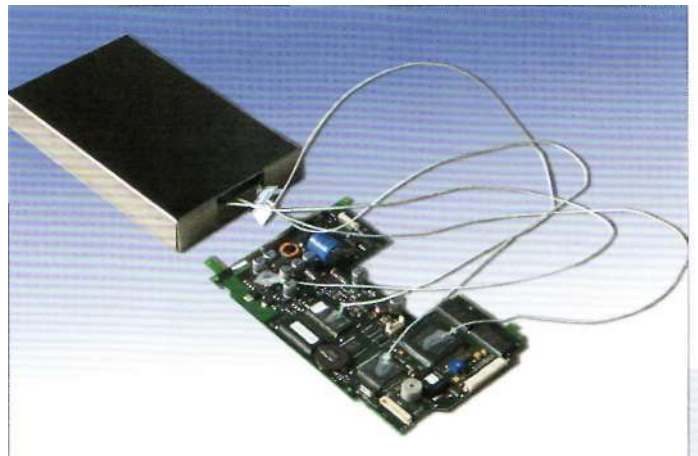


The temperature profile recorder RT-03 is a useful accessory for fine-tuning the SMT soldering process. It enables the user to improve the setting of the oven parameters, to optimise production and to check the soldering process quality, by just looking at the temperature vs. time graph. The device uses four K-type Ni-Cr-Ni micro thermocouples to obtain accurate measurements and high-speed responses. Recording is started and stopped by a manual switch. The maximum duration of recording is 54 minutes, after that time it stops automatically. Of course, in real time, with the profiler connected to a Pc you will be able to record and visualize profiles data for a longer time (about 5 hours). Its small size and compact body makes it an easy-to-use device, suitable for any type of oven.

The software is developed for any Windows system from 95 version onwards. The software manages the communication with the recorder and displays the graph of temperature versus time on the PC monitor using a different colour for each channel. It also provides the following data processing:

- display of thermal gradient, calculating the speed of temperature changes in Celsius degrees per second
- display of three-dimensional temperature graphic
- zooming-in part of the graph, to highlight the most interesting parts
- hard copy of the graphs
- profiles data storage on hard disk.

As option are available the following thermocouples (length 3 mt., 4 mt., 7 mt.)



TECHNICAL SPECIFICATIONS

- **Input:** 4 channels with thermocouples
- **Thermocouples length:** 500 mm (included)
- **Accuracy:** ± 2 °C (at 100 °C)
- **Battery operation:** about 4 hours
- **Registration Time:** 54 minutes max
- **Power supply:** AC Adapter, 7.2 V 500mA (included)
- **Working voltage:** 7.2 Vol, - DC
- **Dimensions:** 340x510x200 mm (Depth x Width x Height)
- **Net weight:** 3,5 Kg
- **Packaging:** 350x520x210 mm (Depth xWidth x Height)
- **Gross weight:** 4 Kg

