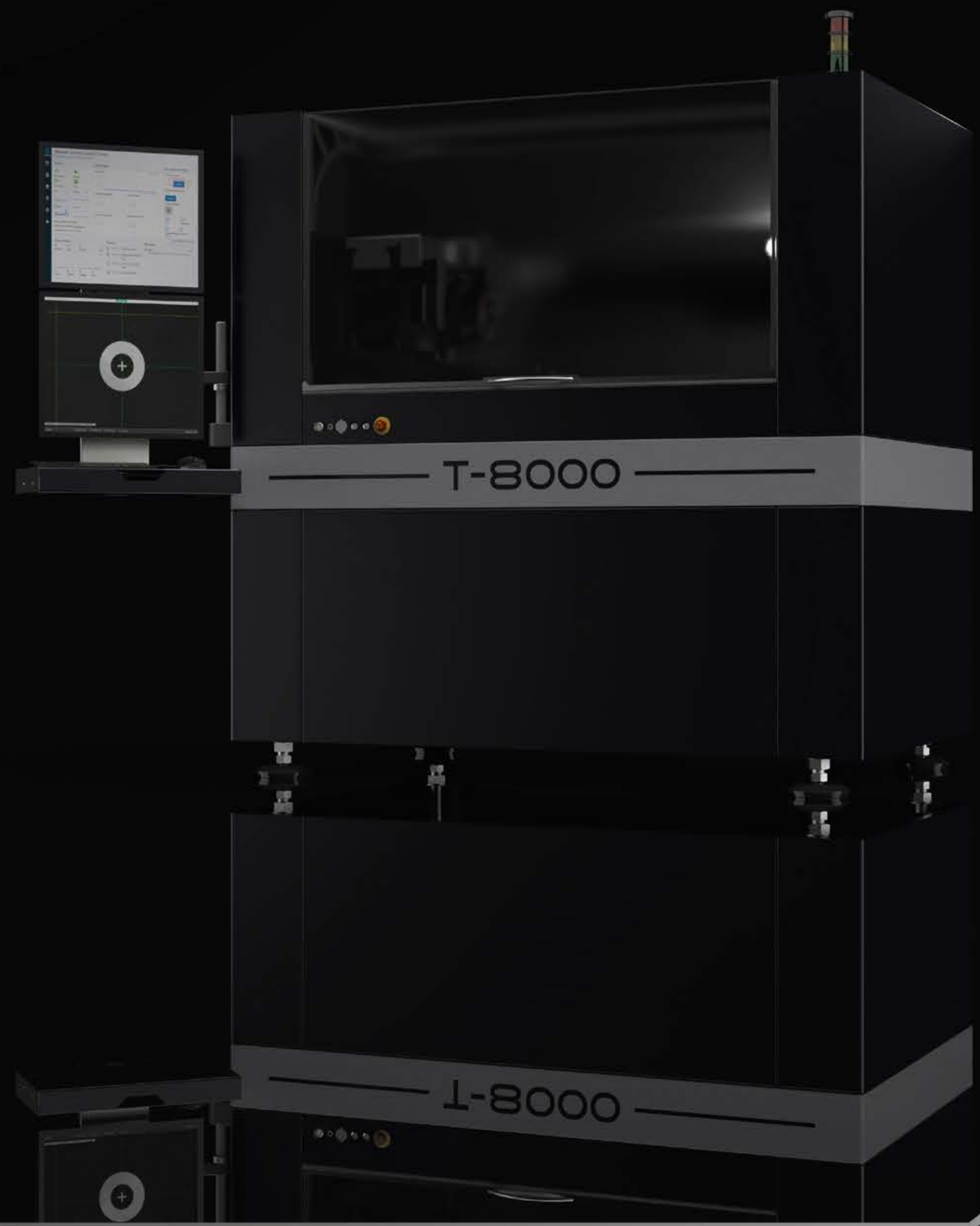
TRESKY
AUTOMATION

Since 1980, the name TRESKY stands for the highest quality, flexibility and maximum reliability

We are one of the world's leading machine manufacturers for placement systems in the high-precision sector with more than 40 years of experience in the semi-conductor industry. Our bonders are Made in Germany. All common packaging technologies can be realized with a flexible TRESKY machine, thanks to our extensive experience with multi-chip module applications. The semiconductor market is trend-setting for many other markets and is therefore subject to constant change. With our modular and flexible machine concept, combined with our numerous innovative options, we enable our customers to react quickly to new technologies, product requirements and new market situations. Our systems are perfectly tailored to the requirements of our customers. We listen to our customers' wishes and contribute our many years of experience to the process. This results in partnerships with our customers that lead to their complete satisfaction and long-term business relationships.

