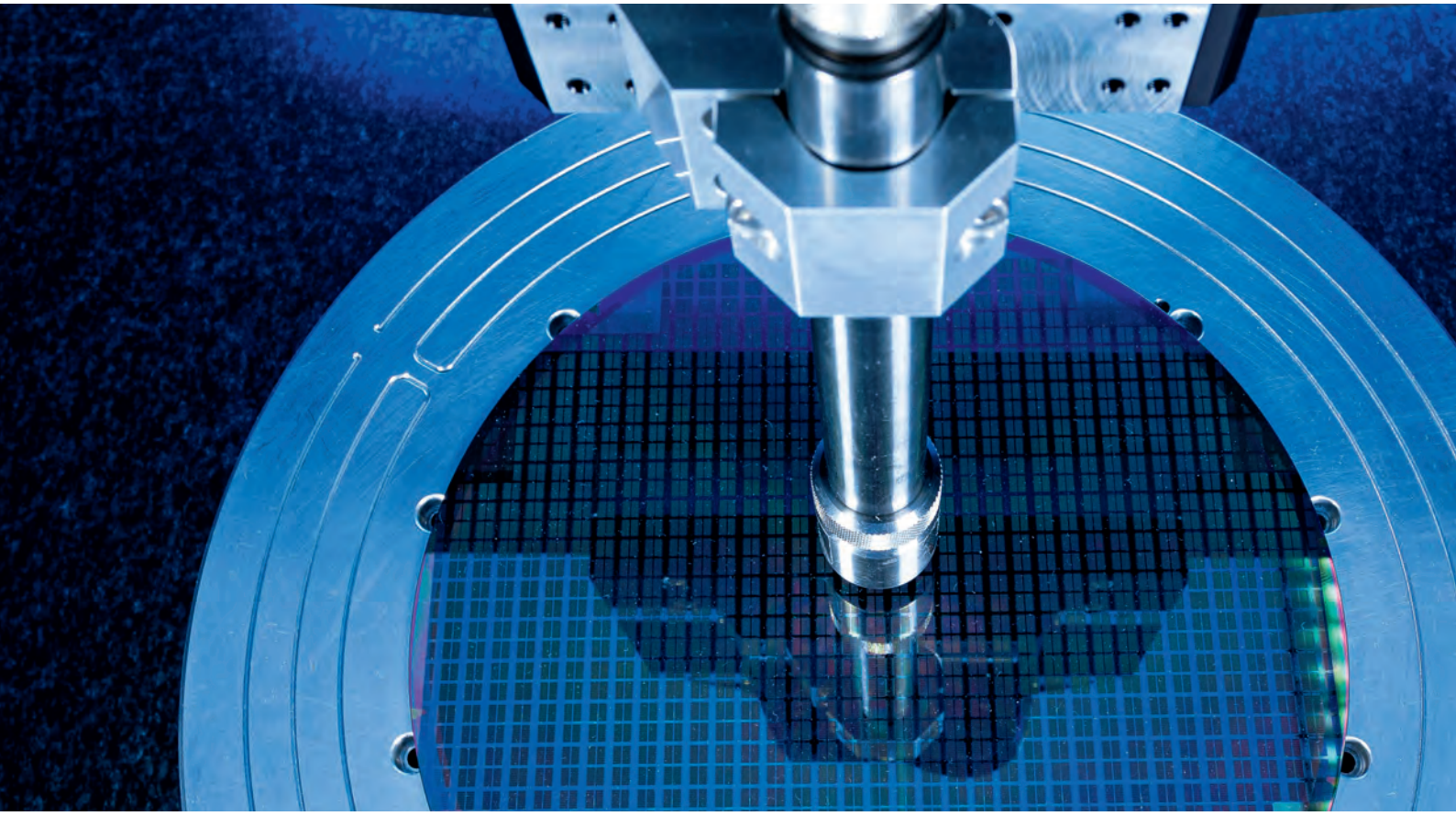