SR 2500

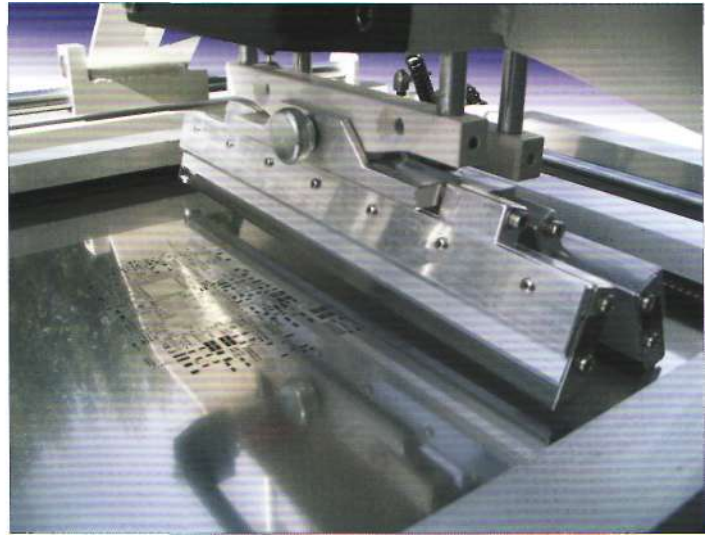
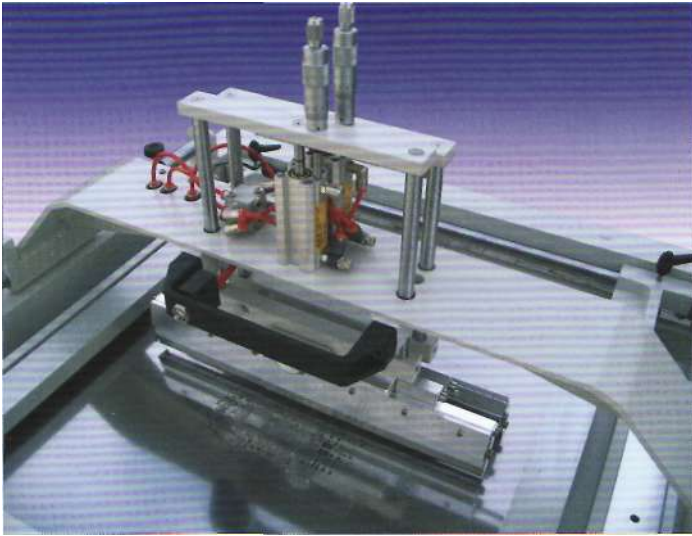


The TWS Automation SR 2500 is an ergonomically designed, air-assisted, benchtop stencil printer for high quality printing. The screen printer SR 2500 gives superior quality printing, at a low cost, and it is extremely easy to use.

The main features are:

- Adjustable snap-off speed, which ensure smooth separation between the stencil and the board, thus improving the paste release from the stencil. The table vertical motion is pneumatically controlled by a front panel switch.
- Double squeegee head, with pneumatic print pressure regulation. The squeegee head is operated by pulling or pushing an handle and it's guided by two rails. Two printing modes: flood-print and print-print. Squeegee angle may be independently adjusted.
- Support table equipped with tool and frame storage cabinet.
- 350 mm metal blade squeegee.
- Universal tooling table, to accept any kind of board including double-sided boards. Tooling pins provided.





On request, the following optional items can be supplied:

- 250 mm adjustable metal blade squeegee
- 400 mm adjustable metal blade squeegee

It can be also equipped with a support bench sold as option.



TECHNICAL SPECIFICATIONS

- **Print area:** 422x422 mm
- **Maximum frame size:** 650x585 mm
- **Compressed air supply:** 4/6 bar
- **Max consumption:** 30 l/min
- **Dimensions:** 880x900x600 mm (Depth x Width x Height)
- **Net weight:** 65 Kg
- **Packaging (wood):** 1060x980x710 mm (Depth x Width x Height)
- **Gross weight:** 97 Kg

OPEN TABLE FOR TWS SCREEN PRINTERS



TWS Automation has designed tables and storage cabinets that can offer strong support for all of the manual and semiautomatic screenprinters. The storage compartments and shelves are ideal for storing PCBs, tools, accessories and similar, close to the working environment. The TWS Automation SMT furniture follow the official standards for the interface and operation of the equipment promoted by the SMEMA International Association.



TECHNICAL SPECIFICATIONS

- **Dimensions:** 1600x1000x760 mm (Depth x Width x Height)
- **Weight:** 50 Kg
- **Packaging:** 1750 x 1160x355 mm (Depth x Width x Height)
- **Gross weight:** 110 Kg

