



## SUCCESS THROUGH INNOVATION AND TECHNOLOGY

Leading supplier for system integrations in semiconductor manufacturing

## A SPIRIT OF DEVELOPMENT – THE SOUL OF OUR COMPANY



The patenting of the P-Dock® locking element in 2005 inspired us to found the company Turbodynamics GmbH. Ever since, the focus of our everyday endeavors has been to expand our knowledge and enhance our products. We have managed to achieve this successfully at all business levels. Our range of products and services has been growing at a steady pace. Today we are represented in several countries in Europe, in the US, and in Asia. Turbodynamics has managed to establish itself as a global partner for system integrations in semiconductor manufacturing.

Two things that have remained unchanged through all these years are the location of our headquarters in Stephanskirchen/Germany and the unwavering commitment of our design team – the soul of our company – to exchange knowledge and ideas. We always strive to deliver the highest possible quality. All Turbodynamics GmbH products pass through many stages of quality assurance before delivery. This is how we are able to guarantee “quality made in Germany”.

Between 2014 and 2019, we won the Fast50 Award four times and also received a major supplier award in 2020. On the following pages, we would like to give you a glimpse into our company and our product world.

Enjoy!

A handwritten signature in blue ink, appearing to read 'Stefan Thurmaier'.

Stefan Thurmaier  
President



## OUR WAY OF THINKING

Our many years of experience enable us to offer you high-precision solutions of the highest quality. The active exchange of ideas within our company means that we always find tailor-made solutions for each machine generation. Our diligence guarantees that you get optimized and tried-and-tested system integrations in semiconductor manufacturing.