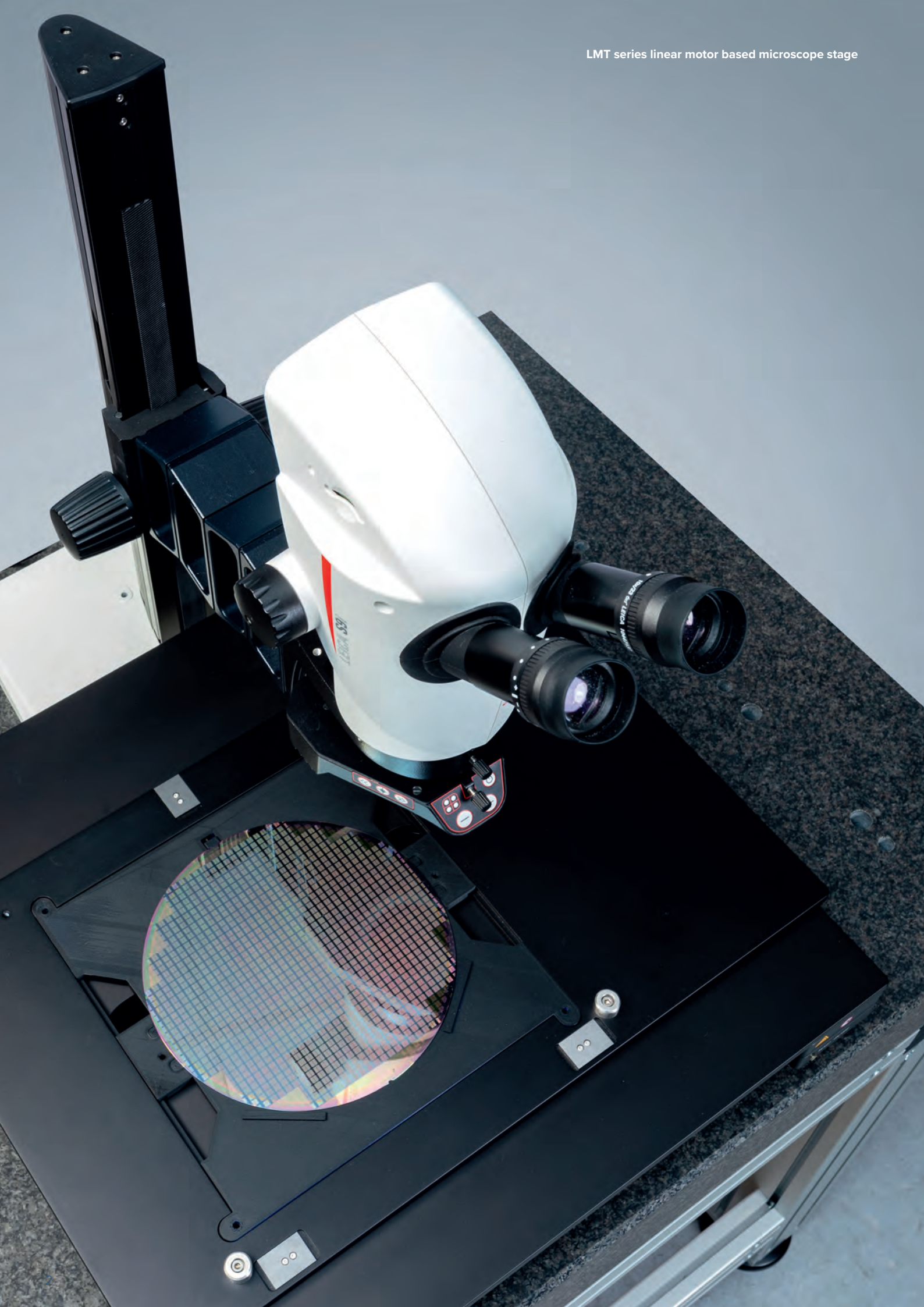