SR 2000



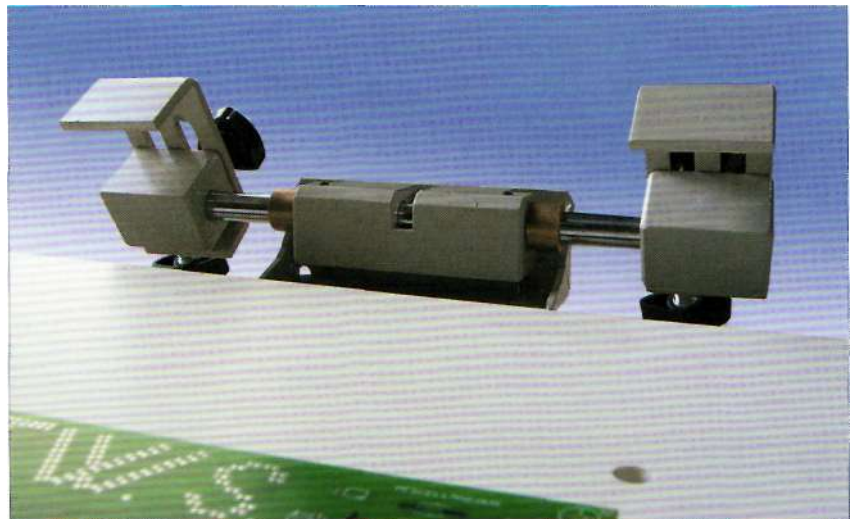
The SR 2000 manual screen printer is an entry-level basic tool that, with some care, can do an excellent job. It enables you to print at lowest cost, being at the same time precise and extremely easy to use with X, Y and Theta adjusting knobs.

The SR 2000 has been designed to be easily transported and to fit any worktable. Its particular design and its simplicity ensure reliability and durability.

The boards are fixed on the workplate by tooling pins.

SR 2000 is also equipped with a magnetic fixture kit, allowing to print any kind of double sided board.

SR 2000 screen printer fits perfectly with TWS 30 frame (available as optional)



TECHNICAL SPECIFICATIONS

- **Maximum frame size:** 570x470 mm
- **Maximum PCB size:** 500x400 mm
- **Print area:** 500x400 mm
- **Dimensions:** 520x660x140 mm (Depth x Width x Height)
- **Net weight:** 14 Kg
- **Packaging:** 540x680x220 mm (Depth x Width x Height)
- **Gross weight:** 16 Kg

SCREEN PRINTING ACCESSORIES

As a part of the SMD line, TWS Automation can offer various accessories and tools such as metal or polyurethane squeegees in any size, universal self-tensioning frames, pre-tensioned mesh screen frames, glue to fix stencils to the mesh screen. Standard squeegee sizes are 50 mm, 250 mm and 350 mm, other sizes upon request.



Frame, Glue for manual printer and Hardner for glue



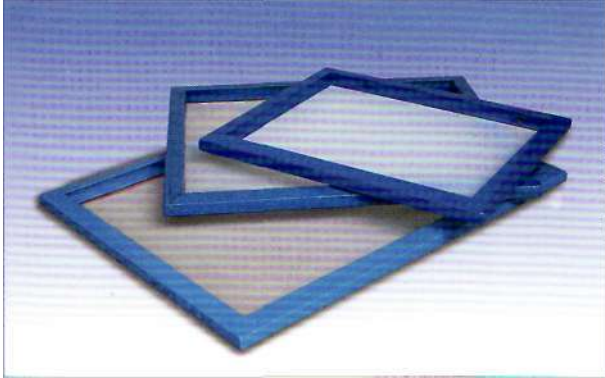
Metal squeegees:
sizes 150 mm, 250 mm, 350 mm



Polyurethane squeegees:
sizes 150 mm, 250 mm, 350 mm

STENCIL FRAMES

TWS Automation provides, as accessories for the screen printer line, different frames to satisfy our customer's needs, starting from the simplest solution to state-of-the-art universal frames.



- TWS 30 polyester mesh screen frame

TWS 30 is a low cost metal frame with pre-tensioned polyester mesh screen. Using the proper two-component glue, the metal stencil may be fixed to the mesh screen; upon glue curing the mesh screen is removed by a cutter from the print area, leaving only the metal stencil exposed. Size available: 550x450 mm



-TWS 100 universal self-tensioning frame

TWS 100 is a self-tensioning frame, with innovative features and tensioning on all four sides of the stencil.

Dimensions: 542x542 mm. Working area: 422x422 mm.

Quick stencil replacement: 3 min.



- TWS 200 universal self-tensioning frame

TWS 200 is a self-tensioning frame, tensioning two sides of the stencil.

Thanks to this feature, it may accommodate stencils having different sizes.

Dimensions: 542x660 mm. Working area: 450x480 mm.

Quick stencil replacement: 3 min.