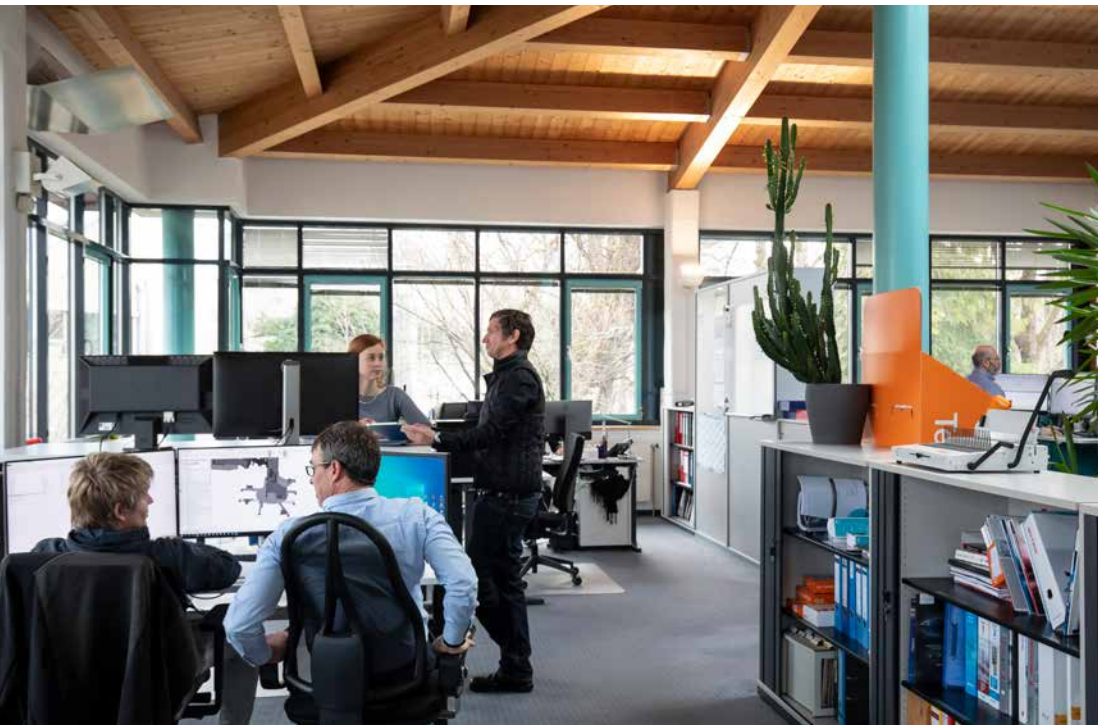
## COMPANY HISTORY

- 2006 — Development and patenting of the P-Dock® locking element
- 2006 — Foundation of the company Turbodynamics GmbH by Stefan Thurmaier
- 2007 — Spin-off of the company Multitest Electronic Systems
- 2009 — Continued development of the “Docking” product line for handlers, probers and testers
- 2011 — Introduction of the Micro P-Dock® module
- 2012 — Expansion of production and office facilities
- 2014 — Our first Fast50 Award
- 2015 — Acquisition of the first 5-axis milling machine
- 2016 — Relocation to a larger company building
- 2017 — Second Fast50 Award
- 2018 — Third Fast50 Award
- 2019 — Fourth Fast50 Award
- 2019 — Representation in other EU countries, in the US, and in Asia
- 2020 — Launch of a new product: the “Tiger” trolley
- 2021 — 15<sup>th</sup> anniversary of the company
- 2021 — We received a major supplier award
- 2021 — Integration of Turbodynamics storage systems in Asia
- 2021 — Opening of a Turbodynamics subsidiary in Silicon Valley/USA
- 2022 — Relocation of the milling department to a production hall nearby



Firmenvideo





Kathrin Thurmaier, HR-Manager

## WITH HEART AND SOUL

Things never get boring at Turbodynamics GmbH. Our aim is to be one of the pioneers who shape Industry 4.0 and we tirelessly pursue technical developments to stay at the cutting edge.

This keeps our team's spirit youthful and motivated. We all work towards our goals together as a team and constantly exchange expert technical advice and innovative ideas with each other. This team spirit enables us to support each other's development and makes our work a lot more pleasant. Our design department

is the heart of our company. This is where all requests, requirements and ideas are collected and processed. Our wealth of experience is complemented by our modern open-plan offices and state-of-the-art software. Production and assembly take place in our professional machine park, which we expanded in 2021. We use this top-of-the-line equipment to develop innovative cleanroom devices in the heart of Stephanskirchen – all from one source – made in Germany.

**Made in Germany**



**Willibald Baumgartner**

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## TAILOR-MADE SOLUTIONS

As the world's leading provider of system integrations in semiconductor manufacturing, we offer a wide range of products and services.

Thanks to our comprehensive understanding and many years of experience, we can offer you a customized solution of the highest quality for each project, while also taking into account potential future changes.

This enables us to build long-term business relationships and support our customers reliably in the long run. Our goal is to boost your productivity in order to make you more successful and efficient.

On the following pages, you can find an overview of our versatile product portfolio. If you have any questions, please don't hesitate to contact us: [info@turbodynamics.com](mailto:info@turbodynamics.com)



Manipulators



Trolleys



Docking/  
Interfaces



Conversion kits



P-Lift



Storage systems



Probe cards



Stiffeners



Precision made in Germany



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## COMPREHENSIVE PRODUCT UNDERSTANDING

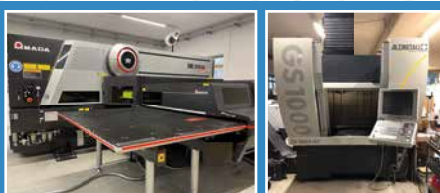
- » Manipulators
- » Trolleys
- » Docking/Interfaces
- » Conversion kits
- » P-Lift
- » Socket Quick Lock
- » Storage systems
- » Probe card analysis adapters



• 3D-Konstruktion • CNC-Bearbeitung • CNC-Drehen • Blechbearbeitung • Qualitätssicherung

**PRANKL**  
Maschinenbau

Prankl Maschinenbau GmbH & Co. KG ist seit 1993 Ihr kompetenter Partner für die Zerspangung und Blechbearbeitung nach höchsten Qualitätsstandart. Wir bieten Ihnen eine Komplettlösung von der Planung bis zur Fertigung Ihrer Teile. Unser motiviertes, junges Spezialistenteam bietet die besten Voraussetzungen für die optimale Auftragsabwicklung in höchster Präzision und Qualität.