Solutions for the semiconductor industry

Positioning systems made to measure.



LMT series linear motor based microscope stage

Positioning

Measure. Control. Move.

ITK stands for quality and system know-how in the development and production of mechatronic positioning systems. We traditionally develop, manufacture and measure components for new systems that are not available on the market – from patented, ironless linear motors for significantly higher performance in the same envelope to position measuring sensors for harsh environments that do not allow optical measurements.

We were one of the world's first manufacturers to incorporate sensors designed according to the magneto-resistive principle in series products. We also broke new ground with MR technology, as ITK developed the first magnetization systems for our own use. Today, we are a supplier of both circular and linear magnetization systems for OEM companies – and a proud partner for demanding positioning tasks in the following industries

- semiconductor
- life sciences
- material sciences
- measurement technology

We have not forgotten our roots in optics. At the Lahnau location, we benefit from immediate proximity to the optics city of Wetzlar and its network of precision specialists. It is often precisely the broad spectrum of applications that opens up competitive advantages for customers. Because ultimately their requirements in terms of precision, speed, reliability and fast time-to-market are very similar.

The foundation of the ITK product portfolio is formed by

- mechanical components
- controllers
- linear motors and drives
- position sensors
- high performance software

This enables us to offer our customers

- high flexibility in the design of products
- series production from batch size 1 for mechatronic systems

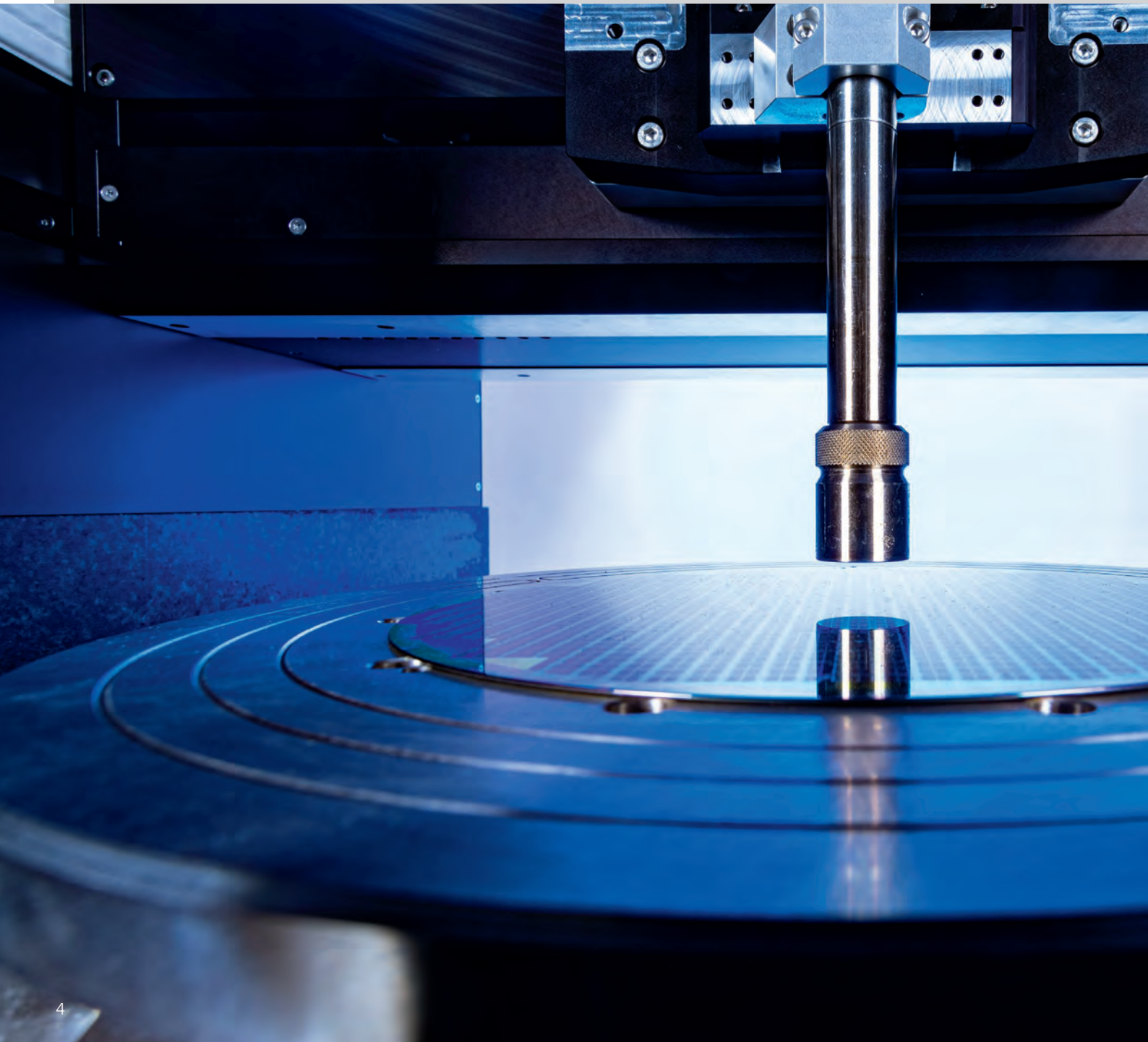
The result of this strong combination: broad knowledge and extensive experience in the design and construction of complete machines, which we develop in interdisciplinary teams. For added value that can only come about thanks to the integrated technical understanding of the individual disciplines of electronics, mechanics and software.