DM 500



The Depanelling machine DM 500 allows easy and safe separation of panelised scored boards without damaging delicate SMD components. Compared to other depanelling systems the DM 500 has the advantage that the blade height is adjustable. It is not necessary to change the blades when they loose their sharpness, instead you can regulate them in height, avoiding expensive blade replacement. The blade is driven by operating a foot pedal, avoiding any risk of accident.

The special design of the DM 500 makes it possible to depanel PCBs with tall components very close to the scoring line. The blade speed can be adjusted at any time and it stops immediately when the pedal is released.



TECHNICAL SPECIFICATIONS

- **Power supply:** 110 Volt - 230 Volt
- **Power consumption:** 200 Watt
- **Maximum separation length:** 400 mm
- **Disc diameter:** 150 mm
- **Dimensions:** 350x700x450 mm (Depth x Width x Height)
- **Net weight:** 37 Kg
- **Packaging:** 380x720x500 mm (Depth x Width x Height)
- **Gross weight:** 40 Kg

SMT 50*/200



With its vacuum pen for handling SMD components and its syringe for the distribution of soldering pastes, adhesives, soldering masks, silicones, etc., this rework station represents a must in any SMT production line.

This station features a vacuum pen with a wide choice of nozzles and suction cups, able to handle all SMDs, from the smallest chip to the largest fine-pitch integrated circuit.

It is a very useful tool for technicians who have to replace components and mount prototypes. It avoids using automatic equipment, which can be more profitably used for mass production.

The accurate dispenser on the SMT STATION 50/200 can dispense all kinds of fluid, including those with low viscosity, due to its anti-dripping device. The syringe containing the liquid may be operated by a programmable timer driven by a footswitch, or manually: in the latter case the liquid flows until the footswitch is depressed. The adjustable pressure and a wide range of nozzles, allows controllable dispensing of lines and dots to have the maximum flexibility.

The SMT 50 version does not contain the vacuum pen and footswitch.



TECHNICAL SPECIFICATIONS

- **Power supply:** AC adapter 12 V 500 mA (included)
- **Power consumption:** 5 Watt
- **Compressed air supply:** 6 bar
- **Max consumption:** 50 1/min
- **Digital Timer:** adjustable from 0.01s to 99s, with resolution of 0.01 s
- **Working voltage:** 12 Volt DC
- **Working pressure of dispenser:** adjustable from 0 to 6 bar
- **Dimensions:** 290x250x75 mm (Depth x Width x Height)
- **Weight:** 2.5 Kg
- **Packaging:** 315x315x250 mm (Depth x Width x Height)
- **Gross weight:** 3.5 Kg

QUADRA Pick & Place

	LASER e	BASIC
Accuracy	± 0.1 Omm X and Y, $\pm 0.16^\circ$ Theta	± 0.20 mm X and Y, $\pm 0.90^\circ$ Theta
Repeatability	± 0.04 mm X and Y, $\pm 0.16^\circ$ Theta	± 0.12 mm X and Y, $\pm 0.45^\circ$ Theta
Component sizes	Up to 0.5mm pitch ICs and up to 0402 chips	Up to 0.8mm pitch ICs and up to 0603 chips
Productivity	Up to 4000 cph peak, 3500 cph avg	Up to 3600 cph peak, 3000 cph avg
Maintainance	Very few mechanical settings	Lot of mechanical settings
Error detection	All machine centering devices and parameters can be directly checked by sw tests	Most of the machine's head components have to be verified and regulated by hw inspections
Options	Smart feeders to speed up changeover process	
	Vision centering for BGAs and very fine-pitch components	

Reflow Oven

	TWS 1400	TWS 1380
Flexibility	Possibility to regulate 10 independent hot zones	Possibility to regulate 4 independent hot zones
Speed	Conveyor belt speed up to 700 mm/min	Conveyor belt speed up to 500 mm/min
Controls	Everything is monitored on the oven display, from the cover opening to the fans motors errors	Manual and display independent cover opening, non fans controls
Productivity	Lower temperature falls due to lots of large PCBs	
Options	Easy to manage double-sided PCBs with the conveyor chain	
	Possibility to see internal profiler graphs directly on oven LCD control display	
	Also available in nintrogen version	



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