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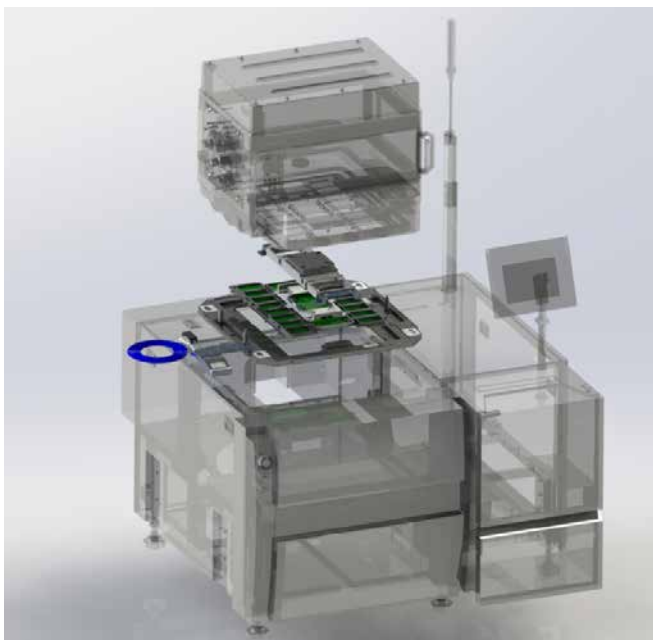
## DOCKING & INTERFACES

Docking & Interfaces is the oldest and largest product group of Turbodynamics. We are, therefore, able to draw on a wealth of experience with these products. Based on our patented P-Dock® locking system, we have developed suitable docking solutions for almost all test cell combinations in the ATE industry over the years. One special feature of our products is their extremely compact design combined with very precise reproducibility. In combination with an ergonomic handling you get a unique product spectrum which enjoys great appreciation by our existing and steadily growing customer base.

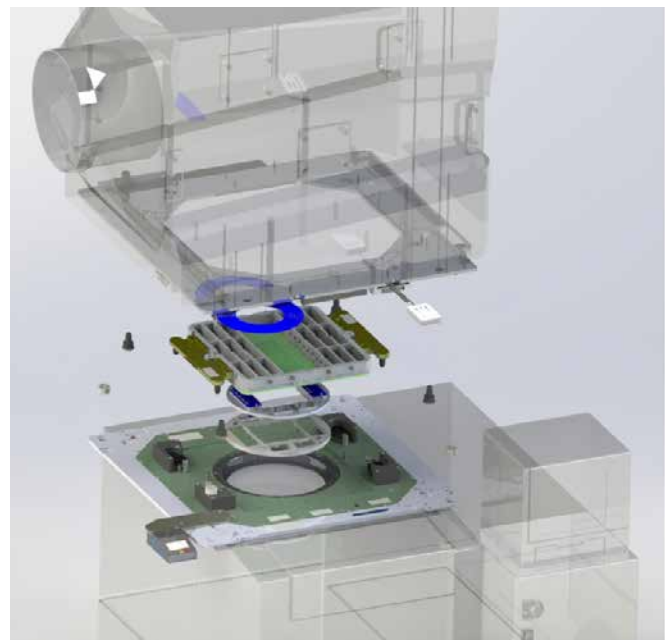


Benedikt Pongratz,  
Product Manager Docking & Interfaces

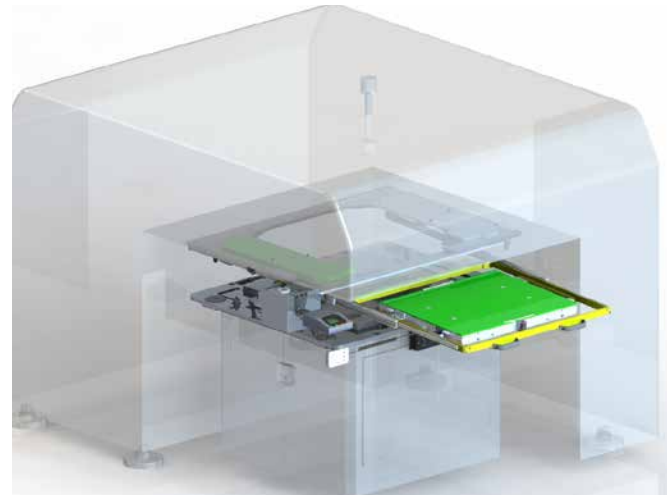
The direct docking systems of Turbodynamics can be integrated on all 200 mm (8") and 300 mm (12") wafer probers. Thanks to the Turbodynamics top-loading technology, we can offer the best cold test and hot test performance in the world. Our direct docking (DD) portfolio covers all popular tester platforms from Advantest, Teradyne, Spea, National Instruments and Cohu. Below you can see a DD Semics combination of an Advantest V93000 tester with a Semic Opus 3 prober.