Industry requirements for positioning systems and components

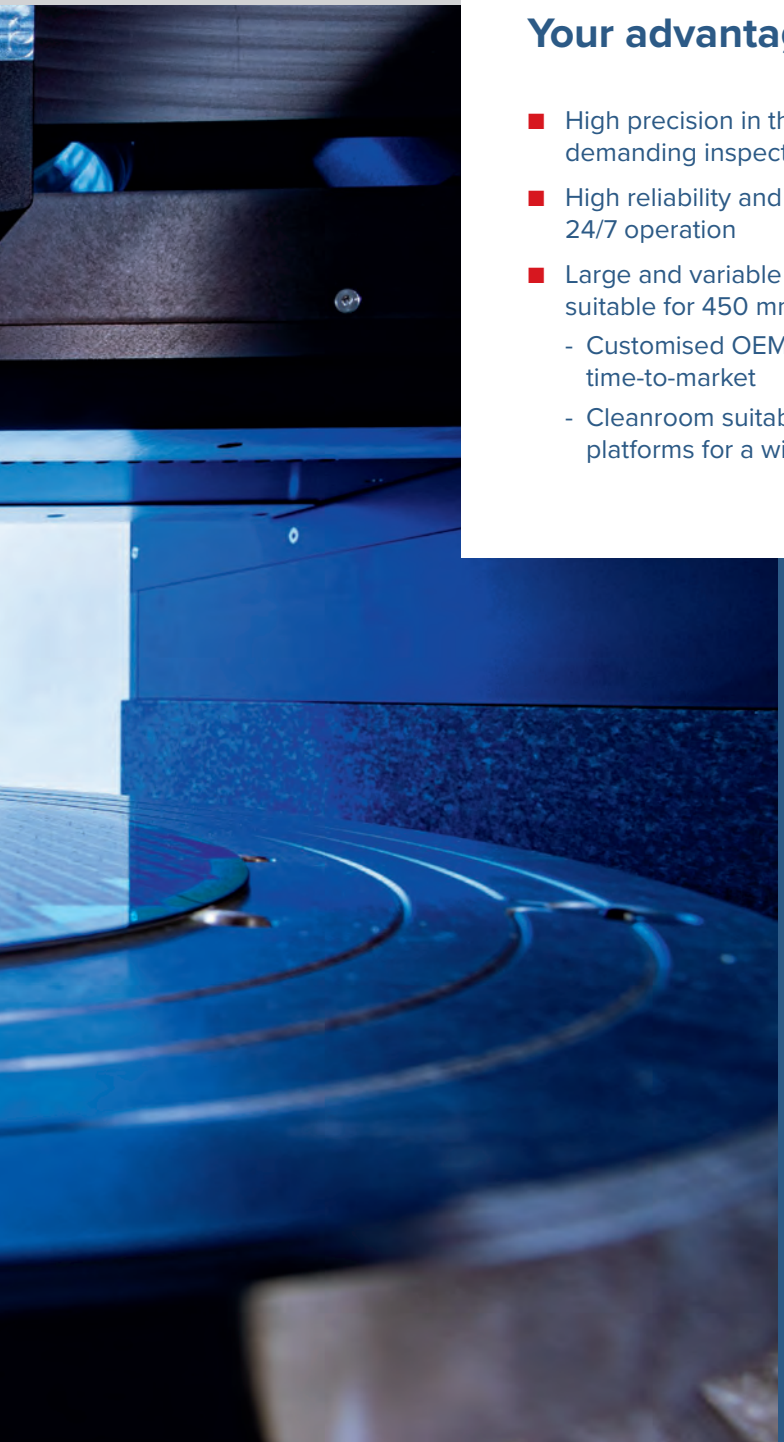
Quality needs experience.

Sand becomes high technology – what is hard to imagine for laymen is everyday work for experts from the semiconductor industry. From the molten silicon to the assembled printed circuit board, our products primarily support front-end and back-end processing. Positioning tasks are mastered by our gantry tables in the special environment of the industry. Whether for 450 mm wafers or for special clean room classes, we customise our systems.

Within these phases, the respective semi-finished products pass through countless fully automated production steps. They range from simple handling tasks with no requirements for positioning accuracy to processes that require precision in the nanometre range. With regard to manufacturing processes, the semiconductor industry is also driving innovation for increasingly high-performance machines.



Within the highly complex and interconnected process steps, there are recurring requirements for positioning systems, one of which is the very high availability of the systems. High MTBF (Mean Time Between Failure) must not be a foreign word here. Rather, it must be planned as part of the development process.

