

VersaSolder

Precise Selective Soldering Station



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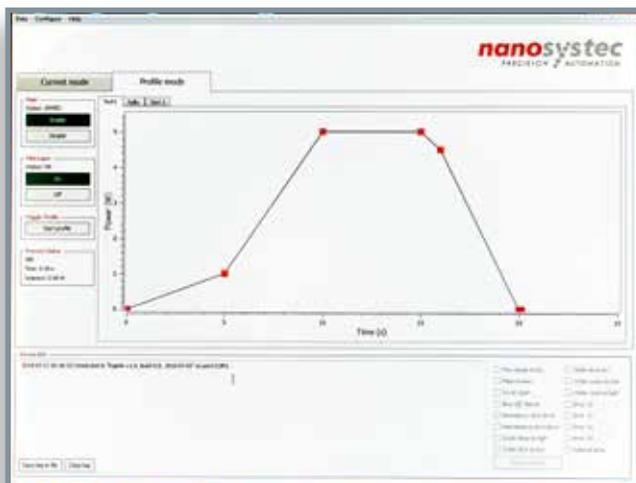
Selective Soldering for Production

The VersaSolder System offers two selective laser soldering technologies: laser and hot bar soldering. Depending on the workpieces and process flow, both methods can be combined in one station. Powerful machine vision and automated loading concepts provide the foundation for fully automated processing.

Selective soldering is used when conventional oven reflow soldering fails. Examples are temperature-sensitive components like optical elements or sensors, flex boards, miniature cables and connectors as well as already assembled products.

The configuration of the work station depends on the specific soldering task and the production flow. The modular design assures an optimal cost-performance ratio.

Optimum Process Control with Rapido



The power profile is saved and a trigger signal starts its execution. The soldering process with pre-warming, soldering and cooling-down phases can be reproducibly performed.

Rapido generates the power for the soldering operation. The control electronics sets the power levels and the timing of the energy pulses. The power level is programmable with 20 set points.

An electrical input for temperature sensors allows the formation of a closed control loop to keep the solder temperature at the desired level.

For selective laser soldering, Rapido has one or two optical outputs with power levels between 30W and 400W. The optical power is guided with a fiber optic cable to the lens assembly which directs the laser beam to the target.

Rapido for hot bar operation delivers the necessary high currents to the thermode. The temperature follows directly the rapid increase of current resulting in an equally fast soldering process.

The laser soldering optics provides a CCD camera port. This camera supports image processing as well as visual inspection and documentation of the soldering joint.

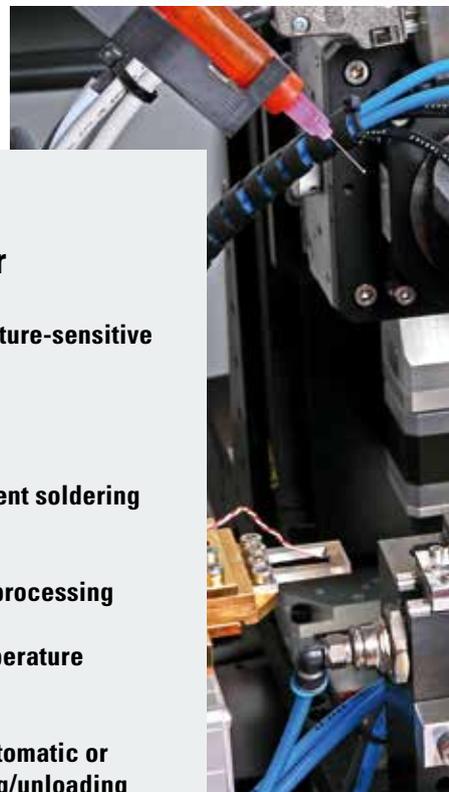


Laser Soldering

Selective laser soldering does not require contact with the workpieces. A focused laser beam heats the solder and the parts to be connected. The precisely controlled energy ensures the high and consistent quality of the solder joints without affecting the surrounding area.

Laser soldering works in reflow applications with paste or preform. The pre-tinned parts are placed correctly and the energy of the laser beam forms a solid connection. For blank contact pads and wires, solder paste is dispensed on the contact area. The laser energy heats the contact and liquifies the solder material. Solder preforms are processed in the same way.

In order to avoid shift and tombstone effects, VersaSolder can be equipped with two laser optics. The symmetric arrangement introduces a balanced energy and keeps the parts in place.



Benefits of VersaSolder

- Ideal for temperature-sensitive components
- Local heating
- High and consistent soldering quality
- Powerful image processing
- Closed-loop temperature control
- Manual, semi-automatic or automatic loading/unloading
- Integration of feeders, robots and belts