Content

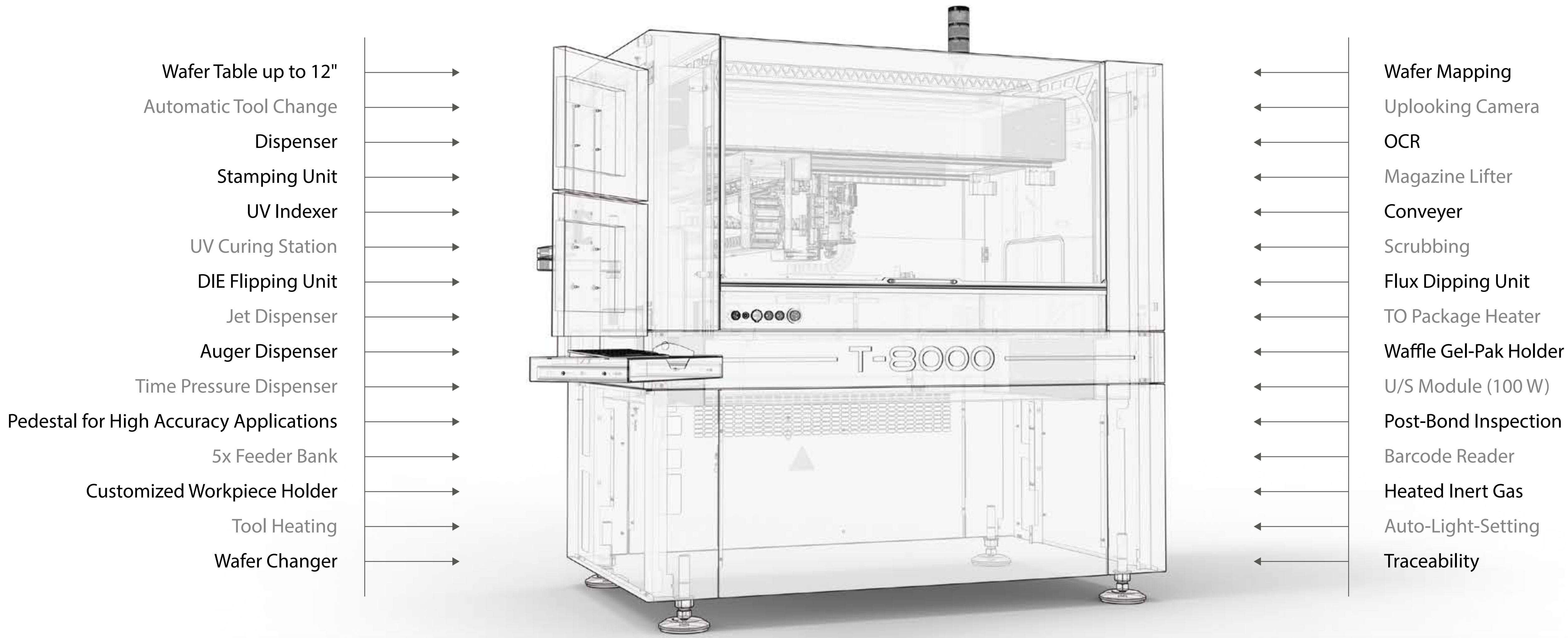


Why granite?

Platforms

A SOLID MACHINE BASIS FOR HIGH-PRECISION RESULTS

In the world of semiconductor manufacturing, precision is the most important thing. That's why Tresky has focused from the very beginning on developing a high-precision system base that meets both current and future production requirements. These requirements apply no matter where our international customers manufacture around the world. Granite therefore plays a very special role for us. In addition, due to the modularity of Tresky DIE bonders, the systems must be designed for a high degree of flexibility.



SOLUTIONS

Epoxy Bonder

Innovative adhesive-based chip-substrate connection technology

Epoxy/adhesive bonding is a specialized process for bonding semiconductor chips, lenses or other micromechanical parts to substrates using an adhesive. Due to its processing speed and low cost, it is one of the most common processes in die attach. The process guarantees high stability, reliability and is very flexible, so the adhesives used can even be used for conductive connections. Tresky offers innovative, precise and sustainable epoxy/adhesive bonding solutions that can be modularly integrated into Tresky's equipment. Tresky's expertise and technology ensure that this bonding process is performed smoothly and with the highest quality to maximize the life and performance of your electronic products.

Added value

- **Reliability and durability:**

  Epoxy/adhesive bonding processes ensure outstanding component reliability and durability. By creating stable, resilient connections that are resistant to mechanical shocks and thermal stresses, this method contributes significantly to extending the service life and reducing the failure rates of electronic components.

- **Flexibility and adaptability:**

  The epoxy/adhesive bonding is characterized by flexibility and adaptability, allowing it to be used in a variety of applications, including chip assembly. The ability to bond dissimilar materials and handle complex geometries makes it a preferred process for innovative product development where conventional bonding methods may reach their limits.

More information

UV Bonder

Bonding processes for processing temperature-sensitive chips

UV Bonding is a special bonding technology that uses ultraviolet (UV) light to cure or harden liquid adhesive. Unlike the use of epoxy, which requires different times and temperatures to cure depending on the type of adhesive, UV adhesive remains in its liquid state until it is exposed to high-energy UV radiation.
The UV adhesive is applied to the surface using a dispenser. The chip is then placed in the liquid adhesive by the bond head.

Added value

- **Reduction of material stress:**

  Due to the low to non-existent thermal load and the low contact pressure, the UV bonding process significantly reduces material stress during the processing of the chip.

- **Flexibility:**

  The respective curing times are individually selectable.

- **Cycle time optimization:**

  By using UV light, the adhesive can be cured quickly and efficiently, even inline.

More information

Ultrasonic Bonder

Fabric-locking chip/substrate connections

Ultrasonic bonding is a bonding process for creating an electrically conductive and mechanically bonded connection between a chip and a substrate. In the friction welding process, pressure (bonding force) and ultrasonic vibration (friction) are used to create an electrically conductive contact. The ultrasonic energy is applied when the chip is placed by the bonding head. Temperature-sensitive components or components that are difficult to heat can be bonded in this way only by ultrasonic bonding. If heat is also used as a support, this is referred to as thermosonic bonding.

Added value

- **Cycle time optimization:**

  Ultrasonic bonding allows shorter bonding times to be implemented due to the elimination of the preheating time.

- **High power density:**

  Ultrasonic bonding enables the production of high-performance components with a high power density.

- **Low heat load:**

  The process generates a lower heat load compared to conventional bonding methods. This means that the material stress of the semiconductor components can be reduced.

- **Reliability:**

  The connections produced by ultrasonic bonding are reliable and have low failure rates. This is crucial for the quality and durability of electronic components.

- **Versatility:**

  Ultrasonic bonding can be used with a variety of materials and chip types, which increases its versatility in different applications.

More information

Thermocompression Bonder

Reliable chip/substrate connections using heat and pressure

Thermocompression bonding is an electrically conductive, mechanically strong and flux-free joining process. Similar to diffusion bonding, it creates a stable, material connection with very good electrical conductivity. In many cases, TC bonding involves placing a flip chip made of gold or indium, for example, on a substrate with pads. The connection is created by applying force and temperature over a defined period of time and, if necessary, plasma activation.
TC bonding is particularly suitable for HF and optoelectronic components, chip-to-chip and chip-to-wafer applications.

Added value

- **Good electrical properties:**

  The connections produced by thermocompression bonding have excellent electrical properties, as the process enables high contact quality and low electrical resistance.

- **Precise alignment:**

  Through the use of positioning and alignment techniques, a very precise connection can be achieved.

- **Good thermal conductivity:**

  The heat dissipation properties are usually good, which is important for cooling components.

- **Reliability:**

  Thermocompression bonding can produce reliable and durable connections.