The Pogo Tower solutions of Turbodynamics guarantee unrivalled repetition accuracy. Thanks to the patented Prober Interface Board (PIB) docking system, our customers are able to achieve significant repeatability improvements in wafer testing. Our modular design makes it possible to combine various platforms. This allows us to offer our customers the best return on investment (ROI) for this platform. Below you can see our Pogo Tower solution for a Teradyne U-Flex tester with a TSK UF 200 prober.

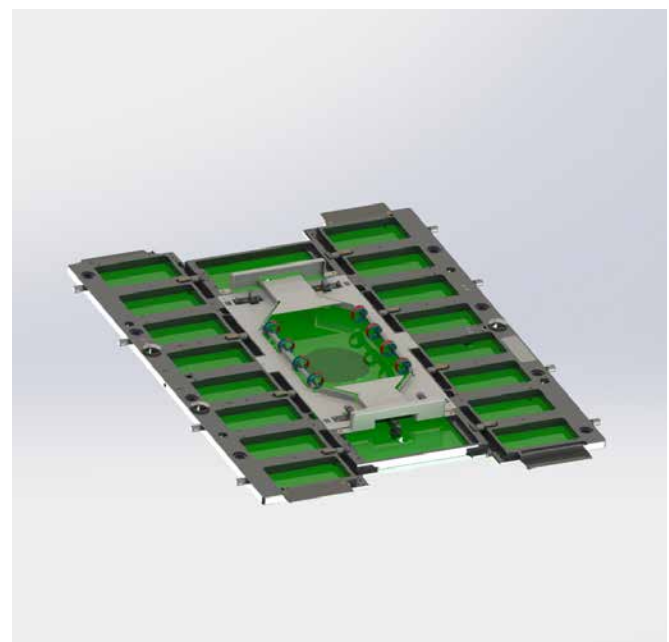
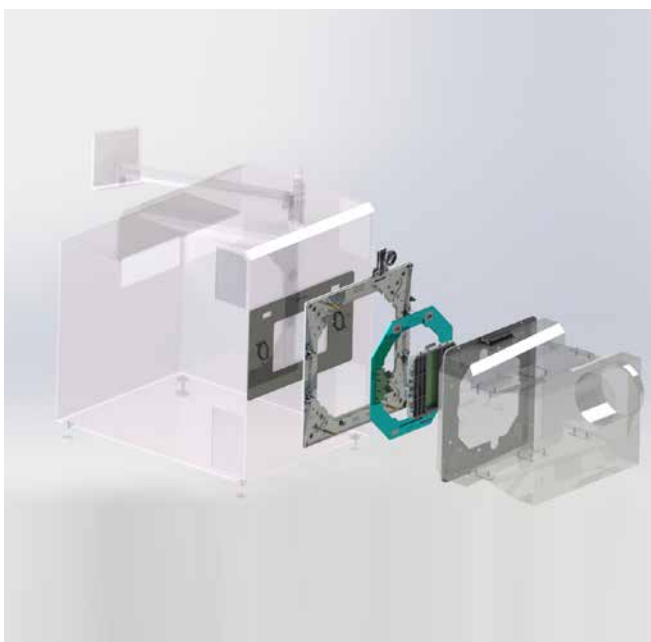


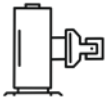
The family of products known as Handler Interface Board (HIB) Lockers are basically a combination of a docking solution and a board changing system. This ensures a quick and simple exchange of those load boards easily and without any hassle. Key advantages of the system include its time-saving and ergonomic design together with the precise reproducibility. These solutions are available both for semi-automated and fully automated variants. For example, on the right you can see a test cell combination of a Teradyne ETS800 tester with a Cohu Delta matrix handler.



Our final test applications were among the first docking solutions developed by us and they are still in great demand and well-known in the back-end process of all major test cell operators. These involve combinations of testers and handlers with a height-adjustable or fixed-height P-docking variant. The choice of variant depends on whether our application will be used in engineering or in production. The illustration below shows a test cell combination of a Teradyne U-Flex tester with a Multitest MT9510 handler.