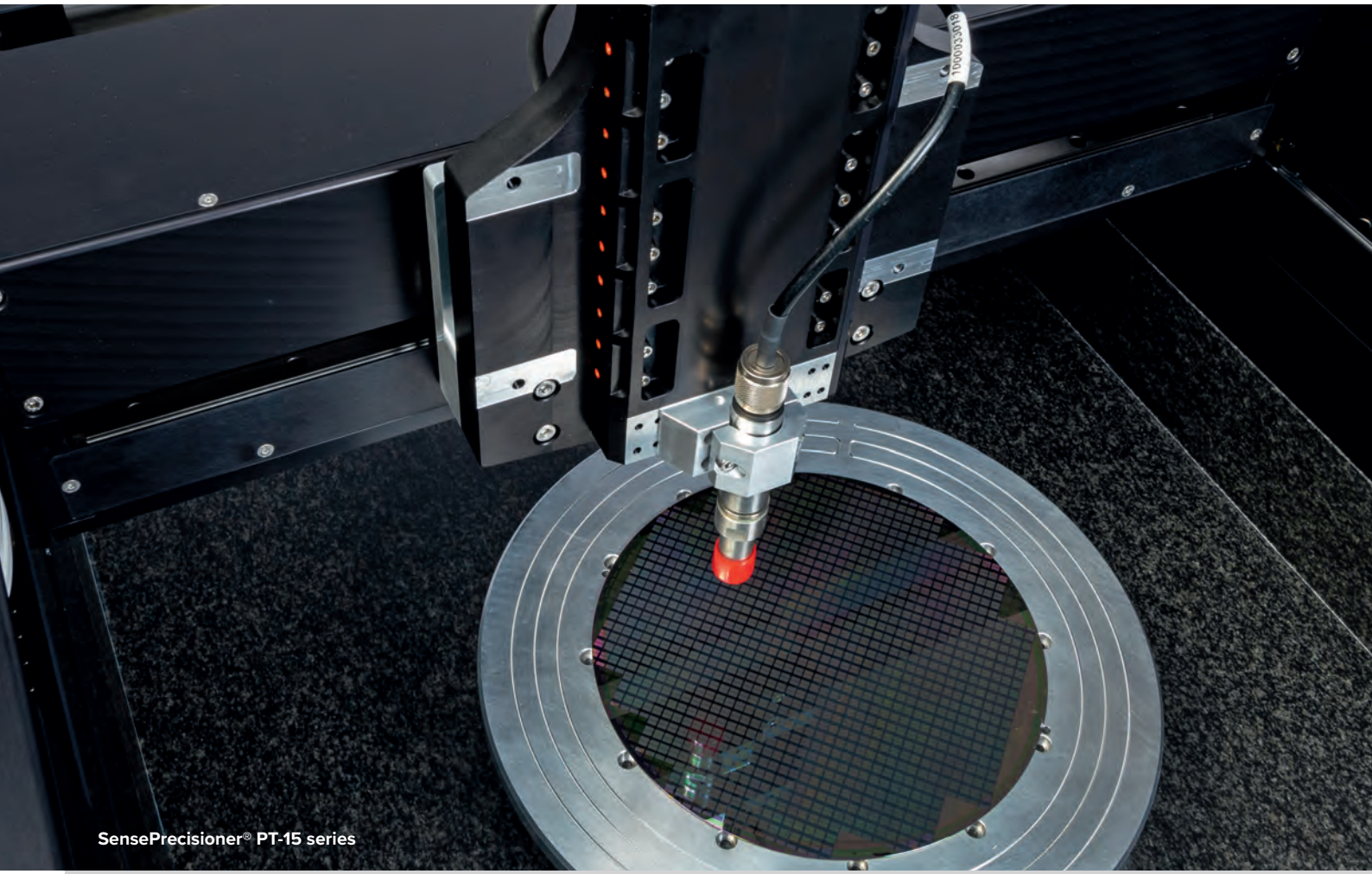


Your advantages.

- High precision in three dimensions for demanding inspection and test tasks
- High reliability and system availability in 24/7 operation
- Large and variable working areas, also suitable for 450 mm wafers
  - Customised OEM solutions for a fast time-to-market
  - Cleanroom suitability of the motion platforms for a wide range of tasks

How has ITK specialised in these fields of application? Read on.

Which solution is the best for your?
Ask us – we will be happy to advise you on all about positioning systems of all kinds and develop the solution that perfectly meets your needs. Highly flexible design with agile methods, modularly assembled from our own components.



SensePrecisioner® PT-15 series

SensePrecisioner®

Positioning Systems from ITK.

Modular, reliable and highly accurate.

The products of the PT-15 series belong to the new SensePrecisioner® family. They are available in various basic versions and form the basis for positioning with systems from ITK. Optimising each system flexibly and according to customer requirements is our speciality. Thanks to the modular design and the use of our own components, we can offer you a customised solution based on your specifications. We can realise your project many times faster and cheaper than you might expect. Contact us – we will be happy to make you an offer. The diagram shows you what our joint start looks like.