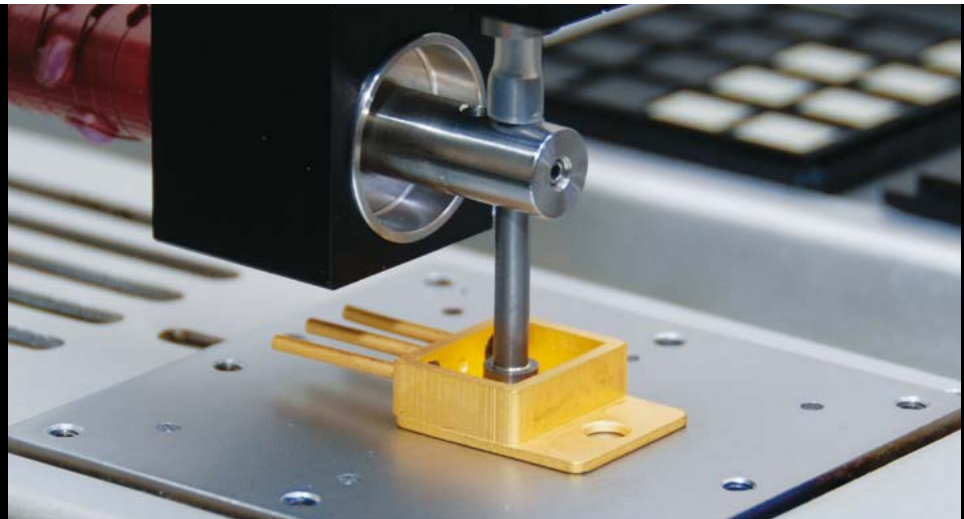
- **Miniaturization:**

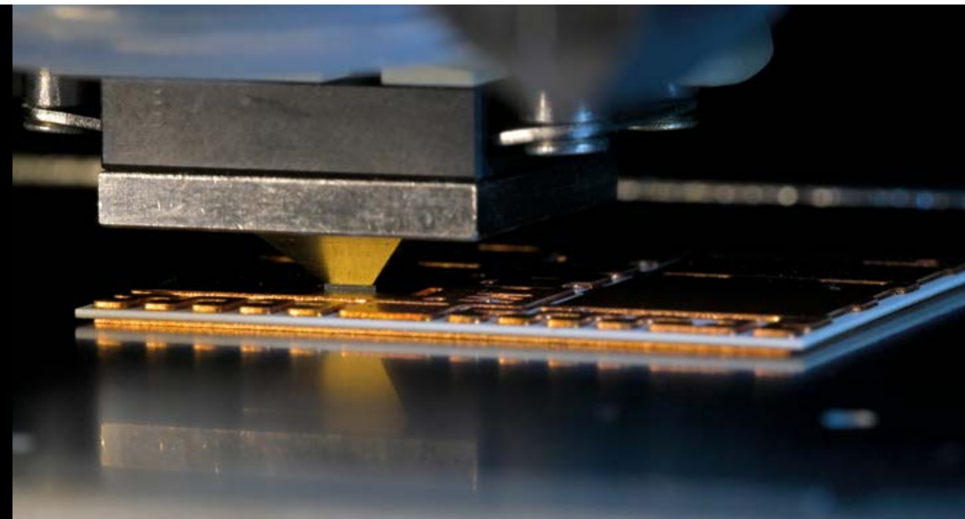
  Thermocompression bonding enables the miniaturization of electronic components and contributes to the development of compact and high-performance devices.

- **High throughput rates:**

  Thermocompression bonding is a fast process and enables high throughput rates in the mass production of semiconductor components.

More information

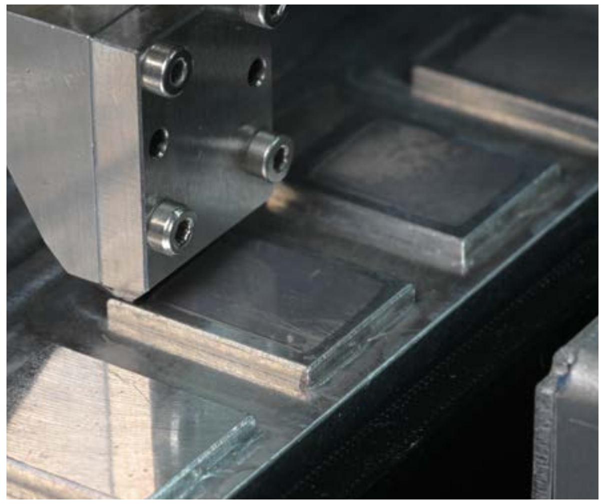




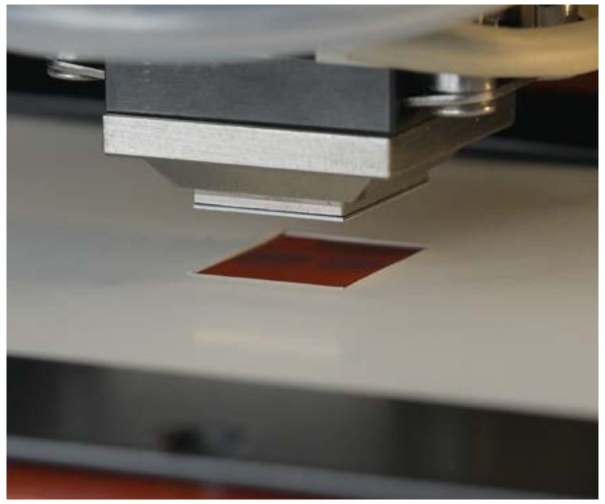
Sinter Bonder

Assembly and connection technology for e-mobility solutions and power electronics

For the bonding of semiconductors such as IGBTs, SiCMOSFETs or GaN HEMTs with Ag on DBC or AMB substrates or for the connection of power modules on heat sinks, metallic sintering offers a high-performance assembly and connection technology with maximum reliability. Tresky's sinter bonders enable the use of copper sinter paste, thixotropic silver paste and DIE Transfer Film (DTF). In the metallic sintering process the chip is bonded to a substrate using sintering paste with the aid of heat and pressure. In the actual sintering process, the metal particles are bonded together by diffusion processes. The advantage over soldering processes is the better thermal conductivity, the longer service life and high thermomechanical stability. These properties are particularly important in electromobility and power electronics.



Application of silver sintering paste with SQ-Nozzle



DIE Transfer Film (DTF) for DIE Attachment

More information

Flip Chip Bonder

Reliable direct contacting of chips on a substrate

In flip chip assembly, the chip is mounted directly to the substrate/circuit carrier with the active contact side facing down, without any further connecting wires. This is where the name flip chip comes from. By mounting the chip directly on the substrate or circuit carrier without additional connecting wires, not only package dimensions are downsized, but conductor lengths are also reduced, allowing more efficient interconnection. For very complex circuits, this technology often offers the only reasonable connection option, because in some cases several thousand contacts have to be implemented. In this way, the entire area of the DIE can be used for contacting.