Turbodynamics provides stiffeners of the highest quality made in Germany. We offer OEM stiffeners from Advantest, Teradyne and Cohu as well as our own developments. These include direct-docking stiffeners and high rigid stiffeners that ensure less deflection. Our daughter-to-motherboard stiffener solutions give our customers the highest modularity across various tester platforms.





## MANIPULATORS

Turbodynamics GmbH always strives to offer an individual solution to each customer. Our broad product portfolio makes it possible to position highly sensitive test heads on test cells with a high degree of precision in a wide variety of test floor/test field environments, in the engineering area, in wafer probe and final test area. Manipulators are available either as purely mechanical devices with counterweight plates or as automated units.



### TDM20 Universal Manipulator

- » A multi-functional all-rounder for test heads up to 300 kg
- » Flexible, compact and economical design
- » Single-arm solution with a static tower
- » Convenient test head leveling at all positions
- » Various add-ons available (cable management, screen and keyboard mounts ...)



### TD1380XL Universal Manipulator

- » A robust and powerful solution for heavy test heads up to 700 kg
- » Flexible, compact and economical design
- » Two-arm solution with a rotating column
- » Motorized motions
- » A safety/power shut-off function to ensure safe docking and undocking of the test head
- » A wide range of customer-specific functionalities are available

## HINGE MANIPULATOR

Our newly designed hinge manipulator, which has been in our product range since the beginning of 2022, is a space-saving solution for the safe docking of test heads on wafer probers. If floor space/ceiling height constraints or peripheral devices make it challenging to set up your test area, you can count on our probe hinge manipulator to meet your unique testing requirements.

It provides you with hinge-style functionality similar to a universal manipulator while significantly reducing the footprint of the test cell.

### TD1300 Hinge Manipulator

- » For test heads up to 650 kg
- » Motorized motion
  - » Vertical orientation for parallel docking
  - » Can be folded in/out to the prober
- » A safety/power shut-off function to ensure safe docking and undocking of the test head
- » Available as an integrated device for the prober or as a stand-alone unit



**SCHÖNBACH**  
Frästechnik GmbH & Co. KG

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- CAD - Cam
- Prototypen

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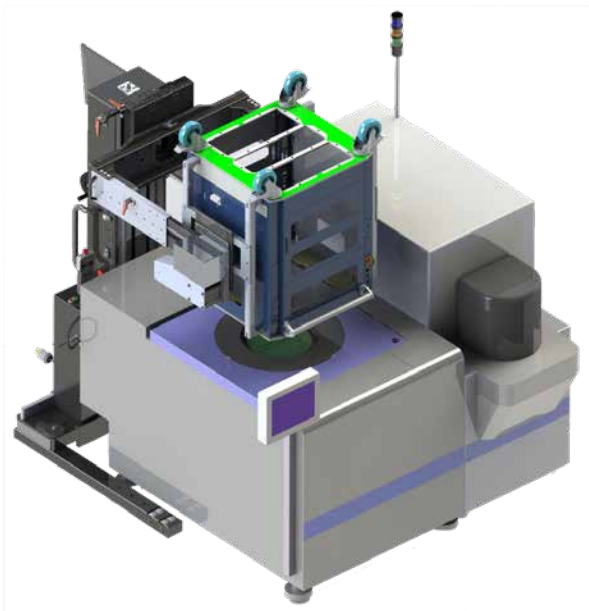


## UNIVERSAL TROLLEY; FINAL TEST TROLLEY

Since 2018, Turbodynamics also offers a mobile manipulator series (Trolleys), where the test head mounted on the Trolley can be maneuvered from test cell to test cell. In this way, the highly sensitive test handlers do not have to be relocated and realigned. This saves considerable time. In addition, the entire test cell becomes more compact, which saves space.

Our "Tiger" trolley series impresses with an elegant design and many technical improvements.

Universal trolley systems are designed for wafer probing and final test applications of all types. The compact, cost-effective design and support for all degrees of freedom at the test head ensure the unparalleled productivity of this system. The design variants for final testing have the same technical features, but their columns are shorter to enable a better overview of the test cell.



