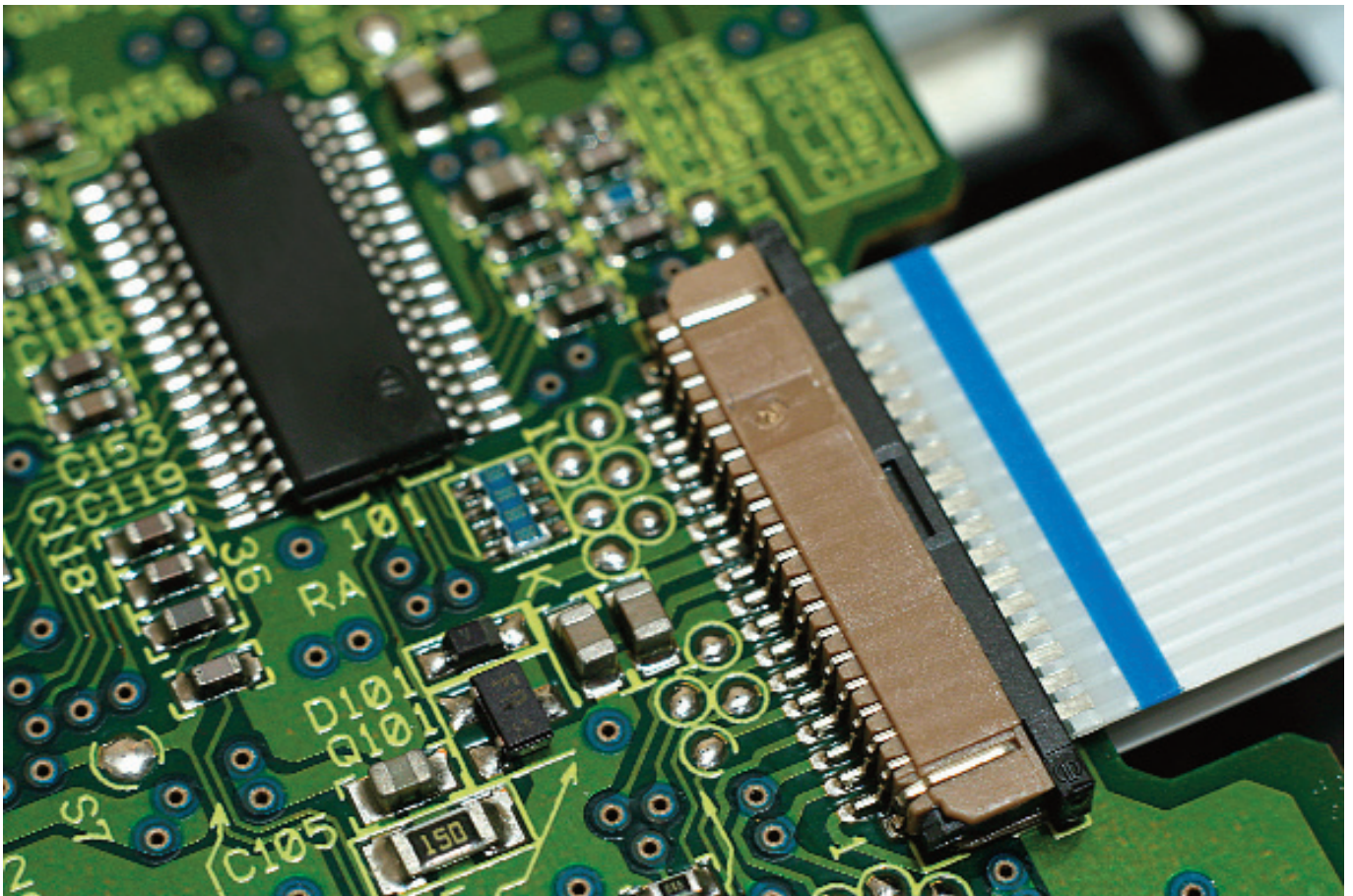


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# NanoRapid

High Throughput Laser Soldering Station  
for Production and Process Development



**nanosystec**



*Rápido is the control electronics for the diode laser or fiber laser source. It functions as a stand alone or computer controlled unit which allows defining and storing ramp profiles in order to achieve a reliable process window for the soldering procedure.*

## High Capacity Production Solution

The NanoRapid Laser Soldering Stations combine ultra-precise hardware with a powerful software package. Depending on the devices to be assembled, single or multiple laser spots can be set at the same time. The simultaneous soldering with several spots does not only increase the throughput, but also reduces possible tilt or tombstone effects during the assembly.

## Modular Architecture

In order to provide the best price-performance-ratio, the functional groups in the NanoRapid are chosen and combined according to the specific process: for example the motion system, machine vision, dispenser, and laser soldering source.

This is also true for the software package. If the requirements change, additional modules can be configured as needed. Typical examples are machine vision functions or even the upgrade from laser soldering to laser welding.

The multi beam optics can be easily exchanged if different layouts will be produced on the same station. To change from one layout to the next takes only several minutes.

## Repeatable Manufacturing Process

Thorough design and continuous optimization of all functional groups lead to superior stability. Mechanical references with tight tolerances provide a repeatable manufacturing situation from device to device.

High-precision positioning stages with crossed-roller bearings and absolute position feedback ensure positioning in the sub micron regime.