Added value

- **High connection density:**

  With flip chip bonding, the connection points are applied directly to the surface of the chip and connected to the contact pads on the substrate or printed circuit board. This enables a very high connection density, as no wire connections are required as with other assembly techniques, e.g. wire bonding.

- **Short signal paths:**

  As the connection points are placed directly above the chips, the signal paths are very short. This reduces electrical losses and enables faster signal transmission, which is particularly important in high-speed applications.

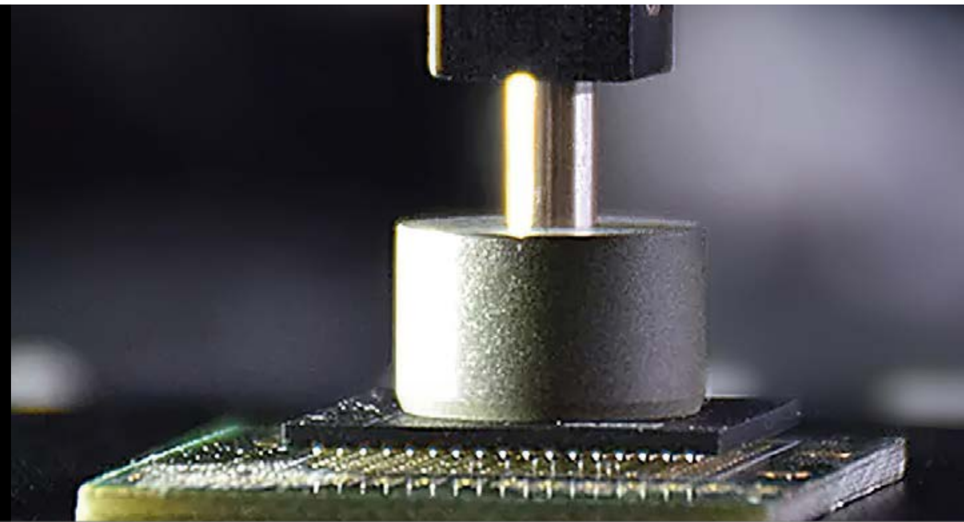
- **Improved thermal performance:**

  The direct contact between the chip and the substrate enables an efficient dissipation of heat. This is crucial for cooling high-performance chips, as it helps to keep the operating temperature low and prolong the life of the chip.

- **Better mechanical stability:**

  Flip chip DIE bonding can provide a robust mechanical connection as the chips are placed directly on the substrate and fixed in place with solder joints or other connection materials. This makes the assembly more stable overall and less susceptible to vibration and shock loads.

More information



Eutectic Bonder

Bonding processes using eutectic alloys

Eutectic bonding connects chip and substrate by means of an intermediate layer to form a eutectic system. This bonding process exploits the specific properties of the individual materials and alloy mixtures during bonding. The frequently used gold/tin alloy (AuSn 80/20) has its melting point at 280 °C, while a gold/silicon alloy (AuSi) finds its melting point at 363 °C.
An eutectic alloy is a mixture of two or more metals or elements in which the melting point of the alloy is lower than the melting point of the individual elements. This means that the alloy melts and solidifies abruptly at a certain temperature. This point is called the eutectic point.
In eutectic bonding, a thin layer of the eutectic alloy is applied to the components to be bonded, e.g. a semiconductor chip and a substrate. They are then heated to the desired temperature to melt the solder. Once the melt is reached, the solder bonds to the components and forms a solid bond when it re-solidifies. Because the melting point is precisely known, the process can be precisely controlled to produce a reliable and permanent bond.

Added value

- **Precise alignment:**

  Eutectic bonding enables very precise alignment of components, as the solder melts and solidifies abruptly at a certain temperature. This leads to exact and repeatable positioning of the components.

- **Good electrical conductivity:**

  Eutectic alloys often have good electrical conductivity. This is particularly relevant in microelectronics.

- **Good thermal conductivity:**

  Eutectic alloys often also have good thermal conductivity. This is crucial in applications where heat needs to be dissipated, as it helps to regulate the temperature of the components and prevent overheating.

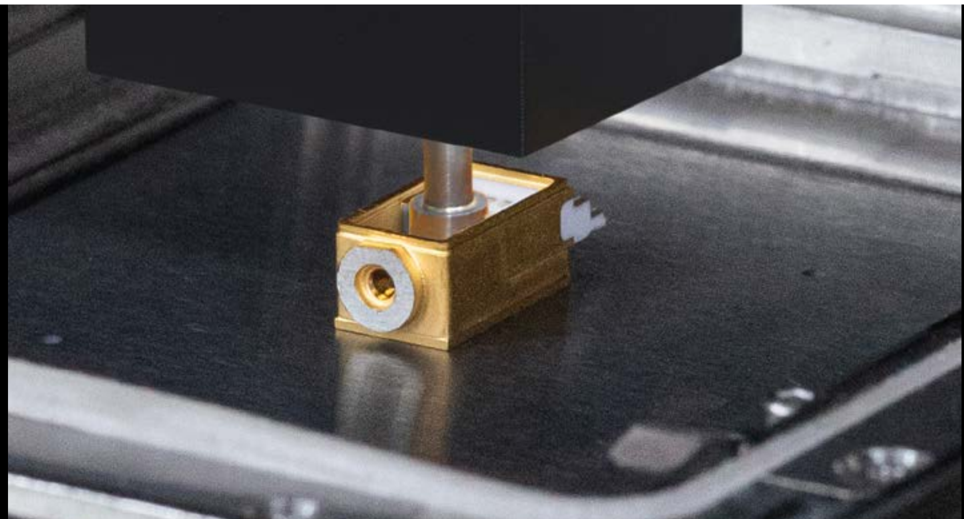
- **Miniaturization:**

  Due to its precise alignment and ability to create tiny solder joints, eutectic DIE bonding enables the miniaturization of electronic assemblies and microsystems.

- **Versatility:**

  Eutectic bonding can create durable andreliable connections that can withstand the stresses and environmental conditions that electronic devices and microsystems are exposed to.