### TD1350 "Tiger200" Universal Trolley for Probing Applications

- » A space-saving mobile version for test heads up to 300 kg
- » Compact and cost-effective design
- » Electric vertical movement
- » Test head leveling at all positions



### TD1255 Trolley with Vertical Handler (Final Test)

- » Small footprint
- » Extremely maneuverable
- » A flexible and agile solution for test heads with a small weight



Alfred Wiesholzer,  
Senior Project Manager



#### **TD1275 Trolley with Horizontal Handler (Final Test)**

- » Robust and efficient design
- » Even heavyweight test heads can be moved flexibly

## TEST CELL/ COMPLETE SOLUTION

Take advantage of the complete solutions/Manipulator & Docking solutions of Turbodynamics.

Our company offers you a comprehensive range of services based on an in-depth requirements analysis and definition that has been developed in close cooperation with our customers.

It extends from the selection of suitable equipment all the way to the development of custom designs for optimized and highly efficient test cells. Turbodynamics offers you almost unlimited system integration options for the realization of complete test cell solutions that are implemented and developed by specialized and experienced staff. In addition, the Turbodynamics team provides you with outstanding design quality and technical support tailored to your needs.

Turbodynamics stands for modern, forward-looking design, high-quality production (made in Germany), and state-of-the-art technologies, as well as products that are virtually maintenance-free. This minimizes accidental damage to test hardware due to operator errors. We also provide customized, on-demand installation and training services.

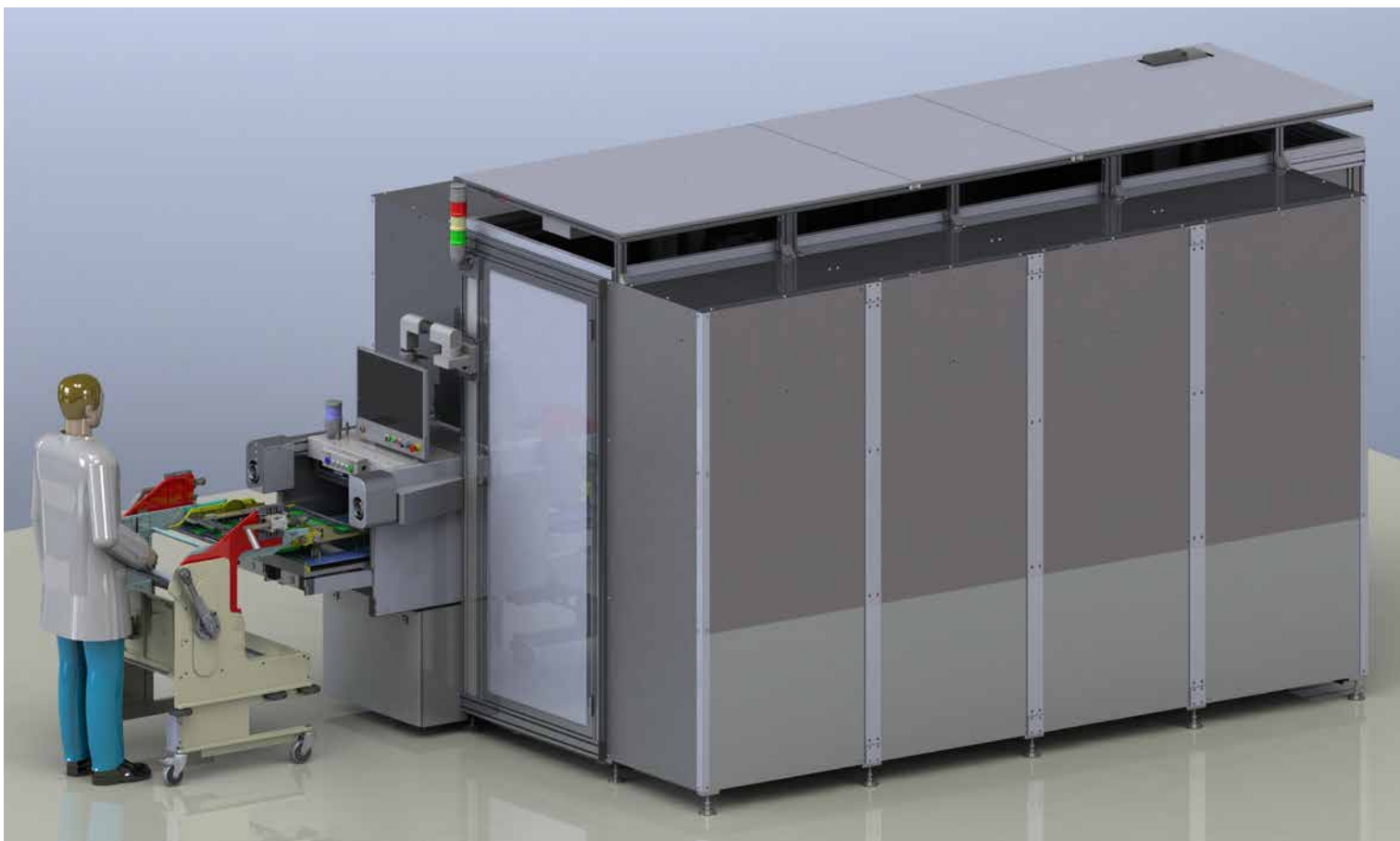
Turbodynamics guarantees the fast execution of all processes: short design and delivery times, as well as reduced conversion and setup times. Overall, you benefit from more added value in the long term thanks to the increase in testing capacity and the rapid return on investment.