Comparison of positioning system series with granite base plate

PT-15 variant	High repeatability	High positioning accuracy	High resolution	High travel speed	High acceleration	Max. load capacity [kg] 0 2 4 6 8 10 12 14 16 18 20
-A	■■	■■■	■■■	■■	■■	
-B	■■	■■■	■■■	■■	■■	
-C	■■■	■■■	■■■	■■■	■■■	
-G	■	■	■■■	■■	■	

Note: The more ■, the better.

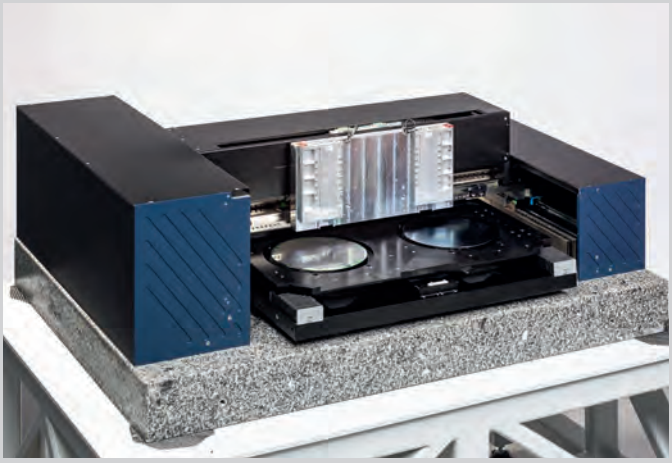
Positioning in clean rooms is associated with special requirements. ITK systems meet them by using components that are predominantly wear-free. These include

- ironless linear motors
- measurement systems on a magneto-resistive basis

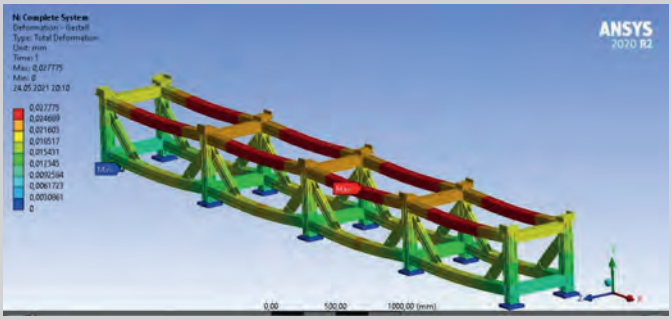
All the systems used have one thing in common: they are 100 % cleanroom compatible and absolutely reliable – even in continuous 24/7 operation. Scanning areas up to 4 m^2 are available within the standard portfolio, larger areas being possible on request.

Reliability analyses form the basis of our proactive preventive maintenance planning and contribute to maximum plant availability in the field.

Varying loads of specimens and workpieces can have serious influences on accuracy and control quality – especially if a system is not designed to optimise vibration. We therefore create simulations in advance using FE analysis. This allows us to take the challenges of everyday machine operation into account during development.



SensePrecisioner® Positioning system PT-15



FE simulation machine frame

Technical Data.

		Unit	Typical performance characteristics		
Load (without Z-module)		kg	2	...	20
Travel speed	in X	m/s	0.5	...	2.5
	in Y	m/s	0.5	...	0.8
Acceleration	in X	m/s^2	5	...	50
	in Y	m/s^2	0.5	...	5
Repeatability	bidirectional	µm	≤ ±0.5	...	≤ ±2.5
Positioning accuracy	bidirectional	µm	≤ ±5	...	≤ ±50
Resolution		nm	50	...	500

Note: The specified performance can be achieved with ITK controllers.

These exemplary technical data are based on systems that have already been realised. They are intended to give you a first impression of the possible performance.

Semiconductor, material sciences and measurement technology

Tailor-made products for the semiconductor industry.

The driver for the development of assemblies and product families is the modular system concept of the semiconductor industry for maximum flexibility and short development cycles. The following is a selection of the most compact modules; ITK also offers a wide range of other solutions.

Our flattest: FRS, FLS and FCS – directly driven by ironless linear motors, position the highly compact linear, cross and rotary stages within the accuracy of the selected measuring system. The proprietary measuring technology based on MR technology allows use even in environments that are not suitable for optical systems.

The Modules.