Hot Bar Soldering

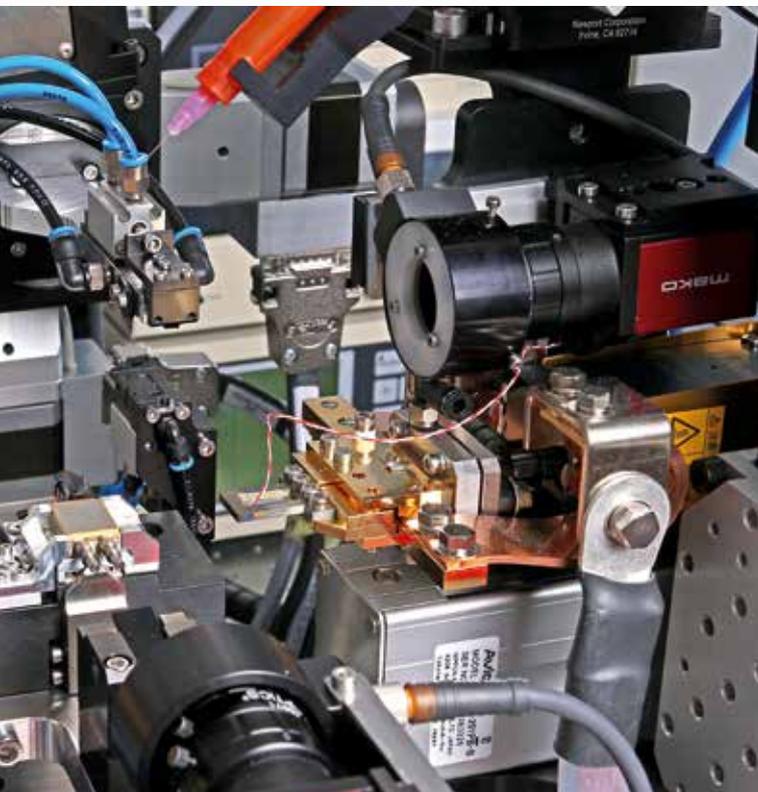
One of the pieces to be connected is pre-tinned. After correct positioning, the hot bar or thermode is in contact with the pieces and applies a well-controlled force. The current flowing through the thermode generates heat which reflows the tin of one part and the connection is formed. The form of the thermode fits the parts to be connected. This ensures a good thermal contact and consistent results. A sensor in the thermode measures the temperature and a control loop keeps the temperature on the desired level.

Precise Positioning of the Workpieces

In more and more applications, the solder points are very small with a fine pitch. Precise positioning is an important condition for a successful soldering operation. VersaSolder combines advanced machine vision with exact multi-axis motion control. Multi-axis motion control brings the parts in the correct position to each other with a precision of 10µm or better. Specifically designed grippers and device nests hold the parts firmly.

Powerful Image Processing

VersaSolder is equipped with powerful image processing. The pictures from optical lenses of high quality and fast CCD cameras are processed with intelligent algorithms. The state-of-the-art software detects not only fiducials, but also complex free forms. Multiple functions will be combined in one command. This provides maximum process stability in shortest time. For detecting difficult structures, the brightness and color of the illumination will be specifically adjusted. The software allows for storing and calling different settings during the process.



Example of a hot bar soldering station: Device-specific grippers and nests hold the devices firmly in place. Advanced machine vision combined with sensors and high-precision motion provides fast and accurate alignment of the workpieces.



Selective laser soldering works with pre-tinned devices or solder paste. Two symmetric optical heads introduce a balanced energy and avoid unwanted shift.

Machine vision is not only used for detection purposes, but also for the inspection of the incoming part and for quality control and documentation of the solder joints.

Modular Process Software

The TestMaster process software works with a direct user interface for teaching positions and adapting the process parameters. Different user levels restrict access to the various functions.

A large library includes numerous metrology and control panels as well as device drivers for instrumentation. The hardware abstraction layer facilitates the integration of new devices as the user interface remains unchanged.

The automated process flow is programmed in a separate sequence editor. The customer has full access rights to this programming and can modify the processes for future improvement and adaptation.

This structure provides a smooth and secure operation of the VersaSolder production systems in high technology environments.

Process Monitoring

Digital inputs on the general machine control and on the motion controller are permanently monitored and can be displayed. Depending on the process, automated actions follow when an interlock or emergency function changes the status. In addition, a possible power, pressure or vacuum outage will be detected followed by an automated shut-down according to the conditions.

Remote Access

The remote access software works over a secured internet connection. This fast and easy access saves time in case any support or trouble shooting needs to be performed on the system.

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Full Process Automation

VersaSolder accepts various method for loading the work pieces and transport of the finished product. The modular design allows for a migration from manual loading to full automation when the production volume reaches the necessary capacity.



Feeders allow for unattended and fully automated operation except for cassette loading and unloading.



Loading with robots includes automatic tooling changes in order to provide maximum versatility. In this way, multiple process steps or different products will be processed without operator intervention.

For low volume, the presentation of one set of parts or multiple sets is the most cost-efficient solution. Removable device trays already reduce the process time as an operator loads and unloads the parts on the trays outside the station while the process runs with a second set of devices.

For larger production volumes, the use of one or more feeders presents an efficient solution. Each feeder holds up to 20 Jedge trays, Auer boats or custom pallets in a transportable cassette. As soon as all parts are processed, the cassette with the finished goods is taken out and the next cassette with new parts is loaded.

The presentation of the parts with a conveyor belt is another solution. A continuous flow of material enters the VersaSolder station and an exit conveyor brings the parts to the next production step.

Robots complement the loading operations. Mounted inside the station, they take the workpieces from trays or blister packs and insert them into the processing nest.

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