

NanoGlue

Advanced Alignment and Gluing Station for
Production and Process Development



NanoGlue

Fast Precision Alignment and Assembly

NanoGlue is an advanced workstation for the alignment of opto-electronic components like planar waveguides, diode lasers and diode laser arrays, VCSEL, lenses and lens arrays, photo diodes and diode arrays. The permanent assembly is made with UV curable epoxy. NanoGlue is suitable for research and product development as well as for volume production.

NanoGlue utilizes various methods for a fast and perfect alignment. Advanced machine vision with powerful algorithms is used for pick-up of components and for pre-alignment, shortening the time needed for active alignment.



The entire process of alignment, resin dispensing and curing runs fully automated.

NanoGlue consists of modular building blocks. This gives the greatest flexibility for the system configuration at a reasonable cost. The electronic circuits and elements are of industrial grade which ensures very long operational times without interruption.

High Precision Motion System

The alignment axes have excellent performance criteria and an extremely long life time. The resolution for the linear axes is 20 nm, rotary axes have a resolution of 0.0005°. Linear axes with a long travel range are ideal for automation of the system with loading/unloading and processing of multiple work-pieces in one session. Either one-channel or multi-channel devices can be processed.

The library of alignment algorithms for active alignment contains various routines. The parameters of these routines can be freely selected to achieve the shortest search and optimization times. An unlimited number of search routines can be stored.

Automated Resin Dispensing and Curing

The automated dispensing of epoxy ranges from volumes of several nl to ml, depending on the dimensions of the work-pieces. The dispensed volume is constant from device to device. This is a significant factor for good and consistent quality of the finished product. Pre-dispensation can be integrated into the process.

The cartridges with the resin are shuttled into position under the vision system. This allows for monitoring the dispensing procedure and provides an accurate positioning of the needle.

UV radiation cures the glue within or after alignment and dispensing. Either arc lamps with flexible guides or LED sources are used. Thermal curing can be added as well.

Benefits of NanoGlue

- **Fast precision alignment**
- **Modular building blocks**
- **Greatest flexibility at a reasonable cost**
- **Multiple work-pieces in one session**
- **Automated resin dispensing and UV curing**
- **Short processing times with tray concept**



Tray concept reduces Handling

To shorten processing times, the devices are loaded onto trays outside of the NanoGlue system on a separate loading station. Only the tray has to be inserted which saves a major amount of time in comparison to loading all parts inside the system. The best utilization of the system is achieved with two trays.

A tray with intelligent design may hold several sets of devices for automated alignment and gluing. This further reduces the time for loading/unloading, eliminates handling errors and streamlines production. This is essential for high volume production environments like Silicon photonics.

Powerful Machine Vision shortens Process Time

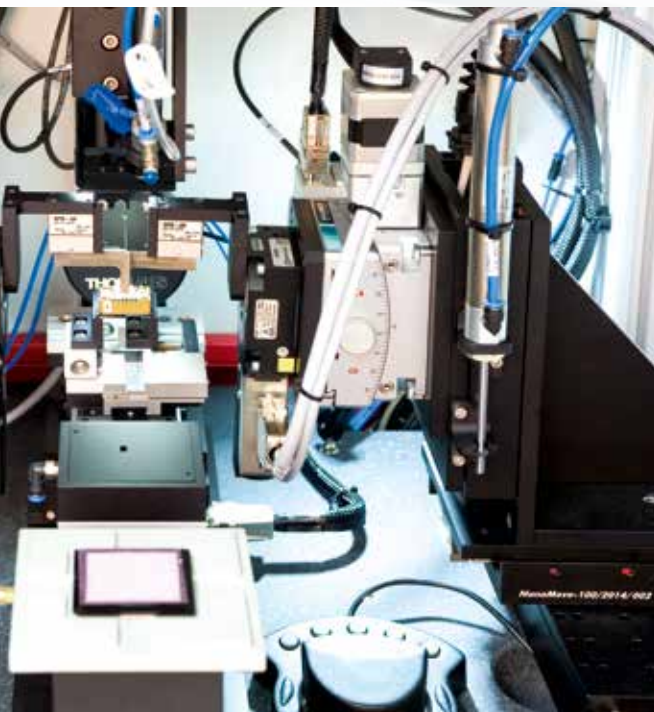
A number of high-performance lenses and cameras is available for integration into the system. Motorized zoom cameras provide variable fields of view and calibrated magnification.