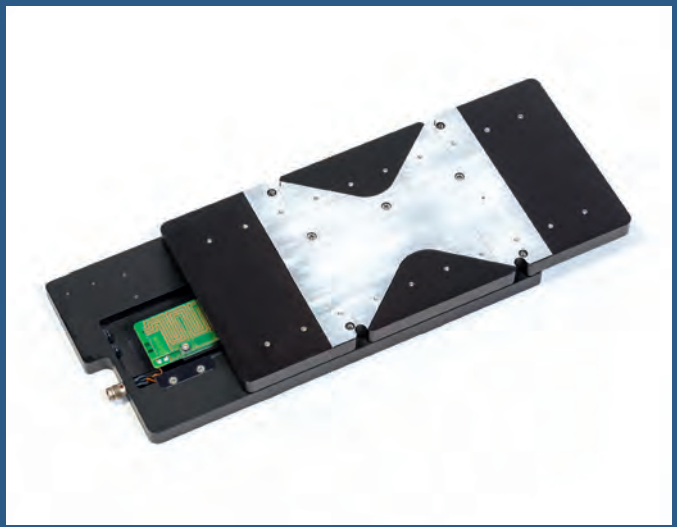
Rotatry Stages

Product example
FRS

- central, large hollow shaft
- extremely flat design (28 mm height)
- precision bearings for high axial forces
- direct drive for accuracy within the quality of the measuring system
- MR-based absolute measuring system that also works under harsh environmental condition
- clean room suitable

Linear Stages

Product example
FLS und FCS



- extremely flat design (23 mm height)
- direct drive for accuracy in the quality of the measuring system
- MR-based absolute measuring system that also works in harsh environmental conditions
- clean room suitable
- also available in X-Y arrangement
- positioning resolution of down to 5 nanometres can be achieved in combination with ITK controls

Modules are the key to fast customization in the systems business, but technological know-how and innovative strength often lie in the components used. For this reason, and also because it is our history, we develop our core components ourselves. Multi-axis controllers, MR measuring systems and linear motors have been successively added to the portfolio over the past 40 years and have continuously been developed since then based on market needs.

Which scope of delivery exactly meets your needs?
Ask us – our colleagues in sales will be happy to support you.

The Components.

Controllers

Product example
Andromeda

- real-time capability
- up to 6 axes with one control
- own motion algorithms for ideal use with stepper and linear motors
- flexibility right down to the software with the ITK Motion Manager

Measurement Systems

Product example
MiniStar ABS

- incremental or absolute measurement
- variant for vacuum application
- flexible use of dimensions and materials of the measurement scale
- resistant against dirt and water
- compact