More information



3D Bonder

Vertical integration of chips for compact components

3D bonding, also known as DIE stacking, is an approach in microelectronics and microsystems technology in which multiple semiconductor chips or components are stacked vertically and connected to increase the performance, functionality and density of electronic assemblies. This technology makes it possible to integrate several layers of chips in a single assembly housing instead of arranging them side by side on a flat surface.

Added value

- **More compact design:**

  3D bonding makes it possible to place several chips in a vertical stack, which significantly reduces the space required on the PCB or substrate. This is particularly advantageous in applications with limited space.

- **Short signal paths:**

  Because the chips in a 3D stack are close together, the connection paths for signals and data are very short, which improves signal integrity and can increase transmission speeds.

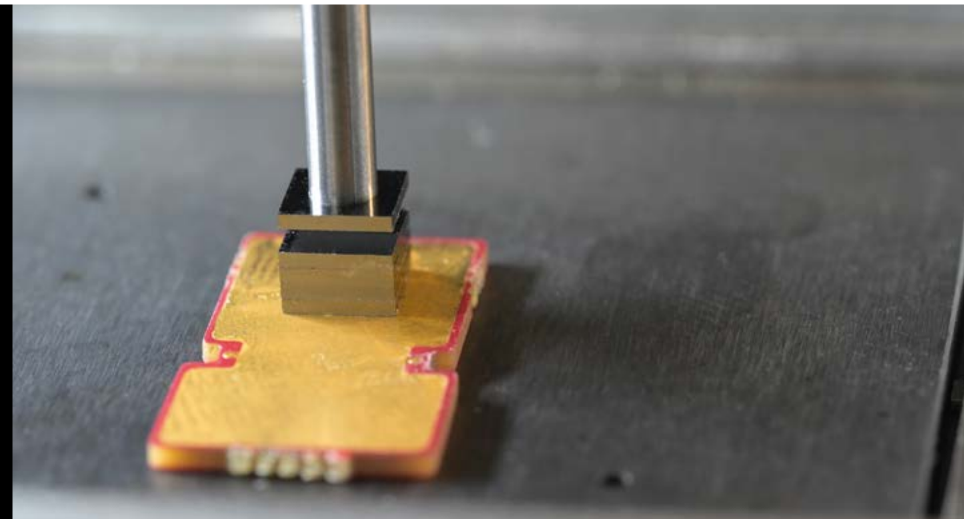
- **Improved performance:**

  By integrating different chips with different functions in a stack, 3D integrations can increase the overall performance and functionality of an assembly. This enables the development of more powerful and versatile electronic devices.

- **Lower energy losses:**

  Shorter signal paths and the ability to implement efficient thermal solutions, help to reduce energy consumption and to extend battery life in mobile devices.

More information



Photonics Bonder

High-precision assembly for nano- and optoelectronics

Technological miniaturization and functional integration in nanoelectronics and optoelectronics are decisive for future-oriented product innovations. Positioning accuracy and reproducibility of complex microsystems are a prerequisite for quality and reliability of these products in the manufacturing and assembly process. We have developed the photonics bonder to successfully meet these requirements. The bonder offers sub-micron placement accuracy, a travel distance of 500 x 700 mm and a bonding head with minimum bonding force of 0.01 N.

Added value

- **High precision:**

  Thanks to the granite machine platform, the photonics Bonder is a highly accurate placement system.

- **Versatility:**

  All processes of the assembly and connection technologies offered by Tresky can be integrated.

- **Modularity:**

  The photonics bonder can be specifically aligned to customer requirements and expanded with different options. This means that the bonder can be used reliably in prototyping, product development and series production of nano- and optoelectronics.

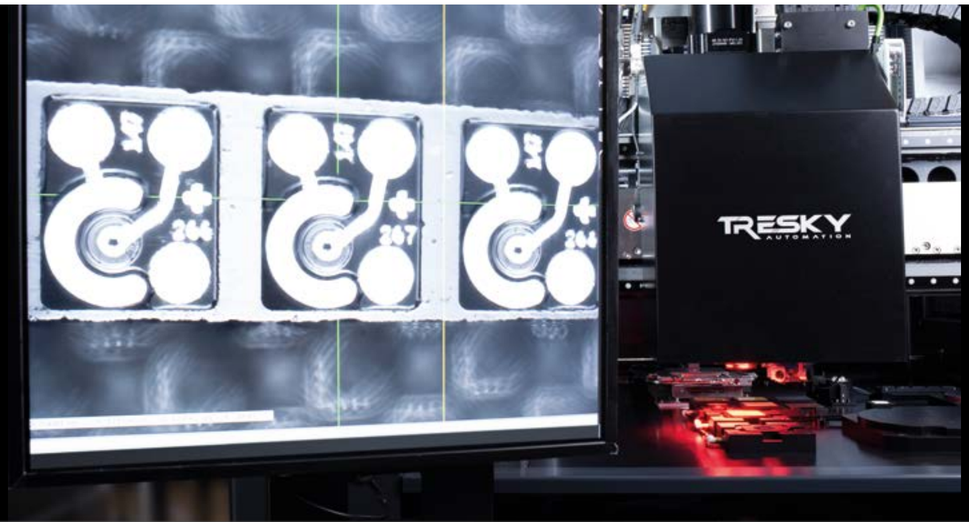
- **Time to market:**

  The prototype to production approach enables the photonics bonder to be used both in manual prototype production and in series production.

- **Bonding forces:**

  Optional high bonding forces also allow the photonics bonder to be used for high-precision sintering applications.