## STORAGE SYSTEMS

Turbodynamics developed a modular storage system for expensive equipment such as probe cards and load boards. Our system enables the safe storage and handling of these increasingly expensive and heavy goods. The modular design makes it possible to adapt the system to various customer-specific requirements.

Clearly structured processes for storage/retrieval and transportation of the cards ensure maximum efficiency and time savings when exchanging probe cards or load boards. Our system can be easily integrated with existing devices into central data management systems of the customer.



- » Cleanroom-compatible
- » Easy storage and retrieval
- » Ergonomic work, no lifting of heavy loads
- » Efficient use of space
- » A flexible design that can be used for many applications
- » "Hands-free" process
- » Savings due to the reduced staff requirements
- » A universal carrier plate for different formats/probe card/board sizes
- » Prevention of human error
- » Industry 4.0





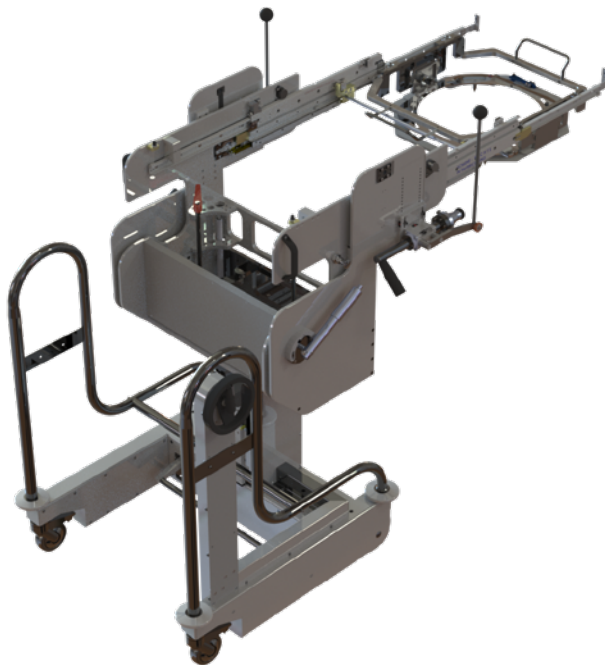
## PROBE CARD TROLLEYS

Our probe card trolleys are available as top-loading and bottom-loading versions for the corresponding prober variants. They enable the safe and easy transport of probe cards with a weight of up to approx. 40 kg between the storage location and the place of use.

In combination with our probe card storage system (patent pending), the trolleys represent another important step towards automation in the handling process on the test floor.