Linear motors

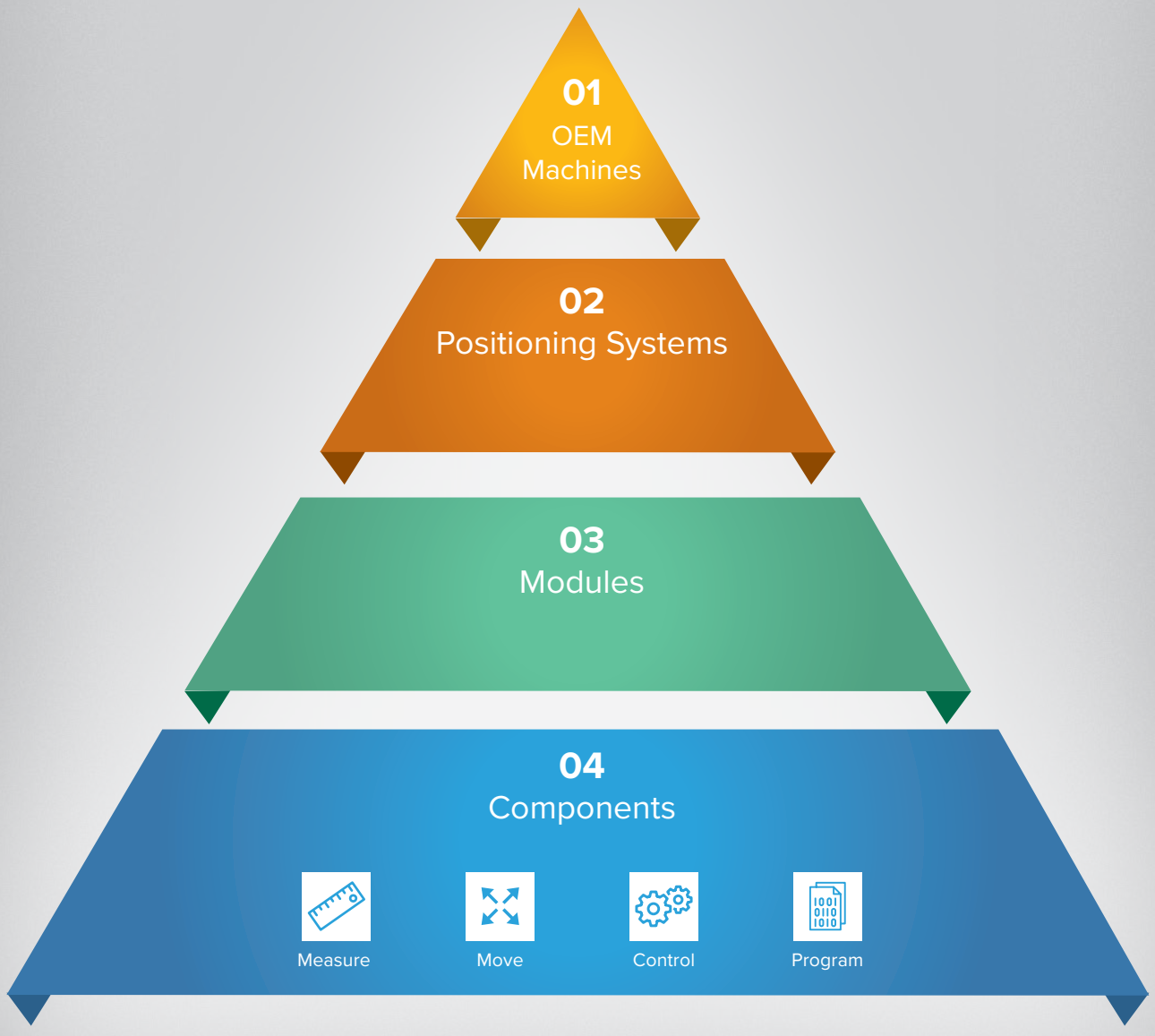
Product example
LM50

- PCB-based stator for optimum heat dissipation
- full flexibility in the selection of the overall length
- easy integration
- wear-free
- resistant against dirt and water

All from one source

From component to system.

ITK as a partner of complete systems for high-precision positioning tasks.
On the way to ever more accurate and flexible systems, we have continuously expanded and optimised our product portfolio. The result is impressive. But it can also be measured: We can achieve a position resolution of down to 5 nanometres at system level.



01

ITK OEM Machines

The reason for the production of our first magnetization system for coding scales fits into our history: Own demand! The development of the machine over 20 years ago was the birth of a new business field for ITK. Since then, the demand for solutions from OEM customers has increased year after year. We meet this demand with high-precision, high-performance systems – developed and approved in accordance with the Machinery Directive. Today, a team of experts from various disciplines at ITK implements special projects based on the pillars of „Positioning. Measure. Control. Move.“ are the cornerstones. Rotary and linear magnetization systems make up the largest share.

02

ITK Positioning Systems

Gantry and microscope stages form the foundation of all ITK positioning systems. Gantry tables are usually of classic gantry design and are used wherever relatively light workpieces and specimens have to be positioned with high precision and dynamically.
The same components are used in microscopy, but in a much more compact design. The latest microscope stages are equipped with five active axes to provide the best possible support for fully automated laboratory operation. Our product portfolio thus ranges from small dimensions under the microscope and samples in the gram range to four-square-metre scanning systems with up to eight active positioning axes.

03

ITK Modules

The modular design of all ITK systems is the basis of our flexibility.
Our assemblies are subdivided according to type of movement. The three main categories result in a wide range of linear stages, cross stages and rotary stages. In this context, the interaction with the ITK controllers developed in-house should be emphasised.
The control technology is our origin and the decisive factor in exploiting the full performance potential of the mechatronic assemblies.
Talk to us about how our in-house software and electronics development can implement your special requirements in a customised manner.

04

ITK Components (our foundation)

The basis for every ITK system are real-time capable multi-axis controllers for the high-precision control of stepper and linear motors. In addition, we offer you further components as stand-alone products (OEM variants).

Our own developments and in-house produced components include:

- Controllers (up to 6 axes)
- Position measuring systems according to the magneto-resistive principle (MR sensors and measuring scale)
- Ironless linear motors with patented ITK functional principle
- Software and motion algorithms

ITK stands for high-precision machines and assemblies for one to three dimensional movement.

With over 40 years of experience, all key components are developed and manufactured in-house.

We understand the interplay of mechanics, electronics and software to ensure sub-micron accuracy and nanometre resolution.

This expertise helps our customers build chips more reliably, develop vaccines faster, make sensors more accurate and accelerate the energy transition.

2026

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