More information



DIE bonding - Applications

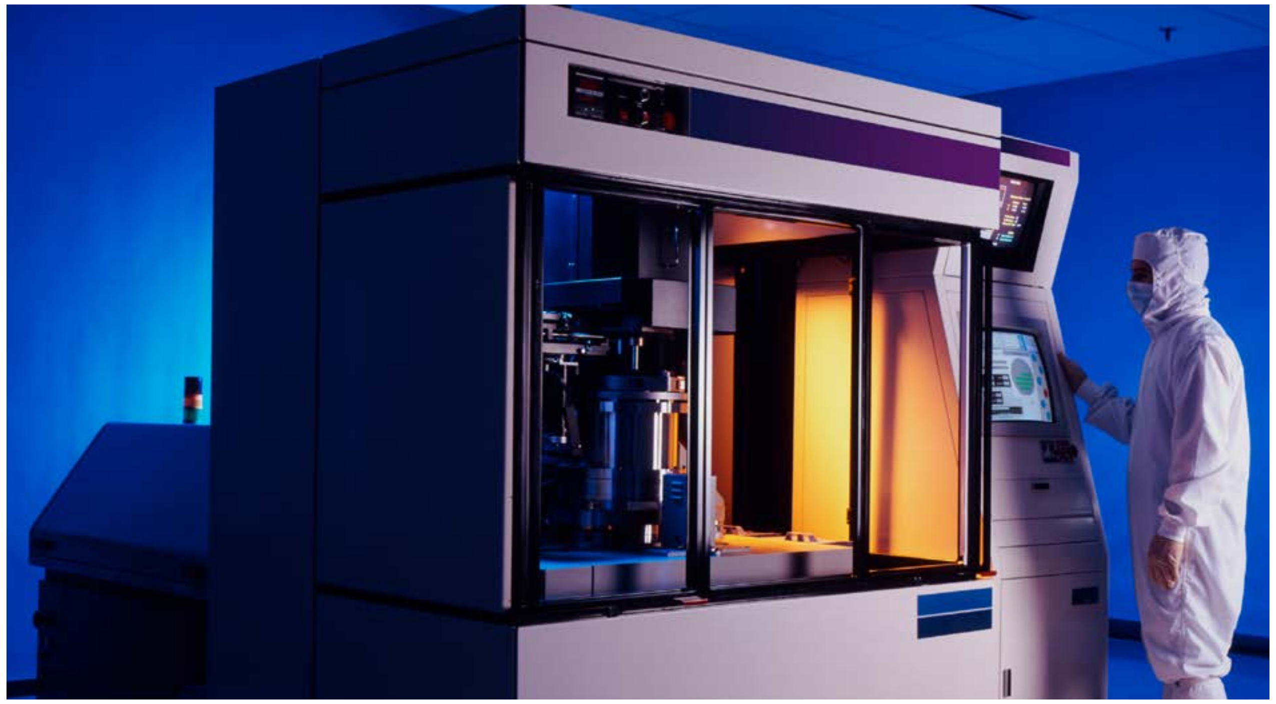
Versatile applications for the key technologies
of today and tomorrow

DIE bonding, also known as DIE attachment or chip bonding, is used in various applications to attach semiconductor chips (DIEs) to substrates or carrier materials.

The use of DIE bonding varies depending on the industry and area of application. It is a key technology that is used in a wide range of electronic products and systems. DIE bonding enables compact, reliable and high performance electronic assemblies that are ubiquitous in our modern world.

Semiconductor industry:

DIE bonding is a key process in the manufacturing of integrated circuits (ICs) and microchips. DIEs are placed on substrates using different bonding solutions. This ensures that they are correctly bonded electrically and mechanically.



Electronics manufacturing:

In the electronics industry, DIE bonding is used to mount semiconductor chips in various electronic devices and assemblies. This includes applications in cell phones, computers, televisions, cameras and many other electronic products.

Med Tech:

DIE Bonding is also used in the medical technology sector to produce compact and reliable electronic assemblies for medical devices such as implantable pacemakers, diagnostic devices and medical imaging systems.

Automotive industry:

More and more semiconductor components are being used in modern vehicles. DIE bonding is crucial for the manufacture of control units, sensors and other electronic components in vehicles.

Aerospace technology:

In the aerospace industry, electronic assemblies and components are often exposed to extreme conditions. Reliable DIE bonding is therefore of great importance to ensure that the electronics works on extreme temperatures and vibrations.

Telecommunications:

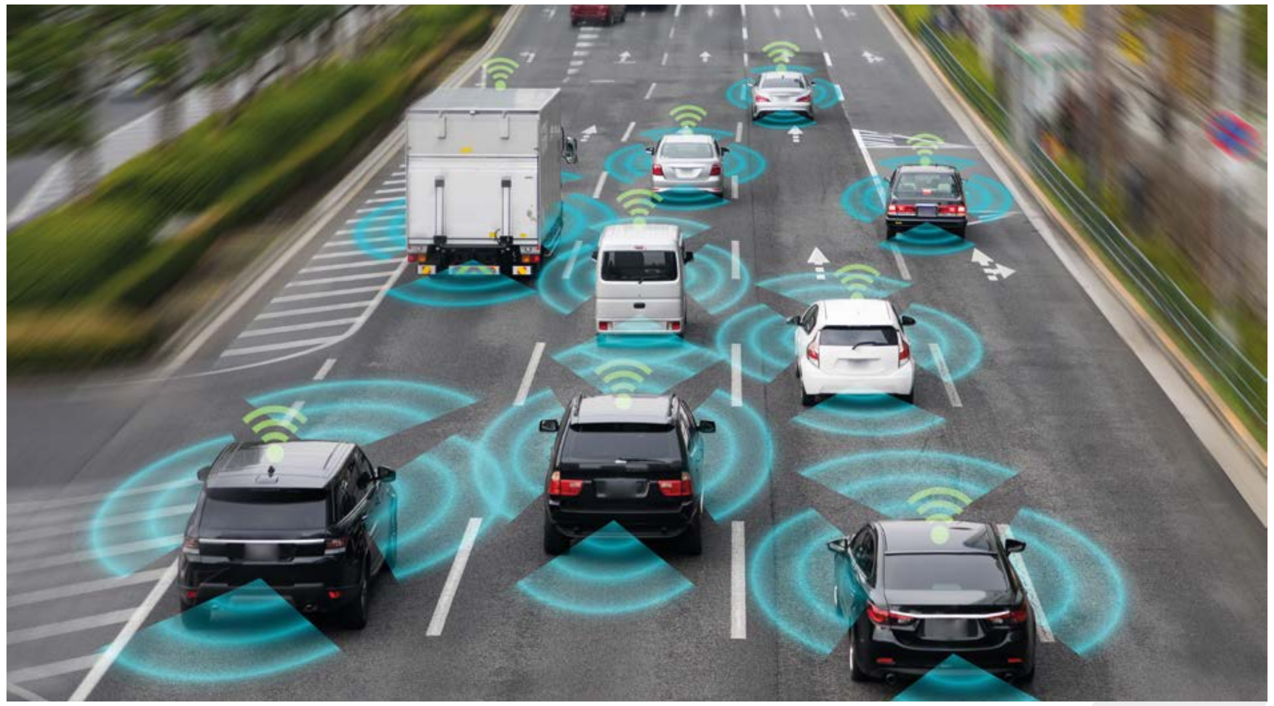
In telecommunication devices such as mobile phone base stations and satellite communication systems DIE bonding techniques are used to assemble high-frequency and power electronics components.