Norbert Hunger,  
Senior Design Engineer



### TD1090

Probe card trolley for top-loading wafer probers

Reliable feeding/removal, safe transport and storage of the probe cards, universal use, modular receiver systems, one system per test floor possible



### TD1095

Probe card trolley for bottom-loading wafer probers

End-to-end feeding/removal process and fail-safe transport of the load board, universal use, one system per test floor, can be combined with an automated guided vehicle, modular receiver systems, damage prevention

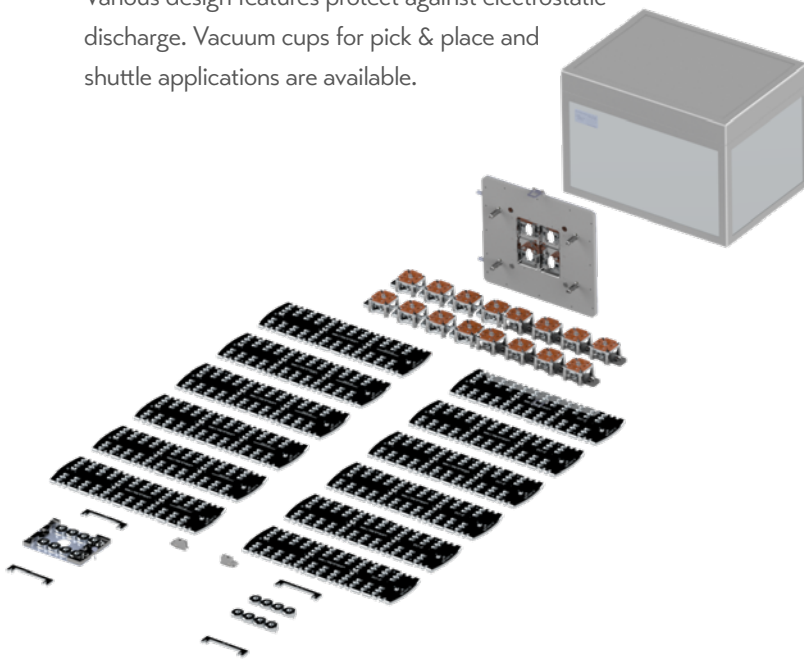


## CONVERSION KITS

We develop and manufacture conversion kits for various test handlers. Our team has many years of industry experience with designing creative individual solutions to meet all customer requirements.

For example, we offer conversion kits for the type MT9510 Pick&Place test handler with our own production line in Germany. Our portfolio features a wide range of device types and sizes (QFN, QFP, BGA, etc.). We fulfill all market requirements by supporting a wide range of temperatures from -55 °C to +175 °C. We offer individual contact site pitches as well as our customized contact unit designs according to customer requirements.

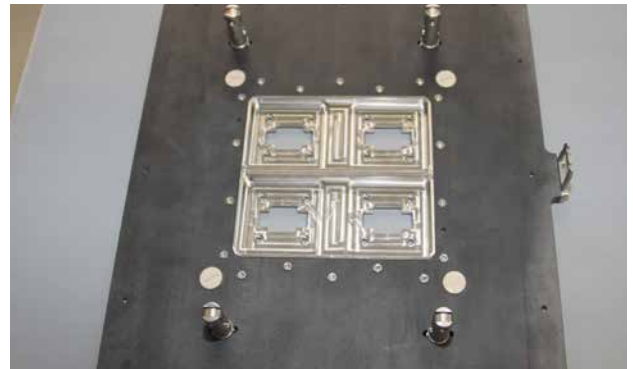
Various design features protect against electrostatic discharge. Vacuum cups for pick & place and shuttle applications are available.



- » A large selection of package types and sizes (QFN, QFP, BGA, etc.)
- » A wide temperature range from -55 °C to +175 °C
- » Individual junction distances are available
- » Various junction options
- » Various designs for the prevention of electrostatic discharge
- » Various vacuum cups available for the handler's P&P and Shuttle



Roland Schotten,  
Senior Design Engineer



## OUR STRONG PARTNERS

Our partners have always been at our side through the years. We would like to thank them for this close cooperation. We currently maintain international partnerships in Europe, the US, and China. We see ourselves as an interface for the development of tailor-made solutions for system integrations in semiconductor manufacturing. Become part of this network and enjoy the benefits from our cooperation. We look forward to meeting you.



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Know-How &  
Originalität**

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- **ZERSPANUNGSTECHNIK**

CNC-Zerspanung von komplexen feinmechanischen Bauteilen

- **SCHLOSSEREI**

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- **MONTAGE**

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- **CAD / CAM**

Vernetzung der Konstruktion mit der Fertigung

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