
NanoWeld Coaxial

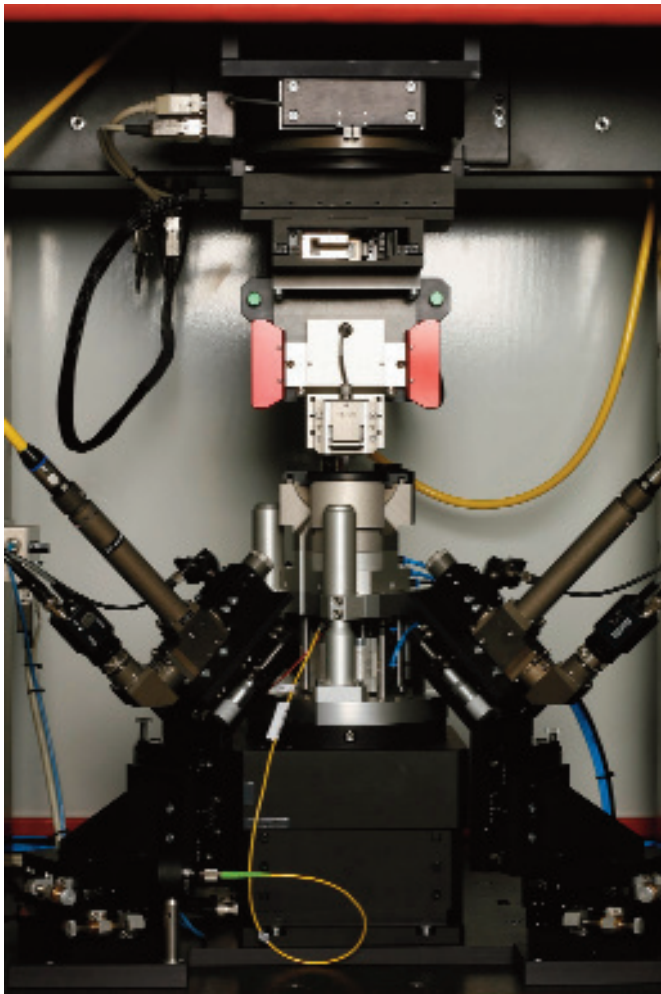
Advanced Alignment and Micro Welding Station
for Production and Process Development



nanosystec

High Capacity Production Solution

The NanoWeld Alignment and Welding Stations combine ultra-precise hardware with a powerful software package. Depending on the device to be aligned and welded, process times for a full cycle including loading and unloading range from less than a minute for TOSA/ROSA applications to several minutes for complex tunable devices including polarization alignment.



The NanoWeld combines excellent yield with short cycle times – the pre-requisite for high capacity production at minimum cost.

Modular Architecture

In order to provide the best price-performance-ratio, the functional groups in the NanoWeld are chosen and combined according to the specific process: for example the motion system, machine vision, weld laser and feedback signal instrumentation for the alignment process.

If the requirements change, the NanoWeld can be easily upgraded with additional instrumentation. The modular concept with device specific trays allows running different device types on the same station easily. To change over from one process to another takes only seconds.

The TestMaster process software copes with different processes and makes it easy to develop and adapt the existing process flow for new functions (see separate data sheet).

Repeatable Alignment and Welding

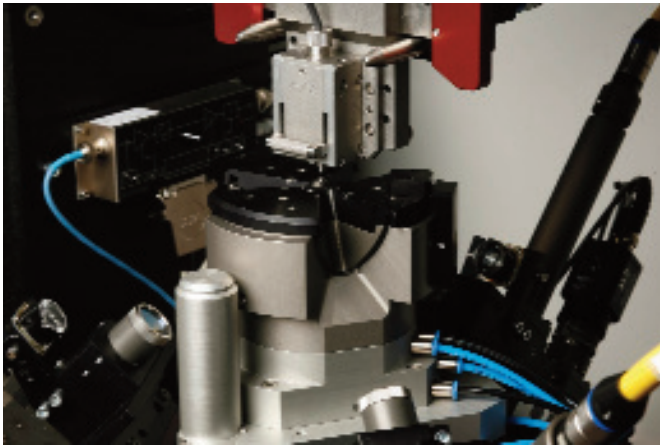
Thorough design and continuous optimization of all functional groups lead to superior mechanical stability. Mechanical references with tight tolerances provide a repeatable manufacturing situation from device to device.