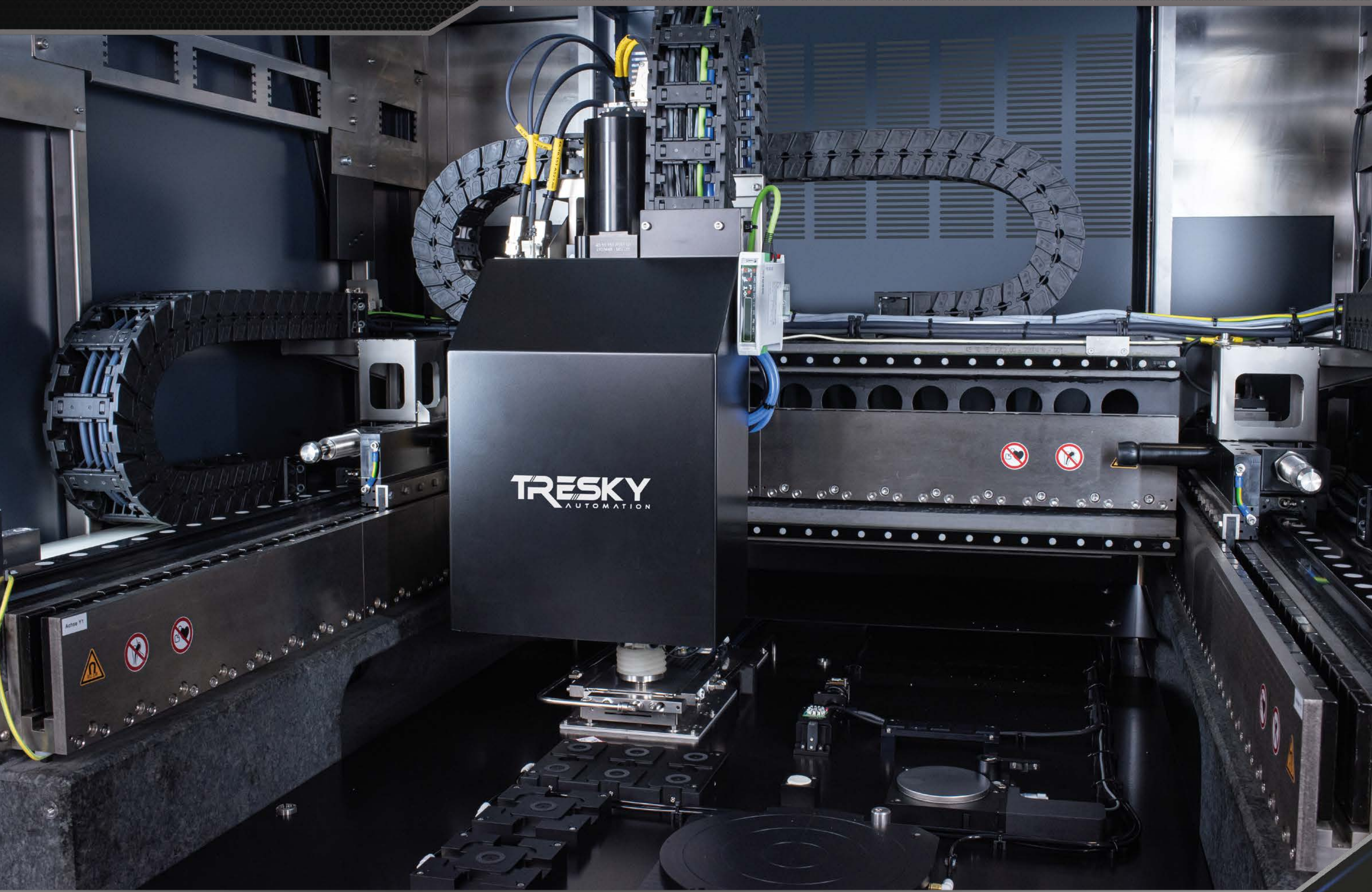
Optoelectronics:

In optoelectronic applications, such as optical communication systems and laser diodes, DIE bonding is used to mount optoelectronic components and ensure that they are precisely aligned.

Sensor technology:

The production of sensors, which are used in a wide range of applications, often requires DIE bonding in order to position the sensor elements securely on the carrier material.




TRESKY
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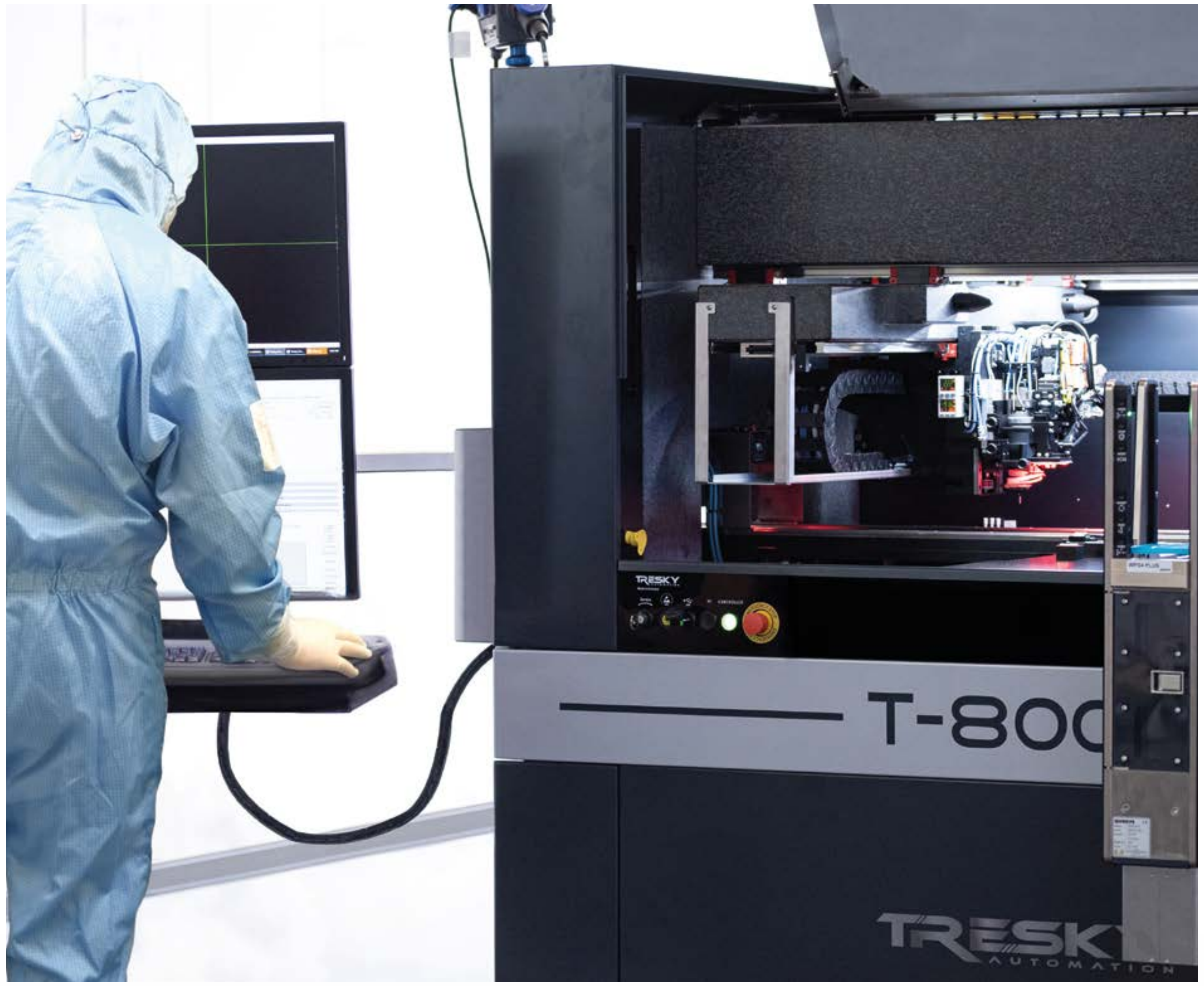
Contract service