Telecentric lenses are used for determination of the size, the integrity and orientation of components. Cameras for both visible and near IR detect optical channels and other features.

Illumination of the working area uses LEDs with wavelengths from blue to near infrared depending on the characteristics of the surface to be detected.



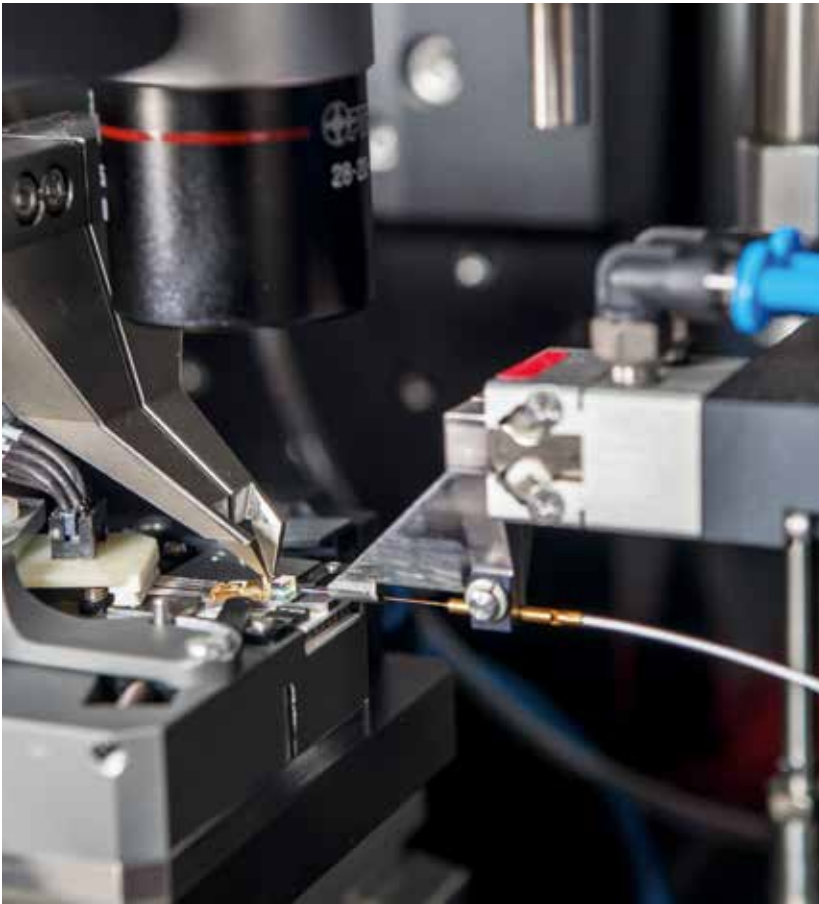
The configuration of NanoGlue is customized depending on the assembly requirements.



Versatile Software and Process Programming

NanoGlue uses the software package TestMaster. This powerful and versatile package is the result of several decades of practical experience and continuous development. Besides controlling the instruments and motion controllers of NanoGlue, additional hardware is integrated easily and communication with other computers is quickly installed.

An easy to be programmed sequencer controls all processes. The number of processes to be stored is next to infinite. Activating a stored process can be done either manually over the keyboard or by reading a 1D- or 2D-label with a scanner. In fully automated production lines the master program supervises the station.



Device-specific grippers allow for precise positioning of optics and fibers.

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