High-precision alignment stages with crossed-roller bearings and absolute position feedback ensure active alignment in the sub micron regime. Fast search algorithms cut the process time to a minimum. These include spiral scans and proprietary optimization scans which are carried out for several axes simultaneously.

The motion stages are mounted onto a vibration-isolated granite structure. This solid set-up makes the NanoWeld insensitive against disturbing external influences.

Extended diagnosis functions both in hardware and software ensure maximum transparency on the system condition.

By reducing all these uncertainties in the production to a minimum, a fine tuning of the process can be accomplished. Possible failures of a device batch or a machine component will be identified in an early stage in order to provide maximum uptime.



The air bearing AeroSwivel brings the parts to be welded in even contact over the entire surface. This results in perfect weld joints with high strength and minimum shift.

Stable Welding with minimum Shift

The AeroSwivel is a key component of the NanoWeld Coaxial Station. A precision ground and hard anodized half sphere floats in a dome shaped air bearing. Once the two parts are brought in surface contact and the half sphere is passively aligned, the angular position in pitch and yaw is fixed.

The high quality of the weld spots is of equal importance. Due to the surface contact, the weld spots and the corresponding weld energy can be small compared to a welding situation in which a gap needs to be bridged. In the standard version, nanosystec works with a 300 micrometer weld spot size.

Three weld spots which are oriented under 120° provide the most stable conditions to join the parts. All spots provide the same amount of energy with a deviation of less than 2.5%. The long focal length of the weld optics combined with a small optics diameter maintain a long beam waist in the focus. Even when the Z position of the weld head changes slightly, this does not affect the spot diameter and the weld results.

This design results in extremely low weld shift and high strength of the assembly.

Laser Induced Micro Adjustment

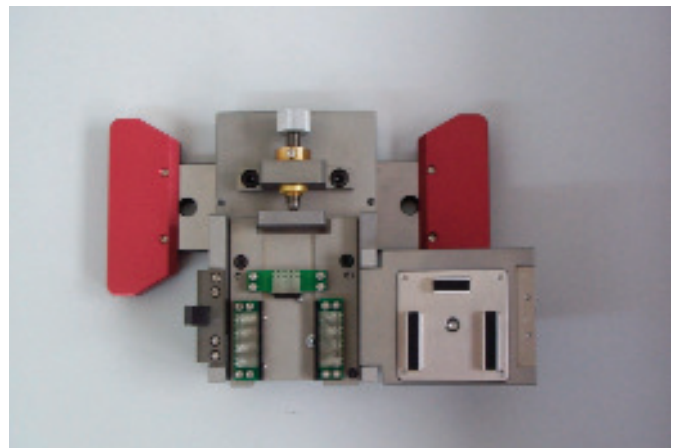
If the weld shift has to be kept well under a micrometer, an additional fine tuning procedure will be applied. The material in the weld joint shrinks when it cools down after welding. Depending on the shift in the first weld spot set, additional single weld spots at calculated angular positions achieve micro bending.

Compared to mechanical bending procedures, the laser-induced micro adjustment introduces less stress. However, this procedure takes more time than a standard process without correction and will only be applied if necessary.

Interchangeable Device Trays

Working with removable device trays has two advantages: First, the loading and unloading time will not block the production system. This improves productivity.

Second, different designs of the trays allow to manufacture different devices on the same station. The device-specific wiring and mechanical fixation remain on the trays. If new or modified devices need to be tested, this does not impact the structure of the NanoWeld station.



Device trays allow to use the machine capacity for the core alignment and welding process. Time consuming loading and unloading is performed outside.

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 in the general machine control or in 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 support is needed. The tool works through a secured internet connection.

Remote Access

The NetViewer Remote Access software works through 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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