DIE bonding prototyping and the production of small series

Our service helps you to reduce time-to-market significantly. As an external partner, we can quickly produce small series on demand without you having to build up production capacity, use existing resources or even interrupt series production. This means that you not only receive the products you want, but we can also show you the performance of our DIE bonders and their reliable process capabilities. You will receive an individual demonstration, including proof of production, which can make it easier for you to decide on a machine for subsequent series production.

More information



Service

Reliably at your side worldwide!

We offer you a comprehensive service for our machines and special solutions. No matter what your task is and what projects you want to implement, we will be happy to advise you on the possibilities and work with you to find the optimum machine solution.

With 3 locations and countless agencies worldwide, we have a broad network of technicians to support you. You will receive competent first-hand advice, fast and punctual delivery and a solution tailored to your problem.

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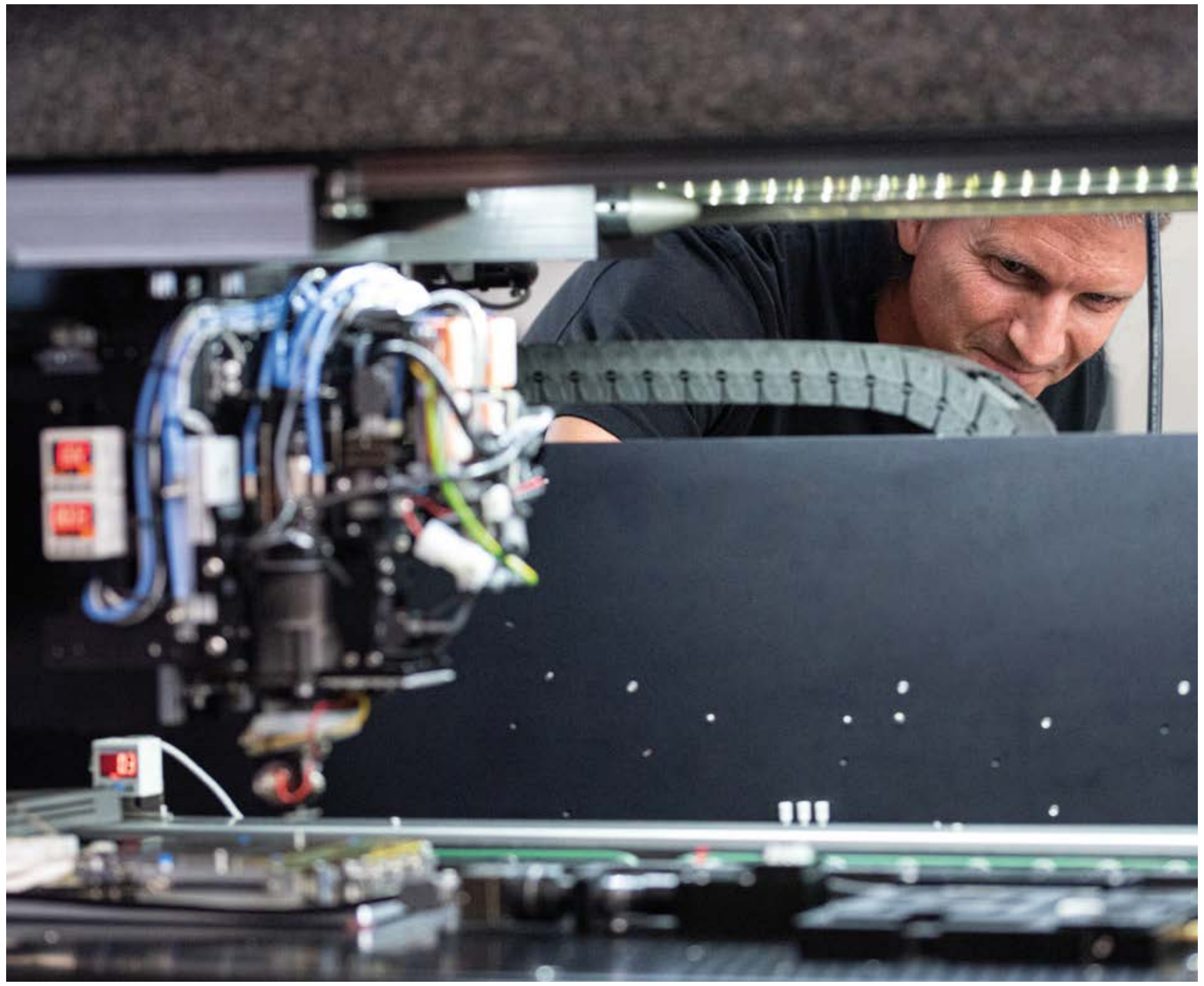

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