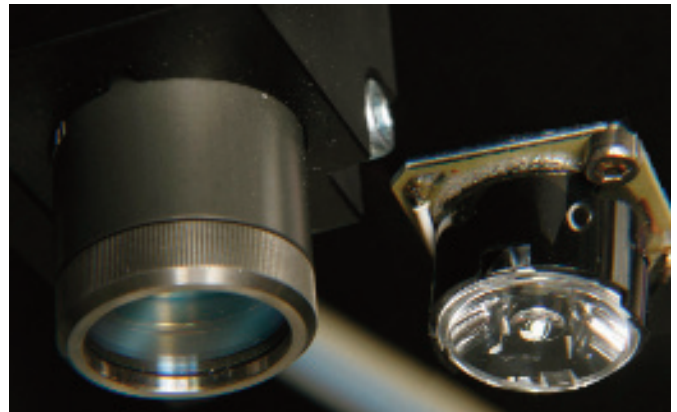
## Powerful Machine Vision Capability

The NanoRapid Stations use automated machine vision algorithms. These include pattern recognition, edge detection and autofocus.

The LED illumination can be adjusted in brightness to provide ideal imaging conditions for the respective task.

## Multi Beam Optics increase Throughput

The proprietary Multi Beam Optics are produced individually for each part to be soldered. The laser beam will be split into various spots. The laser intensity from spot to spot can vary if required. Spot diameters can go down to several micrometers. The number of spots will be determined by the geometry of the device and the total power of the laser source used for the soldering process.



*Multi Beam Optics increase the throughput of the laser soldering. Instead of one, several spots will be soldered simultaneously.*



*All applications which need precise selective soldering procedures are ideally suited for laser soldering. The heat will be introduced locally without impacting the surrounding areas.*

## Selective Laser Soldering

With laser soldering, the heat will be introduced locally to the area which needs the high temperature. The border to surrounding areas is sharp. This makes the laser soldering ideal for heat sensitive and/or miniature devices.

Depending on the final temperature to be achieved, the respective laser source is used. Standard diode lasers with air cooling cover the range up to 100W, while high power laser sources with water cooling reach several kW of laser power. If small spots (less than 0.1mm diameter) are required, a fiber laser source will be used. The laser beam will be guided in free space or via an optical fiber.

In order to achieve a large process window, the laser power will be ramped to maximum with a slope which allows to melt up the solder material (paste or preform) avoiding splashing. A ramp down procedure helps for minimum shift of the component during the assembly.

The Rápido Laser Electronics can store individual profiles. The communication works either via serial interface or with an easy to operate handheld panel. The programmed profile will be shown on a display.

## Stand Alone or In-Line Production

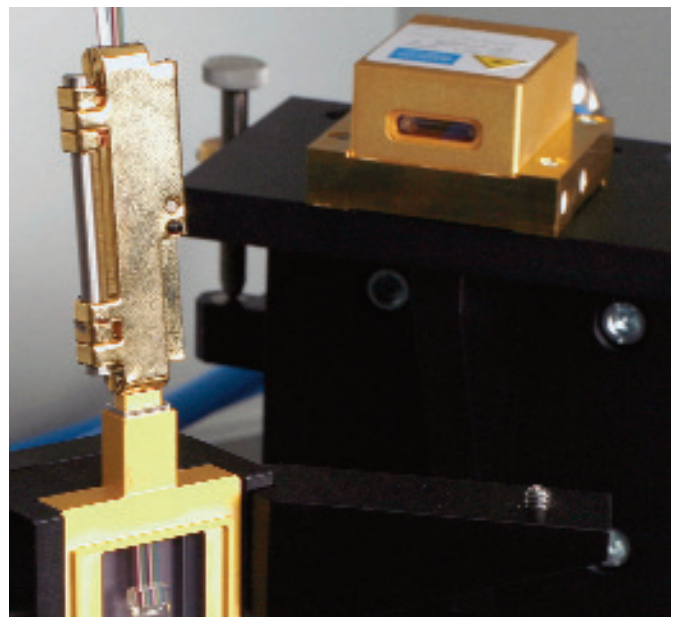
Depending on the device, the NanoRapid works with a device holder concept or with an in-line belt design. This architecture allows running different device types on the same station easily. To change over from one device type to another takes only a few minutes.

If the NanoRapid is chosen as in-line solution, it can be integrated into the production line. The communication with stations before and after is achieved with standard industrial interfaces.

## Mechanical and Electrical Customization

By customizing the NanoRapid station in the mechanical layout and the electrical set-up, the ideal manufacturing process for the respective device can be realized.

The modular concept makes it easy to combine functional groups both in hardware and software. New functions can be added at any later point in time with minimum effort.



*By melting solder preforms, laser soldering is used for the hermetic sealing of packages. This can be a snout as well as a lid on a metal or metallized ceramic device.*

## Different User Levels

Five user levels differentiate the access rights. These rights can be individually assigned for standard operators, skilled operators, service personnel, set-up engineers and administration mode. This structure provides a smooth and secure operation of the systems in high technology production environments.

## Process Monitoring

Digital inputs on the general machine control or on the motion controller are permanently monitored and can be displayed. Depending on the process, automated actions follow when a certain interlock or emergency function changes the status. Also a power, pressure or vacuum outage will be detected. An automated shut-down can be executed.



*Critical machine functions are permanently monitored. Automated sequences follow as soon as such an input changes its status. Standard monitoring signals include voltage, pressure, vacuum and interlock/emergency stop.*



*Remote access reduces the time when a support is needed. The tool works over a secured internet connection.*

## Remote Access

The NetViewer Remote Access software works over a secured internet connection. The fast and easy access helps to save time in case any support or trouble shooting needs to be executed on the system. For safety reasons, nanosystec can only access the system when the user accepts. For each event, a new session will be started.

## Statistic Process Control

Process data can be retrieved during the production. It serves as a basis for quality assurance and process improvements. Typical values include positions, power level at maximum, power shift after assembly, cycle time, etc.

## Connection to Database

Standard commands in the sequence editor write into or retrieve data from a local or network database. Depending on data retrieved, the process can be adapted accordingly.

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